



Clinical and Functional Outcomes of Patients with Rotator Cuff Tear Managed Conservatively: A Cross-Sectional Observational Study.

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Abstract

Background:

Rotator cuff tear is a frequent cause of shoulder pain, restricted overhead activity, and functional impairment among middle-aged and older adults. Conservative management remains an important initial treatment option, particularly for partial-thickness and small-to-medium tears.

Objectives:

To evaluate clinical and functional outcomes of patients with rotator cuff tears managed conservatively and to assess improvement in pain, shoulder range of motion, and functional scores during follow-up.

Methods:

This hospital-based cross-sectional observational study included 80 patients with clinically and radiologically diagnosed rotator cuff tears treated conservatively at Government Medical College, Jangaon, Telangana, India, from August 2025 to January 2026. Conservative care included analgesics, activity modification, home-based exercises, supervised physiotherapy, local physical modalities, and corticosteroid injection in selected patients. Pain and function were assessed using the visual analogue scale, Constant-Murley score, American Shoulder and Elbow Surgeons score, and shoulder range of motion at baseline, 3 months, and 6 months.

Results:

The mean age was 52.8 ± 9.6 years, and males constituted 56.3%. Partial-thickness tear was present in 72.5%, and the supraspinatus was the most commonly involved tendon. The mean VAS pain score decreased from 7.1 ± 1.2 at baseline to 3.2 ± 1.4 at 6 months. The Constant-Murley score improved from 48.6 ± 10.8 to 72.4 ± 12.5 , and the ASES score improved from 45.8 ± 11.6 to 76.2 ± 13.4 . An excellent or good outcome was observed in 72.5% of patients.

Conclusion:

Conservative management produced significant pain reduction and functional improvement in most patients with rotator cuff tears.

Recommendations:

Structured rehabilitation with regular follow-up should be considered as an initial management strategy in suitable patients.

Keywords: Rotator cuff tear; Conservative management; Shoulder pain; Physiotherapy; Constant-Murley score; American Shoulder and Elbow Surgeons score; Functional outcome.

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Introduction

Rotator cuff tear is one of the common causes of shoulder pain and upper-limb disability in adults. The disorder represents a spectrum ranging from tendinopathy and partial-thickness tear to full-thickness tear with varying degrees of weakness, night pain, and loss of shoulder function. Population-based studies have shown that rotator cuff tear prevalence increases with age, and a considerable proportion of tears remain asymptomatic until functional demand or tear progression produces symptoms [1-3]. In routine orthopaedic practice, patients often present with pain during overhead activities, difficulty in lifting objects, sleep disturbance due to night pain, and reduced ability to perform occupational or household work.

The pathogenesis of rotator cuff tears is multifactorial. Age-related tendon degeneration, repetitive microtrauma, subacromial mechanical factors, metabolic comorbidities, and traumatic episodes contribute to cuff failure. The supraspinatus tendon is frequently involved because of its anatomical position and high mechanical load during abduction. Clinical assessment, supported by ultrasonography or magnetic resonance imaging, helps in defining the tendon involved, tear thickness, and tear size. These factors influence prognosis and guide treatment selection. Small and partial-thickness tears are often considered suitable for an initial trial of conservative management, while acute traumatic full-thickness tears in young active individuals require a more individualized surgical decision.

Conservative management includes patient education, activity modification, analgesics or nonsteroidal anti-inflammatory drugs, local physical modalities, supervised physiotherapy, home-based shoulder exercises, and selected use of corticosteroid injection. Reviews and cohort studies report that many patients obtain meaningful symptom relief and functional improvement without immediate surgery [4,5]. Exercise-based rehabilitation focuses on pain control, restoration of shoulder range of motion, scapular stabilization, rotator cuff strengthening, and gradual return to activity [6]. Such treatment is particularly relevant in resource-limited settings where delayed presentation, cost concerns, occupational limitations, and surgical hesitancy influence treatment choice.

Functional assessment is essential because radiological tear size alone does not fully reflect patient disability. Validated measures such as the Constant-Murley score and American Shoulder and Elbow Surgeons score provide a structured method to evaluate pain, daily activity, range of motion, strength, and patient-reported function [7,8]. Observational outcome studies are useful for understanding real-world

responses to conservative treatment, especially in patients treated in routine tertiary care settings. Hence, the present study was conducted with the objective of evaluating the clinical and functional outcome of patients with rotator cuff tears managed conservatively at the Government Medical College, Jangaon, Telangana, India. The study specifically aimed to assess changes in pain score, shoulder range of motion, Constant-Murley score, ASES score, and final functional outcome after conservative management.

