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European Journal of Sports Medicine

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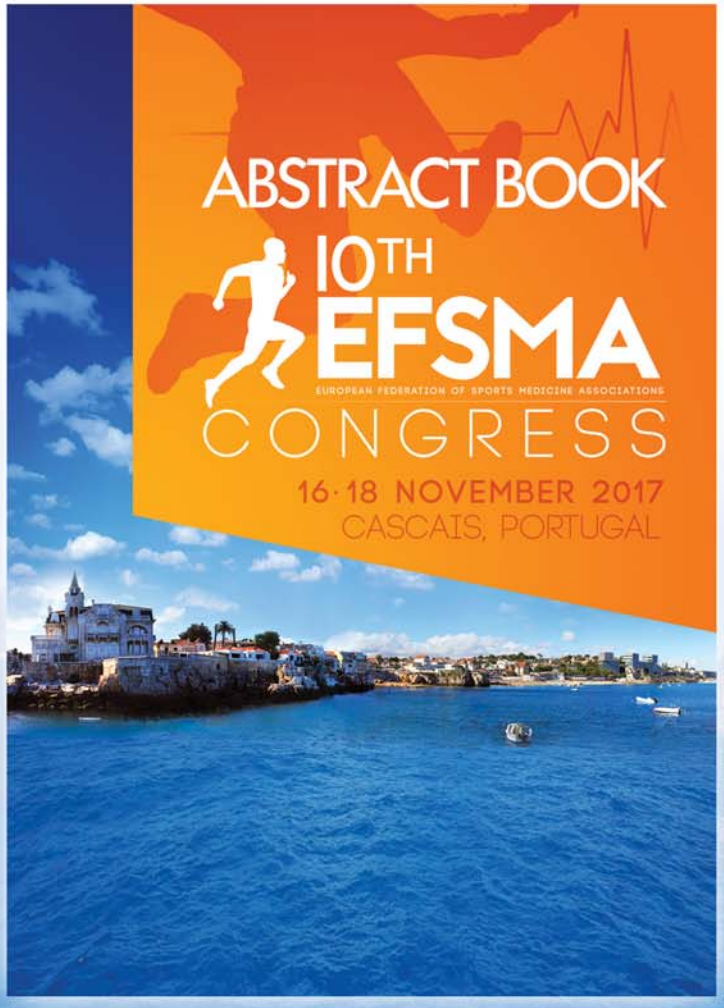

EXERCISE PRESCRIPTION FOR HEALTH

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European Journal of Sports Medicine

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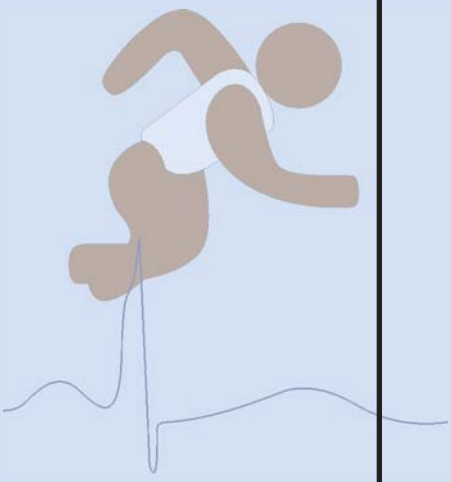

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*a) **Journal article:*** Hubbard TJ, Hertel J. Mechanical contributions to chronic lateral ankle instability. Sports Med. 2006;36(3):263-77.

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*c) **Chapter in a book:*** Phillips SJ, Whisnant JP. Hypertension and stroke. In: Leregh JH, Brenner BM, editors, Hypertension: pathophysiology, diagnosis, and management. 2nd ed. New York: Raven Press; 1995. p. 465-78.

*d) **Conference/Congress proceedings:*** Tocitu D. Enzymatic of the adaptative processes in High Performance Sport. Proceedings of the 12th Balkan Sports Medicine Congress, 6th International Congress of the Sports Medicine Association of Greece, 3rd Hellenic-Cyprus Sports Medicine

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Congress 2002 March 21-24; Thessaloniki, Greece.

e) ***Dissertation Thesis:*** Natsis K. Ultrastructural study of the skeletal muscle fibers after an experimental muscle atrophy [dissertation number 870]. Medical School, Aristotle University of Thessaloniki, 1993.

f) ***Journal article in electronic format:*** Christodoulou A., Terzidis I., Natsis K., Gigis I., Pournaras J. Soleus accessorius, an anomalous muscle in a young athlete: case report and analysis of the literature. Br J Sports Med 2004;38(6):e-38.

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Editorial

Dear Colleagues,

The present supplement is the 1st Supplement of the 5th Volume of the European Journal of Sports Medicine and hosts the abstracts from the 10th European Sport Medicine Congress of EFSMA taking place in Cascais, Portugal on November 16-18, 2017.

We look forward to a well-organized educational activity, with high-level scientific contributions and practical take-home messages for the everyday application.
I hope all of you find useful the collection of these abstracts.

With honor

Prof. Konstantinos Natsis
Editor-In-Chief

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Invited Lectures

Thursday, 16 November 2017
Parallel Oral Presentations –
10:00 – 11:15 Internal Medicine and Sports

A4

IMPACT OF A MOUNTAIN ULTRA-MARATHON (UTMB) ON CARDIAC BIOMARKERS

C. LE GOFF[2]; L. GERGELÉ, J.F. KAUX[1]; G.Y. MILLET[3]

[1]University of Liège, Belgium; [2]University Hospital of Liège, Belgium; [3]Human Performance Laboratory, University of Calgary, Canada

OBJECTIVES: While moderate exercise has beneficial effects on the cardiovascular system, consequences of a supra-physiological effort are not clear yet. In particular, the physiological consequences of ultramarathons need to be further documented. The aim of the study was to assess the changes of various cardiac biomarkers after a mountain ultra-marathon.

MATERIAL AND METHODS: Blood and urine samples were collected on 28 runners (17 men) participating to the Ultra-Trail du Mont Blanc (105 km, total positive elevation: 5600 m) at 3 different times: before the race (Pre), within 1 h after the finish (Post) and 7 days after the finish (D+7). Several biomarkers involved in heart disease (coronary syndrome, heart failure and fibrosis) and in inflammation were assayed on different analyzers such a COBAS® (for CKMB,TnThs, NT-proBNP, H-FABP and CRPs) and KRYPTOR® (for Copeptin). ST2 was measured manually with the Presage kit from CRITICAL DIAGNOSTIC®.

RESULTS: Plasma levels of cardiac markers (CKMB, TnThs, NT-proBNP, copeptin, H-FABP, ST2) and inflammation (CRPs) increased significantly at Post. Means values increased from Pre to Post as follows: 2.3 to 91.9 UI/L for CKMB ($p<0.0001$); 7.6 to 31.7 ng/L for TnThs ($p<0.0001$); 41.7 to 1190.5 ng/L for NT-proBNP, 4.2 to 22.9 pmol/L for copeptin ($p=0.001$); 3.6 to 107.8 ng/mL for H-FABP ($p<0.0001$), 29.7 to 126.2 ng/mL for ST2 ($p<0.0001$); 0.5 to 29.1 mg/L for CRPs ($p<0.0001$). With the exception of a few (H-FABP, ST2, CRPs) biomarkers in some subjects, all values were back to Pre values at D+7.

DISCUSSION-CONCLUSION: Prolonged strenuous running exercise caused an elevation in cardiac biomarkers. Elevation in CK-MB levels lacks specificity for cardiac damage as runners have increased CK-MB from skeletal muscles as well. Previous studies suggested that exercise induced TnThs elevation is a benign reversible physiologic phenomenon but this parameter, as well as H-FABP, could be a sign of

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ischemia. Different phenomena occurred such as stretch of myocytes causing an increase in pressure or volume and neurohormonal activation which can explain the Copeptine and NT-proBNP increase, while ST2 is a biomarker of cardiac remodeling and fibrosis. CRP is an acute phase compound that tends to increase following a strenuous and prolonged bout of exercise and/or muscular injury. As the values tended to return within the normal reference range values within 7 days after the race, our study suggests that there is no permanent structural damage at the myocardium level.

A5

COMPARISON OF CARDIAC BIOMARKERS FLUCTUATION IN RUNNERS OF MARATHONS, SEMI-MARATHONS AND UNTRAINED RUNNERS

C. LE GOFF[2]; L. VRANKEN; J.F. KAUX[1]; E. CAVALIER[1]

[1]University of Liège, Belgium; [2]University Hospital of Liège, Belgium

BACKGROUND: Regular exercise like running is one important part of the prevention program of cardiovascular disease. There are several studies on biomarker changes during marathons especially cardiac biomarkers have been studied and mild to moderate elevations have been described as a results of a running exercise Exact underlying mechanism for these biomarker elevations reflecting physiological or even pathobiological changes is unknown and less trained athletes might exhibit a higher risk compared to well trained The aim of our study was to compare three cardiac biomarkers for ischemic condition (Troponin), cardiac stretch (natriuretic peptides) and fibrotic processes (Galectin-3) were tested in different type of runners, trained marathon and semi-marathon runners and untrained runners before, directly after and 3 hours after the running exercise.

METHODS: 23 (mean age 41± 8.8 yo) marathon runners, 15 semi-marathon runners(44.1±8.4yo) and 17 healthy sedentary subjects (37± 4.4 yo) (race of 10 km, <2h of sport/week).

Blood samples were taken just before (T0), just after (T1) and 3 hours (T3) after the race, centrifuged, aliquoted and stored frozen at -80C before further analysis. The study was approved by the Ethical Committee of our University Hospital.

The analyses were performed on the Abbott ARCHITECT i2000SR (Abbott Laboratories, Germany) for the hs cTnI, BNP and Gal-3 and on the C8000 (Roche Diagnostics, Switzerland) for hs-cTnT and NT-proBNP according to the manufacturer's instructions for use.

RESULTS: In all 3 running groups there is an increase of cardiac biomarkers Troponin I, BNP, Galectin-3 and NT-ProBNP after completion of the physical exercise. Biomarkers increase is depending on the intensity and duration of the exercise and is higher in long distance marathon and semi-marathon runners compared to the control group with a 1 hour run. Cardiac biomarker levels between trained marathon and semi-marathon runners were not statistically different in the pre-exercise baseline samples for BNP, NT-Pro-BNP and Galectin-3. Compared to untrained runners only Troponin I levels were higher in baseline sample of marathon runners (hs-cTnI, $p<0.03$) when compared to controls, cardiac Troponin T (hs-cTnT, $p<0.29$) was less significant.

CONCLUSIONS: Our study demonstrates that exercises of different intensity can be associated with biochemical abnormalities that may reflect adverse consequences on cardiac structure as fibrosis and biology. With exeption of Troponin I there was no difference in the pre-exercise baselines samples.

Invited Lectures

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A17

RELATIONSHIPS BETWEEN RELATIVE AEROBIC POWER AND CARDIAC ATHLETIC CHARACTERISTICS IN ATHLETES OF DIFFERENT BRANCHES OF SPORTS

G. PAVLIK[1]; T. KOVATS[2]; Z. KOMKA[2]

[1]University of Physical Education Budapest, Hungary; [2]Heart and Vascular Center Semmelweis University Budapest, Hungary

INTRODUCTION: As endurance performance markedly depends on the cardiac functions, relationships between some cardiac indices and spiroergometric parameters have been reported in several studies and in our previous paper (Kneffel ea. Echocardiography, 24 901 2007). In the present study relationships between the relative aerobic power, and some morphologic (left ventricular (LV) hypertrophy), functional (diastolic function indicated by the E/A ratio) and regulative (heart rate (HR) characteristics of the athlete's heart were investigated in a large number (more than 1000) male and female young adult subjects (age: 19-35 yr.) of different braches of sports.

METHODS: Subjects were enrolled to subgroups according to their sports activity as follows: endurance athletes – ball-game-players – sprint-and-power athletes – non-athletes. Relative aerobic power was determined on treadmill or bicycle spiroergometry, cardiac characteristics were measured by two-dimensionally guided M-mode, Doppler- and tissue-Doppler echocardiography.

RESULTS: In the whole material, highly significant correlations were found between the rel. aerobic power and the LV hypertrophy ($r=0.40$, $p<0.001$), E/A ($r=0.26$, $p<0.01$) and the HR ($r=-028$, $p<0.01$). In the group of endurance athletes rel.LV muscle mass and HR showed significant correlation with the rel. maximal oxygen consumption, in ball-game-players rel.LV muscle mass only correlated significantly with the rel.VO_2max. In the group of sprint-and-power athletes and in non-athletes no significant correlations were found.

CONCLUSION: Results indicate that in our material the morphologic adaptation (rel.LV muscle mass) proved to be the most consequent, it was followed by the modification of the autonomous regulation (HR). Improvement of the diastolic function indicated by an elevated E/A was moderate, which is accordance with previous observations according to which this property is more characteristic to the older athletic subjects.

Different correlations with the rel. aerobic power were the highest in the endurance athletes followed by the ball-game-players. Endurance trained athletes are supposed to have a high oxidative capacity in their muscles (slow twitch muscle fibres and an improved oxidative metabolism); the limit of the aerobic capacity and performance is the oxygen supply of the muscles which is determined by the cardiac function. The proportion of slow twitch fibres and the oxidative capacity in sprint-and-power athletes is lower; performance is already limited in the periphery.

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A27

SAFE PHYSICAL ACTIVITY

M. HENRIQUES
Exercise Medicine Unit – Naval Medicine Centre; Naval Research Centre, Portugal

The benefits of physical activity regular practice are well established in the medical literature, but the inherent risks are usually less valued. The boom of moderate to vigorous intensity physical activity practice requires the application of an adverse event stratification process, but this is not intended to be a significant barrier to participation. Self-administered pre-participation screening, such as the AHA/ACSM Health/Fitness Facility Pre-Participation Screening Questionnaire, alert individuals at high risk of needing to consult a physician before raising their level of physical activity.

A Portuguese version of the AHA/ACSM Health/Fitness Facility Pre-Participation Questionnaire was applied to the Portuguese Navy population to verify the safety of the practitioners in a possible increase of the physical activity individual level.

From 10.058 questionnaires sent out, 941 (9,4%) different and valid questionnaires were received. The analysis of respondents' answers to the questions in the section "History" (at least one affirmative answer) revealed that 585 (62,2%, CI 95% = [59%; 65,4%]) of the respondents should consult their physician before increasing their physical activity level, considering that they may need to use a facility with a medically qualified staff. Moreover, analysis of the remaining respondents' answers (n = 356) to the questions in the section "Cardiovascular risk factors" (at least two affirmative answers) revealed that 230 (24,4%, CI 95% = [21,6%;27,2%]) of the respondents should consult their physician before increasing their physical activity level, considering that they might benefit from using a facility with a professionally qualified exercise staff to guide their exercise program. In the end, only 126 (13,4%; CI 95% = [11,2%;15,6%]) responders presented a questionnaire that enables an increase in the physical activity level without consulting their physician or other appropriate health care provider in a self-guided program.

This study revealed a high prevalence of Portuguese Navy individuals that should consult their physician before increasing their physical activity level.

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PREVALENCE OF MENSTRUAL IRREGULARITIES IN COMPETITIVE FEMALE ATHLETES

G. VANLYAN; D. DIMITROVA
Department of Sports Medicine, National Sports Academy "V. Levski", Bulgaria

OBJECTIVE: During the past few decades women have become more involved in recreational and competitive sports. The effects of excessive physical training on the female reproductive system are not well documented. Menstrual dysfunction was also described by ACSM as a second component of the female athlete triad.

Although some studies indicate that competitive female athletes have higher incidence of menstrual irregularities than the general population, the actual prevalence is not clear and it varies widely, according to different authors. It is very difficult to identify the exact causes for these alterations. The higher incidence of menstrual disturbances is often associated with aesthetic sports such as gymnastics and ballet dancing where the body weight is low.

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The primary purpose of this study was to determine the presence of menstrual disorders in female athletes participating in a variety of competitive sports and the secondary, to compare the prevalence of menstrual irregularities among aesthetic and non-aesthetic sports.

METHODS: This study encompassed 281 female athletes aged 16 to 25 years (mean age 19.89 ± 2.4). The control group comprised of 47 women of the same age range (mean age 21.74 ± 2.1) not engaged in any sports activity.

Each participant completed a screening questionnaire assessing menstrual status. The questionnaire was meant to identify the age of menarche and the following menstrual disturbances – primary and secondary amenorrhea, oligomenorrhea, polymenorrhea, menorrhagia and dysmenorrhea.

The participants were also asked to provide information about their age, height, weight, use of contraceptive drugs, sports experience, and competitive level. BMI was calculated based on participant's data for height and weight.

The athletes were divided into 2 subgroups according to the type of their sport – I subgroup - aesthetic sports (rhythmic gymnastics, artistic gymnastics, aerobic gymnastics, sports acrobatics, dance, figure skating) (n=69) and II subgroup - non-aesthetic sports (ball games, racket sports, track and field, combat sports, winter and ice sports, rowing, cycling, swimming, fitness, shooting, fencing) (n=212).

Statistical analyses were performed using SPSS-23. Descriptive statistics (mean ±standard deviation) were computed for all variables. Student's t-test for independent samples was used for comparative analyses.

RESULTS: The mean values of the physical characteristics (height, weight and BMI) of the whole group of female athletes were similar to these of the non-practicing women. However, the aesthetic sports athletes have significantly lower height and body weight than the athletes from the other sports. The mean BMI of I subgroup of athletes was 19.38±2.04, which is considered as underweight, and was lower than the BMI of II subgroup.

We observed that the average age of menarche of female athletes (13.45±1.57) was significantly later ($p<0.001$) than in control group (12.82±1.37). Menarche of females of aesthetic sports (14.19±1.83) was significantly delayed as compared to athletes from the other sports (13.2±1.39).

The prevalence of menstrual disturbances in the whole group of female athletes was as follows: primary amenorrhea – 3.2%, secondary amenorrhea – 2.9%, olygomenorrhea – 4.4%, polymenorrhea – 2.9%, menorrhagia – 6.3%, dysmenorrhea – 54.4%. A two-sample t-test between proportions was performed to determine whether there was a significant difference between the groups of athletes and non-practicing sports women. The t-statistic was not significant at the .05 critical alpha levels for all variables.

Analysis of results for both subgroups of female athletes showed that the incidents of primary and secondary amenorrhea, oligomenorrhea, menorrhagia, dysmenorrhea and polymenorrhea were similar for aesthetic and non-aesthetic sports groups.

It was found significantly higher incidence rate of menorrhagia in female athletes from aesthetic sports (10.4%) as compared to general population (1.9%).

Amenorrhea (primary plus secondary) was observed in 3.8% of non-athletes, in 6.1% of whole group of female athletes and in 9.4% of athletes in aesthetic sports, but differences were not significant.

CONCLUSIONS: Sport participation doesn't result in higher prevalence of menstrual abnormalities than in general population. We found higher but not statistically significant incidents of menstrual irregularities among athletes participating in aesthetic sports. These results suggest that practicing aesthetic sports and the maintenance of low body weight rather than exercise stress are responsible for alterations in reproductive cycle of exercising women.

Key words: female athletes, menstrual irregularities, amenorrhea, aesthetic sports

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Invited Lectures

Invited Lectures

Thursday, 16 November 2017
Parallel Oral Presentations –
11:45 – 13:00 Orthopedics, Traumatology

A6

EXPLORING THE EFFECT OF A SECOND CLOSELY-TIMED PRP INFILTRATION FOR TENDINOPATHY

J.F. KAUX[2]; B. FORTHOMME; C. LE GOFF[1]; S. DELCOUR; A. GOTHOT, J.L. CROISIER[1]
[1]University Hospital of Liège, Belgium; [2]University of Liège, Belgium

INTRODUCTION: Although PRP is very popular in sport, especially since it was removed from the doping list, it remains controversed in literature (3). Up to now, there exists no general agreement on the preparation and the use of PRP. Some clinical series have previously evaluated the effect of PRP in the treatment of proximal patellar tendinopathies. Although it is possible that a single infiltrative administration may prove to be an effective treatment for this indication, most of the existing studies evaluated the effects of two or three successive infiltrations. The multiplication of infiltrations is arguably likely to increase the risks of complications, and this treatment can be expensive.

PURPOSE: We aimed to evaluate whether two infiltrations of PRP prove more effective than a single treatment.

METHODS: Our study is a single blinded, randomized controlled clinical trial on leisure sportsmen with chronic proximal patellar tendinopathies, rebel to classical management, including physiotherapy, shock wave therapy… Twenty patients suffering from proximal patellar tendinopathies for over than 3 months were enrolled into the study. PRP was obtained using an aphaeresis machine (1). The subjects were split into two randomized groups and beneficed of 1 or 2 infiltrations of pure PRP, respectively. The one-year follow-up evaluation consisted of VAS, IKDC and VISA-P scores, while algometer, isokinetic and ultrasounds evaluations were carried out up to 3 months.

RESULTS: The concentration of the PRP used for each infiltration was similar in both groups (913.20 ± 65.60 × 103/ L for group 1 and 917.90 ± 63.08for group 2, with virtually no red (<0.001 × 106/ L) nor white cells (<0.001 × 103/ L) in either group). The VAS significantly decreased with time over the 3 month follow-up period ($p = 0002$), with no difference observed between the two groups ($p = 0.2$). Values obtained with the pressure algometer increased with time across both groups over the 3 month follow-up period ($p < 0.0001$), and values were significantly higher for Group 1 ($p = 0.001$). The IKDC score increased with time in both groups over the follow-up period ($p = 0.034$), with values again significantly higher for Group 1 ($p = 0.0026$). The VISA-P score increased with time in both groups over the follow-up period ($p = 0.0023$), with no difference observed between the groups ($p = 0.41$). No improvements in isokinetic physical performance were observed in either group. However, pain during E30 significantly decreased over the 3 month follow-up period ($p = 0.027$) for patients in both groups. No improvement in either jumping performances or in pain was observed in either group during optojump evaluation. No improvements in US findings were observed. However, an increase of the sagittal hypo-echoic area was observed in Group1 ($p = 0.0038$).

After one year, 90% patients of group 1 did not report anymore pain during daily activities, in comparison with only 20% in group 2. In group 1, 20% of subjects still described pain during work activities and 40% during practicing sports versus 40% and 70%, respectively, in group 2. One patient in each group did not return to sport; both subjects still experienced pain through daily and occupational work activities. Six subjects among the group 1 (67%) and 7 among the group 2 (78%) returned to their former sport, and 55% of both groups to the former level than before the tendinopathy. However, 44%of the group 1 and 78% of the group 2 still experienced pain during sports activities. The practiced sports were football, handball, cycling, running, fitness.On the other hand, patients with only few months of symptoms did not evolved more favorably than those with symptoms for longer.

CONCLUSIONS: The comparison between 1 or 2 infiltrations of PRP did not reveal any difference between the 2 groups after a follow-up period of 3 months. A second closely-timed infiltration of PRP to treat proximal patellar tendinopathies is not necessary to improve the efficacy of this treatment in the short term (2). However, there remains a need to evaluate the longer term results.

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A10

PLATELET-RICH PLASMA VERSUS HYALURONIC ACID TO TREAT TENDINOPATHIES

J.F. KAUX[1]; M. ROBERTJOT; A. SAMSON[2]; J.L. CROISIER[1]

[1]University of Liège, Belgium; [2]University Hospital of Liège, Belgium

INTRODUCTION: The treatment of patellar tendinopathies could be difficult. This is the reason why new treatments have been developed, among which platelet rich plasma (PRP) injections. Some clinical series have previously evaluated the effect of PRP in the treatment of proximal patellar tendinopathies. Recent systematic review concluded that PRP could be recommend as a treatment in such indication (1). Recently, the viscoelastic properties of hyaluronic acid (HA) on liquid connective tissue have been proposed for the treatment of tendinopathies (2). Some fundamental studies show encouraging results on HA's ability to promote tendon gliding and reduce adhesion as well as to improve tendon architectural organisation. Some observations also support its use in a clinical setting to improve pain and function.

PURPOSE: We aimed to compare the effect of PRP injection versus two injections of HA after three months on patients who have a proximal patellar tendinopathy.

METHODS: Thirty-three sportsmen with proximal patellar tendinopathies being not relieved after minimum three months of normal physiotherapy treatments where included. Eighteen of them (group 1) have received a leukocyte poor PRP injection (obtained using an aphaeresis machine (3)) and the other fifteen (group 2) two HA injections, all of them have benefited of standardized rehabilitation.

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Concerning the evaluation of the pathology, algo-functional tests (visual analogic scale (VAS), pressure algometer, IKDC score, VISA-P score), isokinetic (associated to VAS) along with the patellar tendon ultrasonography (US) have been realized over three times (pre-injection, after 6 weeks, after 3 months post-injections).

RESULTS: The results of VAS ($p<0,01$), algometric scores ($p<0,01$), IKDC scores ($p<0,01$) and VISA-P ($p<0,01$) show a considerable improvement in the two groups, but not for the US findings. For the group 1, isokinetic tests show significative results for the hamstrings in C60°/s with an improvement of maximum peak torque ($p=0,01$) for the pathological member, a diminution ($p>0,05$) for the healthy limb and during the analysis of the bilateral difference ($p=0,0002$). For the group 2, the improvement of quadriceps maximum peak torque in C240°/s is significant ($p>0,01$) for the pathological knee after 6 weeks post-injections only. The VAS associated with isokinetic tests decreases significantly for all contraction modes after three months of study.

CONCLUSIONS: Both PRP and HA can improve the symptoms of proximal patellar tendinopathy, even if the results are slightly better in the PRP group.

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Invited Lectures

A13

INTRA-RATER RELIABILITY OF THE ICARE PRO REBOUND TONOMETER: A POTENTIAL CLINICAL MEASUREMENT TOOL FOR IDENTIFICATION OF CONCUSSION

C. LODGE[1]; B. HUNT[1]; D. KENT[2]

[1]Institute of Technology Carlow, Ireland; [2]The Vision Clinic, Kilkenny, Ireland

INTRODUCTION: The aim of this study was to establish intra-rater reliability of the Icare® PRO rebound tonometer (Icare, tiolat, oy, Helsinki, Finland) in an active population measured in a standing posture. The rebound tonometer measures Intra-ocular pressure (IOP) by releasing a small, sterile plastic probe that rebounds off the cornea and provides a measure of the pressure inside the eye. Fair to high intra-rater reliability of the Icare® PRO rebound tonometer has been well established in previous studies. However, the common posture tested was in a seated or supine position. Reliability of this tonometer has not yet been established in a standing position. A measure taken in standing is more applicable to a sporting situation such as a head injury assessment (HIA) in team sports and for measures immediately following exercise. Once reliability has been established for this device an analytical prospective cohort study will be carried out on male and female team sport athletes to establish normative values and follow up measures in the event of a suspected concussion. The cohort study will use IOP along with the added outcome measures of Optical Coherence Tomography (OCT) and the Sideline Concussion Assessment Tool (SCAT-3).

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METHODS: 31 student participants from the Institute of Technology Carlow, Department of Science and Health (male N=17, female N=14) aged between 18-31 (mean: 20.97±3.301) years were recruited for the study. Written consent was obtained prior to testing. Participants were excluded if they had any history of serious eye trauma or active eye infection. Participants were examined using the Icare® PRO rebound tonometer to measure IOP in mmHg. There was a single session of testing. Participants were tested in a rested state following 5 minutes of static stance, participants were instructed to breathe normally and focus on a point over the testers shoulder. Three consecutive measures were taken in alternating eyes with 2-minutes between each measure. Intra-class correlation coefficients (ICC's) were calculated for both eyes to establish reliability.

RESULTS:

TABLE 1.0 – Tabulated Results for Intra-rater reliability study

Eye	Mean IOP ±SD (mmHg)	SEM (mmHg)	MDC (mmHg)	ICC (95% C.I)
Left	16.92±1.62	0.17	2.145	0.771 (0.63 – 0.87)
Right	16.65±1.53	0.16	2.107	0.753 (0.60 - 0.86)

CONCLUSION(S): The Icare® Pro rebound tonometer was found to have fair/acceptable intra tester reliability when testing IOP in a standing posture in a single testing session. This portable device could be effective in a sporting setting, possibly as part of a HIA or sideline assessment and as a screening tool for intraocular pressure in team sports. Additional research to determine the reliability of this tonometer over a number of days, during exercise and also to establish inter-rater reliability would be beneficial in the future. These results suggest that this device is reliable when used by a single rater and would be acceptable for use as part of an analytical prospective cohort study to establish a relationship between IOP, OCT and concussion in team sports.

FUTURE DIRECTION: OCT allows the clinician to capture images of the retina and optic disc, calculating the thickness of the various layers. The equipment being used is the TOPCON DRI OCT Triton (TOPCON, Tokyo, Japan). This imaging technique is widely used in ophthalmology for the diagnosis and monitoring of ocular conditions such as glaucoma and macular degeneration. The retina is essentially an extension of the brain. Concussion is a neurological brain-injury and therefore it is logical to explore the possibility that concussion may manifest itself in the neighboring vasculature and neurological structures of the retina. Following the completion of the reliability study, an analytical prospective cohort study was initiated. Baseline data for this study is currently being collected. The aim of this study is to establish baseline and normative values of IOP, OCT and the Sideline Concussion assessment tool (SCAT-3) for various age groups between 18-31 years of age in males and females participating in sports with a contact element (GAA, Rugby, Soccer, Boxing) N=250. In the event of a suspected concussion the participant will be re-tested 48hrs, 2 weeks and 2 months post-injury. Changes in ocular metrics will be explored and correlated to any changes in the SCAT-3. OCT images will be interpreted and examined by a consultant ophthalmologist.

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A28

EXERCISE INTENSITIES, REPRODUCTIVE AXIS AND MUSCLE MASS IN DIET-INDUCED OBESE MICE

A.L.A. PORTO[1]; L.G.G. PORTO[2]; K.S.L. MILESKI[1]; M.S. COELHO[1]; S.A. PEREIRA[1]

[1]University of Brasilia - Faculty of Health Sciences, Brazil; [2]University of Brasilia - Faculty of Physical Education, Brazil

INTRODUCTION: In the last decades, obesity becomes an epidemic condition and several studies shown its relationship with endocrine disorders, as male hypogonadism. Inadequate diet and sedentarism are inappropriate daily life behaviors that contributes to weight gain. Exercise training have been widely used in attempting to lose weight and improve health but the effects of different exercise intensities on reproductive axis in obese population still needs further investigation.

OBJECTIVE: Evaluate the influence of high intensity interval training (HIIT) and moderate intensity continuous training (MICT) on the testis and muscle mass of diet-induced obese mice compared to control.

METHODS: Fifteen C57BL/6 adults male mice assigned to three different groups fed with Hipercaloric Diet (HD): High intensity interval training and Hipercaloric diet group(IH; n=5), Moderate intensity continuous training and Hipercaloric diet group (MH; n=5) and Hipercaloric diet group (HC, n=5). Five animals assigned for a Control group fed with control diet (CC, n=5).

All Animals initiated their respective diet since 28 days of life for 150 days before experiment and continued for more 60 days until the end of the exercise protocol. Food and water were administered ad libitum.

Hipercaloric diet was composed of 57,2% fat, 27,6% carbs and 15,2% protein. Control diet was composed of 15,8% fat, 63,9% carbs and 20,3% protein.

Exercise protocols were performed during eight weeks, five days per week. Each HIIT session lasts about 45 minutes and consists of 4-min high intensity bouts at 90% of the speed reached on previous ramp test followed by 3-min moderate intensity bouts at 70%max. MICT consists in a single bout at 70%max and each session lasts about 54 min.

All animals were sacrificed after the experiment for tissue dissection. The testis and muscle gastrocnemius were collected and weighted using a precision balance (Prolab®).

One-way ANOVA was used for comparison of quantitative variables between groups using post hoc Tukey's Multiple Comparison Test. T test was used to compare means between the two exercising groups. Absolute values of tissue mass were corrected by animals weight.

RESULTS: Analysis of variance shown similiar baseline mean values of body weight between groups (p=0,844).

As expected, Hipercaloric diet groups gained significantly more weight (IH: 26,63 ± 3,118 g, p=0,001; MH: 23,8 ± 3,8 g, p= 0,01; CH: 23,93 ± 3,217 g, p=0,009) than control diet (CC: 15,11 ± 4,601 g) before intervention.

After the exercise intervention, CC (6,3 ± 2,2 g) tends to gain more weight than both exercise groups IH (3,7 ± 0,9 g, p=0,076) and MH (3,5 ± 1,7 g, p=0,061).

The testis mass of the only group fed with control diet CC (5,5 ± 0,7 mg/g) was heavier than non-exercising group fed with HD CH (3,7 ± 1,2 mg/g, p=0,014) but was similar to IH (4,6 ± 0,5 mg/g, p=0,321) and MH (4,1 ± 0,7 mg/g, p=0,053).

The gastrocnemius mass of CC (12,8 ± 2,2 mg) was greater than CH (7,4 ± 2,1 mg/g, p=0,006) and MO (7,0 ± 1,6 mg/g, p=0,004) but was similar to IN (9,7 ± 2,8 mg/g, p=0,190).

Animals of the two exercise protocols runned similar distances on the treadmill (IH: 763,3 ± 184,4 m

vs MH: 748,4 ± 204,4 m, p=0,976) but HIIT sessions lasts shorter than MICT sessions (IH: 44,8 ± 12,8 m vs MH: 53,4 ± 15,4, p=0,01).

CONCLUSION: Hipercaloric diet induced obesity and was associated with reduced testis and muscle mass. Testis is the organ responsible for testosterone production and its integrity is fundamental for optimal function of the reproductive axis. Exercise tends to attenuate the weight gain as compared with no exercise control diet group (CC). Well-balanced and low calorie diets can prevent weight gaining and possibly keep the testosterone production between physiologic levels. Different exercise protocols and intensities may partially attenuate the deleterious effects of inadequate diet. HIIT could be a time-effective training method compared to MICT and was better to preserve fast twitch muscle fibers, as the gastrocnemius, in diet-induced obese male mice. Further studies are necessary to investigate the role of physical activity in prevention and treatment of male hypogonadism and safety of HIIT.

A37

UPPER EXTREMITY INJURIES IN ELITE FEMALE WATER POLO -AN EPIDEMIOLOGICAL STUDY

A. PAVLIK; T. HALASI; N. SZAKÁCS
National Institute for Sports Medicine, Hungary

OBJECTIVES: Female water polo celebrated its 5th Olympic cycle at the Olympic Games in Rio, and it is undoubtedly gaining more popularity. However, few studies exist on the injury patterns of female water polo. Water polo is a unique combination of swimming, throwing and wrestling. The upper extremity is thought to be the most injured body part. The purpose of our study is to determine the most common upper extremity injuries and their characteristic in female water polo.

