

## ORIGINAL ARTICLE

**Assessment of the Arthroscopic Double-Row Restoration Technique's Reliability and Operational Results for Shoulder Cuff Reconstruction**QAISAR ALAM<sup>1</sup>, YASIR MAHMOOD<sup>2</sup>, JAWAD KHAN<sup>3</sup>, NEK MUHAMMAD KHAN<sup>4</sup>, TAHIR MEHMOOD KHATTAK<sup>5</sup>, MOHIB ULLAH KHAN<sup>6</sup>, KHURRAM SHAHZAD<sup>7</sup><sup>1</sup>Fcps Orthopedic, Registrar National Institute of Rehabilitation Medicine<sup>2</sup>Medical Officer Services Hospital Peshawar, Orthopaedic Department<sup>3</sup>Assistant Professor, Gajju Khan Medical College Swabi<sup>4</sup>Consultant Orthopedic Surgeon, Type C Hospital Takhte Nusrati, Karak<sup>5</sup>Trainee Registrar, Khyber Teaching Hospital Peshawar<sup>6</sup>FCPS Orthopaedic, District Orthopaedic Surgeon DHQ hospital Miranshah NWT D KPK<sup>7</sup>HIESS, Hamdard University, Karachi, PakistanCorrespondence to: Qaisar Alam, Email: [Kqsr03@gmail.com](mailto:Kqsr03@gmail.com)**ABSTRACT****Objective:** This study aims at evaluating the effectiveness of shoulder cuff restoration by arthroscopic surgery in dual row repair mode and shows 30 months of practical results, an ASES-based scoring system was developed.**Methods:** This study was conducted at mayo hospital Lahore in orthopedics department and the duration of this study was from October 2021 to march 2023. 23 patients who had significant rotator cuff tears repaired arthroscopically in a double-row fashion are included in this cross-sectional research. The operating surgeon performed a clinical assessment on patients who had been admitted for surgery in the outpatient setting both before and after surgery, as well as during follow-up visits at six weeks, three months, six months, and one year. The last examination took place on average 30 months after surgery. Using a scoring system based on a modified ASES score, the function of the patient was evaluated both preoperatively and postoperatively, and the results were compared. Based on the Modified American Shoulder and Elbow Society (ASES) score, a patient-rated questionnaire was utilized to assess shoulder and elbow function. Three parts make up the questionnaire, the first of which included questions regarding pain and had six components with a total weight of 30 points. The existence of pain, its location, and if the patients had discomfort at night were all questions that were posed to the patients. A visual analog pain scale from 0 to 10 was used to assess the degree of the patient's pain as well as their usage of drugs. The second phase, which included 10 components and a weighted average of 50 points, examined candidates' capacity to carry out everyday tasks. On a scale of 0 to 5, patients were asked to assess their level of competence to accomplish tasks while accounting for any challenges they may have encountered. The shoulder instability was evaluated in the last portion using a visual analog scale with a range of 0 to 10. Patients were divided into four groups based on the grading system: Excellent result (score >75), Good outcome (score 50-75), Fair outcome (score 25-50), and Poor outcome (score < 25)**Results:** At the time of the last follow-up, there was a substantial improvement in the mean operational result scores depending on the Patient Self-Assessed Questionnaire (p-value < 0.01). By using magnetic resonance imaging to evaluate repair integrity 12 months after surgery, it was discovered that 16 patients had type-I repairs, 2 patients had type-II repairs, and only 1 patient had type-III repairs. For enormous tears, the study's retear rate was 5%. Comparing the type-III repaired shoulders to the other kinds of repaired shoulders, the type-III repaired shoulders showed substantially worse functional outcomes in terms of total scores and strength (p-value < 0.01).**Practical Implication:** In the practical implication of this study we discovered that the arthroscopic double-row restoration approach is a successful treatment for repairing large rotator cuff injuries with a low chance of re-tear and a big increase in activity levels.**Conclusions:** In this research, we discovered that the arthroscopic double-row restoration approach is a successful treatment for repairing large rotator cuff injuries with a low chance of re-tear and a big increase in activity levels.**Keywords:** double-row technique, restoration, shoulder cuff, arthroscopically, resonance imaging**INTRODUCTION**

The supraspinatus tendon is the one that sustains the most damage out of all of the rotator cuff tendons, which are crucial stabilizers of the shoulder joint. Because rotator cuff tears need surgical treatment and often present with symptoms, the arthroscopic double-row restoration approach has shown superior clinical results. Because of this <sup>(1)</sup>, the arthroscopic double-row restoration approach has emerged as the gold standard in terms of treatment choices for rotator cuff tears. Keyhole surgery is now the accepted standard of care for the majority of these situations <sup>(2,3)</sup>. By recreating the anatomical imprint of the tendon, the double-row approach increases the region in which the tendon and bone come into touch, improving the likelihood that the injury will heal. According to the research, the double-row repair approach has undergone extensive study, and numerous studies have demonstrated its superiority to single-row repair biomechanically <sup>(4-7)</sup>. However, in terms of performance, barely any proof has demonstrated its superiority, and there is also very little information regarding the long-term radiological and functional outcome <sup>(8,9)</sup>. A study found a lower rate of re-rupture in individuals who had double row repair, albeit it did not make a functional distinction between the two procedures. The efficiency of corrected

rotator cuff tears is highly correlated with the degree of activity after surgery <sup>(10-12)</sup>.

