"EVALUATION OF CLINICAL OUTCOME OF ARTHROSCOPIC ROTATOR CUFF REPAIR"

By

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In partial fulfilment of the requirement for the degree of

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I hereby declare that this dissertation entitled **"EVALUATION OF CLINICAL OUTCOME OF ARTHROSCOPIC ROTATOR CUFF REPAIR"** is a bonafide and genuine research work carried out by me under the guidance **of DR. S.S NANDI**, MBBS, M.S, Professor & HOD, Department of Orthopaedics at BLDE (Deemed to be University) Shri B. M. Patil Medical College Hospital and Research Centre, Vijayapura.

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ABSTRACT

Background: Rotator cuff pathology represents one of the most common causes of shoulder pain and dysfunction, significantly impacting patients' quality of life. Arthroscopic techniques have revolutionized rotator cuff repair, potentially offering advantages in surgical precision and post-operative recovery.

Objective: To examine the functional outcomes of arthroscopic rotator cuff repair in terms of pain relief, range of motion, time to return to daily activities, length of hospital stay, and patient satisfaction at sequential follow-up evaluations.

Methods: This prospective study included 22 patients who underwent arthroscopic rotator cuff repair between May 2023 and June 2024. Patients with full-thickness and partial-thickness tears confirmed by MRI were included. Functional outcomes were assessed using UCLA and Constant-Murley scores, along with VAS pain scores at 6 weeks, 3 months, and 6 months postoperatively.

Results: The study population had an equal gender distribution with most patients aged 41-50 years (36.4%). Supraspinatus was the most commonly affected tendon (77.3%), with complete tears predominating (86.4%). At 6 months, UCLA scores showed significant improvement with 63.6% achieving good outcomes compared to 86.4% poor outcomes preoperatively ($p<0.001$). Similarly, Constant scores improved from predominantly poor preoperatively (86.4%) to good or excellent at 6 months (100%) ($p<0.001$). VAS pain scores decreased from 6.09 ± 0.75 at 6 weeks to 1.5 ± 1.0 at 6 months ($p<0.001$). The mean hospital stay was 5 days, with return to daily activities at 9.64 ± 2.01 days. Patients with traumatic tears demonstrated significantly better UCLA scores than those with degenerative tears ($p=0.01$).

Conclusion: Arthroscopic rotator cuff repair provides excellent clinical outcomes with significant improvements in functional scores and minimal complications. While both single-row and double-row techniques yield satisfactory results, repair strategy should be tailored to tear characteristics and tissue quality. The significant association between traumatic etiology and superior functional outcomes highlights tissue quality as a critical determinant of healing potential and functional recovery.

Keywords (MeSH Terms): Rotator Cuff Injuries, Arthroscopy, Shoulder Pain, Treatment Outcome, Recovery of Function

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LIST OF ABBREVIATIONS

- AAROM: Active-Assisted Range of Motion
- AC: Acromioclavicular (joint)
- ADL: Activities of Daily Living
- AMGP: Anterior Mid-Glenoid Portal
- AP: Anterior-Posterior (view in radiography)
- ARCR: Arthroscopic Rotator Cuff Repair
- AROM: Active Range of Motion
- ASES: American Shoulder and Elbow Surgeons (score)
- ASP: Anterior-Superior Portal
- BP: Brachial Plexus
- CI: Confidence Interval
- CMS: Constant-Murley Score
- DD: Double-layer, Double-row (procedure)
- DR: Double Row (repair)
- ECG: Electrocardiogram
- EI: External Impingement
- ESSE: European Society of Shoulder and Elbow Surgery
- FTT: Full-Thickness Tear
- GH: Glenohumeral (joint)
- GIRD: Glenohumeral Internal Rotation Deficit
- HBsAg: Hepatitis B Surface Antigen
- HCV: Hepatitis C Virus
- HIV: Human Immunodeficiency Virus
- ISP: Infraspinatus
- JOA: Japanese Orthopaedic Association (score)
- MRI: Magnetic Resonance Imaging

- NSAIDs: Non-Steroidal Anti-Inflammatory Drugs
- OSS: Oxford Shoulder Score
- PASTA: Partial Articular Supraspinatus Tendon Avulsion
- PMGP: Posterior Mid-Glenoid Portal
- PNF: Proprioceptive Neuromuscular Facilitation
- PROM: Passive Range of Motion
- PRP: Platelet-Rich Plasma
- PTT: Partial-Thickness Tear
- RC: Rotator Cuff
- RCS: Rotator Cuff Syndrome
- RCT: Randomized Controlled Trial (context dependent)
- RCT: Rotator Cuff Tear
- ROM: Range of Motion
- SB: Suture Bridge (technique)
- SCR: Superior Capsular Reconstruction
- SD: Standard Deviation
- SIS: Subacromial Impingement Syndrome
- SR: Single Row (repair)
- SSC: Subscapularis
- SSP: Supraspinatus
- TM: Teres Minor
- TOE: Transosseous-Equivalent (technique)
- UCLA: University of California Los Angeles (shoulder score)
- US: Ultrasound
- VAS: Visual Analog Scale

INTRODUCTION

Rotator cuff pathology represents one of the most common causes of shoulder pain and dysfunction, significantly impacting patients' quality of life and functionality in both occupational and daily activities. With the advancing age of the global population and increasing participation in overhead activities, the incidence of rotator cuff tears has shown a steady rise, making their effective management a crucial focus in orthopaedic surgery.[1] The evolution of arthroscopic techniques over the past decades has revolutionized the approach to rotator cuff repair, offering potential advantages in terms of surgical precision and post-operative recovery.

The rotator cuff, comprising the supraspinatus, infraspinatus, teres minor, and subscapularis muscles, plays a fundamental role in shoulder biomechanics, providing both mobility and stability to the glenohumeral joint. Tears in these tendons can result from acute trauma, but more commonly develop through chronic degenerative processes, particularly affecting individuals over 40 years of age.[2] Understanding the complex interplay between anatomical factors, biomechanical stresses, and healing responses has been crucial in developing effective surgical techniques for repair.

Arthroscopic rotator cuff repair has emerged as the gold standard treatment for many patients with symptomatic tears, offering several theoretical advantages over traditional open approaches. These benefits include less surgical trauma, better visualization of the glenohumeral joint, reduced postoperative pain, and potentially faster rehabilitation.[3] However, the technical demands of arthroscopic repair and the learning curve associated with these procedures have led to ongoing discussions about optimal surgical techniques and their influence on clinical outcomes.

The evolution of arthroscopic techniques has been accompanied by significant advances in anchor design, suture materials, and repair configurations. Single-row, double-row, and transosseous-equivalent techniques have been developed and refined, each with their proposed biomechanical advantages.[4] The choice of repair technique often depends on various factors, including tear size, tissue quality, and surgeon preference, with current literature showing varying results regarding the superiority of one technique over another in terms of clinical outcomes.

The assessment of clinical outcomes following arthroscopic rotator cuff repair encompasses multiple domains, including pain reduction, functional improvement, patient satisfaction, and return to activities.[5] Standardized outcome measures such as the Constant score, American Shoulder and Elbow Surgeons (ASES) score, and Visual Analog Scale (VAS) for pain have become essential tools in evaluating surgical success. Additionally, advanced imaging techniques have enabled better assessment of structural healing and repair integrity.

One of the most challenging aspects of rotator cuff repair remains the relatively high rate of retear or failure of healing, reported to range from 20% to 94% depending on various factors.[6] Age, tear size, tissue quality, smoking status, and comorbidities such as diabetes have been identified as potential risk factors affecting healing outcomes. Understanding these factors is crucial for proper patient selection and optimization of surgical timing and technique.

The role of biological augmentation in enhancing healing responses has gained increasing attention in recent years. Platelet-rich plasma (PRP), stem cell therapy, and various biological scaffolds have been investigated as potential adjuncts to improve healing rates and clinical outcomes.[7] While early results have shown promise in some studies, the optimal biological augmentation strategy remains a subject of ongoing research and debate.

Post-operative rehabilitation protocols represent another critical factor influencing clinical outcomes. The traditional approach of early immobilization followed by graduated rehabilitation has been challenged by protocols advocating earlier passive motion.[8] The optimal balance between protecting the repair and preventing stiffness continues to evolve, with current evidence suggesting the need for individualized approaches based on patient and tear characteristics.

The long-term durability of arthroscopic rotator cuff repairs remains an important consideration, particularly in younger, active patients. Studies with extended follow-up have demonstrated that while many patients maintain good functional outcomes, there can be a gradual deterioration in both clinical and structural results over time.[9] This highlights the importance of considering factors that might influence long-term outcomes when planning surgical intervention.

Recent advances in surgical techniques, including superior capsular reconstruction for irreparable tears and the use of all-arthroscopic nerve releases, have expanded the therapeutic options available to surgeons.[10] These innovations continue to evolve, offering potential solutions for challenging cases and improving our ability to address various patterns of rotator cuff pathology.

EPIDEMIOLOGY AND RISK FACTORS

The broad range of rotator cuff injuries includes partial tears, tendinopathy, damage, and eventual full tears. Age is an important factor. Injuries varied from 9.7% in individuals aged 20 and under to 62% in patients aged 80 and beyond, regardless of whether symptoms were present. A tear in the opposite shoulder's rotator cuff is also a possibility for people who are becoming older and experiencing unilateral pain. The average age of a patient without a cuff rupture in a research comparing individuals with unilateral shoulder discomfort was 48.7 years. Bilateral rips are 50% likely to occur beyond age 66. Furthermore, age did not correspond with tear size, but it did correlate with the kind and presence of tears.[11]

The most frequent cause of rotator cuff disease is age. It is a progressive degenerative process. One known risk factor is smoking. According to a comprehensive analysis, smokers have higher rates and larger degenerative tears in addition to symptomatic tears, which could lead to more procedures. Family history is another risk factor. A strong link was found between people with rotator cuff disease and their third cousins in a study of the condition in people under 40. It's interesting to note that rotator cuff disease has also been linked to bad posture. “Only 2.9% of patients with optimal alignment had tears, compared to 65.8% of patients with kyphotic-lordotic postures, 54.3% with flat-back postures, and 48.9% with sway-back postures”.

AIMS AND OBJECTIVES

To examine the functional results of arthroscopic rotator cuff repair in terms of how soon patients may resume their daily activities, their range of motion, pain assessment, speed of recovery, length of hospital stay, and patient satisfaction at each follow-up.

REVIEW OF LITERATURE

Among the 236 individuals enrolled in a research by Ho S et al., 209 (88.6%)[61] “had tendon avulsions and 27 (11.4%) had Fosbury flop tears. In contrast to tendon avulsions, which had a mean age of 56.1 years (standard deviation 9.1), Fosbury flop tears had considerably older patients ($P < .05$) with a mean age of 61.6 years (standard deviation 9.0), despite the fact that there was no significant difference in gender or arm dominance between the groups. Tendon retraction did not significantly differ across the groups. At six months and at least a year after surgery, both groups showed a significant improvement in ROM, visual analog scale, American Shoulder and Elbow Surgeons, Single Alpha-Numeric Evaluation, and Constant score. There was no discernible difference between the groups' ROM and clinical scores. The re-tear rate for tendon avulsions was 2.8% (6/209) and for Fosbury flop tears it was 7.4% (2/27) ($P = .361$)”. This difference was not statistically significant.

The average age in a study by Barbosa F et al.[62] was 64 years old. “Overall, there were notable gains in active external rotation ($p < 0.05$), active forward flexion ($p < 0.05$), active abduction ($p < 0.05$), and OSS ($p < 0.05$). According to our research, a sizable percentage of patients who have arthroscopic revision rotator cuff repair had positive results. Age was not a predictor of surgical success, diabetics showed no post-operative benefits, obese patients saw a notable improvement in range of motion, and small” and medium-sized tears were successfully repaired.

According to Davey MS et al.[63] scores from the University of California Los Angeles, age- and sex-adjusted Constant-Morley, and American Shoulder & Elbow Surgeons ranged from 79.4 to 93.2, 73.2 to 94, and 26.5 to 33, respectively, in 5, 6, and 3 investigations. Six of the eight studies had long-term satisfaction percentages ranging from 85.7% to 100%. Furthermore, the range of the overall radiologic retear rate was 9.5% to 63.2%. At a minimum 10-year follow-up, the overall surgical revision rates varied from 3.8% to 15.4% in 6 trials, with revision ARCR requiring 0% to 6.7% and revision subacromial decompression requiring 1.0% to 3.6% in 6 and 2 studies, respectively.

In their study, Kim HG et al[64] discovered that group A had significantly greater mean gains in external rotation (P =.030) and the American Shoulder and Elbow Surgeons (ASES) score (P =.043). Both groups showed significant improvements in the ASES score, Constant score, and visual analog scales for pain and function (all P =.001). The retear rate on regular postoperative MRI at 6 months was 18.5% (10/54) in group B and 20.4% (11/54) in group A; "there was no statistically significant difference between the two groups (P =.808). Factor analysis in group A revealed that the inferior Constant score was associated with mild glenohumeral arthritis (P =.003) and subscapularis involvement (P =.018), while the retear was associated with occupation ratio (P =.036), follow-up duration (P =.019), tear size in mediolateral dimension (P =.037), and incomplete repair" (P =.034).

In their study, Kakoi, H. et al.[65] "discovered that the JOA scores of the SB (suture-bridge) and DD (double-layer, double-row [DD] procedure) groups improved significantly from their preoperative averages of 63.4 and 63.3 points, respectively, to their postoperative means of 91.8 and 92.1 points. From preoperative means of 110.1° and 100.0° to postoperative means of 142.3° and 142.7°, respectively, the active flexural range of motion improved significantly; nevertheless, there were no statistically significant differences between the groups. There was no significant difference in the incidence of re-tear between the two groups; it happened in 5.9% of the DD group (two of 34 shoulders) and 7.9% of the SB group (three of 38 shoulders)."

The mean postoperative range of motion, according to Filho JM et al.[66], was T10 (range: L4 to T7) for medial rotation, 58° (range: 40° to 70°) for lateral rotation, and 134° (range: 110° to 140°) for elevation. The average elevation, lateral rotation, and medial rotation increases were 15°, 14°, and 2 vertebral levels, respectively. Eight instances (10.9%) had good results, four cases (5.5%) had regular results, and 61 cases (83.6%) had exceptional results.

In their investigation, Babhulkar AS et al[67] discovered that, "of the 11 patients, seven had large cuff tears, two had medium cuff tears, and two had tiny cuff tears. Three of the eleven patients had contralateral side amputees, four were wheelchair-bound from post-poliomyelitis muscle weakness, one had a hand amputation on the opposite side, and three had cerebrovascular stroke-related same-side hemiplegia. Three cases had the non-dominant side implicated, while eight individuals had the dominant side. Following arthroscopic cuff repairs, there was a considerable improvement in functional range of motion, the visual analog scale for discomfort, satisfaction, and UCLS scores. After an average of 14 ± 3 months, ultrasound assessment showed that 88% of patients had fully healed and 12% had partially healed".

In Randelli PS et al.[68]'s investigation, 102 patients were available for the final evaluation, and 149 individuals (88.2% of the eligible patients) were available for a full telephone interview. 54 individuals (53.47%) had an intact supraspinatus, according to ultrasound. This rate would decrease to 48.65% if the 10 patients who had revision surgery were added to the nonintact group. In both univariate (hazard ratio, 3.04; 95% CI, 1.63-5.69; P =.001) and multivariate (hazard ratio, 2.18; 95% CI, 1.03-4.62; P =.04) analyses, tear size was linked to supraspinatus integrity. Except for the Constant-Murley Score, which was noticeably higher in patients with smaller tears at the index surgery, there were no notable variations in the subjective or functional scores that were gathered. Additionally, radiographs demonstrated a much larger acromion-humeral distance and lower grades of osteoarthritis, and strength tests demonstrated significantly superior abduction and flexion strength in this group. At the end follow-up, patients with an intact supraspinatus demonstrated better outcomes in all functional ratings, increased acromion-humeral distance, improved abduction and flexion strength, and lower grades of osteoarthritis.

70 (67.9%) of the 97 shoulders in a study by Babhulkar AS et al.[69] were available for final evaluation, with a mean follow-up of 57.52 months (24 to 122) and a mean age of 73.56 years (70 to 81). 25 At the final 26 follow-up, the mean VAS for pain reduced from 8.4 (6 to 10) to 1.04 (0 to 5) (P < 0.001). At the 29th final follow-up, the mean forward flexion, abduction, and external rotation improved from 112.50º to 27 165.43º (P < 0.001), 114.36º to 166.86º (P < 0.001), and 45.14º to 73.64º (P < 0.001), respectively. Additionally, 55 patients (78.5%, n = 70) showed improvement in internal rotation. The final follow-up showed a substantial improvement (P < 0.05) in the mean muscular strength of Supraspinatus (SSP) 30 and Infraspinatus (ISP) 30

from 2.84 (2 to 4) to 4.67 (4 to 5) and from 2.77 (2 to 4) to 4.64 (3 to 5). Only three patients (4.28%, n = 70) were subjectively less than satisfied at the last follow-up, and the mean OSS improved from 11.49 to 44.40 (P < 0.001).

22 patients participated in a prospective study conducted by Vamsinath P et al.[70] to examine the functional results of arthroscopic rotator cuff restoration. The bulk of the participants in our study are between the ages of 40 and 60, with a mean age of 53.5 years. Nine of the 22 cases were female, and 13 were male. Rather than complete thickness tears (40.9%), a significant portion of our sample included partial thickness tears (59.1%). In our study, 18.2% (4) individuals had degenerative tears and 81.8% (18) patients had traumatic tears. By one year after surgery, flexion had significantly improved from 126.8° to 147.0°, abduction from 125.3° to 149.5°, external rotation from 51.1° to 80.2°, and internal rotation from 40.45° to 67.5°. Out of the 22 patients in our study, 3 had poor outcomes, 7 had average outcomes, 8 had acceptable outcomes, and 4 had exceptional outcomes based on their UCLA scores. At the conclusion of the first year, the mean UCLA score rose from 9.09 before surgery to 28.50 after.

With typically positive clinical results, arthroscopic rotator cuff repair has become a dependable and efficient treatment option. The majority of research shows notable benefits in pain management, functional recovery, patient satisfaction, even though success rates differ throughout studies. However, a number of variables, such as patient age, tissue quality, rip size, and post-operative rehabilitation guidelines, can affect the results. The available data also draws attention to ongoing discussions about the best surgical methods, anchor locations, and repair setups. Managing major tears and preventing re-tears remain difficult despite advancements in surgical technique and knowledge of healing biology. In order to better understand the durability of repairs, future research should concentrate on improving biological augmentation techniques, creating more exact patient selection criteria, and carrying out long-term comparative investigations. Furthermore, the evidence foundation for clinical decision-making in rotator cuff restoration would be strengthened and more relevant comparisons could be made if outcome metrics were standardized across trials.

EMBRYOLOGY

TIME FRAME:

“The development of the shoulder joint, glenohumeral joint, and surrounding structures occurs between five and ten weeks of pregnancy.

GLENOHUMERAL JOINT FORMATION:

The shoulder's ball-and-socket joint, or glenohumeral joint, starts to form around week six. By weeks seven and eight, cavitation the gap inside the joint appears, and by week ten, the joint capsule's lining or synovial lining is visible.

ROTATORCUFF MUSCLES:

The mesoderm gives rise to the four rotator cuff muscles—the subscapularis, teres minor, infraspinatus, and supraspinatus—which emerge from the scapula and attach to the humerus”.

ANATOMY

"The rotator cuff is a group of muscles in the shoulder that allow a wide range of movement while maintaining the stability of the glenohumeral joint. The rotator cuff includes the following muscles:[20-22]

- Subscapularis
- Infraspinatus
- Teres minor
- Supraspinatus"aa

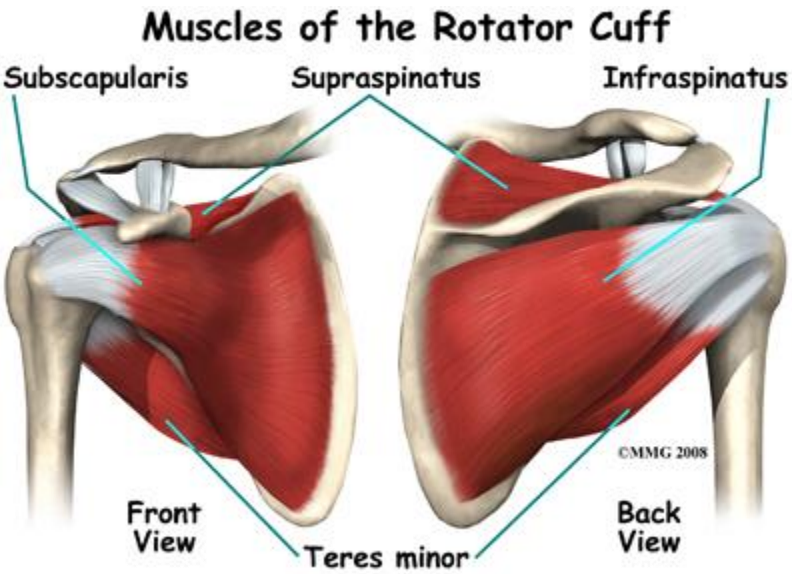
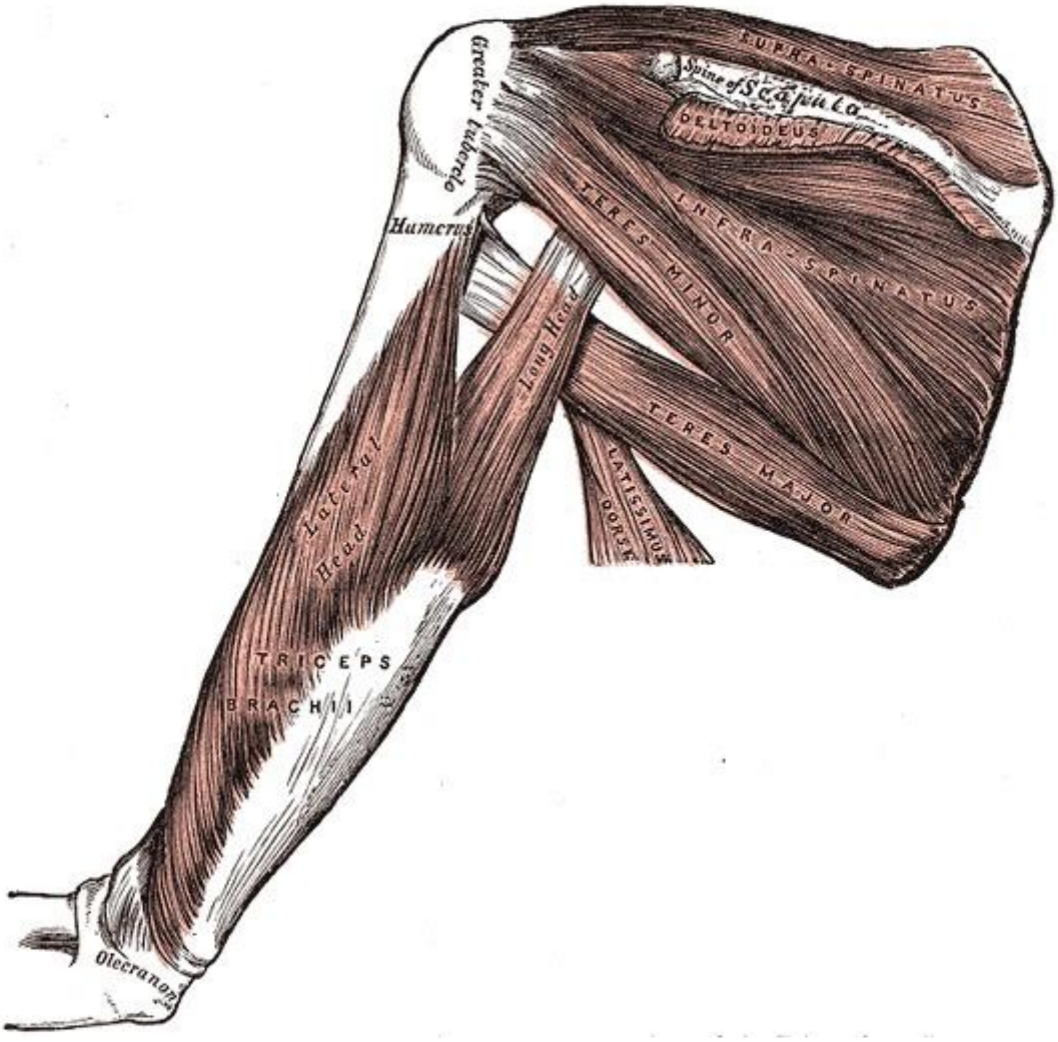


Fig.1: muscles of rotator cuff

A small glenoid cavity and a huge, spherical humeral head make up the glenohumeral joint, which is a ball and socket joint. "The joint is extremely movable due to its anatomy, yet it is also extremely unstable. Both the contractile tissues (dynamic stabilizers), like the rotator cuff muscles and the long head of the biceps brachii, and the non-contractile tissues of the glenohumeral joint (static stabilizers), like the capsule, the labrum, the negative intraarticular pressure, and the glenohumeral ligaments, work together to stabilize the shoulder".