Methodology

Study design and setting

This hospital-based cross-sectional observational study was conducted from August 2025 to January 2026 in the Department of Orthopaedics, Government Medical College, Jangaon, Telangana, India. The study site is a tertiary-care government teaching hospital that provides specialist orthopaedic outpatient, inpatient, emergency, radiological, and physiotherapy services. It serves the Jangaon district and adjoining rural, semi-urban, and urban communities in Telangana. The study was planned and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology guidelines [9].

Study population

Consecutive adult patients presenting to the orthopaedic outpatient department with shoulder pain, restricted overhead activity, and suspected rotator cuff pathology were screened during the study period. Eligibility was confirmed through clinical examination and radiological evidence of a partial-thickness or full-thickness rotator cuff tear on ultrasonography or magnetic resonance imaging, according to clinical need and availability. Patients who fulfilled the eligibility criteria, selected conservative treatment, provided written informed consent, and agreed to scheduled follow-up were enrolled.

Sample size

The sample size was estimated using the single-population proportion formula, $n = Z^2pq/d^2$. In the absence of a precise local estimate, the expected proportion was taken as 50% to provide the maximum sample size, with a 95% confidence level ($Z = 1.96$) and an absolute precision of 11%. The calculated minimum sample size was 79.4, which was rounded to 80 participants.

Inclusion and exclusion criteria

Patients aged 18 years and above with symptomatic rotator cuff tears who were willing to undergo conservative



management and regular follow-up were included. Patients with acute fractures around the shoulder, shoulder dislocation, advanced glenohumeral arthritis, inflammatory arthritis, neurological weakness affecting the shoulder, previous shoulder surgery, massive irreparable tear with pseudoparalysis, and those requiring immediate surgical intervention were excluded.

Conservative treatment protocol

Conservative management included analgesics or nonsteroidal anti-inflammatory drugs for short-term pain control, activity modification, avoidance of painful overhead loading, hot fomentation or local physical modalities, home-based shoulder exercises, and structured physiotherapy. Supervised physiotherapy included range-of-motion exercises, pendulum exercises, capsular stretching, scapular stabilization, isometric and progressive rotator cuff strengthening, and functional training. Corticosteroid injection was used selectively in patients with persistent pain limiting participation in rehabilitation.

Outcome assessment

Baseline demographic data, affected side, dominant shoulder involvement, presenting symptoms, tendon involved, tear type, and tear size were recorded. Pain was assessed by a visual analogue scale. Functional outcome was assessed using the Constant-Murley score and American Shoulder and Elbow Surgeons score, both of which are commonly used shoulder outcome measures [7,8]. Shoulder forward flexion and abduction were measured in degrees at baseline, 3 months, and 6 months. Final outcome at 6 months was categorized as excellent, good, fair, or poor based on clinical improvement and functional recovery.

Bias and its minimization

Selection bias was reduced by screening consecutive patients and applying predefined eligibility criteria uniformly. Information and measurement bias were minimized through a standardized data-collection form, radiological confirmation of the diagnosis, validated pain and shoulder-function instruments, goniometric assessment of range of motion, and fixed follow-up assessments at baseline, 3 months, and 6 months. Data were checked for completeness before analysis. Because treatment and outcome assessment were performed in a routine clinical

setting, residual observer bias could not be completely excluded.

Statistical analysis

Data were entered in a spreadsheet and analysed using descriptive and inferential statistics. Continuous variables were expressed as mean $\pm$ standard deviation. Categorical variables were expressed as frequency and percentage. Baseline and follow-up outcome scores were compared to assess improvement after conservative management. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

Ethical approval and informed consent

The study was initiated after approval from the Institutional Ethics Committee of Government Medical College, Jangaon. Written informed consent was obtained from every participant after explaining the study purpose, assessment procedures, expected benefits, possible discomfort, voluntary nature of participation, and the right to withdraw at any time without affecting routine clinical care. Participant identities were kept confidential, and de-identified data were used solely for research purposes in accordance with the principles of the Declaration of Helsinki.

