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State-wide dissemination of the Resistance Training for Teens program: An evaluation guided by the RE-AIM framework

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Introduction: The health benefits of muscular fitness for youth are compelling. Current guidelines recommend young people (5-17 years) engage in muscle-strengthening activities (e.g., resistance training [RT]) on at least three days per week. However, only 13% of Australians aged 15-17 meet this guideline. Schools present a unique opportunity to introduce adolescents to RT. However, few school-based physical activity interventions have focused on RT, possibly due to reported barriers to delivery in schools. Moreover, the majority of school-based interventions do not progress beyond pilot, efficacy/effectiveness phases to be implemented at-scale. The purpose of this study was to evaluate the state-wide dissemination of the Resistance Training for Teens (RT for Teens) program using the RE-AIM framework.

Methods: Student-, teacher- and school-level data related to RE-AIM were collected between August 2015 and October 2020. RE-AIM was operationalised as: (i) Reach: number and characteristics of students estimated to be exposed to the program; (ii) Effectiveness: impact of the program on student-level outcomes measured in a subsample of students (n = 750); (iii) Adoption: number and representativeness of schools with one or more teachers trained to deliver the program; (iv) Implementation: extent to which the program was delivered as intended; and (v) Maintenance: extent to which program delivery was sustained in schools.

Results: Estimated program reach was ~10,000 students (~5% of a total student population of ~200,000). Students were from varied socioeconomic and language backgrounds. Program participation improved students' muscular fitness, RT self-efficacy, perceived cardiorespiratory fitness and flexibility, and participation in muscle-strengthening physical activities. A total of 468 teachers from 249 schools attended program training, with 30 workshops delivered. Schools were located in diverse geographical regions across NSW. Program implementation was measured via lesson observations and we observed considerable variability in the quality of program implementation. Resources were used in the majority of lessons; however, teachers had adapted the program to suit their students and school context. Despite the adaptations that were evident, the necessary focus on RT remained. Adherence to the SAAFE (Supportive, Active, Autonomous, Fair and Enjoyable) teaching principles was high during observed lessons. Fifty-one schools (20.5%) sent an additional (previously untrained) teacher to a second workshop.

Discussion: Although the RT for Teens had high levels of reach and adoption, there was considerable variability in the quality of program implementation. Additional research is needed to identify support models to optimise implementation quality and sustain program delivery and effectiveness over time.

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S64

Acute effects of gait interventions on tibial stress during running: A systematic review and meta-analysis

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Introduction: High running volumes are a risk factor for sustaining tibial stress injuries. Changing running technique and/or equipment can alter the load and stress placed on the tibia. The ability of interventions to modify tibial stress during running are yet to be synthesised and evaluated. We systematically reviewed the effect of technique and footwear interventions on tibial stress during running.

Methods: Two searches of electronic databases were conducted using key terms relevant to tibial stress and running. Studies were included if: (1) participants were 18 – 45 years of age; (2) the immediate effect of a gait retraining or footwear intervention during running was evaluated; and (3) a measure of tibial stress was used. Interventions and corresponding data were categorised according to their approach (i.e. Footwear; barefoot running; running speed; surface; overground versus treadmill; orthotics, insoles and taping and technique). Methodological quality and risk of bias of included studies was assessed. Standardised mean differences (SMD) with 95% confidence intervals (95% CI) for changes in tibial stress following the intervention were calculated for all relevant studies and meta-analyses were performed where possible.

Results: Database searches yielded 1530 articles, with 33 meeting the inclusion criteria. Tibial stress measures increased when individuals ran barefoot (SMD 1.16 [95% CI 0.50, 1.82]), in minimalist shoes (non-habitually) (SMD 0.89 [95% CI 0.40, 1.39]), in motion control shoes (SMD 0.46 [95% CI 0.07, 0.84]), increased stride length (SMD 0.86 [95% CI 0.18, 1.55]), and with increased running speed (SMD 1.03 [95% CI 0.74,1.32]). Tibial stress measures decreased when individuals ran on a treadmill versus overground (SMD -0.83 [95% CI -1.53, -0.12]), and when targeted biofeedback was used (SMD -0.93 [95% CI -1.46, -0.41]).

Discussion: Reducing the stress and loading on the tibia may reduce the risk of tibial stress injuries. We found several gait alterations that increase tibial stress measures during running and suggest that these be minimised during training periods of high load or be avoided with runners at-risk or recovering from a tibial stress injury. We also found that running on a treadmill versus overground, and the use of biofeedback can reduce tibial stress measures. These interventions could be adopted to target tibial stress reductions in runners training or rehabilitation.

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