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evidence-based practice

Proprioceptive Training for the Prevention of Ankle Sprains: An Evidence-Based Review

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Reference: Schifftan GS, Ross LA, Hahne AJ. The effectiveness of proprioceptive training in preventing ankle sprains in sporting populations: a systematic review and meta-analysis. *J Sci Med Sport*. 2015;18(3):238-244.

Clinical Question: Does the use of proprioceptive training as a sole intervention decrease the incidence of initial or recurrent ankle sprains in the athletic population?

Data Sources: The authors completed a comprehensive literature search of MEDLINE, CINAHL, SPORTDiscus, and Physiotherapy Evidence Database (PEDro) from inception to October 2013. The reference lists of all identified articles were manually screened to obtain additional studies. The following key words were used. Phase 1 population terms were *sport*, *athlet*, and a combination of the two. Phase 2 intervention terms were *propriocept*, *balance*, *neuromusc*, *adj5 train*, and combinations thereof. Phase 3 condition terms were *ankle adj5 sprain*, *sprain adj5 ankle*, and combinations thereof.

Study Selection: Studies were included according to the following criteria: (1) the design was a moderate- to high-level randomized controlled trial (>4/10 on the PEDro scale), (2) the participants were physically active (regardless of previous ankle injury), (3) the intervention group received proprioceptive training only, compared with a control group that received no proprioceptive training, and (4) the rate of ankle sprains was reported as a main outcome. Search results were limited to the English language. No restrictions were placed on publication dates.

Data Extraction: Two authors independently reviewed the studies for eligibility. The quality of the pertinent articles was assessed using the PEDro scale, and data were extracted to calculate the relative risk. Data extracted were number of participants, intervention, frequency, duration, follow-up period, and injury rate.

Main Results: Of the initial 345 studies screened, 7 were included in this review for a total of 3726 participants. Three analyses were conducted for proprioceptive training used (1) to prevent ankle sprains regardless of history ($n = 3654$), (2) to prevent recurrent ankle sprains ($n = 1542$), or (3) as the primary preventive measure for those without a history of ankle sprain ($n = 946$). Regardless of a history of ankle sprain, participants had a reduction in ankle-sprain rates (relative risk [RR] = 0.65, 95% confidence interval [CI] = 0.55, 0.77; numbers needed to treat [NNT] = 17, 95% CI = 11, 33). For individuals with a history of ankle sprains, proprioceptive training demonstrated a reduction in repeat ankle sprains (RR = 0.64, 95% CI = 0.51, 0.81; NNT = 13, 95% CI = 7, 100). Proprioceptive training as a primary preventive measure demonstrated significant results (RR = 0.57, 95% CI = 0.34, 0.97; NNT = 33, 95% CI = 16, 1000).

Conclusions: Proprioceptive training programs were effective in reducing the incidence rates of ankle sprains in the athletic population, including those with and those without a history of ankle sprains.

Key Words: balance, coordination, reinjury

COMMENTARY

Ankle sprains are the most common injuries managed by athletic trainers.^{1,2} Physically active individuals participating in activities that require jumping, changing direction, and pivoting are at increased risk for ankle sprain.^{3,4} After an initial ankle sprain, the joint's passive (eg, joint capsule) and dynamic (eg, muscle) restraints are weakened, leaving the joint unprotected and at risk for reinjury.² Ankle sprains and the repetitive trauma often associated with the condition can lead to long-term disability, time lost from activity, and economic burdens for patients.⁴ Although the cost of treatment after a single ankle sprain is low, compounding expenses for extended care to address repetitive sprains in patients with conditions such as chronic ankle instability can increase the economic burden.⁵ These costs, coupled with the declining physical activity levels and health-related quality-of-life deficits

experienced by these individuals, highlight the importance of developing preventive strategies.³

Proprioception is defined as the neural process by which the body takes in sensory input from the surrounding environment and integrates that information to produce a motor response.³ Examples of proprioceptive training for the ankle joint include balancing on a single leg with the eyes closed, balancing on a wobble board or ankle disk, and balancing on a single leg while completing a task such as catching or throwing a ball.¹⁻⁴ These types of exercises can enhance the sensorimotor system's ability to adapt to a changing environment and subsequently protect the body from injury.

