

(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_s) and large plantar flexion (PF_L). 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_s by approximately 10° compared to PF_L (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_L 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_s than PF_L 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^a, A. Fox^a, N. Saunders^b, D. Trowell^b, P. Kremer^a, B. Vicenzino^c, J. Bonacci^a^a*Deakin University, Australia*^b*Deakin University, Australia*^c*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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(P100135)

The intergenerational effects of parental physical activity on offspring brain and cognitive development: a scoping reviewS. Valkenborghs^a, P. Dent^a, C. Stillman^b^aThe University of Newcastle, Australia^bUniversity of Pittsburgh, United States of America

Introduction: Maternal preconception and prenatal health behaviours (e.g., diet, alcohol consumption, smoking, etc.) impact offspring neurodevelopment. Physical activity (PA) has been linked to improved maternal health during preconception, pregnancy, and postpartum and reduced risk of pregnancy complications. PA not only helps to improve physical health but can also enhance brain health and cognition across the lifespan. Accumulating evidence in animal models suggests PA also has intergenerational effects on brain health and development. That is, parental PA levels—both preconception and during pregnancy—can affect offspring brain health. The extent of evidence of these effects in humans is unknown. This scoping review aimed to compile the human literature, identify knowledge gaps, and make recommendations for future human research in this area.

Methods: We conducted a systematic literature search of PubMed, MEDLINE, Embase, Cochrane Central, and PsycINFO for studies conducted in humans and published in English from database inception to 9th December 2021. Experimental or observational studies were included that reported data on parental PA exposure preconception (fathers and mothers) or prenatally (mothers only) in addition to data on offspring brain and cognitive development. Two reviewers independently screened studies for inclusion according to predetermined criteria. Data from included studies were extracted by one reviewer and verified by a second, including study characteristics, parental characteristics, offspring characteristics, parental PA exposure, offspring neurocognition, and key findings.

Results: Fourteen articles were included reporting results from six experimental (sample size $n=18-336$) and eight observational (sample size $n=65-74,971$) studies. All (100%) studies reported on maternal characteristics, whereas only one (7%) study reported on paternal characteristics (but not PA). Maternal PA exposure was prenatal only in 11 (79%) studies (100% of experimental studies and 63% of observational studies), while preconception and prenatal PA exposure was reported in three (21%) studies (38% of observational studies). Outcomes of offspring brain and cognitive development included brain activity (electroencephalography), neurodevelopment, communication, behaviour, verbal IQ, academic performance, and intelligence. Offspring follow-up was during the neonatal stage ($n=2$, 14%), infant stage (1-2y) ($n=7$, 50%), early childhood (4-7y) ($n=3$, 21%), late childhood (8-10y) ($n=2$, 14%), and young adulthood (17-21y) ($n=1$, 7%). Maternal PA exposure was positively related to offspring brain and cognitive development as neonates (2/2 studies) and infants (5/7 studies).

Discussion: Despite extensive evidence from animal models, little is known about the intergenerational effects of parental PA on offspring brain and cognitive development in humans, particularly paternal preconception PA. Emerging evidence is promising but more experimental and large prospective observational studies with offspring follow-up into late adolescence and young adulthood are needed. More objective and/or mechanistic assessments (e.g., event-related potentials, magnetic resonance imaging, neurotrophins, etc.) are also required as most existing evidence is based on subjective measures.

Impact and application to the field: While substantial literature from animal models indicates the benefits of PA on brain health and cognition can be intergenerational, evidence of such effects in humans is scant.

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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Parental influences on physical activity and sport participation amongst adolescent girls from Culturally and Linguistically Diverse backgroundsN. Dennaoui^a, G. Kolt^b, J. Guagliano^b, E. George^a^aSchool of Health Sciences, Western Sydney University, Australia^bSchool of Health Sciences, Western Sydney University, Australia

Introduction: Despite known health and social benefits associated with regular physical activity (PA), participation rates in PA and sport decline rapidly during adolescence, particularly for girls. Some literature suggests there are steeper declines in PA and sport participation among those from Culturally and Linguistically Diverse (CALD) backgrounds, particularly those of Middle Eastern backgrounds. Parents can play an important role in influencing PA and sport participation of adolescent girls (e.g., positive role modelling). However, limited research has been conducted on the influence that parents from Middle Eastern backgrounds have on their daughters' PA and sport participation.

Methods: A total of 18 adolescent daughters (mean [\pm SD] age = 15.5 ± 0.7 years) and 9 parents (7 mothers, 2 fathers; 45.11 ± 7.56 years) of Middle Eastern background residing Greater Western Sydney were included in this qualitative study. Semi-structured focus groups ($n = 5$) and individual interviews ($n = 4$) were conducted to explore the perceptions and attitudes regarding PA and sport participation of parents and adolescent girls from Middle Eastern backgrounds, with references to culture, religion, and family. A thematic analysis, using an inductive approach, was used to analyse the data. Data analysis was conducted using Quirkos software.

Results: Participants reported barriers and facilitators to girls' PA and sport participation. A total of three main themes, family, social support, and religion and culture, and 14 subthemes emerged. The theme family encompassed the following subthemes, gender roles and expectations, education as a priority, family responsibilities, and family reputation and representation. The second theme, social support included was identified as both a barrier and facilitator to PA and sport participation. For example, family, peers, and schools were identified as positive influences on girls' PA engagement, yet girls also perceived family to be a barrier at times, along with technology and social media. The theme of religion and culture comprised subthemes of religion as a barrier, appearance and clothing, interactions with the opposite gender, religion as a motivator, and cultural expectations and representation. Many of the factors associated with religion and culture were perceived to be both barriers and facilitators PA and sport participation.

Conclusion: The current study explored the perceptions of parents and adolescent girls from a Middle Eastern background, on PA and sport participation. Family, social support, culture and religion were identified as the main factors that shape both parents and adolescent girls' attitudes and perceptions towards PA and sport participation.

Impact/Application to the field:

- This study can be used to inform culturally tailored PA interventions for adolescent girls and their parents.