



7th EFSMA - European Sports Medicine Congress

3rd Central European Congress of Physical Medicine and Rehabilitation
Annual Assembly of the German and the Austrian Society of Physical Medicine and Rehabilitation

Salzburg, 26th - 29th October 2011



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of Physical Medicine and Rehabilitation

Austrian Society of Physical Medicine and Rehabilitation

Salzburg, Austria
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Book of Abstracts



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Lectures & Oral Presentations

Lectures

001

A comparative study of ski and snowboard injuries

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Since ski season 1998/99 we have documented 33,351 ski injuries and 5,069 snowboard injuries. During this time frame the number of visitors in our ski resort has been over 10,000,000.

Observing the general slope population in our Ski Resort the vast majority were downhill skiers (86%), snowboarders representing 12%.

In this retrospective study 72% of injured snowboarders were male while in downhill ski males accounted for 53%. Age distribution showed that snowboarders were younger in comparison to skiers (average age for snowboarders was 25 years old compared to 35 years old for skiers).

The incidence of injury during these 13 consecutive seasons (1999–2011) was 2.51 per 1,000 downhill skiers and 5.29 per 1,000 snowboarders.

According to anatomy, alpine lower extremities ski injuries showed to be more common compared to upper extremities (66% versus 34%), however lower extremity injuries in snowboarding showed to be less common than upper extremities (33% versus 67%).

For both alpine ski and snowboard injuries the most common diagnosis was "contusion", being "contusion in upper extremities" the foremost diagnosis in the contusion category (30% for skiers and 39% for snowboarders).

After contusions, "Knee Ligament Injuries" represented the second most frequent diagnosis with an incidence of 22% of the total alpine ski injuries and 9% in snowboarding accidents. Generally speaking, the third most common diagnosis was "Contusion in Lower Extremities", representing 15% of the total diagnosis for each speciality.

"Contusions in Head/Face" in snowboarders were 13% versus 6% in skiers.

We observed the reverse numbers for "Trunk Contusions" (6% in snowboarders versus 13% in skiers).

"Skier's Thumb" represented 9% of total injuries in the ski group and 3% for snowboard.

"Wrist and Forearm Fractures" were seen in 6% of the snowboard and 2% in the skier groups.

Analyzing the specific diagnosis "ACL Injury" we observed it was more common in skiers while "Simple Knee Sprain" and "MCL Injury" were more prevalent in snowboarders.

Although "Extremity Fractures" is almost exclusive to skiers, "Wrist and Forearm Fractures" usually were observed in the snowboarding group.

Interestingly enough looking at "Shoulder Girdle Injuries" Gleno-Humeral Dislocations tended to be associated with Great-Tuberosity Fractures in alpine skiers, nevertheless, Acromio-Clavicular Dislocations tended to be more widespread in snowboarders.

Studying A-C Dislocation and Clavicle Fractures we observed that the proportion of incidence for both diagnosis was comparable between skiers and snowboarders.

The same was true for Skier's Thumb; although the injury totals are completely different, the degree of injury was corresponding between both groups.

When speaking of collisions snowboarders are most likely to collide against an object or another snowboarder. While skiers most commonly collide with other skiers.

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Advice after injury is like medicine after death! A multi-pronged approach to injury prevention in adolescents

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Objective: Injury prevention is vital to adolescents aiming to reap the physical, mental, and social benefits associated with a physically active lifestyle. Risk factors (RF) that increase the likelihood of adolescent musculoskeletal (MSK) injuries during sport and exercise include genetic anatomical abnormalities, obesity, low physical fitness, poor nutrition, and a lack of health education [1]. The aim of this study was to evaluate the effect of a multi-pronged injury prevention programme (IPP) on reducing injury RF in Emirati adolescents.

Material/Methods: One-hundred and ninety-seven adolescent males (age 14.0±0.2 yr) participated in the nine-month IPP at a weekday residential school in the United Arab Emirates. The IPP involved the synergy of three components: Physical Training, Screening, and Rehabilitation (PTRS); Nutrition and Dietetics (ND); and Health Education (HE). The PTRS entailed all participants completing a paediatric Gait, Arms, Legs, and Spine (pGALS; [2]) MSK screening examination. Abnormal cases attended specialist prehabilitation exercise classes which focussed on reducing the negative effects of the abnormality and facilitating the functionality of the condition. Participants completed anthropometric (i.e. body mass, stature) and physical performance (i.e. one-mile run; 1MR) screening. Body size data was used to classify participants into underweight, healthy weight, overweight, and obese categories taken from the World Health Organisation's BMI-for-age reference standards for boys [3]. Subjects participated in two progressive 45-minute physical training sessions per week and pre-IPP 1MR data was utilised to assign participants to an ability group suitable for their fitness level to minimise injury risk whilst maximising training efficacy. Heart rate monitors were used to record the duration and intensity of all training sessions, with daily feedback provided to the instructors to ensure that the sessions were appropriate for the ability group. The purpose of ND was to enhance the nutritional quality and balance the energy content of all food served to the participants. Weekly food menus were monitored using a nutritional analysis program and a traffic light food labelling system was implemented to educate the participants to make healthy food choices. Overweight and obese subjects attended weekly weight-management appointments with a registered dietician and received portion-controlled meals in a separate area of the restaurant. The objective of HE was to equip all participants with the knowledge to enhance their health and fitness whilst minimising the risk of injury. Participants received twenty 45-minute lessons and topics included: anatomy and physiology, principles of training, dehydration and heat stress, and the importance of balanced nutrition. Anthropometric and physical performance measures were repeated at the end of the nine-month study and health knowledge was assessed by questionnaire pre- and post-IPP.

Results: The pGALS MSK screening revealed that 57% of participants were classified with mild-to-severe pes planus and 6% with mild-to-moderate scoliosis. Proportion of overweight/obese participants decreased from 39% pre-IPP to 23% post-IPP and mean change (± SD) in body mass was -3.8 kg ± 4.7 kg for this group. Over 80% of participants decreased their 1MR time and mean improvement (± SD) was 01:23 ± 01:28 min:s (14% improvement). Self-reported fruit and vegetable consumption (>three portions/day) increased from 34% of participants pre-IPP to 50% post-IPP and health education also improved during the study (e.g. knowledge that a warm-up reduces injury increased from 33% of participants pre-IPP to 78% post-IPP).

Conclusion: The IPP was effective at reducing some of the RF associated with MSK injuries in adolescents. Tracking of anthropometric, physical performance, and injury prevalence data is vital for long-term injury prevention in adolescents, particularly for obese patients and cases with underlying MSK abnormalities.

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Epidemiology of snow sport injuries: The need of speaking the same language

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Epidemiology is the study of the frequency and determinants of trauma or disease. Epidemiologic studies describe the patterns of injury or disease, relate the patterns of injury occurrence to causative factors, gain insight into the ways of decreasing injury or disease and also have important applications in determining the effectiveness of the treatment of the injured athlete.

Ski injury research combines epidemiology and clinical medicine to:

- analyze the frequency and determinants of injuries sustained by athletes,
- to alter patterns of participation which contributes to injury and
- to prevent injuries.

but requires knowledge of epidemiological techniques.

There are many methods to evaluate problems in skiing injuries and skiing safety:

- Observational studies (case studies, case series, case control studies, cohort studies)
- Experimental Studies (randomized or non randomized clinical trials)

Ski injury researchers mostly use case control studies, analyzed with multivariate logistic regression, to investigate the injury incidence and the risk factors for injury and randomized clinical trials to determine the effectiveness of the new equipment. They use also the two Major Indexes for calculating the ski injury rates: IPTSD (injuries per thousand skier days) and MDBI (mean days between injuries).

Problems with ski injury epidemiology make comparisons between studies difficult. There are many variations in:

- injury definition
- methods of quantifying the at risk population
- measuring exposure to risk (skier days)
- site where data obtained (ski area clinic – hospital)
- bypass effect – not all injured skiers report to the ski patrol or clinics near the ski area

so there are too many questions that have to be answered.

Future studies must focus on speaking the same language and effectively eliminate biases or, otherwise, we will continue to flounder in our efforts to determine the best method to reduce the risk of ski injuries or treat injured skiers.

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Exercise prescription principles and outpatient rehabilitation for cancer patients

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Objective: This presentation aims to describe the outpatient cancer rehabilitation concept of the outpatient clinic for oncologic rehabilitation of the Department of PM&R (Medical University of Vienna), and to give exercise prescriptions.

Material/Methods: The outpatient rehabilitation concept is presented, including own experiences in exercise interventions and exercise prescription principles.

Results: Individual tailored rehabilitation plans include medical exercise programs, neuromuscular electrical stimulation (as an passive option to exercise), nutrition, lymph massage, breathing therapy, physiotherapy, occupational therapy, breathing therapy, different forms of massage, electrotherapy, and other physical modalities, but also biofeedback and drug treatment for pain. Since 2011, we discuss challenging and complex cases of cancer patients within the worldwide first official tumour board for cancer rehabilitation in an acute hospital.

One of the most important functional deficits of cancer patients is decreased physical performance (endurance capacity, muscular strength) with impaired activities and participation. Physical activity and regular exercise have been shown to increase physical performance and quality of life of cancer patients. Furthermore, regular moderate physical activity has been described to be preventive against cancer – but also to increase cancer-specific and overall survival in some cancer types.

In our outpatient clinic, patients suffering from metastatic bone disease perform aerobic exercise and reach excellent endurance capacities up to 150%. Furthermore, cancer patients suffering from metastatic brain disease and “multimorbid” cancer patients with peripheral vascular diseases with amputations and after several myocardial infarctions (who normally are not allowed to exercise) are exercising under supervision. Patients during very effective (but very cardio toxic) oncologic treatment modalities are also able to reach excellent endurance capacities. Furthermore, many cancer patients are performing active exercise to increase muscular strength, also those with metastatic bone disease. It has to be mentioned, that all are exercising under supervision of specialized physicians, but also with the “back-up” of a central hospital (Department of Emergency Medicine). This setting seems to be very important in cases of high-risk patients! In all cases of patients who are included in exercise programs, it is very important to have up-to-date knowledge about cancer, cancer treatment, and cancer complications – and of co-morbidities (such as cardiovascular diseases) and of medication of these patients, and an interdisciplinary (oncologist, cardiologist, dietologist,...) approach is very important. Medical history and clinical examination, different laboratory parameters, ECG, echocardiograph findings, exercise testing, spirometry, radiographic findings and bone scans are needed for planning individual exercise programs.

For those patients who are not able or not allowed to perform active exercise neuromuscular electrical stimulation to prevent loss of muscle mass and/or to increase endurance capacity is presented.

Conclusion: Regular physical activity and exercise improve functional health of cancer patients by influencing structures, activities, and participation. Nevertheless, the setting in which it is performed determines the inclusion or exclusion criteria in exercise programs for cancer patients.

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Medical Rehabilitation in the Acute Hospital

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Starting rehabilitation very early for people following the onset of a neurological health condition has the potential to provide specialist medical interventions during an acute hospital admissions and has been developed in response to the need for hospitals to reduce inpatient stays in acute beds. But, is there more to early rehabilitation than just timing? The point of entry is defined as when “the priority of care has moved from the definitive acute treatment to one of rehabilitation” and it is at this time that the rehabilitation specialist takes the lead for clinical care. In reality, once definitive care or resuscitation has taken place, a patient’s inpatient stay in hospital is primarily for rehabilitation and dedicating facilities, including beds, for this purpose will bear fruit to meet healthcare priorities.

Early rehabilitation describes rehabilitation interventions within the first month of a hospital admission following a disabling health condition. Its value is set out in a paper, which was recently published [1] and this presentation will describe an evidence based care pathway and the results of a study in which the outcomes of brain injured patients were improved by interventions in the intensive care unit. It will also describe the categories of suitable patients within the definition of early rehabilitation.

Below are some examples of how it may be delivered.

- i. Transfer of patients to specialist beds in the acute hospital;
- ii. Establishment of mobile rehabilitation teams while the patient remains in the referring specialist’s bed;
- iii. Daily visits to the acute wards by specialists from a stand-alone rehabilitation facility;
- iv. Establishment of rehabilitation centres to take patients in the very short term.

The presentation will discuss the advantages and limitations of the various options, but will look specifically at the clinical pathways being developed in Stoke on Trent.

Establishment	Activity	Advantages	Limitations
PRM Beds in Acute Hospital (≡ <i>Acute inpatient specialised team</i>)	Transfer of patients to PRM beds within acute hospital	Rapid change to PRM clinical activity Early rehabilitation principles under the charge of a trained specialist in PRM Capitalise on the expertise, time and resource of PRM team Requires adequate number of dedicated staff	Limited numbers of beds and, therefore, of patients taken Potential for bed-blocking – need to wait to transfer patients out to either home or rehabilitation facility Need to protect against transfer of inappropriate patients Difficulties if staff numbers inadequate
Mobile PRM Team (≡ <i>acute PRM liaison team</i>)	A PRM team working solely within acute hospital visits patients under care of other specialists	Possible to consult on larger numbers of patients with wider range of conditions Good liaison between team & staff on acute wards	No clinical control - patients under care of other specialists Treating nurses and therapists not within PRM team Least specialised format for acute PRM Does not often address participation issues
PRM Consultation to Acute Wards	A PRM specialist from stand-alone PRM centre visits patients under care of other specialists	Possible to consult on larger numbers of patients with wider range of conditions Closer links between PRM and acute specialists	No clinical control - patients under care of other specialists Treating nurses and therapists not within PRM team Time and expense to be effective; need to be on site

Acute PRM Centre	Rapid transfer of patients to fast-track facility in stand alone PRM Centre	Patient exposed to the total PRM team and facilities at an early stage PRM specialist competence in treating acute conditions	Patients must be medically stable Patients may be transferred back in case of deterioration Little contact between PRM team and acute specialists Little or no service for patients not transferred
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Table 1

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006

Motor recovery after stroke and traumatic brain injury, an outcome analysis of 120 patients in acute rehabilitation

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Patients who have sustained major traumatic brain injury or stroke are transferred for acute rehabilitation to the "Zentrum für Rehabilitationsmedizin Hamburg (ZRH)" at the Workmen's Compensation Hospital in Hamburg. At the time of transferral some patients are still ventilator-dependent, severely cognitive impaired. At the ZRH specific outcome assessments (e. g. Functional Independence Measurement, Acute Rehabilitation Barthel Index) are routinely evaluated at regular intervals. We like to demonstrate data of 120 patients who were treated at our interdisciplinary rehab unit from 01/2009 to 06/2011. Apart from mere statistical data like the duration of stay, mortality or different forms of discharge, we bring the focus on the achieved motor recovery and the recovery of cognitive functions.

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Muscle strength in cancer patients – A general survey and the specifics of patients suffering from Glioblastoma

Mohammad Keilani

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Objective: Cancer and its treatment are associated with substantial side effects, including muscular atrophy. Decreases of muscular strength have profound effects on functional outcomes.

Material/Methods: This invited presentation focuses on two aspects of strength testing in cancer patients:

1. Assessment of muscular strength of thigh muscles in typical male cancers (by using Biodex 3©-dynamometer)
2. Handgrip strength and strength of thigh muscles in patients with Glioblastoma (by using Jamar© and Biodex 3©-dynamometer)

Results:

1. Strength of thigh muscles in typical male cancer: 55 male carcinoma patients ($64 \pm 8a$, range 46-77a), 38 patients with localized prostate cancer, and 17 with localized head and neck cancer were included. Significant higher values for peak torque of the knee extensor ($p=0.033$) and flexor ($p=0.049$) muscles have been shown for prostate cancer patients. These results indicate that (significant older) prostate cancer patients can show higher values for muscular strength than younger head and neck cancer patients. Their impairment of physical performance may also be related to malnutrition (due to alcohol- and tobacco abuse, dysphagia or xerostomia).
2. Muscular strength during treatment of Glioblastoma (GBM): In GBM-patients, neuromuscular dysfunction caused by GBM itself and corticoid treatment, both lead to a decrease in muscular strength. Strength testing was performed in 23 patients ($55 \pm 11a$, BMI= 26 ± 3 kg/m²) at baseline and follow up after 15(± 9) weeks. 18 patients started with physiotherapy program after baseline testing. 2 patients reported regular home based physical activity. 3 patients reported no regular physical activity. Handgrip strength of right/left hand measured $79 \pm 45/68 \pm 46$ lbs. Handgrip strength of right/left hand decreased by 5 % (± 31 , lbs)/ 8% (± 49 , lbs). Peak torque/weight (PT) of right knee extensors measured 166 ± 47 Nm/kg; PT of left knee extensors were 149 ± 59 Nm/kg. PT of right knee flexors measured 79 ± 34 Nm/kg, PT of left knee flexors were 79 ± 45 Nm/kg. At follow up isokinetic strength of knee extension/flexion decreased: extension of right knee: mean = -4% (± 16 , Nm/kg), extension of left knee: mean = -10% (± 20 , Nm/kg), flexion of right knee: mean = -1% (± 38 , Nm/kg), flexion of left knee: mean = -10% (± 29 , Nm/kg). Some of the patients, who performed physiotherapy or reported home based regular exercise ($n=20$) were able to increase muscular strength, while muscular strength of all patients who did not perform exercise ($n=3$) decreased at follow up.

The results of this pilot study especially showed notable deficits in muscular strength of thigh muscles of GBM-patients. Furthermore, at follow up strength of thigh muscles and of handgrip decreased, which shows the impact on clinical course of GBM on muscular strength. Some patients were able to increase their muscular strength in general after performing exercise, while muscular strength of all patients who did no regular exercise during survival time decreased at follow up. This indicates that regular exercise in combination with oncological therapies can improve muscular strength of certain GBM-patients.

Conclusion: A decrease of muscular strength of cancer patients is typically for the course of most cancer entities. Furthermore, necessary cancer treatment modalities often affect skeletal muscle, in terms of muscular strength and sensorimotor functions. Therefore, adequate nutrition and active and passive exercise options should be initiated as soon as possible.

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Osteoporosis – prevention of falls

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Fractures often are caused by a fall. It's mostly the elderly who fall because postural strategies change with increasing age. About 30% of the elderly – above the age of 65 – fall at least once a year. With increasing age this ratio further increases. Ninety percent of the hip fractures are induced by a fall. However, falls do not only break bones but self-confidence as well. About half of all fallers are afraid of falling again and about one quarter of them restrict their daily activities because of this fear.

Most falls experienced by elderly people result from multiple aetiological factors. However, about 15% of falls are caused by a single identifiable endogenous factor like medical problems or impairments in strength, endurance, balance or gait. Another 15% of falls are caused by an environmental factor such as door sills, stairs, poor lightening.

The effectiveness of different interventions for preventing falls in older people living in the community is summarized in a Cochrane-Review. Multiple-component group exercises reduce the risk of falling, individually prescribed multiple-component home-based exercise is even more effective and Tai Chi reduces the risk of falling by 35%. A multifactorial intervention as well as the withdrawal of psychotropic drugs, both reduce the rate of falling. The supplementation of vitamin D is only effective in persons with a very low serum level and home safety interventions in persons with especially high risk of falling. The rate of falls may also be reduced by the withdrawal of psychotropic drugs, and if necessary a pacemaker or eye cataract surgery. There is some evidence that fall prevention strategies can be cost saving. Sometimes hip protectors are recommended to reduce the risk of a hip fracture in the course of a sideways fall. However, the compliance is not very high and study results are diverse.

Of course, identifying persons with a high risk of falling is important. A rough screening is possible by asking the patient if he/she had fallen within the last year. In the case of difficulties with gait or balance further evaluation is necessary.

Depending on the individual problems parts of the multifactorial interventions described above may help reducing the person's risk of falling.

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People with Disabilities in Europe

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The World Health Organisation launched its World Disability Report on 9th June 2011 at the UN Building in New York. It was hard-hitting and confirmed the views that, with 1 billion people in the world experiencing a disability, the needs of people with disabilities was no longer a marginal issue. It is a large document and highlights the lack of access to specialist medical rehabilitation. While establishing community based rehabilitation across the world is a priority, communities in North America and Europe still need to develop, as shown in the UN Charter on People with Disabilities (2007) and in the European Year of People with Disabilities (2009). As Physical & Rehabilitation Medicine differs from country to country across Europe, its response to public health issues for people with disabilities also differs and this is not helped by the patchy response to access to specialist medical rehabilitation. While disability issues in the developed world may be perceived to be more about human rights than health interventions, there is good evidence that people with disabilities get assessed when they have the active involvement of health professionals.

The situation for people with disabilities in Europe as a region is indeed more about ensuring that their rights are defended and promoted. Equal opportunities are essential to allow full participation and the Council of Europe, the European Disability Forum and the Assembly of European Regions espouse this. However, the role of health professionals should not be underestimated in ensuring that people with disabilities function as well as possible and have access to both specialist rehabilitation and to up-to-date technologies to allow their participation. Rehabilitation is, therefore, important, but as important is the emphasis on taking an active role on sport and other activities that the able-bodied in society take for granted. The UEMS Section of PRM and the Multi-Joint Committee on Sports Medicine are working hard at getting over the relevant ideas and this presentation will cover some of them. The recent Royal College of Physicians of London report "Rehabilitation Medicine 2011 and Beyond, which was launched in November 2010 described a template for the delivery of specialist medical rehabilitation services, but also focuses on their funding, albeit in an English healthcare system environment.

This presentation will look at a number of initiatives that could be presented to European governments to allow them to address some of the report's recommendations at a reasonable cost and with relative ease. This would perhaps be a starting point from a European perspective.

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010

Physical activity requirements in older adults

Yvonne Landkammer

SALK, Salzburg, Austria

In almost every country all over the world, the proportion of people aged over 60 years is growing faster than any other age group. To stay healthy until advanced life decade, being physical active plays an important role. What kind of motivation is responsible for being physical active? Are strength, endurance and balance trainable right up until old age to avoid or prevent age related problems and diseases? Which test modalities can be used to determine physical fitness in older adults? The oral presentation should give an overview of current studies and their conclusions concerning Dose-Response-Relation, the correlation between physical activity and morbidity, cardiorespiratory, metabolic, musculoskeletal and functional health.

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Physical treatment – what is possible?

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Medical interventions focus on causation and disease processes, while rehabilitation, including most elements of physical therapy, is concerned with the consequences of disease. Its goals are to reduce symptoms, improve function and minimize disability.

With occurrence of joint destructions of individual joints the diagnosis of anatomic and functional deficits (ROM, strength, stability) guides rehabilitative or surgical management. It is important to identify the stage of tissue injury and repair before beginning a treatment program: Treatment of inflammation, pain, structure defect, mobilization, strengthening, functional restoration.

The base of an therapeutically program is the differentiated anamnesis: The investigation focussed on tissue structure, pain, mobility and muscle function. Regional findings are the dominant base. For the local physical therapy we need the actual situation of the topical structure to form a therapeutically aim. The defined therapeutic remedy (effects, parameters, indications) offered a functional therapy. The interaction between patient and therapist is a dynamic system with the aim: normalizing the dysfunction. Physical therapy so as kinesiotherapy, mechanotherapy and thermotherapy is realized by a lot of technical modalities with different evidence.

Central to musculoskeletal function are joint and muscle biomechanics and neuromuscular functioning. This section illustrates joint mobilization and immobilization techniques, techniques to increase muscle strength, endurance and neuromuscular functioning. Modalities help to improve musculoskeletal functioning by reducing pain and inflammation, stimulate reparative processes and regulate muscle tone. Complex modern exercise programs included static and dynamic exercises, flexibility training, physical fitness.

Supported therapeutic remedies are: therapeutic heat and cold, massage and electrotherapy. Braces and taping are external devices, that aid simple or complex body functions.

A growing number of scientific and clinical studies have shown more or less evidence for the efficacy and effectiveness of many interventions in sports medicine. Appropriate instruments to measure improvement processes and outcomes are available and are being used more and more in research and clinical practice. The development of the scientific base is necessary.

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Prevention of lower limb injuries in the military

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Objective: Lower limb injuries represent a significant health issue within all military forces in both peacetime and combat situations. The aim of this paper is to review evidence based injury prevention strategies and how effective and realistic their implementation could be.

Material/Methods: Injury prevention recommendations can take the generalized form that encompass a whole military or alternatively relate to specific scenarios. The first step is an appropriate audit of not only the type and severity of an injury but also the mechanism and circumstances in which the injury occurred. This was the procedure adapted in a regional military sports medicine clinic. Data collected over a year was categorised utilizing the OSICS 10.1 [1].

Results: A high incidence of lower limb injuries was noted with a prevalence of ankle and knee injuries. Most occurred during physical training and sporting activity but an unexpected significant proportion also occurred due to motor vehicle accidents. Review of the current scientific evidence on the prevention of injuries during military training led to a number of general recommendations that could be implemented in any military base, but the audit findings also allowed a more specific approach. Hence, changes advised ranged from physical training structure, body weight management and hydration strategies to road safety education.

Conclusion: Most lower limb injuries are preventable. Recognising this and implementing the appropriate preventative strategies, some of them quite simple to undertake, can lead to a remarkable reduction in injury incidence.

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Prevention of sports injuries including neuromuscular training

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Sports and recreation injuries constitute a major public health burden. The most common sports injuries are sprains, dislocations, and ligament ruptures occurring at the ankle and knee as well as at the hand, elbow, and shoulder. Particularly, severe injuries such as anterior cruciate ligament (ACL) ruptures or ankle sprains are often associated with increased morbidity (e.g. early development of joint osteoarthritis) and long-term disability. Therefore, measures to prevent and treat these injuries are of particular interest. On the basis of previous research, it is hypothesized that proprioceptive and neuromuscular abilities in particular have a certain impact on injury risk. Furthermore, sport-related joint injuries tend to result in severe and long-term alterations in proprioceptive and neuromuscular functions that can further increase the risk of persisting functional deficits and recurrent injury. Exercise-based prevention programs are thus based on the assumption that modifying proprioception and neuromuscular risk factors might help to decrease injury risk. The aim of my presentation will be first to review the current evidence on specific exercise programs aimed at improving proprioception and neuromuscular function to reduce the incidence of acute sports injuries (e.g. [1]). Furthermore, I will review the effectiveness of neuromuscular rehabilitation programs to prevent injury recurrence (e.g. [2]). The evidence demonstrates that neuromuscular training can reduce the risk of knee and ankle injuries during pivoting sports by at least 32%. There is insufficient evidence to draw conclusions on the effectiveness of interventions used to prevent hamstring, groin or upper extremity injuries. Concerning secondary prevention, it can be concluded that neuromuscular interventions can be effective for the prevention of recurrent ankle sprains.

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Rheumatoid arthritis – fatigue

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Rheumatoid arthritis (RA) is the most common chronic inflammatory disease affecting about 1% of the population, it is characterised by joint swelling, joint tenderness and joint destruction, leading to severe disability and premature mortality.

Gradual destruction of the joints and surrounding tissues leads to functional impairments, to decreased ROM, loss of muscle strength and endurance, to altered movement patterns and deficits in cardio-pulmonary capacity. RA has a major effect on perceived health. Patients do not only suffer of pain, but also of lack of energy and drive – fatigue – sleep disturbances, and depressive mood. Fatigue is really common in RA-patients, it is their most important symptom after pain. However, there has not been paid much attention to fatigue. The 2010 American College of Rheumatology (ACR)/European League Against Rheumatism (EULAR) classification criteria for RA include joint involvement, serology, and duration of symptoms, but not fatigue. However, the ACR/EULAR provisional definitions of remission in RA published this year indirectly include the sensation of fatigue; the fact that fatigue was not assessed in most trials published over the last decade is criticised.

Evidence on the causality of fatigue in RA is conflicting but a model which suggests interactions between three factors has been proposed: 1. disease process, 2. thoughts, feelings, and behaviours, and 3. personal life issues. RA factors that might drive fatigue include deconditioning and actual or perceived increased muscle effort resulting from joint damage and disability. Anaemia, medication, and sleep disturbances may be involved in the causality of fatigue. Beliefs that RA has serious consequences as well as low mood predict future RA fatigue. Of course, personal factors like the ability or inability to work, the presence or absence of social support, and potential comorbidities also potentially influence RA fatigue.

As treatment options for fatigue the cognitive behaviour therapy as well as therapeutic exercise have been proposed. They are supposed to decrease pain and fatigue.

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Sports and amputees

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Objective: This presentation aims to give an overview about the rehabilitation procedure after an amputation leading back into sportive activity and to highlight the different needs of the sportsmen and possible challenges to the interdisciplinary rehabilitation team.

Material/Methods: After intensive literature research the results are presented in a structured overview.

Conclusion: Rehabilitation starts at the day of the amputation. Amputation level determines the extent of impairment and the possible prosthetic supply. Early exercises minimise contractures, oedema, muscle loss and dysbalance. A regularly training program facilitates familiarization with the new artificial limb, walking with or without prosthetic device and the activities of daily living. Finding the optimal type of amputee sport will require some time and professional help. Most common sports for amputees are alpine and nordic skiing, athletics, cycling, swimming, sailing, volleyball, tennis, and table tennis, each of them requiring a different kind of prosthetic device and special training. Amputee sports can create a new quality of life for people who have been active all life long and suffer from an extensive trauma.

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“State of the art” and history of pre-participation screening in Europe*Fabio Pigozzi**University of Rome "Foro Italico", Rome, Italy*

Sports medicine is a multidisciplinary clinical science that deals with the medical care of exercising people which includes diagnosis, treatment, prevention and rehabilitation of injuries or illness related to participation in sport. Thus, sports medicine embraces different areas of interest with particular regard for cardiology, orthopaedics, traumatology and internal medicine. Moreover, sports medicine gives a significant contribution in the area of prevention, not only of the sport-related accidents (musculoskeletal injuries, acute cardiac events and sudden cardiac death) but also of the chronic disorders caused by the sedentary life style of the contemporary time. Over the last five decades the need for sports medicine among European countries has been growing and pre-participation screening (PPS) programs has been implemented in many countries. Italy has been the first one to introduce a national health care program for athletes. According to the current Italian legislation, competitive athletes must undergo a yearly PPS including clinical evaluation (medical history and physical examination), 12 – lead ECG, urine analysis and pulmonary function test, to obtain a medical certification for sports eligibility. This kind of screening allow to detect some acute or chronic conditions that may cause of temporary or permanent disqualification from training and competition. Even if a broad spectrum of disease involving all organs and apparatus would be recognized, the leading causes of athletes’ disqualification are represented by cardiovascular abnormalities which may represent a risk for sudden cardiac death (SCD), the most of which may be identify on this kind of screening. In 2005 the European Society of Cardiology (ESC) assessed a consensus statement for a common European protocol for the cardiovascular pre-participation screening of young competitive athletes for prevention of SCD. The ESC document stated that an effective cardiovascular screening must include a complete personal and family history, physical examination and 12-lead ECG, according to the Italian model, also following “The Lausanne Recommendation” issued by the International Olympic Committee (IOC) in 2004. The ESC proposal mainly derives from the observation of the long-standing experience of Italy where this screening modality for competitive athletes has been implementing since 1982 and has shown to be really effective by reducing of 90% the incidence of sports-related SCD. The screening protocol proposed by the ESC differs from that recommended by the American Heart Association (AHA) and currently applied in the U.S.A., based only on medical history and physical examination but not on 12-lead ECG that is considered a not cost-effective test in a large population of athletes due to its low specificity. In its document the ESC stated that the screening recommended by the AHA has a “limited power to detect potentially lethal cardiovascular abnormalities in young athletes” and that “the addition of 12-lead ECG has the potential to enhance the sensitivity of the screening process for detection of cardiovascular disease with risk of sudden death”. The recently published recommendations for the correct interpretation of the 12-lead ECG in athletes by the ESC group (2010) would result in increasing the ECG specificity (principally by distinguishing the physiological training-related ECG patterns from the potentially pathological, training-unrelated ECG abnormalities) as well as in lowering the global costs of the screening by reducing useless additional cardiac tests.

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“Teenie Workout” as a special training programme for CF children – a case description

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Objective: Cystic fibrosis (CF) is one of the most common autosomal recessive hereditary diseases (incidence ca. 1:2500). The positive effects of sport training programmes have been scientifically demonstrated in respect of lung function, general physical fitness and quality of life. We want to report on our experience with a 14-year-old boy with CF, who was the first patient to join our training programme for children and adolescents (“Teenie Workout”). This is a report on the results one year after starting the training programme.

Material/Methods: The “Teenie Workout” was developed in response to a request from the Department for Paediatrics and Adolescent Medicine (CF Outpatients Department, General Hospital of Vienna) to offer new training methods for children and adolescents from 10–18 years of age. The rehabilitation measures offered at the paediatric clinic were developed for younger patients and it was seen that children and adolescents older than 10 years of age did not feel it was fully appropriate for them. This led to lack of compliance in training among this patient group, which is at a particularly vulnerable stage of life in both a physical and psychological sense (puberty). The “Teenie Workout” seeks to meet the needs of this age group by using specific training elements, including hip-hop, Thai boxing, circuit training, step aerobic and dance. Case report: Out of the group of patients, a 14 year-old boy who was in very good general condition in light of his disease and had an active sporting life was selected for the case study.

Results: By means of the “Teenie Workout”, it was possible to achieve a clear improvement of performance capacity, body posture and three domains in the SF-36 for the patient described, with excellent compliance.

Conclusion: The “Teenie Workout” is an attractive supplement to the existing range of training on offer for children and adolescents aged 10–18, as it incorporates age-appropriate elements. The opportunity to contribute creatively to the design of the programme additionally promotes the patient's sense of responsibility for himself and joy in movement, thus enhancing compliance and the success of the therapy.

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The Significance of Physical Training for the Primary and Secondary Prevention of Back Pain

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Physical training and biopsychosocial education constitute central elements in primary and secondary prevention of back pain. Because of the high lifetime prevalence of back pain, both approaches primarily aim to prevent the occurrence of recurrent back pain and the chronification of the condition (Lühmann et al. 2007).

Systematic reviews have shown evidence of the preventive effectiveness of physical training. The occurrence and duration of recurrent back pain and back pain induced work absenteeism is successfully addressed (Bigos et al. 2009, Linton & van Tulder 2001, Vuori, 2001). With regard to acute back pain, physical training makes no difference compared to applying any other conservative approach or even no treatment. In view of subacute back pain, there is evidence that graded-activity- programs are effective in reducing times absent from work. Concerning chronic back pain, physical training is slightly more effective than other conservative treatments. That holds true for reductions in pain and improvements in functional impairments in both the short and long-term (Hayden et al. 2005). Effects are small to moderate. So far, it is not proven that there is a predominant type of physical training regarding its comparative effectiveness. Further, the optimal mode of training (duration, frequency, intensity, progression and mode of delivery) for achieving preventive effects is not yet clarified by existing primary studies.

Systematic reviews have demonstrated that biopsychosocial education, applied as the only intervention, does not bring about primary and secondary preventive effects with reference to recurrent back pain and back pain induced work absenteeism (Bigos et al. 2009, van Poppel et al. 2004). In contrast, there is strong evidence that an intensive individual education leads to reduction of pain episodes and return to work in acute and subacute back pain. Regarding chronic back pain, the current state of research is unclear. Moreover, the predominance of a specific type of educational intervention is not proven (Engers et al. 2010). In general, combining physical training and biopsychosocial education appears to be most effective in the prevention of recurrent and chronic back pain (Airaksinen et al. 2006). However, only a few studies on that issue do exist. Therefore, the ideal approach of combining biopsychosocial education, cognitive-behavioral and movement-related strategies and modes of delivery is not yet determined. There is a lack of high-quality studies which encompass a homogeneous sample and investigate specific dose-response relationships, underlying mechanisms, differential effects and the cost-effectiveness related to interventions comprising behavioral and movement-related approaches in the prevention of back pain.

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Treatment of diving-accidents with oxygen under hyperbaric conditions (HBO)

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Introduction: Although diving-accidents may occur during all phases of a dive (descent, isobaric stage, ascent) the main course of accidents is during ascent due to the development of nitrogen bubbles (DCS) or arterial embolization of air (AGE). As DCS and AGE have very similar symptoms, summarized as decompression sickness (DCI). The incidence of non-fatal diving accidents is very low (1/10.000); therefore, they are far from being routine in emergency medicine – especially in “non-diving” countries. Therefore, the main symptoms and treatment will be presented.

Symptoms of DCI: The most common mild symptoms are skin bends, rashes, mottling, itching and lymphatic swelling (DCI I). More severe symptoms include nervous system involvement, pulmonary symptoms and circulatory problems such as hypovolaemic shock (DCI II).

Symptoms	Frequency
local joint pain	89%
arm symptoms	70%
leg symptoms	30%
dizziness	5.3%
paralysis	2.3%
shortness of breath	1.6%
extreme fatigue	1.3%
collapse/unconsciousness	0.5%

Table 1: Symptoms by frequency

Time to onset	Percentage of cases
within 1 hour	42%
within 3 hours	60%
within 8 hours	83%
within 24 hours	98%
within 48 hours	100%

Table 2: Onset of DCS symptoms

Treatment of DCI: Regardless whether the patient suffers from AGE or DCS apart from adequate intravenous hydration, oxygen is the only medication with a proven effect in the treatment of diving accidents. After typical diving accidents, oxygen administration at an inspired concentration (FiO_2 1.0) as high as possible is recommended. All patients suspected for DCI should be transferred to a hyperbaric chamber – even if they suffer only from mild symptoms – as DCI I may develop to DCI II within a few hours. Moreover it is important to transfer the buddy of the injured diver as well (as they have performed the same diving profile and may also get symptomatic). Treatment at a hyperbaric chamber follow predefined treatment tables according to the symptoms of the patient (Figure 1).

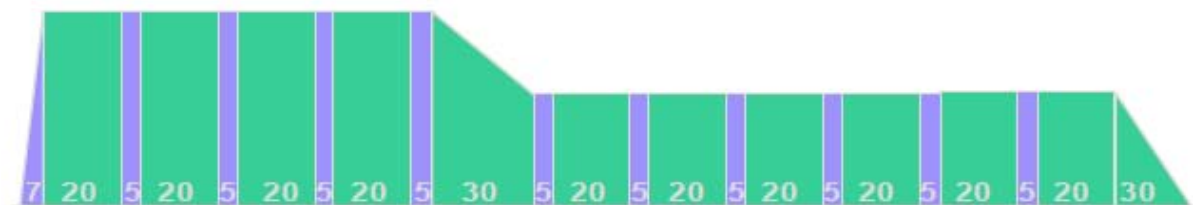


Figure 1: Modified US-Navy table 6 (at 2.8 bar and 1.9 bar)

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A: Rehabilitation in Sports I

020

Effect of preprosthetic training protocol on standing balance and hop-skip ambulation among below and above knee amputees

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Objective: This study determined the effect of preprosthetic training on standing balance and hop-skip ambulation of below and above knee amputees. It further determined the standing balance and hop-skip ambulation scores of amputees before and after the preprosthetic training, and significant difference on standing balance and hop-skip ambulation scores before and after the preprosthetic training.

Material/Methods: This study utilized a quasi-experimental design of research. Twenty-three amputees completed the training which consisted of range of motion exercises for about 10 repetitions; strengthening exercises for the upper extremities for about 10 repetitions; strengthening exercises for the lower extremities for about 10 repetitions; standing balance and coordination exercises as tolerated by the patient. The training was administered three times a week for eight weeks or about two months. Likert scale was used to score standing balance and hop-skip ambulation before and after two months of pre-prosthetic training. Paired t-test was used to determine the significant difference on standing balance and hop-skip ambulation scores before and after the preprosthetic training at 5% level of significance.

Results: There is an increase in the mean score on standing balance of below and above knee amputees after they have undergone pre-prosthetic training (Table 1). Strength training such as sitting push-ups and progressive resistive exercises produce substantial increases in the strength, mass, power and quality of skeletal muscle and this can increase endurance performance thereby improving the standing balance of below and above-knee amputees.

	Mean	Standard deviation
Before Preprosthetic Training	2.64	1.03
After Preprosthetic Training	3	0.6

Table 1: Mean Score on the Standing Balance of amputees before and after training

The mean score on the hop skip ambulation of amputees before and after pre-prosthetic training in Table 2 shows evidence that there is an increase in the score from 2.13 to 2.77 signifying that there is improvement on the mobility of the amputees.

	Mean	Standard deviation
Before Preprosthetic Training	2.13	0.94
After Preprosthetic Training	3	0.42

Table 2: Mean Score on the Hop-Skip Ambulation of amputees before and after training

The p value of .02 which is less than .05 means that the increase in the mean score of amputees before and after training is significant thus resulting to the rejection of null hypothesis (Table 3).

T stat	P value	Decision	Interpretation
-2.59	0.02*	Reject null hypothesis	Significant difference

*computed at 5% level of significance

Table 3: Statistical Analysis on the Standing Balance Score of amputees before and after training

The data on the statistical analysis on the standing balance score of amputees before and after training in Table 4 shows a p value of .00018 which is very much less than .05 signifying that the increment on the standing balance score before and after the application of therapeutic maneuvers is significant.

T stat	P value	Decision	Interpretation
	0	Reject the Null Hypothesis	Significant Difference

computed at 5% level of significance

Table 4: Statistical Analysis on the Hop-Skip Ambulation Score of Amputees before and after Pre-prosthetic Training

Conclusion: The pre-prosthetic training is effective in improving the standing balance and hop-skip ambulation of below and above knee amputees.

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Isokinetic evaluation of the extensors and flexors muscles of the knee joint in elite track and field Athletes

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Objective: The isokinetic systems are used for the evaluation and rehabilitation of the musculoskeletal system, by measuring and comparing strength and performance [1]. The isokinetic measurement and evaluation of the extensors and flexors of the knee joint contributes to prevention and rehabilitation of injuries in sprinters [2].

In the present study, our aim was to measure and evaluate the strength of the extensors and flexors of the knee joint with the help of an isokinetic system. Secondly, our objective was to compare the extensors/flexors ratio at the dominant and non-dominant leg in elite track and field athletes.

Material/Methods: Ten elite track and field athletes (male, mean age $23,5 \pm 1,77$) participated in our study. They were all runners as well as members of the Greek national team. No one suffered an injury either in the knee joint or at the flexors or extensors muscles, for the past 2 years.

Our protocol included isokinetic measurement and evaluation of the strength of the flexors and the extensors muscles of the knee joint at two angular velocities:

- i) High angular velocity of $210^\circ/\text{sec}$
- ii) Low angular velocity of $60^\circ/\text{sec}$,

followed by comparison between the dominant and non-dominant side. In addition, we recorded the flexors/extensors knee joint muscles ratio.

Results: The average percentage of flexor / extensor knee joint muscles ratio at a high speed of $210^\circ/\text{sec}$ was $86.30 \pm 9.04\%$ at the dominant side and $78.45 \pm 12.24\%$ at the non-dominant. The average percentage ratio at low speed of $60^\circ/\text{sec}$ was $78.30 \pm 2.35\%$ at the dominant leg and $76.30 \pm 5.90\%$ at the residual lower limb. The difference between the dominant and non-dominant side at low speed of $60^\circ/\text{sec}$ was $3.6 \pm 2.37\%$ for the extensors and $5.8 \pm 5.05\%$ for the flexors.

Conclusion: According to our results, the elite track and field runners demonstrated flexor / extensor knee joint muscles ratio significantly greater than 60% [$78.30 \pm 2.35\%$ and the dominant side and $76.30 \pm 5.90\%$ at the non-dominant leg] [3]. Moreover, the mean percentage difference between the dominant leg and the residual lower limb was less than 10% for both extensors and flexors muscles of the knee joint [extensors, $3.6 \pm 2.37\%$; flexors $5.8 \pm 5.05\%$], when the reported values – threshold to injury prevention is 15-20% [4]. The aforementioned values are likely related to achieving high performance and probably prevent new injuries or recurrences (Grace et al. 1984, [5].

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Knee dissecans osteocondritis with intra articular loose bodies. Fixation or Excision? About, top-level athletes, 4 cases report where Platelet Rich Plasma (PRP) was associated to the surgical treatment

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Objective: The Dissecans Osteocondritis (OD) of the knee is a defect, in the subchondral region, with partial or complete separation of bone fragment. Most often seen on the postero-lateral aspect of the medial femoral condyle (about 80% of cases), and less often seen in posterior aspect of lateral condyle, is usually unilateral (74%), twice as common in males and classically occurring below the age of 18 (range: 6 to 53 years). Although the etiology of the injury differs from the traumatic osteochondral fractures the clinical presentation could be identical. The repetitive overloading causes fragmentation and separation of bony fragment (loose bodies in 50% of the cases) and the etiology of this multifactorial injury various, according with several theories, from trauma, vascular ischemia, alterations of ossification nuclei, genetic predisposition or combination of referred factors. The treatment of OD of the knee, with detachable fragment, or intra articular loose body already present, (grade III and IV of Ewing and Voto classification) became a surgeon problem regarding the correct surgical attitude. The controversy is rule when presentation is under the form of free body, with respect to the technique to use (reinsertion or excision), in the perspective of cartilage regeneration or integration of those loose bodies after its reinsertion. Milgram, demonstrated that deterioration of the chondral covering of free bodies can occur after its insertion in the original place, in proportion to the time of osteochondral detachment to the joint. Recently, Touten et al. concluded that, even so, the reduction and reinsertion of OD loose fragments must be intended, as soon as possible, and that even in late cases this technique must be attempted because it seems possible late cartilage reintegration, and regeneration. This perspective stimulates the authors to revue 4 clinical cases, involving young top athletes, where excision and micro fractures (MF) were made in two cases (Figure 1) and fragment reinsertion, with absorbable pins (Figure 2), was made in the other 2 cases.

Material/Methods: Four cases follow up and two different surgical methodologies, for the same pathology, in different stages and time delay as loose intra articular bodies. Different decisions but the same objectives regarding return to competition. In the 4 cases the authors associated the application of Platelet-Rich Plasma (PRP) either in MF site or in the fragment fixation site. The 4 cases were evaluated at 6 and 12 months utilizing IKDC scale and imagiologic study objectives.

Results: In accordance with the related criteria, 3 results have been considered excellent, and 1 result considered good, with return to competition between 9 and 13 months, the same anterior level. The criteria for both attitudes are mentioned as well as the importance of PRP resource in this pathology treatment.

Conclusion: The surgical decision in symptomatic and dysfunctional knee dissecans osteocondritis, with detached fragment or loose bodies in the joint, mostly in young top level athletes, must allways attempt the possibility of reduction and reinsertation when this surgical attitude seems possible in adequate articular congruence. In cases where this decision seems impossible, the fragments excision associated with in situ Micro fractures seems to be a good alternative choice of treatment. The Platelet Rich Plasma (PRP) association to MF site or reinsertation site seems to improve the healing process and acts like a complementary attitude to be considered in this pathology treatment.

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Figure 1



Figure 2

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Methodological Proposal for Flexibility Training in Golfers

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Objective: Flexibility is a conditional capability, crucial to achieve optimal physical sports fitness. The specific aim of the present study emphasizes, is the contribution of training the golfer's flexibility taking into account, their endogenous and exogenous factors.

Material/Methods: To achieve the proposed objectives, we designed a longitudinal study, nearly experimental methodology where it was applied a specific methodology called PNF (Proprioceptive Neuromuscular Facilitation). The type sample is not random (N=7). The data with quantitative character was statistical analysis using software PASW Statistics 18, where we used cluster analysis to verify the homogeneity of the sample and the T-Test for paired samples, enabled us to validate the assumptions placed. Was defined 0.05 statistical level of significance.

Results: During the study it was verified, that there was a positive development with respect to the degree of flexibility of measured joints. To prove developments in the articulation of Shoulder: abduction/adduction of 5.4% ($p=0.017$) and the rotation of 16.98% ($p=0.014$). The relationship between rotation of the thoracic/lumbar articulation had an increase of 23.3% ($p=0.01$). At the hip level it was verified an evolution of 41,8% ($p=0,00$) relatively to the external rotation movement.

Conclusion: During the study it was verified, that there was a positive development with respect to the degree of flexibility of measured joints. To prove developments in the articulation of Shoulder: abduction/adduction of 5.4% ($p=0.017$) and the rotation of 16.98% ($p=0.014$). The relationship between rotation of the thoracic/lumbar articulation had an increase of 23.3% ($p=0.01$). At the hip level it was verified an evolution of 41,8% ($p=0,00$) relatively to the external rotation movement. Conclusion: We can conclude that the flexibility training is crucial to increasing physical sports capability of Golf players and that the methodological approach has been planned effectively, although it is evident that some adjustments have to be made.

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Neurofeedback Training Enhances Psycho-physiological and Performance Level of University Archery Players

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Objective: The objectives of the present study were to find out the effect of sensory-motor rhythm (SMR) neurofeedback training on Heart Rate Changes, Pre-Competition Pleasure Level, Post-Competition Pleasure Level, Pre-Competition Arousal Level, Post-Competition Arousal Level, Performance Level, Precision, SMR/ theta ratio and SMR epoch mean of archers during competition.

Material/Methods: Twenty four right handed university level archery players both male (16 subjects) and female (8 subjects) were included by Random Sampling technique. They were randomly divided into Experimental group (n=12) and Control group (n=12), average age of (21.96±1.601) years and experience of (4.31±1.081) years. Pre-post measurements of heart rate, pre and post competition pleasure-arousal level, precision, performance and baseline assessment of EEG components (SMR/ theta ratio and SMR epoch mean) were taken for both control and experimental group archers. None of the subjects had been introduced previously to neurofeedback training and had no history of head injury. They were asked to refrain from any kind of mental training techniques or any meditation during the period of intervention.

Results: The statistical analysis reveals that Pre-Competition Pleasure Level ($p<0.05$), Pre-Competition Arousal Level ($p<0.05$), Post-Competition Arousal Level ($p<0.01$) and SMR/ theta ratio ($p<0.05$) showed statistically significant difference between two groups after intervening with twelve sessions of SMR neurofeedback to experimental group.

Conclusion: The application of SMR neurofeedback on archery players improved the regulation of pleasure-arousal level and EEG components. Further more, the result of the present study suggests that neurofeedback training enhances the archery players accuracy through combined activation and regulation of psycho-physiological and neuro-physiological functions during performance.

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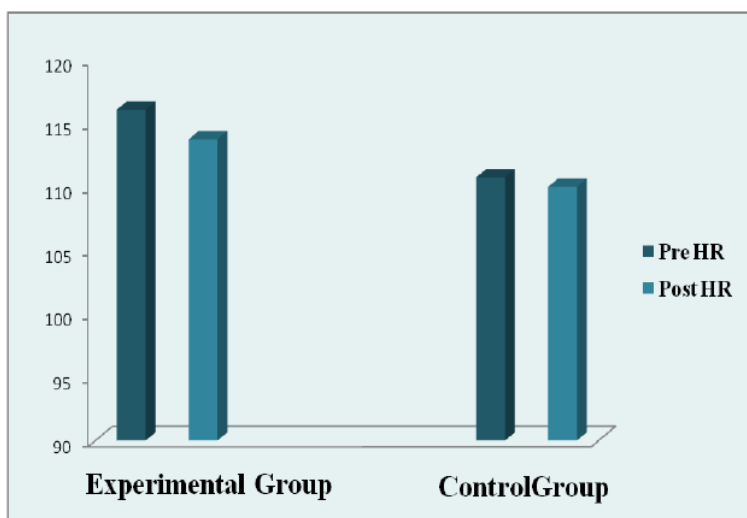


Figure 1: Pre and post measurements of mean Heart Rate in Experimental & Control group

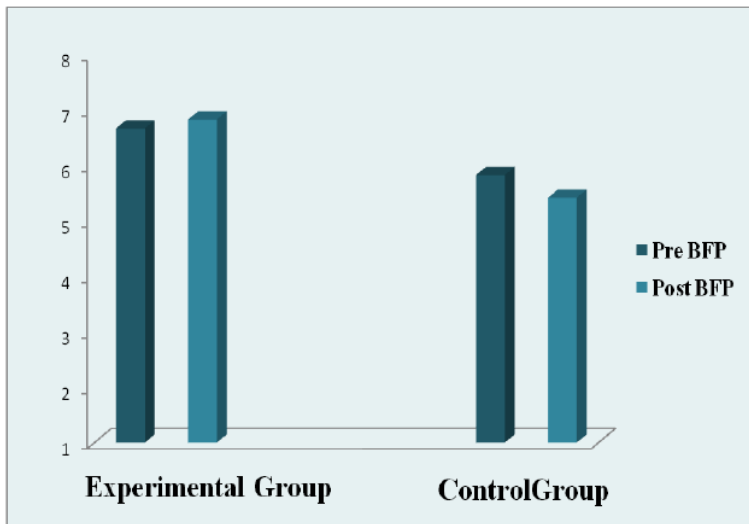


Figure 2: Pre and post measurements of mean Pre Competition Pleasure Level in Experimental & Control group

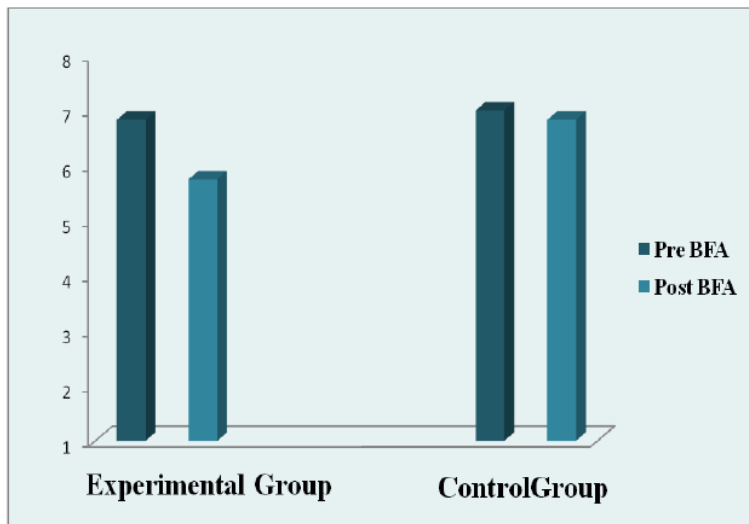


Figure 3: Pre and post measurements of mean Pre Competition Arousal Level in Experimental & Control group

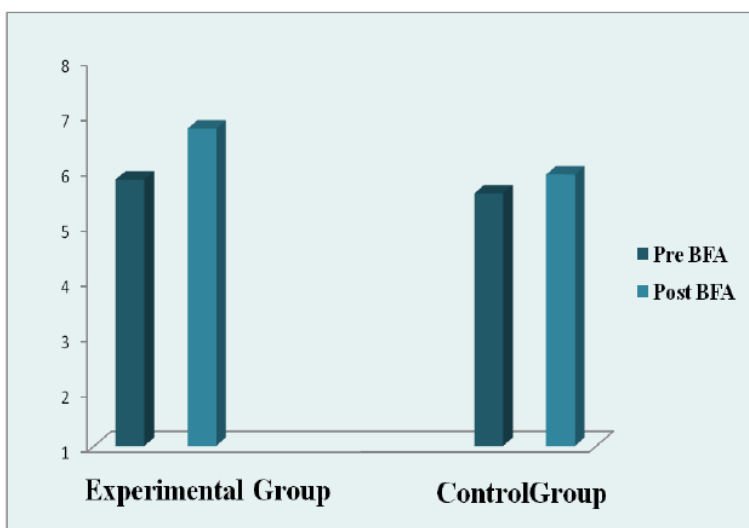


Figure 4: Pre and post measurements of mean Post Competition Pleasure Level in Experimental & Control group

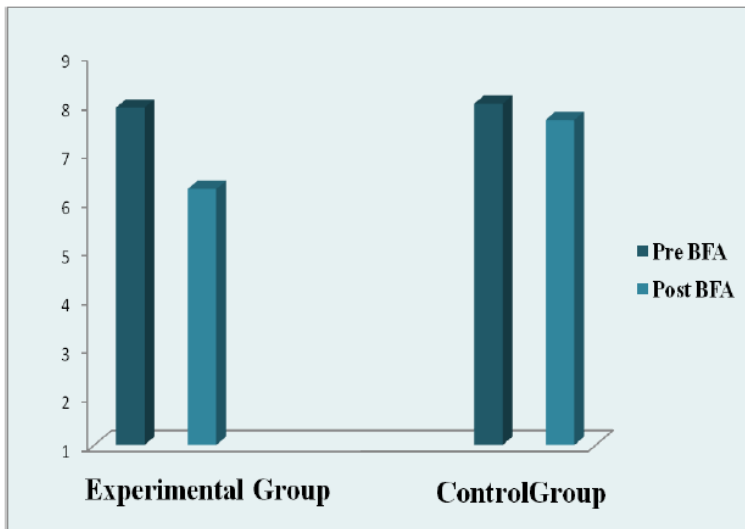


Figure 5: Pre and post measurements of mean Post Competition Arousal Level in Experimental & Control group

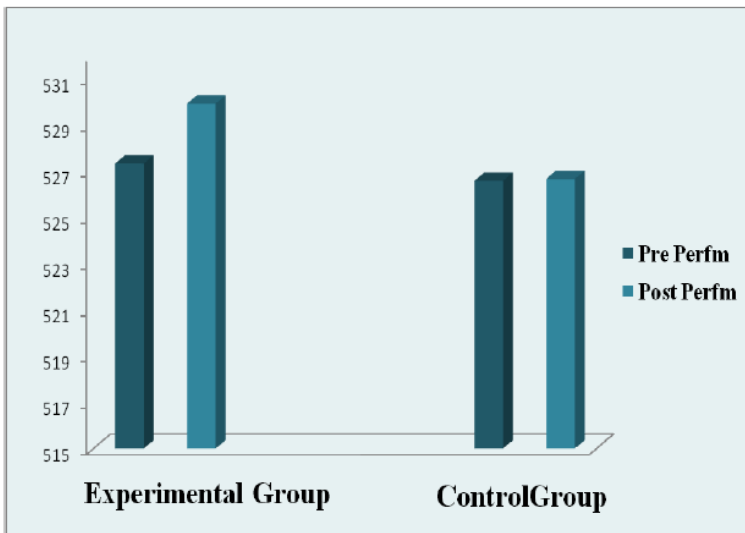


Figure 6: Pre and post measurements of mean Performance in Experimental & Control group

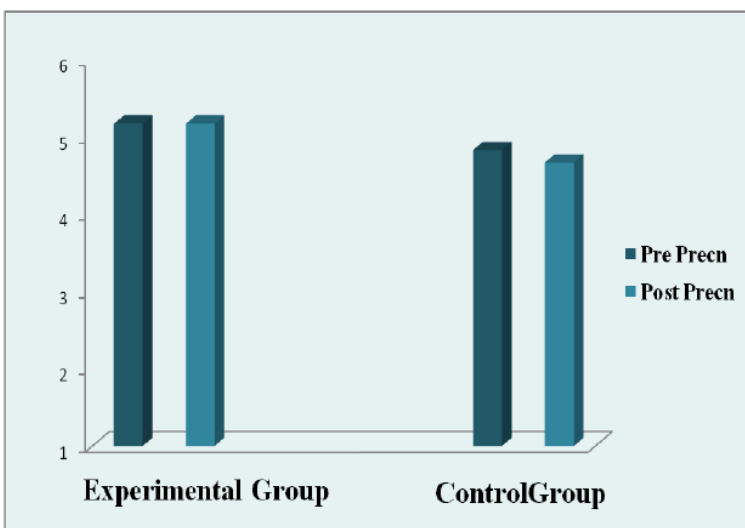


Figure 7: Pre and post measurements of mean Precision in Experimental & Control group

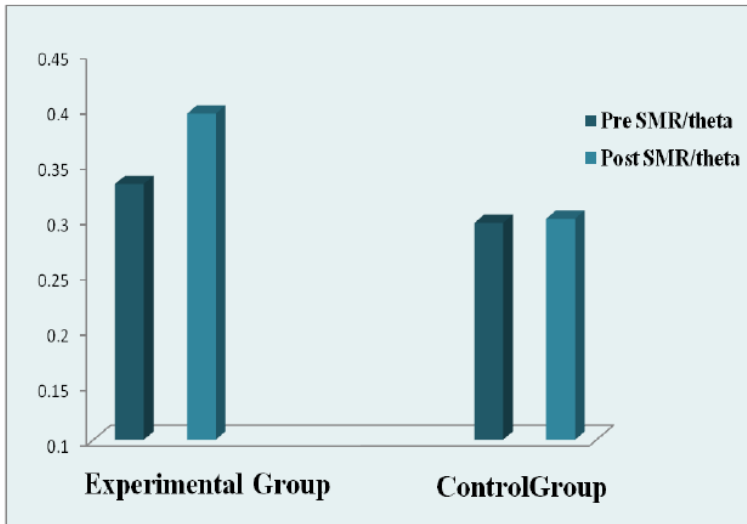


Figure 8: Pre and post measurements of mean SMR/ theta ratio in Experimental & Control group

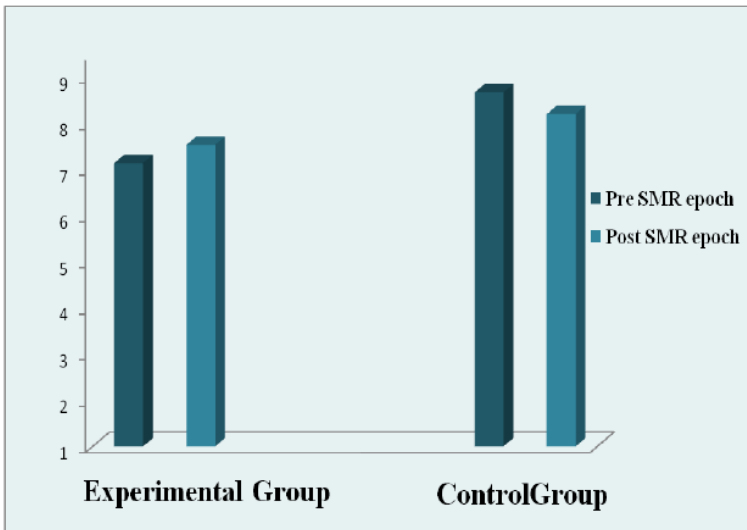


Figure 9: Pre and post measurements of mean SMR epoch mean in Experimental & Control group

Table 1. Descriptive statistical analysis of all variables of Experiment and Control group

Variables	Experimental Group		Control Group	
	Pre test mean \pm SD	Post test mean \pm SD	Pre test mean \pm SD	Post test mean \pm SD
HR	116.08 \pm 9.959	113.75 \pm 7.350	110.75 \pm 3.107	110.00 \pm 2.608
Pre-CPL	6.67 \pm 1.073	6.83 \pm 0.937	5.83 \pm 0.297	5.42 \pm 0.434
Pre-CAL	6.83 \pm 0.937	5.75 \pm 1.055	7.00 \pm 0.302	6.83 \pm 0.271
Post-CPL	5.83 \pm 1.403	6.75 \pm 1.215	5.58 \pm 0.358	5.92 \pm 0.398
Post-CAL	7.92 \pm 1.165	6.25 \pm 0.965	8.00 \pm 0.326	7.67 \pm 0.256
Performance	527.33 \pm 12.257	529.92 \pm 14.248	526.58 \pm 3.803	526.67 \pm 3.650
Precision	5.17 \pm 1.337	5.17 \pm 1.467	4.83 \pm 0.405	4.67 \pm 0.512
SMR/theta ratio	0.331 \pm 0.089	0.395 \pm 0.101	0.296 \pm 0.032	0.300 \pm 0.023
SMR epoch mean	7.1433 \pm 3.437	7.5358 \pm 2.931	8.675 \pm 1.209	8.206 \pm 1.012

Table 1. describes the mean and standard deviation of pre and post measurements of Heart Rate, Pre-Competition Pleasure Level, Pre-Competition Arousal Level, Post-Competition Pleasure Level, Post-Competition Arousal Level, Performance, Precision, SMR/ theta ratio and SMR epoch mean of experimental and control group.

Table 2. Correlation (Spearman Rho Co-efficient) results of all variables in Experimental and Control group

Variables	Heart Rate	Pre CPL	Pre CAL	Post CPL	Post CAL	Perform	Precision	SMR/ theta	SMR epoch mean
HR	1								
PreCPL	-0.225	1							
PreCAL	-0.472*	0.100	1						
PostCPL	-0.194	0.293	0.186	1					
PostCAL	-0.139	0.322	0.235	0.229	1				
Perform	0.121	-0.034*	-0.104	-0.092	-0.143	1			
Precision	0.120	0.058	0.099	-0.099	-0.143	-0.116	1		
SMR/theta	-0.059	0.303	0.195	-0.447	-0.129	0.292	0.366	1	
SMR epoch mean	-0.102	0.169	-0.041*	-0.296	-0.205	0.028	0.346	0.611**	1

* significant at 0.05 level 2-tailed ** significant at 0.01 level 2-tailed Unmarked variables are non-significant

Table 2. describes the correlation between baseline measurements of Heart Rate, Pre-Competition Pleasure Level, Pre-Competition Arousal Level, Post-Competition Pleasure Level, Post-Competition Arousal Level, Performance, Precision, SMR/ theta ratio and SMR epoch mean.

Table 3. Pre and Post one way ANOVA results of all variables in Experimental and Control group

Variables	Pre ANOVA		Post ANOVA	
	'F' value	'p' value	'F' value	'p' value
HR	1.587	0.221	1.244	0.277
Pre-CPL	3.767	0.065	7.660	0.011
Pre-CAL	0.169	0.685	7.068	0.014
Post-CPL	0.214	0.648	2.466	0.131
Post-CAL	0.032	0.860	14.004	0.001
Performance	0.021	0.887	0.349	0.561
Precision	0.355	0.557	0.566	0.460
SMR/theta ratio	0.710	0.408	6.473	0.018
SMR epoch mean	0.960	0.338	0.259	0.616

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One-year follow-up after intensive strength, endurance and coordination training combined with systematic motivation in rheumatologic rehabilitation

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Objective: Polyarthritits (cP) and spondylarthritits (SpA) are the most common chronic inflammatory rheumatic diseases leading to substantial impairment of activity and participation in various areas of life [1]. Regular physical activity results in various health related improvements [2] without causing enhanced joint damage or disease activity [3]. To overcome the often inactive lifestyle of these patients [4], support of the initiation and long-term adherence to physical activity is needed. The present study involved an intensive strength, endurance and coordination training during in-patient rheumatic rehabilitation that was performed in fixed groups with systematic motivational activities based on the transtheoretical model of behavior change [5] to promote independent physical activity in everyday life after discharge from the clinic. Physical, psychological and sociomedical improvements were examined at one-year follow up.

Material/Methods: This prospective controlled sequential study addressed patients with cP or SpA in two rehabilitation clinics in Germany who were asked to fill in questionnaires at four (control group [CG]) and five points in time (intervention group [IG]), respectively. Of 555 patients who were asked to take part in the study before the onset of rehabilitation, 418 participants (75 %) agreed initially. Data of the one-year follow up are available from 326 of 418 participants (78 %). The sample characteristics at the beginning of rehabilitation (T1) were: mean age 47 [\pm 9] years, 64 % women, 71 % cP, 29 % SpA, mean disease duration 9 [\pm 8] years, 81 % employed. The following statistical techniques were used: Student's t-test, MANOVA for repeated measures, multiple linear regression analyses.

Results: At T1 health or activity related variables showed no differences between CG and IG. At the end of rehabilitation (T2) improvements in all surveyed features compared with T1 were found in both groups ($p < .01$). Several aspects of the rehabilitation, such as different treatments, global rating and the recommendations for future exercises, were evaluated better by the IG than by the CG ($p < .01$). After one year (T5) all patients reported stable enhancements regarding health-related quality of life (SF-36), psychological well-being (HADS-D), motivation to and performance of physical activity (FFkA) ($p < .01$). Additionally, IG participants produced lower indirect costs by absenteeism from work ($p < .05$) and showed greater improvements in terms of their overall physical activity, especially in everyday life (FFkA) ($p < .05$). Recommendations of physical activity were met more often by IG participants ($p < .05$). Subgroup analyses showed the activity specific efficacy of the intervention for both sexes and diagnostic groups as well as for younger and older patients.

Conclusion: Results of the study showed long-term positive changes in many health related features after rehabilitation in patients with the most common chronic inflammatory rheumatic diseases. Twelve months after discharge, IG participants reported more physical activity in everyday life than CG without effects of sex, age or diagnostic group. Indirect costs (especially because of disability pension) were lower in the IG. Thus, intensive training exercises in fixed groups combined with systematical motivation regarding physical activity is an efficient strategy to support long-term physical activity and reduce indirect costs.

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Professional sports medical service on the example of the Austrian Youth Soccer Nationalteam during European championship qualifications

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On the occasion of the Challenge 2008 project the Austrian Soccer Association placed the sports medical treatment in professional hands.

In addition to the technical department with a head coach, an assistant coach, a goalkeeper coach and a team manager, a professional sports medicine unit was installed by a team doctor, physical therapist, masseur and sports psychologist.

Usually 2 or 3 days before departure the players are convened at a date and subjected to detailed sports medical examinations. Ailing or injured players will be dismissed from the squad. Finally, 18 players are taken to the qualifying tournament.

The normal daily routine begins with the capillary blood collection to determinate CPK (creatine phosphokinase) and BUN (blood urea). In consultation with the team coach the players are divided into several intensity groups for training due to the current laboratory values. So an individual morning training is possible.

After the prescribed lunch break, there are regenerative measures with complex physical therapy as for example electrotherapy, massage, physical therapy, the attachment of various bandages and medical therapies.

On race days the game usually takes place in the late afternoon.

In case of acute injury the player has to be treated on the field, the degree of injury has to be evaluated and, if necessary further diagnoses and decisions about treatment inpatient or outpatient have to be organized.

On a competition-free day, there are either other therapeutic applications, a regenerative oriented training or a common activity to promote social cohesion.

In the evening analyses of the games are on the program, on free days it is very common to watch championship games, games in UEFA Cup, Champions League or national team games.

In such qualifying tournaments regular doping controls are on the agenda. It is important that the players and the entire care team is regularly informed about the latest developments in this regard.

The composition of the diet plan also falls to the sports physician. This turns out of the upcoming or completed exposure.

There are to complete 3 games within 6 days with an 18-man squad. Mostly the last game is the play-off. The physical fitness and the number of not injured players and not at least the sport-specific skills essentially decide about success or failure and depend crucially on the quality of sports medicine care.

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B: Rehabilitation in Sports II

027

Role of rehabilitation in patients with reconstructed anterior cruciate ligaments: Biomechanical and electrophysiological study

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Objective: To study the biomechanical and electrophysiological changes in the lower limbs after rehabilitation in patients who underwent anterior cruciate ligament (ACL) reconstruction using either closed kinetic chain (CKC) exercises alone or combined closed and open kinetic chain (OKC) exercises.

Material/Methods: The study included 40 patients who were assigned to two groups; group A which carried out CKC exercises and group B which performed combined CKC and OKC exercises. Both groups carried out proprioceptive exercises as well. Before rehabilitation they underwent bilateral knee examination which included thigh girth measurement, range of motion (ROM) assessment, detection of effusion as well as muscle strength assessment for the quadriceps and hamstrings. The biomechanical and posturographic parameters which were determined were the limits of stability (LOS) as well as the vertical projection of the center of gravity (COG) over the base of support. A modified single-legged hop test was performed and the different response parameters were recorded (force, velocity and power). Computerized dynamic posturography was carried out to study the pattern of reflex muscle activity in response to forward and backward translation perturbations and the postural restoration strategy adopted was determined. All the patients underwent re-assessment after completion of the rehabilitation program which lasted for 12 weeks.

Results: Both groups showed a significant increase in knee ROM and thigh girth, however there was no statistically significant difference between the two groups. There was a significant reduction in effusion in both groups. Both groups showed a significant increase in quadriceps and hamstrings muscle strength which was also significantly greater in group B. On performing the modified hop test, the force, velocity and power showed a statistically significant increase in both groups, however there was no statistically significant difference between the two groups. LOS increased significantly in both groups; however it was significantly greater in group B. The COG was centrally projected in 75% of patients in group A and in 50% of patients in group B. There was a statistically significant difference between the 2 groups. In both groups, reflex EMG results showed an improvement which was especially prominent in the tibialis anterior and the gastrocnemius. This reflected its effect on the postural restoration strategy adopted by the patients which generally showed a shift towards ankle strategy rather than hip strategy in both groups with no statistically significant difference between the two groups.

Conclusion: The addition of OKC exercises in rehabilitation programs after ACL reconstruction is essential in restoring adequate muscle strength and postural stability, and is safe when performed in a controlled and supervised manner.

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Surgical or conservative treatment of meniscal tears. A retrospective study in athletic and non-athletic populations

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Objective: To retrospectively examine the clinical results of conservative treatment compared to arthroscopic treatment of meniscal tears, in two different populations: athletic and non-athletic.

Material/Methods: All patients presented with meniscal tears documented by both clinical and imaging studies and were divided in two groups. Group A included 58 patients who were regularly involved in athletic activities, with a mean age of 24 (13–38) years. Group B included 80 patients who were not involved in athletic activities, with a mean age of 54 (16–72) years. Meniscal injuries suggested as an acute injury in 47 patients (81%) of group A and in 22 patients (27.5%) of group B. Independently of the kind of the treatment received all patients in both groups underwent the same physiotherapeutic protocol of a mean duration of 4 (3–6) weeks before the final treatment decision. Patients of group A were subdivided in two subgroups: Group Aa included 49 patients (84.5%) who received arthroscopic partial meniscectomy (medial in 40 patients and lateral in 9 patients); group Ab included 9 patients (15.5%) who only received a conservative rehabilitation protocol. Patients of group B were also subdivided in two subgroups: Group Ba included patients 32 patients (40%) who received arthroscopic partial meniscectomy (medial in 27 patients and lateral in 5 patients); group Bb included 48 patients (60%) who only received conservative treatment with the same rehabilitation protocol. The Tegner Activity Level Scale, the Lysholm Knee Scoring Scale and the IKDC Subjective Knee Evaluation score were used to evaluate the final outcome in each population subgroup. The mean follow-up was 32 (19–58) months for group Aa, 39 (22–60) months for group Ab, 31 (18–54) months for group Ba and 30 (18–54) months for group Bb.

Results: In subgroup Aa the mean values were 95 for Lysholm score, 9.65 for Tegner score, and 95.15 for IKDC score. In subgroup Ab the mean values were 83.44 for Lysholm score, 8.33 for Tegner score, and 80.98 for IKDC score. In subgroup Ba the mean values were 80.2 for Lysholm score, 3.86 for Tegner score, and 51.16 for IKDC score. In subgroup Bb the mean values were 79.71 for Lysholm score, 4.25 for Tegner score, and 49.97 for IKDC score.

Conclusion: Arthroscopic partial meniscectomy followed by a supervised rehabilitation program showed superior results compared to a rehabilitation program alone in the athletic population. Although the number of patients in the two subgroups are not comparable for statistical analysis, the superior results of arthroscopic treatment was expected considering the mainly traumatic event of this young aged and high demanding population. On the other hand, knee scoring scales did not detect any significant difference between patients of subgroup Ba who received arthroscopic partial meniscectomy supplemented with a rehabilitation protocol compared to patients of subgroup Bb who treated with a rehabilitation program alone. The results might suggest that in middle-aged patients with degenerative meniscal tears we should probably insist to physiotherapy, strengthening and rehabilitation regimens before proceed to arthroscopic meniscectomy.

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Systemic ketoprofen may delay recovery after acute muscle injury

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Objective: Acute pain peaking 24 to 48 hours after exercise can be induced by eccentric contraction causing microtrauma induced muscle fiber destruction. Neutrophils and tissue macrophages migrate to the damaged muscle tissue, clean up the debris of broken proteins, and then initiate the regeneration phase [1]. Like all inflammatory responses, these changes are self-resolving over a period of a few days, depending upon the severity of the microtrauma. The use of NSAIDs seems a reasonable therapeutic approach to treat pain and inflammation induced by eccentric contractions. But the results of previous studies are controversial. In our hands topical ketoprofen was able to show a benefit in contrast to a low dose of oral ketoprofen [2]. One of the reasons why the effect of systemic NSAID's might be limited is delayed recovery. Nieman et al found elevated cytokine levels in ibuprofen users following a 160 km race [3]. This study investigated the effects of 200 mg ketoprofen daily on pain induced by walking down stairs with frequent follow-ups to allow for the evaluation of recovery kinetics.

Material/Methods: This multiple-dose, double-blind, parallel-group, randomized, placebo controlled study investigated the effect of muscle pain induced by walking down stairs with a total altitude of 300–400 m depending on body weight. Subjects with a pain score of at least 3 on a 10 point categorical pain scale at 12–16 hours after exercise were randomized to placebo (n=48) and 100 mg ketoprofen b.i.d. (n=24). Intake and application of study drug occurred in the morning and evening of Day 1 to Day 6 and in the morning of Day 7.