Results

During the study period, 91 patients were assessed for eligibility. Seven patients did not meet the eligibility criteria: immediate surgical indication or a massive irreparable tear ($n = 2$), advanced glenohumeral or inflammatory arthritis ($n = 2$), previous shoulder surgery ($n = 1$), neurological weakness affecting the shoulder ($n = 1$), and shoulder fracture or dislocation ($n = 1$). Of the 84 confirmed eligible patients, four declined participation. The remaining 80 patients were enrolled, completed the 3-month and 6-month follow-up assessments, and were included in the final analysis. The mean age of the study population was 52.8 ± 9.6 years. Males constituted 56.3% of the study population. The right shoulder was more commonly affected, and dominant shoulder involvement was observed in 65.0% of patients. The baseline demographic and clinical profile is shown in Table 1.

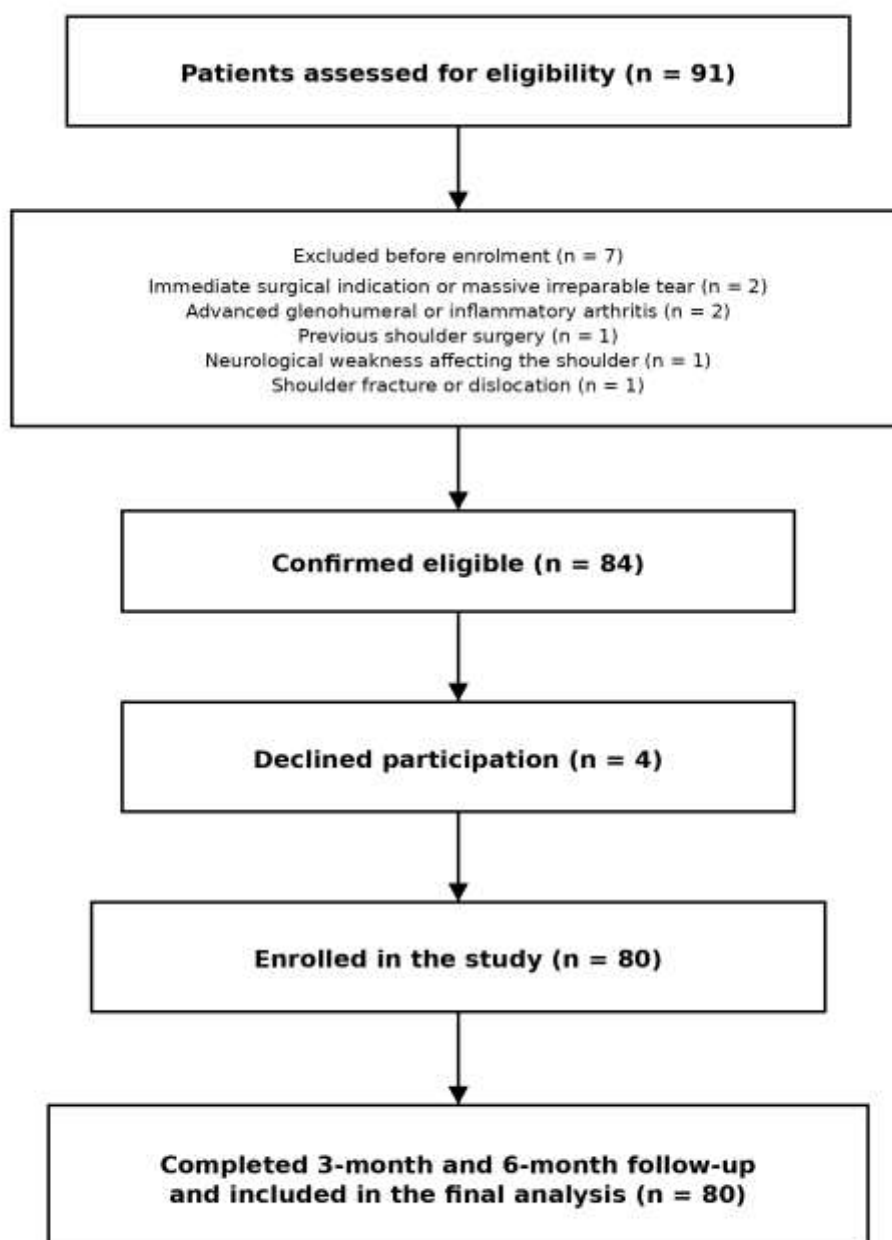


Figure 1 Participant flow diagram



Table 1: *Baseline demographic and clinical characteristics of the study participants*

Variable	Category / Value	Frequency	Percentage
Total sample size	—	80	100.0
Age, years	Mean $\pm$ SD	52.8 $\pm$ 9.6	—
Age group	31–40 years	8	10.0
	41–50 years	22	27.5
	51–60 years	34	42.5
	>60 years	16	20.0
Sex	Male	45	56.3
	Female	35	43.7
Side involved	Right shoulder	50	62.5
	Left shoulder	30	37.5
Dominant shoulder involvement	Present	52	65.0
	Absent	28	35.0

Shoulder pain was present in all patients. Restriction of overhead activities was observed in 82.5% of patients, followed by difficulty in lifting objects in 72.5% and night pain in 57.5%. The supraspinatus was the most commonly involved tendon. Partial-thickness tears were more frequent than full-thickness tears. The clinical presentation and tear characteristics are shown in Table 2.

