Monitoring of sport injuries in young elite soccer players
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BOOK OF ABSTRACTS

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beats/min in Sweden and Norway players having age of 27±1 yrs (Andersson et al., 2008). Even though the mean peak heart rate for Indian players was relatively low as 18±1 beats/min, but the age group was studied varied 24±3 yrs. CK, LDH, UA and urea are the indicators of the physiological stress imposed by exercise. All the values after 12 hour of game situations came back with in the normal range, signifies better bodily response to the exercise. This preliminary result clearly indicates their ability for the adaptations were better during and after the game. References Andersson H, Ekblom B, Krostup P. Elite football on artificial turf versus natural grass: movement patterns, technical standards, and player impressions. J Sports Sci. 2008; 26:113e22. Brancaccio, P., Maffulli, N. & Limongelli, F.M. Creatine kinase monitoring in sport medicine. Br Med Bull 2007;81-82. 209-230. Malkovic B.R. Janevski S. Heimer S. Physiological profiles of top Croatian soccer players. In T. Reilly, J. Clayers & A. Sibibe (Eds.), Science in football II (37) 1994. (1st ed.). London: E & FN Spon.

VARIABILITY OF THE METABOLOMIC RESPONSE TO ENDURANCE EXERCISE IN MODULATED BY THE TRAINING STATE

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Introduction Exercise is a major stimulus for energy metabolism. Classical exercise biochemistry provided an initial description of the induced biomechanical pathways. A holistic picture of the metabolic processes being induced in exercised muscle, and the influence of inter-individual factors such as gene x environment interactions has not been carried out. We hypothesised that exhaustive exercise alters the abundance of a sizeable portion of molecular species in skeletal muscle and that this depends on the training state and inter-individual factors such as gene x environment. Alterations of the muscle metabolome were explained by the training state, rather than capillarity and the ACE I/D gene polymorphism. Discussion The data point out that a relative short endurance stimulus induces a response of metabolite species that are not typically important for these types of stimuli. The identified influence of training state on muscle’s metabolic response to exercise implicates that repeated muscle work alters the pool sizes of metabolic substrates. Contact mflueck@research.balgrist.ch

AB-CRYSTALLIN MODULATION AFTER ACUTE EXERCISE IN SKELETAL MUSCLE: THE ROLE OF OXIDATIVE STRESS AND FIBER COMPOSITION

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INTRODUCTION AB-cryalllin (CRYAB) is a member of the small heat shock proteins implicated in various biological processes, particularly in skeletal muscle where it is involved in adaptive remodelling processes and activation of gene transcription (Ito et al. 2001; Singh et al 2007). We analysed AB-cryalllin’ response in mouse gastrocnemius after recovery from exercise, correlating its modulation with oxidative stress level and fiber composition. METHODS In vivo model: BALB/c mice of 3 weeks age were divided in two groups: Sedentary (S) and Exercised (EG, 15'. The EG performed 1hr of aerobic exercise at 5.5m/min on a motor and red gastrocnemius (RG), while white gastrocnemius (WG) and soleus (SO) were collected after 0', 15' and 30'. In vitro model: C2C12 myotubes were treated with hydrogen peroxide (H2O2) for 1 hr at 200μM and 300μM. After 0hr, 3hr, 6hr and 9hr of recovery time, stress proteins response (CRYAB, HSP70, HSP27), oxidative damage (carbonylated protein and 4-HNE), antioxidant proteins (TrxR1 and MnSOD), as well as survival and apoptotic pathways (p38MAPK, Caspase3, Akt,c-Jun, NFκB-p65 and NFκB) were evaluated in all samples. RESULTS While no increase in CRYAB protein level was observed, we clearly demonstrated that the acute exercise lead to a rapid, specific increase of phospho-CRYAB in the RG, but not in the WG. Moreover, this induction resulted correlated with increased levels of 4-hydroxynonenal (HNE), suggesting a putative role for exercise-induced oxidative stress in driving CRYAB, but not hsp70 or hsp27, activity. These data were also confirmed in the C2C12 in vitro model, where we detected a significant enhancement of pCRYAB in H2O2-treated C2C12 myotubes. Moreover, the specific inhibition of p38 activity was able to counteract the H2O2-mediated phosphorylation of CRYAB, confirming the involvement of this MAPK in the molecular pathway driving pCRYAB. DISCUSSION We demonstrated for the first time a fiber-dependent, p38MAPK-related role of CRYAB in the response of skeletal muscle to acute aerobic exercise. Further experiments are in progress to clarify both the molecular pathway driving CRYAB phosphorylation and its fiber-specific induction. In particular, we aim to identify the protein interactions to pCRYAB leading to the preservation of oxidative fibers’ integrity and/or survival (Sakurai et al., 2005; Bullard et al., 2004). REFERENCES H. Ito, K. Kamei, I. Iwamoto, Y. Inaguma, K. Kato. (2003) Exp Cell Res B.N. Singh, K.S. Rao, T. Ramakrishna, N. Rangaraj, C.M. Rao (2007) Mol. Biol. T. Sakurai, Y. Fujita, E. Ohito, et al (2005)FASEB J. B. Bullard, C. Ferguson, A. Minajeva, et al (2004)J. Biol. Chem. leisadillygrazioli@gmail.com

