INCREASE IN FUNCTIONAL GRAFT LENGTH OVER TIME AFTER ACL RECONSTRUCTION: EFFECTS OF FEMORAL TUNNEL POSITION

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INTRODUCTION:

Graft tunnel position affects tension in the graft over the physiological range of knee flexion. Excessively anterior positioning of the femoral tunnel can cause significant increases in graft tension during flexion in cadaver models. These observations have led to recommendations for tunnel placement posterior to the anatomical insertion of the antero-medial bundle of the ACL, to avoid loss of joint range of motion and prevent potentially damaging strains to the ACL graft. However, clinical studies relating tunnel position to clinical outcome have been inconclusive, and little is known about the effects of tunnel placement on Graft elongation over time. The stepwise regression selected graft) elongation exceeded 3%; 1 subject had a slight decrease in -0.6% to +4.3%). In 3 of the 7 subjects (2 hamstrings, 1 patellar tendon graft; elongation in vivo was identified during a moderately stressful activity (running) – thus, they are referred to as changes in functional graft length. KT-1000 measurements (taken at the same time) were uncorrelated with dynamic length measurements, suggesting that static laxity testing may be inadequate for assessing functional changes in graft behavior over time.

RESULTS:

Mean change in graft length between test dates was +1.7% (range -0.6% to +4.3%). In 3 of the 7 subjects (2 hamstrings, 1 patellar tendon graft) elongation exceeded 3%; 1 subject had a slight decrease in functional graft length over time. The stepwise regression selected anterior/posterior (partial corr. 0.48) and proximal/distal (partial corr. 0.23) graft positions for predicting elongation (statistically significant, R²=0.93, p=0.005). Medial/lateral position was unrelated to elongation.

DISCUSSION:

A relationship between posterior/distal graft position and early graft elongation has been identified in a relatively small group of subjects. These findings suggest that the common practice of placing the femoral graft tunnel posterior to the antero-medial bundle of the ACL, while beneficial for preventing loss of knee flexion range, may have a deleterious effect on graft mechanics. These results will be verified as more follow-up data from the study becomes available (there are currently 31 subjects in the study). No other factors (e.g. graft type, sex, age, activity level) were correlated with elongation, though power is insufficient to rule out such relationships at this time.

Note that these graft length changes were identified during a moderately stressful activity (running) – thus, they are referred to as changes in functional graft length. KT-1000 measurements (taken at the same time) were uncorrelated with dynamic length measurements, suggesting that static laxity testing may be inadequate for assessing functional changes in graft behavior over time.

REFERENCES:


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