<u>Fig 2: anatomy of rotator cuff muscles</u>

MUSCLES:

“The subscapularis is the largest component of the posterior wall of the axilla. It prevents the anterior dislocation of the humerus during abduction and medially rotates the humerus. A large bursa separates the muscle from the neck of the scapula.[23]

Origin: subscapular fossa of the scapula

Insertion: lesser tubercle of the humerus

The supraspinatus muscle is the only muscle of the rotator cuff that is not a rotator of the humerus.

Origin: supraspinous fossa of the scapula

Passes above the glenohumeral joint

Insertion: greater tuberosity of the humerus”

“The infraspinatus is a powerful lateral rotator of the humerus. The tendon of this muscle is sometimes separated from the capsule of the glenohumeral joint by a bursa.

Origin: infraspinous fossa of the scapula

Insertion: greater tuberosity of the humerus, immediately below the supraspinatus.”

“The teres minor is a narrow and long muscle entirely covered by the deltoid, hardly differentiated from the infraspinatus.

Origin: lateral border of the scapula (below the infraglenoid tubercle)

Insertion: greater tuberosity of the humerus, below the infraspinatus tendon”.

STRUCTURE AND FUNCTION

By compressing the “humeral head against the glenoid, the rotator cuff's main biomechanical function is to stabilize the glenohumeral joint. These four muscles attach to the humerus after emerging from the scapula. The inferior face of the joint is left exposed as the rotator cuff muscles' tendons merge with the joint capsule to create a musculotendinous collar that encloses the anterior, superior, and posterior portions. Since the humerus moves inferiorly through the exposed portion of the joint in the majority of shoulder luxations, this configuration is crucial. The rotator muscles contract during arm motions, preventing the humerus' head from sliding and enabling full range of motion and stability.

Additionally, by promoting abduction, medial rotation, and lateral rotation, rotator cuff muscles aid in shoulder joint mobility”.

- “Subscapularis: Medial (internal) rotation of the shoulder
- Supraspinatus: Abduction of the arm. Necessary for the initial 0 to 15 degrees of shoulder abduction motion. The deltoid muscle abducts the arm beyond 15 degrees
- Infraspinatus: Lateral (external) rotation of the shoulder
- Teres Minor: Lateral (external) rotation of the shoulder

During physical examination, each muscle can be evaluated independently based on its specific movements”.

BLOOD SUPPLY AND LYMPHATICS

“The posterior circumflex humeral artery, the subscapular artery, and the suprascapular artery provide the majority of the rotator cuff muscles' vascular supply.

Originating near the base of the neck, the suprascapular artery is a branch of the thyrocervical trunk, a primary branch of the subclavian artery. The nerve serves the supraspinatus and infraspinatus muscles after entering the posterior scapular region superior to the suprascapular foramen.

The axillary artery's major branch is the subscapular artery. It begins from the third segment of the axillary artery, travels along the inferior border of the subscapularis muscle, and splits into the thoracodorsal and circumflex scapular arteries. It provides the subscapularis muscle with vascular supplies”.

“The third segment of the axillary artery in the axilla is where the posterior circumflex humeral artery begins. Along with the axillary nerve, it passes via the quadrangular gap into the posterior scapular region, where it supplies the teres minor muscle. Every lymphatic from the upper limb empties into axillary lymph nodes”.

NERVE SUPPLY

“The subscapular nerve (upper and lower branches) innervates the subscapularis muscle.

- Originate from the posterior cord of the brachial plexus
- Nerve root: C5, C6, C7

The suprascapular nerve innervates the infraspinatus and supraspinatus

- Originates from the superior trunk of the brachial plexus
- Passes through the suprascapular foramen
- Nerve root: C5 and C6

The axillary nerve innervates teres minor

- Originates from the posterior cord of the brachial plexus
- Passes through the quadrangular space into the posterior scapula region
- Nerve root: C5 and C6”

CLINICAL SIGNIFICANCE

CLINICAL FEATURES:

Localized shoulder pain on the lateral aspect is the main complaint. Patients frequently report a "painful arc during flexion and abduction at 60 to 120 degrees, as well as pain at night from laying on the same side. It gets worse with overhead activity. The onset of the presentation may be sudden or persistent. Young patients typically present acutely due to a recent traumatic experience or severe overexertion (carrying a big box, for example). The function is frequently severely compromised. Strength and function gradually deteriorate in older patients or those who engage in repetitive overhead activities. With favorable results from provocative tests like Hawkins (pain on passive forced internal rotation of the shoulder), the range of motion is normal. Confirmatory is the drop arm test. A rotator cuff tear should be considered if there is weakness in shoulder abduction.

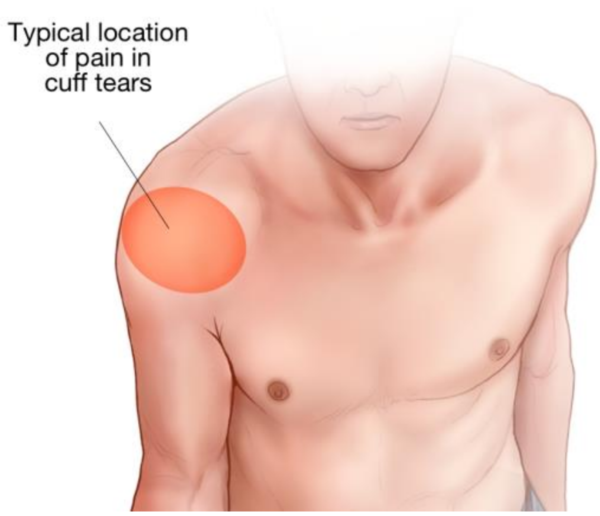


Fig 3: location of clinical pain.

PHYSICAL EXAMINATION[24]

“Rotator cuff muscles can undergo independent evaluation when the patient presents with rotator cuff syndrome”.

The Jobe's test, also referred to as the "empty can" test, is used to assess the supraspinatus muscle. It involves pulling down on the arm while abducing it 90 degrees and rotating it internally, with the thumb pointing to the floor. If this is weak or painful, the test is positive.

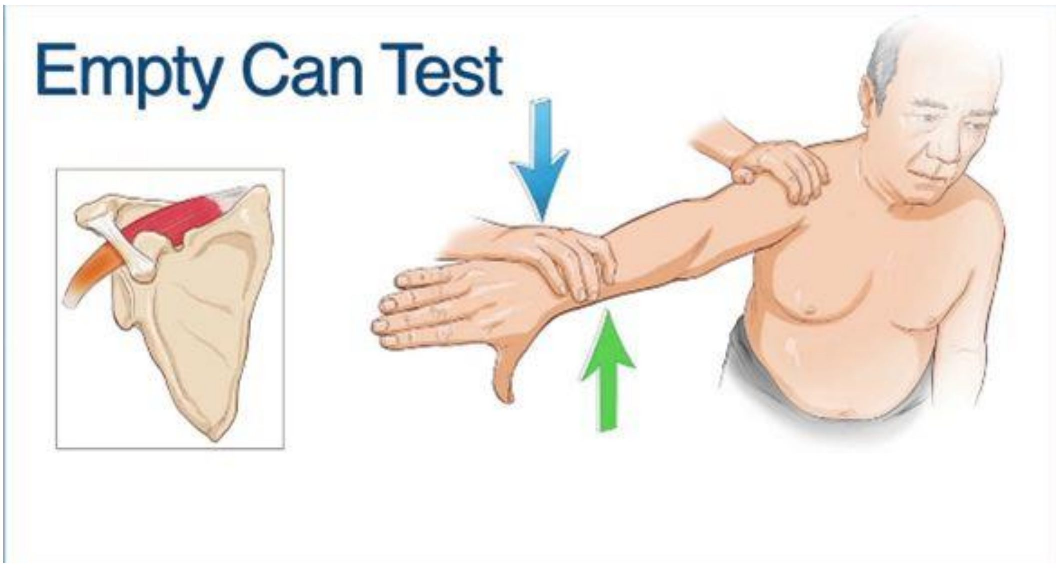


Fig 4: empty can test

“Infraspinatus muscle: Evaluation of this muscle is via lateral rotation against resistance with the elbow flexed and the arm in a neutral abduction/adduction position.

Teres minor muscle: This muscle's evaluation is with the hornblower's test, done with the arm at 90 degrees abduction, the elbow flexed (90 degrees), and doing a lateral rotation against resistance. The test is positive if this is painful or weak”.

Fig 5: bear hug test and lag sign

The "lift-off" and "bear hug" tests are used to assess the subscapularis muscle. “The lift-off test involves the patient bringing their hands around their back, palms out, to the lumbar area. If the patient is unable to raise their hands off their back, the test is considered successful. When doing the Bear Hug Test, the patient tries to withstand the examiner moving their ipsilateral palm away anteriorly by placing it on the” opposing deltoid.

Rotator Cuff Syndrome[25-27]

From simple injuries like “acute rotator cuff tendinitis to advanced/chronic rotator cuff tendinopathy and degenerative diseases, rotator cuff syndrome (RCS) encompasses a wide range of clinical pathologies”.

Shoulder pain is frequently caused by rotator cuff injury. The compressive stresses of subacromial impingement are very dangerous for the rotator cuff tendons, especially the supraspinatus tendon. An injury that progresses “from acute inflammation to calcification, degenerative thinning, and ultimately a tendon tear is caused by improper athletic technique, bad posture, inadequate training, and the subacromial bursa's inability to protect the supporting tendons”.

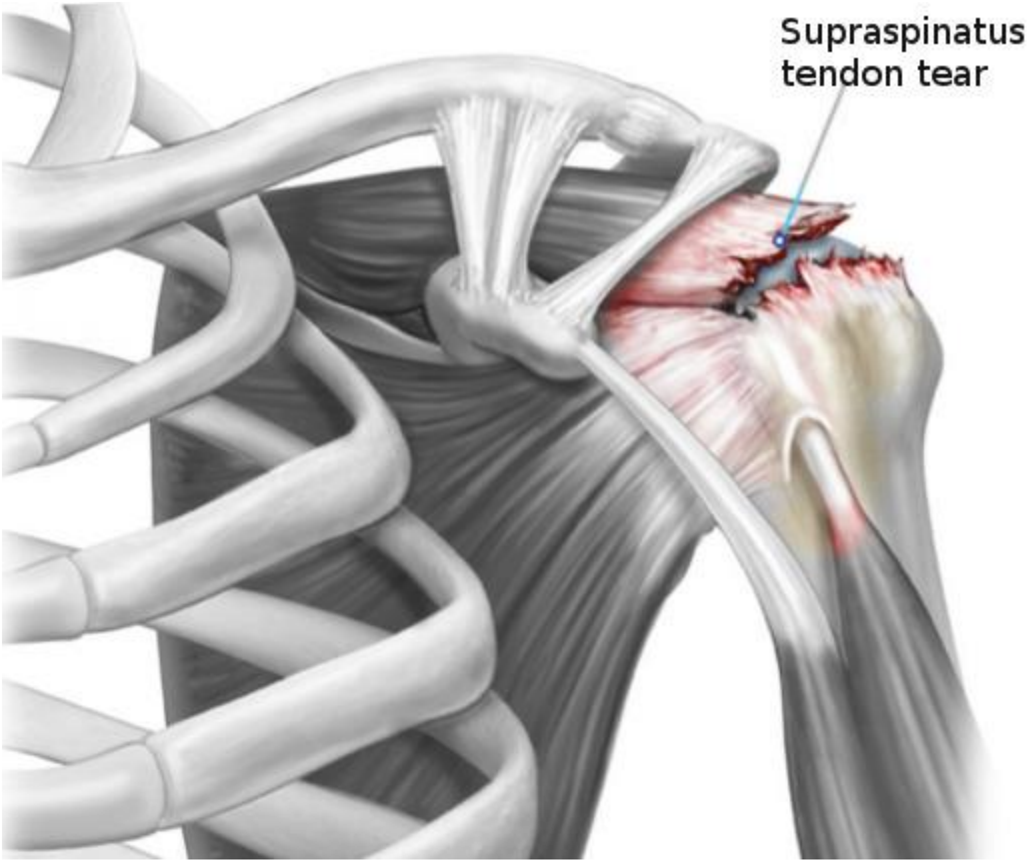


Fig 6: rotator cuff pathology

“Rotator cuff (RC) Tendinitis/Tendinosis”

“Acute or chronic tendinopathic conditions that result from a vulnerable environment for the RC secondary to repetitive eccentric forces and predisposing anatomical/mechanical risk factors.

Shoulder Impingement

A clinical term often used nonspecifically to describe patients experiencing pain/symptoms with overhead activities. It is best to subdivide shoulder impingement into internal and external conditions”:

“Internal impingement:[28] common in sportsmen that throw objects above, such javelin throwers and baseball pitchers. When the shoulder is in maximum abduction and external rotation, the cuff impinges at the posterior/lateral articular side, abducting the posterior/superior glenoid” rim and labrum (the "late cocking" phase of throwing).

- “The term "thrower's shoulder" refers to a common set of anatomic adaptive changes that occur over time in this subset of athletes.
- These adaptive changes include but are not limited to increased humeral retroversion and posterior capsular tightness.
- Glenohumeral internal rotation deficit (GIRD) is a condition resulting from these anatomic adaptations, and GIRD is known to predispose the thrower's shoulder to internal impingement”.

External impingement: A phrase that is used interchangeably with SIS. Subacromial bursitis and bursal-sided injuries to the RC are caused by external impingement (EI), which includes the etiology of external compressive causes (such as the acromion).[29]

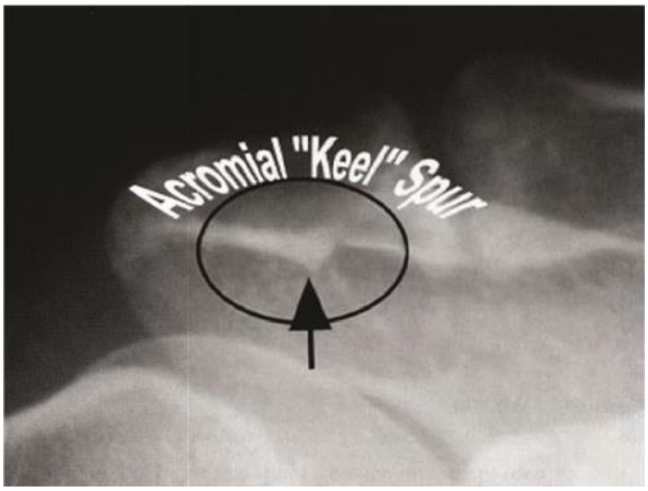
RADIOLOGICAL FINDINGS

PLAIN X RAY OF SHOULDER

Fig 7: plain x ray of left shoulder showing roator cuff pathology

All individuals suspected of having rotator cuff issues should have the four routine shoulder x-ray views taken. The larger tuberosity is examined for indications of cystic degeneration or sclerosis using the true anterior-posterior (AP) view. These results point to chronic rotator cuff inflammation and impingement. Furthermore, when proximal migration of the humeral head occurs in severe chronic cuff illness, the acromiohumeral distance may be smaller than in the opposite shoulder. There may be calcifications around the posterior portion of the greater tuberosity and adaptive alterations or acetabularization of the acromion if the tuberosity comes into touch with the acromion's undersurface.

On the AP view, a subacromial "keel" is another somewhat uncommon but crucial discovery. This term is used to describe those odd, aggressive spurs that are located beneath the acromion and resemble a sailboat's keel. They start on the a”romion's anterior edge, halfway between the lateral border and the AC joint, and extend posteriorly” until halfway under the acromion. Most frequently observed in young and middle-aged women, these "keel" spurs seriously harm the bursal side of the cuff if left in place.



<u>Fig 8: acromial keel in x ray</u>

MRI OF SHOULDER

Fig 9: MRI showing intact supraspinatus tendon

On the coronal picture, a normal, healthy supraspinatus tendon seems to taper gradually and has an intermediate to low tendon signal.

Coronal imaging may be the best way to evaluate the condition of the cuff tendon. A healthy tendon "has a parallel, smoothly tapering fiber orientation that extends from the muscle to the tuberosity on a T1 picture, and it appears thick and robust on a T2 imaging (Fig. 17-19)". The tendon may be edematous and probably partially torn if the fiber arrangement is asymmetrical and it looks bulbous or swollen close to the bone attachment (Fig. 17-20). A thin tendon that resembles a string should be taken seriously because it may be steadily degenerating and, even if it is not completely retracted, it may provide very little tissue for regeneration.

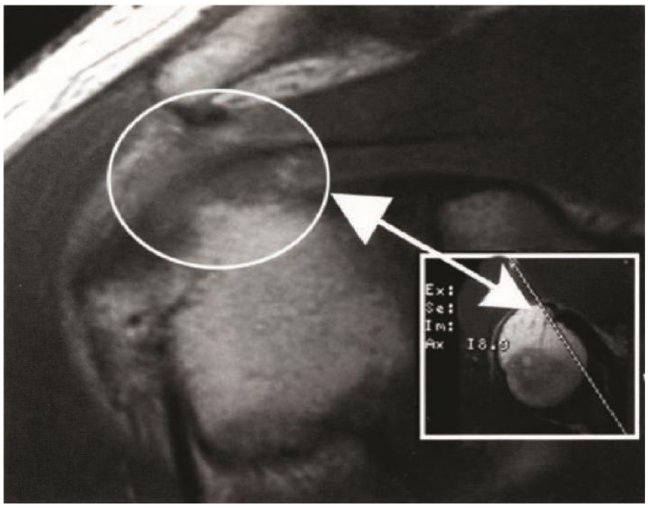


Fig 10: A swollen supraspinatus tendon attachment appears bulbous on the anterior coronal MRI cuts.

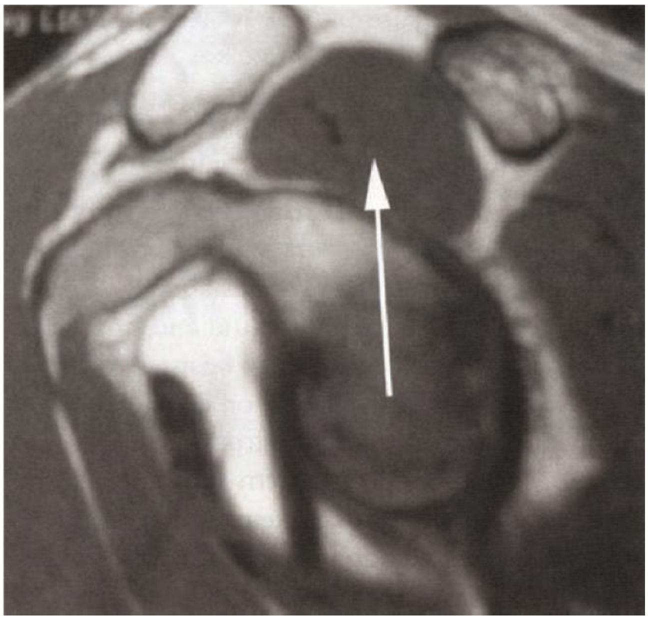


Fig 11: saggital section of MRI showing healthy supraspinatus

On the sagittal MRI, the bony suprascapular fossa should almost be filled by the healthy supraspinatus muscle. A neurologic issue or serious tendon damage should be suspected “if there is significant atrophy of the supraspinatus, infraspinatus, or subscapularis muscle bellies. These muscles clearly suggest chronic dysfunction. There should be little fatty signal around the rotator cuff muscles, which should appear uniform.” The muscle should occupy almost all of the bone space on the sagittal oblique projection, depending on the patient's age. The supraspinatus fossa may completely lack normal muscle signal in cases of severe chronic cuff pathology, which frequently indicates a poor prognosis for surgical operations. When determining whether big rotator cuff tears can be repaired, the Goutallier classification of atrophy has become increasingly prominent.

TABLE 17-1 Goutallier Atrophy Classification	
"Stage 0	Completely normal muscle, no fat
Stage 1	Muscle shows some fatty streaking
Stage 2	Significant fatty infiltration, but there is more muscle than fat
Stage 3	Fat is equal to muscle
Stage 4	More fat than muscle"

Fig 12: Goutaliier atrophy classification

On the coronal oblique sequence, large full-thickness tears are clearly detected, but smaller tears are more difficult to spot unless tendon's end is retracted or elevated from the tuberosity and there is fluid in between

<u>Fig 13: MRI showing atrophic supraspinatus muscle</u>

<u>Fig 14: MRI showing hyperintensity and supraspinatus complete tear with retraction</u>

TREATMENT

The first attempt at therapy should be conservative, using NSAIDs and, most importantly, physical therapy. Both acute and chronic full-thickness injuries are treated surgically with arthroscopy since waiting too long can lead to severe muscle atrophy, tendon retraction, and less successful surgical outcomes.

ARTHROSCOPY

Over the past ten years, shoulder arthroscopy has seen tremendous change. Studies in basic science have shed important light on the pathoanatomy of frequent incapacitating injuries and the mechanisms by which surgical techniques fail. "Newer minimally invasive and biomechanically proved surgical techniques have replaced less-than-ideal procedures, and treatment algorithms have changed in tandem with the findings of cadaveric, biomechanical, and clinical investigations. Newer biomaterials, delivery systems, and biomechanically" better fixation implants have all been made possible by advancements in medical technology. Traditional open surgeries have been effectively supplanted by a new frontier of endoscopic extra-articular procedures brought about by advancements in surgical skills and technical capabilities.

Arthroscopy for Rotator cuff tears

Recent advancements in three crucial areas have led to advances in the treatment of rotator cuff injuries and the arthroscopic management of large, potentially irreparable rips:

Rotator cuff repairs and healing:

Emerging technologies include arthroscopic delivery methods and bioinductive scaffolds may improve the healing potential of large and partial rotator cuff injuries. "Decellularized human skin allograft and amnion matrix cord scaffolds were found to have advantages over the bovine collagen patch, and biological scaffolds improved the healing of articular-sided" partial-thickness supraspinatus tears in a preclinical canine model as compared to debridement.[31] A 2-year follow-up of big and enormous rotator cuff surgeries enhanced with a bio-inductive collagen scaffold patch revealed no implant-related adverse events and a 96% radiological healing rate.[32] “A bioinductive collagen scaffold was proven to be safe and effective for treating intermediate- to high-grade partial-thickness rotator cuff injuries of the supraspinatus tendon in a multicenter prospective trial”.[33]

Rotator cuff repair and autograft augmentation

In order to replicate the superior capsular restriction and to concurrently augment the rotator cuff while undergoing surgery, biceps autograft augmentation has been utilized. In certain instances, “the proximally attached long head of the biceps tendon was utilized as an autograft to supplement inferior tissue in posterosuperior tendons in cases of extensive, potentially irreversible rips. [34] The infraspinatus tendon remained healed at 24 months in three-fourths of the repair group, the patch-augmented group, and 100% of the biceps autograft group, according to a recent study that examined the structural and clinical results of three surgical techniques for massive posterosuperior tears: double-row repair, transosseous-equivalent repair with absorbable patch reinforcement, and Superior Capsular Reconstruction (SCR) with biceps autograft. [35] When the biceps autograft was properly inserted distal on the greater tuberosity, it recentered the humeral head on the glenoid and offered stability in cases of cuff deficit, according to the biomechanical evaluation of the biceps autograft for SCR”. [36]

Superior Capsular Reconstruction

A number of methods using various reconstruction tissues are currently being used for arthroscopic superior capsular reconstruction (SCR), which has grown in popularity. According to clinical results employing a dermal allograft at two years, 72% of patients had satisfactory outcomes, 16% had graft failure, and 12% required revision to replacement.[37]

Although “the graft tear rate was found to be high (fascia lata autograft 5–32% and human dermal allograft 20–75%), a review of clinical outcomes comparing the two procedures in arthroscopic” SCR for irreparable rotator cuff tears indicated significant and clinically important improvements in clinical outcomes in both groups.[38]

ANESTHESIA AND POSITIONING IN SHOULDER ARTHROSCOPY

The risk associated with shoulder arthroscopy in the beach chair posture has been assessed in a number of studies. It was discovered that cerebral blood flow and cerebral oxygenation were impacted by "intravenous general anesthesia and controlled hypotension in the beach chair posture (65°); there were no neurological abnormalities and a 25% chance of cerebral desaturation episodes.[39] In a different trial, symptomatic hypotensive bradycardic episodes in the beach chair posture were linked to pre-operative interscalene brachial plexus (BP) block and advanced age.[40] brain oxygenation was found to be impacted by the beach chair position angle, and as the position angle increased, brain oxygenation decreased linearly".[41] With no concrete proof that one posture is better than the other, the current guidelines for patient positioning during shoulder arthroscopic procedures indicate that beach chairs and lateral positions are both safe and effective options.[42]

EMERGING FRONTIERS IN ARTHROSCOPY

ENDOSCOPIC EXTRA-ARTICULAR PROCEDURES

A recent development in arthroscopy is shoulder "endoscopy," which entails performing surgery in the shoulder's extra-articular areas. Technically, the procedures are difficult, and there is a chance of iatrogenic consequences.

