Main Outcome Measurements Brain activity was measured through electroencephalography during both balance tests and computed by means of spectral power analysis. The predefined balance task was the Y-balance test (YBT), while the reactive balance test (RBT) was selected as the neurocognitive balance test. **Results** For the YBT, θ -power of the prefrontal cortex significantly increased due to MF. For the RBT, brain activity remained unchanged. RBT accuracy worsened ($p < 0.05$) following MF, while YBT performance did not significantly change.

Conclusions The MF intervention induced unfavourable brain activity changes during the YBT, but did not affect YBT performance. However, no changes in brain electrophysiological functioning were observed during RBT execution while a decrease in RBT accuracy occurred. These results suggest that sustained attention tasks might affect different central mechanisms depending on the type of balance task. Further research is needed in order to elucidate the role of the brain and MF in balance performance and injury occurrence.

140 PSYCHOLOGICAL FACTORS FOR AN INJURY FREE ATHLETIC CAREER

^{1,2}Ulrika Tranaeus, ¹Linn Hallgren, ¹Hanna Jörlund. ¹The Swedish School of Sport and Health Sciences, GIH, Stockholm, Sweden; ²Karolinska Institutet, Stockholm, Sweden

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Background Many athletes remain uninjured during their careers. Little is known about if and which psychological factors that may contribute to protect from athletic injuries.

Objective Do uninjured athletes use buffering coping skills and/or other protecting psychological factors to remain injury free?

Design Qualitative interview study.

Setting Face to face interviews, using a semi-structured interview guide with open questions, with Swedish elite athletes.

Patients (or Participants) Six athletes (four males and two females), 23–25 years old, competing at elite level in team sports or running without severe time-loss injuries during their careers volunteered to participate. The definition of uninjured was less than a total of four weeks absence from training due to injury or pain. Time for competing varied from five years to nineteen years.

Main Outcome Measurements The inductive thematic content analysis was aiming to identify common psychological factors in the narratives.

Results The analysis showed six themes that were suggested to influence the athletes to perform and compete without sustaining severe injuries. The themes with examples of underlying categories were 1) structure during the daily life (time management, logistic), 2) all-round training (late specialisation), 3) knowledge (education), 4) coping strategies (acceptance, goal oriented), 5) recovery strategies (body awareness, food and sleep habits) and 6) social support (support from coaches and parents).

Conclusions Adaptive coping strategies and identified psychological factors are suggested to have possible impact on athletes' potential to stay uninjured. This study can play a role of generating hypotheses for testing in future studies, until then athletes and coaches are encouraged to bear these findings in mind in order to prevent injuries and support athletes.

141 THE EFFECT OF FATIGUE ON TRUNK AND PELVIC JUMP-LANDING BIOMECHANICS: A SYSTEMATIC REVIEW

^{1,2}Stefan Vermeulen, ^{1,2}Camilla De Bleecker, ¹Cedric De Blaiser, ³Özge Onursal Kilinc, ¹Tine Willems, ²Jos Vanrenterghem, ¹Philip Roosen, ¹Roel De Ridder. ¹University of Ghent, Department of Rehabilitation Sciences, Ghent, Belgium; ²KU Leuven, Leuven, Belgium; ³Hacettepe University, Ankara, Turkey

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Background Physical active induced fatigue may result altered trunk and pelvic biomechanics during athletic tasks.

Objective To summarize and determine the effect of physical fatigue on trunk and pelvic biomechanics during jump-landings in healthy, physically active populations.

Design Systematic review of literature.

Setting Electronic databases PubMed, Web of Science, Embase, CINAHL, and SPORTDiscus were consulted up to and including April 2021.

Patients (or Participants) Cross-sectional studies including healthy, physically active populations.

Interventions (or Assessment of Risk Factors) Two reviewers independently screened for relevant studies. Methodological quality was assessed by a modified Downs and Black checklist.

Main Outcome Measurements Studies investigating the effect of fatigue on trunk and pelvic kinematics and/or muscular activity during double- and single-legged jump-landings and jump-landing related cutting tasks in healthy, physically active populations.

Results Eighteen studies investigating trunk and pelvic landing biomechanics before and after fatigue met the inclusion criteria. Methodological quality was moderate to high among the included studies. The results of the systematic review show a wide variability of trunk and pelvic landing strategies after fatigue. Based on the kinematic results, there is evidence for more trunk flexion during standardized jump-landings after fatigue ($p=0,001-0,007$). Regarding muscular activity, there is no evidence of fatigue-related alterations in lumbo-pelvic muscular activations during landing.

Conclusions The results of this systematic review provide evidence for adaptive trunk and pelvic biomechanical strategies during landing after fatigue to potentially unload fatigued lower extremity musculoskeletal structures.

142 THE FATIGUE-INJURY HYPOTHESIS: WHAT IS THE EFFECT OF ACUTE PERIPHERAL FATIGUE ON FUNCTIONAL AND NEUROCOGNITIVE PERFORMANCE TESTS?

¹Jo Verschueren, ¹Bruno Tassignon, ²Evert Verhagen, ^{1,3}Romain Meeusen. ¹Human Physiology Research Group, Faculty of Physical Education and Physiotherapy, Vrije Universiteit Brussel, Brussels, Belgium; ²Amsterdam Collaboration on Health and Safety in Sports, Department of Public and Occupational Health, Amsterdam Movement Sciences, Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam, Netherlands; ³Strategic Research Program Exercise and the Brain in Health and Disease: the added value of Human-Centered Robotics, Vrije Universiteit Brussel, Brussels, Belgium

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Background Physical fatigue is known to decrease an athlete's functional test performance (FPT), but less is known about the impact on the injury risk profile. Furthermore, adaptability and neurocognitive performance tests have been put forward as relevant concepts within injury prevention, but to date it is not known if acute peripheral fatigue affects functional and neurocognitive performance tests.

