2. ORAL PRESENTATIONS

Heart rate dynamic during an exercise test in heart failure patients with different sensibilities of the carvedilol therapy

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OBJECTIVE Some trials suggest that the titration of Carvedilol is based on rest heart rate from 50 to 60 bpm and a target daily dose of 50 mg/day. Aim: To evaluate the heart rate dynamic in heart failure patients with different sensibilities of the Carvedilol therapy during an exercise test.

METHODS Patients were divided into four groups and submitted a treadmill cardiopulmonary exercise test: heart rate >60 bpm and Carvedilol 60 bpm and Carvedilol >=50 mg/day (19 patients) (non-optimized low-sensibility); heart rate between 50 and 60 bpm and Carvedilol >=50 mg/day (16 patients) (optimized); heart rate between 50 and 60 bpm and Carvedilol <=50 mg/day (16 patients) (optimized); heart rate between 50 and 60 bpm and Carvedilol <=50 mg/day (16 patients) (optimized); heart rate between 50 and 60 bpm and Carvedilol <=50 mg/day (16 patients) (optimized); heart rate between 50 and 60 bpm and Carvedilol <=50 mg/day (16 patients) (optimized); heart rate between 50 and 60 bpm and Carvedilol <=50 mg/day (10 patients) (optimized high-sensible group).

RESULTS The heart rate peak and the percentage of the peak heart rate in relation with the maximum heart rate predicted for age during the cardiopulmonary exercise test were the same between the non-optimized (128 ± 13 , bpm; $74\pm7\%$) and non-optimized low-sensibility (136 ± 20 , bpm; $78\pm8\%$) groups, and between the optimized (105 ± 25 , bpm; $60\pm13\%$) and optimized high-sensible (108 ± 16 , bpm; $62\pm8\%$) groups.

DISCUSSION & CONCLUSION The heart rate dynamic was almost the same between groups with rest heart rate <60 bpm and between groups >60 bpm, independently of the Carvedilol dose. Based on these findings, we propose a new method to titrate carvedilol therapy by the cardiopulmonary exercise test.

KEY WORDS heart rate, exercise, carvedilol

Heart rate dynamics in heart transplantation patients during a treadmill cardiopulmonary exercise test: A pilot study

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OBJECTIVE One way of defining an individual's maximum heart rate to be expected given their age is by the formula (220-age), but the reinnervation seen in patients who have received heart transplants makes for different calculations from patients who have suffered heart failure. The purpose of this study is to evaluate heart rate dynamics (basal, peak and percentage of predicted heart rate for age) in heart transplant patients compared to optimized beta-blocked heart failure patients during a treadmill cardiopulmonary exercise test.

METHODS Twenty two (81% male, 46 ± 12 years) sedentary heart failure patients and 15 (47% male, 44 ± 13 years) sedentary heart transplant patients performed a treadmill cardiopulmonary exercise test between 10 am and 3 pm. Heart failure optimization was considered 50 mg/day or more of carvedilol, with a resting heart rate of between 50 and 60 bpm.

RESULTS Basal heart rate was lower in heart failure patients (58 ± 5 bpm) compared to heart transplant patients (93 ± 11 bpm; p < 0.0001). Similarly, the peak heart rate (percentage of the maximum predicted for age) was lower in heart failure patients ($60 \pm 13\%$) compared to heart transplant patients (80 ± 12 ; p < 0.0001). Maximum respiratory exchange ratio did not differ between the groups (1.05 ± 0.06 in heart failure patients and 1.11 ± 0.1 in heart transplant patients; p = 0.08). Moreover, the heart rate reserve between heart failure (49 ± 22) and heart transplantation ($46 \pm 16\%$) was not different (p = 0.644).

DISCUSSION & CONCLUSION No patient reached the maximum heart rate predicted for their age during a treadmill cardiopulmonary exercise test. The heart rate reserve was similar between groups. A heart rate increase in heart transplant patients during cardiopulmonary exercise test of more than 80% of the maximum age-adjusted value should be considered an effort near the maximum.

KEY WORDS Heart Transplantation, heart rate, exercise

Validation of the London Chest Activity of Daily Living scale (LCADL) in heart failure patients

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OBJECTIVE The Minnesota Living with Heart Failure Questionnaire (MLHFQ) is a well validated commonly used tool to assess quality of life in people with heart failure. However, the tool lacks specific information concerning breathlessness during daily activities. The London Chest Activity of Daily Living scale (LCADL) is a tool initially validated to measure breathlessness during daily activities in patients with severe Chronic Obstructive Pulmonary Disease. However, since this tool is not specific to patients with COPD and due to the lack of current tools to properly assess activities of daily living in patients with heart failure, the LCADL could also be applied in this population in order to provide important information concerning their breathlessness and functional activity. The evaluation of these outcomes may enable the development of further intervention strategies to address breathlessness during activities of daily living in this rather disabled population.

METHODS Forty-seven heart failure patients (57% males, 50±9 years, left ventricle ejection fraction 29±6% and New York Heart Association (NYHA) functional class I-III) were included in this study. Firstly, all subjects performed a cardiopulmonary exercise test to determinate objectively the exercise capacity. Then, patients responded to the LCADL and the MLHFQ, instructed by the same investigator. The LCADL's retest was applied one week later. An analysis of the LCADL scores stratified by the patients' functional limitation according to the NYHA classification was performed. **RESULTs** The MLHFQ was highly correlated with LCADL. MLHFQ and LCADL were also highly correlated with exercise capacity variables. there was statistically significant difference in the LCADL scores between NYHA functional classes I and II, as well as classes I and III, but not between classes II and III. Despite of this, LCADL total score (r=0.68), and sub-scores self care (r=0.65), domestic (r=0.69), physical (r=0.67) and leisure (r=0.60) correlated with NYHA functional class (p<0.0001 for all). The LCADL was strongly reproducible in all domains. Total score showed a Cronbach's alpha of 0.99, ri of 0.98 (0.92 to 0.97 of CI); self-care domain showed a Cronbach's alpha of 0.97, ri of 0.95 (0.92 to 0.97 of CI); domestic domain showed a Cronbach's alpha of 0.98, ri of 0.96, ri of 0.91 (0.85 to 0.95 of CI); leisure domain showed a Cronbach's alpha of 0.98, ri of 0.96 (0.93 to 0.97 of CI)

DISCUSSION & CONCLUSION The LCADL showed to be a valid and reproducible measurement of dyspnea during daily activities in heart failure patients. This scale could be an additional important tool for the assessment of patients' dyspnea sensation during activities of daily living and to discriminate/categorize patients with different functional impairments.

KEY WORDS lcadl, heart failure, daily activities, quality of life

Prevalence and clinical significance of aortic root dilatation in highly-trained competitive athletes

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OBJECTIVE Few data are available addressing the impact of athletic training on aortic root size. We have investigated the distribution, determinants and clinical significance of aortic root dimension in a large population of highly-trained competitive athletes.

METHODS Echocardiographic aortic root dimensions were assessed in 2,317 athletes free of cardiovascular disease, aged 24.8 ± 6.1 (9-59) years, 56% male, engaged in 28 sports disciplines including participation in Olympic Games and World Championships.

RESULTS In males, aortic root was 32.2 ± 2.7 mm (range 23-44); 95th percentile, 37 mm, and in females was 27.5 ± 2.6 mm (20-36); 95th percentile, 32 mm. Aortic root was <40 mm in 2,300 athletes (99%), and > 40 mm in only 17 (1%), all males. In this subset, aortic dimension increased over a 8 ± 5 year follow-up (40.9 ± 1.3 to 42.9 ± 3.6 mm; p <0.01), including 3 former athletes in whom aorta became dilated (to 50 mm, 50 mm and 48 mm) after 15-17 year follow-up, in the absence of symptoms or evidence of systemic disease. Multiple regression and covariance analysis showed aortic dimension was largely explained by body surface area, LV mass and age (R_2 = 0.61), with sports participation having lower effect.

DISCUSSION & CONCLUSION Dilatation of the aortic root (>40 mm) is rare in highly-trained athletes, and is not a feature of physiologic athlete's heart. Longitudinal assessment of athletes with aortic root >40 mm showed further dimensional increase, which occasionally was marked, underscoring the importance of close clinical surveillance to reduce the risk associated with accelerated aortic enlargement.

KEY WORDS aortic root dimension, athlete's heart, echocardiography

Different presentation of bicuspid aortic valve in 169 sportsmen

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OBJECTIVE Bicuspid aortic valve (BAV) is the most common congenital cardiac anomaly (1-2%) in the general population. Aims of our study were: 1) to evaluate the different patterns of presentation of BAV; 2) to compare different BAV morphological phenotypes.

METHODS Since 1986 to 2009, 169 sportsmen with BAV (mean age 22±10.4, range 7-67 years), were evaluated for different reasons in our Institution. Each subject underwent a thorough cardiological evaluation comprehensive of clinical examination, resting and exercise ECG, echocardiogram, 24h-Holter monitoring and, when indicated, magnetic resonance imaging of the heart and/or angio-CT of coronary arteries.

RESULTS BAV was associated with cardiac pathologies/abnormalities in 46/169 (27%) sportsmen. After excluding subjects with significant cardiac pathologies (10 cases), aged <12 or >50 years (8 cases), the remaining 151 were classified in 4 groups: group 0, (22 cases, 14.6%) with an "almost normal valve"; group 1, (94 subjects, 62.2%) with regurgitation; group 2, (16 cases, 10.6%) with stenosis; group 3, (19 subjects, 12.6%) with isolated aortic dilation. Moreover, taking into account BAV morphology, 109 cases (72.2%) showed antero-posteriorly (AP) and 42 (27.8%) latero-laterally (LL) oriented cusps. Sportsmen with AP-BAV showed larger aortic diameter (34.7 \pm 5.9 vs 31.7 \pm 6.1) and a greater proneness to progressive dilation during follow-up (+0.04 \pm 0.08 vs +0.02 \pm 0.05 mm/year).

DISCUSSION & CONCLUSION As other cardiac pathologies/abnormalities are frequently observed in sportsmen with BAV, a thorough cardiological investigation must always be carried out. Several patterns of BAV presentation exist, possibly with different outcome. Valve morphology, finally, seems to be a predictive factor for its prognosis.

KEY WORDS Bicuspid aortic valve, sportsmen, echocardiogram, morphological phenotypes, aortic diameter, progressive dilation.

Endobutton fixation of lateral end clavicle fractures in cyclists

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OBJECTIVE The aim of our study was to determine the outcomes following open reduction and internal fixation of acute displaced lateral end clavicle fractures in cyclists.

METHODS A prospective study was conducted over a 27 month period from January 2007 to April 2009. We adopted a standard protocol of treating all acute lateral end clavicle fractures in cyclists by open reduction and internal fixation with 2 endobuttons attached with 6 ply orthocord suture in a pulley configuration through bone tunnels in the clavicle and coracoid. We reviewed these patients at 3, 6 and 12 months after surgery, with sequential radiographs and evaluation of functional outcomes.

RESULTS A total of 16 patients were included in the study. The mean age was 38 years with a range from 16 to 57. At one year follow up the median Constant score was 93 points, the median DASH score was 5 points, the mean forward flexion was 180°, mean abduction was 180° and the mean external rotation was 110°. 13 patients returned to cycling within 6 months after the operation. 2 patients had complications in the form of fibrous non-union and capsulitis which responded to distension arthrography. There were no re-operations.

DISCUSSION & CONCLUSION We describe a novel method of operative fixation of lateral end clavicle fractures which produces good functional and radiological results, with a relatively low rate of operative complications. We recommend this technique for the displaced lateral end clavicle fractures in cyclists.

KEY WORDS lateral end clavicle fractures, cyclists, endobutton fixation

Pseudo-winging following midshaft clavicle fracture in cyclists

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OBJECTIVE The aim of our study was to determine the incidence of pseudo-winging after midshaft clavicle fracture and correlate it with the functional outcomes in cyclists.

METHODS A prospective study was conducted between September 2008 and April 2009. Scapulothoracic movement was recorded for all the patients with clavicle fracture after union and reviewed by 2 blind observers. The functional

outcomes were assessed by using validated Disabilities of the Arm, Shoulder and Hand questionnaire.

RESULTS There were 36 patients (33 males and 3 females) with mean age of 29 years. All patients had a pain free full range of motion of their shoulder girdle. 25 patients (70%) had non-operative treatment of their clavicle fracture which resulted in malunion. 15 patients (60%) had scapular prominence and 15 patients (60%) had pseudo-winging in the non-operative group. 8(53%) patients had mild, 8(53%) had moderate and 1(6%) had severe pseudo-winging. 11 patients had primary operative treatment of their clavicle fractures. 2 patients (18%) had scapular prominence and 3(27%) had pseudo-winging in the operative group. The median DASH score was 2.5 with a range from 0-66 for the patients with pseudo-winging and 2.5 with a range from 0-34 for the patients without pseudo-winging.

DISCUSSION & CONCLUSION We concluded that there was a high incidence (60%) of pseudo-winging after non-operative treatment of midshaft clavicle fractures in cyclists. There was no statistically significant difference in the incidence of pseudo-winging between the operative and non-operative groups. There was also no correlation between the pseudo-winging and the functional outcomes.

KEY WORDS Midshaft clavicle fracture, pseudo-winging, cyclists

Supraspinatus muscle belly tenderness: diagnostic value for supraspinatus pathology

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OBJECTIVE This study aims to determine the usefulness of supraspinatus muscle belly tenderness (SMBT) upon palpation in determining supraspinatus pathology.

