

## **Which Repair Technique, Bone Tunneling or Suture Anchors, is Superior When Performing a Lesser Tuberosity Osteotomy at the Time of Stemless Total Shoulder Arthroplasty?**

Jared M Mahylis, Mahdi Mazeh, Emil Espinal Nunez, Daniel Oravec, Johnny Kasto, Chimdindu Obinero, Kai Zhu, Yener N Yeni, Shariff K Bishai, Stephanie J Muh

**INTRODUCTION:** Total shoulder arthroplasty (TSA) has evolved as a treatment for advanced shoulder osteoarthritis, with stemless implants gaining popularity due to reduced risks of stress shielding and complications associated with stemmed designs. However, the optimal technique for repairing the subscapularis during TSA remains under investigation. This study evaluates the biomechanical performance of two repair techniques—bone tunneling and suture anchors—used for Lesser Tuberosity Osteotomy (LTO) in the context of stemless TSA.

**METHODS:** Ten shoulders from six cadaveric specimens (3 male, 3 female; aged 58–93) were prepared and allocated to bone tunneling or suture anchor repair groups. Cyclic loading tests were performed, followed by incremental load-to-failure protocols. Outcomes included repair gapping during cyclic loading, initial repair stiffness (derived as the average secant stiffness for 10 of the initial 3000 cycles prior to fatigue), cycles to failure, displacement of repair and load to failure.

**RESULTS:** The mean age of the cadavers used in this study was  $90.17 \pm 14.73$  years. Mean failure load were identical, and cycles to failure nearly identical, between groups ( $p = 0.862-1.000$ ). No significant differences were observed between the two groups in repair gapping during cyclic loading ( $p = 0.421$ ). However, a nonsignificant trend was observed for initial repair stiffness ( $p = 0.071$ ), with the tunnel group showing greater stiffness ( $62.5 \pm 13.9$  N/mm) compared to the anchor group ( $46.0 \pm 10.6$  N/mm). A trend was also noted in displacement of repair ( $p = 0.099$ ), with the tunnel group exhibiting greater displacement ( $41.4 \pm 17.3$  mm) than the anchor group ( $23.0 \pm 13.1$  mm).

**DISCUSSION AND CONCLUSION:** This study suggests that both techniques may yield comparable biomechanical outcomes in cadaveric models of LTO repair, that warrant further exploration. As a pilot project, this study lays the groundwork for future research that could expand upon these preliminary results and contribute to a deeper understanding of LTO repair techniques.