

Methods: We evaluated the Burn 2 Learn (B2L) intervention using a cluster randomised controlled trial with older adolescents (N=670) from 20 secondary schools in New South Wales, Australia. We utilised a range of implementation strategies to support teachers to facilitate the delivery of 2-3 high intensity interval training (HIIT) sessions/week during lesson-time. The B2L intervention included the following: (i) information seminar for students delivered by school champions, (ii) school-based HIIT sessions delivered during lesson time, (iii) purpose-built smartphone application (app) and heart rate monitors designed to quantify individual and group heart rate and support self-monitoring, and (iv) information newsletters for parents. The HIIT sessions involved a combination of aerobic and muscle-strengthening exercises, designed to be enjoyable and vigorous in nature. Teachers and students in the control group continued with their usual practice. Outcomes were assessed at baseline, 6 and 12-months. The primary outcome was CRF (multi-stage fitness test). Secondary outcomes included physical activity (ActiGraph GT9X Link accelerometers), hair cortisol concentrations, muscular fitness (push-up and standing long jump tests), body composition (body mass index), mental health and HIIT self-efficacy (questionnaires). Data were analysed using linear mixed models, accounting for clustering of effects at the class level. Potential moderators of effects were identified a priori and sub-group analyses were conducted if interaction tests were significant ($p < 0.1$).

Results: At the primary endpoint (6-months), we found a significant difference between groups (in favour of B2L) for the primary outcome CRF [4.0 laps (95% CI, 1.7 to 6.4)] and a range of secondary outcomes. Moderator analyses revealed reduced stress and internalising problems among adolescents in the intervention group who were identified as 'at-risk' of poor mental health at baseline.

Discussion: Implementing high intensity breaks during curricular time improved CRF and muscular endurance among the full sample of older adolescents, and mental health among the 'at-risk' sub-sample. Our findings highlight the health benefits of re-allocating a small amount of curriculum time to physical activity during the final years of secondary school.

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Physical literacy & early childhood executive function and language development: Active Early Learning randomised controlled trial

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Background: Executive function involves a number of cognitive processes that are integral to the self-regulation of behaviour and developing social and cognitive competence in young children. Physical activity is increasingly recognised as an important determinant of cognitive functioning among older populations but less is known about these relationships in early childhood. In younger populations, it has been suggested that interventions aiming to increase physical activity should focus on children's physical literacy. Physical literacy can be defined as developing capabilities in the physical, psychological, cognitive and social domains that facilitate and promote an active lifestyle across the life course. The contribution of physical literacy programs to the healthy development of language and executive function during early childhood is yet to be fully investigated. In this randomised controlled trial, we examined the effect of a physical literacy curriculum, delivered in an early learning centre setting on

child executive function and language development.

Methods: 321 children aged 3-5 years from 16 early learning centres were randomly assigned to the intervention (8 centres; n=169 children) or control group (7 centres, n=152 children). The intervention group received 20 weeks of the physical literacy curriculum, while the control group received usual practice care. Executive function (inhibition [Go/NoGo]; visual spatial working memory [Mr Ant]; shifting [Card Sort]) and expressive vocabulary was assessed using the Early Years Tool Box. Linear mixed effects models were used to determine differences in groups, adjusting for clustering of children within centres.

Results: Children receiving the intervention had greater improvements on measures of inhibition ($\beta = 1.97, p = .001$) and expressive vocabulary ($\beta = 0.5, p = .033$), compared to control group children. No significant differences were observed for visual-spatial working memory or shifting.

Discussion: A physical literacy curriculum that aligns with the Australian Early Years Learning Framework and is fully integrated into early learning centre practices is beneficial in improving aspects of young children's executive function and language development. These data support the case for greater investment in physical literacy professional development for educators working in early learning centres.

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Hormone therapy and exercise as interventions for post-menopausal women with greater trochanteric pain syndrome. A randomised clinical trial

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Background: Greater trochanteric pain syndrome (GTPS) is a debilitating condition, prevalent in post-menopausal women. A positive association between high oestrogen levels and tendon health may exist. Menopausal hormone therapy (MHT) could reduce the incidence of tendon abnormality in post-menopausal women, particularly when combined with exercise. This blinded 2 x 2 factorial randomised clinical trial (GLOBE Hip Trial) aimed to determine the effect of MHT and exercise on tendon pain and function in post-menopausal women with GTPS.

Methods: A total of 132 post-menopausal women (mean age 61.1 ± 6.4 years, BMI 28.6 ± 5.43) with GTPS were randomised into either MHT (oestradiol 50mcg and norethisterone acetate 140mcg) or placebo transdermal cream groups and either tendon-specific/GLOBE or sham exercise groups for a 12-week intervention period. All groups received education on avoiding gluteal tendon compression. Primary (Victorian Institute of Sport Assessment - Gluteal Tendon (VISA-G)) and secondary (Assessment of Quality of Life, Hip Disability and Osteoarthritis Outcome Score, Oxford Hip Score, Global Rating of Change) outcomes were measured at baseline, 12 and 52 weeks. A linear mixed effects model (of best fit) was used to compare groups at each time point and changes over time. Body mass index (BMI) was included as a covariate.

Results: All groups improved over time, regardless of intervention. There was no difference between targeted or sham exercise or MHT and placebo creams (raw unadjusted and including BMI as covariate) at each timepoint. VISA-G outcome was significantly associated with BMI ($p = 0.003$) and there was a significant interaction effect between cream and BMI ($p = 0.03$). The population was therefore stratified based on BMI ($< 25, < 30, \geq 30$). The MHT groups (with exercise and education) had