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IMMEDIATE EFFECT OF ARGENTINE TANGO PRACTICE ON PERSISTENT SYMPTOMS AND POSTURAL CONTROL DEFICITS ASSOCIATED WITH CONCUSSION

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Background Concussion, or mild traumatic brain injury (mTBI), increases risk of brain and musculoskeletal injury after return to play (RTP). Dual-task training options have been suggested as a way to improve neurorehabilitation from concussion, thus reducing the risk of injury with RTP. To begin to evaluate the impact of dual task training on functional restoration, we report the immediate impact of an innovative dual task paradigm (Tango) on neurocognitive and neurosensorimotor symptoms.

Objective Assess within-session impact of Tango on symptoms and postural control.

Design

Repeated measures Immediate impact of Tango (pre v. post session; paired, 2-tailed Student's t-test)

Setting Community

Patients (or Participants) Adults with persistent concussion symptoms 3+ months after date of injury.

Interventions (or Assessment of Risk Factors) One-to-one Adapted Argentine Tango dance lessons (Tango).

Main Outcome Measurements Primary Outcome Measure: Symptoms Score (Sports Concussion Assessment Tool v3). Secondary Outcome Measures: Postural sway (sway) during quiet standing with eyes closed (30 seconds minimum) measured through center of pressure (COP) calculations of resultant variability, velocity, and complexity (respectively: root-mean-square amplitude, mean velocity, and sample entropy calculated using the increment method).

Results Three participants referred from an Ohio State University concussion clinic underwent 16 one-to-one Tango sessions. When measured immediately before and after each Tango session, improvements were demonstrated in total symptoms score ($p=0.001$) as well as sway variability ($p=0.007$), velocity ($p=0.013$), and complexity ($p=0.021$). Per session, mean (SD) Tango dose to music per session was 24.2(5.2) minutes and Rating of Perceived Exertion was 9.2(1.4) (Borg scale, 6–20). Rating of Perceived Comfort during postural control testing with eyes closed was 1.1(0.3) (9 point scale, 1 high).

Conclusions Tango is feasible for adults with persistent concussion symptoms to engage in as a dual task activity and may help to improve persistent symptoms as well as postural control. More research is warranted regarding implications of this activity for supporting RTP.

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A CROSS-SECTIONAL STUDY OF LOW BACK PAIN AMONG RETIRED INTERNATIONAL ATHLETES (RUNNERS, SWIMMERS, ROWERS, AND HOCKEY PLAYERS)

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Background Prevention of low back pain (LBP) requires the identification of modifiable risk factors. Currently there is limited evidence of these risk factors in current and retired athletic populations.

Objective To determine the prevalence and factors associated with LBP among retired international athletes (runners, swimmers, rowers, and hockey players).

Design Cross-sectional survey.

Patients (or Participants) 323 retired international level athletes, aged 30–97 years (median age 62 years), 43% female ($n = 139$) who had competed internationally for Great Britain.

Interventions (or Assessment of Risk Factors) Data was collected on age (years), sex, height (cm), weight (kg), sport and occupational history, bodily pain, training load, joint flexibility and medical history. A prior injury to the lumbar spine was defined by an injury causing pain ≥ 30 days and requiring medical attention.

Main Outcome Measurements LBP (with or without leg pain) on most days of the past one-month.

Results Overall, the prevalence of LBP was 26.0% (84/323). The prevalence of LBP was 24.1% (21/87) in rowers, 29.2% (35/120) in runners, 31.3% (20/64) in swimmers, and 15.4% (8/52) in hockey players. The odds ratio for LBP increased with a prior significant lumbar spine injury [OR 2.64; 95% CI, 1.43–4.89, $p = 0.002$], overweight BMI [OR 1.91; 95% CI, 1.11–3.30, $p = 0.02$], and was less prevalent among those aged 70 years and older [OR 2.37; 95% CI, 1.02–5.54, $p = 0.046$]. No association was detected between LBP and female sex, a high training load, sporting discipline, heavy occupation post sports career, lumbar spine flexion, or comorbidities (i.e. diabetes, cancer, lung disease, stroke, heart disease).

Conclusions A prior significant lumbar spine injury and increased body mass index were associated with LBP in retired international athletes. Longitudinal follow-up is needed to determine if modification of these factors reduces the occurrence of LBP.

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LOW BACK PAIN AND ASSOCIATED FACTORS AMONG ITALIAN EQUESTRIAN ATHLETES: A CROSS-SECTIONAL STUDY

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Background Low back pain is a widespread condition in sport as in the general population.

Objective The purpose of this study is to investigate the prevalence and determinants of low back pain (LBP) and chronic low back pain (C-LBP) among Italian equestrian athletes

Design Cross-sectional survey conducted using an online cloud-based software.

Setting Competitive athletes, members of the Italian Equestrian Sport Federation older than 18 years old ($n=40.932$).

Participants 886 athletes participated in the survey: 21,90% were male and 78,10% were female.

Assessment of Risk Factors Gender, age, weight, height, discipline practiced, years of practice, weekly training volume, athletic training were the independent variables considered.

Main Outcome Measurements Prevalence and characteristics of LBP and C-LBP and their determinants.

