

Reverse Total Shoulder Arthroplasty with Lower Trapezius Transfer for Combined Loss of Elevation and External Rotation

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INTRODUCTION: Reverse total shoulder arthroplasty (RTSA) is a well-accepted treatment for cuff tear arthropathy and consistently restores active forward elevation. However, when there is loss of the posterior rotator cuff (infraspinatus and teres minor), patients can exhibit a “hornblower’s sign.” This loss of active external rotation (ER) can be functionally disabling. RTSA alone will not reliably restore active ER ability in this clinical scenario. We present a series of RTSA with lower trapezius transfer (LTT) (utilizing tibialis anterior allograft) for patients with combined loss of elevation and external rotation (CLEER).

METHODS:

Ten patients (9 male, 1 female) underwent RTSA with LTT (9 with tibialis anterior, 1 achilles tendon allograft). Average age was 68.1 yrs (52-82). Average follow up was 2.5 yrs (1-4 yrs). All had loss of active ER with average active ER at the side being -9.4° (20 to -30). Average active elevation was 68.9° (30-120). Preoperative patient-reported outcome scores were: ASES: 43.0 (± 19.4), SANE: 32.3 (± 19.1), and VAS for Pain: 5.6 (± 2.6).

All exhibited a “hornblower’s sign” with the forearm falling into internal rotation with elevation preoperatively. MRI revealed irreparable cuff tears involving the supraspinatus and infraspinatus. In all cases, the teres minor had significant atrophy and/or fatty infiltration. Five of ten patients (50%) had undergone previous surgery. Seven of ten were the non-dominant arm.

The operation was performed in a sloppy lateral position on a beanbag positioner to allow both the deltopectoral incision and a posterior incision to access the lower trapezius tendon. The LTT is isolated and released from the scapular spine. The RTSA is performed. The tibialis anterior allograft tendon is placed in a transosseous tunnel at the insertion of the infraspinatus. It is passed into the posterior incision, then woven through the LTT and tensioned with the shoulder in elevation and ER. Postoperatively, a sling with a derotation wedge is utilized for 4 weeks.

RESULTS: All patients were able to actively elevate and keep the forearm pointed to the ceiling in the scapular plane following surgery, thus eliminating the “hornblower’s sign.” The average active FE and active ER at the side were 146° (120-170, $p=0.0002$) and 36.7° (10-70, $p<0.001$), respectively. Postop outcome scores averaged: ASES: 81.1 (± 11.3 , $p=0.005$), SANE: 67.4 (± 20.2 , $p=0.002$), VAS for pain: 0.44 (± 0.53 , $p=0.0006$). Manual muscle testing of ER strength at the side improved from avg 2.75 out of 5 to postoperative 4.3 out of 5 (SD 0.82; $p=0.002$).

DISCUSSION AND CONCLUSION:

RTSA with latissimus dorsi transfer has been utilized to address CLEER. However, if the subscapularis is absent or deficient, this can further compromise internal rotation ability. LTT has been described for rotator cuff deficient shoulders without arthritis to restore ER ability without a prosthetic implant.

This series, with early-term follow up, reports the results of RTSA with LTT to restore ER ability in severely dysfunctional shoulders. Consistent functional results and high patient satisfaction were obtained with RTSA and LTT with a tibialis anterior tendon allograft in patients with CLEER. The hornblower’s sign was eliminated in all patients.