Does Correction Of Posterior Femoral Offset And Tibial Slope Improve Patient-reported-outcomes In Flexion Instability In TKA?

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Disclosures:
N.V. Kalore: None. A. Kannan: None. W.A. Jiranek: None.

Introduction: With increase in utilization of total knee arthroplasty (TKA), the burden of revision TKA is projected to increase dramatically with an estimated burden of 268,000 procedures annually by 2030. Instability is the third leading cause of revision TKA. Instability after TKA may be in flexion, extension, or both. Flexion instability results from the flexion gap being greater than the extension gap or from failure of the posterior cruciate ligament (PCL) in cruciate retaining (CR) knees. Reducing the flexion gap to match the extension gap by means of increasing posterior femoral offset and reducing tibial slope seem to be logical treatment strategies. The effect of these treatment strategies on clinical outcomes perceived by the patient has not been reported before. We therefore conducted this study to examine the effect of correction of posterior femoral offset and tibial slope on patient-reported outcomes in patients with flexion instability after TKA.

Methods: We analyzed a retrospective cohort of patients who had undergone revision TKA for a diagnosis of flexion instability at a single teaching hospital over a 5-year period from January 2007 to December 2011 with institutional review board approval. We excluded patients with less than one-year postoperative follow-up and patients with evidence of periprosthetic infection or implant loosening. 37 patients with a mean age 62 years, range 40-82 years, (13 males and 24 females) met the study criteria and had a mean follow up of 32 months (range, 12-76 months). Of these 24 were CR TKAs and 13 were PS TKAs. 31 patients had a fixed bearing while 6 had a mobile bearing. Twelve patients had undergone a procedure for unexplained painful TKA prior to the revision for flexion instability (arthroscopic debridement -4, polyethylene exchange -3, manipulation under anesthesia-3, iliobibial band release 1, tibial component revision-1). Revision surgery involved matching the flexion extension gap by increasing posterior condylar femoral offset and reducing tibial slope. Four patients were treated with revision of femoral component only and the rest had revision of tibial and femoral components. Radiographic corrections achieved at surgery were measured by posterior condylar offset ratio (PCOR), tibial slope and the level of joint line. The clinical outcome was assessed by patient reported modified version of the Knee Society Score (KSS) as a mailed questionnaire. Patients rated improvement with surgery on a 7-point likert scale and this was used to classify patients in good or poor outcome groups. The complications, reoperations and re-revisions after the index revision were recorded. Statistical analysis: Student t test was used for comparison of mean values between two groups and logistic regression analysis was used for analyzing risk factors for poor outcome. P values less than 0.05 were considered significant.

Results: Revision surgery produced a statistically significant increase in PCOR (p<0.001) and decrease in tibial slope (p<0.001) without elevating the joint line. The KSS improved from a mean of 34.5 ± 8.4 to 61.8 ± 25.4 postoperatively at a mean of 32 months from the surgery (p<0.0001). 26 out of 37 (70%) patients reported improvement with surgery and were classified as having a good outcome. Preoperative factors, namely, age, gender, BMI, ASA, procedure performed for painful TKA prior to revision did show a significant effect on the postoperative outcome. Revision of a PS TKA showed a trend toward increased risk of poor outcome with an odds ratio of 3.2 (95% CI, 0.7492 - 14.1597). There were 10 reoperation with 2 stage revision for infection, 2 manipulations, 2 arthroscopic adhesiolysis, 2 scar excision for patellar clunk syndrome, 1 fixation of periprosthetic fracture, 1 screw removal and 1 hematoma evacuation.

Discussion: Instability is a major cause of early revision following TKA. Our study demonstrates that surgical correction of posterior femoral offset and tibial slope lead to overall satisfactory clinical results with a mean improvement in the KSS and KSS-fn by 27 and 21 points, respectively, and 70% of patients reporting a perceptible improvement. Surgical correction with increase in posterior femoral offset and reduction in posterior tibial slope leads to improvement in patient’s function and satisfaction with surgery.

Significance: This study is unique in analyzing effect of surgical correction strategies on patient reported clinical outcomes in flexion instability in TKA

Acknowledgments: None


Waslewski GL, Marson BM, Benjamin JB. Early, incapacitating instability of posterior cruciate ligament-retaining total knee