

Biomechanical Comparison of a Single versus Double-Row Suture Anchor Technique for Rotator Cuff Repair

David H. Kim, M.D., Neal S. ElAttrache, M.D., James E. Tibone, M.D.,
Bong-Jae Jun, MS, Sergai N. DeLaMora, M.D., Ronald S. Kvitne, M.D.

Rotator cuff repair using transosseous tunnels improves footprint contact area and pressure when compared to suture anchor techniques. A double-row technique has been used clinically to improve footprint coverage by a repaired tendon. We hypothesized that an arthroscopic “transosseous-equivalent” rotator cuff repair using tendon suture-bridges will demonstrate improved pressurized contact between tendon and tuberosity when compared to a double-row technique. In six fresh-frozen human shoulders, a “transosseous-equivalent” rotator cuff repair was performed: a suture limb from each of two medial anchors was bridged over the tendon, and fixed laterally with an interference screw (four suture-bridges). In six of the contralateral specimens, two types of repair were performed randomly in each specimen: 1) a double-row repair and 2) a “transosseous-equivalent” repair using a single screw (two suture-bridges). For all repairs, pressure-sensitive film was placed at the tendon-footprint interface, and software was employed to obtain measurements. The mean pressurized contact area between the tendon and insertion was significantly greater for the four suture-limb technique ($115.7 \pm 12.88 \text{ mm}^2$, 72.3%) compared to both the double-row ($56.2 \pm 25.8 \text{ mm}^2$, 35.1%) and two suture-limb ($91.7 \pm 8.2 \text{ mm}^2$, 57.3%) techniques ($p < 0.05$). The mean interface pressure exerted over the footprint by the tendon was also greater for both the two

($0.23 \pm 0.04 \text{ MPa}$) and four ($0.27 \pm 0.04 \text{ MPa}$) suture-limb techniques compared to the double-row technique ($0.19 \pm 0.01 \text{ MPa}$) ($p < 0.05$). The arthroscopic “transosseous-equivalent” rotator cuff repair technique improved pressurized contact area and overall pressure between tendon and footprint when compared to a double-row technique. A “transosseous-equivalent” technique, employing suture-bridges, may help optimize the healing biology at a repaired rotator cuff insertion.