INCIDENCE AND RISK FACTORS OF LATERAL ANKLE SPRAIN IN MALE YOUTH SOCCER PLAYERS –PROSPECTIVE STUDY–

MURATA, K.
WASEDA UNIVERSITY

INTRODUCTION: Lateral ankle sprain (LAS) is a trauma with high occurrence frequency and recurrence rate in soccer [1]. Previously, epidemiological studies and prospective investigation of risk factor in LAS have been mostly conducted with adult players [2,3]. Thus, the risk factors of LAS in youth soccer players is still unclear. Based on this background, this study aims to investigate prospectively risk factor of initial LAS for youth soccer players.
METHODS: The chronological age, height, weight, competition history, history of LAS, and the incidence of the initial and recurrent LAS were recorded for 195 male youth soccer players (ages 10 to 15 years old). The peak height velocity age (PHVA) was estimated using Auxal (Scientific Software International, Inc.). The subjects were then divided into three groups with the following criteria; Pre (< PHVA-1yr.), Average (PHVA±1yr.), and Post (> PHVA+1yr.). Measurements included: arch height ratio, leg heel angle (LHA), forefoot angle (vs. rearfoot), ankle dorsi / plantar flexion, foot internal rotation in ankle plantar flexion, weight-bearing dorsi flexion, navicular-medial malleolus distance, lateral side hop distance, side hop test time, and Y-balance test results. Then, a logistic regression analysis was performed for analyzing risk factor of LAS using all measurements as independent variables. One-way ANOVA was conducted between the three groups [Sprain Foot (SF) group, No Sprain Foot (NSF) group and the control (C) group]. The statistical significance level was set at 0.05.
RESULTS: The incidence of initial and recurrence LAS was 7.4% and 17.6%, respectively. The incidence rate was higher in Post (11.1%) than that of Pre (8.6%) and Average (4.8%). Risk factors of the initial LAS group were short competition history [odds ratio (OR) 0.95 (95% CI: 0.92-0.99)] and the lack of ankle dorsiflexion ROM [OR 0.91 (95% CI: 0.84-0.99)]. In comparison among the three groups, LHA was significantly eversion in the NSF group compared with C and SF group ($p < 0.05$). Forefoot angle was significantly inversion in the NSF group compared with the C group ($p < 0.01$). Ankle dorsiflexion was significantly smaller in the NSF group compared with the C group ($p < 0.05$).
CONCLUSION: The recurrence rate of LAS in youth soccer players was higher than that of adult players [3]. These results imply that youth soccer players need more appropriate rehabilitation for preventing recurrent LAS. In addition to the internal risk factors such as lack of ankle dorsiflexion ROM and the relative inversion alignment of ankle, short competitive history was the possible risk factor. These results may imply that players with inadequate skills are vulnerable to LAS. Thus, developing specific soccer skills as well as improving ROM and alignment of ankle are warranted for preventing LAS of youth soccer players.
Reference
1) Swenson DM. Clin J Sport med, 2013. 23(3): 190-6.
2) Fousekis K. Am J Sports Med, 2012. 40(8): 1842-50.
3) Kobayashi T. Orthop J Sports Med, 2013. 1(7): 2325967113518163.

CONCUSSION REPORTING BEHAVIOURS AND ATTITUDES IN IRISH AMATEUR AND PROFESSIONAL JOCKEYS

CULLEN, S.1, WARRINGTON, G.2, WHELAN, G.3, MCGOLDRICK, A.3, O'CONNOR, S.4
1: WATERFORD INSTITUTE OF TECHNOLOGY, IRELAND 2: UNIVERSITY OF LIMERICK, IRELAND 3: THE TURF CLUB, KILDARE 4: DUBLIN CITY UNIVERSITY, IRELAND