BRACHIAL PLEXUS ENDOSCOPY

Lafosse et al. have found notable functional improvements in a subset of patients with non-specific neurogenic thoracic outlet syndrome after describing an all-endoscopic approach for infra- and supraclavicular brachial plexus (BP) neurolysis.[43] In addition to reporting an all-endoscopic resection of an infraclavicular BP schwannoma, the authors speculate that endoscopy might be a useful technique in certain instances of BP nerve sheath tumors.[44]

ENDOSCOPIC PROXIMAL HUMERAL PLATE REMOVAL

Following proximal humerus fracture fixation, endoscopic implant removal may be done in conjunction with arthrolysis. These methods offer several benefits over traditional open implant removal and entail endoscopic dissection in the subdeltoid and upper arm regions. [45, 46]

SCAPULOTHORACIC ENDOSCOPY

A novel two-portal approach that employs intraoperative landmarks for precise orientation can be used for scapuloplasty and scapulothoracic endoscopy.[47] Most patients with snapping scapula syndrome report improvements in pain, crepitus, and range of motion after arthroscopic treatment; nevertheless, the majority still have lingering symptoms. Poorer outcomes were linked to older age, longer duration of symptoms, and lower pre-operative mental status score.[48, 49]

TENDON TRANSFERS

"Endoscopic harvest and transfer of tendons (latissimus dorsi, teres major, and pectoralis minor) have been described by several authors and are a minimally invasive alternative to open surgery".[50-52]

OFFICE-BASED NEEDLE ARTHROSCOPY

A novel minimally invasive diagnostic technique that eliminates the need for sophisticated imaging and lets the patient actively participate in the diagnostic process is in-office needle arthroscopy.[53] The technique has developed for application in surgery, and reports of single-portal labral and rotator cuff repairs have been made.[54, 55]

FUTURE TRENDS

Current research points to a future need for joint preservation and restoration operations, and arthroscopic methods and techniques are developing quickly. Larger Hill-Sachs lesions with little glenoid bone loss can probably be treated with arthroscopic procedures like remplissage since they are long-lasting and safe. [56] Although arthroscopic bone grafting has demonstrated benefits in terms of technique and results, the procedure is constrained by a high learning curve, and the rate of problems is independent of surgical expertise. [57] More clinical research is required to determine the potential benefits of bioinductive scaffolds in improving the healing rates of repaired tendons. In cases of irreversible rotator cuff injuries, SCR seems to be a way to avoid replacing the prosthesis; nonetheless, graft thickness is essential to achieving the intended outcomes of the initial treatment. In addition to being a desirable and economical option, mobilizing and repairing possibly irreparable rotator cuff injuries in conjunction with biceps autograft for augmentation offers the added benefit of protecting the cuff and superior capsule.[58]

OUTCOME ASSESSMENT

“The UCLA Shoulder Score and the Constant-Murley Shoulder Outcome Score are both used to evaluate shoulder conditions. Both scores combine objective and subjective measures, with a higher score indicating better shoulder function”

CONSTANT MURLEY SCORE:[59]

“The Constant-Murley score (CMS) is a 100-points scale composed of a number of individual parameters. These parameters define the level of pain and the ability to carry out the normal daily activities of the patient. The Constant-Murley score was introduced to determine the functionality after the treatment of a shoulder injury. The test is divided into four subscales: pain (15 points), activities of daily living (20 points), strength (25 points) and range of motion: forward elevation, external rotation, abduction and internal rotation of the shoulder (40 points). The higher the score, the higher the quality of the function.

Subjective findings (severity of pain, activities of daily living and working in different positions) of the participants are responsible for 35 points and objective measurements (AROM without pain, measurements exo -and endorotation via reference points and measuring muscle strength) are responsible for the remaining 65 points. The Constant-Murley score is used in almost every language without official translations. In French, a validated translation has been published. The time needed to complete the Constant-Murley test is between 5 to 7 minutes. This assessment is very intuitive and easy to understand for both patients and clinicians”.

Response options/scale.

“Pain item: 4 Likert levels or visual analog scale

0 = maximal pain, 15 = no pain

ADL: Likert scales

0 = worst and 5 = best

Mobility: Active, pain-free range of elevation: 2 points per 30°

0 = worst, 10 = best

Position of hand:0 = worst, 10 = best

Strength: Measured at 90° lateral abduction

1 point per 0.5 kg, maximum 25 points"

Use of the instrument:

The "Constant-Murley score is recommended by the European Society of Shoulder and Elbow Surgery (ESSE) as a thorough and comparable evaluation of shoulder function. The score is extensively used and recognized as the gold standard for evaluating shoulder function in the European community". In addition to recording specific indicators, the Constant-Murley score offers a functional evaluation that is generally clinical. Consequently, it is applicable regardless of the specifics of the radiological or diagnostic anomalies.

Age affects the Constant-Murley test's strength and scores, which both decline with patient age. Differences in strength and score are also connected to gender. The shoulder function of women over 40 and men over 60 may be overestimated when the relative Constant score is calculated using the original data. When using relative Constant scores—scores derived from a normal population of Constant original research that is matched by age and sex—absolute scores must be provided concurrently in order to facilitate comparison with other populations.

UCLA SHOULDER SCORING:[60]

One of the essential evaluation instruments for assessing shoulder function, especially in patients with rotator cuff disease, is the UCLA Shoulder Score. This scoring system, which was created at the University of California, Los Angeles, gives medical professionals a consistent way to evaluate patient outcomes and monitor development over the course of treatment.

Each of the five unique components that make up the score system helps to provide a thorough assessment of shoulder function. The evaluation of pain, which makes up a sizable amount of the final score, illustrates the enormous influence that rotator cuff injuries have on the comfort and quality of life of patients. Taking into account the frequency and intensity of pain experiences, the scoring system allots up to 10 points for pain evaluation. Another important factor is function, which is weighted at 10 points and looks at the patient's capacity to engage in everyday activities and carry out activities of daily living.

One objective metric that can add up to five points to the UCLA score is the measurement of active forward flexion. In order to shed light on the mechanical restrictions imposed by rotator cuff disease, this component particularly assesses range of motion in forward elevation. By measuring the power produced during this movement, which is frequently impaired in rotator cuff injuries, the strength of forward flexion—also measured at five points—complements the range of motion evaluation.

The last factor, patient satisfaction, which is worth five points, adds a subjective component that reflects the patient's viewpoint on their shoulder condition and the results of their treatment. This feature is especially helpful in comprehending how rotator cuff injuries and their treatment affect patients' quality of life in the real world. Higher scores indicate improved shoulder function and treatment results. The total score, which ranges from 0 to 35 points, offers a comprehensive assessment.

The UCLA score is very useful in a number of situations involving rotator cuff injury. It helps physicians measure the effect of the damage by establishing a baseline evaluation of shoulder function prior to surgery. The score makes it possible to systematically track progress during the rehabilitation phase, whether after conservative treatment or surgery. Monitoring changes across several domains offers important information about how well the selected treatment strategy is working.

The reliability of the UCLA score in evaluating rotator cuff disease has been repeatedly shown by research. Research has shown that UCLA ratings and patient-reported outcomes are strongly correlated, especially when it comes to rotator cuff repair. The scoring system is a useful tool for tracking recovery paths and spotting possible issues or setbacks in the rehabilitation process because of its flexibility.

It's crucial to recognize the UCLA score's limits, though. Although useful for clinical applications, the comparatively straightforward scoring method might miss some subtle facets of shoulder function. Furthermore, not all patient demographics or particular rotator cuff injury patterns will be exactly aligned with the component weights. Although supplementary assessment techniques have been developed as a result of these factors, the UCLA score is still the gold standard for evaluating shoulder function.

MATERIAL AND METHODS

- **Study design**: Hospital-based cross-sectional study
- **Study area**: Department of Orthopaedics at B.L.D.E. (Deemed to be University) Shri B.M. Patil Medical College, Hospital and Research Centre, Vijayapura, Karnataka, India.
- **Study period**: Research study was conducted from May 2023 to June 2024. Below is the work plan.
- **Sample size**: This study requires a total sample size of 22, so to achieve a power of 99% for detecting a difference in Means with 1% level of significance.

INCLUSION CRITERIA:

1. Age group: 18 years old and under 70 years old.
2. Full-thickness tears and partial thickness tears may be seen, according to an MRI report.

EXCLUSION CRITERIA:

1. Rotator cuff arthropathy
2. Concurrent shoulder pathology
3. Revision Rotator cuff repair.

METHODOLOGY:

Study Design and Setting

This prospective study was conducted in the Department of Orthopaedics at B.L.D.E. (Deemed to be University) Shri B.M. Patil Medical College, Hospital and Research Centre, Vijayapura, from March 2023 to November 2024. The study evaluated the clinical outcomes of patients undergoing arthroscopic rotator cuff repair.

Patient Selection and Recruitment

Patients diagnosed with rotator cuff tear through clinical examination and imaging studies were enrolled in the study after obtaining written informed consent. The diagnosis was established through comprehensive clinical examination and confirmed by magnetic resonance imaging (MRI) of the affected shoulder.

PRE-OPERATIVE ASSESSMENT

A thorough pre-operative evaluation was conducted for all patients, including:

- Detailed clinical examination
- Structured patient interview
- Complete documentation of pain patterns and functional limitations
- Range of motion measurements
- Strength testing

LABORATORY AND RADIOLOGICAL INVESTIGATIONS

Comprehensive pre-operative investigations included:

- Complete blood count
- Bleeding and clotting time
- Blood grouping and Rh typing
- Liver and renal function tests
- Random blood sugar
- Viral markers (HIV, HBsAg, HCV)
- Routine urine analysis
- MRI of the affected shoulder

- Plain radiographs of the shoulder
- Chest X-ray
- ECG and 2D Echo for cardiac evaluation

SURGICAL INTERVENTION

All patients underwent standardized arthroscopic rotator cuff repair performed by experienced shoulder surgeons. The surgical technique was documented in detail, including tear pattern, repair method, and any additional procedures performed.

FOLLOW-UP PROTOCOL

Patients were followed up regularly at specific intervals:

- 6 weeks post-operation
- 3 months post-operation
- 6 months post-operation

At each follow-up visit, detailed assessment was performed using two standardized scoring systems:

1. **UCLA Scoring System**, which evaluated:

- Pain (scale 1-10)
- Function (scale 1-10)
- Active forward flexion (scale 1-5)
- Strength
- Patient satisfaction

Section 1 - Pain

- Present always and unbearable; strong medication frequently
- Present always but bearable' strong medication occasionally
- None or little at rest' present during light activities; salicylates used frequently
- Present during heavy or particular activities only; salicylates used occasionally
- Occasional and slight
- None

Section 2 - Function

- Unable to use limb
- Only light activities possible
- Able to do light housework or most activities of daily living
- Most housework, shopping, and driving possible; able to do hair and to dress and undress, including fastening bra
- Slight restriction only; able to work above shoulder level
- Normal activities

Section 3 - Active forward flexion

- 150°
- 120°-150°
- 90°-120°
- 45°-90°
- 30°-45°
- <30°

Section 4-Strength of forward flexion (manual muscle testing)

- Grade 5 (normal)
- Grade 4 (good)
- Grade 3 (fair)
- Grade 2 (poor)
- Grade 1 (muscle concentration)
- Grade 0 (nothing)

Section5 - Satisfaction of patient

- Satisfied and better
- Not satisfied and worse

Total UCLA Shoulder score is: 0

<u>Fig 15: UCLA scoring system</u>

Constant Scoring System, which assessed:

- Pain
- Activities of daily living
- Range of motion
- Forward flexion (scale 0-10)
- Combined active external rotation
- Combined active internal rotation
- Strength measurements

Constant Score

Subjective Shoulder Assessment (35 total points)

Criteria	Points	Patient Score
Pain (15 points)		
None	15	= 15
Mild	10	
Moderate	5	
Severe	0	
Activities of daily living (10 points)		
Ability to work	0-4	= 4
Ability to engage in recreational activities	0-4	= 4
Ability to sleep	0-2	= 2
Ability to work at a specific level (10 points)		
Waist	2	
Chest	4	
Neck	6	
Head	8	
Above head	10	= 10

Objective Shoulder Assessment (65 points)

Criteria	Points	
Flexion and abduction (scored separately)		
>150	10	Flexion= 10
121°-150°	8	Adbuction= 10
91°-120°	6	
61°-90°	4	
31°-60°	2	
0°-30°	0	
Combined active external rotation (10 points)		
Hand behind head, elbow forward	2	= 2
Hand behind head, elbow back	2	= 2
Hand on top of head, elbow forward	2	= 2
Hand on top of head, elbow back	2	= 2
Full elevation from top of head	2	2
Combined active internal rotation (10 points)		
Interscapular region	10	= 10
Inferior tip of scapula	8	
Twelfth rib	6	
Lumbosacral junction	4	
Buttock	2	
Lateral thigh	0	
Strength (25 points)	1/lb	= 25

Score

100

Fig 16: constant scoring system

Outcome Assessment

Clinical outcomes were evaluated based on:

- Pain reduction
- Functional improvement
- Range of motion recovery
- Patient satisfaction
- Return to activities
- Complications and revision rates

The UCLA and Constant scores were calculated at each follow-up visit to track progress systematically. Any complications or need for revision surgery were documented throughout the follow-up period.

Data Collection and Management

All patient data was recorded in standardized forms, including:

- Demographic information
- Pre-operative clinical findings
- Surgical details
- Post-operative progress
- Complications
- Follow-up scores

Quality Control Measures

To ensure standardization:

- All clinical assessments were performed by trained orthopedic surgeons
- Standard protocols were followed for scoring system implementation

- Regular calibration of measurement tools was maintained
- Systematic documentation procedures were followed

STATISTICAL ANALYSIS

- Data was entered in excel sheet and analyzed using SPSS version 21. Results were presented in tabular and graphical forms Mean, median, standard deviation and ranges were calculated for quantitative data. Qualitative data were expressed in terms of frequency and percentages. Student t test (Two Tailed) was used to test the significance of mean and P value <0.05 was considered significant.

SURGICAL TECHNIQUE

In each case, a preoperative dose of ceftriaxone + sulbactam(1.5 g) is administered as a preventive antibiotic measure.

In our study, patient was positioned in the lateral decubitus position, with the affected arm suspended with required amount of traction in the 70-degree abduction and 10-degree forward flexion position.

Under ascetic precautions brachial block with general anaesthesia was given.

Fig 17: Positioning of patient.

SKIN MARKINGS

With arm prepared and suspended in traction, the supraclavicular fossa is marked bordered anteriorly by the clavicle and the AC joint, posteriorly by the spine of the scapula and laterally by the acromion. Surgeon should draw landmarks & portals to make sure the portals are positioned appropriately.

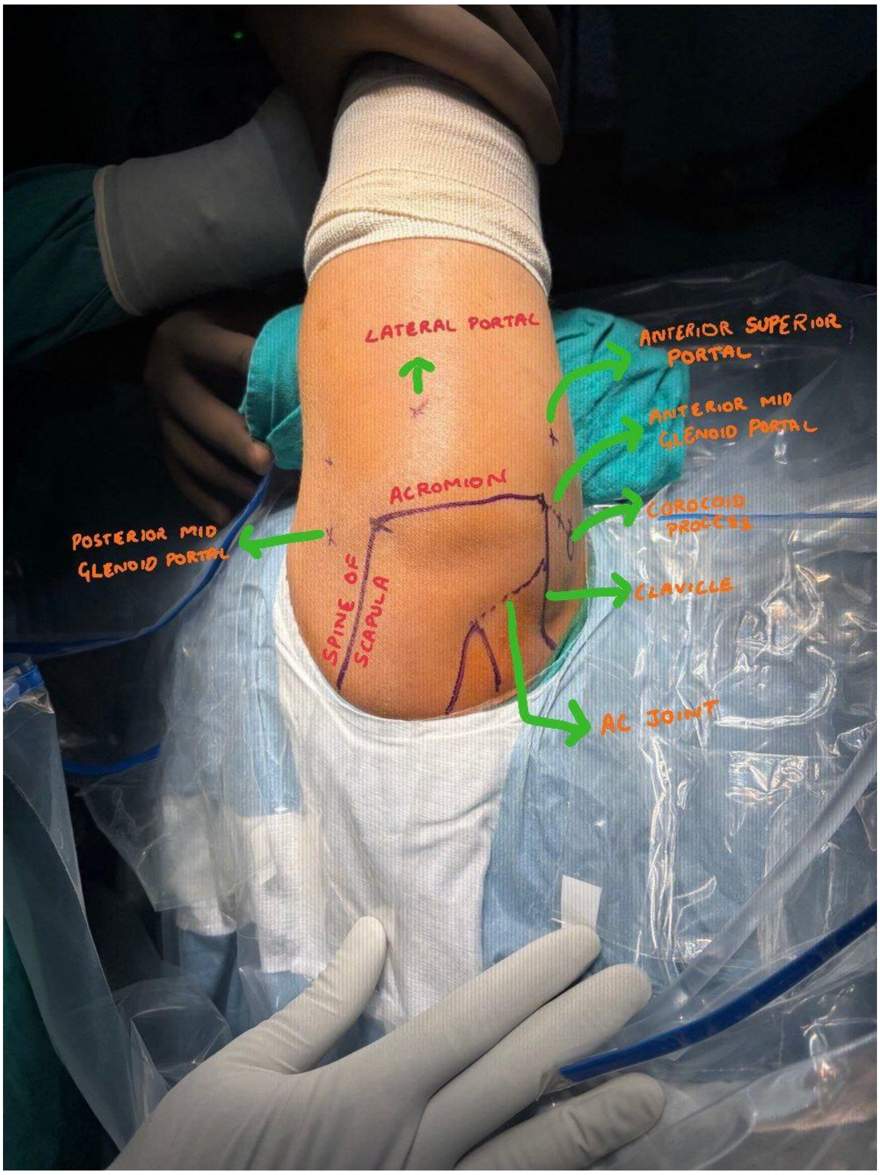


Fig 18: skin marking arthroscopy portals

POSTERIOR MIDGLENOID PORTAL: The first step in performing the 15-point evaluation of the glenohumeral joint is to create the posterior mid-glenoid portal (PMGP) by inserting an arthroscopic cannula. the entry point is approximately 2 to 3 cm inferior and 1 to 2 cm medial from the posterolateral acromial angle

ANTERIOR MIDGLENOID PORTAL: An anterior portal must be created before performing the glenohumeral arthroscopy in order to allow use of a probe and later to complete the second part of the diagnostic examination. To establish the AMGP, pass the tip of the arthroscope into the anterior triangle between the biceps and subscapularis tendons, angle the tip of the scope 20 degrees superior and lateral, and hold it against the anterior capsule. Remove the scope from the sheath and insert a taper-tipped guide rod into the cannula. Push it through the soft tissues to puncture the anterior capsule and tent the skin. Back out the guide rod a few milimeters and make a stab incision in the area of the tip, which should be located approximately 3 cm inferior and 2 cm medial to the anterior edge of the acromion.

ANTERIOR-SUPERIOR PORTAL: If it is determined that an ASP is needed, insert a spinal needle into the skin 1 cm off the anterior lateral corner of the acromion into the joint through the rotator cuff interval so that it enters just anterior to the biceps tendon. Angle the needle to approach the anchor point of the biceps anchor area by passing on the posterior side.

DIAGNOSTIC ARTHROSCOPY

TABLE 3-1 15-Point Anatomy Review

Steps 1–10: Visualizing from the Posterior Portal

1. Biceps tendon and superior labrum
2. Posterior labrum and posterior capsule recess
3. Inferior axillary recess and inferior capsular insertion to the humeral head
4. Inferior labrum and glenoid articular surface
5. Supraspinatus tendon of rotator cuff
6. Posterior rotator cuff insertion and bare area of the humeral head
7. Articular surface of humeral head
8. Anterior-superior labrum, superior and middle glenohumeral ligaments, and subscapularis tendon
9. Anterior-inferior labrum
10. Anterior-inferior ligament

Steps 11–15: Viewing from the Anterior Portal

11. Posterior glenoid labrum and capsule insertion into the humeral head
12. Posterior rotator cuff including infraspinatus and the supraspinatus tendons
13. Anterior glenoid labrum and inferior glenohumeral ligament attachments to the humeral head
14. Subscapularis tendon and recess and middle glenohumeral ligament attachment to the labrum
15. Anterior surface of humeral head with subscapularis attachment and biceps tendon passage through the rotator interval

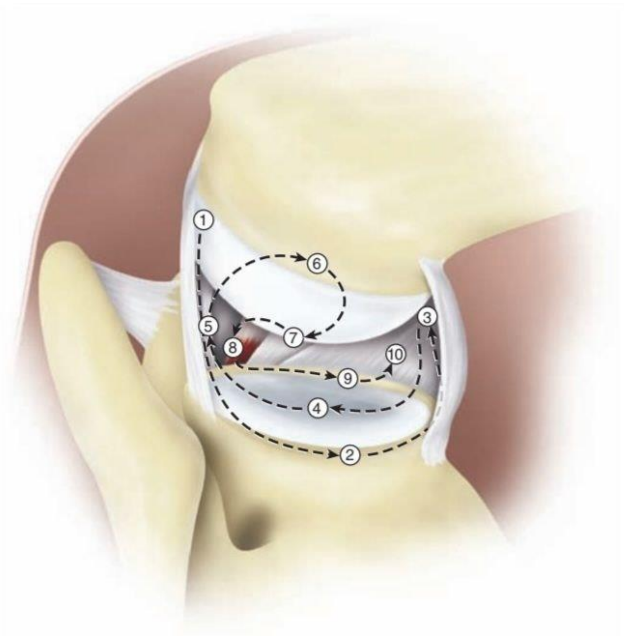
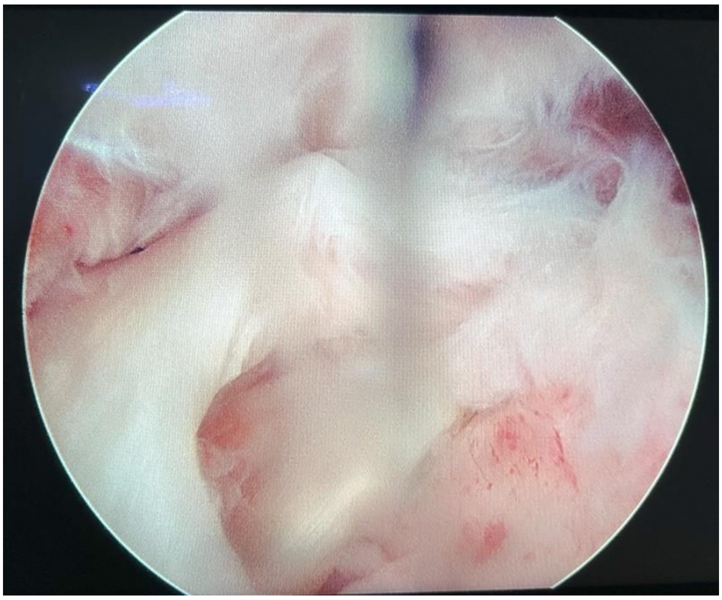
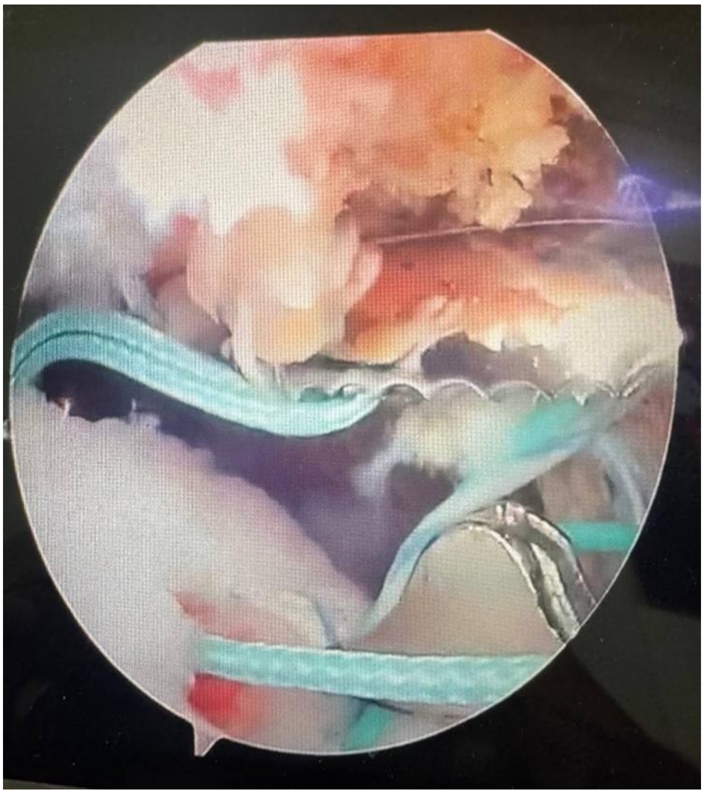


Fig 19: diagnostic arthroscopy



<u>Fig 20: Intraoperative finding of supraspinatus tendon tear.</u>



<u>Fig 21: spectrum gun used to take bites of rotator cuff.</u>

STEPS PERFORMED TO FIX THE SUTURE ANCHOR

- "The needle should be directed at the insertion site for the anchors 5 mm away from the edge of the cartilage. This insertion position will ensure that the sutures are in the optimal position to cause the least amount of tension at the suture–tendon interface (6–8). The angle of incidence to the bone for anchor placement is crucial, and should be like a "tent peg" of 45 degrees into the dense subchondral bone
- Seating the anchor 2 to 3 mm below the cortical surface allows for a "halo" of open space around the eyelet that permits bone marrow to escape from the anchor socket to improve healing.
- 1-mm microfracture bone awl is used to create the vent holes in the tuberosity, beginning a few millimeters away from the anchor pilot holes.
- Insert the anchor through the same small accessory portal used for the punch. Screw it through the muscle and seat the tip in the pilot hole. Align the screw-in anchor so that it follows the direction of the pilot hole at the "tent peg" angle of approximately 45 degrees below the subchondral bone.
- Using the spectrum gun, suture is fixed to it and bites are taken.
- Load the Shuttle with the suture outside the anterior cannula, and carry it back through the cuff from bottom to top and out of the PMGC.
- Tie the sutures with a sliding locking knot followed by three alternating half-hitches. Cut the suture tails 3mm from the knots".