METHODS Twenty five patients who presented with shoulder pain were included in the study. They provided a history of their present illness and underwent focused physical examination of the shoulder (palpation of the supraspinatus belly and tendon, Empty can test and Drop arm test) prior to undergoing MRI. Results were organized into group 1 (supraspinatus tendinosis/tendinitis) and group 2 (supraspinatus tears) which was further divided into group 2A (partial thickness tears) and group 2B (full thickness tears). Diagnostic values were determined for each test in each group as well as in combination.

RESULTS SMBT showed a high specificity (100%) in diagnosing supraspinatus pathology. In group 2, SMBT exhibited a good specificity (80%) but only had a 50% sensitivity. SMBT was also noted to be better in determining partial thickness tears (sensitivity 80% / specificity 80%) rather than full thickness tears (sensitivity 20% / specificity 65%). SMBT likewise showed the highest post test probability (73%) and likelihood ratio in the group 2A. With regards to combination of SMBT with the other test, it showed improvement in its diagnostic value with the highest being in the group of supraspinatus tears and the subgroup of partial thickness tears.

DISCUSSION & CONCLUSION SMBT on palpation provides a simple, inexpensive, non-invasive confirmatory tool for supraspinatus pathology. It is also of particular value in detecting partial thickness supraspinatus tears especially if combined with the other special tests.

KEY WORDS Supraspinatus muscle belly, palpation, diagnostic value, tenderness

Arthroscopic bankart repair and capsular shift for traumatic anterior shoulder instability

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OBJECTIVE Most studies on arthroscopic treatment of anterior – inferior glenohumeral instability are focused on the repair of lesions of the anterior – inferior aspect of the labrum (Bankart lesions). Arthroscopic treatment of anterior shoulder instability is reported less successful than open techniques with failure rates up to 50%. This study demonstrates that anterior – inferior instability is associated with multiple lesions and the treatment of all these lesions can increase success rates.

METHODS The study group consisted of 96 patients who had a mean age of 27 years (range, 15 to 60 years) at the time of the operation. There were 74 athletes, 30 patients with more than five dislocations and 7 patients had a little bony fracture. All shoulders underwent arthroscopic capsulolabral repair with suture anchors. Additionally, 27 plications with sutures, 45 capsular shifts,16 closures of the rotator cuff interval and 8 rotator cuff repairs were performed.

RESULTS At a mean of 16 months postoperatively occurred two traumatic redislocations. In the athletes group 57/74 (77%) returned to the preinjury and 12/74 (16,2%) to lower sports level, while 5/74 (6,8%) gave up sport activities.

DISCUSSION & CONCLUSION Arthroscopic treatment of anterior shoulder instability has evolved tremendously

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over the last decade. However, the variety of the available arthroscopic instruments and techniques shows the complexity of the intra-articular tissue fixation, which includes anchor placement, suture passing, and knot tying. We believe that the improved rate of success is the result of repair not only of the anterior – inferior (Bankart) lesion, but also (where necessary) of associated lesions and especially of the significant volume decrease of the capsule. **KEY WORDS** shoulder instability, bankart lesion, arthroscopic repair, capsular shift,

Muscular strength and activity of deltoid muscle during specific exercises in impingement syndrome

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OBJECTIVE Deltoid muscle plays an important role in normal shoulder function as well as scapular rotators. Although there are some studies evaluating deltoid muscle activity, most of them focused only the middle part. The aim of this study was to evaluate muscular strength and activity of deltoid muscle during specific exercises have been using commonly in rehabilitation of impingement syndrome.

METHODS 20 subjects who were suffering from impingement syndrome (Grade I and II) and 18 healthy subjects were included in the study. The study group was consisted of 13 female and 7 male with mean age of 44.05 ± 8.95 years. The mean age of the control group (13 female and 5 male) was 41.06 ± 15.01 years. All the subjects have been evaluated for muscle strength using dynamometer and Cyriax isometric muscle test. Surface EMG has been used for assessing the muscle activity. Shoulder ladder, shoulder wheel, isometric and isotonic shoulder exercises were chosen as specific exercises during EMG measurements. All the results taken from the measurements in the study group have been compared with the control group.

RESULTS There was significant difference in dynamometric measurements of 3 parts of deltoid muscle between the study and the control group. Dynamometric measurements were lower in the study group than the control group (p<0.05). Strength of deltoid according to Cyriax muscle test in the study group significantly decreased (p<0.05). EMG activities of anterior part in maximum work and power during isometric flexion exercises have reduced in the study group (t1=-2.388,t2=-2.730,p<0.05). Power of anterior part in the study group during isotonic flexion exercises (t=-2.290,p<0.05) and during shoulder ladder exercises (t=-2.151,p<0.05) was also diminished. EMG activity of middle part of the deltoid in the study group was decreased only during isotonic abduction exercises (t=-2.051,p<0.05). However there was significant difference in maximum work and power of posterior part between the study and the control group during shoulder wheel exercises (t=-2.777,t2=-2.653,p<0.05).

DISCUSSION & CONCLUSION The strength of the deltoid muscle was diminished in impingement syndrome. The most aggressive exercises for deltoid muscle were shoulder wheel and shoulder ladder exercises. Isometric exercises and isotonic exercises below than 90° were the least loaded exercises. The most influenced part of the deltoid was the anterior part. These results could be taken consideration in planning of the exercises regarding of deltoid muscle activity and loading. It should be keep in mind that shoulder wheel and shoulder ladder exercises must be used carefully in rehabilitation programme.

KEY WORDS Impingement syndrome, deltoid muscle, muscle strength, muscle activity

Oxygen uptake kinetics in swimming: New findings

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OBJECTIVE Understanding the principal determinants of oxygen (VO₂) uptake kinetics is fundamental to improve human performance in sport. Indeed, there are some swimming related studies that focus on the relationship of the VO₂ response at different constant work-rate exercises (e.g. moderate, heavy and severe intensities) and swimmer's performance. For instance, our group observed the existence of a slow component of the VO₂ kinetics, superimposed to its fast phase, during a time to exhaustion test at the swimming velocity corresponding to VO₂max (TLimvVO₂max). It was observed, inclusively, that the VO₂ slow component was one of the major TLimvVO₂max determinants. However, it was not tried to relate the VO₂ kinetics parameters with swimming competitive events. The purpose of this study is to observe if the VO₂ kinetics parameters determined at a TLimvVO₂max intensity are related to the 400m front crawl, a typical aerobic power event.

METHODS Seven high trained front crawl swimmers (17.4±1.4 years old, 63.5±8.7 kg and 168.8±7.3 cm) performed

an individualized intermittent incremental protocol for vVO₂max assessment, with increments of 0.05m/s each 200m stage and, 30s intervals, until exhaustion. VO₂ was directly measured using a breath-by-breath portable gas analyzer (K4b2, Cosmed, Italy) connected to the swimmers by a respiratory snorkel/valve system. Velocity was controlled using a visual pacer (TAR.1.1, GBK-electronics, Portugal). VO₂max was considered to be reached according to primary and secondary traditional physiological criteria and vVO₂max was accepted as the velocity correspondent to the first stage that elicits VO₂max. Forty-eight hours later, subjects swam until exhaustion at their pre-determined velocity, to assess TLimvVO₂max. The VO₂ kinetics parameters for each phase of the VO₂ response (td1, tau1, A1, td2, tau2 and A2, i.e., time delay, time constant and amplitude for the fast and slow component, respectively) were assessed by mathematical modelling (the cardiodynamic component was not taken into consideration).

RESULTS Velocity of the 400m front crawl event $(1.51\pm0.07\text{m/s})$ was related with A1 (39.4 \pm 7.5 ml/kg/min; r=0.79, p=0.04), none existing other significant relationships: td1 (18.4 \pm 9.5s; r=-0.56), tau1 (15.9 \pm 4.8s; r=0.15), A2 (5.9 \pm 3.4 ml/kg/min; r=-0.12), td2 (104.5 \pm 6.5s; r=0.49) and tau2 (34.7 \pm 20.6s). V400 presented also an elevated relationship with VO₂max (63.4 \pm 6.7 ml/kg/min; r=0.93, p=0.03) and vVO₂max (1.43 \pm 0.07m/s; r=0.97, p<0.01).

DISCUSSION & CONCLUSION Higher amplitude of the fast component of VO₂ kinetics seems to be directly related to best performances in the 400m front crawl event. This result seems to confirm that VO₂max plays a central role among the energy-yielding mechanisms in middle distance swimming and that aerobic power is important in swimming performance.

KEY WORDS Swimming, VO2 kinetics, fast component, 400m front crawl

Index of Coordination assessment in young swimmers: comparison between breathing and non breathing cycles

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OBJECTIVE The index of coordination (IdC) aims to assess the continuity of swimming propulsion, measuring the inter-arm lag time between propulsive phases. The three patterns of arm coordination described in the swimming specialized literature are the catch up (IdC < 0), the superposition (IdC > 0) and the opposition (IdC = 0) modes. No IdC related studies were conducted in swimmers during the childhood period, despite the importance of the development of the coordinative abilities, namely the bimanual coordination, the movement's dissociation and the rhythm, in the "basic training" phase. Knowing that children are not mini-adults, the purpose of this study was to assess the IdC in young swimmers, trying to observe differences between breathing (to their preferential side) and non-breathing cycles.

METHODS Subjects (n = 15; 10.7 ± 0.7 years old; 149.3 ± 7.1 cm height; 41.1 ± 7.5 kg weight and 5.3 ± 2.0 years of training background) performed 2 x 25 m front crawl at high intensity, with rest intervals higher than 20 min. Swimmers were monitored by two underwater video cameras (Sony® DCR-HC42E) in the sagittal and frontal planes. Descriptive statistics and Wilcoxon test were carried out (a significance level of p < 0.05 was accepted).

RESULTS The mean \pm SD, minimum and maximum values for the IdC taking into consideration the breathing and non-breathing cycles, were, respectively, -20.4 ± 3.4 (ranging between -25.8 and -13.6) and -17.8 ± 1.6 (ranging between -19.8 and -14.5) (with significant difference between trials, p < 0.01). These IdC values indicate a preference of the children for the catch up mode, with high lag times between propulsive arm actions, which is not in accordance with the literature for adult swimmers performing at high intensities (values situated between -5 and 0). This fact suggests that our understanding of the skills in the adulthood period should not just be scaled down and applied to children. Moreover, it seems that the process of growth and maturation interfere in our understanding of the inter-arm coordination phenomenon in swimming.

DISCUSSION & CONCLUSION Complementarily, the higher IdC observed, when comparing breathing and nonbreathing cycles, is justified by the increasing discontinuity in the arms propulsive actions in the cycles when the swimmer breathes. In fact, in the literature, it is considered that the duration of the non-propulsive phases (entry/catch and recovery) is higher in the breathing cycles, being also observed an inverse correlation with IdC.

KEY WORDS Swimming, index of coordination, breathing cycles

Relationship between anaerobic power and sprint ability in football players

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OBJECTIVE In many sports short bursts of high intensity power production play a major role in performance

especially in team sports like football. Therefore, anaerobic and sprint performances are very crucial and fundamental activities for these types of sports. Hence, the purpose of the present study was to examine the relationship between anaerobic power and sprint ability in football players.

METHODS Fifteen male football players participated in this study voluntarily (Mage: 23.06±1.98 yrs, Mheight: 173.52±5.80 cm, MBW: 72.91±9.99kg, Mfat: 10.03±4.82 %). Vertical jump of football players was determined by squat and counter-movement jump tests and anaerobic power was calculated by Lewis nomogram. Sprint ability was determined by 20m sprint test and 12x20m running repeated sprint ability tests. After repeated sprint ability test, best time, total sprint time and percentage of decrement were determined and calculated.

RESULTS Pearson Product Moment Correlation analysis indicated significant correlations between anaerobic power of squat jump and total time at 0-10m (r=.584; p=.022), 10-20m (r=.708; p=.003), 0-20m (r=.682; p=.005), performance decrement 10-20m (r=.589; p=.021) and 0-20m (r=.649; p=.009). In addition anaerobic power of counter-movement jump was significantly correlated with total time at 10-20m (r=.643; p=.010), 0-20m (r=.611; p=.016), performance decrement at 0-10m (r=.644; p=.010), 10-20m (r=.686; p=.005) and 0-20m (r=.750; p=.001). No significant correlation was observed between anaerobic power of squat and counter-movement jumps and 20m sprint performance and the best time performances of running repeated sprint ability tests (p>.05).

DISCUSSION & CONCLUSION As a conclusion it can be said that anaerobic power but not vertical jump, is highly related with total time and performance decrement in repeated sprint ability, however is not related with 20m sprint performance in football players. Lack of association between anaerobic performance and single sprint performance indicated that factors other than anaerobic performance might lead to single sprint performance in this group of football players.

KEY WORDS anaerobic performance, sprint ability, football players

The evaluation of training effects in professional soccer players by monitoring the changes of VO max, AnT and creatine kinase

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OBJECTIVE Increasing VO₂max during the soccer training process is imperative, but reaching the highest anaerobic threshold (AnT) is connected with top level performance. On the other side, some data suggest that plasma concentrations of creatine kinase (CK) could be a better indicator of training adaptation than LDH and blood lactates. The aim of this study is to evaluate the soccer training effects by monitoring the changes of VO₂max, AnT and CK.

