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Original Research Article

# Conservative versus Surgical Management of Rotator Cuff Tears: A Comparative Outcome Study

**Arnav P. Urs[1], Ritesh Harwal[2], Sushil Kasnale[3]**

[1,2]Senior Resident, Department of Orthopaedics, Sanjay Gandhi institute of Trauma and Orthopaedics, Bangalore, Karnataka, India

[3]Senior resident, Department of Orthopaedics, S Nijalingappa Medical College, Bagalkot, Karnataka, India

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**Corresponding Author: Dr. Sushil Kasnale**

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**Abstract:**

**Background:** Rotator cuff tears are a common cause of shoulder pain and functional impairment. Both conservative treatment and surgical repair are widely used, although the optimal treatment varies according to patient and tear characteristics.

**Methods:** This prospective comparative study included 120 patients with symptomatic rotator cuff tears. Sixty patients received conservative treatment and 60 underwent arthroscopic rotator cuff repair. Outcomes were evaluated using the Visual Analogue Scale (VAS), Constant–Murley Score, American Shoulder and Elbow Surgeons (ASES) score, range of motion, and patient satisfaction over 12 months.

**Results:** Both groups demonstrated substantial improvement during follow-up. At 12 months, mean VAS scores were 2.7 ± 0.9 in the conservative group and 1.9 ± 0.8 in the surgical group ($p<0.001$). Mean Constant–Murley scores were 77.8 ± 7.8 and 84.1 ± 7.2, respectively ($p<0.001$), while corresponding ASES scores were 80.6 ± 7.5 and 87.3 ± 6.8 ($p<0.001$). Forward flexion, abduction, and external rotation were significantly greater after surgical treatment. Excellent/good outcomes were observed in 75.0% of conservatively treated and 88.3% of surgically treated patients.

**Conclusion:** Both treatment approaches were effective for symptomatic rotator cuff tears. Surgical repair provided greater improvement in pain and functional outcomes at 12 months, while conservative treatment remained an effective option for appropriately selected patients.

**Keywords:** Rotator Cuff Tear; Conservative Treatment; Arthroscopic Repair; Physiotherapy; Constant–Murley Score; ASES Score; Shoulder Function.

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## Introduction

Rotator cuff tears are among the most common causes of shoulder pain and functional disability in adults and may result from acute trauma, chronic degeneration, or a combination of both. Clinical manifestations commonly include shoulder pain, weakness, restricted range of motion, difficulty with overhead activities, and impairment of daily activities.

The optimal management of symptomatic rotator cuff tears remains debated, particularly in patients with small- to medium-sized degenerative tears where both conservative and surgical approaches can provide satisfactory outcomes. [1,3] Conservative treatment generally includes activity modification, analgesics and anti-inflammatory medications, structured physiotherapy, range-of-motion exercises, and progressive strengthening of the rotator cuff and periscapular musculature. Such treatment can provide meaningful improvement in pain and shoulder function without the potential risks and rehabilitation burden associated with surgery. Systematic reviews have demonstrated improvement with non-operative treatment in a substantial proportion of appropriately selected patients. [3.4]

Surgical management, most commonly arthroscopic rotator cuff repair, aims to restore tendon continuity, improve shoulder biomechanics, reduce pain, and recover strength and function. Comparative evidence suggests that surgery may provide superior functional outcomes in selected patients, although the magnitude of benefit over structured physiotherapy may be relatively modest in the short term. [5] Moosmayer et al. demonstrated improvement with both tendon repair and physiotherapy, with differences between

treatment strategies becoming more evident during longer follow-up. [6] The choice of treatment depends on several factors, including patient age, activity level, duration and severity of symptoms, tear size, tendon quality, muscle atrophy, functional requirements, and response to previous conservative therapy.

Randomized studies have shown that non-operative management remains a reasonable initial approach for selected non-traumatic tears, while surgical repair may be required in patients with persistent symptoms or greater functional demands. [7]

Therefore, the present study was undertaken to compare the clinical and functional outcomes of conservative and surgical management of rotator cuff tears, with particular emphasis on pain relief, shoulder function, range of motion, and patient-reported outcomes.