In terms of structural characteristics and a variety of everyday activities, Asian population shoulders vary from non-Asian population shoulders. Despite the importance of the joint in the shoulder, the percentage of shoulder operations in the subcontinent is incredibly low. This can be caused by a variety of variables, such as the surgical approach (to create an effective, robust, free-of-stress rotator cuffed fix by maximizing bone muscle healing), expense, and a dearth of local proof regarding the efficacy of double row fix in regards to reliability and performance <sup>(13,14)</sup>. There is a dearth of evidence around the globe that long-term arthroscopic large rotator cuff rupture repair leads to functional success <sup>(15,16)</sup>. By evaluating the efficacy of the double-row repair procedure in arthroscopic rotator cuff tear treatment about force and functional results in the local (subcontinent) population, this paper seeks to fill a vacuum in the local literature.

**MATERIALS AND METHODS****Study Design:** Twenty-three patients who had arthroscopic double-row repair of major rotator cuff injuries are included in this prospective observational analysis.

Study participants were those who received this surgery in the

orthopedics department between October 2021 and March 2023 at Mayo Hospital. All patients who had signed up for the study had a clinical evaluation, a radiograph, and a confirmation of the diagnosis based on clinical MRI results. The research comprised patients who had rotator cuff tears when they first presented, was younger than 60 years old, had painful and symptomatic rotator cuff injuries but did not respond to conservative therapy, and had significant functional demands. Patients with Glenoid labrum tears enormously retracted tendons, decrease pull along with significant lesions, acromioplasty patients, and those who had their lateral clavicle resected were excluded from the study.

**Participants:** The operating surgeon assessed each patient in the outpatient department before the procedure, and then he or she checked up with them for six weeks, three months, six months, a year, and eventually 30 months, on average, later. A pre-operative shoulder MRI revealed the magnitude of the rotator cuff tear, which was verified during the shoulder arthroscopy. An MRI of the shoulder, which was conducted on average twelve months after the operation and classified into three categories, was used to evaluate the integrity of the repair. A modified ASES scoring system that was divided into four categories was used for functional assessment both before and after the operation. Every six months, a postoperative functional examination was performed, and a final assessment was made after 30 months. With a mean age of 38 years, the research comprised 23 patients, 19 of whom were men and 4 of whom were women.

**Data Collection:** Based on the Modified American Shoulder and Elbow Society (ASES) score, a patient-rated questionnaire was utilized to assess shoulder and elbow function. Three parts make up the questionnaire, the first of which included questions regarding pain and had six components with a total weight of 30 points. The existence of pain, its location, and if the patients had discomfort at night were all questions that were posed to the patients. A visual analog pain scale from 0 to 10 was used to assess the degree of the patient's pain as well as their usage of drugs. The second phase, which included 10 components and a weighted average of 50 points, examined candidates' capacity to carry out everyday tasks. On a scale of 0 to 5, patients were asked to assess their level of competence to accomplish tasks while accounting for any challenges they may have encountered. The shoulder instability was evaluated in the last portion using a visual analog scale with a range of 0 to 10. Patients were divided into four groups based on the grading system: Excellent result (score >75), Good outcome (score 50-75), Fair outcome (score 25-50), and Poor outcome (score < 25).

**Surgical Techniques:** An experienced orthopedic surgeon performed all surgeries in this research while all patients were under general anesthesia and were operated on while sitting in a beach chair (figure 2). The standard portals were created arthroscopically. The arm was sketched with a 20-degree flexion and 45-degree abduction. A soft tissue shaver tool was used to prepare the bone bed before arthroscopic frontal and back apertures were formed to validate the MRI findings of rips (Figure 3) and assess the effectiveness of muscular cartilage and tendon. (Figure 4)

**RESULTS**

All patients had routine follow-ups in the outpatient setting at intervals of six weeks, twelve weeks, twenty-four weeks, twelve months, and, on average, thirty months after surgery for the final assessment. Nineteen male and four female patients totaling twenty-three were enrolled in the research.

