Title: Should Preoperative Deformity Determine Femoral Component Rotation in Total Knee Arthroplasty?

Abstract: (Your abstract must use 11pt Arial font and must not be longer than this box)

Introduction: Most surgeons utilize one of three axis options in conventional total knee arthroplasty (TKA), the transepicondylar axis (TEA), Whiteside’s line (WSL) or the posterior condylar axis (PCA) to set femoral component rotation. Many surgeons believe the TEA to be the gold standard for determining neutral rotation. WSL and PCA have been used as surrogates for determining axial rotation in conventional TKA. The goal of this study was to examine if coronal plane deformity had any effect on the relationship of conventional referencing options such as WSL and PCA to the TEA.

Methods: Utilizing preoperative plans based on magnetic resonance imaging (MRI), we compared the preoperative posterior femoral condyle resections for three different axis options in 176 TKA. The difference in bone resection amount was used to determine the rotational differences between the axis options in all knees. Assuming that the TEA was the ideal rotational axis, we compared the TEA to both WSL and PCA. A 1-sample t-test and paired t-test were then used to determine if there was a significant rotational difference between the various axis options when accounting for degree and direction of preoperative deformity in the coronal plane.

Results: In the overall population of 176 knees (42 valgus, 134 varus), neither WSL or PCA approximated the TEA accurately (p=0.016 and 0.001). In valgus deformity, WSL was found to approximate the TEA (p=0.68) better than the PCA (p=0.21). Minor varus deformity (< 3 degrees) favored the use of PCA (0.53) while moderate varus deformity (3-6 degrees) favored use of WSL (p=0.76). Severe varus (>6 degrees) deformity favored use of PCA due to lower variability.

Conclusion: MRI based preoperative planning indicates that the degree and direction of preoperative coronal plane deformity should help guide the choice of WSL or PCA to approximate the TEA in TKA.

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