

**(P100127)****Effects of plantar flexion angle during falling on rebound jump height**

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**Introduction:** Rebound jumps (RJs), successive vertical jumps performed as quickly as possible with a brief foot-ground contact duration, are often used as part of plyometric training. Since RJs incur high mechanical outputs of the ankle joint, it was hypothesized that RJ height would be affected by the degree of plantar flexion angle prior to each landing. In this study, RJ heights were compared between two distinct plantar flexion conditions. Ankle joint kinematics, ground reaction force (GRF) and ground-contact duration were measured to identify factors that determined the difference in RJ height, if observed, resulting from the alteration of the plantar flexion angle.

**Methods:** Fifteen track-and-field sprinters and jumpers performed six repetitions each of RJs, putting great emphasis on the ankle joint movement, under two conditions: small plantar flexion (PF<sub>s</sub>) and large plantar flexion (PF<sub>L</sub>). Arm swings were permitted during the testing to allow for the best RJ performance. RJ height, ankle joint kinematics and GRF (including foot-ground contact duration) were measured using video images (480fps), an electro-goniometer (1000Hz) and a single-axis force plate (500Hz), respectively.

**Results:** From landing to take-off, plantar flexion angles were verified to be less for PF<sub>s</sub> by approximately 10° compared to PF<sub>L</sub> (P<0.001). Angular velocities of the ankle at the instant of landing and take-off were not different between conditions. RJ height and the concentric impulse were greater for PFs than PF<sub>L</sub> by 0.06±0.04m (P<0.001) and 12.1k±19.5kN·s (P=0.031), respectively. GRF at the transition from the eccentric phase to the concentric phase (amortization) did not differ between conditions. The eccentric duration was slightly but significantly shorter for PF<sub>s</sub> than PF<sub>L</sub> by 0.007±0.007s (P=0.003). However, the concentric duration and the foot-ground contact duration were similar between conditions.

**Discussion:** During RJ training, smaller plantar flexion may enhance jump height as a result of increased concentric impulse. An alteration in plantar flexion angle was thought to influence the length of muscle-tendon unit, across which the stretch-shortening cycle (SSC) occurred. This may have impacted on the level SSC effects. Factors pertaining to the increased concentric impulse could be 1) increased force output at the amortization and 2) extended concentric duration, neither of which was however not evidenced by the pooled results. A third mechanism explaining the increased concentric impulse was proposed to be increased force output throughout the concentric phase following the amortization, which was not quantified by the current methodology. To be more precise, the mechanisms of the increased concentric impulse varied among subjects, attributed to one of the aforementioned factors or a combination of those.

**Impact and application to the field:**

- When performing rebound jumps during plyometric training, jump heights and concentric impulses are augmented with a small plantar flexion angle. This strategy may allow for more specific adaptive stimuli for the improvements in jump performance and other related power tasks.

My co-authors and I acknowledge that we have no conflict of interest of relevance to the submission of this abstract.

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**(P100134)****Australian secondary school principals', parents', and students' attitudes to prescribed school footwear**N. Mazzella<sup>a</sup>, A. Fox<sup>a</sup>, N. Saunders<sup>b</sup>, D. Trowell<sup>b</sup>, P. Kremer<sup>a</sup>, B. Vicenzino<sup>c</sup>, J. Bonacci<sup>a</sup><sup>a</sup>*Deakin University, Australia*<sup>b</sup>*Deakin University, Australia*<sup>c</sup>*University of Queensland, Australia*

**Introduction:** Adolescents participate in up to 120 minutes of vigorous physical activity per day, of which 23% is performed during school hours and in school footwear. The aim of this study was to ascertain the most important factors influencing school footwear selection among adolescents, their parents and secondary school principals.

**Methods:** An online survey performed through Qualtrics was distributed to principals, secondary school students and their parents across Australia between March 2021 to April 2022. Participants responded to questions regarding school footwear use, footwear characteristics and factors influencing footwear choice.

**Results:** 122 secondary school students (average [SD] age: 16.08 [1.53] years), 140 parents and 80 secondary school principals responded to the survey. Secondary school students spent on average 8 [2] hours per day in school shoes for 3 [2] days per week. 24% of students reported foot, ankle, shin, or knee soreness when wearing school shoes. Most principals (95%) and parents (91%) considered footwear to be important to musculoskeletal health, compared to 66% of students. 93% of parents, 85% of principals and 73% of students rated comfort of the shoe as important for footwear choice. Appearance of the shoe and meeting school uniform guidelines was considered important by 58% and 54% of students, respectively. Presentation of the school in the community and student uniformity was considered important by 84% of principals, with recommendations provided by health professionals important to 66% of principals. 70% of principals reported that they would consider changing the school footwear requirements for students.

**Discussion:** Shoe comfort is the most important factor in the selection of school footwear chosen by secondary school students and their parents across Australia. Nearly a quarter of secondary school students report lower limb soreness when wearing school shoes and this may influence participation in physical activity. Principals rate comfort of the shoe, student uniformity and presentation of the school in the community equally important when developing school footwear guidelines. Principals placed less emphasis on recommendations provided by health professionals, despite most principals considering footwear to be important to musculoskeletal health.

**Impact and application to the field:** Better evidence describing the impact of school footwear on lower limb musculoskeletal health may help support principals in the development of school footwear guidelines.

Conflict of interest: My co-authors and I acknowledge that we have no conflict of interest of relevance to the submission of this abstract.

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