The authors of this systematic review and meta-analysis examined the isolated role of proprioceptive training in preventing ankle sprains. In evaluating the prophylactic effectiveness of proprioceptive exercises regardless of ankle-sprain history, the researchers identified a reduction

THE Takeaways

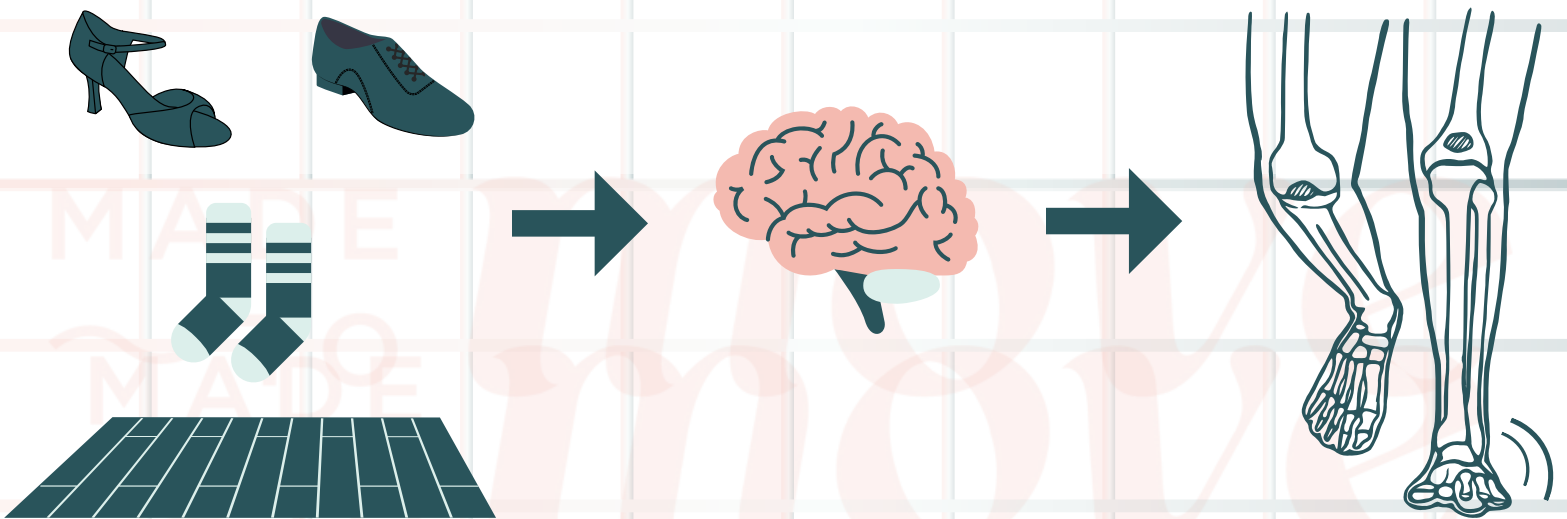
- A systemic review and meta-analysis
- This study looked at proprioception exercises being used to decrease initial and recurrent ankle sprains in athletes
- Published in 2017 by the Journal of Athletic Training

THE Takeaways

- Proprioceptive training programs are effective in reducing ankle sprains in athletes
- This includes athletes with or without a history of ankle sprains
- Jumping, changing direction, pivoting all risks for ankle sprains
 - Therefore proprioceptive exercises should be implemented from day one (all ages)

THE Takeaways

- Proprioception
 - neural process where the body takes sensory input from the environment and integrates it to produce a motor response



THE Takeaways

- Proprioception Exercises include
 - balancing on a single leg + eyes closed,



- balancing on a wobble board



- balancing on an ankle disk,



- balancing on a single leg while completing a task such as catching or throwing a ball



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