**Materials and Methods**

**Study Design and Participants:** This prospective comparative study was conducted among 120 adult patients diagnosed with symptomatic rotator cuff tears. Patients were allocated according to the treatment received into two groups:

**Group C (Conservative Group):** 60 patients managed with conservative treatment.

**Group S (Surgical Group):** 60 patients managed by surgical rotator cuff repair.

Patients were enrolled consecutively during the study period after detailed clinical and radiological assessment.

**Inclusion Criteria:** Patients aged 30–70 years with symptomatic partial- or full-thickness rotator cuff tears confirmed by ultrasonography and/or magnetic resonance imaging (MRI), persistent shoulder pain and functional limitation, and willingness to comply with the prescribed treatment and follow-up protocol were included.

**Exclusion Criteria:** Patients with massive irreparable rotator cuff tears, advanced glenohumeral osteoarthritis, previous major surgery on the affected shoulder, fractures around the shoulder, active infection, inflammatory arthropathy, significant neurological disorders affecting shoulder function, or inability to complete follow-up were excluded.

**Clinical and Radiological Assessment:** A detailed history regarding duration of symptoms, mechanism of injury, dominant-side involvement, occupational activity, and previous treatment was obtained.

Clinical examination included assessment of tenderness, active and passive range of motion, muscle strength, and appropriate rotator cuff provocative tests.

Plain radiographs of the shoulder were obtained to identify associated bony abnormalities. Ultrasonography and/or MRI was performed to confirm the diagnosis and determine tear location, thickness, size, tendon retraction, muscle condition, and associated shoulder abnormalities.

Baseline pain was assessed using the Visual Analogue Scale (VAS). Functional assessment was performed using the Constant–Murley Score and American Shoulder and Elbow Surgeons (ASES) score.

**Conservative Management:** Patients in Group C underwent a standardized conservative treatment protocol consisting of activity modification, short-term analgesic/non-steroidal anti-inflammatory medication when required, and structured physiotherapy. Rehabilitation included pain-relieving measures, passive and active range-of-motion exercises, stretching, scapular stabilization, and progressive rotator cuff strengthening exercises.

Patients were encouraged to perform prescribed home exercises regularly, and progression of physiotherapy was based on pain, shoulder mobility, and functional recovery.

**Surgical Management:** Patients in Group S underwent arthroscopic rotator cuff repair. Tear characteristics were evaluated intraoperatively, and the torn tendon was mobilized and repaired to its anatomical footprint using an appropriate suture-anchor technique. Associated procedures, such as bursectomy, acromioplasty, or biceps procedures, were performed when clinically indicated.

Following surgery, the arm was supported in a sling, and patients underwent a standardized rehabilitation protocol. Initial passive mobilization was followed by gradual active-assisted and active exercises. Strengthening exercises were subsequently introduced according to tendon healing and clinical progress.

**Follow-up and Outcome Assessment:** Patients in both groups were evaluated at baseline and subsequently at 6 weeks, 3 months, 6 months, and 12 months. At each relevant follow-up, pain, shoulder function, and range of motion were assessed.

The primary outcome was improvement in the Constant–Murley Score at 12 months. Secondary outcomes included ASES score, VAS pain score, shoulder range of motion, patient satisfaction, complications, and requirement for additional intervention.

**Statistical Analysis:** Data were entered into Microsoft Excel and analyzed using SPSS version

25.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The independent Student's t-test was used for comparison of continuous variables between the two groups, and the paired t-test was used to assess changes within groups. Categorical variables were compared using the Chi-square test or Fisher's exact test, as appropriate. A p-value <0.05 was considered statistically significant.

## Results

A total of 120 patients with symptomatic rotator cuff tears were included in the study. Sixty patients were managed conservatively (Group C), while 60 underwent arthroscopic rotator cuff repair (Group S). All patients were evaluated clinically and functionally over a follow-up period of 12 months.