Table 2 *Clinical presentation and tear characteristics*

Variable	Category	Frequency	Percentage
Shoulder pain	Present	80	100.0
Restriction of overhead activities	Present	66	82.5
Difficulty in lifting objects	Present	58	72.5
Night pain	Present	46	57.5
Shoulder stiffness	Present	28	35.0
Weakness of shoulder movements	Present	42	52.5
History of trauma	Present	24	30.0
Type of tear	Partial-thickness tear	58	72.5
	Full-thickness tear	22	27.5
Tendon involved	Supraspinatus	70	87.5
	Infraspinatus	18	22.5
	Subscapularis	10	12.5
Tear size	Small	36	45.0
	Medium	32	40.0
	Large	12	15.0

All patients were managed conservatively with analgesics, activity modification, home-based shoulder exercises, and structured rehabilitation. Supervised physiotherapy was advised in 92.5% of patients. Corticosteroid injection was given in selected patients with persistent pain. The conservative treatment modalities used are shown in Table 3.

Table 3: *Conservative treatment modalities used among study participants*

Treatment modality	Frequency	Percentage
Analgesics / NSAIDs	80	100.0
Activity modification	80	100.0
Home-based shoulder exercises	80	100.0
Supervised physiotherapy	74	92.5
Hot fomentation / local physical modalities	48	60.0
Corticosteroid injection	26	32.5

There was a significant improvement in pain and functional outcome scores following conservative management. The mean VAS pain score decreased from 7.1 ± 1.2 at baseline to 3.2 ± 1.4 at 6 months. The mean Constant-Murley score improved

from 48.6 ± 10.8 to 72.4 ± 12.5 , while the mean ASES score improved from 45.8 ± 11.6 to 76.2 ± 13.4 . At 6-month follow-up, an excellent or good outcome was observed in 72.5% of patients. The functional outcomes are shown in Table 4

Table 4 *Clinical and functional outcomes after conservative management*

Outcome parameter	Baseline	3 months	6 months / Frequency	p-value Percentage	/
VAS pain score	7.1 ± 1.2	4.6 ± 1.5	3.2 ± 1.4	<0.001	
Constant-Murley score	48.6 ± 10.8	63.8 ± 11.7	72.4 ± 12.5	<0.001	
ASES score	45.8 ± 11.6	65.2 ± 12.1	76.2 ± 13.4	<0.001	
Forward flexion, degrees	112.4 ± 24.8	138.6 ± 22.5	154.8 ± 20.6	<0.001	
Abduction, degrees	98.6 ± 26.2	124.5 ± 24.1	142.7 ± 22.8	<0.001	
Excellent outcome	—	—	16	20.0	
Good outcome	—	—	42	52.5	
Fair outcome	—	—	15	18.8	
Poor outcome	—	—	7	8.7	
Excellent/good outcome	—	—	58	72.5	
Fair/poor outcome	—	—	22	27.5	

Overall, conservative management resulted in significant pain reduction, improved shoulder range of motion, and better functional outcome scores in most patients. The response was more favorable among patients with partial-thickness tears and small-to-medium-sized tears.

Discussion

The present observational study evaluated the clinical and functional outcome of 80 patients with rotator cuff tears managed conservatively. The study population was mainly middle-aged to older adults, with a mean age of 52.8 years, and the dominant shoulder was involved in nearly two-thirds of patients. This pattern is consistent with the degenerative and activity-related nature of rotator cuff disease described in epidemiological studies, where advancing age and cumulative mechanical loading are important contributors to tear development [1-3].

Pain was the universal presenting complaint in this cohort, while restriction of overhead activity, difficulty in lifting objects, weakness, and night pain were also frequent. These symptoms reflect the combined impact of tendon pathology, altered shoulder mechanics, and pain-mediated inhibition of function. Supraspinatus involvement was the most common

finding, supporting the known vulnerability of this tendon in rotator cuff pathology. Partial-thickness tears were more common than full-thickness tears in the present study, and most tears were small or medium in size, which made the cohort suitable for an initial conservative approach.

