

# Evaluating Clinical Outcomes and Costs of Arthroscopic and Open Procedures in Patients with Degenerative Full-Thickness RTC

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## Abstract

**Background:** Rotator cuff tears have long been known to produce discomfort and impairment. The method of treating rotator cuff tears has changed throughout the years, moving from an open operation to a mini-open technique to an all-arthroscopic approach. On whether one method produces better results, there is disagreement. This study looked at how arthroscopic and open treatments performed on patients with degenerative full-thickness rotator cuff injuries in terms of clinical and financial outcomes.

**Materials & Methods:** From February 2019 to February 2022, a prospective study was undertaken in the orthopaedics department at Patna Medical College & Hospital in Bihar, India, with cases being followed up for at least three years. 40 patients of either sex with non-massive full thickness rotator cuff injuries participated in this study. After three years of follow-up, surveys are used to calculate The American Shoulder and Elbow Surgeons Shoulder Score (ASES), which is a measure of quality of life.

**Results:** It was statistically insignificant ( $P > 0.05$ ) that patients with rotator cuff tears were an average age of 56.5 years for small open repairs and 57.2 years for arthroscopic repairs. The adjusted ASES scores during the preoperative and postoperative periods did not substantially differ between groups ( $P > 0.05$  and  $P > 0.05$ , respectively). Additionally, both groups' individual pain, pleasure, and function levels shown a considerable improvement.

**Conclusion:** This study supports the continued use of arthroscopic repair methods by demonstrating that the short-term outcomes of arthroscopic and mini-open rotator cuff surgery are comparable.

**Keywords:** ASES Score, Rotator Cuff Tears, Repair, Mini-Plates, Arthroscopy.

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## Introduction

Rotator cuff tears have long been known to produce discomfort and impairment. Rotator cuff tears are more common in

older persons, people doing hard labour, men, and people who have had prior injuries [1]. Over the past decades the treatment of rotator cuff tears has evolved

from an open procedure to a mini-open procedure to an allarthroscopic one. Studies have demonstrated that surgical interventions including mini-open or arthroscopic repairs to offer satisfactory outcomes [2, 3].

The mini-open procedure is regarded as the best available because it is much less expensive and produces good to excellent results in 90% of patients [4, 5]. On the other hand, arthroscopic techniques have become more popular among surgeons because to variables including reduced postoperative pain, a speedier recovery, and better cosmetic outcomes [6, 7]. On whether one method produces better results, there is disagreement. The decision to treat a patient operatively should be made after first thoroughly weighing the respective benefits against the risks of treating nonoperatively versus operative repair. Nonoperative treatment include exercises, steroid injections, and avoidance of repetitive motion.

Saving money and avoiding the dangers connected with undergoing an operation are two advantages of nonoperative treatment (i.e., infection, pain, etc.). Unfortunately, the dangers of going in this direction could jeopardise future successful endeavours. A surgical procedure, either open or arthroscopic (including "mini-open"), may be performed to repair the tear.

Recent research has revealed that more rotator cuff surgeries are being performed, in part because less invasive methods are preferred [8, 9]. To support the decision to have surgery, there is insufficient information on the relative costs and health-related quality of life outcomes of arthroscopic and open procedures. In this study, individuals with progressive full-thickness rotator cuff tears will have arthroscopic and open procedures to repair the rips in order to compare the clinical and financial results.

## Materials and Methods

From February 2019 to February 2022, a prospective study on orthopaedic cases was carried out at Jawaharlal Nehru Medical College and Hospital in Bihar, India. Cases were followed up for at least three years. 40 individuals of either sex with non-massive full-thickness rotator cuff injuries participated in this study.

