Patient-Reported Outcomes with Tibial Baseplate Position and PCL Status in Conforming Total Knee Arthroplasty

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Background and Hypothesis: Anteroposterior (AP) tibial baseplate position, posterior tibial slope, and posterior cruciate ligament (PCL) status in total knee arthroplasty (TKA) undoubtedly affect kinematic patterns. Further, few studies document patient-reported outcome measures (PROMS) in *conforming polyethylene* TKA with these varying parameters. The purpose of this study was to correlate PROMS with the interaction of AP tibial baseplate position, tibial slope, and PCL status in a consecutive series of primary TKAs with conforming polyethylene. We hypothesized that pain, function, and satisfaction may correlate with a combination of these three parameters.

Experimental Design or Project Methods: 589 consecutive primary TKAs of a single implant design performed by a single surgeon between January 2016 and October 2018 were retrospectively reviewed. AP tibial baseplate position (relative to the middle of the tibial canal) and posterior tibial slope measurements were performed on 4-week postoperative sagittal view radiographs with a standardized measurement protocol by two independent blinded raters. Validated PROMS related to activity level, pain, and function were evaluated at minimum one-year.

Results: Analyses indicated differences based on ≥8mm vs. <8mm of posterior distance of the tibial baseplate from the tibial canal and whether or not the PCL was released. Four analysis groups (PCL-preserved <8mm, PCL-preserved ≥8mm, PCL-resected <8mm, and PCL-resected ≥8mm) did not differ by demographics/covariates ($p \geq 0.150$), tibial slope ($p \geq 0.132$), or preoperative PROMS ($p \geq 0.088$). The PCL-released <8mm group achieved clinically meaningful higher absolute (92.0) and delta (42.0) median KOOS Jr. scores, higher satisfaction (96.3%), and the greatest reduction in pain while climbing stairs (-7.0) although some findings lacked statistical significance.

Conclusion and Potential Impact: In conforming polyethylene TKAs, releasing the PCL in combination with AP tibial baseplate placement <8mm from the tibial canal may eliminate kinematic conflict between the PCL and tibial baseplate leading to improved satisfaction, function, and pain while climbing stairs.