**Table 1: Baseline Demographic and Clinical Characteristics**

| Variable | Conservative Group (n=60) | Surgical Group (n=60) | p-value |
|---|---|---|---|
| Age (years), mean ± SD | 54.8 ± 8.2 | 55.6 ± 7.9 | 0.588 |
| Male, n (%) | 34 (56.7%) | 36 (60.0%) | 0.711 |
| Female, n (%) | 26 (43.3%) | 24 (40.0%) | |
| BMI (kg/m²), mean ± SD | 26.7 ± 3.2 | 27.1 ± 3.4 | 0.508 |
| Dominant shoulder involved | 39 (65.0%) | 41 (68.3%) | 0.699 |
| Symptom duration (months) | 9.8 ± 4.5 | 10.5 ± 4.9 | 0.417 |
| Partial-thickness tear | 25 (41.7%) | 21 (35.0%) | 0.453 |
| Full-thickness tear | 35 (58.3%) | 39 (65.0%) | |
| Baseline VAS score | 7.1 ± 1.1 | 7.3 ± 1.0 | 0.299 |
| Baseline Constant score | 48.6 ± 9.2 | 47.9 ± 8.8 | 0.671 |
| Baseline ASES score | 45.8 ± 9.7 | 44.9 ± 9.3 | 0.605 |

The two groups were comparable with respect to age, sex distribution, BMI, dominant-side involvement, symptom duration, type of tear, and baseline functional scores. None of the differences between the groups were statistically significant (p>0.05).

**Table 2: Comparison of VAS Pain Scores during Follow-up**

| Follow-up | Conservative Group (n=60) | Surgical Group (n=60) | p-value |
|---|---|---|---|
| Baseline | 7.1 ± 1.1 | 7.3 ± 1.0 | 0.299 |
| 6 weeks | 5.2 ± 1.2 | 5.5 ± 1.3 | 0.191 |
| 3 months | 4.1 ± 1.1 | 3.8 ± 1.0 | 0.122 |
| 6 months | 3.2 ± 1.0 | 2.6 ± 0.9 | 0.001 |
| 12 months | 2.7 ± 0.9 | 1.9 ± 0.8 | <0.001 |
| Mean improvement at 12 months | 4.4 ± 1.3 | 5.4 ± 1.2 | <0.001 |

Both treatment groups demonstrated progressive reduction in pain. At 6 weeks and 3 months, the difference between the groups was not statistically significant. However, the surgical group demonstrated significantly lower VAS scores at 6 and 12 months (p=0.001 and p<0.001, respectively).

**Table 3: Comparison of Functional Outcomes**

| Outcome | Conservative Group (n=60) | Surgical Group (n=60) | p-value |
|---|---|---|---|
| **Constant–Murley Score** | | | |
| Baseline | 48.6 ± 9.2 | 47.9 ± 8.8 | 0.671 |
| 3 months | 61.8 ± 9.0 | 63.5 ± 8.6 | 0.292 |
| 6 months | 70.9 ± 8.4 | 75.6 ± 7.9 | 0.002 |
| 12 months | 77.8 ± 7.8 | 84.1 ± 7.2 | <0.001 |
| Mean improvement | 29.2 ± 9.1 | 36.2 ± 8.7 | <0.001 |
| **ASES Score** | | | |
| Baseline | 45.8 ± 9.7 | 44.9 ± 9.3 | 0.605 |
| 3 months | 61.5 ± 9.1 | 64.2 ± 8.8 | 0.101 |
| 6 months | 72.4 ± 8.3 | 77.8 ± 7.9 | <0.001 |
| 12 months | 80.6 ± 7.5 | 87.3 ± 6.8 | <0.001 |

Significant functional improvement occurred in both groups. The differences in Constant–Murley and ASES scores were relatively small during the early follow-up period but became more apparent by 6 and 12 months. At 12 months, the surgical group demonstrated significantly higher Constant–Murley (84.1 vs 77.8) and ASES (87.3 vs 80.6) scores.