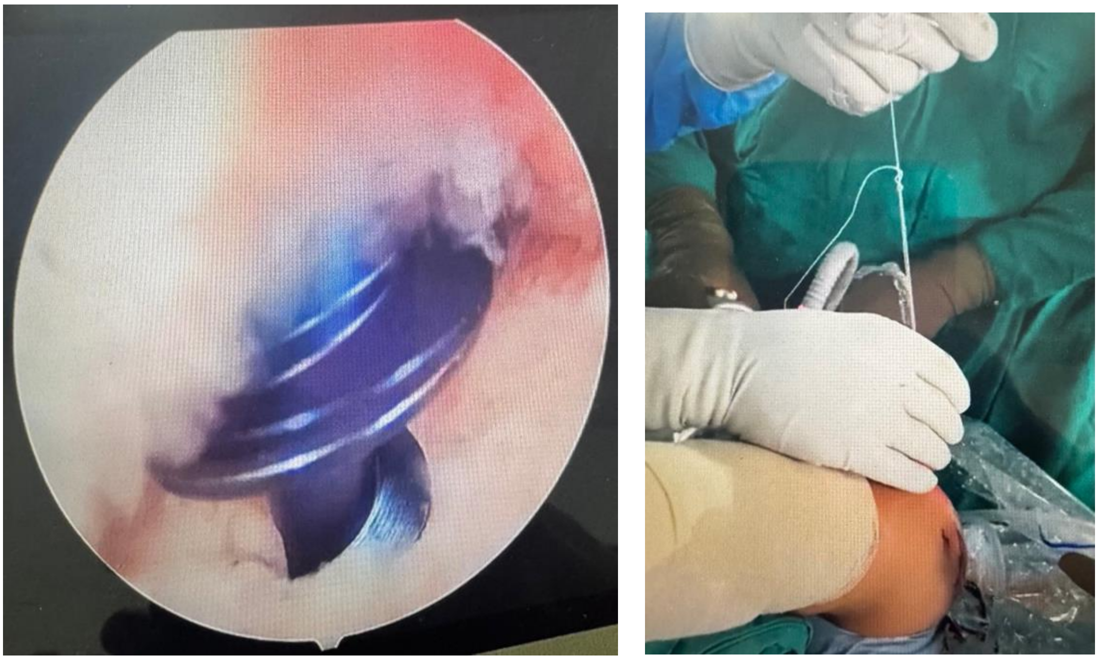


Fig 22: Showing suture anchor placement and locking sliding knot fixation.

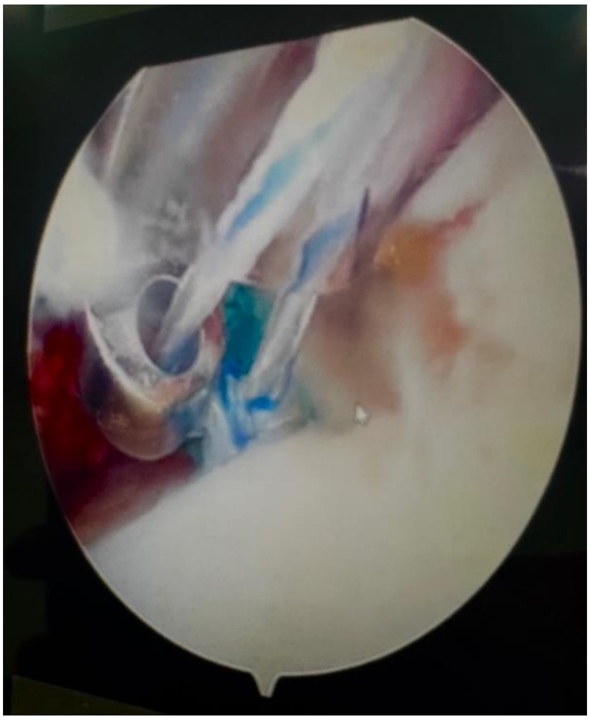


Fig 23: sliding locking knot followed by three alternating half-hitches

POST OPERATIVE PROTOCOL

PHASE I: IMMEDIATE POST-OP (WEEKS 1-6)

- **Primary Goal**: Protect the tendon repair and promote healing
- **Sling Use**: Continuously worn during the day and night with abduction pillow (30-45°)
- **Restrictions**: No active movement of surgical arm, no weight bearing, no overhead reaching
- **Permitted Activities**: Hand, wrist, elbow AROM (no elbow ROM for 4 weeks if biceps tenodesis performed), scapular mobility exercises with sling
- **Progression Criteria**: Appropriate healing, adherence to precautions, pain control

PHASE II: PASSIVE ROM (WEEKS 6-10)

- **Primary Goal**: Minimize stiffness while protecting repair
- **Sling Use**: Gradually removed with surgeon clearance
- **Restrictions**: No active ROM, no aggressive passive ROM, no internal rotation, no weight bearing
- **Exercises**:
    - Supine passive shoulder elevation (0-100°)
    - Seated passive external rotation (0-30°)
    - Table slides and pendulums
    - Scapular exercises without sling (retraction, elevation, depression)
- **Progression Criteria**: 100-120° passive forward elevation, 25-45° passive external rotation, 90° passive abduction

PHASE III: ACTIVE ASSISTED & ACTIVE ROM (WEEKS 10-18)

- **Active Assisted ROM** (Weeks 10-14):
  - Supine AAROM with cane/stick (flexion, abduction, external rotation)
  - Progress from supine to 45° incline (week 11) to upright (week 12)
  - Wall slides and walks (start week 12)
- **Active ROM** (Weeks 14-18):
  - Standing and side-lying shoulder external rotation
  - Active forward reach and shoulder elevation
- **Isometric Exercises** (Weeks 14-18):
  - Submaximal isometrics for flexion, extension, internal/external rotation
  - Standing rows
- **Progression Criteria**: >140° passive forward elevation, >120° active forward elevation without compensation, normal external rotation

PHASE IV: INITIAL STRENGTHENING (WEEKS 18-22)

- **Primary Goal**: Gradually restore strength with full ROM
- **Restrictions**: No lifting >5 lbs, no sudden movements
- **Exercises**:
  - Stretching: Pectoralis, internal rotation, external rotation, cross-body, sleeper stretch
  - Strengthening: Prone W/Y/T/I, rows, resisted IR/ER, forward punch, biceps/triceps exercises
  - Rhythmic stabilization in quadruped position
- **Progression Criteria**: Full pain-free ROM with normal mechanics, pain-free ADLs

PHASE V: ADVANCED STRENGTHENING (WEEKS 22-26)

- **Primary Goal**: Restore maximal strength, power, and endurance
- **Restrictions**: No lifting >10 lbs, no overhead lifting, no sudden pushing/lifting
- **Exercises**:
    - External rotation at 45° and 90° abduction
    - Internal rotation at 90° abduction
    - Full can exercises (limited to 1-2 lbs)
    - PNF diagonal patterns, dynamic hug
    - Push-up progression (wall → counter → floor)
- **Progression Criteria**: Full pain-free ROM, 4+/5 strength, normalized scapulothoracic movement

PHASE VI: RETURN TO SPORT (WEEKS 26-30)

- **Primary Goal**: Safe return to work, recreation, or athletic activities
- **Exercises**:
    - Daily home stretching program
    - 3x/week strengthening with cardiovascular warm-up
    - Activity-specific progression
- **Return Criteria**: 85-90% strength compared to contralateral side
- **Note**: Return to sport decisions should be individualized based on demand level, sport type, and frequency of participation, with surgeon consultation

CASE ILLUSTRATIONS

- A 44 year old male diagnosed with left shoulder full thickness supraspinatus and infraspinatus tear and underwent arthroscopic supraspinatus and infraspinatus repair using double row

Fig 24: Pre-operative x-ray

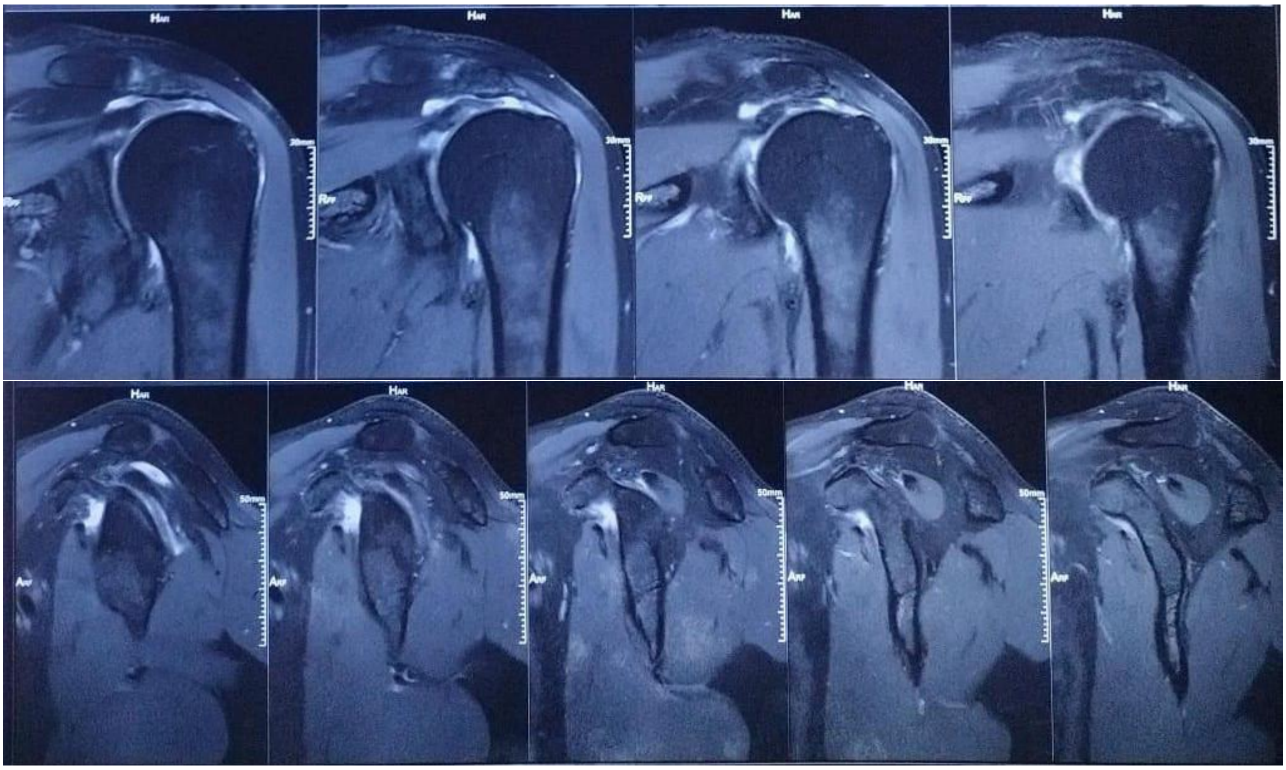
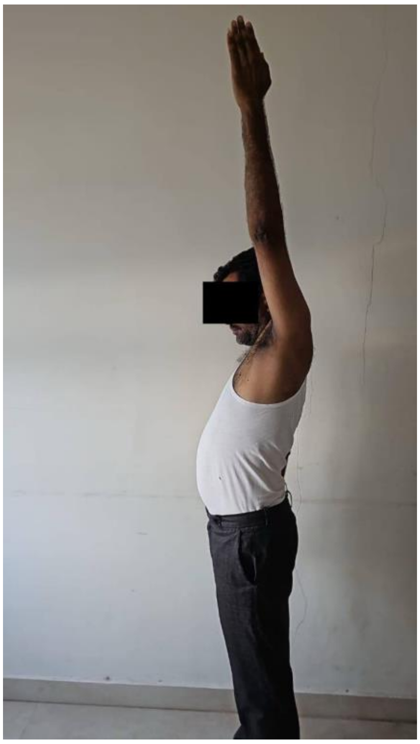


Fig 25: pre op MRI

26a **26b** **26c**



26d **26e** **26f**

<u>Fig 26: Clinical pictures of post-op patient.</u>

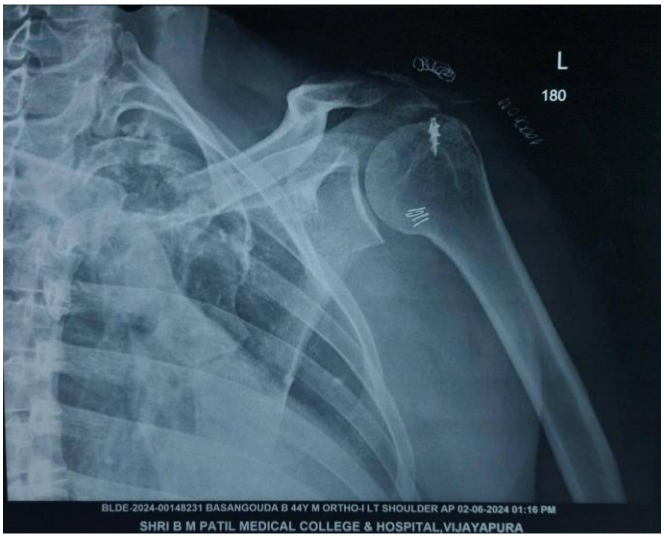


Fig 27: Post-operative x ray of supraspinatus and infraspinatus repair

RESULTS

This prospective study evaluated the clinical outcomes of arthroscopic rotator cuff repair in 22 patients.

Table 1: Distribution of patients according to age

Age (in years)	Frequency	Percentage
30-40	7	31.8%
41-50	8	36.4%
51-60	6	27.3%
61-70	1	4.5%
Total	**22**	**100%**

This table shows the age distribution of the 22 patients who underwent arthroscopic rotator cuff repair. The largest group was patients aged 41-50 years, comprising 36.4% (8 patients) of the total. This was followed by the 30-40 years age group with 31.8% (7 patients), then the 51-60 years group with 27.3% (6 patients). Only one patient (4.5%) was in the 61-70 years age group. This distribution suggests that rotator cuff tears requiring surgical intervention occur predominantly in middle-aged adults, with the majority (68.2%) of patients falling between 30-50 years of age.

Figure 1: Distribution of patients according to age

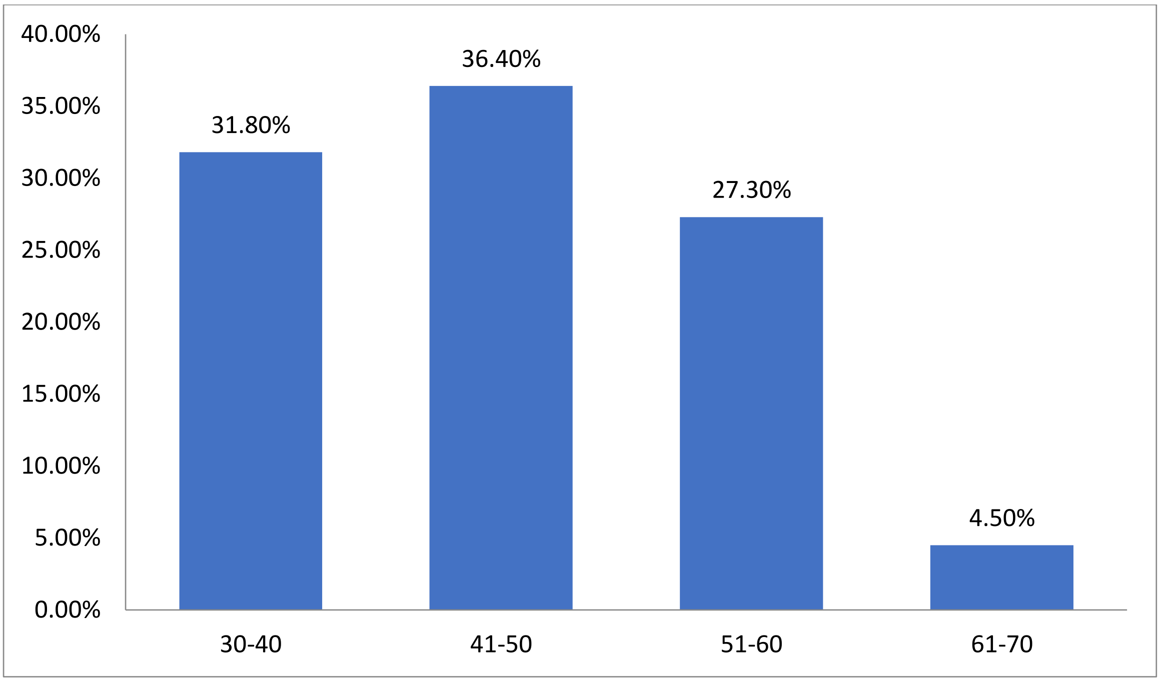


Table 2: Distribution of patients according to gender

Gender	**Frequency**	**Percentage**
Female	11	50%
Male	11	50%
Total	**22**	**100%**

The gender distribution in this study was perfectly balanced, with 11 males (50%) and 11 females (50%). This equal distribution suggests that gender may not be a significant factor in the incidence of rotator cuff tears requiring surgical repair in this particular patient population.

Figure 2: Distribution of patients according to gender

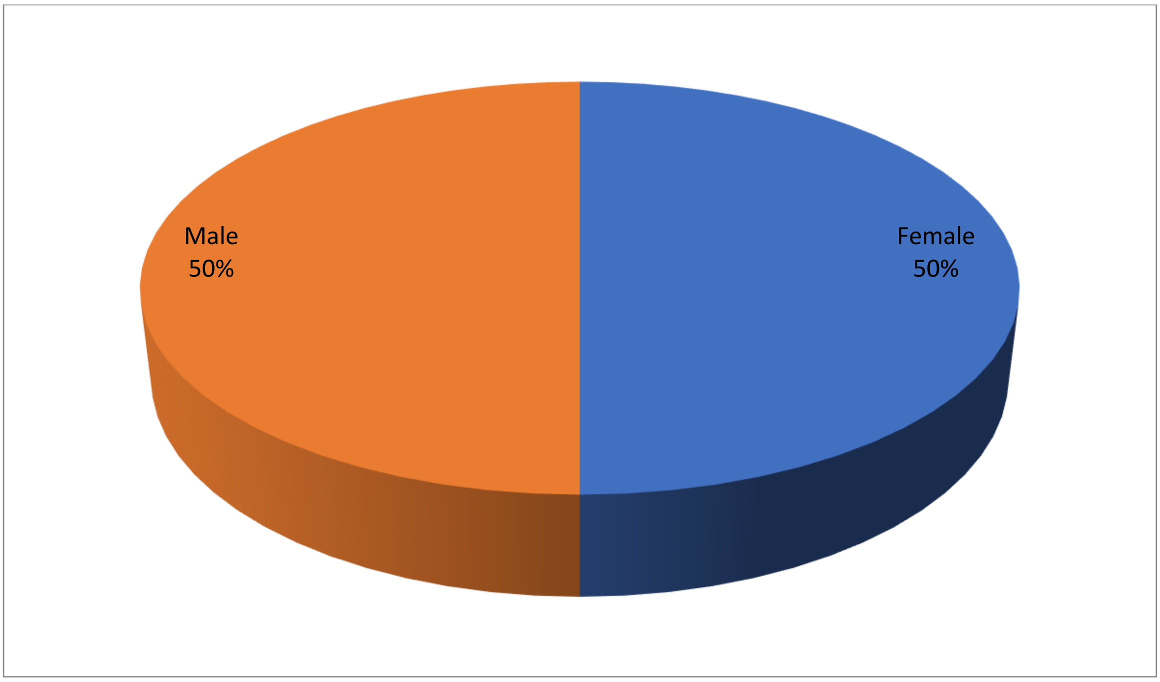


Table 3: Distribution of patients according to laterality

Laterality	Frequency	Percentage
Left	10	45.5%
Right	11	50%
Bilateral	1	4.5%
Total	**22**	**100%**

This table shows which shoulder was affected in the study population. Right shoulder involvement was slightly more common at 50% (11 patients), while left shoulder involvement occurred in 45.5% (10 patients). Only one patient (4.5%) had bilateral involvement affecting both shoulders. The slight predominance of right shoulder involvement may be related to hand dominance, as most people are right-handed and dominant shoulders may be more susceptible to rotator cuff injuries.

Figure 3: Distribution of patients according to laterality

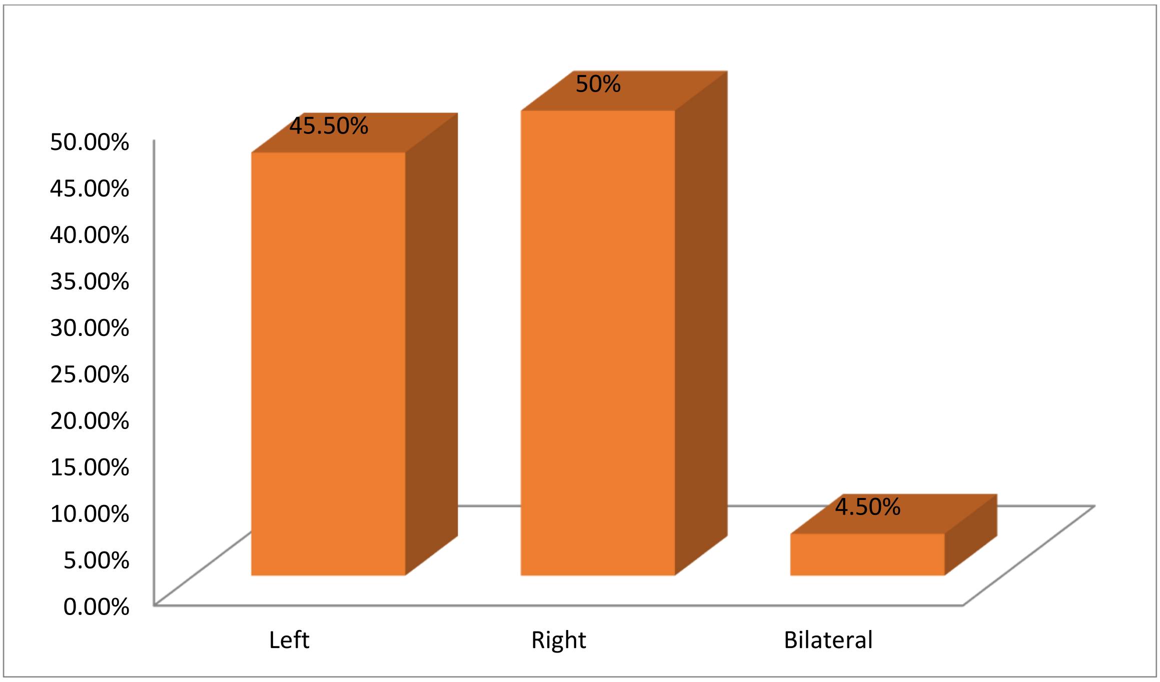


Table 4: Distribution of patients according to tendon involved

tendon involved	Frequency	Percentage
Subscapularis	1	4.5%
Supraspinatus	17	77.3%
Supraspinatus+infraspinatus	3	13.6%
Supraspinatus+ Subscapularis	1	4.5%
Total	**22**	**100%**

This table details which specific rotator cuff tendons were involved in the tears. The supraspinatus tendon was by far the most commonly affected, being involved in 77.3% of cases (17 patients) as an isolated tear. Combined tears involving both supraspinatus and infraspinatus tendons occurred in 13.6% of cases (3 patients). The combination of supraspinatus and subscapularis tears was seen in only one patient (4.5%), as was isolated subscapularis involvement (4.5%). These findings align with the typical pattern of rotator cuff pathology, where the supraspinatus tendon is most vulnerable to injury.

