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The Effect of Autologous Hamstring Graft Diameter on Likelihood for Failure of Anterior Cruciate Ligament Reconstruction

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Summary:
Using a case-control design to match patients by gender, age, BMI, femoral and tibial fixation type, this study identifies a 19% decrease in the likelihood of being a revision case after anterior cruciate ligament reconstruction for every 0.5mm incremental increase in graft diameter.

Abstract:
PURPOSE
The purpose of this study was to evaluate the relationship of hamstring graft diameter to anterior cruciate ligament (ACL) revision within a large cohort of patients, while controlling for gender, age, BMI, and femoral and tibial fixation type.

METHODS
A case-control study using patients registered in an ACL Reconstruction Registry was conducted. Revision was used as a marker for graft failure. A case was defined as a primary ACL Reconstruction performed with a hamstring autograft that was revised during the study period (4/2006-9/2012). Three controls, defined as primary ACL Reconstructions performed with a hamstring autograft who were not revised, were matched to each of the cases according to age, gender, body mass index (BMI), femoral and tibial fixation type. Hamstring graft diameter was evaluated as the exposure of interest in this study. Descriptive characteristics were employed and conditional logistic regression was conducted to produce estimates of odds ratio (OR) and 95% confidence intervals (CI).

RESULTS
124 cases and 367 controls were identified. There were no significant differences in gender distribution (52.4% vs. 52.9% male, p=0.932), median age (17.6 [IQR 15.9 - 20.4] vs. 17.6 years-old [IQR 15.9 - 20.4], p=0.999), median BMI (23.4 [IQR 21.5 – 26.4] vs. 23.4 kg/m2 [IQR 21.6 – 25.8], p=0.954), femoral fixation (p=0.459), and tibial fixation (p=0.766) between cases and controls. The median graft diameter in the cases was 8.0mm (IQR 7.3 – 8.0) and in the controls was 8.0mm (IQR 7.5 – 8.5). After accounting for the differential follow up of the cases, the likelihood of a patient being a case (i.e. a revision) in our cohort was 0.81 times lower (95%CI 0.66 – 0.99, p=0.038) for every 0.5mm increase in graft diameter from 7.0mm to 9.0mm.

CONCLUSIONS
Surgeons performing ACL Reconstruction surgery should be aware of factors that may influence the likelihood of success. Hamstring graft diameter is one such factor. In this study we have found that within the range from 7.0mm to 9.0mm, there is a 19% decrease in the likelihood of being a revision case with every 0.5mm incremental increase in graft diameter. This information may help to explain the reason for some of the failures seen with hamstring autografts.

Level of Evidence: Level III, case-control study.