**Table 4: Range of Motion, Patient Satisfaction and Treatment Outcomes at 12 Months**

| Parameter | Conservative Group (n=60) | Surgical Group (n=60) | p-value |
|---|---|---|---|
| Forward flexion (degrees) | 153.4 ± 13.2 | 160.8 ± 11.6 | 0.001 |
| Abduction (degrees) | 148.6 ± 14.7 | 157.2 ± 12.8 | 0.001 |
| External rotation (degrees) | 61.8 ± 8.9 | 65.2 ± 8.4 | 0.034 |
| Excellent outcome | 18 (30.0%) | 27 (45.0%) | |
| Good outcome | 27 (45.0%) | 26 (43.3%) | |
| Fair outcome | 11 (18.3%) | 5 (8.3%) | |
| Poor outcome | 4 (6.7%) | 2 (3.3%) | |
| Excellent/good outcome | 45 (75.0%) | 53 (88.3%) | 0.058 |
| Satisfied with treatment | 48 (80.0%) | 54 (90.0%) | 0.125 |
| Additional intervention/reoperation | 7 (11.7%)* | 3 (5.0%) | 0.186 |

***In the conservative group, additional intervention represented subsequent surgical treatment because of persistent pain or functional limitation.**

At 12 months, shoulder range of motion was significantly greater in the surgical group. An excellent or good overall functional outcome was achieved in 88.3% of surgically treated patients compared with 75.0% of conservatively treated patients, although this categorical difference did not reach statistical significance (p=0.058). Treatment satisfaction was also numerically higher following surgery.

**Discussion**

The present study compared conservative and surgical management of rotator cuff tears in 120 patients and demonstrated significant improvement in pain and shoulder function with both treatment approaches. However, patients undergoing surgical repair showed greater improvement in pain, Constant–Murley score, ASES score, and range of motion at 12 months.

In the present study, differences between the two groups were relatively small during early follow-up but became more evident at 6 and 12 months.

At 12 months, the mean Constant–Murley score was 84.1 in the surgical group compared with 77.8 in the conservative group. Kukkonen et al. [8] reported improvement following both conservative treatment and surgical intervention in patients with non-traumatic rotator cuff tears, with no major difference in clinical outcomes at two years in their selected patient population. These findings support conservative management as a reasonable initial option, particularly for older patients with small, non-traumatic tears.

Pain reduction was observed in both groups in our study, although it was significantly greater after surgery at 6 and 12 months. Similar improvements with both treatment strategies have been demonstrated in randomized comparative studies. [9,10] Ranebo et al. [11] reported that both surgical repair and physiotherapy were successful for small acute traumatic rotator cuff tears, suggesting that treatment decisions should take tear characteristics and individual patient requirements into consideration.

An important finding was that 80% of conservatively managed patients were satisfied with treatment, indicating that structured physiotherapy can provide satisfactory clinical improvement in a substantial proportion of patients.

Nevertheless, seven patients (11.7%) in the conservative group required additional surgical intervention because of persistent symptoms or functional limitation.

Long-term evidence from Moosmayer et al. [12] suggests that differences between repair and physiotherapy may become more pronounced with increasing follow-up, with tendon repair showing superior outcomes at 10 years for small- and medium-sized tears.

The potential for structural progression should also be considered when choosing non-operative management. Keener et al. [13] demonstrated that degenerative rotator cuff tears may enlarge and become symptomatic during longitudinal follow-up. Subsequent work by Keener et al. [14] also documented patterns of tear progression in degenerative rotator cuff disease. Safran et al. [15] similarly evaluated the natural history of symptomatic tears managed non-operatively, while Mall et al. [16] demonstrated that structural progression may accompany the development of symptoms.

In the present study, surgical management also resulted in significantly better forward flexion, abduction, and external rotation at final follow-up. Restoration of tendon continuity and improved rotator cuff biomechanics following repair may contribute to these functional gains. However, considering the meaningful improvement observed with both approaches, surgical treatment should not be considered necessary for every rotator cuff tear.

Overall, conservative management remains an effective initial strategy for appropriately selected patients, particularly those with lower functional demands and degenerative tears. Surgical repair may offer greater improvement in patients with persistent symptoms, higher functional

requirements, repairable full-thickness tears, or inadequate response to conservative treatment. Treatment should therefore be individualized according to age, tear characteristics, functional demands, symptom severity, and patient expectations.

## Conclusion

Both conservative and surgical management resulted in significant pain relief and functional improvement in patients with rotator cuff tears.

Conservative treatment provided satisfactory outcomes in the majority of appropriately selected patients, whereas surgical repair produced greater improvement in pain, functional scores, and shoulder range of motion at 12 months. Individualized patient selection remains important when deciding between conservative treatment and surgical repair.

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