METHODS This study included 30 professional football players from one of the teams of the first football league. The investigations were made at three points: in the beginning of the preparation period, after the preparation period, and after competition period. Each of the investigations was performed in three phases. The following parameters had been determined: indirect VO₂ max (ml/kg/min) during a maximal treadmill test; AnT with Conconi treadmill test and plasma concentrations of CK by DEROM method. Plasma concentrations of CK were measured before (CK1) and after (CK2) maximal treadmill test. Exercise induced answer of CK was taking account as a difference between CK1 and CK2.

RESULTS After the preparation period, there were significant increases of VO₂max. At the end of competition period there were significant decreases of VO₂max, plasma concentrations of CK and exercise induced CK answer. The AnT was statistically unchanged during the whole training process. There was significant negative correlation between VO₂max and exercise induced CK answer after the preparation period.

DISCUSSION & CONCLUSION The increase of VO₂max after the phase of preparation, connected with a decrease of exercise induced CK answer, was a result of an adaptation of muscle cell membrane on increased volume of training in the phase of preparation. Taking account the decrease of VO₂max at the and of phase of competition, together with the decrease of plasma concentrations of CK and exercise induced CK answer on the one side, and unchanged AnT during the whole training process, on other side, it was indicated that this soccer training process was ineffective and connected with some signs of fatigue and disadaptation at the end of the phase of competition.

KEY WORDS soccer players, VO₂max, AnT, creatine kinase, training effects

Physiological responses and energy expenditure during water cycling

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OBJECTIVE Equipment that was used to improve physical fitness on land are being adapted for water, such as the bicycle. The aim of this study was to compare the energy cost of submaximal cycling at different intensities, performed during cycling in an aquatic-specific bike (CW) and on land stationary bike (CL).

METHODS Fifteen trained male subjects (mean \pm SD: age 21.73 \pm 2.84 years; weight 70.33 \pm 5.33 kg; height 175 \pm 06 cm; fat mass percentage 15,09 \pm 3.13; VO₂máx 50,96 \pm 5,51 ml.kg-1.min-1; FC 182,64 \pm 12,35 bpm). Each subject completed in a randomized order a 6 min exercise bout at the cadence of 60, 80 and 100 bpm, either on a CL and a CW, with 48h separating each exercise bout. Oxygen uptake (VO₂), energy expenditure (EE) and the heart rate (HR) were continuously collected, respectively, with a portable gas analyzer K4b2 (Cosmed, Rome, Italy) and by a transmitter unit attached to K4b2. Rest metabolic rate were measured before each trial. The ANOVA test was used for repeated measures and Bonferroni post-hoc test as well as the paired t-test (p<0.05).

RESULTS The VO₂, EE and HR increased with the cadences in both exercises conditions and were significantly higher (p<0.05) when during CW.

DISCUSSION & CONCLUSION The increased of VO₂ and HR in the water exercise showed a direct relation with the speed of cycling at higher cadences. In conclusion, different intensities may be used in water exercises with the advantages of smaller joint overload.

KEY WORDS water cycling, oxygen uptake, heart rate

Effects of different rest intervals during resistance training on growth hormone, testosterone and blood lactate

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OBJECTIVE Resistance training stimulates the release of different anabolic hormones, specially growth hormone (GH) and testosterone (TS) (1,2,4,5). The acute hormonal responses due to resistance training (RT), reinforces the access to muscle strength, following the chronic training (3). Aim of the present study was a comparison among three different rest intervals on growth hormone (GH), testosterone (TS) and blood lactate and training volume.

METHODS Therefore ten male athletes (Mean \pm SD, age=20.37 \pm 2.24 years, body mass= 65.5 \pm 26.70 kg) voluntarily participated in four sessions with 48 h rest interval who were performing different resistance trainings (RT). At the first session, one repetition maximum (1RM) of participants evaluated. The subjects from the second session up to the fourth, each session, performed four sets of squat and bench press until exhausted with 85% of 1RM and one of rest intervals of 60s, 90s and 120s between the sets used randomly and then the number of repetitions in each set was recorded. Also, there were taken three blood samples from the subjects before (T0), immediately after (T1) and 30 min after (T3), to determine the GH, TS and blood lactate serum concentrations.

RESULTS Based of the results, there wouldn't observe a significant difference in GH, TS and blood lactate serum concentrations in T0. It was observed a significant increment of 64 percent in GH concentration through using the 60s rest intervals in comparison with 120s rest between sets in T1. Besides, there was observed a significant increment of 65 and 67 percent in TS concentration through using the rest intervals of 90s and 120s compared to the 60s rest interval in T1. It wasn't observed a significant difference among the three programs in lactate concentration. Although, the ability of keeping the repetition (training volume) by using 90s and 120s rest intervals has been more than that of 60s, but statistically it wasn't observed a significant difference in training volume.

DISCUSSION & CONCLUSION The results of the present study support rest period in RT sets as an important variable to increase the anabolic hormone concentrations and it should be mentioned that 60s rest interval has caused more increase in GH concentration compared with 120s rest. But TS response has been larger in the program with 120s rest interval between sets. In summary, the results of this investigation indicate that serum GH and TS concentrations were dependent to the length of the rest interval between sets in heavy RT program. The primary finding of this study was that the patterns of GH and TS responses were dramatically different to the length of rest interval between sets in heavy resistance training. Heavy resistance training with short (60 s) rest interval between sets resulted in greater acute GH responses than long (120 s) rest interval between sets. But acute TS responses after heavy resistance training with long rest (120 s) showed great increase than heavy resistance training with short (60 s) rest interval between sets **KEY WORDS** Growth hormone, testosterone, resistance training, rest interval

A new hamstring test for measuring active flexibility before return to sport after injury

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OBJECTIVE Passive flexibility tests are often used for establishing criteria for safe return to sport after hamstring strains. The aim here is to introduce an active hamstring flexibility test and to evaluate its reliability and applicability on injured athletes.

METHODS Eleven healthy subjects (28y) were tested on repeated occasions and 11 athletes (21y) with MRI-verified acute hamstring strain were tested when clinical examination revealed no signs of remaining injury. Flexibility, i.e. highest range of motion of 3 consecutive trials was calculated from electrogoniometer data during maximal voluntary and passive hip-flexions in a supine position. A VAS-scale (0-100) was used to estimate experience of insecurity during active tests.

RESULTS No significant test-retest differences were observed. Intra-class correlation coefficients ranged 0.89–0.97 and coefficients of variation 1.9-3.2%. Active flexibility was greater (23%) than passive flexibility. In the athletes, the injured leg showed smaller active, but not passive, flexibility than the uninjured leg. Average insecurity estimation was 52 for the injured and 0 for the uninjured leg, respectively.

DISCUSSION & CONCLUSION The new active hamstring test showed good reliability. Furthermore, it seems to be sensitive enough to detect differences both in active flexibility and in insecurity after acute hamstring strains, where the commonly used clinical examination fails to reveal injury signs. Thus, the active hamstring test adds discriminative power and could provide useful additional criteria for minimizing the risk for re-injury upon return to sports in athletes. **KEY WORDS** hamstrings, test, strain, flexibility

Effects of FIFA'S "The 11+" injury prevention program on isokinetic strength

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OBJECTIVE This study intended to evaluate whether knee extensor and flexor muscles strength could be improved in response to an injury prevention program.

METHODS Twenty players (aged 22.3 \pm 4.2 yr) performed the "11+", an injury prevention program developed by FIFA's medical assessment and research centre. Players trained 3 times per week during 10 weeks. Isokinetic strength was evaluated on knee flexor and extensor muscles at concentric 60°.s-1, concentric 180°.s-1 and eccentric 30°.s-1 angular velocities. Reciprocal strength differences, and conventional and functional hamstring:quadriceps peak torque ratios (H/Q ratio) were considered. Descriptive statistics were calculated and comparisons between pre- and post-intervention scores were conducted using paired-sample t-tests. Significance was set at 0.05.

RESULTS Peak torque moments increased for all angular velocities. Regarding knee extensors strength changes, significant differences were only found for concentric exertions at 180°.s-1 on the dominant limb (p=0.05). Major improvements were registered in hamstring concentric exertions only: dominant limb at 60°.s-1 (p=0.14), non dominant limb at 60°.s-1 (p=0.001), and non dominant limb at 180°.s-1 (p=0.004). No significant changes were found during eccentric exertions. Conventional H/Q ratios improved in all velocities, despite reaching significance at concentric 60°.s-1 (p=0.046) on the non dominant limb only. No significant differences were found on the functional H/Q ratio.

DISCUSSION & CONCLUSION The "11+" seems to improve concentric but not eccentric strength. Reciprocal muscle balance appears not to change due to the program, but players improved concentric hamstrings strength, mainly on the non dominant limb. We suggest that higher training volume and intensity should be considered when performing the injury prevention program.

KEY WORDS soccer, training, muscle balance, hamstrings

Isokinetic strength evaluation can predict muscle strains in professional soccer players. A prospective study.

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OBJECTIVE Soccer players tend to use their preferred lower extremity for most of the soccer activities and especially for controlling and kicking the ball. Theoretically, this leads to asymmetrical adaptations of the musculoskeletal structures and consequently to muscle injuries. The purpose of this prospective study was to investigate the isokinetic myodynamic profile at the lower extremities of soccer players and to establish an association between possible strength asymmetries with the development of muscle strains.

METHODS One-hundred professional soccer players (age 23.4 years, weight 73,3, height 177.6) were tested isokinetically for concentric and eccentric strength of the knee flexors and extensors and of the ankle dorsal and plantar flexors. Knee flexion and extension was tested at 60_{\circ} , 180_{\circ} and 300_{\circ} /sec for the concentric mode of contraction and at 60_{\circ} and 180_{\circ} /sec for the eccentric. The ankle joint was tested at 60_{\circ} /sec for both the concentric and eccentric mode of contraction. Identical protocols were applied to both body sides (left, right). A lower extremity strength asymmetric profile was then created using selected cut-offs for bilateral strength differences of 15% or more in a total of 14 measurements (concentric and eccentric evaluation of knee and ankle joint). Players were followed prospectively for the next 11 months and 31 strains in the muscles of their lower extremities were recorded.

RESULTS Soccer players suffer many strength asymmetries at their lower extremities. These asymmetries were most prevalent in the eccentric function compared to the concentric (Wilks' \ddot{E} =0.70, F=4.75, P=0.000). Players with concentric asymmetries didn't not present significant higher incidence rate of muscle strains compared to players with no concentric asymmetries (Pearson x2= 0.18, p=0.67, Odds ratio=0.12). In contrary, the incidence rate of muscle strains increased significantly in players with pre-season eccentric strength asymmetries (Pearson X2= 7.78, p=0.005, Odds Ratio= 6.91). Furthermore, grouping of players according to the number of isokinetic asymmetries revealed that players with many concentric/eccentric asymmetries presented also significant high epidemiology in muscle strains (Pearson x2=9.42, p=0.024).

DISCUSSION & CONCLUSION The outcome of this study confirms the hypothesis of asymmetrical myodynamic adaptations of the knee and ankle joint in soccer players. Our findings clarifies the influence of bilateral isokinetic strength asymmetries on muscle strain at the lower extremities of professional soccer players. Isokinetic evaluation during the pre-season period can predict and thus decrease the incidence rate of muscle strains in soccer. **KEY WORDS** soccer, injury prediction, strength asymmetries

Isokinetic strength profile of quadriceps and hamstrings in elite male volleyball players

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OBJECTIVE Knowledge of lower-extremity strength can be used in injury prevention, conditioning and rehabilitation of volleyball players. The goals were: (1) to describe the concentric and eccentric quadriceps (Q) and hamstrings (H) muscle function in volleyball players, (2) to evaluate the differences in Q and H strength, strength ratios and bilateral strength asymmetry among age groups, playing positions and playing levels, (3) to compare bilateral strength asymmetry in Q and H muscles in two different contraction modes.

METHODS 95 professional male volleyball players were tested on an isokinetic machine at 60° /sec to assess concentric and eccentric Q and H strength. We also calculated strength ratios and bilateral strength asymmetries. MANOVAs indicated significant main effect of playing level on relative PT (p=0.001) and strength ratios (p<0.05).

RESULTS International-level players had significantly (p<0.05) higher H strength and dynamic control ratio (DCR) of the right leg compared to the 1st and/or 2nd national division players. There were no signs of bilateral strength asymmetry regardless of muscle group tested and contraction mode.

DISCUSSION & CONCLUSION Our results suggest that right H strength and DCR could be important for successful volleyball performance. Descriptive data about Q and H muscle function can be used as guidelines for coaches and therapists during training and rehabilitation of male volleyball players

KEY WORDS volleyball, isokinetic strength

Normal values of left ventricular remodelling in elite athletes, as assessed by threedimensional echocardiography

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OBJECTIVE Aim of our study was to assess the normal values of left ventricular (LV) remodelling, as assessed by three-dimensional echocardiography (3DE) in a large population of elite competitive athletes.

METHODS A study population of 426 elite athletes engaged in different sports disciplines (41 skill, 100 strength, 127 combined and 158 endurance) and 62 sedentary controls underwent 3DE for assessment of LV end-diastolic volume (EDV), systolic volume (ESV), mass (LVM), which were normalized to body surface area, and ejection fraction (EF).