Figure 4: Distribution of patients according to tendon involved

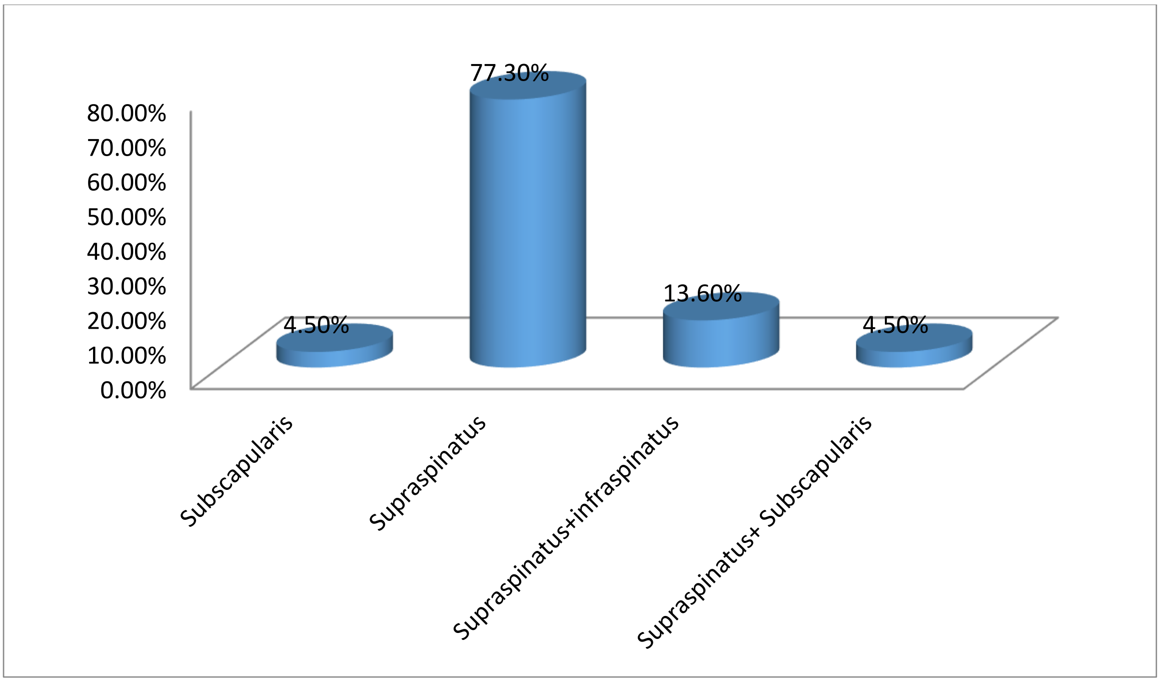


Table 5: Distribution of patients according to type of tear

Type of tear	**Frequency**	**Percentage**
Partial	3	13.6%
Complete	19	86.4%
Total	**22**	**100%**

This table categorizes the tears as either partial or complete. The vast majority of patients (86.4%, 19 patients) had complete tears, while only 13.6% (3 patients) had partial tears. This suggests that in this patient population, complete rotator cuff tears were the predominant indication for arthroscopic repair.

Figure 5: Distribution of patients according to type of tear

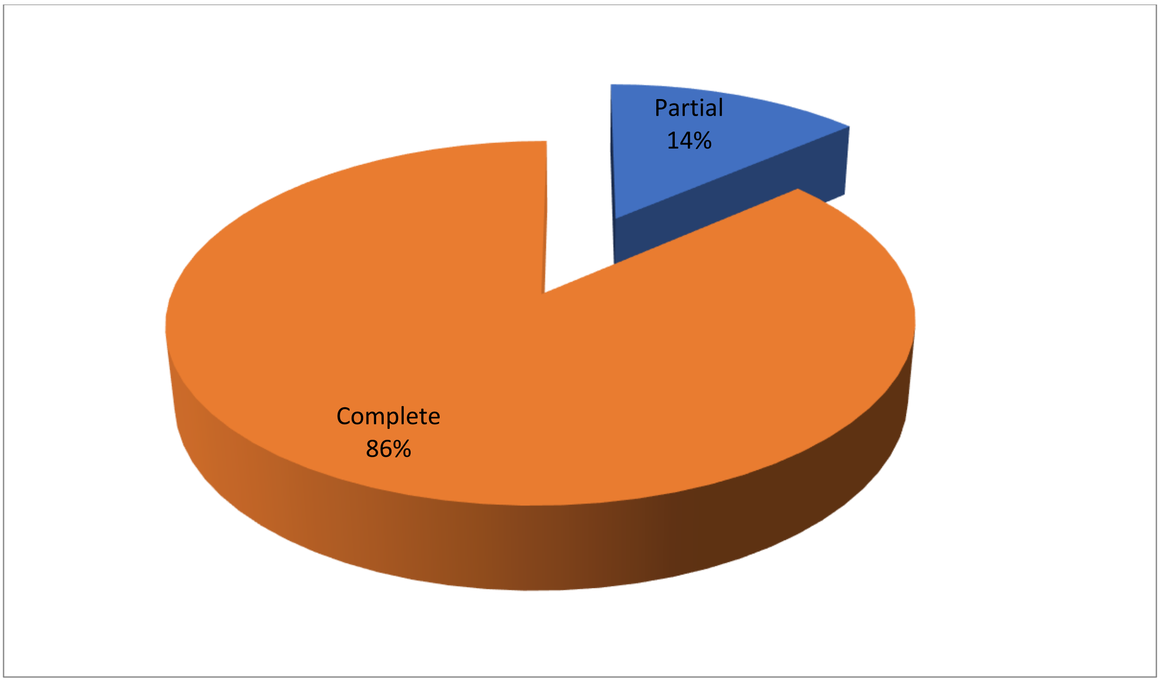


Table 6: Distribution of patients according to additional findings

Additional findings	Frequency	Percentage
Biceps tendon tear	1	4.5%
Pasta lesion	2	9.1%
Absent	19	86.4
Total	**22**	**100%**

This table documents other pathologies found during the arthroscopic procedure. Most patients (86.4%, 19 patients) had no additional findings beyond the rotator cuff tear. PASTA lesions (Partial Articular Supraspinatus Tendon Avulsion) were found in 9.1% (2 patients), and biceps tendon tear was present in 4.5% (1 patient). These findings indicate that while rotator cuff tears can occur in isolation, they sometimes coexist with other shoulder pathologies.

Figure 6: Distribution of patients according to additional findings

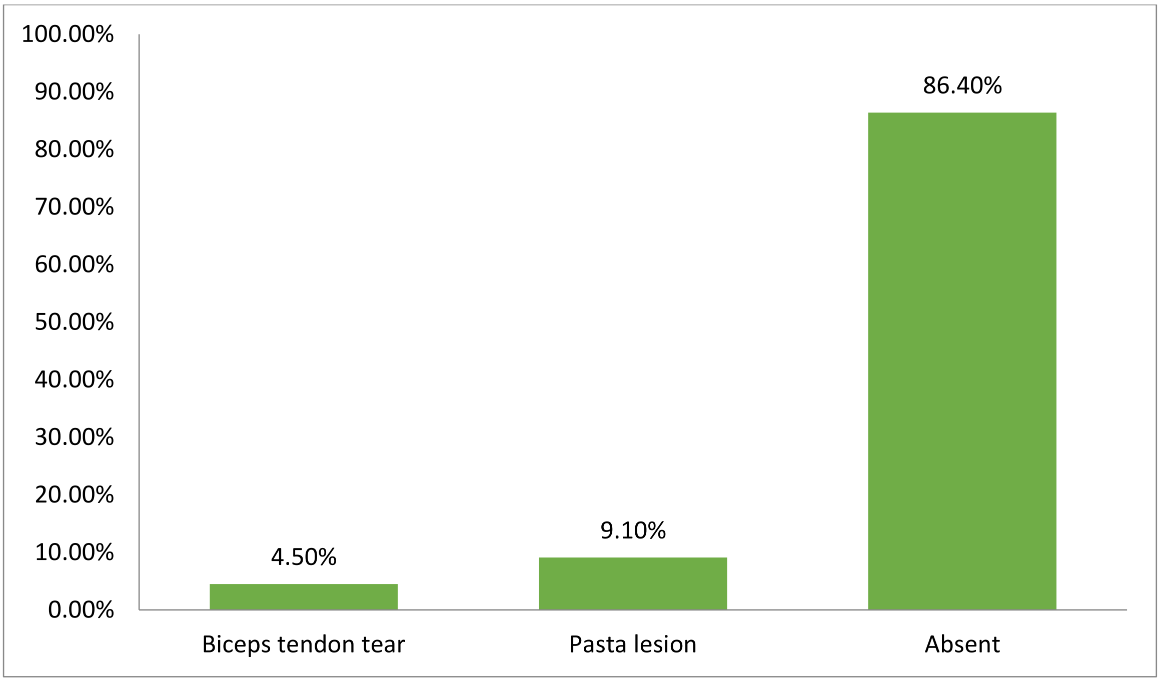


Table 7: Distribution of patients according to mechanism of injury

Mechanism of injury	Frequency	Percentage
Degenerative	12	54.5%
Traumatic	10	45.5%
Total	**22**	**100%**

This table categorizes the etiology of the rotator cuff tears. Degenerative tears, resulting from age-related wear and tear, were slightly more common at 54.5% (12 patients). Traumatic tears, resulting from acute injury, accounted for 45.5% (10 patients). This distribution reflects the two main pathways for rotator cuff injury: gradual degeneration over time and acute traumatic events.

Figure 7: Distribution of patients according to mechanism of injury

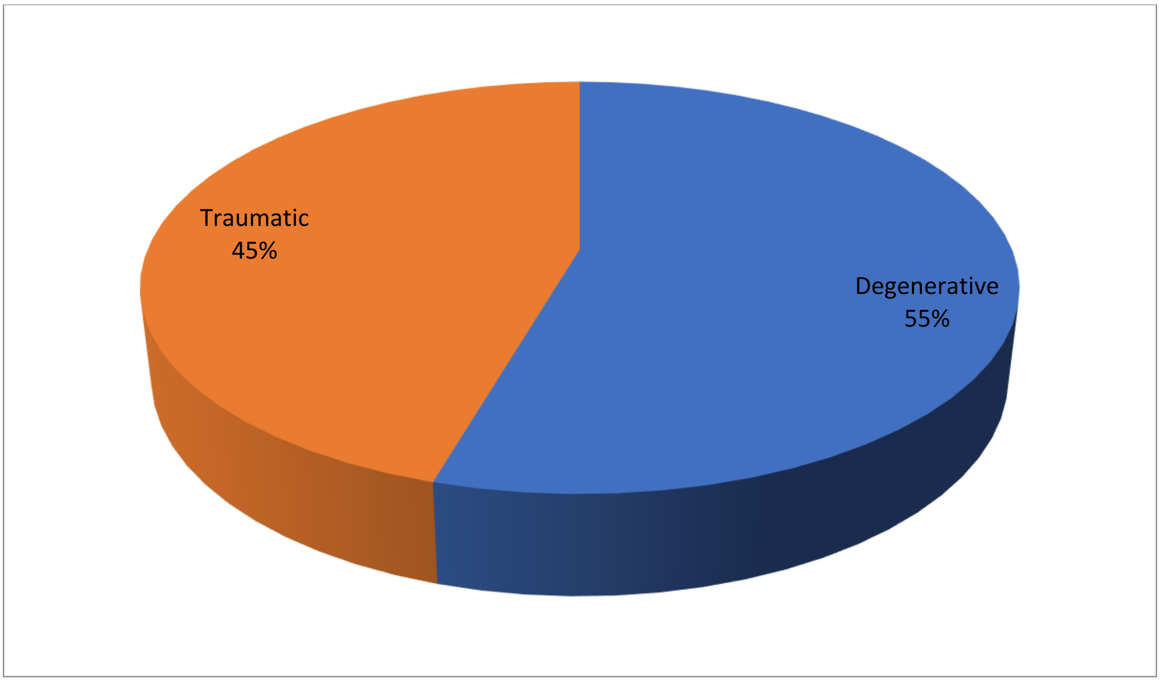


Table 8: Distribution of patients according to size of tear

Size of tear	Frequency	Percentage
Large	2	9.1%
Massive	6	27.3%
Medium	6	27.3%
Small	8	36.4%
Total	**22**	**100%**

This table classifies the tears by size. Small tears were the most common, accounting for 36.4% (8 patients). Medium and massive tears each comprised 27.3% (6 patients) of cases. Large tears were the least common at 9.1% (2 patients). This distribution shows a range of tear sizes in the study population, with a slight predominance of smaller tears.

Figure 8: Distribution of patients according to size of tear

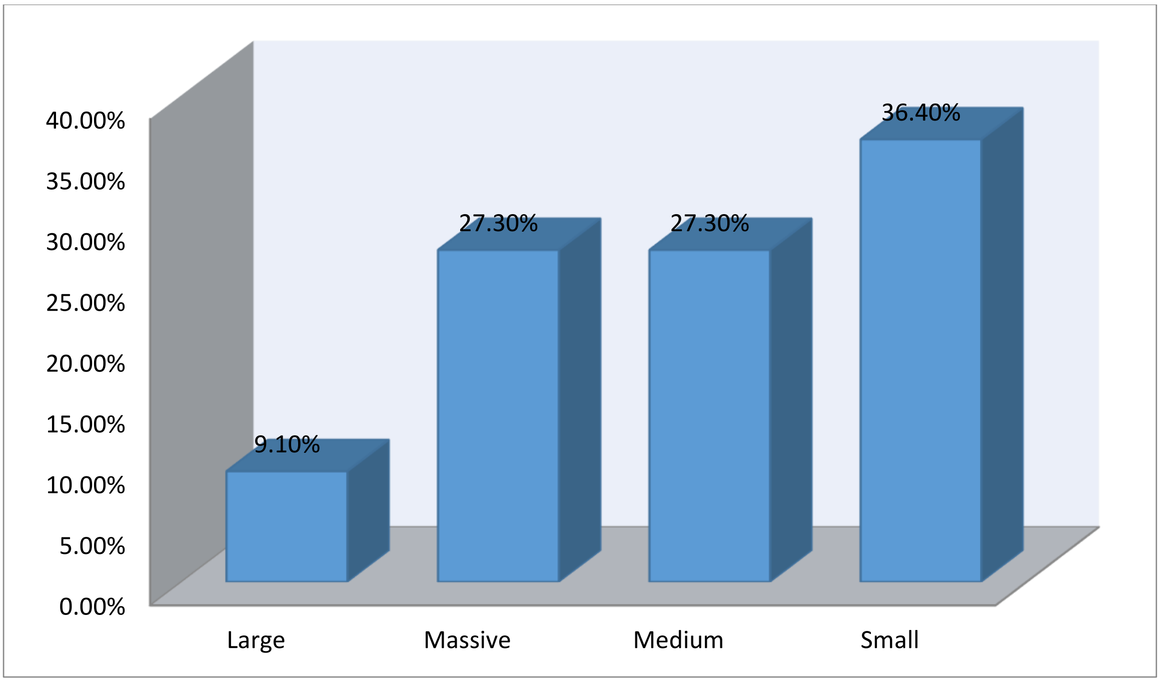


Table 9: Distribution of patients according to shape of tear

shape of tear	Frequency	Percentage
Crescent	11	50%
L-shaped	8	36.4%
U-shaped	3	13.6%
Total	**22**	**100%**

This table categorizes the morphology of the tears. Crescent-shaped tears were the most common at 50% (11 patients), followed by L-shaped tears at 36.4% (8 patients). U-shaped tears were the least common at 13.6% (3 patients). The shape of the tear is an important consideration for surgical planning and technique selection.

Figure 9: Distribution of patients according to shape of tear

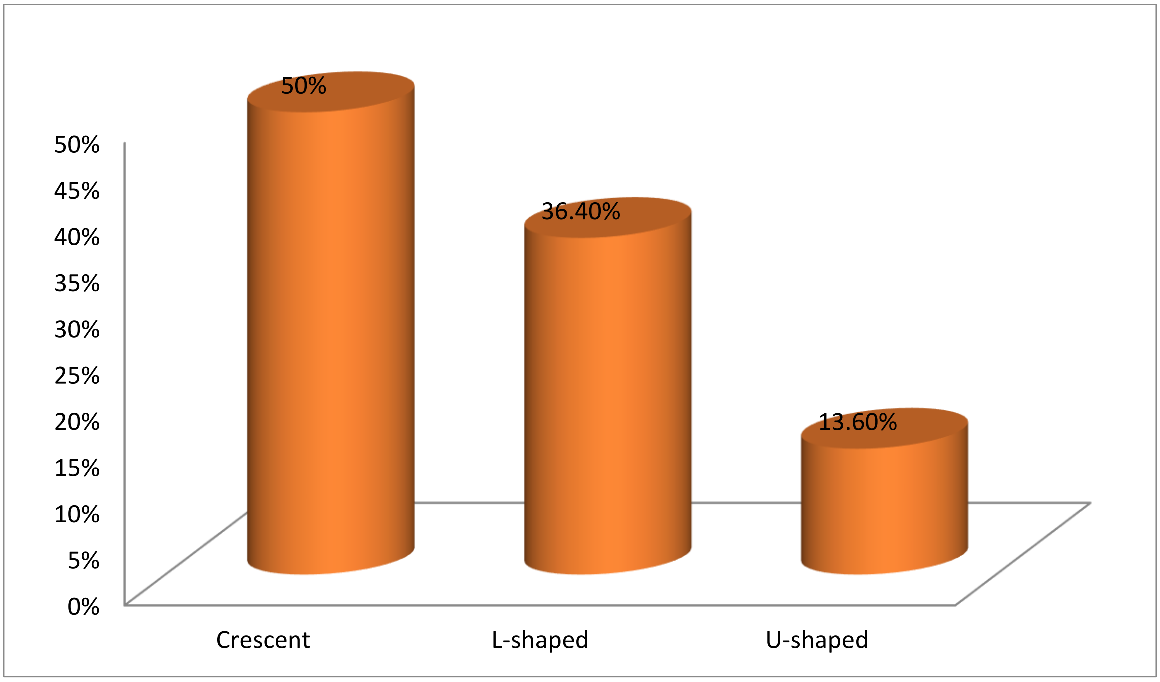


Table 10: Distribution of patients according to number of anchors used

Number of anchors used	**Frequency**	**Percentage**
1	4	18.2%
2	7	31.8%
3	8	36.4%
4	2	9.1%
5	1	4.5%
Total	**22**	**100%**

This table shows how many anchors were used during the repair procedure. Three anchors were used most frequently (36.4%, 8 patients), followed by two anchors (31.8%, 7 patients). One anchor was used in 18.2% (4 patients), four anchors in 9.1% (2 patients), and five anchors in 4.5% (1 patient). The number of anchors typically correlates with the size and complexity of the tear being repaired.

Figure 10: Distribution of patients according to number of anchors used

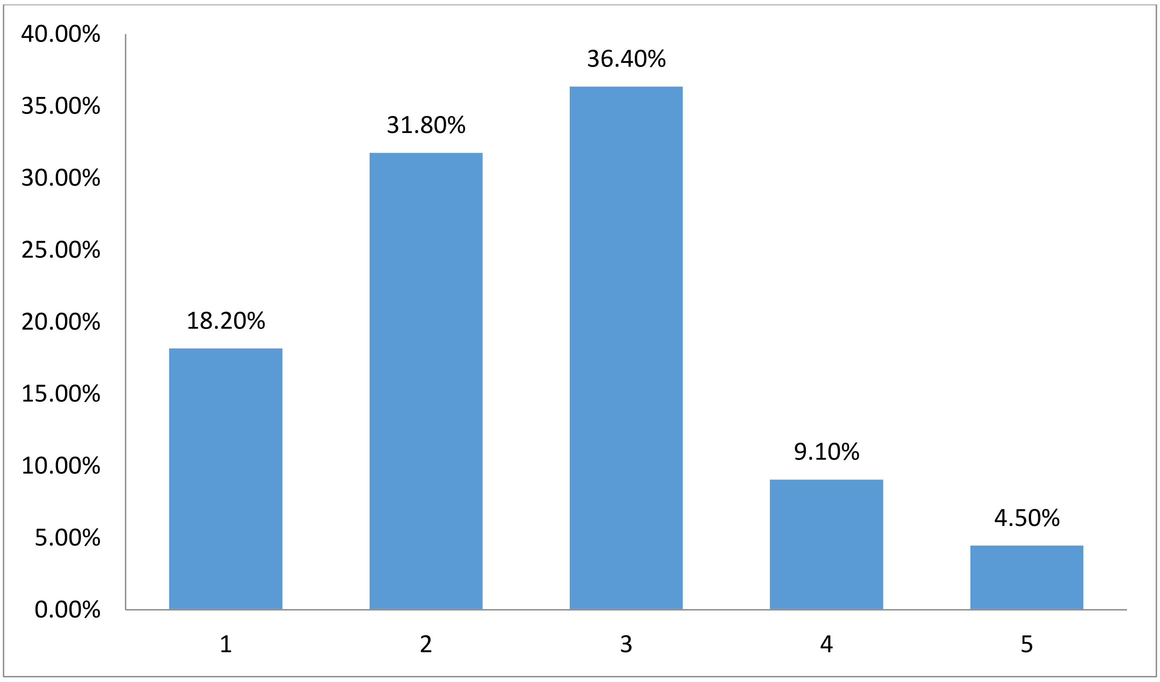


Table 11: Distribution of patients according to technique used

technique used	Frequency	Percentage
Double row	12	54.6%
Single row	10	45.4%
Total	**22**	**100%**

This table shows the surgical technique employed for repair. Double-row repair was used in 54.6%

of cases (12 patients), while single-row repair was used in 45.4% (10 patients). The choice between these techniques typically depends on the size, shape, and location of the tear, as well as surgeon preference.

