

Functional Outcomes of Mini-Open Repair for Isolated Supraspinatus Tendon Tears: A Prospective Cohort Study

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ABSTRACT

Background: Isolated supraspinatus tears are a frequent cause of shoulder pain and activity restriction. While arthroscopic repair is increasingly favored, mini-open repair continues to retain practical relevance because it allows secure tendon repair through a smaller approach while remaining technically less demanding.

Aim: To evaluate pain relief and functional recovery after mini-open repair of isolated full-thickness supraspinatus tendon tears.

Materials and Methods: This prospective cohort study included 10 adults aged 18-50 years with MRI-confirmed isolated full-thickness supraspinatus tears. All underwent mini-open repair through an anterolateral deltoid-splitting approach. Outcomes were assessed using the Constant-Murley Score, the UCLA Shoulder Score, and the Visual Analogue Scale for pain at baseline and during follow-up up to six months.

Results: Mean Constant-Murley Score improved from 62.0 to 85.6, mean UCLA Shoulder Score improved from 17.8 to 29.6, and mean Visual Analogue Scale pain score declined from 7.2 to 3.1. The absolute mean change was 23.6 points for Constant-Murley Score, 11.8 points for UCLA Shoulder Score, and 4.1 points for pain reduction on Visual Analogue Scale. Reported percentage improvement was 38.1%, 66.3%, and 56.9%, respectively. No major complications were reported. Isolated postoperative stiffness and superficial wound infection were noted, while most patients returned to their pre-injury activity level with high overall satisfaction.

Conclusion: Mini-open repair of isolated supraspinatus tears was associated with substantial short-term functional recovery and meaningful pain relief with low reported morbidity. It remains a clinically relevant option, especially where dependable repair and procedural simplicity are priorities.

Keywords: supraspinatus tendon tear, mini-open rotator cuff repair, Constant-Murley score, UCLA shoulder score, visual analogue scale

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INTRODUCTION

Rotator cuff disease remains one of the most frequent structural causes of shoulder pain in adults, and its prevalence rises steadily with age even in people who have little or no obvious disability at the time of imaging [1]. Community-based data have shown that rotator cuff tears are not rare findings in the general population, which explains why the clinical picture often ranges from mild discomfort to marked weakness and loss of overhead function [2].

The biology of cuff failure is equally important. Supraspinatus pathology often develops through a combination of tendon degeneration, altered vascularity, repetitive mechanical loading, and age-related tissue failure rather than through trauma alone [3]. Still, when a full-thickness tear becomes symptomatic, particularly in

active adults, restoration of tendon continuity remains a major therapeutic goal because persistent pain, weakness, and limitation in activities of daily living can become progressively disabling [4].

Repair strategies have moved from formal open approaches to mini-open and fully arthroscopic techniques over the past several decades. Yet the mini-open technique has not disappeared. In fact, it still occupies an important middle ground because it combines limited soft-tissue disruption with direct visualization of the tear and secure tendon handling [5]. This becomes especially relevant in settings where arthroscopic repair may be technically demanding, resource intensive, or less practical for the operating team.

Outcome assessment after rotator cuff repair also needs to be clinically meaningful. The Constant-Murley Score

remains one of the most widely used composite shoulder instruments because it captures pain, daily activity, range of motion, and strength within a single framework [6]. The UCLA Shoulder Score adds a pragmatic assessment of pain, function, active forward flexion, and patient satisfaction, making it useful in post-repair evaluation [7]. Pain intensity, meanwhile, is commonly tracked using the visual analogue scale, which remains a simple and validated method for serial postoperative assessment [8]. Against this background, the present study was undertaken to evaluate the functional outcome of mini-open repair in patients with isolated full-thickness supraspinatus tendon tears treated at a tertiary-care orthopaedic unit. The primary focus was the direction and magnitude of change in Constant-Murley Score, UCLA Shoulder Score, and pain severity over the reported follow-up period.

MATERIALS AND METHODS

Study design and setting: This was a prospective cohort study conducted in the Department of Orthopaedics at Adichunchanagiri Institute of Medical Sciences, B.G. Nagara, Mandya District, Karnataka, India.

Study population: The series comprised 10 patients aged 18-50 years with isolated full-thickness supraspinatus tendon tears confirmed on magnetic resonance imaging.

Inclusion criteria: Patients aged 18-50 years with isolated supraspinatus tendon tears were eligible for inclusion.

Exclusion criteria: Patients with massive rotator cuff tears, shoulder instability, associated clavicle fracture, or proximal humerus fracture were excluded.

Surgical technique: All patients underwent mini-open supraspinatus tendon repair through an anterolateral deltoid-splitting approach.

Outcome measures: Functional outcome was evaluated using the Constant-Murley Score, the UCLA Shoulder Score, and the Visual Analogue Scale for pain.

Follow-up: Outcome trends were reported at the preoperative stage and during postoperative review up to six months, with intermediate assessments shown at six weeks and three months.

Table 1. Cohort profile and treatment framework.