RESULTS EDV was larger in athletes engaged in strength (77 \pm 14 ml/m2; p<0.001), combined (77 \pm 11 ml/m2; p<0.001) and endurance (91 \pm 13 ml/m2; p<0.001), but not in skill (70 \pm 11 ml/m2) disciplines compared to controls (63 \pm 11 ml/m2). Also, ESV was larger in strength (29 \pm 7 ml/m2; p<0.001), combined (29 \pm 6 ml/m2; p<0.001) and endurance (35 \pm 7 ml/m2; p<0.001), but not in skill (26 \pm 6 ml/m2) disciplines compared to controls (23 \pm 5 ml/m2). LVM was significantly greater in strength (78 \pm 13 g/m2; p<0.001), combined (79 \pm 11 g/m2; p<0.001) and endurance (91 \pm 14 g/m2; p<0.001) but not in skill disciplines (69 \pm 10 g/m2) compared to controls (61 \pm 10 g/m2). No significant differences were identified for EF between skill (63 \pm 5%; p<0.001), strength (63 \pm 9%; p<0.001), combined (62 \pm 5%; p<0.001), endurance (52 \pm 5%; p<0.001) and controls (63 \pm 5%).

DISCUSSION & CONCLUSION LV remodelling as assessed by 3D is related to type of sport participated, with endurance athletes showing the most marked increase in EDV, ESV and LV Mass; instead, no significant LV morphologic changes were observed in skill athletes. Regardless the extent of LV remodelling, the systolic function remained within normal limits in all athletes.

KEY WORDS athletes, three-dimensional echocardiography, left venticular remodelling

Left ventricular mechanical systole in elite athletes assessed by 3D echocardiography.

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OBJECTIVE We sought to evaluate left ventricular (LV) systolic time interval (STI) comparatively in elite athletes and sedentary controls by 3-dimensional echocardiography (3DE).

METHODS 426 athletes, involved in skill (n=41), strength (n=100), combined (n=127), and endurance (n=158) disciplines and 62 sedentary controls, matched for age, underwent 3DE examination. By off-line analysis, LV volume-time curve was generated; time from the beginning of the QRS complex to the minimum systolic volume was considered to be the systolic time interval, this interval was also expressed relatively to the length of the hearth cycle (STI %). The systolic flow rate (SFR) was calculated as the ratio between stroke volume and STI.

RESULTS Heart rate was lower in athletes engaged in skill (61 ± 12 bpm; p<0.001), strength (58 ± 10 bpm; p<0.001), combined (57 ± 10 bpm; p<0.001) and endurance (53 ± 10 bpm; p<0.001) sports compared to controls (75 ± 12 bpm). LV end-diastolic volume was larger in strength (150 ± 35 ml; p<0.001), combined (158 ± 29 ml; p<0.001) and endurance (178 ± 32 ml; p<0.001) but not in skill (127 ± 30 ml; p<0.001) athletes vs. controls (111 ± 27 ml). The STI % was shorter in athletes compared to controls (40 ± 5 vs 30 ± 4 p< 0.001); among athletes the STI % was shorter in skill (31 ± 4 %; p<0.001), strength (31 ± 5 %; p<0.001), combined (31 ± 4 %; p<0.001) and endurance ($29\pm4\%$; p<0.001) athletes compared to controls ($40\pm5\%$. In addition, the SFR was higher in athletes compared to controls (212 ± 58 ml/s vs 310 ± 75 ml/s, p<0.001); among athletes higher values for SFR were identified in skill (256 ± 60 ml/s; p<0.001), strength (297 ± 78 ml/s; p<0.001), combined (308 ± 67 ml/s; p<0.001), and endurance (334 ± 74 ml/s; p<0.001) athletes as opposed to controls (212 ± 58 ml/s).

CONCLUSION Elite athletes show a significant shortening of relative systolic time interval (STI%) in comparison to sedentary controls, in association with a significant increase in LV emptying velocity (SFR). These adaptations may contribute to enhance LV systolic function.

Prevalence and clinical significance of negative T waves in sportsmen: a retrospective study

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OBJECTIVE Trained, healthy athletes frequently show 12-lead-ECG changes (sinus bradycardia, increased QRS-voltages, etc), generally regarded as physiological adaptation to athletic conditioning. Despite several studies, disagreement still exists on determinants and clinical significance of ventricular repolarization anomalies. **METHODS** Rest-ECG of the sportsmen evaluated at our Institution from 1979 to 2009 were analyzed, looking for the presence of negative T-waves >2 mm in depth in at least 3 leads (apart from III, aVR, V1). In selected cases the presence of conditions potentially responsible for these anomalies were retrospectively researched by means of clinical history and instrumental investigations (mainly echocardiography). Sportsmen with systemic diseases potentially affecting ECG (mainly hypertension), were excluded.

RESULTS Out of 12.387 sportsmen, only 142 (1.14%) (mean age 28.9 ± 12.5 , range 12-59 years) had negative T-waves at rest-ECG and 134 of them (94.4%) showed cardiac morpho-functional anomalies at echocardiogram or other tests, diagnostic or highly suspected for: hypertrophic cardiomyopathy (HCM, 67.9%), isolated papillary muscles hypertrophy (6.0%), myocarditis (8.9%), arrhythmogenic right ventricular cardiomyopathy (ARVC, 8.2%), valvular diseases (2.2%), ischemic cardiomyopathy (1.5%), abnormal coronary artery origin (0.7%), myocardial bridge (0.7%), dilated cardiomyopathy (0.7%), long-QT syndrome (0.7%). Forty-three of these 142 sportsmen (30.3%) had giant (>10 mm) negative T-waves, associated with certain or highly suspected HCM (83.7%, 58.3% with apical localization), isolated papillary muscles hypertrophy (4.6%), myocarditis (6.9%); only 1 case (2.3%, evaluated in early 80s) showed no significant heart abnormalities.

DISCUSSION & CONCLUSION Negative T-waves on rest-ECG of sportsmen are rare. When observed, a cardiac morpho-functional abnormality, sometimes at risk of sudden death, must be carefully ruled out. **KEY WORDS** Athlete's ECG; ventricular repolarization; heart; sudden death

Heart rate profile to exercise: Effects of age and exercise training

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OBJECTIVE Heart rate (HR) dynamic during exercise test has shown to be a non-invasive tool to assess cardiac autonomic control of the nervous system, reflecting the interaction of sympathetic and parasympathetic activity. However, there is litle information about the effects of exercise training on HR dynamic of healthy women of different age groups. Our purpose was to analyze the effect of two times-a-week exercise training program on HR dynamic, as well as to compare this effect among women of different age groups.

METHODS 117 healthy sedentary women, divided in four groups according to their age $(G1 - n=30, 30.3\pm6.2 \text{ years}; G2 - n=37; 44.1\pm2.5 \text{ years}; G3 - n=27; 53.7\pm3.5 \text{ years}; G4 - n=20; 66.4\pm6.9 \text{ years})$, were submitted to a two times-a-week exercise training program with aerobic (20 minutes at 60-75% of reserve heart rate), whole-body resistance (2-3 sets of 8-12 repetitions at 60-80% of 1- RM), and stretching exercise, performed for 12 month. Maximal graded exercise test (GXT) was performed at baseline and after twelve months of follow-up.

RESULTS Exercise training improved cardiorespiratory fitness in $10.3\pm5.1\%$ with no significant difference among the four age groups. Resting and recovery HR were reduced in G1 and G2 (p<0.05), but not in G3 and G4, after the twelve month of exercise training. Peak HR did not change significantly in any group after the follow-up.

DISCUSSION & CONCLUSION The results suggest that two times-a-week multi-component exercise training is enough to improve HR profile to exercise in young (age < 50 years), suggesting a better interaction of sympathetic and parasympathetic system. However, this improvement was not observed in older women.

KEY WORDS exercise; cardiorespiratory fitness; heart rate; autonomic nervous system; aging.

Changes of cerebral haemodynamics at boxers according to duplex scanning

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OBJECTIVE To determine the condition of cerebral haemodynamics at boxers according to duplex scanning.

METHODS Studied condition of cerebral haemodynamics by duplex scanning extracranial brachiocephalic vessels and transcranial duplex scanning of 32 amateur boxers aged 18 to 26 years. Surveyed the boxers were in the preparatory period. Control group consisted of 30 men aged 18 to 25 years who did not have a history of deferred traumatic brain injury. The survey was conducted in the unit LOGIO 400 PRO series General Electric Company on the standard methodology used in the sensors 11, 8 and 2 MHz in a pulse mode and a color mapping. For the study of intracranial arteries using three standard access: transtemporal, transoccipital, transorbital.

RESULTS The increased the velocity of blood flow in the artery cerebri media met in 11 cases. Angiospasm phenomena occurred in 4 cases, the trend toward hypertonus was observed in 6 cases. Violations of venous outflow showed overload transverse sinuses - 6 observations, cavernous sinuses - 2, basal veins - 1. In 13 cases out of 32 haemodynamic pattern in the studied group of patients characterized by signs angiodistonia. In the control group from 2 people signs of angiodystonia occurred.

DISCUSSION & CONCLUSION Haemodynamic disorders among boxers have been characterized signs of angiodystonia (40,6%), increased the velocity of blood flow to arteria cerebri media (34,4%), acceleration of venous outflow (28,1%), which is required in some cases the appointment of drugs improving cerebral circulation. **KEY WORDS** cerebral haemodynamics, traumatic brain injury, boxing, duplex scanning.

Functional adaptation of articular cartilage to different physical exercises

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OBJECTIVE The objective of the present study was to investigate deformational behavior and functional adaptation of articular cartilage by the changes of serum level of Cartilage Oligomeric Matrix Protein (COMP) during a 30-min exercise after 12-weeks of regular high impact, impact or non-impact exercise.

METHODS Blood samples were drawn from 44 healthy sedentary males immediately before and after and 0.5 h after a 30-min walking exercise on a motor-driven treadmill at 5 km/h speed. Serum COMP concentrations were determined using a commercial enzyme-linked immunosorbent assay (AnaMar Medical, Goteborg, Sweden). After first measurements participants were randomly and equally assigned to high impact (running, n=11), impact (cycling, n=11), non-impact (swimming, n=11) and control groups (n=11). All exercise groups participated in sessions of 40 minutes per day, 3 days per week for 12 weeks. Exercise sessions were determined according to the ACSMs' guidelines. Participants in running and cycling groups partake sessions in the human performance laboratory one by one, while swimming group perform exercise sessions in indoor swimming pool. Throughout the 12-week period, the control group was told not to participate in any organized or structured exercise and continue their daily life activities. At the end of the 12-weeks intervention period, post tests were applied. The data were analyzed with separate 4x2 (groups and time) mixed repeated-measures ANOVA design for each phase of blood sampling. Bonferroni-adjusted paired-samples t-tests were employed for post-hoc analyses. The level of statistical significance was accepted as p<0.05.

RESULTS Mean values of serum COMP levels at pre-test measurements for recovery, fatigue and regeneration phases were 10.06 ± 2.05 , 11.45 ± 2.58 and 10.24 ± 1.83 U/I respectively. Serum COMP levels at post test measurements were 9.60 ± 1.95 , 11.21 ± 2.36 , 10.16 ± 1.93 U/I for each phases. Multivariate tests indicate a significant fatigue or resting effect on serum COMP concentration in all experimental and control groups at pre and post tests. Therefore, pair wise comparisons were conducted in order to assess which means differ from each other. Results indicated significant differences in post test measurements among phases of cycling, swimming and control groups except running group.

DISCUSSION & CONCLUSION 30 minutes moderate walking activity has little influence on the increase serum COMP concentrations of young sedentary men. However, 12 weeks regular weight-bearing high impact physical exercise (running) decrease the deformational effect of walking activity by functional adaptation of articular cartilage to specific environmental requirements.

KEY WORDS COMP, fitness, knee joint, deformation

Effects of anaerobic training on blood nitric oxide and haematological parameters

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OBJECTIVE Nitric oxide (NO) is a vasodilator and an antioxidant gas. Although the synthesis of NO has been attributed exclusively to the vascular endothelium, it has been demonstrated that red blood cells (RBCs) express the endothelial nitric oxide synthase enzyme isoform (eNOS). In addition, RBCs have been assumed to metabolize large quantities of NO due to hemoglobin (Hb). The aim of our study is to investigate the effects of anaerobic (judo) training on serum NO levels and hematological parameters.

METHODS 18 Turkish national female judoists (aged 17.9 ,,b 0.8 yr) participated in our study. In the 19 week period prior to the competitive season, once at the start and once at the end, main haematological parameters (haemogram, serum ferritine, iron, etc), NO and some biochemical parameters were analyzed in fasting blood.

RESULTS After training, no significant changes occurred in serum NO levels (which decreased % 10.6), significant decreases were determined in blood RBC, Hematocrit (Hct), trombosit, serum iron, creatinine and globuline levels (P<0.05), significant increases were established in blood Hb, ferritine, transaminases (aspartate amino transaminase and alanine amino transaminase activities). However, after the training, significant negative relationships were established between NO and urea levels and transaminases used as predictors of overtraining. Insignificant negative relationships were found between NO and difference values between two measurements of RBC, Hct and Hb before and after the training.

DISCUSSION & CONCLUSION The reason of negative effects established on blood NO levels and main haematological parameters may be in part the anaerobic nature of intensive judo training.

KEY WORDS Nitric oxide, Hematological parameters, Judo training.

The effect of aquatic aerobic training on the quality of life on Multiple Sclerosis(MS) patients

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OBJECTIVE MS is a central nervous system disease with various physical and mental symptoms, such as physical disability, movement depauperation, walking disorders, and decrease in quality of life(QOL). Studies on MS patients began in 1868 by Sharcot. In a research which was done on 112 M.S patients by Koudouni and Orologaes (2004) the finding showed a relative improvement in (QOL) of M.S patients after 8 week of aerobic training. Purpose study the effect of an aquatic exercise for 8 weeks, on the improvement QOL of female MS patients.