INTRODUCTION: Under-reporting of concussions is a serious concern in sport, with concussion understanding and attitudes potentially impacting on reporting (Kroshus et al., 2010). Concussions are frequent in both professional and amateur horse racing (O'Connor et al., 2017), however concussion reporting behaviours and attitudes in these athletes have not yet been investigated. This study aimed to investigate concussion reporting behaviours and attitudes among Irish professional and amateur jockeys.
METHODS: Licensed amateur and professional jockeys (n=119) were recruited to complete an anonymous questionnaire which was distributed through emails sent to jockeys, over social media and during professional and amateur race meetings. Questions were included on basic demographics, past personal concussion history and attitudes towards concussion.
RESULTS: Despite not being medically diagnosed, amateur (32.4%) and professional (19.6%) jockeys suspected that they did sustain a concussion. This was not apparent in professional flat jockeys. If a concussion occurred during riding out or if an important race was coming up within the following week, 52.8% and 63.8% of jockeys would not report a suspected concussion respectively. However, if they felt they were unable to ride the next horse to the best of their ability, three quarters of jockeys would report a suspected concussion. Reasons for not reporting a suspected concussion and continuing to ride included not considering it serious (85.7%); under pressure at risk of losing the ride (84.0%); not wanting to let owner down (77.8%); considered as a sign of weakness (74.1%); unsure if a concussion was present (60.0%); needed money (48.1%) and an important race (44.0%).
CONCLUSION: Attempts have been made in the Irish horse racing industry to improve jockey knowledge and understanding of concussion through the distribution of factsheets to each license holder annually as well as displaying these at all race tracks. In addition, a mandatory medical assessment by a Turf club approved medical doctor is required following any fall at a race-track in the attempt to deter under-reporting. Despite this, under-reporting of concussions does still occur. The reasons provided by jockeys for under-reporting suggest there is a need to educate the wider racing community and jockey support network on the adverse health implications of concussion as well as appropriate management to encourage reporting of suspected concussions by jockeys.

NO ADAPTATIONS IN MUSCLE ARCHITECTURE AFTER 12 WEEKS OF STATIC STRETCHING IN YOUNG HEALTHY PARTICIPANTS

LONGO, S., CÈ, E., BISCONTI, A.V., LIMONTA, E., RAMPICHINI, S., SHOKOHYAR, S., CORATELLA, G., ESPOSITO, F.
UNIVERSITÀ DEGLI STUDI DI MILANO

INTRODUCTION: Muscle architecture is one of the main determinant of muscle function and performance. Adequate mechanical stimuli (e.g., strength training) can induce modifications in muscle architecture. However, whether long-term stretching provides a sufficient stimulus for bringing architectural changes is still controversial. Therefore, the aim of the present study was to assess possible changes in muscle architecture after 12 weeks of static stretching (SS) in young healthy participants.
METHODS: Twenty-eight participants were randomly divided into two groups: stretching (STR, n=16, 7 females and 9 males; mean±SD: age=23.5±1.0 yrs; stature=1.75±0.08 m; body mass=69.8±8.9 kg) and controls (CTR, n=12, 6 females and 6 males; mean±SD: age=24.2±2.4 yrs; stature=1.70±0.06 m; body mass=65.5±7.2 kg). STR underwent 12 weeks of SS for both pantarflexors (PF) and knee extensors (KE) muscles. CTR did not undergo any training intervention. SS was performed five times per week. One session consisted in 5

sets of 45-s SS each (15-s rest in-between). A total of four exercises were executed: two for PF and two for KE of the right lower limb. All participants kept a file record of the training sessions performed. Ultrasound images of the medial head of the right gastrocnemius (GM) and vastus lateralis (VL) muscles were obtained at 50% muscle length before, at six weeks, and the end of the 12 weeks in both groups. Fascicle length (Lf), pennation angle (PA) and muscle thickness (MT) were measured offline by using an open source software. A 3x2 mixed-model ANOVA was used to assess possible differences over time and between groups in all architectural parameters for each muscle group. Significance was set with $p<0.05$.
RESULTS: Lf, PA and MT did not change significantly in STR over time ($p>0.05$ for all parameters) in both PF and KE. No significant differences were found between STR and CTR over time ($p>0.05$ for all parameters at any time point) in both PF and KE. No time x group interactions were found ($p>0.05$ for all parameters) in both PF and KE.
CONCLUSION: 12 weeks of SS did not induce architectural changes in the mid portion of the GM and VL muscles. These results suggest that common SS exercises for the PF and KE do not provide a sufficient mechanical stimulus for structural adaptations of GM and VL, respectively, despite the protocol duration (12 weeks). However, regional adaptations cannot be excluded.

TRAINING EFFECTS OF ALTERNATED AND PULSED CURRENTS ON FAT MASS OF COMPETITIVE ATHLETES

OLIVEIRA, P., MODESTO, K., BOTTARO, M., BABAULT, N., DURIGAN, J.