Objective To assess the impact of acute peripheral fatigue on lower extremity functional and neurocognitive tests.

Design Randomized counterbalanced cross-over design.

Setting Primary prevention clinical setting.

Participants Twenty healthy participants (three females and ten males; age=24±3 years; height=177.5±6.6 cm; weight=73.2±11.3 kg) participated in this study.

Interventions Acute peripheral fatigue was induced by a 30 second modified Wingate protocol matched for maximal 30 second power output, while the participants were seated on the bike for 30 seconds during the control task.

Main Outcome Measurements The Y-balance test (YBT), reactive balance test (RBT), single leg hop test (SLH) and counter-movement jump (CMJ) were evaluated pre-post intervention.

Results ANOVA revealed no interaction effect of time and condition for the YBT. The CMJ & SLH were significantly lower post physical fatigue intervention ($p<0.001$), together with the SLH being significantly lower compared to control ($p=0.027$) post fatigue intervention. A significant decrease in RBT accuracy was observed post physical fatigue ($p=0.004$), with participants performing significantly worse when peripherally fatigued compared to control ($p<0.001$). No differences were observed when considering the effect of acute peripheral fatigue on visuomotor reaction time in the RBT.

Conclusions In a fatigued state, accuracy in response to environmental stimuli decreases, while visuomotor reaction time remains unaffected. SLH and CMJ are also negatively affected by acute peripheral fatigue, although the functional test performance is not primarily determined by peripheral intra-muscular energy resources. Clinicians should consider evaluating injury risk in a fatigued state, together with the evaluation of neurocognitive performance tests.

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MODELLING THE RISK OF SOFT TISSUE NON-CONTACT INJURIES FROM MULTIPLE TRAINING MONITORING DATA SOURCES IN A SHORT TRACK SPEED SKATING ELITE TEAM

^{1,2,3}François Bieuzen, ¹Jérémy Briand, ¹Breault Pierre-Olivier, ¹Sylvain Gaudet. ¹Institut National du Sport du Québec, Montréal, Canada; ²ReFORM : Réseau francophone olympique de la recherche de médecine du sport, IOC Medical Research Network, Montréal, Canada; ³Speed Skating Canada, National Training Center, Montréal, Canada

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Background In short track speed skating, the Canadian national team monitors their athletes throughout the season to adjust training and maximize the amount of time an athlete is at 100%.

Objective This study attempts to create a statistical model to predict the injury risk of an athlete based on training monitoring data with a machine learning approach.

Design Retrospective observational study.

Setting 2018–2019 season.

Patients (or Participants) National women's speed skating team.

Interventions (or Assessment of Risk Factors) We defined injuries as overuse, subjective, non-traumatic or soft tissues. Multiple variables were measured throughout the season and pooled in 5 categories: external and internal load, mental state, heart rate variability and neuromuscular function. We also engineered multiple features from the training load

(moving means and SD) over different time scales, providing time evolution information. The machine learning algorithm try to spot patterns in the variables leading to overuse injury. We tested 5 different algorithms, 4 resampling and used 3 different approaches to deal with Non-available data.

Main Outcome Measurements We started with a broader perspective, hence the large number of algorithms, resampling technique and variables used. The different models on 3 performance metrics were evaluated: Sensitivity, Specificity and F-score.

Results The Naïves Bayes algorithm model with the over/under resampling technique and the fill approach had the best results out of the 75 different possibilities: F-score: 0.77 (harmonic mean of precision and recall), Sensitivity: 0.81 (true positive rate) and Specificity: 0.72 (true negative rate).

Conclusions The common imbalance between the injured and non-injured class in our data set and the amount of non-available data forced us to address these issues in a way that could have led to overfitting. However, this project provides great insight in regard to which variables should be considered when trying to predict injury risk. Also, the framework created throughout this project represent a great starting point for future work.

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IS PROXIMAL STABILITY A RISK FACTOR FOR KNEE INJURIES IN ATHLETIC POPULATIONS? A SYSTEMATIC REVIEW WITH META-ANALYSIS AND BEST-EVIDENCE SYNTHESIS

¹Lionel Chia, ^{2,3}Daniilo De Oliveira Silva, ¹Marnee McKay, ¹Justin Sullivan, ³Fabio Micolis de Azevedo, ¹Evangelos Pappas. ¹The University of Sydney, NSW, Australia; ²La Trobe University, VIC, Australia; ³São Paulo State University, São Paulo, Brazil

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Background Proximal stability has been proposed as a contributor to athletic knee injuries. However, it is unclear if this is supported by current evidence.

Objective Examine the association between proximal stability and future athletic knee injuries

Design Systematic review, meta-analysis and best-evidence synthesis.

Setting Amateur to elite athletic settings.

Patients (or Participants) Healthy athletic populations participating in any sport, performing arts, military or physical education teacher education settings with no restriction on sex, age, or level of competition.

Interventions (or Assessment of Risk Factors) Six electronic databases were searched (April 2019) for original research articles. Prospective cohort studies investigating at least one proximal stability variable (lumbopelvic-hip strength, endurance, biomechanics, control, proprioception) for knee injuries in athletic populations were included. Quality of studies was assessed using the Quality in Prognostic Studies (QUIPS) tool.

Main Outcome Measurements Odds ratio effect measures of association between proximal stability variables and future knee injuries. Data not suitable for meta-analysis were synthesized in a best-evidence synthesis.

Results Twenty-one studies met the inclusion criteria, with a high risk of bias found in six studies. Meta-analysis revealed that stronger hip extension and external rotation strength were associated with 34% (OR 0.66, 95% CI 0.45–0.96,