Muscle pain was rated by the subjects using a 10 point categorical pain scale before exercise, before the first dose of study drug, at 1, 2, 4, 8, and 12 hours after the first dose of study drug. Subsequently, pain rating was performed immediately before study drug applications. The following parameters were assessed; Area under the curve of all assessments (AUC), Maximum pain (P_{max}), Time of maximum pain (T_{max}) and Time to end of pain (T_{end}). A Wilcoxon test for unpaired observations was used to test the null hypothesis of no difference between treatment groups against the alternative hypothesis of a difference between groups. A two-sided significance level of 5% was applied.

Results: Oral ketoprofen resulted in significantly higher pain scores ($p=0.0240$) compared to placebo considering the full observation period (AUC; see Table 1). P_{max} and T_{max} were numerically higher for the ketoprofen group as compared to the placebo group but the differences were not statistically significant. Evaluation of all parameters indicated that most of the negative effect of oral ketoprofen was caused by a delay of recovery (T_{end} : $p=0.0046$).

Parameter	Ketoprofen (n=24)	Placebo (n=48)	P- Value
AUC	462.4±160.4	376.2±159.1	0.0240
P_{max}	6.1±1.5	5.8±1.4	0.3377
T_{max}	30.5±15.8	26.4±14.9	0.2615
T_{end}	121.5±21.0	105.3±25.0	0.0046

Table 1: Assessment of kinetic parameters of muscle pain after eccentric exercise (mean ± SD)

Conclusion: In contrast to topical ketoprofen [2], systemic application of ketoprofen might cause deleterious effects on recovery from muscle soreness induced by eccentric contraction. Since systemic application of ibuprofen and celecoxib showed reduced muscle soreness without effects on recovery [4], [5], the effect might be drug specific or may depend on mode and timing of drug application.

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The comparison of the effectiveness of hydrotherapy and physiotherapy on the knee osteoarthritis

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Objective: Osteoarthritis (OA) is the most common human articular disease. Based on the radiological findings, in the western countries the incidence of OA is 2% for 45 years people and 35% for people between 45–65 years old and 68% for people older than 65 years [1], [2], [3]. In compared with more serious diseases such as cancer or cerebral stroke, OA is responsible for the most of complete disability in older adults [1]. Therefore, the purpose of this research was the survey and comparison of the effectiveness of hydrotherapy and physiotherapy on the function, walking and dynamic balance in the subjects with knee osteoarthritis.

Material/Methods: For this respect, 36 individuals affected by knee osteoarthritis (with a mean of Age (40.75±5.83), weight (72.75±6.45), height (178±7.2)) were classified randomly into three groups of hydrotherapy, physiotherapy and control. Then participants of experimental groups received 6 weeks of aquatic therapy and physiotherapy. Aquatic therapy program were included of exercises that was performed in the pool (water temperature 27–30°C). Physiotherapy program was planned for 45 minutes, which was included ultrasound, TENS, infrared, and stretching and strengthening exercises of quadriceps muscle. Outcome measures were included, step test, timed "Up & Go" Test and Six-Minute Walk Test that were performed in the pretest and posttest for the assessment of dynamic standing balance, physical function and gait respectively. The differences in the variable at the pretest (baseline) and posttest (final) between the three groups were assessed using a one-way ANOVA test and effects of the interventions for the variable were analyzed by paired sample t test (Table 1).

Group/variable	Balance score mean (numbers)		Gait score mean (meter)		Physical function score mean (second)	
	pretest	posttest	pretest	posttest	pretest	posttest
control	12/08±2/01†	11/87±3/11	420/14±9/03	419/38±43/12	11/74±2/73	11/43±2/65
physiotherapy	12/34±2/21	16/93±3/4*	419/21±54/81	444/33±76/32*	11/47±3/02	9/03±2/87*
hydrotherapy	12/86±3/11	17/11±3/7*	418/38±65/12	447/22±23/65*	11/13±3/12	8/98±3/02*

†Data are mean ±SD

* Significant difference with the control group

Table 1: Pretest and posttest means of balance, gait and physical function in three groups.

Results: The findings showed that there is no significant difference between balance, gait and physical function in two groups of physiotherapy and hydrotherapy ($p < 0/05$). In this research findings showed that both of hydrotherapy and physiotherapy increased gait, balance and knee function in subjects affected by knee OA ($p > 0/05$). However the hydrotherapy was approximately better than physiotherapy.

Conclusion: According to the results, it was indicated that both of hydrotherapy and physiotherapy have significant effectiveness on balance, gait and physical function of the patients affected by OA. This result is consensus with previous studies, Silva, et al [2], Green J, et al [1] and Rana S Hinman, et al [3], who expressed significant effectiveness of hydrotherapy on the objective and subjective function of patients affected by OA [1], [2], [3]. Therefore, despite of better results of water therapy group than Physiotherapy group; there are no significant differences between the efficacy of those treatment methods on the amount of walking, balance and physical function in osteoarthritis patients there. But according to the relatively better results of water therapy, can be advised this treatment as a relatively effective treatment for patients with knee osteoarthritis.

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The effect of plyometric training on the vertical leap of university varsity basketball players

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Objective: This study determined the effect of plyometric training on the vertical leap of university varsity basketball players. This study further determined the significant difference of the vertical leaps before and after five sessions; before and after 10 sessions, and after five and 10 sessions of plyometric training.

Material/Methods: Nine of sixteen qualified players made it to end of study. Baseline heights of vertical leap of the players were measured by letting them touch the vertically wall-mounted black Velcro tape with their chalk dust coated middle finger of the dominant hand for three trials. The plyometric training consisted of squatting, jump squatting, lateral jump squatting, and stair jumping in this order for two weeks at five sessions per week. Each exercise was performed for three sets with 30-second rest between sets; each set consisting of ten repetitions of exercise with the players carrying a pair of 10-pound dumbbells. The vertical leaps measurement after training was done just before the 6th training session and two days after the 10th session in the same manner as the baseline. The significant difference of vertical leaps were determined using paired t-test with p value set at 0.05 and degree of freedom of 8.0.

Results: The height of the vertical leap has steadily increased from the baseline or before the start of the plyometric training to the time when 5th and 10th sessions were completed (Table 1). The increase is observed not only in the means but in the upper and lower limits of the ranges. This simply signifies that there is always an improvement after any set of training session. There is also a more tremendous increase between the means of the baseline and after five sessions than between the first five sessions and the last five sessions. This indicates that the first week of training has more substantial effect. Therefore, coaches and athletes should be more aggressive in the first week as these provide more improvement in the vertical leap and subsequently more scores from jump shots, dunks and rebounds.

However, it should also be emphasized here that plyometric training should be maintained as there are still some improvements after the later sessions of the training, and whatever gains accumulated from the first and succeeding weeks of training may be lost if the training is stopped.

The difference between the vertical leap before and after five training sessions is significant (Table 2). Although it is expected that the difference between the vertical leap before and after ten training sessions would still remain significant, it connotes that continued training would further increase the vertical leap. This is proven by the significant difference of the vertical leaps after the 5th and 10th sessions. There may have been a sudden surge in the improvement of vertical leap in the first five sessions but the next five sessions and even the succeeding sessions should there be more would still have some effects on the vertical leap until the differences decline when the plateau is reached.

Phases of Training	Height of Vertical Leap (cm)	
	Range (cm)	Mean
Before the training	55.20–77.07	67.300
After 5 training sessions	59.83–77.37	69.900
After 10 training sessions	60.40–79.33	70.978

Table 1: Vertical Leap Before and After Plyometric Training N=9

Vertical Leap	p Value	Remarks
Before and after 5 training sessions	0.0480	Significant difference
Before and after 10 training sessions	0.0100	Significant difference
After 5 and 10 training sessions	0.0376	Significant difference

Table 2: Significance in Differences of Vertical Leap Before and After the Plyometric Training N=9

Conclusion: Plyometric training for ten sessions significantly increased the vertical leap of the university varsity basketball players.

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A prospective cohort study and analysis of psychological predictors for exercise related injuries in the Irish Permanent Defence Forces Cadet School

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Objective: A hypothesis amongst the sporting community is that certain personality types are more likely to become injured more frequently than others. The purpose of this study was to ascertain if this hypothesis is true, as well as to extract psychological variables which tend to predict occurrence and severity, to use them to create a profile for those most probable to become injured within the cohort, and to extrapolate from this methods which would allow for the prevention of injury.

Material/Methods: A prospective cohort study was performed. The participants were Irish and Cypriot, male and female recruits to the Irish Permanent Defence Forces Cadet School (n=28). Information from participants was gathered using validated questionnaires to assess potential psychological antecedents to injury. Dynamic physiological data to quantify responses to physical stress was also measured in the participants. Information on injuries sustained throughout a training period of over 3,000 participant hours was also collected prospectively. The above information was tabulated and concordance analyses performed. One-way analysis of variance (ANOVA) as well as linear regression analysis of the hypothesis, with the dependent variable injury in order to find injury predictors. This information was used for a logistic regression. Logistic regression was used to show how a large group of cadets could be successfully predicted as injured or non-injured, according to the results from the linear regression.

Results: Psychological predictors of injuries trending towards significance were identified including life event stress and ineffective coping. These categories alone could account for the frequency and severity of injury in almost 80% of instances. Similarly these factors and others when combined offer a psychological signature which profiles those at least risk of sustaining considerable injuries in this training environment.

Conclusion: There is much interest in the pathogenesis of sports injuries. Physiological predictors have attracted the lions share of attention, however these factors are not always readily amenable to correction in the context of sports injury prevention. This study suggests which psychological factors are significantly involved in sports injury prediction; these psychological factors have been shown to be amenable to modification through behavioural therapy techniques. Thus this work suggests non-invasive techniques to reduce injury incidence amongst Irish and Cypriot recruits in the Irish Cadet School.

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A randomized clinical study of the effects of traditional Thai massage on pain, chest expansion and shoulder range of motion among patients with scapulocostal syndrome

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Objective: Scapulocostal syndrome (SCS) has been defined as a chronic musculoskeletal syndrome characterized by pain over the medial superior border of the scapula [1]. Traditional Thai massage has been used to treat patients with SCS for long time, but its efficacy has not been studied. The purpose of the current study was to determine the effects of TTM on pain, chest expansion and shoulder range of motion in patients with SCS.

Material/Methods: Forty-four patients (34 females and 10 males, aged 21–49 yrs) were randomly allocated to receive a 30-minutes session of either TTM or physical therapy (PT: ultrasound therapy and hot pack) for 9 sessions over a period of 3 weeks. Thai Short-form McGill Pain Questionnaire (Th-SFMPQ), pain frequency, chest expansion, shoulder flexion and shoulder abduction were measured before and 1 day after the treatment period.

Results: Results indicated that the TTM group showed a significant improvement in all parameters after 3 weeks of the treatments ($p < 0.001$). However, the PT group showed a significant improvement only in the Th-SFMPQ, pain frequency and chest expansion ($p < 0.05$). The TTM group demonstrated more improvement than the PT group in range of motion in shoulder flexion and abduction at the end of the treatments ($p < 0.05$).

Conclusion: This study suggests that TTM is an effective intervention that can decrease pain and increase chest expansion, shoulder flexion and shoulder abduction among patients with SCS.

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Association between falls and balance in stroke patients: attempt to predict falls using the Berg Balance Scal

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Objective: A high risk of falling after stroke has been reported, both during hospital stay and after patients have been discharged [1], [2]. In order to assist with fall prevention, it is necessary to identify the risk factors for falling and subsequently to take counter-measures against these. Many of the methods that are used by medical institutions to identify patients at risk of falling are, however, based on personal experience, subjective observations and mental evaluations, and there have been only a few reports that have focused on specific investigational methods, standardized judgment criteria for fall prediction and the establishment of an evaluation index [3]. The objective of this study was to identify risk factors for falling in hemiplegic stroke patients so as to develop a predictive model.

Material/Methods: In total, 72 stroke patients (42 males, 30 females; age 67.6 ± 10.3 years) were included in the study. All falls were reported by medical staff using a dedicated fall report and this formed the basis on which the subjects were allocated into either a faller (occasional and repeat) or non-faller group. The following were extracted from the inpatients' hospital records: occurrence of falls during hospital stay; age; gender; stroke type; time from stroke onset; length of hospital stay (LOS); the affected side of the body (right, left or bilateral); FIM on admission and discharge; BBS on admission; and MMSE. The relationships between falls and these patient characteristics were investigated. Fallers and non-fallers were compared to detect mean differences between the two groups for continuous variables using a Student's t-test and the χ^2 test. The variables that achieved statistical significance were then included in a multivariate logistic regression analysis. Pearson correlation coefficients were calculated to determine the strength of the relationships between variables. Sensitivity and specificity in predicting fall status were calculated. The ability to predict the outcome of falling in stroke patients was assessed by the area under the receiver operating characteristic (ROC) curve. Statistical evaluation of the data was carried out using the SPSS® statistical package (SPSS Inc., Chicago, IL, USA) for Windows®. A P-value of <0.05 was considered to be statistically significant with the exception of the entry probability for logistic analysis.

Results: The characteristics of the stroke patients and statistical comparisons between the faller and non-faller groups are shown in Table 1. Age and LOS were significantly higher in the faller group compared with the non-faller group, while significantly lower values were recorded in the faller group compared with the non-faller group for time from stroke onset, total FIM on admission and discharge, BBS on admission and MMSE. The Pearson correlation coefficients for the variables (Table 2) show a strong correlation between BBS on admission and total and motor FIM on admission and discharge. Age, time from stroke onset, LOS, cognitive FIM on admission and discharge, BBS on admission, and MMSE were subjected to logistic regression analysis using the occurrence of falls as a dependent variable. To prevent multicollinearity, the strongly correlated total and motor FIM on admission and discharge were excluded, and the factor selected was BBS on admission. Based on the calculated OR, BBS on admission was found to be significantly related to falls (Table 2). The ROC curve analysis (Figure 1) showed that BBS on admission best differentiated subjects who had fallen from those who had not fallen at a threshold score of 29 points (sensitivity 80%; specificity 78%) and area under the curve of 0.81.

Conclusion: The numerical presentation of predicted fall risk and the establishment of a practical index for use in clinical practice were investigated in stroke patients. With stroke patients in the convalescence to maintenance stage, balance on admission was closely related to the risk of falling.

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Characteristics	non – fallers n = 45	fallers n = 27	P-value
Age (years)	64.5 ± 10.0	72.8 ± 8.6	P=0.001 ^{a)}
Sex (male/female)	29/16	13/14	P=0.097 ^{b)}
Stroke type			
Infarct	25	16	P=0.947 ^{b)}
Hemorrhagic	16	9	
SAH	4	2	
Duration of disease (months)	22.4 ± 8.8	17.9 ± 5.0	P=0.018 ^{a)}
LOS (days)	72.4 ± 35.6	100.6 ± 41.2	P=0.003 ^{a)}
Affected side of the body (right/left/bilateral)	24/18/3	10/17/0	P=0.101 ^{b)}
Admission			
Total FIM score	90.4 ± 23.0	52.2 ± 20.8	P<0.001 ^{a)}
Motor FIM score	64.8 ± 19.2	34.2 ± 14.9	P<0.001 ^{a)}
Cognitive FIM score	25.6 ± 7.9	18.0 ± 8.4	P<0.001 ^{a)}
Discharge			
Total FIM score	102.4 ± 21.5	76.8 ± 23.3	P<0.001 ^{a)}
Motor FIM score	72.9 ± 19.5	54.1 ± 18.5	P<0.001 ^{a)}
Cognitive FIM score	29.6 ± 12.8	22.7 ± 7.4	P=0.013 ^{a)}
Admission BBS score	40.4 ± 16.2	16.9 ± 17.9	P<0.001 ^{a)}
MMSE	21.4 ± 7.6	15.3 ± 8.8	P=0.003 ^{a)}

^{a)} Student's *t* test test ^{b)} χ^2 test

NOTE. Data are presented as mean ± standard deviation (SD) .

Student's *t* test was used to assess the statistical significance of difference in age between falling and non-falling patients and was used to determine the statistical significance of the value of since time of stroke, LOS and Admission and Discharge FIM score and Admission BBS and MMSE between two groups.

χ^2 was used to assess the statistical significance of categorical variables among the Sex, Stroke type and Stroke side.

Abbreviations : BBS; Berg Balance Scale , MMSE; Mini-Mental State Examination

Table 1: Characteristics of stroke patients and comparisons among non-fallers and fallers.

Predictor	OR	95%CI	P-value
Age (years)	1.05	0.97 – 1.13	P=0.278
Duration of disease (months)	0.86	0.74 – 1.00	P=0.057
LOS (days)	1.00	0.98 – 1.02	P=0.895
AD Cognitive FIM	0.93	0.83 – 1.04	P=0.186
DIS Cognitive FIM	0.99	0.93 – 1.05	P=0.774
AD BBS	0.94	0.89 – 0.98	P<0.01
MMSE	0.99	0.88 – 1.10	P=0.786
Hosmer–Lemeshow test	$\chi^2 = 4.56$		P = 0.80

Table 2: Logistic models for predicting falls.

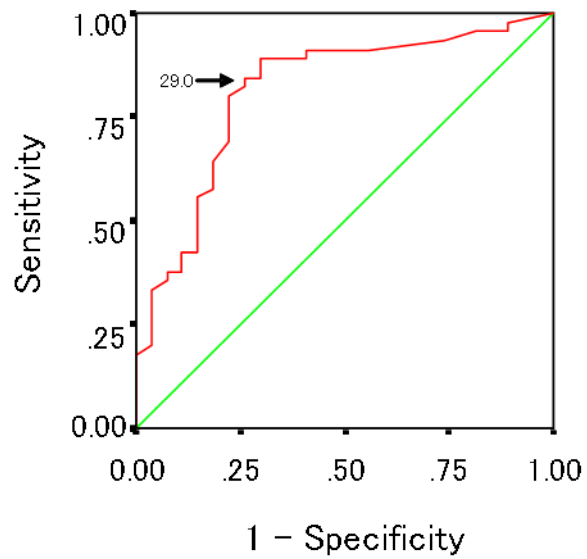


Figure 1: ROC curve for admission BBS to discriminate between not-fallers and fallers with stroke patients (AUC=81%, P=0.0001)

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Clinical and Physiological Outcomes Improvement Following Core Stabilization Exercise on Patients with Clinical Lumbar Instability: Two Case Studies

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Objective: Clinical lumbar instability is one of causes of mechanical low back pain [1]. It is defined as a loss of spine ability to maintain its pattern of displacement under physiologic load so there is no initial or additional neurologic deficit, major deformity and incapacitating pain [2]. Clinical lumbar instability results from dysfunction of one or more subsystems of spinal stabilizing system including active stabilizing, passive stabilizing and neural control subsystems. A core stabilization exercise is empirically used for clinical lumbar instability; however, no previous study had reported the realistically beneficial effect of core stabilization exercise on patients with clinical lumbar instability.

The objective of the study was to describe clinical and physiological outcomes improvement following core stabilization exercise on two patients with clinical lumbar instability.

Material/Methods: Two patients with clinical lumbar instability (1 male and 1 female), aged of 28 and 29 years respectively, participated in this study. The patients were assigned with the core stabilization exercise for 20 minutes session, two sessions per week over 10 weeks. Clinical outcome measure was the Roland-Morris Disability Questionnaire (RMDQ) and physiological outcome measure was a ratio activity of transversus abdominis/internal oblique (TrA/IO) and rectus abdominis (RA) muscles using surface electromyography. The RMDQ and ratio activity of TrA/IO and RA muscles were measured at pre-intervention period as baseline and 10 weeks of treatment session.

Results: Two patients exhibited improvement in functional disability and increasing of ratio activity of TrA/IO and RA muscles at 10 weeks of treatment session when compared to baseline.

Conclusion: Core stabilization exercise can provide the short term effect to improve functional ability and increase ratio activity of abdominal muscles in patients with clinical lumbar instability.

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Comparison of neurological symptomatic with electroencephalographic studies in boxers which moved mild traumatic brain injury

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Objective: The study of bioelectrical brain activity according to EEG in relation to neurological symptoms in boxers which moved mild traumatic brain injury.

Material/Methods: Were examined 48 highly skilled amateur boxers (champions and medalists championships of Ukraine, Europe and the World), duration of boxing training ranged from 5 to 14 years. Surveyed boxers were in the preparatory period. Observed group consisted of 36 men and 12 women aged from 18 to 32 years, the number of boxing matches ranged from 51 to 260, and the number of knock-downs from 2 to 15. Control group consisted of 30 men aged from 18 to 25 years who did not have a history of deferred traumatic brain injury. All patients underwent clinical and neurological study, studied brain activity in the electroencephalograph EEG-16C («DX-Systems», Ukraine).

Results: The main neurological complaints at the boxers were: headache – 34 observations, general weakness – 19, pain in the neck – 15, irritability – 14, loss of memory – 12, sleep disturbance – 10. In the study of the neurological status of the most frequently identified: smoothed the nasolabial folds – 24 observations, deviation of the tongue in the side – 22, unsteadiness in the Romberg position – 15. According to diffuse EEG changes irritative nature found in 34 observations. Local changes in the EEG, in particular, emphasis in the left fronto-temporal region recorded in 18 cases, emphasis in the left temporal region – 1, emphasis in the right fronto-temporal region – 2. The 3 boxers detected paroxysmal activity in the form of bilaterally synchronous sharp waves. Complexes, indicating dysfunction of stem-diencephalic structures, found in 22 observations, dysfunction of diencephalic structures – 7. Specific phenomena of the EEG in the analyzed cases are not detected. In the control group, 5 patients there were diffuse changes irritative nature, characteristics of local changes in the EEG is not revealed.

Conclusion: Clinical manifestations of neurologic symptoms in highly skilled amateur boxers have some connection with the nonspecific electroencephalographic changes that indicate interest in brain structures in response to previous mild traumatic brain injury.

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Development of a web-based educational program for risk management of concussions

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Objective: The appropriate assessment and management of sport-related concussion has drawn increased attention particularly during the past few years for a number of reasons. Recent research findings have established chronic changes to the brain as a result of repetitive trauma. Additionally, evidence of early stages of depression has also been reported in former athletes in their third and fourth decades of life, some leading to suicidal tendencies. As a result of the potentially traumatic consequences associated with sports-related concussion, increased litigation has become a reality, leading practitioners to become more aware of the most currently accepted guidelines for concussion management. The purpose of this presentation is to share an educational program devised by the authors that can be presented to healthcare providers, parents, coaches, and athletes informing them of the most current guidelines for concussion care.

Material/Methods: The authors have collaborated to establish a series of on-line courses with the focus of educating all constituents who may be exposed to concussions. Each course can be accessed on a central website regardless of one's location for viewing. Course development involved peer review and individual focus group feedback prior to completion. Feedback assisted to determine optimal course length for specific groups (healthcare provider versus parent). Courses are designed to be interactive, with modular based learning components comprising of post section quizzes. Courses are delivered in the language most appropriate for the recipient. For example, course for healthcare providers speak specifically to the evaluation process, including the SCAT2 assessment, and detailed neurophysiology. Courses designed for parents, coaches and student athletes are much shorter in length, and focus on the recognition of signs and symptoms, as well as the importance of not returning to play following a concussion without the clearance of a physician and the absence of all signs and symptoms.

Results: To date, users from all over the world have found the on-line model for concussion education to be a valuable resource. The educational program serves as a one-stop shop of information that is current, accurate, and easy to follow. The voice narration allows for the user to listen while viewing text information, videos, and images on each slide. Additionally, accompanying references are provided for the viewer to refer to should further information be sought. Healthcare providers can complete the course content in approximately 2 hours, and all others (coaches, parents, athletes) can complete their version in about 20 minutes.

Conclusion: The development of user-friendly, easily accessible programs can be very successful in educating mass amounts of constituents with timely and valuable information about concussions. The more people that become educated with regards to current concussion management the less likely the chances of catastrophic related injuries and subsequent lawsuits seeking negligence. Such programs can be shared internationally or developed locally for specific audiences. The online concussion education program serves as a model for future programs in other areas of risk management for sports medicine professionals.

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Effects of specific osteoporosis exercise on bone mineral density, bone metabolism, coordination/balance, muscle strength and endurance – a 2-year prospective study

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Objective: Patients with osteoporosis have a high risk of falling and thus osteoporotic fractures due to deficits in muscle strength, endurance, coordination and balance. Therefore, we aimed to evaluate the effects of specific osteoporosis exercises on these parameters.

Material/Methods: 42 patients with osteoporosis (mean age 68 ys.) receiving adequate calcium and vitamin D supplementation and bisphosphonate therapy were included. Of these, 17 patients served as control group without exercise and 25 patients underwent specific training once a week (exercise group). Outcome parameters at baseline and after 1 and 2 years included bone mineral density (BMD) of the lumbar spine and right femur, markers of bone metabolism (osteocalcin, crosslaps), as well as assessment of coordination, balance (standing on a balancing board and cone, "tandem standing"), muscle strength and endurance (chair rising test, standing on one leg), and pain (visual analogue scale 0-100 mm).

Results: After 2 years, the exercise group showed a significant increase in BMD of the right femur ($p < 0.02$), whereas the control group had a decrease of BMD. The exercise group showed a significant increase of osteocalcin levels after 1 and 2 years ($p < 0.01$) and a significant decrease of the crosslaps after 2 years. Both groups presented a tendency towards increased lumbar BMD as well as improved chair rising test results. Standing on one leg was significantly better after 1 year in both groups, but after 2 years only in the exercise group ($p < 0.01$). Both groups showed a tendency towards improvement in the balancing board test. However after 2 years, significantly improved results were found in the exercise group only ($p < 0.01$). The so-called cone test improved significantly after 1 ($p < 0.03$) and 2 years ($p < 0.01$) in the exercise group. Regarding "tandem standing", no amelioration could be observed in both groups during the follow-up period. A significant reduction of pain was detected only in the exercise group after 1 and 2 years ($p < 0.01$).

Conclusion: A standardised osteoporosis exercise programme once weekly causes significant positive effects on bone mineral density, bone metabolism and the risk of falling in patients with osteoporosis and osteoprotective medication. These results support the necessity for specific osteoporosis exercise. Of note, even once-weekly exercise appears to be sufficient to sustain these positive effects. Thus, osteoporosis exercise training is highly efficient, simple and cost-effective in daily practice.

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Electrophysiological and psychological indices of learning process in young adult subjects related to physical activity

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Objective: Regular long term physical activity (PA) promotes health and effective cognitive functioning. Electrophysiological and psychological indices of learning process were assessed in healthy young subjects concerning their level of physical activity.

Material/Methods: A number of 90 participants were divided into three groups, (each group consisted of 30 subjects, mean age 21.2 years): sedentary group (low level of PA), recreational group (moderate level of PA) and athletes group (high level of PA). We used Ray Auditory Verbal Learning Test to evaluate the ability to learn verbal information and EXG – electroexpectogram's paradigm to evaluate ability to adapt to cognitive demanding of experimental environment. We compared the learning curves obtained from EXG and RAVLT testing, between investigated groups.

Results: The physically active subjects (both groups) were significantly better than sedentary subjects in forming the multi-oscillatory EXG curves which is an indicator of successful cognitive adaptation during this cognitive electrophysiological paradigm. Results from RAVL testing showed that average value of the sum of the properly recalled items in sedentary individuals was 52.43 ± 5.67 ; in group with moderate level of PA average total score was 57.5 ± 5.42 ; in the athletes it was 59.63 ± 5.12 . The results gained in our study have shown that subjects who are involved in a long-term regular exercise display more successful learning curves during applied cognitive examinations.

Conclusion: Young adult subjects with higher level of physical activity had better cognitive performance during psychological and neurophysiologic assessment of learning process. Our outcome supports the hypothesis that physical activity has a positive impact on cognitive functions.

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Introduction of a balance test assembly with reference data of THA and TKA patients four weeks post operation

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Objective: Falls among elderly people and their consequences play an important (medical and financial) role for preventive medicine and rehabilitation [1]. Pajala et al. [2] showed an interconnection between higher CoP-movements and increased risk of falls on the basis of static balance evaluations. Patients with total arthroplasty of the hip (THA) or knee (TKA) show limitations in their stand stability due to muscular deficiencies and restrictions. Besides various studies regarding balance and stand stability in healthy people, only little data has been published concerning arthroplasty patients. Therefore it was the objective of this investigation to present a standardized test assembly including reference data of 112 hip and knee arthroplasty patients as a basis for stand stability evaluation.

Material/Methods: 112 patients (59♀, 53♂; 69±9a; 173±9cm; 81±16kg, THA n=67, TKA n=45) participated in this study. Evaluation of stand stability was assessed by means of a standardized test assembly with progression in the level of difficulty. At all times patients and test manager could interrupt the measurements due to safety or pain. The test assembly consisted of three parts: (1) Rombergtest (feet in comfortable, parallel stance; arms crossed and hands on opposite shoulder) with eyes open (REO) and eyes closed (REC); (2) Semitandem stand with left (STL) and right foot (STR) back (Hallux of posterior foot in contact with medial area of the calcaneus of the anterior foot; arms stretched out forward); (3) One legged stance on the left (EBL) and right (EBR) foot (arms in position as in REO and REC). All conditions were tested over a period of 20 sec [3] during which the patients were instructed to stand as still as possible. Pressure distribution was recorded by pressure plate (DIERS pedoscan) at 25 Hz and the CoP sway was determined. Absolute CoP length was calculated as a measure of stand stability. One-way ANOVA was performed with level of significance at 5 % ($\alpha=0,05$; Bonferroni correction).

Results: All 112 patients accomplished REO and REC, 75 % achieved STL/R and only 14 % managed EBL/R. This increasing difficulty in the test assembly can also be represented by total CoP length (Figure 1), which discriminates between test levels ($p<0,001$). Furthermore results of the achieved test level can be discriminated by total CoP length of REO ($p=0,03$) and REC ($p<0,001$). Post Hoc comparisons showed for total CoP length of REO differentiability only between levels REO/C and EBL/R ($p=0,029$), but for total CoP length of REC between levels REO/C and STL/R ($p=0,003$) as well as between REO/C and EBL/R ($p<0,001$). No difference was found between level STL/R and EBL/R at this parameter.

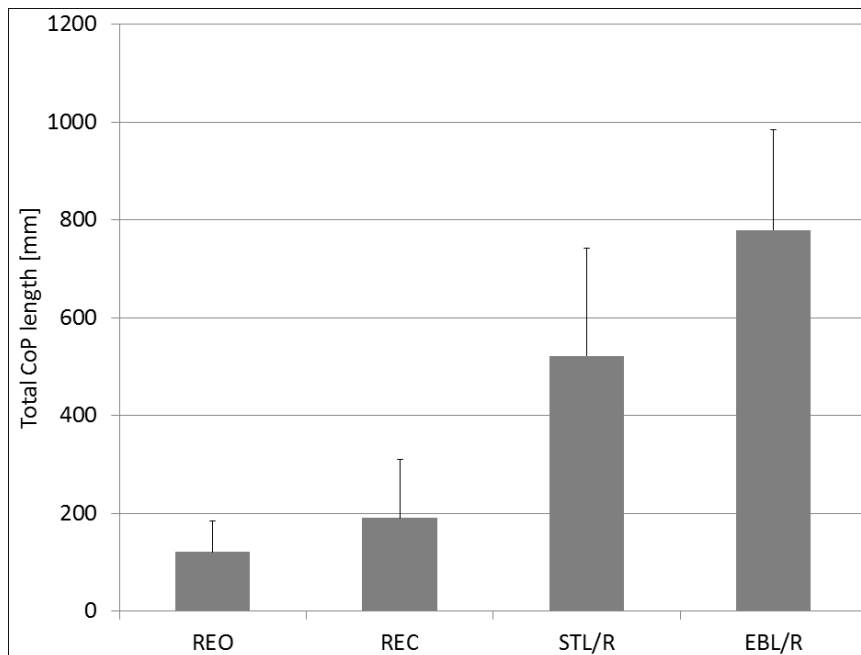


Figure 1

Conclusion: The examined balance test assembly shows, by virtue of its increasing level of difficulty, applicability in the classification of stand stability in THA and TKA patients. If necessary there is a shorter classification with bipedal stand and open eyes, by way of REO possible, distinguishing only between the groups achieving REO/C and EBL/R. There is also the possibility to reduce test procedure but discriminate between all three test levels by only accomplishing REC and identifying the different level achieving groups by total CoP length. Further investigations should extend the number of examined parameters. Collected data serve as a reference data base and shall be extended by future evaluations regarding stability values at earlier and later stages.

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Investigation of Health-Related Quality of Life in Physically Active Individuals with and without Amputation

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Objective: To investigate the health-related quality of life in individuals with and without amputation in relation to physical activity.

Material/Methods: The health-related quality of life (QoL) of 71 amputees was studied by using the standardised MOS SF 36 and a self-developed questionnaire investigating demographic variables, physical activity, and disabilities. The data were compared to the Federal German Health and Examination Survey 1998 cohort [1].

QoL in amputees was compared to a healthy control. QoL in physically active amputees was compared to amputees with a low physical activity level. Other disabilities like spastic paralysis and short stature were compared in terms of QoL.

The primary outcome variable was health-related quality of life using the German version of Short Form 36 (SF 36) with its eight specific domains physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. Statistical analysis was performed using Mann-Whitney U test. T-Test was used for determining significance in comparison to data from the literature.

Results: We found that the health related quality of life of amputees in comparison to a random sample of the Federal German Health and Examination Survey in 1998 representing the average population, is significantly lower in all dimensions of SF-36.

Amputees with high and low physical activity levels showed considerable difference in QoL being higher in physically active amputees.

Physically active amputees showed to be comparable to the healthy control sample in the SF-36 domains vitality, role-emotional and mental health.

Conclusion: Physical activity is significantly related to the health-related quality of life in amputees. Amputees should undergo post-amputation rehabilitation to facilitate higher physical activity levels and better quality of life.

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E: Prevention I

042

Acute effects of electrostimulation on muscle and bone biomarkers in recent spinal cord injured subjects

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Objective: The aim of the present study was to investigate the time-course response to surface electro-myostimulation (EMS) on bone and muscle biomarkers in men with recent spinal cord injury (SCI). Our hypothesis was that EMS might produce a release of both muscle and bone formation biomarkers beyond the basal levels, together with a reduction of muscle and bone destruction biomarkers.

Material/Methods: Seven recent spinal cord injured men (stage A according to ASIA scale after a neurophysiological examination) participated in this investigation after giving informed consent. The mean (\pm SD) time post injury, age, weight and height were 5 (\pm 1.2) weeks, 39 (\pm 13) yr, 73.6 (\pm 5.7) kg, and 1.77 (\pm 0.1) m; respectively. Blood samples were drawn at basal conditions, immediately after EMS (0 min) and 15 min, 30 min, 24 h and 48 h following the EMS protocol. Blood serum total testosterone (T) was measured by chemiluminescent microparticle immunoassay using ARCHITECT i2000SR (Abbott Laboratories S.A, Madrid, Spain). Serum cortisol (C) was measured by microparticle enzyme immunoassay using ARCHITECT c4000 (Abbott Laboratories S.A, Madrid, Spain). Serum osteocalcin (O) was analyzed by radioimmunoassay using a Diasource kit (Barcelona, Spain). Serum type I collagen C-telopeptide (CT) was analyzed by electrochemiluminescence using the E 170 module for MODULAR ANALYTICS (Roche Diagnostics, S.L., Madrid, Spain). Surface EMS of the quadriceps femoris was applied on a supine position at knee angles of 10°, 30°, 60° and 85° using a commercial stimulator. Values of pulse duration, pulse width, frequency and current amplitude were 6 s, 200 μ s, 30 Hz, and 10 to 140 mA; respectively. A total of 20 contractions per knee angle were applied during 47 minutes. The changes in T, C, O and CT over time from basal were studied using analysis of variance with repeated measures (SPSS for Windows, v. 16.0, Inc., Chicago, IL). A level of $P < 0.05$ was accepted as significant.

Results: The ANOVA did not revealed any significant difference on T, C, T/C ratio or O between any time points after EMS (Table 1). On the other hand, EMS induced significant changes on CT levels and O/CT ratio when measured immediately, 15 min and 30 min after EMS.

	Basal	0 min	15 min	30 min	24h	48h
T (ng/mL)	5.75 (1.92)	5.77 (1.39)	4.98 (1.78)	5.22 (1.5)	5.4 (1.63)	5.3 (1.77)
C (μ g/dL)	13.7 (5.44)	9.95 (2.15)	10.6 (5.15)	10.6 (5.16)	12.6 (4.48)	10.8 (3.23)
T/C ratio	0.48 (0.22)	0.6 (0.22)	0.56 (0.26)	0.58 (0.25)	0.49 (0.26)	0.53 (0.22)
O (ng/mL)	11.2 (5.6)	11.6 (4.04)	10.4 (4.08)	10.9 (3.82)	11.6 (5.16)	11.6 (5.56)
CT	1.27 (0.51)	0.88 (0.46)*	0.83 (0.43)*	0.77 (0.32)**	1.08 (0.42)	1.21 (0.55)
O/CT ratio	8.92 (3.55)	14.43 (4.56)*	13.96 (5.61)*	14.92 (4.93)** †	10.92 (3.93)	9.86 (1.82)

* $p < 0.05$ compared to Basal; ** $p < 0.01$; † $p < 0.05$ compared to post-48h

Table 1: Mean (\pm SD) of blood biomarkers at basal conditions, 0 min, 15 min, 30 min, 24h and 48h after EMS

Conclusion: This is the first study to provide some insight to the acute EMS effects on muscle and bone biomarkers in patients with such a recent SCI. In spite of the relatively low intensity EMS protocol used, it was shown to be effective to produce positive alteration in bone metabolism markers (i.e. decrease in CT). Muscle hormones were unaffected since the required contraction threshold [1] to induce positive effects on muscle (i.e. increase hypertrophy or reduce atrophy) was probably not reached.

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Eccentric endurance training affects isometric strength in overweight individuals

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Objective: Overweight and its severe consequences are known as activator and accessory symptom of lifestyle diseases [1]. As a part of exercise interventions of the current guidelines for the prevention of cardiovascular disease and type-II-diabetes strength training is a major topic [2]. Because of elevated blood pressure during strength training new exercise interventions are necessary to gain all benefits of strength training without possible harm. Three different types of muscle activity are known. Concentric exercise (CE) as a consequence of active motion where the muscle strength exceeds external force, eccentric exercise (EE) as a consequence of passive motion, where external force exceeds internal strength and isometric exercise without visible motion, where external force is equal to internal strength [3]. Daily exercise is a mixture of concentric and eccentric exercise for movement and isometric exercise for static work. Concentric exercise is needed more in hiking upwards, whereas hiking downwards includes eccentric exercise more. Eccentric endurance training mixes high muscle force loads with low cardiovascular effort [4]. Therefore we investigated the effects of eccentric endurance training on strength parameters in overweight healthy individuals.

Material/Methods: After acceptance from the institutional review board and the Ethics Committee of Vorarlberg physical examination 55 individuals (gender: 36f/19m; age: 50±10.8a; BMI: 28.4±4.5kg/m²) absolved an 8-week intervention of downhill walking with hiking poles with a minimum of three bouts per week (distance: 4.2km; height: 636m). Participants therefore used a cable car connection for reaching the beginning of the track. Usage of cable-car connection also recorded compliance. Pre- and post intervention testing was made for isometric strength on isometric leg press test device (CTT-isoLegPress TITAN; BFMC, Germany) with a computer-supported ankle adjustment at 110° of knee flexion. Further testing for isometric trunk strength was performed with CTT Kolossos (BFMC, Germany), which provides measurement of anatomic directions of thoracic and lumbar spine in frontal, sagittal and transversal direction. Therefore six measurements including sagittal flexion and extension, lateral flexion and rotation in both directions were recorded. Ten seconds after one attempt measurement started sequentially, beginning with the left side. Two attempts over 7 seconds with maximum effort were logged for each person pre and post interventional. Leg strength was given in Newton [N] whereas trunk strength was given in Newton meter [Nm] as torque. For statistical analysis the higher value was used. For interval scaled parameters with normal distribution students t-test was used to perform a comparison of means. Further analyses were made for correlations with training frequency. A statistical level of significance was accepted with 5% using SPSS 15.0 (IBM Corporation, USA).

Results: After exclusion of 3 participants because of missing hiking times compliance was 94.5%. Change in Body Mass Index was not reported for both gender (f: p=0.149; m: p=0.450). No difference in hiking times was reported (p=0.325). Because of a statistically significant difference in pretested strength parameters for male and female participants (p=0.035) further calculations were made separated for both groups. Improvement in isometric strength in lower extremities performing leg press was statistically significant only in women (left: 183.5 N [13.6 %], p=0.002; right: 161.3 [11.0 %], p=0.005). The improvement of leg strength in men was not given significantly (left: 93.8 N [5.5%], p=0.103; right: 37.1 N [2.0%], p=0.240). No statistically significant change in sagittal trunk flexion was recorded (p=0.567) for both sexes. Measurement for lateral flexion showed a decrease of isometric strength in both sides and for both sexes, but only statistically significant for women in right direction (12.4 Nm [11.7%], p=0.026). Changes in rotational strength parameters showed significance only for women in the left direction (5.6 Nm [8.1%], p=0.016). Correlation of hiking times showed significance with age ($r^2= 0.171$; $p<0.001$).

Conclusion: Despite lower cardiovascular stress eight weeks of eccentric endurance exercise show benefits in isometric leg and trunk muscle strength parameters in healthy overweight individuals. Therefore we recommend this exercise modality to sedentary overweight individuals.

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Effects of different exercise regimes on body composition and metabolism among overweight Emirati female military personnel: A cross-randomization study

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Objective: The purpose of this study was to assess the effect of two different supervised exercise regimens on body composition, physical fitness tests, and blood chemistry in sedentary, overweight and obese female military personnel.

Material/Methods: Seventy-nine overweight or obese female military personnel, with a mean age of 28.67 ± 4.9 year and a mean body weight of 92.60 ± 15.30 kg, were recruited from the United Arab Emirates Defence Forces. Participants were randomized into one of two groups. The intervention consisted of either running plus gym-based exercise (R&G group) (n = 40), or dance-based exercise plus ball-based exercise (D&B group) (n = 39). Participants in both groups were given similar dietary advice during the intervention period. Baseline and post-intervention testing involved the assessment of body composition, blood pressure, a fitness test and blood lipid profile. The exercise regime for the R&G group consisted of 60 minutes running plus 60 minutes of gym-based exercise, 4 times weekly for 12 weeks, while the D&B group exercise regimen consisted of 60 minutes of aerobic dance plus 60 minutes of ball-based exercise, 4 times weekly for 12 weeks.

Results: Body composition measures, including body weight, BMI, fat mass, percentage of body fat, waist circumference, as well as hip circumference decreased significantly over time ($P < 0.0001$) in both groups. All components of the physical fitness test (shuttle, push-up and sit-up) improved significantly over time ($P < 0.0001$) in both groups. The two exercise schemes produced only subtle differences in blood chemistry, e.g. total cholesterol level and low density lipoprotein (LDL) cholesterol were decreased significantly in R&G group ($P < 0.0001$), but not in D&B group.

Conclusion: Both exercise interventions resulted in significant improvements over time in numerous health and fitness variables in an overweight and obese population.

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Identifying individuals with an anterior cruciate ligament deficient knee as copers and non-copers: a narrative literature review

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Introduction: ACL rupture may result in increased tibiofemoral laxity and impaired neuromuscular function, which ultimately may lead to knee instability and dysfunction. Individuals who opt to choose surgery, due to these changes, may be defined as "non-copers". Conversely, "copers" may be defined as individuals with an ACL deficient knee who do not have functional impairment and instability and who successfully resume pre-injury activity levels without surgical intervention. This narrative literature review is designed to explore the differences and outcomes between individuals who have had anterior cruciate ligament (ACL) reconstruction and those who did not undergo surgical intervention following a tear of the ACL. Second, to review the evidence related to the ability to identify individuals who may or may not need surgery after an ACL rupture. Finally, to describe the differences between copers and non-copers.

Materials & Methods: An electronic search was conducted up to April 2011, using medical subject headings and free-text words. Subject-specific search was based on the terms "anterior cruciate ligament reconstruction versus conservative treatment", "copers", "non-copers".

Results: A similar percentage of copers and non-copers return to sporting activity. Three papers used an algorithm and screening examination involving individuals with ACL injuries. Evidence exists that, as opposed to copers, non-copers have: deficits in quadriceps strength, vastus lateralis atrophy, quadriceps activation deficits, altered knee movement patterns, reduced knee flexion moment, and greater quadriceps/hamstring co-contraction.

Conclusions: ACL screening examination shows preliminary evidence for detecting potential copers. Objective differences exist between copers and non-copers. Individuals with ACL injury should be informed of the possibility of good knee function following a non-operative rehabilitation program.

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Musculoskeletal Adaptation to Resistance Exercise in Older Women with Knee Osteoarthritis and Total Knee Arthroplasty

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Objective: Lower-extremity strength deficits are commonly reported in women with knee osteoarthritis (OA) or total knee arthroplasty (TKA), and may markedly reduce functional capacity and balance [1]. Resistance exercise (RE) is an effective method to improve muscle mass and strength [2], [3]. However, little is known about musculoskeletal adaptation to RE in TKA and knee OA patients. Our purpose was to analyze musculoskeletal adaptation to RE in older women with TKA and knee OA.

Material/Methods: Seven older women with TKA and knee OA in the contralateral limb (OKG; 75.3±3.1 years), and sixteen older (OG; N=8; 64.4±6.5 years) and young (YG; N=8; 23.9±3.8 years) women without musculoskeletal limitations underwent a twice-a-week RE program for 13 weeks (2 sets of 8 to 12 repetitions of unilateral leg press, knee curl and calf raise exercises in both legs). Initial RE intensity was set at 60% of 1 repetition maximum (1-RM) strength of the weaker leg, and it was increased in 5% to 10% each time 2 sets of 12 repetitions were performed in a determined exercise (both legs). Muscle strength was assessed before and after RE program by 1-RM strength test.

Results: OKG displayed lower ($P<0.01$) baseline 1-RM strength than OG ($27.7\pm 10.11\%$) and YG ($57.4\pm 11.75\%$), and baseline 1-RM strength of OKG was lower ($P=0.007$) in the OA (2.88 ± 0.47 kg.kg-0.67) than TKA leg (3.75 ± 0.41 kg.kg-0.67). Muscle strength improved significantly after RE training in all groups ($P<0.001$); however, 1-RM strength increase of OKG was greater ($P<0.05$) in the OA ($62.2\pm 11.6\%$) than TKA leg ($38.9\pm 6.0\%$), and greater than YG ($25.2\pm 11.9\%$) and OG ($37.7\pm 20.7\%$) increase. The greater RE induced 1-RM strength increase of OA leg reduced the 1-RM strength deficits between legs in OKG ($23.4\pm 7.4\%$ vs. $10.8\pm 7.7\%$, $P=0.02$). OKG also displayed greater RE intensity progression than YG and OG at leg press (OKG= $103.6\pm 33.6\%$; OG= $36.6\pm 17.8\%$; YG= $40.0\pm 16.9\%$; $P<0.001$) and calf raise (OKG= $80.1\pm 21.2\%$; OG= $40.4\pm 12.4\%$; YG= $32.4\pm 13.9\%$; $P<0.05$), and greater than YG at knee curl (OKG= $142.2\pm 42.6\%$; YG= $43.1\pm 17.4\%$; $P<0.01$).

Conclusion: The OA leg of OKG displayed greater RE-induced muscle strength than TKA leg of OKG, and both legs of OG and YG. OKG also showed greater RE intensity progression than OG and YG. These results suggest that RE is an effective method to counteract the lower-extremity strength deficits reported in women with knee OA and TKA.

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Neuromuscular patterns in chronic ankle instability

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Objective: Ankle sprains are the most frequent injury in sports. Up to 40% of acute sprains develop chronic ankle instability (CAI). CAI must be seen either as mechanical (ligamentous) instability or functional (neuromuscular) instability. So far, no method is known to objectivate functional instability. The purpose of the study was to measure neuromuscular patterns in patients with mechanical ligamentous CAI

Material/Methods: 15 patients (age 15-58 years) were included evidencing chronic unilateral mechanical ankle instability undergoing ligament reconstruction. As control, the contralateral healthy ankle and 15 sex- and age-matched participants were used. Superficial Electromyography (EMG) analysis of four muscles were recorded: gastrocnemius medialis (GM), tibialis anterior (TA), peroneus longus (PL), and soleus (SO) while the patient performed single stance tests on a Biodex Balance System (BBS). EMG was analyzed by intensity and frequency using Wavelet Transformation. Neuromuscular control was analyzed by the results of the BBS.

Results: CAI patients showed significantly decreased results in neuromuscular ankle joint control correlating to increased ankle pain. EMG analysis showed a significant decrease in frequency recruitment for the PL (average frequency, 138.8 Hz for the unstable ankle versus 158.3 Hz for the contralateral healthy side, $p < 0.001$). Instead, no change in intensity was found for the PL. For the GM, TA, and SO, changes neither for intensity, nor frequency were found

Conclusion: This shift of frequency in the PL muscle due to chronic ligamentous ankle instability is the sign of lower muscle activation coming along with type II muscle atrophy. This is the first study to report on the fact that functional ankle instability may be measured as muscle damage seen by a shift in EMG frequency. Therefore, prevention and rehabilitation of chronic ligamentous instability has to address also a functional chronic muscle damage.

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The prevention of injuries in American flag football in Israel: a one-year pilot study

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Introduction: American Flag Football (AFF) is becoming a very popular amateur sport in Israel, with over 85 teams and 1100 players. Although it is a non-tackle sport, many moderate-severe contact-type injuries have been reported. The author conducted a two-season prospective cohort injury surveillance study (historical cohort) over the 2007-9 playing seasons. The purpose of this study was to introduce a one-season (2010/11 winter league), longitudinal, prospective injury pilot prevention program in an attempt to significantly reduce the incidence and the severity of sports-related injuries in American flag football in Israel (AFI). The results were compared to the historical cohort.

Materials and Methods: A total of 724 amateur male (n=610) and female (n=114) players (ave. age 20.49 SD=3.791) participated in the study (injury prevention cohort). Four intervention methods were introduced. The no pocket rule was enforced, mouth guards, ankle braces and a pre-season information brochure were distributed. All time-loss injuries sustained in game sessions were recorded by the off-the-field medical personnel. This was followed up by a more detailed phone questionnaire by the author, 7-14 days following the injury.

Results: There was a highly statistically significant reduction in the number of finger injuries related to fingers being caught in the opposition player's pockets as well as in the number of ankle sprains ($p < 0.01$). There was no statistically significant difference in the severity nor in the incidence of facial injuries.

Conclusions: This pilot prevention program demonstrates that the intervention methods introduced, resulted in a highly significant reduction of both finger and ankle injuries. This pilot program will form the basis of a further two-season longitudinal, prospective injury prevention study, the recommendations of which will be sent to the AFI for implementation, as well as, to the various organizations responsible for the game of American flag football worldwide.

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F: Kinesiology & Biomechanics I

049

3D gait analysis of early Parkinson's disease and healthy elderly subjects: What is the difference?

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Objective: To compare the spatiotemporal and kinematics parameters of 3D gait analysis in early PD with the healthy elderly.

Material/Methods: Ten patients with early PD, stage 1 and 2 Hoehn and Yahr Modified Scale and ten healthy elderly subjects were recruited and evaluated for spatiotemporal and kinematics parameters of 3D gait analysis.

Results: There were statistically significant differences between healthy elderly group and the early PD group, in stride velocity, stride length, and in the hip joint kinematics data: on initial contact, on maximum extension during terminal contact and on maximum flexion during mid-swing.

Conclusion: The 3D gait analysis significantly characterized the difference between early PD and normal healthy elderly.

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Accessory soleus muscle: A case report and review of the literature

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Objective: The purpose of this work was to present a case report of a patient with bilateral accessory soleus muscle treated conservatively and to review the literature on this subject.

Material/Methods: The authors reviewed the pertinent findings of the previously reported cases of accessory soleus muscle cited in the literature and the characteristic features, diagnostic methods, and treatment indications and modalities on this subject.

Results: The authors report a symptomatic bilateral accessory soleus muscle in a 19-year-old female that was diagnosed on MRI. The patient experienced pain posteromedial to both ankles, gradually increasing with activity (walking and/or running). The symptoms were relieved by rest. On physical examination, there was a noticeable decrease in the ankles range of motion as well as bilateral equinus. Initial MRI showed a mass with signal characteristics of normal muscle, but in an abnormal location. Following a carefully guided physical therapy program the outcome was very good, the patient's painful symptoms were relieved and she had nearly complete joint movement with symmetrical muscle force. Normal activities were resumed.

Conclusion: The accessory soleus muscle is a rare anatomical variant which, although congenital in origin, may manifest in the second and third decades of life. The delay of onset of symptoms until adolescence is probably due to the increase in muscle mass and muscle activity. This anomaly, although more commonly presenting as an asymptomatic soft tissue mass bulging medially between the distal part of the tibia and the Achilles tendon, may give rise to symptoms such as pain with exertion and swelling. In rare cases it can be associated with clubfoot or equinus deformity. MRI is the diagnostic modality of choice enabling confirmation of the muscle nature of the mass and ruling out the possible diagnosis of tumor. It also demonstrates the muscle's origin and insertion. The differential diagnosis of a soft tissue mass in the posteromedial aspect of the ankle includes ganglion, lipoma, haemangioma, encapsulated haemangioma, synovioma, sarcoma and haematoma. The key to the differentiation from other lesions is the finding of MRI signal characteristics that are identical to those of muscle, the well-encapsulated nature of the mass and the typical anatomic location. Treatment usually depends on the presence or severity of the symptoms. If a diagnosis of accessory soleus is made, and the patient has no symptoms, observation is recommended. For symptomatic patients, conservative treatment such as orthoses, physical therapy and activity modification may be tried. Surgical approaches include fasciotomy or excision of the muscle. Both have been found to be equally effective. Patients generally do well after surgery and generally become asymptomatic.

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Anatomical variations of the vastus medialis muscle

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Objective: A lack of standardization and agreement toward the approach of patellofemoral assessment and interventions lead to a plethora of unsubstantiated outcomes. It was hypothesized that the anatomical location of the vastus medialis oblique plays a determinant role. Thus, the objective of this study was to identify the anatomical location of the vastus medialis muscle insertion into the patella.

Material/Methods: Fourteen (14) cadavers were measured (28 knees total) for accessibility of the Vastus Medialis Obliquus (VMO) muscle insertion. Subjects were of equal gender comprising 7 each. Most cadavers required cutting of fascia, adipose, and other tissues for identifying purposes of the actual attachment site. Two independent investigators were trained to take measurements from the apex of the patella to the most distal VMO fibers (cm) at a perpendicular intersection. The Intra-rater reliability ICC = .79 (>.75=good) was established.

Results: Descriptive statistics were used to compare the attachment sites amongst cadaveric specimens. Variations of up to 5mm for both male and female cadavers were noted related to the overall distal length (Average right male VMO: 18.3 mm, average left male VMO: 18.9 mm; Average right female VMO: 18.4 mm, Average left female VMO: 17.3 mm. The VMO to the patella ratio was also measured with only smaller differences in variation (Male VMO to patella ratio: Right 0.34:1 mm, Left 0.38:1 mm; Female VMO to patella ratio: Right 0.37:1 mm, Left 0.35:1 mm.

Conclusion: Successful rehabilitation for patellofemoral conditions has been reported as a quandary by sports medicine practitioners. One multi-factorial dilemma often discussed contributing to the challenge of decreasing a person's knee pain is the VMO muscle attachment site, firing pattern, and frequent atrophy. The purpose of this study was to assess any varying muscle attachment patterns as a possible explanation of rehabilitation success versus failure. Our findings indicate that there are no clear differences between males and females, or left versus right, on average, for the VMO insertion. Limitations of this study include the age of the cadavers, the difficulty in identifying the exact location of the fiber insertion, and the overall condition of the cadavers versus actual in vivo tissue measurements. Future studies of this are encouraged to determine if there are clinical implications related to the vasti attachment that may be able to predict successful outcomes.

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Baropodometric behavior of foot in cycling in elite route. Simulation by means of 4 controlled tests

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Objective: Biomechanics is a science that has been applied from different points of view in Cycling. Due to it's a cyclical exercise, this science is more important than in other Sports. Therefore an optimal configuration in the symbiosis bike-rider guarantees a better performance. One of the most complicated item to study in the biomechanics of complex bike-rider is the transferred forces to the pedal. The baropodometry applied in cycling can know quantitatively the distribution of support forces that the foot exerts on the boot and this on the pedal. For the time being literature is not accurate in describing the distribution of plantar pressures and the methodology that was used to establish relationships between parameters such as pedaling cadence or power should be revised. The objective of this study is to first establish a base on foot baropodometric behavior in the road cycling. Second is to establish which parameters changes plantar pressures and which not.

Material/Methods: The study sample consists of 50 professional cyclists from different countries, the mean age is 25.7 ± 4.4 years, the mean weight is 68.78 ± 7.67 kg, the mean height of 1.78 ± 7 , 27 meters high and mean training is 27.9 ± 2.4 hours per week. All of them are active and show no previous symptoms. The baropodometric study was performed by Biofoot 6.0[®]. The sample collection protocol was based on 4 tests on a static Roller, 2 of them which changes the cadence keeping the power (80ppm, 100ppm / 180w) and in the other two tests the power was modified keeping the cadence (100ppm / 180w, 250w). Baropodometric data were compared with cyclist's biomechanical parameters (metatarsal formula, type of cleats, foot posture index, dominance, weight, hours of training, joint range of dorsiflexion of the foot, range of internal and external rotation of hip). The statistics are based on bivariate correlations for joint ranges and plantar pressures, and in an ANOVAS series for morphological parameters).

Results: Significant differences were found among all baropodometric tests, both in the variation of cadence and power variation in all areas (first test in first toe $147 \text{ kPa} \pm 133$; second test in first toe $183 \text{ kPa} \pm 173$; third test in first toe 378 ± 331 ; fourth test in first toe $640 \text{ kPa} \pm 446$). The areas that received more pressure are the first finger ($640 \text{ kPa} \pm 446,3$) and the first metatarsal ($738 \text{ kPa} \pm 528$), and areas that received less pressure were medial arch ($106 \text{ kPa} \pm 72$) and the heel ($120 \text{ kPa} \pm 90$). Regarding the modifying factors studied were significant differences in foot posture index, cyclist weight and type of cleats (rigid or mobile). All anatomical ranges studied (hip and ankle) had statistically significant, but only in certain areas (midfoot and first toe).

Conclusion: Knowing the pressure distribution pattern is helpful in the interpretation of the biomechanics of cycling, however should be considered that there are certain parameters, morphological (the bike), mechanical (the bike or boots) that modify plantar pressure and therefore the transferred forces. The optimization of all variables would improve the biomechanics and therefore the performance.

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Changes in ankle joint position sense in elite female handball-players as a result of a special injury-prevention training

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Objective: In an earlier study, where a special neuromuscular training was applied in a therapeutic fashion for 6 weeks on young athletes with chronic lateral talocrural instability we observed, that the proprioceptive sensory function of the ankle plantarflexors on the injured side didn't differ significantly from healthy controls before the start of the programme. However at follow-up this function improved vastly and became significantly better, compared to controls. This could be interpreted as an indirect sign on the preventive effect of the training. With an epidemiologically already proven preventive effect of this neuromuscular training on ankle ligament injuries, the main goal of this study was to prove the positive effect on ankle proprioception with the training being applied in a preventive fashion in elite athletes of a high-risk sport.

Material/Methods: First, in order to identify the sport with the highest injury-risk, we defined the sport-specific incidence of ankle injuries based on comparable literature data. Processing 119 relevant papers in full-text, we have found that handball features the highest injury frequency rates for ankle injuries, leading to 2.14 injuries in 1000 playing hours. In accordance with these epidemiological findings we examined ankle joint position sense function measuring 20 ankles of 10 elite-level players of a female handball club. For the measurements we applied the slope-box test, first described by Robbins et al. The test was performed before the special drills were incorporated into the team's regular training regimen and 20 months later, measuring joint position sense on 11 different slope amplitudes in four directions (anterior, posterior, lateral and medial) each on both ankles.

Results: Proprioceptive sensory function of the measured ankles improved with a high significance ($p < 0.0001$; avg. mean estimate error improvement: 1.77°). This improvement was also highly significant ($p < 0.0002$) in each single direction, with avg. mean estimate error improvement varying between 1.59° (posterior direction) and 2.03° (anterior direction). These changes were also strongly significant when these handball-players were compared to a control-group of healthy athletes from our previous studies. Regarding improvement between single directions, and also between dominant and non-dominant sides, no significant differences could be observed. As an indicator of the actual preventive effect by means of lowering injury incidence, results of this group (62% fewer ankle injuries) were similar to those of earlier epidemiological studies, investigating larger samples.

Conclusion: In our series of studies the positive effect of this special neuromuscular training on ankle proprioception was proven both when applied in a therapeutic and a preventive fashion. This justifies the name "proprioceptive training" for this preventive method. In comparison to the therapeutic group it can be stated, that in patients with chronic lateral talocrural instability proprioceptive training should be continued on long-term at a lower intensity after it was successfully applied therapeutically. We consider the incorporation of proprioceptive drills into the regular training regimen in contact team sports indispensable, in other sports recommended for the prevention of ankle injuries.

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Clinical Patterns and Injury Exposure Rates in Elite Road Cycling Are Changing over the Last Decade

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Objective: Different factors such as the recent bicycle technical improvements and the new training tools and conditioning protocols might have an incidence of injury occurrence in professional cycling. This issue has been not yet investigated.

This work was aimed at analyzing changes in injury clinical patterns and incidence within a group of elite cycling racers still in active and comparing injury rates with those reported for an historical group competing in 80's and early 90's.

Material/Methods: Injury/cyclist ratio was 1.32 in the HG and 2.13 in the CS. Traumatic injuries increased from 39.5% (HG) to 53.9% (CS) ($p < 0,05$). This increased did not mean greater severity. AIS severe traumatic lesions decrease from 49.9% in the HG to 10.5% in the CS. Tendinopathies around the knee (32.6%) and at the Achilles' tendon (15.4%) were the most common overuse injuries in the HG. Patellofemoral pain due to overuse decreased from 28.8% (HG) to 6.1% (CS). Muscle injuries implying absence of competition were only seen at the low back (13.4%) in the HG. Contrary, 50.7% of overuse injuries were due to muscle lesions in the CS group: 29.2% at the low back and 21.5% in muscles of the lower extremity. In HG racers, the rates of risk for traumatic injury were 0.104 per year/cyclist, and 0.003 per 1000 km of training and competition. This figures increased to 0.287 and 0.009 respectively in the CS group. The injury rates for overuse showed a lower increment.

Results: Professional cyclists still in active are exposed to a double risk of traumatic injuries than those competing in the 80's and early 90's. However, these lesions have less severity. Overuse injuries had a complete different clinical pattern in the current active cyclist; there were much more muscle injuries and less tendinous lesions than in the historical group.

Conclusion: Prevention programs should be reevaluated and focused on this new clinical nature of injuries.

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Dynamic baropodometric analysis of athletes with medial tibial stress syndrome

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Objective: Medial tibial stress syndrome (MTSS) is one of the most common overload leg injuries in athletes. Excessive pronation of the foot while standing has been found to be intrinsic risk factors in multiple prospective studies. The mid and the hindfoot has been less focused on the literature. The objective of this work was to dynamically assess the plantar pressure distribution in athletes suffering from MTSS with special reference to the posterior aspect of the foot.

Material/Methods: Dynamic foot pressure measurements were analyzed in 25 athletes (15 men and 10 women) of high competitive level with symptoms of MTSS (38 tibias) along a year season. Average age was 18 years, height 180 cm, weight 60,9 kg and BMI 20.9. There were 17 athletes practicing a cyclic-aerobic athletics modality and 8 performing an explosive-anaerobic type of exercise. Control group consisted on 20 healthy athletes (12 men and 8 women) of the same competitive level and matched in age, weight, BMI and training hours. An insoles system (Biofoot®/IBV) with telemetry transmission information was used to record the pattern of plantar loadings. The plantar surface of foot was divided in 3 zones (hindfoot, midfoot, forefoot) that, in turn, were divided in 3 subareas (medial, central and lateral). Dynamical measurements were recorded during free running.

Results: Among symptomatic athletes there were 28% with hyperpronated foot. Total plantar pressure was higher in controls than in MTSS athletes but with the same distribution by hindfoot, midfoot, and forefoot. As compared to healthy athletes, those with MTSS showed a different load distribution in the digital areas with lower average pressure at the central digits (850 kPa vs 1400 kPa; $p < 0.05$) and more percentage of the total load of the digital areas on the first toe ((37% vs 24%; $p < 0.05$). In the metatarsal areas, average total pressures were lower in MTSS athletes being significant only at the first metatarsal region (620 KPa vs 1050 kPa; $p < 0.01$). At the midfoot, athletes with MTSS had more percentage of the total load on the lateral region (68% on the lateral and 32% on the medial midfoot). Healthy athletes had an inverse distribution (38% on the lateral midfoot and 62% on the medial aspect). These differences were clearly significant on both midfoot sides ($p < 0.01$). In the talar region MTSS athletes had also lower average total load than healthy controls (790 kPa vs 1270 kPa; $p < 0.01$). When pressures were analyzed according to the time sequence of plantar loading, MTSS athletes first loaded the talar region, second the lateral midfoot and afterwards the medial aspect of the midfoot. More interesting was the early discharge of the talar region that was seen at an average of 31.6% of the total period of the footprint. Healthy athletes discharged the talar region at an average of 76.3% of the total footprint period ($p < 0.001$).

Conclusion: Athletes with MTSS showed a different mechanical pattern during gait. The baropodometric findings indicated that in MTSS athletes the foot had an attitude of equino-varus talus due to retraction of the muscles of both superficial and deep posterior tibial compartments. This study emphasizes the importance of baropodometric studies in top athletes in order to improve the biomechanical strategy to prevent overload injuries.

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G: Prevention II

056

Normalization of muscle strength: What is the optimal method?

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Objective: It is well recognized that muscle strength is influenced by body mass. In the assessment of muscle strength, either clinically or in research studies, normalization for body mass is thus often recommended. However, there is a lack of consensus on the best method for normalizing muscle strength measures. We therefore sought to compare various methods recommended in the literature to normalize knee extension strength (both force and torque) in a community-based cohort of young men and women.

Material/Methods: In 24 men and 25 women, representing a random sample of community adults aged 20 to 29 years, we assessed both isometric knee extension force (in Newtons [N]) and torque (in N-meters [N-m]) using a custom-built chair dynamometer. Total lean muscle mass was measured from whole body DXA scans. Skeletal muscle mass was estimated using the appendicular lean muscle mass from the arms and legs regions from these scans multiplied by 1.33, while leg lean mass was determined from the leg region of scans. Using ratio standards, we normalized knee extension force for each subject by different measures of body mass (in N): total weight, lean mass, skeletal mass and lean leg mass. Knee extension torque was normalized using each of these same measures of mass as well as by height (in m). For knee extension force and torque respectively, the coefficient of variability (CV) of their normalized variables was determined, and the one with the lowest CV was considered the optimal normalization method for each measure of strength. Men and women were analyzed separately.

Results: In men as well as women, normalization of knee extension force using skeletal mass yielded the smallest CV, followed by normalization using leg lean mass. The highest CV was normalization by body weight. For knee extension torque, again in both men and women, the smallest CV was normalization by skeletal mass and height, followed by leg lean mass and height. The highest CV was with normalization by weight and height.

Conclusion: In a community-based sample of young adults, we found that using skeletal mass measurements derived from DXA scans was the optimal method for normalizing knee extension strength, either force or torque. However, normalizing by body weight, which is by far the most common approach used in the literature, appeared to be the least favorable method.

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Sex-related differences in muscle strength are due to differences in muscle mass not muscle quality

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Objective: In the general population, men, on average, are stronger than women. However, it remains unclear whether the sex-related differences in muscle strength observed are due to greater skeletal muscle mass in men or also to qualitative differences in skeletal muscle between men and women. The aim of this study was to investigate whether differences between men and women in muscle strength, as measured by isometric knee extension force and torque, persist after normalization by skeletal mass using an age-stratified, random sample of community men and women.

Material/Methods: In 311 men (mean age, 56 yrs; range, 23–91 yrs) and 356 women (mean age, 57 yrs; range, 21–97 yrs) representing an age-stratified, random sample of community adults, we assessed both isometric knee extension force (in Newtons [N]) and torque (in N-meters [N-m]) using a custom-built chair dynamometer. Total lean muscle mass was measured from whole body DXA scans. Skeletal muscle mass was estimated using the appendicular lean muscle mass from the arms and legs regions from these scans multiplied by 1.33. Using ratio standards, we normalized knee extension force for each subject by total skeletal mass. Knee extension torque was normalized using skeletal mass as well as by height (in m). Then, for each decade in age strata (20–29 yrs, 30–39 yrs, etc), we compared isometric knee extension force and torque between men and women, before and after normalization.

Results: Non-normalized knee extension force and torque were both significantly higher in men than in women across all age strata. However, when we normalized by skeletal mass (for force) or by skeletal mass and height (for torque), there was no significant difference between men and women in either strength measure and results were consistent across all age groups.

Conclusion: Although we found that knee extension strength was greater in men than women across all age groups, these differences were no longer apparent after normalization for skeletal mass. These results suggest that sex-related differences in strength are attributable to differences in muscle mass, rather than muscle quality between sexes, even with aging.

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The Effects of Resistance Training on Visceral Adipose Tissue and Inflammatory Response: A Meta-Analysis

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Objective: Whether resistance training (RT) alters visceral fat and several proinflammatory cytokines produced in adipose tissue has not been convincingly established. The objective of this review was (1) to perform a meta-analysis of randomized controlled trials (RCT) regarding the effect of RT on a) visceral adipose tissue (VAT) and b) on specific biomarkers of inflammation, i.e. adiponectin, leptin, C-reactive protein (CRP), interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF- α). One additional aim was (2) to investigate the potential of a dose-response relationship between RT variables (duration, intensity, volume) and assessed outcomes.

Material/Methods: Studies were retrieved by searching MEDLINE and Cochrane Library (1990–December 2010). Studies were included if they were RCTs comparing RT with an exercise or non-exercise control group among sedentary healthy or overweight/obese adults. 21 RCTs met our inclusion criteria. We performed random effects meta-analysis to determine weighted mean differences (WMD) with 95% confidence intervals using the software package Review Manager 5.0 of the Cochrane Collaboration. A random-effects meta-regression model was performed to examine dose-response relationships between RT variables and assessed outcomes.

Results: RT reduced VAT by 10.77 cm² (95%CI: -20.94 to -0.59, p=0.04) or 0.19 liter (95%CI: -0.37 to -0.01, p=0.04). The pooled reduction in CRP was 0.23mg/liter (95%CI: -0.41 to -0.04, p=0.02) (Table 1). There was no statistically significant effect of RT on serum concentration of adiponectin, leptin, IL-6 and TNF- α . Further, it appears that there is a dose-response relationship between RT intensity and adiponectin – i.e., that higher intensity RT leads to additional benefits – and RT duration and leptin. However, additional research will be necessary to confirm these findings.

Outcomes	No Studies	Sample size	WMD	95% CI	p-value	I ² (%)
VAT						
VAT (cm ²)	6	311	-10.77	-20.94 to -0.59	0.04	30
VAT (L)	5	152	-0.19	-0.37 to -0.01	0.04	0
Cytokines						
AD (μ g/ml)	6	197	0.57	-0.82 to 1.96	0.42	54
LP (ng/ml)	6	175	-0.44	-1.71 to 0.82	0.49	78
CRP (mg/l)	7	413	-0.23	-0.41 to -0.04	0.02	11
IL-6 (pg/ml)	5	249	-0.23	-0.59 to 0.13	0.20	28
TNF- α (pg/ml)	5	204	0.12	-0.15 to 0.38	0.40	0

I² = inconsistency

Table 1: Pooled estimates of effect size (95% confidence intervals) expressed as weighted mean difference (WMD) for the effect of RT on visceral adipose tissue (VAT) and serum concentration of adiponectin (AD), leptin (LP), C-reactive protein (CRP), interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF α).

Conclusion: In summary, this meta-analysis found that RT significantly decreases visceral fat and seems to be effective in reducing resting levels of serum CRP, and therefore should be recommended in the management of obesity.

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The influence of a medical compression-sock on fatigue

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Objective: The fatigue resistance is an essential factor in training and competition in most sports and demanding exercise [1]. The purpose of this study was to assess if the use of medically prescribed compression-sock (CS) reduces fatigue during intense exercise and positively influences the electromyographic activity of gastrocnemius muscle.

Material/Methods: Forty subjects (20 males and 20 females with a mean age of 28.7 ± 7.3 yrs) performed 60 consecutive maximal toe-raises (plantar flexion). The frequency of plantar flexion lasted about 3s per plantar flexion and was controlled via a metronome and recorded via Optojump (Microgate, Bolzano, Italy) measuring instrument. After 10 min recovery, we conducted the second trial identical to the first trial. During the first trial of 60 plantar flexion exercises, the subject wore the CS on dominant or non-dominant leg. Only one lower leg used the CS and the sequence of first exercise trial was conducted in random order. At the end of first trial we removed the CS from the leg and in the middle of recovery phase (after 5 min) we applied the CS to the opposite leg. The electromyographic measurements were conducted via bipolar surface electrodes measuring both gastrocnemius muscle heads (long and short head).

Results: Our data revealed that electromyographic signals were significantly lower ($p < 0.05$) during both trials as well as during recovery phase with CS on vs. trials without CS.

Conclusion: The reduction in electromyographic signals with CS suggests that there was greater resistance to fatigue compared to no CS. This may be due to an increased venous return that was enhanced via CS and an increased venous circulation that may have influenced the removal of local waste products formed in gastrocnemius muscle [2].

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H: Kinesiology & Biomechanics II

060

Effect of repetitive instep kick on ankle plantar flexion angle on ball impact

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Objective: Os trigonum syndrome, known as posterior ankle impingement syndrome, is caused by repetitive stress from ankle plantar flexion due to kicking in soccer players. Our recent study showed that the angle of maximal ankle plantar flexion angle on ball impact does not exceed that of passive plantar flexion (2010). The purpose of this study was to demonstrate a gradual change in the angle of maximal plantar flexion during repetitive instep kick. We hypothesized that repetitive instep kicking increases the maximal ankle plantar flexion angle on ball impact, by causing fatigue of the tibialis anterior and repetitive stress of the periarticular tissues.

Material/Methods: Eight male university soccer players participated in this study. The subjects performed 11 sets of 3 maximal instep kicks. Among each sets, they repeated 10 maximal instep kicks. Before and after the experiments, isometric muscle strength of ankle dorsal flexion and passive plantar flexion were measured. The movements of the kicking legs on ball impact were captured using 3 high-speed cameras (4 Assist, Japan) at 200 Hz. The direct linear transformation method was used with a digitizing system (Ditect, Japan) to obtain 3D coordinates. One-way ANOVA was used to compare the maximal ankle plantar flexion angle on ball impact among the sets. Student's t-test was used to compare the isometric muscle strength of ankle dorsal flexion and the passive plantar flexion. $P < 0.05$ was considered significant. Data analyses were performed using SPSS (IBM, Japan).

Results: There were significant differences in the isometric strength of ankle dorsal flexion ($272.9 \pm 44.3\text{N}$ vs. $182.1 \pm 59.8\text{N}$) and the angle of passive plantar flexion ($50.6 \pm 6.4^\circ$ vs. $54.1 \pm 6.0^\circ$) between the measurements taken before and after the experiences. Figure 1 shows the maximal ankle plantar flexion angle on ball impact. The largest angle was $43.9 \pm 16.8^\circ$ (set 4) and the smallest angle was $41.2 \pm 13.3^\circ$ (set 11). There were no significant differences among the sets.

