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Inter-limb differences in impulsive loading following anterior cruciate ligament reconstruction in females

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Abstract

Anterior cruciate ligament injury and reconstruction (ACLR) dramatically increase the risk of knee osteoarthritis, but the contributing factors, and therefore the targets for intervention, are poorly understood. Differences in loading characteristics between the ACLR and contralateral limbs during routine activities such as walking may elucidate the mechanical pathogenesis of post-traumatic knee osteoarthritis. Twenty-nine females with ACLR (age = 21.7 ± 3.1 years; time since ACL injury = 48 ± 41 months) performed walking gait at a self-selected speed from which the overall peak vertical ground reaction force (vGRF) in the first 50% of the stance phase and its linear (slope of the vGRF-time curve) and instantaneous (first time-derivative) loading rates were calculated. The magnitude of the vGRF peak immediately following heelstrike and its linear and instantaneous loading rates were also identified. Subjects were further classified as