Quantitative Assessment of Knee Kinematics Utilizing a New Low Profile Pivot Shift Test

The pivot shift test (PST) has been shown to be a highly specific diagnostic test for evaluating anterior cruciate ligament (ACL) deficient knee instability. However, patient pain has been observed as the practitioner induced internal rotary, anterior, and valgus tibial forces of the PST are applied to a patient's knee. Our study seeks to quantitatively understand the associated knee kinematics of a low profile pivot shift test (LPPST), and, in an effort to reduce patient pain, we also seek to show that a new LPPST consisting of operator induced internal rotary and anterior directed forces (no valgus force) with subsequent patient knee range of motion can effectively differentiate between the ACL deficient and ACL sufficient knee. Twenty cadaver knees were utilized in our study. Our quantitative assessments utilized computer assisted navigation (Orthopilot) to sample the anterior/posterior translation and internal/external rotation of the tibia as the LPPST force vectors were applied and each cadaver knee was taken through a full range of motion. Our results show a consistently greater anterior tibial translation and internal tibial rotation in the ACL deficient vs. ACL sufficient knees during the entrance and exit pivot phases of the LPPST. Our study demonstrates a diagnostic test which effectively elucidates differences between the ACL deficient and ACL sufficient knee.