METHODS: In a retrospective study we analyzed the medical records of 148 adult and junior elite female water polo players from 2010 to 2016 and collected the musculoskeletal injuries, with a special focus on the upper extremity. We subcategorized the injuries by localization, we separated acute and overuse injuries. Only those injuries were included in the study which caused more than five consecutive days out of training.

RESULTS: From 2010 to 2016 148 adult and junior water polo players sustained 209 musculoskeletal injuries. Among this, 145 injuries occurred at the upper extremity. We recorded 40 shoulder, 26 elbow, 4 forearm, 18 wrist and 57 hand injuries. 19 injuries needed surgical intervention - 10 shoulder, 1 elbow, 1 forearm, 3 wrist, 4 hand. Out of the 40 shoulder injuries, 10 injuries required surgical repair, and 32 injuries considered to be an overuse injury (80%). More than half of the hand injuries were acute injuries, including 29 finger fractures and 13 ligament injuries. However, in the subgroup of hand injuries only 4 cases needed surgery.

CONCLUSIONS: Based on our results, upper extremity injuries are very common in female water polo – 69%; 13% required surgical intervention, 87% were treated conservatively. Comparing to previous studies where the injuries in male water polo was described, shoulder injuries among female athletes seem to be more frequent - multidirectional instability of the shoulder is more common and the rehabilitation requires more time to return to sport. Finger fractures are extremely common, but the majority heal with conservative treatment. With an appropriate prevention program a significant part of the overuse shoulder injuries would be preventable, thus we recommend the introduction in the regular training program in the youth and adult players to decrease the time out of training and competing.

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Parallel Oral Presentations –
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A34

EXERCISE AND AGING PROCESS RELATED TO OXIDATIVE STRESS

S. PETROVSKA; J. PLUNCEVIC; B. DEJANOVA
Medical Faculty Skopje, The former Yugoslav Republic of Macedonia

INTRODUCTION: Aging process is mainly related to endothelial function which may be impaired by oxidative stress (OS).

Exercise is known to be beneficial to aging process, which may improve health and prevent appearance of chronic diseases in elderly. The aim of the study was to investigate the OS markers related to exercise.

METHODS: A number of 80 subjects (healthy volunteers) were examined (38 male and 32 female), divided in 3 age groups: I group ≤ 30 years (n=24); II group – 31-50 years (n=24); III group - ≥ 51 year (n=32). Each group was divided to subgroups of sedentary subjects (SS) and subjects who exercise (SE). I group: SS (n=11), SE (n=13); II group: SS (n=13), SE (n=10); III group: SS (n=23) SE (n=9). Lipid peroxidation (LP) as a fluorimetric method with thiobarbituric acid was used to estimate OS. Antioxidative status was determined by cell antioxidants such as enzymes - superoxide dismutase (SOD), glutathione peroxidase (GPx) and glucose 6 phosphate (G-6-PD); and by extra cell antioxidants such as glutathione reductase (GR), nitric oxide (NO) and total antioxidant capacity (TAC).

RESULTS: Increased values of LP were noticed along the aging process: I group – 3.30±0.3 μmol/L; II group – 3.91±0.2 μmol/L; III group – 3.94±0.8 μmol/L ($p<0.05$), while no statistical significance was found between male and female subjects. Statistical significance for OS was not found between SS and SE in I group as it was found in II group ($p<0.05$) and in III group ($p<0.01$). Not statistical significance was found for all cell antioxidants and GR within the groups, while NO and TAC showed lower values in SS compared to SE in II ($p<0.05$) and in III group ($p<0.05$).

DISCUSSION: Aging process showed increased OS which may be either due to impaired function of scavengers of free radicals or due to their enormous production. Exercise might be one of the factors that keep the integrity of blood vessel endothelium which slows down the aging process. Possible mechanism of exercise beneficial influence is shear stress by up regulation of genes coding for nitric oxide bioavailability. Thus, due to obtained results we may conclude that OS is found to be diminished in the subject groups who perform exercise.

A43

DISTINCT OXYGEN CONSUMPTION KINETICS LEAD TO THE SAME OXYGEN DEFICIT IN NORMALIZED INTENSITY EXERCISE

N. NEUPARTH[1]; V. SIMÕES[2]; A.S. PRATA[2]; A. LADEIRA[2]; J. BECKERT[2]; D. FERREIRA[2]; F. CYMBRON[2]; F. ALVES[3]

[1]NOVA Medical School - Nova University of Lisbon, NMS|UNL, Portugal; [2]High Performance Center of Jamor, IPDJ, Portugal; [3]CIPER - FMH-UL, Portugal

INTRODUCTION: Exercise tolerance is an important factor regarding quality of life. The maximal oxygen uptake (VO_2max) is a good indicator of pulmonary, cardiovascular and muscular functional integration during exercise.

Oxygen uptake (VO_2) kinetics is a reliable determinant of sports performance, in terms of oxygen (O_2) transport adjustment, muscular metabolism during exercise, and exercise intensity. The time constant (τ) and the amplitude of the VO_2 response (ΔVO_2) are parameters of the VO2 kinetics, and allow the determination of the O_2 deficit, calculated as τ x ΔVO_2.

The aim of this study was to determine the effect of different training backgrounds on VO_2 kinetics parameters. For a given work rate in the moderate intensity domain, τ is lowest in subjects with the highest VO_2max. We had previously performed a pilot study on a smaller sample and didn't find a significant difference in τ between the two groups studied. Thus, we extended the original study and gathered data from 14 more participants.

METHODS: Overall, we recruited 12 endurance-trained (T) and 14 sedentary (S) healthy males, aged 26-56 years, to perform 4-bouts of constant-work-rate (CWR) exercise in moderate intensity domain, in a treadmill ergometer.

The selected work rate for each subject was previously determined in a maximal incremental stress test in a treadmill ergometer with gas-exchange analysis, at 10% below their individual first ventilatory threshold (VT1), also known as anaerobic threshold.

RESULTS: VO_2max was higher in T than in S (T, 60.31±6.62 mL.Kg^{-1} .min $^{-1}$ vs. S, 43.21±6.81 mL.Kg^{-1} .min^{-1}, p=0.000). Body weight was lower in T than in S (T, 72.13±5.47 Kg vs. S, 79.98±9.58 Kg, p=0,025), and muscle mass percentage was higher (T, 59.4±2.8% vs. S, 52.1±4.5%, p=0,000).

During the CWR exercise, VO_2rest was not different between groups (T, 5.78±0.81 mL.Kg^{-1} .min^{-1} vs. S, 5.29±0.80 mL.Kg^{-1} .min^{-1}, p=0.138), and work rate selected for each subject was higher in T than in S (T, 166±12.47 Watt vs. S, 120.35±26.70 Watt, p=0.000), as was ΔVO_2 (T, 34.15±3.21 mL.Kg^{-1} .min^{-1}, vs. S, 24.71±3.03 mL.Kg^{-1} .min^{-1}, p=0.002). The time constant was also significantly different between groups (T, 27.75±5.02 seconds vs. S, 32.90±5,73 seconds, p=0.024) but the O_2 deficit was not different between groups (T, 15.84±3,46 mL.Kg $^{-1}$ vs. S, 13.58±3.01 mL.Kg $^{-1}$, p=0.088).

DISCUSSION: Trained individuals performed the CWR exercise at higher work rates and attained greater ΔVO_2 than those in the sedentary group. We also found that τ was different between the two groups, which is consistent with what is described in the literature.

At this normalized exercise intensity, the O_2 deficit was not significantly different between groups. This is due to bigger τ values in the sedentary group that once multiplied by the ΔVO_2, elicit similar O_2 deficits.

CONCLUSION: Our data suggests that individuals with different aerobic capacities, performing normalized CWR exercise, develop similar O_2 deficits, which further emphasizes the importance of individualizing the prescription of exercise towards a given sporting performance.

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THE ANATOMY OF THE EXTRATEMPORAL FACIAL NERVE AND ITS PRACTICAL ASPECTS RELATED TO MANDIBULAR TRAUMA

P. NAGY[1]; R. KÉSMÁRSZKY[2]; G.Y. RÁCZ[3]
[1]IMEDIM Ltd., Hungary; [2]Hopital de la Misericorde, France; [3]Semmelweis University, 1st Department of Pathology and Experimental Cancer, Hungary

INTRODUCTION: The facial nerve is the most often damaged cranial nerve. The frontal and mandibular branches are extremely vulnerable. The anatomy of the involved branches and their relationship to other structures are key-factors explaining the consequences of traumas.

OBJECTIVES: The aim of this study was to analyse the anatomy of those facial nerve branches that are related to mandibular traumas.

METHODS: Over one hundred cadaveric dissections were achieved, approved by ethical committee. The branching patterns and their relationships to the bony structures were analysed during the preparation and using digital imaging. Distances to the mandibula, number of the branches and the presence of collaterals were determined. Stereomicroscopy helped to analyse the morphology of the specimens. Their answer to specific mechanical forces was tested by biomechanical lab analysis.

RESULTS: The course, thickness, branching patterns, collateral structures and vascularisation of the examined nerves all showed important differences. No factors explaining the individual and side-to-side differences were found. No prediction related to age, sex, side or the body mass index was observed. In several cases unforeseen anatomical variations and pathological conditions were observed close to the nerves. The landmarks are not always reliable.

CONCLUSIONS: The anatomy of the extratemporal facial nerve is variable. These variants, including their relationship to the mandibula may influence the consequences of any head and neck trauma. Routine medical check-up of the sportsmen may reveal other some of the anatomical variants or diseases but currently no means are available to detect the course of the nerve in professionals or amateurs.

The interpreted data may help the prevention of trauma and facilitate the surgery of the injured.

Keywords: facial nerve, anatomy, sport, trauma

A47

THE CONCLUSIONS OF THE OLYMPIC TEST EVENT AND THE OLYMPIC GAMES, TEAM PHYSICIAN REPORT BY THE HUNGARIAN NATIONAL CANOE-KAYAK TEAM

T. HALASI; J. TOMAN
National Institute of Sports Medicine, Budapest, Hungary, Hungary

INTRODUCTION: The Hungarian National Canoe-Kayak Team took part in an Olympic Test Event between the 30th of August and the 8th of September, 2015, in Rio de Janeiro. Our test event experiences were used within the frames of the XXXI. Olympic Games.

AIM: To analyze the effectivity of our test event experiences and preventive activity during the Olympic

Games. Monitoring the effects of the jet lag on the sleeping and sport performance of our athletes. Explore the risk factors, such as infections, climate differences, venous circulation during a transatlantic flight, and antidoping issues.

MATERIALS AND METHODS: The test event was attended by 19 athletes (13 men and 6 women) and 13 team members. The schedule of the meals, as well as the time of falling asleep and waking up was recorded within the frames of a questionnaire, where their fatigue and the sport performance of the athletes during the day was evaluated on a subjective scale. The resting heart rate, the body temperature and the blood pressure during the day was recorded, and the changes of the reaction time were measured by a smartphone app. Samples from the water were taken both at the venue of the race and at the hotel. We analyzed the effectiveness of our measures taken in the favor of the infection control. At the Olympic Games 13 Hungarian canoe-kayak athletes and 18 members represented our country.

RESULTS: At the test event 5 persons out of 32 had had an infection causing diarrhea for 1-2 days, 1 hepatitis-A infection. The 3rd day after the flight was critical concerning the results, the switch occured on the 4th-5th day. Beside the water of the lake being infected, we also had an other risk factor to cope with. At the Olympic Games out of 31 persons only 1 had a diarrhea-infection.

CONCLUSIONS: The arrival date is optimal for the beginning of the races. Our measures for the prevention of infections were necessary.

A48

THE INFLUENCE OF AGE AND LIFELONG SEDENTARY BEHAVIOR ON MITOCHONDRIAL FUNCTION IN SKELETAL MUSCLE

P.A. FIGUEIREDO[1,2]; J.A. DUARTE[2]; S. POWERS[3]

[1]USF São Julião, Figueira da Foz, Portugal; [2]CIAFEL, Universidade do Porto, Portugal; [3]University of Florida, United States of America

INTRODUCTION: One of the most adversely age-affected tissues is skeletal muscle. Indeed, aging is associated with a loss of skeletal muscle mass (i.e., sarcopenia) and a progressive decline in the fibbers ability to maintain homeostasis, in part, due to mitochondrial dysfunction. Skeletal muscle mitochondrial dysfunction has been widely associated with increased age. The age-related oxidative damage to mitochondrial DNA, lipids and proteins has been suggested as one possible mechanism behind this loss of function resulting in a progressive reduction of mitochondrial bioenergetic capacity, leading to cellular energy deficits and compromising overall cellular functionality. Despite it is well established that aging results in loss of skeletal muscle mass and contractile dysfunction, data in the literature about age-related mitochondrial dysfunction remains controversial. It is well described that regular physical exercise influence skeletal muscle mitochondrial content even in the aged skeletal muscle constituting a mean to counteract the widely accepted notion that skeletal muscle mitochondrial density is diminished with age; however, little is known about the impact of lifelong behaviours, namely sedentariness and active lifestyles on the functionality of individual mitochondria.

PURPOSE: This study investigated the impact of lifelong inactivity on both skeletal muscle mass and skeletal muscle mitochondrial function.

METHODS: Young (3 months), mature (18 months) and old (25 months) male C57BL/6 mice were studied from two experimental groups: 1) Sedentary (housed in standard cage); and 2) Active (housed

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in cage with running wheel). At the completion of the experiment, muscle weights were obtained, tests of mitochondrial function were performed, and biomarkers of oxidative damage to mitochondrial proteins were determined. The local Ethics Committee had approved the study and the experiments were complied with the current national laws.

RESULTS: Our findings indicate that aging is associated with a diminished respiratory function of skeletal muscle mitochondria. Additionally, lifelong inactivity exacerbates sarcopenia and the age-related decline in skeletal muscle mitochondrial respiratory function. Moreover, our data reveal that the age- and sedentary-related decline in mitochondrial function is associated with higher levels of mitochondrial oxidative damage.

CONCLUSIONS: Collectively, these data indicate that beyond aging per se, lifelong inactivity is a major determinant in the etiology of both sarcopenia and skeletal muscle mitochondrial dysfunction.

A59

FROM KAZAN TO RIO DE JANEIRO: THE ROLE OF DXA-BODY COMPOSITION OF THE NATIONAL ELITE TEAM OF SWIMMING AND SPRINGBOARD JUMP ATHLETES IN TRAINING. WORKING NOW FOR TOKYO 2020...

G. ANGIARI; G. CARBOGNIN; A. NARDI
OSPEDALE SACRO CUORE NEGRAR, Italy

Invited Lectures

AIMS AND OBJECTIVES: we wanted to make a study with the best swimmers and divers for give them precisious data to prepare in the best way the most important events of the year between 2015 and 2016 (World Championship, World Series, European Championship). We analized Dxa Body Composition data of 8 athletes (6 swimmers and 2 divers) the week before World Championship of 2015 in Kazan. That was the reference to organize athletic training in the next 12 months in order to have the best value of Body Composition just before Rio 2016.

METHODS AND MATERIALS: the Dxa exam has been acquired in the early morning, fast, with empty bladder. The exposition to X-ray is very low, like to the exposition at the sun for two hours, 3 micro/gray. The value of fat mass and lean mass was in gr and in percentage/total body mass. The exam took about 7 minutes/each.

RESULTS: Mean fat mass index was in our swimmers was 12,45% of the total body mass for male and 22,45% for female. Lean mass in male was 83,7%, in female 74,1%. The distribution of fat mass was gynoid for all athletes, male and female. The T-score for male was +0,1, for female +1,9. In our springboard jump female athletes, mean fat mass index was 18,3% of the total body mass. Lean mass was 77,8%. The mean T-score was +1,7.

CONCLUSION: The periodic study of professionistic athletes by Dxa body composition is a precise, fast, repeatable exam which is very helpful in the athletic training of a sport season, with the finality to keep every single athlete at the top of his values just before the most important sport event of the year.

We are using body composition for World Championship 2017 in Budapest. The final target are the Olympic Games in Tokyo 2020.

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A60

DEPENDENCE ON THE PRACTICE OF PHYSICAL EXERCISE?

I. HENRIQUES; C.A.F. RIBEIRO; A. REBELO-MARQUES
Faculty of Medicine - University of Coimbra, Coimbra, Portugal

INTRODUCTION: The regular practice of physical exercise is fundamental to maintaining a healthy lifestyle. However, the excess of practice can become harmful and, in some cases, an addiction. Addiction to physical exercise, although rare, is a reality with relevant consequences at the biopsychosocial level, which makes it necessary to identify individuals at risk for future intervention. The aim of this study is to understand the prevalence of this condition among physical exercise practitioners in the city of Coimbra.

MATERIALS & METHODS: A total of 299 gymnasium attendees from the city of Coimbra filled out a questionnaire with different variables: gender, age, weight, height, literacy, and a number of times they practiced exercise per week. For the evaluation of the risk of physical exercise addiction, the "The Exercise Addiction Inventory" (EAI) was applied. The means comparison tests were used to evaluate the statistical significance of the relationship between the variables obtained and the risk of addiction. The psychometric properties of the EAI were assessed through internal consistency and principal component analyses.

RESULTS: The prevalence of the risk of addiction was 5.01%, with no significant relation to gender, age, literacy or body mass index, but with relation to the number of weekly training sessions. The scale obtained an internal consistency of 0.614 and the factorial analysis revealed only one component.

DISCUSSION: The risk of physical exercise addiction among gym-goers in Coimbra is low and was not related to gender, age, BMI or literacy, but only with a higher number of weekly training sessions. The EAI has proven to be adequate for the evaluation of this risk and is therefore recommended as an instrument for practical use. The dependence on physical exercise should be, in addition to being treated early, prevented through informing exercise professionals and professionals, both health and sports.

Key-words: Behavior, Addictive; Dependence; Exercise; Prevalence; Portugal.

A66

RELATIONSHIP BETWEEN REGULAR EXERCISE-INDUCED CARDIAC HYPERTROPHY AND MICRORNA

M. PALA[1]; G. METIN[2]; Ş. DINÇER[2]
[1]Deparment of Physiology, Biruni University Medical Faculty, Turkey; [2]Deparment of Sports Medicine, İstanbul Medical Faculty, İstanbul University, Turkey

INTRODUCTION: Cardiac hypertrophy (CH) is an adaptational enlargement of the myocardium in exposure to altered stress conditions or occurs in case of injury. Exercise-induced CH is a type of physiologic CH.

MicroRNAs (miRNAs) are involved in cardiac development, hypertrophy and angiogenesis. miRNAs act as regulators of gene expression by promoting the degradation or inhibiting the translation of target mRNAs.

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PURPOSE: In this study, we investigated the regulatory role of miRNAs in regular exercise-induced cardiac hypertrophy.

METHODS: Male Sprague-Dawley rats were used. Rats were divided into Exercising-group (EG, n=9) and Control-group (CG, n=6). Swimming sessions started with 60 min/5 days/8 weeks and continued with on the 9th week 2x/day, and on the 10th week 3x/day. Systolic and diastolic dimensions of the left ventricle and myocardial wall thickness were measured by transthoracic echocardiography to assess the cardiac hypertrophy. miRNAs analysis was performed by miRNA microarray and confirmed by real-time PCR. Apoptosis, necrosis, and cell proliferation were evaluated histologically.

RESULTS: In echocardiography left ventricular mass, end-diastolic diameter of the left ventricle and end-systolic diameter of the left ventricle, the thickness of the posterior wall and interventricular septum thickness were found to be increased significantly in EG. Genetic analysis showed upregulation of the expression of miR-132-3p and miR-194-5p and downregulation of the expression of miR-290 in EG. In histological analysis although there was necrosis in cardiac tissue, there were no cell proliferation and apoptosis in TG.

CONCLUSIONS: We suggest that in exercise-induced cardiac hypertrophy, heart may be protected from fibrosis due to changes in the expression of the genes miR-132-3p and miR-290. Increase in expression of miR-132-3p in circulating blood may be a predictor of fibrosis. Also an increase in the expression of miR-194-5p may be an indicator of exercise induced cardiac hypertrophy. However, these findings should be validated with further research.

Key words: regular exercise, cardiac hypertrophy, echocardiography, miRNAs, gene expression

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Invited Lectures

A68

THIRTY MINUTES OF RUNNING EXERCISE REDUCES T2 SIGNAL INTENSITY BUT NOT THICKNESS OF THE KNEE JOINT CARTILAGE: A 3.0 TESLA MAGNETIC RESONANCE IMAGING STUDY

Y. KARANFIL; G. DÖNMEZ; N. BABAYEVA
Hacettepe University Dept. of Sports Medicine, Turkey

BACKGROUND: Running has become a popular physical activity in order to maintain cardiovascular fitness and mental health, with a continuously growing number of participants from all around the world Therefore, investigating the long-term effects of running on the knee joint cartilage is imperative. Over the last decade, and along with advancements in quantitative magnetic resonance imaging (MRI) techniques, MRI has become increasingly used in the field of exercise and to investigate the effects of exercise on joint cartilage. This study was designed to determine the effects of 30 minutes of heart-rate controlled (80% of the maximal heart rate) running exercise on a treadmill on the dominant and non-dominant knee joint cartilage using the three-dimensional (3D) turbo spin echo (VISTA = Volume ISotropic Turbo spin echo Acquisition) MRI technique.

METHODS: This was a controlled laboratory study. Twenty-two male adults, aged 18-35 years, participated in this study and underwent an initial MRI at 3.0 T for both knees. Second MRI evaluation was performed immediately after 30 minutes of running exercise on the following day. Measurements of T2 signal intensity mean pixel values and thickness of the knee joint were taken in the patellofemoral and femorotibial joints.

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RESULTS: A significant reduction in the mean pixel values of T2 signal intensity was detected after running in both dominant and non-dominant knee tibial and femoral cartilage compared with resting values ($p<0.001$). The most obvious decline (10.6%) was seen at the medial tibial plateau of the dominant knee.

CONCLUSION: The reduction in T2 values suggests a change in the cartilage water content with running activity. Greater reductions in the medial tibial plateau cartilage indicate greater load sharing by these areas of the joint during running exercise.

Thursday, 16 November 2017
Parallel Oral Presentations –
16:45 – 17:45 Orthopedics, Traumatology

A41

DELAYED ONSET MUSCULAR SORENESS (DOMS) IS CAUSED BY INSUFFICIENT LYMPHATIC TRANSPORT OF EXCESS CAPILLARY FILTRATE FROM MUSCLES AND SUBCUTANEOUS TISSUE

M.T. ZALESKA[2]; W.L. OLSZEWSKI[1]; A. ZIEMBA[2]; T. MIKULSKI

[1]Central Clinical Hospital, Warsaw, Poland; [2]Medical Research Center, Polish Academy of Sciences,Warsaw, Poland

BACKGROUND: Blood perfusion and capillary filtration in muscles, skin and subcutaneous tissues in runners has been thoroughly studied. However, the transport away of the capillary filtrate containing proteins, erythrocytes and mononuclear cells as well as cellular debris and breakdown products of extracellular matrix and penetrating micoorganisms has been largely neglected. These accumulating components may have an adverse effect on tissue function and be a cause of pathological symptoms. Under normal conditions capillary filtrate proteins and cells are evacuated by the lymphatics draining all limb tissues. Initial lymphatics merge with collecting trunks, form afferent vessels entering inguinal lymph nodes. Lymph nodes work as filters for cells and matrix fragments and also create a hydraulic valve for lymph slowing down its flow and facilitating extraction of cells and non-viable elements in the sinuses. During long-distance running blood perfusion and subsequently capillary filtration of plasma and blood cell transport to tissues increase. Moreover, long-lasting microtrauma of sole skin with breaking matrix and single muscle fibers provide debris in large amounts. Sole bacteria penetrate skin. All these lymph components should be taken up and processed by regional lymph nodes.

Until recently the insight into the function of the limb lymphatic system was limited. Today, imaging techniques as lymphoscintigraphy, indocyanine green fluorescent lymphography, magnetic resonance lymphography, ultrasound imaging enable observations of the lymphatic system during limb function. Together with plethysmography, capillary Doppler and deep tonometry techniques a thorough insight into the tissue events can be obtained.

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AIM: to study capillary flitration and lymph formation and flow in lower limbs of long-distance runners with DOMS complaints

MATERIAL AND METHODS: ten runners, 5 males and 5 females, age 22-28, practicing long-distance running were investigated one to three days after run. Both lower limb plethysmography and point Doppler techniques, tonometery of tissues, lymphoscintigraphy and indocyanine green fluorescent lymphography were applied. As control served 10 individuals of the same age group not practicing running.

RESULTS: one to three days after run plethysmography and point Doppler showed 3-4times higher blood capillary flow compared to mean control values. Deep tonometry of calf tissues was increased by 30-60%. Lymphoscintigraphy showed dilated superficial and deep lymphatics and enlarged popliteal and inguinal lymph nodes. ICG lymphography showed confluents pictures of accumulated fluid in the foot and calf subcutis (fluorescence level 70-90% compared with 40% in controls).

CONCLUSIONS: Studies of capillary filtration and lymph formation in long-distance runners showed three days after run dilatation of skin blood capillaries, excess fluid in skin and subcutaneous tissue with dilated lymphatics and enlarged lymph nodes. This is the first ever study showing that not only muscles but also skin and subcutaneous tissues undergo major fluid exchange changes during and after running, presumably responsible for DOMS symptoms.

A51

INCIDENCE AND TYPES OF INJURIES OF LOWER EXTREMITIES AND THEIR CORRELATIONS WITH CLINICAL TORSION PROFILE AND ISOKINETIC CHARACTERISTICS OF KNEES AND ANKLES IN YOUNG FEMALE HANDBALL PLAYERS

M. MILENKOVA; E. HANDJISKA; Z. HANDJISKI
PZU Kineticus - sports medicine, The former Yugoslav Republic of Macedonia

INTRODUCTION: The rate of injuries of lower extremities (ankle and knee), especially in female handball players, increases from study to study although there are only few relevant studies according with this problem, mainly reporting from European or World championships.

According with the known scientific data that the prevalence of injuries of lower extremities in female athletes is positive correlated with an increasing of some measurements of clinical torsion profile (Q angle), there are no data about correlations between incidence of injuries of lower extremities in female handball players and clinical torsion profile and isokinetic characteristic of ankles and knees

AIMS: The aims of this study are to present the incidence and type of injuries of lower extremities of young female handball players and their correlations with clinical torsion profile and isokinetic characteristics of ankles and knees.

MATERIAL AND METHODS: 61 female handball players were recruited in this study (17,61 ± 2,07 years). At January and August 2016, we made an isokinetic testing of both ankles and knees with these parameters for evaluation, both in flexion and extension: Peak TQ (N-M) and deficit (%) between both ankles or knees, Peak TQ/BW (%), Max Rep Tot work (J) and deficit (%) between both ankles or knees, Avg Power (Watts) and deficit (%) deficits between both ankles or knees, Acceleration and deceleration time (msec), Agon/Antag (%) and ROM (range of motion, deg). We measured lengths of both legs (cm), angle of torsion with pedi-scoliometer (deg) and, with an angle measurement tool, we measured: internal and external rotation of right and left hip (deg), Q angle (deg), tight foot angle (deg) and foot progression

angle (deg) of both legs. During this period, we noticed the incidence and types of injuries of lower extremities (per/1000h training session and competition, rest days without training, etc). We used descriptive statistics, t test and correlations ($p<0.05$).

RESULTS: 17 (27,86%) from all handball players had injury of lower extremities, 10 of them have injured during the competition and 7 during the training process. 18% were overused and 82% traumatic. There were 30.67 injuries/1000 hours of training process and competitions, with 9,82 hours absence of training/injury. 35% of all injuries of lower extremities were distorsions of articulation talocruralis, mainly right one (5 distorsions of right and 1 of left ankle), 17% menisci injuries and 12% distensions of collateral ligaments of knee. Tight/foot angle of right leg significantly ($p<0,01$) increased after 7 months (7,64±6,06 to 11,38±5,96 deg). Acceleration time in flexion of right knee (41,76±11,99 to 35,29±13,33 msec) and left knee (45±13,55 to 37,35±7,39 msec) significantly ($p<0,05$) decreased after 7 months. ROM of right knee significantly decreased ($p<0,05$) after 7 months (109,02±11,45 to 102,114±12,3 deg). There were significant correlations ($r>0.49$; $p<0.05$) between isokinetic characteristics of ankles and knees and clinical torsion profile.

CONCLUSIONS AND DISCUSSION: Incidence of injuries of lower extremities (30,67/1000 h of handball game) in our study was lower than European one (40,7/100o h of handball game), with higher incidence of overuse injury in our study (18%) than in European one (7,1%). Although we expected that Peak TQ and Peak TQ/BW of ankles and knees would significantly increase after 7 months of training program and competitions, our study did not confirm our expectation. On the other side, increasing of tight foot angle of right leg and decreasing of acceleration time in flexion and ROM of right knee were probably connected with increased incidence of injuries of legs in this group. Namely, distorsion of right ankle was the most frequent injury in female handball players during the period of training process and competition of 7 months.

Key words: female handball players, injuries of legs, clinical torsion profile, ankle, knee

A54

PHYSICAL ACTIVITY OF THE HUNGARIAN ADULT POPULATION

É. MARTOS[1]; B. NAGY[2]; M. BAKACS[2]

[1]Hungarian Society of Sports Medicine, Hungary; [2]Directorate General of Food and Nutrition, National Institute of Pharmacy, Hungary

The benefits of regular physical activity in prevention of non-communicable diseases are evident nowadays. Despite the known benefits, however, about half of the EU citizens above 18 year of age spend zero minutes on health-enhancing physical activity according to the data of European Health Interview Survey (EHIS) collected in 2014. This questionnaire based survey revealed, that only 27 % of Hungarian adults met the criteria of recommended minimum weekly 150 min of physical activity. Although the self-reported data could have several bias, the physical activity of the Hungarian adults have not been measured yet. In the framework of the periodically repeated Hungarian Diet and Nutritional Status Survey 2014 (OTAP2014) therefore pedometer was used to estimate step counts of the participants. The OTÁP2014 was carried out on the subsample of the EHIS 2014. The stratified two step-sampling method was applied to ensure representativeness of the data by age and gender for the Hungarian adult population (age >18y). Height, weight, waist circumference were measured with identical, calibrated, portable tools by trained staff. Physical activity was assessed by OMRON HJ 320 E pedometer, step count was recorded by the subjects on one average activity day.

The average daily step count was 7022 corresponding to low-active physical activity category. 78% of the population did not reach the recommended 10 000 steps/day, the level which has apparently

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associated health benefits. Men (average 7949 steps/day) were more physically active than women (average 6333 steps/day). The daily step count decreased with age in both genders, while the 18-34y old men took 9237 steps, men of the elderly age group (65y+) took 5143 steps, the corresponding figures for the same age groups in women were 7437 steps and 4208 steps, respectively. Obese (BMI>30) men and women accumulated significantly less steps (men: 6991 steps/day, women: 5406 steps/day), than those of normal or underweight (men:9035 steps/day, women: 6543 steps/day). Waist circumference was significantly inversely associated with step count but not with body mass index when adjusted for gender and age. According to the findings of additional questionnaire, 36% of men and 29% of women are engaged in any kind of leisure time activity, while an average Hungarian adult sits 5 hours daily.

OTÁP2014 was the first representative survey in Hungary with measurement-based assessment of physical activity. The representative and measured data form the basis of targeted interventions and the assessment of their impact.

A55

OVERUSE INJURIES IN PARATROOPERS MILITARY TRAINING

L. MORENO[1]; J.L. MÓNICO[1]; V. PINHEIRO[2]

[1]Centro de Saúde Militar de Coimbra, Portugal; [2]Centro Hospitalar e Universitário de Coimbra, Portugal

INTRODUCTION: Overuse injuries are common in many sports. Despite the highly controlled environment and training methods, athletes are exposed to high training loads and insufficient recovery.

In military training, the recruits are exposed to adverse environmental conditions, high training loads, sleeping deprivation and hydration deficits. Therefore, military individuals are thought to be particularly at risk to suffer from overload injuries. Identifying and understanding the underlying mechanisms involved in this type of injury is the first step towards prevention.

OBJECTIVE: Characterization of injury patterns in soldiers during military training and assessment of the treatment methods used.

MATERIAL AND METHODS: We performed a prospective study within 5 months. We used two groups as follows:the experimental group consisted in 57 recruits attending basic military parachute training; the control group consisted in 30 soldiers who didn't attend the basic military parachute training.

A clinical evaluation was performed three times, one before the beginning of the basic military parachute training, the other one at the end of the basic military parachute training, and the last one 3 weeks after its conclusion.

RESULTS: Almost 70% of the soldiers attending basic military parachute training developed overuse injuries within the 5 month training period, unlike the control group that didn´t reported any pain, $X2(1) = 47.86$, $p < .001$. Up to 85% of the recorded injuries affected the lower limb. Fifty percent of the affected soldiers reported lower physical performances due to the injuries. On the other hand, no soldiers in the control group suffered any overuse injuries.

Regarding the treatment options, all injured soldiers reported improvement of symptoms with resting during the weekends and, up to 85%, also used non-steroidal anti-inflammatory drugs.

Finally 38.5% of the injured soldiers still reported pain in the last clinical evaluation.

DISCUSSION/CONCLUSION: Despite the ability of the body to adapt to high training loads and develop higher physical performances, repetitive mechanical loading often results in injuries, such as tendinopathy or stress fractures. Understanding how our body tissue adapts to mechanical stress is the key to a good and healthy training method with maximisation of performance outcomes. Also developing efficient injury prevention methods is essential for maintaining the operational capacity of the soldiers.

A31

HEMATOLOGICAL AND ANTHROPOMETRIC PARAMETERS IN PHYSICALLY ACTIVE ELEMENTARY SCHOOL BOYS

J.P. GLIGOROSKA; S. MANCHEVSKA; B. DEJANOVA; S. PETROVSKA; L. EFREMOVA; L. TODOROVSKA

Institute of Physiology, Medical Faculty, University of Ss Cyril and Method, The former Yugoslav Republic of Macedonia

INTRODUCTION: Red blood cells and associate hematologic parameters are in interactive interrelationship with physical fitness. Children which are physically active same as general children population has lower values for number of hematologic parameters. The purpose of this paper was to investigate the characteristic of red blood cell system in male children age span 7 to 12 year, and correlations between them and anthropometric parameters.

METHODS: We studied 99 young athletes, age span 7-12 years, mean age 9.37±1.22 year. Red blood count (RBC), hemoglobin (Hb), hematocrit (Hct), mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), mean hemoglobin concentration (MCH) were analyzed in standardized capillary blood samples. The Matiegka anthropometric method was used to determine body components: muscular mass (MM), bone mass (BM) and fat mass (FM).