(40 + 7 years) The average age was 38. In this brief time of research follow-up, there were no cases of retear recorded, but functional outcomes were assessed using a modified ASES system-based Patient Self-Rated questionnaire, which revealed a substantial difference and improvement between pre-and post-surgical functional outcomes. Nineteen patients in total were analyzed for this research since four individuals were lost to follow-

up and were thus not included. In the following Table 1, demographics are further discussed and summarized.

Table 1: Demographic information of the participants included in the study.

	Mean Age (Years)	N	%	Range
Age	38	38		26-60
Gender	Female	4	21.1	
	Male	15	78.9	
Injury Mode	Others	1	5.2	
	RTA	2	10.5	
	Sports	16	84.3	
Injury Type	Massive RCT	19/19	100	

At the time of the last follow-up, there was a substantial improvement in the mean operational result ratings depending on the Patient Self-Rated Questionnaire (p-value < 0.01). A type-I repair was present in sixteen patients after surgery; a type-II repair was present in two patients, and a type-III repair was seen in only one patient, according to magnetic resonance imaging results from one year after surgery.

According to this research, enormous tears had a retear rate of roughly 5%. In comparison to the other kinds of repairs, the shoulder joint with a type-iii restoration had a substantially worse functional result as far as general scores and ability (p-value < 0.01). The findings are summarized in Tables 2 and 3.

Table 2: Patients with shoulder injuries' preoperative scoring grades

Groups	n (%)
A Excellent	0 (0)
B Good	3 (15.70)
C Fair	10 (52.60)
D Poor	6 (31.60)
Total	19 (100)

Table 3: Grade following Cuff Repair in Postoperative ASES

Groups	n (%)
A Excellent	11 (57.80)
B Good	5 (26.30)
C Fair	1 (5.30)
D Poor	2 (10.60)
Total	19 (100)

Based on the Patient Self-Rated Questionnaire's ASES score grade, the total number of research participants was separated into four groups both pre-and postoperatively. According to Table 2 and Table 3, results at the final checkup demonstrated a considerable improvement over the pre-operative state.



Figure 2: Position of the beach chair and arthroscopic portals



Figure 3: Cuff tear in Arthroscopic view



Figure 4: Shaver-blade preparation of the bone bed



Figure 5: Medial Anchor Suture as Shown

## DISCUSSIONS

The method of choice for rotator cuff repairs is arthroscopic. However, the functional result and satisfaction among patients are compromised by the older, basic technique's high re-rupture rate, which led to the development of the double row technique—

modified arthroscopic method with anchors<sup>(17)</sup>. At the time of the last monitoring in this research, the mean operational result scores depending on the Patient Self-Rated Questionnaire considerably improved ( $p$ -value  $< 0.01$ ). When the integrity of the repair was evaluated by magnetic resonance imaging one year after surgery, it was discovered that 16 patients had a Type- I repair, 2 patients had a Type II repair, and only 1 patient had a Type III repair. According to the research, enormous tears had a retear rate of roughly 5%. When compared to the other forms of repairs, the shoulders with type-III repairs had substantially worse functional outcomes in terms of total scores and strength ( $p 0.01$ ). Several studies have established the advantages of the double-row method over the single-row approach<sup>(18-20)</sup>. A previous study found that using a double-row repair approach instead of a single-row restoration approach considerably reduced the aberrant gap in his study on a corpse<sup>(21)</sup>. While another study found that the traction strength of his cadaver was stronger after double-row restoration<sup>(22)</sup>. Research that compared the re-rupture rates in the double-row restoration and single-row restoration groups using 3-Tesla magnetic resonance imaging found that they were 25% and 60%, respectively<sup>(23)</sup>. The research found that when only injuries longer than 3 cm were detected, a significant difference was seen<sup>(24)</sup>. Another meta-analysis found that although ratings derived utilizing R or SR repair did not significantly vary from one another, investigations employing size revealed significant differences<sup>(25)</sup>. Another retrospective research evaluated the results using ASES and UCLA ratings and looked solely at major rotator cuff injuries (more than 5.0 cm)<sup>(26)</sup>. These authors concluded that the DR group's repair findings were 4.9 times more refined than those of the SR group.

There are certain inherent limitations in our investigation. First, there were fewer patients available throughout the time of our research. Due to the prospective nature of this investigation, selection bias may also be seen. Lastly, a brief follow-up period.

The short-term functional results of 19 patients who had arthroscopic Rotator Cuff Tendon Repair using the Double-Row Anchor Suture Correction approach are reported in the present research. According to recent research, Rotator Cuff Repair using Double Row Technique offers greater functional results with lower perioperative morbidity.

## CONCLUSIONS

Massive rotator cuff injuries were successfully repaired using the arthroscopic double-row repair approach, with little chance of re-tear and a noticeable increase in functional activities. As a result, it may be said to be a trustworthy treatment for treating such tears.

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