### Inclusion criteria

- Patients aged more than 50 years who have suffer from a rotator cuff tear.
- Have a full thickness rotator cuff tear
- Rotator cuff tear diagnosed using MRI or ultrasound scan
- Patient able to consent

### Exclusion criteria

- Previous surgery on the affected shoulder
- Dual shoulder pathology
- Rheumatoid arthritis/systemic disease
- Significant osteoarthritis problems
- Significant neck problems
- Unable to undergo an MRI scan for any reason

### Surgical Methods

Surgery is performed while seated on a beach chair. By dividing the deltoid muscles, we can see the shoulder joint. Only type II or type III acromions are now treated using Neer's acromioplasty. We minimise the amount of the tear with end-to-end suture and reattach the RC tendons to the humerus after releasing and mobilising the RC muscles and prepping the bone for reattachment. Two layers are used to seal the incision. The arm is then advised to undergo long-term (6 months) therapy after being immobilised in a brace for 4 to 6 weeks. During the study period, we used intraosseous sutures at first, Mitek RC anchors next, and Spiralok anchors last (Mitek). After the initial "single-row" technique using simple sutures, we adopted a "double-row" technique with mattress sutures and, subsequently, the modified Mason-Allen technique combining mattress and simple vertical sutures. The

double-row technique allowed us to extend the area of contact for reattachment and increased the strength of fixation.

After three years of follow-up, surveys are used to calculate The American Shoulder and Elbow Surgeons Shoulder Score (ASES), which is a measure of quality of life. The cost of surgery is measured by the material used for surgery (Implant, Suture Material) as ours is a charitable trust hospital so there are no operative charges, medicine charges and hospital stay charges. So comparison of cost effectiveness is done by material used for repair of rotator cuff as it is the only chargeable. The final preference of surgery by cost effectiveness and quality of life of the patient after surgery is measured by questionnaires.

### Results

Data on 40 patients in all have been gathered retroactively. Among them, 20 patients got arthroscopic rotator cuff surgery, and 20 patients underwent micro open repair. In small open repair, there were 40% female patients and 60% male patients, while in arthroscopic repair, there were 45% female and 55% male patients. It was statistically insignificant ( $P > 0.05$ ) that patients with rotator cuff tears were an average age of 56.5 years for small open repairs and 57.2 years for arthroscopic repairs. All patients showed improvement in their modified ASES scores with surgery. The initial modified ASES score for patients in the arthroscopic group averaged 52, and this improved to an average final score of 91 ( $P < 0.05$  and  $P > 0.05$ , respectively). In addition, the individual scores for pain, satisfaction, and function showed significant improvement for both groups.

### Discussion

The goal of mini-open repair was to bring the best aspects of arthroscopy and open surgery together. Mini open repair has gained popularity because it can treat intra-articular disease while also repairing the tendon with bone tunnels without removing

the deltoid origin. Mini-open repairs have shown positive short-term results [10–12]. 73 patients who underwent arthroscopic rotator cuff surgery and were monitored for at least two years were the subject of a report by Gartsman et al. The ASES scores of the patients increased from an average of 30.7 to 87.6. 84% of patients achieved a good or exceptional performance based on Constant and Murley scores [13]. A similar result obtained by Andreas M Sauerbrey et al [14] retrospectively reviewed 54 patients who underwent either mini-open or arthroscopic rotator cuff repair.

All patients showed significant improvement in their scores for pain, satisfaction, and function at the time of follow-up. The average preoperative and postoperative scores for the mini-open group were as follows: pain 17 and 27 (30 possible points), satisfaction 3 and 9 (10 possible points), function 32 and 53 (60 possible points), and total 52 and 89 (100 possible points) ( $P < .05$ ). Average preoperative and postoperative scores for patients who had arthroscopic repair were as follows: pain 12 and 26, satisfaction 2 and 9, function 28 and 51, and total 42 and 86 ( $P < .05$ ). While scores in each group improved significantly, there was no statistically significant difference in the total scores between the 2 approaches.

Servud and his colleagues compared 35 patients who had undergone mini-open repair with 29 patients with arthroscopic repair. At final follow-up, which averaged 44.6 months, there was no significant difference in function or range of motion. However, they reported that 4 of the 29 patients developed stiffness. Final outcome as measured by the ASES, UCLA, and SST scores were similar [15]. These results were similar to the results obtained with either open or mini-open repair and have provided a basis for the continued use of this technique [16,17].

### Conclusion

This study supports the continued use of arthroscopic repair methods by demonstrating that the short-term outcomes of arthroscopic and mini open rotator cuff surgery are comparable. Patients' preferences for surgery vary significantly depending on cost effectiveness, so it is especially important for patients from low-income backgrounds in remote areas.

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