Two-Year Functional, Radiologic and Electromyographic Outcomes After Arthroscopically Assisted Lower Trapezius Transfer

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Introduction: The purpose of this study was to evaluate the functional outcomes and structural healing two-years after arthroscopically assisted lower trapezius transfer for irreparable posterior superior rotator cuff tears utilizing suture anchor fixation of an Achilles allograft.

Materials and Methods: All patients who underwent arthroscopic assisted lower trapezius tendon transfer for an irreparable posterior superior rotator cuff tear between 2017-2021 by two surgeons at an academic medical center with a minimum of 2 year follow up were identified. Functional scores including the American Shoulder and Elbow Surgeons (ASES) score, visual analog pain (VAS) score, and range of motion (measured utilizing a goniometer) at a minimum of two-years postoperatively were collected. Patients were evaluated at least two years postoperatively with an MRI to assess healing of the Achilles allograft to the greater tuberosity and an EMG to assess muscle activity of the lower trapezius. The MRI was read by a fellowship trained musculoskeletal radiologist. Grafts were defined as healed if there was evidence of any tissue in continuity with the greater tuberosity. The EMGs were performed by a fellowship trained non-operative sports medicine physician.

Results: Twenty-four eligible patients (25 shoulders) were identified through chart review. Mean age and follow up were 54.9±9.5 and 2.9±1.7 years, respectively. 72% (18/25) clinical follow-up was obtained. All functional outcomes including ASES (preoperative, 48.8±19.6; postoperative, 80.9±15.4; $p<0.001$), VAS pain (4.9±2.3; 1.4±1.5; $p<0.001$), and forward flexion (110°±53.2; 141.7±40.4°; $p=0.024$) improved. Twelve shoulders (48%) presented for EMG follow-up. All twelve patients demonstrated EMG activity of the lower trapezius in forward elevation, external rotation at the side, and external rotation at 90° of abduction. Fourteen shoulders (56%) were available for MRI follow-up of the shoulder. 12/14 (85.7%) patients demonstrated healing of the allograft to the posterior aspect of the greater tuberosity, while 2/14 (14.3%) demonstrated complete lack of healing of the graft to the humerus. Only 3/12 of healed patients (21.4%) demonstrated tissue covering the entire greater tuberosity to the anterior aspect of the supraspinatus footprint. There were no differences in postoperative ASES (healed, 85.2±13.4; not healed 85.5±3.5; $p=0.659$), VAS healed, 1.2±1.1; not healed, 1.5±0.7; $p=0.659$), and forward flexion (healed, 136.8±49.8; not-healed, 153±9.9; $p=0.923$) between patients that healed versus those that failed to heal.

Discussion: Arthroscopic assisted lower trapezius transfer demonstrates excellent functional outcomes two-years postoperatively. There is a high rate of healing of the graft posteriorly to the humerus although in many cases the graft fixed to the superior aspect of the greater tuberosity resorbs. The lower trapezius predictably fires in phase in forward flexion, external rotation at the side, and external rotation in 90° of abduction in all patients that underwent EMG testing.