Time Post-Anterior Cruciate Ligament Reconstruction Does Not Associate With The Capacity To Modify Walking Biomechanics

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Background: Increased post-traumatic osteoarthritis risk following ACLR is linked to aberrant walking biomechanics. Real-time gait biofeedback (RTGBF) which cues changes in vertical ground reaction force impact peaks (vGRF-IP) has been used to acutely normalize gait biomechanics of ACLR individuals and may be an effective way to elicit sustained gait improvements. However, it remains unclear whether the amount of time post-ACLR alters ACLR individuals' capacity to modify gait biomechanics and match given targets during a RTGBF intervention.

Purpose: The purpose of this study was to determine the association between time post-ACLR and individuals' capacity to adapt vGRF-IP in response to a vGRF-IP based RTGBF intervention.

Methods: Individuals 6 months to 5 years following primary unilateral ACLR (N=35) participated in a usual walking trial and three 250-step randomized RTGBF walking trials which cued 5%, 10% and 15% increases in vGRF-IP. Univariate linear regression analyses between time post-ACLR and root mean square error (RMSE) for each RTGBF condition were conducted.

Results: There were no significant associations between time post-ACLR and RMSE for any of the 3 RTGBF trials ($R^2$ ranged between 0.003-0.023; all P values > 0.05).

Conclusions: The capacity to adapt to biomechanics cued by RTGBF does not associate with time post-ACLR. These data suggest that RTGBF could be implemented between 6 months and 5 years post-ACLR with similar efficacy for eliciting immediate changes in gait biomechanics.