A Systematic Review of the effectiveness of rehabilitation training to restore proprioception after anterior cruciate ligament reconstruction

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Purpose

The purpose of this systematic review will be to evaluate the effectiveness of various methods of proprioceptive training with patients who have undergone ACL reconstruction.

Methods

A search of PUBMED, CINAHL, PROQUEST CENTRAL and GOOGLE SCHOLAR was performed for articles published after 2000. Inclusion criteria consisted of studies age ranges 12-60 years old, male or female, and patients that have undergone anterior cruciate ligament reconstruction. Articles were excluded if they included conservative (non-surgical) management of ACL tears, knee pathology other than an ACL tear, or other comorbidities affecting the ability to undergo rehabilitation protocols.

Results

Of the 993 studies retrieved, two reviewers independently scored the quality of the 10 studies that met the inclusion criteria using the PEDro scale. Scores ranged from a 3-8 with an average of 5.1. Proprioceptive interventions included whole body vibration (WBV), specific neuromuscular training, specific balance training, closed chain kinetic exercises, an accelerated rehabilitation protocol and the use of the Nintendo Wii Fit. Of 10 studies examining the most effective interventions for proprioception restoration, 5 studies utilized the outcome measure of joint position in space at various angles without visual feedback. Two of these studies using closed chain kinetic exercises and a WBV protocol demonstrated statistical significant improvement. Other outcome measures included single leg stance control, and anterior-posterior and medial-lateral stability using the Biodex Stability System. Four articles used functional measures such as the Lysholm Knee Scale and the Cincinnati Knee Rating System.

Conclusions

The results of this systematic review indicate that whole body vibration, closed kinetic chain exercises, and specific neuromuscular training demonstrated significant improvements in proprioception and functional knee outcomes with individuals following ACL reconstruction. However, this evidence is limited due to a lack of consistency between outcome measures, lack of long-term follow-up, and lack of consistency between treatment protocols. Future research should determine the optimal treatment parameters and include specific treatment protocols to improve proprioception.

Clinical Relevance

These finding suggest that the aforementioned interventions are safe and effective when rehabilitating a patient with a reconstructed ACL. Improved functional outcome scores may lead to a higher quality of life and an earlier return to prior level of function.

References


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