Figure 11: Distribution of patients according to technique used

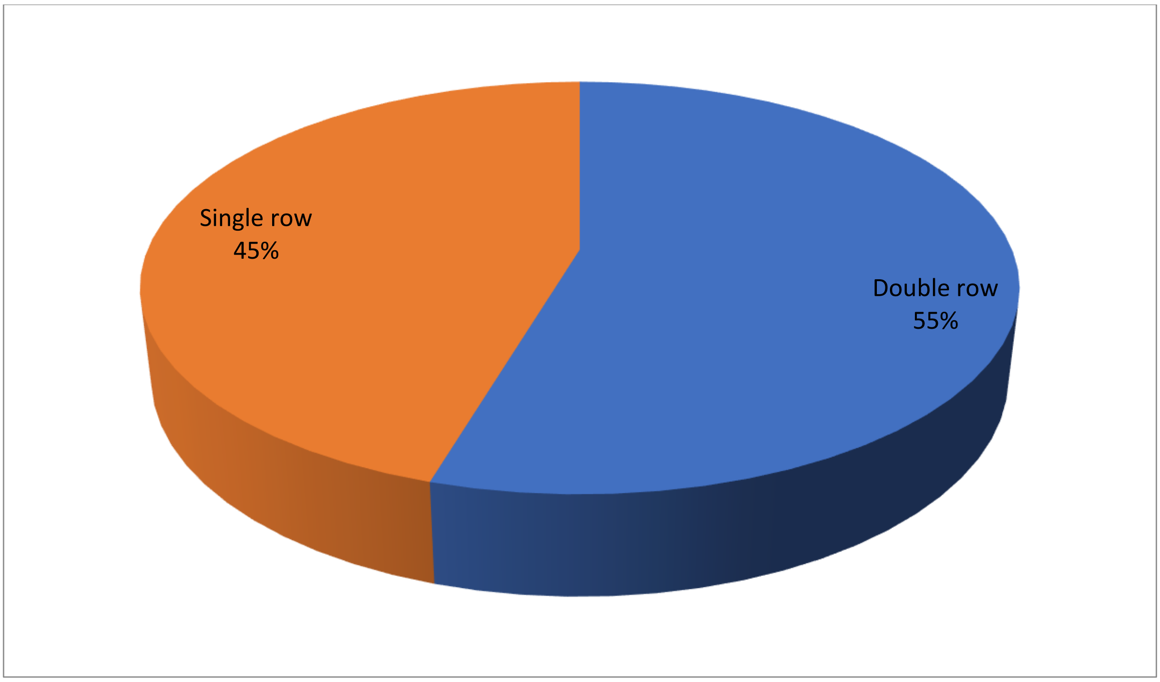


Table 12: Distribution of patients according to UCLA scores at different intervals

UCLA scores	Preoperative	At 6 weeks	At 3 months	At 6 months
Poor (<20)	19 (86.4%)	16 (72.7%)	4 (18.2%)	-
Fair (21-27)	3 (13.6%)	6 (27.3%)	14 (63.6%)	7 (31.8%)
Good (28-33)	-	-	4 (18.2%)	14 (63.6%)
Excellent (>33)	-	-	-	1 (4.5%)
p-value		0.26	**<0.001**	**<0.001**

This table tracks functional outcomes using the UCLA (University of California, Los Angeles) shoulder rating scale at different time points. Preoperatively, most patients (86.4%, 19 patients) had poor scores (<20), with only 13.6% (3 patients) having fair scores (21-27). At 6 weeks post-surgery, improvement was minimal with 72.7% still in the poor category. By 3 months, significant improvement was seen ($p<0.001$) with 63.6% in the fair category and 18.2% achieving good scores. At 6 months, further improvement was evident with 63.6% having good scores and 4.5% achieving excellent scores. No patients remained in the poor category at 6 months. These results demonstrate progressive functional improvement over time following rotator cuff repair.

Figure 12: Distribution of patients according to UCLA scores at different intervals

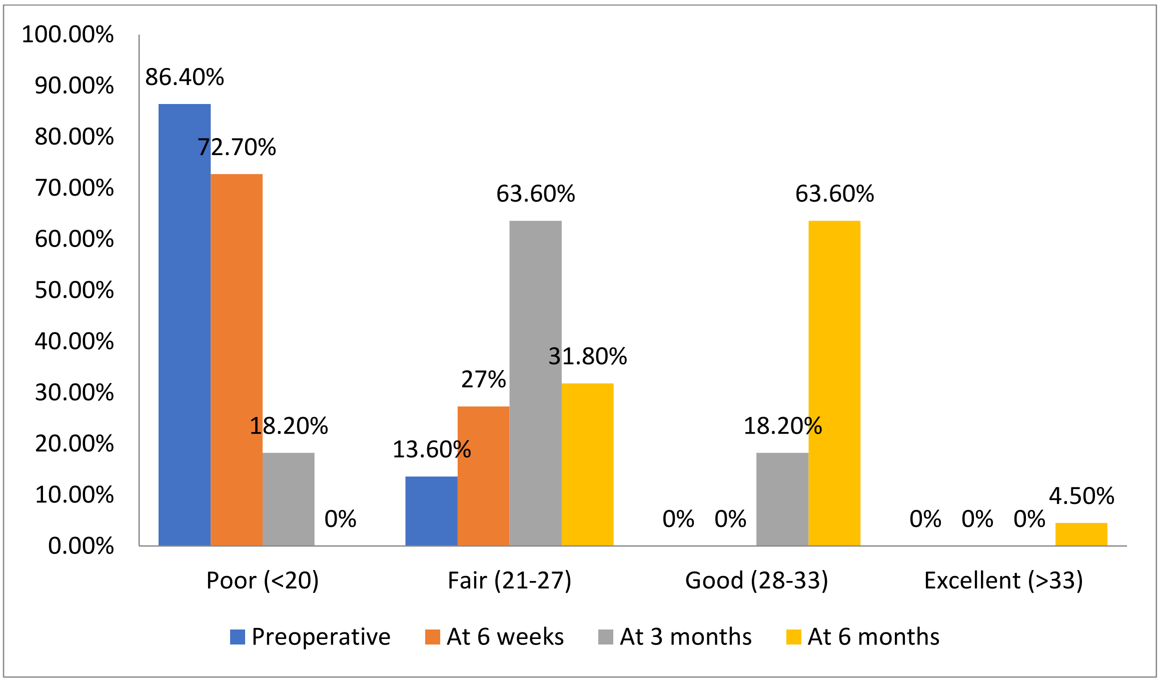


Table 13: Distribution of patients according to Constant scores at different intervals

Constant scores	Preoperative	At 6 weeks	At 3 months	At 6 months
Poor (0-55)	19 (86.4%)	3 (13.6%)	-	-
Fair (56-70)	3 (13.6%)	17 (77.3%)	5 (22.7%)	-
Good (71-85)	-	2 (9.1%)	17 (77.3%)	12 (54.5%)
Excellent (86-100)	-	-	-	10 (45.5%)
p-value		**<0.001**	**<0.001**	**<0.001**

This table tracks functional outcomes using the Constant shoulder score at different time points. Preoperatively, most patients (86.4%, 19 patients) had poor scores (0-55), with only 13.6% (3 patients) having fair scores (56-70). At 6 weeks, significant improvement was seen ($p<0.001$) with 77.3% in the fair category and 9.1% achieving good scores. By 3 months, further improvement occurred with 77.3% having good scores. At 6 months, 54.5% had good scores and 45.5% achieved excellent scores. These results show progressive and statistically significant improvement in shoulder function over time.

Figure 13: Distribution of patients according to Constant scores at different intervals

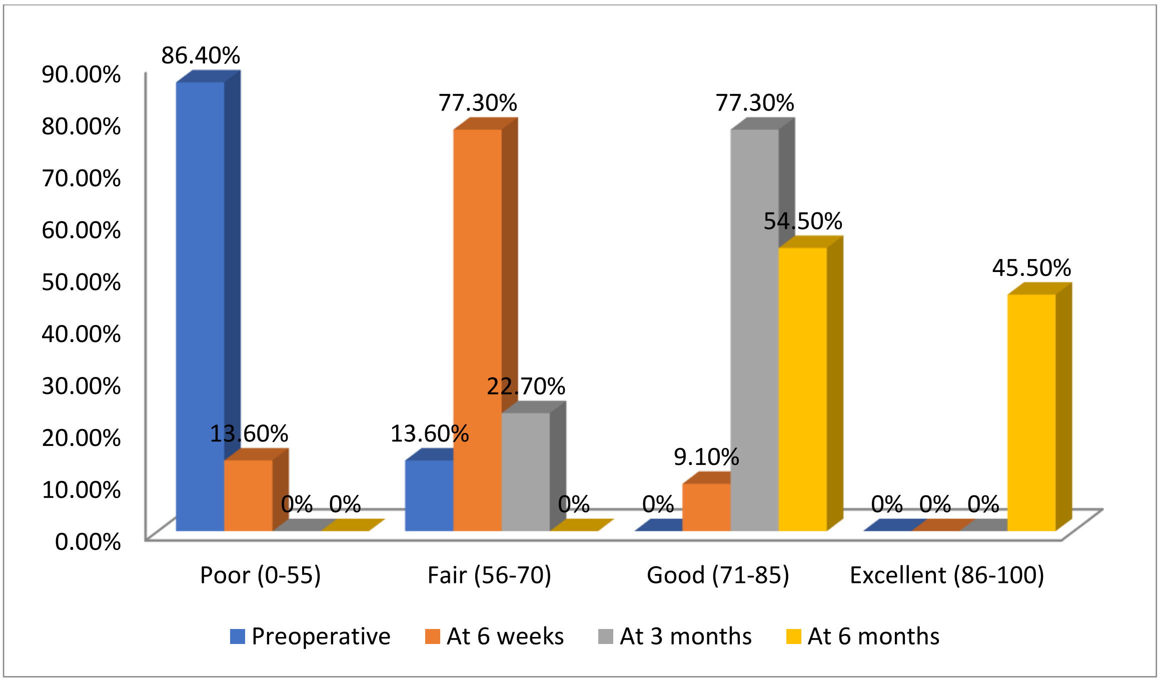


Table 14: Distribution of patients according to VAS scores at different intervals

VAS scores	**At 6 weeks**	**At 3 months**	**At 6 months**
Mean±SD	6.09±0.75	3.36±1.04	1.5±1.0
p-value		**<0.001**	**<0.001**

This table tracks pain levels using the Visual Analog Scale (VAS) at different time points. At 6 weeks post-surgery, the mean pain score was 6.09±0.75. By 3 months, this had decreased significantly to 3.36±1.04 ($p<0.001$). At 6 months, further improvement was seen with a mean score of 1.5±1.0 ($p<0.001$). These results demonstrate progressive and statistically significant reduction in pain over time following rotator cuff repair.

Figure 14: Distribution of patients according to VAS scores at different intervals

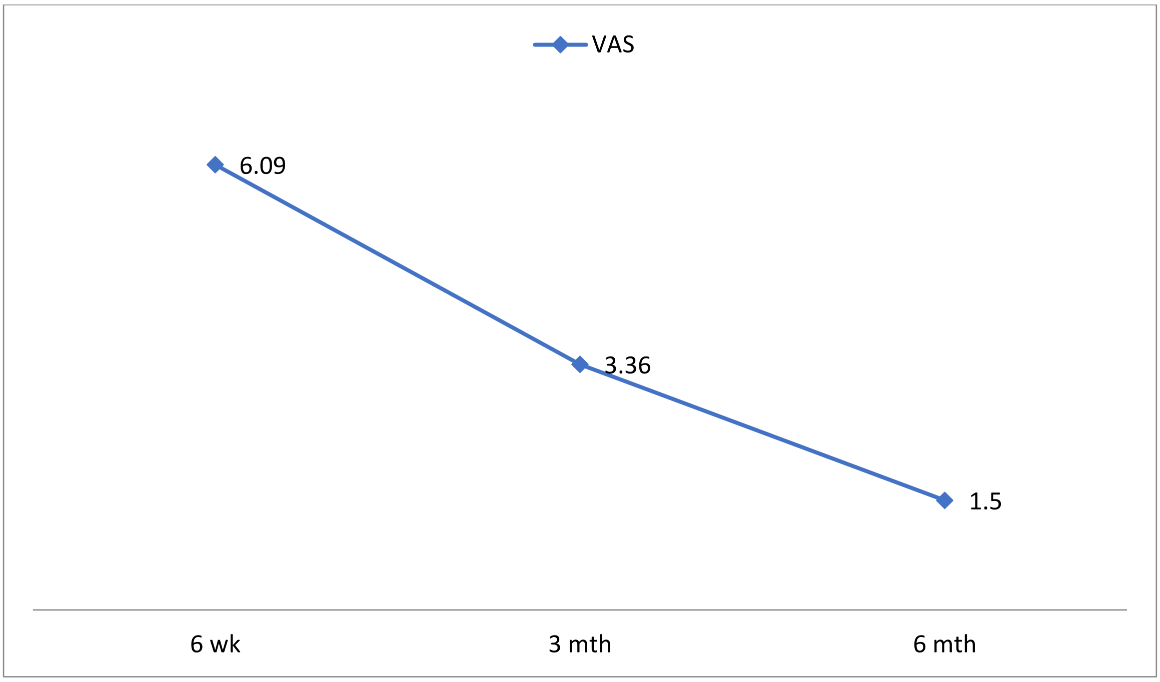


Table 15: Distribution of patients according to different parameters

Parameters	**Length of hospital stay**	**Time to return to daily activities**
Mean±SD	5±**0**	9.64±2.01

This table provides information on recovery metrics. The mean length of hospital stay was 5±0 days, indicating a standardized hospitalization period. The mean time to return to daily activities was 9.64±2.01 days, suggesting a relatively quick recovery to basic functioning following the procedure.

Figure 15: Distribution of patients according to different parameters

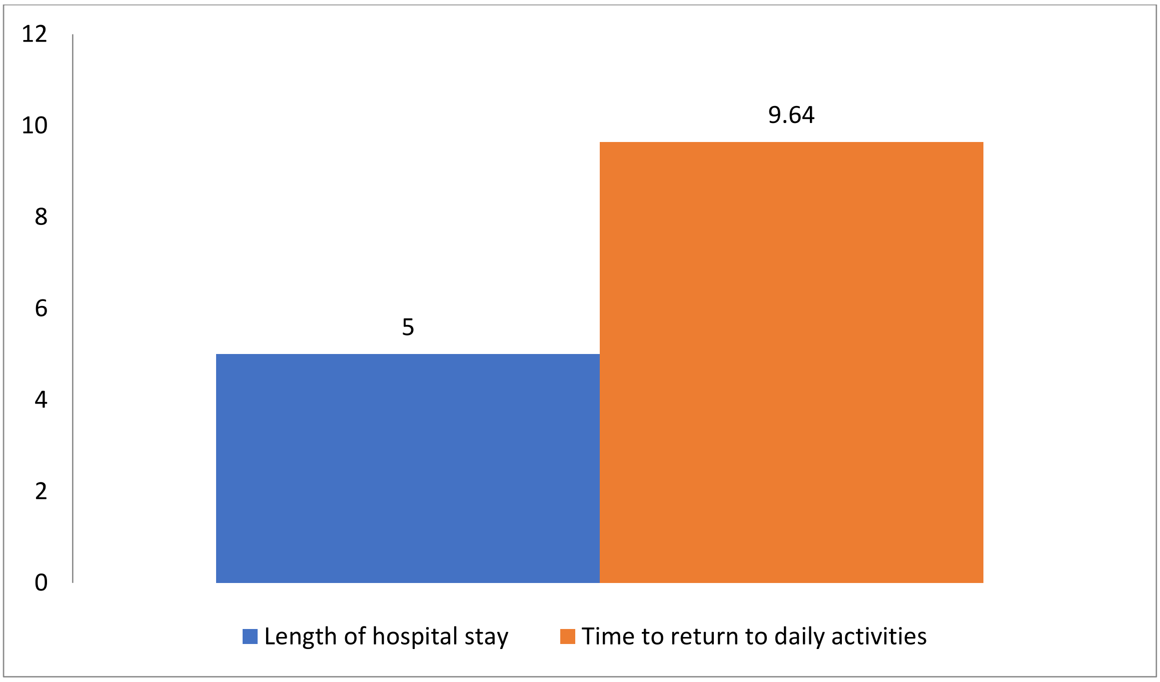


Table 16: Distribution of patients according to complications

Complications	Frequency	Percentage
Anchor failure	1	4.5%
None	21	95.5%
Total	**22**	**100%**

This table documents surgical complications. Only one patient (4.5%) experienced anchor failure, while the remaining 95.5% (21 patients) had no complications. This suggests that arthroscopic rotator cuff repair is a relatively safe procedure with a low complication rate in this study population.

Figure 16: Distribution of patients according to complications

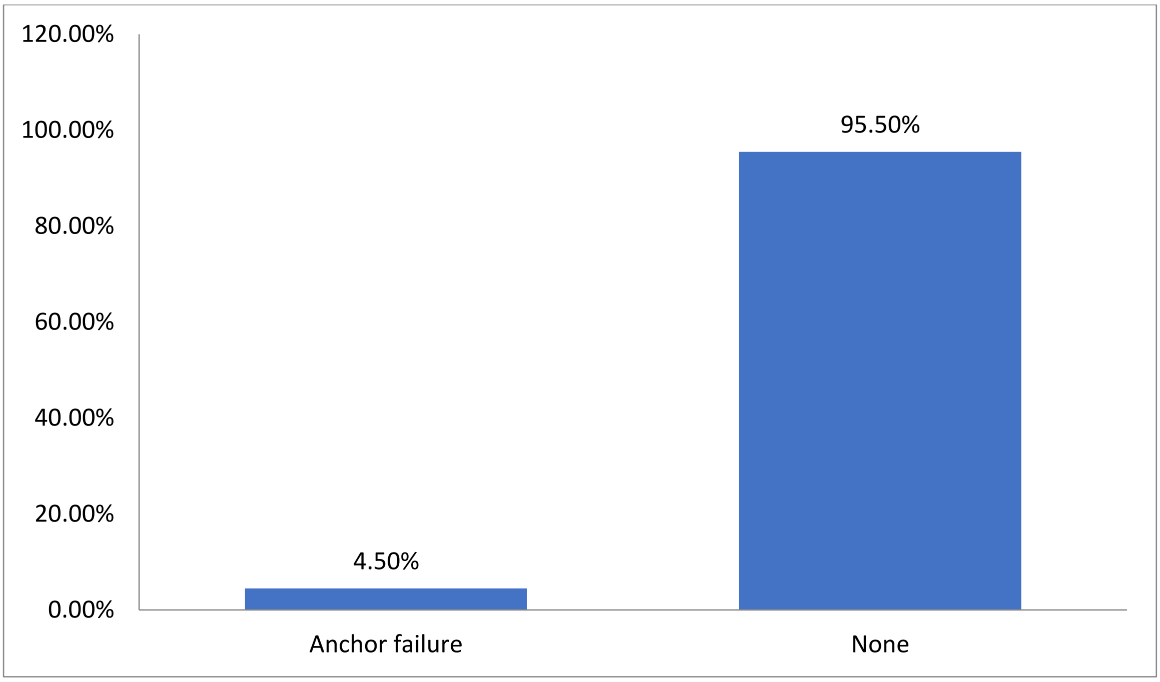


Table 17: Association of UCLA scores at 6 months with age

Age (in years)	UCLA scores			p-value
	Fair	**Good**	**Excellent**	
30-40	3 (42.9%)	4 (28.6%)	0	0.71
41-50	3 (42.9%)	4 (28.6%)	1 (100%)	
51-60	1 (14.3%)	5 (35.7%)	0	
61-70	0	1 (7.1%)	0	
Total	**7 (100%)**	**14 (100%)**	**1 (100%)**	

This table examines the relationship between patient age and functional outcomes. Among patients with fair UCLA scores at 6 months, 42.9% each were from the 30-40 and 41-50 age groups, with 14.3% from the 51-60 age group. For those with good scores, 28.6% each were from the 30-40 and 41-50 age groups, 35.7% from the 51-60 group, and 7.1% from the 61-70 group. The single patient with an excellent score was in the 41-50 age group. The p-value of 0.71 indicates no statistically significant association between age and UCLA scores at 6 months.

Figure 17: Association of UCLA scores at 6 months with age

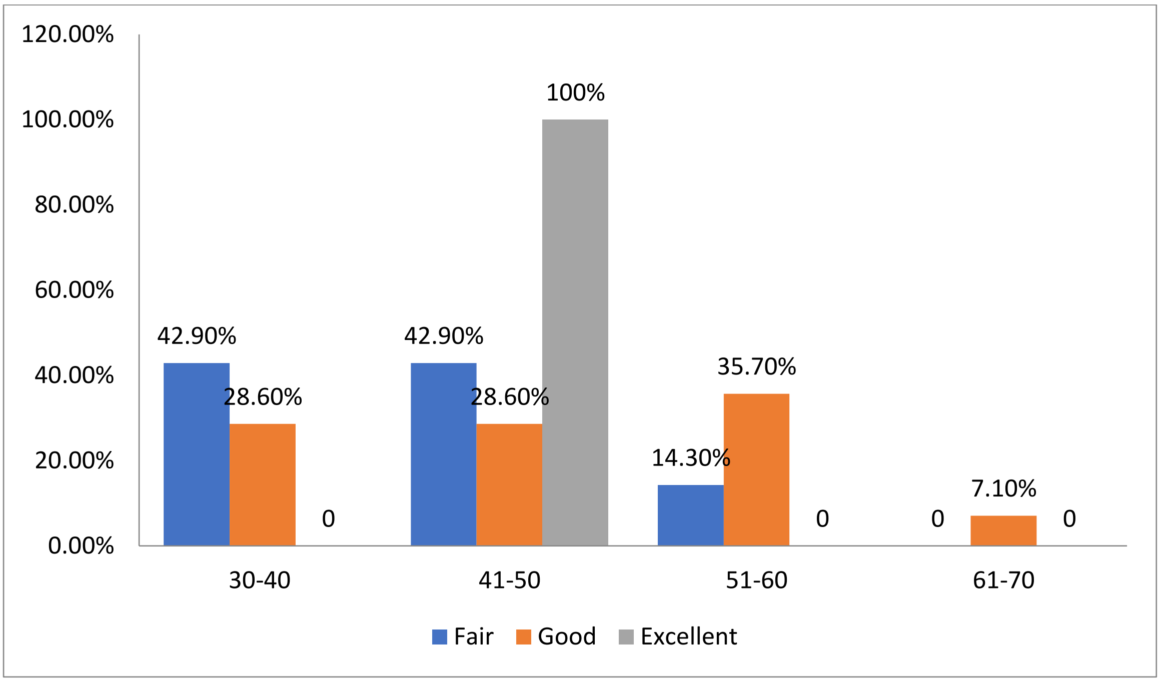


Table 18: Association of UCLA scores at 6 months with mechanism of injury

mechanism of injury	UCLA scores			p-value
	Fair	Good	Excellent	
Degenerative	7 (100%)	5 (35.7%)	0	
Traumatic	0	9 (64.3%)	1 (100%)	
Total	**7 (100%)**	**14 (100%)**	**1 (100%)**	**0.01**

This table examines the relationship between injury mechanism and functional outcomes. All patients (100%) with fair UCLA scores at 6 months had degenerative tears. Among those with good scores, 35.7% had degenerative tears and 64.3% had traumatic tears. The single patient with an excellent score had a traumatic tear. The p-value of 0.01 indicates a statistically significant association between injury mechanism and UCLA scores at 6 months, with traumatic tears generally having better outcomes.

Figure 18: Association of UCLA scores at 6 months with mechanism of injury

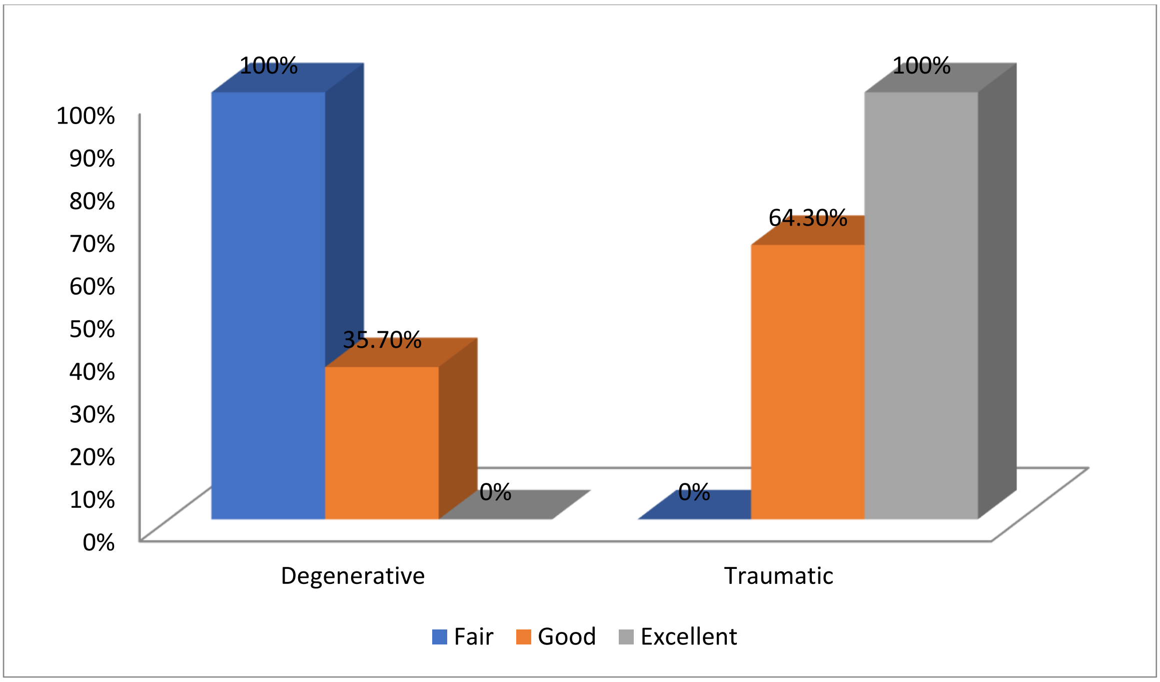


Table 19: Association of Constant scores at 6 months with age

Age (in years)	**Constant scores**		**p-value**
	Good	**Excellent**	
30-40	6 (50%)	1 (10%)	0.16
41-50	4 (33.3%)	4 (40%)	
51-60	2 (16.7%)	4 (40%)	
61-70	0	1 (10%)	
Total	**12 (100%)**	**10 (100%)**	

This table examines the relationship between patient age and functional outcomes measured by Constant scores. Among patients with good Constant scores at 6 months, 50% were from the 30-40 age group, 33.3% from the 41-50 group, and 16.7% from the 51-60 group. For those with excellent scores, 10% were from the 30-40 age group, 40% each from the 41-50 and 51-60 groups, and 10% from the 61-70 group. The p-value of 0.16 indicates no statistically significant association between age and Constant scores at 6 months.

