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Changes In Lower Extremity Mechanics During A Stop Jump From 6 To 12 Months Following ACL Reconstruction.

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Abstract:

Rehabilitation following ACL reconstruction is a lengthy process. Over the past decade the expected rehabilitation time has been cut by at least 50%, however, over a similar time period 20-30% of these patients had a second ACL tear. It has been suggested that athletes require time in order to normalize their movements following ACL reconstruction; however, there is limited research to support or refute this claim.

PURPOSE: To examine how landing mechanics change in ACL reconstruction patients between 6 and 12 months following surgery.

METHODS: Fifteen patients underwent a lower extremity biomechanical analysis that included motion capture and ground reaction force data collection. Data were collected bilaterally during a stop jump task which required the subject to land with each foot on a separate force plate. The task was performed at a maximal velocity and the subject was instructed to perform a maximum vertical jump. A similar protocol was carried out at both time points. Sagittal plane lower extremity mechanics for the ankle, knee and hip at initial contact and peak values were the primary variables of interest. Statistical analysis was carried out accounting for time (6 month vs. 12 month) and limb (surgical (S) vs. non-surgical (NS)) using a repeated measures ANOVA ($\alpha=0.05$). Statistical interactions were of a primary interest with the main effects for side and time being assessed as a secondary aim.

RESULTS: There was a statistically significant interaction for the peak knee extension moment ($p<0.03$, S-6: 0.109 ± 0.030 Nm/ht*BW; NS-6: 0.150 ± 0.026 Nm/ ht*BW; S-12: 0.110 ± 0.024 Nm/ ht*BW; NS-12: 0.136 ± 0.033 Nm/ ht*BW). Main effects for side existed for the ankle position at initial contact (S: -2.3 ± 12.2 deg; NS: -5.5 ± 12.5 deg), the peak plantarflexion moment (S: 0.095 ± 0.018 Nm/ ht*BW; NS: 0.103 ± 0.021 Nm/ ht*BW), and the peak vertical ground reaction force (S: 1.64 ± 0.40 %BW; NS: 2.0 ± 0.57 %BW).

CONCLUSIONS: The findings of this study suggest that sagittal plane moments at the knee increase symmetry between 6 months and 12 months following ACL reconstruction surgery, however, large asymmetries continue to exist bilaterally at 6 and 12 months post-surgery. These mechanical differences may be important to target during neuromuscular training programs following ACL reconstruction.

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