

Differential Balance Enhancements Associated with Conventional Balance Training and Portable Slackline Board Training: A Randomized Controlled Trial

Introduction

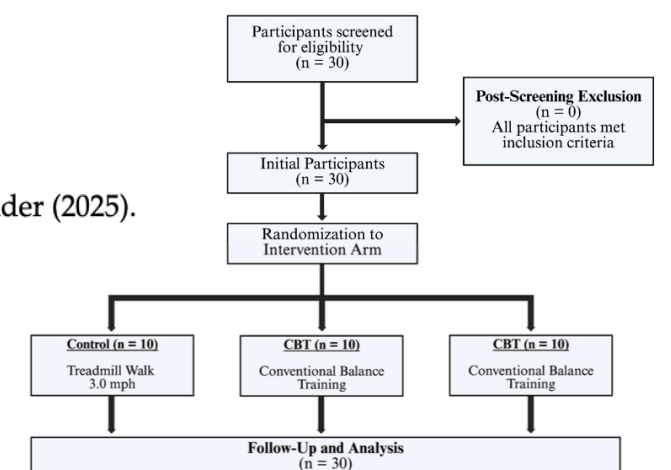
This study examined whether a portable slackline balance board could improve balance in elite Division I American football players and how it compared to traditional balance training tools. Balance is a key component of athletic performance and injury prevention, as well as being foundational to overall fitness, healthy aging and quality of life.



Methodology

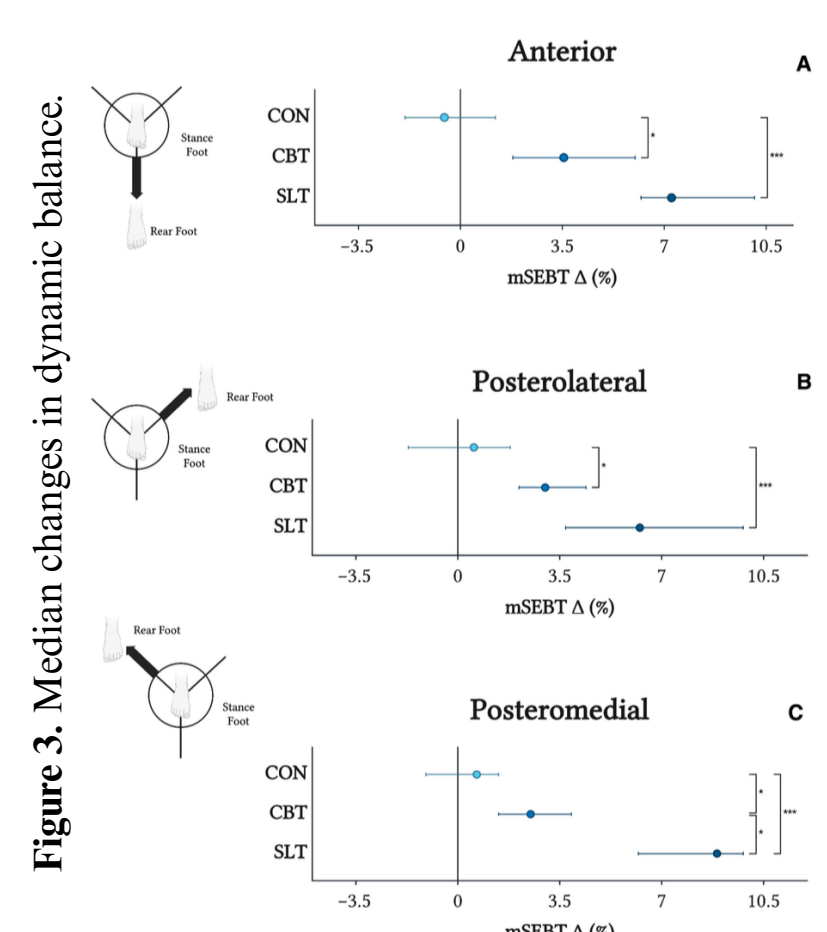
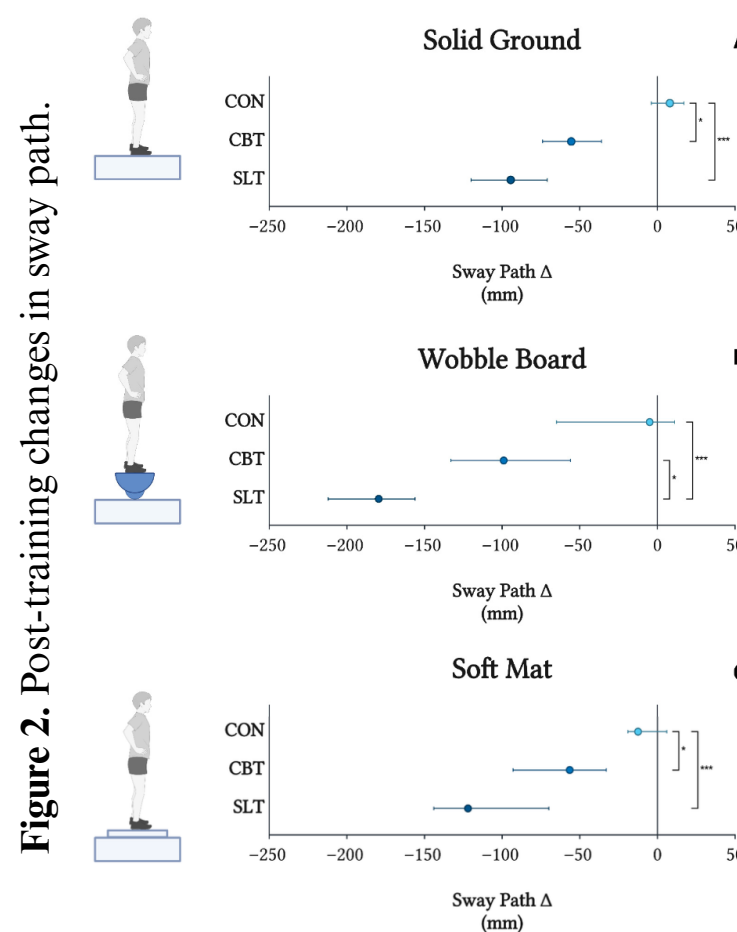
Thirty Division I football players were randomly assigned to one of three groups for eight weeks. One group performed no balance training, one group completed traditional balance exercises using equipment such as wobble boards and BOSU balls, and the third group trained using a portable slackline board. All balance training was performed three times per week for 15–20 minutes. Importantly, the training programs were carefully matched so that the only true difference between groups was the type of balance device used.