RESULTS: Descriptive statistics for anthropometric features for investigated sample was as follows: height = 140.39 ± 8.7 cm, weight= 36.23 ± 5.7 kg, MM = 19.18±23.5kg, BM=7.2kg, FM=5.5kg, FM%=16.3±2.8%. The mean values and standard deviations for hematologic parameters were: RBC=4.83±0.37 *106/mm3, Hb = 13.15 ± 0.89 gr/dl, Hct = 40.76±2.71%, MCV=84.23±3.4 μm3, MCH=27.42±1.48pg, MCHC=29.59±1.51 gr/dl. Weak to moderate positive correlations was found between RBC and Hb with muscle component (r=0.34; r=0.46). Correlation coefficient between fat mass and RBC and Hb was r=0.06 and 0.22.

CONCLUSION: The correlations between muscular mass and some RBC indices are stronger than correlations between those indices and fat mass in young physically active children. This findings could indicate that physically active boys with larger muscular mass could have higher values of red blood cells, hemoglobin and hematocrit.

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A102

MODEL FOR MONITORING BLOOD PRESSURE AND HEART RATE IN PATIENTS OF THE HIPERDIA PROGRAM IN FAMILY HEALTH UNIT

B.T.L. de NORONHA[1]; K.C.P. LIMA[1]; A.L.P. MUNIZ[2]; B.F. de NORONHA
[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil

The measurement of blood pressure (BP) and heart rate (HR) are among the most important propaedeutic methods performed by all health professionals. For this reason, the various measurement techniques seek to better study the cardiovascular condition of patients, trying to reduce unreliable results. However, the basic level of health care faces difficulties in this type of follow-up, with the greatest difficulty being the impossibility of using other methods of measurement. The aim of this study was to set up a monitoring model for continuous BP and HR, although only the technique with the sphygmomanometer was available. A monitoring was carried out in Family Health Units (FHU) of three municipalities of Pará: Anajás, Barcarena and Juruti, one USF per municipality, and 60 patients in each (Total: 180), in the age group of 60 85 years and enrolled in the USP's Hiperdia program between July and November 2009. The model was carried out as follows: a multiprofessional program with doctors, nurses and technicians, verifying patients' BP and HR twice a day (morning And later) for 8 days. Through the verified indices, differences were observed between the blood pressure levels of the patients in relation to the sporadic measurements in the FHU. Being aware of arterial hypertension and the optimization of diagnostic and control methods contribute to the reduction of morbidity and mortality of this pathology, thus we encourage the experimentation of other modes and techniques of BP and HR control in order to establish the real and statistical condition of the population.

A105

PREVALENCE OF USE OF ANABOLIC STEROIDS IN PRACTITIONERS OF 06 FITNESS CENTERS IN BELÉM – PA.

B.T.L. de NORONHA[1]; K.C.P. LIMA[1]; A.L.P. MUNIZ[2]; B.F. de NORONHA
[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil

Several reasons can be pointed out as a reason for the high consumption of anabolic steroids: idealization of the body, social acceptance, physical performance, acceleration of body development, etc. However, along with the desired effects (not always found) can come along several pathological reactions of the organism, sometimes irreversible if there is no professional accompaniment. The objective of this study was to verify the prevalence of anabolic steroid use in young bodybuilders. The sample consisted of 60 people (30 of each sex), between 15 and 25 years of age, attending gymnastics gyms in Belém (PA), who went to the doctor's office for clinical evaluation between June and October 2009, informed About the study and who agreed to participate in it. The patients were from 06 academies and 40 (66.66%) reported using anabolic agents, being the most cited: hardteston, stanozolol, hemogenin, dianabol and oral oxandronolone. The substance given orally (oxandronolone) was prescribed by a physician, the others, however, were indicated by physical educators, gym colleagues, the Internet, magazines and nutritionists. Regarding the main reason for using steroids, no patient claimed to be a high performance athlete, nor

as preventive health care, most claimed to do so for aesthetic reasons. The use of substances such as steroids should always be accompanied by a doctor and done in specific cases at risk of causing harm. The multiple sources of knowledge of our time end up giving margin to the indiscriminate use of these drugs, being proposed specific attention of the primary attention of Public Health on this question.

A110

IDENTIFICATION OF GROUP DYNAMICS THROUGH SOCIOGRAM IN HIGH - LEVEL TEAMS

V. ONORATO; N.D. BELLA; F. SCARZELLA
Istituto di Medicina dello Sport di Torino, FMSI (Torino, Italy), Italy

The research involves the following high-level teams: football, waterpolo, volleyball, rugby and includes the analysis of the size of the group in order to optimize athletic performance. The goal is to provide a profile outline of the various groups highlighting the meaningful relationships of each athlete with classmates. The main phase of the intervention is the administration of the sociogram, a technique created by J.L.Moreno for the analysis of relationships within groups, which allows to highlight the hidden structure and translate it in an objective and quantitative manner. The sociogram represents schematically the relationships between the athletes in the field (task orientation) and out of it (social orientation). Through this diagram we can identify some typical position that members of the group can occupy in a schematic representation of their relationships. Data collected through a simple questionnaire, can be represented in a double entry table called "Sociomatrice" and then used for the construction of Sociogram as the visual representation of all the relationships existing in the group. The methodology adopted for the research includes: project presentation and discussion with the coach and/or management staff, a first meeting with the team in which the questionnaire will be administerd, a second meeting oriented to discussion with the team the results of sociometric test. The result represents a picture of the team, from which it can be deduced: the presence or absence of isolated groups, who is the leader, who is isolated from the team, who is rejected by the team, the presence of alliances and conflicts. This work will be then used by team sport psychologist providing useful informations to the coach to facilitate cohesion and to encourage other useful alliances to achieving the objective.

A111

EXERCISE INDUCED BRONCHOSPASM (EIB) AND EXERCISE INDUCED LARYNGOSPASM (EILO) AND VITAMIN D DEFICIENCY IN ELITE ATHLETES

P.G. GIAN[1]; D. MOZZONE[1]; M. BELLOCCHIA[2]; C. BUCCA[2]; G. MICHELETTI[1]; R. AMBROSANIO[2]; A. IANNIELLO[3]; F. SCARZELLA[1]
[1]Istituto di Medicina dello Sport di Torino, FMSI (Torino, Italy), Italy; [2]S.C.Pneumologia U, AOU Molinette (Torino - Italy), Italy; [3]Laboratorio Analisi, AOU Molinette (Torino - Italy), Italy

BODY: Exercise dyspnea can be caused by exercise bronchospasm (EIB) or exercise induced laryngospasm (EILO). We have previously noted that vitamin D (25OHD) deficiency can favor laryngeal spastic response during hyperventilation tests.

The target of this paper is to verify the relationship between vitamin D deficiency and EIB and/or EILO in elite athletes subjected to stress tests.

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39 male athletes were examined, 38 white and 1 black, aged 15-19 years, nonsmoking, 21 football players (54%) and 18 basketball players (46%). The athletes (or their parents in case of minors) have given informed consent to the study and have been submitted to anamnestic questionnaire and AQUA questionnaire, spirometry and exhaustion stress test on treadmill (Bruce modified protocol). FEV_1 and inspiratory and expiratory flow-volume curve were recorded before the stress test and 1- 5-10-15-20 minutes after, using FEV_1 and maximal mid-inspiratory flow (MIF50) as respective bronchospasm and laryngospasm indexes. EIB has been diagnosed when, after the test, FEV_1 decreased by at least 10%, EILO when MIF50 decreased by at least 25%.

RESULTS: The anamnesis revealed atopia in 28% of athletes, rhinitis in 21% and asthma in 13%. Basal spirometry was normal in all athletes. All athletes had 25OHD deficiency, mild (>20ng/ml) in 12, moderate (10-20 ng/ml) in 21 and severe (< 10 ng/ml) in 6. 25OHD values were significantly lower in basketball players than in football players (13,5±1,3 vs 18 ±1, p=0,09). The stress test was negative in 14 athletes (36%), showed only EILO in 12 (31%), only EIB in 4 (10%) and EIB + EILO in 9 (23%). The presence of EILO, but not EIB, was associated to significantly lower 25OHD values.

25OHD values were significantly related to the maximum heart rate achieved during exercise (FC max %), expressed as a percentage of the predicted (R= 0.34, p=0.034). A second test was taken after the summer and after Vit. D supplementation. Blood tests showed that all the subjects improved and reached normal vitamin D levels. Along with vitamin D normalization we observed a significant reduction in EILO while EIB did not change.

CONCLUSIONS: Vitamin D deficiency is very common in elite athletes and is related to the development of exercise-induced laryngospasm. Correlation between 25OHD and FCmax% suggests that vitamin D deficiency could adversely affect stress resistance and therefore athletic performance. Further analysis are to be done to correlate vitamin D deficiency, EILO and physical performance.

Invited Lectures

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ISOKINETIC STRENGTH TESTING IN PARATROOPERS MILITARY TRAINING

L. MORENO[1]; J.L. MÓNICO[1]; V. PINHEIRO[2]

[1]Centro de Saúde Militar de Coimbra, Portugal; [2]Centro Hospitalar e Universitário de Coimbra, Portugal

INTRODUCTION: The skeletal muscle tissue is an active tissue with the ability to adapt and remodel to the different stimuli. The neuromuscular remodelling depends on the volume, frequency and intensity of the exercise, as well as the adaptability of the athlete's own body. Military training is known to be demanding, resulting in higher neuromuscular performance and increased overuse injuries. The knee is the most common site of injury and patellofemoral pain (PFP) syndrome is the most common overuse injury.

OBJECTIVES: Evaluation of lower limb strength before and after military training. Comparison strength values between soldiers with PFP and soldiers with no pain.

MATERIAL AND METHODS: We performed a 5-month prospective study, using 38 young soldiers attending the basic military parachute training. The HUMAC®/NORM™ Testing and Rehabilitation System (Humac®) was used for strength testing before and after the basic military training. The chosen angular velocity was 60º/s, and concentric exercise was used for flexion and extension on both lower limbs. The studied parameters were: peak torque and flexor-extensor torque ratio.

RESULTS: The mean flexion and extension muscle strength increased in both legs. The non-dominant leg and the flexor muscles scored the biggest improvements. There was no statistically significant difference between soldiers with PFP and soldiers without pain p>0.05.

Invited Lectures

CONCLUSION: Military training successfully improved neuromuscular performance in a 5-month period, with greater improvements on the non-dominant leg. There were not significant differences between soldiers with PFP and soldiers without pain. However, with longer training periods, we believe that this difference would be greater due to impaired physical performance.

Friday, 17 November 2017
Parallel Oral Presentations –
12:00 – 13:00 Conservative Sports Medicine

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IS THERE A RELATIONSHIP BETWEEN SERUM VITAMIN D LEVEL AND CARDIAC AUTONOMIC FUNCTION IN ATHLETES?

A. YILDIRIM[1]; G. DÖNMEZ[2]; M. YILDIRIM[2]
[1]Hacettepe University Dept. of Cardiology, Turkey; [2]Hacettepe University Dept. of Sports Medicine, Turkey

BACKGROUND: Besides mortality, cardiac autonomic function is also associated with athletic performance and exercise tolerance. The relationship between cardiac autonomic dysfunction and vitamin D deficiency in healthy athletes is unknown, although it has been well described in healthy participants. Therefore, we aimed to determine if serum vitamin D levels play a role in maintaining cardiac autonomic function in athletes.

METHODS: Eighty-nine healthy volunteers (56 athletes and 33 sedentary control participants) participated in this randomized case-control study. After measuring initial serum 25(OH) vitamin D concentrations, all participants underwent a submaximal exercise stress test according to the Bruce protocol. After reaching 85% of the maximal age-predicted heart rate, the running exercise was stopped and the heart rates were measured after one, two, and three minutes of recovery. Heart rate recovery indexes (HRR1, HRR2, and HRR3) were calculated by subtracting the one-, two-, and three-minute recovery heart rates from the peak rate during the exercise test (i.e., 85% of the max HR).

RESULTS: There were no correlations between serum vitamin D levels and any of the HRR indexes in either group. However, when the groups were divided according to their vitamin D levels, the HRR2 index in the control group was significantly lower in the low vitamin D group (< 15 ng/mL) than in the high vitamin D group.

CONCLUSION: These results suggest that the cardiac autonomic function was not affected by vitamin D deficiency in athletes, unlike in the sedentary control group. The positive effect of regular exercise on parasympathetic and sympathetic regulation may play a role in these findings.

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TWO-WEEKS OF ELECTIVE SPORTS MEDICINE INTERNSHIP PROGRAM IN MEDICAL SCHOOL EDUCATION POSITIVELY EFFECTS ON PHYSICAL ACTIVITY COUNSELING

Ş. TORĞUTALP; G. DÖNMEZ; M.P. YARGIÇ
Hacettepe University Dept. of Sports Medicine, Turkey

BACKGROUND: The burden of chronic diseases is rapidly increasing worldwide with estimates of trillions of dollars in annual health care cost and causing millions of deaths every year. Physical activity and exercise are now considered principal interventions for use in primary and secondary prevention of chronic diseases. Physicians are increasingly being called upon to promote physical activity among patients. While increasing physical activity and exercise prescription seems to be a very important solution in prevention of these diseases, lack of physician knowledge as a barrier in this area. In this study, knowledge and viewpoint of medical students about physical activity and exercise prescription were evaluated.

METHODS: Of the 216 medical students underwent two weeks of elective sports medicine internship program, 65,7% (n = 142, mean age; 24.2 years) was included in the study with returned questionnaire form about sports medicine, International Physical Activity Questionnaire (IPAQ) form and Short Form Health Survey (SF-36). The internship program was consisted of theoretical and practical sessions for general issues about sports injuries, exercise physiology and exercise prescription in chronic diseases.

RESULTS: They reported that 87.8% of them were not aware of sports medicine branch as a residency program. More than two-thirds (69.1%) of the students didn't have lecture about physical activity counselling nor exercise prescription for previous 5 years of medical education. After two weeks of education program the students who felt sufficient knowledge for physical activity counselling was increased to 76.8% from one-fourth at the beginning. At the end of the internship program almost all of the students decleared to believe benefits of physical activity counselling. The percent of students perceiving that exercise prescription would be highly relevant for diabetes mellitus treatment to their future practice increase during 2 weeks of program, from 59 to 93%. Students who had higher IPAQ scores and SF-36 values as well, were significantly more prone for physical activity counselling ($p < 0.05$).

CONCLUSION: Our results indicate a greater level of physical activity behaviour in medical students is important for future physicians to perform physical activity counselling as preventive medicine approach.

A93

THE HEART DIASTOLIC LEFT VENTRICLE FUNCTION DURING EXERCISES OF DIFFERENT POWER IN ATHLETES

O. NEKHANEVYCH[1]; I. DEKHTIAROV[2]
[1]Dnipropetrovsk Medical Academy of Health Ministry of Ukraine, Ukraine; [2]Ukrainian Medical Centre of Sport Medicine Ministry of Health of Ukraine, Ukraine

Understanding the factors that affect capacity for physical work is the main scientific goal of modern sports medicine. Recently there have been some reports of symptoms of myocardial relaxation, i.e. diastolic heart function as an early sign of cardiac overtraining. In such patients left ventricle (LV) ejection

fraction (EF) may remain normal since the performance of the heart depends not only on its ability to eject blood into the aorta during systole, but also on its ability to fill with blood in diastole.

The purpose of our study was to evaluate changes in heart diastolic function during work of different intensities using echocardiography.

MATERIALS AND METHODS: We examined 68 athletes from 12 to 27 years old (average age is 17.8±4.5 years). The majority (85.3%) participated in swimming and 14.7 % participated in volleyball.

First, echocardiographic (echoCG) and electrocardiographic (ECG) data were obtained. according to standard procedures in a state of physiological rest. Then echoCG was carried out whilst the participant performed a symptom-interfaced bicycle exercise test in a semi-supine position on a tilting exercise table with a step increased load without rest periods. EchoCG and Doppler study was conducted at the end of each level of capacity in the four-chamber, long-axis position. ECG and echoCG data were collected between the third and fifth minute of recovery time according to standard. We measured indicators of the maximum speed (cm/s) of early diastolic (E) and late diastolic mitral valve streams (A), maximum speed (cm/s) of early diastolic and late diastolic mitral annulus velocity (e' and a' respectively), early diastolic inflow acceleration time (AT, ms) and deceleration time (DT, ms).

RESULTS AND DISCUSSION: In our sample of athletes transmitral inflow was similar to the population averaged reported by, but detailed analysis of selected indices revealed differences between athletes of different skill levels. In athletes were increased peak early filling (E-wave) and it leaded to the E/A ratio increasing ($p<0.05$). The e'/a' ratio in our sample was similar to the population average. The detailed analysis did not reveal any differences between above mentioned values.

Due to physiological bradycardia the at-rest heart rate in our sample was 51.1±4.8 beats per minute. Compared with the population average we also registered an increase in the time between early and late diastolic waves of transmitral flow in our athletes.

The standard indicator of diastolic function is the E/e' ratio, the ratio of maximum early diastolic transmitral inflow to maximum early diastolic septal mitral annulus velocity. Values of E/e' less than 8 exclude the possibility of acceleration in LV filling and values of E/e' greater than 15 are taken as an indication of accelerated filling. The age-related reduction in the elasticity of the myocardium leads to an increase in the E/e' ratio. The mean E/e' ratio in our sample of athletes was similar to that for the general population.

The research shows that under loads which require medium and submaximal power (from 50% to 75% of maximal heart rate E and e' increases proportionally, confirming the international research data and thus the E/e' ratio remained unchanged or slightly reduced.

We found that under increasing load at maximal level the increase in e' was less than the increase in E in people with impaired myocardial relaxation or people exercising above threshold load. This leads to an increase in the E/e' ratio. These data suggest that stress echoCG could be used to assess diastolic myocardial reserve.

The DT interval is another potential indicator of threshold load. DT decreases slightly during submaximal exertion in individuals with a normal myocardium but under loads above threshold load DT decreases by more than 50 ms.

Our data on the changes of diastolic function during the recovery period are of particular interest. There is evidence that patients with impaired myocardial relaxation due to the coronary heart disease have constant elevation of wave E within 5-10 minutes, whereas e' reduces as soon as the load is removed; hence in this population there is an increase in the E/e' ratio when load is removed. In patients with normal diastolic function the decreases in E and e' occur in proportion. In our sample of athletes E decreased more quickly than e' when the load was removed and thus the E/e' ratio dropped below the at-rest value.

Key words: athletes, heart diastolic left ventricle function, stress-echocardiography.

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ROLE OF MODERATE AND INTENSE EXERCISE ON BLOOD-BRAIN BARRIER PROPERTIES

A.P. SILVA[1]; R. LEITÃO[1]; V. PINHEIRO[2]

[1]CNC.IBILI, University of Coimbra, Portugal, Portugal; [2]Occupational Medicine Service, Coimbra Hospital and University Centre, Portugal

INTRODUCTION: Nowadays, physical exercise is a widely accepted behavioural strategy to improve health status. In fact, physical exercise has been studied by its positive effects on cognitive functions (learning and memory), being a non-pharmacological approach to improve health under conditions of neurodegenerative and/or psychiatric disorders. Sports with intensive physical activity are also performed all around the world. Although it is already known that exhaustive exercise causes oxidative stress in muscle and other tissues, there is no consensus if strenuous exercise could generate oxidative stress in brain parenchyma. On the other hand, doping substances have gained a great popularity in competition sports, despite the known toxicity to brain cells. The blood-brain barrier (BBB) is the structure responsible for brain protection, against hazardous molecules and pathological organisms, and for brain homeostasis control. Thus, its dysfunction is associated with several and harmful effects, such as brain cell death, which consequently lead to neurological and psychiatric abnormalities. Nevertheless, nothing is known about the effect of exercise on BBB properties.

AIM: Therefore, the present work aims to study alterations on BBB proteins during moderate and acute high-intensity physical exercise.

MATERIAL AND METHODS: We used two independent experimental approach as follows: the first group was composed by male C57BL/6J wild-type mice (10 weeks old) and was submitted to a moderate exercise protocol (60-80% of VO_2max); in the second experimental group we used young adult male Wistar rats (8 weeks old) subjected to a single bout of high-intensity exercise (forced running in a treadmill for 35 min, with a 20 cm/s speed and a 15º of inclination). Possible alterations in the protein levels of tight junctions (TJs) proteins (claudin-5 and occludin) as well as inflammation-associated proteins (vascular cell adhesion molecule 1, VCAM-1 and glial fibrillary acidic protein, GFAP) were analysed by western blot in the pre-frontal cortex, striatum and hippocampus isolated 24h after the last exercise session.

RESULTS: In the moderate exercise group, we observed a BBB disruption associated with a downregulation of TJs proteins (namely claudin-5) in the hippocampus, however we did not observe any effect on both striatum and pre-frontal cortex. Moreover, a significant increase in GFAP levels was also present in the hippocampus, with no alterations in VCAM-1 protein levels. On the other hand, the animals submitted to a single bout of acute high-intensity physical exercise showed a statistical significant decrease of TJs proteins levels (namely occludin) only in the striatum, with no effects on the hippocampus and pre-frontal cortex.

CONCLUSION: We clearly showed that physical exercise caused BBB weakening as well as augmentation of inflammation-associated proteins. Nevertheless, we also observed different brain regions responses that need further study. In conclusion, this work enlightens the importance to the correct prescription of physical exercise and its appropriate follow-up.

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A62

COMPARISON OF PLATELET RICH PLASMA INJECTIONS AND PROLOTHERAPY IN THE TREATMENT OF CHONDROMALACIA PATELLA

M.M. SEVEN; S. AKPANCAR; A. ORSCELIK
Gülhane Training and Research Hospital, Turkey

PURPOSE: Chondromalacia patella (CMP) is the most common problem in musculoskeletal system. Platelet-rich plasma (PRP) has been suggested to be beneficial in the treatment of sports injuries. Prolotherapy (PrT) is an injection-based technique for treatment of chronic musculoskeletal pain. The aim of the current study is to assess the comparison of PRP and PrT usage in the treatment of CMP for the first time in the literature.

METHODS: Randomized controlled clinical trial. A total of 47 patients with CMP for more than 3 months, with age of 21 to 66 years, were included in the study. The patients were divided into two groups. 24 participants in group A (38 knees) were given a triple injection of PRP and 24 participants in group B (33 knees) received 6 injections of PrT at an interval of 3 weeks. Of the 24 patients in group B, 1 patient later refused treatment when they reported for injection, and hence, 23 patients (31 knees) were available at follow-up. 5 ml solution was done into the knee joint and 5 ml solution was "peppered" on bone around the patella. In multiple injections 3 weeks expected to next injection. All patients received a six-week standard exercise program. The patient questionnaire, the Tegner and Lysholm knee score and VAS score were assessed in the beginning, 3 weeks, 6 weeks and 6 months later.

RESULTS: Group A consisted of 22 (57,9%) males and 16 females (42,1%). Group B consisted of 20 (64,5%) males and 11 (35,5%) females. Age mean values were 44,5±10,3 in Group A, 39,0±11,8 in Group B. There was a statistically significant difference in pain level during exercise, crepitus, exercise ability, total number of medications and VAS between group A and B before the treatments ($p=0.014$, $p=0.042$, $p=0.001$, $p=0.003$, $p=0.029$ respectively). In comparison of groups before and 24 weeks after the treatment, there was a statistically significant difference in pain level during exercise, ROM, crepitus, total number of medications, VAS and The Tegner and Lysholm Knee Score ($p=0.004$, $p=0.038$, $p<0,001$, $p=0.003$, $p=0.001$, $p=0.026$ respectively). Among the patients with CMP treated with an exercise program, both PRP and PrT treatments resulted in greater improvement in pain and knee functions during a 24-weeks follow-up ($p<0.05$).

CONCLUSIONS: Our results supported the usage of PRP and PrT injections in CMP treatment. PrT and PRP ameliorates chondromalacia patella symptoms and improves physical ability. Both PRP and PrT treatments were found effective in CMP but PRP treatment was found more effective than PrT treatment.

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HOW MUCH IS TOO MUCH? – ABOUT TWO CROSSFIT CLINICAL CASES

Ú. MARTINS; J. BARRETO; J. CUNHA
Centro Hospitalar Entre o Douro e Vouga, Portugal

INTRODUCTION: CrossFit is a high-intensity strength and conditioning program that has gained popularity over the past decade. One of the features that attracts people is its emphasis on quantifiable results, being associated with a significant improvement in VO_2 max and decreased body fat percentage. However, potential injuries associated with CrossFit training have been suggested.

CASE REPORT: We report two cases of cerebrovascular events associated with CrossFit workouts.

Patient 1: 28-year-old female, personal trainer and professional CrossFit athlete with past history of untreated hypertension and consumption of dietary supplements.

During a cross fit training, the patient performed handstand push-ups with repetitive craniocervical trauma, initiating at that time temporal headaches associated with cervical pain, that progressed to a worsening of headache and vertigo, dysphagia and deep sensation deficit on the left side of the body.

The MRI showed a vertebral artery dissection which led to a bulbar ischemic stroke. The craniocervical EcoDoppler showed a 50% stenosis of right V4 segment. She was hospitalized for 15 days at the hospital and then transfered to a rehabilitation center, presenting with deficits in superficial and deep sensation on the left side, right partial horner syndrome and gait ataxia. She started 100 mg of aspirin daily. After an intensive rehabilitation program, some deficits reversed, however a partial horner syndrome, right homonymous hemianopsia and the deficit in superficial sensation still persist. During hospitalization, she underwent a reconditioning program and was instructed on the workouts she was allowed to do. Although this, the patient returned to Crossfit workouts without any restriction 7 months later.

Patient 2: 36-year-old female, a non-professional CrossFit athlete (practices twice a week) with past history of dietary supplements consumption and smoking.

During a Crossfit workout, while performing squats, she had a severe headache, accompanied with dysarthria, left grade 1 hemiparesis (including face) and anosognosia. The MRI revealed an ischemic stroke in the temporal polar and lenticulo-capsular temporal region of the right side with extension to the radiated crown. The craniocervical EcoDoppler showed a stenosis of 50% of the right internal carotid and middle cerebral stenosis. She was hospitalized for four days, and started 100 mg of aspirin daily. During the hospitalization, all deficits were reversed.

DISCUSSION: While direct causality cannot be proven in the second case, intense Crossfit workouts may have led to the ischemic event. On the other hand, in the first case, there was a traumatic exercise that probably caused the dissection of the vertebral artery. Some experts are troubled by lack of guidance of beginners such as the second patient, who may dive into stressful workouts with intensities inappropriate to their physical condition. Even fit people are at risk by lack of technique or overly strenuous and excessively fast exercise. Cases of cervical carotid artery dissections and rhabdomyolysis and have been reported.

To prevent injuries trainers should have appropriate training certifications, the equipment should be inspect regularly. A medical clearance should be done before participation and monitor athletes for signs of overtraining, rhabdomyolysis, and other problems. Participants should adjust rest periods to optimize recovery and reduce fatigue, and the train should alternate exercise programs with other unit training activities to eliminate redundant activities and minimize the risk of overuse injuries.

CONCLUSION: The danger of CrossFit is the speed and high-intensity movements and lack of proper guidance on technique. The constant push to increase performance with faster speed and more weights may lead to further degradation in exercise technique and predisposition to injury. So the question is how much is too much in the quest for balance between health and competitive performance.

A78

GENDER RELATIONSHIPS OF SHOULDER ROTATOR MUSCLES ISOKINETIC POWER-VELOCITY CHARACTERISTICS AFTER ARTHROSCOPIC LABRAL REPAIR

Ł. SZUBA; A. KRÓLIKOWSKA; A. CZAMARA
College of Physiotherapy, Poland

INTRODUCTION: Arthroscopic labral repair is common way of treatment after repeated shoulder injury in athletes or recreational sport participants. Primarily, anterior shoulder instability is experienced by young and active males. Nevertheless, females are also exposed for shoulder injury with total number of 23% for gleno-humeral joint dislocations. Recovery after surgery is based on physiotherapy early oriented on reducing inflammation and pain, further followed by restoring the range of motion of the joint and improving proprioception. Regarding to healing process, surgical technique and physiotherapy criteria more intense strength exercises are carefully introduced. Previous studies clearly explain peak torque assessment and interpretation after labral repair, however many other isokinetic parameters may be also vulnerable in looking for side-to-side deficits of shoulder muscles strength and power. Gender differences in isokinetic torque qualities are also unknown after shoulder anterior instability treatment, which may restrict the validity of the biomechanical studies for clinical practice.

OBJECTIVES: We aimed to use isokinetic testing to assess differences in the power, strength and shoulder active range of motion functional tests of patients following arthroscopic labral repair compared with a healthy control group. Secondly, we assess males and females to look for gender related changes of obtained biomechanical outcomes.

DESIGN: The functional outcomes of patients who underwent arthroscopic labral repair followed by short term supervised (21± 5 appointments) followed by self-guided home-based exercises and were compared with gender, age- and body mass index (BMI)-matched healthy controls.

METHODS: Group I included 30 (20M, 10F) patients who had undergone arthroscopic labral repair after being diagnosed with recurrent anterior glenohumeral joint instability without associated bony joint lesions. Postoperatively, they participated in physical therapy, followed by self-guided home-based exercises. Group II included 30 (20M, 10F) healthy individuals without upper limb or cervical spine injuries. The two groups were matched for age and BMI and were equal for gender distribution. The orthopaedic examination, functional tests, and biomechanical measurements under isokinetic conditions were performed at an average of 14 ± 6 months postoperatively. The mean values and standard deviation for each measurement were calculated. The Wilcoxon test for dependent samples was used to assess for significant differences within goups. Inter-group differences were assessed using one way ANOVA test. Comparisons were performed between measurements obtained from operative arms and the dominant arms of the control group. A p-value of less than 0.05 was considered significant in all cases.

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RESULTS: Significant differences in for both sexes were observed in range of shoulder rotation on the operative shoulder compared with the unaffected side and in the dominant arms of the control group. The patients were also found to have significant deficits in biomechanical parameters such as peak torque, power and total work. Gender differences were observed at peat torque, power, and time to peak torque. Inter-group comparison revealead lower values of obtained biomechanical parameters in Group I. Time to peak torque and peakt torque were significantly lower for female participants copmared to males in both groups.

CONCLUSIONS: Significant deficits in peak torque, power, and time to peak torque during external and internal shoulder rotation are persistent up to 14 months after arthroscopic labral repair of shoulder anterior instability for male and female patients. Females obtained lower values of biomechanical parameters with reference to males in both studied groups.

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ACTUAL EVIDENCE AND BEST PRACTICE IN GROIN INJURY PREVENTION

R.N. REKIK; R. DAOUD; O. SKHIRI
Aspetar (orthopaedic and sport medicine hospital), Qatar

Invited Lectures

Groin injuries are frequent and troublesome in football. They seem to vary between 10 and 20 % of all injuries and are primarily related to the hip adductors, which account for 69% of all groin injuries. Furthermore, some studies showed that time-loss definition as used in previous injury surveillance studies captured only one-third of the male groin problems registered. We note also the complexity of the musculotendinous structures in the groin region, the discrepancy between clinical and radiological findings, the different management protocols and long time-loss. It's a complicated area when it comes to diagnosis and therapy, that's why prevention should be preferred over cure.

In literature, some authors consider groin injury prevention as a utopia, because of a lack of comprehensive and high level evidence on prevention of groin injuries in professional football. Through this work, we tried to assess this assumption by reviewing the available evidence on groin injury prevention. In this context, we did a review of the literature through pubmed.

In a first step, we assessed the general and nonspecific prevention including exercise interventions based on strength training and the FIFA 11+ program. The related papers showed a clinically meaningful groin injury reduction in general and statistically significant reduction for the FIFA 11+ program. Then some other papers have been more specific and targeted specific exercises for the groin. In this regard, if the Holmich protocol showed 30% decrease (not statistically significant) in groin injuries, some authors underlined the important role of the Copenhagen adduction exercise and hip adduction exercise with an elastic band in this prevention.

Even if a high level of evidence is actually not available, the reviewed studies suggested that groin injury prevention could contribute to reduce substantial disability, time-loss, injury-related costs and increased risk of reinjury and chronicity. This prevention consists of active strength and coordination exercises, including mainly the Copenhagen Adduction exercise and Hip Adduction exercise with an elastic band.

We need more rigorous scientific approaches, concerning groin injury prevention, to advance this important area of sports medicine to becoming high evidence-based. In this context, specific exercises for possible future use in groin injury prevention have to be systematically and quantitatively evaluated.

Invited Lectures

Invited Lectures

A81

DO WE HAVE ANY STANDARDS FOR A MULTIPLANES OBJECTIVE ASSESSMENT OF MUSCLE STRENGTH FOR ATHLETES WHO WANT TO RETURN TO SPORT AFTER THE ACL RECONSTRUCTION?

A. CZAMARA[2]; L. SZUBA[1]; A. KROLIKOWSKA[1];

[1]The College of Physiotherapy in Wroclaw, Poland; [2]The Polish Society of Sports Medicine, Poland

INTRODUCTION: Athletes who want to return to sport after anterior cruciate ligament reconstruction (ACLR) of the knee joint need to complement clinical assessment of the treatment supported by strength and strength-speed characteristics evaluation of muscles affecting the knee joint, both in the sagittal and transverse plane. Why? Because knee injuries usually take place during a multiplane motion, with the knee deeply flexed, adducted, and shin excessively rotated. In addition, harvesting of semitendinosus (ST) and/or gracilis (GR) muscles tendons used as autologous grafts for the reconstruction may weaken the muscles and disturb the biomechanical ratio between flexion - extension and external - internal knee stability.

AIM: The study aimed to present an application of isometric (IT) and peak (PT) torque measurements of muscles affecting the knee joint in the sagittal and transverse planes in athletes after ACLR. The second goal of this study was to evaluate the practical effect of 26 weeks postoperative physiotherapeutic procedures on IT and PT values in muscles responsible for extension, flexion and internal shin rotation under static and isokinetic conditions in athletes after ACLR.

MATERIAL: The studied material comprised 25 males after primary unilateral ACLR with the use of autologous ipsilateral STGR graft undergoing a supervised postoperative physiotherapeutic procedure with a frequency of three sessions per week in the rehabilitation center where the study was carried out (ACLR Group). The results of the ACLR Group were compared to the results of healthy males without known orthopaedic problems, the Control Group (n=20).

METHODS: In both studied groups a comprehensive clinical assessment supported by the measurements of maximal IT under static conditions and PT values under isokinetic conditions of muscles extending, flexing, and rotating the shin in the knee joint with the use of Humac Norm &Rehabilitation System were carried out. In the ACLR Group, IT measurements were performed in the 13th and 26th week of postoperative physiotherapy, while PT measurements were performed in the 17th and 26th week of physiotherapy following reconstruction. In the Control Group the measurements were performed once. There was carried out the standard intra-group and inter-group statistical analysis. The IT and Pt values were expressed in N*m, and normalized to body mass (bm), and expressed as a relative torque (N*m/kg bm) for the purposes of inter-group comparison. Additionally, the between-limbs comparison was expressed as a percentage difference (%).