Figure 19: Association of Constant scores at 6 months with age

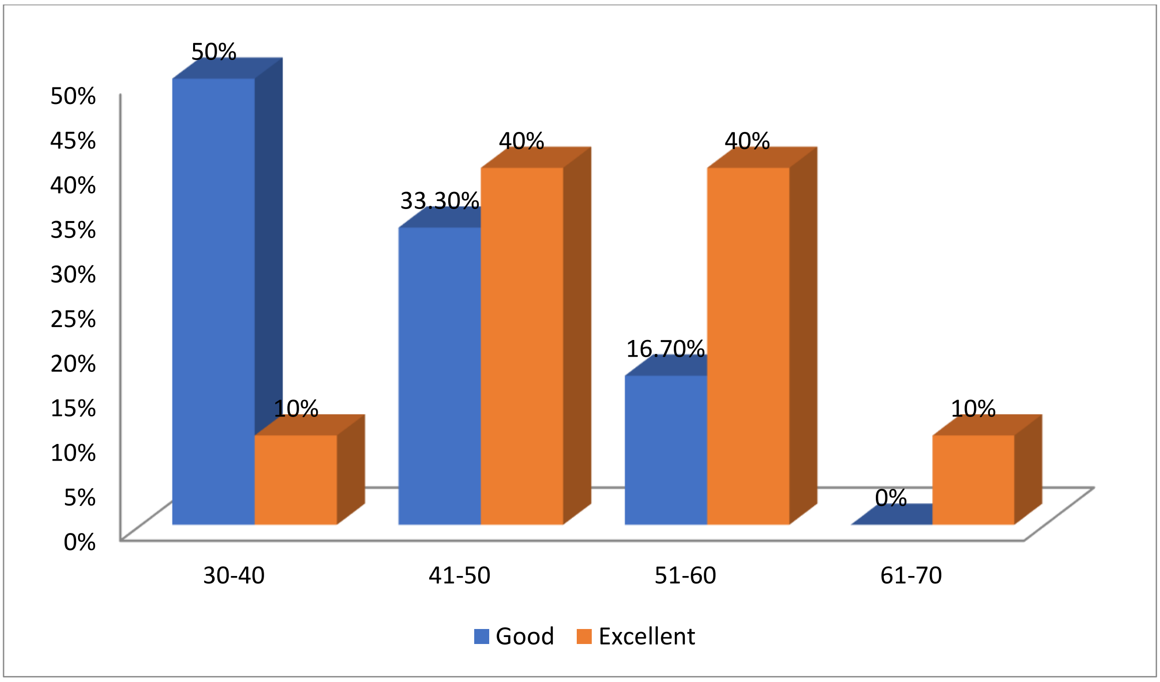
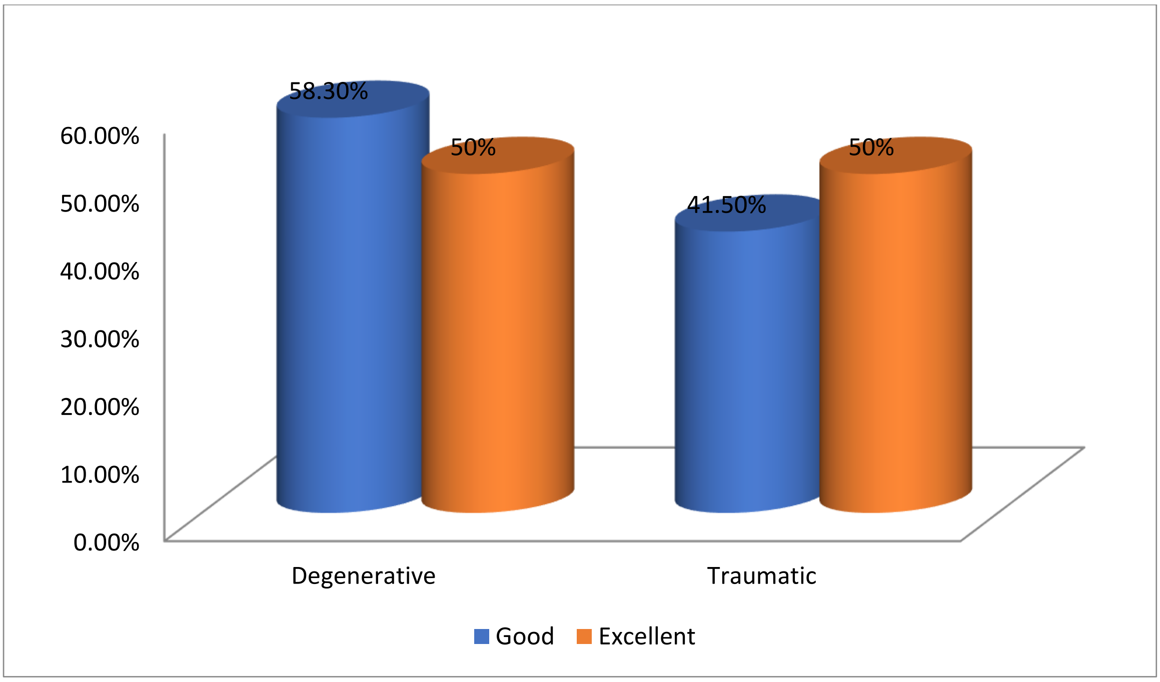


Table 20: Association of Constant scores at 6 months with mechanism of injury

mechanism of injury	Constant scores		p-value
	Good	**Excellent**	
Degenerative	7 (58.3%)	5 (50%)	0.69
Traumatic	5 (41.5%)	5 (50%)	
Total	12 (100%)	10 (100%)	

This table examines the relationship between injury mechanism and functional outcomes measured by Constant scores. Among patients with good Constant scores at 6 months, 58.3% had degenerative tears and 41.5% had traumatic tears. For those with excellent scores, there was an equal distribution (50% each) between degenerative and traumatic tears. The p-value of 0.69 indicates no statistically significant association between injury mechanism and Constant scores at 6 months.

Figure 20: Association of Constant scores at 6 months with mechanism of injury



DISCUSSION

Rotator cuff tears represent one of the most common shoulder pathologies encountered in orthopaedic practice, significantly impacting patient quality of life through pain, weakness, and functional limitation. The evolution of arthroscopic techniques for rotator cuff repair has revolutionized the management of these injuries, offering potential advantages of decreased postoperative pain, reduced deltoid morbidity, improved cosmesis, and accelerated rehabilitation compared to traditional open approaches. This study aimed to evaluate the clinical outcomes of arthroscopic rotator cuff repair in 22 patients, analyzing demographic profiles, tear characteristics, surgical techniques, and functional improvement using validated outcome measures. The present investigation highlights important considerations regarding patient selection, technical aspects of repair, and postoperative functional recovery that continue to evolve in contemporary orthopedic practice.

Demographic Profile

In our study, the majority of patients with rotator cuff tears fell within the age range of 41-50 years (36.4%), followed by 30-40 years (31.8%) and 51-60 years (27.3%), with only 4.5% in the 61-70 years age group. This age distribution reflects a predominantly working-age population, highlighting the socioeconomic importance of effective treatment for this condition. The gender distribution in our study was perfectly balanced with 11 males (50%) and 11 females (50%).

These findings align with the demographic profile reported by Pandey et al.[71] in their study of 74 patients undergoing arthroscopic rotator cuff repair, where the mean age was 55.2 years (range 35-70 years) with slight male predominance (56.8%). However, our study demonstrated a somewhat younger patient population compared to several other published series. Carbonel et al.[72] reported a mean age of 59.2 years in their comparative study of single-row versus double-row repair techniques, while Franceschi et al.[73] documented a mean age of 59.5 years (range 41-72) in their investigation of 60 patients undergoing arthroscopic rotator cuff repair.

The relatively younger demographic in our study may reflect regional variations in patient referral patterns, occupational factors, or earlier presentation due to heightened awareness of rotator cuff pathology. Furthermore, this age distribution contradicts the traditional understanding that rotator cuff tears primarily affect older individuals. As noted by Mall et al.[74] in their epidemiological study of rotator cuff tears, the prevalence increases significantly with age, from 9.7% in individuals under 20 years to 62% in those over 80 years. The younger demographic profile in our cohort potentially indicates a higher proportion of traumatic tears compared to purely degenerative pathology.

Tear Characteristics and Etiology

Our data revealed that the supraspinatus tendon was most commonly involved (77.3%), followed by combined supraspinatus and infraspinatus tears (13.6%), while isolated subscapularis and combined supraspinatus-subscapularis tears were less frequent (4.5% each). This distribution is consistent with the anatomical vulnerability of the supraspinatus tendon, particularly its critical zone of relative hypovascularity. Complete tears predominated in our series (86.4%) compared to partial tears (13.6%).

Regarding tear size, small tears were most prevalent (36.4%), followed by medium and massive tears (27.3% each), with large tears being least common (9.1%). Crescent-shaped tears constituted 50% of cases, followed by L-shaped (36.4%) and U-shaped tears (13.6%). The mechanism of injury was degenerative in 54.5% of cases and traumatic in 45.5%.

These findings share similarities with the work of Kim et al.[75] who analyzed 312 consecutive arthroscopic rotator cuff repairs. They reported supraspinatus involvement in 84.3% of cases, with isolated supraspinatus tears accounting for 62.5%. They also found that medium-sized tears were most common (45.8%), followed by small (29.5%), large (18.9%), and massive tears (5.8%). Tear configuration in their series showed crescent-shaped tears in 48.7%, L-shaped in 35.3%, and U-shaped in 16.0% of cases, closely mirroring our distribution.

The relationship between tear pattern and functional outcomes deserves special attention. Davidson and Burkhart[76] emphasized the importance of tear pattern recognition for surgical planning and outcome prediction. They categorized tears into crescent-shaped (relatively simple repair), L-shaped and U-shaped (requiring margin convergence), and massive tears with poor tissue quality. This classification guided our surgical approach, with simpler repair techniques employed for crescent-shaped tears and more complex techniques for L-shaped and U-shaped tears.

The nearly equal distribution of degenerative versus traumatic etiology in our study (54.5% vs. 45.5%) provides an interesting comparison with the literature. Yamamoto et al.[77] in their population-based study found that approximately 65% of rotator cuff tears had degenerative etiology, while 35% had clear traumatic origins. Our slightly higher proportion of traumatic tears may reflect our younger patient demographic or regional variations in occupational demands and sports participation.

Surgical Technique and Intraoperative Findings

In our study, double-row repair technique was employed in 54.6% of cases, while single-row technique was used in 45.4%. This distribution reflects contemporary practice patterns that individualize repair strategy based on tear characteristics and tissue quality. The number of anchors used varied from 1 to 5, with 3 anchors being most common (36.4%), followed by 2 anchors (31.8%), 1 anchor (18.2%), 4 anchors (9.1%), and 5 anchors (4.5%).

Our approach aligns with evolving evidence regarding repair constructs. DeHaan et al.[78] in their systematic review of 1252 repairs across 23 studies found that double-row repairs demonstrated significantly lower re-tear rates compared to single-row repairs (25.9% vs. 34.1%) on imaging studies, though clinical outcome differences were less pronounced. Similarly, Millett et al.[79] in their meta-analysis reported that double-row repairs resulted in lower re-tear rates and higher healing rates compared to single-row repairs, especially for tears larger than 1 cm.

The selection of single-row versus double-row technique in our study was influenced by tear size, configuration, tissue quality, and surgeon preference. Generally, we favored double-row constructs for larger tears (medium and large) and tears with significant retraction, while single-row repairs were primarily employed for smaller tears with good tissue quality. This approach is supported by Carbonel et al.[72] who found that double-row repairs provided superior outcomes for tears larger than 3 cm, but showed no significant advantage for smaller tears.

The number of anchors used in our series correlates with tear size and configuration, with more anchors typically employed for larger tears requiring greater footprint coverage. This practice is supported by Park et al.[80] who demonstrated that increasing the number of fixation points improves initial repair strength and potentially enhances healing potential through better load distribution across the repair site.

Additional pathologies identified in our cases included biceps tendon tear (4.5%) and PASTA lesions (9.1%), while 86.4% had no additional findings. This relatively low incidence of concomitant pathology contrasts with some published series, such as that by Murthi et al.[81] who reported biceps pathology in approximately 45% of patients undergoing rotator cuff repair. Our lower incidence may reflect population differences or variation in diagnostic criteria.

Functional Outcomes

Our study demonstrated significant improvement in functional outcomes following arthroscopic rotator cuff repair across multiple validated scoring systems. The UCLA score improved from predominantly poor scores preoperatively (86.4%) to predominantly good (63.6%) and fair (31.8%) scores at 6 months, with 4.5% achieving excellent results. Statistical significance was observed at 3 months ($p<0.001$) and 6 months ($p<0.001$) compared to preoperative values.

Similarly, Constant scores progressed from predominantly poor preoperatively (86.4%) to predominantly good (54.5%) and excellent (45.5%) at 6 months, with statistically significant improvements at 6 weeks ($p<0.001$), 3 months ($p<0.001$), and 6 months ($p<0.001$). Pain reduction was substantial, with VAS scores decreasing from 6.09±0.75 at 6 weeks to 3.36±1.04 at 3 months and 1.5±1.0 at 6 months ($p<0.001$).

These results are comparable to those reported by Pandey et al.[71] who documented improvement in mean Constant scores from 36.8 preoperatively to 86.3 at final follow-up and UCLA scores from 10.7 to 32.3. Similarly, Franceschi et al.[73] reported improvement in Constant scores from 44 preoperatively to 91 at 24 months, and UCLA scores from 11 to 32.

The temporal pattern of recovery in our study deserves attention. While significant improvements were noted at 3 months, continued enhancement occurred between 3 and 6 months, suggesting that full recovery extends beyond the early rehabilitation period. This pattern aligns with the findings of Cole et al.[82] who demonstrated progressive improvement in functional outcomes up to 12 months following arthroscopic rotator cuff repair, with the most substantial gains occurring within the first 6 months.

Interestingly, our analysis revealed a significant association between mechanism of injury and UCLA scores at 6 months ($p=0.01$), with traumatic tears demonstrating better outcomes compared to degenerative tears. All patients with fair UCLA scores at 6 months had degenerative etiology, while 64.3% of those with good scores and 100% of those with excellent scores had traumatic etiology. This finding suggests that tissue quality, which tends to be better in traumatic tears compared to degenerative tears, significantly influences healing potential and functional recovery.

This observation is supported by the work of Le et al.[83] who identified preoperative tear characteristics, particularly chronicity and tissue quality, as significant predictors of both structural healing and functional outcomes. Their study demonstrated that acute traumatic tears had higher healing rates compared to chronic degenerative tears (84% vs. 61%), correlating with superior functional outcomes.

However, no significant association was found between Constant scores at 6 months and mechanism of injury ($p=0.69$), suggesting that different outcome measures may capture distinct aspects of recovery. Similarly, neither UCLA nor Constant scores at 6 months showed significant association with patient age ($p=0.71$ and $p=0.16$, respectively), indicating that chronological age alone may not be a reliable predictor of functional recovery.

Complications and Practical Considerations

Our study reported minimal complications, with anchor failure occurring in only one case (4.5%). This low complication rate compares favorably with the literature. Randelli et al.[84] in their systematic review of complications following arthroscopic rotator cuff repair reported an overall complication rate of 10.6%, with hardware issues accounting for approximately 2.5% of complications.

The mean hospital stay in our series was 5 days, and the mean time to return to daily activities was 9.64 ± 2.01 days. These metrics reflect the relatively rapid recovery associated with arthroscopic approaches compared to traditional open techniques. However, our hospital stay duration appears longer than that reported in some international studies, particularly those from North America where outpatient rotator cuff repair is increasingly common. This difference likely reflects variations in healthcare delivery systems and postoperative protocols rather than surgical technique or patient factors.

Rehabilitation Protocol

While not explicitly detailed in our results, rehabilitation protocol represents a critical determinant of functional outcomes following rotator cuff repair. Our approach generally followed contemporary guidelines, with initial emphasis on protection of the repair, followed by progressive range of motion and strengthening exercises. Passive range of motion typically began after 2 weeks, active-assisted motion after 6 weeks, and strengthening exercises after 12 weeks, with return to unrestricted activities permitted around 6 months postoperatively.

This protocol aligns with the approach described by van der Meijden et al.[75] who emphasized the importance of balancing early motion to prevent stiffness against protection to facilitate tendon healing. Their systematic review suggested that early passive range of motion is safe for most repair types, while active range of motion and strengthening should be delayed based on tear size and repair quality.

Study Limitations and Future Directions

Several limitations of our study warrant acknowledgment. The sample size of 22 patients, while sufficient for preliminary analysis, limits statistical power for subgroup comparisons. The follow-up period of 6 months, though demonstrating significant improvement, may not capture long-term outcomes or late complications such as re-tears. Additionally, the absence of postoperative imaging prevents assessment of structural healing and its correlation with functional outcomes.

Future research directions should include longer follow-up periods, incorporation of imaging to assess tendon healing, comparison of different repair techniques within more homogeneous tear subgroups, and evaluation of biological augmentation strategies to enhance healing, particularly in degenerative tears with compromised tissue quality. Prospective randomized studies comparing single-row versus double-row techniques for specific tear patterns would provide stronger evidence to guide surgical decision-making

Clinical Implications

The findings of our study have several important clinical implications. First, they reinforce the efficacy of arthroscopic rotator cuff repair in improving pain and function across diverse patient demographics. Second, they highlight the potential influence of tear etiology on functional outcomes, suggesting that patients with traumatic tears may anticipate better recovery compared to those with degenerative pathology. Third, they demonstrate that significant functional improvement continues beyond 3 months postoperatively, emphasizing the importance of patient education regarding realistic recovery timelines and the value of continued rehabilitation even when early progress appears satisfactory.

From a technical perspective, our experience supports the individualization of repair strategy based on tear characteristics, with consideration of double-row constructs for larger tears while reserving simpler single-row techniques for smaller tears with good tissue quality. This tailored approach optimizes the balance between biomechanical security and surgical efficiency.

Conclusion

Arthroscopic rotator cuff repair demonstrates excellent clinical outcomes with significant improvement in functional scores and minimal complications. The predominance of supraspinatus involvement, with considerable variation in tear size and configuration, underscores the heterogeneity of rotator cuff pathology and the importance of individualized treatment strategies. The significant association between traumatic etiology and superior functional outcomes highlights tissue quality as a critical determinant of healing potential and functional recovery. While both single-row and double-row techniques yield satisfactory results, repair strategy should be tailored to tear characteristics and tissue quality. Future research should focus on longer-term outcomes, structural healing assessment, and biological augmentation strategies to enhance healing in degenerative tears with compromised tissue quality.

CONCLUSION

Arthroscopic repair of rotator cuff tears demonstrates excellent clinical outcomes with significant improvement in functional status and pain reduction. Our study of 22 patients undergoing arthroscopic rotator cuff repair revealed substantial improvements in both UCLA and Constant scores from predominantly poor preoperative scores to good and excellent outcomes at six months postoperatively. The supraspinatus was the most commonly affected tendon, with complete tears predominating over partial tears. Both single-row and double-row repair techniques proved effective, with technique selection appropriately individualized based on tear characteristics.

The significant association between traumatic etiology and superior UCLA scores at six months highlights tissue quality as a critical determinant of functional recovery. This finding suggests that patients with acute traumatic tears may anticipate better outcomes compared to those with chronic degenerative pathology. However, the absence of significant association between age and functional outcomes indicates that chronological age alone should not determine surgical candidacy, and elderly patients with appropriate indications can achieve satisfactory results.

The minimal complication rate in our series, with anchor failure in only one case (4.5%), confirms the safety of arthroscopic rotator cuff repair when performed with appropriate technique and patient selection. Furthermore, the relatively rapid return to daily activities (mean 9.64 days) demonstrates the advantage of arthroscopic approaches in facilitating postoperative recovery.

While our six-month follow-up demonstrates significant improvement, longer-term studies incorporating imaging assessment of structural healing would further enhance our understanding of the relationship between repair integrity and functional outcomes. Additionally, larger sample sizes would facilitate more robust subgroup analyses to refine patient selection criteria and optimize repair strategies for specific tear patterns.

In conclusion, arthroscopic rotator cuff repair represents an effective treatment modality for patients with symptomatic rotator cuff tears, providing significant improvement in pain and function with minimal complications. Continued refinement of surgical techniques, rehabilitation protocols, and biological augmentation strategies holds promise for further enhancing outcomes, particularly for patients with compromised tissue quality.

SUMMARY

This prospective study evaluated the clinical outcomes of arthroscopic rotator cuff repair in 22 patients. The demographic analysis revealed a predominantly middle-aged population, with the majority of patients falling within the 41-50 years age group (36.4%), followed by 30-40 years (31.8%) and 51-60 years (27.3%), with equal gender distribution (50% male, 50% female).

The supraspinatus tendon was most commonly involved (77.3%), followed by combined supraspinatus and infraspinatus tears (13.6%). Complete tears predominated (86.4%) over partial tears (13.6%). Regarding tear size, small tears were most prevalent (36.4%), followed by medium and massive tears (27.3% each). Crescent-shaped tears constituted 50% of cases, while the etiology was degenerative in 54.5% of cases and traumatic in 45.5%.

Surgically, double-row repair technique was employed in 54.6% of cases and single-row technique in 45.4%. The number of anchors used ranged from 1 to 5, with 3 anchors being most common (36.4%), followed by 2 anchors (31.8%). Additional findings included biceps tendon tear (4.5%) and PASTA lesions (9.1%).

Functional outcomes showed significant improvement across all measurement parameters. UCLA scores progressed from predominantly poor preoperatively (86.4%) to predominantly good (63.6%) at 6 months, with statistically significant improvements at 3 months ($p<0.001$) and 6 months ($p<0.001$). Similarly, Constant scores improved from predominantly poor preoperatively (86.4%) to predominantly good (54.5%) and excellent (45.5%) at 6 months, with significant improvements at all follow-up intervals ($p<0.001$). Pain reduction was substantial, with VAS scores decreasing from 6.09 ± 0.75 at 6 weeks to 1.5 ± 1.0 at 6 months ($p<0.001$).

The mean hospital stay was 5 days, and the mean time to return to daily activities was 9.64 ± 2.01 days. Complications were minimal, with anchor failure occurring in only one case (4.5%). Analysis of prognostic factors revealed a significant association between traumatic etiology and superior UCLA scores at 6 months (p=0.01), suggesting that tissue quality significantly influences functional recovery.

Overall, the study demonstrates that arthroscopic rotator cuff repair provides excellent clinical outcomes with significant improvement in functional scores and minimal complications, supporting its role as an effective treatment modality for rotator cuff tears.