The main finding of this study was the significant improvement in pain and function after conservative management. The VAS pain score decreased from 7.1 at baseline to 3.2 at 6 months, indicating clinically meaningful pain relief. Functional gains were also clear, with the Constant-Murley score improving from 48.6 to 72.4 and the ASES score improving from 45.8 to 76.2. These results are comparable with previous reports showing that nonoperative care can provide satisfactory improvement in many patients with atraumatic and degenerative rotator cuff tears [4-6,10]. The improvement in forward flexion and abduction further indicates that pain reduction and rehabilitation translated into better shoulder mobility.

An excellent or good outcome was observed in 72.5% of patients at 6 months. This finding is close to the success rates reported in reviews and prospective cohorts of nonoperative treatment [4,5]. Better response among patients with partial-thickness and small-to-medium tears is also biologically plausible because tendon continuity, preserved force



coupling, and less retraction support functional recovery. Jain et al. observed better nonoperative outcomes in patients with partial-thickness tears and absence of fatty infiltration, while Nakhaei Amroodi and Salariyeh reported that dominant-side partial tears and deeper tendon involvement predicted conservative failure [11,12].

The findings support a structured conservative trial before surgical decision-making in selected patients. Randomized and meta-analytic evidence have shown that conservative care can achieve functional outcomes comparable to surgery in some degenerative rotator cuff tears, although surgery has a role in persistent pain, acute traumatic tears, larger tears, and failed rehabilitation [13,14]. In clinical practice, treatment should therefore be individualized using age, activity level, symptom duration, tear morphology, functional limitation, and patient preference.

Generalizability

The findings are primarily generalizable to adults with symptomatic partial-thickness tears or small-to-medium full-thickness rotator cuff tears who receive conservative care in government tertiary-care hospitals with access to physiotherapy and regular follow-up. Applicability is more limited for acute traumatic tears, massive or retracted tears, pseudoparalysis, advanced fatty infiltration, high-demand athletic populations, and healthcare settings with substantially different rehabilitation resources or adherence patterns. Multicentre studies with broader populations and longer follow-up are needed to confirm external validity.

Conclusion

Conservative management resulted in significant clinical and functional improvement among patients with rotator cuff tears. Pain decreased steadily, shoulder range of motion improved, and both Constant-Murley and ASES scores showed statistically significant gains at 6 months. An excellent or good outcome was achieved in nearly three-fourths of patients, indicating that structured rehabilitation with activity modification and pain control is an effective initial strategy for selected patients. The response was more favorable in partial-thickness tears and small-to-medium tears. Patients with persistent pain, poor functional recovery, large tears, or progressive disability require closer follow-up and timely reassessment for possible surgical management.

Limitations

The study had a single-center observational design with a modest sample size and a 6-month follow-up period. Long-

term tear progression, muscle fatty infiltration, occupational workload, and adherence to home exercises were not assessed in detail. Imaging follow-up was not performed for all patients, limiting structural correlation with functional recovery.

Recommendations

Patients with rotator cuff tears should receive an initial structured conservative treatment plan when the tear characteristics and functional status are suitable. Rehabilitation should include supervised physiotherapy, home-based strengthening, scapular stabilization, range-of-motion exercises, and patient education regarding activity modification. Regular follow-up at defined intervals is important to identify poor responders. Patients with large tears, full-thickness tears, dominant-side disability, persistent night pain, or failure to improve after adequate rehabilitation should be reassessed with imaging and considered for surgical opinion. Future studies with larger samples and longer follow-up should evaluate structural progression and predictors of conservative treatment success.

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Abbreviations

ASES: American Shoulder and Elbow Surgeons;
CMS: Constant-Murley Score;
NSAIDs: Nonsteroidal Anti-inflammatory Drugs;
ROM: Range of Motion

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Conflict of interest

The authors declare no conflict of interest.

Author contributions

YP-Concept and design of the study, results interpretation, review of literature, and preparing the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript. **BJ** -Concept and design of the study, results interpretation, review of literature, preparation of the first draft of the manuscript, and revision of the manuscript. **RR**

-Review of literature and preparing the first draft of the manuscript. Statistical analysis and interpretation.

Data availability

De-identified data underlying the findings of this study are available upon reasonable request.

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