Oral presentations

OP-PM33 Sports Medicine & Orthopedics: Injury prevention I

MONITORING OF SPORT INJURIES IN YOUNG ELITE SOCCER PLAYERS

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Introduction Little information exists on the magnitude of injuries in elite development programs for young talented soccer players. The purpose of this study is to investigate the magnitude of the injury problem and to explore different monitoring methods. Methods During
a 5 month period (aug – dec. 2014). 24 talented female soccer (mean age 17.2 ± 1.2) players filled in the OSTRC Oversea Injury Questionnaire (Clarsen et al. 2014) on a 2-weekly basis to monitor injuries. In this questionnaire, 4 questions are used to monitor the severity (range 0 – 100) of any physical problem. Subsequently, all players were asked to retrospectively report all time-loss injuries after the 5 month period. Results The response rate over the 5 month period for the online OSTRC questionnaire was 97%. A total of 256 questionnaires were filled in by all 24 players. Based on the OSTRC questionnaire, 63 injuries were reported. The most common localisations were ankle (18%), knee (14%) and the front side of the upper leg (14%). Most injuries were acute (76%) and 24% of the injuries was a re-injury. The duration of injuries ranged from 0 to 71 days, with a median of 2 days. In total, 17 time-loss injuries were reported. The most common localisations of the time-loss injuries were the ankle (29%), the knee (17%) and the back side of the upper leg (12%). Time-loss ranged from 9 to 65 days, with a median of 31 days. The total burden of each injury, calculated by summing the severity score for each 2-week period, was higher in time-loss injuries (mean = 185 vs 38). The sum of the severity score correlated significantly with the duration of the injury problems (r=0.91, p<0.001). The sum of the score of the only first question of the OSTRC questionnaire (the existence of health problems) also correlated significantly with the duration of the injury problems (r=0.91, p<0.001). Discussion The presented data show that many reported injuries do not necessarily lead to time-loss. This indicates that participation in training and matches with physical discomfort is common. Future studies may investigate the risk of physical discomfort on future time-loss injuries. Finally, simplifying the OSTRC questionnaire will benefit monitoring in a practical setting, especially with younger athletes. Our findings suggest that the first question of the OSTRC questionnaire is representative for the total injury severity. This result can form a starting point for further research on practical and valid injury monitoring tools. Contact a.richardson@hva.nl