Figure 1. CONSORT diagram. Made with Biorender (2025).



Assessment Process

Balance was evaluated before and after the training period using two well-established methods. **Static balance** was measured by assessing how much an athlete swayed while standing on different surfaces using force plate technology. **Dynamic balance** was measured using the modified star excursion balance assessment. Both are considered gold standard assessments for measuring balance.

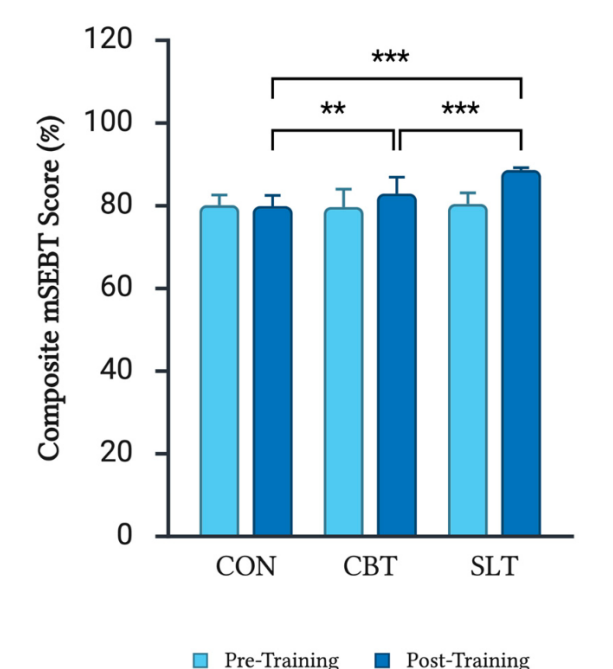


Results

Slackline-based balance training did not merely match conventional balance training methods – **it clearly outperformed them** across all static and dynamic balance outcomes. Traditional balance tools produced improvements of 6–9% in static balance and 2–6% in dynamic balance. Slackline training generated substantially larger, higher-order adaptations, with improvements of 10–19% for static balance and 7–11% in dynamic balance. Results indicate a more significant global enhancement of neuromuscular control in the Slackline training group.

Conclusion

The gentle, more dynamic amplitude of a slackline may provide the ideal training stimulus for global balance enhancement and balance training outcomes.



Outcome	Control	Conventional Balance	Slackline Balance
Static Balance – Firm Surface	+1.9% (worse)	–7.7%	–11.7%
Static Balance – Soft Mat	–0.1%	–6.6%	–10.1%
Static Balance – Wobble Board	–1.1%	–9.1%	–19.1%
Dynamic Balance – Anterior Reach	+1.7%	+6.7%	+11.5%
Dynamic Balance – Posterolateral Reach	0%	+4.8%	+7.1%
Dynamic Balance – Posteromedial Reach	0%	+2.0%	+8.1%
Dynamic Balance – Composite Score	0%	+3.8%	+11.3%