RESULTS: In the ACLR Group, the IT (13th week) and PT (17th week) values of extensor, flexor and shin rotator muscles, obtained from the involved limbs were significantly lower than the values obtained from the uninvolved limbs and the Control Group results ($p < 0.001$). Evaluation carried out in the ACLR Group between the 1st and last measurements (26th week following reconstruction) showed a statistically significant improvement of IT, PT of measured muscle groups and most of them, there were normal values in the involved limbs compared with results obtained from uninvolved limbs ($p<0.002$-0.001) and the Control Group. Finally in ACLR Group significantly lower PT were noted in the involved limb knee extensors (15%) and IT values for the muscles internally rotating the shin in the position of 25° of internal rotation (15%).

CONCLUSIONS: The study demonstrates the usefulness of biplanar analysis of muscle strength under isometric and isokinetic conditions as a critical standard in a comprehensive assessment of athletes who want to return to sport after ACLR.

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THE LONG TERM OUTCOMES OF ACL RECONSTRUCTION IN ATHLETIC POPULATION

F. OZKAN; B. ULKAR; M. CELEBI
Ankara University Faculty of Medicine, Sports Medicine Department, Turkey

OBJECTIVE: Anterior cruciate ligament (ACL) rupture is one of the most common sports-related injuries to the knee. The asserted causes of these injuries are believed to be multifactorial. Intrinsic factors such as gender, joint laxity and biomechanical characteristics and extrinsic factors such as sports specific activities and sports grounds were predominantly studied. The aim of this study is to investigate the distribution of ACL injuries among sports branches and the effect of blood group on incidence of injury, as well as the ratio of return to pre injury level of sports activity.

MATERIALS AND METHODS: A self-report questionnaire was used to collect data on 159 patients (mean age 29,79±8,03) who were undergone ACL reconstruction in the last five years. The blood groups, type of sports activity, Lysholm Knee Scoring results and the current sports activity levels were included in the questionnaire. The reasons of failure to return to sports were questioned, as well.

RESULTS: There were no significant relation of blood types and ACL injuries among the participants. The distribution of the cases according to sports participation were as follows: 47% soccer, 18,2 % basketball, 6,9% handball, 5,7 % volleyball, 4,4% martial arts, 3,7% American football and 14.1% other sports. %52,83 of the patients were able to return to sports. The mean Lysholm scores of the patients who were able to return to sports were significantly ($p<0,001$) higher (97,40±4,80) than the patients failed to return (93,37±7,28). The 57,53% of the patients reported the cause of failure to return to sports as the fear of re-injury.

CONCLUSION: Almost half of the patients who had ACL injury were soccer players. There were no significant relationship between the injury risk and blood type in ACL injured patients. The Lysholm knee scoring is an important indicator of ability to return to sport. The leading cause of failure to return to sport was reported as fear of re-injury. There is growing evidence to suggest that psychological factors matter and this may have important implications for clinical practice.

Additional research is needed to identify objective criteria and setting of functional and psychological testing to detect the appropriate phase to return to sport besides a well-structured functional rehabilitation program to improve clinical decision making for return to sports after ACL reconstruction.

A89

ANTERIOR SPINAL ARTERY SYNDROME SHOT PUT-RELATED – A CASE REPORT

J.V. COSTA[1]; G. ANDRADE[1]; J. SILVEIRA[3]; I. LUCAS[1]; P. FIGUEIREDO[2]
[1]Rehabilitation Medical Centre of Central Region - Rovisco Pais, Portugal; [2]Pediatric Hospital of Coimbra - Physical and Rehabilitation Medicine Dep., Portugal; [3]Department of Physical and Rehabilitation Medicine – CHUC, Portugal

INTRODUCTION: Spinal cord infarction from anterior spinal artery syndrome (ASAS) in children and adolescents is a rare condition and may result from traumatic, like in sports (surfing, weight lifting, taekwondo fighting), or non-traumatic events, such as aortic disease, thromboembolic disorders,

hypotension or after thoracolumbar or abdominal aortic surgeries. Diagnosis is based on clinical and MRI findings. The outcome is variable and depends on the extent of the spinal cord infarct and subsequent rehabilitation. There were no case reports identified by the authors in PubMed until now of ASAS related to shot put.

OBJECTIVE: To present a case of a 16-years-old boy who became paraplegic after practicing shot put.

PATIENT: A 16-years-old boy, obese, presented to the emergency department with a bilateral leg weakness and epigastric pain. 3 days before he practiced shot put more intensively than usual. On physical examination the patient had flaccid paraparesis, impairment of superficial (temperature and pain) and deep sensibility as well as acute urinary retention, with a degree of American Spinal Injury Association (ASIA) of D and D3 neurological level. Full blood count showed leukocytosis (13000/ul) and neutrophilia (8100/uL). Blood clotting times, ESR, CRP, electrolytes, autoimmunity and thrombophilia tests were all normal. MRI performed on admission revealed increased signal intensity in the ventral aspect of the spinal cord, between D3-D6, characteristic of ASAS. Treatment was implemented with high-dose corticotherapy, anticoagulation therapy and a bladder catheter. and pharmacological bowel training. The patient engaged intensive rehabilitation therapy on the week 2 after admission, carried out by the Physical and Rehabilitation Medicine Department, including range of motion and stretching exercises, sensibility, standing, transference, balance, and gait training, as well as spasticity treatment with botulinum toxin, bladder catheterism and pharmacological bowel training. The patient scored a Functional Independence Measure (FIM) of 84/126 points (Motor 49 and Cognitive 35 points). On week 14 after the admission there were a good outcome, with the patient performing autonomous mobility in a mechanical wheelchair and independency on activities of daily living, transferring and bowel bladder care. At this point he scored a FIM of 111/126 points (Motor 76 and Cognitive 35 points).

CONCLUSIONS: ASAS is being associated to traumatic events linked to sports, however there's no data related to shot put identified by the authors. In this case report we assume that the relationship between the shot put practice and the spinal cord infarction from ASAS is likely as the patient doesn't have any other relevant risk factors besides obesity. The aims of rehabilitation were being accomplished until the week 14 after admission to the hospital.

A94

MANAGEMENT AND RETURN TO PLAY GUIDELINES AFTER TRAUMATIC SPINE INJURIES, DURING AMATEUR ATHLETIC ACTIVITY

A. MYLONAS[1]; G. GAVRIDAKIS[2]; N.CH. SYRMOS[1]; V.GIANNOULI[3]

[1]Aristotle University of Thessaloniki, Macedonia, Greece; [2]Venizeleio General Hospital, Heraklion, Crete, Greece; [3]Medical School, Aristotle University of Thessaloniki, Macedonia, Greece

AIM: Aim of this study is to present the definition, the signs, and the symptoms of traumatic spine injuries (TSI) during sports activity.

MATERIAL-METHODS: Evaluation of 10 amateur athletes with TSI was performed. 7 men-70% and 3 women -30% (range 18-28 years and mean age 24) after TSI were enrolled in this study. 2 cervical spine injuries (20%), 2 thoracic spine injuries (20%), 4 lumbar spine injuries (40%) and 2 combined spine injuries (20%)

– 1 basketball players (10%)
– 1 football (soccer) players (10%)
– 1 volleyball players (10%)

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– 1 beach volley player (10%)
– 1 boxer athlete (10%)
– 1 swimmer (10%)
– 4 sports sea activity (40%)

RESULTS: In all of them(10,100%), accurate evaluation was performed . 7 of them- 70 %-returned with safe results in the physical activity after 1 month period. In 3 of them (30%), application of immobilization with cervical collar in one case(10%) and with lumbar zone in two cases (20%). The athletes returned with safety in physical activity after 2 months period.

CONCLUSIONS: Factors such as recognition and education are very important, because together with other parameters such as equipments, techniques, and adherence to rules of the sports can decrease the incidence or severity of traumatic spine injuries. Reuturn to play rules should be 1) according to international standards and 2) using a progressive step by step system.

A98

EPIDEMIOLOGICAL STUDY OF INJURIES IN PHYSICAL ACTIVITY PRACTITIONERS IN FITNESS CENTERS IN BELÉM – PA.

B.T.L. de NORONHA[1]; K.C.P. LIMA[1]; A.L.P. MUNIZ[2]; B.F. de NORONHA
[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil

Invited Lectures

Injury among physical activity practitioners and athletes is a frequent reality. However, especially in amateurs and without guidance, most of them could be prevented primary or secondary. There is also the mentality of overtraining and exhaustion as a form of exercise enhancement, which seems to contribute to the onset of injury. The objective of this study was to observe the epidemiology of physical injuries in physical activity practitioners in Belém-PA academies. It was studied in a cross-sectional, descriptive and observational way, and the sample consisted of 100 subjects, randomly approached in Belém academies and researched through their own protocol in the months of September to November of 2009. Gender equality was found to be equal and The age range was between 18-45 years (± 9.1). 92% of the respondents claimed to engage in physical activity without medical advice and none of them sought a physician to assess their fitness for physical activity before starting the practice. 80% of the total had a history of at least one injury associated with the practice of the gym, divided as follows: cervico-lumbago (30 cases), muscular injuries (20 cases), knee injuries (13 cases). 28 patients reported characteristic symptoms of pressure gradient or Heat-Stroke signs, and 10 indicated exercise-induced asthma. The practice of physical activity without medical guidance can be deleterious in the short, medium and long term, being essential the monitoring before and during the time of practice of the exercises. The importance of adequate evaluation in order to prevent injuries should be emphasized in sports and academy circles.

Invited Lectures

A114

SEASONAL VARIATION OF FITNESS VARIABLES IN COMPETITIVE JUDO ATHLETES: THE ROLE OF THE SPORTS MEDICINE PHYSICIAN

N. PONORAC[1]; D. RADOVANOVIC[2]

[1]Faculty of Medicine, University of Banja Luka, Republic of Srpska, Bosnia and Herzegovina; [2]Faculty of Sport and Physical Education, University of Nis, Serbia

INTRODUCTION: During a judo training, a lot of effort has been put into the attempt to maintain, restore or improve physical fitness and increase performance. Both fitness and performance depend on the individuals' ability to perform the correct technique under anaerobic and aerobic conditions, and on the capacity to develop high levels of muscle strength and power.

Seasonal variations in the fitness variables have been observed in several individual sports, but there is a lack of studies of combat sports. Therefore, the purpose of this study was to determine whether seasonal variations among selected physiological variables and muscular outputs could also be observed in judo athletes.

METHODS: Eight high-level judo athletes went through the same investigation protocol at four different periods of training during a competitive season (P1 – during the main preparatory period in January; P2 – before national individual championships in March, P3 – during main international tournaments in May; P4 – before national team championships in August). The investigation protocol consisted of anthropometric measurements, monitoring of dynamic lung function, measurements of oxygen uptake (VO_2) during arm-crank ergometry with determination of lactate thresholds, the one-repetition maximum (1RM) test, monitoring of muscular outputs (peak power and velocity of movement) during bench presses and squats, and monitoring of muscular outputs (peak power, mean power and fatigue index) during upper body Wingate anaerobic tests.

RESULTS: An one-way repeated measures ANOVA showed that mean body weight and percentage of fatty tissue varied significantly between four different periods during competitive season. No significant difference was found in VO_2 at the aerobic threshold and VO_2 during the maximal lactate steady state. However, a significant difference was observed in the maximal oxygen uptake between four different periods. All of the studied variables of dynamic lung function showed a significant difference between different testing periods. No significant difference was found in 1RM. However, a significant difference was observed in the muscular outputs during bench presses and squats between four different periods. All of the studied variables of upper body Wingate anaerobic tests showed a significant difference between different testing periods.

DISCUSSION AND CONCLUSION: The obtained results are within the average values for elite athletes, which is in accordance with the specific characteristics of judo as a sport. Understanding and monitoring fitness variables enables the preparation and correction of individual areas of the training workload in appropriate cycles during a prolonged competitive season. Moreover, sport-specific testing in laboratory

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conditions may assist with identification of individual training adaptations and early signs of detraining or overtraining, and help coaches in making personalized suggestions during the training process.

Key words: Seasonal variation; Judo; Training; Testing.

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A103

MODIFICATIONS IN THE PRESSURE PROFILE OF HIPERDIA PATIENTS AFTER AN EDUCATIONAL PROGRAM OF PHYSICAL AND DIETARY ACTIVITY IN FAMILY HEALTH UNITS

B.T.L. de NORONHA[1]; K.C.P. LIMA[1]; A.L.P. MUNIZ[2]; B.F. de NORONHA

[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil

Invited Lectures

Physical activity and adequate nutrition are recognized factors that contribute to the fight against arterial hypertension, and understanding its efficacy helps us to understand the dynamics of the health system itself. Knowing the patient's pressure behavior not only at one moment of his day, and still subject to interference as in the case of white coat hypertension, is necessary for diagnostic, therapeutic and prognostic optimization. However, primary care still lacks better examination and diagnosis conditions, where in this context the Ambulatory Blood Pressure Monitoring (ABPM) technique is cited. This study sought to observe whether the professional orientation regarding diet and physical activity, as recommended in the Family Health Strategy (FHS), resulted in differences in the results found in the blood pressure values of the patients studied. The research was transversal and descriptive, performed in Family Health Units (USF) in three municipalities of Pará: Anajás, Barcarena and Juruti, one USF per municipality, and 60 patients in each, in the age range of 60 to 85 years, Enrolled in the Hiperdia program, between September and November 2009. A research plan was set up to follow up the hypertensive patients with an ABPM adapted to the local reality, practicing during three months physical training three times a week during 40 minutes, in addition to guidelines on balanced feeding, on working days due to the operation of the USF, which involved a physician, a PSF nurse; And physical educator, social worker and pedagogues provided by other municipal secretariats of the municipalities involved. It was found that 68 (37.78%) of the patients presented pressure levels that allowed the withdrawal of the drug regimen and in 48.33% (87 patients) it was possible to reduce antihypertensive drug therapy. Only 25 cases (13.89%) did not present changes or had to reinforce antihypertensive therapy. The good indexes suggest that the implementation of one of the FHS principles, the approach of the health professional to the community through health education, can modify the health condition of a social group, and stimulates the improvement of educational resources At this level of attention.

A99

INCIDENCE OF POSTURAL DEVIATION IN ATHLETES OF FIVE PROFESSIONAL FOOTBALL TEAMS.

B.T.L. de NORONHA[1]; K.C.P. LIMA[1]; A.L.P. MUNIZ[2]; B.F. de NORONHA

[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil

Invited Lectures

Soccer is the sport most practiced in Brazil, being one of the countries with the largest number of fans of

this sport in the world. The present study had as objective to know and to analyze the incidence of postural deviation in athletes from 17 to 35 years old of five teams of the regional soccer championship between the years of 2008 to 2010. For this, a descriptive and transversal study was done, In the period from 2008 to 2010, including 100 athletes from five Para teams of professional football. The participants of the research were submitted to the evaluation of the postural deviation through the symmetograph. With this device, the most obvious postural deviations can be identified by means of the observation of specific anatomical points (acromion, iliac crests, condyles, malleoles) that allowed to identify the asymmetries resulting from this postural alteration. The athletes who presented postural deviation were still questioned about the presence of symptoms (back pain, shoulder). For statistical analysis, the Biostat 5.0 program was used. 100 athletes were analyzed, and 68% (68/100) presented some postural deviation. Among those surveyed, 45% (45/100) were symptomatic, presenting pain and / or movement restriction. Statistical parameters were obtained using the Chi-square test, with $p = 0.0003$ (deviation or not) and $p < 0.0001$ (symptomatic or not). The early evaluation of postural deviation of the athletes will allow a better physical preparation, in order to minimize the present symptoms, to increase the physical fitness, to improve the sporting performance besides to avoid possible damages in the postural condition of these athletes.

A100

INCIDENCE OF POSTURAL DEVIATION IN STUDENTS OF A PUBLIC SCHOOL AND A PRIVATE SCHOOL IN THE MUNICIPALITY OF BELÉM-PA.

B.T.L. de NORONHA[1]; K.C.P. LIMA[1]; A.L.P. MUNIZ[2]; B.F. de NORONHA

[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil

Physical problems that can affect children and adolescents beginning in the growth phase are a risk factor for irreversible spine dysfunction in adulthood. Epidemiological data point to a high prevalence of postural alterations of the spine in this age group. This study aimed to verify the incidence of postural changes in the vertebral column in schoolchildren aged 10 to 16 years old in the city of Belém, PA. A descriptive and cross - sectional study was carried out between 2015 and 2016, including 50 public school students and 50 private school students. The subjects of the research were submitted to the evaluation of the postural deviation through the symmetograph. With this device, the most obvious postural deviations can be identified by means of the observation of specific anatomical points (acromion, iliac crests, condyles, malleoles) that allowed to identify the possible asymmetries resulting from this postural alteration. The students who presented postural deviation were still questioned about the presence of symptoms (back pain, shoulder). Among the 50 students of the public school 35 (70%) presented postural deviation, of which 22.9% (8) were symptomatic. Of the students in the private school 38 had postural deviation and 31.6% (12) were symptomatic. Therefore, there is a significant prevalence of postural deviations among schoolchildren in the city of Belém-PA. Since school age comprises the ideal phase for effectively recovering spine dysfunctions, important health promotion campaigns are aimed at adopting healthier lifestyles and attitudes, including the prevention and treatment of postural changes.

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Saturday, 18 November 2017
Parallel Oral Presentations –
10:00 – 11:00 Mixed Topics

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SAGITTAL PATELLAR TILT: A NEW CONCEPT IN PATELLOFEMORAL PAIN SYNDROME ETIOPATHOGENESIS

D. KAYA[1]; E. AKSAHIN[2]; I.M. PEPE[3]; Y. ERDOGANOGLU[1]; H. YIGIT[2]; C.N. AKTEKIN[5]
[1]Ankara MedicalPARK Hospital, Orthopaedics and Traumatology, Turkey; [2]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Turkey; [3]Ankara Training and Research Hospital, Turkey; [4]Department of Orthopaedics and Traumatology, Turkey

BACKGROUND: Patellofemoral pain is a serious problem and can lead to patellofemoral arthritis in long terms. Patellar abnormal tracking such as vertical plane malpositioning, patellar tilt or subluxation plays an important role in the development of patellofemoral pain syndrome (PFS). However, the malalignment of the patellofemoral joint in the sagittal plane is a new concept and the effect of this situation on the PFS is unknown.

OBJECTIVES: The aim of this study was to analyze the sagittal patellofemoral alignment in PFS patients and its correlation with peripatellar muscle status. The second aim of the study is to delineate the effect of physical treatment modality that was used in this study, on sagittal patellar alignment and peripatellar muscle volume changes.

STUDY DESIGN & METHODS: Patients who were diagnosed as a PFS and followed prospectively in our clinic were included in this study. The inclusion criteria were age range of 20-55, retropatellar pain in one or both knees with at least three activity and positive patellar grind test. Previous knee surgery, patellofemoral subluxation or dislocation, patella baja or alta, grade 3-4 arthritis, coronal or sagittal plane deformities were exclusion criteria. 29 patients were enrolled in the study. Magnetic resonance imaging (MRI) was taken for both knees before and the treatment. Clinical evaluation of the patients were performed with kujala patellofemoral score. Patients were treated with a new physical treatment protocol. Control MRI was taken for the patients who completed the 6 months treatment period. Measurements of the sections were taken using the Osirix software (Pixmeo, Geneva, Switzerland). Patella-patellar tendon angle (P-PT angle) for both knees at hyperextension, 0°, 15°, 30° and 60° flexion position was measured and recorded. Besides parapatellar each muscle volumes were measured. Statistical analyses were performed using SPSS.

RESULTS: 58 knees of 29 patients were evaluated. In 35 knees of 29 patients there were PFS and these knees included in pathologic group. The rest of 23 knees who has no symptoms were included in the control group. The mean P-PT angle of normal and pathological knees were 141.8°/148.1° at hyperextension; 141.2° / 147.3° at 0° flexion; 139.9° /146.5° at 15° flexion; 139.5°/145.4° at 30° flexion and 138.4°/143.3° at 60° flexion respectively. Differences in P-PT angle of normal and pathological knees in different flexion degrees were found to be significant ($p<0.05$). Following the treatment, the P-PT angle

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in pathological knees were decreased to 144.1° at hyperextension; 143.9° at 0° flexion; 141.7° at 15° flexion; 141.4° at 30° flexion and 139.6° at 60° flexion. The decreases in P-PT angle of pathological knees were also found to be significant ($p<0.05$). The comparison of P-PT angles in control knees and pathological knees shown that following the treatment the P-PT angles of pathological knees were decreased and similar with the control knees ($p>0.05$). The mean Kujala score increased from 61.2(19-91) to 75.2(42-98) following treatment ($p<0.05$). Treatment protocol increased the mean peripatellar muscle volume 56.36 cm^3 on PFS side and 14.63 cm^3 on the healthy side ($p<0.05$). Negative significant correlations were found between kujala clinical score, peripatellar muscle volume and P-PT angle changes on different flexion degrees of knee.

CONCLUSIONS: Sagittal patellar tilt seems to be one of the etiopathogenetic factors in PFS. Besides, the treatment protocol that we used in this patients group has positive effect on both clinical scores and sagittal patellar malpositioning by changing peripatellar muscle volumes.

Keywords: Sagittal Patellar Tilt, Patellofemoral Pain Syndrome, Parapatellar Muscles.

A101

INQUIRY ABOUT THE MAIN PAIN ZONES OF THE INFERIOR MEMBERS AFTER THE SOCCER GAMES IN PROFESSIONAL ATHLETES

B.T.L. de NORONHA[1]; K.C.P. LIMA[1]; A.L.P. MUNIZ[2]; B.F. de NORONHA

[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil

INTRODUCTION: Injuries to lower limbs are common problems in professional soccer players around the world. Chronic pains of small intensity are faced by almost all athletes, considered "normal", not receiving treatment. The large number of hours of training and start-up leads to marked physical exhaustion, requiring specific treatment to avoid complications and maximize performance. Objective: To identify the main painful sites in the lower limbs of professional players after soccer matches. Method: A prospective, cross-sectional and qualitative study was conducted through a research protocol in individual interviews of 106 professional soccer players from the 2008 Paraense Championship. Results: The mean age and time as athletes were 23.8 and 4.6 years. 15.1% of the athletes were injured, with osteo-articular lesions in 81.2%. 65.4% of those surveyed said they felt pain. The predominant characterization of this pain was frequency "sometimes" (61% of cases), and medium scale 4.8 (where: 0 = no pain and 10 = unbearable pain). The most frequent painful places were the thighs, with pains in the posterior thigh in 41 athletes and 11 in the antero-medial, followed by the calves. This pain did not radiate in 80% of the cases, being evoked in 57% of the time, with sudden onset in more than half of the interviewees. Nine out of ten athletes with pain stated this being of the intermittent type, prevailing "soreness". When correlating pains with the athlete's playing position, we obtained: Goalkeepers, Defensores and Sides with an average 4.5 pain in the posterior thigh and ankles; Steering wheels, 5.5 in rear thigh, calf and knee; Socks, with 4 medium intensity of pain, in the thigh, calf and ankle; And Attackers, mean 4 in thigh (80% of complaints). They also affirmed that the pain interferes in their performance in the field, when the games are realized in a frequency Sunday - Wednesday - Sunday. Conclusion: There is a high incidence of post-match pain among soccer players from Pará, with the posterior thigh being their main location.

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A104

SUPERVISED PHYSICAL TRAINING PROTOCOL FOR THE HYPERDIA PROGRAM IN FAMILY HEALTH UNIT

B.T.L. de NORONHA[1]; K.C.P. LIMA[1]; A.L.P. MUNIZ[2]; B.F. de NORONHA
[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil

A number of diseases have a regular physical activity in their therapeutic plan, but this need often runs counter to the health professionals' difficulty in conducting a correct training program, either due to structural or training limitations. In primary care, this condition is exacerbated by the shortage of professionals, especially physical educators. The objective of this work was to develop, together with the community, a physical training protocol for Hiperdia participants. The protocol was developed with the participation of 60 patients from this program at a Family Health Unit (USF) in the city of Barcarena, Pará, in 2009. The protocol's development was attended by doctors, nurses and Community Health Agents of the USF and young students of the municipality previously trained by the professional team. A training program of 3x / week frequency was instituted, during 40 minutes each, and intensity evaluated according to the clinical and metabolic profile of the patient. Due to the recent implementation, it is still not possible to quantify results, but it is possible to notice an improvement in the quality of life of the participants, as well as the time that they collaborate with the development of the study in relation to the improvement of the Protocol, besides the social inclusion of the young monitors and the Awakening of the scientific sense. The importance of comprehensive care and the occurrence of important limitations that exist in basic care are confirmed, but professionals are encouraged to know the local reality of their people and to develop methods that optimize community health in partnership with the community

A121

IS THE HEALTH OF FIREFIGHTERS ENDANGERED? – THE PREVALENCE OF RISK FACTORS IN SLOVENIAN VOLUNTARY FIREFIGHTERS

N. PLANINC; M. KOKALJ-KOKOT; A. PAJK; P. ZUPET
IMS Institute for Medicine and Sports, Ljubljana, Slovenia

INTRODUCTION: Firefighters are exposed to numerous dangers on duty: high temperatures, flames, smoke and its toxic components, loud noise, potential instability of the affected structures. Strenuous physical activity, psychological stress, and different pollutants all strain the cardiovascular system, and can trigger sudden cardiac death (SCD) among firefighters with underlying coronary heart disease (CHD) and/or left ventricular hypertrophy (LVH). SCD is the leading cause of duty-related mortality among firefighters. The greatest risk for cardiovascular events on duty including SCD have firefighters with previously diagnosed cardiovascular disease (CVD), some type of underlying structural disease, and/or a mix of traditional CVD risk factors and subclinical CHD. Even in younger firefighters (≤45 years) on -duty SCD is related to preventable lifestyle factors which are associated with obesity, CHD, and LVH and/or cardiomegaly.

AIM: The aim of the study was to evaluate the prevalence of risk factors for CVD including SCD in voluntary firefighters in Slovenia and compare it among different statistical regions.

METHODS: 278 voluntary firefighters from 17 fire departments from four (Central Slovenia, Upper Carniola, Central Sava and Gorizia) out of twelve statistical regions in Slovenia were included in the study. Their mean age was 35,92 (min 17, max 63). 89,9 % were men. 52,5 % of them belong to basic group and 47,5 % to group which uses self-contained breathing apparatus. We analysed the following risk factors: gender, smoking, physical activity, obesity, arterial hypertension, diabetes mellitus, alcohol abuse and positive family history. They were considered smokers if they self-reported smoking. Physically active were those who had at least a total of 150 minutes of moderate intensity of aerobic activity divided on at least 3 days a week. Obesity was defined as BMI ≥ 30, overweight as BMI 25.0 – 29.9 and normal weight as BMI < 25. Arterial hypertension was considered if the firefighters had a previous arterial hypertension diagnosis, and/or required hypertension medication. Diabetes mellitus was defined by fasting plasma glucose ≥7.0mmol/l (126mg/dl) or 2–h plasma glucose ≥11.1mmol/l (200mg/dl), previous diagnosis of diabetes, and/or requiring diabetes mellitus medications. We considered alcohol abuse as elevated liver enzymes (Gamma-Glutamyl Transferase – GGT > 0, 92 μkat/L) and positive family history as family history of premature CHD in a first-degree relative (heart attack, treated angina, percutaneous coronary catheter interventional procedure, or coronary artery bypass surgery, stroke or sudden cardiac death in a male parent or sibling before age 55 years or a female parent or sibling before age 65 years).

Descriptive methods were used for the presentation of sample group and prevalence of risk factors. Pearson chi-squared test was used to evaluate the differences in prevalence of CVD risk factors between different statistical regions in Slovenia. $\alpha<0,05$ was considered as statistically significant. All information is anonymous and all participants in the study agreed to use their personal information for the purposes of this study.

RESULTS: 56,9 % of firefighters were non-smokers, 35,3 % were smokers and 7,8 % ex-smokers. Only one third (33,2 %) were enough physically active. 1,1 % had diabetes mellitus, and 11,2 % had arterial hypertension. 33,5 % had normal weight, 43,5 % were overweight and 23 % were obese. 19 % had elevated GGT and 10,2 % had positive family history. There were no statistically significant differences in prevalence of gender, physical activity, obesity, arterial hypertension, diabetes mellitus and positive family history between different statistical regions in Slovenia among firefighters. We observed important differences (p=0,012) in prevalence of smoking in Central Sava region where only 17,65 % were non-smokers with a lot of smokers (64,7 %) and ex-smokers (17,65 %) compared to other regions. In other regions the average percentage of smokers was 32,55 %, 60,25 % of non-smokers and 7,2 % of ex-smokers. Also we found significant differences (p=0,005) in prevalence of alcohol abuse in Central Sava region where 38,9 % of firefighters had elevated liver enzymes compared to lower average percentage (12,2 %) among firefighters in other regions.

DISCUSSION: Central Sava region is a small statistical region in Slovenia (3 % of Slovenia's population in 2015). It is a less developed region with negative net migration and natural decrease. Unemployment rate was third highest in the country (10,8 %) and the average monthly net earnings (EUR 914) are the lowest among all regions. The share of persons in employment working in another region was the highest (49 %). The GDP per capita was the lowest in the country (EUR 10,060) and industry contributed almost 42 % to total regional value added. Average turnover per person working in the enterprise was the lowest in the country (EUR 68,743) and the number of passenger cars per 1000 population was also the lowest (482). We associate the high prevalence of bad lifestyle habits (smoking, alcohol abuse) in this region with high prevalence of blue collar workers, low monthly incomes and the lack of development in the region.

The limitation of our study is the direct connection between elevated GGT and alcohol abuse even though even small amounts of alcohol within 24 hours of a GGT may cause a temporary increase in the GGT. We use it as a screening method in discovering excessive alcohol consumption but we must be aware that elevated GGT suggests a condition or disease that is damaging the liver and is usually associated

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with hepatobiliary disease of various aetiology. Elevated levels may also be due to other conditions, such as congestive heart failure, hypercholesterolemia, pancreatitis, and diabetes. Different drugs may also cause an elevated GGT.

Unfortunately, we did not have enough data of serum cholesterol to include it in the study which is also a very important risk factor.

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Invited Lectures

A122

EXERCISE PRESCRIPTION IN PATIENTS WITH TYPE 2 DIABETES

Nejc Planinc[1], Vida Zevnik[2], Petra Zupet[1]

[1]IMS Institute for Medicine and Sports, Ljubljana, Slovenia; [2]Faculty of Health Sciences, University of Primorska, Koper, Slovenia

INTRODUCTION: Diabetes mellitus is a very common chronic disease. According to International Diabetes Federation more than 415 million people had diabetes in 2016 across the world. There were also 318 million people with impaired glucose tolerance which can lead to type 2 diabetes if not treated. Scientists predict that 1 out of 10 people will have diabetes in 2040. In less developed countries there were also around 193 million people with undiagnosed diabetes. In Slovenia the number of patients diagnosed with diabetes increased by 12,5 % in years 2010 – 2014. 104,550 patients in Slovenia were treated by medications and among those with type 2 diabetes 69 % also had arterial hypertension, 67 % had dyslipidaemia, 41 % were obese, and 19 % were smokers. Half of them were not physically active enough. These are all important risk factors for cardiovascular disease (CVD) and when combined they exponentially increase the risk for CVD. If diabetes is not treated it is often accompanied by acute complications which can be life-threatening or chronic complications which develop over years but importantly decrease quality of life. Exercise have numerous health benefits. There are strong evidence of the effectiveness of regular physical activity in the prevention of different chronical disease (diabetes, cardiovascular disease, cancer, hypertension, obesity, depression and osteoporosis) and premature death.

AIM: The aim of the study was to evaluate if regular physical activity prescribed according to EFSMA recommendations has health benefits, improve motor abilities, overall mood, and decrease the need for medications in patients with diabetes.

METHODS: 6 participants with diabetes were included in the study. 5 were men and the mean age was 57 (min 35, max 66). Average body mass index (BMI) was 32. They were included in the project "Exercise

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prescription for Health" (EPH) under European Federation of Sports Medicine (EFSMA) umbrella. Before the start they all passed the preparticipation examination by a sports medicine specialist. The examination included medical history, clinical examination, blood pressure measurement, body composition analysis, ECG at rest, spirometry, and anthropometric measurements. Afterwards exercise according to EFSMA recommendations was prescribed by a doctor. Kinesiologist performed different motor tests which included Functional Movement Screen (FMS) tests and few other standardized tests (Sorensen test, back scratch flexibility test, modified Schober test, five times sit to stand test (FTSTS), hand grip strength measured with dynamometer, timed up and go test (TUG), and balance test using balance-pad Airex) before the start and after 6 weeks of training. Participants started with exercise at different times so we analysed their first six weeks of training. One training lasted one hour and was supervised by a kinesiologist. Body analyser TANITA MC-980 MA was used for body composition analysis, Schiller's CS-200 Ergospiro for spirometry and ECG at rest. Blood pressure was measured manually. Anthropometric measurements included patient's height, weight, body mass index (BMI), visceral fat assessment, fat free mass, and muscle mass. Because of a small sample we analysed each participant's improvement separately.

RESULTS: On average the participants trained 2 times per week (max 3 times per week, min 1,2 times per week). Half of them reduced body fat mass. All were obese (BMI >30) except one. One third of the patients reduced their BMI by 0,75 on average, one third maintained the same BMI while one third increased their BMI by 0,35. Five participants had elevated levels of visceral fat (> 12) at the start of training which is correlated with higher cardiometabolic risk and three of them managed to reduce it. In five participants out of six we noticed increase in fat free mass and muscle mass. There were not any significant changes in vital capacity, heart rate and blood pressure among participants after six weeks of training. Half of them improved their lumbar flexion. Five of them improved results in FTSTS test and half of them in TUG test. Hand grip strength improved in four patients while all patients improved their FMS test results. Overall mood improved in all patients (from 6/10 to 7/10). One patient managed to maintain normal serum glucose levels with diet and exercise only. Two could lower the dosage of the short acting insulin in the morning. Three participants who were on per os medicine maintained the same treatment.

DISCUSSION: Exercise is one of the most effective prevention of type 2 diabetes. It improves health factors, motoric abilities and psycho-physical well-being. When the exercise is prescribed according to recommendations depending on individual's health status it has positive impact on health in general, mood and motoric skills. We noticed in our study that most of the patients with diabetes improved the results on all motor tests. Also all participants estimated that after 6 weeks of training they felt better. The training did not have so significant impact on health indicators; body fat mass, muscle mass, BMI, vital capacity, heart rate and blood pressure. Those results in our opinion are due to a short period of trainings. Half of participants also trained for less than 90 minutes per week which is less than EFSMA recommendations. Other studies with longer period of training proved also improvement of most health factors mentioned. Important limitations in our study are small sample with high variability, differences in training time among participants, and the lack of control group.