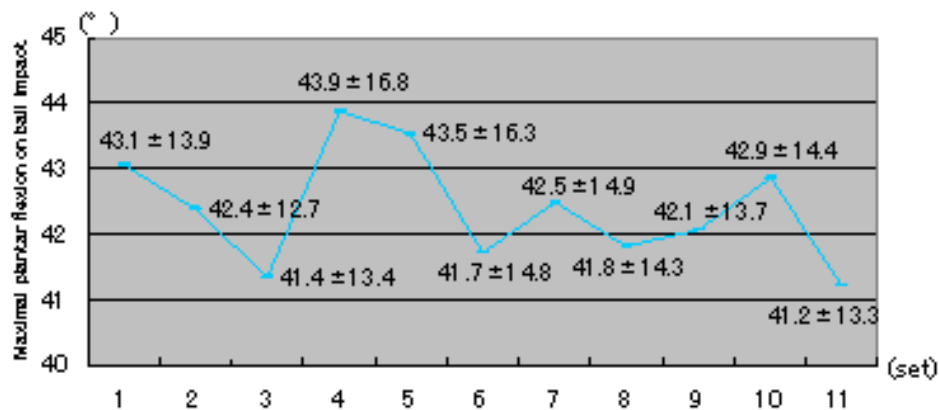


Figure 1: The changes in maximal plantar flexion angle on ball.

Conclusion: Our results suggested that fatigue of the tibialis anterior and repetitive stress of the periarticular tissues occur after the repetitive instep kick. However, repetitive instep kick did not increase the maximal ankle plantar flexion angle on ball impact. This finding did not support our hypothesis. Ankle plantar flexion on ball impact might have been avoided by the compensatory change in the way of kicking, i.e., the foot inversion and eversion movement.

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Hip and knee kinematics of the operated versus the non-operated limb of THA and TKA patients four weeks following surgery

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Objective: Patients following total hip (THA) or knee (TKA) arthroplasty are known to show deficits in the range of motion of hip extension at ground contact [1], knee flexion during weight acceptance [1], [2] and knee extension in the push-off phase [1], [2]. However, research has focused mainly on deficits of the operated limb in comparison to healthy controls, whereas the non-operated limb is seldom considered. But inter-limb differences in gait kinematics after arthroplasty might result in a premature deterioration of the healthy limb [1]. Therefore, the objective of this investigation was to present sagittal hip and knee kinematics of both the operated and non-operated limb that allow for an inter-limb comparison and serve as a reference to evaluate future patients rehabilitation progress.

Material/Methods: 447 patients (M237, W210, 66.9 (\pm 8.6) yrs, 173 (\pm 9) cm, 80.5 (\pm 16.4) kg) underwent gait analysis at the end of their stationary rehabilitation 28 (\pm 6) days following a total joint replacement of the hip (THA, n=275, 137 left, 138 right) or knee (TKA, n=172, 91 left, 81 right). Kinematic data were collected in a routine gait analysis setup. At least ten steps of each leg were analysed while patients walked barefoot on an 8m runway back and forth at their preferred walking speed. Kinematics were recorded at 45Hz with a three camera kinematics system (Lukotronic, Austria) and projection angles in sagittal plane were determined using the company's proprietary algorithm. Total range of motion of the hip extension (Hext-rom), knee flexion (Kflex-rom), and knee extension (Kext-rom) were afterwards calculated using Matlab 2008 (Mathworks, USA). Inter-limb differences in kinematic parameters were analysed using paired student t-tests (α =.05).

Results: Since no differences in the kinematics were found between patients with arthroplasty on their left or right limb, data of the operated limbs (OP) respectively non-operated limbs (NON) were combined. As expected, THA patients showed significant reduction in hip and knee extension of the OP limb compared to the NON limb. Inter-limb asymmetries were found in hip and knee extension in patients regardless of the operated joint (THA: reduced Hext-rom, Kext-rom/TKA: increased Hext-rom, reduced Kext-rom). Range of motion in knee flexion (Kflex-rom) of both limbs was low compared to literature values for THA and TKA patients [1], [2], [3], [4]. In inter-limb comparison, however, no differences were found (Figure 1).

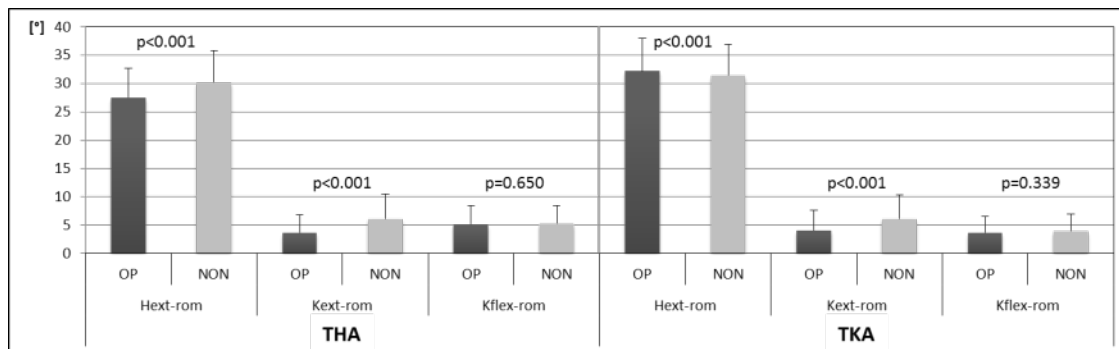


Figure 1

Conclusion: One possible explanation for the fact that inter-limb asymmetries become apparent only in hip and knee extension is that reduced knee flexion during weight acceptance results in higher impacts. These impacts are perceivable by patients and might lead to adaptation of knee flexion on both sides to regain symmetrical impacts. Differences in limb extension, on the other hand, might not be perceivable and, therefore, it can be difficult for the patients to correct them. In an effort to relearn symmetrical gait following arthroplasty, patients might be dependent on external feedback of deficits in their limb extension. The presented data set can be used as reference data to evaluate the progress of rehabilitation following hip or knee arthroplasty. The data set should be supplemented with kinematics collected later in the rehabilitation process.

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Knee joint kinematics during a sidestep maneuver in handball: Study of the influence of gender

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Objective: Anterior cruciate ligament (ACL) tear is a common injury in handball with a risk 3–5 times higher among women [1]. Despite surgery, the consequences of this injury are severe and the return-to-sport activity unsecured [2]. To progress in understanding the rupture mechanism and prevention, biomechanical studies must now analyse more realistic sports movements which are at risk of ACL tear [3]. The sidestep maneuver is a specific technique movement in handball with a change of direction. It is also the main circumstance of ACL injury in this sport [4]. The purpose of this study was to describe and compare, across gender, knee kinematics and angular displacement of the whole body during this specific handball technique maneuver. The null hypothesis was no difference across gender in the axial rotations of the pivot knee during the stance phase.

Material/Methods: Fifteen females and fourteen males, all good level handball players, executed the same specific sidestep maneuver. All athletes performed their technique gesture as they used to do in game or practice situation. All were trained to practice this maneuver in their federal handball structure. Spatio-temporal data and kinematics of the pivot knee, ipsilateral foot and hip, pelvis and trunk were calculated using a 3D motion analysis system Vicon. A Mann-Witney test was used to compare data.

Results: The analysed gesture was highly reproducible despite the absence of constraint. At initial contact, men had a higher instantaneous speed. The duration of the stance phase was similar. No gender significant difference was found in the axial rotation of the knee during the pivoting stance phase. At initial contact, women exhibited less knee flexion and more knee valgus. The pelvis rotation was also different with men more turned to the change of direction trajectory. Gender differences were also found during the first part of the stance phase in knee frontal plane and in the hip transverse plane.

Conclusion: kinematic analysis of a technical gesture is possible and reproducible when it is made without constraints. During this specific handball sidestep manoeuvre, the observed knee postures suggest an increased ACL injury risk at initial contact in women. A prevention work could be proposed to decrease the risk. Relationships between knee and hip seem important.

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Lower limb kinematic differences in children with and without Cerebral Palsy concerning gait and obstacle avoidance

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Objective: The purpose of the present study was to examine the neuromuscular, dynamic and kinematic differences of the lower limb between children with and without Cerebral Palsy concerning horizontal obstacle avoidance (HOA).

Material/Methods: 16 children without (CG; boys: n=8, girls: n=8, aged 9.5±2 years) and 12 children with cerebral palsy (CPG; boys: n=6, girls: n=6, aged 8.8±2 years) were examined. Subjects walked through an 8-meter corridor, in the middle of which a 1.5 m x 0.02 cylinder was placed on the ground perpendicular to the walking direction and served as an obstacle. Data were recorded using a six-camera 3D motion analysis system (VICON 612, Oxford Metrics Ltd, Oxford, Oxfordshire, UK), an EMG device (BTS Telemg, Milano, Italy) and a ground mounted 40x60 cm force plate (Bertec Type 4060, Bertec Corporation, Columbus, OH, USA). All devices were triggered by the motion analysis system, with the sampling frequency set at 100 Hz and 1 kHz, respectively. The parameters evaluated were: contact time (Tc) of the support before the obstacle, step length (SL), vertical ground reaction force (vGRF), agonist activity of plantar flexors (PF), antagonist activity of dorsal flexors (DF), swing leg's lateral malleolus vertical distance from the obstacle (H), ankle joint flexion (Aang) and knee joint flexion (Kang). Subjects performed eight trials, but five successful trials were selected. The selected trials were averaged for further analysis. Differences between CPG and CG were investigated utilizing independent samples T-test using SPSS 10.1 software (SPSS, Chicago, Illinois, USA). The level of statistical significance was set at p=.05.

Results: CPG performed the HOA with significantly (p<.01) longer Tc (1.4±0.6 sec vs 0.6±0.1 sec), shorter SL (0.85±0.4 m vs 1.48±0.2 m) and lower H (0.14±0.05 m vs 0.09±0.03 m). Non-significant (p>.05) differences between groups were observed concerning vGRF (lower in CPG), PF (higher in CG) and DF (lower in CG). Swing leg's Kang was more flexed in CG, while support leg's Aang was more flexed in CPG (p<0.01).

Conclusion: CPG and CG followed different motor patterns in HOA. Results indicated that CPG did not prepare effectively their neuromuscular system during the supporting phase, since a lower activation of their agonist muscles and higher activation of their antagonist lower limb muscles was observed. CPG seemed to follow an insecure walking pattern, with signs of some adaptations concerning their motor program referred to walking [1], [2]. In general, the deficit which was observed in CPG during the landing phase could also be attributed to their inability to optimally organize complex movements .

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Profile of strength in shoulder rotator muscles during fatigue-resistance exercise in elite tennis players

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Objective: Internal Rotator muscles (IR) of the tennis player's dominant shoulder display greater isokinetic peak torque (pT) during Maximal Voluntary Actions (MVC) than those obtained in the non-dominant shoulder, in contrast, the external rotator muscles (ER) do not show shoulder-related differences [1], [2], [3]. Nevertheless, tennis performance is not solely limited to MVCs but also requires the capability of maintaining a high level of strength while hundreds of shots during matches [4]. Thus, two previous studies showed that ER muscles were less fatigue-resistant than IR muscles without reporting shoulder-related differences [1], [5]. However, these studies did not indicate the progression of the conventional (ER/IR) and functional (ER eccentric/IR concentric) ratios which, make it possible to accurately quantify the muscular balance between IR and ER muscles. Thus, the aim of this study was to analyse the mechanical properties of IR and ER muscles and the progression of the conventional and functional ratios during a fatigue-resistance exercise in tennis players' shoulders.

Material/Methods: PT produced by 8 elite tennis players were recorded before (pre-test), during and after (post-test) an isokinetic fatigue-resistance exercise. The pre- and post-tests were composed of 2 concentric and 2 eccentric maximal repetitions of internal and external shoulder rotations at the angular velocities of 60° and 120°.s⁻¹. The fatigue-resistance exercise consisted of performing 50 concentric maximal repetitions (10 sets of 5 repetitions) of internal and external rotations of both shoulders at 120°.s⁻¹. IR and ER pT were measured. Normalised IR and ER pT, conventional and functional ratios were analysed.

Results: During the fatigue resistance-exercise, the decrease in the normalised pT in the dominant shoulder was greater for ER muscles (-63.3%±12.4) than for IR muscles (-46.8%±7.90) (Figure 1). In post test, there was a decrease in the conventional ratio (-3.1%±8.1) whereas no change was observed in the functional ratio.

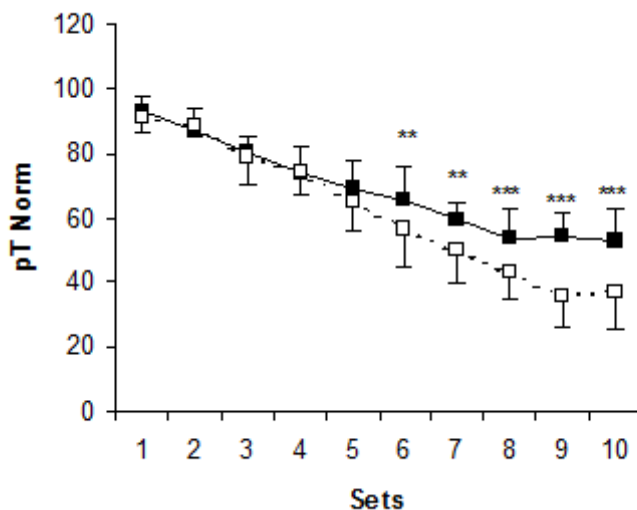


Figure 1: Internal (IR) (■) and External (ER) (□) Rotator muscle peak Torque normalized (pTnorm) collected in the dominant shoulder during the fatigue-resistance exercise (mean±SD; n=8). IR pTnorm vs ER pTnorm were significantly different at: **p <0.01; ***p<0.001.

Conclusion: According to previous findings, ER muscles were less fatigue-resistant than IR muscles [1], [5]. Consequently, this difference led to a decrease in the conventional ratio after exercise. According to literature, during MVCs, the decrease of this ratio underlines a muscular imbalance which, may be a cause of occurrence of injuries [1], [2]. Thus, to protect tennis players from injuries, it is recommended to perform conditioning and rehabilitation programs using resistive exercises to improve the fatigue-resistance capability of ER muscles.

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Strength profile of quadriceps and hamstrings in female volleyball players

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Objective: Knowledge of lower-extremity strength can be used in injury prevention, conditioning and rehabilitation of volleyball players. The goals were: (1) to describe the bilateral concentric and eccentric quadriceps (Q) and hamstrings (H) muscle strength in female volleyball players, (2) to evaluate strength ratios and bilateral strength asymmetry.

Material/Methods: A sample of 159 female volleyball players were tested on an isokinetic dynamometer TechnoGym REV 9000 at 60°/s to assess concentric and eccentric Q and H strength. We also calculated strength ratios and bilateral strength asymmetries. Strength asymmetry was evaluated using repeated measures ANOVA for factors side, muscle and contraction type.

Results: The results are presented in Table 1. The mean concentric strength ranged from 2.31–2.34 Nm/kg and 1.25–1.29 Nm/kg for quadriceps and hamstrings, respectively. As expected the eccentric strength values were significantly higher for both muscle groups. Classical strength ratio was 0.56 on average, while dynamic functional ratio was 0.61. There were no signs of bilateral strength asymmetry regardless of muscle group tested and contraction mode ($F=3.84$, $p=0.052$).

Normalized strength values (Nm/kg)		Mean	Std. Deviation
Quadriceps			
concentric	Left	2.31	0.33
	Right	2.34	0.35
eccentric	Left	2.48	0.58
	Right	2.57	0.58
Hamstrings			
concentric	Left	1.25	0.19
	Right	1.29	0.20
eccentric	Left	1.40	0.26
	Right	1.42	0.27
Strength ratios		Mean	Std. Deviation
Dynamic functional ratio	left	0.61	0.10
	right	0.61	0.11
Classical concentric ratio	left	0.55	0.09
	right	0.56	0.09
Bilateral differences (%)		Mean	Std. Deviation
Quadriceps		0.14	16.43
Hamstrings		1.93	13.68

Table 1: Strength profile of quadriceps and hamstrings in female volleyball players

Conclusion: The results of our study are stressing the relative concentric and eccentric weakness of hamstrings in female volleyball player that may predispose them to acute knee injuries (e.g. ACL rupture). This is best seen through the mean of low strength ratios. We believe that preventive training in female volleyball player should definitely stress the hamstrings. Descriptive data about Q and H muscle function can be used as guidelines for coaches and therapists during training and rehabilitation of female volleyball players.

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The postural system is affected by static and dynamic muscular fatigue

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Objective: Human balance is maintained by a complex system of postural control consisting of an efferent information from motoric centers to the muscles and a cluster of afferent information from the periphery towards the central nervous system. The main pathways are the visual, the vestibular and the somatosensory systems. Fatigue is defined by several parameters like metabolic fatigue, structural fatigue, electrophysiological and central fatigue and is related to intrinsic conditions and external loading. This loading can be either static/acyclic or dynamic/cyclic. The aim of our study was to examine, what kind of influence muscular fatigue has on this information system and if there is a difference between static and dynamic fatiguing exercises.

Material/Methods: 23 healthy people (14 female) gave their informed consent to participate in the study. Mean age was 32a (+/-13a). Females had a BMI of 22 (+/-1,8) and males had a BMI of 24 (+/-2,2). Posturography was carried out with a 4-force-plate platform (Tetrax, sunlight) to measure the postural sway during 30 sec. in 8 different positions with eyes open and closed, on hard and soft surface, and with 4 different positions of the cervical spine (standard procedure). Out of this data, general stability index (ST) and a fast-fourier-analysis (FFT) was calculated. FFT allows for differentiation between visual, vestibular and somatosensory part of the postural system. Muscular fatigue was carried out by a leg-press machine (isoLegpress, BFMC, germany) in sitting position. The test was started with a first posturography. After that a peak force measurement was carried out (3 trials, 5 sec. each) for comparison. A second posturography should demonstrate if there is a short time effect due to this peak force test with maximal voluntary contraction. Subsequently the static (isometric) fatigue test was executed with 5sec. contraction, 1 sec. rest as often until subjects reached 50% of peak force. Immediately after the last contraction, the 3rd posturography took place, followed by a second peak force measurement. The same protocol was administrated for the dynamic fatigue test with concentric leg extension and eccentric flexion with 1 week in between the 2 tests. The stop criterion was insufficient leg extension.

Results: After static/isometric fatigue test postural sway (ST) increased highly significant between test 1 and 3 and between test 2 and 3. No difference could be found between test 1 and 2. This was true for all 8 positions. FFT Analysis showed to some extend significant changes for the visual system and especially for the somatosensory system and not significant changes in the vestibular system. Peak force did not vary. After dynamic/concentric-eccentric fatigue test ST showed the same effect but FFT gave different results. Only for the frequency band representing the somatosensory system, we found an impact due to fatigue. An impact also could be seen for the first position in other frequencies, but this might represent an effect of increased breathing after exhaustion. To go without saying there was a difference between man and women. Comparing the results of static versus dynamic tests we did not find any substantial differences except minor effects for the somatosensory system during the first minutes after the tests.

Conclusion: Both static and dynamic fatigue has a negative impact on postural stability and might lead to a greater risk of falling. This holds true especially for the somatosensory system. We did not find any difference between static and dynamic disturbance. So we conclude, that the overall performance of the muscular system has an influence on the postural System and the risk of fall as could be shown also by Simoneau M. et al. [1] after fatiguing walking. Fatigue increases the postural sway and we assume that this has to be considered in balance training and for strategies to reduce the risk of falls.

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I: Nutrition & Ergogenic Aids

067

Consumption of a fermented dairy product containing the probiotic *Lactobacillus casei* CNCM I-1518 improves clinical outcome of common infections and quality of life in adults under stress (firemen students) in a randomized controlled trial

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Objective: The risk of infections and their severity may be increased in people under physical and psychological stress. Subjects undergoing physically stressful heavy exercise represent a population with such a known higher susceptibility to common infections [1], [2], [3], [4], [5].

The aim of this study was to assess the effect of a fermented dairy drink containing the probiotic strain *Lactobacillus casei* CNCM I-1518, on the resistance to common infectious diseases (CID), respiratory and gastro-intestinal, in physically and mentally stressed healthy adults.

Material/Methods: A multicenter, randomised, double-blind, controlled trial was conducted in 239 healthy volunteers undertaking Firemen training, a model combining multi-stressor conditions such as intensive exercise, sleep deprivation, and psychological pressure. Volunteers were randomized for the consumption of 200g of either a fermented dairy product (N=118) or the control (non-fermented) dairy product (N=121) daily during seven weeks. The incidence, duration, severity, and type of common infectious diseases experienced were recorded. Quality of Life (QoL) during the study was assessed through the SF-36 questionnaire.

Results: The consumption of the fermented product significantly reduced the average duration per episode of CID (3.00 vs. 4.00 days in control group, $p=0.046$). This was accompanied with an increase of *Lactobacillus casei* species in stools throughout the fermented product consumption (from 2.8×10^6 at baseline to 6.6×10^8 equivalent CFU/g faeces, 4 weeks after consumption had started, $p<0.001$).

Furthermore, the consumption of the fermented product had a beneficial effect on QoL, improving social functioning for all volunteers ($p=0.005$) and bodily pain for volunteers experiencing CIDs ($p=0.013$) in both the ITT population and PP population.

The cumulative number of CIDs (primary outcome) was not different between groups nor was the CID severity, fever, pathogens occurrence, medication, immune blood parameters. The study products were ingested in accordance with the study protocol and compliance was good (97.9% in control group and 97.6% in product group). There were no serious adverse events and clinical safety was excellent.

Conclusion: In healthy adults under heavy physical training and psychological stress conditions, the regular consumption of a fermented dairy product containing the probiotic strain *L. casei* CNCM I-1518 was associated with a decreased duration of CIDs in comparison with the control group, and with an improvement in some dimensions of Quality of Life. Thus, the inclusion of such a fermented dairy product in the diet of comparable populations such as athletes undergoing intensive training periods may be of interest to improve their resistance to common infections.

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Effect of antioxidant supplementation on muscle damage and oxidative stress markers in elite young soccer players

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Objective: The purpose of the current study was to examine the effect of novel antioxidant -astaxanthin (Asx) on muscle enzymes as an indicators of muscle damage, oxidative stress markers and antioxidant response in elite young soccer players.

Material/Methods: 32 male elite soccer players (age 17.72±0.76 years) were randomly assigned in a double-blind fashion to Asx and placebo (P) group. Asx group was supplemented with 4 mg of Asx. After the 90 days of supplementation, the soccer players performed 2 hour forced training. Blood samples were obtained at rest before supplementation and before and after the training at the end of observational period.

Results: Basal total antioxidative status TAS levels did not changed along the study. However, forced training induced significant decrease in TAS levels only in P group ($p < 0.01$). Basal sulphhydryl groups (SH) content increased significantly only in Asx group over the 90 days of supplementation ($p < 0.05$). We observed significant decrease in basal superoxide-dismutase (SOD) activity ($p < 0.05$) along with significant increase in superoxide anion ($O_2^{\bullet-}$) concentrations ($p < 0.05$) both in P and in Asx group by the end of the study. However, forced training caused additional increase in $O_2^{\bullet-}$ levels only in P group ($p < 0.05$). Malondialdehyde (MDA) levels did not change throughout the study. All participants showed a significant decrease in basal plasma creatine kinase (CK) and aspartate aminotransferase (AST) activities after 90 days. Post-exercise significant elevations above resting values was observed for CK ($p < 0.01$) and AST ($p < 0.01$) only in P group, while remained practically unchanged in Asx group.

Conclusion: Asx supplementation may have favorable effect on preserving non-enzymatic antioxidant defense system from consumption by the oxidative process. Antioxidant activity of Asx can have potential benefits in neutralizing post-training rise in $O_2^{\bullet-}$, but without impact on lipid oxidation. Asx reduced post-training increment of CK and AST, which may suggest that the muscular damage was reduced. Based on our findings, supplementation with astaxanthin might be beneficial strategy in improving sport recovery and performance.

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Effect of supplementary consumption vitamin B1 (thiamin) on blood glucose changes during and after maximal aerobic exercise

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Objective: The objective of the present study was to determine the effect of vitamin B1 on blood glucose changes. We observed that when the subjects received 300 mg thiamin/day, there was a lowering of blood glucose level during and after physical activity. Like the other B vitamins, thiamin is used to treat fatigue. High-dose thiamin supplementation may be helpful in preventing fatigue or accelerating recovery from exercise-induced fatigue.

Material/Methods: In this research 36 non-athlete university students male were selected with average 22.75, 179 and 77.16 for age, height and weight respectively, (12 persons in each group). The subjects placed in three groups: Experimental Group A (EGA), Experimental Group B (EGB) and Control Group (CG). They have to exercise on treadmill before and after the thiamin consumption. First of all, blood glucose measured in three groups before exercise and then performed exercise on treadmill until exhaustion. Blood glucose changes in subjects measured by glucometer after 5 minutes and in the end of the exercise (pre-test). The subject's consumed thiamin during 10 days (EGA 30 mg /day, EGB 300 mg/day and CG just placebo). Blood glucose changes measured in three groups like as pre-test, during and the end of the exercise on treadmill after 10 days.

Results: Our results indicates, that there is no changes in blood glucose in EGA (30 mg thiamin/day) and CG(placebo) but showed that blood glucose reduced in EGB (300 mg thiamin/day) ($P>0.05$).

Conclusion: In fact, degree of exhaustion increased in EGB that they consumed 300 mg thiamin per day, and they could to do exercise for a long time. Like the other B vitamins, thiamin is used to treat fatigue. High-dose thiamin supplementation may be helpful in preventing fatigue or accelerating recovery from exercise-induced fatigue.

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Energy and dietary intakes of young professional football players

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Objective: Adequate dietary habits in endurance and energy demanding sport such as soccer are very important for young athletes since deficiency may delay development and affect performance. Demanding training and busy travel schedules in addition to a possible lack of nutritional knowledge may prohibit them from maintaining an optimal dietary intake. The aim of this study was to investigate the nutritional profile of young high-level football players to establish specific dietary guidelines to enhance their peak athletic performance and overall health.

Material/Methods: Three-day dietary records were analyzed and also the anthropometric measurements were taken at the beginning of competitive season. In this cross-sectional study, with 40 male elite football players, ergospirometry tests were conducted. Furthermore, lipid, hematological and biochemical parameters were sampled from athletes as well. Dietary and energy intakes with emphasis on macronutrient, micronutrient and fluid values were calculated using COSMED FMed 2.0 software.

Results: Physical characteristics of players with a mean age, height, weight, BMI and F% of 16.7±0.7years, 179.2±6.1cm, 71.5±7.0kg, 22.2±1.5 and 9.33±2.7 reflect that they were homogeneous group. Only F% demonstrate significant difference (p<0.05) for various soccer position in offense. Reported daily energy intake (EI) with meals, mostly taken at home, was 3042.9±905.9.9 kcal which is significant lower (p<0,001) than the EI obtained by the formula. Throughout the recording period carbohydrate intake was 52%±8.2, fat intake was 31.0%±5.5 and proteins were represented with 17%±3.5. Fluid intake of 1782.3±714.7 ml was no optimal and there is doubt that data had been under reported. Intake of vitamins and minerals had variation from DRI (%DRI) for Ca (71.6), Mg (94.8), Fe (134.5), K (71.2), Na (277.6), Vit.C (210.8), Vit.B6 (23.8) and Vit.B12 (61.1). EI was positively correlated with Fe (p<0.01) and Ca (p<0.05) intake. Cholesterol (112.0) and saturated fatty (157.6) intake above DRI suggest about quality of consumed food. Iron deficiency without anemia (11.6±1.5) was found in 22 soccer players. In previous studies this iron deficiency is represented as a factor that can impact on endurance. The ANOVA showed that EI had significant effects on VO₂max.

Conclusion: This study reveals differences regarding current opinions about sports nutrition and points the need to increase EI with a higher carbohydrate proportion in football athletes. Inadequate fractional contribution of micro-nutrients and fluid should be adjusted to reach DRI. The nutritional consideration of young male football players should be focus on providing appropriate nutritional information in order to improve the athletes' diet and, consequently, their health and sports ability.

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J: Functional Rehabilitation

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Adaptive changes in the dominant shoulders of female competitive overhead athletes

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Objective: A cascade of adaptive changes such as glenohumeral internal rotation deficit – GIRD, symptoms of SICK scapula syndrome and muscular imbalances develop in dominant shoulders of overhead athletes and represent a shoulder at risk. Our goal was to isolate adaptive changes that are critical for injury development. We wanted to find correlation between career duration and the expressiveness of adaptive changes and injuries and how does the (a)symmetry of hand use in a specific field position of overhead athletes influence the development of adaptive changes and injuries of the dominant shoulder.

Material/Methods: Participants were 36 competitive female overhead athletes (21 handball players and 15 volleyball players), divided in 2 groups by symmetry of hand-use (symmetric, group 1: setters in volleyball, goalkeepers in handball; asymmetric, group 2: other than group 1 - hitters and throwers). All completed medical questionnaire, detailing shoulder injury and pain in the past year. Clinical examination of the shoulders was performed, including SICK scapula signs, passive internal (IR) and external rotation (ER), GIRD evaluation and special shoulder clinical tests. Isokinetic testing of IR and ER was performed in concentric (c) and eccentric (e) mode at two testing speeds (60°/s, 150°/s). Fatigability of IR and ER was measured. Stability spiking (eER/cIR) and cocking ratios (eIR/cER) were calculated.

Results: All players showed decreased IR and increased ER ROM in the dominant shoulder ($p > 0,001$). Average GIRD was 20,6°, greater GIRD was correlated with lower cIR peak torques ($p = 0,026$ and $p = 0,008$). Players with increased passive ER and more SICK scapula signs had lower eIR peak torques and hence lower cocking ratios ($p = 0,019$, $p = 0,035$ and $p = 0,04$). Dominant hand eER peak torques were lower ($p = 0,015$, $p = 0,04$) and the spiking ratios were also lower on the dominant side ($p = 0,002$ and $p = 0,006$). Players with previous injury showed more passive scapular abduction on their dominant side ($p = 0,05$), increased passive ER ($p < 0,001$) and lower cocking ratios ($p = 0,023$). Players with objective or subjective glenohumeral instability showed more SICK scapula signs ($p < 0,05$) than players without instability. Setters, goalkeepers and liberos (symmetrical hand-use) had lower fatigability of IR and ER ($p = 0,019$ and $0,01$).

Conclusion: Several adaptive changes were found in the dominant shoulders of our participants (GIRD, increased passive ER, signs of SICK scapula, muscular imbalances), regardless of career duration or field position. Pronounced scapular abduction, increased passive ER and low cocking ratios were correlated to the history of injury. Players with GH instability had more SICK scapula signs on their dominant side, mainly protraction and abduction. Hitters and throwers showed more fatigability of IR and ER, probably due to higher percentage of faster, type 2, muscle fibers, which is noticed in other overhead sports as well.

Because of delicate balance between mobility and stability of the overhead athlete's shoulder, adaptive changes need to be recognized, regularly followed and controlled with proper preventive training, focusing on the stretching of posterior capsule, dynamic GH stability exercises, scapular stability exercises and eccentric training for GH rotator muscles.

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Die Nachhaltigkeit einer VMO-Rehabilitation bzgl. sozialmedizinischer und psychischer Parameter

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Hintergrund: Auf Grund einer zunehmenden Komorbidität psychischer Erkrankungen bei orthopädischen Patienten wurde in unserer Klinik 2009 eine Abteilung VMO integriert, um durch eine intensivere psychologische Mitbehandlung den Erfordernissen des biopsychosozialen Krankheitsmodells besser Rechnung tragen zu können. Mittels einer prospektiven Untersuchung bei bislang 107 Rehabilitanden wurde anhand psychologischer Testverfahren eine signifikante Besserung der Schmerzverarbeitung (FESV; Geisner, 2001) und motivationalen Bereitschaft (FF-STABS; Maurischat et al., 2006) sowie depressiver Verstimmung (BDI II; Hautzinger et al., 2006) nachgewiesen. Es gelang auch, 15 der anfänglich 46 arbeitsunfähigen Rehabilitanden arbeitsfähig in das Erwerbsleben zurückzuführen. Während eine klassische orthopädische Rehabilitation nur gering anhaltende Effekte erbringt [1], wurde eine verbesserte Nachhaltigkeit einer VMO vs. orthopädischen Rehabilitation hinsichtlich der psychischen Parameter bei [2] nachgewiesen. Ziel der jetzigen Untersuchung war es, eine Nachhaltigkeit über den Zeitraum eines Jahres auch unter Beurteilung der sozialmedizinischen Parameter zu bestätigen.

Material/Methoden: Ein Jahr post Reha wurde begonnen, oben genannte Testverfahren und die sozialmedizinischen Daten Arbeitsfähigkeit und Erwerbssituation der Rehabilitanden katamnestic zu eruieren. Die derzeitige Rücklaufquote der Befragung beträgt 60 Prozent.

Ergebnisse: Zur Auswertung kamen bislang 17 Datensätze. Eine erste Datensichtung belegt Folgendes: Während sich der BDI und die Parameter der schmerzbedingten psychischen Beeinträchtigung den Ausgangswerten zu Beginn der Rehabilitation wieder annähern, festigen sich hingegen die motivationale Bereitschaft sowie die Parameter der kognitiven und behavioralen Schmerzbewältigungsstrategien und zeichnen sich hoch über den Ausgangswerten liegend ab. Für eine Beurteilung der sozialmedizinischen Daten sind die bislang vorliegenden Datensätze noch zu inhomogen.

Schlussfolgerung: Die VMO hat bei den Rehabilitanden nach ersten Hinweisen aus den Daten zu einer anhaltenden Verbesserung der behavioralen und kognitiven Schmerzbewältigungsstrategien sowie der motivationalen Bereitschaft im aktiveren Umgang mit der Schmerzsituation geführt. Inwieweit eine Abhängigkeit von der Erwerbssituation Einflussfaktor auf die Ergebnisse ist oder eine Weiterführung ambulanter Psychotherapie zu einer nachhaltigen Verbesserung der Stimmungslage und zur Reduzierung schmerzbedingter psychischer Beeinträchtigung Beitrag leisten kann, soll die Weiterführung der Katamnese zeigen. Die Untersuchung dieser Faktoren auf das Ergebnisbild kann als Ausblick genannt werden. Für die Beurteilung der sozialmedizinischen Parameter Arbeitsfähigkeit und Erwerbstätigkeit ist die Auswertung eines größeren Datensatzes notwendig.

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Effectiveness of treatment with brace versus tape in acute lateral ankle sprains: A quasi randomized controlled trial

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Objective: Ankle sprains are the most frequently reported sports injuries [1] often leading to pain and other impairments including chronic physical limitations and impingement. Another frequently reported problem is the recurrence of an ankle sprain. The risk of re-spraining within a period of 3 years after the initial ankle sprain was reported to range from 3 to 34%. [2] Since the nineties functional treatment of ankle sprains is highly recommended [3]. Nowadays, the regular treatment of an ankle sprain includes ankle taping, while the use of an ankle brace to prevent re-injuries is conventional [4]. The purpose of this quasi randomized controlled clinical trial is to investigate the effect of a 4-week treatment with an ankle brace (type Push Med, soft brace) compared to the treatment with an ankle tape on recurrent sprain and residual problems within one year in patients with an acute lateral ankle sprain.

Material/Methods: Patients with an acute lateral ankle sprain caused by an inversion trauma were included and sequentially randomized to the treatment group (ankle brace) or control group (ankle tape). A sports physician conducted the baseline measurements consisting of an anamnesis and a physical exam during which the ankle was examined for swelling, discoloration by haematoma, limited dorsoflexion and tenderness. Also, several tests were performed to measure passive and active ankle stability. After the baseline measurements patients had to fill in online questionnaires aimed at re-injuries and residual complaints at week 5, 9, 13, 26 and 39 post-trauma. After 52 weeks a final assessment by a sports physician took place.

Results: No significant differences were found for re-injuries. The objective residual complaints; swelling, functional outcome and active stability and the subjective residual complaint pain showed no significant differences either. Patients in the brace group scored worse on passive stability determined by the anterior drawer test ($p=0.019$).

Conclusion: Regarding the risk of re-injury and residual complaints, the effectiveness of a 4-week treatment with an ankle brace (type Push Med) is equal to the effectiveness of a 4-week treatment with ankle tape after an acute lateral ankle sprain. Consequently, the physician or paramedic has a choice between ankle tape and brace in which the preference of the patient can be taken into account.

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Proprioceptive function after ACL reconstructed athletes

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Objective: Proprioception is the ability to sense the joint position and movement or motion of limb segments both individually and relative to one another. This ability is very important to athletes. It was earlier believed that high-level athletes have good proprioceptive function. However, this is yet to be verified. In 2001, we created a device for the measurement of proprioceptive function of the knee joint. This device was manufactured by Sensor and Measurement Co. Ltd. (Japan, Figure 1) and named a proprioceptive function measurement instrument. An ACL is an important mechanical structure, which maintains knee joint integrity movement. However knee joint function is complex and does not depend on mechanical stability alone. It is also based on sensorimotor function. ACL injury leads to a disturbance of the sensorimotor system due to a loss or damage of the mechanoreceptors causing changes in motor behavior.

Proprioceptive function is often examined after anterior ACL injury and its reconstruction. The purpose of this study was evaluate of the influences joint position sense (JPS) and kinesthesia after reconstructed ACL.

Material/Methods: JPS was evaluated using a passive angle reproduction test. The subjects memorized the degree of an angle and later reproduced the same angle passively at random or at 1 d/s. The absolute error was considered as the joint position. Knee joint position was evaluated at knee flexion angles of 20° and 45°. The subjects of this study were 40 (20 male and 20 female) healthy athletes, 40 (20 male and 20 female) athletes who had ACL injury, and same athletes who had undergone reconstruction for ACL injury. Kinesthesia was evaluated the threshold for detecting passive motion (TTDPT). This device (Figure 1) can evaluate from 0.1 d/s and the study were selected 0.1 d/s, 0.2d/s, and 0.3 d/s which represents extremely slow movement.

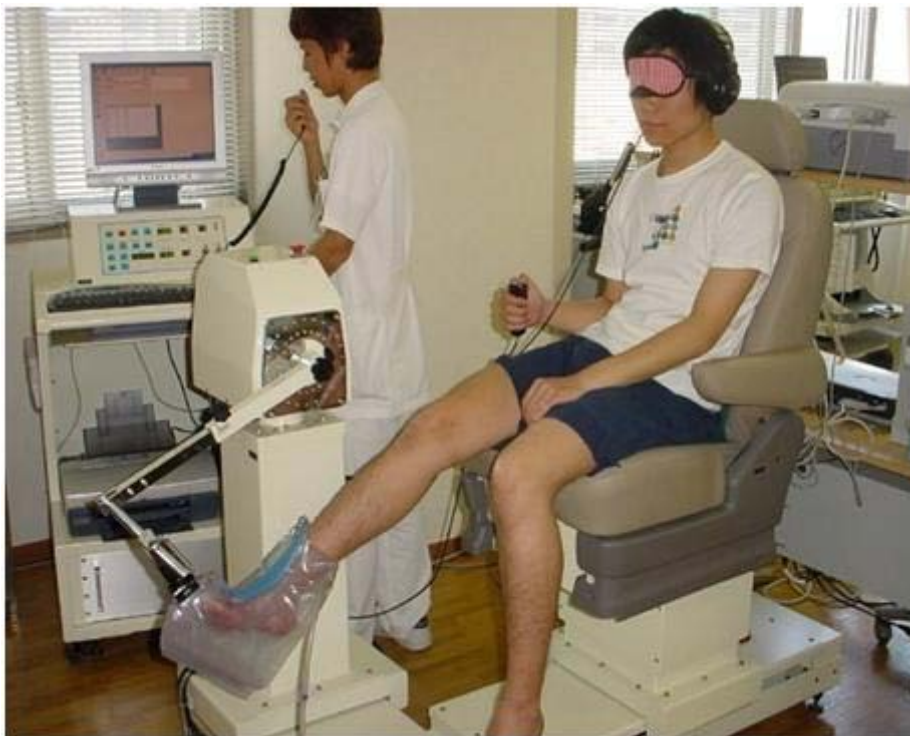


Figure 1: The proprioceptive function measurement.

Results: The absolute error was fixed from the flexion angle of 20° extension of JPS; it was uncertain from 45°. The absolute error was 4 to 5° in almost all the athletes. The incidence ratio of ACL injury was higher in female athletes. However, with regard to joint position sense, there was no difference between male and female athletes and between athletes who had injured their ACL and those who had not. The absolute error on the ACL-ruptured side was larger. However, no difference was found between the injured and uninjured side. In some cases, the absolute error was found to be larger in the initial stages after reconstruction. The TTDPT for knee extension direction from 20° of knee flexion is showed the normal subject can aware the movement easily only 3.9 seconds, but ACL injured athletes was delayed 6.5 second significantly with 0.1 d/s ($p < 0.05$). And it decrease 3 months

and later. Six months and 12 months were not significant change compared with normal subjects. Passive motion at 0.2 d/s is easier to detect than that at 0.1 d/s. The 0.2 d/s demonstrate same results with 0.1 d/s, however 0.3 d/s is not significant difference each conditions. So, the angular velocity of 0.1 and 0.2 d/s are important to consider the ACL influenced athletes. The TTDPT for knee flexion angle at 45° indicate similar results at 20° of flexion.

Conclusion: This study showed similar results as other reports on joint position sense. Thus far, the lowest speed of motion at which kinesthesia has been measured is 1 d/s. However, it lacks the ability to detect passive motion. The authors measured kinesthesia by using an instrument that can measure movement sense from 0.1 d/s. It is reported that proprioception can recover after reconstruction; however, this is yet to be confirmed. Although the importance of proprioception is recognized by many researchers, it can not be measured accurately in the absence of an efficient measurement tool.

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Rehabilitation after hip dislocation in a soccer player

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Objective: Hip dislocations usually occur with high-energy trauma and are uncommon in sports. American football and rugby are the sports in which hip dislocation has been the most widely reported, followed by snowboarding and alpine skiing. Most contact injuries were caused by tackling or kicking.

In a posterior dislocation, the head of the femur lies posterior to the acetabulum and the injured lower extremity has a clinical presentation of shortening, internal rotation, and adduction.

An intimate knowledge of the sport and the specific duties required of the athlete for playing soccer are important for a successful functional progression program. This knowledge obliges the sports physician, the physical therapist and the athletic trainer to prescribe a specific rehabilitation program for the unstable hip joint.

Material/Methods: We report a case of a 22-year-old fourth division soccer player who sustained a posterior hip luxation in his left non-dominant leg during a game. He tried to kick the ball away while running, with the left hip in internal rotation, but at the same moment the adversary tackled him from behind and dropped him to the ground. The patient arrived to the emergency room with the left lower extremity in a position of flexion, adduction and internal rotation. Radiologic evaluation confirmed a right posterior hip dislocation.

Results: General anaesthesia allowed the patient and his musculature to relax, and the reduction was performed. Skeletal traction through the tibia was installed for one month, and then the patient was treated with rest and physical therapy, including non-weight-bearing for another two months.

Following several month of physical therapy intervention, in full weight-bearing, the athlete will be able to return to his previous level of activity in soccer.

Conclusion: A frequent mechanism of injury for a posterior hip dislocation is the knee striking the ground with the hip in a flexed and adducted position, thereby forcing the femoral head posteriorly over the rim of the acetabulum. This injury occurs more commonly during contact and collision sports when a running player is tackled from behind and falls onto a flexed knee and hip. As the opposing player falls onto the tackled player's back, his added weight drives the torso and pelvis toward the ground, and the femoral head is thus driven out of the socket in a posterior direction.

The best way to prevent this occurrence is to reduce the injured hip as soon as possible, preferably less than 6 hours after injury. Degenerative osteoarthritic changes are the most common long-term outcome of hip dislocation, and can be exacerbated by the presence of bony fragments and soft tissue in the joint space.

At the point of ball contact the knee extensors and hip flexors are agonists, and therefore need to be trained concentrically. At other points during the kicking movement these same muscles act eccentrically, which means that flexor activity is dominant during extension and extensor activity dominates during flexion. Quadriceps activity was greatest during the loading phase when they are antagonist to the movement and the hamstrings were most active during the forward swing, when they are antagonistic to the movement. Equilibrium and balance between the flexors and extensors is likely to reduce the incidence and frequency of injury, improve the neuromuscular kick pattern, and generally improve kick performance.

Soccer skills such as kicking, passing and trapping the ball, tackling, falling, jumping, running, sprinting, starting, stopping and changing direction, all involve the hip joint.

Athletes recovering from hip dislocations must follow a strict physical therapy regimen to ensure complete recovery of function. Stretching and range of motion exercises are important early in the recovery process, advancing to walking on crutches when the patient's pain fully resolves. Strengthening exercises of the muscles around the hip are important during the rehabilitation to take stress off the injured joint. Muscle strength is a determinant factor in successful performance of the kicking skill and can be developed through appropriate training.

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K: Various I

076

Estimates of repolarization dispersion in elite athletes and in sedentary healthy subjects

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Objective: Although a rare event, sudden death in athletes generates great social and emotional impact throughout society, especially when the victim is a young athlete, it arises questions from the media: Would be the sport detrimental to health sudden death could be prevented? Several electrophysiological mechanisms (e.g. repolarization due to potassium channel downregulation, myocardial ischemia) and the presence of multiple factors such as benign cardiac hypertrophy developing normally in athletes (athlete's heart), increased sympathetic activity, foods together can increase inhomogeneities in myocardial repolarization in this case, an otherwise harmless extrasystole occurring with unlucky timing may although very seldomly-elicite fatal arrhythmias. The arrhythmogenic substrates alone do not produce fatal arrhythmia [1]. The aim of this study was to analyze the repolarization dispersion (QT dispersion and transmural dispersion: Tpeak-Tend) in elite men athletes and in sedentary, healthy young men. In addition, we examined relationship between the repolarization dispersion and the left ventricular enlargement and the repolarization dispersion between the heart rate. Furthermore, we examined the early repolarization in elite men athletes and in sedentary, healthy young individuals.

Material/Methods: We studied 34 athletes (18 elite triathlons and 16 professional ball-game players) and 15 healthy non-athletes making no regular physical activity. The echocardiogram were performed according to the recommendation of the American Society of Echocardiography. Left ventricular measurements from the two-dimensionally guided M-mode were made from 5 consecutive heart cycles and we calculated the left ventricular mass. In the second step 5 minutes long, 12-lead resting ECG was recorded to establish the heart rate, QT dispersion and transmural dispersion. Finally step, we examined the prevalence of early repolarization syndrome (ERS). Statistical analysis was done by using the Statistica 9.0 for the Statsoft. Significance was determined with one-way ANOVA with Tukey HSD post-hoc test. Next step we calculated the correlation between the LV mass and the QT dispersion and between the LV mass and the heart rate.

Results: In the myocardial hypertrophy (LVH) and in the resting heart rate water triathlons were the best and non-athletes the worst. Endurance athletes and ball-game players had a significantly greater LV mass ($p < 0,001$) and lower heart rate ($p < 0,001$) than healthy sedentary non-athletes. The QT-dispersion was greater in the athlete's groups ($p < 0,01$) than in the controls. The difference in the transmural dispersion between the groups with pathological LVH was not statistically significant ($p < 0,6$). In the group of non-athletes and competitors of several kinds of sports (endurance athletes and ball-game-players) LVMM correlated significantly with the QT dispersion ($r = 0,56$). We found negative correlation between the QTd and the heart rate ($r = -0,36$) by groups.

Conclusion: 1. Regular and extensive endurance training results in similar changes in LV and RV mass and function in athletes.

2. The measurement of QT dispersion may be an useful and non-invasive method for screening additional pathological conditions in endurance athletes.

3. Repolarization wave front starts earlier on ventricular wall and partially overcomes the end of depolarization causing an upward displacement of the J-point, ST segment elevation, and inscription of magnified T-waves amplitudes leading to characteristic surface ECG waveform patterns.

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Functional dynamic measurement of core stability in athletes and untrained persons

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Objective: The importance of core stability on posture is well acknowledged but the exact role of these complex processes on trunk functionality remains unknown. The interaction between the M. multifidii, M. transversus abdominis, the diaphragm and the pelvic floor provides the basis for upright posture [1]. Any impairment or insufficiency can rapidly lead to musculoskeletal disorders and associated functional deficits [1], [2]. Until recently, objective measurement of the core stability has been limited to a combination of clinical scores [3], muscle activity measurements using EMG [4] or sonographic measurements of the M. transversus abdominis [5]. However, the evaluation of upright posture requires assessment in a dynamic setting. The goal of the present work is to provide data on functional dynamic measurement of core stability.

Material/Methods: Thirteen elite athletes and eleven untrained controls were assessed for trunk stability in a one-legged standing posture on an unstable surface (Posturomed) during the application of a standardised anterior perturbation. Measurement of trunk kinematics was performed using an optical measurement system (Vicon, Oxford, UK). In addition, combination of clinical scores for core stability were performed.

Results: Significantly reduced movement of the trunk was observed in the athlete group. Hereby, the median of movement (shoulder girdle and pelvic ring acting as reference points) was reduced 4 times in comparison to untrained persons. The data demonstrate that trained athletes achieve trunk stability with less amplitude in motion.

Conclusion: To achieve core stability sensomotoric and muscular coordination have to perform as a complex system. We demonstrate in this study that core stability can be measured in a functional and dynamic setting. The system provides a platform to obtain quantifiable data on the functional stability of the trunk and can be used to evaluate early training effects of physical intervention.

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OA and DMOAD literature overview

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OA and DMOAD take a look at the literature: Osteoarthritis is a chronic degenerative disease with multifunctional etiology characterized by the gradual loss of joint cartilage and the degradation of synovial fluid. OA is one of the most declared chronic diseases affecting more than 50% of the population over 64 years of age in the U.S. More than 5 Million are given the diagnosis every year. An immense social impact is seen due to pain and limitation of movement which affects quality of life and changes habits. Conservative treatment of course includes physical activity and in a number of cases physical therapy, but the field of Structure and Disease modifying anti OA drugs is becoming more important due to significant advantages in a long term therapy. Goal is to give a literature overview on OA drug regimes focusing on the S/DMOADs.

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Quantitative approach of comparing back-to-back games with performance in the National Hockey League

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Objective: The purpose of this study was to determine if professional hockey players experience a decrease in their performance when playing back to back games on two consecutive days. Theoretically, playing a high impact, intense, and physical sport two days in a row at a professional level would decrease one's physical and mental ability to perform at peak levels. To date, no study has quantifiably measured the actual result of team performance under such circumstances.

Material/Methods: Through publicly available documents, data was collected from all 32 National Hockey League teams during the 2008–2009 regular season. Consecutive games were defined as a regular season game followed by another regular season game on two consecutive calendar days. The following variables were measured as a part of team performance: shots for/shots against, wins/losses, number of penalties per game, overall regular season record. Descriptive statistics were incorporated to identify percentage differences between game one and game two.

Results: A minimal decrease in team performance from the first to the second game was found. The following were areas most notable:

- A 6.6% increase in the total number of penalty minutes
- A decrease of less than 1% of total shots taken
- An increase of 0.23% of total shots allowed
- A total decrease in wins/losses by 3.12%

Conclusion: Despite the widely accepted perception that team performance may be significantly decreased on day two of competitive back to back games, our results identified only subtle deficits in team performance indicators. There are a number of limitations to this study that may have influenced the results, including; injuries to players, travel distance and time zone changes, eating habits, and coaching decisions. Regardless, according to our findings, minimal evidence exists to support the perception of significant decreases in team performance with back to back competition for professional hockey players.

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Risk factors of Osteoarthritis: long-term follow-up after ACL transection

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Objective: Rupture of the anterior cruciate ligament (ACL) is among the most frequent sport injuries with a large socio-economic impact. In long-term, many open questions remain addressing interplay of degeneration and osteoarthritis, and instability. The aim of this study was to follow-up three cats with radiologic, kinematic, and kinetic data acquisition over a period of 12 years.

Material/Methods: Three cats underwent transection of the anterior cruciate ligament and were followed-up for 144 months (12 years) corresponding to 68 human years. Follow-up included: 1) Radiology: conventional x-rays of the knee and radiologic documentation of the anterior drawer sign. 2) Kinematic data: cats learned to walk on the specially configured treadmill. Angles and range of motion were analyzed. 3) Kinetic data: ground reaction forces were measured with two Kistler Force plates. At the last follow-up, knee extensor forces were measured isometrically. Cats were sacrificed and knee joints underwent histologic preparation and analysis.

Results: After ACL transection changes in gait were found. Knee joint range of motion decreases, the knee joint is held in a more flexed position while ground reactions forces reduced. These effects disappeared after 3 to 4 months and then, gait looked completely normal until to the very end, when the cats were in pain due to these advanced joint degeneration. Although gait analysis returns to normal, degeneration of the knee joint is found very early and progresses fast. Anterior drawer test remained pathologic.

Conclusion: Understanding of risk factors for joint degeneration is important in order to improve prevention of posttraumatic knee joint osteoarthritis. In this study, cats developed osteoarthritis very fast although no primary impact as a sign of acute trauma was documented. However, instability remained and must be seen as primary source for OA. Interestingly, although functional instability was compensated after 3 to 4 months, mechanical instability remained and OA progression could not be stopped.

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The effect of home based exercise on treatment of women with poly cystic ovary syndrome; a single-blind randomized controlled trial

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Objective: To find the effect of home base aerobic-strengthening exercises on anthropometric and hormonal variables of patients with PCOS.

Material/Methods: In this randomized controlled trial twenty women in exercise group performed aerobic-strengthening exercises; the other 20 participants of control group were advised to continue their previous physical activity pattern. Blood pressure, Waist to Hip ratio (WHR), BMI along with hormonal variables (including insulin related factors, sexual hormones and inflammatory factors) were assessed at baseline and after 12 weeks intervention.

Results: Of the patients in exercise group, 16 and of those in control group, 14 finished the study. The WHR ($p < 0.001$) along with the blood level of insulin ($p = 0.016$), FBS ($p = 0.044$), Prolactine ($p = 0.022$) and hsCRP ($p = 0.035$) and HOMA index ($p = 0.009$) were decreased significantly in exercise group compared with the control group. No significant differences were found in lipid profile and sexual hormones between groups at the end of the study.

Conclusion: We can conclude that 12 weeks combined aerobic-strengthening exercise program in women with poly cystic ovary syndrome can lead to reduction of waist to hip ratio (WHR) and some cardiovascular risk factors (including insulin, FBS, HOMA index and HsCRP) along with increase of prolactine level in these patients.

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L: Internal Sports Medicine

082

A young athlete's sudden death due to atrioventricular septal defect. A postmortem study

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Objective: Isolated ventricular septal defect (VSD) have a number of anatomic malformations, and each has a distinctive natural history and decision-making issue. Studies have showed that there are five types of VSD's (Perimembranous, Inlet, Apical Muscular, Mid Muscular and Outlet). From the other hand sudden cardiac death remains a common mode of death in adult congenital heart diseases (ACHD) and so high mortality rate can reflect VSD's who didn't underwent surgical closure.

Material/Methods: At the present study we report the case of a 20-year-old athlete who died suddenly while sleeping. Because his was an active, healthy and symptom free football player without known family history an autopsy has been performed in order to investigate the cause of death.

Results: The autopsy showed significant degree of left and right ventricular hypertrophy (1,8cm left and 0,9cm right) with a total heart weight of 473gr and also an atrioventricular septal defect of maximum diameter 1,1cm. It also showed emphysema and mild lung edema. The histopathological examination of the heart and lungs verified the hypertrophy and the emphysema. No other significant autopsy and histopathological findings were found, such as heart attack, intramural coronary arteries (myocardial bridging) or other congenital malformations. The toxicological analysis have shown no traces of alcohol or of drugs of abuse.

Conclusion: Risk factors for death in adult patients with VSD's are clearly related to the size of the defect and the absence or presence of pulmonary artery hypertension that can lead to malignant arrhythmias and sudden death.

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Characteristics of the athlete's heart and the blood pressure in triathlon competitors

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Objective: Extremely long distance competitions (triathlon, marathon running, duathlon, ironmen) became more and more popular during the last decades both as top-level sport and as leisure-time activity. To investigate the triathletes' heart and blood pressure seemed to be especially interesting in two main causes. 1.) Endurance training is known to be the most suitable to develop the athlete's heart, it is interesting to investigate it in such an ultra endurance group. 2.) In our recent investigations [1] it was found that cycle racers and aquatic athletes have slightly higher blood pressure (BP) than the other athletes and the triathlon contains both activities.

Material/Methods: Resting BP, 2D guided M-mode, transmitral Doppler and tissue Doppler echocardiographic data of 76 male top-level triathlon competitors of both gender were compared with data of age matched non-athletes (N=162) and of other athletes (N=1188, power athletes, sprinters-and-jumpers, dry-land ball-game and water polo players, swimmers, runners and cyclists).

Results: Triathlon competitors showed high but not the highest relative aerobic power (males 67.5 ± 6.4 , females 54.5 ± 5.0 ml/kg). BP was found relatively high but it was in normal range. In the males ($130 \pm 14 / 76 \pm 7$ mmHg) cyclists, power athletes, non-athletes and water polo players, in the females ($124 \pm 13 / 78 \pm 13$ mmHg) synchronized swimmers and pentathlonists only showed higher values. Left ventricular hypertrophy was smaller than in the water polo players and endurance athletes, the muscular quotient (wall thickness/internal diameter) was slightly higher, indicating a small extent of concentric type hypertrophy. E/A quotient (indicating diastolic function) was relatively high, resting heart rate (expressing autonomous regulation) was nearly the lowest among the different groups, indicating a high fitness level.

Conclusion: Complex, ultra endurance athletes, namely triathlon competitors show a high level endurance fitness. Blood pressure elevating effect of cycling and swimming seems to be diminished by the running. The moderate intensity of the extremely long competitive issues seems to impede the development of very extensive left ventricular hypertrophy.

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Holter monitoring in young athletes: what's new in 2011?

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Objective: It is widely known that the most prevalent cause of death in young athletes is life-threatening arrhythmia. Preparticipation screening is recommended by the ESC and aims to reduce sudden cardiac deaths. Holter monitoring providing valuable cardiologic information was used in sport during 30 years [1].

The purpose of the study was to compare the rate of ECG-disturbances in contemporary adolescents with different habitual physical activity level.

Material/Methods: 24 h ECG was recorded in 22 athletes (A) 11-18 years (mean, $M\pm m$, 14.8 ± 0.5 yr) participating in different sport disciplines and 28 non-sportsmen (NS, 17.1 ± 0.3 yr). 15 athletes (15.6 ± 0.5 yr) and 24 NS (16.9 ± 2.2 yr) underwent polyfunctional monitoring (ECG, BP and respiratory inductance plethysmography).

Results: Athletes needed further evaluation due to ECGs or history/symptoms (casual BP elevation, overtraining). We found no differences in height and weight between A and NS in ECG group (height 172.8 ± 3.2 and 173.6 ± 1.7 kg; weight 60.3 ± 3.5 and 60.9 ± 1.8 kg), while NS in BP group were heavier (height 174.3 ± 2.0 and 179.7 ± 1.8 cm; weight 67.2 ± 3.4 vs 85.0 ± 4.0 kg, $p<0.01$).

Only day and night SBP in A was lower (day 130.7 ± 2.7 and 138.0 ± 2.4 mm Hg, $p=0.03$; night 113.6 ± 2.9 and 119.4 ± 2.3 mm Hg, $p=0.05$) and apnoea/hypopnoea index (AHI) in A was smaller (5.3 ± 0.7 and 9.8 ± 2.0 ; $p<0.05$).

Early repolarisation was seen in the day-time in 28.5% of A and in 4.2% of NS ($p<0.01$), whereas no difference in the night was obtained (42.9 and 37.5%).

Premature supraventricular beats $>100/24h$ were seen in 24.1 and 21.1%; ventricular premature beats (VPBs) – in 18.2% of A and 40.4% of NS ($p<0.05$).

No differences were detected in AV II degree block (18.2 vs 15.4%) and SA block (33.3 vs 18.3%, $p>0.05$). Transient long QT-interval ($<10\%$ of time) obtained in 36.4% of A and 17.4% of NS, short QT-interval – in 9.1 vs. 17.3% in NS. Short PQ-interval existed in 21.2% of A (WPW in 3 A) vs. 15.4% of NS.

Heart rate variability analysis revealed that power spectra of low frequency band (LF, linked to the sympathetic and vasomotor modulation) both in the day-time and night and very low frequency power (reflects slow regulatory mechanisms, e.g. the renin-angiotensin system, thermoregulation) – only in night in A was significantly bigger than in NS. Power of high frequency band (related to parasympathetic activity) did not differ.

EchoCG examinations in all A were normal except mild mitral (in 35%) and tricuspid (in 18%) valve prolapse.

Conclusion: Early repolarisation in the day-time in young athletes exists more frequently, VPBs – more seldom, day systolic BP is lower and night breathing – more regular than in sedentary adolescents. Thus, Holter ECG+BP – monitoring is a useful tool for identification resting ECG features and optimization training volume and intensity in young athletes.

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QT interval variability during exposure to acute hypoxia

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Objective: Ventricular repolarization instability as quantified by the index of QT interval variability (QTVI) is one of the best predictors for risk of malignant ventricular arrhythmias and sudden cardiac death. Because it is difficult to appropriately monitor early signs of organ dysfunction at high altitude, we investigated whether high resolution advanced electrocardiogram (HR-ECG) analysis might be helpful as a non-invasive and easy-to-use tool for evaluating the risk of cardiac arrhythmias during exposure to acute hypoxia.

Material/Methods: 19 non-acclimatized healthy trained alpinists (age 37,8±4,7 years) participated in the study. Five-minute 12-lead HR-ECGs (Cardiosoft) were recorded in each subject at rest in the supine position breathing room air and then after breathing 30 min of 12.5% oxygen. For beat-to-beat RR interval and QT interval variability (RRV and QTV, respectively), the program of Starc was utilized to derive standard time domain measures such as root mean square of the successive interval difference (rMSSD) of RRV and QTV, the corrected QT interval (QTc) and the QTVI in lead II. Changes were evaluated with paired-samples t-test with p-values <0.05 considered statistically significant.

Results: As expected, the RR interval and its variability both decreased with increasing altitude, with p=0.000 and p=0.005, respectively. Significant increases were found in both the rMSSDQT and the QTVI in lead II, with p=0.002 and p=0.003, respectively. There was no change in QTc interval length (p = non significant).

Conclusion: QT variability parameters may be useful for evaluating changes in ventricular repolarization caused by hypoxia. These changes might be driven by increases in sympathetic nervous system activity at ventricular level.

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Relation of abnormal ECG patterns with sports classification proposed by Italian Organizing Cardiological Committee on Sports Eligibility (COCIS)

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Objective: The value of 12-lead ECG in the pre-participation screening of process of athletes is supported by studies showing that ECG is more sensitive than history and physical examination alone in identifying athletes with underlying cardiovascular disease. Cardiovascular remodeling in the athletes is often associated with ECG changes. It is critical to recognize that the prevalence of pathological ECG is immensely affected by criteria chosen to define "abnormal". The present investigation, therefore, we addressed this problem by assessing the prevalence and the spectrum of ECG abnormalities found in a unselected population of athletes and relation of abnormal ECG patterns with sports classification for COCIS

Material/Methods: We assessed a population of 7353 subjects [5988 (81,43%) males], prospectively examined in Sport Medicine clinics. The ECG patterns were evaluated according to commonly used clinical criteria. Athletes' ECG abnormalities can be divided into two groups: common and training-related; uncommon and training-unrelated. Sports activities have been formerly classified according to cardiovascular involvement, which took into account the changes in few parameters easy to detect and monitor, such as heart rate and cardiac output, blood pressure, peripheral resistance and degree of sympathetic activation due to emotional involvement. The types of sports can be divided in five groups in according to COCIS 2009. For all the variables, standard statistical indices (mean, median, and standard deviation) were calculated and distribution of frequencies of variables was assessed. The relationship of ECG abnormalities with sports classification was assessed by dividing the overall population in five groups. Comparison of the proportions were assessed by two-sided z test. A P-value of <0.05 was considered statistical significance.

Results: The ECG patterns were considered normal in 6575 of the 7353 athletes (89,42%); abnormal common and training-related (ACTR) in 661 (8,98%) and abnormal uncommon and training-unrelated in 117(1,59%).

The abnormalities common and training-related were: Incomplete RBBB (n=402; 60,81%) Sinus bradycardia (n=157; 23,75%); First degree Av block (n=58;8,77 %), Early repolarisation (n=22; 3,32%) and isolated QRS voltage criteria for LVH (n=21; 3,17%). The most frequent abnormalities uncommon and training-unrelated were T wave inversion (n=41; 35,04%) and Left axis deviation/left anterior hemiblock (n= 35; 29,91%). Finally, with regard to type of sport discipline, from ours analysis, it was evident that prevalence of ECG anomalies are different in accord to COCIS group (Table 1) . The differences of the proportions among types of sport were statistically significant (Figure 1).

Conclusion: Electrocardiogram screening must be conducted using modern criteria to distinguish physiologic cardiac adaptations from underlying pathology and limit unnecessary diagnostic evaluations. Sports classification has only the purpose of providing an indication, and it is dictated by practical need, that are helping sports physicians in evaluating cardiovascular risk reliably. Further studies are needed to test accuracy, utility, and cost-effectiveness of the present ECG criteria in relation to different types of sports.

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FIG1: Prevalence of Uncommon and training-unrelated ECG changes according to sports classification by COCIS

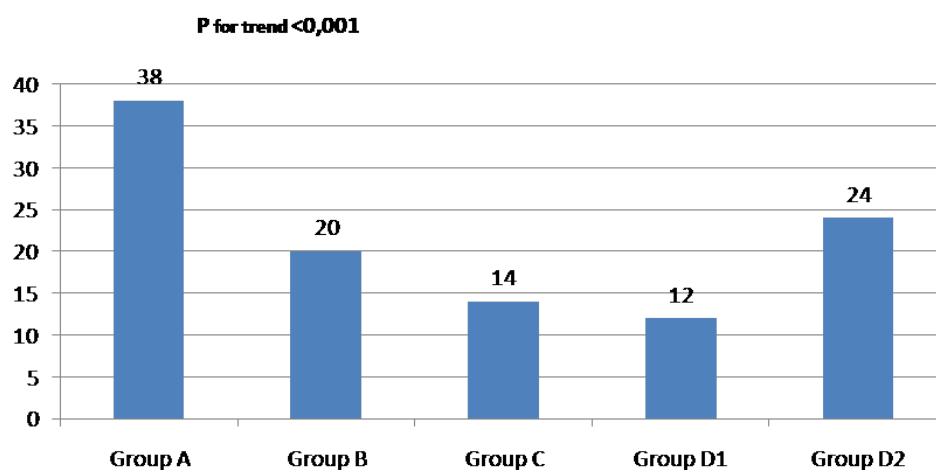


Table 1: Abnormalities of the athlete's ECG in accord to COCIS group

COCIS	P	% abnormal ECG
Group A	(A vs B)NS; (A vs C)NS; (A vs D1)NS; (A vs D2)NS	7,6
Group B	(B vs C)NS; (B vs D1)<0,000; (B vs D2)<0,000;	5,1
Group C	(C vs D1)<0,000; (C vs D2)<0,05;	5,9
Group D1	(D1 vs D2) NS	11,6
Group D2		10,6
NS: not significative		

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Relevance of predicted values of VO₂max, from young high performance athletes being trained in Alsace

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Objective: Many children and adolescents practice high performance sport in a club or a training center. Medical examination before and all along the training are mandatory and useful for good practice of sport. Cardio-respiratory test during exercise is one major component of this evaluation. Test protocols are well defined and based in our laboratory on theoretical values of VO₂max that were defined in the eighties, by tests performed on a population of young North American adolescents for whom there are limited information on their daily workload [1]. Our objective was to assess the relevance of these reference values during the evaluation of young athletes registered in the training center (CREPS) of Strasbourg.

Material/Methods: This retrospective study involved 266 athletes covering 27 different sports, according to the Mitchell classification [2]. 161 boys and 105 girls, between 9 and 17 years old, were all listed either in a training center or as high performance athletes in Alsace. They have all performed a maximal exercise test up to exhaustion, on an ergocycle, in order to determine their VO₂max and their ventilatory threshold.

Results: For the whole group of 266 children, the maximal measured O₂ uptake (VO₂max) averages 2.87±0.87 L.min⁻¹, i.e. 113 ±19% of predicted values. Boys have a mean VO₂max of 3.32 ±0.75 L.min⁻¹ (51 ±8 mL.min⁻¹.kg⁻¹), i.e. 108 ±17% of predicted values and the girls have a mean VO₂max of 2.17 ±0.52 L.min⁻¹ (41 ±7 mL.min⁻¹.kg⁻¹), i.e. 120 ±19% of theoretical values. VO₂max significantly increases with age (p<0.001) but remains stable when expressed with weight (specific VO₂max). For both girls and boys, the ventilatory threshold is relatively high and averages 64 ±9% of VO₂max. The highest values of VO₂max are observed in the C group of the Mitchell's classification, whatever the sex. To characterize the difference between both predicted and measured VO₂max, we used the Bland-Altman's method. For the boys, it shows that the mean of measured VO₂max is 210 ±530 ml higher than the mean predicted VO₂max value (Figure 1). For the girls, the difference reached 360±360 ml (Figure 2). In both groups, these differences are not statistically significant.

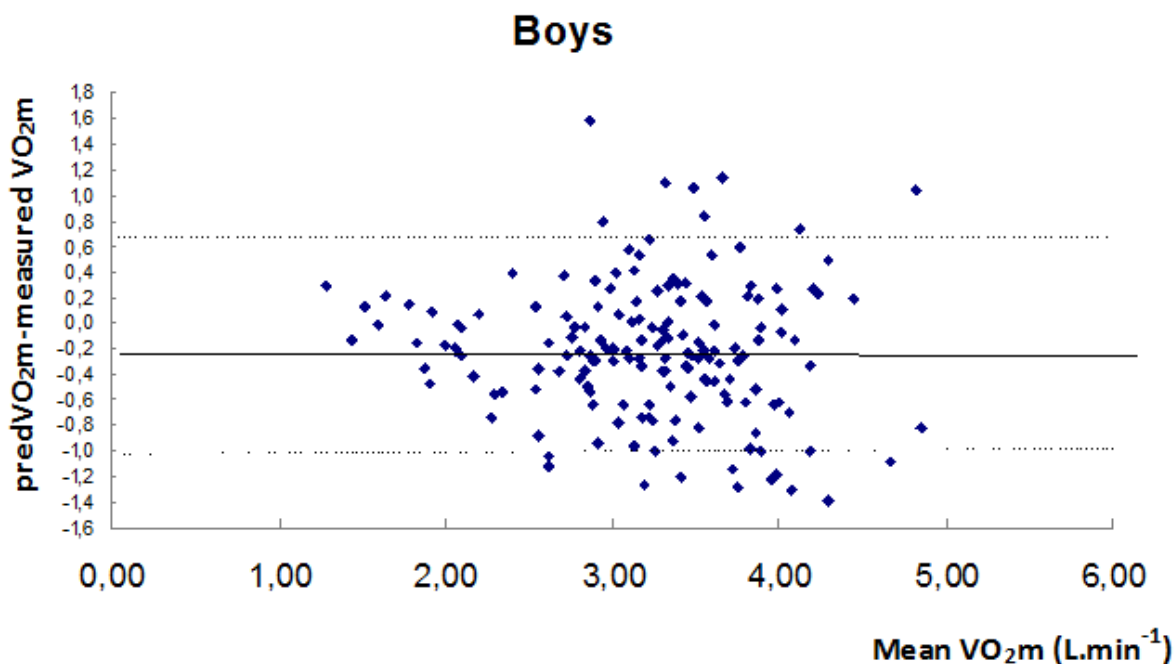


Figure 1: Bland-Altman plots of predicted and measured VO₂ max (L.min⁻¹) of the boys' group. Differences in VO₂max (predicted-measured) (L.min⁻¹) are plotted against the mean VO₂max (mean of predicted VO₂max and measured VO₂max) (L.min⁻¹).

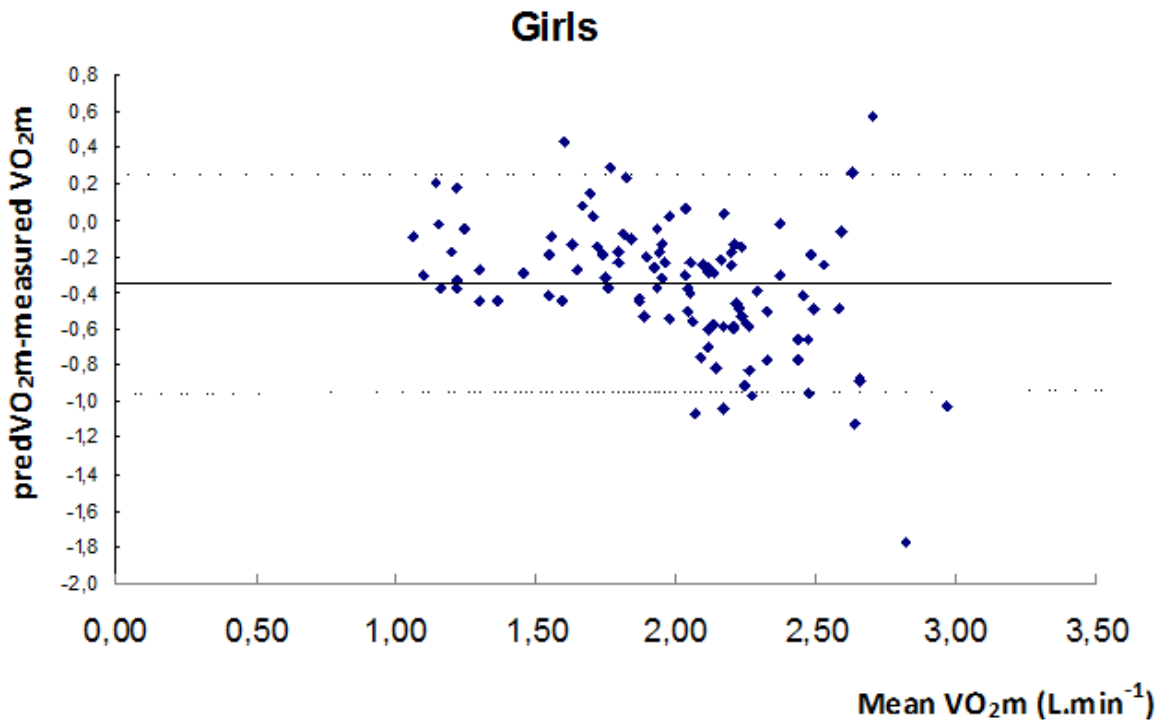


Figure 2: Bland-Altman plots of predicted and measured VO_2max ($\text{L}\cdot\text{min}^{-1}$) of the girls' group. Differences in VO_2max (predicted-measured) ($\text{L}\cdot\text{min}^{-1}$) are plotted against the mean VO_2max (mean of predicted VO_2max and measured VO_2max) ($\text{L}\cdot\text{min}^{-1}$).

Conclusion: The measured VO_2max of adolescents listed as potentially high performance athletes are higher than the values derived from the Cooper and coll. [1] formulae, but the difference is not clinically significant, neither for boys and girls. For this specific population, we can assume that the values of VO_2max calculated with Cooper's formulae can still be used as predicted values, between 9 and 17 years old.

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The post-effects of high-intensity aerobic interval vs. moderate continuous exercise on ambulatory blood pressure of young normotensive women at high familial risk for hypertension

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Objective: Young normotensive women offspring of hypertensive parents (FH+) have early several metabolic, hemodynamic and neuro-hormonal abnormalities [1]. High-intensity aerobic interval exercise (AIE) has shown to be more effective than continuous moderate exercise (CME) for reversing these abnormalities [2]. However, the acute and chronic effects of both AIE and CME on the blood pressure (BP) of FH+ have not been studied. The purpose of present study was to compare the acute and chronic effects of AIE and CME on 24-hour ambulatorial BP (24-h ABP) of young FH+ women.

Material/Methods: Thirty-two healthy sedentary FH+ women (25.0±4.4 years) randomized to a three times per week equal-volume AIE (80-90% of VO₂MAX) or CME (50-60% of VO₂MAX) regimen had their 24-h ABP analyzed at three different moments: 1) after a nonexercise control period (baseline), after the first session of AIE or CME (acute) and after 16 weeks of AIE or CME training (chronic). The baseline and acute 24-h ABP were performed in a random order.