UNIVERSITY OF BRASÍLIA/FEDERAL INSTITUTE OF BRASÍLIA

INTRODUCTION: Neuromuscular electrical stimulation (NMES) is widely used for strength training in healthy individuals and athletes. Previous studies have shown that alternated mid-frequency currents (MF) and low-frequency pulsed currents (PC) have similar effects on quadriceps evoked strength and level of discomfort in this population. However, little is known about the effects and best parameters of NMES to induce fat mass loss. The aim of the study was to evaluate the effects of 6 weeks training with different neuromuscular electrical stimulation (NMES) currents (medium alternated and low frequency pulsed current) on fat mass of competitive athletes.
METHODS: A double-blind controlled and randomized experimental study was carried out with 33 athletes (22.2 ± 2.6 yrs, 74.7 ± 9.8 kg, 176.8 ± 6.0 cm), divided into 3 groups: mid-frequency current (MF, n=12), pulsed current (PC, n=11) and control group (CG, n=10). Fat mass percentage was assessed before and after the interventions through a body composition bio-impedance scale (BC-418 Segmental Body Compostion Analyzer, Tanita Corporation of America Inc., Illinois, USA). NMES training was performed 3 times per week and consisted of 18 sessions, 15 min/session (36 involuntary isometric contractions per session), 6s duration in each contraction interspersed with 18s rest. Data were expressed as means ± standard deviation (SD) and normality was checked using the Shapiro-Wilk test. A two-way analysis of variance (ANOVA) with repeated-measures and Tukey post-hoc test were used to analyze data (group and time effects). Statistical significance was accepted with $p < 0.05$.
RESULTS: After the training period, fat mass percentage did not change in any group (PRE: PC = 14.2 ± 3.5 %, MF = 15.4 ± 3.8 %, CG = 15.0 ± 5.1 %; POST: PC = 14.3 ± 3.5 %, MF = 15.0 ± 4.1 %, CG = 14.7 ± 3.9 %; $p > 0.05$). All currents produced similar evoked torque and levels of discomfort ($p > 0.05$).
CONCLUSION: Quadriceps NMES training applied through alternated or pulsed currents produced similar effects and did not change fat mass composition in competitive athletes.

CORTICAL AND MOTOR NEURONE EXCITABILITIES VARY WITH THE RATE OF FORCE DEVELOPMENT OF THE SUBSEQUENT CONTRACTION

GOUVERNEUR, Y., BAUDRY, S., DUCHATEAU, J.

UNIVERSITÉ LIBRE DE BRUXELLES

INTRODUCTION: Previous work indicates that, in leg muscles, the increase in corticospinal excitability prior to ballistic (BAL) contractions (high rate of force development) was delayed compared with ramp (RAMP) contractions (low rate of force development) (1), suggesting that corticospinal excitability during the preparatory period of a contraction may be specifically tuned depending on the rate at which force is developed during the subsequent contraction (2). To further document this possibility, this study investigated the modulation of cortical and spinal excitability during the preparatory period of BAL and RAMP contractions.
METHODS: Seventeen young adults performed isometric contractions with the right ankle dorsal flexor muscles. Subjects had to match a template displayed on a monitor with the force of the ankle dorsiflexor muscles. The template represented a RAMP (1500-ms duration) or a BAL (150-ms duration) contraction developing the same level of force (force associated with the maximal rate of force development during BAL contraction). Transcranial magnetic stimulation was applied over the left motor cortex to induce motor evoked potential (MEP) in the tibialis anterior, in a 500-ms window preceding the onset of the contractions (n=17). In 6 subjects, paired-pulse stimulations (2-ms interval) were used to assess short-interval intracortical inhibition (SICI, %). Peripheral nerve stimulation was used to assess motoneurone excitability by recording the occurrence of F wave (n=8).
RESULTS: MEP amplitude increased significantly ($p<0.05$) between each 100-ms window (+18.7%, +25.58%, +48.7%) from 500ms to the onset of the ramp contraction, whereas it increased (+85%) only in the last 200-ms prior to BAL contractions ($p<0.001$). In contrast, SICI (-50.8±23.4% prior to BAL and -46.4±19.5% prior to RAMP) did not change within the preparatory period, regardless of the contraction type ($p>0.05$). The F-wave occurrence increased progressively ($p<0.05$) from 500ms (18%) to 100ms (34%) prior to the onset of the RAMP contraction, whereas it did not change significantly over the same epoch preceding the BAL contraction (~20%; $p>0.05$).
CONCLUSION: These data suggest that prior to a BAL contraction, the motor neurones excitability is depressed up to the onset of the contraction to achieve a non-refractory state leading to greater motor units discharge rate during the subsequent contraction (3).
REFERENCES: 1. Kagamihara et al. (1992) Neurosci Res 14:1-11
2. Nielsen and Petersen (1995) J Physiol 484:777-89
3. Van Cutsem and Duchateau (2005) J Physiol 562:635-644
CONTACT: Yannick.Gouverneur@ulb.ac.be