Knee Loading Deficits During Dynamic Tasks in Individuals Following Anterior Cruciate Ligament Reconstruction

Deficits in sagittal plane knee loading persist 6 to 24 months after surgery in individuals following anterior cruciate ligament reconstruction (ACLR) across a variety of tasks. Specifically, individuals adopt strategies that shift the demands away from the knee extensors of the reconstructed limb. These strategies are well documented across tasks and throughout recovery, and are characterized by decreases in flexion motion and internal extensor moments in the reconstructed knee when compared to a healthy control or nonsurgical limb. Knee extensor moment deficits as large as 35% are observed 6 to 15 months postsurgery during deceleration of dynamic running, landing, and hopping tasks, as the knee extensors act to eccentrically control knee flexion. This is of concern, as the presence of asymmetrical loading is thought to contribute to risk for reinjury.

While many studies describe a strategy that limits knee extensor moments following ACLR, the dynamics of knee loading have not been fully explored in this group. Deficits in knee power absorption have been identified during dynamic tasks, suggesting that the dynamics of knee loading are altered following ACLR. Orishimo et al observed that individuals 7 months postsurgery exhibit a 43% decrease in knee joint power absorption in the reconstructed limb and a 6% decrease in knee extensor moment during a single-leg hop test. Greater deficits in knee joint power than in knee extensor moment indicate that knee flexion velocities may be limited during dynamic tasks in individuals following ACLR. Furthermore, Kline et al observed that during running, individuals at 6 months post-ACLR limit the rate at which the reconstructed limb generates knee extensor moments and are slower to reach the peak knee extensor moment deficits as large as 35%.