Results: Baseline 24-h ABP was not significant different between groups (AIE: daytime systolic (S) BP=118.8±7.6, daytime diastolic (D) BP=75.8±3.8, nighttime SBP=104.9±6.1, nighttime DBP=61.4±4.8; CME: daytime SBP=116.8±6.6, daytime DBP=73.9±5.5, nighttime SBP=102.8±5.7, nighttime DBP=59.5±5.1), and an acute session of AIE or CME did not change 24-h ABP significantly (AIE: daytime SBP=116.1±6.3, daytime DBP=74.3±5.8, nighttime SBP=102.0±6.0, nighttime DBP=59.6±5.1; CME: daytime SBP=115.8±7.2, daytime DBP=74.8±4.7, nighttime SBP=101.4±8.1, nighttime DBP=59.7±6.3). However, both AIE and CME were effective to improve (P<0.01) nighttime (but not daytime) 24-h ABP after 16 weeks of training (AIE: daytime SBP=116.5±6.4, daytime DBP=73.9±4.8, nighttime SBP=99.7±6.5, nighttime DBP=57.3±4.8; CME: daytime SBP=114.9±8.3, daytime DBP=72.9±4.0, nighttime SBP=99.3±8.1, nighttime DBP=56.5±3.4).

Conclusion: An acute session of AIE or CME did not change 24-h ABP of FH+ women. However, 16 weeks of both AIE and CME were effective to improve 24-h ABP of these young normotensive women at high familial risk for hypertension. These findings may have important implications for the prevention of inherited hypertensive disorder.

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M: Nutrition & Ergogenic Aids

089

Longitudinal changes of anabolic/catabolic balance in high level male basketball

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Objective: The ratio testosterone to cortisol (T/C) was suggested as potential marker to assess the balance between anabolic and catabolic processes under influence of physical loads. Despite well-documented responses of cortisol (C) and testosterone (T) to strength and endurance exercises, the scarce of data regarding the monitoring of T/C still exist in the intermittent sport games [1], [2]. We aimed to describe the course of T/C in high-level male athletes throughout basketball season.

Material/Methods: This study was conducted on six male basketball players during consecutive 37 weeks. The duration of practices was accounted in minutes, subdivided in categories and expressed as weekly load [3]. Involved athletes were recruited for the Euroleague matches as well for Lithuanian and Baltic championships matches. To study the hormonal fluctuations during the basketball season, blood samples were carried out 11 times. First blood sample was taken before the first practice after off-season and represents reference value. Second and third sampling occurred during pre-season preparation. To avoid any confounding effects of variations in circadian rhythm and food intake on hormonal secretion, athletes provided blood samples at same time (09.00–09.30) after overnight fasting. All the venous blood samples were drawn via antecubital venipuncture in semirecumbent position. Serum T and serum C concentrations were assayed using Immulite 2000 analyser and immunoassay (Siemens Healthcare Diagnostics, Deerfield, IL, USA).

Results: The individual dynamic of both measured hormones are highly varying through the period of observation. The individual coefficients of variation are in range between 0.16 and 0.26 for T/C. Also the number of cases when the change of T/C was above the personal coefficient of variation differs among investigated athletes. The Figure 1 represents accumulated data of T/C during 37 weeks of observation. The decreasing of T/C values occurs after beginning of regular practices and remains relatively stable with exception of the last measure through the period of observation. The elevation of last measured T/C was statistically significant and associated with 5-day taper before beginning of play-offs. The Friedman test was used for one-way repeated T/C measures analysis. Significance was set at $p < 0.05$ a priori.

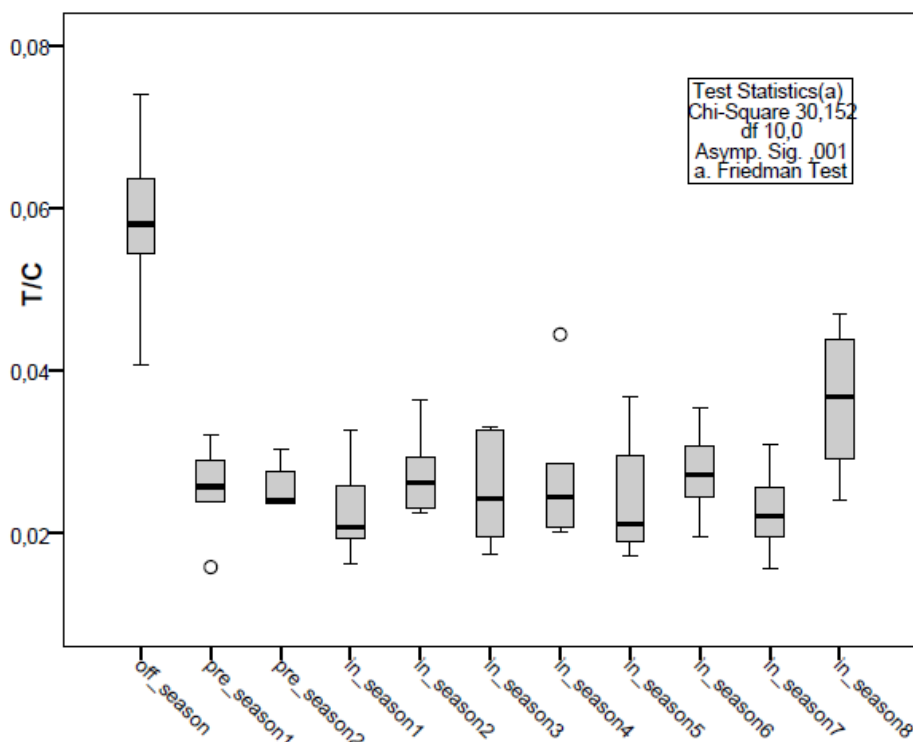


Figure 1: Seasonal dynamics of T/C in male basketball players.

Conclusion: Our results showed that T/C balance through the in-season remains stable suppressed and probably reflect the cumulative impact of regular training rather than effects of the last load. The 5-day tapering is sufficient to elevate T/C ratio in male basketball players.

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Nutritional habits of Slovenian swimmers

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Objective: The aims of our study were (1) to determine the eating habits and nutritional status of Slovenian swimmers of different sex and age groups (2) to calculate their energy intake and expenditure and (3) to evaluate the use of dietary supplements.

Material/Methods: Forty-six swimmers (18 males and 28 females), aged 11–32 years participated in the study. They have fulfilled the dietary questionnaire and their nutritional status was assessed via a 7 day dietary record. Descriptive statistics (means, standard deviation and frequencies) were used for the exploratory analysis. ANOVA was used to assess the differences in the energy intake/expenditure among the different sexes and age groups.

Results: The main results of our study have shown that the energy intake was 63 kcal/kg (58–69 kcal/kg) for males and 54 kcal/kg (51–58 kcal/kg) for females. Such energy intake met the estimated energy expenditure only in the youngest age group of both sexes (boys/girls), while in the all other age groups in females the energy intake was too low causing the negative energy balance (–16 kcal/kg to –6 kcal/kg). The results in males were better as only senior male swimmers had the negative energy balance (–6 kcal/kg). In general, Slovenian swimmers consume too little carbohydrates in their diet (31 % in males and 32 % in females) and too many fats (37 % in males and 29 % in females). Dietary supplements are used daily by 61 % of males and 54 % of females. In both sexes the most frequently used supplements are different energy drinks containing carbohydrates, while ergogenic aids (e.g. creatine) are used only youth and senior players.

Conclusion: Our findings are in concordance with previous studies that also reported a low carbohydrate intake in swimmers [1], [2]. We believe that increase of carbohydrate intake with concomitant decrease in fat intake would help regeneration process in swimmers and allow them to train and compete at more advanced level. The majority of increased fat intake can be attributed to high intake of different milk (diary) products with high fat values.

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Plasma visfatin and sICAM-1 levels changes following 10 weeks endurance and resistance training in sedentary postmenopausal women

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Objective: Today it is known that obesity and lack of a proper level of physical fitness is associated with many disabling diseases such as diabetes mellitus and coronary arteries disease. Adipose tissue is an active endocrine organ releasing a large number of cytokines and bioactive mediators, is responsible for the chronic inflammatory state of visceral obesity. Visfatin, a novel adipokine with insulin mimetic properties, has recently been described by Fukuhara, et al (2005). Higher plasma visfatin levels in obese and diabetic subjects in comparison to normal weight and healthy people may determine the probable link between visfatin concentrations and obesity and its accompanied metabolic disease and atherosclerosis. Chronic inflammation, the pathogenic feature of atherosclerosis; activating endothelial, stimulates pre-inflammatory proteins synthesis like chemokines and resulted in cell adhesion molecules expression enhancement. Intercellular adhesion molecule- 1 (ICAM-1), a member of immunoglobulin supergene family, is the key step for leukocyte infiltration in inflammatory injury. Epidemiological studies have shown that soluble ICAM-1 is a predictor of cardiovascular disease. Whilst physical activity and exercise can ameliorate inflammation, daily exercise training is recommended to lower the incidence of CVD and metabolic syndrome. Most of the studies make more intense to investigate the effects of endurance exercise on inflammatory markers and visfatin. Lee K J et al (2010) has reported the reduction of plasma level of visfatin following 12 weeks aerobic training [1]. Teresa M Becki et al (2010) has shown 12 weeks of cardiac rehabilitation program significantly decreased sICAM-1 level of plasma [2]. Olson, et al (2007) has demonstrated that one year of resistance training in obese women declined plasma sICAM-1 level [3]. However, to our knowledge none of the studies has investigated the influence of resistance training on plasma visfatin levels. Thereby according to recent public health guidelines from the American Heart Association and the American College of Sports Medicine advocating that regular physical activity, including aerobic and resistance exercise, is essential for healthy aging; and our limited contrary information about endurance and resistance training on visfatin and ICAM-1 concentrations, this study has investigated the influence of swimming endurance and resistance training on plasma levels of visfatin, ICAM-1, lipid and metabolic profile in sedentary post menopausal obese women.

Material/Methods: Participants included 33 (11 control, 11 resistance and 11 endurance training) sedentary post menopausal obese (BMI \geq 30 kg/m²) women, studied before and after 10 weeks of resistive (3 days/week at 40-60% of 1RM) and swimming endurance training (3 days/week at 50-60% of HRmax). Serum levels of visfatin and sICAM-1, lipid profile, HOMA-IR and anthropometric indices were measured before and 48 hours after the last training session. Statistical analysis was done by ANOVA, paired t-test and Pearson correlation and P value<0.05 was considered significant.

Results: Statistical analysis showed a significant difference between the training and control groups for visfatin (P=0.002), sICAM-1(P=0.042) levels. Although visfatin concentration, lipid and metabolic profile and anthropometric indices did not significantly change following 10 weeks of resistance training (P>0.05), plasma sICAM-1 level (P=0.012) decreased significantly. Endurance training caused significant decrease in all blood factors and anthropometric indices measured (P<0.05). Hence significant correlation existed between post training levels of sICAM-1 and WHR (R=0.367,P=0.048) and waist circumference (R=0.394,P=0.041); and changed visfatin levels significantly correlated with pelvic circumference (R=-0.366,P=0.040).

Conclusion: This is one of the first studies investigating the effects of swimming endurance and resistance training on visfatin and ICAM-1 levels in sedentary post menopausal obese women. Our finding is in line with that of Shang Jing, et al (2008) has shown significant decline in visfatin level, lipid profile and insulin sensitivity improvement following 8 weeks of swimming in obese mice's [4]. So it can be proposed that amelioration of lipid profile and HOMA-IR is responsible for visfatin decrease after 10 weeks endurance training. Mohammadi, et al (2010) has found significant decrease in visfatin level and body fat percent following 8 weeks of endurance training [5]. According to the findings of Michael J Puglisi, et al (2008) and Ziccardi et al (2002), Decrease in sICAM-1 level may be associated with the beneficial effect of exercise on body composition or/and lipid profile. However further studies are needed to elucidate the mechanisms responsible for the effects of 10 weeks resistance training on serum levels of visfatin and ICAM-1.

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The effects of aerobic activity and caloric restriction on cardio-vascular disease markers in obese women

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Objective: The aim of this study, the comparison of effects Aerobic activity and Caloric restriction on cellular and vascular adhesion molecules in obese women.

Material/Methods: 40 sedentary Obese woman with mean \pm SD age: $20/4 \pm 1/26$ years, %BF: $26/6 \pm 3/95$ and BMI: $30/6 \pm 2/81$ m/kg² were selected and randomly allocated to EXP1 (Aerobic activity), EXP2 (Caloric restriction), EXP3 (concurrent intervention) and control groups. 8 week Training program in EXP1 included running on treadmill in 50-60 min, 5 day/week, EXP2 use a caloric restriction diet with equal energy to EXP1 and EXP3 use a diet and Aerobic activity with energy restriction equal EXP1. Fasting blood sample analyzed for VCAM-1 and ICAM-1 levels before and after 48 h at the end of study.

Results: Resulting data were analyzed by ANOVA and bonferroni post hoc, pair t test and person correlation coefficient ($\alpha=0.05$). Data Analyzing show that weight, BMI and %BF in the experimental groups were significantly decrease. The higher changes seen in EXP2 equal 6/4%, 6/4% and 1/9% ($p<0.05$). Result show that the decreases of Icam-1 in EXP1, EXP2 and EXP3 equal %9.3, %19.7 and %23.1. The decrease of Icam-1 significant in EXP2 (Aerobic activity) ($p=0.05$). The levels of VCAM-1 in Experimental groups were decrease but there were not significant ($p>0.05$).

Conclusion: The levels of VCAM-1 in Experimental groups were decrease but there were not significant ($p>0.05$). A low correlation were seen between Baseline and changes adhesion molecules levels and %BF, weight ($p>0.05$).

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The probable effects of anabolic-androgenic steroids (AAS) consumption on the skin microflora of bodybuilders

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Objective: Abuse of anabolic-androgenic steroids (AAS) has reached alarming dimensions by members of fitness centers and others. AAS are drugs which mimic the effects of the male sex hormones testosterone. They increase protein synthesis in cellular tissues, which results in the buildup of cellular generations, especially in muscles, and in return can increase strength and bodyweight in the athletes. Previous studies supported the association between cardiovascular, liver, reproductive, and dermatologic disorders and using of AAS. Moreover, it has been shown that AAS increase activation of sebaceous glands and consequently cholesterol and free fatty acids of skin surface lipids. So the number and type of lipophylic bacterial skin flora such as propionibacterium acnes, Staphylococcus aureus might be influenced by using of these substances. Although it has been shown that these mentioned bacteria are resistant to antimicrobial activities of the fatty acids in sebaceous glands and may cause dermatological disease such as acne, folliculitis, and sebaceous cysts, their role in cutaneous lesions of AAS users is not clearly understood. To address this question, the effects of these supplements on the bacterial flora of the AAS users were investigated among the male bodybuilders.

Material/Methods: The ninety four male bodybuilder (71 AAS users, 23 non AAS users) and 34 sex and age matched students as control group were studied. The average and median ages of the bodybuilders were 24.7 and 24 years, respectively. All the participants completed a questionnaire including bathing habits, using AAS and others supplement, usage of antimicrobial drugs for at least four weeks, and general medical conditions. The skin of the examinee was check for the presence of the lesions. Specimens were obtained from skin surface by swabbing 1 cm² of back and chest areas by two wet swabs. All samples were cultured Tryptone Soy Agar supplemented with 5% Sheep blood in 37°C in anaerobic condition for isolation of P. acnes and in aerobic condition for S. aureus. The isolated bacteria identified by using standard microbiology techniques.

Results: Higher prevalence of the skin lesions was observed in the bodybuilders in compared with the control group and this difference was statistically significant (P<0.05). Moreover significant differences were also observed in skin lesions among the AAS users and the non-AAS user builders (P<0.05). The prevalence of S. aureus and P. acnes in the athletics were higher than control groups. In addition, a significant difference in distribution of P. acnes was found between body builders that used AAS and those did not (p-value<0.001). While no significant variation was found in prevalence of aerobic bacteria between AAS users and the rest of athletics.

Conclusion: Taken together, the higher numbers of the bacterial flora that found in the bodybuilders in particular those using AAS in comparison to the controls might be due to the influence of these AAS on the skin microflora and transmission of the bacteria through the direct contact of the naked skin with exercise instruments.

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N: Sports Injuries

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A novel approach to acute ankle sprain alphabet exercises

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Objective: Despite the fact that several peer-reviewed articles and a myriad of other lay sources recommend the ankle alphabet exercise as an effective and safe rehabilitation modality, none of these sources to our knowledge have reported on the effectiveness of the specific exercise itself. It is well accepted amongst clinicians that lateral ankle sprains that occur as the result of an inversion movement comprise the majority of the mechanisms associated with overall ankle sprain injuries. The anterior talofibular ligament (ATFL), and the calcaneofibular ligament (CFL) are the two main ligamentous soft tissue structures located on the lateral aspect of the ankle that undergo tension with associated triplanar motion that includes inversion, adduction, and plantar flexion. After reviewing the directional movements associated with routine ankle alphabet exercise routines, it appears to us that a large portion of the letters of the alphabet when “spelled out” lend themselves to positions directed in the same pattern as that of the mechanism of injury, most likely placing the injured ligaments on further tension. This in turn would lead to increased pain and discomfort associated with the directional movement toward associated ligamentous instability, particularly in the acute phases of rehabilitation.

Material/Methods: We developed a quadrant configuration that sought to duplicate the starting position, directional movement, and ending position of the ankle while performing the alphabet exercise for each individual letter. While viewing the quadrant from an anatomical position, the four sections can be referred to as upper left (UL), upper right (UR), lower left (LL), and lower right (LR). Furthermore, each quadrant can be visually converted to reflect anatomical movement directional terms, with the upper quadrants relating to dorsi flexion and the lower quadrants relating to plantar flexion. Similarly, the left and right quadrants represent inversion and eversion movements, depending upon whether one is assessing the left or right ankle. 13 volunteer certified athletic trainers with experience ranging 1–24 years participated in the study. Each was familiar with the alphabet exercise protocol and was provided verbal directions to complete the alphabet grid provided with each letter in a quadrant format.

Results: After performing the various movements associated with the alphabet exercise protocol for each letter, it was discovered that many letters involve movements that recreate the mechanism of ankle injury, potentially leading to increased pain and ankle instability (Tables 1a-d). Some letters, furthermore, demonstrated movements in all quadrants. Letters to avoid for all ankle sprains while performing alphabet exercises: A C D E G O P Q R S X Z.

Conclusion: In accordance with our theory that some letters of the alphabet serve to promote a safer environment for early phases of rehabilitation associated with an acute ankle sprain, other letters when performed as part of the acute phase would likely not promote a comfortable scenario for one to exercise within. Ironically, certain letters, when drawn with the ankle, actually cross into all four quadrants. While in sub-acute and advanced progressive phases of rehabilitation a gradual increase of tensile force to the healing ligament and proprioceptive movement in direction of the unstable position may serve to facilitate a protocol toward optimal recovery, it is our recommendation that these letters be used with caution or even avoided altogether from an alphabet exercise program during the acute phase. The timeframe for which such directional movements should be added to a person’s rehabilitation protocol should always be person specific and consider all of the possible factors associated with the injury and the goals of return to participation.

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Acute injuries and overuse syndromes in sport climbing and bouldering in Austria

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Objective: In the last 20-30 years sport climbing and bouldering have become trend sports. The high impact and strain on shoulder girdle, hands and fingers is a known fact in these sports. Acute injuries and overuse syndromes affect mostly ligaments, tendons and joint capsules. Known disease patterns are the climber's elbow or the climber's finger. The incidence of the different injuries was evaluated in some studies in Germany and England. Injuries in rock climbing are common and more than half of these injuries involve the wrist and hand. Acute injuries mostly occur because of a fall. Therefore the ankle is the most common injury site and fractures, contusions, sprains or strains are the most common injury types.

The aim of the recent study was to evaluate acute injuries and overuse syndromes in sport climbing and bouldering in Austria.

Material/Methods: The evaluation was conducted by the use of a self-administered questionnaire between summer 2009 and summer 2010. Climbers all over Austria were asked to participate in this study by an advertisement on <http://www.bergsteigen.at/>, which is an important gateway for climbers in Austria. Furthermore the questionnaire was available on the homepages from the national federations „Österreichischer Alpenverein“ and „Naturfreunde Österreich“ and in different climbing halls. Climbers with more than 6 months climbing experience were included.

The questionnaire evaluated in a first part demographic and anthropometric data like age, sex, body mass index, type of climbing (sport climbing, bouldering, out- or indoor climbing) and climbing experience. In the second part injuries and overuse syndromes were recorded (type of injury and localisation).

Results: 193 climbers (133 male and 60 female) participated in the study. Subjects were between 18 and 57 (mean±SD: 30±8) years with a body mass index of 21.6±2 and a climbing experience of 9.3±7.7 (1-35) years. On average 49.9% performed sport climbing outdoor, 29.3% sport climbing indoor, 21.0% bouldering outdoor and 28.6% bouldering indoor. 136 of the 193 participants (70.8%) reported at least one injury or overuse syndrome. Overall 431 injuries and overuse syndromes were recorded (67.1% injuries, 30.6% overuse syndromes and 2.3% not to classify). The predominance of finger injuries (34.6%) was followed by ankle (13%), shoulder (12.3%) and elbow (11.8%). The most frequent complaints were located at ligaments and tendons (44.1%) followed by joints (20%) and skin (18.3%).

Conclusion: The injuries and overuse syndromes in climbing in Austria are in line with previously published results from studies in Germany and England. Further studies dealing with possible recommendations concerning prevention and treatment of the mentioned injuries and overuse syndromes are already planned.

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High number of hamate hook fractures in underwater rugby players

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Objective: Fractures of the hook of the hamate are rare injuries that can manifest in palmo-ulnar pressure pain and paraesthesia in the area supplied by the ulnar nerve.

In underwater rugby players displaying such symptoms, the ensuing diagnostics and therapy were evaluated retrospectively.

Material/Methods: The study was conducted on 17 male, athletic patients in whom a fracture of the hook of the hamate had been confirmed. Radiological imaging included a conventional x-ray in 2 planes and thin-layer computed tomography with multiplanar reconstruction. All patients were immobilised in a plaster splint for at least 6 weeks after diagnosis. If the symptoms persisted, fragment extirpation or osteosynthesis were recommended.

Results: The right hand was affected in all cases, which was also used as the leading hand during games. In the entire patient population, conventional x-rays failed to confirm the fracture (0%). As a result of the persistent symptoms, computed tomography was performed on each patient and confirmed the fracture of the hook of the hamate (100%). Despite recurrent symptoms, periods of 1 week to 4 years elapsed before the correct diagnosis was rendered and therapy given. Among the 17 patients, there were 7/17 distal (~41.2%), 5/17 medial (~29.4%) and 5/17 proximal (~29.4%) fractures of the hook of the hamate, none of them displaying substantial dislocation. Conservative therapy did not achieve freedom from symptoms in any of the patients, 10/17 (58.8%) of them developing a pseudarthrosis, which was confirmed in the CT using image morphology by an increased sclerosis of the adjacent fracture surfaces. Fragment extirpation was performed in these 10/17 patients. In 5/17 patients the fracture was treated with osteosynthesis (ORIF). Despite persistent symptoms, one patient declined surgery. All of the patients who underwent surgery were free of symptoms over the further course, did not experience any loss of strength in the hand and were able to play underwater rugby again.

Conclusion: In underwater rugby, there appears to be a higher incidence of fractures of the hook of the hamate as a result of the specific forces applied to the leading hand. Despite corresponding clinical symptoms, the possibility of a fracture of the hook of the hamate is not considered sufficiently, especially in this sport, and it is often diagnosed very late. If a fracture of the hook of the hamate is suspected, adequate imaging is necessary for early diagnosis and for differentiated planning of therapy.

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Injuries in female spanish top level handball team

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Objective: To describe the incidence, nature, anatomic distribution and severity of sports injuries registered during two consecutive seasons in a female top Spanish division handball team.

Material/Methods: The team had two physiotherapists who were at all times in practices and games. Injuries were recorded by one of them at the end of each session/ game in an injury registration diary. The diary was filled with the next information: Player name, date of the injury, anatomic structure injured, days off training, number and type of physiotherapist treatments and exposition time. The number of players per position in both seasons was: 14 back players, 6 wing players, 4 line players and 5 goalkeepers. Injuries were graded according to the "absence/modification of the training session": slight= 0 days; minor= 1-7 days, moderate= 8-21 days, major>21 days [1]. Injury incidence was calculated as the number of injuries per 1000 hours of exposure.

Results: 168 (67.2%) were overuse injuries and 82 (32.8%) acute. The lower extremity was involved in 46.4% of the injuries, the trunk 28.8% and the upper extremity 21.2%. The lower extremity showed the highest percentage of overuse injuries 45.8%, followed by the trunk 39.9% and the upper extremities 14.3%. 152 injuries did not required absence from training/game (60.8%), 78 injuries were minor (31.2%), 11 were moderate (4.4%) and 9 were major injuries (3.6%). Line players had the highest injury incidence compared to other player position.

Conclusion: On contrary to the expected, this study shows that female professional handball players have a high injury incidence in the lower extremities and the trunk compared to the upper extremities. Furthermore, many slight (non-time loss) injuries do occur in high-level handball team and the registration of daily complaints and minor injuries is important since degenerative changes may occur in the areas with more stress. The current study might provide baseline information for further prevention strategies.

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Injuries in synchronized skating

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Objective: The International Skating Union (ISU) is governing the winter sports of figure skating, speed skating, short track speed skating and synchronized skating. In synchronized skating up to 16 skaters, mostly females, are skating together in unison, performing different formations on the ice. The main characteristic of the sport is synchronized work by skater's legs, body, arms and head. Synchronized skating is a relatively new competitive sport and data about injuries in this discipline are lacking. Therefore the purpose of this study was to investigate the frequency and pattern of acute and overuse injuries in synchronized skaters.

Material/Methods: The questionnaire consisting of 22 questions was given to 23 participating teams, including 460 skaters, at World Synchronized skating championship held in Zagreb in April 2009.

The questionnaires inquired about the site and types of acute and overuse injuries that occurred during their synchronized skating career. In addition questions were asked about their current age, the age when they started to skate, as well as the age when they started to skate in synchronized skating. Major parts of the questionnaires inquired about the incidence of injuries with reference to on/off ice training, practicing team (i.e. block, line, intersection, etc.) or individual elements (i.e. jumps, spins, etc.) We also inquired about possible overuse syndromes that occurred during their previous figure skating and their synchronized skating career.

Results: A total of 451 ladies and 9 men senior skaters completed the questionnaires. 191 (42,4%) female and 4 (44.4%) male skaters had suffered from acute injuries during their synchronized skating career. As some skaters had suffered from more than one injury, the total number of acute injuries in females was 278 and in males 14. In female skaters 19,8% of acute injuries were head injuries, 7,1% trunk, 33,2% upper and 39,9% lower extremity injuries. In male skaters 14,3% were head injuries, 28,6% upper and 57,1% lower extremity injuries, with no report of trunk injuries. 109 female and 2 male skaters had low back problems and 72 female and 2 male skaters had one or more overuse syndromes during their skating career. Of 95 overuse injuries in female skaters, 65,3% occurred during their figure skating career, while 34,7% occurred when they skated in synchronized skating teams. In male skaters, out of 5 overuse injuries, 80% occurred in their figure skating career, while 20% occurred during their synchronized skating career. Out of the total of 292 injuries, 240 (82.2%) occurred during on ice practice, while 52 (17.8%) happened during off ice training. 78 (26,7%) acute injuries occurred while practicing individual elements, and 214 (73,3%) on ice injuries occurred while practicing different team elements. 63.8% of all injuries in female skaters and 71.4% in male synchronized skaters occurred in the last 4 skating years.

Conclusion: In conclusion, we would like to stress that the current available data suggests that the number of injuries in synchronized skating is not so low. Data also show that the number of injuries has increased in the past 4 skating seasons, although it cannot be ruled out that the numbers have been biased by a better recall of recent injuries. Although it is tempting to suggest that the increase coincides with increased demands for more technically difficult elements performed by the synchronized skaters, this conclusion should be cautioned. Nevertheless, we strongly recommend that the medical community work closely with the coaches, skaters and technical committees in future development of synchronized skating.

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Reconstruction of the sternoclavicular joint in active patients with the figure-of-eight technique using hamstrings

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Objective: Dislocations of the sternoclavicular joint are rare injuries mainly caused by massive forces applied directly or indirectly to the joint. A high rate of complications has been reported following this injury emphasizing the importance of an accurate diagnosis and therapy.

Material/Methods: We report a series of patients with chronic anterior or posterior sternoclavicular dislocation treated with figure-of-eight gracilis- or semitendinosus-tendon reconstruction. Tendon grafts were collected from the patient's ipsilateral knee. Preoperative and postoperative DASH scores were compared to evaluate the outcome.

Results: Six patients (mean age: 22 years; range 15 to 46years; male: 3 female: 3) were included in this study. These patients sustained an isolated dislocation of the sternoclavicular joint due a high-energy trauma. Anterior dislocation was observed in 3 patients, posterior instability in 2 patients and the remaining patient showed multidirectional instability. The mean time from injury to operation was 8 months (range 4 to 33 months). The semitendinosus tendon was used in 4 patients, the gracilis tendon in 2 patients, respectively. The latest follow-up examination was after 17 months mean (range 9 to 29 months). The DASH score improved from 54.3 points (range 45.7 to 68.8) preoperatively to 28.8 points (range 25.8 to 34.5) postoperatively.

Conclusion: All patients returned to full activity without limitations including competitive contact sports. Stabilization of the sternoclavicular joint with the figure-of-eight technique seems to be a feasible alternative for young and active patients with remaining instability following conservative treatment.

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Scaphoid fractures in elite Handball athletes

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Objective: A scaphoid fracture in athletes is a serious injury that can result to late return to play. Usually occurs after falls onto an outstretched hand or through direct injury [1]. Swelling, limited motion of the involved joint, and tenderness of the snuffbox appear immediately [2]. The diagnosis should be made after x-rays but often CT scanning and MRI are additionally asked to decide the treatment approach [3]. The architecture of the fracture and vascularisation of the scaphoid are the critical points for the doctor to decide which approach should be chosen. The diagnosis should be early and accurate for an early return to the game. Treatment of fractures that are stable and fixed is immobilization by cast but in some cases that early return is desired operative fixation can be used. For non stable fractures operative fixation is used. Operative techniques include internal and percutaneous fixation and in some cases arthroscopy [4]. The treatment plan should be decided from the doctor after a thorough clinical and imaging examination and the need for early return should be also considered. An on time diagnosis and proper treatment a successful manage of scaphoid fractures can be achieved with few or no consequences to the athlete [4].

Material/Methods: Five handball players with scaphoid fractures were treated surgically. All injuries happened during midseason. All were male athletes and the treatment was surgical.

Results: The return to the game after the surgical fixation averaged 4.2 months.

Conclusion: Early and accurate diagnosis followed by surgical fixation of the fracture allows early return to the game.

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Osteoporotic fractures: a problem of the old age, a problem in rehabilitation

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Objective: Osteoporotic fractures has become one of the biggest problems in the recent decades. With ageing the number of the osteoporotic fractures increases. The aim of this study was to find the factors influencing the opportunity for rehabilitation.

Material/Methods: Retrospective study of the case history of all patients with osteoporotic fractures at the Department of Rehabilitation in the Szent János Hospital in Budapest, between 1.1.2004 and 31.12.2009. Authors classified the data from the point of view of the disability and analysed them with simple statistical methods. Osteoporotic fractures were defined as fractures, that happened without any big force. From the anamnestic data the authors identified factors which can lead to osteoporosis: early menopause, hyperthyreosis, rheumatoid arthritis, and other immunological disease, problems with absorption, corticosteroid therapy alcohol or nicotine abuse. Data, which increase risk for accidents were also collected. Such as: hemiparesis, Parkinsons disease, immobility, post-polio syndrome. Factors influencing the rehabilitation process were also taken into consideration. These are mostly the consequences of the old age.

Results: During the six years 2441 patients in total participated in rehabilitation programme at the department, 836 of them had 905 osteoporotic fractures. 227 patients previously had an osteoporotic fracture, 13,5 % suffered from a disease and 12,2% took a drug that contributes to the onset of osteoporosis. 10% were in danger of falling because of a neurological disease. The mean age of the patients was 80,8 years, so most of them without any accident and fracture already had problems with seeing, hearing, orientation, posture, muscle strength, etc. These factors influence the rehabilitation of the elderly.

Conclusion: Although the possibility for healing post-operative fracture is good, the quality of life of the patient will worsen. The patient post fracture needs more help to take care of him/herself. The complexity of caring for older patients with a fracture requires more attention in the rehabilitation.

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Strength profile of external and internal shoulder rotators in elite volleyball players

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Objective: The objective of our study was to establish a baseline strength profile of shoulder external and internal rotators in elite volleyball players, where chronic shoulder injuries represent a significant health problem. Our other goals were to evaluate the side dominance effect for those muscle groups and to explore the possible strength differences between different playing positions, age groups and levels of play.

Material/Methods: A sample of 118 male volleyball players from Slovenian Division 1 and 2 was tested using the Techno Gym REV900 isokinetic dynamometer. Testing was performed in short range of motion (30°) at the angular velocity of 90°/s in the concentric mode of contraction for both muscle groups. The main outcome measure was peak torque (Newton meters – Nm) of shoulder internal and external rotators normalized for body weight (Nm/kg). A repeated measure ANOVA was used to evaluate the side dominance effect, while multivariate ANOVA was used to evaluate the differences in strength across different playing positions, age groups and levels of play.

Results: The results are depicted in Figure 1 that shows peak torque to body weight normalized values for external and internal rotators and above are repeated measures ANOVA findings for a factor side dominance. We may conclude that there are important bilateral strength differences in relation to the side dominance effect. This effect is much stronger for internal than for external rotators as indicated by large difference in F values. Multivariate ANOVA has shown that there are no significant strength differences between different playing positions ($F=0.72$, $p=0.78$), age groups ($F=1.18$, $p=0.32$) or levels of play ($F=0.99$, $p=0.41$).

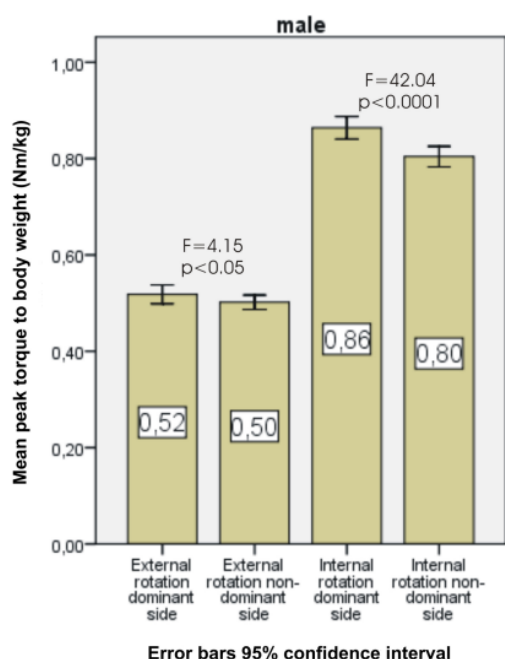


Figure 1

Conclusion: Our study has shown that there is a significant difference in concentric strength of shoulder internal and external rotators in elite volleyball players between dominant and non-dominant arm side. This effects is approximately 10 times stronger for internal than external rotators. This finding can be explained by the fact that concentric strength of internal rotators is crucial for spiking and serving activities, but this is not followed by concomitant increase in the strength of antagonist muscle group – the external rotators. This could of course predispose volleyball players for shoulder injury. Furthermore, we may also conclude that there are no systematic differences among different levels of play, age groups or playing positions. We believe that our findings give an important data on shoulder external and internal rotators strength that will be of great value and interest for clinicians and coaches as reference values for rehabilitation and/or training purposes.

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Survey the effect of motivational intervention on learning and performance of the discrete motor skill (free throw basketball)

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Objective: Arousal and condition of it is one of the major environmental factors that influence performance and learning of motor skills through motivating subjects. Therefore, the aim of this study was to survey the effect of audience presence as a motivational intervention on learning and performance of free throw basketball skill.

Material/Methods: Subjects were 24 healthy and non-athlete girls that were divided into two groups of audience (n=12) and control (n=12) randomly. Protocol of acquisition stage concluded free throw basketball for 6 weeks, 3 sessions per week with 15 trails in each session with the presence of motivational factor in separate groups. Scores of free throw basketball test was record per session, and then post test was carried out and finally after 2 weeks detraining, retention test was done in the same condition and transfer test like the real world of competition (in the presence of audience for two groups) was performed 24 hours later.

Results: Results showed that all groups improved through acquisition stage and there was no significant difference in free throw basketball scores between 3 groups in acquisition test ($p=0.145$). But in retention and transfer test, results was in advantage of music and audience groups, in retention test music group achieved the highest scores and in transfer test music and audience groups was significantly higher than control group ($p=0.000$).

Conclusion: The both groups improved up to 80% in post test of acquisition stage. This finding is in agreement with Social Facilitation Theory that indicates presence of audience facilitates sport performance [1], [2]. However, process of change up to retention test in audience group was increasingly but in control group decreased 7.6%. Another finding was that in transfer situation to real world, audience group had a permanent learning of free throw basketball skill than control group, so that scores of audience group enhanced 21% from the retention performance level, as well as the researches done in this area [3], [4], [5].

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The effect presence of audience and music as motivational factors on learning and performance of the continuous motor skills

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Objective: The aim of this study was to survey the effect of motivational factors by the presence of audience and music on learning and performance of dribbling basketball as the continuous motor skill.

Material/Methods: Subjects were 36 healthy and non-athlete girls with the mean and standard deviation of age (21.8 ± 2.23 years), height (163.4 ± 6.19 Cm) and weight (57.5 ± 10.13 Kg), that were divided into three groups of audience ($n=12$), music ($n=12$) and control ($n=12$) randomly. Protocol of acquisition stage concluded dribbling basketball Harrison Test for 6 weeks, 3 sessions per week for 30 seconds duration in each session with the presence of motivational factors in separate groups. Score of dribbling basketball test was record per session, and then post test was carried out and finally after 2 weeks detraining, retention test was done in the same condition and transfer test like the real word of competition (in the presence of music and audience) was performed 24 hours later. In order to become subjects in the same level of arousal base used rest heart rate index.

Results: To analyze data one way ANOVAs test, repeated measure ANOVA and Bonferroni Post Hoc test was used. Results showed that all groups improved through acquisition stage and also there was significant difference in dribbling basketball scores between 3 groups in acquisition test ($p=0.000$) that this difference was more benefit in control group than two other groups. But in retention and transfer test, results was in advantage of music and audience groups, in retention test audience group achieved the highest scores and in transfer test music and audience groups was significantly higher than control group ($p=0.000$).

Conclusion: In this research we found that motivational factors can performe as refinement to improve sport performance and motor learning.

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Indirect assessment of cardiac output and stroke volume during spiroergometric examination in male subjects of different performance level

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Noninvasive determination of cardiac output (Q) and stroke volume (SV) based on the study by Stringer et al. [1] provides a simple and low-cost assessment of cardiac function in response to exercise. Based on our previous experience ([2]) we studied the estimated values of Q_{max} and SV_{max} in 4 groups of male subjects of different performance level. Group A (n=10) included young swimmers, group B (n=12) junior ice hockey players, group C (n=11) competitive cyclists and group D untrained university student volunteers (n=11). Data collected from the groups are summarized in Table 1 (anthropometric characteristics), Table 2 (cardio-respiratory parameters including Q_{max} and SV_{max}) and Table 3 (obtained data compared to Czech norms for average population based on IBP /International Biological Program/ results). The results showed significant differences in Q_{max} and SV_{max} between the groups in accordance with different athletic history of the subjects.

		Age	Hght	Wght	BMI	Fat
		yrs	cm	kg		%
A	Mean	12.9	160	51.9	19.9	12.9
	STD	1.0	12	13.2	2.5	1.0
B	Mean	16.8	179	77.2	24.0	12.0
	STD	1.0	4	6.5	1.6	3.3
C	Mean	27.4	179	74.5	23.2	11.3
	STD	6.9	6	5.6	1.4	4.5
D	Mean	22.2	179	78	24.4	13.3
	STD	1.7	7	10.6	3.3	4.3

Table 1

		HR_{max}	VO_{2max}	VO_{2m/kg}	W_{max}	W_{m/kg}	Q_{max}	SV_{max}
		b/min	l/min	ml/min	W	W/kg	l/min	ml
A	Mean	193	2.8	55.6	256	5.0	17.2	89
	STD	7	0.4	9.4	64	0.8	2.6	15
B	Mean	189	4.7	60.7	438	5.7	28.9	153
	STD	10	0.5	6.2	34	0.5	3.1	16
C	Mean	192	5.2	69.9	494	6.7	32.1	168
	STD	9	0.5	4.9	46	0.7	3.1	16
D	Mean	183	3.4	48.4	341	4.5	21.1	115
	STD	9	0.3	15.	46	0.9	1.9	10

Table 2

		VO₂max	VO₂m/kg	W_{max}	W_{m/kg}
		%	%	%	%
A	Mean	128	113	131	117
	STD	23	19	25	17
B	Mean	151	129	163	138
	STD	16	13	12	13
C	Mean	165	165	179	179
	STD	20	18	21	24
D	Mean	103.9	101	119	113
	STD	108	14	15	23

Table 3

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The effect of rhythms of music on central and peripheral fatigue indices in non-athlete young females

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Objective: The aim of study is the effect of different rhythms of music on central and peripheral fatigue indices in non-athlete young females.

Material/Methods: In order to do this study, 38 healthy female students randomly allocated in 3 groups include fast music group or EXP1 (N=13, M SD:22 2 years), slow music group or EXP2 (N=13, M SD:23 2 years) and control group (N=12, M SD:23 2 years). At first pretest was performed like the training condition, then training program continued for 6 weeks and two sessions per week and posttest finally performed. In each session, training program consists of pedaling on ergometer cycle was executed in a 20 watt power with 50 R.P.M, then after each minute, 10 watts was added to workload in all three groups so that they became exhausted. The experimental groups were doing the training as they listened to music by headphone. The EXP1 group listened to fast music (Allegro Assay of Mozart by the rhythm of and the speed of 180 metronomes) and The EXP2 group listened to slow music (Andante of Mozart by the rhythm of ½ and the speed of 60 metronomes) and control group received no musical intervention.

Results: Analyzing results of finger tapping test showed that there was no noticeable different in peripheral fatigue between experimental groups and control group. The results of Chart for Continual Naming of Colors test confirmed the central fatigue in control group than fast and slow music groups. Data analysis by ANOVA showed that the pretest differences between fatigue indices in three groups was not significant ($P>0.05$). But also post test of final workload of subjects ($p=0.022$), HR of exhaustion ($p=0.013$) and time to reach exhaustion ($p=0.028$) between groups were significant. The post hoc of Tukey showed that there were significant differences between experimental groups with control group in all variables ($P<0.05$). But there was not significant difference between experimental groups ($P>0.05$).

Conclusion: The final conclusion was that listening to music with training currently, delayed central and peripheral fatigue and improved sport performance.

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The martial arts shoulder

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Objective: To describe the arthroscopic findings of the shoulder of elite martial arts athletes.

Material/Methods: Our service has extensive experience in the treatment of high level judokas because the senior authors (WC, BS) are part of the national team staff for the past 15 years. Therefore, we have become a reference for those athletes and directed our attention to this modality. Jiu jitsu is also very popular in our region and with the growing popularity of other martial arts we expanded our attention to the martial arts in general. From July 2007 to October 2009, 49 patients were submitted to 60 arthroscopies of their shoulders. We included the high level martial art competitors that had an indication for shoulder arthroscopy and agreed to participate in this study. There were 9 women and 40 men and the mean age was 29.06 years. All athletes were black belt degree (national and international level). Exclusion criteria were acute or previous infection of the shoulder joint or surrounding joints (acromioclavicular, sternoclavicular) or systemic infection; acute or previous fractures of the clavicle, scapula or humerus.

Results: There were 13 jiu-jitsu athletes, 1 krav maga, 1 MMA (mixed martial arts) fighter and 34 judokas. The findings reported during arthroscopy were 32 Bankart lesions (Figure 1a) and 1 bony Bankart (Figure 1b), 18 chondral lesions being 9 on the glenoid (Figure 1c) and 9 on the humeral head (Figure 1d), 13 rotator cuff tears (8 supraspinatus, 5 subscapularis), 13 SLAP lesions and 8 Hill-Sachs lesion. Patient characteristics and other surgical findings are summarized in Table 1 and Table 2.

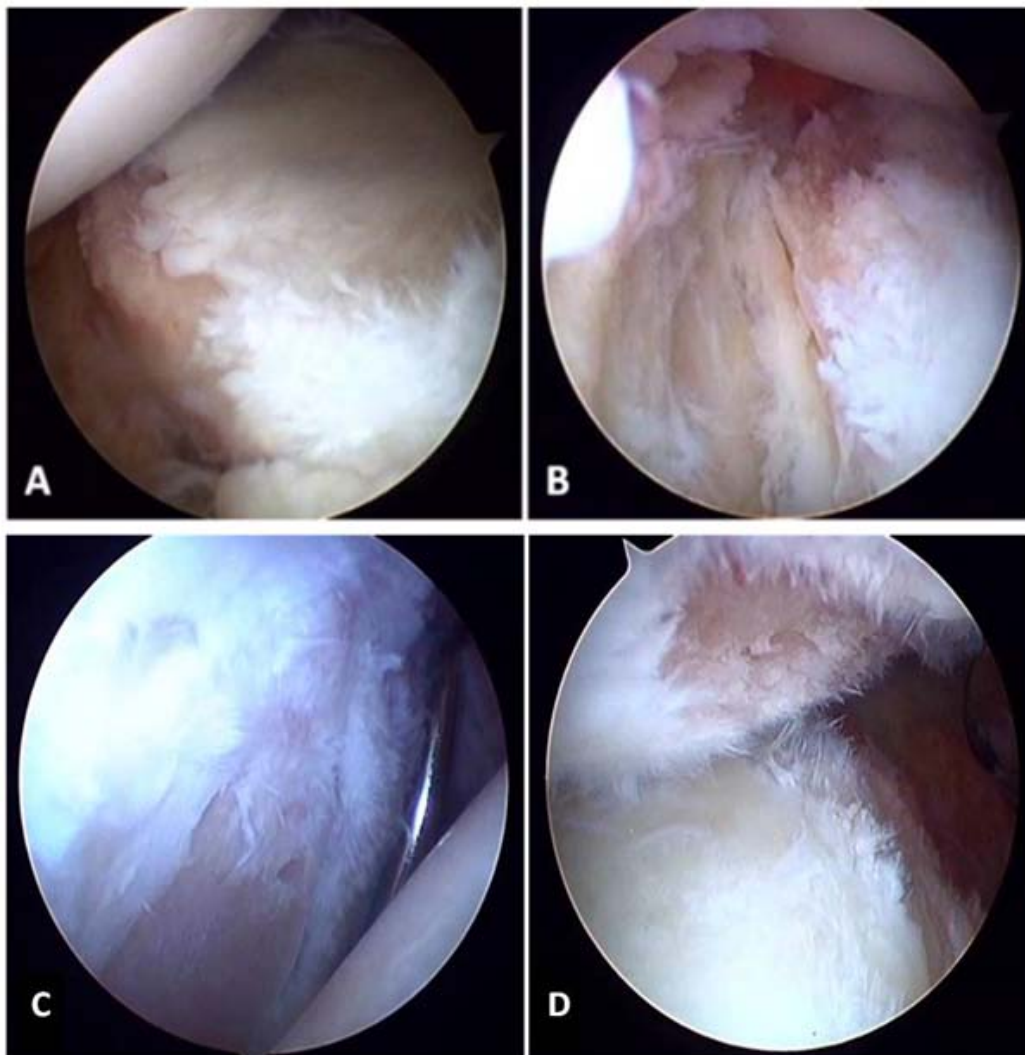


Figure 1

PATIENT	AGE	GENDER	MODALITY	SURGICAL FINDINGS
1	18	M	Judo	Bankart
	22			Posterior labrum lesion
2	18	F	Judo	Capsular laxity
	23			Bankart
	23			Bankart + SLAP V + HS
3	29	M	Jiu-jitsu	SLAP + capsular laxity
4	47	M	Jiu-jitsu	RCT (subscapularis)+ LHB subluxation
5	27	M	Judo	RCT (supraspinatus) + <i>os acromiale</i>
	31			HAGL lesion + RCT (subscapularis)
6	22	M	Judo	Bankart
7	27	F	Judo	Bankart + RCT (supraspinatus articular lesion) + posterior ALPSA lesion + LHB degeneration
8	32	M	Jiu-jitsu	Bankart + chondral lesion of humeral head + loose bodies
9	25	M	Judo	RCT (supraspinatus)
10	32	M	Judo	Bankart + SLAP
11	25	F	Judo	RCT (subscapularis + supraspinatus) + LHB + SLAP
12	34	M	Jiu-jitsu	SLAP
13	29	M	Jiu-jitsu	Humeral head and glenoid chondral lesion + HS
14	20	M	Jiu-jitsu	Bankart + SLAP + HS + supraspinatus tendinopathy
15	25	M	Jiu-jitsu	RCT (supraspinatus) + SLAP + humeral head chondral lesion
16	31	M	Judo	Bankart + capsular laxity
	33			Humeral head chondral lesion + LHB adhesion + parcial supraspinatus lesion + loose metallic anchor + adhesive capsulitis
	33			Labrum lesion
17	33	M	Jiu-jitsu	Posterior labrum lesion
18	42	M	Judo	Bankart
19	16	M	Judo	Glenoid chondral lesion + bony Bankart
	18			Bankart
20	32	M	Judo	RCT (supraspinatus)
21	25	F	Judo	Bankart
22	21	M	Judo	Bankart + loose bodies
				ACJ arthrosis
23	29	M	Judo	SLAP
24	18	M	Krav-maga	Bankart
25	29	F	Judo	Bankart
26	37	M	Judo	SLAP
27	26	M	Judo	Bankart + HS
28	21	F	Judo	Bankart + HS
29	22	M	Judo	Bankart
30	30	M	Judo	Bankart + capsular laxity
31	18	M	Judo	Bankart
32	21	M	Judo	Bankart
33	31	M	Jiu-jitsu	SLAP
34	33	M	Jiu-jitsu	SLAP + ACJ arthrosis
35	30	F	Judo	SLAP
36	31	M	MMA	Humeral head and glenoid chondral lesion + inferior humeral osteophyte + LHB lesion + Bankart + ACJ arthrosis
37	38	M	Jiu-jitsu	Glenoid chondral lesion + ACJ arthrosis
38	33	M	Jiu-jitsu	Bankart + HS
39	34	M	Jiu-jitsu	LHB lesion + humeral head chondral lesion
	35			Distal clavicle osteolysis + glenohumeral arthrosis
	39			ACJ arthrosis
40	26	F	Judo	Posterior labrum lesion
	27			Bankart +RCT (subscapularis)
41	25	M	Judo	Bankart
42	31	M	Judo	Bankart + HS + subluxation of LHB + RCT (subscapularis) + SLAP
43	34	F	Judo	Bankart
44	41	M	Judo	Bankart + ACJ arthrosis + glenoid and humeral head chondral lesion
45	37	M	Judo	Bankart + posterior humeral head chondral lesion + anterior glenoid chondral lesion
46	28	M	Judo	Posterior labral lesion + glenoid chondral lesion + ACJ dislocation
47	35	M	Judo	Bankart + posterior glenoid chondral lesion
48	26	M	Judo	Posterior glenoid chondral lesion + humeral head chondral lesion + Bankart
49	28	M	Judo	HAGL + Bankart

Abbreviations: ACJ: acromioclavicular joint; ALPSA: anterior labrum periosteal sleeve avulsion; F: female; HAGL: humeral avulsion of the glenohumeral ligament; HS: Hill-Sachs; LHB: long head of biceps; M: male; MMA: mixed martial arts; RCT: rotator cuff tear; SLAP: Superior labrum anterior posterior lesion

Table 1

TYPE OF INJURY	NUMBER OF LESIONS (%)
Bankart	32 (20,5%)
Chondral lesion	18 (11,5%)
Humeral head	9 (5,75%)
Glenoid	9 (5,75%)
SLAP lesions	13 (8,3%)
Rotator cuff tear	13 (8,3%)
Supraspinatus	8 (5,1%)
Subscapularis	5 (3,2%)
Hill-Sachs lesion	7 (4,4%)
Long head of biceps lesion	7 (4,4%)
Tears/tendinitis	5 (3,2%)
Subluxation	2 (1,2%)
ACJ arthrosis	6 (3,8%)
Posterior labrum lesion	5 (3,2%)
Capsular laxity	4 (2,5%)
HAGL lesion	2 (1,2%)
Others	11 (7%)
TOTAL	156

Table 2: Injury incidence in martial arts shoulder.

Conclusion: Nowadays the constant need for high performance among high level competitive athlete has led to serious consequences to physical and psychological aspects of these competitors. Knowing the incidence of most frequent injuries, as well as its possible causes is very important for planning treatment and implementing preventive measures, contributing to increase athletic performance. Martial arts, as other competitive sports, requires strength, velocity, endurance, ability and agility; therefore injuries are inevitable for those who practice this modality. Sports which submit its practitioners to high intensity of impacts during falls with high rates of repetitions, as occurs with falls on combat sports, are among the modalities that results in higher injury rates in athletes that practice periodically. The mechanical impact to the body of these athletes depends upon how the load is applied, its intensity and frequency, and the individual susceptibility that varies with phenotype and the body region subjected to such a load. The injury rates for judo is one of the higher among all sports [1], [2], [3]. The literature reports on acute injuries, lacking works on chronic overload injuries. In this work we found that the most common injury pattern was Bankart lesion (20,5%), due to the increased frequency of shoulder dislocations among judokas [2], [4]. The second most common injury was chondral lesion (11.5%), affecting equally the glenoid and the humeral head. As previous authors have reported with throwing athletes, we believe that martial arts athletes develop a certain pattern of shoulder injuries due to the sport impact. Each modality, with its specific biomechanical characteristic, develops a particular kind of injury to certain anatomical parts of the athlete's body. There are many reports in the literature regarding the shoulder of throwing athletes and there are some reports on swimmer's shoulder pathology [5]. The understanding of shoulder joint pathology has improved with the use of arthroscopy, and as seen in this study the "wrestler's shoulder" is characterized by a Bankart lesion resulting in anterior instability of the glenohumeral joint. The athlete further compensates this lack of stability with posterior translation of the humeral head, which leads to increase overload on the glenoid and humeral head cartilage resulting in the pattern described in this work. Further studies are needed to better characterize the biomechanics and pathoanatomy of these injuries.

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The role of the sport in the difference in verbal and psychophysiological responses in the body image perception

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Objective: To examine differences in the body image perception and cardiovascular and electrodermal reactivity in men and women (n=119, age: 21.89, SD=2.13 years old) depending on the sport.

Material/Methods: The sample was divided into three groups: control (subjects who do not practice physical activity or sports) (n=27), subjects engaged in sport and physical activity (n=59), and athletes (amateur and professional) (n=33). All groups completed two tasks assessing self-perception of body image: silhouettes and photographs scales (electrodermal conductance and heart rate were monitored continuously).

Results: The distortion/satisfaction of individuals of different groups did not differ with the scale of silhouettes, but on the scale that offers the photograph of the participant, the differences indicated that the control group is quite wider than you would like, compared to the group of athletes. This suggests that both, men and women who play sports, are satisfied with their body image and have greater accuracy in recognizing their own image than those who do not play sports. However, all groups of women want a thinner image to feel attractive, and men, a more muscular, although this difference is less pronounced in the groups that practice sports or physical activity. No differences in psychophysiological variables.

Conclusion: Subjects with dedication to the practice of physical exercise and sports show greater satisfaction with their body image, and have developed their sense of attractiveness.

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Q: Various III

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Analysis of one hundred therapeutical use exemptions of elite athletes in Serbia

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Objective: TUE (Therapeutical Use Exemption) is required when an athlete wants to use the substances from Prohibited List because he is injured or ill. Athletes have obligation to apply and get approval for TUE before using any medication that can lead to positive doping result. One of criteria for granting a TUE points that there is no reasonable therapeutic alternative to use of listed prohibited substance or prohibited method.

Material/Methods: In this cross sectional study, one hundred TUE applications from elite athletes of Serbia, were analyzed in last four years by using official data of Anti-doping agency of Serbia. These applications had been processed by national and international sports federations.

Results: This research has included all variations of Therapeutic Use Exemptions in last period which resulted in the proportion: TUE/DoU/ATUE – 31/37/32. No longer existing, ATUE (Abbreviated TUE) and DoU (Declaration of Use), were required for beta-2-agonist taken by inhalation and glucocorticosteroids administered by non-systemic routes. Frequency of application has been raising during the observed period, from 14 in 2007. up to 29 in 2010. Third of all TUE were forward to international sports federations and were approved by them. Basic statistic had shown that men/women ratio was 70:30. Glucocorticosterodes, betamethasone (26%) and triamcinolon (20%), were the most commonly administered medicines. Considering beta 2 agonists, salbutamol was the most used substance in treatment represented by 14%. The musculoskeletal disorders (64%) and asthma (20%) were the main reason for applying TUE. Only 5% applications were related to chronicle diseases. Both inhalation and intraarticular routs of drug administration were equally represented in treatment of athletes. Also, Athletic Federation of Serbia, followed by Basketball and Football Associations had reported the highest number of TUE in Serbia.

Conclusion: This study can be useful for perceiving medical conditions regarding one hundred elite athletes. The significant low number of TUE in Serbia implies that the education of athletes and sports federations should be on a higher level. Frequent non-systemic use of glucocorticosteroids without valid medical indication can cause severe side effects leading to decreased sports performance. Since illegitimate consumption of these medicines can cause doping positive result, the importance of reporting TUE should be stressed out.

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The effect of a specific training programme on the incidence of injuries during a 222 hour volleyball marathon

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Aim: To reduce the number of injuries sustained during a 222 hour, 48 player, volleyball marathon through a strength and proprioception training programme.

Methods: The pre-marathon training sessions included specifically strength training for quadriceps, hamstring, rotator cuff, proprioception training, plyometrics and correct jumping and landing techniques. Subsequently the number and nature of clinic visits during the marathon were analysed by nature and region and compared to the data from the previous year's marathon.

Results: Injury rate for 2000 was 20.4/1000 playing hours and 13.1/1000 playing hours for 2001. There was a statistically significant reduction in the incidence of knee ($p=0.004$) and ankle ($p=0.04$) injuries reported.

Conclusion: The inclusion of plyometrics and proprioception and strength training in the preparation training programme was successful in reducing the overall injury rate and specifically the incidence of knee and ankle injuries in a volleyball marathon.

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The effect of a succession of matches on the activity profiles of professional soccer players

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Objective: Professional soccer players competing in the domestic competition and Championship leagues are often required to play competition matches with only 1-2 days recovery. The potential for residual fatigue in these matches is high with possible implications in terms of the movement behaviours of players competing in successive matches. In a recent study, Odetoyinbo, Wooster & Lane (2009) examined the effect of a succession of matches on the activity profiles of professional soccer players. In this study the activity profile of UK-based professional soccer players were considered when three matches were played in five days. Overall, the results suggest that players were able to recover when the total distance is considered over three matches. The data, however, also indicate that some residual fatigue may be apparent that affects certain high-intensity aspects of play. However, these findings are not conclusive given that some limitations and/or methodological problems can be observed. Based on the limitations of the extant research, the aim of this study was to investigate recovery via analysis of activity profiles in a professional soccer team over an intense period of matches.

Participants and match sample: A total of 27 Spanish League matches played at the weekend by a professional team during the 2005-2006 season were included for analysis. With ethics approval from the internal review board of the sampled professional football club, physical demands were analysed for 23 outfield players: central defenders (n=5), external defenders (n=5), central midfielders players (n=5), external midfield players (n=4), and forwards (n=4). The sample included only players that played in their customary position. Altogether, 172 observation of match performance were obtained.

For the purpose of this study sampled players were divided into two groups according to the number of matches played, one or two matches a week. This research model provided 41 players for the first group (those players who played two matches a week) and 132 for the second (those players who played one match a week).

Data collection procedure and measures of competitive performance: A computerized player tracking system (AMISCO Pro©, Sport-Universal Process, Nice, France) was used to characterize activity profiles in the team.

Statistical Analysis: An independent-samples t-test was performed to test for differences in the distance covered at various speeds by the players of the two groups considered. A standard multiple regression was used to examine how much the distances covered at various speeds by the players was explained by the situational variables (match location, match status and quality of opposition), the number of matches played per week and the individual playing position of the players.

Results: The main finding of this study suggests that the activity profiles of professional soccer players were not influenced by the short recovery between matches (Table 1). Although those players who played two matches a week covered lower distance at maximal (>23 km/h), submaximal (19.1-23 km/h) and medium (14.1-19 km/h) intensities than those players who played one match a week, no significant differences were found. The walking profile demonstrates an inverse relationship. Players covered greater distance by walking and jogging when two matches were played in the same week. Moreover, results from the present study seem to confirm that the elite soccer players' distance covered at various speeds is dependent on match contextual factors. The results were always influenced by one or more situation variables, with particular relevance to match location and match status. Thus, elite soccer players performed less high-intensity activity when winning than when they were losing. The home teams covered a greater distance than visitors at low intensity (<14.1 km/h), but no differences were found at medium, submaximal or maximal intensities. The distance covered with the lowest intensity (0-11 km/h) was also explained by the variable quality of the opponent. The better the quality of the opponent, the higher the distance covered by walking and jogging (Table 2).

Conclusion: In summary, in this study the activity profiles of Spain-based professional soccer players were considered when two matches were played in 3 days. Overall, results suggest that the activity profiles of professional soccer players were not influenced by the short recovery between matches. However, further research is warranted to address others factors that may influence activity profiles over an intense period of matches. Work could be extended to examine the effects of match type (domestic cup competition vs. league games), and the influence of specific team formation (systems of play). The major limitations of this study were the low number of matches and players examined and that players played for only one club. Therefore, the patterns observed might be a reflection of this particular team.

	One match a week	Two matches a week	Level of significance
Total distance	10928 ± 677	10851 ± 573	p=0.514
0-11 km/h	6857 ± 320	6869 ± 191	p=0.812
11.1-14 km/h	1628 ± 245	1625 ± 217	p=0.958
14.1-19 km/h	1679 ± 354	1646 ± 322	p=0.604
19.1-23 km/h	512 ± 150	470 ± 141	p=0.118
>23 km/h	252 ± 123	239 ± 135	p=0.565
N	131	41	

Notes: The values are the number of metres covered by players in a match.

Table 1: Comparison of the activity profiles of professional soccer players according to the number of matches played a week

Variables	Total distance covered	Walking and jogging (0-11km/h)	Low speed running (11.1-14.0 Km/h)	Medium intensities (14.1-19 km/h)	Submaximal intensity (19.1-23km/h)	Maximal intensity (>23 Km/h)
Number of matches	-18.19 (95.47)	18.26 (38.41)	-7.68 (36.44)	-54.22 (53.03)	-9.44 (20.65)	-7.33 (0.33)
Match status						
Draw	4.11 (2.12)	3.68** (1.15)	1.57* (0.72)	0.40 (1.08)	-1.19** (0.45)	-0.34 (0.49)
Winning	2.40 (1.79)	2.18* (0.97)	1.77** (0.59)	-0.02 (0.96)	-0.84* (0.43)	-0.81* (0.39)
Match location	281.58** (89.64)	-143.93** (42.96)	-67.14* (31.82)	-15.83 (48.55)	-29.09 (20.66)	-16.20 (21.16)
Quality of opposition	-16.47* (9.67)	-17.15** (5.33)	-4.41 (3.09)	1.32 (4.89)	3.02 (2.19)	0.78 (2.11)
Playing position						
External defenders	591.28** (96.29)	-57.31 (47.82)	18.72 (36.44)	302.22** (55.21)	187.72** (26.36)	146.59** (22.16)
Central midfielders	828.43** (116.93)	76.34 (60.42)	180.94 ** (41.23)	471.61** (63.63)	110.10** (24.62)	-10.44 (22.23)
External midfielders	1051.01** (159.49)	99.25 (90.42)	99.26 (100.48)	493.77** (69.30)	211.79** (45.97)	149.11** (41.82)
Forwards	223.49** (149.78)	-29.96 (53.55)	-219.31** (51.75)	135.12 (75.11)	188.11** (28.88)	151.03** (26.04)
Intercept	10234.07** (220.47)	6632.31** (127.98)	1511.53** (69.88)	1359.85** (119.01)	498.61** (48.16)	226.85** (43.18)
R ²	0.38	0.31	0.37	0.32	0.42	0.44

Notes: The values are the number of metres covered by players in a match.

Standard errors are in parentheses.

** ($P < 0.01$) * ($P < 0.05$)

Table 2: The influence of the number of matches played per week, match location, quality of opposition, match status, and the individual playing position of the players on the total distance covered during the entire match

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The survey of lower extremity alignment in the athletes affected by shin splint

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Objective: One of the most common shin problems that are frequently labeled “Shin Splints” is Medial Tibial Stress Syndrome. This sport injury has been reported to occur frequently in military recruits, distance runners, dancers, football (soccer) players and gymnasts. Although, much research is done for the pathophysiologic cause of this situation, but this problem remains unresolved. Because some of the Study shows that excessive foot pronation has been one of the most reasons of shin splint [1], [2], [3], [4]. And because, some of authors have stated that the foot excessive pronation can be cause compensatory internal rotation of the tibia and the femur [5]. Present study hypothesis, due to relationship between excessive foot pronation and tibial and femoral internal rotation, these two factors are affecting the Shin Splint as well as foot pronation.

Material/Methods: For this research, 12 athletes affected by shin splint with a mean of Age (24.95 ± 3.92), BMI (23.90 ± 3.7), height (174 ± 18.2) and duration of exercise per week (15.81 ± 6.06) and 12 healthy athletes with a mean of Age (25.06 ± 4.26), BMI (23.95 ± 2.5), height (178 ± 12.2) and duration of exercise per week (11.35 ± 7.21) were selected as a research subjects. Foot type and femoral anteversion and tibial torsion were measured by the foot posture index (FPI) and CT scan respectively. In this study was used of the spiral CT scan model, diagnostic accuracy of spiral CT is comparable, with 92% sensitivity and 96% specificity. The FPI is a diagnostic clinical tool aimed at quantifying the degree to which a foot can be considered to be in a pronated, supinated or neutral position. The differences of variables between the two groups were assessed using an independent sample t test.

Results: Findings: Findings showed that significantly different between average of IPF score in the two groups in Favor of subjects with Shin Splints ($p < 0/05$). Also there wasn't significantly different between average tibial torsion and femoral anteversion angle in the two groups ($p > 0/05$).

Conclusion: Conclusion: In this study, the patients affected by Shin Splint have excessive subtalar pronation, that consistent with Delacerda, Bennett et al, Yates et al. [1], [3], [4]. Since the plantar arch is an essential component to ground reactions force absorption during the Gait Cycle. Excessive pronation causes the longer eccentric contractions on the foot intrinsic and extrinsic muscles. Consequently, muscle fatigue occurred earlier, which in return that increased the force absorbed by tenoperosteom and bone and this could be a factor for Shin splint. Average of IPF for the subjects affected by shin splint was in the pronation area, therefore the shin splint must be prevented by the early intervention before the exercise via distinguish pronated foot.

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Poster Presentations

Ethical & Medico-Legal Aspects

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GC-MS analysis of hair for the detection of amphetamines and cocaine and their metabolites. A new modified methodology

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Objective: Hair analysis is recognized as a suitable method for the assessment of long term use of drugs of abuse. In the present paper we describe the development of a new methodology aiming to detect and quantify the presence of amphetamines and cocaine and their metabolites in hair from human subjects including samples of narcotic drug users.

Material/Methods: Hairs were obtained from drug-free humans and were used for method development: All hair samples were washed with water, followed by acetone and finally with dichloromethane. Thirty mg of washed hairs were spiked with the analytes of interest and internal standards, and the sample was subsequently extracted with methanol. Following centrifugation, the extract was evaporated to dryness and BSTFA (1%TMCS) was added to the dry residue. Following derivatisation, analysis was conducted on GC-MS with selected ion monitoring (SIM). The analytes included: cocaine, benzoylecgonine, ecgonine methyl ester, amphetamine, methamphetamine, MDA, MDMA. Internal standards from each category were added (in total three standards).

Results: First the GC-MS (electron impact) analytical method was optimized to reach the best chromatographic separation and highest sensitivity. Three ions were selected for each analyte for SIM and one of these three ions was used for quantitation. Next, the methodology applied for the derivatisation was optimized: derivatisation time, temperature and volume of BSTFA added were studied. The best conditions were 20 min, 70°C and 50 µL of BSTFA respectively. Using the developed methodology, calibration curves were obtained for the 7 analytes (8 concentration points and four independent repetitions for each point). Linearity was found satisfactory (R² ranged from 0.972 to 0.999). Within day repeatability (RSD less than 15%) was found very satisfactory. Stability of the derivatised sample was found limited to 48 hours. The limit of detection was found in the low ng/mg range (up to 0.5 ng/mg of hairs). The method was successfully applied to the analysis of samples from drug users.

Conclusion: A simple and efficient method was developed and validated for the detection and quantitation of amphetamines and cocaine and their metabolites in trace levels in hair. This tool is complementary to the existing arsenal of analytical tools in the fight against drug abuse, increasing the time span for the detection of drugs of abuse in biological samples.

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Exercises & Diseases

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Acute effects of whole-body vibration on testosterone responses in the athlete and non athlete

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Objective: Recently, sport immunology has been noticed by many researchers of sport science, physiology, immunology and behavior sciences. It has been found that there is significant relationship between neuro-hormonal and immune systems. Sport effectively alters hormone level and neural system functions. Findings indicated increase of testosterone and growth hormones level

Material/Methods: Since control of all effective factors on variables of the research was not possible, hence it was done in a semi experimental method. Athlete group were with mean age of 23.4 ± 1.4 years, height 166 ± 4.43 cm and weight 61 ± 3.2 Kg. and non athlete group with age of 22 ± 2.3 years, height 168 ± 4.15 cm and weight of 63 ± 3.26 Kg were selected. Blood samples were collected from the left hand brachial vein before, immediately after, and 2 h after vibration For data analysis, the inferential statistic methods such as variance of analysis (ANOVA) with repeated measurements and following test of LSD were used

Results: One session vibration training has significant effect on the serum testosterone concentration in the athletes and non-athletes girls ($P \leq 0.05$). Serum testosterone concentration in the athlete girls immediately after training and after training showed significant difference compared to the before training, but insignificant 2 h after training compared to immediately after training. Also serum testosterone concentration in the non athlete girls immediately after training showed significant decline compared to the before training, and had significant difference 2h after training compared to immediately after training. Insignificant difference was noticed between before training and 2h after training .

Conclusion: We found increase of testosterone. One of them is increase of hormone secretion though stimulation of hypothalamus and hypophysis – adrenal. Testosterone – cortisol ratio is an anabolic to catabolic index. Findings of the present study indicated that one session vibration training at 40 Hz frequency causes decrease of testosterone significantly .The reason could be attributed to the nature of vibration, intensity, time or amplitude of vibration performance, further relevant studies are suggested.

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Adaptation of patella and achilles tendon to different forms of loading patterns in young elite athletes

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Objective: In adult athletes Achilles (AT) and Patella tendon (PT) diameter is increased in high-impact sports compared to low-impact sports. However, it remains largely unknown whether different forms of loading patterns are associated with tendon hypertrophy in Young Elite Athletes. Therefore, the aim of this study was to investigate differences in AT and PT diameter in relation to loading patterns acting on the tendon.

Material/Methods: 27 Young Elite Athletes were divided into three groups according to their level of impact acting in sport (Group 1: swimming; n=10; 12.1±1.1y; 157.4±7.3cm; 45.5±8.3kg. Group 2: handball/soccer; n=9; 11.9±0.6y; 158.5±0.6cm; 48.5±12.9kg. Group 3: gymnastics; n=8; 11.5±1.4y; 144.1±8.9cm; 34.6±5.6kg) (Figure 1). All athletes trained min. 4x/week since min. 2 years. AT and PT diameter [mm; mm/kg body weight] were analyzed by ultrasound (Xario Toshiba, 8MHz) in anterior-posterior direction 20 mm proximal to the tendon insertion. One way repeated measures ANOVA and post hoc Tukey-HSD was used to analyze differences between groups ($\alpha < 0.05$). Correlation between tendon thickness and bodyweight (BW) was calculated by Pearson Correlation Coefficient.

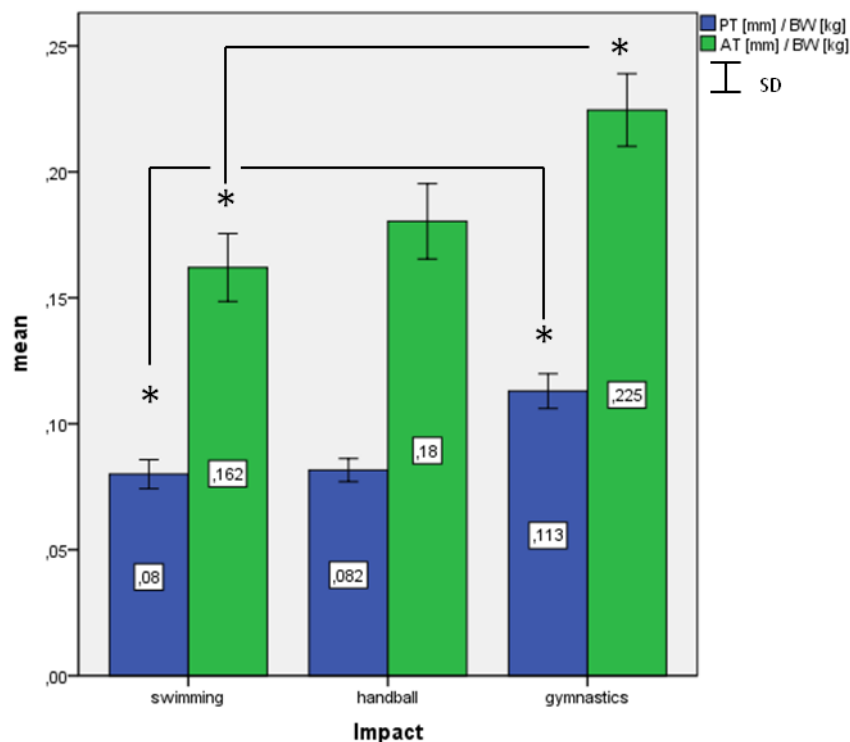


Figure 1

Results: Mean PT diameter for S was 3.5±0.5mm, for H 3.8±0.5mm and 3.7±0.6mm for G. There was no statistically significant difference between groups ($p > 0.05$). Correlation between bodyweight and PT was $r = 0.393$ ($p = 0.052$). Normalized to bodyweight G showed statistically significant thicker PT compared to S ($p = 0.011$). Mean AT diameter for S was 4.7±0.6mm, for H 5.5±0.3mm and 5.2±0.4mm for G. Comparing means a statistically significant difference between S and H ($p = 0.006$), S and G ($p = 0.05$) in absolute values and between S and G ($p = 0.002$) in normalized diameter could be shown. Correlation between BW and AT diameter was not statistically significant ($r = -0.170$), ($p = 0.387$).

Conclusion: It can be concluded, that AT and PT diameters adapt as well to bodyweight as to the degree of impact at the lower extremity even in young elite athletes.

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Adverse responses of the musculoskeletal system during 4 weeks resistance-endurance training in a cardiovascular rehabilitation program

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Objective: The aim of this study was to assess possible adverse effects of 4 weeks of a cardiovascular rehabilitation (CR) program on the musculoskeletal system.

Material/Methods: Nine-hundred-ninety-six patients (204 women, age 65 yrs and 792 men, age 62 yrs) completed a combined resistance-endurance training program consisting of 5±2 resistance training sessions (50% of one repetition maximum, 2-3 sets of 12-15 repetitions each, using 10 different muscle groups) and 15±4 endurance training-sessions [(50-60% of maximal leg power (P_{max}))] on cycle ergometer lasting 10-18 minutes per training session. Interaction of statin-therapy with the complications of the muscle system during resistance training was evaluated by Pearson's Chi-square test.

Results: As result of training, 55 patients had adverse effects, 42 were associated with the skeletal, 13 with the muscular-system, and 2 additional adverse effects were associated with injuries that were not directly connected to training sessions. Statins were prescribed to 770 (77%) of 996 patients at entry and 849 (85%) at discharge. Nine (69%) of 13 patients with adverse effects on muscular-system took statins at entry and 11 (85%) at discharge from the CR program. Pearson's Chi-square test revealed that Statins are not responsible for complications of the muscular-system [Chi-square (1)=.004, $p = .949$].