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A7

TRANSLATION AND VALIDATION OF THE VISA-P QUESTIONNAIRE FOR FRENCH-SPEAKING PATIENTS

J.F. KAUX; J.L. CROISIER; O. BRUYÈRE
University of Liège, Belgium

INTRODUCTION: The Victorian Institute of Sport Assessment-Patella (VISA-P) is a questionnaire originally developed in English to assess the symptoms and repercussions of patellar tendinopathies and their impact on daily and physical activities. The maximum score of the VISA-P is 100, which represents an asymptomatic subject. The theoretical minimum score is 0, corresponding to major functional impairment. Although this questionnaire has already been translated into different languages, it has never been adapted for French-speaking patients. A French translation would be useful, because French is one of the most widely spoken languages, with approximately 275 million people who speak the language worldwide and that French is one of the 2 official languages in sport.

PURPOSE: The aim of our study was to translate the VISA-P into French and verify its psychometric properties.

METHODS: Our study is a clinical measurement study. The translation and cultural adaptation were performed according to international recommendations in 6 steps: initial translation, translation merging, back translation to the original language, use of an expert committee to reach a prefinal version, test of the prefinal version, and expert committee appraisal of a final version. Afterward, the psychometric properties of the final French version (VISA-PF) were assessed in 92 subjects. These subjects were divided into 3 groups: pathological subjects with jumper's knee (n = 28), asymptomatic subjects (n = 22), and sports-risk subjects (n = 42).

RESULTS: All members of the expert committee agreed with the final version. On a scale ranging from 0 to 100, with 100 representing an asymptomatic subject, the average SD scores on the VISA-PF were 53,17 for the pathological group, 99,2 for the healthy group, and 86,14 for the sports-risk group. The test-retest reliability of the VISA-PF was excellent, with good internal consistency. Correlations between the VISA-PF and divergent validity of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) were low, and the correlation coefficient values measured between the VISA-PF scores and converged items of the SF-36 were higher.

CONCLUSIONS: The VISA-PF is understandable, valid, and suitable for French-speaking patients with patellar tendinopathy (1).

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A8

VALIDITY AND RELIABILITY OF THE FRENCH TRANSLATION OF THE VISA-A QUESTIONNAIRE

O. BRUYÈRE[1]; J.F. KAUX[2]; J.L. CROISIER[1]

[1]University of Liège, Belgium; [2]University Hospital of Liège, Belgium;

INTRODUCTION: The Victorian Institute of Sport Assessment-Achilles tendinopathy questionnaire (VISA-A) is a self-administered questionnaire, originally developed in 2001 for English-speaking population, on the basis of the VISA-P. VISA-A assesses the symptoms of Achilles tendinopathies and their impact upon physical activity. As with the VISA-P, it consists of eight questions divided into three areas: the first three focusing on pain, the next three on functional consequences and the last two on the consequences for sporting activity. It was subsequently translated into other languages but no French translation has been carried out to date, justifying the approach taken in this study. This French version of the VISA-A (VISA-AF) could be used by nearly 275 million French speakers around the world across all five continents.

PURPOSE: The aim of this study was to translate the VISA-A into French and to study the reliability and validity of this French version, the VISA-AF.

METHODS: The VISA-A was translated into French to produce the VISA-AF using a validated methodology in six steps. Thereafter, several psychometric properties of this French version such as test–retest reliability, internal consistency, construct validity and floor and ceiling effects were evaluated on patienst. We recruited 116 subjects, distributed into 3 groups: pathological patients with Achilles tendinopathy (n=31), at-risk athletes (n=63) and healthy people (n=22).

RESULTS: The final version of the VISA-AF was approved by an expert committee. On a scale ranging from 0 to 100, the average scores of the VISA-AF obtained were 59 (± 18) for the pathological group, 99 (± 1) for the healthy group and 94 (± 7) for the at-risk group. The VISA-AF shows excellent reliability, low correlations with the discriminant subscales of the SF-36 and moderate correlations with the convergent subscales of the SF-36.

CONCLUSIONS: The French version of the VISA-A is equivalent to its original version and is a reliable and valid questionnaire for French-speaking patients with Achilles tendinopathy. The VISA-AF questionnaire is a reliable translation of the original VISA-A, from English into French, which is one of the most widespread languages in the world. The VISA-AF questionnaire is now a valid instrument that can be used by clinicians and researchers to assess the severity of pain and disability of French-speaking subjects with Achilles tendinopathy. The VISA-AF is a questionnaire to assess the severity of Achilles tendinopathy symptoms but is not a diagnostic tool (1).

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A9

CROSS-CULTURAL ADAPTATION AND VALIDATION OF THE KUJALA ANTERIOR KNEE PAIN SCALE (AKPS) QUESTIONNAIRE FOR FRENCH-SPEAKING PATIENTS

F. BUCKINX; O. BRUYÈRE; J.F. KAUX
University of Liège, Belgium

BACKGROUND: The femoropatellar syndrom is one of the most spread and common knee problem observable. It is a pain noticeable on the anterior part of the knee, more specifically observable while practising activities putting weight on the femoropatellar joint. The Kujala Anterior Knee Pain Scale (AKPS) is a questionnaire used to examine the subjective symptoms, such as the functional limitations and the anterior knee pain. This questionnaire has already been translated in Portuguese,Persan, Chinese, Turkish and Duch.

OBJECTIVE: The aims of the study were to translate and cross-culturally adapt the AKPS questionnaire into French and to evaluate the reliability and validity of this translated version of the questionnaire (AKPS-F).

DESIGN: Clinical measurement study.

PATIENTS (OR PARTICIPANTS): 101 patients with femoropatellar syndrom.

INTERVENTIONS (OR ASSESSMENT OF RISK FACTORS): The translation and the inter-cultural adaptation of the questionnaire has been adopted through the international recommendations highlighting 6 different steps: initial translation, translations synthesis, translation back to the original language, committee of experts, test of the pre-final version and the approval from the expert's committee.

MAIN OUTCOME MEASUREMENTS: Indeed the French version obtained, the participants have filled twice the AKPS with an interval of 7 days, and the Short Form Health in order to evaluate the psychometric properties (the internal coherence, the test-retest fidelity and the built validity).

RESULTS: The AKPS shows a high level of fidelity in the test-retest with a score of 0.97. The French translation also has a high internal coherence score with 0.87. The Kujula shows a great correlation with a part of the converging sub-scales from the SF36. There is a low/average correlation noticeable with the diverging sub-scales. There is no floor/ceiling effect.

CONCLUSIONS: This study shows that AKPS-F is reliable and valid for the French patients suffering from a femoropatellar syndrom and can therefore be used.

A11

ISOKINETIC PROFIL OF SUBJECTS WITH PROXIMAL PATELLAR TENDINOPATHY

J.L. CROISIER[1]; V. LIBERTIAUX[1]; J.F. KAUX[2]
[1]University of Liège, Belgium; [2]University Hospital of Liège, Belgium

INTRODUCTION: Proximal patellar tendinopathy is relatively common among sportsmen, even among football players. However, the strength profile of subjects with proximal patellar tendinopathies is not yet described, especially the isokinetic strength profile.

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PURPOSE: We aimed to determine the strength profile of subjects suffering of this chronic pathology.

METHODS: Forty-three subjects with chronic proximal patellar tendinopathy were involved in order to determine a profile specific of patient suffering of such pathology. It has been based on the evaluation of the quadriceps and the hamstrings muscular performance of the healthy and pathological member on isokinetic dynamometer at the the speed of 60°/s (C60) and of 240°/s (C240) in concentric mode and at the speed of 30°/s (E30) in eccentric mode. A visual analogic scale of pain (VAS) has been also realized after each isokinetic test.

RESULTS: The results of the isokinetic tests comparing the healthy to the pathological member are meaningful for the different conditions of contraction and test speeds, just like the results of the VAS associated to those tests (p<0,01). Indeed, pathological knees had a maximum peak torque for the quadriceps in C60 and C240 lower than healthy knees (2.17 ± 0.68 N.m/kg vs 2.47 ± 0.55 N.m/kg, p = 0.0003 and 1.46 ± 0.42 N.m/kg vs. 1.56 ± 0.31 N.m/kg, p = 0, 02, respectively). This represents a difference of 13.8% for C60 and 6.8% in C240. In E30, pathological knees were also weaker than the healthy knees (2.46 ± 0.91 N.m/kg vs 2.79 ± 0.96 N.m/kg, p = 0, 0008), a difference of 13,4% between knees healthy and pathological. For the hamstrings, the pathological member, observed a peak torque at C60 and C240 lower than for the hamstrings of the healthy member (1.26 ± 0.37 N.m/kg vs. 1.37 ± 0.36 N.m/kg, p = 0, 006 and 0.80 ± 0.23 n/kg vs 0.85 ± 0.20 N.m/kg, p = 0, 04). The difference between the pathological member and the hamstring of the healthy member is 8.7% in C60 and 6.2% in C240. The pathological knees were more painful than the healthy knees (VAS C60: 3.47 ± 2.65 vs 0.20 ± 1.05; p>0.01; VAS C240: 2.83 ± 2.47 ± 0.10 vs. 0.68; p>0.01; VAS E30: 5,26 ± 2.78 vs 0.58 ± 1.93; p>0.01). The difference in scores VAS is 94.3% for C60, 96.5% for C240 and 89% for E30.

CONCLUSIONS: In our study to determine a profile of the subject to a jumper's knee, the isokinetic results show a significant difference in performance isokinetic between the healthy and the pathological member as well as EVA associated with these tests. However, the diversity of outcomes recorded in the patients suggests us that, in rehabilitation, an individualized treatment is more relevant than a common protocol in the healing of this tendon pathology. Isokinetic tests can also be a tool for assessment of treatment planning. Finally, it would seem that a test isokinetic in eccentric in some patients is, in addition to a test of provocation of the tendon, a pain assessment tool.

Poster Presentations

A12

CROSS-CULTURAL ADAPTATION AND VALIDATION OF THE PATIENT-RATED TENNIS ELBOW EVALUATION QUESTIONNAIRE ON LATERAL ELBOW TENDINOPATHY FOR FRENCH-SPEAKING PATIENTS

O. BRUYÈRE[1]; J.L. CROISIER[1]; J.F. KAUX[2]

[1]University of Liège, Belgium; [2]University Hospital of Liège, Belgium

Poster Presentations

INTRODUCTION: The lateral elbow tendinopathy is a common injury in tennis players and physical workers. The Patient-Rated Tennis Elbow Evaluation (PRTEE) Questionnaire was specifically designed to measure pain and functional limitations in patients with lateral epicondylitis (tennis elbow). First developed in English, this questionnaire has since been translated into several languages.

PURPOSE OF THE STUDY: The aims of the study were to translate and cross-culturally adapt the PRTEE questionnaire into French and to evaluate the reliability and validity of this translated version of the questionnaire (PRTEE-F).

METHODS: The PRTEE was translated and cross-culturally adapted into French according to international guidelines. To assess the reliability and validity of the PRTEE-F, 115 participants were asked twice to fill in the PRTEE-F, and once the Disabilities of Arm, Shoulder and Hand Questionnaire (DASH) and the Short Form Health Survey (SF-36). Internal consistency (using Cronbach's alpha), test-retest reliability (using intraclass correlation coefficient (ICC), standard error of measurement and minimal detectable change), and convergent and divergent validity (using the Spearman's correlation coefficients respectively with the DASH and with some subscales of the SF-36) were assessed.

RESULTS: The PRTEE was translated into French without any problems. PRTEE-F showed a good test-retest reliability for the overall score (ICC 0.86) and for each item (ICC 0.8-0.96) and a high internal consistency (Cronbach's alpha ¼ 0.98). The correlation analyses revealed high correlation coefficients between PRTEE-F and DASH (convergent validity) and, as expected, a low or moderate correlation with the divergent subscales of the SF-36 (discriminant validity). There was no floor or ceiling effect.

DISCUSSION AND CONCLUSIONS: The PRTEE questionnairewas successfully cross-culturally adapted into French. The PRTEE-F is reliable and valid for evaluating French-speaking patients with lateral elbow tendinopathy.

A14

A WITH RARE CASE OF LIPOMA WITH OSSEOUS METAPLASIA BEHIND THE COCCYX ON A CYCLIST

M. PIAGKOU[1]; C. LYRTZIS[2]; K. NATSIS[2]

[1]Department of Anatomy, National and Kapodistrian University of Athens, Greece; [2]Department of Anatomy, Medical School, Aristotle University of Thessaloniki, Greece;

INTRODUCTION: Lipomas are the most common benign soft tissue tumors and appear in any part of the body. Trauma and ischemia can lead to fibrosis and dystrophic calcification in lipomas. Osseous and cartilaginous metaplasia rarely presents itself after a long, chronic persistence. Sitting on a bicycle saddle can cause coccydynia in some people. We present a rare case of a lipoma with osseous metaplasia behind the coccyx.

CASE REPORT: A 31-year-old cyclist woman was referred for a subcutaneous mass behind her coccyx that had been present for more than 2 years. The mass progressively hardened and grew larger in size causing pain when sitting and during the night. X-Rays showed an ossified mass behind the coccyx. Computerized Tomography and Magnetic Resonance illustrated an ossified mass 22x10x15mm in size with benign imaging characteristics. It was entirely separate from the coccyx. We surgically removed the mass under general aneasthesia. The tumor was sent for histologic analysis and results showed that the mass was in fact a lipoma with osseous metaplasia. The athlete remains without pain and any evidence of tumor recurrence 10 months after surgery.

CONCLUSION: The location of lipomas behind the coccyx is rare, but it is a typical part of the body with repetitive trauma and irritation during seating position, like in cyclists. Lipomas with osseous metaplasia are rare and the cases which are independent of bone even more so.

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A15

WHAT MAY HAVE IN COMMON HOCKEY GLOVES AND NINTENDO® WII UTM BUTTONS? IDIOPATHIC PALMAR ECCRINE HIDRADENITIS – TWO CASE REPORTS

J.C. CARNEIRO; C. RESENDE
Hospital Privado de Gaia - Grupo Trofa Saude, Portugal

BACKGROUND: Idiopathic palmoplantar eccrine hidradenitis primarily affects healthy children and young individuals, in the absence of associated diseases, usually following physical activity with intense sweating, or mechanical friction, as ballet dancers, swimmers, soccer or hockey players. It is characterized by sudden appearance of painful erythematous papules and nodules on palms and soles, that may last 1 to 4 weeks and could interfere with daily activities. Isolated palmar involvement is very unusual. The clinical findings and evolution are so characteristic, that histologic examination is usually not required. We presented two cases of idiopathic palmar eccrine hidradenitis, one associated with moist environment of hockey glove and other associated with exaggerated console gaming, and discussion of clinical, evolution, and preventive options available.

CASE PRESENTATION:

Case 1: A 17-year-old boy presented to our outpatient clinic with a 1-week history of painful, acute onset, bilateral cutaneous lesions isolated to the palms of his hands. He did not recall any recent trauma involving his hands. Physical examination revealed multiple erythematous nodules on palms (more pronounced on right palm). No lesions were detected elsewhere on his body, including the plantar surfaces. His medical history was unremarkable and there was no family history of cutaneous diseases. He has recently increased the number of hours of roller hockey practice, a modality that he practiced since infancy. The patient recovered fully after 12 days of complete abstinence of practicing roller hockey. Taken together the clinical picture and evolution, a diagnosis of idiopathic palmar eccrine hidradenitis was made. After recovery, the practice of roller hockey had continued daily, but he changed the hockey glove to avoiding excessive sweating. There were no recorrences in 3 months of follow-up.

Case 2: A healthy 11-year-old boy presented to our outpatient clinic with intensely painful, acute onset, bilateral cutaneous lesions isolated to the palms of his hands. Lesions had developed 3 weeks prior to referral to our hospital. Physical examination revealed erythematous, firm, tender papules and nodules on the palmar aspects of the first metacarpophalangeal joints and the thenar prominences of both hands, as well as on intermediate phalanges and distal phalanges of the thumb, index finger and middle finger, bilaterally. Findings of the remainder of his examination were unremarkable. Our patient had not participated in any sport recently and denied any recent trauma involving his hands. However, his parents recalled that he spend many hours per day playing games of Nintendo® Wii UTM and intensify this practice several days prior to the appearance of the lesions. The patient recovered fully after 15 days of complete abstinence from the console gaming. A final diagnosis of idiopathic palmar eccrine hidradenitis secondary to Nintendo® Wii UTM was made. There were no recurrences in 2 months of follow-up.

DISCUSSION: The lesions of our cases were isolated on the plamar surfaces and may be attributed in first case to the occlusive effect of hockey glove use, during a long period, that create a moist environment similar to a rubber shoes with excessive sweating, which may cause obstruction of the eccrine duct. Gradual resumption of activity after resolution of lesions is recommended and it is better to change hockey glove frequently and properly dry them out every time they are used. Similarly, in the second case, the continuous grasping of hands together with repeated pushing of buttons produce continuous and prolonged trauma to the palmar surfaces of hands. Moreover, palmar sweating is frequent, during the console gaming, because the player is anxious with the result of game, which could result in eccrine

hidradenitis, by a mechanism similar to the occlusive effect of hockey glove use, and the lesions disappearing spontaneously few days after abstinence of playing console games. It is important to educate patients and parents for the dangerous of excessive video gaming, that until recently was thought to only include psychological symptoms, but now physical ailments such as in this case, have begun to surface. Relapses occur in up to 50% of cases and it is imperative to establish effective preventive measures that allow decreasing excessive sweating, to avoid further recurrences. Idiopathic palmar eccrine hidradenitis is a benign condition that involves palms and/or soles and resolves without therapy.

We presented these cases because this entity is probably more common than previously realized, especially in the paediatric population and to highlight that sports medicine physicians, dermatologists and paediatrics should recognize this entity to help to avoid extensive examination and the use of therapeutics that have no proven benefit and reassure of both patients and parents.

A18

ANALYSIS OF BODY COMPOSITION IN ATHLETES AGED 18 TO 25 YEARS WITH BIOELECTRICAL IMPEDANCE

I. KARAGJOZOVA; S. PETROVSKA; B. DEJANOVA
Institute of physiology and anhropology, The former Yugoslav Republic of Macedonia

Main objective of this study was to analyze body composition in athletes age span 18-25 years and compare the differences of the mean values for all parameters.This study included 60 healthy athletes aged 18-25 years, divided into three groups. First group consists of 25 basketball players, the second group consists of 20 crossfit athletes and third group consists of 15 recreational athletes. The following parameters were examined in order to determine body composition: body height, body weight, total amount of intracellular (ICV) and extracellular (ECV) body water, protein component (PC), mineral component (MC), skeletal muscle mass (SMM), body fat mass (BFM), body mass index (BMI), waist - hip ratio (WHR). Height is determined by altimeter, while the other parameters were determined using multi-frequency bioelectrical impedance analysis (BIA). Between the three groups of participants a statistically significant difference was found for the following parameters: ICV, ECV, PC, MC, SMM, BFM and for the body height ($p< 0.05$). In basketball players the highest values were found for: body height, body weight, ICV, ECV, SMM, PC and MC, compared with krosfit and recreational athletes, while highest mean values for BMI (25,20+6,560SD) and BFM (16,60+12,574SD) were find in third group. This study shows that body composition results assessed by BIA in male athletes differ between groups, but additional testing and greater number of participants are required for more reliable and consistent results.

Key words: Athlets, Body composition, Bioelectrical impedance.

A19

WHAT COULD BE THE BEST WAY FOR JUNIOR ATHLETES TO ADAPT TO A NEW ENVIRONMENT?

N. YAMAGUCHI[1]; H. MATSUMOTO[2]; Y. TSUKAHARA[3]; K. AZUMA[3]; N. YAMAGUCHI[1]
[1]Department of Orthopaedic Surgery, University of Miyazaki Faculty of Medici, Japan; [2]Sports Medicine Research Center, Keio University, Japan; [3]Institute for Integrated Sports Medicine, Keio University, Japan

BACKGROUND: Although many elite athletes go abroad for international competitions and training

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nowadays, junior athletes may find it difficult to adapt to new environment and cope with jet lag because of their paucity of experience and knowledge. Little has been studied, however, about the consequences of traveling to a foreign country on junior athletes and their response to it.

PURPOSE: To evaluate their ability to cope with new environment and find out the factors that may have a positive effect for them to adapt to the new environment.

METHODS: Twenty-one top-level junior Japanese female soccer players (aged 18±0.7) were involved in this study. In order to participate in an international competition, they departed Tokyo in the evening and landed in Los Angeles around noon, which took approximately 10 hours. The players filled a questionnaire regarding performances, sleep problems, appetite, fatigue and jet-lag, 6 times from day 1 through day 7 except on day 4 before they went to bed. In addition, the players also filled a questionnaire regarding menstrual cycle, sleep schedules, eating habits, how many times they have been overseas for competitions and amount of sleep in the aircraft after they landed in Los Angeles. The answers were scored by visual analogue scale from -5 (very negative compared to usual status, which is scored as 0) to 5 (very positive compared to usual status). Athletes were asked to evaluate their sleep of the day before. For example, on day 2 the athletes evaluated their sleep of the night from day 1 to day 2. Day of arrival was counted as day 0 and the team had friendly matches on day 3,5 and 7 in the afternoon. The significance level was set at $P<0.05$.

RESULTS: While performances and sleep problems did not have any correlation between jet-lag, both quality of sleep and awakening had a correlation between meal satisfaction ($r=0.53$, $p<0.05$ and $r=0.51$, $p<0.05$ respectively). In addition, meal satisfaction also had correlation between physical movement, mood and concentration ($r=0.57$, $p<0.01$, $r=0.78$, $p<0.01$ and $r=0.58$, $p<0.01$ respectively).

DISCUSSION: Since amount of sleep in the aircraft and other factors during the flight did not show any differences in adaptation to new environment in our study, we speculated that adaptability to the change of environment may be influenced by satisfaction to meals. Although taste preferences differ individually, our study indicates that, if the athlete is satisfied with their meals in the new environment, it may also lead to better performances. Even though our former research showed similar results in track and field athletes of both genders, we need to do the same thing after traveling to other countries as well and further research is required.

CONCLUSION: Sleep problems and performances had correlation with meal satisfaction. Thus, preparing better meal for athletes and serving them at an ideal time may be necessary for them to gain certain level of sports performance and help them get used to the new environment. We need more information after traveling to other countries as well and further investigations are required.

No funding was received in this study.

A21

TRENDS IN THE AGE OF WORLD CHAMPIONSHIP MEDALLIST SWIMMERS

I. BALATONI; L. CSERNOCH
University of Debrecen, Hungary

Different athletes reach their maximum performance at different ages. Numerous research studies have attempted to determine the time interval in athletes' lives when this peak performance can be expected. Here the age distribution of the medallists competing at the 16 most recent World Aquatic Championships was examined by comparing the various individual swimming events. In addition, the possible trends, along with the data of men and women competing in the same events were also assessed searching for

differences between genders. Linear regression was applied to examine the trends of ages in the various sport events using clustering for grouping the events. The Kolmogorov-Smirnov test was applied for checking probability distributions while Moses extreme reactions test was used to identify extreme values. Although the ages of medallists vary rather greatly (13-35 years), the average age is in a relatively narrow range (20.2 – 22.9 years). The age distribution generally proved to be symmetrical, with few extreme values, at the same time a negative skewness could be observed in the case of short-distance breaststroke (50-100 m), which suggests a high probability of ages below the average. Significant trend could be detected in most of the events with a rising tendency in age. The average age of men was higher in all events except for the 1500 m freestyle. While the age of medallists in shorter distance events proved to be significantly lower in the case of men, the medallists of longer distances were found to be older in the case of women. Differences in the various swimming styles draw the attention to the fact that this aspect must also be considered when drawing conclusions regarding age and gender. The work was supported by GINOP-2.3.2-15-2016-00062.

A22

AGE DEPENDENT CHANGES IN THE PERFORMANCE OF SENIOR SWIMMERS

H.V. SZÉPNÉ[1]; L. CSERNOCH[2]; I. BALATONI[1]
[1]University of Debrecen, Hungary

One of the most important components of a healthy lifestyle is the appropriate physical activity. Swimming is among those sports that are not only popular among the young but can be continued by the elderly. An important aspect behind is the fact that swimming is not only accepted as a sport but also as means of health promotion. It plays an important role in developing the skeletal muscles, in correcting musculoskeletal anomalies, it has a positive influence on the respiratory system, and the positive feeling associated with being in the water can have a preventive role in the development of psychosomatic disorders.

Aging is a multidimensional concept which not only includes the absence of the development of diseases, but incorporates the freedom of physical activity, the preserved cognitive functions, and the maintained affective and social connections. Increasing number of evidence point to the fact that the systematic physical activity in the old age helps preserving the physical and mental well-being.

In Hungary swimming is among the most popular sports, reasons being, amongst others, the large number of medalists in Olympic Games or World Championships, and the fact that it can be pursued by a person who has a less load-bearing body due to certain medical conditions or by those with lower incomes. These led to the fact that one finds a large number of active competitive swimmers among the elderly. Here we investigated the results of Hungarian senior swimmers obtained on National Competitions to gain a better insight on how performance changes with age.

The time results of more than 20 internationally significant senior swimmers were analyzed in an at least 25-year-long period. The eldest of the persons involved in the study was more than 90 years old, while the longest time period evaluated exceeded 50 years.

Early publications in the field approximated the change in performance with a second order polynomial. More recent studies used the sum of two exponentials to describe the age-dependence, where the first is associated with the increase in performance during the early ages while the second is with the decline as age advances.

Here we find that the performance first decreases linearly in the age window of 30- 55 years than above 55-60 years of age it accelerates and resembles more an exponential. The time constant of this exponential fell in the range of 15-40 years. Nevertheless, we found a much shallower decline in the performance of the 65-95-year-old age-group.

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Our results point to the fact that the age-dependence of performance displays a large person-to-person variability and a complex kinetics in the older ages. Characteristically, after reaching the peak performance a slow, linear kinetics is observable for approximately 30 years, which is then followed by an exponential-like decline. However, it should be stressed that even above the age of 80 years, exceptional performances can be documented. The work was supported by GINOP-2.3.2-15-2016-00062.

A23

THE EFFECTS OF COMPETITIVE SPORT ON HEALTH STATUS, HEALTH BEHAVIOR, AND ACADEMIC ACHIEVEMENT IN ADOLESCENCE.

R. MIKULÁN[1]; L. TÖRÖK[1]; B. PIKÓ[2]

[1]Department of Sports Medicine, Faculty of Medicine, University of Szeged, Hungary; [2]Department of Behavior Sciences, Faculty of Medicine, University of Szeged, Hungary

BACKGROUND: Who recommends at least 60 minutes of daily moderate-to-vigorous intensity physical activity for children aged 5-17 in order to improve their physical and mental health. Participating in competitive sports is one of the alternatives for the accumulation of daily physical activity. At the same time, we must not forget, that it could also serve as a risk behavior: competitive sports can increase the risk of developing acute and chronic sport injuries, unhealthy dietary habits, and the use of banned performance enhancing drugs.

OBJECTIVE: The purpose of this study is to investigate the effect of competitive sport on health status, health behavior and academic achievement among adolescent students.

METHODS: Data was collected by anonymous questionnaires among adolescent students (n=317) who were competitive (n=154) and non-competitive athletes (n=163). Both boys (69%) and girls (31%) had optimal BMI (body mass index)percentiles. The questionnaire included global health indicators for characterizing the physical and mental state of individuals, such as the Psychological Well-being Scale and the Self-evaluating of Health Status and Psychosomatic Symptoms Scale. Participants were also asked about their drug consumption (life and monthly prevalence), body weight control (body weight estimation, concerns about gaining weight, the frequency of dieting, and the attention they paid to their own healthy eating) and academic record.

Data analysis was made with a program called SPSS 20 (two-sampled T probe, Mann-Whitney probe; $p<0.05$).

RESULTS: Our results show that competitive athletes considered their health status to be significantly better, reported fewer psychosomatic symptoms, and their psychological well-being was better than that of non–competitive athletes. Our research could not prove a significant difference between the body weight control of competitive and non–competitive athletes. Smoking habits and alcohol consumption was similar, too. As far as illicit drug consumption is concerned we could prove a significant difference in both life and monthly prevalence: more non–competitive athletes tried any kind of illicit drug or consumed more in the previous month than competitive athletes. Based on our research sample, competitive athletes had better marks at school than non–competitive athletes.

We studied the effects of sport status (competitive, non-competitive) within gender. In the case of male students, the comparison between competitive and non-competitive athletes found no difference between psychosomatic symptoms, psychological well–being, body weight control, drug consumption

and academic achievement. However, the self–evaluation of health status of competitive male athletes was better than that of non–competitive male athletes. Within the sample of female students, more differences were found: competitive athletes had better self-evaluation of health status, psychological well-being and reported less psychosomatic symptoms than non-competitive athletes. Female competitive athletes had a better body weight control, than female non–competitive athletes, they were less worried about weight gain and dieted less frequently, even if they had almost the same body mass index percentiles (non-competitive: 53% and competitive: 50%). Female competitive athletes had better marks at school than female non-competitive athletes. Their drug consumption was similar.

CONCLUSION: Our results show that the effects of competitive sport and non-competitive sport are different on health status, health behavior and academic achievement, and this effect considerably changes according to genders.

Keywords: competitive sport, health, academic achievement

A24

SWELLING OF KNEE JOINT DURING SPORT ACTIVITY. CAUSES AND TREATMENT.

K. GEORGARAKOU, E. LYMAXIS, N. KATSIGIANNIS, I. ILIADIS, P'GEORGIOU, PANAGOPOULOS, A. PASTROUDIS, G. KARATZAS
'Asklepieion' General Hospital, Athens, Greece

PURPOSE: Registration of traumatic causes of swelling of the knee (haemarthrosis or effusion) in 'amateur'/'semi-professional' athletes during or following sport activities and evaluation of the treatment.

MATERIAL AND METHOD: Seventy five (75) 'amateur'/'semi-professional' athletes, aged 16-41 years old,were treated for knee swelling during or following their sport activity. In forty two (42) cases the swelling was located in the right knee while in the rest thirty three (33) in the left. Fifty four (54) athletes were men and twenty one (21) were women.The injury of the knee was sustained during: soccer(19),basketball(12), mini-soccer(11), beach-volleyball(7), volleyball(6), ski(5), tennis(5), athletics(4), aerobic(3),karate(3). The protocol of initial treatment was including clinical examination, knee X-ray (F/P),knee-MRI (when necessary). The patients were followed-up for 3-15 months.

RESULTS: Knee swelling was due to identified cause in 76% of cases (menisci tear, ACL tear, fracture of patella, MCL tear, contusion of femoral condyle, ACL+menisci tear, sublaxation/ dislocation of patella,avulsion of intracondylar eminence, PCL tear, rupture of extensor mechanism, chondral lesions), while in the remaining 24% was due to 'reactive' synovitis. Haemarthrosis of the knee was detached in 48% of the cases. Thirty six (36) patients underwent knee arthroscopy. 64% of injured knees were treated surgically. In 88% of cases the results were excellent/very good.

CONCLUSIONS: A variety of injuries are the causes of knee swelling (haemarthrosis or effusion) in 'amateur'/'semi-professional' athletes during or following sport activities. Appropriate treatment followed an accurate diagnosis is the key point for the successful outcomes.

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NO ASSOCIATION BETWEEN SERUM VITAMIN B_{12} AND RED BLOOD CELL PARAMETERS IN TRACK AND FIELD ATHLETES.

A. ZIEMBA[1], J. KRZYWAŃSKI[2], T. MIKULSKI[1], A. POKRYWKA[2,3], I. PILCHOWSKA[4], H. KRYSZTOFIAK[1,2]
[1]Department of Applied Physiology, Mossakowski Medical Research Centre PAS, Warsaw, Poland; [2]National Centre for Sports Medicine, Warsaw, Poland; [3]Department of Applied and Clinical Physiology, University of Zielona Gora, Zielona Gora, Poland; [4]Department of Complex System Research, University of Social Sciences and Humanities, Warsaw, Poland

No association between serum vitamin B_{12} and red blood cell parameters in track and field athletes.

BACKGROUND: Vitamin B_{12} (cobalamine) is necessary for the DNA synthesis and cell multiplication, TCA cycle metabolism and proper function of the nervous system. Therefore it is believed by many athletes, that supplementation and high concentrations of cobalamin enhance performance, especially in endurance sports by improving red blood cell parameters.

Aim of the study was to evaluate, if there is a relationship between serum vitamin B_{12} concentration and red blood cell parameters in elite athletes.

METHODS: Red blood cell parameters: hemoglobin (Hb), hematocrite (Ht), mean corpuscle volume (MCV) and mean corpuscle hemoglobin (MCH) were determined using the hematological analyser in 1150 samples collected from 247 elite track and field athletes (mean age 28±5 years; 55 endurance and 192 strength). Serum concentration of vitamin B_{12} was assessed in all samples by the electrochemiluminescence method „ECLIA" using Elecsys and Cobas E instruments.

The study was carried out in National Centre for Sports Medicine during the routine monitoring program, which included determination of blood B_{12} concentration. A population of this cross-sectional, observational study consisted of 247 international level, male and female polish athletes (135 male and 112 female aged 18-44 yrs; 55 endurance and 192 strength). Total number of 1150 samples were taken during seven consecutive years since 2008 until 2015

RESULTS: Analysis of Spearman's rho correlation showed no significant relationship between serum vitamin B_{12} and Hb, Ht, MCV and MCH. The lack of relationship occurred also in bootstraping (1000 repetitions, 95% PU). Endurance athletes had significantly higher serum concentrations of vitamin B_{12} than speed/strength athletes (median 709 pg/ml vs. 482 pg/ml, $p<0.001$).

CONCLUSIONS: Unless vitamin B_{12} deficient, there is no rationale for athletes to use vitamin B_{12} supplementation, at least for the hematological purposes. Especially endurance athletes who use many supplements containing vitamin B_{12} should be advised to revise the total consumed dose and confront it with the recommended daily allowance.

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A26

INJURIES IN 'SEMI-PROFESSIONAL' SOCCER PLAYERS: ANALYSIS OF TYPE OF INJURIES, FACTORS INFLUENCING THE OCCURRENCE OF INJURIES AND OPTIONS OF TREATMENT

G. KARATZAS; N. KATSIGIANNIS, K. GEORGARAKOU, E. LYMAXIS; G. TOUNOUSSIDIS, P. PENTAZOS, G. BARDIS, A. PASTROUDIS
'Asklepieion' General Hospital, Athens, Greece

PURPOSE: Description of the types of injuries occurring in 'semi-professional' soccer players, analysis some factors influencing the occurrence and registration of treatment's options.

