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The effects of the vibration training on balance and knee joint position sense after anterior cruciate ligament reconstruction

Abstract

Introduction: The purpose of this study was to compare the effect of a whole body vibration training (WBVT) protocol with a conventional Physiotherapy (PT) program on knee joint position sense and balance after anterior cruciate ligament (ACL) reconstruction.

Methods: The study was designed as a single blind RCT, Twenty athletes with unilateral ACL reconstruction were randomly assigned to the WBVT (n=10) or PT (n=10) group in this RCT; all participants received 12 sessions of WBVT or conventional training. Absolute error in joint repositioning for two target angles (30° and 60°) was measured by the Biodex dynamometer; bilateral dynamic postural stability indices were measured by the Biodex Balance System. All measurements were done pre and post intervention in both knees.

Results: The improvement in postural stability in the WBVT group was significantly greater than that in the PT group ($p \leq 0.05$). The p values of the changing scores of open overall, open anteroposterior, open mediolateral, closed overall, closed anteroposterior and closed Mediolateral stability indices were 0.002, 0.010, 0.0001, 0.001,0.0001 and 0.046, respectively. In addition, there were significant differences in all the changing scores of absolute angular error at 60° and 30° between the WBVT and PT groups inboth knees ($p=0.001$ in healthy and reconstructed knees at 60° and $p<0.0001$ in reconstructed knees at 30°), apart from the healthy knees at the 30° target position, which was not significant ($p=0.131$).

Conclusion: The results of this study showed that WBVT was associated with a greater improvement of knee joint position sense and postural balance. WBVT may be a new candidate for the rehabilitation of patients after ACL reconstruction.

Keywords: Whole Body Vibration Training, Anterior Cruciate Ligament, ACL Reconstruction, Knee Position Sense, Balance.