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Original Research

Balance Training for Neuromuscular Control and Performance Enhancement: A Systematic Review

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Abstract

Objective: As a result of inconsistencies in reported findings, controversy exists regarding the effectiveness of balance training for improving functional performance and neuromuscular control. Thus, its practical benefit in athletic training remains inconclusive. Our objective was to evaluate the effectiveness of training interventions in enhancing neuromuscular control and functional performance.

Data Sources: Two independent reviewers performed a literature search in Cochrane Bone, Joint and Muscle Trauma Group Register and Cochrane Controlled Trials Register, MEDLINE, EMBASE, PEDro (Physiotherapy Evidence Database), and SCOPUS.

Study Selection: Randomized controlled trials and controlled trials without randomization with healthy and physically active participants aged up to 40 years old were considered for inclusion. Outcomes of interest were postural control, muscle strength, agility, jump performance, sprint performance, muscle reflex activity, rate of force development, reaction time, and electromyography.

Data Extraction: Data of interest were methodologic assessment, training intervention, outcome, timing of the outcome assessment, and results. Standardized mean differences and 95% confidence intervals were calculated when data were sufficient.

Data Synthesis: In total, 20 randomized clinical trials met the inclusion criteria. Balance training was effective in improving postural sway and functional balance when compared with untrained control participants. Larger effect sizes were shown for training programs of longer duration. Although controversial findings were reported for jumping performance, agility, and neuromuscular control, there are indications for the effectiveness of balance training in these outcomes. When compared with plyometric or strength training, conflicting results or no effects of

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balance training were reported for strength improvements and changes in sprint performance.

Conclusions: We conclude that balance training can be effective for postural and neuromuscular control improvements. However, as a result of the low methodologic quality and training differences, further research is strongly recommended.

Keywords: methodologic quality assessment, postural control, motor control

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