MATERIAL & METHOD: 112 males 'semi-professional' soccer players of different levels of skill, aged 16-38 (average:28,4yrs) sustained 128 injuries during games or practice. Previous injuries, correlation of injuries (frequency & severity) with age and frequency of playing (or practicing) weekly and options of treatment were also registered.

RESULTS: 89% of injuries caused by trauma and 11% by overuse. 68% of injuries involved the lower extremity, 21% the upper extremity, 7% both upper & lower extremity and 4% the spine. Joints sprains predominated (36%), followed by fractures (25%), menisci tears (12%), ligaments injuries (10%), e.t.c. More than 15 different injuries were treated. Injuries to the ankle were most prevalent (42%), followed by the knee (26%) and the wrist (17%). The 2/3 of the injured players were playing soccer 'occasionally' (no more than 1-2 times per week, usually without any previous training), while the 1/3 had suffered previous injury in the same area of their body. Injuries were more frequent in players aged >30 years old (occurred almost half of them) and in players of low/medium skill's level, while they were more severe in younger players (<30yrs old) and in players of higher (medium/high) skill's level. Most injuries occurred during games. The treatment was surgically or conservatively (in ratio 1:1), depending on the type of injury.

CONCLUSIONS: 'Semi-professional' soccer players sustained a variety of injuries. Poor physical condition (occasionally playing & practicing), and 'personal' factors (previous injuries, level of skill) seemed to be related with the frequency and the severity of the occurred injuries. The treatment is based on the type of injury.

A30

CONCUSSION IN YOUTH FOOTBALL - A CASE REPORT

F. GONCALVES
Hospital da Luz, Portugal

11 year old male futsal player sustained a head trauma during a competitive game. Neck examination was made and no lesions were suspected. No Bleeding was active. After being removed from the field he was evaluated using child SCAT3.The GCS was 15/15 and child-Maddocks score was 0 out of 4. the medical staff decided he had no conditions to remain in the game so he was removed from the game to the dressing room where he stayed under medical supervision. 20 minutes later symptom scale was used. The child had 4 symptoms and a score of severity of 7/60. His cognitive assessment was also made: orientation score 3/4, immediate memory score 11/15 and concentration score 3/6. Balance and coordination examination were perfect.

Parents were advised of signs to watch and it was advised to the child missed the next day of school to rest. after one week and a supervisor exercise program the child was given medical clearance for return to play.

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A32

REHABILITATION EXERCISES FOR RECOVERY OF ART. TALOCRURALIS LIGAMENTS

V.M. IVANOVSKA[1]; O. BOJCEVSKI[2]; L. KULIĆ[3]

[1]Medical Faculty Skopje, The former Yugoslav Republic of Macedonia; [2]PHI Health Center Struga, The former Yugoslav Republic of Macedonia; [3]Medical University of Prishtina – Kosovska Mitrovica, Serbia and Montenegro

INTRODUCTION: Ankle and foot ligaments injuries are extremely common among athletes, especially in the sports such as basketball, volleyball, triple jump. Injuries occur when a force will cause excessive amplitude of motion in the wrist above the limit of elasticity and resistance of ligament tissue. Rehabilitation programs that emphasize the use of therapeutic exercise to restore joint range of motion, muscle strength, neuromuscular coordination, and gait mechanics have been shown to have clinical success in patients suffering various foot and ankle pathologies. It is a process which starts immediately after the injury and progresses through all stages of treatments and is of particular importance for the return of the athletes on a sports ground in the shortest possible time.

AIM: The purpose of this research is based on theoretical and practical scientific knowledge to create exercises in order to strengthen the ligaments of the ankle and their application in the process of rehabilitation and everyday sports training in athletes.

MATERIAL AND METHOD: This study included 35 athletes from different sports with injury such Distorsio art.talocruralis of all levels, from the region of Struga, aged 12-14 years, over a period of three years (2014-2016). In order to improve the success of the program for rehabilitation and training process that will prevent this type of injury, we designed the study protocol with specific movements and exercises for athletes. Athletes can use performed exercises to strengthen the ligaments of the ankle as a program for rehabilitation after injury and as preventive exercises that will reduce the possibility of occurrence of injury of the ankle and foot.

Key components in the rehabilitation program are: increased locomotor elasticity and toughness, improved propriorecepcion and muscle rehabilitation. We recommend these exercises to be part of the rehabilitation program, but athletes continue to implement as preventive exercises during sports training.

RESULTS: The movements or exercises in this study protocol have systemic effects. This type of exercises developed a high degree of motor control in the execution of uniform coordinated and efficient movements. They also allow maximum use of sensory information from muskulinte tendon units and common structures and provide protection of damaged structures. After the rehabilitation procedures full recovery and return to identical sport activity was obtained in 28 of the tested athletes. Recovery was achieved in four of the athletes with injury, but they continued to deal only with recreational sports activity from the same sport. Two of the athletes had injury recovery, but they were not able to continue practicing the same sport and were orientated to other kind of sport. Only one of the athletes with injury of ligamentus talocruralis after undergoing rehabilitation in general could not proceed with any sports activity.

CONCLUSIONS: The violation of ligaments of art. talocruralis are the most common sports injuries, especially in the sports such as basketball, volleyball and triple jump. Due to the frequency of injury, it is recommended to constantly monitor the predisposing factors for injury and their correction especially in sports activities. However, if an injury happens the extent and type of damage has to be assessed and adequate treatment and proper rehabilitation have to be applied in terms of duration and physiotherapeutic procedures and modalities. The especially designed exercises for strengthening the joints ligaments of the ankle can be used as physiotherapeutic exercises in the phase of rehabilitation and as preventive exercises in daily sports activity of athletes.

A33

LIPID PROFILE IN ACTIVE POSTMENOPAUSAL WOMEN

S. PETROVSKA; B. DEJANOVA; S. MANCEVSKA
Medical Faculty Skopje, The former Yugoslav Republic of Macedonia

INTRODUCTION: Postmenopausal women are at an increased risk for cardiovascular disease because of physiologic changes occurring during menopause, including weight gain and atherogenic changes in serum lipid profiles. The aim of the study was to examine the influence of moderate physical activity on the lipid profile in postmenopausal women.

METHODS: The total number of 32 women in post-menopause, were examined before and after 3 months of walking 3 km per day. Lipids level (HDL-CH, LDL-CH, triacylglycerides and total cholesterol) were measured before and after physical activity. They were determined with standard colorimetric-spectrophotometric method.

RESULTS: Statistical analisys has shown that moderate physical activity in post-menopausal women within a three-month significantly decreased the level of LDL cholesterol: from 3.5 ± 1.6 to 2.6 ± 0.9 ($p<0.05$), but significantly increased the HDL cholesterol level: from 1.2 ± 0.3 to 1.6 ± 0.4 ($p<0.001$). Index of atherosclerosis (LDL-CH/HDL-CH) also shows the significant decrease: from 2.7 ± 0.3 to 1.6 ± 0.4 ($p<0.05$). However, there was no statistical significance in the level of triacylglyceroles and total cholesterol.

DISCUSSION: Menopause transition is associated with an increased prevalence of metabolic syndrome, which may partly explain the higher coronary heart disease risk (Roussel M, et al., 2009). Physical activity can prevent coronary artery disease due to its favourable influence on plasma lipids, lipoproteins and triglycerides. Moderate activities, such as walking 30 miles (48 km) per week, required 3 months to observe a significant rise in HDL (Elavsky and Mc Auley, 2005). Exercise increases lipoprotein lipase, the enzyme responsible for catabolizing triglyceride-rich lipoproteins (Weise SD,2005). Exercise and weight loss improve blood lipid profiles by decreasing LDL and increasing HDL levels, thus improving systolic blood pressure (Williams PT, 1996).

CONCLUSION: The moderate-intensity physical activity can improve blood lipid profiles, so it can reduce the risk of atherogenic changes in postmenopausal women.

A35

INJURIES AMONG THE ELITE ADOLESCENT PLAYERS OF THE HUNGARIAN NATIONAL ACADEMY OF HANDBALL – A PROSPECTIVE STUDY

É. MARTOS[1]; L. TÁBORI[2]; A. TALLAY[3]
[1]Hungarian Society of Sports Medicine, Hungary; [2]National Institute for Sports Medicine Hungarian Society of Sports Medicine, Hungary; [3]NISM - Hungarian Society of Sports Medicine, Hungary

OBJECTIVES: Handball is an extreme fast spectacular team sport. Several papers exist in the literature regarding the risks and injuries in adult elite athletes. The number and severity of injuries are quickly increasing; nevertheless there is only limited knowledge about the prevalence and incidence of handball injuries among elite adolescent players. The aim of this study is to describe the incidence, severity, anatomic location and type of handball injuries among elite adolescent players.

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METHODS: A two season (2013/2014 and 2014/2015) prospective study recorded exposure to training activities and injuries in male and female adolescent handball players (age range 14-18) from the National Academy of Handball (130 players – 70 male, 70 female).

RESULTS: Injuries to the ankle, knee and shoulder were the most common activity limiting injuries. There were 46 ankle ligament injuries in total (30 male, 16 female), in 10 cases operative stabilization were needed (5 male, 5 female). During the two seasons 18 knee operations were performed – 5 meniscal repairs (3 male, 2 female), 8 ACL reconstructions (3 male, 5 female), 5 other operations. 9 players suffered acromioclavicular joint subluxation/luxation (4 male, 5 female). 14 players suffered from shoulder impingement syndrome (2 male, 12 female). 54 hand and elbow injury occurred during the two seasons (30 male, 24 female) and 25 muscle tears (15 male, 10 female). In total, 30 operations were performed among the 130 players during two seasons because of musculoskeletal injuries. 50 players suffered from scoliosis (25 male, 25 female), 2 players developed Scheuermann's disease (1 male, 1 female) and 2 players had spondylolisthesis.

CONCLUSIONS: Based on our early experiences, there is a high incidence of handball injuries among adolescent players. Ankle, knee and shoulder injuries limited the training activity most commonly. There is strong need for professional medical service and prevention training for adolescent players. The pre-enrollment screening must be more accurate and careful. Young athletes with the history of meniscectomy and ACL repair should not be enrolled because of the extremely high risk of early osteoarthritis. In our understanding the reason of the high incidence of injuries within the first 4 training months is due to the inappropriate loading intensity.

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BODY COMPOSITION RELATED TO BODY MASS INDEX AMONG YOUNG ELITE FOOTBALL PLAYERS

M. NESTOROVA; B. SPIRKOSKA; B. DEJANOVA
Medical Faculty Skopje, The former Yugoslav Republic of Macedonia

INTRODUCTION: Assessment of body composition is very important among athletes in order to develop appropriate exercise prescription. It is well known that there is a relationship between sport success and certain anthropometric characteristics. Moreover, it may be a useful tool in young athletes to select sport performances. Body mass index (BMI) may be an important parameter to validate body fat and to optimize athlete's capacity related to VO_2 max. The aim of the study was to investigate some anthropometric measurements and VO_2 max related to body mass index in young elite football players.

MATERIAL AND METHODS: A number of 29 young football players were divided in 3 groups related to BMI: I group (24.4± 5 years) - BMI of 22.8±0.8 kg/m^2 (n=8); II group (23.9±3 years) with BMI of 24.1±0.4 kg/m^2 (n=13); and III group (26.5± 7 years) with BMI of 25.7±1.6 kg/m^2 (n=8). The subjects were submitted to sub-maximal pulse approach on treadmill (Schiller Ag, MTM-1500 Bear, Switzerland) to measure VO_2 max (ml/kg/min). To measure BMI in football players, the height and weight were taken from the subjects according to the formula BMI = weight (kg) / height (m^2). Body composition analyzer (InBody720, Biospace Co, Seoul, Korea) was used to determine body fat - BF (%), skeletal mass - SM (%) and total body water – TW (L) including intracellular body water – ICW (L) and extracellular body water – ECW (L). The obtained data were statistically analyzed using mean and standard deviation. For the statistical significance $p<0.05$ was considered.

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RESULTS: The football players showed the highest VO_2 max value in the II group as following: I - 45±3 ml/kg/min; II - 50±5 ml/kg/min; III - 48±3 ml/kg/min ($p<0.05$). In accordance with the certain BMI, BF was increased in the III group as following: I – 10.4±3 %; II - 11.7±2%, and III - 13.8±5% ($p<0.02$). Body water composition showed that TW was 48.4±4 L (ICW - 30.9±2L and ECW – 17.5±1L) in I group, 51.5±2 L in II group (ICW – 32.9±1L and ECW - 19±0.9L), and 51.2±3 L (ICW - 31±2L and ECW - 18±1L) in III group. The ratio ECW/ICW was 1.76 - I group; 2.0 - II group; 1.72 - III group. SM did not showed any significant difference among the groups: I – 38.0±3%; II – 40.9±2%; III – 40.5±3%.

CONSLUSION: Due to our results, we may conclude that optimal VO_2 max is found in II group which had the most appropriate BMI as well as the BF value obtained. As the ICW showed highest value in II group, it is obvious to have the best performances for successful sport performance. All these parameters may discover the condition of young athletes in order to select training procedures, proper diet, and personalized performance.

A38

BODY MASS INDEX IN YOUNG ATHLETS RELATED TO MAXIMAL AEROBIC CAPACITY

M. NESTOROVA; B. DEJANOVA; B. SPIRKOSKA
Medical Faculty Skopje, The former Yugoslav Republic of Macedonia

INTRODUCTION: The influence of body weight and body composition may influence on aerobic fitness condition. Thus, obesity might change the sport performance and sport achievement. The aim of the study was to evaluate the influence of body mass index (BMI) and obesity degree (OD) on maximal aerobic capacity in young athlets.

MATERIAL AND METHODS: The number of 28 young athletes were divided in 2 groups according to their BMI: I group – 23.1±0.8 kg/m^2 (n=14); and II group – 25.0 ±1.3 kg/m^2 (n=14). To measure BMI in football players, the height and weight were taken from the subjects according to the formula BMI = weight (kg) / height (m^2). The subjects were submitted to sub-maximal pulse approach on treadmill (Schiller Ag, MTM-1500 Bear, Switzerland) to measure VO_2 max (ml/kg/min). Body fat (BF), skeletal muscle mass (SMM) and OD were determined by the Body composition analyzer (InBody720, Biospace Co, Seoul, Korea). OD was considered as actual weight / standard weight x 100. For the statistical significance for t-test, $p<0.05$ was considered.

RESULTS: While there was no statistical difference within the examined groups for BF: I – 10.6±2.8% vs 12.6±4.4%; and for SMM: I – 38.6±3.6% vs 40.6±2.5%, OD showed $p<0.01$ (I - 104.9±3.5% vs II - 113.7±5.7%). VO_2max showed increased value of 50.7±5.2 ml/kg/min in II group compared to I group, 46.7±5.1ml/kg/min ($p<0.03$).

CONCLUSION: Due to our results, we considered that OD correlated with BF, but it did not show a significant influence on VO_2max. This means that fatness and obesity do not imply a reduced ability to maximal oxygen consumption in these close BMI values. However, BMI should be an important tool to evaluate diet program and control the sport performance in athletes.

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TRAUMATIC BRAIN INJURY IN BOXERS (CLINICAL FEATURES, DIAGNOSIS, PROGNOSIS)

A. MURAVSKIY[1]; I. DEKHTIAROV[2]
[1]National Medical Academy of Post-Graduate Education, Ukraine; [2]Ukranian Medical Centre of Sport Medicine Ministry of Health of Ukraine, Ukraine

The study included 199 active amateur boxers who have had a history of repeated traumatic brain injury (TBI) using the methods of clinical neurological and neuropsychological analysis, neuroimaging, neurophysiological, genetic and immunological data, statistical processing.

In the clinical picture of the consequences of head injury in boxers dominated syndromes such as cephalgia, autonomic dysfunction, cerebrasthenia, cognitive disorders, intracranial hypertension; in 75.9% of cases were typical simultaneous combination of two to eight clinical syndromes. The decrease in cognitive function, according to neuropsychological testing and research of cognitive evoked potentials of the brain (P300).

According neuroimaging techniques boxers revealed asymmetry of the lateral ventricles, expansion of the lateral and III ventricles and the cavity of septum pellucidum, the extensions convexital spaces.

Typical was increasing the speed of blood flow in parts of the extracranial carotid vessels and reduction in vertebrobasilar with changes in indicators of vascular resistive; intracranial carotid vessels characterized by a decrease of blood flow velocity without changes of vascular resistive.

The most frequent pathological electroencephalographic changes in boxers with a history of TBI were diffuse changes of bioelectric activity of the brain, nonspecific dysfunction of median structures, diffuse and focal changes in the left hemisphere of the brain.

In boxers observed dysregulation of cellular and humoral immune system, increasing the average values observed levels of autoantibodies to neurospecific proteins; found the imbalance in the content of anti-inflammatory cytokines. The development of the syndrome of cognitive impairment was significantly correlated with the presence of boxers genotype ε3ε4, ε4ε4 and allele ε4.

Developed and implemented the concept of prevention of development of professional pathology of the brain and disability of amateur boxers high skill level before, during the active sports career, and after receiving TBI boxers that will make this sport safer to prevent receiving TBI and the development of neurological disorders.

Key words: boxer, traumatic brain injury, clinical features, diagnosis, prevention.

A42

SYSTEMIC APPROACH TOWARDS UNDERSTANDING EXERCISE TOLERANCE AND SPORTS PERFORMANCE

J. BECKERT[1]; A.S. PRATA[1]; J.P. MENDES[2]; F. CYMBRON[1]; J. REIS[3]; N. NEUPARTH[4]; F. ALVES[3]; D. FERREIRA[1]
[1]High Performance Center of Jamor, IPDJ, Portugal; [2]CENTEC, IST-UL, Portugal; [3]CIPER, FMH-UL, Portugal; [4]NOVA Medical School - Nova University of Lisbon, NMS|UNL, Portugal

In order to identify the determinants of exercise tolerance in a laboratory setting, physiological parameters are measured during the response to exercise. A systemic approach is more useful than a single-parameter focused one, hence, a mathematical model based on system dynamics can be used to

describe the behaviour of those physiological parameters and provide an explanation of their relationships.

The main objective of this study is to compare different training backgrounds on the simulation's precision.

Breath-by-breath gas analysis provides an accurate proxy of muscle cell metabolism during appropriately chosen work rate exercise protocols, as well as an insight into the control mechanisms of O_2 consumption, ventilatory and cardiovascular parameters. However, a delay between the end-expiratory gases analysed in cardiopulmonary exercise testing and the myocyte environment occurs, which can be attributed to the buffering of metabolites, fluid convection and gas exchanges.

Ten endurance-trained and 8 sedentary healthy males, aged 26-56 years, were recruited to perform 4-bouts of constant-work-rate (CWR) exercise in moderate intensity domain, in a treadmill ergometer. The selected work rate for each subject was previously determined in a maximal incremental stress test in a treadmill ergometer with gas-exchange analysis, at 10% below their individual first ventilatory threshold (VT1). We monitored O_2 consumption, CO_2 production, ventilation, and heart rate (Jaeger, Carefusion), blood lactate (Lactate Scout) and transcutaneous tissue oxygenation at the vastus lateralis (Nirox, Nimo) during both exercise tests, and determined the O_2 consumption kinetics parameters in the moderate intensity domain.

The simulation error of the model for VO_2 calculated by the root mean square error (RMSE), was 5,32 ±0,59 $ml \bullet Kg^{-1} \bullet min^{-1}$ for the trained group and 5,05 ±0,59 $ml \bullet Kg^{-1} \bullet min^{-1}$ for the sedentary group.

The simulation error for both groups was similar to laboratory procedure error and was therefore acceptable. Since the mathematical model was originally calibrated for an athletic sample, these results support its application to a sedentary population.

A45

PHYSIOLOGICAL ADAPTATIONS TO INTERMITTENT EXERCISE: KICKBOXING AS AN EXAMPLE

P.A. FIGUEIREDO[1,2]; J.A. DUARTE[2]

[1]USF São Julião, Figueira da Foz, Portugal; [2]CIAFEL, Universidade do Porto, Portugal

INTRODUCTION: Intermittent exercise is characterized by frequent intensity alterations, in which it is possible to distinguish phases of partial recovery and phases in which high intensity exercise is performed. These type of sports and efforts are also characterized by involving a great variety of motor skills performed at different intensities and depending on the technical and tactical skills of the opponent. In combat sports, namely in Kickboxing, the periods of effort and pause are, in general terms, previously delimited in its duration. The rounds are developed during 2 minutes with 1 minute of recovery between them. The effort in each round is executed intermittently, this way it's possible to characterize Kickboxing as a typical sport of intermittent exercise. With the accomplishment of this work we intend to study the acute physiological and biochemical responses to a 10 round Kickboxing fight.

METHODS: Eight male Kickboxing elite athletes constituted the survey sample of the present study. Approval of the ethical committee was obtained and the athletes were told the procedure of the tests and the exercises they had to perform. To evaluate the acute biochemical responses we collected blood samples to determine plasma glucose concentrations, lactate, free fatty acids (FFA), ammonia (NH3), potassium (K+) (blood and plasmatic), glutamate oxaloacetate transaminase (TGO) and glutamate pyruvate transaminase (GPT). For this purpose the blood samples were taken at rest (before warm-up), between 5th and 6th round and at the end of the 10th round. Heart rate was measured by means of a

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short-range radio telemetry system throughout all fight (POLAR VANTAGE NV). Statistical analysis was performed with the program SPSS-17. The significance level was established in 5%.

RESULTS: The main results of this study were: the highest average heart rate were recorded at the 9th and 10th rounds, with 177.1±15.08 (95.79% of maximum HR) and 177.0±16.80 bat.min.$^{-1}$ (95.35% of maximum HR), respectively. Blood lactate and glucose concentrations were significantly higher ($p<0.05$) in the 5th and 10th round when compared with the basal values (Lactate values (mmol/L) in the 1st, 5th and 10th round: 1.58→10.21→9.48; Glucose values (mg/dL) in the 1st, 5th and 10th round: 95.84→150→146.38). Ammonia concentrations where higher in the 10th round, when compared with the basal concentrations (1.092 (µg/ml) →4.255 (µg/ml), $p<0.05$). Free fatty acids (FFA), K+ (blood and plasmatic), TGO and GPT haven't changed significantly during the entire fight.

DISCUSSION: The results of the present study allows us to point out the following conclusions: (i) the average heart rate of all the evaluated fights reached the value of 171.5±19.3 bat.min.$^{-1}$; (ii) the average HR in each round tended to increase during the first 4 rounds, stabilizing in the 6 following rounds. The highest average HR values were recorded during the 9th and 10th rounds with 177.1±15.08 (95.79% of maximum HR) and 177.0±16.80 (95.35% of maximum HR) bat.min.$^{-1}$, respectively, which presumably reflects a high exercise intensity in the last rounds; (iii) plasmatic lactate concentrations seem to confirm an important glycolytic energy production along the effort of 10 Kickboxing rounds; (iv) glucose concentrations increased throughout the fight. The light reduction registered in the last five rounds could be related with a muscular glycogen depletion; (v) ammonia concentrations evidenced increases throughout all the fight. Ammonia production indicates that both the reactions of adenylate kinase and the AMP deaminase seem to be activated during the fight. The significant increase of the concentrations of NH3 at the end of the fight could also be related with a depletion of muscular glycogen stores.

A46

THE EFFECTS OF DIFFERENT QUADRICEPS FEMORIS MUSCLE EXERCISES ON PAIN, FUNCTION AND BALANCE IN FEMALE PATIENTS WITH KNEE OSTEOARTHRITIS

S.A. YILDIZ1; D. ÇOKAR2

[1]Istanbul University, Faculty of Medicine, Department of Sports Medicine, Turkey; [2]Istanbul Bilim University,School of Health, Physiotherapy and Rehabilitation, Turkey

The aim of this study was to investigate the effects of different types of exercises on quadriceps femoris muscle; on pain, function and balance in female patients with knee osteoarthritis. 45 female patients between 40-65 years old were divided into 3 groups. The pain and function of the patients in each group were evaluated by visual analog scale (VAS) and The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Muscle strength and endurance were measured with an isokinetic dynamometer (Cybex 350), static balance index was tested with Biodex Balance System. Group 1 patients performed home-based isometric exercise program, Group 2 performed strength (high intensity low repetitions) and Group 3 patients performed endurance exercises (low intensity high repetitions); 4 days/week, for 6 weeks. The results were evaluated with SPSS version 21.

At 6th week, only the activity pain scores decreased on Group 1, whereas the rest, night and activity pain scores decreased statistically significantly on Group 2 and Group 3 ($p<0.001$, $p<0.01$ and $p<0.001$, respectively). Significant improvements in physical functions were found in favor of each group ($p<0.001$). The isokinetic muscle strength increased significantly just on Group 2 patients ($p<0.01$). Balance indices of Group 2 and Group 3 patients were improved at certain positions ($p<0.05$).

Isometric home-based and low-intensity exercises are widely used in the treatment of patients with

knee osteoarthritis. However, high intensity exercises may be preferred due to shorter time of intervention for improving muscle strength, slow the progression of the disease and reduce the risk of falling, via improving balance, in this population.

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A49

BLOOD LACTATE KINETICS ON THE 200 M BUTTERFLY EVENT: A STUDY OF GLYCOLYTIC METABOLIC DYNAMICS

P.A. FIGUEIREDO[1,2]; A. SILVA[3]

[1]USF São Julião, Figueira da Foz, Portugal; [2]CIAFEL, Universidade do Porto, Portugal; [3]Universidade de Trás-os-Montes e Alto Douro, Portugal

INTRODUCTION: Measurement of blood lactate concentration has been adopted by researchers for the control and evaluation of training in swimmers and for the characterization of the intensity and type of effort in certain specified competitive events. Relationship between lactatemia and swimming speed enable to determine the ideal training speeds for different levels of intensity. This traditional use of lactatemia does not allow for recognition of metabolic kinetics during a course of a specified distance. The lactate kinetics has considerable importance for the definition of a swimmer's preparation objectives at any given moment, just as they do for the definition of competitive strategy. For these reasons it is important to follow the kinetic pattern of blood lactate throughout the event in order to understand the variations in its blood accumulation, comparing and correlating them with swimming speed throughout the 200m butterfly event. The objectives of our work was to study the variation in the biochemical parameters, such as blood lactate and blood lactate increasing speed (BLIS)- the latter being the parameter taken as an important indirect indicator of the glycolytic power- during the 200m butterfly, correlating these parameters with the swimming speed.

METHODS: Ten male trained swimmers of Portuguese national level were studied. Approval of the ethical committee was obtained and the athletes were told the procedure of the tests and the exercises they had to perform. The swimmers were subjected to an experimental protocol subdivided into four phases. In the first phase the subjects performed a maximal 200m test in a 25 meter swimming pool. Time for each one of the four 50m lengths was recorded and, for assessment of maximal blood lactate concentrations, capillary ear-lob blood samples were obtained at 1, 3, and 5 minutes of recovery. In 2nd, 3rd and 4th phases of evaluation, subjects swam, respectively, 50, 100 and 150m at the same pace as recorded previously in the 200m. After each distance, blood samples were taken at 1, 3 and 5 minutes of recovery for assessment of maximal blood lactate concentrations. Between the first two phases of evaluation the interval was 48h and between those remaining the interval was 24h, in order to facilitate the total replenishment of muscular glycogen stores. Statistical analysis was performed with the program SPSS-17. The significance level was established in 5%.

RESULTS: (i) Swimming speed decreased progressively throughout the trial event, as much in individual terms as in relation to the average observed in the athletes studied; statistically significant differences where observed between results obtained at 50 and 150m and between results obtained at 50 and 200m (ii) the analysis of blood lactate concentrations revealed a rise in the levels of lactatemia throughout the trial event. Statistical analysis revealed statistical significance between the values obtained at 50m and 200m (iii) The highest BLIS values were obtained at 50m, with a marked decrease in BLIS values at 100 meters; a progressive increase in BLIS was seen also between 150 and 200m. Statistically significant differences were observed in the readings for BLIS between the finishing points of the 50 meters and

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those of the 100 and 150m trial distances (iv) Only approximately 27% of the variation in the swimming speed is accounted for by the increase in lactate concentrations (v) As far as the relationship between the alterations in BLIS and the alterations in swimming speed is concerned, only 23% of the variation in the measurements taken for swimming speed is explained by the variation in the BLIS.

DISCUSSION: The variations in blood lactate do not present a strong correlation with swimming speed, and diminution in swimming speed is thus seen to be admissible of explanation as a consequence of accumulation of lactic acid in only 27% of the cases considered in this study sample, in which the diminution of swimming speed otherwise remained due to other uncontrolled variables. Neither does BLIS present a very strong correlation with swimming speed. Blood lactate increasing speed only explains 23% of the diminution in swimming speed. The rise observed in lactate concentrations and the readings obtained for BLIS seem to confirm an important glycolytic participation, in this event and in these swimmers, which supports an important glycolytic bioenergetic participation in the 200m butterfly event. The high reading for BLIS early on, in the first 50m of the event seems to indicate an important glycolytic participation right from the outset in the first 50m. In the meantime, in spite of BLIS readings being lower in the 2nd, 3rd and 4th trial distances, in comparison with the 1st, these readings evidence an increase throughout the 2nd, 3rd and 4th successive distances of the trial event, which probably indicates that the glycolytic metabolism continues to predominate in the energy supply.

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A50

PHYSIOLOGICAL PROFILE OF KICKBOXING ELITE ATHLETES

P.A. FIGUEIREDO[1,2]; J.A. DUARTE[2]
[1]USF São Julião, Figueira da Foz, Portugal; [2]CIAFEL, Universidade do Porto, Portugal

INTRODUCTION: Elite athletes physiological characteristics have been studied broadly with the aim of analyzing the chronic adaptations to a certain type of effort, since these can give a good indication of the physiologic demands of sport, once it is natural that the athletes have adapted to the effort. References in the literature concerning the physiological characteristics of combat sports athletes approach fundamentally the analysis of the maximal oxygen uptake (VO_2 máx.), anaerobic power (Wingate test) and body composition of the athletes. The purpose of this study was to analyze the physical and physiological characteristics of eight International level Kickboxing athletes.

METHODS: Eight male Kickboxing athletes constituted the survey sample of the present study. Approval of the ethical committee was obtained and the athletes were told the procedure of the tests and the exercises they had to perform. All athletes have been subjected to evaluations of body composition, vertical jump, maximal oxygen uptake and anaerobic power. Athlete's body composition was assessed by means of bioimpedance (BIA-101, BodyComp). Following the body composition evaluation, athletes were asked to perform a maximum vertical jump in order to assess their lower limb power (counter-movement jump- Ergo-Jump, Ergo Tester - GLOBUS); then we evaluated the athlete's maximal oxygen uptake (VO_2 máx.) (cycle-ergometry- Medifit SensorMedics; EOS- Sprint 3.0) and the anaerobic power (Wingate Test).

RESULTS: The main results of this study, presented as mean values, were: VO_2 máx.: 56.20 ml/Kg/min; peak power: 9.40 W/Kg; average power: 7.69 W/Kg; minimum power: 5.90 W/kg; fatigue index: 37.13%; vertical jump: 37.59 cm; body fat: 11.95%; fat-free mass: 88.05%; body fat weight: 8.06kg; body fat-free weight: 58.94kg.

DISCUSSION: Considering the data stated above, we think it's possible to enunciate certain typical

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characteristics of the Kickboxing athletes. However, we cannot disregard the fact that weight classes categorize this sport and the representative values for each weight class can vary, although they are all Kickboxing athletes. These variations can reflect different training methods, tactical differences in each category, as well as the need to lose or win weight to accede a certain weight class. For example, it is feasible to assume that in the heavy weight class the athletes won't have the same body composition characteristics of those that belong to the category of flies. Taken that into consideration we purpose a more detailed analysis of the athletes physiological characteristics in sports that are governed by weight classes; this should have in consideration the distribution of the athletes by weights, or groups of weight classes.

A52

HOW CAN DANCE INTERVENTION BECOME A WAY OF STRESSMANAGEMENT BETWEEN YOUNG GIRLS?

B.B. PERJÉS[1]; V. PREMUSZ[1]; G. HEGYI[1]; M. MOLLER[2]; A. NAGY[3]; A. DUBERG[2]

[1]Doctoral School of Health Sciences, Faculty of Health Sciences, University, Hungary; [2]Faculty of Medicine and Health, Örebro University, Örebro, Sweden; [3]Hungarian Society of Sports Medicine, Budapest, Hungary, Hungary

The physical and psychological health of young generation is very important period to determine healthy adults. Researches have shown that girls are more exposed to interpersonal stress and they are more sensitive than boys. The gender differences and the need for preventition program related to adolescent health for girls concluded a „Dance project" in Sweden, about dance intervention for adolescent girls with internalizing problems. In our research we collaborated and adapted this project, where it was shown that dance can be suitable intervention to reduce stress and psychosomatic symptoms among teenage girls. Physical activity can provide increased confidence if it is practiced on regular basis. Although dance may not be suitable for all, the swedish thesis points out the role of enjoyable, social and non-jodgmental physical activity in influencing mental health for this target group.

OBJECTIVES: Our complex, eight-week long, randomized controlled intervention and stressmanagement program aimed to provide physical, mental and emotional advices for girls between 13-15years in order to prevent or alleviate stressdiseases. The aim of our study was to evaluate if a creative dance intervention twice weekly is effective for girls with psychosomatic symptoms or stress, and how could influence the girl's self-rated health (SRH).

METHODS: The complex education program lasted for eight weeks. The duration of the class was 30 minutes, which included 5minutes of warm-up, 15 minutes of dance practice, 5 minutes of stretching, light massage in pairs, relaxation, and 5 minutes of reflection. Overall, the dance intervention applied a positive focus, aimed to strengthen the girls'individual resources, which has support in the litterature. In the questionnaires we followed the swedish version, regarding lifestyle, SRH, emotional distress, psychosomatic symptoms, feelings, sleep, school, interests, friends, leisure time and how they enjoy dance.

RESULTS: The dance intervention group improved their SRH more than the control grop. The girls experienced the dance intervention to be enjoyable without any usual school pressure. They had challenge to choose music and to be creative in the choreographies, the made new friends which was very important in social aspect. The current study examines the effect of whole intervervention, not only the actual dancing.

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CONCLUSION: Our study was an short adaptation of the swedish „Dance project", which points out the role of joyful and non-judgmental social activity in influencing young girls's health. Optimism has been shown to influence mental health. Stress and psychosomatic symptoms can be reduced by a non-pharmacological therapy, called dance.

