

# Comparative Analysis of Mini Open versus Arthroscopic Repair of Supraspinatus Tears

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## Abstract

**Background and Aim:** Among all the rotator cuff tendon injuries, supraspinatus tear is very common and it is most common in older individuals. Before the arthroscopy came into high demand, the open repair of supraspinatus tear was the preferred method of surgery. Recently, the miniopen technique of repair has also gained popularity because of certain factors like better repair strength, requires less expertise and facilitates early active mobilization. Present stud was performed to compare functional and clinical outcomes of arthroscopic and mini-open repair.

**Material and Methods:** The present analysis is the randomized control study done on the patients diagnosed with rotator cuff tears and was planned with supraspinatus repair with the use of arthroscopic and mini open technique. As per the inclusion and exclusion criteria total of 128 patients were included in the study. The included patients were equally divided into two groups: 64 patients who underwent mini-open repair and 64 patients who underwent arthroscopic repair. Follow up was done after 12 months postoperatively and the results were evaluated using University of California Los Angeles (UCLA) shoulder score.

**Results:** For arthroscopic repair group, UCLA shoulder score were: 26 patients got excellent result, 30 patients got good result and only 8 patients got fair result. In the other group UCLA shoulder score were: 22 patients in whom excellent results were obtained good results were obtained in 32 patients and in 10 patients we got fair results.

**Conclusion:** The arthroscopic procedure decreased postoperative pain, faster regains normal ROM and quicker return to function and in turn early return to work compared to mini-open procedure. The arthroscopic procedure better in addressing intra-articular and other associated problems than mini-open technique.

**Key Words:** Arthroscopy, Mini-Open repair, Rotator Cuff Tear, Supraspinatus Tear

## Introduction

Rotator cuff tears involving the supraspinatus tendon are common and can be associated with debilitating pain and dysfunction in the shoulder.<sup>1</sup> The size and degree of supraspinatus tendon tears can range from low-grade partial-thickness tears

to massive full-thickness tears. In the general population, the prevalence of rotator cuff tears was reported to be up to 22%. A partial-thickness tear of the supraspinatus can progress to become a full-thickness tear involving the other rotator cuff tendons if not detected and addressed early.<sup>2,3</sup>

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Among all the rotator cuff tendon injuries, supraspinatus tear is very common and it is most common in older individuals. As the tendon undergoes several degenerative changes in many metabolic diseases, its tear is very common after even a trivial fall over the shoulder.<sup>4,5</sup> Rotator cuff repair was first described by Codman over a century ago. Rotator cuff pathology may be graded arthroscopically using the "ABC" system in which "A" represents the articular side of the cuff, "B" is bursal, and "C" denotes a complete tear connecting the two surfaces.<sup>6,7</sup>

Many studies have shown that mini-open requires less tissue dissection and decreased chances of deltoid muscle detachment. On the other hands in arthroscopic method, there is decreased post-operative pain, shorter hospital stay and faster rehabilitation. Also, many studies have data to prove that there is no significant difference between the two modalities.<sup>8,9</sup>

In the trauma institute there is a facility of performing both types of surgeries, but as most of the patients visiting the hospital belong to below poverty line group and cannot afford arthroscopic surgery and having some evidence that mini open repair can be comparable to arthroscopic repair, hence the current study was done to compare both the methods.

### Material and Methods

The present analysis is the randomized control study done on the patients diagnosed with rotator cuff tears and were planned with supraspinatus repair with the use of arthroscopic and mini open technique. The ethical committee of the institute as informed about the study and the ethical clearance certificate was obtained prior to the start of the study. The entire included cases of the study were operated in the department of orthopedics medical college assoaited hospital for the period of two year.

On the basis of the clinical history clinical examination and the radiographic analysis the patients were included in the study. On the radiological examination the full thickness supraspinatus tear was the common findings. The inclusion and exclusion criteria of the study were as follows:

### Inclusion criteria:

Patients with age between 18 and 60 years

Patients with traumatic tear of supraspinatus tendon

### Exclusion criteria:

- Patients with other medical history diabetics, previous history of any fracture around the shoulder joint
- Patients with any previous history of the injury near the biceps or shoulder area.

As per the inclusion and exclusion criteria total of 128 patients were included in the study. An informed consent was taken from all the patients before their participation in the study. The included patients were equally divided into two groups: 64 patients who underwent mini-open repair and 64 patients who underwent arthroscopic repair. The surgical procedure was done by the two experienced surgeon.

