

Smaller Graft Size is Associated with Poorer Outcomes and Increased Risk of Revision 2 Years After Primary ACL Reconstruction with Hamstring Autograft: A MOON Cohort Study

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Summary:

Smaller hamstring autograft size is correlated with lower KOOS and subjective IKDC scores two years following ACL reconstruction and graft size less than 8.5 mm is associated increased risk of revision ACL reconstruction, especially in younger patients.

Abstract:

Introduction:

Hamstring autografts are frequently utilized for anterior cruciate ligament (ACL) reconstruction. Commonly used 4-strand grafts average about 8 mm in diameter but significant variation among patients has been noted. Previous retrospective studies have demonstrated increased failure rates with smaller grafts, particularly in younger patients. No studies have evaluated the effect of graft size on patient-reported outcomes following ACL reconstruction. We hypothesize that decreased hamstring autograft size is associated with poorer patient reported outcome scores and increased risk of revision ACL reconstruction.

Methods:

Through use of prospectively collected cohort data augmented with retrospective chart review, 263 of 320 consecutive patients (82.2%) undergoing primary ACL reconstruction with hamstring autograft at two academic centers were evaluated. Graft size, patient sex, femoral tunnel drilling technique, patient age and BMI at the time of ACL reconstruction, pre-operative and 2-year post-operative KOOS and IKDC scores, and whether each patient underwent revision ACL reconstruction during the 2 year follow-up period were recorded.

Results:

The 263 patients included 144 males (54.8%) and ranged in age from 13 to 58 years (mean, 25.6 years). After controlling for age, sex, operative side, surgeon, BMI, and femoral tunnel drilling technique, a 1mm decrease in ACL graft size predicted a decrease in the KOOS-pain subscale by 3.0 points ($p = 0.009$), a decrease in the KOOS-sport/recreation function subscale by 4.6 points ($p = 0.015$), and a decrease in the subjective IKDC score by 2.9 points ($p = 0.05$). Fifteen of the 263 patients (5.7%) underwent revision ACL reconstruction. Two revisions were performed in the 178 patients over age 18 (1.1%), but 13 revisions were required in the 85 patients age 18 and under (15.3%) ($p < 0.0001$). Revision was required in 0 of 61 patients (0.0%) with grafts greater than 8mm in diameter and 14 of 202 patients (6.5%) with 8 mm or smaller grafts ($p = 0.037$). Among patients age 18 and under, revision was required in 0 of 14 patients (0.0%) with grafts greater than 8mm in diameter and 13 of 71 patients (18.3 %) with 8 mm or smaller

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grafts. Most failures (13 of 15) were noted to occur in patients age 18 and under with grafts 8mm in diameter or less. The revision rate in this population was 18.3% (13 of 71 patients).

Conclusions:

Smaller hamstring autograft size is a predictor of poorer patient-reported outcome scores 2 years following primary ACL reconstruction. Larger sample size is required to confirm the relationship between smaller graft size and increased risk of revision ACL reconstruction.