

Julian Rimm, MS, Krystin Wong, BA, Samantha Andrews, PhD, ATC, Kristin Mathews, MS, ATC, Cass Nakasone, MD

Abstract Title: Gap Balance versus Measured Resection Technique in Total Knee Arthroplasty with Fixed Femoral Cut of 6° Valgus

Objective

Restoration of near-neutral mechanical axis (MA) is a hallmark of successful total knee arthroplasty (TKA) and has been shown to reduce alignment related early implant failures. Measured resection (MR) and gap balancing (GB) are two soft tissue balancing techniques implemented in TKA, however it is still debated which method is superior in restoring MA. Therefore, the purpose of this study was to compare MR and GB during TKA while utilizing a fixed distal femoral cut of 6° valgus.

Methods

A total of 148 patients (203 knees) underwent primary TKA by a single surgeon, including 109 MR knees and 94 GB knees. Pre- and six-week post-operative mechanical axis was measured on weight bearing, anteroposterior radiographs, with neutral mechanical axis considered $0^{\circ} \pm 3^{\circ}$. At six-week follow up, the Knee Society Knee Score and Function Score, knee flexion and the KOOS JR patient survey were collected. Additional data collected included patient demographics and surgical time. Non-parametric tests were performed to determine difference between GB and MR groups.

Conclusion

Age and body mass index were not significantly different between implant groups, however, GB had a greater percentage of male patients ($p=0.033$). Pre-operatively, mechanical axis was significantly more varus in the GB group ($-5.9^{\circ} \pm 8.9^{\circ}$) than the MR group ($-2.7^{\circ} \pm 9.7^{\circ}$) ($p=0.020$). Post-operatively, no significant difference in mechanical axis was noted between the GB ($0.23^{\circ} \pm 2.8^{\circ}$) and MR groups ($0.39^{\circ} \pm 2.9^{\circ}$) ($p=0.958$), with 76 (80.9%) and 83 (76.1%) of GB and MR knees classified as neutral ($p=0.702$). Surgical time was significantly longer in the unilateral MR group (66.2 ± 15.2 minutes) compared to the GB group (60.5 ± 9.5 minutes) ($p=0.047$) but no difference was noted in bilateral procedures ($p=0.851$). There was also no significant difference in post-operative clinical outcomes (Knee Score, $p=0.920$; Function Score, $p=0.652$), knee flexion ($p=0.142$) or KOOS JR scores ($p=0.416$). With no difference in post-operative mechanical alignment or clinical/patient reported outcomes, both surgical methods represent equivalent options for surgeons trying to decide on a primary implant system for TKA.