



## Grant Information Summary:

# Predictors of Functional Outcome Following Anterior Cruciate Ligament Reconstruction

### Practical Significance:

**This study shows that post-operative kneecap pain and knee strength relative to body weight are associated with and predict surgical success following anterior cruciate ligament reconstruction.**

#### Background

Anterior cruciate ligament (ACL) injuries are common in competitive athletics. Surgical reconstruction of the ACL clearly improves the function and performance of the knee, although surgery rarely restores the knee to pre-injury levels. Several variables have been theorized to influence the effectiveness of surgery, yet sufficient empirical evidence of what determines positive outcomes following surgery is lacking.

#### Objective

To identify specific physical characteristics that may relate to, and

potentially predict, post-operative functional outcome in the ACL reconstructed knee.

#### Design and Setting

A prospective, observational design was used to achieve the objective in a university laboratory setting.

#### Subjects

Forty-four males (range 18-51, mean 26.22 +/- 7.57 years) and 32 females (range 18-53, mean 26.91 +/- 7.95 years) served as subjects. All subjects underwent intraarticular, autogenous, bone-tendon-bone patellar tendon graft ACL reconstruction at least

one, but not more than five, years prior to the study.

### **Measurements**

Nineteen specific physical variables were broadly categorized as demographic, anthropometric, impairment, or surgical characteristics. We quantified functional outcome using four different outcome measures including the Cincinnati Knee Rating Scale (CKRS), ACL-Quality of Life Questionnaire (ACL-QOL), Single Assessment Numeric Evaluation (SANE), and a mean symmetry index of six performance tests comparing the reconstructed and uninjured extremities.

### **Results**

Several physical characteristics including: age, limb-dominance, physical activity level, body fat, knee valgus/varus position, quadriceps angle, tibial slope, knee laxity, knee torque, and anterior knee pain were significantly related to the functional outcome measures. Stepwise multiple regression identified anterior knee pain and knee

torque relative to body weight as common predictors for all functional outcome questionnaires. Physical characteristics explained 51% of the difference in each subject's scores on the CKRS, but only accounted for 25% and 29% respectively, of the variation in subject scores on the SANE and ACL-QOL. The performance tests were poorly related to, and predicted by, these same physical characteristics.

### **Conclusions**

These data indicate that physical characteristics have a significant, but limited value in predicting functional outcome following intraarticular, autogenous, bone-tendon-bone patellar tendon graft ACL reconstruction. Despite these limitations, physical characteristics predicted over half of the variability in scores on the CKRS. Further study should address 1) the etiology of post-operative anterior knee pain and 2) determine if a cause-effect relationship exists between knee torque relative to body weight and functional outcome.

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