

Range of motion and self-reported functional outcomes following latissimus dorsi tendon transfer for irreparable rotator cuff tear using a post-operative physical therapy protocol: a case series

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Clinical Case Presentation

Background: Rotator cuff injuries are the most common shoulder musculoskeletal shoulder disorder. Surgery for massive irreparable rotator cuff tears can involve latissimus dorsi tendon transfers (LDTT), either as an open or arthroscopic-assisted procedure. Several studies have examined outcomes following LDTT, but few have described facilitation techniques aimed at activation of the newly transferred latissimus dorsi tendon.

Purpose: The purpose of this retrospective case series is to present the short term outcomes following LDTT, which include active range of motion, passive range of motion, and functional outcome scores. The secondary purpose is to describe a novel neuromuscular facilitation method used to activate the latissimus dorsi.

Case Description: Patients (n=7) diagnosed with massive irreparable rotator cuff tears and underwent either open or arthroscopic-assisted LDTT surgery by a single orthopedic surgeon. One patient also had a reverse total shoulder in combination with an open LDTT, and one patient required a revision surgery. All patients were rehabilitated using the current post-operative protocol by a single physical therapist. The average time from surgery to the initial evaluation was 38.8 days. The average length of physical therapy for this cohort was 2-3 times per week for 8.8 months. To minimize the possibility of subacromial impingement, all passive and active-assisted range of motion was performed in the supine position for 12 weeks. Strengthening techniques consisted of isometric and isotonic external rotation, via manual and progressive resisted exercises, in combination with shoulder forward flexion. The shoulder flexion angle was slowly increased when the patient was able to maintain shoulder external rotation activation in space. To facilitate shoulder external rotation, the patient was encouraged to recruit the latissimus dorsi, using its “native” action of shoulder extension, prior to shoulder external rotation. This was done by manual resistance at the posterior distal humerus. To facilitate shoulder forward flexion, the patient performed multi-angle isometric and manually resisted external rotation holds at various forward flexion ranges to assist latissimus dorsi activation prior to forward flexion. These facilitation methods differ when compared to those reported in prior studies.

Outcomes: Supine passive shoulder flexion (FLX), abduction (ABD), external rotation (ER) and internal rotation (IR), standing active shoulder FLX, ABD, and ER at midline were all measured with a standard goniometer. Self-reported outcome were measured using the Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH) and the Modified American Shoulder Elbow Surgeons scale (M-ASES). Outcome measures were recorded at 6 weeks, 12 weeks, 24 weeks, and 40 weeks post-operatively. From initial post-operative evaluation to 40 weeks, patients improved passive FLX from 95° to

157.5°, passive ABD from 86.6° to 118.8°, passive ER from 43.3° to 66.3°, and passive IR from 56.7° to 71.3°. Active range of motion was not measured until 12 weeks post-operative. From 12 weeks post-operative to 40 weeks, patients improved active FLX from 75.8° to 127°, active ABD from 56.7° to 116°, and active ER with arm at the side from 6.7° to 35°. From initial post-operative evaluation to 40 weeks, DASH score improved from 65.3 to 41.4, and M-ASES score improved from 5 to 31.

Discussion: This case series provides descriptive information regarding short term post-operative outcomes for patients with massive irreparable rotator cuff tears surgically treated with LDTT. This case series also describes a novel technique used to facilitate latissimus dorsi muscle activation following LDTT. The range of motion outcomes from this study are comparable to those reported in prior studies and systemic reviews. This clinical case series can help guide the clinician in establishing range of motion and functional outcome expectations, as well as provide strategies to achieve these outcomes.