Outcomes of Scapulothoracic Fusion Using Non-Absorbable Cerclage Tape Fixation

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Background: Scapulothoracic fusion (ST) is an effective treatment for scapular instability, though reported complication rates are high. Fixation strategies classically include wires or cables, however non-absorbable tensioned cerclage sutures are an alternative. The purpose of this study was to characterize the outcomes of primary and revision ST fusion using non-absorbable suture fixation. Our hypothesis is that union rates are not diminished using this fixation strategy.

Material & Methods: A retrospective chart review was undertaken for patients receiving ST fusion at a single institution performed by two surgeons from a period of 2020 to 2024. Patient demographics, surgical technique, time to union, complications, clinical outcomes, and implant costs were recorded. Univariate statistics were performed to compare pre- and post-operative outcomes.

Results: Twenty-two patients with 25 ST fusions (n=3 bilateral) and an average follow-up of 19.9 months (SD 11.9) were included for analysis. Pre-operative diagnoses included facioscapulohumeral dystrophy (FSHD) (n=6/22; 27%), scapulothoracic abnormal motion (STAM) with paralytic serratus anterior and/or trapezius (n=5/22; 23%), neurogenic, functional STAM failing prior surgeries (n=6/22; 27%), reconstruction after sarcoma resection (n=2/22; 9%), or revision ST fusion for non-union (n=3/22; 14%). Fifteen (n=60%) patients had relevant prior surgery, with 80% (n=12/15) having prior scapular or shoulder surgery and 20% (n=3/15) having cervical and thoracic spine surgery. Active forward elevation (82 degrees versus 112 degrees; $p<0.001$) improved significantly after fusion while abduction (78 degrees versus 90 degrees; $p=0.085$), external rotation (42 degrees vs 38 degrees; $p=0.8$), and internal rotation (sacrum-L5 versus L4-L5; $p=0.7$) remained similar. VAS pain (5.4 versus 2.8; $p=0.002$) improved significantly postoperatively while SSV (22% versus 53%; $p=0.085$), qDASH (54.9 versus 58.6; $p=0.15$), and PROMIS (40.75 versus 41.0; $p=0.09$) remained similar. Patient satisfaction was 3.5 (SD 1.3; range 1-5) on a 5-point Likert scale. Twenty-three fusions (n=23/25; 92%) had addition of femoral head allograft with one rib autograft (4%) and one complete scapular allograft (4%). Average radiographic time to fusion was 27.1 (SD 23.8) weeks with an average of 3 (SD 1.4; range 1-5) ribs fused at this time point. The number of cerclage sutures used per case was 4 (SD 2.8; range 1-11) with an average implant cost of $1941.30 (SD $1342.84; range $475.00 - $5225.00). There was a complication rate of 4% attributed to a non-union, revised with iliac crest autograft with cerclage tape and resultant fusion. Reoperation rate was 12% attributed to local pain and bony prominence resection (n=1; 4%), non-union (n=1; 4%), and scapular fracture fixation (n=1;4%).

Discussion: Patients receiving primary or revision ST fusion using non-absorbable cerclage sutures demonstrate high rates of fusion in this heterogenous series. Surgeons should be aware of this fixation strategy and the associated costs.

Level of Evidence: III – retrospective therapeutic study
Keywords: Scapulothoracic fusion; allograft; facioscapulohumeral dystrophy; scapulothoracic fusion outcomes; ST fusion; FSHD