Results LBP had a prevalence of 91,6% and 74,2% for lifetime and 1-year respectively, while C-LBP had a prevalence of 23,9%. Prevalence of LBP in Show-Jumping was 61% , in Dressage 13,6%, in Eventing 6,3%, in Horse Country Riding 2,9% and in Reining 2,2%. Weight has a positive association with LBP (O.R. 1.05 95% CI=[1.02, 1.09] $p < 0.05$), while age has a negative association (O.R. 0.95 95% CI=[0.94, 0.98] $p < 0.05$). Practicing activity more than 5–6 hours a week has a positive association with C-LBP (O.R. 1.21 95% CI=[1.05, 1.4] $p < 0.05$). C-LBP is associated with interrupted activity ($p < 0.001$), drugs consumption ($p < 0.001$) and restriction in participation ($p < 0.001$).

Conclusions LBP and C-LBP are very common conditions in equestrian athletes and their prevalence is higher compared to general population and other sports. LBP is more frequent in show-jumping compared to other disciplines. Age and weight are associated with lifetime LBP, with, respectively, a negative and positive association. Athletes with C-LBP showed more disability in activities of daily living (ADLs) and tendency to suspend sports more frequently.

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NEUROMUSCULAR RESPONSES OF THE HAMSTRING AND TRUNK MUSCLES DURING UNANTICIPATED TRUNK PERTURBATIONS

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Background Trunk movement is considered to be involved in lower extremity injuries. Hamstring strain injuries often occur when movements are unanticipatedly perturbed by the opponents.

Objective To examine the neuromuscular responses of the hamstring and trunk muscles during unanticipated trunk perturbations in the athletes with and without a history of hamstring strain injury.

Design Descriptive laboratory study.

Setting College athletes.

Participants Male college athletes were recruited, 11 with a history of unilateral hamstring strain injury and 10 without prior injury.

Assessment In the kneeling position, the participants wore a chest harness attached to a cable that was pulled backward as a resisting force. They were instructed to resist the force isometrically and keep their initial position as possible as they could when the perturbations were applied. The force was released with a cue (CUE) and without cue (NoCUE). Trunk acceleration, three-dimensional kinematic data, and surface electromyography (EMG) signals of the erector spinae, internal oblique, gluteus maximus, biceps femoris, and semitendinosus muscles were measured.

Main Outcome Measurements (1) Maximum trunk acceleration; (2) angular displacement of the trunk, pelvis, hip, and knee; (3) onset latency; (4) EMG activation in the 50-ms window before the perturbation; and (5) EMG activation in the 100ms after the perturbation.

Results The maximum trunk acceleration and displacement were significantly greater during the NoCUE than during the CUE in both groups ($p < 0.05$). The injured group demonstrated significantly delayed onset of the gluteus maximus and erector spinae muscles during the NoCUE compared with the CUE ($p < 0.05$), while no difference was observed in the uninjured group. There was no difference in the phasic EMG activities between groups.

Conclusions Athletes with a history of hamstring strain injury displayed reduction in the neuromuscular coordination of pelvis and trunk muscles when they controlled the unanticipated trunk movement.

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MODIFIED KETTLEBELL SQUATS COULD BE SAFER FOR THE LOW BACK OF ATHLETES WITH LIMITED ANKLE DORSIFLEXION

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Background Kettlebell squats, holding the kettlebell in front of body, such as goblet squats (GS) can increase range of squat motion. However, the effects of GS variations on postural balance, hip kinematics and their relationship with underlying postural restrictions are not known.

Objective The purpose of this study was to determine the best kettlebell squat exercise variation for improving the strength and postural balance while preserving anterior pelvic tilt for low back health of the athletes with different dorsiflexion range of motion (DFROM) capacities.

Design Single session repeated - measurement

Setting Sport Health Laboratory.

Participants 32 male athletes (22,1 ± 1,8 years; 177,7 ± 5,1cm; 73,3 ± 5,4kg; Training years: 4.9 ± 2.2) were included in this study.

Main Outcome Measurements Athletes performed 8 different squat positions on the force platform. Balance measurements were recorded at 100 Hz for 30 seconds. Kettlebell equipment which was 8 kg, was held (1) close to the trunk (elbows flexed) (GS-EF) and held away from the trunk (elbow extended) (GS-EE) during the goblet squat. Digital inclinometer was used to measure pelvic tilt angle.

Results Postural balance parameters (COP area and antero-posterior sway) during GS-EF were significantly lower in both squat and split squat positions in the dominant leg ($p < 0.001$). However, it was found that posterior pelvic tilt was lower with GS-EE compared to GS-EF, which shows that athletes maintained their neutral lordosis better with GS-EE. In addition, the athletes with lower DFROM posterior tilted more with GS-EF ($p < 0.01$). Posterior pelvic tilt was lower during split GS compared to bilateral GS, meaning athletes stayed closer to their neutral lumbar lordosis during split GS ($p < 0.05$).

Conclusions Athletes with restricted DFROM could incorporate regular or split GS-EE exercises for minimize the low back injury risk. Additionally, higher postural sway during GS-EE