Key words: phyasical activity, mental health, dance, stressmanagement

A58

ULTRASOUND-GUIDED INJECTION OF PLATELET-RICH PLASMA IN CHRONIC ACHILLES AND PATELLAR TENDINOPATHY.

A. EROGLU
Erenkoy physical medicine and rehabilitation hospital, Turkey

PURPOSE: The efficacy of platelet-rich plasma (PRP) in the treatment and healing of chronic tendinopathy through stimulation of cell proliferation and total collagen production has been demonstrated by both in vitro and in vivo studies. The aim of this study is to evaluate the effectiveness of ultrasound (US)-guided autologous PRP injections in patellar and Achilles tendinopathy.

MATERIALS AND METHODS: Autologous PRP was injected under US-guidance into the Achilles and patellar tendons (30 Achilles tendons, 28 patellar tendons) in 48 prospectively selected patients (30 males, 18 females, mean age 38 ± 16 years, range 20-61 years). All patients were previously evaluated according to the Victoria Institute of Sport Assessment (VISA) scale, which assessed pain and activity level, and they all underwent US of the tendon before treatment and at follow-up after 20 days and 6 months. Statistical analysis was performed with Chi-square and Wilcoxon tests.

RESULTS: 20 days after PRP injection the patients presented a non-significant improvement of clinical symptoms. At the 6-month follow-up VISA score increased from a mean value of 57-75.5 ($p < .01$). US evaluation revealed a reduction of hypoechoic areas in 26 tendons ($p < .01$) associated with a widespread improvement of fibrillar echotexture of the tendon and reduced hypervascularity at power Doppler.

CONCLUSION: PRP injection in patellar and Achilles tendinopathy results in a significant and lasting improvement of clinical symptoms and leads to recovery of the tendon matrix potentially helping to prevent degenerative lesions. US-guidance allows PRP injection into the tendon with great accuracy.

A63

EXERCISE-INDUCED ANAPHYLAXIS

D. SUNA
Riga Stradins university, Latvia

INTRODUCTION: Anaphylaxis is an acute, generalized or systemic, allergic or hypersensitivity reaction that can be life-threatening or fatal. Exercise-induced anaphylaxis is a rare, potentially fatal clinical syndrome in which anaphylaxis occurs in conjunction with exercise or physical activity. In food dependent exercise-induced anaphylaxis (FDEIA) symptoms occur only when the subject ingests a particular food before exercise or a meal prior to exercise, known as specific FDEIA and non-specific FDEIA, respectively.

AIM OF THE STUDY: Was to analyze published articles regarding cases of EIA and to review relevant studies and literature.

MATERIALS AND METHODS: Articles, published from 2007 to 2017, were indentified by scanning electronic bibliographic database Medline using key words: 'anaphylaxis', 'exercise', 'physical activity'.

RESULTS: 38 articles were reviewed and analysed, including case reports, case reviews and case series, reporting 56 cases of EIA. 28 cases were male (6 – 79 years old), 28 were female (9 – 85 y.o.). Of the 56 cases analyzed, 3 were EIA, 51 was FDEIA, 2 cases were dust mite ingestion associated EIA. Of the 51 case of FDEIA, the majority (n=24) was wheat-dependent exercise induced anaphylaxis (WDEIA), 9 were hydrolyzed wheat protein associated WDEIA, 18 were FDEIA due to other food allergens, like lentil, chickpea, soy, celery, red meat, nuts, fruits, berries, cow's milk, shellfish. Physical activity needed to induce anaphylactic reaction ranged from minimal physical acitivity like walking, gardening and cleaning the house to vigorous physical exercise like running, playing football, basketball, swimming. Patients presented with weakness, generalized urticaria, erythema, pruritus, ocular and nasal itching, angioedema, respiratory (cough, wheezing, hoarseness, tightness of larynx, dyspnea, respiratory distress) and gastrointestinal (nausea, vomiting, diarrhea, abdominal cramps/pain) symptoms,headache, hand numbness, blurred eyesight, bradycardia, tachycardia, hypotension, collapse, loss of consciousness. Other cofactors reported were aspirin, naproxen, spring pollen, menstruation and ovulatory phase of menstrual cycle. Cases were reported both in patients with and without other known allergies. Diagnosis of was made based on clinical history, physical examination, laboratory testing and provocation tests. Patients recieved treatment of the acute episodes and individualized emergency plan, education about their condition and prevention.

CONCLUSION: EIA and FDEIA are uncommon and potentially life threatening disorders of growing global prominence. Awareness of this is necesarry to facilitate prompt and accurate diagnosis and to provide lifesaving therapy and ongoing care. Appropriate patient education is necesarry to heighten awareness of the symptoms of EIA and self-management of anaphylactic episodes. A personalized emergency plan and medication kit are required for EIA patients.

A64

THE INDIVIDUAL REACTION OF ATHLETES TO METABOLIC DRUGS

E. RAZUMETS; D. KRAVCHUK; M. HOVHANNISYAN
Federal Research and Clinical center of Sports Medicine and Rehabilitation, Russian Federation

INTRODUCTION: This paper presents the results of a study of athlete's individual response to a course of metabolic correction.

MATERIALS AND METHODS: The study involved 35 athletes (male, aged 15-17 years, mean age – 15.88±0.7 years). Athletes received the metabolic complex, which consists of following components: Elkar (L-carnitine), Kudevita (Coenzyme Q10), Calcemin Advance (Ca, Mg, Zn, vitamin D3, Cu, Mn, B) and Berokka (group B vitamins, vitamin C, Ca, Mg, Zn) in age-adjusted doses. The course of metabolic correction was lasted for 37 days. To determine the types of individual response to the course of correction we used the analysis of heart rate variability (HRV) with ES Teck System Complex (LD Technology) and with further assessment of autonomic nervous system state before and after the metabolic correction. The statistical analysis was made by Statistica 10 and Wizard Pro software. We used two-tailed Student's t-Test to compare two groups. Values of $p<0.05$ were considered as significant.

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RESULTS: Based on the classification of Shlyk N.I., athletes were divided into 4 groups depending on the type of vegetative regulation of HRV: group I - moderate predominance of sympathetic (central) regulation of cardiac rhythm - a moderate tension of regulatory systems; group II - expressed predominance of sympathetic regulation of HRV - autonomic dysfunction (for elite athletes this state characterizes the peak form - the risk for overtraining); group III - a moderate prevalence of parasympathetic (autonomic) regulation, which characterizes optimal state of regulatory systems, reflects the normal level of training (for elite athletes it underlines the low training level); group IV - expressed predominance of parasympathetic system (it reflects the state of overstrain, defatigation and overtraining, among elite athletes – the high level of training).

Most of the athletes were distributed almost equally between groups I and III. Only three athletes presented group II (8.5% of the total number of athletes). There were no athletes in group IV.

After the course of metabolic correction athletes from group I had a tendency to move into group III. This phenomenon is more chrin athletes from group II. There were no significant variations in HRV parameters in group III.

CONCLUSIONS: Thus, four basic types of drug response were detected: moderate sensitivity (corresponding to group I); high sensitivity (corresponding to group II); moderately low sensitivity (corresponding to group III); low sensitivity (most probably corresponds to the group IV, which is not represented in this study).

Provided study may help to increase the efficiency of biomedical support of elite athletes by individualization of pharmacological support.

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A65

ETIOPATHOGENESIS AND TREATMENT OF CRANIAL AND SPINAL NERVES' TRAUMA

A. ONACA; A. IONESCU

Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

Peripheral nerve injury structures pathology is a separate entity by the multitude of lesion schemes and the somatic topography.

In basic mode, the damage of nerve fibers belonging to the second motor neuron and spinal or cranial sensitive neurons, assumes the axoplasm impairment, the myelin sheath as well as the interstitial. When the injury intersects the neuronal cell directly, the peripheral neuropathy is developing an aggravated evolution.

Posttraumatic lesion of peripheral nerve fibers causes the waleriana degeneration (WD). Affecting only the terminal innervation constitutes the "dying-back" Neuropathology.

The peripheral neuron section leads to myelin reaction after two minutes, 5mm distal to the section level. After one hour the adjacent axoplasm degenerates and after 6 hours the lesions are quickly advancing distal in the small fibers with myelin fragmentation. After 48 hours, the myelin loss is massive and the conductivity drops to 80%. Degenerative changes and proximal section occur, and neuronal cell bodies expand producing a chromatolysis.

Traumatic injury may be produced either by direct trauma or indirect by avulsion, traction or repeated push. Minor areas of resistance are known: the radial nerve in the vicinity of the humerus, the external popliteal sciatic nerve in the vicinity of the fibular head (the head of the fibula), the ulnar nerve at the humeral epicondyle' level.

The peripheral nerve compression, traumatic section or postoperative iatrogenic injury completes the causality.

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Nerve fibers injury occurs simultaneously with the damage of neighboring osteo-articular or musculo-skeletal and visceral tissues.

A particular aspect is related to cranial nerve injury produced by the base of skull fractures, oral-facio contusions or fractures, with unilateral or bilateral intersection of cranial nerves' pairs.

In severe cases, the encephalic suffering masks the nerve fibers injuries, subsequently becoming pregnantly as sequelae after posttraumatic remission.

The motor deficit is topographically well established while sensory deficit depends on different anatomical structures, knows pain of protopatic type or epicritic type sensations, anesthesia or aberrant hypersensitivity of cauzalgia type, or even the perception of phantom limb when there is a central lesion as well.

The treatment is complex and variable. It's addressed to hemodynamic, metabolic, tissue, visceral or cerebral general balancing, simultaneously with the treatment of acute peripheral neuropathy.

It is also considered the surgical operation with anatomical discontinuity.

Subsequently it's appreciated that a proximal lesion requires more than 200 days for an efficient regeneration, compared to 30 days only for the regeneration of distal lesion.

The recovery aims the treatment of peripheral neuropathy, but also the recovery of peripheral osteoarticular segment or cranio-facial one. The prognosis largely depends on healing methods and techniques.

A71

ST-ELEVATION MYOCARDIAL INFARCTION SECONDARY TO PROLONGED ANABOLIC-ANDROGENIC STEROIDS CONSUMPTION

P. AMADOR[1]; R. MARINHEIRO[2]; R. CARIA[1]

[1]Centro Hospitalar de Setubal, Portugal

BACKGROUND: Anabolic-androgenic steroids (AAS) appear to cause atherogenic, thrombogenic, vasospastic and direct myocardial effects which can contribute to an increased cardiovascular risk.

CASE DESCRIPTION: The authors present a case of a 56-years bodybuilder who consumed steroids for thirteen years continuously. After a training session, he described an intense chest pain that radiates to both arms and mandible, accompanied by profuse sweating and vomiting. It lasted about 45 minutes with no relief. The only cardiovascular (CV) risk factor was hypertension, diagnosed about 4 years ago. She denied a family history of CV disease. The patient admitted the consumption of several AAS compounds, administered intramuscularly, weekly and uninterruptedly for 13 years. In the last month he reported having administered boldenone undecylenate 200 mg weekly and 600 mg testosterone cypionate biweekly, during which time he also suspended the antihypertensive drugs, voluntarily. He practiced non-competitive weightlifting with 1.5- 2 hours, about 10 times a week, for 13 years. At hospital admission, he had a muscular appearance, BMI of 30.80 kg / m^2, blood pressure of 150/85 mmHg and heart rate (HR) of 72 bpm, showing no signs of HF. He performed an electrocardiogram (ECG) that showed sinus rhythm, with HR of 75bpm, ST elevation in DII, DIII and aVF and ST-depression in V1, V2 and aVL and also frequent ventricular extrasystoles (Figure).

The diagnosis of inferior ST-elevation myocardial infarction (STEMI) was assumed and emergent coronary angiography was performed. It confirmed important coronary artery disease (CAD): proximal occlusion of the right coronary artery (CD) (figure) and subocclusive lesion of the first diagonal of the anterior descending artery (LAD). Percutaneous coronary intervention (PCI) of the culprit artery was performed, with instrumental thrombectomy, balloon pre-dilatation and placement of two non-

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impregnated metal stents, the second partially overlapping the anterior one (figure). First diagonal branch was treated few days later, during hospitalization.

CONCLUSIONS: Although a cause-effect relation between AAS consumption and AMI has not yet been established, it is possible to infer that, given the increase in its use and the known CV deleterious effects, the occurrence of AMI in these patients is becoming more frequent. It seems reasonable that the atherogenic and thrombotic effects of AAS contribute to a growing portion of AME cases, becoming a major public health problem as long-term users of AAS reach middle age.

A72

ALTERNATIVE TREATMENT FOR HADLUNG DEFORMITY: EXTRACORPOREAL SHOCK WAVE THERAPY AND PLATELET RICH PLASMA

A. SARI; A. EROGLU
Erenkoy Physical Medicine and Rehabilitation Hospital, Turkey

INTRODUCTION: Haglund's syndrome is a clinically important morphological alteration of the greater tuberosity of the calcaneus, associated with painful swelling of the local soft tissue. Conservative treatment must always be employed first in order to reduce pain, limit injury to the Achilles tendon and reduce the inflammatory process, surgery is often recommended. We aimed to present a bilateral Hadlung Deformity case which is surgery recommended that we applied Extracorporeal Shock Wave Therapy (ESWT) and Platelet Rich Plasma(PRP).

CASE: A 38 year old male, teacher came in with a complaint of pain and swelling on his heels. His condition started about 3 years prior to consultation, as a moderately painful, slowly growing hard lump on the posterior area of his heels combined with distal Achilles tendinopathy. Initially, he felt pain only when he woke up in the morning. His pain lasted all day long for last year. Prolonged time of walking would usually exacerbate pain and swelling. He could not recall any history of trauma that was associated to his present condition. Family history was unremarkable. His gait was characteristically normal. Lower extremities showed normal alignment. There was a prominent bony lump on the posterior aspect of his heels. On palpation, it was non-tender, not warm, hard, fixed to its base and with a moderately thickened skin covering. Ankle range of motion was full but showed mild degree pain on maximum dorsiflexion. The radiograph of his ankles shows enlargement of the posterosuperior border of the calcaneus without sclerosis or bone lysis noted. MRI images were found to be compatible with bilateral Haglund Deformity similar to radiography. Non-steroidal anti-inflammatory drug was started to suppress pain and inflammation to the patient. Achilles tendon stretching exercise was given. Patient was advised to use a soft backing or a non-backed shoe. Epin cushion is suggested, the ball is raised and calcaneus was aimed to relax during walking. When the patient came to check-up after one month, it was seen that his complaints were continued. The patient was then treated with ESWT. The treatment consisted of one session of 1500 shocks with an energy of 0.12 mJ/mm^2. The shock wave therapy was performed with the patient in the prone position and was administered once a week, for 5 sessions. Patient was treated with a single ultrasound guided injection of PRP after ESWT treatment. PRP injection was repeated after 2 weeks. His complaints were significantly reduced after one month.

CONCLUSION: Before leading the patient to surgery, ESWT and PRP treatment are methods that can be effective in the conservative treatment of Hadlung Deformity.

A73

SYNOVYAL OSTEOCONDROMATOSIS IN METACARPOPHALENGEAL JOINT: A CASE REPORT

A. SARI; A. EROGLU; C.A. KARAMAN
Erenkoy Physical Medicine and Rehabilitation Hospital, Turkey

INTRODUCTION: Synovial osteochondromatosis is a benign synovial metaplasia that effect synovial membrane, tendon sheath and bursae which is characterized with intraarticular clustered osseocartilaginous nodules. Knee, hip, shoulder, elbow involvement is frequently observed but involvement of hand joints is rare. There are two types as primer and secondary. Malignant transformation can be observed in the primary synovial osteochondromatosis. Secondary synovial osteochondromatosis is mostly associated with osteoarthritis, osteochondritis dissecans, neuropathic arthropathy and trauma. We aimed to present a case of synovial osteochondromatosis with metacarpophalangeal joint involvement that we have not often find in the literature.

CASE: A 63-year-old female patient applied to our outpatient clinic with short-term stiffness after rest in the hands, enlargement of the left hand third finger joint, deformity and pain with reduced heat. There were no paresthetic complaints. Depending on the work she was doing, her hands were overused and badly used, there was no trauma story. There was no feature in her history and rheumatological questionnaire. On physical examination, enlargement and tenderness of the left hand third metacarpophalangeal joint were detected; limitation of joint motion, heat or effusion were not detected. Laboratory tests included complete blood count, routine biochemistry, markers of inflammation were normal, ANA and RF were negatif. On the bilateral hand radiography, there was a narrowing of the left hand third metacarpophalangeal joint space and a large number of millimetric uniformly restricted, round, heterogeneous nodules around the joint and osteophytic occurrences at the joint corners. On the left hand MRI, third finger metacarpophalangeal joint osteophyte enlargement at the metacarpal and proximal phalanx angles, subchondral resorptive changes at the radial and ulnar side at the third metacarpal head, coexisting with several adjacent bones of 2.2x2.4 mm on the radial side were seen. No separate bone fragment was observed. In addition slight osteophytic sharpness and minimal degenerative resorbtive changes were observed in the second and fourth digit metacarpophalangeal joints. These findings in the third metacarpophalangeal joint were thought to be osteochondral bodies that developed secondary to broken osteophytes and were considered to be compatible with secondary synovial osteochondromatosis. The patient's complaints were regressed with non-steroidal anti-inflammatory drugs. Pain and stiffness were completely regressed by not leaving the hand in difficulty tasks in the following periods.

CONCLUSION: Although synovial osteochondromatosis usually involves large joints, it should be kept in mind that rheumatologically differential diagnosis should be made. Especially primary synovial osteochondromatosis may be malignant transformation and it should not be forgotten that these cases require further investigation and follow-up.

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THE CORRELATION BETWEEN MYOTONOMETER AND ELASTOGRAPHY AT MEASURING VISCOELASTIC PROPERTIES OF MUSCLE TISSUE

Ö.B. GÖZÜBÜYÜK[1]; B. TAHIRBEGOLLI[1]; A. IŞIK[2]
[1]Istanbul University, Turkey; [2]Acıbadem Sports, Turkey

The state of tension, elasticity, and stiffness are important biomechanical properties of biological soft tissues. The accumulating data regarding these viscoelastic properties are generally intervention-based and not compared between different methods of measurements. Myoton(R), is a hand-held device measuring the tone, tension, elasticity and stiffness of soft tissues externally via an oscillatory impulse. Shear-wave elastography (SWE) is a relatively new ultrasonographic method embedded in diagnostic ultrasonography devices that enable objectively measuring the stiffness of soft tissues. To our knowledge, there are no studies comparing the outcomes of these methods. Therefore we aimed to investigate the correlation between these two non-invasive measuring methods on human biceps brachii muscles. Eighteen (9 male, 9 female) healthy volunteers with no history of recent trauma, systemic disease or infection who did not perform any exercise recently (past 72 hours) were recruited to the study. Both measurements were performed at the same day, within an hour, on their non-dominant arm. Participants were laying supine for myotonometric measurement, and sitting upright for SWE in a relaxed state. Myotonometric measurements were performed by 5 repetitions, from 9 different points, surrounding the reference point (%66 distal of the upper arm, between the anterior acromion and the elbow crest) of the thickness/electromyographic evaluation 1 cm apart. Elastographic measurements were performed at the reference point as well, 3 times and averaged. There was a moderate correlation between stiffness of the biceps brachii muscle measured by myotonometer and elastography at 6 out of 9 points ($r=0.479-0.583$, $p<0.05$) whereas no correlation was found at medial 3 points. In conclusion, hand-held myotonometer and ultrasound elastography shows a moderate and location-dependent correlation in measuring viscoelastic properties of human biceps brachii muscle. The narrow reliable stiffness measurement zone even for a relatively small muscle such as biceps brachii may raise repeatability and reliability questions of these devices. In order to obtain reliable measurements, more than 3 points for each method shall be used.

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EVALUATING HIGH PERFORMANCE ATHLETES: POC TESTING A VALUABLE OPTION

A.M. IONESCU[1]; I. STOIAN[1]; I. PATZAICHIN[2]
[1]National Institute of Sports Medicine, Romania; [2]Romanian canoe Federation, Romania

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Point-of-care testing is defined as testing performance at or near the sites of training or competitions, in the same conditions likely to be really experienced. In sports science, such tests have greater validity because of their greater sport specificity.

We used evaluation of blood acid-base status in high level athletes (more than 10000 tests were performed during rest, trainings, races and post-exercise recovery on olympic athletes) between 1994 - 2012.

Parameters measured were pH, pCO_2, HCO_3, SBC, Lactate, electrolytes, and also AST, ALT, CK, LDH. Using HCO_3 and SBC we calculated a metabolic cost index (R) in rest, exercise and recovery. We use a micromethod, rapid and easy to perform. Blood sampling should be timmed, according to the intensity and duration of exercise.

In baseline condition, blood acid-base status, blood lactate and R caracterize the condition. During exercise, we found several levels of metabolic acidosis and different degrees of respiratory compensation and subsequent costs (R). Post-exercise recovery period, is defined by acid base status, R and a blood lactate "clearence" curve.

Defining an athlete's personal profile during trainings and races, is a major target:to define and control the levels of exercise intensities ("energy training zones"), to quantify metabolic functionality (sports specific energy sources, baseline conditions, functional costs of exercise in specific conditions) and to evaluate post-exercise recovery.

The parameters HCO and SBC were used to calculate metabolic cost of exercise ($R = SBC / HCO_3$) in rest, exercise and recovery period.

In basal condition / rest: the accepted R values are near 1 or 1.During exercise, we found several levels of metabolic acidosis plus different degrees of respiratory compensation and subsequent costs (R). The R values must be correlated with $\Delta R = R$ exercise – R basal / rest and with time results.In the postexercise recovery period, a blood lactate "clearance" curve and the time to reach "bloodlactate peak value" represent an index of clearance/fatigue. Test results are more suggestive if analyzed with sports results: good aerobic endurance capacity = good sports performance plus low blood lactate values plus high blood lactate clearance rate. Reduced performance/overtraining = low sports performance plus high blood lactate values plus lowblood lactate clearance rate.To be able to make the corrections and achieve optimal training conditions, the results must be given before the next training, which typically is within the same day. The possibility of point-of-care testings to be done in real sport-specific conditions has demonstrated an significant potential to change the way of monitoring sport trainings and recovery. Testings are done considering trainings / race specific environmental factors: run and bike – road, weather, hills, wind resistance; rowing, canoeing – water conditions, weather, boat friction / water resistance; altitude. Valuable coaching decisions could be taken. It is essential that the coach receive an experienced support from professionals who can manage the details of training / competition based testings. POCT can provide informations about athlete weakness or limitations, about developing and improving sport performance.These kind of testings respect specificity / specific and environmental factors, personal skills, experience and training status, age and sex. It is possible to create the athlete's profile, for training to performance.

A77

FUNCTIONAL OUTCOMES OF PLAYERS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION AND REVISION SUSTAINING AT HIGH-LEVEL PROFESSIONAL FOOTBALL

A. CZAMARA; Ł. SZUBA; A. KRÓLIKOWSKA
College of Physiotherapy, Poland

BACKGROUND: Return to sport after serious knee surgery which is anterior cruciate ligament reconstruction (ACLR) or ACLR revision is very difficult and sometimes unsuccessful process. Postoperative goals are to restore balance, limb symmetry of hamstrings and quadriceps strength qualities regarding to recovery of biological factors such as subchondral bone bruise or graft ligamentization. Player's return to pre-injury level in term of specific sport performance as well as mental awareness of re-injury is also a difficult task This functional and biological considerations attend the decision making of return to sport or preserve knee joint function participating professional competition. Reduction of relatively high number of ACL re-injuries in game based sports is a challenge for healthcare professionals as well as players and coaches. From strength and conditioning perspective, landing

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technique, sudden changes of movement direction are crucial abilities for sport participation and should be longitudinally sustained on high level after return to play.

OBJECTIVES: We aimed to assess mid-term functional outcomes after ACLR and ACLR revision in professional football players. Secondly, we assess non-injured soccer players as a reference group for functional testing performance.

MATERIAL: Group I consisted of 23 players who had undergone isolated ACLR using semitendinosus (ST) autograft, successfully returned to sport. Group II consisted of 7 players experienced second ACL injury (5 contact, 2 non-contact) with ACL revision surgery followed by return to sport and sustaining at least 2 years without re-injury. Postoperatively, patients in both groups participated in full time professional physical therapy, resulted in gradual return to sport and competition. Group III included 25 players without severe knee and ankle injuries as a reference for functional performance. The three groups were matched for age and body mass index (BMI).

METHODS: Functional tests – standardised Figure of 8 Hop Test, Side-Hop and run-test with maximal speed and sudden change of direction manoeuvres (s) were carried out measuring time of performance by standard stopwatch. Quadriceps/hamstrings torque measurement at seated position under isokinetic conditions was performed. Mean time of follow-up was ±32 months postoperatively for Group I and ±27 months postoperatively for Group II. The mean values and standard deviation for each measurement were calculated. The Wilcoxon test for dependent samples was used to assess for significant differences within groups. One way ANOVA test was used for inter-group comparisons. A p-value of less than 0.05 was considered significant in all cases.

RESULTS: The limbs with the primary ACLR in Group I had LSI=8% for quadriceps and LSI=3% for hamstrings peak torque as compared to uninjured side (p=0.389, p=0.577 respectively). The subjects with ACLR revision in Group II had LSI=13% for quadriceps and LSI=7% for hamstrings peak torque as compared to uninjured side (p=0.092, p=0.211 respectively). In inter-group comparison significant differences of quadriceps and hamstring torque were not found. Results of the hop tests showed significant side to side difference in patients from Group II and significantly slower time in intra-group comparison of 8 Hop Test of revised ACL side. Run-test with sudden change of direction manoeuvres was no significantly different in inter-group comparison with times 18”92 s; 19”15 s; 18”88 s for Group I, II and III respectively.

CONCLUSIONS: Patients who undergo anterior cruciate ligament revision surgery had worse functional outcomes in terms of quadriceps strength and the results of the both Hop Tests and and run-test with maximal speed and change of direction manoeuvres 2 years postoperatively. Primary ACLR players had non significant side to side differences, however, when compared to non-injured players demonstrate lower values of LSI in quadriceps/hamstring strength and hop performance.

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IMPROVEMENT OF MEDICAL-PEDAGOGICAL OBSERVATION AS A METHOD FOR PREVENTING THE DEVELOPMENT OF PRE-PATHOLOGICAL CONDITION IN YOUNG ATHLETES

A. USMANKHODJAEVA[1]; B. POLYAEV[2]

[1]Tashkent Medical Academy, Uzbekistan; [2]1st Moscow State Medical Institute under named Pirogov, Russian Federation

BACKGROUND: In the practice of training young athletes in recent years, there has been a tendency to

one-sided development. Currently, existing protocols, medical-pedagogical surveillance (MPS) is imperfect, do not enable to collect complete information about young athlete in the course of training which required for the correction of the training process and optimise post-physical stressing recovery. Aim of the study is to assess the effectiveness of the improved protocol implementation – medical-pedagogical observations of children engaged in sport schools in Uzbekistan.

METHOD: The study was performed over 120 sports school students. Medical-pedagogical supervision (MPS) was conducted in the morning and evening sessions in different periods of the annual cycle. Each school held a medical-pedagogical supervision in groups with different level of sports training: the initial (1-2 year from the start of classes), medium (3-4 years), senior (5-7 years). Study participants were divided into 2 groups and each includes 60 people, depending on the applied Protocol MPS. During the training, led timing classes, noted what the athlete using a symbol. At the end of training calculated duration of physical stress and motor density lesson finding the percent of the time the physical stress to the total training duration. Special attention was paid to the nature of the training process: the number of lessons per week correct their location, the duration and structure of activities, their common and motor density. During exercise, every 10-15 minutes the pulse was counted.

RESULTS: Density of the training depended on the degree of preparedness of young athletes and in the elementary group, it was 58%, middle – 63%, high – 70%. According to the current Protocol MPS failed to identify the presence of fatigue of young athletes and to assess its degree. In middle physical stress distributed such a way that the ratio of general physical training and special physical stress was equal parts, warm-up was 18-20%, the majority – 60%, final was 15-18%. In older group warm-up 10-15% of the entire training duration, the major part – 80% and the final 5-10%. The density classes are 65-80%. Reorganization showed that the number of basic groups of chronic diseases was decreased 1.2-2.5 times in most classes of diseases, whereas in control group these indicators in 2015, by contrast, has grown in 1,5 - 2,2 times in comparison with 2014. The structure and density of the training according to the enhanced protocol MPS, motor density classes (in percentage) were 58.4±3.2; 63.4±2.8 and 68.6±3.2 in initial, middle and older groups respectively.

CONCLUSION: Conduct medical-pedagogical supervision on advanced protocols and corresponding reorganization of the training process and rationalization of physical stress allowed to improve the dynamics of their physical development without deviations from age-related standards of physical fitness and reducing rates of infection.

A80

THE CLINICAL AND FUNCTIONAL EVALUATION, AND RETURN TO SPORT OF PROFESSIONAL SOCCER PLAYERS AFTER ANTERIOR ANKLE IMPINGEMENT SYNDROME ARTHROSCOPICAL MANAGEMENT

L. SZUBA; A. CZAMARA; A. KROLIKOWSKA
The College of Physiotherapy in Wroclaw, Poland

BACKGROUND: To date, there is no strong scientific evidence in the literature supporting the criteria for a professional soccer player's safe return to sport after arthroscopically treated symptomatic anterior ankle impingement syndrome (AAIS).

OBJECTIVES: The aim of the study was to clinically and functionally evaluate the professional soccer players after anterior ankle impingement syndrome arthroscopical management, and to assess their return to the game.

MATERIAL: The initial sample consisted of 201 male soccer players playing in the 1st and 2nd Polish

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Divisions enrolled in the study between 2010 and 2016. The final material comprised two groups. The Group I consisted of 12 players averagely three years after arthroscopically treated symptomatic AAIS, and the Group II was a control group of soccer players without any ankle joint injuries (n=15).

METHODS: All of the players underwent a comprehensive clinical examination including the measurements of ankle joint circumference and active range of motion (ROM), the peak torque (PT) measurements of muscles responsible for plantar and dorsal flexion of the foot, landing vertical ground reaction force (VGRF) during one-legged and two-legged vertical jumps, and the run-test with maximal speed and change of direction manoeuvres. The clinical assessment was supported by current pain assessment with the use of visual analogue scale (VAS), and functional assessment using Foot and Ankle Ability Measure (FAAM). The game-related statistic of players were also analysed. The statistical analysis involved studying the distribution and intra-, and inter-group comparison. The PT values were normalized to body mass and expressed as relative torque values.

RESULTS: There were found no statistically significant differences between the involved and uninvolved leg and the control group in the joint circumferences and in the RT of ankle dorsi- and plantar-flexion muscles. The comparison between the two groups also didn't reveal any statistically significant differences between the results of the run test, VGRF during two-legged jump values, FAAM results and in the level of professional sport participation. No pain was noted during or after the performed test. In the day of measurement, all of the players were playing on the same competitive level pre-operatively and pre-injury. There were found statistically significant differences in VGRF during one-legged jumps between involved leg in Group I and dominant leg in Group II. There was also noted limited range of foot dorsiflexion in the involved leg comparing to uninvolved one in the Group I.

CONCLUSIONS: Three years after arthroscopical treatment of AAIS revealed good results in the clinical assessment, most of biomechanical tests, physical activity level and return to competitive sport assessment. However, in players after the AAIS management the range of foot dorsiflexion in the involved leg was limited which may have a meaning in ankle joint arthritis development in the future.

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PREVENTION OF SWELLING AFTER INJURIES

Z.Z. MILINKOVIC[1]; Z. NIKOLIC[2]

[1]Center Milinkovic, Serbia and Montenegro; [2]Systems of life rehabilitation, Serbia and Montenegro

Stoping inflammation in sport injuries is the most important for time recovery. If you start ELIXIR application right after injuries like topically direct on injuries, amino acids well true pores directly effect cells of connective tissue, muscle and ligament and help them to recover from trauma and start reproduction instead of dying. One of the amino acids that is in question is ARGININE. This is unessential amino acid but in stage of injuries is essential and needs to be supplement by food or medication, were true blood go's all over body and small amount of it with each heart beat reach injuries. Because this amino acid is free floating in ELIXIR and don't need to be process by our body and true pores accessing injure cell immediately. This way recovery time is hours instead of days and weeks.

Making this ELIXER all natural and organic way wit process up to 300 days.

There is no unknown side effect for using topically.

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THE IMPORTANCE OF D VITAMIN SCREENING IN ATHLETES

A. ZAHARE[1]; S. STEINA[2]; J. UPITE[3]

[1]Latvian National Armed Forces, Latvia; [2]Rigas Stradins University, Latvia; [3]University of Latvia, Latvia

BACKGROUND: Vitamin D_3 is a steroid hormone that can be found in animal tissues and often referred to as cholecalciferol. This vitamin is regulating different tissue processes, the main fundamental role is regulation of calcium and phosphate metabolism and bone mineralisation. Unfortunately, there are still no guidelines for screening vitamin D3 deficit for one of the important risk factor group- athletes. Vitamin D3 deficiency can cause bone disorders, musculoskeletal pain, muscle weakness and is associated with many other health disorders. For athletes in particular it may impair training and performance, prolong recovery and increase risk of injury (Quadri, A. et al 2016).

MAIN THESIS: It is important prophylactically monitoring vitamin D3 levels in athletes, because it's deficiency in athlete's correlates with health problems, sports performance and sports injuries risks.

METHODS: A systematic search- PubMed, EBSCO, Google Scholar from 2007 up till 2017 including, was done using key terms vitamin D, athletes, sports injuries and prevention; all types of articles were included. Relevant articles, including reviews, chapters of the most recent editions of standard text books were reviewed.

RESULTS: The search yielded a total of 502 records. After screening of the titles and abstracts, 85 records were included as likely meeting the inclusion criteria: vitamin D deficiency and athletes: definition, epidemiology, pathophysiology, risk factors, diagnostic methods, monitoring, symptoms, related diseases, treatment and prevention.

DISCUSSION AND CONCLUSIONS: Decreased vitamin D_3 levels are one of the important causes of reduced exercise capabilities in athletes. Athletes have risk factors what contribute with vitamin D3 deficit and afterwards contributes with diseases and injuries and lower performance. One of the clinical study presented, that athletes with D3 deficit have significantly smaller cardiac structural parameters than insufficient and sufficient athletes, but in another studies have lower neuromuscular performance and neuropsychological functions (Allison R. J., 2015, Kopeć A. et al., 2013). Even in elite athletes has been found vitamin D_3 deficit (Bartoszewska M. et al., 2010). Vitamin D3 production is absent or is drastically reduced during winter months, athletes who don't use dietary supplements or expose themselves to artificial UVB (especially indoor athletes) radiation have to rely on diet and summer vitamin D_3 stores. It is assumed that participation in outdoor sports provides an advantage for vitamin D_3 production, but football players during spring practice showed that 81% were vitamin D_3 deficit and players with musculoskeletal injury had vitamin D_3 levels substantially was lower (average 19.9 ng/mL) than non-injured peers (Franklin D. S. et al., 2012). There has been found that even young, active Middle Eastern males have an extremely high prevalence of vitamin D_3 deficiency (Hamilton B. et al., 2010). There should be no more questions, if there is still need for monitoring vitamin D_3 levels in athletes in sports medicine. Authors of this review advise and recommend to regularly measure vitamin D_3 levels in athletes throughout all year. There is need for education about vitamin D_3 deficiency, healthy sun exposure, diet and it's supplementation for athletes.