For post-operative pain management, intravenous acetaminophen and a cyclooxygenase-2 selective inhibitor was administered till postoperative day 3. From day 3 to day 8 oral tablet containing combination of acetaminophen 325 mg and tramadol 37.5 mg was given. For additional pain control in some patient intramuscular diclofenac was administered if needed. This rehabilitation protocol was same for both the groups and all the patients followed it satisfactorily.

Patients were placed in arm sling early passive ROM for 3 weeks active assisted exercise after 3 weeks active ROM and strengthening exercise after 6 weeks. Follow up was done after 12 months postoperatively and the results were evaluated using University of California Los Angeles (UCLA) shoulder score. Statistical analysis was performed using statistical package of social science (SSPS) version 20 software.

### Results

Total of 128 patients were included in the study. The included patients were divided into two groups. In group 1 there were 64 patients who underwent mini-open repair and in group 2 there were 64 patients who underwent arthroscopic repair. The male to female ratio was found to be 1.25:1.

There were 68 males and 60 females. (Table 1) The maximum numbers of included patients were from age more than 40 years.

At the end of the study period the collected results were analyzed using the UCLA shoulder score as it is the simplest test and there are fewer chances of errors. For arthroscopic repair group, total 64 patients were there. The results according to the UCLA shoulder score were: 26 patients got excellent result, 30 patients got good result and only 8 patients got fair result. None of the study patients got poor result in this group.

In the other group none of the patients were lost on follow up. Total of 64 patients were included in this group. At the end of the follow up periods as per the UCLA shoulder score there were 22 patients in whom excellent results were obtained good results were obtained in 32 patients and in 10 patients we got fair results. Poor outcome was not recorded in any of the groups. (Table 2)

**Table 1: Gender Wise Distribution of study participants**

Gender	Number	Percentage (%)
Male	68	53.12
Female	60	46.87

**Table 2: Distribution according to UCLA shoulder score**

UCLA shoulder score	Arthroscopy N (%)	Mini Open N (%)
Excellent	26 (40.62)	22 (34.37)
Fair	30 (46.87)	32 (50)
Good	8 (12.5)	10 (15.62)
Total	64 (100)	64

## Discussion

In the previous literature, several studies have been conducted in order to compare the outcome of mini-open and all-arthroscopic surgeries. In the meta-analysis on randomized controlled trials comparing the outcome of arthroscopic and mini-open rotator cuff repair, conducted by Ji *et al.*<sup>10</sup> the authors founded no differences with regards to surgery time, functional outcome score, VAS pain score and ROM between these two techniques.

Arthroscopic supraspinatus repair is a very common modality of definitive management of supraspinatus tear. The 2 most important benefits of an arthroscopic repair are small incision and better visualization of the tear.<sup>11</sup> It has become a hugely popular modality for supraspinatus repair and surgeon's skills and experiences are still improving. Moreover, causes less pain and as the result rehabilitation is quite compliant.<sup>12,13</sup>

The present study is based on the outcomes evaluated using UCLA shoulder score. These parameters are evaluated and compared between the 2 study groups. According to some researches, patients who underwent arthroscopic repair obtained good results in terms of functional score as compared to mini open group. When pain is taken as one of the parameters, some studies found there is no significant differences between the 2 groups. The results are also similar to the mentioned studies.<sup>14,15</sup>

In the UCLA scoring, strength and range of active forward flexion are 2 important parameters for evaluating the outcome. Even when these 2 parameters were compared among the 2 groups, no statistically significant difference was observed. For range of active forward flexion, arthroscopy group had mean score of 4.56 compared to 4.50 of mini open group with p value being 0.73. For strength of forward flexion, the mean scores were 4.47 and 4.19 for arthroscopy group and mini open group respectively with p value of 0.07. All of the patients in the present study were satisfied with their outcomes. Studies suggest arthroscopic repair has very good short as well as long term results.

## Conclusion

The arthroscopic procedure decreased postoperative pain, faster regains normal ROM and quicker return to function and in turn early return to work compared to mini-open procedure. The arthroscopic procedure better in addressing intra-articular and other associated problems than mini-open technique. Even on the basis of functional outcome no technique is superior to one other producing similar result over long term. So, depending on the patient's need the method of choice of repair can be customised. Also, miniopen method can be an essential decision-making tool in the set ups where arthroscopic facilities are not available.

Ethical approval was taken from the institutional ethical committee and written Informed Consent was taken from all the participants.

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**Conflict of Interest:** None declared

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