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# Clinical Application of Quantitative Assessment of the Pivot Shift – A Multicenter Study

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**Summary**:

**Abstract**:
Introduction
Evaluation of the pivot shift test in the clinical setting could be challenging because of the subjective grading and the many execution techniques. The purpose of this study was to test the validity of quantitative pivot shift (QPS) to aid in assessment of ACL deficiency and the outcome of ACL reconstruction.
Methods
Patients undergoing anatomic single-bundle ACL reconstruction with hamstring autograft were prospectively enrolled at four international centers from December 2012 to February 2015. Examiners across all centers were trained to perform a standardized pivot shift test prior to the study. During a 24-month follow-up period, data were collected at eight separate timepoints for each patient. Quantitative pivot shift (QPS) was assessed by inertial sensor and image analysis technology.
Results
107 patients (46 % females) with an average age of 24.8 years were included. During follow-up, 3 graft failures (2.8 %) occurred and 2 patients (1.9%) underwent contralateral ACL reconstruction. The technology for quantitative assessment of pivot shift were found valid and able to distinguish differences between clinically graded low- and high-grade pivot shift. There was a significant positive correlation between lateral tibial translation and acceleration in ACL deficient knees, and injury pattern influenced the strength of the correlation. Significant differences in grading of the pivot shift was found when comparing testing under anesthesia with testing of patients in awake state.
Conclusion
The failure rate in this study was <3 % for patients undergoing anatomic ACL reconstruction with hamstring tendon autograft. Dynamic knee laxity can be reliably assessed by the use of inertial sensor and image analysis for QPS. Further understanding of factors that impact the magnitude and characteristics of the QPS is needed.