METHODS From 100 MS patients, 25 people on the basis of illness degree and age range were selected randomly. with EDSS 1-4 with average illness time of (4 1) and age rang of (20-50) years. They were divided in two groups. Experimental group 15 people and controlled group 10 people. The experimental group participated in the exercise for 8 weeks, each week three sessions with intensity of 40-50 percent of the maximum heart-beat rate. The QOL was measured by FAMS. Version 2 questionnaire in experimental and controlled groups before and after exercise. The gathering data were analyzed by using descriptive statistic and dependent sample t- test.

RESULTS The research has shown that after 8 weeks, in the experimental group the QOL was meaning fully improved (P < 0/01).

DISCUSSION & CONCLUSION Considering the results of this research, which has caused in an improvement in the QOL MS patients with low EDSS, so it seems necessary to apply an aquatic exercise for such patients. Therefore, it is recommended these exercises to be used by specialists as a supplementary remedy beside medical treatments for MS patients

KEYWORDS Multiple sclerosis- - aquatic exercise - quality of life

Baseline simple and complex reaction times in female compared to male boxers

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OBJECTIVE Cognitive performance can be easily evaluated, nowadays, by means of computerized neuropsychological (NP) tests, but no research used this tool to investigate female boxers. Aim of the study is to compare baseline cognitive performance in female to male amateur boxers.

METHODS Study population was composed of a group of 28 female amateur boxers, with no history of head concussions (except boxing). A group of 56 male boxers, matched for age, employment and competitive level to female athletes formed the control group. Each boxer was requested to: a) fulfill a questionnaire collecting demographic data, level of education, occupational status, boxing record and number of head concussions during boxing; b) undergo a baseline computerized NP test (CogSport) measuring simple and complex reaction times (RT).

RESULTS Female were significantly (p<0.0001) lighter than male boxers (56.0+/-7.0 vs 73.1+/-9.8 kg). No significant differences at NP testing scores were observed between groups. Male boxers showed a significantly longer simple-RT at the end than the beginning of the NP test (0.247+/-0.007 vs 0.243+/-0.007 s, p=0.02), however with a significant lower rate of mistakes (0.7+/-1.6 vs 2.0+/-3.1%, p = 0.005), observed also in the female group (0.5+/-1.1 vs 2.2+/-3.0%, p=0.005). No boxing activity parameter (fighting record, number of knock-outs, etc.) correlated with NP scores.

DISCUSSION & CONCLUSION Women's Olympic style boxers show no or minimal differences in baseline cognitive performance in respect to male amateur boxers. This study confirms that women's boxing seems to be as safe as male boxing in respect to cognitive performance.

KEY WORDS concussion; mild traumatic brain injury; contact sports; trauma; head

Gait analysis and functional deficiencies in elite soccer players with chronic ankle instability

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OBJECTIVE Among all sports-related injuries, ankle injuries have a high risk for both recurrence and sequela. Instability being the most frequent and serious sequela is developed in approximately 30-40% of the patients, can be resistant to conservative managements and became permanent. It was conceived that; if the differences associated with chronic ankle instabilities can be demonstrated, pathophysiological basics of the condition will be comprehensible.

METHODS 157 soccer players, aged between 13-18 years, were recruited for the study. Among these players, chronic ankle instability was diagnosed in 22 players (14%), fifteen of these being eligible for the study. Eighteen healthy soccer players randomized for control group. The groups were evaluated by 3D computerized walking analysis for temporo-spatial, kinematic and kinetic assessments in both sagital and transverse plane. For functional deficiencies; "Functional Ankle Disability Index" were performed (FADI and FADI-S). Statistical analysis was performed for assessment of the data.

RESULTS All cases were classified into two groups; group1 for instability cases and group2 for control group. The groups were similar in respect to average age, height and weight. There were a statistical significant difference between the groups in FADI and FADI-S results for both extremities (<0.05). Although temporo-spatial parameteres and physical findings were similar in two groups, gait analysis demonstrated arthrokinetic changes in cases with chronic ankle instabilities.

DISCUSSION & CONCLUSION The studies on chronic ankle instability are generally either not discriminated the two major factors (functional and mechanical ankle instability) which are appreciated as two different entities for instability, or evaluated separately as a single factor. In the following report, functional disability diagnosed with FADI and FADI-S was considerably more severe in unstable cases. More over, unstable cases had hazardous changes for recurrance in movement pattern during walking analysis.

KEY WORDS soccer, chronic ankle instability, gait analysis, FADI

The effect of aerobic and anaerobic functional fatigue protocols on ground reaction force components during jump landing movement

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OBJECTIVE In most tasks, most of the loss of force occurs because of the changes within the muscle or central nervous system and or both of them. There appears to be a relationship between altered neuromuscular control and muscle fatigue. The purpose of this study was to examine the effect of aerobic and anaerobic functional fatigue protocols (AAFFP) on dynamic postural stability in nonelite young soccer players.

METHODS Twelve male young soccer players who were playing in league one (Tehran) (age: 17.42 ± 0.51 y, weight: 67.65 ± 6.58 kg, height: 173.33 ± 3.09 cm) that all of them was health participated in this study. Before beginning the fatigue protocol, dynamic posture stability index (DPSI) evaluated following single leg jump-landing movement (athletic task that resulting injury) with sampling frequency of 200-HZ in 3 second recording. Stability indices analyzed in mediallateral (MLSI), anterior-posterior (APSI) and vertical (VSI) direction. Immediately following fatigue, post testing was performed. The data was analyzed with analyses of variance (ANOVA) with repeated measures (p < 0.05).

RESULTS ANOVA revealed significant differences when comparing anaerobic fatigue pre test and post test values for MLSI, APSI, VSI, DPSI and RPE. Likewise aerobic fatigue revealed significant differences pre test and post test values for VSI and DPSI whereas no significant differences were revealed when comparing the aerobic fatigue protocols for pre test and post test of MLSI and APSI.

DISCUSSION & CONCLUSION In attention to this fatigue protocols probably eccentric contraction of hamstring muscles during the late swing phase to control forward motion of the thigh and leg segments, is case of altering in hamstring quadriceps muscle strength rate and decrease lower extremity stability. Also it seems that, subjects because of deceleration the body,s downward velocity for decrease the impact force, altered mechanical mechanism of landing skill. The results of this investigation suggest that aerobic and anaerobic functional fatigue protocols, specially aerobic fatigue have effect in dynamic postural stability. This matter can be used one of the main factors in determining of injury mechanism (in jumplanding movement).

Key words fatigue, dynamic postural stability, soccer players, jumplanding movement

Electromiography in front crawl technique-case of study

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OBJECTIVE The need to develop systems electromiographic (EMG) in quatic environment, has led several researchers to refine these instruments to ensure the credibility of the data provided by EMG. The aim of this study is to characterize the behavior of two muscle muscles involved in the crawl technique (biceps brachii and triceps brachii) over a test of 200m crawl.

METHODS A male swimmer trained was subjected to a test consisting of a maximum voluntary contraction (CVM) of the Biceps Brachii (BB) and Triceps Brachii (TB) for standardization. A protocol of 4 x 50m with an interval of 15 seconds at a swimming speed of pre-established, making each part to 95% of transit time for 200m crawl. The EMG were used with a Wirelless signal of the BB and TB muscles of the right arm was removed throughout the test and then synchronized with the video image, and selected 5 cycles of swimming on all identical pathways.

RESULTS There is a gradual decrease of its average muscle activity. The BB was about 43% and TB was 26%. The largest variation on it, in the case of BB, between the third and fourth route (21%), and in the case of TB, between the second and third route (14%).

DISCUSSION & CONCLUSION The muscles studied demonstrated changes in the duration of swim cycles, indicating that, there is a decrease in muscle activity, this supposed to be due to limitations in production capacity under swimmer and the characteristics of the art of swimming which are changing as increasing fatigue.

KEY WORDS electromiography, kinematics analysis, crawl, swimming

Methodology for investigating the use of the arms in fall recovery

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OBJECTIVE Despite extensive preventive efforts, falls continue to be a major source of morbidity and mortality. Most studies of falling mechanics have focused on response time, lower limb muscle strength, and leg muscle activation. Less attention has been given to rotational arm movements that express angular momentum that would otherwise be associated with destabilization of the trunk. The purpose of this ongoing study was to determine how arm rotation is modulated during a fall recovery in response to varied balance perturbations.

METHODS Twelve volunteer participants were initially held in a static forward-inclined position using a horizontal tether attached to a waist belt. The subjects were then unexpectedly released from initial lean angles of 5.5° and 6.5°. They were instructed avoid taking a step during the fall recovery. Six Eagle motion analysis cameras were used to track 54 markers placed on the subjects' bodies and a Kistler force platform was used to record ground reaction force. Full-body kinematics and kinetics were computed from marker and force data using Visual3D software. Custom written MATLAB code was used to compute the three dimensional angular momentum of the arms. At this writing, however, we have completed analysis of only one subject's fall recoveries.

RESULTS The results for a single subject showed similar angular momentum patterns for all trials. First, the arms were rapidly raised away from the body in the frontal plane. This movement was followed by a rapid rotation of both arms in the clockwise direction (viewed from the right). The angular momentum of the arms during this phase appeared to be graded in response to the magnitude of the perturbation. Peak angular momentum in sagittal plane was found to be approximately 50% greater for and initial body lean of 6.5° than for 5.5° .

DISCUSSION & CONCLUSION We have developed a methodology for applying a balance perturbation and measuring the use of the arms during fall recovery. Analysis of one subject's recoveries showed that the subject seemed to generate more angular momentum with the arms when a greater perturbation was applied. Processing all trials would permit statistical tests to confirm if this apparent modulation of the response of the arms is consistent across the subject population. Such findings would suggest that arm rotations are calibrated rather than being a maximal response. This same methodology may be used to study the maintenance of balance during sporting activities such as the volleyball spike.

KEY WORDS fall, recovery, arm rotation, tether release, angular momentum

Characterization of temporal patterns of behavior of the crawl technique

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OBJECTIVE With this work we want to check the standards of the crawl technique from an observational methodology appropriated. The instrument of observation (Nilton, 2008) was developed Ad Hoc, using the references of biomechanical models, based on a mixed system of categories and formats of fields, with particular reference to four criteria that add in the form of alpha-numeric codes. The results of the quality of the instrument revealed indices of reliability and high precision.

METHODS We use a sample of six swimmers from Portuguese and international level as part of the Portuguese national team in swimming. Each element was subject to the overall swimming crawl technique at a distance of 25m to achieve maximum speed without a breath. The units of observation are natural (events and behaviors) and analytical (of behavior). The detection of temporal patterns by binomial analysis (Magnusson, 2000) was made by the software 5.0 Theme created by Magnusson (1996, 2000). The instrument is intended to identify patterns which are within the critical intervals, allowing examination of the inter-relationship of temporal events (movement), using the record of occurrences in the collection of patterns found in data.

RESULTS The patterns found in each swimmer is different and each pattern is adjusted to the particular individual techniques.

DISCUSSION & CONCLUSION The same swimmer can present similar structures for implementation, representing a behavior pattern. In all the swimmers were identified more than one standard. However, it is noteworthy that no swimmer of the sample made the same overall behavior at any stage observed in the five cycles analyzed.

KEY WORDS Temporal Patterns, Behaviour, Crawl Technique

Characterization of anthropometric features and nutritional habits of elite Italian athletes, selected for participation in the 2008 Bejing Olympic Games

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OBJECTIVE aim of our study was to characterize a population of elite athletes, participating at the highest level of competition including the Olympic Games, with regard to their nutritional habits and body composition.

METHODS 555 elite Italian athletes (340 male and 215 female), selected for participation in the 2008 Olympic Games were included in this analysis. Athletes aged 14 to 45 years, and were engaged in 25 different sport disciplines. Anthropometric characteristics, nutritional habits and dietary intakes were assessed; specifically, height, weight, body mass index (BMI), fat mass and fat-free mass (by skin folds) were measured. Moreover, a nutritional survey was performed by expert dieticians to evaluate daily energy intake (DEI), total proteins and proteins per kilogram of body-weight, lipids, carbohydrates, C-vitamin and iron.

RESULTS mean values \pm standard deviations for male and female athletes were respectively: age 27 \pm 6 and 25 \pm 6 years, weight 80 \pm 12.8 and 62 \pm 12.9 kg, height 181 \pm 10.5 and 168 \pm 8.7 cm, BMI 24.3 \pm 2.9 and 21.8 \pm 2.8 kg/m2, fat mass 13 \pm 4.8% and 20.5 \pm 5.6%. The nutritional survey showed, in male and female athletes, respectively, DEI 3066 \pm 630 and 2373 \pm 449 kcal/day; proteins 18.6 \pm 3.4% and 18.6 \pm 3.2%; proteins for kg of body weight 1.8 \pm 0.4 and 1.8 \pm 0.3 g/kg; carbohydrates 49 \pm 6.4% and 49.3 \pm 6.7%; lipids 32.3 \pm 5% 32.4 \pm 5.7%; C-vitamins 133 \pm 78.9 and 136 \pm 75.0; iron 16.3 \pm 4.3 and 13.4 \pm 3.6 mg.

DISCUSSION & CONCLUSION Italian elite athletes appear to be in the upper range for height respect to the mean of Italian population; their fat mass is very low and, consequently, their fat-free mass is increased, as an expression of enhanced muscular structure. Indeed, nutritional habits are considered appropriate to their caloric expenditure, following the pattern of the "Mediterranean Diet" as recommended by the World Health Organization.

