

<sup>b</sup>Western Sydney University, Australia

<sup>c</sup>Victoria University, Australia

<sup>a</sup>La Trobe University, Australia

<sup>b</sup>Indiana University, United States of America

**Introduction:** Physical function capacity measures are recommended as outcomes in people with lower limb tendinopathy, however, a recent systematic review reported that they are rarely used. The purpose of this scoping review was to explore the measures of physical function capacity and the context in which they were used as recommended by experts in lower limb tendinopathy.

**Methods:** Databases including Medline, Embase and CINAHL were searched using keywords related to lower limb tendinopathy and physical function capacity from inception to May 2022. Eligibility criteria included expert opinion papers, clinical commentaries, and narrative reviews that outlined a rehabilitation protocol. Systematic reviews and trials were excluded. Study selection was limited to sources which included a progressive exercise protocol for adults with lower limb tendinopathy. Following selection, a 15-item tool was used for data extraction, and data reported descriptively.

**Results:** Of the 26 studies included, only 8 recommended a physical function capacity measure. There were 10 physical function capacity measures across three domains including: (i) strength (isometric strength, repetition maximum and two variations of the heel raise test), (ii) power (hop and jump tests), and (iii) balance (single leg stance). These measures were included in sources across a range of lower limb tendinopathies ((patellar (4/10), Achilles (1/10), proximal hamstring (1/10), gluteal (1/10), combined patellar and Achilles (1/10)). Most physical function capacity measures were recommended for Achilles or patellar tendinopathy (9/10), with hop and jump tests the most frequently included (5/10). Progression criteria were recorded in all 26/26 of studies. Pain was the most common criterion that was used to determine the progression of rehabilitation (25/26 studies) with physical function capacity measures used rarely as criterion (3/26 studies).

**Conclusion:** Physical function capacity measures are infrequently documented and their use is inconsistent across a variety of expert recommended rehabilitation programs. This may be due to the limited evidence available to guide the appropriate use of measures and the interpretation of measures in the context of lower limb tendinopathy. Due to the limited use of measures, there is a need to develop tests of physical function capacity for patients with lower limb tendinopathy that can better guide functional improvements in addition to pain, to improve exercise rehabilitation outcomes.

#### Impact/Application to the field:

- Of the limited number of physical function capacity measures recommended by experts in lower limb tendinopathy, very few are used as progression criteria in exercise rehabilitation.
- The hop and jump tests which are the most commonly recommended physical function capacity measures by experts require greater empirical evidence to justify their use in clinical practice.

**Conflict of interest statement:** 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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(P100110)

#### Is running good or bad for your knees and hips? A systematic review and meta-analysis

S. Coburn<sup>a</sup>, K. Crossley<sup>a</sup>, J. Kemp<sup>a</sup>, S. Warden<sup>b</sup>, T. West<sup>c</sup>, A. Bruder<sup>a</sup>, B. Mentiplay<sup>a</sup>, A. Culvenor<sup>a</sup>

**Introduction:** Running is a popular physical activity but associated with high rates of musculoskeletal injury. Running is perceived by some to be detrimental to joint health, yet it does not seem to increase the risk of knee or hip osteoarthritis (OA) or accelerate OA progression. Cartilage loss is the hallmark feature of OA and the impact of running on cartilage is not well understood. This study summarises the immediate impact of running on cartilage in healthy adults and those with, or at risk of OA, using magnetic resonance imaging (MRI) measures. Secondly we explored the delayed impact of running on hip and knee cartilage, regional differences within each joint and associations with sex, run duration and age.

**Methods:** This study was a systematic review of six databases, with random-effects meta-analyses of studies that used MRI and a within-subject study design to measure change in hip or knee cartilage within 48 hours pre- and post-running. Risk of bias was assessed with the Newcastle-Ottawa Scale and certainty of evidence evaluated using the GRADE assessment.

**Results:** Twenty-four studies were included, evaluating 389 healthy knees and 57 knees with/at risk of OA (and no hips) in 378 participants (41% female). Participants were generally healthy, young adults (mean age 32 years, BMI 23kg/m<sup>2</sup>). Thirty-three percent of studies were assessed low risk of bias. Decreases in knee cartilage morphology (thickness/volume) and composition (quality) occurred immediately after running and were greatest in the patellofemoral compartment. Morphology changes ranged from a loss of patellar cartilage volume of 5.5% (95%CI 4.4-5.7%) to a loss of weight-bearing femoral cartilage thickness of 2.8% (1.9-3.7%). Tibiofemoral composition measures (T2 relaxation times) recovered to baseline levels within 90 minutes, and existing cartilage defects were not altered within 48 hours after run completion.

**Discussion:** There is very low certainty evidence that running immediately decreases the thickness, volume and composition of patellofemoral and tibiofemoral cartilage. These findings support the biphasic model of a hydrostatic cartilage response to loading with redistribution and exudation of small amounts of water. Immediately after running, T2 relaxation times reduced, consistent with expected water loss and matrix consolidation in healthy cartilage. Cartilage composition changes returned to baseline within 60-90 minutes of run completion and morphology (volume/thickness) was reported to recover from 15 minutes-12 hours after running. There are no relationships between cartilage changes after running and age or sex although a trend was noted that indicated increased relaxation time reductions with increased run duration.

#### Impact:

- A single bout of running causes small, transient changes in cartilage and is not bad for the knees of healthy, young adults.
- Running can be promoted as a public health physical activity endeavour knowing that it doesn't appear to immediately alter joint structure detrimentally.

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

S. Inagawa, A. Sakamoto, S. Taue, K. Aoki

*Juntendo University, Japan*

**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.

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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.

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