Conclusion: Our findings suggest that adverse effects of a combined resistance-endurance exercise program for 4 weeks on the musculoskeletal system are rare and do not limit the performance of cardiac patients engaging in resistance-endurance exercise. These findings are independent of statins.

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Breast cancer and exercise

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Objective: The aim of this study was to define the correlation between breast cancer and physical exercise and the mechanism for the prevention of breast cancer by physical exercise.

Material/Methods: The material emanates from a review of the international bibliography and from our own study in our Laboratory in Thessaloniki, Hellas.

Results: Sufficient evidence has accumulated to warrant an analysis of the relationship between exercise and breast cancer. Recent epidemiological studies confirm an inverse relationship between exercise and breast cancer, with stronger associations appearing for occupational activity than for leisure time or nonoccupational activity. Several plausible hypothesized biological mechanisms exist for the association between physical activity and breast cancer, including changes in endogenous sexual and metabolic hormone levels and growth factors, decreased obesity and central adiposity and possibly changes in immune function. Central adiposity has been particularly implicated in promoting metabolic conditions amenable to carcinogenesis. Exercising four or more hours a week may decrease hormone levels and help lower breast cancer risk.

Conclusion: The mechanisms are not well defined; several lines of evidence support the inclusion of low-to-moderate exercise as a preventive strategy for breast cancer.

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Cardiovascular complications during combined resistance-endurance training of a 4 weeks cardiac rehabilitation program

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Objective: The purpose of this study was to examine adverse cardiovascular events that occurred as result of resistance training within combined resistance-endurance training sessions in a cardiac residential rehabilitation (CR) program.

Material/Methods: Nine-hundred-ninety-six patients (204 women, age 65 yrs and 792 men, age 62 yrs) completed a combined resistance-endurance training consisting of 5±2 resistance training-sessions (50% of the one repetition maximum, 2-3 sets of 12-15 repetitions each, engaging 10 different muscle groups) and 15±4 endurance training-sessions consisting of 50-60% of maximal leg power (P_{max}) on cycle ergometer, lasting 10-18 minutes per training session.

Results: 28 patients exhibited adverse effects associated with resistance training sessions 4 hypoglycemia and 24 cardiovascular complications. Of those, 9 presented hypertension, 11 hypotension, 2 atrial fibrillation, 1 angina pectoris, 1 bradycardia and 16 further adverse effects that were not directly connected to training sessions (5 acute respiratory illnesses and/or influenza infections, 4 angiography, 3 vertigo, 2 diarrhea, 1 pleural effusion, 1 venous patch).

Conclusion: Our findings suggest that complications of the cardiovascular system are rare and appear to be mild during a 4 weeks lasting combined resistance-endurance training program.

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Comparison of physical capacity on short and long term cardiac transplantation

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Objective: Cardiac transplant is the last alternative therapy for patients suffering from end stage heart failure. It aims to manage these patients to have bigger hemodynamic improvement and better quality of life. Although functional capacity is caught up post-cardiac transplant (TX), some physiological responses remain reduced and become even more decrease with the use of medicaments. Nevertheless, there are few trials comparing people at different post-cardiac transplant terms according to their cardiorespiratory responses. This paper aims to evaluate and compare cardiorespiratory data of people at different post-cardiac transplant terms.

Material/Methods: 21 post-Tx patients (8 women) were divided into two groups according to their Tx- term. G1 was defined as long-term Tx, with ≥ 6 years post-Tx, $n=10$, age of 51.5 ± 14.6 years, BMI 28.3 ± 11.2 kg/m² and LVEF 62.7 ± 3.5 %; G2 as short-term Tx, with ≤ 3 years post-Tx, $n=11$, age of 41 ± 15.2 years, BMI 25.3 ± 4.7 kg/m² and LVEF 67 ± 4.4 %. All patients were submitted to a cardiorespiratory test performed on a treadmill. Their hemodynamic data, heart rate (HR), systolic and diastolic blood pressure (SBP and DBP) were evaluated at rest, peak exercise and recovery, and, the cardiorespiratory one, at peak exercise.

Results: Hemodynamic data showed no significant difference between G1 and G2 respectively, with HR at rest (beats/min) 93.9 ± 7.1 vs. 97 ± 11 , HR at peak exercise (beats/min) 130.6 ± 13.5 vs. 128.4 ± 19 ; SBP at rest (mmHg) 130.2 ± 24.8 vs. 122.7 ± 1.3 ; SBP at peak exercise (mmHg) 155.6 ± 29.4 vs. 146 ± 35.4 ; SBP at 1st min of recovery (mmHg) 154.2 ± 32.5 vs. 143.7 ± 28.9 ; DBP at rest (mmHg) 86.9 ± 12 vs. 84.2 ± 8.6 ; DBP at exercise peak (mmHg) 75.1 ± 14.6 vs. 70.3 ± 12.8 ; and DBP at 1st min of recovery (mmHg) 80.9 ± 11.7 vs. 74.8 ± 10 . No significant difference was also observed between G1 and G2 for exercise test duration (min): 13.3 ± 3.4 vs. 14.2 ± 3.1 and for cardiorespiratory data: peak VO_2 :(ml/Kg/min) 21.4 ± 3.4 vs. 22.9 ± 4.4 ; slope VE/VCO_2 : 28.6 ± 4.0 vs. 28.6 ± 3.2 and VE : (L/min) 33.7 ± 4.4 vs. 35.1 ± 2.3 .

Conclusion: Neither short nor long term transplantation has influence on physical capacity of cardiac recipients.

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Eccentric endurance training and its consequences on physical performance in sedentary overweight individuals

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Objective: Overweight and its severe consequences are known as activator and accessory symptom of lifestyle diseases [1]. As a part of exercise interventions of the current guidelines for the prevention of cardiovascular disease and type-II-diabetes strength training is a major topic [2]. Continuous training and increasing endurance are the basis for beneficial effects. Three different types of muscle activity are known. Concentric exercise (CE) as a consequence of active motion where the muscle strength exceeds external force, eccentric exercise (EE) as a consequence of passive motion, where external force exceeds internal strength and isometric exercise without visible motion, where external force is equal to internal strength [3]. Daily exercise is a mixture of concentric and eccentric exercise for movement and isometric exercise for static work. Concentric exercise is needed more in hiking upwards, whereas hiking downwards includes eccentric exercise more. Eccentric endurance training mixes high muscle force loads with low cardiovascular effort [4]. Therefore we investigated the effects of eccentric endurance training on cardiorespiratory parameters in overweight healthy individuals.

Material/Methods: After acceptance from the institutional review board and the Ethics Committee of Vorarlberg physical examination 55 individuals (gender: 36f/19m; age: 50±10.8a; BMI: 28.4±4.5kg/m²) absolved an 8-week intervention of downhill walking with hiking poles with a minimum of three bouts per week (distance: 4.2km; height: 636m). Participants therefore used a cable car connection for reaching the beginning of the track. Usage of cable-car connection also recorded compliance. Pre- and post intervention testing was made for cardiorespiratory parameters. Therefore participants absolved a treadmill ergospirometry till exhaustion. Relative maximum volume of oxygen consumption (relVO₂max) was measured. For interval scaled parameters with normal distribution students t-test was used to perform a comparison of means. A statistical level of significance was accepted with 5% using SPSS 15.0 (IBM Corporation, USA).

Results: After exclusion of 3 participants because of missing hiking times compliance was 94.5%. Change in Body Mass Index was not reported for both gender (f: p=0.149; m: p=0.450). No difference in hiking times was reported (p=0.325). Because of a statistically significant difference in pretested strength parameters for male and female participants (p<0.001) further calculations were made separated for both groups. Improvement in relVO₂max was statistically significant (f: 2.8 ml/min/kg [10.5 %], p<0.001; m: 3.8 ml/min/kg [+11.6 %], p<0.012). No statistically significant change in capillary lactate samples (1.4±0.5 mmol/l) during intervention was measured for both sexes.

Conclusion: Despite low cardiovascular stress eight weeks of eccentric endurance exercise show benefits in cardiorespiratory parameters in healthy overweight individuals. Therefore we recommend this exercise modality to sedentary overweight individuals.

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Effect of 2 months endurance training on immune cells and humoral

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Objective: Exercise is the strongest stress to which the body is ever exposed. The body response to this stress through a set of physiological changes in its metabolic, hormonal and immunological systems. The purpose of the study was to examine the effect of 2 months endurance training on plasma immune cells and humoral responses. The immune system components are cellular or soluble which are splashed from the specific cells and have a particular operation in the particular active conditions.

Material/Methods: Eighteen active women that were college student, participated in the study. They performed selected endurance training for two months. Before and after training, blood sample were obtained. Data was analyzed using paired sample t-test. Concentration CD4, IgA and CD4/CD8 increased and CD8 decreased significantly.

Results: Means showed the mean plasma concentration of CD4, IgA and CD4/CD8 increased after 8 weeks exercise, the mean plasma concentration of CD8 decreased and IgA secretion rate did not change significantly after exercise. T-test showed IgA response was not significantly but CD4, CD8 and CD4/CD8 response were significantly ($P \leq 0/05$).

Conclusion: It has been well established that prolonged endurance exercise is associated with muscle cell damage and local inflammation. It has been hypothesized that natural auto antibodies may be used to assist macrophages in disposal of muscle cell breakdown products. It is possible that these antibody leave the circulation to carry out this same function in tissues. It was showed that endurance training may induces changes in lymphocyte subsets and CD8, CD4 function adapted in experimental group. We conclude that endurance training may result in significant alteration in T lymphocyte number, but their actual significant for immunity is seen controversially.

Key words: CD4, CD8, IgA, exercise

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Effect of Tendoactive® on tendon organization

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Objective: When diseased or injured, adult tendons do not heal to the same regenerative capacity of embryonic tissue, but exhibit a highly disorganized matrix that consequently affects normal tissue function. Disorganized collagen bundles and variations in the diameters and orientation of the collagen fibers are characteristics of a tendinopathic tendon. The mechanical properties of tendon are, to a great extent, determined by the molecular structure and organization of the collagen fibers. The maintenance of the tendon matrix has important consequences for the ability of the tendon to resist mechanical forces and to repair response to injury.

The aim of this study was to investigate the effect of Tendoactive® (TA) on fibrillogenesis of collagen and on Tenomodulin levels in the presence/absence of IL-1 β in a 3-dimensional culture of primary human tenocytes.

Material/Methods: Primary human tenocytes were cultured in high density cultures [1] for 0, 7, 10 and 14 days under the different treatments. Cultures were either treated with TA, non-stimulated or stimulated with IL-1 β , and stimulated with IL-1 β and TA. Tendoactive (TA) is a nutraceutical formulation that contains mainly mucopolysaccharides.

Tendon ultrastructure, in particular extracellular matrix (ECM) and collagen fibril organization and orientation, was investigated by electron microscopy. Additionally, we evaluated by western blot analysis if the treatment of tenocytes with the formulation could prevent IL-1 β -induced upregulation of catabolic events leading to downregulation of production of matrix specific proteins such as the glycoprotein Tenomodulin. This protein is described in literature [2] that plays a role in tendon development and organization of the tendinous structure.

Results: Cells treated with IL-1 β underwent apoptosis and extracellular matrix was completely disorganized. The treatment with Tendoactive® was able to counteract the negative effects on the tenocytes: cells looked healthy and with abundant and well organized extracellular matrix (ECM) consisting of thick fibrils of collagen. Also tenocytes displayed high amount of euchromatin that indicates that cells are very active and with a high rate of protein biosynthesis.

Western blot demonstrated a considerable prophylactic effect of Tendoactive® on human tenocytes co-treated with IL-1 β on Tenomodulin production. Additionally an anabolic effect of the formulation was observed: cells showed an increased Tenomodulin production compared to the untreated control cells.

Conclusion: These results indicate that Tendoactive® could be useful in the prevention and/or treatment of tendinopathies (tendinitis, tendinosis, etc). The administration of this product is believed to contribute to remodelling the tendon, which is a necessary step in returning it to its mature functional structure.

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Effects of aerobics and body-building programs in motor balance in elderly women

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Objective: The aging for both men and women alike can compromise the central nervous system, preventing the processing of vestibular signals, visual and proprioceptive responsible for maintaining the body balance. This research represents the first evaluation of a longitudinal research project on women's health studies in postmenopausal and senile osteoporosis. To evaluate the effect of the practice of physical exercise programs in motor balance in postmenopausal women in the senile stage, through the application of specific protocols of aerobics and body-building

Material/Methods: Search for quasi-experimental clinical trial. Population: women being senile older than 60 years. Participants: 24 subjects of the research group exercise program for osteoporosis. For data analysis we used the Berg Balance Scale, two chairs, one with and one without support a bank to step stair climb, a ruler.

Data Analysis: Statistical Package 1 BM SPSS Statistic 18.0. Test of Shapiro-Wilk – Verification of normality of samples distribution; test t of measure dependant to analysis of result intra groups. The mean level adopted was $p < 0,05$.

Results: The table to demonstrate as well had difference in the mean level ($p < 0,05$) in comparison between medium value before and after the application of program to the both groups of aerobics ($p = 0,000$) and body-building ($p = 0,012$) (Table 1).

	N	Age	Minimum Score	Maximum Score	Pre Average	Pos Average	Average Differences	P
Water Aerobics	11	67,7±4,2	41	54	47,1	50,7	3,6	0,000
Bodybuilding	7	66,1±4,5	34	56	45	53,5	8,5	0,012

Table 1: Descriptive analysis of data for both groups

To the both groups had elevated value in comparison between pré with pós-test, is that for the group of aerobics the medium values initial were 47,1 for 50,7, representing the variation 3,6 points or 7.6% on average among the subjects evaluated. To the group of body-building the initial values were 45 and the final 53,5 to the demonstrate the variation medium of values 8,5 ponto or showed in graphic 5 above.

Conclusion: In the EEB scores 45 points lower than predicted high risk of falls in elderly. In the group of aerobics in the mean score increased 47,1 for 50,7 points, this is a statistically significant difference ($p = 0,012$). The test showed that the imbalance index was also greatly improved, in the group of body-building all test (8,10,11,13) had improve in 42,8% and in the group of aerobic the test of 10,14 had improve in 27% and the test 13 had improve 36,3%. Those values are corroborate for the study that defender the program of exercise has alteration in the motor balance.

Both groups obtained after the evaluation of exercise programs, is that the variation of Bodybuilding obtained average score in the EEB more significant than aerobic group, setting this way, both are indicated for the improvement of physical valence.

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Effects of exercise intensity on the oxidation of carbohydrates and fats during recovery in type 2 diabetes

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Objective: Individuals with type 2 diabetes have changes in the utilization of energy substrates [1]. These changes in resting metabolism as well as exercise, favoring the use of fat for energy production and reduce the use of carbohydrate and muscle glycogen synthesis, increasing hyperglycemia and insulin resistance. Studies have shown that exercise is effective in the control and treatment of this phenomenon, but the effect of different exercise intensities on the ratio of the contribution of carbohydrates and fats during the recovery has not yet been elucidated.

Material/Methods: 20 individuals (males and female) sedentary participate voluntarily in this study. The subjects were divided, 1) Diabetes (DB, n=9) and 2) without diabetes (ND, n=11). Both groups performed three experimental sessions (interval of 72 hours between them). Participants performed an incremental test session (TI), also used for calculating the Lactate Threshold (LT), one session of exercise at 90% of lactate threshold (90% LL), which represents a moderate activity intensity and Session Control (Cont), without performing exercise. The 90% LL and Cont were underwent in random order. In all exercise sessions, subjects remained rest for two (2) hours and fifteen (15) minutes, and at 45 minutes recovery was ingested a solution of carbohydrate (CHO) (Figure 1).

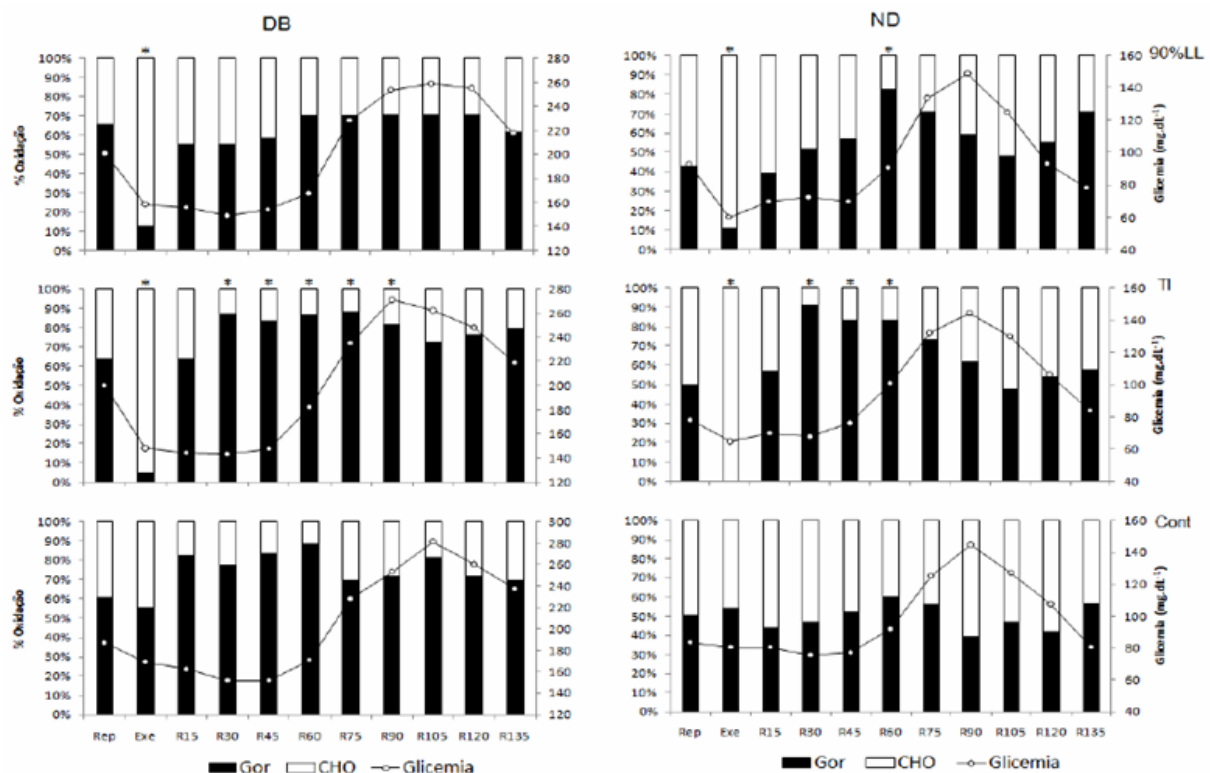


Figure 1: Contribuição percentual de carboidrato (CHO) e gordura (% oxidação) como substrato energético durante as três sessões experimentais nos grupos Diabéticos (DB) e Não-Diabéticos (ND). Rep: Repouso pré-exercício; Exe: final do exercício ou controle; R15 R135: Recuperação pós-exercício. * $p < 0.05$ em relação ao Repouso.

Results: Both groups showed high carbohydrate oxidation during intense exercise sessions and low-moderate when compared to resting values ($p < 0.05$) in both groups. The oxidation of fat was increase during the recovery of IT in both groups ($p < 0.05$), but in the DB group, the change has lasted for a longer time. In the recovery period to only 90% LL, ND group had higher fat oxidation in a single moment, 60 minutes. Type 2 diabetics have carbohydrate oxidation increase during intense and low-moderate exercise. And recovery from intense exercise in the DB group had high fat oxidation for a prolonged time. So intense exercise can increase fat oxidation during

recovery from exercise in type 2 diabetics, resulting in positive effects on health such as increased insulin sensitivity and energy balance. Agreement, Braun et al. [2] reports that increase in lipid oxidation on the exercise have a positive effect, favoring the balance between content and lipid oxidation, helping to restore insulin sensitivity.

Conclusion: Type 2 diabetics showed higher carbohydrate oxidation during moderate-intensity exercise as intense low-moderate. In addition, the type 2 diabetics had higher fat oxidation and a longer time than their peers without diabetes in the recovery period of high intensity exercise, even with ingestion of CHO solution after exercise.

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Efficiency of physiotherapy in Romanian toddlers and young children with cystic fibrosis

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Objective: This study's specific objectives are focused on individualizing physiotherapy according to age, compliancy, socio-cultural level, clinical state in patients with cystic fibrosis.

1. Physiotherapy for the infant – efficiency: postural drainage; percussions and thoracic vibrations; secretion aspiration, 1 year.

2. Physiotherapy for the small child – efficiency and compliance to various schemes of therapy: first stage: physical exercising – 4 months; second stage: classic clearance techniques – 4 months; third stage: clearance techniques combined with physical exercises– 4 months.

3. Physiotherapy and the efficiency of the classic clearance techniques (ACTB and AD) on children aged between 6 and 12, 1 year.

Material/Methods: This study was conducted in the Romanian National Cystic Fibrosis Center in 2007–2010, and the study lot was represented by a number of 49 patients, aged between 2 months and 12 years. For the first subplot, the research plan was conceived by analysing the following aspects: the general clinical state and nutritional status; cough character; pulmonary physical signs; bacteriological examination of the sputum; radiological examination through the "Norman & Chrispin" score; pulse oxymetry to assess oxygen saturation. For subplot 2, the methodology was similarly structured as in the case of lot 1, at which specific elements of a higher age were added. For Sublot 3 we have followed the signs of the obstruction of the small air ways (FEF25%–75%), evolution of FEV1, FVC. The statistical processing of data was made with the help of a statistics programme (Graph PadPrism), using a non-parametric test: the Wilcoxon matched pairs test.

Results: Sublot 1 – 1. The evaluation of the efficiency of physiotherapy has shown the substantial benefit in the clinical improvement and of the nutritional status, the reduction of the number of exacerbations of the respiratory suffering and the number of hospitalizations.

Sublot 2 – 2. The combined techniques (physical exercises associated with clearance techniques) have proved to be net superior (72% of cases), both from the point of view of efficiency, as well as compliance (to the patient and to the family).

Sublot 3 – 3. The chosen techniques for the patients between 6 and 12 years old have proven to be effective, especially for improving the respiratory symptomatology and the ventilometric parameters. In this regard, the results of the statistic processing indicate the fact that there are significant statistic differences ($p < 0, 05$), before and after treatment on all the evaluated ventilometric indexes.

Conclusion: Physiotherapy must be mandatory included in the management programme of any patient with cystic fibrosis, must be started immediately after diagnosis and must be conducted daily. A consistent and true physiotherapy is probably the most important factor in the prevention of a chronic pulmonary infection and, added to antibiotherapy, helps improving the prognostics significantly and helps maintaining a prolonged period of life quality as close as possible to the normal level.

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Extensor flexor ratio and anterior knee pain

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Austria managed more than 84 thousand knee surgeries in 2009 (Statistic Austria). Anterior knee pain is a common preexisting condition to arthritis and joint destruction. With this case report we are presenting the benefit of specific muscle exercise in order to achieve a balanced Extension/Flexion ratio and to strengthen the medial portion of the m. quadriceps. We want to accentuate the early improvement and the long lasting benefit with only daily routine movement.

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From neuromuscular stimulation and/or biofeedback-assisted exercise up to Triathlon competitions – regular physical activity in cancer patients and its different ways

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Objective: Regular physical activity has been shown to be very important for functional health and participation of cancer patients. However, not all cancer patients need the same form of regular physical activity.

Material/Methods: In this survey, experiences of the outpatient clinic and of the special exercise program for cancer patients of the Department PM&R (Medical University of Vienna) are presented. A review about own clinical experiences, clinical studies and case reports is given – for all described conditions we cite and present our studies and reports from the literature.

Results: Experiences from our outpatient clinic show, that regular physical activity of cancer patients can include the application of neuromuscular electrical stimulation (in form of a “passive training”), biofeedback-assisted exercises, aerobic exercise, strength exercise, and even sports and competitions, for example, Marathon running and Triathlon (Iron man). Yes, there are really cancer patients who are willing to perform sports with regular participation in competitions! Of whom, the case of a prostate cancer patient who performed a Triathlon (Ironman) within 14h 35’ is presented.

Nevertheless, physical activity of cancer patients typically and in most cases is represented by aerobic exercise. This form of exercise – individually prescribed – has been described to improve functional health of cancer patients with benefits for physical performance, mental health, quality of life, and – in some types of cancer – survival. Our own experiences show that female breast cancer patients can benefit from aerobic exercise during adjuvant chemotherapy in a central hospital, and that even patients suffering from metastatic bone disease can reach excellent endurance capacities up to 150% and maintain independency from others help. Cancer patients suffering from very severe concomitant diseases (myocardial infarction, stroke, peripheral vascular disease, amputation) are also able to perform supervised aerobic exercise – and to benefit. Patients under very modern oncologic treatment (Sunitinib), which is known to be very effective and to significantly increase survival of metastatic cancer, but which can be a danger during exercise due to its cardio toxicity, are able to perform active aerobic exercise and to reach excellent endurance capacities.

To increase muscular strength, cancer patients are performing strength training even in cases of metastatic bone disease. Some patients suffering from advanced multiple myeloma can only increase strength in a safe way by using biofeedback-assisted exercise.

Cancer patients with metastatic brain disease or brain tumours can also benefit from regular active exercise, but also from neuromuscular stimulation.

For those patients, who are not allowed to perform active exercise, neuromuscular electrical stimulation (NMES) is an option. NMES is performed with the intention to prevent loss of skeletal muscle mass in patients who are not able and/or not allowed to perform active exercise, but also to increase muscular strength and endurance capacity in some patients suffering from very advanced cancer who want to increase their (social) participation.

Conclusion: Regular physical activity has been described to be an important part in the treatment and rehabilitation of cancer patients, but it can differ in its motivations and goals. Nevertheless, most of cancer patients should start as soon as possible to be physically active, but under the supervision of specialized physicians and within their individual “right” setting. This setting should be planned according their individual (medical) risk factors and according their individual (sportive) goals, to find the right way for the individual cancer patient.

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Functional evaluation of patients undergoing hemodialysis with chronic kidney disease

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Objective: The chronic kidney disease (CKD) is characterized by the loss of the kidney's ability to eliminate toxic substances, concentrate urine and conserve electrolytes, with subsequent alteration of the remaining kidney function. The severe loss of kidney function is a first-order threat to life and requires the removal of toxic waste that cannot be debugged with sufficient effectiveness for other organ systems, as well as the restoration of an adequate volume and composition of body fluids - dialysis. If the loss of renal function is irreversible patients have two options: kidney transplant or chronic dialysis. Since 1977, with the pioneering study by Jette et al., it is well documented that patients with CKD on hemodialysis are limited in their overall physical capacity between 60 and 70% of that expected for their age, compared with healthy patients [1] and most CKD patients are sedentary [2], [1]. With this study, our main objective is to evaluate the functional status of hemodialysis patients with CKD.

Material/Methods: The study was carried out by the NorDial Clinic (Mirandela city – Portugal) in a total population of 123 patients. We met the exclusion criteria defined by the American College of Sports Medicine. Tests: anthropometric measurements, sit-to-stand, up and go, handgrip strength and blood tests. Material: Tefal scale accurate to ± 100 g, metric stadiometer (Detecto D52, USA), chair of 46cm, 8 memory stopwatch with precision 1/100 seconds (Bravo, Spain), cone with 40cm, manual hydraulic dynamometer Jamar[®].

Results: 60.5% of the patients of our study were men. This data is extremely variable in publications on hemodialysis. The average age of our participants is 63.46 years (women) and 61.16 years (men). But more important than biological age is the time on hemodialysis, since we know that the mortality of these patients increases in proportion to years of treatment. The men in our sample were on hemodialysis for 4.42 years and women for 6.17. In the sit-to stand 60s test both men and women were able to reach an average of more than 30 repetitions (35.76 ± 9.66 and 32.26 ± 8.46 respectively). These values are higher when compared with other studies [3]. It is widely reported that patients undergoing hemodialysis have marked skeletal muscle dysfunction and that this dysfunction is also observed in handgrip strength. The values found in this study (175.91 ± 51.35 N for women and 321.1 ± 84.1 for men, both for right hand) agree with the findings in the scientific literature. Comparing men and women, we observe lower values of strength in women as showed in other studies, which is perfectly described by the metabolic and structural differences. This is an important result due to the relationship between handgrip strength and quality of life [4]. The up-and-go test is a classic test to assess the mobility and walking capacity and is strongly related to lower limb strength and balance. In our study the results of this test were 7.6 ± 3.05 s and 9.37 ± 3.78 , for men and women respectively – results slightly higher than others published in other investigations like in [5]. As it is well known, the internal milieu of hemodialysis patients suffer numerous homeostatic changes derived from many factors, making it difficult to interpret analytical results, comparing men and women. Anyway, we found no baseline differences in the data published by other researchers relating to hemoglobin and hematocrit, since there is a consensus on the minimum tolerable to keep these patients through the dosage of erythropoietin.

Conclusion: a) The anthropometrics results of our patients are similar to other publications.
b) The overall functional capacity of our patients is lower than healthy population.
c) The overall functional capacity of our patients is higher than shown by other studies.

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High motivation for blind children to practice swimming activities authors

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Objective: The general aims are to promote independence, enjoyment, safety and to enhance the basic motor skills in water and swimming styles. It is important to be socially accepted, but also to promote general well-being, enjoyment and socialization.

Material/Methods: This study was conducted in the University Politehnica Timisoara in 2009–2010, and the study lot was represented by a number of 10 children, aged between 4 years and 8 years with premature retinopatia. All the results were measured with the Swimming Scale for Persons with Visual Impairments which include: The basic motor skills in water and swimming styles (total immersion, swimming with aids, dog paddle, crawl, breaststroke, backstroke, snorkeling), resistance (25 m with aids, 25 m without aids free style, 50 m with aids, 50 m without aids free style), maintaining positions in water (floating in supine position, floating in prone position, floating in one side position, equilibrium vertical position), basic swimming behavior (walk, jumping in the water, running, diving), psychomotricity (breathing – legs coordination, breathing – hand coordination, breathing – hands – legs coordination), spatial orientation and mobility in swimming-pool area (recognizing the teacher's voice, directions, mobility and routes: locker room-toilet-swimming pool).

Results: Initially the children were uncomfortable in water, because of the lack of experience. The initial results – very low shows us the fact that swimming and water activities are new things. After experimentation they showed us that their skills are like the skills of children without visual impairment and they can learn fast to swim. The Breaststroke swimming style: Beginners usually use the breaststroke swimming style because it is easy. With the head out of the water the blind person can orientate easily. This way, kids never skip a breath. The bras swimming style strengthens the muscles that help you keep your posture, avoiding eventual back problems, common in children with visual impairments. The Crawl swimming style: It needs a minimum of training and endurance to practice it correctly. But the crawl swimming style consumes a whole lot of energy and puts o minimum strain on your body. This swimming style is recommended to everyone. Kids like this style because it's fast. They have problems in maintaining the straight position. Backstroke swimming style: This is the recommended swimming style for blinds avoiding back problems like kyphosis. Breathing is very easy because the mouth and nose are always out of water. The leg movement is similar to the crawl swimming style. There isn't any strain put on the back and all the muscles needed to achieve a good posture are worked and strengthened. The backstroke swimming style is good to work your arm, chest and abdominal muscles. With the ears in the water the orientation is very difficult to realize. The final results shows the fact that all the parameters increased with significant statistic difference ($p < 0,05$) after the swimming program: spatial orientation and mobility in swimming-pool area, psychomotricity, basic swimming behavior, maintaining positions in the water, resistance, the basic motor skills and swimming styles.

Conclusion: Water provides an effective learning environment for a child with vision impairment. The persons with visual impairment become totally dependent on the sound for orientation. In an echo filled tile indoor enclosure, this is really hard. When the orientation problem has been solved, swimming becomes an excellent experience for those children. Swimming gives a real sense of freedom. In the pool you can assume many different body positions while moving through the water which feels wonderful, is good for both mind and body. The sense of touch is developed not only in the fingers like usually, but also all over.

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Impact of a functional recovery program on muscular strength, exercise tolerance and quality of life in a patient with cystic fibrosis: A case report

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Objective: Cystic fibrosis (CF) is a genetic autosomal recessive disease that influences many systems in the body, associated with decline of pulmonary function, pancreatic insufficiency, and important physical limitation. One aspect of the care of this chronic condition is the management of the systemic consequences of the disease, including exercise intolerance and skeletal muscle weakness. In this sense it has been developed a functional recovery program to analyze its effect over the muscle strength, exercise tolerance and quality life of a patient with CF after a hospital admission of 4 weeks.

Material/Methods: Prospective, longitudinal and descriptive study. Exercise tolerance, skeletal muscle strength and respiratory function were studied in a female subject with CF heterozygous for DF508 (age 21 years; height 164 cm; weight 54.4 kg; body mass index (BMI) 20.22 kg/m²; body fat mass 38.6%; Forced Expiratory Volume in one second (FEV₁) 62% predicted). The CF diagnosis was verified by sweat testing (Cl, 60 mEq/L), clinical criteria, and genetic analysis. The following tests were performed: horizontal jumping ability; hand-grip strength; abdominal strength; a functional test of leg muscle endurance; and exercise tolerance the 6-Minute Walk (6MWT). To analyse the health-related quality of life (HRQL) Cystic Fibrosis Questionnaire-Revised (CFQ-R) was used. The intervention had a duration of 12 weeks, with a frequency of 3 days per week with training session of 60min. Workouts were based on aerobic volume capacity 50–65% heart rate reserve (HRR) and strength training (combining dynamic, reactivate and isometric method).

Results: The results of this study suggest a significant improvement in exercise tolerance (increase 190 meters in 6MWT) and static strength near to 80 % in the upper extremity and of 130 % in the strength resistance of the lower extremity. In relation to the FEV₁ a moderate increase was observed after the physical activity period. Significant quality life improvements (CFQ-R) were found after long-term physical exercise program. Also, there were significant decreases in fat mass of 7.4 points.

Parameters	Pre-Training	Post-Training
Weight. kg	54.4	56.2
Body Mass Index (BMI). kg/m ²	20.22	20.89
Body Fat Mass. %	38.6	31.2
FEV ₁ predicted. %	62	66
Dyspnea Scale (MRC)	1/4	0/4

Table 1: Characteristic Patient with CF.

Parameters	Pre-Training	Post-Training	Increase %
Horizontal Jump. cm	76	112	47.3
Right-hand grip. kg	19.5	32.5	66.6
Left-hand grip. kg	16	28.5	78.1
Sit-up, No. In 30 s	12	24	100
Total	28	54	92.8
Knee bends, No. In 30 s	17	41	141.1
Total	21	48	128.5

Table 2: Muscular Strength and Function in Patient with CF.

<i>Parameters</i>	<i>Pre-Training</i>	<i>Post-Training</i>
Distance. m	532	725
Heart rate, No. Initial	82	78
Final	152	135
SpO2%. Initial	97	98
Final	95	97
Fatigue Borg Scale	7/10	5/10

Table 3: Exercise tolerance 6MWT in Patient with CF.

Conclusion: The results of this study suggest that a physical exercise program of 16 weeks has significant influence on increasing a muscular strength, lung function, cardio-respiratory fitness and quality of life in a patient with CF. Therefore this intervention could be recommended in the functional recovery of CF patients. Further studies are needed to evaluate whether the small differences might be related to metabolic abnormalities in skeletal muscles in CF patients.

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Incidence of musculoskeletal injuries in professional athletes Figueirense Futebol Clube in the period January to December 2010

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Objective: Identify what musculoskeletal injuries more frequent in the period January to December 2010 in professional athletes Figueirense Futebol Clube.

Material/Methods: We conducted a retrospective study with a series of cases, where we analyzed medical records of assessment of athletes from professional football Figueirense Futebol Clube who entered the medical department in the period January to December 2010. Injuries have been reported more frequently, especially including: muscle injury, followed by joint damage and bone lesions.

Results: Data, we found a total of 116 cases of musculoskeletal injuries during the period January to December in the records of professional athletes Figueirense Futebol Clube, with the following results: Muscle Injury 80 cases (68.97%), Injuries joint 33 cases (28.45%) and bone lesions 3 cases (2.59%).

Conclusion: Therefore, we conclude that muscle injuries are more frequent with 68.97% of cases, joint injuries with bone lesions and 28.45% to 2.59%.

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Minimal repolarization abnormalities as a manifestation of muscle bridging in asymptomatic adolescent soccer player

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Objective: Minimal repolarization ECG changes are quite common in young sportsmen and are generally considered as a benign condition due to cardiovascular adaptation to physical exercise resulting from increased vagal tone. Nevertheless, in some cases other conditions are reasonable and they may have a pathological basis. We present a clinical case of an asymptomatic 17 year old active soccer player, who was referred to the examination because of the minimally inverted T-waves occasionally found on the resting ECG.

Material/Methods: He was born from the physiological pregnancy, with no family history of myocardopathy, congenital heart disease or sudden death. His somatic development was adequate with just common childhood diseases, with no operations or serious injuries. He was actively involved in playing soccer from the 3 grade of elementary school, being a member of a national junior representative team, with training program on a regular basis – about 3 hours daily, at least 5 times in a week with at least 1 full-time game played through a weekend and pre-season medical screening annually.

Results: He was referred to the cardiologist because of the minimally inverted T-waves (<2 mm) in inferior and lateral leads with no other abnormalities on the resting ECG. Echocardiography was normal with no features of left ventricular hypertrophy, LVOTO, RVOTO or valvular disease, with normal systolic and diastolic function. There were no signs of ischaemia during the maximal cycle ergometer testing, but stress myocardial perfusion scintigraphy showed discrete perfusion defects in anterior and lateral segments. He was admitted to the cathlab with normal coronary anatomy on angiography, but cardiac CT angiography, which was performed later, revealed a muscle bridging in the proximal part of LAD. Athlete gave on his parents' advice and refused further investigations and procedures. He stopped his further sports career continuing playing soccer only recreationally.

Conclusion: The significance of minor T-wave changes such as flat and/or minimally inverted (<2 mm) T-waves in two or more leads (mostly inferior and/or lateral) is unclear. Like deep inverted T-waves, minor T-wave abnormalities are infrequently encountered in the athlete heart, but are common in cardiomyopathy and may be in myocardial bridging as well, like in presented case. ECG abnormalities are unlikely to be caused by bridging alone, particularly because stress myocardial scintigraphy showed myocardial perfusion defects and coronary angiography was normal. In this regard, athletes with post-pubertal persistence of T-wave inversion beyond V1 require further clinical evaluation to exclude an underlying structural heart disease.

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Peak cardiac power output and cardiac reserve in women

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Objective: Cardiac power output (CPO) measures cardiac function by taking into account both pressure [mean arterial pressure (MAP)] and flow [(cardiac output (CO))] generating capacities of the heart. Peak cardiac power output (CPO_{peak}) achieved during maximal physical activity is the best method of measuring overall cardiac function and one of the major determinant of exercise capacity. Cardiac reserve (CR) is calculated as difference between cardiac power output at maximal exercise and at rest (CPO_{peak}-CPO_{rest}) [1]. Previous investigations into peak cardiac power output measured CO using rebreathing method and have been mostly limited to clinical populations [2], [3]. Data about healthy sedentary adults using echocardiography exam would allow a greater understanding of CPO_{peak} and CR parameters as measures of cardiac function. The aim of this study was to determine CPO_{peak} and CR in young, healthy physical non-active women in our population by echocardiography.

Material/Methods: The study included 46 sedentary female subjects (mean±SD, age 21.17±0.69) who were subsequently divided into two groups of 23 women, by achieved values of heart reserve (Group 1 with higher and Group 2 with lower heart reserve). Values of heart work and circulatory condition were measured before and after maximal physical activity on cycle ergometer with echocardiography exam. From these values peak cardiac power output and heart reserve were calculated as described by Cooke et al. [1].

Results: In whole group CPO_{peak} was 4.22 (±0.73) W and heart reserve was 3.08 (±0.52) W. After maximal physical activity significant differences (p<0.05) between Group 1 and Group 2 were found in values of systolic blood pressure (TASy), mean arterial pressure, cardiac output, peak cardiac power output and heart reserve. There was significant correlation (r=0.44, Pearson's coefficient) between level of achieved load on cycle ergometer (W) and cardiac reserve in both groups. Heart's size and volumes of the subjects were in physiological limits compared with the values of relevant categories (Guidelines for Quantification chamber, the British Association of Echocardiography [4].

Conclusion: In our population value of peak cardiac power output in women is 4.22 (±0.73) W and value of cardiac reserve is 3.08 (±0.52) W. Women with higher cardiac reserve had better results on exercise test and could endure to higher level of maximum load. Cardiac reserve is important factor in achieving maximal load during physical activity. The advantage of echocardiography in estimating CPO_{peak} and CR is in its noninvasiveness and capability of measuring cardiac dimensions and pumping parameters during examination.

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Proprioceptive training vs classical physiotherapy in children with Down Syndrome

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Objective: To demonstrate the early interervention through proprioceptive training program performed in all the motor development stages, we'll enhance the quality of motor behavior, we'll achieve a faster acquisition of the main milestones and we'll improve the postural tonus, the balance and transfers.

Material/Methods: The study was performed at Speranta Special Care Center Timisoara, during april 2008-april 2011. Lot study consisted in 30 randomized patients aged between 2 months-5 years with the mean age 2 years and 3 months. The subjects were divided in two groups: control group 15 subjects, classical kinetotherapeutic program 3 times/week/45 minutes; study group 15 subjects, proprioceptive training 3 times/week/45 minutes. The children were assesed before and after intervention using Bayley Motor Scales of Infant Development and we evalauted 12 milestones.

Results: Following the proprioceptive training all the subjects have presented an improvement in the development milestones compare to control group. Significant results have been obtain for: standing, walking, climbing stairs, running and jumping ($p < 0,05$). At the end of the experiment, motor performance was: control group 1 subject normal performance -7%, 9 subjects late performance -60%, 5 subjects significant late performance -33%; study group 2 subjects normal performance -13%, 10 subjects late performance -67%, 3 subjects significant late performance -20%.

Conclusion: All the children have improved their performances because of the development of them during the study and cause of the kinetotherapeutic intervention. Still, the proprioceptive training had determined a significant diminution of the mean age of occurence in the main milestones compare to classical intervention. The proprioceptive training must be included in the kinetotherapeutic management of each child with Down syndrome. The early intervention is desired for the achievement of maximum potential of the child.

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Rehabilitation of patients suffering from metastatic bone disease

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Objective: Metastatic bone disease has become an important issue in cancer rehabilitation. Modern oncologic treatment strategies are able to increase survival of these patients. Typical entities which involve the skeleton are breast cancer, prostate cancer, lung cancer, kidney cancer, and multiple myeloma. Furthermore, thyroid cancer and melanoma, but also very often the so called “cancer of unknown primum” can involve skeleton. Patients suffering from metastatic bone disease often are a challenge for cancer rehabilitation due to the danger of pathological fractures with the consequence of neurological deficits, immobility and dependency, hypercalcaemia, severe pain, and of reduced survival time.

Material/Methods: A rehabilitation concept for patients suffering from metastatic bone disease is presented. This includes a description of functional deficits, specific dangers, therapeutic options and contraindications. Furthermore, the planning process within a specialised tumour board and a helpful tool (checklist) are presented.

Results: Rehabilitation plans for cancer patients suffering from metastatic bone disease have to be individually tailored depending on their individual functional deficits, and on their individual general and specific (metastatic bone disease) medical conditions. They can include medical exercise with the intention to increase endurance capacity and/or muscular strength, neuromuscular electrical stimulation (as an passive option to exercise), nutrition, lymph massage, breathing therapy, physiotherapy, immersion/hydrotherapy, biofeedback, ergonomics, orthotics, occupational therapy, different forms of massage, analgesic electrotherapy, and other physical modalities, psychotherapy/psychooncology, but also drug treatment for pain (especially the so called co-analgesics).

Most of the functional deficits of the these very challenging cancer patients are pain (often due to bone disease), fractures, neurological deficits, daily fatigue, decreased endurance capacity and muscular strength, weight loss (cachexia) or weight gain (depending on their treatment), sensorimotor deficits and polyneuropathy, dyspnoea, lymphedema, incontinence, cognitive deficits (“chemobrain”), psychological distress and anxiety, walking disturbances due to polyneuropathy with the risk of falls and the danger of fractures.

For most patients suffering from metastatic bone disease, an individual rehabilitation concept is defined within a specialized tumour board (with referring specialists from different medical specialities all involved in the rehabilitation process, and with the goal to plan rehabilitation, but NOT to treat the oncologic disease itself!). Furthermore, for the individual patient, we recommend a check list which displays medical history and diagnoses, medication, special risks, individually allowed treatment options and contraindications, but also the information of the patient and of the members of the rehabilitation team.

Conclusion: Rehabilitation concepts for cancer patients suffering from metastatic bone disease have to be individually tailored depending on their individual needs. A specialized tumour board, a checklist, and an individual rehabilitation plan which includes specific nutrition, psychooncologic help, and different options from the field of Physical Medicine and Rehabilitation may help these patients to improve their functional health, and independence in daily activities, and to maintain social participation.

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Resistance exercise elicits acute blood pressure reduction in type-2 diabetics

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Objective: To analyze the occurrence of post-exercise hypotension (PEH) and cardiovascular and metabolic responses to aerobic (AE) and resistance exercises (RE) in type-2 diabetics.

Material/Methods: Nine type-2 diabetics performed 1) 20-min of cycling (AE) at lactate threshold intensity; 2) RE at 70%1RM, and 3) control session (CONT). For the RE, 3 sets of circuit training, composed by 6 exercises with 8 repetitions each, were performed with a 50-sec interval between sets and 1-min between circuit laps. Heart rate (HR), blood pressure (BP), blood lactate ([lac]), oxygen consumption (VO₂) and rate of perceived exertion (RPE) were measured at rest, exercise or CONT and over the 120-min of post-session recovery.

Results: HR, BP, RPE and caloric expenditure measured immediately after exercise sessions did not differ between groups. Mean VO₂ of RE (10.6±1.7) was lower than AE (13.3±1.4) (p<0.05). VO₂ peak measured immediately after each RE bout (17.5±3.4) was higher than in AE (p<0.05) also showing a higher peak [lac] after RE (7.5±3.0 vs. 4.2±1.5mM) (p<0.05). The RE but not AE elicited PEH in systolic blood pressure, diastolic blood pressure and mean arterial pressure (MAP) (p<0.05). The MAP decrease after one hour of recovery in RE was ~5.3 mmHg, while AE elicited a non-significant decrease of ~1.9 mmHg. Only RE elicited diastolic PEH.

	CONT	RE (70% 1RM)	AE (100% LT)
Lac (mM)	2.0±0.6**	7.5±3.0*	4.2±1.5
Mean VO ₂ (mL·kg ⁻¹ ·min ⁻¹)	3.3±0.6**	10.6±1.7*	13.3±1.4
Exercise VO ₂ (mL·kg ⁻¹ ·min ⁻¹)	-----	17.5±3.4*	13.3±1.4
Peak VO ₂ (mL·kg ⁻¹ ·min ⁻¹)	-----	17.7±3.6*	14.8±1.00
Session RER	0.87±0.07	1.09±0.13***	1.00±0.09
Peak RER	1.00±0.14	1.28±0.18***	1.00±0.14
Caloric Expenditure (Kcal)	27.8±7.2**	101.5±29.4	116.4±30.6
RPE (Borg)	-----	13.6±1.2	13.6±2.0
SBP (mmHg)	122.0±19.5**	145.8±19.0	156.4±13.5
DBP (mmHg)	79.2±8.8	77.3±9.3*	85.6±5.3
HR (bpm)	78.9±9.2**	131.4±18.1	138.6±20.8
RPP	8456.0±1644.0**	19411.0±4326.0	21664.0±3613.0
Duration (min)	20.0±0.0	21.8±3.8	20.0±0.0

Lac – Mean blood lactate results measured during experimental sessions. Mean VO₂ – Mean of oxygen consumption measured during the entire RE session (including recovery period between sets). Exercise VO₂ – oxygen consumption measurement of the experimental session without considering recovery between exercise and sets in RE. Peak VO₂ – Oxygen consumption measured immediately after the execution of exercise. Session RER – Respiratory exchange rate of the whole period of the experimental session. Peak RER – Greatest value reached in the experimental session. RPE – Rate of perceived exertion. SBP - systolic blood pressure, DBP - diastolic blood pressure measured during the experimental sessions. HR – Heart Rate. RPP – Rate pressure product. *p≤0.05 in relation to AE; **p≤0.05 in relation to RE and AE; ***p≤0.05 in relation to CONT.

Table 1: Mean (±SD) values of blood lactate, oxygen consumption, blood pressure, rate of perceived exertion, caloric expenditure, rate-pressure product and duration of the CONT, RE (70% 1RM) and AE (100% LT) sessions (n=9).

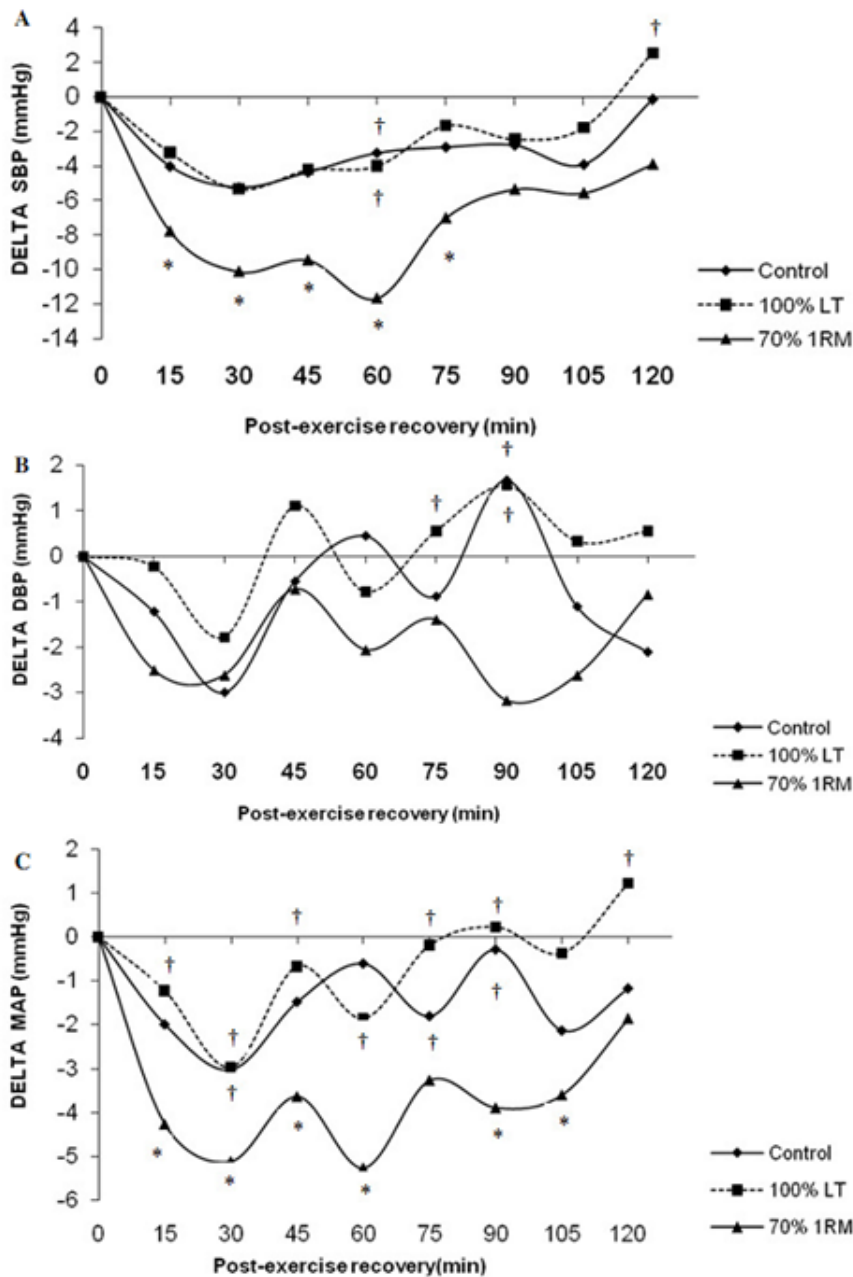


Figure 1: (A, B and C): Delta of SBP, DBP and MAP variation during post-exercise recovery in relation to pre-exercise resting (post-exercise recovery minus pre-exercise rest). * $p=0.05$ in relation to rest; † $p=0.05$ in relation to 70% 1RM (RE) session.

Conclusion: Only the 70%1RM RE circuit training model promoted PEH in type-2 diabetic individuals, perhaps due the higher cardiovascular and metabolic stress when compared to the AE session.

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Results of aerobic training in adolescent patients with moderate idiopathic scoliosis

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Objective: Several studies have shown the decrease in the capacity to produce aerobic work in young subjects with mild to moderate AIS (when scoliosis exceeds 25°) [1], [2]. These abnormalities may lead to an increase in the energy required for walking or performing other physical activities [3]. Our aim is find out the frequency and the relevance of the restricted work capacity since is uncertain and a matter of controversy.

Material/Methods: 6 weeks of aerobic training in AIS girls that suffer from mild scoliotic curvatures (n=6) and healthy controls (n=6) in different biochemical, anthropometric and cardio respiratory parameters. The groups performing a cycling training program were subjected to a training program of 3 sessions per week during a period of 6 weeks with an approximate duration of 1 hour per session (table 2). The training intensity was increased from 65% to 85% VO₂max. All the girls trained every day with a Pulsometer 810R Cardio Polar.

Results: The maximal power output and the power output achieved at the anaerobic threshold, during the maximal exercise test, were significantly increased in both experimental groups. The training program caused significant changes in body composition (i.e. a decrease in body fat %) only in the scoliotic group. Regarding the cardio respiratory measurements, VO₂max was increased by 17% in AIS group and by 10% in the healthy group.

Conclusion: We measured in our study the degree of the curve according to Cobb and we did not find any significant modification after 6 weeks of training in a cycle ergometer. Our results suggest that physical activity should be encouraged in scoliotic girls with mild curvatures.

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Swimming induced pulmonary edema in triathletes, red flag sign for medical personel at races

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Objective: To do a contemporary literature review on swimming induced pulmonary oedema (S.I.P.E.), with the focus on triathletes, to determine possible causes, put in an objective clinical signs during and after race and treatment for eventually evolved S.I.P.E.

Material/Methods: U.S. Nationaly Library of Medicine, National Institutes of Health database was searched for a term "swimming induced pulmonary edema" published until 1.5.2011. We had 31 results from which we did a review of those connected to open water swimming and especially triathlons.

Results: Causes, pathophysiology, treatment was outlined in a form of guidelines for detecting and managing S.I.P.E. on triathlon race site.

Conclusion: Medical personel on triathlon races should be aware off possible occurrence of S.I.P.E. This literature review in a form of poster presentation outlines basic facts about it.

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The comparison of two types exercise on innate immune

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Objective: Studied have demonstrated that exercise induced considerable physiology change in the innate immune system. The interaction between exercise stress and the immune system provide a unique opportunity to evaluate the role of underlying stress and immunophysiological mechanisms. The purpose of the study was to comparison of two types exercise on innate immune.

Material/Methods: Eighteen active female, healthy volunteers participated in the study. Subjects were assigned in one of two groups: aerobic exercise (n=10)(age :21.6 ±1.71years, height: 161.45 ± 2.71cm, weight: 57.25±6.99 kg. and VO_{2,max} 34.18 ± 2.ml.kg⁻¹.min⁻¹) and, exhaustion exercise(n=8), (age: 24.25±4.30 years, height: 159.81±4.86 cm, weight: 54.69±3.82 kg.and maximal oxygen consumption VO_{2, max}: 36.1±3.79 ml.kg⁻¹.min⁻¹). The experimental protocol was approved by the ethics committee and all subjects were informed of the risks and purposes of the study before their written consent was obtained. Blood samples (n=18) were drawn from the antecubital vein before and immediately after aerobic exercise and exhaustion exercise (Bruce protocol). For cytokines measurement 11 ml blood sample was drawn. Plasma was separated from the cells and analysis for IL6, IL1 and TNFα. Statistical analyses, tables, graph, means ± M±ME, t test used for measurement TNFα, IL1 and IL6 response (a was set at 0/05).

Results: Means showed the mean plasma concentration of TNFα increased, IL1 decreased and IL6 no changed after exhaustive exercise and the concentration of TNFα and IL1 decreased and IL6 no changed after endurance exercise. T-test showed changes of TNFα after endurance exercise was but another changes were not significant.

Conclusion: The exhaustion exercise is not very intensive or prolonged so, subjects were active and carbohydrate intake was not controlled in the present study and subjects can be assumed to be well loaded. Therefore changes of TNF, IL1 and IL6 were not significantly. Recent studies show that several cytokines can be detected in plasma during and after strenuous exercise. Endurance physical activity might reduce endothelial cell secretion of al IL1 and TNFα, both induces of an acute phase inflammatory response. More sensitive of kits and specific assays may be due to the fact that cytokines is produced locally and is rapidly cleared from the circulation. Both cross sectional and longitudinal studies support an inverse relationship between inflammatory cytokines and physical activity levels in healthy individual. Studied reported increased plasma TNF 2h after completing a 2•5h run (2h 30 min) and 1h after a 5 km race, respectively, but other studies have failed to detect TNF after exercise. Endurance exercise induces an decrease in the pro-inflammatory cytokines TNF. In conclusion, regular exercise protects against diseases associated with chronic low-grade systemic inflammation.

Key words: IL6, IL1, TNF, exhaustion, endurance

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The effect of physical exercise on abdominal adiposity and serum lipids in young obese subjects

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Objective: In the past decade, metabolic and cardiovascular pathology in obese subjects is being increasingly in direct relationship with the accumulation of visceral fat than excess subcutaneous tissue. Abdominal obesity is now recognized as a major factor that holds a central place in the etiology of type 2 diabetes mellitus, hypertensive disease, atherosclerosis and coronary heart pathology. After a long period of time when it was thought that the excess adipose tissue, regardless of its localization, is the cause for an entire range of pathological manifestations, the researchers' point of view got changed nowadays to such an extent that we now deal with a clear difference of risks related to the process of cumulating adipose tissue in different areas of the body. In other words, the metabolic and cardiovascular pathology at obese or overweight persons have to be directly related to the visceral accumulation of body fat rather than to the total amount of excessive overweight. Moreover, even if the BMI is kept at normal values, the excess of visceral fatness remains a risk factor for cardiovascular pathology.

The purpose of our study were to compare two physical exercise programs on abdominal adiposity and the correlation of these effects with the modification of serum lipids.

Material/Methods: The study has been carried out for 6 months and included 20 obese male subjects, aged 25.2 ± 2.6 yr. The research subjects been separated into 2 groups: group I (n=10) who has undertaken 45 minutes of intermittent submaximal exercise/sessions, 3 sessions/week; group II (n=10) who has performed three events of 15 minutes x 3/week with maximal and submaximal exercise. During the exercise sessions, intensity of effort was heart rates monitored by heart rates telemetric recorded with Suunto Team Monitor. Monthly, we have recorded for each subject the body weight, the waist circumference, abdominal adiposity (by ultrasonographic measurement) and serum lipid parameters (triglycerides, LDL- cholesterol, HDL- cholesterol).

Results: Generally, from the analysis of results it can be observe a favorable evolution in all parameters. Additionally, the correlations between variation of serum lipid parameters, as a result of the physical exercise program, was better at group II than the variation of the same parameters at group I.

Conclusion: For treatment of young with obesity, the using of submaximal and maximal exercises in short sessions has better results than only submaximal exercises on abdominal adiposity and serum lipid parameters. Acknowledgements. This work was supported by CNCSIS-UEFISCSU, Romania, Grant No. 385/2008, Ideas_PNCDI 2.

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The effects of manual mobilisation on the mobility of the thoracic spine in patients with ankylosing spondylitis

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Objective: To explore the effects of manual mobilisation on the thoracic spine mobility, respiratory function and disease activity in patients with ankylosing spondylitis (AS).

Material/Methods: Two groups, each consisting of 12 patients, were treated with physiotherapy during inpatient therapy. One group was also treated with manual mobilisation of the thoracic spine for an average of 6 sessions, whereas the other group only received conventional physiotherapy. The primary outcome parameter was the mobility of the thoracic spine represented by the Ott's sign. The secondary outcome parameters were pain (VAS), respiratory function (differences of chest expansion and inspiratory vital capacity = IVC), disease activity (BASDAI), function index (BASFI), and patients global score (BAS-G).

Results: Mobility of the thoracic spine (Ott's sign) increased significantly within the group of manually mobilized patients compared to baseline (hospital admission) at each of the follow-up visits ($p_{\text{discharge}}=0.002$, $p_{\text{1month}}=0.002$, $p_{\text{3months}}=0.004$). No significant impact on thoracic spine mobility could be noted in the control group. Comparing both groups, manually mobilised patients had significantly improved mobility at the time of discharge from the hospital ($p=0.002$) as well as 1 month later ($p=0.009$). No difference could be shown after 3 months. An impact on reducing pain (VAS) was not achieved. Merely the group treated with manual mobilisation showed a tendency to pain reduction compared to baseline ($p_{\text{discharge}}=0.006$, $p_{\text{1month}}=0.005$, $p_{\text{3months}}=0.013$). Parameters of the respiratory function test increased during therapy with manual mobilisation. Compared to baseline chest expansion improved at all follow-up visits ($p_{\text{discharge}}=0.001$, $p_{\text{1month}}=0.026$, $p_{\text{3months}}=0.005$). The therapy also had a positive impact on the IVC at the time of discharge ($p=0.003$) and after 3 months ($p=0.008$). Regarding the scores (BASDAI, BASFI, BAS-G), a significant decrease was detected, thus reflecting a general improvement of the manually treated patients in terms of disease activity and function. Overall, the observed effects on most outcome parameters lasted until the follow-up visit at 1 month after discharge but were observed to 3 months later.

Conclusion: The results show that physiotherapy including manual mobilisation of the thoracic spine promotes mobility, improves respiratory function and has a positive influence on disease activity and physical function. Therefore, manual mobilisation of the spine should be included in the physical therapy concept of patients with AS. Since the effects appear to last for approximately 3 months, manual mobilisation should be repeated on a regular basis for optimal long-term outcome.

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Worrisome Prevalence of Waterpipe Smoking among Athletes

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Objective: The aim of this study was to evaluate prevalence of waterpipe smoking in athletes of Ardabil, a city in the northwest of Iran.

Material/Methods: The members of 16 sport associations (n=1647) selected randomly from 49 sport associations in this study. A cluster sampling technique was used. The sampling unit was sport association.

Results: Of the 1647 participants, 14.7% and 10.5% of athletes were habitual and recreational users respectively. 24.4% of non-smokers stated they were in the exposure of waterpipe smoke. The most habitual smokers were wrestlers (42.0%) whereas the most recreational users were swimmers (26.1%). Prevalence of waterpipe in futsal players were less than the others (non-smoker: 91.3% and habitual smoker: 0.0%). Just 36.8% of athletes believed waterpipe use affect their performance.

Conclusion: According the data knowledge of athletes about peril of this type of use is not sufficient and more of them would suffer from misunderstanding about hazards of waterpipe use. Knowledge promotion of athletes about waterpipe hazards and providing more recreational facilities may be a suitable manner to prevail this increasing phenomenon among athletes.

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Anthropometric and physiological parameters in young soccer players

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Objective: In young soccer players, body mass and cardiorespiratory fitness increase due to growth and/or training. Rapid qualitative and quantitative changes appear in young soccer players which contribute to better physical performance. Due to the obvious lack of descriptive data concerning the soccer players in the region, the aim of this study was to determine some anthropometric and physiological parameters in young soccer players regarding their age.

Material/Methods: A number of 152 male soccer players, concerning the age, was divided in 3 groups: I – 11.75±1.01 years (n=27); II – 14.58±0.49 years (n=47); and III – 16.63±0.48 years (n=78). The analyzed physiological parameters were: maximal oxygen uptake (VO₂max); red blood cell count (Rbc); and hemoglobin (Hb) value. For VO₂max the treadmill protocol by Bruce was used. The set of basic anthropometric parameters such as height, weight and body mass index (BMI) were analyzed.

Results: VO₂max increased from 37.53±6.78 ml/kg in the I group to 42.61±5.89 ml/kg in the II and 44.23±4.71 ml/kg in the III group (p<0.01). Regarding Rbc, there were no significant differences among the groups, but increased Hb level in older 2 groups was found (p<0.05). When compared from I to III group, a significant increase in height (p<0.001) and in weight (p<0.001) was noticed. BMI showed higher values with statistical significance of p<0.0005 in the II group (20.76±2.55 kg/m²) and p<0.0001 in the III group (22.45±2.32 kg/m²) compared to the I one.

Conclusion: From the obtained results we may conclude that VO₂max, Hb and BMI were significantly higher in the older players. Due to these findings, they may serve as useful parameters to establish a base data for young soccer player performance assessment.

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Effects of four exercise tests on one day on blood parameters with and without plasma volume correction

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Objective: Blood samples are often taken before and after exercise testing to investigate reactions to physical activity. However, dehydration during exercise decreases plasma volume and may bias the blood analyses taken after exercise [1]. Dill and Costill therefore introduced a correction factor to adjust the blood values to the decreased plasma volume based on changes in haematocrit (Hct) and haemoglobin (Hb) [2]. Nevertheless, this plasma volume correction (PVC) is not consistently validated in practice. Therefore, metabolic parameters and leucocytes with and without PVC were analysed in a study on four exercise tests within 8 hrs.

Material/Methods: 16 healthy subjects (8 females, 8 males; 27±5 years, 67±7 kg, 173±6 cm, $VO_{2\max}$ 54±11 ml/min/kg) performed four maximal incremental cycling tests with 1.5 h of passive recovery. Fluids and carbohydrates were substituted in a standardized manner after each test. Venous blood samples were taken before and immediately after each test. Hct, Hb, glucose, triglycerides and leucocytes were analysed. Blood values before the first test were used as reference. For all following values plasma volume correction (PVC) factors were calculated according to Dill and Costill: $PVC = Hb_{\text{before}} / Hb_{\text{after}} \times (100 - Hct_{\text{after}}) / (100 - Hct_{\text{before}})$ [2]. Changes over time (between and within tests) were analyzed by using a repeated measures ANOVA with Bonferroni post-hoc tests. Differences between the non-corrected and corrected values were compared by means of paired t-tests.

Results: Hb and Hct changed significantly from reference to the end of the first and the second test ($p < 0.05$) as well as within each test ($p < 0.05$). PVC led to changes in the outcome measures of -12.5 to +4.7% on average (range: -20.5 to 33.7%). Comparisons between the non-corrected and corrected values for glucose, triglycerides and leucocytes revealed statistically significant differences after the first and the second test ($p < 0.05$; Table 1). Non-corrected and corrected values were also significantly different at the beginning of the third test ($p < 0.05$) but not at the beginning of the second test. Thereafter, comparisons between non-corrected and corrected values showed inconsistent differences. Non-corrected and corrected blood values of test 1 and 2 are given in Table 1.

	Test 1 before	Test 1 after	Test 2 before	Test 2 after
Glucose non-corrected (mmol/l)	4.9 ± 0.8	6.5 ± 1.1	4.6 ± 0.4	6.1 ± 0.9
Glucose corrected (mmol/l)		5.7 ± 1.0	4.8 ± 0.5	5.5 ± 0.8
Triglycerides non-corrected (mmol/l)	1.1 ± 0.4	1.3 ± 0.5	1.2 ± 0.5	1.4 ± 0.5
Triglycerides corrected (mmol/l)		1.1 ± 0.5	1.2 ± 0.5	1.3 ± 0.5
Leucocytes non-corrected ($10^3/\text{mm}^3$)	5.7 ± 1.2	10.0 ± 2.0	7.3 ± 1.8	12.7 ± 2.4
Leucocytes corrected ($10^3/\text{mm}^3$)		8.7 ± 1.5	7.5 ± 2.1	11.4 ± 2.2

Table 1: Non-corrected and corrected blood values in test 1 and 2

Conclusion: This study showed that PVC is reasonable when analysing blood parameters of incremental cycling tests. Differences between non-corrected and corrected values appear relevant in glucose and leucocytes for both clinical and research questions. However, differences in triglycerides were irrelevantly small which might be attributable to the short duration of exercise.

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Interrelation between apolipoprotein e polymorphism with cognitive impairments in boxers with mild traumatic brain injuries

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Objective: To study the presence of a genetic predisposition to cognitive disorders based on the study of polymorphism of apolipoprotein E in patients with repeated mild traumatic brain injury (TBI).

Material/Methods: We examined 86 amateur boxers high skill level from age 18 to 32 years, playing a boxing classes ranging between 5 to 14 years. During a sports career boxers underwent TBI in the form knockdown and knockouts in number from 1 to 10. The control group included 30 people aged 18 to 25 years who had not a history transferred TBI, associated diseases of the nervous and cardiovascular systems. Was conducted neuropsychological research and genetic testing to determine the ApoE genotype and ApoE alleles.

Results: These neuropsychological tests shows a reduction of cognitive functions (mild cognitive impairment) in boxers with repeated mild TBI. The lowest test scores observed in patients with $\epsilon 4$ allele, and this difference is statistically reliable. In the control group rates of cognitive functions is slightly different from the norm. For frequency in both groups dominated allele $\epsilon 3$, a group of boxers often met alleles $\epsilon 2$ and $\epsilon 4$ compared with control group. In both groups dominated genotype $\epsilon 3\epsilon 3$, among a group of boxers often compared with the control group met genotypes $\epsilon 2\epsilon 3$ and $\epsilon 3\epsilon 4$. If the control group had never met the patients with genotype $\epsilon 4\epsilon 4$, then the group of boxers with repeated mild TBI had been four such cases, and found the boxer with the genotype $\epsilon 4\epsilon 4$ in which it was lowest neuropsychological tests.

Conclusion: Proved communication ApoE, including alleles $\epsilon 4$, with the development of cognitive disorders in boxers after deferred mild TBI. Genetic testing (determination ApoE $\epsilon 4$) allows to predict the possibility of developing complications from the side of the nervous system after transferred TBI.

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Magnetic resonance imaging in boxers with mild traumatic brain injury

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Objective: The study of changes in magnetic resonance imaging (MRI) brain in boxers who had a history of mild traumatic brain injury (TBI).

Material/Methods: 75 boxers high skill level from age 18 to 32 years, during which a sports career suffered repeated mild TBI conducted MRI brain. MRI brain was conducted on the «Magnetom Concerto» (Siemens, Germany). Boxers were divided into two groups (first – 44 athletes - candidate master of sports and master of sports, second - 31 athletes - master of sports of international class and honored master of sports). The number of boxing matches was from 45 to 260, the total number of TBI in the form of knockdown and knockout depending on the length of sports career ranged from 1 to 10. The control group comprised 30 people aged 18 to 30 years who had no history of TBI.

Results: According to MRI in boxers observed the following changes: expansion of cavum septum pellucidum, lateral ventricles, convexital spaces, cysts pineal gland, focus of gliosis traumatic genesis. MRI picture was normal in 56.8% athletes first group, 58,1% – second group and 86.8% – control group. There was no significant difference in the number of changes in MRI brain between athletes of different groups. However, if the boxers higher qualification (second group) often proved to be expanded cavum septum pellucidum, the boxers in the first group often identified expansion convexital spaces and lateral ventricles. Changes in MRI of the brain in boxers are manifestations of repeated mild TBI.

Conclusion: Comparison of MRI brain data with clinical data in boxers who had a history of repeated mild TBI will enable to choose the right therapy and recommends relevant sport mode to prevent the possible consequences of injury.

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Reliability of GOW heart rate monitor for heart rate variability measurement on exercise

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Objective: In this study we try to compare HRV data from a smart textile system for recording heart rate variability (GOW) (Weartech s.l; Spain) and an electrocardiogram machine (Cardiolab II plus) (Prucka engineering, TX, USA) commonly used in hospitals, during a continuous cycling test.

Material/Methods: 6 cardiology patients performed a cycling test at stable intensity, heart rate variability data was recorded by the two systems during the test. 3' RR segments were taken to compare time intervals between beats and HRV variables, using Bland-Altman analysis and intraclass correlation coefficient (ICC).

Results: Limits of agreement (LoA) were stable on RR intervals around 4 ms (Widdest LoA: -7.979 to 7.457; Tighest LoA: -4.351 to 3.553; Medium LoA, -4.39 to 4.90). HRV variables present ICC to ensure interchangeability of the methods in 5 of 7 variables. However RMSSD, HF and SD1 have large LoA.

Conclusion: Time intervals between heartbeats recorded by two metods were similars, LoA was about the difference on sampling times (1 ms for ECG and 4 ms for GOW). Correlation on HRV variables between the two methods is good as well as agreement. Except for RMSSD, HF and SD1, related to short-term variability, and sensitive to different sampling times. We conclude that both systems have excellent agreement in the register of RR intervals, but they are not so great for HRV variables related to the short time.

Please cite as: Alis R, Romagnoli M, Villar J, Aranda R, Basterra J, Guillen S. Reliability of GOW heart rate monitor for heart rate variability measurement on exercise. In: 7th EFSMA – European Congress of Sports Medicine, 3rd Central European Congress of Physical Medicine and Rehabilitation. Salzburg, 26.-29.10.2011. Düsseldorf: German Medical Science GMS Publishing House; 2011. Doc11esm147.
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Miscellaneous

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Acute achilles tendon rupture. The surgical question revisited. A narrative literature review

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Background: The primary aim of medical professionals should be to return patients following acute Achilles tendon ruptures (AATR), to fully functional pain-free activity in the shortest time possible, without increasing their susceptibility to re-rupture. Herein lays the controversy in the literature. The question remains whether surgery is always indicated, or can early, gradual rehabilitation in a functional boot, achieve the same or even better short and long term functional results.

Materials and Methods: A search was conducted including the Cochrane Musculoskeletal Injuries Group's specialized register, the Medline, PubMed, Embase and Cinahl (to July 2011). All prospective, level 1 and 2, randomized and quasi-randomized were reviewed. Subject-specific search was based on the terms "achilles tendon rupture", "surgery" and "conservative treatment". The search was restricted to studies about humans published in

Results: Fourteen trials involving 891 patients qualified for the analysis. Most trials showed good to excellent long-term results in the non-operated group, with no significantly higher re-rupture rate compared to the operative cases. Patients who were fitted post-operatively with a functional brace rather than a cast, tended to have shorter in-patient stay, fewer days off work, a quicker return to sporting activity, and better range of ankle motion and strength.

Conclusion: Contrary to previously reported studies, there exists good evidence that AATR may be successfully rehabilitated in a non-operative manner, without increasing susceptibility to re-rupture. This needs to be further investigated with larger sample sizes and further high-quality research protocols. What is more apparent is that early functional rehabilitation in an active brace post-surgery is more advantageous than the current protocol of immobilization. This is irrespective of whether surgery has occurred or not. Level of Evidence: 3

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Autologous matrix – Induced chondrogenesis (AMIC) for reconstruction of osteochondral lesions of the talus

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Objective: Surgical treatment of osteochondral lesions (OCL) of the talus remains a challenging task and frequently concerns young sportive patients. Several surgical techniques are available, e.g. autologous chondrocyte implantation (ACI), osteochondral autograft transfer system (OATS), matrix-induced autologous chondrocyte implantation (MACI). Good clinical results are reported; however, certain disadvantages remain (sacrificing healthy cartilage of another joint for grafts, the need for two-stage procedure, high costs). We present the clinical-radiological results of a novel one-step surgical technique for treatment of OCL of the talus. The autologous matrix-induced chondrogenesis (AMIC) – aided procedure combines debridement, spongiosa-plasty from the iliac crest and covering with a collagen I/III membrane.

Material/Methods: Twenty-five patients (8 female, 17 male; mean age 35 years [range 17–55 years]) were prospectively assessed in our outpatient clinic for OCL of the talus. Clinical examination included the American Orthopaedic Foot & Ankle Society (AOFAS) hindfoot scale and Visual Analogue Scale (VAS). Radiological imaging consisted of conventional radiographs and magnetic resonance imaging (MRI). For the evaluation of MRI scans the magnetic resonance observation of cartilage repair tissue (MOCART)-Score was used. Surgical procedure consisted of debridement of the OCL, spongiosa-plasty from the iliac crest and coverage with a commercially available I/III collagen membrane (Chondrogide, Geistlich, Switzerland). Clinical and radiological follow-up was performed after a minimum of 12 months postoperatively.