KEY WORDS athletes, anthropometric characteristics, nutritional habits

The comparison of some bone and calcium metabolism indices in active and non active menopause women

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OBJECTIVE The purpose of this study was to compare some bone and Calsium metabolism in active and non active Menopause women(MW). Calcium and Phosphorus of Urinary and serum, special bone Alkaline Phosphatase as a bone construction index and Resisting Acid Phosphatase to Tartarate as a bone absorbtion Index and Parathyroid hormone(PaH) and Calcitonine hormone(CH) for comparison of Calcium and bone metabolism were all considered in two groups.

METHODS Twenty eight MW (14 active and 14 nonactive) with the some traits from those who were clients to a sport club in Sabsevar were used to from the two treatment groups. Measures: Height, weight, PWC ,VO₂Max ,WHR.BMI, BP and RHR of the subjects were determined. Subjects had similar nutritional program and didn't use any drugs. Prior to breakfast morning urine test up to 80 cc and blood sample from brachialis vein up to 10 ml were gathered from the subjects. Comparison of two groups and pearson's correlation test was used to determine the relationship between the indices.

RESULTS 1- Serum calcium rate, serum PaH and bone AP in active MW were significantly lower than non active women, and CH rate in active MW was significantly higher than non active one (p<0.05). 2- Between urine calcium, serum and urine Phosphorus ,between Resisting Acid Phosphatase to serum Tartarate and between Calcium ration to urine creatinin in active MW with non active women no significant difference was observed.

DISCUSSION & CONCLUSION It seems that prolonged regular physical activity can affect calcium and bone metabolism indices in MW and prevent degeneration of bone tissue by decreased bone regeneration and also obviate bone tissue from calcium and mineral empaiying through decreased PaH and increased CH.

KEY WORDS Calcium and bone metabolism. serum and Urinary Phosphorus. Alkaline Phosphatase. Acid Phosphatase. Parathyroid and Calcitonine hormones. active and non active Menopause women.

Isokinetic strength balances of the ankle and regional bone mineral density of tibia in medial tibial stress syndrome patients

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OBJECTIVE Medial tibial stress syndrome (MTSS) is one of the most common causes of exercise related leg pain. Our knowledge about the pathophysiologic mechanism and the specific pathologic lesion of MTSS is limited. The primary purpose of this study was to evaluate possible disbalances of muscle forces acting on the ankle, which might play a role in pathopysiology of MTSS. Also this study aimed to evaluate possible changes in tibial regional bone mine-ral density (BMD) at acute phase, which was shown to decrease after 5 months of duration of MTSS.

METHODS Fifteen MTSS patients (mean duration of MTSS was 8 (3-24) weeks) were compared with 13 control subjects. Mean age and body mass index of patients were 21 ± 2.8 years and $22,2 \pm 2.8$ kg/m². Mean age and body mass index of controls were 23.2 ± 3.1 years and 21.7 ± 2.9 kg/m². All subjects filled in a questionnaire about nutrition and exercise habits. Ankle plantarflexion, dorsiflexion, eversion and inversion concentric forces were evaluated using an isokinetic dynamometer. Standard lomber and femur BMD measurements were taken. The BMD of three regions from both tibias' was measured, too.

RESULTS Mean and peak eversion torques of MTSS group at 30°/sec velocity were significantly higher than controls (mean: 21.9 \pm 6.4; 18.3 \pm 6.1 Nm (p<0.05), peak: 23.4 \pm 6.4; 19.3 \pm 5,0 Nm (p<0.05)). Mean inversion torque/mean eversion torque ratio of MTSS group at 30°/sec velocity was significantly lower than controls (0.97 \pm 0.22; 1.23 \pm 0.46, p<0.05). Mean eversion torque of MTSS group at 120°/sec velocity were significantly higher than controls (14.0 \pm 3.6; 11.7 \pm 3.8 Nm, p<0.05). Tibial regional bone mineral density showed no significant difference between groups. Lomber T-score was significantly higher in control group (p<0.05).

DISCUSSION & CONCLUSION Decreased Inversion/eversion ratio because of increased eversion torque might be a predisposing factor of MTSS. BMD of the tibia at the pain side doesn't seem to be affected.

KEY WORDS medial tibial stress syndome, isokinetic strength, bone mineral density, eversion, inversion

The evaluation of interventions based on transtheoretical model in adoption and maintenance of physical activity

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OBJECTIVE This study evaluates the effect of informing and counseling interventions carried out by researchers to improve the exercise behavior in adults, based on transtheoretical model.

METHODS The study design is a quasi-experimental interventional study, which was conducted in a single group with pre-test and post-test follow-up design. The data on individual socio-demographics, the stages of change in the context of Transtheoretical Model, process of change, self-efficacy, decisional balance, was collected by questionnaires before interventions (pre-test). Thereafter, the individual counseling was given to the participants. The follow-up evaluation continued at the first, third, and sixth months.

RESULTS The mean age of the participants was 38.17 ± 8.22 . The difference between the stages of change determined at four different time points was highly statistically significant (p<0.0001). There is a significant difference in mean of the general scores of stages of change scale between pre-intervention and last intervention time (p<0.0001). There was a statistically significant in the self-efficacy difference between pre-intervention and last intervention time (p<0.0001). There was a statistically significant in the self-efficacy difference between pre-intervention and last intervention time (p<0.0001). The mean scores of decisional balance was increased in the pros dimension and decreased in cons dimension after information and counseling interventions (p<0.0001). The analyses of the relation between the mean scores of the stages of change, decisional balance and self-efficacy was correlated statistically significantly (p<0.0001).

DISCUSSION & CONCLUSION As a result the group in general progressed in the stages of change. As a result, in the 64% of the participants progressed in the stages of change whereas there was no change in the 25% and 11% regressed in the stages of change. In conclusion, the evaluation of Transtheotetical Model based interventions for physical exercise behavioral improvement demonstrated that the nursing interventions is effective and beneficial to adapt positive behaviors in regular exercise behavior.

KEY WORDS Transtheoretical Model, Stage of Change, Process of Change, Self-Efficacy, Decisional Balance, Individualized Counseling, Intervention, Exercise.

General target consideration sport influence on the selector of bloody factors among male fast students.

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OBJECTIVE In random; 2007 a research design with general target consideration sport influence on the selector of bloody factors (Triglyceride; Cholesterol; LDL & HDL Lipoproteins) was performed among male fast students in Islamic Azad University; Tabriz; with special targets.

METHODS To survey sport effect on the amount of blood Triglyceride; Blood Cholesterol; HDL Lipoproteins and LDL Lipoproteins among male fast students in Islamic Azad University; Tabriz. One hundred ten male fast students of Azad University selected by random which have been stood in two groups of fifty five people by chance. From all selectmen were cupped amount of 5 cc blood in every process before and after Ramadan. During lent month (Ramadan) for experimental groups were given sport activities such as Cooper Testing three times a week. The variations of bloody factors in the first or second test were compared in statistic method (T test) and these are following results.

RESULTS The meaningful variations in balance of Triglyceride and LDL & HDL Lipoproteins between experimental groups weren't observed. The meaningful relation between sport exercises and reduction of measure of Blood Cholesterol in experimental groups were observed.

DISCUSSION & CONCLUSION fast people can continue their sport activities without any worried. This work not only makes negative variations from blood fast but also it will reduce the measure of their blood Cholesterol; to; and keeps it in normal limit. And consequently this work prevents from illnesses such as: Intensification Blood fast; Atherosclerosis; and some infraction.

KEY WORDS Triglyceride, cholesterol, lipoproteins ldl & hdl, sport, fast.

Acute vitamin C supplementation, exercise-induced lipid peroxidation and inflammation

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OBJECTIVE The purpose of this study was to evaluate the effect of acute supplementation with vitamin C on exercise induced lipid peroxidation, muscle damage and inflammation.

METHODS Sixteen healthy untrained male participated in a 30 min exercise at 75% VO₂max. Subjects were randomly assigned to one of the two groups: placebo (P) and vitamin C (VC: 500 mg vitamin C). Blood samples were obtained prior to supplementation (baseline), 2hrs after the supplementation (immediately pre-exercise), immediately, 2hrs and 24hrs post-exercise. Plasma levels of vitamin C, total antioxidant capacity (TAC), creatine kinase (CK), malondialdehyde (MDA), total leukocytes, neutrophils, lymphocytes, interleukin-6 (IL-6), CRP and cortisol were measured.

RESULTS With supplementation, plasma vitamin C concentration increased significantly only in the VC (P<0.05). TAC decreased significantly in P group, 2hrs and 24hrs after exercise (P<0.05). Although MDA levels were similar between groups at the baseline, it increased significantly after exercise only in the P group (P<0.05). CK increased immediately and 2hrs after exercise in both groups and 24hrs after exercise only in placebo group compared with preexercise (P<0.05). Markers of inflammation (total leukocytes, neutrophils and IL-6) and muscle damage (CK) were increased significantly in response to the exercise in both groups (P<0.05).

DISCUSSION & CONCLUSION VC supplementation prevented exercise-induced lipid peroxidation and muscle damage but had no effect on inflammatory markers.

KEY WORDS supplementation, exercise, vitamin C, inflammation

S100B profiles and cognitive function at high altitude

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OBJECTIVE Exposure to high-altitude can lead to Acute Mountain Sickness (AMS) and High-Altitude Cerebral Edema (HACE). In this study we investigated the effect of high-altitude on neurocognitive function and S100B-release. Increased S100B-release has been hypothesized to be a sign of loss of integrity in the Blood-Brain-Barrier (BBB).

METHODS Seven healthy volunteers trekked to Capanna Regina Margherita (4554 meters above sea level) in the Monte Rosa Massif. During ascent and descent, five test events were undertaken, where participants performed neurocognitive testing, Lake Louise-scoring (LLS) and blood was drawn for measurements of S100B

RESULTS The S100B levels increased 42-122% from baseline, and mean LLS increased from 0.57 to 2.57. A significant correlation was observed between both S100B levels and LLS, and between S100B and some neurocognitive scores.

DISCUSSION & CONCLUSION The study indicates that S100B can be released by a mild hypoxia in the setting of AMS. Moreover, an observed correlation between S100B and a lower score on neurocognitive tests suggests that the pathogenetic mechanisms may be associated. The study demonstrates that cognitive function can be adversely affected by symptoms of AMS.

Rating of perceived exertion in cycle ergometer: Effect of maximal capacity differences

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OBJECTIVE Perceived exertion is described as "the subjective intensity of effort, strain, discomfort, and/or fatigue" that is experienced during the physical exercise. Rating of perceived exertion (RPE) is a widely accepted tool in the estimation of exercise intensity and in prescription of exercise. It has been previously shown that RPE have positive associations with physiological variables, such as heart rate and oxygen utilization. The aim of our study was to evaluate the physiological responses to exercise intensities determined by heart rate reserve (HRR) method and to detect whether perceived exercise intensity can be affected by individuals fitness level.

METHODS Twenty sedentary participants of both sexes aged 20 to 41 (mean 26.9) participated. Rating of perceived exertion (RPE) scores were collected at different percentages of subjects' HRRs during graded exercise test on a cycle ergometer. Following the test, subjects were divided into two groups according to their maximal O₂ uptakes (VO₂max) as high (MET>=10; n=9), and low MET groups (MET<10; n=11). After 48 hours, participants performed the steady state exercise test at a perceived exertion level of 13-14. For regression analysis the mean values for intercepts, slopes, and Pearson r correlations were determined.

RESULTS In all HRR levels low MET group had significantly lower MET values (p<0.01-0.001). Perceived exertion was significantly higher in low MET group compared to high MET group during graded exercise test. In steady state cycling test, low MET group exercised at higher relative VO₂ values compared to high MET group (p<0.05-0.001). The groups cycled at similar HRR percentages to a given RPE score.

DISCUSSION & CONCLUSION Our results demonstrate that exercise intensity can be prescribed in individuals with different VO₂max levels by HRR percentages or by RPE scale methods considering the fact that individual oxygen consumptions may differ. In conclusion, the guidance of perceptual indices for prescription of exercise intensity has positive associations with physiological variables, and can be used in the estimation of exercise intensity and in the prescription of exercise. Our results suggest that when exercise prescription is organized according to HRR method in sedentary individuals with different fitness levels, exercise intensity may be perceived similar despite different oxygen consumptions. High and low MET groups cycled at similar HRR percentages to a given RPE score. Moreover, exercise intensity of the groups having different maximal oxygen consumption levels could be prescribed either by HRR percentages or by RPE scale methods considering the fact that individual oxygen consumptions during exertion may differ.

KEY WORDS rating of perceived exertion (RPE), Borg scale, cycle ergometer, steady state exercise, VO₂max differences, heart rate reserve (HRR).

The association between physical fitness and ventilatory efficiency in major depressive disorder: A potential adjunct for risk stratification?

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OBJECTIVE Cardiopulmonal exercise testing (CPET) provides eligible information regarding ventilatory abnormality in chronic heart failure (CHF) but in major depressive disorder (MDD) such data remain unavailable. Ventilatory efficiency measurements offer insights into ventilatory and metabolic dysfunction and is commonly used to stratify cardiac risk. Thus, the current study was conducted to estimate and classify ventilatory inefficiency and its relationship to physical fitness in MDD. Secondary, we evaluated ventilatory and metabolic demands at the ventilatory anaerobic threshold (AT).

METHODS A single exhaustive incremental exercise test was completed by 15 female pair matched major depressive patients. AT was assessed as submaximal ventilatory threshold according to Beaver and colleagues. VE/VCO2 slope was fitted via linear regression to the relationship of ventilation and carbon dioxide production until peak exercise. Furthermore, peak exercise data were also assessed in order to quantify ventilatory demands and objective exhaustion levels.