CAN MOTION CONTROL SYSTEMS PREVENT RUNNING-RELATED INJURY?
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Introduction A recent prospective study suggested that pronation is not a risk factor for running-related injuries (RRRI) [11]. Nevertheless, runners with pronated feet are usually recommended to wear shoes with motion control systems (MCS). Therefore, the aim of this study was to determine whether or not runners using shoes with MCS will sustain fewer RRRI than runners using standard neutral shoes. Methods This double-blind randomized control trial included 372 recreational runners. Foot morphology was analysed using the Foot Posture Index. The participants were randomly allocated to either the experimental group (MCS) or the control group (STD). The only difference between the shoe models was the presence of MCS in the shoes distributed to the experimental group. Training and injury data were collected during 6 months on an internet based platform: www.TIPPS.lu. A RRRI was defined as a physical pain or complaint, located at the lower limbs or lower back region, sustained during or as a result of running practice and impeding planned running activities for at least 1 day. Cox regression analyses were used to compare the occurrence of RRRI rates between the two groups based on hazard rate ratios (HR) and their 95% confident intervals (CI). Stratified analyses were conducted to evaluate the effect of MCS in runners with supinated, neutral and pronated feet. Results 93 participants (25%) experienced at least one RRRI during the observation period. The adjusted risk ratio for runners in the experimental group (MCS) compared to the runners from the control group (STD) was 0.55 (95% CI = 0.36 – 0.85). Previous injury was identified as a risk factor [HR=2.72, 95%CI=1.79-4.41], while running experience over the last 12 months correlated significantly with the duration of the injury problems (r=0.91, p<0.001). The sum of the severity score correlated significantly with the duration of the injury problems (r=0.91, p<0.001). Discussion The presented data show that many reported injuries do not necessarily lead to time-loss. This indicates that participation in training and matches with physical discomfort is common. Future studies may investigate the risk of physical discomfort on future time-loss injuries. Finally, simplifying the OSTRC questionnaire will benefit monitoring in a practical setting, especially with younger athletes. Our findings suggest that the first question of the OSTRC questionnaire is representative for the total injury severity. This result can form a starting point for further research on practical and valid injury monitoring tools. Contact a.richardson@hva.nl

PARALYMPIC ATHLETES’ PERCEPTIONS OF THEIR EXPERIENCES OF SPORTS-RELATED INJURIES: A QUALITATIVE STUDY
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Introduction Our knowledge of sports-related injuries in Paralympic athletes is limited [1], and there are no data on how the athletes themselves perceive an injury and how the disability itself influences their perceptions. The aim of this study was to explore Paralympic athletes’ perceptions of their experiences of sports-related injuries. METHODS Eighteen elite athletes were recruited by a purposive sampling from the Swedish Paralympic program. Athletes with vision impairment, spinal cord injury, cerebral palsy, intellectual disability, myelomeningocele, dysplasia and neuromuscular disorders participated. They represented goalball, wheelchair rugby, athletics, cycling, skiing, boccia, ice sledge hockey, table tennis and swimming. Data were collected through individual interviews. For the detection and interpretation of the athletes’ perceptions of their experiences a qualitative phenomenographic design was used. RESULTS The analysis revealed eight different categories of the perception of the experiences of the cause of a sports-related injury. The athletes perceived that the disability itself influences the cause and impact of an injury. Another perception was that the impact of elite training was seen as a cause of injury, and this may be explained by the inability to train correctly. Also, a majority of the athletes perceived that injuries could be self-inflicted. The domain to this category was described as one’s own performance and the essence as guilt. Other categories identified were: the normalized pain, the impact of injury, individual possibilities to prevent injuries, the dangerous elite sports and the in equal prerequisites. CONCLUSION The results from this study indicate that Paralympic athletes’ perceptions of their experiences of sport-related injuries are complex and multifactorial. This needs to be considered in the design of future injury surveillance systems and prevention programs. Also, these perceptions need to be taken into account in the sports safety work within the National Paralympic Committees to be able to secure a safe future sports career for Paralympic athletes. REFERENCES 1. Fagher K & Lexell J, Sports-related injuries in athletes with disabilities, Scand J Med Sci Sports 2014 Oct;24(5):e320-31 CONTACT kristina.fagher@med.lu.se