Parameter	Details
Sample size	10 patients
Age eligibility	18-50 years
Tear pattern	Isolated full-thickness supraspinatus tendon tear
Imaging confirmation	Magnetic resonance imaging
Operative method	Mini-open repair through an anterolateral deltoid-splitting approach

Statistical analysis: Outcome reporting was descriptive and based on reported mean preoperative and postoperative scores, absolute mean change, and percentage improvement.

Ethics approval: Institutional Ethics Committee approval was obtained before study initiation (IEC reference number:). Written informed consent was obtained from all participants.

RESULTS

A total of 10 patients with isolated full-thickness supraspinatus tears formed the analytic cohort. The overall study profile, operative framework, and follow-up structure are summarized in Table 1.

Mean functional outcome improved across all reported instruments by the final follow-up visit. The Constant-Murley Score rose from 62.0 preoperatively to 85.6 postoperatively, and the UCLA Shoulder Score improved from 17.8 to 29.6. Over the same period, the mean Visual Analogue Scale pain score declined from 7.2 to 3.1, indicating a clear reduction in pain burden. These preoperative and postoperative mean values are detailed in Table 2 and visualized in Figure 1.

The absolute magnitude of change remained clinically notable. The Constant-Murley Score improved by 23.6 points, the UCLA Shoulder Score by 11.8 points, and the Visual Analogue Scale showed a mean pain reduction of 4.1 points. Relative improvement was highest for the UCLA Shoulder Score at 66.3%, followed by the Visual Analogue Scale at 56.9% and the Constant-Murley Score at 38.1% (Table 3, Figures 2 and 3).

Qualitative postoperative recovery also appeared favorable. No major complications were reported. Adverse events were limited to isolated cases of postoperative stiffness and superficial wound infection. Most patients resumed their pre-injury activity levels, shoulder range of motion improved on serial clinical assessment, and overall patient satisfaction was reported to be high. These clinical observations are summarized in Table 4, while the internal composition of baseline and recovered score segments is illustrated in Figure 4.

Follow-up points	Preoperative, 6 weeks, 3 months, and 6 months
Outcome instruments	Constant-Murley Score, UCLA Shoulder Score, Visual Analogue Scale for pain
Reported complications	Isolated stiffness and superficial wound infection; no major complications reported

Table 2. Preoperative and postoperative mean outcome scores.

Outcome measure	Preoperative mean	Postoperative mean	Direction of change
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Constant-Murley Score	62.0	85.6	Higher is better
UCLA Shoulder Score	17.8	29.6	Higher is better
Visual Analogue Scale pain score	7.2	3.1	Lower is better

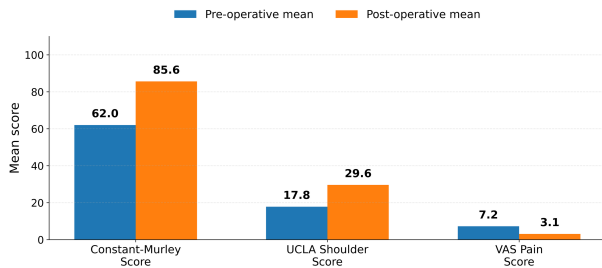


Figure 1. Preoperative and postoperative mean outcome scores.

Grouped bars present the reported mean preoperative and final follow-up values for each instrument. Raw values are labeled above the bars.

Table 3. Absolute mean change and relative improvement in reported outcomes.

Outcome measure	Mean change	Percentage improvement	Clinical interpretation
Constant-Murley Score	+23.6	38.1%	Marked functional gain
UCLA Shoulder Score	+11.8	66.3%	Substantial improvement
Visual Analogue Scale pain score	-4.1	56.9%	Meaningful pain reduction

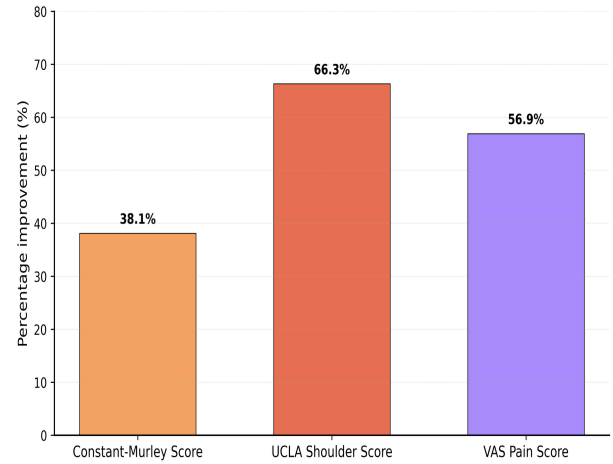


Figure 2. Percentage improvement across reported outcome measures.

Bars show the reported relative improvement from baseline to final follow-up for each scoring instrument, with values displayed above the bars.