Results: Both function and pain could be improved largely and remained stable over a mean of 23.1 months postoperatively. The mean preoperative AOFAS hindfoot scale increased significantly from 60.2 points (SD ±15.9) pre-operatively to 89.6 points (SD 11.9) at final follow-up ($p < 0.01$). Pain measured with VAS improved significantly ($p < 0.01$) from 5.0 (SD 1.7) to 1.5 (SD 2.1). At follow-up conventional radiographs showed osseous integration of the graft in all cases. MRI showed intact cartilage covering of the lesions in all cases with a mean MOCART-Score of 62.0 points (SD 17.1).

Conclusion: Excellent clinical and radiological results were demonstrated after a mean follow-up of 23.1 months. The results are comparable or superior with the results of ACI, OATS and MACI. More, the AMIC-aided technique is a readily available, economically efficient, and a successful one step surgical procedure. Therefore it can be recommended as treatment option of osteochondral lesions of the talus.

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Bilateral lower limb amputation – Case report

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Objective: Had been to examine and emphasize the complexities of prosthetic rehabilitation in bilateral lower limb amputees.

Material/Methods: A patient V.V. (age 23) suffered traumatic bilateral lower limb amputation at work whereby his legs got caught in a machine. The accident took place on the 27th of October 2010. He was taken to emergency via emergency medical service. Unfortunately, it was necessary for the right lower extremity to be reamputated at the transfemoral level. As well, the left lower limb had to be reamputated at the high transtibial level. Even though the amputations were made at a higher level, skin defects were severe, and he was transferred to the plastic surgery clinic where skin transplantation was performed. The patient was treated at the plastic surgery clinic until the 12th of January when he was transferred to the Clinic for medical rehabilitation. Preprosthetic rehabilitation commenced during inpatient treatment at the surgical ward. At the time of admission at the clinic for medical rehabilitation, the patient underwent detailed clinical and psychological assessments. Upon routine ECG monitoring we discovered a right bundle branch block with left axis deviation, infrequently premature ventricular contractions were recorded as well. We consulted a cardiologist who allowed prosthetic rehabilitation. The right (transfemoral) residual limb was adequate for prosthetic fitting (Figure 1). There was breakdown of transplanted skin on the left (transtibial) residual limb (Figure 2). We had to wait for the healing process to conclude. Majority of the left residual limb was actually scar tissue. The length of the left residual limb was 13 cm (measured from medial tibial plateau). Despite physical therapy, flexion knee contracture was present (extension at left knee was -25°). Muscle strength of the upper and lower limbs was satisfactory. Prosthetic team concluded that prosthetic rehabilitation is possible and desirable. We decided to prescribe prosthesis for the right limb while healing process was ongoing on the left limb. We kept in mind the psychological issues concerning the delayed prosthetic prescription. On March 3rd, 2011 the above-knee prosthesis was delivered. Prosthetic fittings and training began. We achieved simple standing at the parallel bars. Knee contracture decreased and extension improved to -5°. Prosthetic fittings and training went without complications. Bellow-knee prosthesis was made following a consultation with the plastic surgeon. He agreed that the left residual limb was healed at its maximum restoration. Bellow-knee prosthesis was delivered on the 23rd of March 2011. Left bellow-knee residual limb was very fragile as was expected. We had to control the duration of the prosthetic wear. Careful inspection of the residual limb was made following prosthetic wear in order to prevent and detect skin breakdowns. Prosthetist was consulted several times. Socket correction was made in order to reduce pressure to vulnerable parts of the residual limb that were noticed. Fortunately, careful increase of prosthetic wear time together with socket corrections prevented additional damages to the residual limb (Figure 3).



Figure 1



Figure 2



Figure 3

Results: Three months following inpatient rehabilitation treatment the patient is able to walk with two lower limb prosthetics and the aid of two fore-arm crutches (Figure 4). He is capable of donning and doffing prosthesis independently. The patient is able to wear the prosthesis for up to 6-7hrs daily. He performs the transfers of wheelchair-bed and vice versa independently. He performed the Timed Up & Go test and scored 26 seconds. The distance ambulated during the two minute walk test was 65 m.

Conclusion: Prosthetic fitting and gait training for bilateral lower limb amputees is challenging especially in cases where complications occur. In order to achieve success, close cooperation of all rehabilitation team members throughout all phases of prosthetic processes is crucial.



Figure 4

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Biofeedback – basics and indications

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Objective: Biofeedback is known to be an effective psychophysiological method with the power to enhance self-competence in healthy people but also in patients suffering from different diseases. Aim of this presentation is to give a survey about the method and its indications from a scientific and a pragmatic point of view.

Material/Methods: For this survey, the method and data of medical and scientific literature are presented.

Manuals of producers, a recent textbook which is used at the Medical University of Vienna and at the Austrian Society for Biofeedback and Psychophysiology/ÖBFP [1], and a literature search using scientific medical databases (Medline/Pubmed, Embase) and other popular search engines were used.

Results: By using a biofeedback-apparatus, and with the help of a so called biofeedback-therapist, clients and patients are able to gain self-competence. The biofeedback system transforms bodily functions into electrical signals and so called parameters, and – by giving feedback of these biological signals – helps the patient to get an insight into his body and to gain awareness about them. With this (bio-)feedback, and with skills given by the biofeedback-therapist, the patient has then the possibility to change deficits in bodily functions according a treatment goal. Skin conductance level and skin conductance response, peripheral temperature, pulse, heart rate, heart rate variability, electromyography, EEG, hem-encephalography are typical parameters used.

Typical indications are stress management and hypertension, dependencies, different anxiety disorders, attention deficit disorder and children with other school problems, dysthymia and other forms of depression like the so called burnout syndrome, but also sport-psychological interventions (peak performance training, ...). Best scientific evidence has been reported for female and male incontinence, good evidence for pain syndromes like migraine and tension type headache, cervical syndrome, back pain and sciatica, temporomandibular disorder and bruxism, and abdominal pain in children. Furthermore, biofeedback has been reported to be able to reduce (but not to avoid) the use of medications and other medical interventions in some cases.

For all these indications, high or good scientific evidence has been reported within several medical high-impact journals, and furthermore, it has been demonstrated that the knowledge about useful and effective medical indications for the method of biofeedback seems to show a strong dependency on expertise – an expertise which is depending on 1) medical knowledge, and 2) knowledge about the method biofeedback itself. Nevertheless, regarding medical indications, biofeedback should only be seen as an effective additive part of scientific and evidence based state of the art treatment regimens. For medical purposes, biofeedback should not be used before medical diagnosis and/or treatment, and only after prescription of a physician!

Conclusion: Biofeedback has been reported to be effective in different non-medical and medical indications. For medical indications, biofeedback – if indicated – should be seen as an effective but additive tool within state of the art treatment regimens.

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Biofeedback for cancer patients

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Objective: Cancer has a very high clinical and socioeconomic relevance! Just at this moment, 300.000 Austrian people are suffering from cancer, and every year 15000-17000 inhabitants become new-diagnosed cancer patients. Due to fear of diagnosis, treatment, and of prognosis, cancer has an enormous impact not only on cancer patients, but also on their partners, family members, friends, and on treating medical staff.

Medical treatment of cancer is multimodal and so is rehabilitation. For rehabilitation purposes biofeedback is a method with the goal to enhance self-competence. This presentation aims to highlight the indications for the use of biofeedback in cancer patients.

Material/Methods: A survey about the clinical use of biofeedback in cancer patients is given. Interesting clinical cases are presented.

Results: In cancer patients, stress management, anxiety and depression are typical indications for the use of biofeedback (Case 1: Hyperventilation). Musculoskeletal pain syndromes, such as cervical syndrome, back pain and sciatica, are especially in cases of cancer entities which typically affect the skeleton very interesting indications regarding biofeedback-assisted exercise and –physiotherapy. Such a “Myo-feedback” by using surface EMG feedback helps the patient to find an insight into his body, and to gain self-competence when performing exercises (Case 2: Multiple Myeloma). Furthermore, biofeedback can be used as an additive tool for breathing exercises before and after thoracic surgery (Case 3: Lung cancer).

Besides their cancer, some patients are suffering from headache (migraine, tension type headache), where biofeedback can reduce pain and – due an enhancement of self-competence – help to reduce (necessary) medication (and side effects).

Female incontinence and male incontinence (after prostate cancer) are often seen in cancer patients. Incontinence is a very isolating symptom which decreases social participation. For incontinence, the use of biofeedback shows best scientific evidence available.

In dying patients suffering from terminal cancer, who are not able to communicate due somnolence, heart rate variability can help to find the right dosage of pain medication. In cases of very severe pain (so called break through pain), which is an enormous stress for these patients, heart rate variability decreases – and physicians are able optimize pain medication.

The modern and so called burnout syndrome is a very well known form of depression often affecting nursing partners and relatives, but also medical staff. In these cases, biofeedback can be an effective part of a multimodal treatment regimen.

Conclusion: In cancer patients, there are some interesting indications for the use of biofeedback, where it can help to improve functional health, activities and participation of patients. Nevertheless, also in cancer patients biofeedback should be seen as an effective but additive tool and performed only after prescription of a physician.

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Biofeedback-assisted mental techniques in elementary school – a pilot project

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Objective: Biofeedback (BFB) is known to be an effective method with the power to enhance self-competence. Mental training and techniques, such as relaxation and breathing exercises are known to help individuals to improve mental, cognitive, and physiological functions. Aim of the present pilot study was to investigate if BFB-assisted mental training with the intention to improve psychological (cognitive) and physiological functions (muscular tension) could be a feasible and well-accepted tool in elementary schools.

Material/Methods: To answer this question a pilot study in a 4th class of an elementary school (Mannswörth, Lower Austria) was conducted after approval of the ethics committee of the Medical University of Vienna. After written informed consent of their parents, 15 (of 17) pupils gave informed consent to participate.

Intervention: the participants were instructed in simple relaxation techniques by using biofeedback to facilitate their learning process (BFB-assisted mental training). These techniques included progressive muscular relaxation, breathing and pulse control techniques.

Assessment was performed before intervention (t1), after a time period of six weeks with active mental training and with regular, daily instructions by the teacher (t2), and after a further time period of six weeks where no further instructions were given (t3).

To investigate attention and concentration, the so called Aufmerksamkeits- und Konzentrationstest d2-R (Brickenkamp) and the so called Zahlenverbindungstest ZVT were used. To investigate stress management the so called Stressverarbeitungsbogen SVF-KJ (Janke, Erdmann) in the form for use in children (Hampel, Petermann, Dickow) was used. Muscular tension of trapezius muscle was observed by using surface electromyography (BFB-System Xpert 2000[®], Schuhfried Mödling).

Results: Although this study population started from better baseline-levels than the published (peer-)group-values, positive effects of the intervention have been observed:

d2-R: significant improvements from baseline/t1 to t2, and also from t2 to t3, indicating very stable effects of the intervention.

ZVT: significant improvement from baseline/t1 to t2, no significant differences between t2 and t3, indicating a ceiling effect.

SVF-KJ: did not significantly change over time.

Accompanying surface electromyography documented positive effects of mental techniques on muscular tension of trapezius muscle.

All pupils stated that the Biofeedback-system had helped them to learn of the mental techniques. Furthermore, they reported to have performed mental techniques with pleasure, and to have had benefit of having a tool in stressing situations like tests in school or like sporty competitions. Their teacher reported the BFB-assisted mental techniques to be easily to perform within the regular school plan. She also reported to have learnt a lot about their pupil's-and her own-stress management. Furthermore, she would suggest that other elementary schools also should integrate relaxation techniques into their repertoire.

Conclusion: Feasibility and acceptance of BFB-assisted mental techniques within an elementary school concept have been proven with help of this pilot study. The results of this study population indicate beneficial effects of BFB-assisted mental techniques in elementary school pupils. Nevertheless, further studies with higher sample sizes (maybe after roll-out of the study concept) should be performed to confirm these results.

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Conservative treatment options of carpal tunnel syndrome – „Update 2011“

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Objective: Purpose of this review was to update scientific literature about the effects of conservative treatment for carpal tunnel syndrome (CTS).

Material/Methods: Meta-analyses and original articles concerning this topic were included in this review. The databases Medline (1/1966-5/2011) and Embase (1/1989-5/2011) were used.

Results: Due to state of the art, CTS can be diagnosed by history taking, clinical examination, and electrophysiological investigation (Ortiz-Corredor et al., 2011, Cocito et al., 2006, Graham 2006). Conservative treatment options are: splinting (Werner 2005, Premoselli 2006, Ucan 2006, Brining 2007, Heebner 2008, Yagci 2009, De Angelis 2009, O'Connor 2009, Bionka 2010, Huisstede 2010); steroid injections (Armstrong 2004, Ucan 2006, Marshall 2009, Peters-Veluthamaningal 2010, Karadaş 2011); ultrasound treatment (Bakhtiar 2004, O'Connor 2009, Bionka 2010, Huisstede 2010); iontophoresis (Banta 1994). Other conservative treatment options are ergonomic computer-keyboards, manual therapy, dynamic magnetic fields, and yoga (Huisstede 2010, Marshall 2009). After surgical treatment, rehabilitation consists of different active and passive modalities. These can be physiotherapy and occupational therapy (to accelerate recovery) (Provinciali 2002), Laser-therapy and ultrasound (for treatment of scars), Co₂-baths and lymph-massage (for treatment of oedema and swelling). Postoperative pain is treated using pharmacological and physical-medical modalities (Derry 2009).

Conclusion: “State of the art regimen” in diagnosis and therapy seems to be important and useful in the treatment of patients with CTS. Nevertheless, further randomised controlled high quality clinical studies investigating the non-surgical treatment options of CTS are necessary in order to optimize conservative treatment of CTS.

Please cite as: Keilani M, Nuhr M, Crevenna R. Conservative treatment options of carpal tunnel syndrome – „Update 2011“. In: 7th EFSMA – European Congress of Sports Medicine, 3rd Central European Congress of Physical Medicine and Rehabilitation. Salzburg, 26.-29.10.2011. Düsseldorf: German Medical Science GMS Publishing House; 2011. Doc11esm154.

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Indirect magnetic resonance arthrography and 18F-FDG PET findings in adhesive capsulitis

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Objective: Pathophysiology of adhesive capsulitis is not well known and controversial. We compared findings of indirect magnetic resonance arthrography (iMRA) and 18F-FDG PET (PET) in patients with adhesive capsulitis and other shoulder disorders to investigate if inflammatory process contributes to pathophysiology of adhesive capsulitis.

Material/Methods: Among patients who visited outpatient clinic for shoulder pain, 28 shoulders had taken PET for medical screening. Patients were classified as typical adhesive capsulitis, early adhesive capsulitis and other shoulder pain which includes rotator cuff disorder, acute calcific tendinitis, and chronic calcific tendinitis group (Table 1, Table 2). Thickness of joint capsule in the axillary recess, area of hyposignal intensity around coracohumeral ligament, enhancement of axillary recess and rotator interval was measured in iMRA (Figure 1, Figure 2). Location, degree, and distribution of FDG uptake were identified, and maximum standardized uptake values (SUVmax) were acquired in PET. Differences of iMRA and PET findings between groups and correlation between clinical data, PET (Table 3), and iMRA were measured (Table 4).

	Duration of pain (month)	Limitation on AROM	Plain film	MRI findings	Impingement sign
Typical AC	> 1	Yes	-	-	-
Early AC	< 3	No	No calcification	Negative rotator cuff tear	-
Acute calcific tendinitis	Few days	-	Gartner type III	-	-
Chronic calcific tendinitis	> 1	-	Gartner type I or II	-	Positive
Rotator cuff tear	> 1	-	-	Positive rotator cuff tear	Positive

Table 1: Clinical classification criteria

	Typical FS (n=16)	Early FS (n=4)	Others (n=8)
Age(years)	58 (range 52-85)	54 (range 45-64)	52 (range 48-64)
Sex(M : F)	8 : 8	2 : 2	6 : 2
Duration from onset(month)			
Clinical diagnosis	5.3 (range 1-12)	2.9 (range 2.5-3)	3.6 (range 0.1-12)
PET	5 (range 4-13)	5 (range 3-9)	2 (range 0-6)
I-MRA	6.8 (range 1.5-13)	6.3 (range 3-9)	3.9 (range 0.1-11)

Table 2: Characteristics of subjects

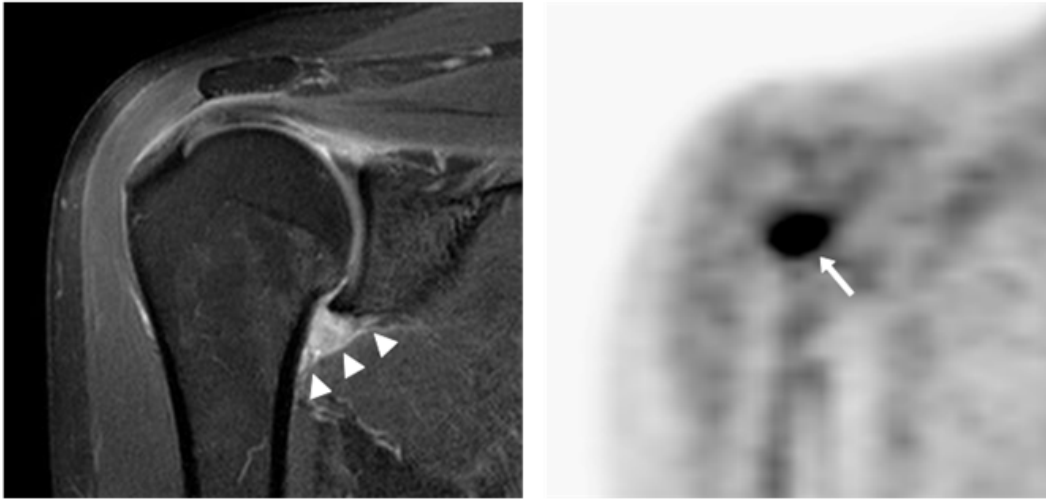


Figure 1: (A) Coronal T1WI of Indirect MR arthrography shows thick and enhanced axillary recess (arrow heads). (B) Coronal view of 18F-FDG PET scan shows focal increased uptake of FDG at corresponding area (arrow).

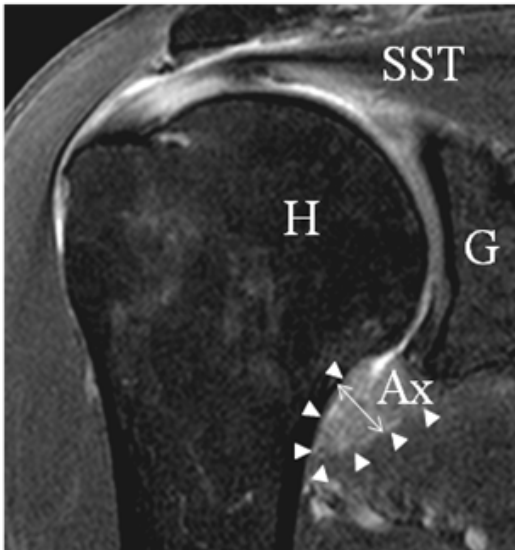


Figure 2: Measurement of thickness and enhancement of axillary recess. Arrow heads indicate hypertrophied and enhanced axillary recess, arrow indicates partial tear of supraspinatus tendon. Note the enhancement of the joint capsule and synovial membrane in the axillary recess (score 4), measured perpendicular to adjacent cortex in right FS shoulder (arrow). Ax: axillary recess, G: glenoid fossa, H: humeral head, SST: supraspinatus tendon

Criterion	Typical FS (n=16)		Early FS (n=4)		Others (n=8)	
	Mean	SD	Mean	SD	Mean	SD
Rotator interval (SUVmax)	2.4*	1.22	3.1†	0.29	1.7	0.36
Axillary recess (SUVmax)	3.2**	1.31	2.2	1.10	1.5	0.42
Highevalue (SUVmax)	3.5**	1.16	3.3†	0.36	1.7	0.31

*: comparison between typical FS and others (p<0.05),

** comparison between typical FS and others (p<0.001),

†: comparison between early FS and others (p< 0.001)

Table 3: Comparison of criteria – PET.

Criterion	Typical FS (n=9)		Early FS (n=3)		Others (n=7)	
	Mean	SD	Mean	SD	Mean	SD
Area of hyposignal intensity of CHL(score)	2.9**	0.60	2.7†	0.58	0.7	0.49
Enhancement of RI(score)	2.8*	0.67	2.7†	0.58	0.9	1.07
Enhancement of AR(score)	3.3**	0.50	3.0†	0.00	0.4	1.13
Width of AR mid(mm)	10.8*	2.66	7.9	2.1	7.2	0.94
max(mm)	12.0*	1.82	9.9	2.46	7.7	2.07

*: comparison between typical FS and others ($p < 0.05$),

** comparison between typical FS and others ($p < 0.001$),

†: comparison between early FS and others ($p < 0.05$), FS: Frozen shoulder

Table 4: Comparison of criteria – iMRA

Results: Sixteen shoulders were classified as typical adhesive capsulitis, four shoulders were classified as the early adhesive capsulitis (Figure 3) and 8 were classified as other shoulder pain group. In iMRA findings, there were significant differences between adhesive capsulitis group (typical and early) and other shoulder pain group in most of parameters. And there were no differences between typical and early adhesive capsulitis group. In PET findings, there were significant differences between adhesive capsulitis and other shoulder pain group in SUVmax of AR and RI. And there were no differences between typical and early adhesive capsulitis group. SUVmax were increased until 5th month from onset of pain, and then started to decrease.

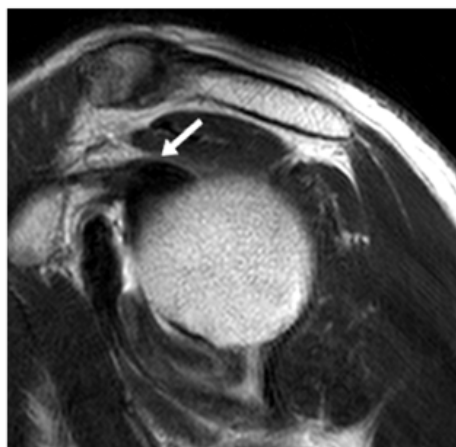


Figure 3: Distribution of hyposignal intensity around CHL was 51-75% to entire CHL (arrow) in a patient with adhesive capsulitis (score 3).

Conclusion: This study confirms that the pathophysiology of adhesive capsulitis is the inflammation of rotator interval and axillary recess and the inflammation naturally tend to decline. In addition, PET may offer an alternative diagnostic tool for early adhesive capsulitis, and have an advantage for the quantitative measurement of inflammation.

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Medical study of non-invasive cerebrovascular autoregulation real-time monitoring on professional weightlifters and bodybuilders

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Objective: A new ultrasonic monitor (Vittamed) can be used for non-invasive and real-time monitoring of dynamics of cerebrovascular autoregulation (CA) on sportsmen during their training. The objective of sportsmen medical study was to obtain the real time data for better understanding of CA dynamics under physical load conditions by performing CA monitoring on healthy amateur and professional sportsmen at rest and after physical exercises.

Material/Methods: Innovative fully noninvasive real-time CA monitoring device (Figure 1) is based on the transmission of short ultrasonic pulses through the human head and dynamic measurements of the time-of-flight of ultrasonic pulses. The convenient mechanical frame is mounted on sportsman head in order to fix ultrasonic transducers to proper position (Figure 2). The time-of-flight depends on the acoustic properties of pulsating blood flow in small brain vessels and arterioles and reflects cerebral blood flow autoregulation. It is proved, that this non-invasive technology could be applied for continuous monitoring of CA by using permanent intracranial waves analysis methodology [1].



Figure 1: Non-invasive monitor for continuous real time monitoring of cerebrovascular autoregulation



Figure 2: The mechanical frame mounted on the sportsman head in order to fix ultrasonic transducers for transmitting ultrasonic signal through brain parenchyma

Results: CA was monitored on 20 healthy amateur sportsmen, 10 professional weightlifters and 10 professional bodybuilders in supine position at rest (10 min) and after physical exercises (15 min). During the exercises the sportsmen lifted 50 kg weight and the weight of 80 % of individual maximum in a dynamic (weight lifting 10 times) and a static (weight holding 30 sec.) manner. It was observed that the mean value of CA reactivity indexes were almost the same on amateur and professional sportsmen at rest. Immediately after the physical exercise the CA reactivity index shows temporal improvement of the CA status for almost all sportsmen. But in the range of 7–10 min after the physical exercises an unstable CA status was observed for the professional bodybuilders. Such variation can appear due to the bodybuilders' muscle mass. They get tired more quickly to quietly hold hands on their pectoral than amateur sportsmen or weightlifters. A temporally applied static physical load increases the heart rate, improves blood supply to the brain and normalizes the CA status as well. Additionally, the estimation of the influence of the body position on CA was monitored on professional sportsmen. It was detected that for a sportsman in the supine position with lowered down legs, some instability of the CA status may be observed and this instability is related to the changes in the arterial blood pressure.

Conclusion: The Vittamed non-invasive monitor provides real-time CA monitoring data during the sportsmen's training and can be used for optimization of the sportsmen training methodology. The provided information about the CA dynamics in sportsmen might be useful for better understanding of healthy human brain physiology and for exploring the limits of human physical capabilities.

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Mondor's disease in a healthy handball athlete

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Objective: First described by Henri Mondor in 1939, this condition is a rare entity characterized by a sclerosing thrombophlebitis of the subcutaneous veins of the anterior chest and abdomen wall.

Material/Methods: A 25 years old handball athlete was suffered from a sudden appearance of a subcutaneous cord and superficial pain after her trainee. There was linear swelling, redness and tenderness of a limited area of their anterior chest and abdomen wall. It was accompanied by tension and skin retraction. Management of the patient included warm compresses, pain relievers and local NSAID for 2 weeks. She abstained from training and competition for 3 weeks

Results: Progressive regression of clinical and painful symptoms were present in the following 3 weeks. The athlete don't underwent any additional therapy. She was examined further with mamography and breast MRI for exclusion the presence of systemic disorders, especially breast cancer.

Conclusion: Mondor's disease must be included in differential diagnosis of any subcutaneous linear swellind and tenderness of the anterior chest and abdomen wall. Conservative treatment constitutes its treatment.

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Muscle strength in patients suffering from Glioblastoma

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Objective: Glioblastoma (GBM) is a primary brain tumour with frequently poor prognosis. Nevertheless, surgery, chemotherapy, and radiation are proven state of the art treatment options which are intended to improve quality of life and survival time of GBM-patients. Accompanying treatment normally includes the use of corticosteroids and of anticonvulsive medication. Especially these necessary “accompanying” medications can lead to myopathy with loss of muscle mass especially of thighs. Besides this, corticosteroids also lead to iatrogenic osteoporosis with the risk of fractures. In combination with the iatrogenic muscle weakness, deficits in coordination due to consequences of the brain tumour himself increase the risk of falls due to gait disturbances with the consequence of fractures and possible early dependency from others help. Therefore, the management of muscular strength seems to be of one goal of high importance in the group of GBM-patients to help them to maintain longer independency.

Aim of this pilot study was to describe muscle strength in GBM-patients and discuss rehabilitative options for these patients.

Material/Methods: Patients: after approval of the ethics committee (Medical University of Vienna), and after written informed consent, 37 patients (m:f=31:6, 54±12a, BMI=26±3 kg/m²) were included in this cross-sectional observation.

Assessment of muscular strength: Hand grip strength was measured by using a Jamar© hand-dynamometer. Isokinetic testing of knee extension and flexion strength was performed by using a Biodex3© -dynamometer – two sets of five reciprocal isokinetic knee extension and flexion movements with an angular speed of 60°/sec were assessed.

Parts of this ongoing study have been published as master thesis at the Medical University of Vienna.

Results: During and after strength testing none adverse effects have been observed.

Handgrip strength: right hand=74±40 lbs; left hand=70±41 lbs.

Isokinetic testing of thigh muscles (peak torque/kg): right knee extensor muscles=159±52 Nm/kg; left knee extensor muscles=147±56 Nm/kg; right knee flexor muscles=75±38 Nm/kg, left knee flexor muscles=69±37 Nm/kg.

Conclusion: As expected, in this cross-sectional pilot study, GBM-patients showed low handgrip strength and extremely low isokinetic muscular strength of knee extensors and flexors in comparison to age and sex related expected values of the healthy population. However, the observed deficits in muscular strength seem to be more related to thigh muscles than to handgrip. For this patient group, physical medical treatment options should include active exercise to improve muscle strength, gait training, and fall prevention. Furthermore, neuromuscular electrical stimulation can be added in cases of GBM-patients with negative seizure history or sufficiently treated epilepsy. To our opinion, these rehabilitation options should be individually planned (within a tumour board for cancer rehabilitation) and to begin as early as possible.

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Physical therapy after flexor tendon and nerve repair of the hand in zone IV

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Objective: The deep laceration of the flexor tendons is usually accompanied with laceration of the peripheral nerves due to the anatomical proximity. Since the combined injuries of flexor tendon and peripheral nerve of the hand are very complex, the application of early mobilization and sensory reeducation after nerve and tendon repair is necessary to restore full motor and sensitive function. Objective of this research is to show the efficiency of early mobilization, advantages of application of sensory reeducation protocols, to present assessment methods after the repair of tendon flexors and peripheral nerves of the hand in zone IV.

Material/Methods: During the period 2006–2010, in our clinic, twenty five patients with microsurgical repair of combined flexor tendon and peripheral nerve injuries of the hand in zone IV were reviewed. The evaluation was performed at 3, 6, 12 months. Controlled early passive mobilization was applied during the first week after repair, while sensory reeducation was applied when the protective sensibility was regained. The total active motion, grip strength, reinnervation and tactile gnosis were evaluated.

Results: According to TAM classification the results of amplitude of movement are: excellent in 8.1%, good in 70.3%, and fair in 21.6% patients and none of the cases is in poor category. Significant improvement has been observed in grip strength. The reinnervation was evaluated using Semmes-Weinsteins monofilaments, and the results were presented according to Rosen B. The mean value of Semmes-Weinsteins for median nerve was 0.69 while for ulnar nerve was 0.68. Two point discrimination > 15mm was in 92% or 23 patients, 11–15 mm in 8% or 2 patients.

Conclusion: Controlled early passive mobilization, as much as is allowed by the length of the repaired tendon and nerve, is very important to prevent tendon and nerve adhesions. Application of the post-operative rehabilitation protocols including sensory reinnervation protocols, are required in order to regain its motor and sensitive function.

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Physical therapy and splinting after flexor tendon repair in zone II

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Objective: Early Physical therapy and splinting after flexor tendon repair in zone II is very important to improve tendon healing, increase tensile strength, decrease adhesion formation, early return of function and less stiffness and deformity.

Material/Methods: This study reports the results of physical therapy and splinting which was applied to 75 patients with 76 digits after flexor tendon repair in zone II, treated in Clinic of Physical Therapy and Rehabilitation, Pristine-Kosovo. Physical therapy and splinting started the first day after surgery and have lasts until week 12.

Results: Patients were evaluated with regarding to the range of motion and grip strength. The assessments were done at the 8, 10, 12 weeks and the final assessment were done after 6 months. Range of motion according to the Strickland classification were excellent in 21.1%, good in 44.7%, fair in 11.8% and poor in 22.4%. Grip strength were good in 63.8%.

Conclusion: Results of this study shows that using a physical therapy and splinting achieve good results in range of motion, muscle force and early return of function of the hand.

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Pisotriquetral Arthrodesis for Pisotriquetral Instability: Case Report

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Objective: Although the pisotriquetral Joint (PTJ) is small, it is an anatomically complex structure. The pisiform serves as attachment for several muscles and ligaments, including the flexor carpi ulnaris, abductor digiti minimi, pisometacarpal ligament, pisohamate ligament, and ulnar collateral ligament. It is well recognized that instability of the PTJ ultimately leads to pisotriquetral arthrosis associated with chronic ulnar-sided wrist pain.

Material/Methods: A 22-year-old professional downhill mountain bike rider developed unilateral increasing instability of the PTJ of the left wrist. The history of the injury revealed no single high-impact trauma to the PTJ. Nevertheless, the wrist was exposed to chronic force in extension according to the position when downhill mountain biking. Computed tomography scans in neutral position revealed correct alignment of the PTJ. In extension, however, ulnar luxation of the pisiform was seen on computed tomography scan. The patient elected to proceed with pisotriquetral arthrodesis, which was performed 10 weeks after the initial incident.

Results: To preserve full function of the pisiform bone, we performed pisotriquetral arthrodesis. Under both direct and fluoroscopic vision, we placed a 1.0-mm guide wire through the pisiform into the triquetrum. A 3.0-mm cannulated Herbert screw was then placed across the PTJ after drilling and tapping with cannulated instruments. The wrist was splinted until suture removal at 14 days, and a removable wrist splint was applied for another 6 weeks.

Conclusion: Ten months after the splint was removed, the patient was free of symptoms and returned to professional downhill mountain biking without limitations. This uncommon method seems to be a feasible treatment strategy and can be recommended in high-demand patients.

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Possibility of physical therapy after luxation/subluxation of a temporomandibular joint – Case report

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Objective: The aim of this study was to point out the complex structure of temporomandibular joint, to show one of the causes of temporomandibular dysfunction as well as the possibilities and outcome of the physical therapy in reducing subjective symptoms and improving the functional status. Temporomandibular dysfunction includes a series of pathological conditions with similar symptoms which in their basis have dysfunction of temporomandibular joint. One of the most often listed TMD classifications in literature is the one of Oksen J.P, accepted by the American Academy of Orofacial Pain. The TMJ is a small, but complex joint whose function is of vital importance. The injuries of the joint are caused by a direct impact of force which is, through the joint, transferred to the base of skull. Concerning the fact that the mandible is the strongest facial bone, the most common type of injury is a one sided luxation of the TM joint. The joint consists of: convex joint body – head of mandible, concave joint bodytemporal bone socket, and in between these two joint bodies – the articular disc. The joint capsule is reinforced with ligaments (lateral, sphenomandibular, stylomandibular ligaments). The range of movement in this joint includes opening and closing of mouth and rotations. In the act of opening the mouth, the force of gravity takes part, as well as platysma muscle, digastric muscle and lateral pterygoid muscle.

Material/Methods: Case study: Patient XX, 54 years old, suffered a subluxation of TM joint during a chiropractic class where he/she took part as a demonstration model. Clinical picture was dramatic (strong pain in TM joint, local swelling, hypersalivation, lowered angle of the mouth, movement restriction). Apart from clinical findings, in diagnosis we used X-ray, OPT, CT/MR scan of what we gain insight into the joint and bone structure and numerous soft tissue structures of articular region. After diagnosis, treatment implied the reposition, immobilization of joint for 48 hours, pureed food through a straw and application of physical proceedings afterwards (cryotherapy, laser therapy, sonophoresis, electrotherapy-electrophoresis with medicaments, magnetic therapy, IR light) and local infiltration of glucocorticoids. By reducing local swelling and signs of inflammation in order to reduce the pain we conducted acupuncture as well. During the 6 months period of treatment we observed the following parameters: pain by VAS (0-10cm) patient subjective evaluation method for 2 weeks. Size of maximal mouth opening was measured in cm (the distance between the upper and lower teeth) for 4 weeks. The quality of chewing was observed every 4 weeks at the control examination of the patient by the answers to the given questions, the ability of chewing the soft, semisolid and solid food (answers: without difficulties -1, with partial difficulties -2, impossible to chew -3)

Results: After 6 months of treatment pain in the joint at the phase of rest was significantly reduced ($p < 0,025$), there was no statistically significant reduction in pain when chewing, the size of maximal mouth opening was increased ($p < 0.002$), while analyzing the answers to the solid food chewing ability was no statistically significant improvement.

Conclusion: The complex structure of TM joint, including its vital function (food chewing) requires timely diagnosis, reposition measures, resting phase, gradual transition from pureed food on a solid while results of applied physical therapy have an important place in reducing pain and increasing joint mobility

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Pre and post surgical physical therapy in athletes with knee injuries

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Objective: The delay, deliberately or not, of the surgery in anterior cruciate ligament reconstruction determines a supplementary diminution of the muscular strength, of the mobility and generally, of the knee functionality contributing to the complication of the post operative rehabilitation progress. The study is aiming to demonstrate the concrete highlighting of the efficiency of applying a pre-operative physiotherapy program in late plastic surgeries of anterior cruciate ligament.

Material/Methods: We conducted a prospective study on 24 patients all performance athlete (mean age 23.3±3.1 years) who, subsequent to sport related injuries, were diagnosed (clinically, arthroscopic and/or visually – by M.R.I.) with partial or total anterior cruciate ligament rupture and were submitted to, within a period of 3–6 weeks after the injury, to a surgical intervention involving ligamentoplasty through the usage of an autogenous patellar tendon graft. The objectives of the specific preoperative kinetic program: controlling the inflammatory process: edema and pain management, restore range of motion, improve flexibility, increase strength, promote gait/walking, and increase function. Patients were divided in two groups of 12 patients: the study group benefited a specific preoperative kinetic program, while the witness group, out of various reasons (fear of pain, of the possible negative reactions upon the injured knee, mental state inappropriate), was not subjected to such a program. All patients were evaluated at the inclusion and after 7 months with a universal goniometer for the range of motion (knee flexion) and manual muscle testing (quadriceps femoris muscle, hamstrings muscle, and triceps surae muscle). To compare the data at baseline and at the end of the study we used the paired t test.

Results: Results are presented as mean±standard deviation. The evaluation of the athletes included in study group at the end showed an statistically significant increase in recovery of full range of motion (42,5±4,52 to 138,6±3,58 p=0.003) compared with the witness group. The results of the manual muscle testing also showed statistically significant increase in muscle strength for the study group: for quadriceps femoris muscle (2,41±0,51 to 5±0, p=0.0001), hamstrings muscle (2,40 ±0,51 to 5±0,50, p=0.0001), triceps surae muscle (2,33±0,49 to 5±0, p=0.0006).

Conclusion: The results of our study show the efficiency of applying a preoperative physiotherapy program to the athletes included in study group compared with the witness group athletes. The necessary time to go back into specific activity, which is based on subjective and objective criteria concerning the rehabilitation of the injured knee, as well as the usefulness of employing this type of recovery program for this type of surgery and for other orthopedic interventions (meniscus repair, meniscectomy). Physical therapy performed following surgery can help decrease the amount of time required to recovery for the athlete and promote the total functional gain and to return in the sport activity at the high level of physical performance. The athletes were able also to return to the sport quickly compared with the athletes included in witness group.

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Reconstruction of a large osteochondral lesion of the distal tibia with an Iliac Crest Graft and Autologous Matrix Induced Chondrogenesis (AMIC) – Case report

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Objective: Joint preserving treatment of osteochondral lesions (OCL) in younger sportive patients remains a big challenge for the orthopaedic surgeon. Isolated OCL of the distal tibia are rare and no clear treatment guidelines have been established. We developed a novel surgical treatment method using a stable bone plug harvested from the iliac crest combined with the implantation of a collagen I/III membrane. With this case we report the successful use of Autologous Matrix Induced Chondrogenesis (AMIC) aided reconstruction for OCL of the distal tibia.

Material/Methods: Preoperative management: A 29 year old male patient (sports teacher) complained about persisting pain and recurrent swelling of the left ankle joint 12 months after an ankle sprain. Sport activities were no longer possible. The painful ankle presented a distinct anteroposterior and inversion instability. Flatfoot deformity was present. Pain measured by the Visual Analogue Scale (VAS) was 4. The AOFAS Ankle-Hindfoot Scale was poor with 61 points. Imaging revealed edema of the subchondral bone and thinning of the cartilage above the osseous defect at the lateral distal tibia. Surgical course: The osteochondral defect was debrided followed by microfracturing of the underlying sclerotic bone. A cancellous bone plug was harvested from the iliac crest and impacted into the defect. A collagen membrane (Chondro-Gide, Geistlich, Wolhusen, Switzerland) was cut to match the chondral defect and fixed on the defect with fibrin glue. The medial ankle ligament complex was repaired directly anatomically as described by Karlsson and al. Finally, a calcaneus lengthening osteotomy was performed through the sinus tarsi, to correct the hindfoot valgus.

Results: At 12 and 36 months the patient had a VAS of 0 points and returned to a full time job. AOFAS hindfoot score increased from 61 points preoperatively to 100 points after 12 months and remained 100 points after 36 months. At 12 months he returned to full sports. Conventional radiographs at one year showed successful osseous integration of the plug, osseous consolidation of the calcaneal osteotomy and a nearly anatomic shape of the tibial joint line. MRI dGEMRIC scans at 36 months showed intact cartilage layer over the defect and glycosaminoglycan content indicating fibrous cartilage repair.

Conclusion: This case demonstrates AMIC aided reconstruction of large osteochondral lesions of distal tibia to be a promising treatment method. Future research needs to compare this new technique to other available treatment methods in terms of radiological, clinical and histological outcome. Early return to full sporting activity after treatment with AMIC technique is possible.

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Referent weight-bearing distribution patterns in treadmill jogging: an original research study

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Introduction: Athletes and sports enthusiasts, who have sustained certain lower limb pathological conditions as well as have undergone certain surgical procedures, are commonly limited in their weight bearing ability. Accurate and reliable normative treadmill running must be identified in order for treating physicians to advise regarding the gradual return to weight-bearing activities.

Objectives: To identify the average percentage body weight (APBW) values and weight-bearing distribution patterns (WBPD) during treadmill jogging in a referent adult population.

Design & Methods: A gait analysis system (SmartStep™) was utilized to measure the above parameters. 40 asymptomatic individuals (median age, 34y; range, 19-72 y) participated in the study. Each subject ran for a 15 second time period on a treadmill (Technogym™ "run excite 700"), at a constant speed set of 8.5 km/hr.

Results: On the entire foot, the APBW value was 136.46% (SD=16.49), the hind foot, 34.30% (SD=15.52) and 110.85% (SD = 20.61) for the fore foot. The average time spent in the swing phase was 36.47% (SD= 2.61) and 63.53% (SD=2.61) in the stance phase. The group average cadence value was 109.54 steps/min (SD=19.86).

Conclusions: These results may now form the basis of rehabilitation protocols, which aim to return athletes to treadmill jogging within their weight-bearing limitations following certain lower limb orthopedic conditions as well as in sports injury rehabilitation.

Clinical relevance: To provide medical personnel with normative data in order to assist with decision making concerning weight-bearing abilities following *certain lower limb pathological conditions and following certain surgical procedures*.

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Rehabilitation outcome following war-related below-knee amputation in Kosovo: observational retrospective study

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Objective: The aim of this study was to analyze the influence of predictors that affect the rehabilitation outcome of war-related below-knee amputees.

Material/Methods: This is observational, retrospective study. We reviewed the records of 69 war-related below-knee amputees, rehabilitated in Ortho-Prosthetic Center-prosthetic rehabilitation unit in University Clinical Center of Kosovo – Inpatient Ward. For the assessment of rehabilitation outcome respectively of possibilities for ambulating with prosthesis, we established three grades of rehabilitation.

Results: The majority of patients with below-knee amputations have achieved the first grade of rehabilitation 59.4%. According to multiple logical analyses of regression, the variables that significantly influenced the first grade of rehabilitation were the age of the patients and posttraumatic stress disorder (PTSD). With the increasing of patient's age in one year, the probability of achieving the first grade of rehabilitation decreased to 0.93 (OR=0.93, 95% CI 0.89 to 0.98, $p<0.007$). The developing of PTSD in amputees has decreased the probability of achieving the first grade of rehabilitation to 11 (OR=11.25, 95% CI 1.89 to 66.9, $p<0.008$).

Conclusion: The successful outcome of rehabilitation is predicted by younger age, and without the presence of PTSD.

Key words: War-related below-knee amputations; rehabilitation outcome; age; PTSD; stump length; co-morbidity; injuries in other extremities.

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Sagittal spino-pelvic alignment relative to the spine-pelvic motion in young males

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Objective: To determine spinal and pelvic positional parameters in upright stance and relate them to the spine and pelvis mobility during bending forward in healthy males.

Material/Methods: Twenty two physically fit males participated in the study, the averages and SD of age, height, and body mass index were [23.76 (SD 3.99) years, 175(SD 0.06) cm, 23.52(SD 2.12) BMI]. Lumbar curvature (LC) and sacral inclination (SI), in relaxed upright stance, and differential lumbar-pelvic motion during forward bending were calculated in the sagittal plane with an electro-goniometer. This consists of two receivers located at L1 and S1 spinous processes, which detected the magnetic pulses emitted by a source. Lumbar curvature is the angle formed between L1 and S1 receivers. Sacral inclination is the angle given by S1-receiver in the sagittal plane [1], [2] which reflects the spatial orientation of the pelvis. The averages and standard deviations were calculated for: the degrees of the LC and SI in relaxed upright stance, the range of spine (S), pelvis (P) motion, and the S/P-ratio during the entire movement of bending forward. Individuals were group according to whether moving either more in pelvis than spine (group 1) or in spine than pelvis (group 2). Twelve subjects with S/P-ratios<1 were assigned to group 1 and ten with S/P-ratios>1 were assigned to group 2

Results: The average S/P-ratio was significantly greater in group 2 (1.4, SD 0.4) than group 1 (0.7, SD 0.2)] ($p<.001$). In relaxed upright stance: the degrees of lumbar curvature and sacral inclination were significantly greater in group 2 (LC: 38.5°, SD 12.9°; SI: 19.8°, SD 12.9°) than group 1 (LC: 26.2°, SD 6.8°; SI 7.9°, SD 7.6°) ($p<.001$); and strong and significant correlation ($p<.001$) was found between lumbar curvature and sacral inclination for each of the two groups (group 1 $r=.77$, group 2 $r=.97$). Lumbar curvature in upright stance further showed a very strong and significant correlation with the range of pelvis flexion for group 1 ($r=.79$, $p<.05$), and with the range of spine flexion for group 2 ($r=.87$, $p<.01$); the regression models have a R2 values of 0.63 for Group 1 and 0.76 for Group 2.

Conclusion: In standing upright the current data showed that as lordosis decreases, the sacral inclination decreases. The males who tended to stand with a more vertical sacrum, and a flatter low back moved more in pelvis than spine (group 1). The males who tended to stand with a more horizontal sacrum, and a lordotic low back moved more in spine than pelvis (group 2). 63% of the pelvis mobility in the group 1 and 76% of the spine mobility in the group 2 are explainable by the lumbar curvature in upright stance.

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Self-reported physical activity and performance in long-term heart transplant recipients – preliminary data

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Objective: Heart transplantation is state of the art treatment in severe heart failure. In the scientific medical literature, there is clear evidence that regular physical activity such as aerobic exercise may increase survival and quality of life in heart transplant recipients. Furthermore, there is a clear increase in long-time survival of heart transplant recipients due to optimized treatment strategies. Therefore, aim of the present pilot-study was to describe self-reported physical activity and performance (fitness) in Austrian long-term heart transplant recipients.

Material/Methods: Setting: After approval of the ethics committee (Medical University of Vienna), the members of the Austrian Association of Heart- and Lung- transplanted people (Verband der Herz- und Lungen-Transplantierten) have been invited to participate the present cross-sectional pilot study, with the aim to get information about their self-reported physical activity and physical performance (reported walking distance and ability to climb stairs).

Study population: After written informed consent, 25 members [66±7 years; m:f=20:5, mean time since transplantation was 10±7 years with a range from 2 to 26 years; BMI=27±5] of this specific Association have been included, yet.

Assessment: By using the method of a structured telephone interview, these patients were asked different conditions (demographic data, socioeconomic status, and clinical data). Furthermore, they were asked if they have participated the rehabilitation program for heart transplant recipients of the outpatient rehabilitation centre from Department of PM&R of the Medical University of Vienna/General Hospital of Vienna.

Parts of this ongoing study have been published as master thesis at the Medical University of Vienna.

Results: 84% (n=21) of the included patients (n=25) stated to perform regular (7±5 hours/week) physical activity. 44% (n=11) of the included patients answered to have participated in the described rehabilitation program at the outpatient rehabilitation clinic. For physically active patients who were not able to participate in this program, the most important factor of non-participation was the amount of the distance between their domicile and the outpatient rehabilitation clinic. Patients, who reported to have performed regular physical activity such as aerobic exercise at their home and/or at the outpatient rehabilitation clinic, reported significant better values for physical performance (p=0.001 walking distance, p=0.008 stair climbing) than patients who reported to be inactive.

Conclusion: As expected, preliminary data of the present observation in Austrian long-term heart transplant recipients indicate that self-reported physical activity seems to go hand in hand with self-reported physical performance (reported walking distance and reported ability to climb stairs), especially depending on the quality and amount of regular physical activity, and on health status after transplantation (which can influence participation in rehabilitation programs). Inclusion of further participants in this ongoing observation will increase the power of these preliminary results.

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Stress fractures in the Swiss Orienteering and Triathlon National Teams – Analysis of frequency, localisation, and risk factors

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Objective: Stress fractures in high level endurance athletes is frequent and occur 8% to 25% per year. The importance of several intrinsic and extrinsic risk factors in high level endurance athletes is very little understood (e.g. nutrition, orthopaedics, endocrinology, gynecology, physiology of training).

Material/Methods: Retrospective data analysis of all National Team Athletes in Orienteering and Triathlon regarding frequency, localisation, and risk factors. In total, 200 patients were included (Orienteering; men 89, women 67; Triathlon; men 29, women 15). Data collection included A) analysis of the medical documents, B) questionnaire, C) personal interview if necessary.

Results: In total, 36 athletes suffered from one or more stress fractures during their active career (18%); OL women 22%, men 13%; Triathlon men 29, women 15. Therefrom, 44% were found at the lower leg, 33% at the forefoot; and 11% for the mid-/hindfoot and the pelvis and hip respectively. Stress fractures occur in 50% between the age of 19 and 21. A significantly elevated ratio of primary and secondary amenorrhoe were found. 38% of these young and very sports active patients showed already signs of osteopenia and osteoporosis. Orthopaedic-biomechanical risk factors are found approximately in one third of all athletes. Future results will be presented at the conference.

Conclusion: Stressfractures are frequent in endurance sport, and are often associated with symptoms of the female athlete triad. Age and localisation of lesions showed typical changes. The understanding and the meaning of risk factors is important, in order to identify athletes at risk and to adapt lifestyle and maybe prevent a stress fracture

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The "HÄMOFIT"-project: exercise for adult male patients with severe haemophilia in Austrian fitness centres

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Objective: Aim of this pilot study was to test feasibility of strength training and flexibility exercises for adult male patients with severe haemophilia in fitness centres, the so called "HÄMOFIT"-project.

Material/Methods: This pilot study was performed in cooperation with the Austrian society of haemophilia ("HÄMOFIT"-project). After instruction by fitness trainers, 14 male patients with severe hemophilia performed strength training and flexibility exercises.

14 patients underwent baseline assessment, and 7 patients (50%, 30±8a, BMI=23±4 kg/m²) returned to follow up after 20(±10) months.

Frequencies of joint bleedings, number of painfully affected joints were assessed. Range of movement (ROM) of knees and elbows were recorded. Flexibility (0=no shortening, 1=moderate shortening, 2=severe shortening) of quadriceps muscles and pectoral muscles, and strength (KG0=no activity, KG1=noticeable activity, KG2=visible activity after compensation of gravity, KG3=activity against gravity, KG4=reduced strength against resistance, KG5=normal strength against resistance) of long trunk extensors and trunk flexors were assessed according to muscle test battery of Janda et al..

Results: Observed effects of the described exercise program ("HÄMOFIT"-project):

None of the patients showed side effects. Frequency of joint bleedings did not change.

The number of painful affected joints did not change or decreased.

There were no change of ROM of right elbow [0-26(±31)^o-129(±21)^o, mean] at follow up (for any patient). ROM of left elbow decreased slightly [0-9(±12)^o-143(±10)^o - 0-9(±12)^o-140(±13)^o, mean]. For patient 6, flexion of left elbow decreased by 15%.

There no change of ROM of both knees (for any patient): right knee: mean=0-4(±9)^o-117(±13)^o; left knee: mean=0-4(±8)^o-116(±16)^o.

Muscle strength of long trunk extensors and trunk flexors did not change for the whole group (KG4±1 – KG4±1, range). Nevertheless, muscle strength of long trunk extensors improved in 2 patients (patient 3: KG3 – KG4, patient 6: KG3 – KG4) and did not change in the other patients (KG3 – KG5, range).

Muscle strength of trunk flexors improved in patient 4 (KG4 – KG5) and did not change in the other patients (KG4 – KG5, range).

Flexibility of pectoral muscles and of right quadriceps muscles did not change for the whole group: right pectoral muscle: mean=0±0 – 0±0; left pectoral muscle: mean=0±0 – 0±0; right quadriceps muscle: mean=1±1 – 1±1. Nevertheless, patients 4, 5, 7 improved flexibility of right pectoral muscle (1–0, range); patients 1, 5 improved flexibility of left pectoral muscle (1–0, range). Patients 1, 2 improved flexibility of right quadriceps muscle (2–1, range). Flexibility of left quadriceps muscle improved for the whole group: mean= 2±1 – 1±1.

Conclusion: Strength and flexibility exercise in fitness centres seems to be feasible in patients with severe haemophilia. The results of this pilot observation indicate that severity of joint damage does not increase after such a strength and flexibility exercise-program. However, some patients were able to increase muscle strength of long trunk extensors and trunk flexors. Furthermore, some patients could improve flexibility of quadriceps muscles and pectoral muscles.

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The first Tumour board for Cancer Rehabilitation in a central hospital

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Objective: Typically, a tumour board represents an institutional multidisciplinary treatment planning approach for a specific cancer entity in which physicians of different medical specialities (oncologists, surgeons, radiotherapists,...) present, review and discuss challenging medical cases, e.g. the individual medical treatment options of patients suffering from cancer. At the end of this process, there is a statement (tumour board review – a multidisciplinary opinion) where the individual treatment plan is defined.

Material/Methods: The first Tumour Board for Cancer Rehabilitation in an acute hospital is presented in a descriptive matter. This includes a description of the members and presented patients of this tumour board, and of the process of such a very special and untypical tumour board.

Results: Since his implementation in November 2010, the tumour board for cancer rehabilitation has been an untypical, but regular tumour board, such as the other existing tumour boards within the General Hospital of Vienna/Medical University of Vienna/Comprehensive Cancer Center.

It is guided by a physiatrist who has his expertise in the field of oncologic rehabilitation.

Referring specialists from different medical specialities – all involved in the rehabilitation process of cancer patients – such as PM&R, dietology and nutrition, oncology, radiology, radiation oncology, surgery, cardiology, orthopedics are invited to attend this tumour board.

Challenging and complex cases of cancer patients with the intention of outpatient or inpatient rehabilitation are presented and discussed with the goal to plan rehabilitation (but NOT to treat the cancer itself!). An individual rehabilitation concept depending on individual functional deficits, and on medical conditions of cancer patients is defined, which has to be executed in this form. Sometimes, in cases of contraindications or in cases of important medical issues, patients are told to consult their oncologist once more, before starting rehabilitation. Most functional deficits of the discussed cancer patients are (musculoskeletal or cancer) pain, decreased performance status (decrease in endurance capacity and muscular strength), weight loss (cachexia), but also weight gain, sensorimotor deficits and polyneuropathy, dyspnoea, lymphedema, cognitive deficits (“chemobrain”), incontinence, psychological distress and anxiety, neurological deficits such as movement disorders and walking disturbances with the risk of falls and fractures. The rehabilitation plans include medical exercise with the intention to increase endurance capacity and/or muscular strength, neuromuscular electrical stimulation (as an passive option to exercise), nutrition, lymph massage, breathing therapy, physiotherapy, occupational therapy, breathing therapy, different forms of massage, electrotherapy, and other physical modalities, but also drug treatment for pain.

Conclusion: To our knowledge, this is the first worldwide existent tumour board for cancer rehabilitation in an acute hospital. It has been established to be a regular part of the rehabilitation process in challenging cases of cancer patients before and/or during their rehabilitation process. This tumour board has found good acceptance in its members and in patients as well, and it has become a very important interdisciplinary and multi-professional help to plan rehabilitation and supportive strategies in challenging cancer patients.

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The prevalence of the anterior genicular transverse ligament amongst different population groups – Is this the missing link in knee injuries?

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Objective: Little is known about the four distinct menisco-meniscal ligaments which have been identified in the knee joint with varying prevalence. The most common one is the anterior genicular transverse ligament with a general prevalence of 36–94%, sometimes mistaken as a synovial fold or meniscal tear of the anterior horns of the menisci. It has been postulated that the role of the transverse ligament might be that of stabilising the menisci during movement of the knee [1]; [2] by anchoring the menisci [3] and preventing excessive rotation of the anterior horns of the menisci [4]; [1]. Little attention is given to the transverse ligament of the knee and its prevalence amongst different population groups. The aim of the study was to investigate the prevalence of the anterior transverse ligament using cadaveric material.

Material/Methods: A sample was selected from a cadaver population at the Department of Anatomy, Faculty of Health Sciences, Stellenbosch University, Republic of South Africa. The method of selection was non-random sampling according to specific characteristics from a sample of convenience. Twenty (20) cadavers (40 knees) were selected according to specific groups (gender, age and ethnicity). For gender, 10 male and 10 female cadavers were chosen. In the three age groups namely, below the age of 35 (<35), 35 to 65 (35-65), and above 65 (>65), six, seven and seven specimens were allocated to the different age groups, respectively. A physical dissection of each specimen's knee was completed until all the necessary structures were visible and a clear superior view of the proximal articular surface of the tibia was possible. This view allowed for a clear, full and correct identification of the presence of the transverse ligament.

Results: The transverse ligament was identified in 11 of the 20 cadavers, with a prevalence of 50% in the total number of knees. Two cadavers presented with transverse ligaments unilaterally. In relation to gender, a presence prevalence of 70% for male cadavers and 60% for female cadavers was observed for the transverse ligament. With regard to ethnic groups, Caucasian, Coloured, and Black, the prevalence was 66.7%, 57.1% and 42.9% respectively. All the results in this study were similar to that found in literature for general prevalence, laterality, gender and age groups with the exception of ethnic groups, for which no literature could be found. The differences within groups were not statistically significant.

Conclusion: In theory, knee injuries could be related to the presence of this peculiar ligament in the knee. One out of every two people in this study was found to have a peculiar transverse ligament of the knee. However, the exact function of this ligament first needs to be identified, before its presence/absence can be linked to knee injury.

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The subcutaneous fat tissue on the appearance in the sportists lesions and its influence in the rehabilitation

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Objective: Around 80% of the fat tissue lies under the skin (panniculus adiposus), and the other quantity lies around the other organs [1]. The Subcutaneous fat tissue also influences on the rehabilitation phase at the muscular lesion, especially at the acute phase, and the duration of Cryotherapy depends on the thickness of the fat tissue for gaining the same effect on the muscular tissue. The goal of the Project: The research of influence on the thickened fat tissue on lesions of football players and to prove if there is a difference of the Subcutaneous fat tissue on the measurements done to lesion and non-lesion subject groups, the influence on the causes of the lesions and the main causes of the lesions.

Material/Methods: On this research there are involved the players of the 12 football teams of Kosovo's Super League during the competition season 2009/2010, for the 15 active footballers of the team who were seniors from the 20 to 38 years of age. The football players were divided into two research groups: I-Group- 145 injured and II-Group 35 non-injured.

Results: The group of the injured players has presented higher values of the subcutaneous fat tissue. The higher subcutaneous fat tissue shows that it has influenced that the most injuries occur on the muscular tissue compared with the other tissues. The higher percentages were found on the region of the knee 26.2%, ankle 22.1% and hip joint 20.0%. The results of the survey show that the injuries of the muscles are 36.6% and articulations with 24.1%, and contusions and lacerations (tears) with 46.6%. Forces from the outside are the most indicators of the injuries with 42.1% of all the overall injuries. The most attacked region is the knee with 26.1%. There is no correlation between the age and the appearance of the injury.

Conclusion: It was found that the growth of the subcutaneous fat tissue influences on the growth of the prevalences of the injuries. The thickness of the subcutaneous fat tissue influences on the duration on the application of the cryotherapy. At the same time the decrease of the subsequent fat tissue especially in the stomach will influence on the prevalence of the kind, and at the injuries shown and on the decreasing of the frequency of their occurrence.

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Ultrasonography Evaluation of the Achilles Tendon Thickness in Two Different Angles and Levels of Contraction in Asymptomatic Subjects

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Objective: The Achilles tendon is the largest, strongest and thickest tendon in the human body [1]. Intrinsic factors such as gender seem to influence Achilles tendon thickness as males demonstrated thicker tendons than females [2], [3]. However, it is unknown whether these existing differences can be influenced by different levels of contraction at different position angles. Therefore the purpose of this study was to examine whether measuring the Achilles tendon in different levels of contraction at different angles of position can influence the tendon thickness with respect to gender. It is hypothesized that females will have thinner Achilles tendons in both levels of contraction and position angles compared to males.

Material/Methods: A cross-sectional ultrasonography study of the Achilles tendon was undertaken. Eight asymptomatic subjects (4 males & 4 females mean age 27.3 ± 7.7 yrs.) were included. All measurements were taken with the subjects in a prone position in fixed angles at 0° and 30° plantar flexion with the assessment of an isokinetic dynamometer (Con-Trex, CMV 16 swiss). Achilles tendon thickness was measured 2 cm proximal from the calcaneus insertion [3], [4] in the two position angles during rest and at 100% maximal voluntary contraction (MVC) in longitudinal scan. Data were analysed using the non-parametric Mann-Whitney test to examine the differences between genders. Furthermore, to examine differences without dividing the group descriptive analysis was used. Main outcome measure was the median of thickness during rest and contraction (0° and 30° plantar flexion) between males and females.

Results: Ultrasonography showed no statistically significant differences of thickness between males and females during rest and contraction at 0° and 30° of plantar flexion ($P > 0.05$). Descriptive analysis showed slightly thicker Achilles tendons but not statistically significant differences ($p > 0.05$) at 30° plantar flexion during rest (5.47 ± 0.67 vs 5.26 ± 0.71 mm) and during contraction (5.60 ± 0.86 vs 5.12 ± 0.61 mm).

Conclusion: Measuring the Achilles tendon in different angles does not have significant influence on tendon thickness. Existing differences between males and females are not dependent on angle or contraction. Therefore ultrasonography is a valid imaging method to measure tendons in both at rest and under contraction.

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Muscles

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Body mass components in young soccer players

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Objective: Body composition plays an important role in the selection of young soccer players and it is associated with the success of young athletes. Body mass components are an important aspect of fitness for soccer. The most commonly used model of body composition divides the body into two compartments - fat components and fat-free mass (muscular and bone components). The aim of the study was to determine the body composition parameters of young male soccer players and to show the differences in age groups.

Material/Methods: A sample of 152 young male soccer players, age span 9 to 18 years, were divided into three groups according to the age: I - less than 14 years; II - 14 to 16 years; III - 16 to 18 years. Anthropometric measurements were taken according to the method of Mateigka. The following measurements were made: body weight, body height, circumferences (arm, forearm, thigh and calf), diameters (elbow, knee, wrist, ankle) and skinfold thickness (biceps, triceps, thigh, leg, chest, abdomen). Body mass components such as muscular component (MC), the bone component (BC) and the body fat (BF) were analyzed as absolute values and as percentage values.

Results: Following values were determined: for I group - MC=50.56%; BC=20.34%; BF= 15.21%; for II group - MC=50.34%; BC=18.8%; BF= 14.87%. and for the III group - MC=52.54%; BC=17.94%; BF=15.24%. MC showed highest value in the III group of 36.55+/-5.42 kg ($p<0.0001$). Compared to I group, BC showed decreased values in II group, 18.8% ($p<0.05$) and in the III group, 18.04% ($p<0.05$). BF did not show any statistical difference for all groups.

Conclusion: The youngest group which is in the prepubertal phase had higher bone component and the oldest group had higher muscular component while the body fat was with similar value in all groups. The obtained data could be used as standard values for body mass components evaluation in young soccer players.

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Does short passive stretching volumes influences total work?

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Objective: To observe if total work is influenced by different short stretching volumes.

Material/Methods: 21 trained adults men (22.05 ± 2.09 yrs; 176.0 ± 6.7 cm; 75.8 ± 8.5 kg; $12.1 \pm 4.1\%$ BF) underwent to four isokinetic randomized testing session after 5 minute of cycloergometer (50 Watts). Each session were separated at least 48 hours and no more than 7 days between them. During three of sessions (20sec; 40sec; 60sec) a short prior acute static stretch (SPASS) were applied after a cycloergometer perform as a warm up complement. One session with no PASS (NPASS) was assessed as a control. During SPASS sessions exercise stretches were carry out once and intent for quadriceps and hamstring muscles held passively by them in a non-pain position. Total Work (TW) was calculated from concentric knee extension (EXT) and flexion (FLX) at all 5 repetitions in two different angular velocities (60 and $180^\circ \cdot s^{-1}$). Statistical analyses were performed using One-way ANOVA to repeated measures comparing different sessions (NPASS, 20sec, 40sec, 60sec). Significance level was set at a ≤ 0.05 for all comparisons.

Results: No differences were observed between all sessions. Table 1 shows all results.

Session	EXT TW (J)		FLX TW (J)	
	$60^\circ/s$	$180^\circ/s$	$60^\circ/s$	$180^\circ/s$
NPASS	1044.7 ± 125.7	721.2 ± 91.7	608.4 ± 90.6	436.81 ± 52.5
20sec	1015.9 ± 149.8	712.4 ± 100.7	589.0 ± 104.6	425.15 ± 68.8
40sec	1054.5 ± 128.6	724.0 ± 95.6	606.3 ± 87.3	433.4 ± 69.7
60sec	1040.4 ± 139.5	726.5 ± 92.6	606.7 ± 94.0	437.6 ± 65.4

Table 1: Mean (SD) of total work (TW) during all sessions.

Conclusion: As opposed of some believes, our study observed that short prior acute static stretches were unable to influence on total work in adults men. Regardless of short volumes used in our study, they are similar to those used as a warm up complement during the majority of training programs.

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Einfluss auf die Beckenbodenmuskulatur mittels Galileo-Vibrationstherapie in Kombination mit Physiotherapie zur Behandlung der weiblichen Belastungsharninkontinenz

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Zielsetzung: In einer prospektiv randomisierten Vergleichsstudie wurde untersucht, ob intensive Vibrationstherapie mittels Galileo 2000 in Kombination mit Physiotherapie zu einer Verbesserung der Kontinenzrate bei Frauen mit urodynamisch gesicherter Stressinkontinenz führt. Dabei wurde die Wirksamkeit auf die Beckenbodenmuskulatur sowie der therapeutische Effekt auf die Stressinkontinenz untersucht.

Patientinnen und Methoden: 29 Patientinnen wurden klinisch und urodynamisch (einschließlich Perinealsonographie und Pelvimeter) untersucht. Gruppe A hatte sowohl Physiotherapie (PT) als auch die Vibrationstherapie (VT) über den gesamten Zeitraum, Gruppe B begann mit der Physiotherapie, wechselte nach 12 Wochen zur Vibrationstherapie. Gruppe C begann mit der Vibrationstherapie, wechselte dann zur Physiotherapie. Die wöchentliche Trainingszeit wurde auf 2 Trainingseinheiten festgesetzt, wobei die Physiotherapie 30 Min. betrug, die Vibrationstherapie 2x4 Min. Der insgesamt 24-wöchigen Trainingszeit folgte eine 12-wöchige Nachbeobachtungszeit.

Ergebnisse: Die objektiven Kontinenzraten waren 80% in der Gruppe A (Kombinationsgruppe), 56% in der Gruppe B (PT→VT) und 60% in der Gruppe C (VT→PT). Dies stand im Einklang mit der Abnahme der subjektiven Häufigkeit des Urinverlustes pro Woche. Die Beckenbodenkraft, pelvimetrisch gemessen, verbesserte sich im Mittelwert in allen 3 Gruppen erheblich (in Gruppe A um 8 μ V, B um 7 μ V, C um 6 μ V). Palpatorisch und sonographisch fanden sich identische Resultate. Nach Studienende verringerten sich in Gruppe A die Stressinkontinenzgrade im Durchschnitt von 1,8 auf 0,2, in Gruppe B von 1,7 auf 0,2 und in Gruppe C von 1,8 auf 0,3. Dieses Ergebnis stellte sich auch in der Minderung des subjektiven Leidensdruckes für alle dar ($p < 0,0001$).

Schlussfolgerung: Die Vibrationstherapie zur Muskelstimulation verbessert die subjektiven und objektiven Parameter der Stressinkontinenz. Insbesondere die Kombination der Vibrationstherapie mit der Physiotherapie erweist sich als sehr effektiv und stellt somit eine echte Therapieoption dar.

Bitte zitieren als: von der Heide S, Hilgers R, Emons G, Viereck V. Einfluss auf die Beckenbodenmuskulatur mittels Galileo-Vibrationstherapie in Kombination mit Physiotherapie zur Behandlung der weiblichen Belastungsharninkontinenz. In: 7th EFSMA – European Congress of Sports Medicine, 3rd Central European Congress of Physical Medicine and Rehabilitation. Salzburg, 26.-29.10.2011. Düsseldorf: German Medical Science GMS Publishing House; 2011. Doc11esm177.

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Electromyography patterns at professional sportsmen

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Objective: Electromyography (EMG) completes electroneurography, representing a recording technique of the action potentials produced by the skeletal muscular fibers during repose state, voluntary muscular contraction and after muscle direct stimulation or nervous fibers that innervate the studied muscle indirect stimulation. The test can be done for an experimental or clinical purpose. Our purpose was to study the electromyography activity of all tested professional sportsmen categories (fence, handball, volleyball) to compare the obtained data and to identify characteristic neurophysiologic patterns, associate to professional sportive activity, which can contribute to a correct athletes' selection and a training improvement, thus emphasizing the inter-sports differences.

Material/Methods: The group of subjects participating in the research was formed of healthy athletes, who received a medical – sportive confirmation to participate at the trainings and sport competitions. We studied a group formed of 27 male athletes (age=20±3years), right-handed, fencers (n=7), handball players (n=10) and volleyball sportsmen (n=10), active for between 7 and 10 years exclusively in either one of the studied sports, with homogenous average ages, heights and weights and training regime.

In our research regarding muscular performance, we have chosen the usage of surface EMG correlated with the simultaneous recording of the developed muscle force, by myomechanography (MMG), with the purpose of finding a synthetically relation between the muscle force and the EMGS parameters. For this we have used modern methods of computerized processing of the EMGS recordings, methods which are used frequently only by the high rank researches, resulting original parameters and indices for better analysis of muscle contraction.

Surface EMG was measured to all athletes, at the same time with the mechanogram, during maximal isometric contractions, performed by hand fingers flexors muscles, till fatigue, obtained by squeezing a force traductor with right and left hand, succesively. We recorded the muscular biopotentials, using surface electrodes (BIOPAC) made from silver, the measuring was made simultaneously on EMG BIOPAC MP 150 two channles connected to a PC Pentium IV, were used three electrodes, two active electrodes for each channel and a reference one placed on the distal extremity of the forearm.

Results: Fencers recorded the highest values for indexes like intercept, slope, percent variation, in the area of time and mixed parameters, frequency parameters define superior values for voleyball players and for most of the mechanogram parameters, handball players presented the highest values.

Conclusion: EMG patterns contribute to a correct selection of the sportsmen, to improve performances through specific training, being so, a trainers guide, in order to establish standards training.

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Lactate and related variables in physically active subjects

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Objective: Better performance is often related to lactate clearance from the blood. The increase in blood lactate levels during exercise is reduced by acclimatization. The aim of our study was to examine the relationship of training to physical performance by lactate determination.

Material/Methods: For a control group we examine 24 male sedentary volunteers of age 25 ± 3 years exposed to treadmill stress test up to sub-maximum heart rate level (I group). A number of 28 male physically active subjects were examined (21 ± 2 years old). They were divided in 2 groups: II – exposed to treadmill stress test for 20 minutes ($n=13$) and III – exposed to cycle ergometer for 15 minutes ($n=15$). For the lactate test the photometric enzyme method by Boehringer Mannheim was used.

Results: Increase of lactate concentration was found: in the I group from 2.71 ± 1.5 to 12.59 ± 3.2 $\mu\text{mol/L}$ ($p < 0.01$); in the II group from 3.17 ± 1.6 to 9.31 ± 3.2 $\mu\text{mol/L}$ ($p < 0.05$); and in the III group from 2.36 ± 2.2 to 6.63 ± 2.3 $\mu\text{mol/L}$ with no significant difference.

Conclusion: In the study, the pattern of lactate increase due to exercise is described. From the obtained results we may conclude that lactate variable is highly correlated with the physical performance. There is a strong relationship between lactate and its related variables: condition level and exercise type performance, respectively.

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Prevalence of sarcopenia in geriatric patients hospitalised for rehabilitation

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Objective: Sarcopenia is characterized by progressive muscle wasting during aging and is often associated and aggravated by acute or chronic diseases. Last year a consensus statement of the European Working Group on sarcopenia in older people was published with the intention to establish criteria for the diagnosis of sarcopenia (1). Concerning these criteria a patient is characterized as sarcopenic if there is a significant reduction in skeletal muscle mass and a reduction in muscle strength or in physical performance. The consensus statement recommends screening of older patients by testing of the hand grip strength and walking speed. If there is a significant reduction in one of these parameters an assessment of the skeletal muscle mass should follow. Therefore with these simple screening parameters patients at risk for sarcopenia could be identified and treated early.

Material/Methods: All patients with an age over 65 years submitted to the department of acute geriatric rehabilitation are screened for sarcopenia by measurements of the handgrip strength and walking speed. Additionally quantification of skeletal muscle mass by dual energy X ray absorptiometry (DEXA) will follow. To evaluate whether DEXA is a useful method to quantify muscle mass a magnetic resonance tomography of both thighs will be performed. Moreover age, gender, diagnosis for hospital admission and medication are documented to identify possible factors for amplification of sarcopenia. Mobility at admission is documented by basic mobility score and Tinetti testing.

Conclusion: The aim of this study is to investigate the prevalence of sarcopenia in geriatric patients hospitalised for rehabilitation.

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Testing and training the strength, power and complex reaction in rugby players

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Objective: The physical demands of rugby players vary, depending on the control of play, the athlete's position, environmental conditions and many other variables. Therefore, taking a methodical and scientific approach to conditioning is vital.

Rugby games involve fierce body contact at regular intervals combined with explosive force generation as well as spinal stability and core strength which leads to greater body control, awareness, balance and muscular endurance [1]. Strength is therefore a major ingredient for the production of power (speed strength). For the legs and hips, the goal is to develop explosive strength for the hip flexors and extensors, and maintain or acquire balance between the quadriceps and hamstring muscle groups.

Athletic performance in rugby players involves the response to an act of an opponent, and the performance is usually dependent, upon the reaction time required to initiate muscular sequence in response to an opponent's act but also of the quality of the response (in terms of strength and power) [2], [3]. While simple reactions are mainly regulated by processes of genetic dominance, complex reactions (which involve an important part of the body or the whole body and are associated with coordination skills) are influenced above all by social factors such as specific training.

The purpose of this study is to demonstrate the effectiveness of proper testing and training for improving strength, explosive power and reaction speed in rugby players.

Material/Methods: Twenty rugby players (18 to 32 years old) underwent measurements of explosive force and power of the lower limbs by performing the Counter movement jump test (using Myotest system, Switzerland) and Complex acoustic reaction test (using Optojump Next system, Italy). The complex reaction was assessed by making a move outside a perimeter and reaching a target located at a distance of 1 meter and 10 centimeters from the floor. All investigated subjects participated in a 10 weeks training camp. The training program was based on the concept of periodization, and comprised the following phases: Hypertrophy phase (2 weeks, 3-4 sets of 8-12 repetitions at 65-80% of 1RM), Maximal strength phase (4 weeks, 3-6 sets of 2-6 repetitions at 80-95% of 1RM), Conversion phase (4 weeks, 3-4 sets of 2-6 repetitions at 40-70% of 1RM, in which the speed of contraction was emphasized). Along with this, on the entire period of training, the reaction speed to opto-acoustic stimulus was trained using coordination and plyometric exercises.

Results: Using the paired t test to compare the data at baseline and at the end of the study, we noticed a significant improvement in reaction time to acoustic stimulus (from 1.69±0.06 seconds to 1.41±0.06 seconds, p<0.001). Improved reaction speed may be related in a certain degree with the increase of leg explosive force (from 21.6±1.8 N/kg to 25.8±3.3 N/kg, p<0.001) and explosive power (from 39.4±7 W/kg to 46.4±8.4 W/kg, p=0.009).