RESULTS In depressive disorder AT appeared at high significant lower relative work rates $(0,48\pm0,14 \text{ vs. } 0,67\pm0,21 \text{ W} \cdot \text{kg-1}, p<0,01)$ than in healthy controls. We found a conspicuous ventilatory abnormality with augmented VE/VCO2 slopes in depressive disorder. Three out of 15 achieved critical ventilatory class (VC)-III (36,0-44,9) and 8 out of 15 achieved VC-II (30,0-35,9; figure 2). We interestingly revealed a strong correlation between physical fitness and ventilatory inefficiency (r=0,84).

DISCUSSION & CONCLUSION CPET measures are beneficial to estimate ventilatory efficiency and maximal and submaximal physical fitness in MDD. But further investigations are needed to verify if the ventilatory classification system is also appropriate to stratify risk levels in depressive disorder.

KEY WORDS exercise testing, ventilatory inefficiency, VE/VCO2 slopes, ventilatory threshold, individual anaerobic threshold, exercise treatment, cardiac risk

Determination of body composition and hydration status in cadet super leage wrestlers (14- 17 years)

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OBJECTIVE In sports based on weight categories such as wrestling, many athletes are exposed to rapid weight loss applications to compete in the categories they want. However, acute weight loss is thought to affect performance and health negatively. This study aims to determine the cadet super league wrestlers' body composition and hydration levels and to investigate how this affects performance.

METHODS Measurements were accomplished on the first day of work, which is the seventeenth day before competition, third day before weigh in, before weigh in and immediately before the competition. During these study periods, body weight, skinfold and urine specific gravity (Usg) were measured and, scoring was done according to competition results.

RESULTS Body weight and hydration levels didn't change significantly until the third day of event weight (P> 0.05). A significat level weight loss (% $3.9 \pm 2,7$) and an increase in Usg level (1.024- 1.028 g/cm³) were determined in the last three days before weigh in. However, no significant change in Usg values (P> 0.05) was observed after weigh in until the match, although a significant weight gain (P< 0.05) was observed. Furthermore, no significant level correlation has been found (P> 0.01) between the positive points obtained at the end of the competition and changes in body weight and hydration levels.

DISCUSSION & CONCLUSION Consequently, it can be said that there are a rapid weight loss and dehydration in cadet wrestlers just before the weigh in and there is a rapid weight gain after weigh in until the competition; however, it doesn't improve the hydration status, so the wrestlers compete dehidrated; however, this doesn't lead to a meaningful change on the wrestlers' match result.

KEY WORDS cadet wrestlers, hydration, urine specific gravity, body weight

Low back pain in elite track and field male and female athletes

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ObjectIve Low back pain is a common complaint in general adult population with disc herniation being the underlying reason most of the times. The aim of this study is to investigate and compare the cause of low back pain (LBP) in elite track and field (T&F) male and female athletes.

METHODS Retrospective cohort study of SEGAS clinic LBP reports compiled by certified physicians between 1998 and 2008. The participants were 18 to 26 year-old male and female elite T&F athletes with LBP. The main outcome measure was an analysis of MRI findings, classified by anatomic location and event category (throwers, jumpers, sprinters, runners and decathlon athletes).

RESULTS One hundred fifty six athletes (65 female, 91 male) were included in the study, all presenting with LBP. MRI reports revealed abnormal findings in 122 athletes (48 female, 74 male) and were normal in 34 athletes (17 male, 17 female). When evaluating all events concurrently disc herniation was the most common cause in both males and females, followed in decreasing order by disc degeneration, disc bulging, spondylolysis, grade I facet degeneration and muscle strain. Significant gender difference in MRI findings (p < 0.05) was seen for three event categories. Disc herniation was more common in female throwers but in males it was more often reported in jumpers and sprinters. Degenerated disc was most commonly seen in male sprinters and in female throwers and jumpers. Facet degeneration was encountered mostly in female sprinters and male jumpers. Finally spondylolysis was mainly seen in female sprinters, jumpers and throwers.

DISCUSSION & CONCLUSION When evaluating all event categories concurrently our data suggest very little difference in MRI findings between elite T&F men and women. However, when assessing each category separately significant gender difference exists.

KEY WORDS low back pain, track and field, male, female

Arthroscopic lateral release for clinical and radiographic tilt of the patella

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OBJECTIVE The purpose of the present study was to evaluate the results of lateral retinacular release, in the treatment of patients suffering from pain, due to chondromalacia of the patella.

METHODS 107 athletes, 62 women and 45 men, who suffered, in the last 6 years (2003-2008), from patellofemoral pain syndrome, were included in the study. The criteria for inclusion were the presence of complaints of patellofemoral pain, with no predominant instability, clinical signs pointing to lateral retinacular tightness and radiological evidence of lateral patellar tilt. In 21 athletes the symptoms were bilaterally. All patients had a positive Clark test, while 32/107 (32,1%) knees had joint swelling. We performed a radiological examination in all patients. At operation all patients were subjected to a comprehensive arthroscopic examination of the knee joint. In 95/107 (88,8%) knees we cut arthroscopically the lateral patellar retinaculum. Any cartilaginous lesions of the patella were classified according to Ficat. Patellar debridement was performed in all cases except from 12/107 (11,21%) knees with 1st degree lesions. The patients began isometric exercises of the quadriceps muscle from the 1st day postoperatively. They followed a program for strengthening of the vastus medialis muscle.

RESULTS All patients were relieved from the pain. The 105/107 (98,13%) patients continued sports, while the 2/107 (1,87%) patients who gave up sports, had taken their decision preoperatively. In 2/107 (1,872%) patients there was a postoperative hematoma in the lateral surface of the knee and in 1 case (0,93%) there was an infection required re operation.

DISCUSSION & CONCLUSION The data indicated that significantly better results can be achieved in patients who have positive clinical signs pointing to patella tightness, well localized parapatellar tenderness and positive medial patellar glide test. Poorer results are to be expected in cases with severe chondral lesions.

KEY WORDS Patellofemoral pain, lateral patellar tilt, arthroscopic lateral release

Clinical outcome of an ACL reconstruction using biodegradable interference screws and a sophisticated graft tension system

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OBJECTIVE The purpose of this study is to report the preliminary postoperative clinical results after arthroscopic ACL reconstruction with quadrupled hamstring autograft, fixed with biodegradable interference screws, endopearl in the femoral tunnel and using a new tensioner for graft tensioning.

METHODS Between May 2003 and May 2007, we performed an endoscopic ACL reconstruction with a quadrupled hamstring autograft in 121 patients. The graft was fixed with a biodegradable interference screw and endopearl in order to enhance the mechanical stability in the femoral tunnel. The tibial side of the graft was fixed by a conical biodegradable interference screw and a washer screw as back-up fixation after tensioning each tendon by different tension. Postoperatively the patients were permitted an accelerated rehabilitation program, without a motion limiting brace. At least 2 years postoperatively (24 - 48months) x-rays, Lachmann's Test, Pivot shift and mean anterior translation of the tibial head, measured by the Rolimeter (side – to – side difference) was evaluated. The average follow-up was 35 months.

RESULTS Radiological findings showed an average of 22% increase in the tibial tunnel diameter. Postoperative complications were four excessive haematomas and three infections, both treated by antibiotics.

DISCUSSION & CONCLUSION Arthroscopic ACL reconstruction with quadrupled hamstring autograft, fixed with biodegradable interference screws and tensioning the two grafts separately, provides excellent ligament stability and permits an early accelerated rehabilitation. There was an increase in the tibial tunnel diameter but there were no effects on the clinical results.

KEY WORDS ACL reconstruction, hamstring's autograft, medial portal placement, graft tension

The study of static lower extremity alignment in female athletes with ACL injury

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OBJECTIVE Rupture of the ACL is a serious, common and costly sport injury in world. Each year an estimated more than 250000 ACL injury occur in USA. Females are 2 to 8 times more likely to sustain ACL rupture than their male counterparts. It appears several intrinsic and extrinsic risk factors associated with ACL injury. The study of three important malalignment risk factor as pronation, tibial torsion and Q angle in tear of ACL in professional female athletes.

METHODS Twenty ACL – injured female (age 24.90 ± 5.75 yr, height 167.05 ± 6.58 cm, mass 60.88 ± 5.58 and athletic experience 7.70 ± 4.41 yr) and 20 non-injured female (age 24.80 ± 5.59 yr, height 166.15 ± 6.39 cm, mass 60.20 ± 6.08 and athletic experience 7.00 ± 3 .69 yr) were matched by age, sport and limb participated in this study. Navicular drop, tibial torsion and Q angle was measured in both limbs. Mechanism of injury was noncontact in about 90% cases.

RESULTS In 17 cases (85%) a medial meniscus injury was reported. The finding showed significant difference between pronation and tibial torsion in groups (p<.05). There is no significant difference in Q angle between groups (p<.05). Also there are no significant difference in lower extremity alignment between injured and non-injured limb of ACL injured group.

DISCUSSION & CONCLUSION Therefore identifying of the biomechanical risk factors and screening athletes with hyperpronation and internal tibial torsion that may predispose them the ACL to excessive injury is important also apply corrective and prevention program from coaches is needed.

KEY WORDS malalignment, female athletes, ACL injury, pronation, internal tibial torsion

The association between tibial slope, isokinetic knee strength and anterior cruciate ligament injury risk in soccer players

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OBJECTIVE The purpose of this study was to examine the influence of tibial slope and isokinetic strength of knee

extensor and flexor muscle groups on anterior cruciate ligament (ACL) injury risk.

METHODS A total of 64 elite soccer players and 45 sedentary controls were enrolled in this study. Radiographic and isokinetic measures were taken before the start of season. The angle between mid-diaphysis line of the tibia and between the anterior and posterior edges of the medial tibial plateau is measured as tibial slope via lateral graphies. Isokinetic strength of knee extensor and flexor muscle groups was measured at 60 and 300./sec through a Cybex 6000 NORM dynamometer. Individual player exposure and injuries prospectively recorded during the two and a half year period.

RESULTS In total, 11 non-contact ACL injuries (10 dominant and 1 non-dominat leg, incidence= 0.2/1000 playing hour) had been registered during the study period. Tibial slope of the injured players in both dominant and non-dominant legs was higher compared with the uninjured players. The difference reached significant level only for the dominant legs (p < 0.001). The tibial slopes of the dominant legs of the injured players were higher than that of the non-dominant legs (p = 0.042). Players with a tibial slope over the mean group value had 5.62 times "Odds Ratio" increased ACL injury risk. Injured players had higher eccentric quadriceps strength (p = 0.007) and lower eccentric flexor/extensor ratio (p = 0.031) at 60°/sec in both dominant and non-dominant legs than uninjured players.

DISCUSSION & CONCLUSION The findings of the study revealed that higher tibial slope seems to be related to increased ACL injury risk. In addition, higher eccentric quadriceps strength and lower eccentric flexor/extensor ratio should also be taken into consideration as contributing factors.

KEYWORDS tibial slope, knee, isokinetic strength, ACL injury

Aerobic training responses in young swimmers of different level

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OBJECTIVE Some authors (e.g. Maclaren and Coulson, 1999; Dekerle, 2006) reported that aerobic training has a positive effect on critical velocity in swimming. However, it raises the question whereas this effect is similar among swimmers of different performance level. Therefore, the purpose of this study was to determine the training responses in aerobic parameters (critical velocity and critical stroke rate) in young swimmers of different level during an in-season period of training.

METHODS 3 groups of 6 young swimmers of both gender belonging to the same swimming club participated in this study. All participants have been trained by the same coach and for the same club for the previous two years. Swimmers were divided according to the value of critical velocity value determined using 50 m and 400 m front crawl tests. Group 1 comprised of 6 swimmers with the best performance in the test (high level), group 3 comprised of 6 swimmers with the lower performance (poor level) and group 2 was the intermediate group. The evaluations took place in two different moments: beginning of the in-season and after 12 weeks of training. For each swimmer, critical velocity and critical stroke rate were determined in both moments.

RESULTS In groups 1 and 2 critical velocity increased between the first and the second moment (1.15 vs. 1.18 m.s₋₁; 1.04 vs. 1.07 m.s₋₁; p<0.05) whereas in group 3 the increase in critical velocity was not significant (p>0.05). Although critical stroke rate decreased in the same period for all groups, this decrease was not significant in none of them.

DISCUSSION & CONCLUSION As expected, critical velocity enhanced during the training period, suggesting that 12 weeks of swimming training cause the improvement in the aerobic capacity. The swimmers were able to perform the same intensity without increasing their stroke rate to swim at a higher velocity. The combination of stroke rate with critical velocity could be useful physiological and technical criteria for coaches for monitoring endurance training in swimmers; despite more research is needed to understand the effects of training in different level groups.

KEY WORDS Physiological, aerobic, technique, training, swimming.

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Estimation of biological age in females aged 18-65 based on physical fitness factor

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OBJECTIVE Biological age depends on functional capacity of cells, organs, and the body as a whole. Chronological age is not always an appropriate marker of biological age, simply because the growth and aging rate is not the same for different people. This study was designed to study the rate of biological aging in females according to the level of their sporting activities. It also provided a good opportunity to produce an equation to estimate biological age of Iranian women.