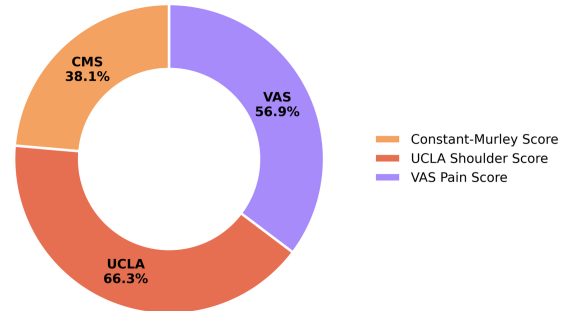


Figure 3. Descriptive distribution of relative improvement across outcome measures.

Donut segments summarize the reported percentage improvement for Constant-Murley Score, UCLA Shoulder Score, and Visual Analogue Scale pain score. This figure is descriptive and does not imply direct equivalence between instrument scales.

Table 4. Clinical recovery and postoperative observation summary.

Domain	Reported observation
Major complications	No major complications were reported.
Minor postoperative events	Isolated stiffness and superficial wound infection were noted.
Return to activity	Most patients returned to their pre-injury activity level.
Pain trajectory	Pain scores decreased markedly over follow-up.

Patient satisfaction	Overall satisfaction was reported to be high.
Range of motion	Clinical photographs demonstrated improved postoperative shoulder range of motion.

DISCUSSION

The present series showed a consistent pattern of short-term recovery after mini-open repair of isolated supraspinatus tears. Functional scores improved in parallel with a clinically meaningful decline in pain, and this overall direction is in line with earlier matched-pair work showing that mini-open repair can produce strong clinical outcomes with acceptable tendon integrity in appropriately selected tears [9].

That observation has also been supported by randomized supraspinatus-specific work. Kasten and colleagues reported no meaningful inferiority of mini-open repair when compared with arthroscopic repair for the supraspinatus tendon, reinforcing the idea that the mini-open approach remains a valid reconstructive option rather than merely a transitional technique between open and arthroscopic surgery [10].

The same theme appears in larger randomized trials. Van der Zwaal et al. found comparable clinical outcomes between all-arthroscopic and mini-open repair in small to medium-sized tears, suggesting that surgeon familiarity and case selection may influence results as much as the chosen exposure itself [11]. Similar findings were reported by Zhang et al., who also observed favorable recovery in both techniques over 24 months of follow-up [12].

Meta-analytic evidence has generally moved in the same direction. Huang et al. found broadly equivalent clinical outcomes between all-arthroscopic and mini-open repair across tear sizes, with few decisive differences in final functional scores [13]. More recent synthesis has suggested that arthroscopic repair may provide some modest advantages in selected metrics, yet the overall differences remain small enough that mini-open repair continues to retain clinical legitimacy, especially when operative simplicity, cost considerations, or local expertise influence decision-making [14].

Another relevant point is durability. Longer-term series focused on isolated supraspinatus tears have shown that mini-open repair can remain reliable beyond the early postoperative phase. Vicenti et al. reported comparable long-term outcomes between mini-open and arthroscopic repair for isolated supraspinatus tears, while van Deurzen

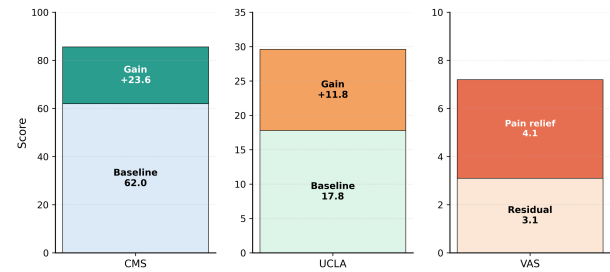


Figure 4. Composition of baseline status and recovered score segments across instruments.

For Constant-Murley Score and UCLA Shoulder Score, the stacked bars show baseline score and postoperative gain. For Visual Analogue Scale, the bar partitions the baseline pain burden into residual postoperative pain and pain relief achieved at final follow-up.

et al. demonstrated that satisfactory functional outcome can persist even beyond a decade after repair of small- to medium-size full-thickness tears [15,16]. That longer view matters because short-term improvement alone is not enough when tendon healing and sustained function are the real clinical goals.

The practical message from this study is therefore quite straightforward. Mini-open repair appears capable of delivering relevant pain relief and functional restoration in isolated supraspinatus tears, particularly in a focused surgical cohort without massive cuff disruption or instability. This can be especially meaningful in resource-constrained settings, where dependable outcomes with a familiar technique may be more valuable than theoretical technical advantages alone.

At the same time, the present study should be interpreted cautiously. The cohort was small, there was no comparator arm, baseline demographic stratification was not reported in detail, and the analysis was limited to aggregate outcome measures without dispersion statistics. Formal inferential testing and effect-size estimation were therefore not possible within the present report. Even so, the direction of recovery remained internally consistent across all three instruments, which strengthens the clinical impression of benefit.

CONCLUSION

Mini-open repair of isolated full-thickness supraspinatus tendon tears was associated with substantial improvement in shoulder function and clear reduction in pain over the reported six-month follow-up. Reported complications were few and mostly minor, while patient satisfaction and return to activity were favorable. Although larger comparative studies with full statistical reporting are still needed, the mini-open approach remains a dependable and clinically relevant option for selected supraspinatus tears.

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Conflict of Interest: None declared.

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