Conclusion: The results emphasizes that even a short period of training (10 weeks) can improve reaction time required to initiate complex muscular sequence, along with explosive power and strength of rugby players.

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The effect of using insulin injection in body builder athletes

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Objective: Recently, body builders with objective over weight perform human and animal insulin injection. The purpose of this essay is to discuss the effects physiological insulin injection of the body builder athlete. Although insulin injection during the short time results significant and quick over weight (muscular bulk) it has a lot of problems later. Plasma glucose concentration maintenance of the determine rang is very necessary for human health. The first effect of insulin injection is hypoglycemia. Hypoglycemia is very dangerous, because glucose is the essential energetic material for brain and lack of it like loss of oxygen results function, disorders and tissue injures, and if the lack will be long time it results to death. In fact, the brain sensitivity relates to hypoglycemia (opposite of other body tissues) can not use of circulatory free fatty acids.

Material/Methods: The purpose of this research was the study the effects of using insulin injection in body builder athletes. In this research, 12 males aged between 20–25 year voluntary participated and filled out the questionnaire. Subjects performed continuing insulin injection skin at the abdomen part (for 6 continuous month and 2 time per week). Blood sample for determination of plasma glucose were taken during rest time.

Results: The results showed hypoglycemia in subjects. Hypoglycemia causes disorder of the function of nervous system and symptoms like: dizziness, headache, and confusion, decrease accuracy, behavior disorders, convulsion and lake of sober. On the other hand, hypoglycemia results the release epinephrine rapidly that it a causes adrenergic symptoms like: profuse sweating, tachycardia, agitation, and hungry.

Conclusion: At the case study of the insulin dependent patients with injection under skin, effects appears during it became maximum during 6 hours, but insulin effects of the normal people appeared during some minutes and it became maximum during 2 hours. Rapid hypoglycemia results insulin injection and reaction of it causes obvious adrenergic symptoms. Our finding suggest that acute reactions like these, that mentioned above for body builders that perform continuing insulin injection skin at the abdomen part, may be very dangerous. Resistant to insulin and diabetes suffering are the other dangerous that the high and continuing use of insulin can have.

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Three-dimensional control in stretching the hamstring muscle

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Objective: The limited elasticity and flexibility of the hamstring muscle often inhibits the performance of athletes. The stretching process of this tight and contractible muscle is a long and inconvenient process for the athlete. This can be reduced if the exercise is controlled in three dimensions.

Material/Methods: The author developed and patented the vertical plus sling suspension equipment. It is a new development since it enables complex exercises controlled in three dimensions, including vertical settings. The exercises developed for stretching the hamstring muscle demonstrates the benefits of the three-dimensional control.

Results: These exercises were used in the stretch-training of handball goal keepers, to improve their ability to defend the goal.

Conclusion: The controlled set of three-dimensional forces enlarges the diversity of the stretching, muscle strengthening, and coordination-improvement exercises. The equipment and the method offer new possibilities for prevention, wellness and fitness, as well as in the rehabilitation of athletes.

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Vitamin D receptor gene polymorphisms, muscle mass and muscular explosive strength in elite soccer players

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Objective: Vitamin D receptor (VDR) polymorphism is reported to be associated with muscle mass and strength [1], but the evidences for this is limited and conflicting. The present study examined the association between the polymorphisms of VDR gene BsmI, Apal and FokI and muscular mass and strength in elite soccer players.

Material/Methods: Thirty-nine top-level male soccer players (mean age 24.5±3.8) participated in the study. All examined athletes had reached National level. Ten out of thirty-nine athletes were official members of the National Teams and one of them had won the gold medal in the World FIFA (International Federation of Football Association) Championship in 2006. Athletes' training consisted of 29.3±6.33 hours per week. Genomic DNA was extracted from buccal swabs, and VDR genotypes were determined by PCR. The explosive muscle strength of the lower limb was measure by mean of Squat Jump (SJ) and Counter Movement Jump (CMJ). Limb circumferences and skinfold thickness were measured on the right mid-thigh using a measuring tape and a skinfold calipers. Thigh muscle area (TMA) was calculated by an equation after measuring limb circumference and skinfold thickness. The differences in muscular strength and muscle area among VDR genotype groups were analyzed using one-way ANOVA.

Results: The explosive leg muscle strength, and the thigh muscle area were not significantly different between VDR genotype groups. The analysis of variances indicate a similarity of TMA, SJ, CMJ values for BsmI (F=0.3884; df=6; p=0.87), Apal (F=0.4708; df=6; p=0.82) and FokI genotypes (F=0.5701; df=6; p=0.74). However, the data also indicate a trend toward higher SJ value in soccer players with VDR FokI*ff genotype (ff, cm 44.4±8.9; Ff, cm 40.44±4.7; FF, cm 39.45±3.80) than those with FF homozygous.

Conclusion: The data suggested that VDR BsmI and Apal polymorphisms seem not to be associated with muscular strength and thigh muscle area in top-level soccer players. However, our results indicated that we cannot exclude the possibility that homozygosity for the FokI*f allele could represent an advantage to exert a better explosive muscular strength in soccer.

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Osteoporosis

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Bone metabolism markers in sportswomen with menstrual cycle dysfunctions

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Objective: It is a well known fact that sportswomen with irregular menstrual cycle are exposed to the risk of diminished bone mineral density and consequentially osteoporosis may appear [1], [2]. Monitoring of the levels of biochemical markers of bone metabolism enables the understanding of the dynamic changes during the bone remodeling process [3].

The objectives of the conducted research were to determine the prevalence of menstrual dysfunctions in a sportswomen sample and a control group, as well as to determine the levels of bone metabolism markers in groups of women with menstrual dysfunctions.

Material/Methods: The women (n=117) were separated in two groups, the experimental (S) (n=84) comprised of three subgroups of sportswomen (34 sportswomen for ball games, 27 for athletics and 23 for sport dances) and the control group (C) (n=34). To determine the menstrual profile and dysfunction of the menstrual cycle, we used a very detailed questionnaire. The level of the middle, fragment of osteocalcin (N-MID osteocalcin) as the marker of bone formation, was determined, as well as the β -CrossLaps (β -CTx–bone resorption marker) via the electroluminescent immunochemistry method in the Elecsys 1010 automated machine.

Results: The primary amenorrhea was found in 7 (8,33%) and oligomenorrhea in 11 (13,09%) sportswomen That was statistically much higher incidence ($p<0,05$), than in the control group (0/34). Values of bone metabolism markers showed a statistically significant difference in the level of bone resorption marker, β -CrossLaps, between the groups of amnorrheic and oligomenorrheic sportswomen in comparison to eumenorrheic women, both sportswomen as well as those in the control group. Accelerated resorption was accompanied with accelerated bone formation.

Conclusion: Menstrual dysfunctions were statistically more present in the sportswomen group than in the control group and were accompanied with accelerated bone metabolism from the point of view of the increase of bone metabolism markers level.

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Physical capacity, quality of life and body composition of postmenopausal osteoporotic women

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Objective: Osteoporosis is a systemic skeletal disease that has great influence on functional independence and quality of life, leading to reduced bone mass, microarchitectural deterioration, increased bone fragility, bone fractures with minimal trauma, decreased bone mineral density and decrease bone quality. This quality is defined by the bone health of it and is closely related to physical activity and body composition, genetic and hormonal factors and nutrition. Under normal conditions, bone mineral density evolves, increased up to 27 years, leveling up to 40. From here begins to decrease and there is a sharp decline in the menopausal stage and after it keeps a sharp downward trend. Thus we aim to evaluate the physical condition of postmenopausal osteoporotic women, assessing their functional status, different manifestations of strength and body composition.

Material/Methods: After approval by the Ethics Committee of the North Health Region, we identified women diagnosed with osteoporosis by dual-energy bone densitometry (DEXA), which showed inclusion criteria and who wanted to participate in the study of their own free will. After assessment of blood pressure and heart rate were subjected to:

- a) Demographic variables
- b) Quality of life evaluated with the osteoporosis assessment questionnaire (OPAQ) – 1 to 5 points represented by numeric scale from 1 to 5, in which 1 represents better quality of life and 5 represents poor quality of life
- c) Tinetti Falls Efficacy Scale [1]
- d) Physical activity: short version of IPAQ (International Physical Activity Questionnaire).
- e) Functional capacity: timed up and go test; 30 sec sit to stand; unipodal balance eyes shut
- f) Height: stadiometer Seca®
- g) Handgrip strength of both hands: Jamar® hand dynamometer
- h) Key pinch strength with digital dynamometer Baseline®
- i) Body composition: bioelectric impedance on Tanita Ironman Body Composition Monitor®

Results: The 18 women studied have an average age of $66,8 \pm 6,4$ years, $148,2 \pm 5,3$ cm of height and $57,4 \pm 6,2$ Kg of weight which represents a BMI of $26,2 \pm 3,3$. In the OPAQ the evaluated women achieved $3,1 \pm 0,7$ points and in the FES achieved $79,3 \pm 21,1$ points. In the IPAQ 14 women were with low level of physical activity and 4 with moderated physical activity (average physical activity of $387,5 \pm 294,9$ METs). The average result of the timed up and go test was $9,4 \pm 2,7$ seconds, in the 30 sec sit to stand was $10,1 \pm 2,9$ repetitions and in the unipodal balance test was $4,1 \pm 6,9$ seconds. When evaluating strength, we found $16,8 \pm 6,4$ Kg/f for right handgrip strength and $16,2 \pm 5,8$ Kg/f for left handgrip strength. When evaluating key pinch strength we found $6,6 \pm 5,0$ Kg/f and $6,3 \pm 5,2$ Kg/f for the right and left hand, respectively. Analyzing the body composition average values, we have $33,6 \pm 6,0\%$ for total body fat, $47,5 \pm 4,3\%$ to body water, $2,0 \pm 0,2$ Kg to bone mass and $36,2 \pm 3,2$ Kg to muscular mass. Once established correlations between different variables, we can highlight some of the most important:

- Weight correlates with total body fat ($0,561^*$) and with body water ($-,470^*$);
- BMI correlates with average OPAQ ($0,529^*$), total body fat ($0,732^{**}$) and body water ($-0,709^{**}$);
- timed up and go test correlates with average age ($0,633^{**}$), sit to stand ($-0,583^*$), handgrip right and left ($-0,581^*$; $-0,504^*$)

Conclusion: The participants in this study show similar values when compared with the population with similar characteristics. The BMI value means that the participants are averagely overweight. Most of the women of the study have reduced physical activity levels and none of them have high physical activity levels. We also can conclude that weight as an important role on body composition and the timed up and go test is an easy and cheap test that gives us much information about the physical functioning of these osteoporotic postmenopausal women.

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Quantitative ultrasound (QUS) measurement of the calcaneus in patients with long-term non-invasive mechanical ventilation (NIV)

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Objective: Aim of the study was to examine whether persons with long-term non-invasive mechanical ventilation (NIV) show an increased fracture risk compared to the healthy collective. Quantitative ultrasound measurements allow a quantitative analysis of the bone status as well as an estimation of the fracture risk, similarly efficient as the DXA. Quantitative ultrasound measurements at the calcaneus in transversal transmission have been validated in comprehensive studies, amongst them also prospectively designed fracture studies.

Material/Methods: We examined 22 patients (9 male, 13 female), age average of 49 years (18–85 a), 60% of which are bed-ridden (13 patients), 27% mobile in a wheelchair (6 patients), 13% ambulatory, an average duration of stay of 22 months (2–81 months). The ultrasound measurements were carried out at the calcaneus using the Achilles Insight (GE Healthcare). Based on the Stiffness Index, the respective z-scores were collected.

Results: The mean z-score was $-2,864 \text{ SD} \pm 1,466 \text{ SD}$. Except one patient (z-score 0 SD), all showed a reduced z-score (z-score $-1,0 \text{ SD}$ to $-4,5 \text{ SD}$). The younger the patients, the lower the results were ($r = -0,646$, $p = 0,046$).

Conclusion: The existing results show that patients with NIV show a significantly increased fracture risk ($p < 0,05$; $r = 0,646$) compared to the healthy collective.

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Pain Management

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Connection between physical activity and complaints of musculoskeletal system

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Objective: Objective: The risk factors for the development of musculoskeletal pain are age, workplace conditions, psychosocial factors and physical activity. Musculoskeletal disorders are more frequent in women than in men. Obesity and overweight correlate with pain, as well as knee and hip osteoarthritis.

Material/Methods: Methods: The study involves 309 healthy subjects (114 males, 195 females; average age 39.98±10.3 years) with different physical activity due to different jobs. The aim was to establish the level of physical activity in groups performing different physical activities – postmen and health visitors walking several hours daily and sedentary postmen – as well as to examine painful joints (related to specific jobs and physical activity) in eight anatomical regions: shoulder, neck, back, lumbar spine, hip, knee, ankle and foot. The International Physical Activity Questionnaire and its evaluating protocol were applied to estimate physical activity levels. MET/min/week served as the basics of the study and ANOVA statistical methods were used. All results were statistically significant ($p < 0.05$).

Results: Results: According to our results there is a significant relationship between shoulder joint, foot and ankle pains and physical activity at work. Back pain is significantly more frequent in women and higher BMI refers to ankle and foot pain. Pain in the dorsal spine (60%) and in the cervical curve (50%) are most frequent among people with sedentary jobs. Low back pain is the most common type of pain in both the walking and the sedentary job group. Low back pain is the most frequent type of chronic pains with 20% of people with sitting-down jobs reporting it in our sample.

Conclusion: Conclusion: Interrelations of physical activity and joint pain are not fully cleared, further investigation and research are needed.

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Electrotherapy for the treatment of low back pain: a literature review

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Objective: The objective was a literature review of electrotherapy for the treatment of unspecific low back pain.

Material/Methods: A structured literature search in the electronic database Medline was conducted. The period of the literature search was from the time of the initiation of this database to June 2010. The key words low back pain, sciatic, lumbar spine, lumbar spinal were each connected with the following interventions electrotherapy, interferential current, interferential therapy, PEMF, pulsed electromagnetic fields, iontophoresis, transcutaneous electrical nerve stimulation, TENS, muscle stimulation, short wave therapy, diathermy. Only papers in English and German were reviewed. References of the included studies and literature reviews were also checked. For analysis only randomized controlled trials whose outcome measure was pain assessment were included. As a control application either a placebo or another physical modality or non medicamentous therapy has been accepted.

Results: The computer-assisted literature search produced 4523 papers. Of which 34 studies finally met our search criteria. The following data were extracted from each study: author, design, number of patients, age, acuity, intervention (type, intensity, duration) and control intervention, and results in particular with regard to pain assessment.

22 studies of TENS, 4 studies on Electrical Muscle Stimulation (EMS), 3 papers on interference current therapy, a study of PEMF (pulsing magnetic field therapy), 3 studies on short wave therapy (diathermy) and a paper on micro current therapy were analyzed.

Regarding TENS in 7 of 22 studies a significant reduction in pain was reported compared to the control group. In some of the remaining studies focusing on TENS a significant decrease in pain was found in the before-after comparison, compared to the control group (2x acupuncture, 1x percutaneous nerve stimulation) this decrease was equivalent. Regarding EMS in 3 of 4 trials a significant pain reduction compared to the control group was reported. For the interference current therapy, with none of 3 trials a significant reduction in pain compared to the control group was registered. In these studies in the before-after comparison, a clinically relevant pain reduction was apparent, which was equivalent in comparison to the control group (manipulation, combination massage and traction). In 2 of 3 studies on short-wave therapy a significant reduction in pain compared to the control group was reported. In the study concerning PEMF, but not in the study concerning microcurrent therapy, a significant pain reduction was observed in comparison to the control group.

Detailed results of each study will be presented in the congress.

Conclusion: A significant reduction of pain in non-specific low back pain can be found in 3 of 4 trials on EMS, in 2 of 3 trials on short-wave therapy and in the only study for pulsed magnetic field therapy. Therefore the use of these methods within the treatment concept for low back pain should be considered. On the most commonly studied method TENS no general statement about its use in non-specific low back can be made.

Eine signifikante Schmerzreduktion beim unspezifischen Kreuzschmerz zeigte sich in 3 von 4 Studien für die EMS, in 2 von 3 Studien über Kurzwellen-Therapie und in der einzigen Studie für die gepulste Magnetfeldtherapie. Der Einsatz dieser Methoden im Rahmen des Behandlungskonzept für den unspezifischen Kreuzschmerz kann daher empfohlen werden. Über die am häufigsten untersuchte Methode TENS kann derzeit keine allgemein gültige Aussage über den Evidenz-basierten Einsatz beim unspezifischen Kreuzschmerz getroffen werden.

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Is Biofeedback an effective and scientific method for treatment of pain? A pilot study at the Medical University of Vienna

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Objective: Biofeedback is known to be an effective psychophysiological method with the power to enhance self-competence, and has been reported in several high-impact journals to be an effective means in the treatment of bodily pain. Aim of this pilot study was to assess knowledge about biofeedback, and acceptance of biofeedback in an Austrian study population of medical students and doctors with background of the Medical University of Vienna.

Material/Methods: To answer this question, a pilot study in 142 subjects [medical students 72 (beginners=38, advanced =34), residents: n=9, seniors: n=61 (from whom pain experts=27)] all of them with background Medical University of Vienna was conducted. By using a questionnaire, knowledge about biofeedback (familiarity with the method, distinction between biofeedback and bioresonance) and if biofeedback is seen as scientific and effective method for treatment of pain was assessed.

Results:

- Familiarity with biofeedback: medical students 47.2% (beginners=28.9%, advanced=67.6%), residents: n=77.8%, seniors: n=98.4% (pain experts=100%).
- Distinction between biofeedback and bioresonance: medical students 33.3% (beginners=23.7%, advanced=44.1%), residents: n=66.7%, seniors: n=72.1% (pain experts=85.2%)
- Acceptance of biofeedback as a method of scientific medicine: medical students 31.9% (beginners=23.7%, advanced=41.2%), residents: n=88.9%, seniors: n=86.9% (pain experts=92.6%)
- Biofeedback seen as an effective method in scientific pain medicine: medical students 23.6% (beginners=10.5%, advanced=38.2%), residents: n=88.9%, seniors: n=90.2% (pain experts=96.3%)
- Knowledge about indications for the application of biofeedback: medical students 22.6% (beginners=7.9%, advanced=38.2%), residents: n=77.8%, seniors: n=85.2% (pain experts=92.6%)

Conclusion: The results of this pilot study indicate that the knowledge about the method of biofeedback shows a strong dependency on expertise in the field of medicine. Furthermore, especially in the group of experts in the field of pain medicine, biofeedback is significantly more often is seen as an effective and scientific method. Further studies with higher sample sizes should be performed to confirm these results. Nevertheless, these results indicate effectiveness of biofeedback in pain treatment concepts, and the fact that pain experts – due their proven knowledge – are the most qualified group to prescribe biofeedback for these indications.

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Subacute nerve root lesion in a competitive amateur tennis player – diagnostic and therapeutic procedures

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Objective: A 54 old, right handed, male amateur tennis player sought medical advice for persistent low back pain with irradiation in the left thigh since 6 weeks after a lumbar spine retroflexion trauma due to a tennis match.

He reported low back pain irradiating in the left thigh and shank partially combined with paraesthesia, and discovered a weakness in the knee extensor muscles, disabling him to raise from a squatting position.

Material/Methods: Prominent findings were a missing left patellatendon nreflex, paraesthesia on the left thigh ventrally, on the left lower leg laterally and medially, as well as painful springing test L4/L5, lateralflexion to the left side and retroflexion of the lumbar spine.

Lasegue and Femoralislasegue manoeuvres were negative bilaterally.

Muscular strength of the left m. quadriceps femoris compared to the collateral side was mildly reduced.

Measuring the circumference of the left thigh showed a significant difference in comparison with the right thigh about 2 cm less.

Results: Conventional radiographs of the lumbar spine showed degenerative changes in the intervertebral disk of L4/L5 and facet joint arthrosis the lower lumbar vertebra.

Magnetic resonance imaging showed a small disc protrusion, containing a significant amount of water, L3/L4 on the left touching the radix L3, and disk protrusions L4/L5 bilaterally, oedema of the facet joints L4/L5 bilaterally and the processus spinosi at L4/L5 and L2/L3.

Magnetic resonance imaging of the thigh bilaterally showed a diffuse atrophy most pronounced in the mm. adductor magnus and vastus medialis, minimal oedema in the M.adductor magnus and increase in fatty tissue between the fasciae of the thigh muscles.

Electroneuro and -myography were without pathological findings.

Combining clinical and radiological findings, we diagnosed a subacute L3 left nerve root lesion. We conducted a CT-guided intraforaminal injection with 2 ml triamcinolonacetomid 80 mg and 3 ml Licocain HCL 1% at the level of L3/L4 leftside.

The pain subsided within one day. We advised the patient to refrain from sport activities and initiated an exercise program for muscular trunk stabilisation and activation and specific strength training for the weak end left thigh muscles. The patient returned to sports activity after 2 weeks.

Conclusion: Although MRT showed multiple pathological findings all of them associated with tennis sport, careful clinical examination identified irritation of lumbar nerve roots as prominent painful and debilitating factor. Interventional pain therapy provided rapid pain relief and functional recovery thus confirming the diagnosis.

In this case, diskogenic low back pain diagnosed and treated aggressively can shorten injury related inactivity and facilitate rapid return to sports in amateur tennis.

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Prevention

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Age Upgrading of Young Players into Adult Competitions – Proposal of a Medical Evaluation Protocol

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Objective: In recent years there has been an increase on demand of young players (15-16 years old) to compete in adult teams, the main reason being shortage of players or good sports skills and seldom the main reason being early maturational development and growth.

Sports federations rules and national laws impose a sports medical evaluation to get the clearance to an age upgrading of young athletes, but there are no established criteria to support this decision and no studies describing the consequences of this action. Adding to this, in Portugal the decision cannot be reversed, that is, the age upgrading is “for life”, no matter the consequences it may have.

We are aware that the inclusion of a young athlete in an adult competition may have effects at several levels that may affect their physical, mental and social well-being.

This presentation is based on the attempt to create a medical evaluation protocol for the age upgrading of young athletes and is included in a major multidisciplinary project trying to evaluate the personal and social repercussions, with the aim of providing feedback to the sports doctors who are in charge of taking this decision and at the same time provide information to sports agents about these same repercussions and what they can expect when using young athletes in adult sports competitions.

Until mid-2010 the decision following the medical evaluation protocol, which included bone-age determination, blood analysis and echocardiogram, was based in a very much subjective “feeling” of adequacy to the age upgrading and on some empirical cardiologic maturation parameters that were gathered in our Centre for the last 30 years, but never compiled or subject to re-evaluation.

Material/Methods: 65 young players (11 F, 54 M) were evaluated in the last 8 months, and a medical evaluation protocol which included body composition (skinfold), sexual (Tanner) and bone-age (Greulich&Pyne) evaluation, height, weight and BMI percentile (Portuguese approved tables), echocardiogram (morphological study and body-surface corrected left ventricular mass index) and blood tests was standardized. Results for each parameter were defined as Adequate, Possibly Adequate or Non-Adequate for the age upgrading of that athlete for that particular sport. Factors that influence this decision are related to sports classification in contact/non contact and/or exhaustive/non exhaustive sports. Cut-off values (M/F) for body composition were set at 55/50% muscle mass and >10% body fat, growth cartilage closure (18/16y), corrected Left Ventricular Mass for Body Surface Area above 100/92 g/m² and, in contact sports, height and weight above the 75th percentile of the approved growth tables for the ages 18/16y and sexual maturity of 5 in all stages.

Results: Sports that most frequently applied for age upgrading were Basketball (B) (n=16, 2F/14M), Field Hockey (FH) (1M), Football (Ft) (n=19, 17 soccer, 2 indoor, all M), Handball (H) (n=6, 2F/4M), Table-Tennis (TT) (1M), Volleyball (V) (n=4 3F/1M) and Waterpolo (W) (n=18, 4F/14M).

4 players (B, F, H, V) were not allowed any age-upgrading and 19 players were allowed to play only in the immediate upper age group (3B 1F/2M; 8Ft 8M; 4A 2F/2M; 3W, 3F; 1V 1F). The main reasons for this decision were either low bone age and/or non-adequate heart adaptation and in some borderline cases there was a conjugation of all the other parameters.

Conclusion: Young players that are requested to participate in adult competitions may be subject to negative health consequences and this preliminary presentation is an attempt to overcome the absence of an objective protocol for the medical evaluation of these adolescents that is not just based on size or sexual maturation. We feel very confident that the evaluated parameters are the correct ones but we still have to gather more data to determine cut-off values. The re-evaluation of all players will allow us to gather data relating to injury, drop-out or other factors incidence, as well as the rate of remainder growth and/or maturation. In our opinion, the limitation of the age upgrading to the remaining season would allow a more “liberal” evaluation because the decision would be reversible in case unexpected problems would occur.

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Concept of applied physical therapy procedures during specialized conditioning camp for top cyclists

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Objective: Physical therapy (physiotherapy) is one of the most ancient branches of medicine. Even in remote past humans used it as a method of choice in the treatment of various diseases. Physical therapy is divided into several main lines involving electrotherapy (electric muscle stimulation), magnetotherapy, phototherapy, laser therapy, ultrasound therapy, inhalation and aeroionotherapy, kinesitherapy, mechanotherapy, massages, reflexotherapy, hydrotherapy, thermotherapy (heat therapy), climate therapy, balneotherapy, physical prophylaxis and rehabilitation.

Material/Methods: Sport involves workouts that can be daily or frequent and whose purpose is to achieve certain goal in various conditions that largely differ from those of the normal daily routine. Most often people practice sports for pleasure, for participation in competitions, for personal improvement, for skills development or for reasons somewhere in between. The European Sports Charter (2001, revised) defines sport as "all forms of physical activity which, through casual or organized participation, aim at expressing or improving physical fitness and mental well-being, forming social relationships or obtaining results in competition at all levels". Cycling is one of the most popular sports in the world. The elaboration, employment and administration of a specialized physical therapy program for the recovery of cyclists during specialized, training and/or conditioning camps can play a vital role for the future success high level events on world and Olympic scale.

Results: Being best conditioned for the competition is the basis of the sportsperson's success when he/she aspires at high sports achievement. Most often, conditioning for a competition is performed in the course of specialized sports camps or planned micro- and macro cycles of the training process. The application of physical therapy procedures is particularly important and of basic significance for the recovery of bodily skills and the improvement of the physiological and vital signs of sportspersons under heavy training pressure. The purpose of this presentation is to introduce a detailed schedule and program for physical therapy, rehabilitation and stimulation procedures which will not only provide quality, fast and effective recovery of the physiological capabilities of the body during the specialized cycling training camp but will so condition and stimulate the organism that the cyclist won't feel the burden of augmenting workouts and will improve his/her achievements with every workout in the course of the training camp.

Conclusion: The elaboration of the schedule and program of the specialized cycling training camp involves the administration of seven physical therapy procedure types, namely, mechanotherapy, hydrotherapy, balneotherapy, kinesitherapy, massage, climate therapy and aeroionotherapy. Special emphasis is placed on sleep as part of the compensatory and recovery mechanisms of the living organism. Comment with brief analysis of the role and need of sex life for the top sportspeople during a training camp is provided.

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Epidemiological study in young professional footballers: a prospective study of three consecutive seasons

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Introduction: Football as most of contact and situational sports is characterized by sudden changes in speed and direction, and this may be noticed in younger players as well with lower power level. Performers are subject to injuries of various kinds mainly located in the lower limbs. At a young age when the athlete matures from a biological and technical point of view, it is important that the athletic and clinical staff implement prevention and training protocols with the purpose to prevent overload diseases. Recovery time between the various sessions should ensure the optimal psycho-physical restoration.

Objectives: The aim of the study is to make a quantitative analysis of three soccer season, in order to: 1) quantify the incidence and type of injury; 2) know which are the roles most affected by injuries; 3) identify which are the age groups with higher incidence; 4) identify which situation has the highest risk of injury.

Subjects: A sample of 745 young-players was identified from the professional football academy of Cagliari Calcio s.p.a., aged between 10–20 years, during the seasons 2007/08, 2008/09 and 2009/10. Collection of data: Each injury was examined by the medical staff at the end of each training session and after each game played and, whenever necessary, put through further diagnostic investigations. Afterward the lesion was classified according to: age (Figure 1) and role of the player (Figure 2), situation (Figure 3), mode of injury (Figure 4), anatomical district and type of pathology (Figure 5). Data were recorded on a spreadsheet for further statistical processing. Statistical analysis: Differences between condition in mean \pm SD were studied with unpaired t-test while differences between ages, role, modality, anatomic and kind of pathology with mean \pm SD were analyzed with one-Way analysis of variance (ANOVA). Statistical significance was set at $p < 0,05$.

Results: The total number of injuries throughout the three seasons is 236 (81, 80 and 75) (Figure 6). The results indicate that the most affected age group is between 14–16 years (42.33 ± 11.24 , 18 ± 3.61 and 21.67 ± 2.31) with higher incidence during training sessions than the game (60.67 ± 4.51 vs 18 ± 2.65). The case report shows a greater incidence in defenders rather than in midfielders, strikers and goalkeepers (37 ± 3 , 20 ± 3.61 , 14.33 ± 1.53 and 10.33 ± 7.57). The most affected anatomical areas are thigh, ankle and knee (29.67 ± 4.51 , 5.29 ± 15 , 13 ± 3), no statistical significance for foot, leg or arm. Tendinopathy is the most frequent pathology (27.67 ± 12.66), followed by the muscular (20 ± 5.2), distorsive (18 ± 3.46) and contusive (8.67 ± 3.06).

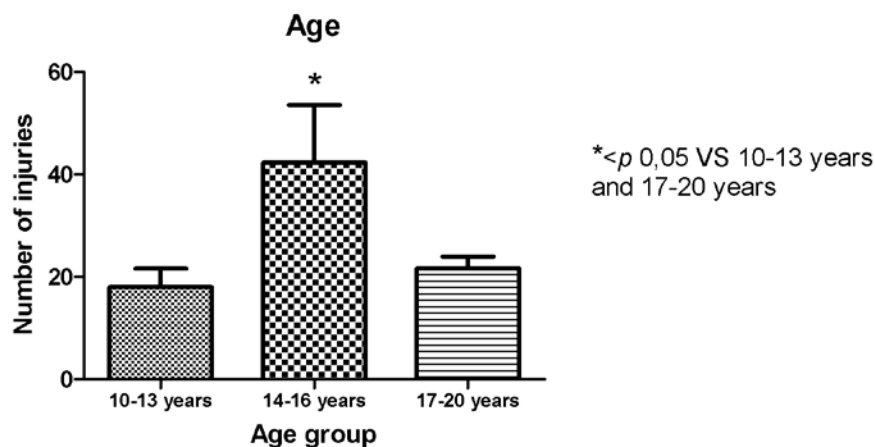


Figure 1

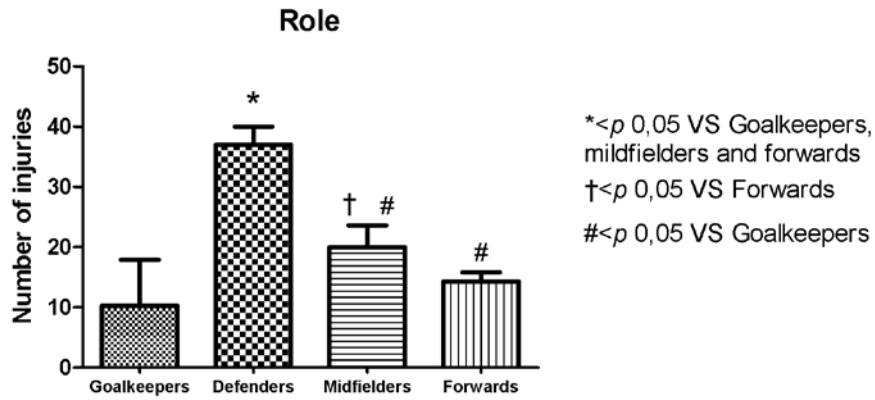


Figure 2

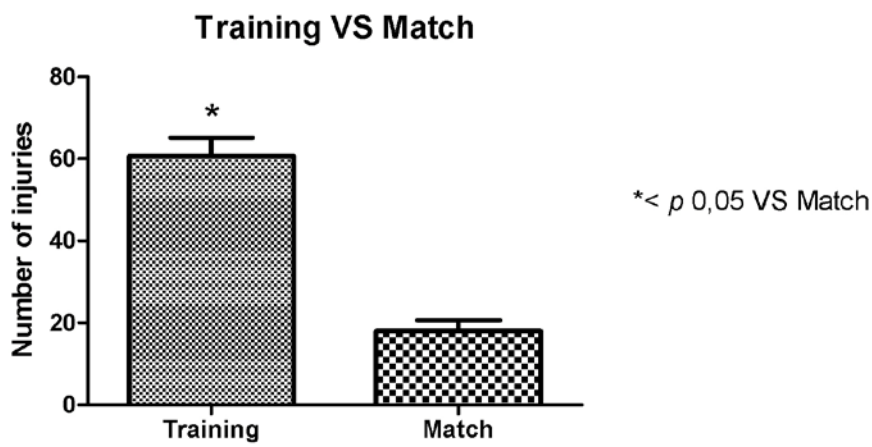


Figure 3

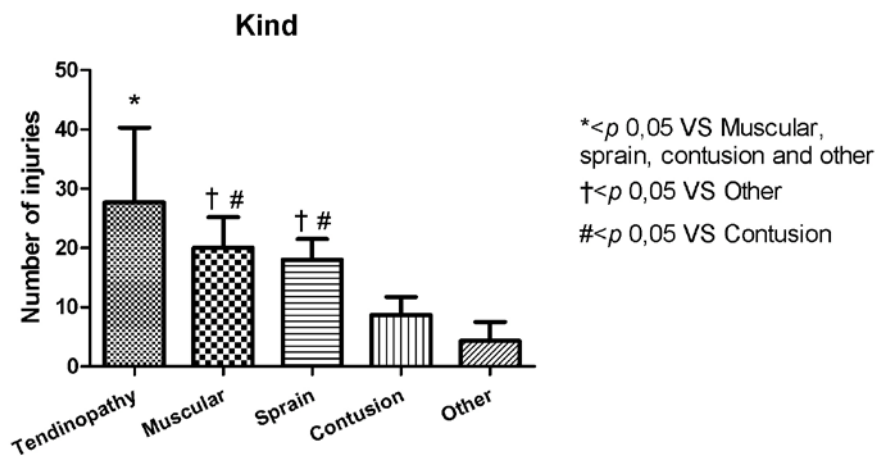


Figure 4

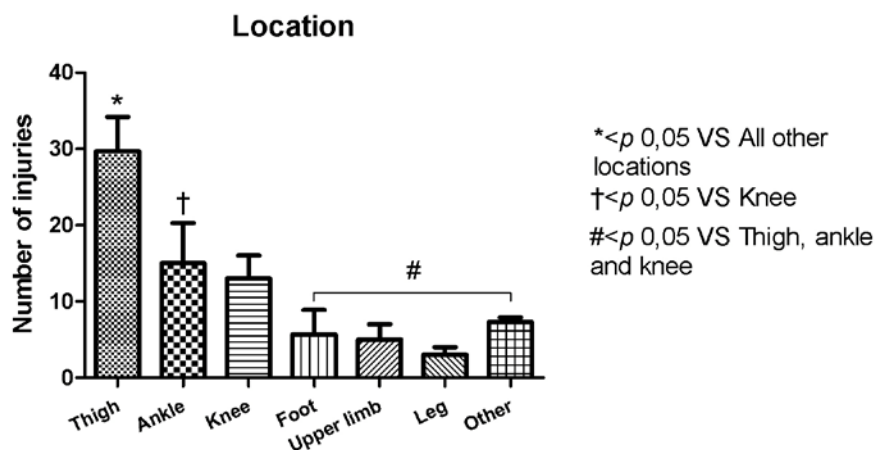


Figure 5

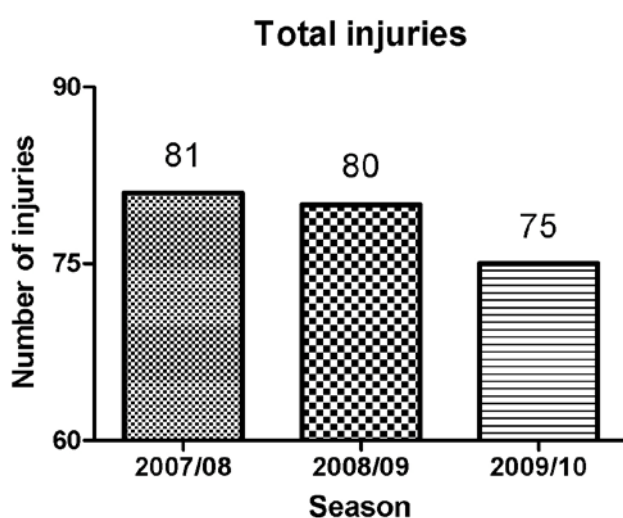


Figure 6

Discussion: The survey indicates that the reason for the athlete to discontinue competitive activity is more often due to tendon or muscular injuries of the lower limbs, while traumatic lesions display a lower incidence. Most affected roles are defenders and midfielders, due to the higher density of players in such areas of the pitch. The game situation and age group in which injuries occur leads us to believe that in the 14–16 age group the number of training sessions is too high and this does not allow an adequate period of optimal recovery in athletes who are in the process of psycho-physical growth. It can be inferred that it might be more appropriate to modify or reduce training sessions to safeguard the athlete’s global growth.

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How long do the positive effects of school-sponsored sport activities last?

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Objective: In the literature it is widely documented that practicing motor skills and sport activities is fundamental for the physical and psychological development of the child and the adolescent.

The epochal changes of the last 50 years (motorization and computerization) have created a “sitting” society, and very often the time spent in school dedicated to physical education is the only time left, since yards have been substituted by computers and television sets. On top of this, political choices based exclusively on economic criteria tend to reduce even more physical activity in school.

The purpose of this study is to reexamine, after 5 years, a group of children who had taken part in a “sport project” organized by their elementary school during school time. The sport project consisted in adding to the school schedule 8 hours of motor sport activities (2 hrs of nordic skiing, 2 hrs of ice-skating, 2 hrs of swimming, 2 hrs of motor activities in the gym) to document whether the benefits experienced at the end of elementary school (reduction in overweight, better school grades, better results in coordination tests, explosive force and aerobic capacity) were still present and whether they had changed the family’s lifestyle.

Material/Methods: From 1995 to 2000, 21 children (sport group) who took part in the sport project – together with 39 children (control group) who attended the same school - were examined annually: physical exam with anthropometric measurements, exercise testing with measurement of the aerobic capacity, motor evaluation testing, and also speed, strength, and coordination testing.

In 2005, 44 boys and girls (14 belonging to the sport group and 30 to the control group) were reexamined. The average age of the subjects examined, calculated on April 1, 2005, was 15 years and two months (SD 0.36) for the males and 15 years and three months (SD 0.45) for the females.

The sport anamnesis, academic achievements, physical exams with anthropometric parameters, exercise testing at the cycloergometer, coordination and explosive abdominal force testing were all reviewed.

Results: The improvements registered at the end of the 5 years in the experimental group (a smaller percentage of overweight children, better school grades, aerobic capacity, and coordination) were no longer confirmed.

Conclusion:

1. The addition of motor sport activities to the scholastic educational program brings about indisputable benefits to the students’ health (especially in terms of overweight, coordination capabilities) and also to their academic achievements.
2. Such benefits disappear with the interruption of sport activities.
3. The direction offered by the school environment for 5 years is not enough to create in the child the “habit” of physical exercise and to modify the lifestyle of the families.

Our progressive civilization has vastly reduced the offers of motor skills activities. Therefore, it is essential that school either helps to fill the void or that it offers the possibility of practicing sport activities every year of a student’s school life and not only during elementary school.

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Lower body muscle imbalance in rugby players

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Introduction: Rugby involves all aspects of physical fitness including but not restricted to, balance, coordination, flexibility, aerobic and anaerobic endurance, reaction speed, strength and power [1], [2].

Considering the multitude of skills required by the rugby players, it is very important that training be based on relevant functional tests for this sport.

In order to increase the leg stability and performance, but also to decrease the number of sports injuries it is useful to investigate imbalances between left and right legs of the rugby players [3].

Objective: The study is aiming to demonstrate the importance of proper testing and adaptation of training according to the test results in order to increase physical performance and decrease the risk of injury.

Material/Methods: A total of 22 rugby players, underwent measurements of explosive force (Counter movement jump) evaluate using Myotest system and one leg explosive force (Squat jump) evaluate with Optojump system, before the start of a training camp and after two months of training. Exercise training comprised: strength training (once on 48 hours, 3-6 sets of 2-6 repetitions at 80-95% 1RM), aerobic training, completed by field training. During the training period was considered the power differences between legs and was emphasized the strengthening of the weaker leg.

Results: The evaluation of sportsmen at the end of the study showed an statistically significant increase in explosive power of the lower limbs (from 39.41 ± 6.998 W/kg to 46.36 ± 8.399 W/kg, $p=0.009$), along with an increase in explosive force at the same level (from 21.59 N/kg ± 1.82 to 25.75 ± 3.25 N/kg ($p < 0.001$)).

Regarding the differences in explosive power between legs, although we didn't find statistical differences at baseline, we noticed a mean difference of 0.48 W/kg between right and left leg. After only 2 months of training the mean differences was reduced to 0.28 W/kg.

Conclusion: Two months of intensive exercise training, significantly increase explosive power and force of the lower limbs. Emphasizing the strength training of the weaker leg, we can adjust the muscles imbalance and decrease the risk of injury. Based on testing results, physical trainers should create personalized training programmes for adjusting muscular imbalance. In case of injury followed by important asymmetry, proper rehabilitation should be performed before starting the specific exercise training.

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Novel antioxidant supplementation in young soccer players

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Objective: Increased formation of free radicals during exercise leads to the deterioration of relation between pro-oxidant molecules and antioxidant defense system. The result is the increased muscle damage with subsequent consequences. Astaxanthin, a red carotenoid pigment, is a biological antioxidant that occurs naturally in a wide variety of living organisms. The aim of this study was to determine the possible effects of Asx supplementation in young soccer players.

Material/Methods: Double blind, placebo controlled study was performed on sixty healthy young (mean age 17.7) soccer players during three months. The intervention group received 4 mg Asx capsules daily. Monitored ergospirometry parameters on treadmill were (VO₂max, RQ, VE, HRmax, HRrecovery, time to exhaustion, maximal speed). Also, we have analyzed blood biochemical (transaminase, parameters of muscle damage, iron, ferritin, lipid status, Gly, Tp, TBIL, urea, creatinine) and hematological parameters before and after training session. Before starting the dietary supplementation, baseline values for each of the subjects were obtained. All tests were repeated after three months of supplementation.

Results: Significant improvement was seen in Asx group in maximal speed (18/18.5 km/h) and time to exhaustion (9.7/10 min) before and after 90 days of supplementation period (p<0.05), but without significant changes in ergospirometry parameters between groups. Significant elevation of CK level registered in P group after training session 90 days after supplementation (p<0.05), was not observed in Asx group. Biochemical and hematological parameters were not showed significant changes within or between groups.

Conclusion: The present study indicates a possible positive effect of Asx supplementation in reduction of muscle fatigue by stabilizing cell membranes. Based on our findings, Astaxanthin supplementation could improve endurance that may lead to better sports performance. Further studies need to evaluate mechanisms behind the increased endurance.

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Obesity at ex-sportsmen case presentation

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Objective: Obesity nowadays is a very important health problem. Obesity is associated with high mortality risks due to increased rates of cardiovascular diseases, diabetes. The association of obesity with other pathologies like cancer are in research. In obesity treatment and obesity prevention sport is almost always indicated.

Our goal is to study obese ex-sportsmen to determine if the past intense sport activity has a long time beneficial influence (independent of eating) on obesity risks - cardiovascular and diabetes pathology, plasma lipoprotein levels, insulin sensitivity and inflammation markers, studying also the distribution of body fat (visceral versus abdominal fat), regarding the difference in associated pathology of one versus another.

Visceral adiposity more than subcutaneous fat has been being associated with systemic metabolic variables like: alterations in plasma lipoprotein-lipid levels particularly increased plasma triglyceride and lowering high-density lipoprotein concentrations [1], elevated blood glucose levels and decrease in insulin sensitivity at young men measured by an euglycemic hyperinsulinemic glucose clamp [2], link between the many facets of the metabolic syndrome: glucose intolerance, hypertension, dyslipidemia, and insulin resistance [3].

Obesity has also a negative impact on the hormonal levels, decreasing the total and free testosterone and FSH and LH levels in morbidly obese men (BMI>40) indicating a functional impairment of the gonadostat suggesting hypogonadotropic hypogonadism syndrome [4].

Material/Methods: We studied a young obese male after a 8 years period of sports activity interruption.

We followed body fat, distribution of body fat, plasma lipoprotein levels, insulin sensitivity, blood glucose levels, inflammation markers, cardiology consult, testosterone, psychological evaluation.

The psychological evaluation aimed for detecting eating behavior, eating disorders, factors that maintain the fat accumulation.

Male 28 years old ex-sportsmen (played rugby for 9 years), 194 kg and 187 cm (BMI 55,92) with 63 kg of muscle mass and a 133 kg of fat (measured with bioelectrical impedance), with no associated pathology other than morbid obesity. He's father has diabetes mellitus type 2 so he had a genetic risk factor

He practice rugby from 11 years old until 20 years old.

After finishing the sport career he began adding kilos. At 20 (when he finished playing rugby) he had 120.

At cardiology consultation he had 130/80 mmHg with 87 beat/min without any other problems.

At psychological evaluation he was diagnosed with compulsive eating disorder.

Evaluation of plasma lipoprotein levels showed a total cholesterol of 200 with a low HDL of 42, a high VLDL of 41 and increased plasma triglyceride of 203.

For inflammation we evaluated he's fibrinogen that was high 355.

He's blood glucose was 100 and the glycated hemoglobin was at the maximum stage of 6.20 with high blood insulin levels of 19.90.

Gonad function is decreased with low LH of 2.63, low FSH of 1.56 and low free testosterone of 2.07.

At MRI the amount of visceral fat was bigger than subcutaneous fat.

Results: This case is part of a larger study in progress. It can not draw conclusion is more of initiating a question on quality of life for ex performance athletes, especially in heavy sports like rugby, lifting weights etc.

We also want to initiate a warning signal that continuing practicing sport and controlling eating behavior is necessary all the time even for an ex sportman.

Our patients had atheromatosis and cardiovascular risk (low HDL and boundary high cholesterol, high triglyceride levels), insulin resistant and poor control of blood glucose levels (boundary high levels of insulin and glycated hemoglobin), prothrombotic state (high fibrinogen) and gonad function affected.

The risks of pathology associated with visceral fat present.

Conclusion: So in this case the practice of sport even if it was of high intensity did not offer a long term protection, considering also the fact that he has morbidity obesity.

Even if in our case the patient was young and had no other diseases he had risks of cardiovascular diseases, diabetes, metabolic syndrome and hypogonadism.

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Overuse injuries in elite female handball

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Objective: To document the impact of time exposure to handball and the incidence of overuse injuries in an elite female handball team over four competitive seasons.

Material/Methods: The team had two physiotherapists who were at all times in practices and games. Injuries were recorded by one of them at the end of each session/ game in an injury registration diary. The diary was filled with the next information: Player name, date of the injury, anatomic structure injured, days off training, number and type of physiotherapist treatments and exposition time [1]. The number of players per position was: 27 back players, 13 wing players, 10 line players and 9 goalkeepers. Injury incidence was calculated as the number of injuries per 1000 hours of exposure.

The coefficient of determination R² was calculated to find out about the relationship between exposition time and injury incidence. The Kruskal Wallis test showed the significant differences in the number of injuries throughout the months per season. Level of significance $\alpha < 0.05$.

Results: 338 (61.3%) were overuse injuries. The incidence of overuse injuries was 30.7 injuries/1000 h of exposure. There was a significant statistical relationship between exposition time and injury incidence ($p=0.004$). Furthermore, the average value of overuse injuries was significantly different between the months ($p=0.01$). Specifically, the highest overuse injury incidence occurred at the beginning of the season (August with 55.2 injuries/1000 h of handball exposition and September with 38.1 injuries/ 1000h of handball exposure) and the late period of competition (March with 28.6 injuries/1000 h of handball exposition and April with 30 injuries/ 1000 h of handball exposition)

Conclusion: This study shows that elite female handball players were more susceptible to overuse injuries in the pre-season and the late competition training phases [2]. Furthermore, this data may provide helpful information to coaches and athletic trainers since it gives feedback for a better control of the training loads.

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Stress and social environment on volley Albanian player at first category

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Objective: To understand that fight against the stress is a crucial problem and underline the role of social environment especially to the elite athlete, volley-player. Subjects: This study engages Team Volley, 210 persons of first Category in Albania like: For male "Skenderbeu", " S.K Tirana," Teuta" , " Elbasani" ,: Vllaznia" ," Flamurtari"and " Dinamo"; for female Skenderbeu", " S.K Tirana", " Teuta" ,UMB,"Studenti", " Partizani", " Krutja" ," Minatori".

Material/Methods: Questionnaire assessment Stress and the Social Environment has been applied [1].

Results: Data from question according the scale are:

For male

"Teuta", Inadequate Level, 0%,Marginal L.8% ,moderate L.34%,superior L.58%,optimal level, 0%.

"Skenderbeu", Inadequ L.5% ,Marginal L.15% ,moderate L35% ,superior L.35% ,optimal L, 10%.

"S.K Tirana, Inadequa L,9 % ,Marginal L.16% ,moderate L .50% ,superior L.9%,optimal L. 16%.

"Elbasani", Inadeq L , 0 % ,Marginal L,0% ,moderate L.19% ,superior L.54% ,optimal L. 27%.

"Vllaznia", Inadequ L, 0% ,Marginal L,30% ,moderate L 70% ,superior L. 0% ,optimal L. 0%.

"Flamurtari" Inade L , 0 % ,Marginal L,36% ,moderate L,46% ,superior L,0 % , optimal L,18 %.

"Dinamo" Inadequ L, 0% ,Marginal L. 10% ,moderate L 60% ,superior L. 30% ,optimal L, 0%.

For female

"UMB, Inadequate Level, 9% ,Marginal L. 0% ,moderate L . 27% ,superior L. 46% ,optimal L,18%.

Skenderbeu", Inadequ L, 0% ,Marginal L. 12% ,moderate L,38% ,superior L. 50% ,optimal L, 0%.

"S.K Tirana", InadequaL. 0% ,Marginal L.25% ,moderate L .25% ,superior L. 34% ,optimal L, 16%.

" Teuta" , Inadequa L 0%,Marginal L. 0% ,moderate L. 66% , superior L.34% , optimal L. 0%.

"Studenti", Inadequa L. 0% ,Marginal L.9% ,moderate L. 64% ,superior L.18 % ,optimal L. 9 %.

" Partizani", InadequatL. 0 % ,Marginal L.25% ,moderate L .59% ,superior L. 8% ,optimal L. 8 %.

" Krutja" , Inadequa L. 0% ,Marginal L. 0% , moderate L. 25% , superior L. 58% ,optimal L. 17%

" Minatori", Inadequa L. 8% ,Marginal L. 8% , moderate L. 34% , superior L. 50% ,optimal L. 0%

Conclusion: For male and female teams seems to have no significant problem to stress where the most of the team are at moderate and superior level.

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The benefit of the individualised prophylactic programs on the somatometric parameters of obese young people

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Objective: A study made on the students from West University of Timisoara has shown that 38% are overweight and obese. An individualized prophylactic program that includes an exercise program and a hygieno-diet regime can modify the lifestyle and can improve the young obese's somatometric parameters, state of health and quality of life.

Material/Methods: The study group was composed by 60 students; the criteria upon which the students were selected were: age between 18 and 25 years (21.4 ± 3.74 years), $BMI > 30 \text{ kg/m}^2$, agreement upon voluntary participation to the assessments meetings, training programs and accordance to the hygieno-diet regime; the exclusion criteria were: the presence of an associated pathology that would contradict physical effort and/or a hygieno-diet regime, disapproval towards the mentioned agreement, expressed desire to leave the program. The assessment protocol was composed of: somatometry, body composition analysis through bioimpedancy (InBody720 device), analysis of the glycaemic and lipids profile, ergospirometric analysis, life quality assessment (WHOQOL) [1]. The study period was 24 months; the subjects were evaluated on a quarterly basis. The training schedule was based upon the ergospirometric analysis, so that the heart rate intervals demanded by the physical training were those in which lipids are predominantly consumed [2]. The nutritional counselling was based upon stressing the focus on a hypocaloric and hypolipidic regime.

Results: The most significant results of this study are presented in Table 1.

Conclusion: Following the compliance with the kinetoprophyllactic program and with the diet, significant improvement of the majority of the somatometric parameters and indexes has been obtained, especially on those which are directly related to the cardio-metabolic risk (visceral fat area, lipidic profile, rest heart frequency, blood pressure values, waist-hip ratio).

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The body mass index underestimates thinness in adolescent athletes

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Objective: Children and adolescents are often involved in sports in which weight loss is perceived as an advantage. Adolescents try to lose weight or body fat in the interest of improved appearance or athletic performance. Unhealthy weight-control practices can impair athletic performance and increase injury risk. They also may result in medical complications including delayed physical maturation, oligomenorrhea and amenorrhea in such as the female athletes, development of eating disorders, potential permanent growth impairment, etc. Body mass index (BMI, kg/m²) is the most widely used screening tool for underweight, especially in general practice. In athletes BMI as indicator of thinness can be questioned. The aim of the study was to determine sensitivity and specificity of thinness among healthy young athletes based on body mass index (BMI, kg/m²) (using the IOTF criteria [1]), and the % body fat (%BF) determined by the bioimpedance method and using percentile lines from UK study [2].

Subjects and methods: We used data from the Sports Medicine State Agency database on health check-ups conducted between 2008 and 2009. Cross-sectional study using cluster sampling (sports organisations) was implemented, analysing data from 7 667 young athletes (5222 male and 2 445 female) at age from 7 to 17 years old. Athletes were categorised as belonging to lean (n=2 390) or non-lean (n=5 277) sports [3]. Body composition (%BF) was measured by a multi frequency 8-polar bioelectrical impedance leg-to-hand analyser (X-Scan plus II, Korea).

Results: The prevalence of underweight according to IOTF BMI cut-off values was 3,2% (n=216, CI 95% 0,88-5,6), the corresponding values of underfat using body fat cut-offs was 59,42% (n=4556, CI 95% 58,32-60,52). The performance of BMI cut-off values for identification of thinness individuals with %BF as reference is displayed in Table 1.

Type of sport	Boys			Girls			Total		
	Sens	Spec	Perc	Sens	Spec	Perc	Sens	Spec	Perc
Leanness	2	100	50	2	100	51	2	100	51
Non-Leanness	22	97	30	17	99	18	20	98	23
Total	9	98	42	4	100	43	5	99	42

Table 1: Sensitivity (Sens), specificity (Spec), and proportion of individuals that are underfat according to % body fat and with body mass classified as normal or above according to BMI cut-offs (Perc) displayed by type of sport (leanness vs. non-leanness) and gender.

Conclusion: The sensitivities of the BMI-derived cut-offs were mostly below 20%, while the specificities were high. Our results suggest that the low sensitivity IOTF BMI cut-offs leads to a considerable underestimation of the true prevalence of thinness in youth athletes.

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The examination of the effects of proprioceptive training among young basketball players

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Objective: The high frequencies of ankle and knee injuries, as well as the associated negative consequences cry out for preventive methods in the point of sport activities. Literatures, both home and international confirm the legitimacy of proprioceptive training in injury prevention, as well as during the follow-up care. However it can be concluded in the light of the results of the relevant literature published on the subject, that the research concerning children is quit scant. The proprioceptive training applied on children has a positive impact on quantitative evidence, even after six weeks of training.

Material/Methods: The sample size was 14 persons, all boys, brought up as reinforcement, playing basketball at competition level. The average age is 10.28 years (min.: 9, max.: 11, SD: 0.61). The proprioceptive training was practiced for 6 weeks, 2 times a week. The sessions were 20 minutes, organized with the method of rotation with 3 stations. The Bretz type of stabilometer provided the numerical data. The values of state static and dynamic balance were obtained as a result of tests carried out on both (N=28).

Results: Measured in millimeters in vertical dimension, the tipping of the centre of body mass towards antero-posterior direction did not (N=28; SD Diff.=17,80; t=1,38; p=0,18), while towards medio-lateral direction showed a significant difference (N=28; SD Diff.=8,09; t=2,66; p=0,01) in paired t-test.

Conclusion: The significant improvement of medio-lateral displacement value quantifies the extent of the lateral muscle groups' muscle length regulation, which is tantamount to increasing the effectiveness of the defensive reflex action, hoping to decrease the frequency of inversion injuries in the future. The movement of the ankle joint to antero-posterior direction is present with much higher frequency during the regular motions, so it did not show a significant change. In field of the prevention of ankle injury the medio-lateral shift has a greater importance. Based on conclusions drawn from the training meets the objective of exercises has been drawn up, which has demonstrated positive effect after 6 weeks in the case of basketball player in young age.

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Rehabilitation of Neurological Disorders

204

Short term effect of an aerobic exercise program in a patient with neuroacanthocytosis syndromes: A case report

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Objective: The term “neuroacanthocytosis” describes a heterogeneous group of molecularly-defined disorders which result in progressive neurodegeneration, predominantly of the basal ganglia and erythrocyte acanthocytosis, their pathogenesis is still unknown. The clinical presentation of neuroacanthocytosis syndromes typically involves chorea and dystonia, but a range of other movement disorders may be seen. The aim of the present study was to investigate the ambulatory functionality and the importance of physical activity in a subject with neuroacanthocytosis syndrome, and its relationship to static-dynamic balance and postural control.

Material/Methods: Prospective, longitudinal and descriptive study. A male patient with neuroacanthocytosis syndrome and degree of disability 50 in functional scale MYERS was studied (age 42 years; height 164 cm; weight 70.2 kg). The following tests were performed: Timed Up and Go (TUG); hand-grip strength; Berg Balance Scale (BBS); 10 Meter Agility Shuttle Test (MAST); and exercise tolerance the 6-Minute Walk. Also Borg Perceived Exertion and Fatigue Severity Scale (FSS) were used. The supervised intervention had duration of 6 weeks, with a frequency of 2 days per week with training session of 45 minutes in treadmill. Workouts were based on a 70% aerobic volume capacity of 40–50% heart rate reserve (HRR), and 30% static balance training.

Results: The results of this study suggest a significant improvement in 10MAST (1.250 seconds), TUG (1.800 seconds), exercise tolerance (56 meters in 6MWT), static strength (near to 10 % in the upper extremity) and static-dynamic balance (BBS 42-48). In relation to FSS a moderate decrease was observed after the physical activity period. However, there were not significant important changes final heart rate (HR) in 6MWT after program.

Conclusion: The results of this study suggest that an aerobic exercise program of 6 weeks have significant influence on improvement of static and dynamic balance, and on increasing muscular strength in a patient with Neuroacanthocytosis. Not appear have an important influence in exercise tolerance. Therefore this intervention can be recommended in the functional recovery of Neuroacanthocytosis patients.

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The Elderly Patient

205

Effectiveness of physical therapy in elderly patients with internal fixation after hip fracture

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Objective: Hip fracture is the most common trauma among elderly population (90%).

The objective of this study was to compare the level of functional recovery and improvement in local findings before and after medical rehabilitation, in elderly patients with internal fixation after hip fracture.

Material/Methods: 30 patients with surgically treated hip fracture (internal fixation with Gamma 3 nail) were included in this research. We registered comorbidities, the time from surgical intervention until admission to Clinic for medical rehabilitation and duration of inpatient rehabilitation in all patients. We assessed the range of active movements of the hip, muscular strength measured by the manual muscle test and functional outcomes using Harris hip score, on admission and at discharge from our institution. Physical therapy included intensive kinesiotherapy, occupational therapy and electromagnetic therapy (unless there were contraindications for its implementation).

Results: The average age of patients was 76 years. Cardiovascular disease were the most common comorbidity (65%). The average time from surgical intervention until admission to Clinic for medical rehabilitation was 41 days. The average duration of inpatient rehabilitation was 23 days. All parameters showed statistically significant improvement in local and functional recovery, after physical therapy ($p < 0.01$). There is statistically significant correlation between range of active movement of the hip joint and Harris hip score. Two patients were excluded from the program of medical rehabilitation because of medical complications due to comorbidities and complication.

Conclusion: Early mobilisation of the patient together with carefully designed and dosed program of medical rehabilitation, adapted to the elderly patients and their other diseases is very important for a successful functional and local recovery.

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Factors associated with reintegration to normal living after stroke

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Background and Purpose: Emotional alterations are frequent after stroke. Anxiety is a response due to the fear from disease, although depression is a result of potential disability and restrictive lifestyle. The object of this study was to investigate the relation between reintegration to normal living (community reintegration) of patients after stroke and their functional disabilities.

Subjects and Methods: Data were collected from 44 patients with chronic stroke receiving physical therapy services at Physical Medicine and Rehabilitation Clinic, University Clinical Center of Prishtina. Activities of Daily Living (ADL) were measured with the Barthel index (BI), Reintegration to Normal Living Index (RNLI) was used to measure Reintegration into normal social activities, Functional Capacity was measured with six-minute walk test (6MWT), balance was evaluated with Berg Balance Scale(BBS),and Motor Functioning was assessed with Fugl-Meyer Motor Assessment (FMA).

Results: Based on statistical results it's concluded that the RNLI score has correlated positively with 6MWT, and BI, meanwhile age didn't demonstrate any correlation.

Characteristic	Value
Demographics	
Age, y, $\bar{X} \pm SD$ (range)	49.8 \pm 17.4 (18–80)
Sex, no. (%)	
Men	26 (59.1)
Women	18 (40.9)
Stroke characteristics	
Side of paresis, no. (%) of subjects	
Left	24 (54.5)
Right	20 (45.5)
Type of stroke, no. (%) of subjects	
Ischemic	34 (77.3)
Hemorrhagic	10 (22.7)
Length of rehabilitation hospital stay (d)	29.5 \pm 18.2 (5–87)
No. of days physical therapy was provided	20.6 \pm 12.6 (5–61)
No. of physical therapy sessions per day	1.5 \pm 0.5 (1–2)
Duration of sessions (min)	34.1 \pm 6.5 (25–45)
Risk factors	
Hypertension	24 (54.5)
Diabetes	15 (34.1)
Cardiovascular diseases	13 (29.5)
Smoking	19 (43.2)

Table 1: Subject Characteristics

Measures, ^a $\bar{X} \pm SD$ (range)	
RNL index (0–100)	62.2 \pm 17.5 (39–90)
BBS score (0–56)	47.1 \pm 6.8 (37–56)
BI score (0–100)	68.0 \pm 20.5 (41–98)
6MWT (m)	336.6 \pm 82.2 (231.7–472.1)
FMTOTAL score (0–114)	66.2 \pm 20.1 (38–96)
FM arm score (0–66)	44.3 \pm 13.8 (16–65)
FM leg score (0–34)	21.9 \pm 6.3 (12–31)

^a RNL = Reintegration to Normal Living, BBS = Berg Balance Scale, BI = Barthel Index, FMA = Fugl-Meyer Motor Assessment, 6MWT = Six-Minute Walk Test

Table 2: Subject

Measures

Variable	Pearson r Correlation with RNL Index Scores
Age	-0.058, $p > 0.05$
BBS	0.550, $p < 0.001$
BI	0.631, $p < 0.0001$
6MWT	0.648, $p < 0.0001$
FM total score	0.607, $p < 0.001$
Length of rehabilitation hospital stay (d)	0.255, $p > 0.05$

Table 3: Relationship between Reintegration to Normal Living (RNL) Index Scores and Other Variables

Conclusion: Physical impairment have immense impact in reintegration of stroke patients in society. With the improvement of physical state the quality of life is raised too, and stroke patients are easier reintegrated in the society. Patients with stronger reintegration to normal living had better outcomes in daily activity and quality of life.

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Functional capacity and risk of fall in institutionalized elderly

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Objective: The normal aging process involves a loss of functional capacity, more or less significant, caused by the deterioration of physiological systems. The decline in functional capacity, particularly at physical fitness, that involves reducing the levels of muscle strength, gait and static balance disorders, are largely indicated in the literature as major risk factors for falls in the elderly. Falls are a serious public health problem: 32% of people over 65 have at least one fall per year and 5% of falls result in fractures. The majority of seniors who had a fall will fall again within six months [1]. The self perception of a reduced ability to self protection during the fall (speed of reaction to cling, putting hands in front, for example) and the ability to get up after falling can trigger the fear of falling and increase the functional decline by self-limitation of activity and self-restraint of participation [2]. The objective of our study is to determine the relationship between fear of falling, functional capacity and body composition in institutionalized elderly.

Material/Methods: We drew up a descriptive, correlational and cross-cutting study. To achieve our objective we collected the following data:

- a) Demographic variables: gender, age and length of institutionalization
- b) Clinical history and risk factors for osteoporosis
- c) Tinetti Falls Efficacy Scale (FES) [2]
- d) Senior Fitness Test Rikli Jones (1999) – modified protocol: timed up and go test; 30 sec arm curl test with dumbbell; 30 sec sit to stand; back scratch test; chair sit and reach; unipodal balance eyes shut
- e) handgrip strength of both hands: Jamar[®] hand dynamometer
- f) Key pinch strength with digital dynamometer Baseline[®]
- g) Body composition: bioelectric impedance on Tanita Ironman Body Composition Monitor[®]

Results: A total of 73 elderly were subject to this study, 46 women (81,02±7,71 years) and 27 men (81,81±7,76 years) with FES score of 84,33±21,08. We found correlations between age and:

- 30 sec arm curl test with dumbbell (-0,400**)
- 30 sec sit to stand (-0,331**)
- chair sit and reach (-0,307*)
- unipodal balance eyes shut (-0,278*)
- timed up and go test (0,324**)
- handgrip test left hand (-0,241*)
- key pinch strength right (-0,280*) and left (-0,366**)
- bone mass (-0,265*)
- visceral fat rating (0,296*)

We found correlations between FES score and:

- 30 sec arm curl test with dumbbell (0,442**)
- 30 sec sit to stand (0,479**)
- timed up and go test (-0,643**)
- handgrip test right hand (0,368**) and left hand (0,343*)
- key pinch strength right (0,409**) and left (0,400**)
- bone mass (0,298*)
- total muscle mass (0,290*)

When comparing the subjects of our study with standard values for same age and sex, we observed reduced values with statistical differences in: 30 sec sit to stand, chair sit and reach, back scratch test, timed up and go test, handgrip and key pinch strength, bone mass in women and total muscle mass ($p < 0,05$). We also find statistical differences, but with higher values, in total body fat, visceral fat rating and BMI ($p < 0,05$).

Conclusion: We detected low levels of functionality at agility, flexibility and balance in association with a decrease in handgrip and key pinch strength. Also the findings regarding body composition are risk factors for morbidity, risk of falls and low-impact fractures. Improving the functionality of the elderly population significantly

reduces risk factors for falls, increasing also the activity and social participation which leads to improved self-esteem and self-image and a healthier life.

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Influence of therapeutic program in aquatic environment on static strength, ventral dorsolumbar flexion and cardiorespiratory fitness in healthy post-menopausal women

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Objective: A sedentary lifestyle and a poor physical conditioning may interfere with daily activities and with the ability to act independently in older people. Also it can increase the risk of accidents and decrease the quality of life. Among the strategies utilized to prevent neuromuscular and cardio-respiratory deterioration, physical activity is one of the most effective, especially strength conditioning and aerobic training. In this sense it has been developed a therapeutic program based on physical exercise in aquatic environment in order to analyze its effect over fitness in a population of postmenopausal women.

Material/Methods: The experimental sample was 26 women aged between 60 and 70 years (64.35 ± 3.24). To perform the study three tests were performed. In order to evaluate cardiorespiratory fitness the 6-Minute Walk Test was performed, to assess the flexibility the Sit and Reach test was used, and the static force was evaluated by manual dynamometry. The intervention had a duration of 8 weeks, with a frequency of 4 days per week with training session of 45–50min. Workouts were based on a 50% aerobic volume capacity of (60% HRmax.), 30% strength training and 20% flexibility.

Results: The results of this study suggest a significant improvement in cardio-respiratory function and in flexibility after the physical activity period. However, there were not significant changes in strength condition. After the detraining period, flexibility changes were maintained while aerobic improvements were lost.

Conclusion: The results of this study suggest that a physical activity program of 8 weeks in aquatic environment have significant influence on increasing dorsolumbar flexibility and cardiorespiratory fitness in postmenopausal women, but they need to continue practicing exercise to keep the improvements achieved.

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Postural balance in elderly evaluated in a force platform: the vestibular system and its importance in the aging process

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Objective: Balance dysfunction remains a significant factor for disability in the elderly [1]. Several mechanisms have been proposed to explain the changes in balance during aging. Balance disorders represent a growing public health problem due to the association with falls and fall related injuries [2]. The complexity of the balance system, however, often requires a thorough, multidisciplinary approach to the evaluation and successful treatment of balance impairment [3]. The vestibular system detects head movement in space and in turn generates reflexes that are crucial for daily activities, such as stabilizing the visual axis and maintaining head and body posture [4]. To measure postural balance an accurate and reliable instrument is needed that can numerically reflect the importance of the different variables involved in human balance [5]. With this study it's our aim to directly determine the balance of older people and to establish the importance of the vestibular system in aging.

Material/Methods: The data of postural balance in three test conditions was collated with a Metitur[®] force platform (normal standing with eyes open, normal standing with eyes closed, foam standing with eyes open and foam standing with eyes closed, with 30 seconds duration each). Height was measured with a Seca[®] stadiometer: subjects were asked to stand with back, buttocks and heels against the stadiometer. Subject's feet were together and flat on the floor and their heads in the Frankfort plane.

Results: We evaluated 49 elderly (42 woman and 7 men) with a mean age of 68,73±9,39 years and with a BMI of 28,63±4,77. The postural balance data obtained was:

Mean x-axis speed in normal standing with eyes open – 3,56±1,39 mm/s

Mean y-axis speed in normal standing with eyes open – 6,82±2,5 mm/s

Mean x-axis speed in normal standing with eyes closed – 4,51±2,35 mm/s

Mean y-axis speed in normal standing with eyes closed – 10,96±4,75 mm/s

Mean x-axis speed in foam standing with eyes open – 4,37±1,67 mm/s

Mean y-axis speed in foam standing with eyes open – 9,29±2,86

Mean x-axis speed in foam standing with eyes closed – 5,59±2,62

Mean y speed in foam standing with eyes closed – 15,01±4,29

Establishing correlations, we observed that the age is positively correlated to different types of evaluations in foam: mean x-axis speed in foam standing with eyes open (0,358*, p=0,011), mean y-axis speed in foam standing with eyes open (0,419**, p=0,002), mean x-axis speed in foam standing with eyes closed (0,331*, p=0,02) and mean y-axis speed in foam standing with eyes closed. Comparing the subjects studied with reference values of same age and sex [5], we can observe that our subjects achieve better results (less velocity) in both "x" and "y" axis (subjects versus references values):

Mean x-axis speed in normal standing with eyes open – 3,56±1,39 mm/s vs. 4,18±0,81 mm/s

Mean y-axis speed in normal standing with eyes open – 6,82±2,5 mm/s vs. 7,27±1,84 mm/s

Mean x-axis speed in normal standing with eyes closed – 4,51±2,35 mm/s vs. 5,68±1,44 mm/s

Mean y-axis speed in normal standing with eyes closed – 10,96±4,75 mm/s vs. 12,20±3,01 mm/s

Taking into account the results in the different tests, the platform software assigns a classification to the importance of the different systems involved in balance. The vestibular system is itself responsible for 55,19% of the total balance of the studied subjects.

Conclusion: The subjects of our sample had better results when compared with reference values of same age and sex. They also tended to have more pronounced sway with age in foam standing with eyes open and in foam standing with eyes closed, in both "x" and "y" axis, which means that the vestibular system has a very important role in the balance of the elderly subjects we have studied.

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Various

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Anti-doping control: Profile of positive cases in Brazilian athletics

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Objective: The objective of this study was to present a description of positive cases of doping in athletes practicing Brazilian athletics.

Material/Methods: With the authorization of the Brazilian Athletics Confederation (I believe needs to be placed here WHAT was done). We conducted a search in the database of the National Anti Doping Agency (ANAD) regarding the athletes tested between the years 2002 and 2010, through descriptive statistical analysis.

Results: It was found that between 2002 and 2010 found a total of 3,123 tests, 42 positive cases of doping among athletes brazilians. The anabolic agents were the most prevalent substances found in tests with more than 40% of cases, followed by stimulants with more than 25%. The event of Long Distance showed the highest incidence of athletes with positive tests, with a percentage more than 55%. The substances most found were the anabolic agents (38%) and stimulants (34%). For the event of Middle Distance, the most prevalent were anabolic agents and peptide hormones with 40% in each case. In the sprints events only two substances were found, anabolic agents (55%) and peptide hormones (50%). In the jump events total up anabolic agents by 57%. For the throw and shot put events the stimulants were the highlights with 50% of case. Among women, the highest incidence of positive tests is evidence in the long distance events, with 44% of cases, followed by jumping events (22%) and the Middle Distance (22%). In men, evidence of substance also has the highest number of cases (64%), followed by the sprints (15%).

Conclusion: From the data presented we could observe that among the athletes of athletics the substances were found; agents anabolic (41%), stimulants (25%) peptides hormones (16%), diuretic and agents masked (8%), glucose (6%) modulated (moduladores) and hormones antagonist (4%). For both gender the long distance (57%) was that presented the most number of doping, followed jumps (14%).

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Assessment of aerobic efficiency and state of nutrition in a selected group of Polish athletes practicing Brazilian jiu-jitsu

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Objective: The aim was to assess aerobic efficiency and state of nutrition in athletes practicing Brazilian jiu-jitsu.

Material/Methods: The study was conducted with the participation of 47 athletes, aged 25 ± 5 years, practicing Brazilian jiu-jitsu. The minimum training period for athletes was 4 years. A criterion for the participation in the study was the requirement of at least 4 trainings of Brazilian jiu-jitsu a week, apart from general development trainings and strength trainings. Body composition was analyzed by the bioelectrical impedance method with a BIA 101S analyzer by AKERN-RJL, using the Bodygram computer software. Measurements of body composition were performed in accordance with the recommended measurement conditions, i.e. on an empty stomach in the morning. Maximum oxygen uptake ($VO_{2\max}$) by athletes was recorded using a Cosmed K4b2 respirometer during the progressive test at an increasing load on a Kettler X1 cycle ergometer.

Results: Analysis of body composition in athletes practicing BJJ showed a mean content of the adipose tissue of 15.5% body weight. In over 50% examined athletes the adipose tissue was found to be less than 14.9%, with 6.5% athletes having body fat content below 10%. In turn, the level of the adipose tissue over 18% was observed in 27% athletes (in 6.5% athletes $FM > 23\%$). Analysis of the fat-free body mass, the muscle tissue mass and total water content showed their values to be on average 83.7%, 54.9% and 62.1%. Maximum oxygen uptake determined during the progressive test was 58.4 ± 8.2 ml/min/kg b.w. We need to stress the fact that the highest oxygen uptake (62.6 ± 8.5 ml/min/kg b.w.) was found for athletes, in whom the level of the adipose tissue was found to be consistent with the physiological norm at 15–18%. In case of individuals with a very low adipose tissue content ($FM < 10\%$) $VO_{2\max}$ was 54.5 ± 3.3 ml/min/kg b.w., while the lowest values of $VO_{2\max}$ (51.6 ± 5.9 ml/min/kg b.w.) were observed in athletes with fatness levels at over 23% body weight. In this study correlations were also observed e.g. between oxygen uptake and total water content in the organism ($r=0.51$, $p<0.001$), the level of extracellular water ($r=0.40$, $p<0.01$), the adipose tissue ($r=0.44$, $p<0.01$) and the muscle tissue ($r=0.38$, $p<0.01$).