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A85

THE CAUSE OF CHRONIC WRIST PAIN IN A BOXER; SCAPHOLUNATE DISLOCATION

B. ULKAR; S. GUL; I. KAYA
Ankara University Faculty of Medicine, Sports Medicine Department, Turkey

The wrist is one of the most complex joints of the body. Wrist injuries are common in baseball, volleyball, gymnastics and in fighting sports. The falls on the hyperextended hand are the main risk factors in these injuries. Scapholunate joint injuries are complex issues that have controversies regarding both diagnosis and treatment. Scapholunate ligament injuries are usually responsible in dislocation of scapholunate joint. These injuries are often overlooked and commonly lead to chronic wrist pain. Early diagnosis of the scapholunate ligament damage is very important in planning the appropriate treatment regime. The diagnosis and treatment process of scapholunate dislocation injury in a boxer with chronic wrist pain is presented.

A87

METATARSAL STRESS FRACTURES - RETURN TO PLAY

J. DIAS; D.R. MARTINS
Centro Hospitalar de Lisboa Central, Hospital S. José - Serviço de MFR, Portugal

INTRODUCTION: Metatarsal stress fractures were first described by a Prussian military physician as a march fracture. Nowadays, it is known that these fractures are not limited to military recruits or high-level athletes. These fractures are seen in weekend athletes, such in runners of all levels, ballet dancers, gymnasts, patients with neuropathic conditions. The incidence is also increasing in patients who are involved in high-impact aerobics.

MATERIALS AND METHODS: An online research was made on PubMed, Medline and consulted articles from 2000 to 2016. Further papers were consulted through the consultation of the bibliography of relevant articles.

RESULTS: From the research 95 articles were selected. Only the ones written in English were eligible. After detailed analysis of the abstracts and exclusion criteria applied were selected 11 relevant articles. Clinical cases were excluded.

DISCUSSION: It is useful to divide stress injuries into high and low grades, as this provides an approximate assessment of the healing time, with high reliability. Stress fractures in the first 4 metatarsals

routinely heal without complication in 4-8 weeks. Stress fractures at the base of the fifth metatarsal have a nonunion rate of 35-50% and it may take months to a fully union.

CONCLUSIONS: After recovery from metatarsal stress fractures, athletes may return to play when they can participate without pain, with the projected recovery times serving only as a guide to the rehabilitation program. The intensity and duration of activities need to be increased slowly, and the patient must adhere to regular rest periods. Healing time is defined as the time required to return to full activity without any symptoms and this is must be the rehabilitation program final set point.

A88

SCAPHOID FRACTURE WITH A LOW ENERGY MECHANISM: A CASE REPORT

R.N. REKIK
Aspetar (Orthopaedic and sport medicine hospital), Qatar

Scaphoid fractures occur most often after a fall onto an outstretched hand, with the body weight landing on the palm. They can also occur during sports or motor vehicle collisions with more violent mechanism and high-energy activities. Other than a painful area just below the base of the thumb, the clinical and radiological findings could be misleading especially in a low energy mechanism.

A 35-year-old amateur football player (goolkeeper) with no significant past history except an overweight presented with a painful right wrist following a football match. He received the ball on the palm of his right hand with resulting hyperextension of his wrist. The ball speed was not high and the pain it caused was not severe. He consulted one day later as the pain persisted. A scaphoid fracture was diagnosed on the basis of a tenderness in the anatomic snuffbox and on the thumb side of the wrist, despite the absence of swelling, bruising or loss of motion. An X-ray was done the same day and returned normal. The decision was to complete the investigations with an MRI which concluded to a scaphoid fracture and partial scapholunate ligament tear. The immediate management was a conservative treatment.

Scaphoid fractures, although rare with a low energy mechanism, should be suspected when patients present with pain in the anatomic snuffbox and/or on the thumb side of the wrist. They can be difficult to diagnose, and can result in significant functional impairment. A good history and physical examination are usually enough to pose an early diagnosis. However further investigations should be requested when we are not comfortable with an initial normal X-ray. Management typically involves conservative or surgical intervention to prevent complications. The treatment approach should be decided on a case-by-case basis.

A90

PERFORMANCE AFTER ANTERIOR CRUCIATE LIGAMENT RUPTURE IN ELITE ATHLETES

J. DIAS; D.R. MARTINS; A. PEGADO
Centro Hospitalar de Lisboa Central, Hospital de S. José - Serviço de MFR, Portugal

INTRODUCTION: Anterior cruciate ligament (ACL) tears are one of the most common injuries in both contact and noncontact sports. Anterior cruciate ligament (ACL) injuries are particularly frequent in contact sports and can seriously impair an athlete's performance and career longevity. They are most

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often a result of low-velocity, noncontact, deceleration injuries and contact injuries with a rotational component. Contact sports also may produce injury to the ACL secondary to twisting, valgus stress, or hyperextension all directly related to contact or collision. The treatment is imminently surgical.

MATERIALS AND METHODS: An online research was made on PubMed, Medline and consulted articles from 2000 to 2016. Further papers were consulted through the consultation of the bibliography of relevant articles.

RESULTS: From the research 127 articles were selected. Only the ones written in English were eligible. After detailed analysis of the abstracts and exclusion criteria applied were selected 19 relevant articles. Clinical cases were excluded.

DISCUSSION: There is a high return to sport (RTS) rate following anterior cruciate ligament repair when the surgery and rehabilitation program are performed by a highly trained medical team. Nearly all players resumed play the season after surgery. The mean time to RTS ranges from 6 to 13 months.

CONCLUSIONS: Performance among elite athletes who returned to sport after ACL reconstruction often deteriorated compared with preinjury levels. The number of games for season is usually decreased. The performance tends to decrease on the second and subsequent seasons. The rupture graft rate is considerable. Clinicians must guide the athletes into realistic expectations regarding return to sport following ACL reconstruction.

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CHRONOTROPIC AND INOTROPIC HEART CAPACITY OF FEMALE ATHLETES

S. ROZENSTOKA
Sports laboratory, Ltd; Riga Stradins University, Latvia

Regular training program demands athletes' adequate neural, cardiac and respiratory physiological, morphological and functional adaptation. Amateur sports have significant influence to the adult people physical activity, especially to the female athletes. In literature in mentioned that 55% of adult young female in the 15-24 age groups do regular exercises and different kind of sports on a regular basis, compare with 29% in the 55 and older age group.

The cardiorespiratory system functionality determines person future health and longevity. It could be expressed with the physical working capacity of the body, maximal oxygen uptake, cardiopulmonary interdependence and functional heart rate recovery after physical exercises and other indicators.

OBJECTIVE: To assess the chronotropic and inotropic capacity of the heart for female amateur athletes.

METHODS: The research was established in Sports laboratory, Ltd., Riga, Latvia. In the research were involved 150 adult female amateur athletes in age group 26 – 42 years old, who do high dynamic load kind of sports: running, cycling, cross country skiing, rowing and swimming. They underwent maximal cardiopulmonary exercise testing on ISO certified Master screen CPX system. Standard descriptive statistical analyses were conducted (SPSS version22.0 software (IBM SPSS,Corp.,Armonk,NY)).

RESULTS: Amateur adult female athletes do sports regularly in 92.7% (n-139) cases, only 20% (n-30) with coach guidance, 360 [300; 450] exercise minutes per week.

The female amateur athletes' average weight 65.73±10.63, average height 169.63±5.98, average BMI 22.80±3.12. The female amateur athletes reached maximal physical working capacity 3.14±0.66 W/kg, maximal heart rate 177±10 beats per minute, maximal cardiac output 14.66±2.83 litre per minute,

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maximal blood pressure 172±15/55±5 mmHg, maximal oxygen uptake 35.71±6.89 ml/kg/min. Chronotropic index 92.67±8.63, in 92.0% (n-138) it was adequate, but in 8.0% (n-12) it was increased with high cardiovascular risk. The average heart rate recovery after reached maximal physical exercises were 106±14 beats per minute. In the estimation of the the adequate recovery, it was found in 27.3% (n-41), satisfactory recovery in 33.3% (n-50) but prolonged recovery in 39.3% (n-59) cases. Only 26.7% (n-40) of female amateur athletes were adapted to the physical exercise, 53.3% (n-80) of them were with decreased adaptation, but 20.0% (n-30) were not adapted to the physical exercises.

CONCLUSION: The physical exercise and sports performance requires adequate physiological responses of the body. Chronotropic and inotropic heart capacity and the cardiorespiratory adaptation was significantly better for female amateur athletes than it is female general population. The regular and intense training program decrease cardiovascular and mortality risks for these athletes. But the adaptation to the physical exercise for female amateur athletes should be checked like professional athletes with cardiopulmonary exercise testing, training program planning should be done with coach assistance when coach take into a consideration individual features and abilities. It would protect the amateur athletes from overtraining and refuse overload.

Keywords: chronotropic, inotropic, female athletes, cardiovascular

A95

MANAGEMENT AND RETURN TO PLAY GUIDELINES AFTER TRAUMATIC BRAIN INJURIES, DURING AMATEUR ATHLETIC ACTIVITY

G. GAVRIDAKIS[1]; A. MYLONAS[2]; V. GIANNOULI[3]; N.CH. SYRMOS[2]

[1]Venizeleio General Hospital, Heraklion, Crete, Greece; [2]Aristotle University of Thessaloniki, Macedonia, Greece; [3]Medical School, Aristotle University of Thessaloniki, Macedonia, Greece

AIM: Aim of this study is to present the definition, the signs, and the symptoms of traumatic rain injuries (TBI) during sports activity.

MATERIAL-METHODS: Evaluation of 10 amateur athletes with TBI was performed. 6 men-60% and 4 women -40% (range 20-30 years and mean age 25) after TBI were enrolled in this study

- 2 basketball players (20%)
- 3 football (soccer) players (30%)
- 2 volleyball players (20%)
- 1 handball player (10%)
- 1 boxer athlete (10%)
- 1 swimmer (10%)

RESULTS: In all of them(10,100%), accurate evaluation of the signs, and the symptoms was performed. All of them- 1000%-returned with safe results in the physical activity after 2 months period.

CONCLUSIONS: Factors such as recognition and education are very important, because together with other parameters such as equipments, techniques, and adherence to rules of the sports can decrease the incidence or severity of traumatic brain injuries. Return to play rules should be 1) according to international standards (FIFA-UEFA-ECOSEP-FIMS-IOC) and 2) using a progressive step by step system (exercise program) both in amateur and in professional level.

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A96

POST CONCUSSION SYNDROME DISORDERS IN ATHLETES

N.CH. SYRMOS
Aristotle University of Thessaloniki, Macedonia, Greece

BACKGROUND: Post concussion syndrome is a situation than needs appropriate approach and management.

Aim of this study was to evaluate post concussion syndrome disorders in athletes

Evaluation of 10 athletes was performed, 5 men-50% and 5 women -50% with post concussion syndrome disorders

The most common disturbances were headaches and dizziness in 5 patients-50%, fatigue in 1-10%, anxiety in 2-20%, insomnia in 1,10%, loss of memory in 1, 10%. We suggest in all 10,100%, cognitive l therapy and appropriate medication, under neurological and psychiatric surveillance. 9 of them- 90%- returned with safe results in the physical activity after 3 months.

Seems that cognitive-behavioural therapy and medication could be helpful in these situation.

A97

USE OF NUTRITIONAL SUPPLEMENT AMONG PHYSICAL ACTIVITY PRACTITIONERS IN FITNESS CENTERS IN BELÉM-PA

A.L.P. MUNIZ[1]; B.T.L. NORONHA[2]; C.F. RAMOS[3]; K.C.P. LIMA[2]
[1]Centro Universitário do Pará, Brazil; [2]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [3]Universidade do Estado do Pará, Brazil;

The use of nutritional supplements among physical activity practitioners is common in gym settings. Whether for aesthetic reasons or support to the physiology of the exercise, indicated or not by health professionals, the use is widespread and sometimes even confused with the effects of the use of other substances (anabolic, other corticosteroids). Thus, source of indication of the products and goals of the use are some of the variables involved in the final result of the use of supplements in academies. The study studied the prevalence of the use of nutritional supplements in gyms. A cross-sectional, observational and descriptive study was carried out, where 100 subjects were interviewed with a random protocol in the academies of the city of Belém-PA from September to November 2009. There was the same proportion between the sexes of the subjects And 86% reported using some nutritional supplement, with the mean time of physical activity being 3.6 years. Regarding the reasons for the consumption of these substances, 46% stated that they had no influence from third parties, that is, they made use of their own resources due to "research" and "reading articles"; 20% did so because of other people's indication; 16% decided to use supplement after reading the packages available in drugstores; Only 4% justified the use by prescription. The consequences of this consumption for the optimization of physical activity after three months of use were verified as positive by 23.2% of those who used it. The most cited products were: creatine, L-carnitine, HMB, BCAA's, arginine and testosterone. The consumption of nutritional supplements had a high prevalence, however, the expected results did not have the same tendency, which arouses the attention of the physician and health professionals to orientation around the variables that lead the practitioner to use such products, not only for The best product, but also to propose alternatives to this broad use.

A106

PREVALENCE OF PHYSICAL EVALUATION PRE-PARTICIPATION TO PHYSICAL EVENT BETWEEN ATHLETES AND NON-ATHLETES

B.T.L. NORONHA[1]; C.F. RAMOS[2]; K.C.P. LIMA[1]; A.L.P. MUNIZ[3]
[1]Fundação Luiz Dècourt – Clínica do Movimento, Belém (PA), Brazil; [2]Universidade do Estado do Pará, Brazil; [3]Centro Universitário do Pará, Brazil

Physical activity, although excellent for health maintenance, prevention of cardiovascular disorders and rehabilitation, can bring risks to the practitioner if performed without proper guidelines, such as chronification of injuries, onset of osteoarticular lesions, overtraining and even sudden death. The exercise doctor is sometimes seen as a professional intended for the performance athlete, and the evaluation of the average practitioner is less frequent than expected. The objective of this study was to verify the prevalence of participants of a physical event that performed a medical evaluation before the activity. The research was cross-sectional and descriptive, with the participation of 100 people, aged between 16 and 43 years old, being 50 athletes and 50 non-athletes (gymnasium goers), through a research protocol in the From October to November 2009. It was found that 29% of all did not perform any evaluation, a value that among athletes (36.0%) was lower than that of non-athletes (78.0%). All non-athletes who were evaluated sought service because of pathological conditions known to be pre-existing. It is essential that awareness of the importance of physical assessment before vigorous physical activities is diffused, especially among non-athletes, since the other group has attention directed at other consultations, once they inform themselves to be athletes. Physical activity needs to be viewed as a danger factor and deserves to be well evaluated before the practice.

A107

A TWO-SEASON PROSPECTIVE STUDY OF TRAINING INJURIES IN A GROUP OF PORTUGUESE MALE RUGBY UNION PLAYERS

A. CRUZ-FERREIRA
Faculdade de Ciências da Saúde da Universidade da Beira Interior, Portugal

INTRODUCTION: Sports injuries are of the utmost importance for both athletes and coaches, especially in high-contact high injury incidence sports with like Rugby Union. It is also known, that injury incidence rates in matches are higher than those in training. Available data, at elite level, reports injury incidence rates between 2 to 6 per 1000 player match-hours during training, but no data is available concerning non-elite players. We aim to report the incidence rate and relevant epidemiological data of injuries occurring in training sessions, in a group of Portuguese male rugby players, during two consecutive seasons.

METHODS: A prospective cohort study was conducted with a group of 51 (season 2013/14) and 45 senior (season 2014/15) male players, combining a total exposure of 9544.5 training hours. Outcome measures included injury incidence, position, type, location and severity of injuries. Mann-Whitney and Kruskal Walis tests were used to compare severity, type and site of injury between groups.

RESULTS: Overall injury incidence was 5,23 per 1000 player training-hours. Mean time-loss for injury was 17,42 days. Forwards sustained more and significantly more severe injuries (p=0.02), than backs.

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Lower limb injuries accounted for 68,0% of all injuries, and joint/ligament injuries were the most prevalent type (42,0%), with contact events being responsible for only 28% of all injuries.

DISCUSSION: Most of our data are consistent with the literature. However it becomes clear that the reported training loads and its intrinsic characteristics, are lower than at elite rugby, while injury incidence rates are at the top end of the reported range for the same level. Authors believe these data reinforces the need to develop and implement effective injury surveillance and prevention programs.

A108

EPIDEMIOLOGY OF INJURIES IN PORTUGUESE SENIOR MALE RUGBY UNION SEVENS: PRELIMINARY RESULTS

A. CRUZ-FERREIRA
Faculdade de Ciências da Saúde da Universidade da Beira Interior, Portugal

OBJECTIVE: To investigate the incidence rate, type and location of sustained injuries during the 2016 Portuguese National Rugby Sevens Circuit.

DESIGN: Observational 1-season prospective cohort study.

SETTING: 15 Portuguese rugby union sevens clubs.

PARTICIPANTS: 226 senior male rugby sevens players.

MAIN OUTCOME MEASURES: incidence of injuries (injuries per 1000 player match-hours), anatomical location, type and injury incident.

RISK FACTORS: playing position and activity.

RESULTS: 27 time-loss injuries were recorded, for an injury rate of 133.9 per 1000 player match-hours (95% CI: 90.1-192.2). Backs sustained the higher number of injuries (59.3%). Contact events preceded 77.8% of all injuries. Lower limb was the most frequent site (66.7%) and joint/ligament the most frequent type of injury (44.4%).

CONCLUSIONS: The preliminary results of our study show that rate, type and location of injuries seem to be more in accordance to the findings reported for elite athletes than for amateurs. Injuries are common among Portuguese senior male rugby sevens athletes, with a very significant proportion involving the lower limb.

CLINICAL RELEVANCE: In order to accurately formulate future injury prevention protocols and/or to recommend modifications to the game laws and competition formats, a deeper understanding of injury patterns in amateur rugby sevens is crucial.

A109

TIME-LOSS INJURIES IN SENIOR AND UNDER-18 PORTUGUESE MALE RUGBY PLAYERS

A. CRUZ-FERREIRA
Faculdade de Ciências da Saúde da Universidade da Beira Interior, Portugal

INTRODUCTION: Rugby union has one of the highest injury incidence rates in team sports, however most of the available data focus on the epidemiology of injuries in countries where rugby is popular. We

aimed to report the incidence rate and relevant epidemiological aspects of injuries occurred in a group of Portuguese male rugby players.

METHODS: A prospective cohort study was conducted with a group of 45 senior and 32 under-18 male players competing in the respective national top division, during a complete season (from september to june). Outcome measures included injury incidence, position, type, location and severity of injuries. Mann-Whitney and Kruskal Walis tests were used to compare severity, type and site of injury between groups.

RESULTS: Match injury incidence for all players was 55.84 per 1000 player match-hours (66.66 for seniors, 48.86 for under-18) while mean time-loss for injury was 20.79 days. No statistical differences were found between groups. Lower limb injuries accounted for 60.5% of all injuries, while joint/ligament injuries were the most prevalent type. Contact events were responsible for 65.1% of injuries.

DISCUSSION: Despite the limitations, data obtained is consistent with the literature. Time-loss injuries seem highly prevalent in rugby union and the incidence rates found in this Portuguese-based study were lower than the reported for international and senior men's professional rugby union, but higher than those occurring in community rugby in tier-1 countries. Authors believe these data reinforces the need to develop and implement effective injury surveillance and prevention programs.

A112

EFFECTS OF THE DURATION OF MOTOR ACTIVITY IN PRIMARY SCHOOL ON BODY MAX AND PHYSICAL EFFICIENCY

P. ASTEGIANO; F. SCARZELLA; R. BARTOLOMEI; G.P. GANZIT; G. MICHELETTI; C. MILANESE
Istituto di Medicina dello Sport FMSI di Torino, Italy

OBJECTIVE: This study examined the effects of number of years of practice of mini volley training during curricular time on appropriate body development and physical fitness in primary school children.

METHODS: We recruited 68 females and 74 males (gr. A) that did physical activity (three 60-min lessons per week) in primary school for 4-5 years, 78 females and 82 males (gr. B) for 1-2 years and 190 males and females of control (gr. C).

Anthropometric data, triceps skinfold, joint mobility of the spine and agility, with the Exagonal Obstacle Test(HOT), were evaluated. A questionnaire to assess knowledge in sports and on the effects of exercise was also administered.

RESULTS: In males, BMI resulted in the three groups A, B, C respectively of 19.1 (SD 3.4), 20.3 (SD 4.3) and 20.1 (SD 4.1) corresponding to 45°, 53° and 51° percentile of the population of northern Italy. In females the values were respectively 18.3 (SD 2.8), 19.3 (SD 2.8) and 19.4 (SD 3.2) corresponding to 39°, 48° and 50° percentile. The changes of BMI with age corresponding to a significant reduction in the percentile in both males and females. The HOT test result respectively in the three groups of 14.8 s (sd 2.1), 19.1 (SD 5.3) and 23.7 (SD 6.3) in males. In females, the values were 14.4 (ds2,2), 20.2 (2.8) and 23.7 (SD 6.1). The performance was significantly better in gr. A versus B and in gr. B versus C in males and females. The analysis of the questionnaires showed that the subjects of group A and B have a significantly better knowledge of sports, in relation to equipment and organization, as well as of the physical activity health benefits.

CONCLUSIONS: The results support the conclusion that the planned physical activity during the period of the Primary School, in the form of the mini-volleyball training, helps to produce morphological, cognitive and motor positive effects in relation to the number of years of practice.

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PLATELET-RICH PLASMA AND EARLY MOBILIZATION IN THE TREATMENT OF THE RUPTURE OF THE DISTAL MUSCULOTENDINOUS JUNCTION OF THE GASTROCNEMIUS MEDIAL HEAD

P. BORRIONE; G. TOMASSI; C. FOSSATI; M.T. PEREIRA; S. GIANNINI; C. MINGANTI; F. PIGOZZI
Department of Movement, Human and Health Sciences, University of Rome "Foro Italico

OBJECTIVE: To evaluate the functional and structural recovery following a specific combined therapeutic approach characterized by an active exercise therapy carried out immediately after platelet-rich plasma injections for the treatment of the muscular lesion of the distal musculotendinous junction of the gastrocnemius medial head.

METHODS: Twenty subjects (age range: 44,8±12,24 years) were treated with the combined therapeutic approach. Other twenty subjects (age range: 44,6±6,94 years) were treated with the standard therapeutic approach and served as control group. The combined therapeutic approach consisted in three platelet-rich plasma intra-lesional ultrasound guided injections followed by early mobilization with active exercise therapy. The standard therapeutic approach was based on rest, ice, compression, elevation and immobilization followed by a physiotherapy protocol started as soon as pain allowed it.

RESULTS: The time necessary to fully recover was significantly shorter in the platelet-rich plasma treated group. The statistical analysis showed a significant correlation between the time elapsed from injury to the first platelet-rich plasma injection and both the time needed to walk without pain and the time occurred to return to the previously practiced sport activity.

CONCLUSIONS: A specific combined therapeutic approach characterized by an active exercise therapy carried out immediately after the platelet-rich plasma injections may significantly reduce time and costs for reaching a complete recovery.

A116

PN-GAL AS A MARKER OF RENAL FUNCTION IN ELITE CYCLISTS DURING GIRO D'ITALIA AND TOUR DE FRANCE

P. BORRIONE; E.O. PISTONE; A. ANDREAZZOLI; C. FOSSATI; A. SPACCAMIGLIO; R. SALVO; F. QUARANTA; C. MINGANTI; L. DI LUIGI
Department of Movement, Human and Health Sciences, University of Rome "Foro Italico"

OBJECTIVE: To assess acute variations in NGAL plasma levels after performing high endurance physical exercise in a group of professional cyclists during the two major European professional cycling competitions (Giro D'Italia and Tour de France).

METHODS: 18 professional cyclistis were recruited for the study. A blood sample was collected during rest (after 8 hours fasting) and immediately after the competition (mountain stages) in order to assess the effect of very intense exercise on kidney function by measuring the variations in plasma levels of NGAL, creatinine, creatine-kinase (CK) and alanine-aminorasferase (ALT).

RESULTS: Creatinine and CK levels remained almost stable between rest and post-competition. As for ALT and NGAL, their levels showed a mild increase between rest and post-competition. However, post-competition values of all investigated variables remained within the physiological range.

CONCLUSIONS: Even if NGAL values mildly rised after competition, no kidney injury occured in these highly trained athletes during mountain stages of Giro D'Italia and Tour de France. Other studies in literature confirmed that high endurance physical exercise seems not to cause renal injury in elite athletes. This is probably due to adaptive mechanisms of renal function and to the adaptation to physical stress gained with training.

A117

THE GOBI DESERT CHALLENGE 2016: MEDICAL PREPARATION FOR A 100 KM TREK IN A LARGE GROUP, MULTINATIONAL EXPEDITION

S.H. BOYCE[1,2], D.L. SCOTT[4]

[1]Emergency Department, Glasgow Royal Infirmary; [2]SportScotland Institute of Sport, Stirling; [3]University of Glasgow; [4]Sandbaggers (www.sand-baggers.com)

BACKGROUND: The Gobi Desert Challenge took place in October 2016, located in a remote area of the Gobi Desert in Southern Mongolia. The trek was 100 km in distance divided into five days of varying length and terrain. The trekkers were multinational in origin, all employees of a large global banking corporation.

AIM: To develop a system of medical preparation for the expedition involving risk assessment, medical supplies and equipment.

METHOD: All trekkers (88 in total) and 12 support staff received medical questionnaires to complete in advance by email detailing past medical history, medications and allergies. The Embassy / Consulate were contacted to obtain details of local medical service provision. Equipment and medications were sourced in the UK and transported to Mongolia. A risk assessment of all parts of the route was performed by the expedition director six months prior to the expedition in a reconnaissance trip.

RESULTS: 18 nationalities were represented. Male – female distribution was approximately equal. Age range ; 20 – 62 years. The following medical conditions were identified: Asthma (6), Hypertension (2), Epilepsy (1), Mitral valve replacement (1), Anaphylaxis (1) (to nuts). The nearest hospital was in a small town, Dalanzadgad, approximately 70km from the trek providing minor A&E services. Any significant illness or injury would require emergency helicopter evacuation to the capital city, Ulan Bator, over 600 km away. Standard pitchside resuscitation medical bag including defibrillator was transported to Mongolia from the UK. All medications were purchased in the UK. Each trekker was provided with a list of personal medication, first aid kit and environmental protection equipment to bring on the expedition. Following risk assessment of the route the following was implemented: Divide party into four groups, each group led by a trained expedition leader from the UK and qualified in mountain first aid, medical equipment located in main vehicle, doctor walking on the route with basic medical kit, all expedition staff and vehicles radio linked for communication, one safety vehicle supporting each group.

CONCLUSION: Preparation and planning in advance is essential. Medical equipment and medication was not available locally so required transportation from the UK. It is impractical to plan for 100 people's medical supplies therefore asking each trekker and staff member in advance to arrive with basic medications and kit decreased the amount of medication requiring transportation. Awareness of local medical service provision is mandatory. Risk assessment of the route and support structure is essential in ensuring a safe and successful expedition.

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THE GOBI DESERT CHALLENGE 2016: ILLNESS AND INJURY IN A 100 KM TREK IN A LARGE GROUP, MULTINATIONAL, EXPEDITION

S.H. BOYCE[1,2]; D.L. SCOTT[4]

[1]Emergency Department, Glasgow Royal Infirmary; [2]SportScotland Institute of Sport, Stirling; [3]University of Glasgow; [4]Sandbaggers (www.sand-baggers.com)

BACKGROUND: The Gobi Desert Challenge took place in October 2016, located in a remote area of the Gobi Desert in Southern Mongolia. The trek was 100 km in distance divided into five days of varying length and terrain. The trekkers were multinational in origin, all employees of a large global banking corporation.

AIM: To identify and manage illness and injury occurring in a 100 km expedition trek.

METHOD: 100 people were present on the expedition. 88 trekkers and 12 support staff. 18 nationalities were represented. The expedition was divided into five single day stages of varying distance and terrain. Maximum daily distance 24km, minimum distance 16km. Terrain varied from dry barren plains, mountain gorges to desert sand dunes. Environmental conditions were dry with intermittent wind, maximum daily temperature 22C dropping to minus 10C at night. All clinical contacts were documented for assessment of illness and injury.

RESULTS: The basic fitness levels of the trekkers varied greatly from those who participated in regular exercise to normally sedentary individuals. Overall 36 clinical contacts occurred peaking on Day 4: Illness (12) – Injury (24). These were subdivided as follows – Illness: Significant illness (3), Skin rash (3), Pharyngitis (2), Allergy (1), Headache (1), Diarrhoea (1), Fatigue (1); Injury: Knee pain (8), Achilles pain (5), Ankle pain (2), Foot blisters (2), Finger burns (2), Minor Head Injury (1), Ingrown Toenail (1), Groin pain (1), Thigh pain (1), Back pain (1). Three significant medical presentations occurred: Hypothermia (1), Asthma exacerbation (1), Hypoglycaemia (1). The most significant injury was overuse tendonitis (7); Achilles (3), Patellar (2), Tibialis Anterior (1), Biceps Femoris (1). The majority of clinical management involved simple advice and the administration of NSAID's and simple analgesia. All trekkers completed the expedition. No staff members required medical treatment.

CONCLUSION: Clinical contact was mainly for minor illness and musculoskeletal presentations. Although the medical workload was not clinically challenging the presentations were frequent and above pre expedition predicted levels. The occurrence of three significant medical presentations confirmed the requirement for medical emergency equipment. In retrospect, for such a large group of people in a remote location, two medical practitioners or the addition of a physiotherapist would be of benefit in relation to the clinical workload.

A119

THE USE OF MUSCULOSKELETAL ULTRASOUND IN THE DIAGNOSIS OF RIB FRACTURES FOLLOWING BLUNT CHEST WALL TRAUMA

C.J. LOWRY[1]; J.A. COCHRANE[1]; S.H. BOYCE[1,2]

[1]Emergency Department, Glasgow Royal Infirmary; [2]SportScotland Institute of Sport, Stirling

INTRODUCTION: Patients presenting to the Emergency Department with blunt chest wall trauma

following a fall or contact injury receive no radiological investigations to determine if a rib fracture is present. Chest X-ray is only performed if an underlying complication is suspected. This can leave patients feeling dissatisfied as no definitive diagnosis of their injury has been provided.

AIM: To determine if the use of musculoskeletal ultrasound (MSK US) can detect rib fractures in patients presenting with blunt chest wall trauma.

DESIGN: Prospective observational study.

SETTING: Large, city centre, Emergency Department.

METHOD: Patients presenting with chest wall pain and/or tenderness following a fall or blunt injury were recruited into the study. Following clinical examination and verbal consent, a MSK US scan was performed using a 12MHz ultrasound probe. The probe was placed directly in contact with the area of injury and the underlying rib bony integrity was assessed in a continuous linear motion. The presence of any associated underlying pneumothorax can also be detected using MSK US.

RESULTS: 17 patients were included in the study and underwent a MSK US scan of their chest wall. 6 patients had a rib fracture detected on ultrasound. In 9 patients the MSK US scan confirmed the absence of a rib fracture. No pneumothoraces were demonstrated.

CONCLUSION: Musculoskeletal ultrasound scan is an effective method of detecting a rib fracture in patients presenting with pain following blunt chest wall trauma. The presence of an underlying pneumothorax can also be demonstrated. Sports Medicine physicians are increasingly using MSK US in their clinical practice. This can be used to assess chest wall trauma in the sports setting and confirm / exclude the presence of a rib fracture.

A120

28 DAYS IN JULY: A REVIEW OF NATIONAL TEAM MEDICAL PRACTICE AT THE UEFA WOMENS EURO FINALS, NETHERLANDS 2017

S.H. BOYCE[1,2,3]; O.G.D. DAVIES[2]; M.M. MCKENNA[2]; A. BOYLE[2]; S. PETRIE[2]; G. VAN HERP[3]; J. MCLEAN[3]; G. JONES[3]

[1]Emergency Department, Glasgow Royal Infirmary; [2]SportScotland Institute of Sport; [3]Scottish Football Association

BACKGROUND: The UEFA Women's European Championship Finals took place in the Netherlands in July 2017. The Scotland Women's National Team qualified for the first time and was drawn in a group with England, Spain and Portugal. The squad gathered to begin preparations on the 1st July 2017.

AIM: To determine the medical workload during major championship finals.

METHOD: The squad consisted of 23 players (20 outfield and 3 goalkeepers). Ages ranged from 19 – 36 years. All medical clinical contacts by the national team doctor were documented for assessment of illness and injury.

RESULTS: Overall 25 medical clinical contacts occurred during the preparation and tournament phase. This was divided into musculoskeletal injury (MSK) (12) and illness (13). MSK was further subdivided into contact occurring during competitive matches (4) and non-contact injuries (6). Diagnostic investigations included one MRI scan and one X-ray. These results are below:

MSK contact: Hamstring tear (1), Posterior AC joint dislocation (1), Gastrocnemius tear (1), Soleus contusion (1)

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MSK non-contact: Heel pain (1), Acute on chronic Achilles tendonosis (1), Gastrocnemius strain (1), Pre-existing bone bruising and medical meniscal tear (1), Adductor strain (1), MSK lumbar back pain (1), Soft tissue bruising hallux (1), Re-injury of hamstring (1)

Illness: Insect bites (6), Hayfever (1), Tonsillitis (1), Viral URTI (1), Ingrown toenail (1), Abdominal pain (1), Allergic generalised itch (1), Inguinal lymph node size increase (1)

CONCLUSION: Medical clinical contact was mainly for minor illness and musculoskeletal presentations. There were no medical or trauma emergencies. Two significant MSK traumatic injuries occurred during competitive matches (Hamstring tear and Posterior AC joint dislocation) ruling players out of the tournament. This added to the physiotherapy workload with treatment and rehabilitation of these injuries being time consuming. With hindsight perhaps these players should have been sent home for rehabilitation. The results do not include physiotherapy assessment and treatment sessions or soft tissue massage.

Poster Presentations

Poster Presentations

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