METHODS 107 females aged 18 to 65 were recruited for the study. They belonged to age categories of 18-20, 21-25, 26-30, 31-35, 36-40, 41-45, 46-50, 51-55, 56-60, and 61-65. Each category consisted of at least 10 volunteers out of 15 females who were requested to participate in the study. Physical fitness tests included: vertical jump, modified pull-ups, sit and reach, Ellinois agility test, 30 meter run, 20 meter Shuttle run, sit-ups, and medicine ball throw. Sporting activity level was determined using a standard scale. The data was statistically analyzed by Discriminant and Multiple Regression analyses.

RESULTS Data analysis revealed that chronological age had a reverse relationship with all physical fitness factors. However, the rate of declination of physical fitness of subjects depended on their sporting activity level, indicating the higher the sporting activity the lower the rate of declination ($p \le 0.05$). A multiple regression formula was developed for estimation of biological age in women.

DISCUSSION & CONCLUSION The positive effect of sport on biological age explored in this study is similar to findings of other researchers in developed countries. However, our subjects had lower physical fitness compared to them. This finding is alarming, especially when considering aerobic fitness. This study could be more reliable, if the same data are collected from other provinces of the country.

KEY WORDS aging, physical fitness, females, biological age

Exercise training restores hemodynamic, hormonal and metabolic profile in normotensive young women at high familial risk of hypertension

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OBJECTIVE Offspring of essential hypertensive parents are at high risk of future hypertension and subsequent cardiovascular diseases. However, the underlying pathophysiology of family cluster hypertension in women is incompletely understood. Moreover, there is little information about the effects of exercise training (ET) in this population.

METHODS We studied healthy sedentary young women with two hypertensive parents (FH++: n=17; 25.1±4.8 years), one hypertensive parent (FH+: n=18; 24.9±4.1 years), or none hypertensive parent (FH-: n=15; 25.3±3.8 years), to analyze their ambulatorial blood pressure (ABP), carotid-femoral pulse wave velocity (PWV), and biochemistry (total cholesterol and fractions, triglycerides, glucose, insulin and insulin sensitivity). BP, nor-epinephrine (NE), endothelin-1 (ET-1) and nitrite/nitrate (NOx) were also analyzed during a graded exercise test (GXT). Then, the FH++ and FH+ women were randomically assigned to a three times-a-week ET program (FHex) or control group (FHcon), and had their ABPM, PWV, biochemestry, NE, ET-1 ant NOx levels analyzed after 16 weeks of follow-up.

RESULTS ABP were not different between groups, but PWV was 7.5% and 12.6% higher in FH++ than FH+ and FH-, respectively, and 4.8% higher in FH+ than FH- (p<0.01). Insulin and insulin sensitivity were increased in FH++ and FH+ (p<0.05), and LDL-cholesterol tended to be higher only in FH++ (p=0.07). FH++ showed higher exercise diastolic BP than FH- (p<0.01), and increased resting, exercise and recovery NE and ET-1 levels than FH-. FH+ showed only greater rest, exercise and recovery NE, exercise EPI, and rest ET-1 (p < 0.05). Rest, exercise and recovery NOx were lower in FH++ and FH+ than FH- (p<0.01). On the other hand, ET reduced PWV (p<0.01), insulin (p=0.001), insulin sensitivity (p < 0.01), and LDL-cholesterol (p < 0.05), to levels similar to those of FH–. ET also reduced exercise diastolic BP (p < 0.05), rest and exercise NE (p < 0.05), and rest ET-1 (p < 0.05). Exercise and recovery NOx was also improved after ET (p<0.05). There were no significant differences in any parameter for the FHcon or FH– after the follow-up.

DISCUSSION & CONCLUSION Hemodynamic, metabolic and hormonal abnormalities typical of hypertension were

presented in nonhypertensive young women offspring of hypertensive parents before any increase in BP, where the greater abnormalities were observed in women with a strong family history of hypertension (FH++). On the other hand, exercise training restores these abnormalities to levels similar to those of young women without history of hypertension. These results suggest that exercise training may have a potential role in the management of an inherited hypertensive disorder.

KEY WORDS hypertension; endothelial function; insulin; sympathetic activity; exercise; prevention

Prevalence of haemoglobinopathies in Qatar sportsmen

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OBJECTIVE Haemoglobinopathies are prevalent in many regions of the world, with the impact on both health and athletic performance varying depending on the nature of the abnormality. Extreme exercise may be hazardous in athletes even with haemoglobinopathy trait. This study wished to evaluate the prevalence of hemoglobinopathy (homozygous or heterozygous) in sportsmen in Qatar.

Methods 704 male athletes who underwent medical screening over a 12 month period were included in the study, with all athletes having a low Mean Cell Volume (MCV) or Mean Cell Haemoglobin (MCH) investigated with a thallassemia screen and DNA analysis as indicated. Age ranged from 14 to 36 years old (mean 22.5).

RESULTS Of 104 (14.7%) athletes meeting the criteria for further investigation, 81 (77.8%) underwent further testing. The prevalence of thalassaemia trait in this group was found to be 19.7%. Haemoglobinopathies observed included 8 â-Thalassaemia minor, 8 á-thallassemia minor, 4 sickle cell trait and one Haemoglobin D Los Angeles variation. Of those found to be positive for thalassaemia, 13 were Qatari (61.9%), with the remainder being from other Gulf, Asian and African countries.

DISCUSSION & CONCLUSION We conclude that there is a high prevalence of hemoglobinopathy trait in athletes in this region with low MCV and MCH, and given the potential implications for health, screening and counseling to this population is recommended.

KEY WORDS sport, athlete, thallassemia, hemoglobinopathy, blood rheology

Efficacy of COX-2 inhibitor drug on exercise-induced inflammation and lipid peroxidation

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OBJECTIVE The purpose of this study was to examine the effect of acute Celecoxib administration on exerciseinduced inflammation, muscle damage and lipid peroxidation markers.

METHODS Twenty healthy untrained male (age; 25.5 ± 4.5 yrs, weight; 72.7 ± 7.9 kg, height; 177.3 ± 7.2 cm) were randomly assigned to treatment (T) and placebo (P) groups. Blood samples were taken before, immediately, 3 and 24h after exercise. Subjects ran for 30-min at 75% VO2max on treadmill. T and P groups consumed 100 mg Celecoxib and placebo immediately and 12h after the second blood sampling, respectively. Total leukocyte counts and creatin kinas (CK) activity by Aautoanalyzer, C-reactive protein (CRP) by Nephelometry and malondealdehyde (MDA) by HPLC were measured. Data were analyzed using repeated measures analysis of variance (ANOVA) with Bonferroni correction.

RESULTS Markers of inflammation (total leukocyte and neutrophil counts) were significantly increased 3h and decreased 24h after exercise in both groups (P<0.05). Lymphocyte counts significantly decreased 3h after exercise (P<0.05), then increased 24h after exercise only in P group. CRP and CK levels were significantly increased immediately, 3 and 24h after exercise in two groups (P<0.05), but no difference between groups. Peak of CK activity was found 24h after exercise only in T group. MDA levels were significantly increased immediately after exercise in both groups (P<0.05). There was no difference between two groups, though MDA levels were higher 24h after exercise in T group.

DISCUSSION & CONCLUSION According to this study, it seems acute Celecoxib administration has been able to attenuate some markers of inflammation but not lipid peroxidation.

KEY WORDS Celecoxib- Lipid peroxidation- inflammation- muscle damage

A 6-week protocol based on exercise and antioxidant supplementation improved oxidative stress in athletes with mental retardation

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OBJECTIVE Recent studies have reported a high prevalence of obesity and overweight in handicapped athletes. However, little information is available in the literature regarding oxidative stress in high-performance athletes with mental retardation. Mainly if we take into account high performance, overweight and mental retardation have been associated to increased oxidative damage that has been finally proposed as a pathogenic mechanism of atherosclerosis, cell aging, neurodegeneration, etc. in this population. Further oxidative damage may impair their physical performance as well as increasing the risk of sports-related injuries. Accordingly the present study was undertaken to ascertain the influence of a mixed protocol in plasmatic total peroxide concentration in athletes with mental retardation.

METHODS Fifty-five high-performance, overweight athletes with mental retardation volunteered for this study. Fourty were randomly included in experimental group to perform a 6-week protocol including exercise (low-moderate intensity aerobic exercise before breakfast 3 times/week, 45-50 minutes) and supplementation (1g ascorbic acid + 400 UI fN-tocopherol 6 times/week). Control group included 15 age-sex-trained and BMI-matched athletes with metal retardation that did not perform our protocol. Further our protocol was approved by an institutional ethic committee. Total peroxide concentrations of plasma sample were determined by using the FOX2 method with minor modifications 72-hours before starting the protocol (pre-test) and after its ending (post-test).

RESULTS When compared to baseline plasmatic total peroxide concentration was decreased significantly after our 6-week protocol (14.6 ± 1.7 vs 11.3 ± 1.2 micromol H202/L; p<0.05). No changes were reported in controls.

DISCUSSION & CONCLUSION It was concluded a 6-week mixed protocol based on fasting exercise and antioxidant supplementation decreased significantly total peroxide concentration in athletes with mental retardation. Further studies on this topic are required to improve both their physical performance and health status.

KEY WORDS Oxidative stress; mental retardation; exercise

The effects of heat stress on eccentric exercise induced muscle damage

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OBJECTIVE Heat stress has been shown to increase tissue levels of heat shock protein 70 (HSP70), which protects cells from further stresses. The purpose of this study was to determine if heat stress is effective to prevent or reduce the degree of muscle damage following eccentric exercise.

METHODS 22 volunteer males were randomly assigned to either sauna (SAU, n = 10, age: 24.90 ± 1.91 year) or control (CON, n=12, age: 23.00 ± 2.21 year) groups. SAU group was exposed to sauna for 2X20min with 10min break at a temperature of 85 °C and 50% humidity, 24h before eccentric exercise. Participants in both groups performed 8X10 maximal eccentric knee flexion (from a 180 degree full extension to 90 degree flexion) at 60 rad degrees/s. Plasma HSP70 levels were evaluated before and 24h after sauna exposure. To evaluate biochemical muscle damage markers; plasma CK, LDH, AST and ALT enzymes were determined just before and 1, 2, 3, 4, and 7 days after eccentric exercise. Isometric knee flexion and extension strengths were measured on the same time frame at a joint angle of 90 degree. In addition, neutrophil chemiluminescence, ADP and collagen induced thrombocyte aggregations were measured.

RESULTS There were no significant differences in resting plasma HSP70 levels between SAU and CON groups (p>0.05). Sauna exposure resulted in 94% increase in plasma HPS70 levels (p<0.05). Although CK activity significantly increased in both groups following exercise (p<0.01), there were no differences between SA and CON groups (p>0.05). LDH, ALT or AST enzyme levels did not change following exercise in either group (p>0.05). While eccentric exercise resulted in decreases in isometric extension strength in both groups (p<0.01), flexion strength was protected in sauna group, and it was higher than that of CON group (p<0.01). Neutrophil chemiluminescence values decreased after exercise in SAU (p<0.01) group, and it was lower than that of CON (p<0.01) group. ADP induced thrombocyte aggregation increased 24 hours after exercise (p<0.05), however, there were no significant group differences (p>0.05). On the other hand, no significant change was observed in collagen induced thrombocyte aggregation after exercise (p>0.05) in both groups.

DISCUSSION & CONCLUSION This study has shown that heat stress induced by sauna results in increased levels of

plasma HSP70 and decreased neutrophil functions. Although heat stress did not effect on biochemical damage markers following eccentric exercise, it resulted in mild degree of protection of muscle strength which could be an important for exercise performance.

KEY WORDS Heat stress, muscle damage, eccentric exercise

Does age and physical fitness affects resistance exercise intensity progression in men?

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OBJECTIVE It has been recommended that older people must increase resistance exercise (RE) training intensity more slowly than young people, indepently of health or physical fitness status. However, there is no scientific evidence supporting this recommendation. Our purpose was to compare the RE intensity progression between older (sedentaries or activies) and young men.

METHODS Healthy men, divided in young sedentaries (YS; n = 8; age = 25.9 ± 3.7 years, BMI = 23.5 ± 5.1 kg/m2), older sedentaries (OS; n = 7; age = 67.4 ± 5.2 years; BMI = 26.5 ± 4.5 kg/m2), and older runners (OR; age = 71.3 ± 3.0 years; BMI = 22.7 ± 0.5 kg/m2), were submitted to a 13-week RE program. RE was performed 2 times a week, and consisted of 2 sets of 8 to 12 repetitions in 9 exercises; initial intensity = 60% of 1 repetition maximum (1-RM). Exercise intensity was increased in 5% to 10% each time 2 sets of 12 repetitions were performed in a determined exercise. 1-RM test was used before and after follow-up to measure muscle strength.

RESULTS Muscle strength increased 35.4% after 6 month of training, followed by lower but significant increases of 8.4%, 4.2% and 5.1% at post-12, post-24 and post-36 month of follow-up, respectively (p<0.01). Cardiorespirespiratory fitness was continuously increased by 5.4%, 6.1% and 2.3% at post-12, post-24 and post-36 month of follow-up (p<0.05). Resting HR was reduced 6.1 beats per minute at post-12, did not changed at post-24, and reduced 5.3 beats per minute at post-36 month of follow-up (p<0.05). Peak HR did not changed significantly during the follow-up, and recovery HR reduced 6.15, 5.0 and 7.9 beats per minute at post-12, post-24 and post-36 month of follow-up (p<0.05).

DISCUSSION & CONCLUSION The results suggest that two times-a-week multi-component exercise training is enough to improve physical fitness and HR profile to exercise of middle-aged and older women, and that the improvements continue even after a three-year follow-up, although in an lower intensity.

KEY WORDS Aging; exercise; exercise progress; muscle strength; older.