Conclusion: Assessment of body composition showed an appropriate state of nutrition in the analyzed group of athletes. However, a high percentage of athletes was characterized by an excessive level of the adipose tissue. Determined values of maximum oxygen uptake show an average aerobic efficiency of athletes practicing BJJ in comparison to e.g. wrestlers and judokas, which indicates the need to increase its level by appropriate modifications in the character of fitness preparation of athletes. We also need to stress the fact that in athletes exhibiting a moderate level (within physiological norm) of the adipose tissue, a better adaptation is found to aerobic effort. This seems to prove an advantageous relationship between the optimal state of nutrition and physical fitness, with no need to excessively reduce the level of the adipose tissue, which may lead to e.g. weakness and a reduction of effort fitness.

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Assessment of body composition and anaerobic strength in a selected group of Polish athletes practicing wrestling and Brazilian jiu-jitsu

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Objective: The assessment of body composition and anaerobic efficiency in a selected group of athletes practicing wrestling and Brazilian jiu-jitsu.

Material/Methods: The study was performed with the participation of 43 athletes, aged 21 ± 4 years, practicing free-style wrestling ($n=23$) and Brazilian jiu-jitsu ($n=20$). Analyses of body composition of athletes were conducted using the bioelectric impedance method with a BIA 101S analyser by AKERN-RJL. In turn, the anaerobic strength was assessed using the Wingate test with the application of a Monark 894E cycle ergometer.

Results: Analysis of body composition showed a mean content of the adipose tissue in athletes to be 14.4% body weight (wrestlers: 14.6% vs. BJJ: 14.2%). In both sports disciplines the level of fat-free body mass and the muscle tissue in athletes were also similar, amounting on average to 85.5% and 56% body weight. We need to stress here that fact that in over 50% athletes practicing wrestling (57%) and BJJ (55%) the adipose tissue was found at less than 14.9%. Moreover, 13% examined wrestlers had a very low body fat content, amounting to less than 10% body weight. Analysis of anaerobic efficiency of the examined group of athletes, performed on the basis of the Wingate test, showed a maximum strength of 11.8 ± 2.0 W/kg in wrestlers and 11.5 ± 1.3 W/kg in athletes practicing Brazilian jiu-jitsu. In both sports disciplines a similar time to reach maximum strength was observed (wrestlers: 2.7 ± 1.6 s vs. BJJ: 2.6 ± 1.2 s), as well as mean strength (wrestlers: 8.0 ± 0.6 W/kg vs. BJJ: 7.9 ± 0.5 W/kg), minimum strength (wrestlers: 4.9 ± 0.6 W/kg vs. BJJ: 4.6 ± 0.6 W/kg) and reduction of strength [wrestlers: 57.9% (7.1 ± 1.8 W/kg) vs. BJJ: 59.0% (6.8 ± 1.5 W/kg)]. Statistical analysis of results collected in this study showed correlations e.g. with mean strength and body weight ($r=0.90$, $p<0.001$), total water content ($r=0.93$, $p<0.001$), fat-free body weight ($r=0.93$, $p<0.001$) and muscle mass ($r=0.60$, $p<0.001$), as well as maximum strength and body weight ($r=0.77$, $p<0.001$), total water content ($r=0.77$, $p<0.001$), fat-free body weight ($r=0.76$, $p<0.001$) and muscle weight ($r=0.70$, $p<0.0001$). Moreover, a correlation was found between the reduction of strength and body weight ($r=0.69$, $p<0.001$), mass of the adipose tissue ($r=0.45$, $p<0.01$) and fat-free body weight ($r=0.72$, $p<0.001$). In case of the time required to reach maximum strength a negative correlation was shown with muscle mass ($r=-0.51$, $p<0.001$) and cell mass ($r=-0.50$, $p<0.001$).

Conclusion: Assessment of body composition and anaerobic strength did not show significant differences depending on the practiced sports discipline. Polish athletes practicing wrestling and Brazilian jiu-jitsu are characterized by an appropriate state of nutrition and the results obtained using the Wingate test indicate a very good anaerobic efficiency of the examined group of athletes. We need to stress here the fact that in individuals practicing martial arts, exhibiting e.g. a higher level of fat-free body weight and appropriate hydration of the organism, we observe a better adaptation to anaerobic effort.

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Assessment of nutrition status and maximum oxygen uptake in a selected group of Polish athletes training martial arts

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Objective: The aim of the study was to assess the nutrition status and maximum oxygen uptake in a selected group of Polish athletes practicing martial arts, being in a high training period.

Material/Methods: A total of 36 athletes, aged 20 ± 3 years, practicing freestyle wrestling ($n=18$) and judo ($n=18$), participated in the study. Analysis of body composition was performed by the determination of values of resistance and reactance by the bioelectrical impedance method using a BIA 101S analyser by AKERN-RJL. On their basis the body composition of athletes was assessed using a Bodygram computer programme. Measurements of body composition were taken under recommended measurement conditions e.g. on an empty stomach in the morning. Maximum oxygen uptake ($VO_{2\max}$) by athletes was measured using a Cosmed K4b2 respirometer during the progressive test performed by the athletes at an increasing load at the Kettler X1 cycle ergometer.

Results: The analysis of body composition showed a mean adipose tissue content of 14.1% in wrestlers and 13.4% in judokas. In 67% wrestlers and 72% judokas the adipose tissue was found at less than 14.9%, of which over 22% examined athletes in both groups had body fat content below 10%. The measurement of maximum oxygen uptake during the progressive test showed similar values in both analyzed sports disciplines, amounting to 68.7 ± 9.0 ml/min/kg body weight in wrestlers and 67.2 ± 8.9 ml/min/kg b.w. in judokas. We need to stress here the higher ($p=0.02$) maximum oxygen uptake in athletes with a low body fat content ($FM < 10\%$ – mean $VO_{2\max} = 76.3$ ml/min/kg) than in those with a higher body fat content ($FM > 18\%$ - mean $VO_{2\max} = 62.1$ ml/min/kg). In this study correlations were also observed e.g. between $VO_{2\max}$ and the percentage of the adipose tissue ($r = -0.55$, $p < 0.001$) and the muscle tissue ($r = 0.43$, $p < 0.01$).

Conclusion: Assessment of body composition showed an appropriate state of nutrition in the analyzed group of athletes. However, a high percentage of athletes had a very low level of the adipose tissue. In turn, determined values of maximum oxygen uptake indicate very good oxygen efficiency of wrestlers and judokas. However, we need to stress that fact that in athletes with a lower level of the adipose tissue a better adaptation for aerobic exercise is observed. It seems to indicate the necessity to obtain and maintain not only a specific body weight, but also an appropriate body composition in athletes training martial arts.

Please cite as: Durkalec-Michalski K, Jeszka J. Assessment of nutrition status and maximum oxygen uptake in a selected group of Polish athletes training martial arts. In: 7th EFSMA – European Congress of Sports Medicine, 3rd Central European Congress of Physical Medicine and Rehabilitation. Salzburg, 26.-29.10.2011. Düsseldorf: German Medical Science GMS Publishing House; 2011. Doc11esm213.

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Case report about the beneficial effect of gamma swing in chronic low back pain

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Gamma swing is a new therapeutic method for the treatment of pain due to degenerative changes of the spine, especially lumbar spine, disc prolapse, muscular imbalances of the back, blockade of small intervertebral joints or coxarthrosis .

With gaiters on both ankles, the patient becomes lifted. In phase 1 the pelvis is elevated, in phase 2 the patient is lifted up to the shoulder and in phase 3 the patient is free-hanging . Each phase includes a swinging movement up to 100 frequencies per minute.

This treatment causes a negative pressure on the disc, a separation of the joint partners and a distension of the ligaments and muscles. Due to that a reduction of the pain, a relaxation of the muscles and an improvement of movement occurs.

I treated a patient with severe degenerative changes of the lumbar spine with low back pain under physical activity and radiating pain into both lower extremities while walking on broken ground or when he overlooked small steps. Before we started the therapy with gamma swing we tried all evidence based therapies, but without success.

He was a very enthusiastic mountain climber. But due to the expectation of provoking the pain he nearly stopped all physical activities.

We made the treatment twice a week, starting with phase 1 and 2 each 5 minutes and phase 3 with 1 minute at the beginning, enhancing up to 5 minutes and a frequency of 60 – 70 per minute in each phase.

The pain becomes consecutive lesser, with VAS 8 at the beginning and VAS 3 after 8 treatments.

After the treatment the patient is able to pursue all the preferred physical activities and also his quality of life enhanced to a great amount.

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Changes of the intervertebral disc under traction therapy with the GammaSwing device

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Objective: Traction therapy is widely used for the treatment of symptoms caused by low back pain. The therapeutic device "GammaSwing" is a traction system, developed by the Austrian orthopaedist Dr. Ferdinand Gundolf, which allows patients to be pulled up to a free-hanging position using slings which are fixed to the lower legs. During therapy a swinging movement with a frequency of up to 100 oscillations per minute can be applied in any chosen position. The aim of this retrospective study was to determine alterations of the intervertebral discs during a series of traction therapies with the GammaSwing device in patients with vertebral complaints, in particular low back pain, and to correlate them with the clinical course of the disease.

Materials/Methods: MR and CT images taken before and after a treatment series with the GammaSwing device were independently assessed by two experienced radiologists regarding degenerative changes in the intervertebral discs and classified with a scoring system. Thereafter these results were correlated with the clinical routine parameters (numerical pain scale, measure according to Schober and finger-floor distance, patient satisfaction with the treatment, and adverse side effects).

Results: A total of 28 patients (16 males, 12 females; age between 28 and 69; mean value 50.5 years) with vertebral complaints, particularly low back pain, who underwent a therapy series with the GammaSwing device were included in the study. The MR and CT images revealed significant changes ($p < 0.01$) in the morphology of the intervertebral discs as well as in the affection of the nerve roots. Assessment of the clinical parameters revealed a marked improvement, in particular in pain arising from the vertebral column.

Conclusion: The radiologically determined changes of the intervertebral discs and the nerve roots observed in the course of a dynamic traction treatment with the GammaSwing device suggest that by this treatment not only beneficial clinical effects, but also favourable changes of the vertebral structures can be achieved. On the basis of these results it appears to be meaningful to perform a treatment series with dynamic traction therapy in patients with low back pain.

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Comparison of sagittal spinal curvatures and pelvic tilt between standing and sitting on the bicycle in highly trained cyclists

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Objective: To compare the sagittal thoracic and lumbar spinal curvatures and pelvic inclination in highly trained cyclists when relaxed, standing on the floor, and when sitting on a bicycle.

Material/Methods: A total of 30 highly trained cyclists (mean age: 22.23±3.15 years) were evaluated. The Spinal Mouse system (Idiag, Switzerland), a hand-held, computer-assisted electromechanical-based device, was used to measure sagittal spinal curvatures and pelvic inclination in relaxed standing on the floor and seated on the bicycle in high, medium and low handlebar-hand positions. The measurements were made in a randomized order. For each position, the thoracic (T1-2 to T11-12) and lumbar (T12-L1 to the sacrum) spine and the pelvic inclination (difference between the sacral angle and the vertical) were recorded. In the lumbar curve, negative values corresponded to lumbar lordosis (posterior concavity). With respect to the pelvic inclination, a positive value reflected an anterior pelvic tilt. The classifications proposed by Mejia et al. [1] and Tüzün et al. [2] were used to classify the posture in categories for thoracic kyphosis and lumbar lordosis in standing.

Results: The mean thoracic and lumbar curvatures and pelvic tilt in the evaluated postures are shown in Figure 1. The ANOVA analysis revealed significant differences for the main effects of thoracic and lumbar curvatures and pelvic tilt ($p < 0.001$). Post hoc analysis with Bonferroni correction showed significant differences between standing posture and the three handlebar-hand positions for all dependent variables ($p < 0.0125$). A high percentage of thoracic hyperkyphotic postures in the standing position was observed (60%) whereas predominately neutral values were found in the lumbar spine (93.3%).

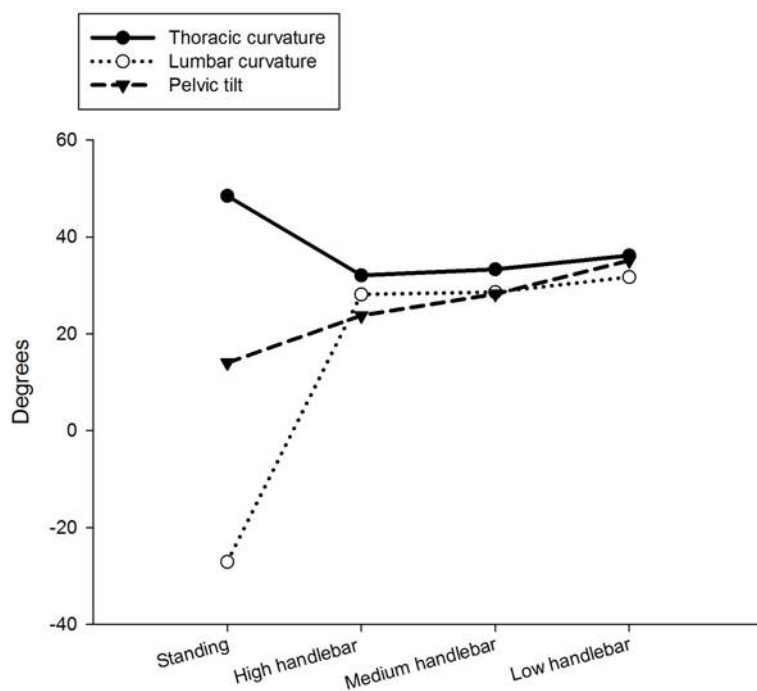


Figure 1: Mean values of thoracic and lumbar spine and pelvic tilt (degrees) in the postures evaluated

Conclusion: The thoracic hyperkyphotic posture in standing in cyclists may be related to factors other than the posture adopted on the bicycle. Cyclists adopted a more neutral thoracic posture when sitting on the bicycle in all handlebar-hand positions. The lumbar flexed posture and high anterior pelvic tilt when sitting on the bicycle do not influence the sagittal configuration of the lumbar spine in standing.

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Consumption and biochemical impact of some commercially available plant-derived nutritional supplements on athletes: a pilot study

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Over the last decade the so called "nutritional" or "dietary supplements" have gained a great popularity among all-level athletes. Beside the "traditional" supplements, a growing consumption of natural (plant-derived) products has been registered over the last years with particular regard for plant-derived hormones (*ecdysteroids*, *phytoestrogens* and *vegetal sterols*) and other substances with referred hormone modulating properties such as *tribulus terrestris*. The present study was carried out to evaluate the consumption as well as the biochemical effects of these supplements on the health profile of the users. A group 26 recreational athletes who declared to habitually use plant-derived nutritional supplements was enrolled. 30 healthy active comparable volunteers, who denied the use of any nutritional supplements, were enrolled as controls. Circulating hormones and circulating markers of organ toxicity/damage were measured on blood samples. The laboratory tests revealed the absence of any signs of organ damage in all the tested subjects in both groups. On the other hand, the evaluation of the plasma hormone profile revealed marked alterations of sexual hormones in 15 (65%) out of the 26 of investigated users, isolated or combined, while no alterations were found in the control group. Specifically, ten male subjects presented increased plasmatic levels of progesterone ($0,8 \pm 0,5$ ng/ml with a maximum value of 2,1 ng/ml). Fifteen subjects presented with abnormal estrogen levels ($363 \pm 508,7$ pg/ml), including 5 subjects (2 female and 3 males) showing "dramatically" increased values (max value in men 1535 pg/ml; max value in women 1235 pg/ml). Finally, two male subjects with increased estrogen levels presented also significantly increased testosterone levels (1650 ng/dl), associated with a complete inhibition of LH and FSH.

All subjects presenting abnormal sexual hormone levels declared of regularly consuming multiple dietary supplements, including "traditional" and "natural" compounds. In particular, those with abnormal estrogen levels shared the consumption of high dosage of soy protein (2 gr/Kg/die). Subjects with abnormal estrogen levels associated with increased progesterone also consumed products containing ecdysteroids. Finally, those with increased testosterone levels consumed both high dosage of soy protein and products containing and ecdysteroids and *tribulus terrestris*. The gas-cromatography analysis excluded the contamination of this products (randomly chosen) by steroid hormones. The results of the study suggest that "natural" does not necessarily means harmless and safe and suggest that the use of nutritional supplements by healthy subjects would be envisaged because of the potential long-term adverse effects.

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Different models to assess heart rate recovery after bicycle exercise

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Objective: Different models to assess HR recovery have been developed but knowledge of their reliability is poor at different submaximal exercise intensities and recovery durations. Our aim was to determine the reliability of HR recovery after a test on a cycle ergometer.

Material/Methods: Twenty-one healthy individuals performed a submaximal exercise at 65% and 80% HRmax followed by passive recovery. The exercise was repeated (retest) within 2 weeks to assess reliability. HR recovery was assessed by 8 models, based on monoexponential kinetics or absolute recovery (recovered HR at fix time points). Intraclass correlation coefficient (ICC) and standard error of measurement (SEM, %SEM) were used to address reliability of measurements.

Results: We found that: (1) assessment of HR recovery after 80% HRmax exercise leads to more reliable values than after 65% HRmax exercise (mean ICC: 0.827 vs. 0.747); (2) a longer recovery time increases the absolute consistency of the measurement (%SEM: 26.7 at 60 s, 19.5 at 120 s and 16.3 at 180 s, irrespective of model or exercise intensity); (3) T30min is more reliable than T30 (ICC: 0.691 vs. 0.528; %SEM: 28.5 vs. 70.8) for the calculation of the fast component of HR recovery (HR kinetics calculated over ≤ 60 s) after exercise.

Conclusion: A good sensitivity of measurement – large ICC and small SEM – is obtained for analysis of HR recovery after submaximal exercises on the cycle ergometer, especially for internal workloads of 80% HRmax. At this workload, consistency of results increases for recoveries of longer duration

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Early diagnosis of scaphoid fractures in athletes using C/T

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Objective: There is no consensus on the optimum timing for C/T use to confirm the diagnosis of scaphoid fractures among patients with suspected scaphoid fractures and normal radiographic findings. Computed tomography (CT) is usually used 10 days after a trauma and persistent pain for the diagnosis of scaphoid fractures. The necessity of immediate evaluation of a suspected scaphoid fracture with C/T after a wrist trauma in athletes.

Material/Methods: Thirteen athletes after a fall on their outstretched hand and pain on the scaphoid bone area had visited our emergency department. They had normal radiographic findings. Seven of them with such wrist injury immediately underwent a carpal C/T (group A) and the other six with same wrist injury after ten days (group B). The reference standard for a true fracture of the scaphoid was visible in sagittal or coronal views. The images were considered in random order by the same radiologist.

Results: Non dislocated scaphoid fracture was detected in four of seven athletes with carpal C/T (group A). The athletes in group B who underwent carpal C/T ten days after the trauma (group B) demonstrated a non dislocated scaphoid fracture in five patients. There were no athletes with dislocated scaphoid fracture.

Conclusion: Carpal CT was very critical because of early diagnosis of non dislocated scaphoid fractures with normal radiographic findings. The early diagnosis is very important for the athlete population in order to reduce the time of recovery after a wrist trauma. This study could not confirm that early CT imaging was a superior examination compared to MRI and scintigraphy which has less or no radiation.

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Hamstring extensibility and spinal and pelvic postures in young paddlers

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Objective: To determine whether the degree of hamstring muscle extensibility influences the sagittal spinal curvatures in standing, slumped sitting, and maximal trunk flexion with knees extended in young paddlers.

Material/Methods: A total of 128 young nationally ranked kayakers were recruited for this study (mean age: 15.43±0.67 years). The inclusion criteria were more than 4 years' paddling experience and training at least six times per week. The thoracic and lumbar angles and pelvic inclination were measured with a Spinal Mouse (Idiag, Volkswill, Switzerland) in relaxed standing, slumped sitting, and maximal trunk flexion with knees extended (sit-and-reach test). The Spinal Mouse was guided along the midline of the spine (or slightly paravertebrally in particularly thin individuals with prominent processus spinosus) starting at the processus spinosus of C7 and finishing at the top of the anal crease (approximately S3). For each testing position, the thoracic (T1-2 to T11-12) and lumbar (T12-L1 to the sacrum) spine and the position of the sacrum and the hips (difference between the sacral angle and the vertical) were recorded. For the pelvic inclination, a positive value reflected an anterior pelvic tilt while a negative value reflected a posterior pelvic tilt. Hamstring muscle extensibility was determined in both legs by passive straight leg raise test (PSLR). The ankle of the tested leg was restrained in plantar flexion. The measurements were made in a randomized order. Only subjects with PSLR difference between right and left sides lower than 10% were included in the analysis (n=121). The left and right PSLR measurements were then averaged. After this, the sample was divided into three groups according to PSLR angle: (1) lower extensibility (Group A, PSLR <74°, n=45), (2) moderate extensibility (Group B, PSLR= 74°-86°, n=39), and (3) greater extensibility (Group C, PSLR >86°, n=37), and the dependent variables were analyzed.

Results: The mean values (± standard deviation) of passive straight leg raise test were 70.98±10.47° for lower hamstring extensibility group, 81.90±9.30° for moderate hamstring extensibility group, and 94.76±10.26° for greater extensibility group (p<0.001). No differences were found between groups for standing and slumped sitting in any dependent variable. The mean values for thoracic curvature in the sit-and-reach test were 60.22±12.27°, 54.62±10.84°, and 47.05±13.34° for groups A, B and C, respectively. The values of pelvic inclination were -13.56±9.23°, -7.03±8.94°, and 1.46±10.99°, for groups A, B and C, respectively. The ANOVA analysis showed significant differences between groups for thoracic (p<0.001) and pelvic (p<0.001) angles in sit-and-reach test. Post hoc analysis showed significant differences between all pairwise comparisons for pelvic angle and thoracic angle (p<0.001). However, no differences were found for lumbar curve.

Conclusion: The hamstring muscle extensibility influences the thoracic and pelvic postures when maximal trunk flexion is performed. The subjects with lower hamstring extensibility adopt greater kyphotic postures in the thoracic spine while the pelvis adopts greater posterior pelvic tilt postures. The hamstring extensibility has no influence in standing or slumped sitting because the hamstring muscle tension is reduced.

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Intersession reliability of H-reflex measurements in treadmill walking

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Objective: H-reflex measures are commonly used in sports and exercise science. Minimum muscle activation is necessary to evoke the H-reflex. Therefore multiple studies investigated reliability of the measure in different static body positions [1], [2]. Particularly, in dynamic conditions the correct reproduction of background muscle activation and posture is essential for reliability [3]. Since walking is unlikely to alter noticeably between sessions, it could serve as standard setup for H-reflex measurements at the lower extremity. Consequently, intersession reliability of soleus muscle H-reflex during treadmill walking was investigated.

Material/Methods: 7 young and healthy (2 female, 5 male) participants were measured twice during an average of 47 (± 9) days. Subjects performed walking trials on a treadmill at 5 km/h. The stimulating electrode was placed on the tibial nerve in the popliteal fossa. EMG was recorded from the soleus muscle. To synchronize the stimulus to the gait cycle initial heel strike was detected with a plantar pressure sole. A 300 ms delay was used to stimulate in midstance. Finally the recruitment curve was created (Square-impulse: 500 μ s duration; Stimulation-interval: 10 s; Increase of stimulation intensity: 0.2 mA). Hence, maximum H-reflex amplitude and M-wave amplitude was obtained and Hmax/Mmax-Ratio was calculated. Intersession reliability was assessed by calculation of intraclass and Pearson's correlation-coefficient, test-retest variability and Bland and Altman's 95% limits of agreement criterion.

Results: The Hmax/Mmax-Ratio ranged from 0.24-0.54. Data reveals good intraclass (ICC=0.89) and Pearson's correlation-coefficients ($r=0.95$). The TRV was 13.01% (± 11.8). The reliability criterion by Bland & Altman was fulfilled (100%).

Conclusion: H-reflex measurements in dynamic condition reveal high intersession reliability. Although gait increases degrees of freedom (gait speed, step length, step width, loading conditions, etc.), reliability of dynamic and static measurements is almost equal [2], [4], [5]. The H-reflex during walking can serve as a reliable measurement tool in many sports and exercise contexts.

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Maximal oxygen consumption among 14–19-year-old cross-country skiers: a longitudinal study

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Objective: It is known that aerobic capability in male cross-country skiers is very high. The maximal oxygen consumption (VO₂max) level among men may increase up to 89–93 ml/min/kg [1]. Longitudinal studies have shown that as an outcome of training [2]. VO₂max increases the most in the age group 15–25. However, it is not clear to what extent this increase is related to training or other development values. The aim of this study was to analyze the maximal oxygen consumption longitudinally among 14–19-year-old cross-country skiers and its relation to anthropometric and cardiopulmonary values and with training characteristics.

Material/Methods: The subjects of this study were 34 cross-country skiers (14–19 years old, 23 males and 11 females), who have attended a periodic health evaluation (PHE) in the Sports Medicine and Rehabilitation Clinic of Tartu University Hospital, Estonia in 1997 to 2010. Inclusion criteria of the subjects were high level participation of cross-country skiing and periodic health evaluation once per year during the period in the age of 14 to 19 years. Subjects' anthropometric data (body height, body mass, BMI), lung function values (spirometry) and training characteristics were collected. Subjects' VO₂max was measured using gas analyzer system (Oxycon Pro 5., Hoechberg, Germany) according to standardized test on treadmill for cross-country skiers.

Results: During this age period (14 to 19 years), VO₂max increased (61.1±4.8 to 67.7±4.8 ml/min/kg) in male subjects. In female subjects, mean VO₂max values increased until the age of 17 yrs (54.4±4.7 and 57.2±3.9 ml/min/kg, in 14 yrs and 17 yrs old subjects, respectively), whereas after age of 18 it showed a tendency of decrease. In male subjects, statistically significant differences were found in 17, 18 and 19 yrs old subjects in comparison with 14 yrs old subjects ($p \leq 0.05$). During this age period, the highest VO₂max increase was 12.3 ml/min/kg in males and 7.4 ml/min/kg in females. VO₂max showed statistically significant associations with training volume, physical performance capacity, vital capacity of the lungs, and maximal ventilation (l/mn) of the lungs during the exercise test. Relationships were more expressed in male subjects than in female subjects. Anthropometric data did not reveal any statistically significant associations with VO₂max.

Conclusion: Our study results show that VO₂max is significantly associated with training volume, physical performance capacity and lung function and these relationships are more expressed in male subjects than in female subjects.

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Mean power as an indicator of fatigue induced by exhaustive weight exercises on unstable surfaces

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Objective: Mean power in concentric phase of lifting is considered as a better indicator of fatigue during weight exercise set performed with maximal effort than peak power. Though, this has been proved for ordinary exercise (bench press) with stable support [1], there are no data specifying the most sensitive parameter of fatigue during weight exercise performed on unstable support surface. The study compares the decline of peak and mean power during chest presses and squats performed on unstable surface to failure.

Material/Methods: A group of 14 physical education students (age 24.8 ± 2.7 y, height 184.7 ± 8.2 cm, weight 78.3 ± 7.8 kg) performed randomly in different days barbell chest presses on Swiss ball and barbell squats on Bosu ball (both with 70% 1RM) to failure. However, only 16 reps of chest presses and 21 reps of squats were taken into consideration because majority of the subjects were able to perform this number of repetitions on particular surface. The system FITRO Dyne Premium based on precise velocity sensor with sampling rate of 100 Hz was used to monitor basic biomechanical parameters involved in weight exercise. Peak and mean values of power in concentric phase of lifting were obtained. Fatigue index was calculated as a ratio of power decline ($P_{\text{peak}} - P_{\text{min}}$) and peak power (P_{peak}).

Results: Mean power in entire concentric phase of lifting decreased more profoundly than peak power during both chest presses on Swiss ball (from 396.3 ± 23.7 W to 234.1 ± 16.7 W, and from 701.8 ± 46.0 W to 492.0 ± 28.7 W, respectively) and squats on Bosu ball (from 421.6 ± 25.6 W to 280.6 ± 18.1 W, and from 783.8 ± 52.4 W to 588.3 ± 32.7 W, respectively). This may be also documented by significantly ($p < 0.05$) higher fatigue index calculated from mean than from peak power of chest presses (40.9% and 29.9%, respectively) and squats (33.4% and 24.9%, respectively). In both cases mean power in entire concentric phase of lifting started to gradually decrease after one-two initial repetitions, whereas peak power towards the end of such exhaustive sets. This finding is in agreement with our previous study [2] that showed greater decline of P_{mean} than P_{peak} during both stability and instability chest presses with more pronounced differences at 80% 1RM rather than at 60% 1RM. While in the present study the difference between fatigue index of P_{mean} and P_{peak} during chest presses with weight of 70% 1RM was 11.0%, in the study of Jeleň [2] it was 9.1% at 60% 1RM and 14.4% at 80% 1RM. These findings indicate that peak power is less sensitive to fatigue at higher than at lower weights lifted. Moreover, our other experiments showed significantly greater inter-day variability in peak power throughout exhaustive repetitions compared with two-three initial values. In practice it would require multiple day-to-day trial protocols in order to obtain required reproducibility.

Conclusion: These findings indicate that mean power in entire concentric phase of lifting is more sensitive indicator of fatigue induced by instability resistance exercises than peak power.

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Medical counseling of drug abusers in sports via Internet website from the viewpoint of anti-doping

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Objective: Drug abuse in sports is widespread; therefore, many men and women are affected by side effects of the abused drugs. However, worldwide, there are few consulting systems for drug abusers, such as the anti-doping hotlines in Sweden and Germany. We think that in an anti-doping effort those in the medical field should provide advice to drug abusers in sports and rescue them from the side effects of such drugs. We hope that this effort would decrease use of performance enhancing drugs. From positions as a sports physician and anti-doping, we consulted privately with drug abusers by telephone from 1993 to 2003. In addition, in 2001 and 2002, we offered web-based counseling, but thereafter discontinued it because of professional commitments. However, in 2009, we resumed web-based counseling with the same objective as in the initial effort. We report results for the year 2009.

Material/Methods: Our counseling efforts on doping were done via a website established in 2009 (<http://www.reco.co.jp/doping/index.html>). This website is accessible in Japan via Yahoo and Google search engines. The website aims to provide a definition of doping to help users understand the concept of doping, giving examples of side effects of drugs used in doping, and providing other information on this subject. In addition, we refer those who consult via the website to specialized clinics or hospitals. The subjects of this report are Japanese athletes and exercise enthusiasts who used this website for consultation. The first author of this study is a medical doctor who specializes in endocrinology and andrology and was the consultant for each subject. Counseling occurred via e-mail, and access was provided 24 hours a day. No specific personal identifying information was obtained from subjects. In analyzing the content of the consultations, we could identify the state of drug abuse. We categorized the content of each counseling session according to topic and tracked the number of accesses. In addition, symptoms reported were also categorized.

Results: In 2009, 18 persons consulted the website. All were Japanese. As to the content of consultation, 5 persons consulted about "anabolic agents", 4 about "doping control", 5 about "side effects", 2 about "prohormones" and 2 about other matters. In addition, although 9 persons had no bothersome symptoms, 5 felt to be in poor condition and 2 had symptoms involving the genital organs. In addition, one athlete had gynecomastia and another symptoms of allergy.

Conclusion: Fewer persons sought consultation in 2009 than in 2001 and 2002 (57 and 37, respectively). During the period that our website was interrupted, new sites like "Amehuto.com" (<http://amehuto.com/bbs/mibbs.cgi?mo=p&fo=tore&tn=0003&rs=631&re=660&rf=no>) became popular. On this site, the manager instructs athletes on means of doping and medically treating side effects. As the number of accesses of that website exceeds ours, it is clear that the interest in using anabolic agents continues and that side effects remain a problem. An official public consultation system should be constructed so that reliable medical advice can be given on deleterious effects of anabolic steroids and their treatment. This information should be aimed to discourage usage.

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MRI evaluation in young patients with clinical suspicion of medial tibial stress syndrome (MTSS)

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Objective: Medial tibial stress syndrome (MTSS) is one of the most common leg injuries in athletes and soldiers. It was proposed an MR rating system for the MTSS. There are four different stages: a) Periosteal edema (grade I), b) moderate to severe periosteal edema with marrow edema (grade II), c)marrow edema (grade III) and d) fracture line (grade IV) .The purpose of this paper is to correlate the imaging findings, stage of MTSS, duration and type of treatment and the follow up after conservative treatment.

Material/Methods: Four young athletes aged between 16–23 years old (mean age 18,6 years) were transmitted to our department with clinical leg pain. All patients underwent initial radiography. One patient underwent also CT examination with a Picker PQ 5000 CT scan. In all patients were performed also MRI examination at 1 Tesla Siemens Expert Plus. They were obtained conventional T1 WI before and after intravenous administration of contrast agent, T2 WI and STIR in axial and coronal levels. At both MRI examinations, before and after treatments were evaluated location of the stress injuries, types of bone alterations, presence or absence of periosteal and bone marrow edema. Results were correlated with duration of conservative treatment.

Results: Two of the patients were soldiers and two young athletes. Only in one case the radiography was positive due to the presence of one osteolytic lesion which was initially misdiagnosed as osteoid osteoma and was falsely treated with radiofrequency (RF) ablation. It was the same patient that underwent CT scan for the detection of the lesion and the treatment. Two patients were classified as grade I , localized periosteal edema, medial tibial stress syndrome, one as grade II , moderate to severe periosteal edema and localized marrow edema, medial tibial stress syndrome and one grade III, severe marrow edema. In our study there was no patient with fracture line, grade IV. All the patients were treated conservative. In one case after treatment MRI was negative. At the rest of the cases there was a significant improvement of the findings.

Conclusion: MRI and sometimes CT evaluation in patients with clinical suspicion of medial tibial stress syndrome is the gold standard method not only for the diagnosis but mostly for the follow up .This is due to the fact that treatment to MTSS is, at most of the cases, conservative and not always effective. That is why MRI examination is essential.

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Oxidative stress in soccer players

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Objective: The aim of our work was to optimise the oxidative stress (OS) markers in soccer players (SP) during moderate and high intensity exercise.

Material/Methods: In a number of 13 SP (20±3 years old) and 22 control subjects, age matched (medical students). Plasma samples were taken for reactive oxygen metabolites (d-ROMs), lipid peroxidation (LP) and nitric oxide (NO) determination. The d-ROMs test was performed by measurement of hydroperoxide levels (Diacron, Italy) in which transitional metals transfer to peroxide presence in free radical (FR) formation followed by alchilamine trapping. Lipid peroxidation was measured by fluorimetric method by its end product malonyldialdehyde (MDA). For NO determination the method of nitrate enzyme reduction with the Greiss reagent was used (OXIS, USA). The study was performed in two sessions: I - treadmill performance (exposure to moderate exercise); and II - match performance (exposure to high intensity exercise). The blood analysis were taken before treadmill (BT); after treadmill (AT); before match (BM); and after match (AM). Moderate intensity exercise was considered as submaximal exercise treadmill test (50% VO₂max). High intensity exercise was considered for the match (80% VO₂max).

Results: No significant difference between any of the certain parameters of the same time measurements in SP and control group was found. FR showed increased value in SP from 253±36 UCarr BT to 286±30 UCarr AT (p<0.05). Control subjects showed even more FR production than SP, from 245±20 UCarr BT to 295±25 UCarr AT (p<0.01). The value of FR was more increased AM in SP, 357±49 UCarr and higher LP of 4.5±0.9 µmol/L AM was found in SP (p<0.05). The value of NO in SP increased from 50±18 µmol/L BT up to 98±29 µmol/L AT (p<0.05).

Conclusion: Due to our results we may suggest that moderate-intensity aerobic exercise augments endothelium-dependent vasodilatation through the increased production of NO and that high intensity exercise possibly increases OS. These findings suggest that these OS parameters may be useful markers for better approach and evaluation of the training program in sport medicine.

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Patellar retinaculum ligament injury. MRI evaluation

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Objective: The patellar retinacular ligaments are a coalescence of multiple fascial elements that help stabilize the patella. The fascial elements of the patellar retinaculum complex consist of contributions from extensions of the quadriceps mechanism and fascial layers investing the medial and lateral supporting structures of the knee. Injury of retinaculum is usually associated with acute patellar dislocation injuries. Transient lateral patellar dislocation is an injury that occurs in recreational and high-performance athletes. The injury most commonly results from a twisting motion, with the knee in flexion and the femur rotating internally on a fixed foot. Although the diagnosis can be made on the basis of the patient's history and physical examination, in the acutely swollen and painful knee, it may be difficult to distinguish patellar dislocation from other more common traumatic injuries. In this report, we review our experience with MR imaging of the spectrum of patellar retinacular ligament injuries.

Material/Methods: They were examined 12 patients with acute or repetitive history of knee trauma and clinical suspicion of subluxation or luxation of the patella. Three of them were ski athletes after acute trauma, four were basketball players, two of them after acute trauma, two were tennis player and two football player. The interval time of trauma was estimated to 14 days. 10 of the patients had a positive MRI examination 3 women (30%) and 7 men (70%) aged between 11 to 31 years old. The MR examinations were performed with a 1 Tesla Siemens Expert Plus. The MR examinations included axial STIR and T2* sequences, coronal and sagittal T1-WI, PD, and T2-WI and post contrast T1 sequences.

Results: 10 (83,3%) patient had positive MRI examination. All the patients had an amount of intrarticular fluid and injury of patellar retinaculum. Eight of them (80%) had injury of medial retinaculum and only 2 (20%) had injury at both retinaculum. Seven patients (70%) had additional strain of one, or both cruciate ligament thus one (10%) had strain of the lateral collateral ligament.

Conclusion: MRI in patients with history of knee trauma and clinical suspicion of injury of patellar retinaculum is the gold standard method not only for the diagnosis of retinaculum injuries but for the concomitant lesions also.

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Personality traits of children who achieved successful sport results

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Objective: It has been well documented that sport activity has positive effect on the mental development in children. Sport has a beneficial effect on the process of children integration into society and the development of valuable attitudes minimizing pathological behavior. Number of studies have shown that children who regularly perform sport activities are emotionally more stable, more confident and more extroverted (outgoing) compared to the less active children. The aim of this study was to examine the personality traits of children and adolescences who achieved the highest results in karate (N=15) and compare them to the counterparts who were equally active but attained less successful results (N=15).

Material/Methods: Eysenck Personality Questionnaire was used to measure personality to be definer of Neuroticism, Extraversion, Psychoticism factor and Tendency to give socially desirable answers.

Results: The major findings of this study suggest that there isn't a significant difference in personality traits between the active children who achieved significant success in competitions compared to the comparably active children who have not been equally successful in the same competitions.

Conclusion: This study confirms that the performance of top athletes depends on some other psychological constructs rather than only on personality traits.

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Physical activity, isometric strength and body composition of university students

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Objective: The importance of physical activity in promoting health and well-being of the young adult population is evidenced by several epidemiological studies. The increasing incidence in this population of cardiovascular, metabolic and degenerative diseases and obesity has been linked with an epidemic variable, the sedentary behavior, and commonly dubbed the “disease of the century”. Regular physical activity may contribute to the development of muscle strength, improve the quality of soft tissue and bone mass, and decreased body fat. The early inclusion of regular physical activity and other healthy lifestyles tend to be incorporated throughout life with noticeable gains in health and quality of life in adult life.

In this study we assessed the physical activity level (PAL), muscle strength (MS) and body composition (BC) of 84 young adults in higher education with the following objectives: assess physical activity; evaluate different manifestations of muscle strength; assess body composition and analyze the relationship between muscle strength, body composition and physical activity in young adults.

Material/Methods: We drew up a descriptive, correlational and cross-cutting study. To achieve our objective we collected the following data:

- a) Physical activity: short version of IPAQ (International Physical Activity Questionnaire).
- b) Muscle strength: hand grip of both hands with Jamar[®] Hand Dynamometer;
- c) Key pinch strength with digital dynamometer Baseline[®];
- d) Maximum isometric strength of the quadriceps in seat 45-degree incline leg press machine linked to a strain gauge Ergo Meter – Globus[®] and appropriated software
- f) Body composition: bioelectric impedance on Tanita Ironman Body Composition Monitor[®]
- g) Height: stadiometer Seca[®]

Results: A total of 84 university students were subject to this study, 66 females and 18 males with an average of 20,9±2,3 years old. In IPAQ classification we found 50 students with low, 25 with moderate and 9 with high level of physical activity. Relatively to muscle strength there were significant correlations between handgrip strength (both hands), key pinch strength (both hands) and isometric maximum strength of the quadriceps. Analysing body composition we can observe that female students with more IMC and more body fat present higher levels of physical activity. Regarding the male students, we can find the opposite: the lesser the percentage of body fat and lower IMC levels the higher physical activity. We found no relation between the different strength demonstrations and the levels of physical activity. When correlating handgrip strength (right hand; left hand) with body composition, we observed correlations between:

- Height (0,704**; 0,705**), total body fat (-0,412**; -0,428**), weight (0,406**; 0,463**), body water (0,441**; 0,453**), visceral fat level (0,223*; 0,259*), bone mass (0,800**; 0,798**) and muscular mass (0,816**; 0,803**).

When correlating key pinch strength (right hand; left hand) with body composition, we observed correlations between:

- Height (0,577**; 0,531**), total body fat (-0,389**; -0,252*), weight (0,336**; 0,424**), body water (0,449**; 0,348**), bone mass (0,638**; 0,657**) and muscular mass (0,677**; 0,684**).

When correlating maximum isometric strength of the quadriceps with body composition, we observed correlations between:

- Height (0,355**), total body fat (-0,389**), body water (0,389**), bone mass (0,480**) and muscular mass (0,490**).

Conclusion: Results indicate that the evaluated university students are mainly sedentary. We also concluded that there are very strong positive correlations between the different manifestations of strength and that there is no relationship between the different manifestations of strength and levels of physical activity. Analyzing our results, we can conjecture about why young people do exercise: females exercise themselves to lose weight and males to maintain physical condition. But there are strong correlations between the different manifestations of strength and the different variables of body composition.

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Role of the physician in the clinical protocol – drawing a lesson from a case

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Objective: The medical practice is a series of clinical decisions. Not even a good practice basing on up to date guidances and instruments and investigation leads to the best clinical judgement. Respecting the patient but forgetting the sportsman even the right clinical decision could break sport carriers.

27 years old african origin professional basketball player suffered calf strain during training and forced 2 days break.

During the next session he has reported weakness, dizziness and collapsed without losing consciousness. After appropriate water intake he has become asymptomatic and left for home. The following day at lunchtime he has had the same attack and the ambulance has brought him to the Neurologic Departement of the University Hospital.

Material/Methods: Negative neurological symptoms and signs. Normal lab results. Brain CT scan w/o defect. ECG: sinus rhythm, marked negative T-waves in II, III, aVF and V4-6, tall peaked T-waves in V2-3. The patient was transferred to the Emergency and Accident Departement because of possible cardiac background.

Emergency and Accident Department: repeated normal lab results, no further changes on ECG. Echocardiography: concentric left ventricular hypertrophy otherwise unremarkable. The patient was admitted to the Department of Medicine for overnight observation.

Department of Medicine: repeated normal lab results, the patient was transferred to the Department of Cardiology.

Department of Cardiology. Abdominal ultrasound: renal cyst, otherwise unremarkable. Normal glucose tolerance test. ECG: sinus rhythm, PR 225 ms, QRS 90 ms, normal R-axis, transition zone at V2-3., deep negative T waves in II, III, aVF and V4-6. Prominent ventricular strain. The clinical decision was complete prohibition from sports.

Echocardiography: suspected cardiomyopathy, ventricular wall thickness exceeds the normal upper limit. The clinical decision was complete prohibition from sports.

MRI: CMP was excluded

A cardiologist consultation: pacemaker implantation was suggested based up on the telemetric and echocardiographic results. The conclusion was still complete prohibition from sports.

The specialists in Sport Medicine reviewed the case and the medical literature decided letting the patient continuing his sport carrier without need of further intervention.

Results: In consequence of this decision the sportsman has been playing in his front-rank club successfully. His symptoms have not repeated with following the suggested diet.

Conclusion: A high risk clinical decision considering the special circumstances of the sportsman even it differs from accepted clinical protocols can give back an entire sporting carrier.

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Sagittal spinal curvatures and pelvic inclination in young high trained canoeists

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Objective: The aim of this study was to compare the sagittal thoracic and lumbar spinal curvatures and pelvic inclination in relaxed standing, slumped sitting and on the canoe in young canoeists.

Material/Methods: A total of 37 young highly-trained canoeists (mean age: 14.91 ± 0.71 years) were recruited. The Spinal Mouse system (Idiag, Fehraltdorf, Switzerland), a hand-held, computer-assisted electromechanical-based device, was used to measure sagittal spinal curvatures and pelvic inclination in relaxed standing, slumped sitting, in the base position (kneeling on one knee in the canoe) and in the catch phase of the stroke. The measurements were made in a randomized order. For each position, the thoracic (T1-2 to T11-12) and lumbar (T12-L1 to the sacrum) spine and the pelvic inclination (difference between the sacral angle and the vertical) were recorded. In the lumbar curve, negative values corresponded to lumbar lordosis (posterior concavity). With respect to the pelvic inclination, a positive value reflected an anterior pelvic tilt while a negative value reflected a posterior pelvic tilt. The classification proposed by Mejia et al. [1] and Tüzün et al. [2] were used to classify the posture in categories for thoracic kyphosis and lumbar lordosis.

Results: The mean thoracic kyphosis in standing, slumped sitting, base position and catch phase in the canoe were $44.42 \pm 7.75^\circ$, $46.17 \pm 9.41^\circ$, $38.86 \pm 9.42^\circ$, and $28.22^\circ \pm 10.61$, respectively. In the lumbar curve, the mean values were $-29.56 \pm 8.14^\circ$, $21.33 \pm 9.94^\circ$, $-23.69 \pm 6.74^\circ$, and $-13.06 \pm 10.84^\circ$, respectively. With regard to pelvic inclination, the mean values were $13.89 \pm 6.74^\circ$, $-16.72 \pm 8.35^\circ$, $14.47 \pm 4.08^\circ$, and $36.67 \pm 6.03^\circ$, respectively. The ANOVA revealed significant differences for the main effects of thoracic and lumbar curves and pelvic inclination ($p < 0.001$). Post hoc analysis with Bonferroni correction showed significant differences between all pair-wise comparisons for thoracic kyphosis ($p < 0.001$) (except between standing and slumped sitting), lumbar lordosis ($p < 0.001$), and pelvic inclination ($p < 0.001$) (except between standing and base position). A higher percentage of hyperkyphotic postures in standing (43.2%) than in the canoe was found (29.5% in the base position and 6.8% in the catch phase), while thoracic hypokyphosis increased in the catch phase of the stroke (18.2% in the catch phase and 0% in standing and base position). As regards the lumbar curve, the percentage of hypolordosis postures in the base position was higher than when standing (20.5% vs 9.1%). Lumbar kyphotic postures were only found in the catch phase (13.6%). Hyperlordotic postures were only shown in standing (11.4%).

Conclusion: A higher percentage of hyperkyphotic postures in standing than in the canoe was found, while thoracic hypokyphosis increased in the catch phase of the stroke. The standing thoracic hyperkyphosis in young canoeists may be related to factors other than the posture and movement in the canoe. The canoeists adopted a lumbar flexed posture at the catch phase of the stroke, although this position may not affect the sagittal configuration of lumbar spine in standing. Postural training should be included in the systematic training to improve the thoracic posture in standing.

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Study of handgrip in a group of Italian young gymnasts

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Objective: We know that the physical fitness and nutritional status are influenced by many factors. Especially during the adolescence period an important role is played by the practice of physical activity, with a great variability due to the type, the intensity and frequency of the activity. Handgrip strength is an important test to evaluate physical fitness and nutritional status.

Material/Methods: We compared 68 subjects (age $8,45 \pm 2,62$ years), 25 artistic gymnasts, 11 rhythmic gymnasts and 32 general gymnasts in order to study the effect of a specific program of preparation on handgrip strength. We monitored handgrip (HG) variations during a 1 year period. Descriptive statistics, chi(2) tests, analysis of variance, Student's T test, Pearson Correlation and logistic regression analysis were performed. Continuous variables are presented as mean \pm -standard deviation. A P value <0.05 was considered statistically significant. Height and body mass were measured and so body mass index (BMI) was calculated. Biceps and triceps skinfolds, arm relaxed, arm flexed, forearm and wrist girths, acromiale-radiale, radiale-styliion-radiale and midstyliion-dactyliion length and humerus breadth were measured. Bioelectrical impedance analysis was performed. Maximal HG strength of the right hand was measured using the hand dynamometer. The rhythmic gymnasts had higher HG compared to the other groups ($p < 0.05$).

Results: In rhythmic and general gymnasts there was a significant increment of HG (Table 1). Stepwise multiple regression analysis indicated that the most important predictive values of HG were age ($\beta=0,536$; $P=0,003$) and sex ($\beta=0,250$; $P=0,000$).

	General		Artistic		Rhythmic	
	T0	T1	T0	T1	T0	T1
HG	35,69 \pm 16,03*	39,91 \pm 11,75*	48,12 \pm 6,27**	48,82 \pm 14,08**	58,08 \pm 33,59***	66,92 \pm 37,90***
* P=0,01 ** P=N.S. *** P= 0,006						
Data are expressed as mean \pm -standard deviation						

Conclusion: The results of the present study show that physical activity has a strong effect on body composition, in young rhythmic and general gymnasts handgrip strength is influenced by specific program of preparation, we aim to provide to improve physical activity in children.

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Study regarding the correlation between the neck circumference, some obesity indices and overweight – metabolic syndrome risk in a group of young athletes

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Objective: The paper objectives are to revealed the overweight and metabolic syndrome risk, on a group of young students, members of two university's teams, and also to revealed the correlation between neck circumference, some obesity indices and the results of four nutrition questionnaires.

Material/Methods: The study was conducted on a group of 29 athletes of both genders, with a mean age \pm SD of 23.58 ± 5.22 (aged between 19 to 39 years), members of two university's teams: men's volleyball team (41.38%) and women's handball team (58.62%). The following parameters were determined: neck circumference, waist circumference, fat percentage and body mass index (BMI). Also, eating habits were assessed based on the four nutrition questionnaires results.

Results: A total of 12 students (41.37%) had values of neck circumference above the normal limit, of which 17.24% have an increased risk of overweight (all of them males) and 24.14% have an increased risk of developing metabolic syndrome (20.69% male and 3.45% female). Using Pearson correlation coefficient showed strong positive association between neck circumference, abdominal circumference and BMI respectively ($r_1=0.725$ and $r_2=0.819$) and a weak positive association between neck circumference and „Sodium/Salt Control Questionnaire” score, respectively between waist circumference and „Fat/Cholesterol Control Questionnaire” score ($r_3=0.301$, $r_4=0.301$). The association was absent between the two circumferences and the results of other nutrition questionnaires. Also, we obtained values of Pearson coefficient indicating a negative association between neck and waist circumference and the body fat percentage respectively ($r_5=-0.359$ and $r_6=-0.108$).

Conclusion: Most students had low scores on nutritional questionnaires: 68.96% of them had an unbalanced diet and 58.62% had a rich in fat (cholesterol) diet; almost half of them having an increased risk of metabolic syndrome and overweight. Neck circumference was positively correlated with BMI and negatively with body fat percentage, being absent in the case of nutrition questionnaires results.

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The changes of oxidant-antioxidant profile in the blood of healthy men after single dry sauna procedure – preliminary study

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Objective: People have used extremely hot air for ages for hygiene, relaxation, for social or also medicinal goals. Extremely high temperature which affects human organism like sauna, is one of the oldest of such procedures [1]. As a result of sauna, the sympathetic nervous system and hormonal axis hypothalamus-pituitary-adrenal are activated, in order to keep thermal balance of the organism. Therefore, thermal impulse is connected i.a. with increased concentration of noradrenalin [2], [3]. The concentration of adrenaline does not change or it increases. Alterations result from different conditions of cooling [4]. After sauna the increased secretion of adrenocorticotrophic hormone (ACTH) is also noted [2], [3] and after sauna procedures with cooling by immersion in ice-cold water, secretion of cortisol increased, too [4]. After sauna bathing in healthy subjects' blood plasma of both sexes the concentration of beta-endorphins and prolactin is also elevated [2].

The final effect of the hormonal changes is water retention, "fight-or-flight" response of the organism, increase of dermal blood flow, heart rate and sweating. There is reduced perception of pain, elated mood and alertness [2], [3]. Reduction of plasma volume and loss of sodium during sweating activates renin-angiotensin-aldosterone system [4]. The concentration of arginine, vasopressin and natriuretic hormone during sauna procedures increases significantly. In men the concentration of testosterone is not changed [5].

The aim of the study was to indicate the effect of dry sauna on the activity of antioxidant enzymes (PON – paraoxonase, CAT – catalase, SOD – superoxide dismutase, GPx – glutathione peroxidase) and also on the concentration of lipid peroxidation product (TBARS – thiobarbituric acid reactive substances) in blood of healthy men.

Material/Methods: Subjects (n=7) performed single dry sauna procedure (three entries into sauna, each 10 min), in temperature of 90°C and relative air humidity of 10%. After each exit from sauna, men cooled their whole body surface due to cold shower. The blood samples were taken from cubital vein before the entry to sauna, 15 and 60 min after the exit. The activity of CAT, SOD, GPx was expressed in U/g of Hb. The activity of paraoxonase was expressed in IU/l of serum.

The main product of lipid peroxidation reacting upon thiobarbituric acid (TBA) is malondialdehyde (MDA) so for simplification the level of TBARS in erythrocytes was expressed as nmol of MDA/g of Hb and in the blood plasma as nmol of MDA/ml of plasma.

The obtained results were statistically analyzed by using ANOVA test. The changes of the level $p < 0.05$ were accepted as statistically significant.

Results: Statistically significant increase of the activity of SOD was revealed 15 and 60 min after exit from sauna in comparison to the SOD activity before entry to sauna ($p < 0.05$). In the paper increasing tendency of activity of PON, GPx and CAT and the concentration of TBARS (in blood plasma) both 15 and 60 min after exit from sauna was found as compared to activity of PON, GPx and CAT and the concentration of TBARS (in blood plasma) before entry to sauna (control).

Statistically significant very high positive correlation ($r = 0.828$; $p < 0.05$) was noticed between the activity of CAT and SOD before entry to sauna.

Conclusion: Single dry sauna procedure increases the generation of free radicals thus it disturbs oxidant-antioxidant balance in the organism.

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The Charité Acute Rehabilitation Mobility Index (CHARMI) – A Mobility Assessment for Acute Rehabilitation displaying Efforts in Human Resources

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Objective: Achieving mobility – from transfers to locomotion – is the core capability and goal of acute and early post-acute inpatient rehabilitation. Countless assessment tools serve as measures for treatment planning and outcome of rehabilitation. Unfortunately the most commonly used assessments like Barthel-Index, Functional Independence Measure (FIM) or Rivermead Mobility Index (RMI) are only partly suitable for the acute and early post-acute rehabilitation phase [1], [2].

The aim was to develop a simple mobility assessment tool for the acute rehabilitation setting concentrating on transfer and locomotion items with a resource-oriented scaling system. The assessment was to display the expenditure in human resources by the number of staff involved in patients' transfer and locomotion, and by duration of conducting transfers and locomotion.

Material/Methods: Phase one – Development of the Assessment

Three rehabilitation physicians screened existing assessment tools and literature for test items addressing the rehabilitation phases of "verticalisation" (transfers) and locomotion. Seven items were identified and a scaling system was established. Items and scaling systems were tested in a pilot study. After remodelling of the scaling a structured expert vote (by four rehabilitation physicians) was conducted to assess face/content validity.

Phase two – Psychometric Test Evaluation

The Charité Acute Rehabilitation Mobility Index (acronym CHARMI) was used on 36 consecutive acute rehabilitation patients at admission and discharge in the Charité university hospital, Berlin, Germany. Reliability testing was conducted by calculating internal consistency (Cronbach's alpha). Inter-rater reliability was tested using kappa-statistics to evaluate possible differences between ratings of physiotherapists and physicians.

Results: Phase one – Development of the Assessment

The CHARMI assesses mobility by testing seven items. Four items address transfer abilities, three locomotion. The CHARMI uses two four-point scales (0 to 3) for each item displaying effort in personnel (CHARMI-P) and time (CHARMI-T) needed to conduct these mobility functions.

The items used are based on the course of optimal mobilisation from transfers to locomotion. Content validity is logical, a formal validation by an expert panel confirmed content validity of all items and scaling.

Phase two – Psychometric Test Evaluation

The total CHARMI shows excellent internal consistency (Cronbach's $\alpha_{\text{total}}=.93$), as do CHARMI-P ($\alpha_p=.86$) and CHARMI-T ($\alpha_T=.86$) alone. Inter-rater reliability was excellent for total CHARMI ($\kappa_{\text{total}}=.96$), as well as for CHARMI-P ($\kappa_p=.93$) and CHARMI-T ($\kappa_T=.98$).

Admission and discharge scores were compared to verify responsiveness to change. The mean admission score was 19.1 (SD=9.3), the mean discharge score was 27.4 (SD=9.2), effect size was large ($d=1.12$).

Conclusion: The CHARMI is an easy-to-use, graphically displayable mobility index for acute rehabilitation. It is a valid and reliable measure for mobility scaling efforts in personnel and time. Furthermore it is delegable to physiotherapists. Evaluation is currently going on. An "alpha-version" of the CHARMI will be presented in the future.

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The dynamic spinal traction system "GammaSwing" used during inpatient rehabilitation in case of Low Back Pain

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Objective: Multidisciplinary rehabilitation concepts meeting ICF-criteria can demonstrably improve pain and function of patients with Low Back Pain. In the rehabilitation programmes usually active as well as passive therapies are implemented, such as traction treatment.

The "GammaSwing" is a dynamic traction system for treating spinal problems. The patient can be gradually pulled up to a free-hanging position, held by specially upholstered slings which are fixed on the lower leg. The traction can be combined with a vibration frequency from up to 100 swings per minute.

The aim of the study was to investigate the effectiveness and the compatibility of the traction device GammaSwing with the rehabilitation programmes for patients suffering from Low Back Pain.

Materials/Methods: During a three-week inpatient rehabilitation stay all of the 58 included patients (46 male, 12 female, age 54.7 ± 10.1 years) received a standard treatment programme composed of active exercise therapy (hydrotherapy included), electrotherapy, thermotherapy, massage, back training, and relaxation techniques. Patients received randomized 6 therapy units with the GammaSwing system (Griseemann company, Kufstein, Austria) or the corresponding back massage units. This 3-phase treatment – lifting of pelvis and lumbar spine, shoulderstand, and free-hanging position, each of them for 5 minutes – was combined with an oscillating movement of 60 swings per minute.

The studied parameters were pain at rest and on motion using a ten-part visual analogue scale, the Roland & Morris Disability Questionnaire (a multidimensional assessment of pain-induced disability), and the Pittsburgh Sleep Quality Index (regarding the back pain induced sleep disorders).

Results: During the inpatient rehabilitation both therapy groups showed improvements regarding all determined parameters. In particular the pain on motion of the patients treated with the traction therapy improved significantly from 5.5 to 2.2 (in comparison the massage group: 4.5 to 2.5). The finger-to-floor distance also diminished more in the GammaSwing group (13.5 to 9.3 cm) than in the comparison group (13.3 to 10.3 cm). This difference also was significant between the groups. In the course of the therapy there occurred no severe undesired side-effects.

Conclusion: Essential improvements of the complaints of Low-Back-Pain patients can be attained by an intensive multimodal rehabilitation programme. Integration of the GammaSwing system in these programmes was well tolerated by the patients and resulted in beneficial supplementary effects, especially regarding pain on motion as well as the mobility of the spine measured by the finger-to-floor distance.

The circumstance that even within the framework of widespread conceptualized complex rehabilitation programmes supplementary positive effects can be demonstrated for the application of the GammaSwing argues for the use of this dynamic traction system in the rehabilitation of Low Back Pain.

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The effect of ZMA supplement accompanied by six week resistance training on testosterone, IGF-1, CK and LDH in untrained males

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Objective: The aim of this research was to examine the impacts of ZMA supplementations during six weeks resistance training on testosterone and IGF-1 hormones and muscle damage markers (creatine kinase and lactate dehydrogenase) in untrained males.

Material/Methods: 27 untrained young male students (age: 21/27±1/65 years, height: 177/90±6/25 centimeters, weight: 68/24±10/26 kilograms, body mass index: 21/54±2/54 kg/m²) were voluntarily participated and randomly divided in three groups including ZMA group (n=10), ZMA-CHO group (n=9) and placebo group (n=8). The exercise protocol contained three resistance training sessions. Each session consisted of three sets with each set made of six movements. Movements were repeated eight times for the first three weeks and six times for second three weeks at 70% one repetition maximum. Blood samples (five cc from brachial vein) were drawn every 12 hours before and after fasting period to measure testosterone, IGF-1, CK and LDH. For data analysis, two-way REPEATED ANOVA and Bonferroni posthoc test were used.

Results: Results showed there were no significant differences in testosterone and IGF-1 in pre- and post-test among three groups. LDH was significantly decreased 22.5% and 25% in first and second group respectively. However, CK was not significantly decreased in second group (Table 1).

Variables	groups	pretest	posttest
Testosterone (ng/ml)	ZMA	8.34±2.34	9.45±1.94
	ZMA+CHO	7.87±0.99	8.38±1.44
	Placebo	7.56±1.62	7.87±1.3
IGF-1 (ng/ml)	ZMA	203.76±54.65	213.96±48.98
	ZMA+CHO	185.16±64.05	200.8±52.13
	Placebo	175.38±43.31	160.52±42.02
LDH (U/L)	ZMA	379.6±80.8	283.4±64.59 *
	ZMA+CHO	390.6±104.55	303.77±52.43 *
	Placebo	358±50.34	333.87±40.31
CK (U/L)	ZMA	148.7±50.16	147.3±47.57
	ZMA+CHO	157.44±37.48	137.57±44.38
	Placebo	147±36.1	132.51±42.98

* P < 0.05, difference with Pre exercise

Table 1: Changes in anabolic hormones and muscle damage markers following resistance training accompanying ZMA supplementation

Conclusion: Our data indicated that ZMA supplementation during six weeks resistance training led to non-significant increase in testosterone, IGF-1 hormones and CK enzyme (P>0.05) but, significant decrease observed in LDH (P<0.05). This result was under situations that consumed dosage in current study was 1/3 recommended values. So, it can suggested according with previous studies that ZMA supplement should be useful if supplementation done in higher dose [1], and more duration [2], [3].

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The influence of resistance, aerobic and concurrent training on serum visfatin concentrations in healthy men

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Objective: The present study was designed to investigate the acute effects of resistance, aerobic and concurrent aerobic and resistance exercise on serum visfatin and insulin in healthy male subjects.

Material/Methods: Nine healthy male students (age, 24.2±3.6 yr; body mass index, 21.8±2.8 kg/m²) undertook three trials: 1) RE included three sets of 15 repetitions at 60% of one repetition maximum (1RM) for 7 exercises, 2) AE included 50 min exercise at an intensity corresponding to 60% of HRmax on cycle ergometer, 3) CE encompassed two sets of 15 repetitions at 60% of 1RM for 7 exercises and 22 min aerobic exercise at 60% of HRmax on separate days in a randomized balanced design. Blood samples were collected before, immediately and 30 min after exercise. Participants maintained similar meal patterns 48 h prior to the exercise trials, and they were instructed not to exercise among exercise trials. The repeated measures ANOVA (3×3) (trial × time) was used to compare the visfatin and insulin levels in response to three exercise protocols and recovery.

Results: Serum visfatin and insulin levels were reduced similarly after all trials (P<0.05).

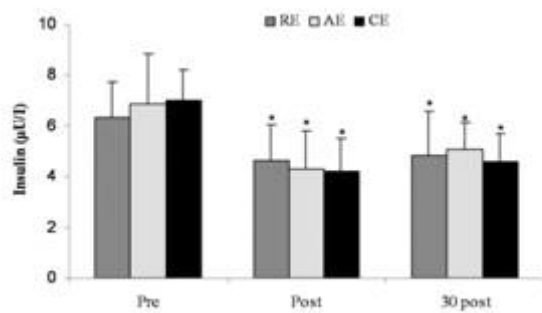


Figure 1: Insulin

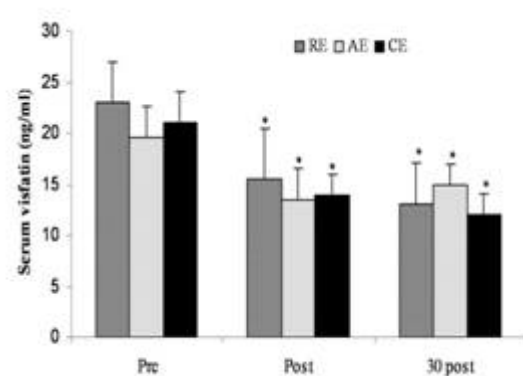


Figure 2: Visfatin

Conclusion: Ghanbari-Niaki et al. [1] reported that high-intensity sprint exercise resulted in increased plasma visfatin levels, which were accompanied by increase in insulin and glucose concentrations. Frydelund-Larsen et al. found no effect of 3 h of aerobic exercise [60% VO₂max] on plasma visfatin concentrations in healthy young men. In another study, Jürimäe et al. [2] reported a significant decrease (-10.0%) in plasma visfatin in competitive male rowers during recovery from a prolonged 2-hour moderate-intensity training session. Our results are inconsistent to Frydelund-Larsen et al., [3] but are agreement with Jürimäe et al. [2] findings. In summary, this is the first report of a significant decrease in serum visfatin concentrations as a result of acute resistance and concurrent aerobic and resistance exercise in healthy young men. Moreover, acute visfatin and insulin response may not be related to the types of exercise done and it should be noted that lower visfatin concentrations could be seen after moderate-exercise.

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Triangular Fibro Cartilage Complex (TFCC) Injuries in elite Handball players

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Objective: Injuries of the upper extremities and especially of the wrist joint in sports are some of the most common injuries that are reported [1]. All athletes are likely to suffer from an acute or chronic injury at the anatomical region of the wrist joint during their sport career [1]. More specifically at the sport of handball emphasis should be placed at TFCC injuries. The extreme twist of the wrist joint during shooting or passing is the main causative biomechanical factor that may cause acute or even overuse injuries [2]. Additionally Handball as a contact sport, injuries of the TFCC can happen due to falls or direct trauma of the wrist area [2].

The diagnosis of these injuries should be done after a good history taking where the athlete describes the precise mechanism of the injury, physical examination and imaging techniques such as fluoroscopy and magnetic resonance imaging [3], [4].

The therapeutic approach of these injuries depends on the results of the imaging methods and can range from a simple stabilization of the joint to surgery [5].

Material/Methods: Three male athletes and one female were treated for a TFCC injury. All had magnetic resonance imaging for the diagnosis and the treatment was conservative. All of them were treated with a sport cast immobilization, NSAIDs and physical rehabilitation.

Results: The average period that the symptoms subsided was 2.8 weeks while the return to play averaged 5.8 weeks.

Conclusion: Conservative treatment can have equal results to that of surgical, but good clinical and imaging examination is recommended to justify the damage of the cartilage before the therapeutic approach.

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Anthropometric features that affect on the placement at elite ice climbers

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Objective: Ice climbing as competitive sport exists in some countries for many years but as World Cup is organized in the last ten. Still anthropometric profile of ice climbers (IC) is unknown. The aim of this paper was to determine main anthropometric features of these elite athletes and their impact on placement.

Material/Methods: The 23 male (age 26.7±5.9) participants of the Ice climbing World Cup were measured day before competition. Control group (age 23.8±2.6) was made of 23 non climbers (NC), students from Faculty of sport. The variables measured included age, height, weight, body mass index, % body fat by bioimpedance, % segmental body fat (trunk, left and right arms, -legs), fat mass, leg length, arm span, ratio of arm span to height (Ape index), right and left handgrip strength, handgrip strength to body mass ratio (SMR), pincer strength (dominant hand, i.e. thumb and forefinger), handgrip endurance (dominant hand), endurance of shoulder's muscles, foot raise, hip flexion, hip abduction and climbing ability through standing position [1], Mermier CM; 2000, [2], [3].

Results: Elite ice climbers compared with NC have less height, weight, % body fat (IC 9.4±2.3; NC 13.1±3.8%), BMI, BMR, FFM and TBW (p<0.05). They have the same arm span and leg length but higher Ape index. Tests of strength, endurance and flexibility are the same, except that Ice climbers have significant better hip abduction (IC 90.9±9.8; NC 81.6±7.9 degree), (p<0.05). Age, handgrip endurance, SMR, foot raise and hip abduction had significant influence on competition rank in Ice climbing (p<0.05) while handgrip strength (left and right) shown significance of (p<0.01).

Conclusion: Elite ice climbers have moderate body composition with low fat % and good hip flexibility. This anthropometric profile of elite Ice climbers have shown that except endurance, strength and flexibility, success on competition is influenced by experience which coming with age, as well as with improvement of climbing techniques.

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Does ice climbing change climber's anthropometry?

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Objective: The vast majority of ice climbers (IC) doing rock climbing during the year. The aim of this paper was to show whether the ice climbing make some different on climber's anthropometry.

Material/Methods: The 23 male participants (age 26.7±5.9) of the Ice climbing World Cup were measured day before competition. Control group was made of 23 rock climbers (RC) (age 27.9±3.9) who reported on site climbing grade over VII+/6c (UIAA/French) [1]. The variables measured included age, height, weight, body mass index, % body fat by bioimpedance, % segmental body fat (trunk, left and right arms, -legs), fat mass, fat-free mass (FFM), total body water (TBW), basal metabolic rate (BMR), leg length, arm span, ratio of arm span to height (Ape index), right and left handgrip strength, handgrip strength to body mass ratio (SMR), pincer strength (dominant hand, i.e. thumb and forefinger), handgrip endurance (dominant hand), endurance of shoulder's muscles, foot raise, hip flexion, hip abduction and climbing ability trough standing position or the most difficult on site lead climbing [2], [3].

Results: We have found significant differences ($p < 0.05$) between IC and RC for body fat % (IC 9.4±2.3; RC 6.5±2.2 %), fat mass (IC 6.6±2.1; RC 4.7±1.9 kg) and trunk fat % (IC 9.5±3.9; RC 5.5±3.0 %). IC have weaker ($p < 0,05$) hand grip (left hand: IC 442±96; RC 575±83 N/right hand: IC 495±95; RC 589±78 N), SMR (IC 7.0±1.1; RC 8.5±1.0 N/kg) and foot rise (IC 68±6; RC 76±7 cm). No difference has been found for pincer strength, grip endurance, endurance of shoulder's muscles, hip flexion and abduction.

Conclusion: Results indicate that IC have higher body fat, lower hand grip and SMR and weaker hip flexibility. These could be a body reaction on cold environment and adaption on different tools (ice axe and crampons) which have been used during the ice climbing. Ice axe is much bigger and adequate for handling than rock's holds and there is less possibility for foot rise with crampons on them. Taking everything into consideration, ice climbing is not considerably affected changes in climber's anthropometry.

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Oxygen saturation profile of Iranian female climbers while ascending Mera Peak (6654 m) and its correlation to the incidence of acute mountain sickness

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Objective: Acute mountain sickness (AMS) is characterized by nonspecific symptoms like headache, loss of appetite or nausea, dizziness, fatigue, insomnia, and peripheral edema that usually occur within 4–8 h after rapid exposure of non-acclimatized individuals to altitudes above 2000–2500 m [1]. There is no gold standard to predict AMS to date. However, there are studies reported the correlation between SpO₂ at low altitude and AMS at higher altitudes [2], [3], [4]. Therefore, the purpose of this study was to investigate the relationship between SpO₂ and AMS in female Iranian climbers during ascent from Lukla (2800 m) to the Mera Peak (6654 m).

Material/Methods: Eight female climbers (age: 34.4±8.7 years) who were selected from 35 climbers and dispatched to Himalaya by mountaineering federation (Kermanshah province) participated as subjects, voluntarily. Climbing rout was from Lukla to Mera peak summit with overnights at 3310 m, 4150 m, 3525m, 4210 m, 5100 m, and 5800 m altitudes. After arriving in all camps, SpO₂ were measured using pulse-oximeter (Nonin Onyx II 9550). AMS symptoms were assessed using Lake Louise scoring system.

Results: Means ± SD for SpO₂ at 2800 m, 3310 m, 4150 m, 3525m, 4210 m, 5100 m (day 1), 5100 m (day 2), and 5800 m were 93.0±1.2, 92.4±1.4, 86.3±2.6, 92.0±1.3, 87.6±2.4, 82.0±2.2, 84.3±0.9, and 72.0±4.9, respectively. There was no significant correlation between AMS symptoms and SpO₂ values. However, there was a significant increase in SpO₂ from day 1 to day 2 in the base camp (5100 m) (*t*= -3.63; *p*=0.008).

Conclusion: In conclusion, there is no relationship between SpO₂ at low altitude and incidence of AMS at higher altitudes during a Himalayan expedition to a 6654 m summit. However, for this conclusion, the small sample size should be considered as a limitation. Another finding was that with staying at altitude for more than one night, acclimatization would occur and this acclimatization is confirmed by the increase in SpO₂ at 5100 m.

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Parents perception of post-game beverage for youth ice hockey players

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Objective: Chocolate milk has recently been reported in a few studies as good post event beverage for muscle recovery in endurance type events. To date no studies have demonstrated similar results with anaerobic sporting activity. The purpose of this study is to identify the preference and knowledge of parents of youth ice hockey players as it relates to ideal post-game recovery beverages.

Material/Methods: A survey instrument was developed and sent via email through a third party to all families of youth ice hockey players in Tampa, Florida, USA. Emails sent to an address that included more than one parent were instructed to have each of the parents complete the survey independently. Completed survey responses were emailed back to the same third party, and then forwarded to the investigators of this study de-identified.

Results: Respondents reported post-game drinks as being important for muscle recovery and development, re-hydration, replenishment of vitamins and minerals, increased energy and alertness, and a good mix of protein, fat and carbohydrates. Most respondents stated that the most effective drink is one that serves to re-hydrate the body. Water, milk, and flavored milk were identified as the most popular flavors of choice. Factors most reported when determining the post-event beverage included cost, availability, convenience, taste, and quality.

Conclusion: Studies performed in controlled laboratory environments testing muscle recovery patterns with aerobic activity following post-activity beverages have recently demonstrated that chocolate milk has positive benefits. These benefits have included a greater time to exhaustion and an increased amount of total work between two exercise bouts. Furthermore, perceived muscle soreness after exercise has been reported to decrease with the use of flavanol-rich cocoa. Immediate consumption post-exercise has been shown to provide the greatest benefit for subsequent exercise bouts. Empirically, parents and coaches of youth ice hockey players have regularly promoted the use of chocolate milk as a post-game ergogenic aid. This parental promotion was of curiosity to the authors since no studies have demonstrated such benefits with aerobic-based sports similar to that found with anaerobic activity. Furthermore, no studies have reported the effects of chocolate milk specifically with ice hockey players. Despite the lack of evidence, parents of youth ice hockey players believe firmly that chocolate milk is the best post-event recovery beverage. Until future research demonstrate the ergogenic benefits of chocolate milk associated with recovery for anaerobic activity, and specifically ice hockey, parent's perception and commercial marketing will influence the beliefs .

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Relationship between physical fitness and climbing performance while ascending Mera Peak (6654 m) in Iranian female climbers

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Objective: Because of decrement in arterial oxygen saturation at altitude, physical fitness will be reduced. Studies show individual differences in physical fitness diminution at altitude; however, there is no gold standard in low altitude to find these differences to date. One of the criteria for selection of mountaineers to climb high mountains is results of physical fitness tests in Iran yet. Because these tests are normally performed near to sea level, their validity for selection of mountaineers is disputed. Therefore, the purpose of this study was to investigate the relationship between physical fitness and success on Mera Peak (6654m).

Material/Methods: For this purpose, eight female climbers (age: 34.4±8.7) who were selected from 35 climbers and dispatched to Himalaya by mountaineering federation (Kermanshah province) participated as subjects, voluntarily. In Kermanshah city (1350m, Iran) physical fitness tests including Cooper test, lung-jump, chin up, and sit up tests were conducted.

Results: Results showed that none of the cooper test, lung jump, chin up, and sit up tests; and also weekly training volume, age, body mass, BMI, or percent of body fat were significantly correlated to summiting. Summiting was only related to climbing ability over 5000 m in 2 days before summiting ($p=0.039$) and sleeping history over 3000m ($p=0.002$).

Conclusion: In conclusion, physical fitness near to sea level could not guaranty climbing ability at high altitude. Climbing and sleeping history at high altitude may be better criteria for a successful upcoming climb.

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