Does Hip Strength Predict Dynamic Valgus in Female Recreational Runners?

1,2Gabriel Zeitune, 3Jairandil Nadal, 1Luz Alberto Batista, 1Leonardo Metsavaht,
4Biomedical Engineering Program, Federal University of Rio de Janeiro, RJ, Brazil;
3Biomechanics and Motor Behaviour Laboratory, State University of Rio de Janeiro, RJ,
Brazil; 5Post Graduation Program of Rehabilitation Sciences, SP, Brazil
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Background Dynamic valgus has been the focus of many studies to identify its association to an increased risk of running-related injuries. Many therapists suggest gluteus strengthening exercises to identify its association to an increased risk of running-related injuries. However, it is not clear whether proximal joints play a critical role for landing successfully. Preventive training must therefore include how athletes prepare for a landing with a strong emphasis on upper body and proximal joint control.

Results Participants landed with more trunk flexion (success: 21.8°±13.2°; failed: 30.3±17.2°) (p<0.05), more anterior pelvic tilt (success: 4.2°±5.4°; failed: 7.7°±5.1°), and less lateral pelvic tilt towards the landing leg (success: 4.7±3.0°; failed: 2.7±3.7) during failed landings (p<0.05). Higher rectus femoris, biceps femoris and gluteus medius excitation amplitudes were also observed during the failed landings (p<0.05). MACD analysis identified that differences between failed and successful landings were initiated during the preparatory phase of the drop-jump.

Conclusions While biomechanical variables were significantly different during the landing phase, our novel MACD analysis identified that these differences initiated during the flight phase. Our findings also highlight that proximal joints play a critical role for landing successfully. Preventive training must therefore include how athletes prepare for a landing with a strong emphasis on upper body and proximal joint control.

343 SHORT TRACK VS HOCKEY HELMETS: INVESTIGATING IMPACT ATTENUATION PROPERTIES OF HELMETS IN TWO SKATING SPORTS

1Daniel Aponte, 2Susanne Leclerc, 1David Peasall; 1McGill University, Montreal, Canada;
2Institut National du Sport du Québec, Montreal, Canada
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Background Certification standards governing short track (ST) and ice hockey (IH) helmet impact attenuation requirements are mechanisms of injury which are known to cause concussion. Conversely, ice hockey (IH) helmet certification requirements involve low velocity impacts in addition to high velocity impacts, and have been designed to mitigate both impact velocities.

Objective To compare the impact attenuation characteristics between ST and IH helmets, in both high and low velocity impacts.

Design Two-group experimental design.

Setting Impacts were performed in laboratory under controlled conditions. Helmets were impacted at two impact velocities (high and low; 4.5m/s and 2.4m/s respectively) and four impact locations (rear, rear boss, side and front boss). This was performed using a linear impactor device and the Hybrid III surrogate headform and neck.

Patients (or Participants) 5 different helmet models; 3 ST models and 2 IH models.

Interventions (or Assessment of Risk Factors) Assessment of ST and IH helmet impact attenuation under various conditions.

Main Outcome Measurements Peak linear and rotational acceleration; Head Injury Criterion (HIC) and Brain Injury Criterion (BrIC).

Results Between-groups ANOVA for linear [Low F(1,27) = 10.7, p<0.05, \( \eta^2 = 0.284 \); High = F(1,24) = 5.8, p<0.05, \( \eta^2 = 0.195 \)] and rotational [Low F(1,27) = 15.8, p<0.05, \( \eta^2 = 0.370 \); High = F(1,24) = 8.1, p<0.05, \( \eta^2 = 0.251 \)] accelerations yielded statistically significant differences with large effect sizes for all impact locations in both impact velocities. One-way between-helmet ANOVAs and post-hoc Bonferroni revealed impact attenuation performance hierarchy; IH 2 > IH 1 > ST 3 > ST 1 > ST 2. Between-groups ANOVA revealed statistically differences for HIC [Low F(1,27) = 14.1, p<0.05, \( \eta^2 = 0.344 \); High = F(1,24) = 7.6, p<0.05, \( \eta^2 = 0.241 \)]. BrIC results were mixed.

Conclusions Results suggest that these IH helmets are better at attenuating both impact velocities than this group of ST helmets. Interestingly, the largest effect sizes were observed in the low-velocity impacts.

344 DO MOUTHGUARDS PREVENT ORO-FACIAL TRAUMA IN SPORT: A SYSTEMATIC REVIEW

Peter Fine. UCL Eastman Dental Institute, London, UK
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Abstracts