LIMITATIONS

Despite the promising results, this study has several limitations that should be acknowledged:

1. **Sample Size**: The relatively small sample size of 22 patients limits the statistical power of the study, particularly for subgroup analyses. This may have prevented the detection of subtle differences in outcomes between different repair techniques or patient demographics. A larger cohort would provide more robust data for definitive conclusions.
2. **Follow-up Duration**: The follow-up period of 6 months, while sufficient to demonstrate significant improvement in functional outcomes, may be inadequate to assess long-term durability of repairs. Several studies have shown that rotator cuff re-tears can occur beyond 6 months, and functional deterioration may manifest later in some patients. A longer follow-up period of 1-2 years would provide more comprehensive data on the sustainability of outcomes.
3. **Absence of Postoperative Imaging**: This study did not incorporate postoperative imaging (such as MRI or ultrasound) to assess the structural integrity of repairs. Without imaging data, the correlation between clinical outcomes and anatomical healing cannot be established. Evidence suggests that structural healing does not always correlate with functional outcomes, and this relationship remains an important area for investigation.
4. **Lack of Control Group**: The absence of a control group (either non-operative management or alternative surgical technique) limits the ability to definitively attribute improvements to the arthroscopic intervention rather than natural history or rehabilitation protocols. A comparative design would strengthen the evidence for the efficacy of arthroscopic repair.
5. **Potential Selection Bias**: The study population may not represent the full spectrum of rotator cuff tear patients, particularly those with massive irreparable tears or severe comorbidities who might have been excluded from surgical intervention. This selection bias could

potentially overestimate the efficacy of arthroscopic repair in the general population with rotator cuff pathology.

6. **Surgeon Variability**: Although not explicitly mentioned, the study likely involved a limited number of surgeons. Surgeon experience and technical proficiency significantly influence outcomes in arthroscopic procedures. The generalizability of results to less experienced surgeons or different surgical techniques may be limited.
7. **No Standardization of Rehabilitation Protocol**: While a general rehabilitation approach was followed, the study did not implement a strictly standardized rehabilitation protocol with compliance monitoring. Variations in rehabilitation adherence and physical therapy quality could have influenced outcomes independently of the surgical intervention.
8. **Limited Assessment of Patient-Reported Outcomes**: While UCLA and Constant scores incorporate both objective and subjective elements, the study did not include specific patient-reported outcome measures focusing on quality of life, return to work, or sports participation. These dimensions are increasingly recognized as important metrics of successful intervention.
9. **Heterogeneity of Tear Patterns**: The study included various tear patterns, sizes, and configurations. This heterogeneity, while representative of clinical practice, may confound the analysis of technique-specific outcomes. Stratification by tear characteristics in a larger cohort would provide more specific guidance for surgical decision-making.
10. **Limited Analysis of Prognostic Factors**: While the study identified etiology as a significant prognostic factor, other potential predictors such as tear size, fatty infiltration, muscle atrophy, and comorbidities were not comprehensively analyzed. A more detailed multivariate analysis would better identify independent predictors of outcome.

These limitations provide opportunities for future research directions, including larger prospective studies with longer follow-up, incorporation of imaging assessment, standardized rehabilitation protocols, and more comprehensive analysis of prognostic factors. Despite these limitations, the study provides valuable data on the efficacy of arthroscopic rotator cuff repair in improving pain and function across diverse patient demographics and tear characteristics.

REFERENCES

1. Yamamoto A, Takagishi K, Osawa T, Yanagawa T, Nakajima D, Shitara H, et al. Prevalence and risk factors of a rotator cuff tear in the general population. J Shoulder Elbow Surg. 2020;19:116-20.
2. Denard PJ, Burkhart SS. The evolution of suture anchors in arthroscopic rotator cuff repair. Arthroscopy. 2019;29:1589-95.
3. Park JY, Lhee SH, Choi JH, Park HK, Yu JW, Seo JB. Comparison of the clinical outcomes of single- and double-row repairs in rotator cuff tears. Am J Sports Med. 2018;36:1310-6.
4. Mall NA, Lee AS, Chahal J, Sherman SL, Romeo AA, Verma NN, et al. An evidenced-based examination of the epidemiology and outcomes of traumatic rotator cuff tears. Arthroscopy. 2019;29:366-76.
5. Galatz LM, Ball CM, Teefey SA, Middleton WD, Yamaguchi K. The outcome and repair integrity of completely arthroscopically repaired large and massive rotator cuff tears. J Bone Joint Surg Am. 2018;86-A:219-24.
6. Neyton L, Godeneche A, Nove-Josserand L, Carrillon Y, Clechet J, Hardy MB. Arthroscopic suture-bridge repair for small to medium size supraspinatus tear: healing rate and retear pattern. Arthroscopy. 2019;29:10-7.
7. Jo CH, Shin JS, Lee YG, Shin WH, Kim H, Lee SY, et al. Platelet-rich plasma for arthroscopic repair of large to massive rotator cuff tears: a randomized, single-blind, parallel-group trial. Am J Sports Med. 2020;41:2240-8.
8. Keener JD, Galatz LM, Stobbs-Cucchi G, Patton R, Yamaguchi K. Rehabilitation following arthroscopic rotator cuff repair: a prospective randomized trial of immobilization compared with early motion. J Bone Joint Surg Am. 2019;96:11-9.

9. Millett PJ, Warth RJ, Dornan GJ, Lee JT, Spiegl UJ. Clinical and structural outcomes after arthroscopic single-row versus double-row rotator cuff repair: a systematic review and meta-analysis of level I randomized clinical trials. J Shoulder Elbow Surg. 2018;23:586-97.
10. Mihata T, Lee TQ, Watanabe C, Fukunishi K, Ohue M, Tsujimura T, et al. Clinical results of arthroscopic superior capsule reconstruction for irreparable rotator cuff tears. Arthroscopy. 2019;29:459-70.
11. May T, Garmel GM. Rotator Cuff Injury. [Updated 2023 Jun 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK547664/
12. Sambandam SN, Khanna V, Gul A, Mounasamy V. Rotator cuff tears: An evidence based approach. World J Orthop. 2015 Dec 18;6(11):902-18.
13. Moulton SG, Greenspoon JA, Millett PJ, Petri M. Risk Factors, Pathobiomechanics and Physical Examination of Rotator Cuff Tears. Open Orthop J. 2016;10:277-285.
14. Schmidt CC, Morrey BF. Management of full-thickness rotator cuff tears: appropriate use criteria. J Shoulder Elbow Surg. 2015 Dec;24(12):1860-7.
15. Dang A, Davies M. Rotator Cuff Disease: Treatment Options and considerations. Sports Med Arthrosc Rev. 2018 Sep;26(3):129-133.
16. Tempelhof S, Rupp S, Seil R. Age-related prevalence of rotator cuff tears in asymptomatic shoulders. J Shoulder Elbow Surg. 1999 Jul-Aug;8(4):296-9.
17. Fehringer EV, Sun J, VanOeveren LS, Keller BK, Matsen FA. Full-thickness rotator cuff tear prevalence and correlation with function and co-morbidities in patients sixty-five years and older. J Shoulder Elbow Surg. 2008 Nov-Dec;17(6):881-5.
18. Schibany N, Zehetgruber H, Kainberger F, Wurnig C, Ba-Ssalamah A, Herneth AM, Lang T, Gruber D, Breitenseher MJ. Rotator cuff tears in asymptomatic individuals: a

clinical and ultrasonographic screening study. Eur J Radiol. 2004 Sep;51(3):263-8.

19. Maruvada S, Madrazo-Ibarra A, Varacallo MA. Anatomy, Rotator Cuff. [Updated 2023 Mar 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK441844/
20. Varacallo M, El Bitar Y, Sina RE, Mair SD. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Mar 5, 2024. Rotator Cuff Syndrome.
21. Varacallo MA, El Bitar Y, Mair SD. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Aug 4, 2023. Rotator Cuff Tendonitis.
22. Cowan PT, Mudreac A, Varacallo MA. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Aug 8, 2023. Anatomy, Back, Scapula.
23. Vosloo M, Keough N, De Beer MA. The clinical anatomy of the insertion of the rotator cuff tendons. Eur J Orthop Surg Traumatol. 2017 Apr;27(3):359-366.
24. Hippensteel KJ, Brophy R, Smith MV, Wright RW. A Comprehensive Review of Physical Examination Tests of the Cervical Spine, Scapula, and Rotator Cuff. J Am Acad Orthop Surg. 2019 Jun 01;27(11):385-394.
25. Wolff AB, Sethi P, Sutton KM, Covey AS, Magit DP, Medvecky M. Partial-thickness rotator cuff tears. J Am Acad Orthop Surg. 2006 Dec;14(13):715-25.
26. Inderhaug E, Kalsvik M, Kollevold KH, Hegna J, Solheim E. Long-term results after surgical treatment of subacromial pain syndrome with or without rotator cuff tear. J Orthop. 2018 Sep;15(3):757-760.
27. Harrison AK, Flatow EL. Subacromial impingement syndrome. J Am Acad Orthop Surg. 2011 Nov;19(11):701-8.
28. Gelber JD, Soloff L, Schickendantz MS. The Thrower's Shoulder. J Am Acad Orthop Surg. 2018 Mar 15;26(6):204-213.
29. Farfaras S, Sernert N, Rostgard Christensen L, Hallström EK, Kartus JT. Subacromial

Decompression Yields a Better Clinical Outcome Than Therapy Alone: A Prospective Randomized Study of Patients With a Minimum 10-Year Follow-up. Am J Sports Med. 2018 May;46(6):1397-1407.

30. DeNiese P, Bhatia DN. Recent advances and future trends in shoulder arthroscopy. J Arthrosc Surg Sport Med 2020;1(1):16-22.
31. Smith MJ, Bozynski CC, Kuroki K, Cook CR, Stoker AM, Cook JL. Comparison of biologic scaffolds for augmentation of partial rotator cuff tears in a canine model. J Shoulder Elbow Surg 2020:S1058-2746.
32. Thon SG, O'Malley L 2nd, O'Brien MJ, Savoie FH 3rd. Evaluation of healing rates and safety with a bioinductive collagen patch for large and massive rotator cuff tears: 2-year safety and clinical outcomes. Am J Sports Med. 2019;47:1901-8.
33. Schlegel TF, Abrams JS, Bushnell BD, Brock JL, Ho CP. Radiologic and clinical evaluation of a bioabsorbable collagen implant to treat partial-thickness tears: A prospective multicenter study. J Shoulder Elbow Surg. 2018;27:242-51.
34. Bhatia DN. Massive, Retracted and Fatty Infiltrated Triple Tendon Rotator Cuff Tears: Arthroscopic Repair Techniques for “Irreparable” Tears.
35. Barth J, Olmos MI, Swan J, Barthelemy R, Delsol P, Boutsiadis A. Superior capsular reconstruction with the long head of the biceps autograft prevents infraspinatus retear in massive posterosuperior retracted rotator cuff tears. Am J Sports Med. 2020;48:1430-8.
36. Han F, Kong CH, Hasan MY, Ramruttun AK, Kumar VP. Superior capsular reconstruction for irreparable supraspinatus tendon tears using the long head of biceps: A biomechanical study on cadavers. Orthop Traumatol Surg Res. 2019;105:257-63.
37. Makki D, Tang QO, Sandher D, Morgan BW, Ravenscroft M. Arthroscopic superior capsular reconstruction of the shoulder using dermal allograft. Orthopedics.

2020;2020:1-6.

38. de Campos Azevedo CI, Andrade R, Ângelo AC, Espregueira-Mendes J, Ferreira N, Sevivas N. Fascia lata autograft versus human dermal allograft in arthroscopic superior capsular reconstruction for irreparable rotator cuff tears: A systematic review of clinical outcomes. Arthroscopy. 2020;36:579-91.e2.
39. Aguirre JA, Etzensperger F, Brada M, Guzzella S, Saporito A, Blumenthal S, et al. The beach chair position for shoulder surgery in intravenous general anesthesia and controlled hypotension: Impact on cerebral oxygenation, cerebral blood flow and neurobehavioral outcome. J Clin Anesth. 2019;53:40-8.
40. Choi JW, Kim DK, Jeong HJ, Kim YR, Chung YJ, Son YH. Risk factors associated with hypotensive bradycardic events during open shoulder surgery in the beach chair position. Korean J Anesthesiol. ;2020
41. Songy CE, Siegel ER, Stevens M, Wilkinson JT, Ahmadi S. The effect of the beach-chair position angle on cerebral oxygenation during shoulder surgery. J Shoulder Elbow Surg. 2017;26:1670-5.
42. Rojas J, Familiari F, Bitzer A, Srikumaran U, Papalia R, McFarland EG. Patient positioning in shoulder arthroscopy: Which is best? Joints. 2019;7:46-55.
43. Lafosse T, Le Hanneur M, Lafosse L. All-endoscopic brachial plexus complete neurolysis for idiopathic neurogenic thoracic outlet syndrome: A prospective case series. Arthroscopy. 2017;33:1449-57.
44. Lafosse T, Le Hanneur M, Popescu IA, Bihel T, Masmejean E, Lafosse L. All-endoscopic resection of an infraclavicular brachial plexus schwannoma: Surgical technique. Arthrosc Tech. 2018;7:e869-73.
45. Dines JS, Hettrich CM, Kelly BT, Savoie FH 3rd, Lorich DG. Arthroscopic removal of proximal humerus locking plates. Knee Surg Sports Traumatol Arthrosc. 2010;18:409-

11.

46. Bhatia DN. Arthroscopic removal of proximal humerus plates in chronic post-traumatic shoulder stiffness. Arthrosc Tech. 2017;6:e375-81.
47. Bhatia DN. Scapulothoracic endoscopy for the painful snapping scapula: Endoscopic anatomy and scapuloplasty technique. Arthrosc Tech. 2015;4:e551-8.
48. Menge TJ, Horan MP, Tahal DS, Mitchell JJ, Katthagen JC, Millett PJ. Arthroscopic treatment of snapping scapula syndrome: Outcomes at minimum of 2 years. Arthroscopy. 2017;33:726-32.
49. Memon M, Kay J, Simunovic N, Ayeni OR. Arthroscopic management of snapping scapula syndrome improves pain and functional outcomes, although a high rate of residual symptoms has been reported. Knee Surg Sports Traumatol Arthrosc. 2018;26:221-39.
50. Kany J, Selim HA. Combined fully arthroscopic transfer of latissimus dorsi and teres major for treatment of irreparable posterosuperior rotator cuff tears. Arthrosc Tech. 2019;9:e147-57.
51. Cutbush K, Peter NA, Hirpara K. All-arthroscopic latissimus dorsi transfer. Arthrosc Tech. 2016;5:e607-13.
52. Cartaya M, Werthel JD, Valenti P. Arthroscopic-assisted pectoralis minor transfer for irreparable tears of the upper two-thirds of the subscapularis tendon: Surgical technique. Arthrosc Tech. 2017;6:e1501-5.
53. Daggett MC, Stepanovich B, Geraghty B, Meyers A, Whetstone J, Saithna A. Office-based needle arthroscopy: A standardized diagnostic approach to the shoulder. Arthrosc Tech. 2020;9:e521-5.
54. Lavender C, Lycans D, Adil SA, Berdis G. Single-incision rotator cuff repair with a needle arthroscope. Arthrosc Tech. 2020;9:e419-23.

55. Lavender C, Lycans D, Kopiec A, Sayan A. Nanoscopic single-incision anterior labrum repair. Arthrosc Tech. 2020;9:e297-301.

56. Eichinger JK. Editorial commentary: If you want your arthroscopic bankart repairs to be durable for 10 years consider treating the hill-Sachs lesion with remplissage. Arthroscopy. 2019;35:1368-9.

57. Verma NN. Editorial commentary: Arthroscopic latarjet: Is it ready for prime time? Arthroscopy. 2019;35:1062-3.

58. **Savoie FH 3rd**. Editorial commentary: Is shoulder joint preservation an endangered species? Let's save the glenoid. *Arthroscopy*. 2017;33:1926-7.

59. V. B. Conboy, R.W. Morris et al.; " An evaluation of the constant-Murley shoulder assessment"; J Bone Joint Surg 1996;78-B:229-32

60. Moorthy V, Chen JY, Lee M, Ang BF, Tjoen DT. The UCLA shoulder score is a better predictor of treatment success than the constant and oxford shoulder scores after arthroscopic rotator cuff repair: a 2-year follow-up study. Arthroscopy Sports Med Rehab 2021;3(2):e485-90.

61. Ho S, Martinho T, Amiri A, Abinden J, Chong XL, Bothorel H, et al. Clinical and radiologic outcomes of arthroscopic rotator cuff repair in medial bursal-side fosbury flop tears compared with tendinous avulsion lesions. Arthroscopy Sport Med Rehab 2024;6(2):100879.

62. Barbosa F, Titchener A, Tambe A, Espag M, Cresswell T, Clark D. Clinical Outcomes of Arthroscopic Revision Rotator Cuff Repair. Indian J Orthop. 2023 Feb 13;57(3):490-494.

63. Davey MS, Hurley ET, Carroll PJ, Galbraith JG, Shannon F, Kaar K, Mullett H. Arthroscopic Rotator Cuff Repair Results in Improved Clinical Outcomes and Low Revision Rates at 10-Year Follow-Up: A Systematic Review. Arthroscopy. 2023

Feb;39(2):452-458.

64. Kim HG, Kim SC, Park JH, Kim DY, Lee SM, Yoo JC et al. Clinical and structural outcomes of arthroscopic rotator cuff repair in patients over 75 years are comparable to those in younger patients: a propensity score-matched comparative study. J Arthroscopic Rel Surg 2024;40(6):1739-50.
65. Kakoi, H., Izumi, T., Fujii, Y. *et al.* Clinical outcomes of arthroscopic rotator cuff repair: a retrospective comparison of double-layer, double-row and suture bridge methods. *BMC Musculoskelet Disord* **19**, 324 (2018).
66. Filho JM, Sella G, de Souza LH, Miyadahira R, Rosa JR, Miyazaki AN. Evaluation of the clinical outcomes of the arthroscopic treatment of rotator cuff tears using the modified suture bridge technique. Rev Bras Ortop 2022;57 (6):1746179.
67. Babhulkar AS, Agrawal AK, Ramaswamy AG, Patil PC, Vimalkumar KH. Results of arthroscopic rotator cuff repairs in patients with comorbid disability of other extremities. J Arthrosc Surg Sports Med 2022;3:90-3.
68. Randelli PS, Menon A, Nocrino E, Aliprandi A, Feroli FM, Mazzoleni MG et al. Long-term results of arthroscopic rotator cuff repair: initial tear size matters: a prospective study on clinical and radiological results at a minimum follow-up of 10 years. The Am J Sports Med 2019;47(11):5529.
69. Babhulkar AS, Ravikumar MS, Patil P, Kumar V. Clinical outcome of arthroscopic rotator cuff repair in patients aged 70 years and older. Int J Orthoped 2019;6(4).
70. Vamsinath P, Ballal M, Prakashappa TH, Kumar S. A study of functional outcome of arthroscopic rotator cuff repair in rotator cuff tear patients. Indian J Orthop Surg 2024;4(2):204-8.
71. Pandey V, Jaap Willems W. Rotator cuff tear: A detailed update. Asia Pac J Sports Med Arthrosc Rehabil Technol. 2015;2(1):1-14.

72. Carbonel I, Martinez AA, Calvo A, Ripalda J, Herrera A. Single-row versus double-row arthroscopic repair in the treatment of rotator cuff tears: a prospective randomized clinical study. Int Orthop. 2012;36(9):1877-1883.
73. Franceschi F, Ruzzini L, Longo UG, Martina FM, Zobel BB, Maffulli N, Denaro V. Equivalent clinical results of arthroscopic single-row and double-row suture anchor repair for rotator cuff tears: a randomized controlled trial. Am J Sports Med. 2007;35(8):1254-1260.
74. Mall NA, Kim HM, Keener JD, Steger-May K, Teefey SA, Middleton WD, Stobbs G, Yamaguchi K. Symptomatic progression of asymptomatic rotator cuff tears: a prospective study of clinical and sonographic variables. J Bone Joint Surg Am. 2010;92(16):2623-2633.
75. Kim HM, Caldwell JM, Buza JA, Fink LA, Ahmad CS, Bigliani LU, Levine WN. Factors affecting satisfaction and shoulder function in patients with a recurrent rotator cuff tear. J Bone Joint Surg Am. 2014;96(2):106-112.
76. Davidson J, Burkhart SS. The geometric classification of rotator cuff tears: a system linking tear pattern to treatment and prognosis. Arthroscopy. 2010;26(3):417-424.
77. Yamamoto A, Takagishi K, Osawa T, Yanagawa T, Nakajima D, Shitara H, Kobayashi T. Prevalence and risk factors of a rotator cuff tear in the general population. J Shoulder Elbow Surg. 2010;19(1):116-120.
78. DeHaan AM, Axe MJ, Wilk K. Does double-row rotator cuff repair improve functional outcome of patients compared with single-row technique? A systematic review. Am J Sports Med. 2012;40(5):1176-1185.
79. Millett PJ, Warth RJ, Dornan GJ, Lee JT, Spiegl UJ. Clinical and structural outcomes after arthroscopic single-row versus double-row rotator cuff repair: a systematic review and meta-analysis of level I randomized clinical trials. J Shoulder Elbow Surg.

2014;23(4):586-597.

80. Park MC, Cadet ER, Levine WN, Bigliani LU, Ahmad CS. Tendon-to-bone pressure distributions at a repaired rotator cuff footprint using transosseous suture and suture anchor fixation techniques. Am J Sports Med. 2005;33(8):1154-1159.
81. Murthi AM, Vosburgh CL, Neviaser TJ. The incidence of pathologic changes of the long head of the biceps tendon. J Shoulder Elbow Surg. 2000;9(5):382-385.
82. Cole BJ, McCarty LP 3rd, Kang RW, Alford W, Lewis PB, Hayden JK. Arthroscopic rotator cuff repair: prospective functional outcome and repair integrity at minimum 2-year follow-up. J Shoulder Elbow Surg. 2007;16(5):579-585.

ANNEXURE I

INFORMED CONSENT FORM FOR PARTICIPATION IN DISSERTATION / RESEARCH

I, the undersigned, _________, S/O D/O W/O _____, aged _years, ordinarily resident of __do hereby state/declare that **Dr.SARAGUR ANAND D** of Shri.B. M. Patil Medical College Hospital & Research Centre has examined me thoroughly on______at ____(place) and it has been explained to me in my own language that I am suffering from _______disease (condition) and this disease/condition mimic following diseases. Further **Dr. SARAGUR ANAND D** informed me that he/she is conducting dissertation/research titled " **EVALUATION OF CLINICAL OUTCOME OF ARTHROSCOPIC ROTATOR CUFF REPAIR"** under the guidance of **Dr. S.S NANDI** requesting my participation in the study. Apart from routine treatment procedure, the pre-operative, operative, post-operative and follow-up observations will be utilised for the study as reference data.

The doctor has also informed me that during the conduct of this procedure, adverse results might encounter. Most of them are treatable but are not anticipated; hence there is a chance of aggravation of my condition. In rare circumstances, it may prove fatal despite the expected diagnosis and best treatment made available. Further Doctor has informed me that my participation in this study help in the evaluation of the results of the study, which is a useful reference to the treatment of other similar cases in future and also, I may be benefited from getting relieved from suffering or a cure of the disease I am suffering.

The Doctor has also informed me that information given by me, observations made/ photographs/ video graphs taken upon me by the investigator will be kept secret and not assessed by the person other than my legal hirer or me except for academic purposes.

The Doctor did inform me that though my participation is purely voluntary, based on the information given by me, I can ask for any clarification during treatment/study related to diagnosis, the procedure of treatment, the result of treatment, or prognosis. I've been informed that I can withdraw from my participation in this study at any time if I want, or the investigator can terminate me from the study at any time from the study but not the procedure of treatment and follow-up unless I request to be discharged.

After understanding the nature of dissertation or research, diagnosis made, mode of treatment, I the undersigned Shri/Smt _____under my full conscious state of mind agree to participate in the said research/dissertation.

Signature of the patient:

Signature of doctor:

Witness: 1.

2.

Date:

Place:

ANNEXURE II

SCHEME OF CASE TAKING

CASE NO. :
NAME :
AGE/SEX :
I P NO :
DATE OF ADMISSION :
DATE OF SURGERY :
DATE OF DISCHARGE :
OCCUPATION :
RESIDENCE :

Presenting complaints with duration :

History of presenting complaints :

Family History :

Personal History :

Past History :

General Physical Examination

Pallor:	present/absent
Icterus:	present/absent
Clubbing:	present/absent
Generalized lymphadenopathy:	present/absent
Built:	poor/moderate/well
Nourishment:	poor/moderate/well

Vitals

PR: RR:

BP: TEMP:

Other Systemic Examination:

Local examination:

Right/ Left shoulder

Inspection:

a) Attitude/ deformity

b) Abnormal swelling

- Site
- Size
- Shape
- Extent

c) Skin

Palpation:

a) Local tenderness

b) Bony irregularity

c) Abnormal movement

d) Crepitus

e) Swelling

Movements:	Right	Left
SHOULDER JOINT		
Flexion		
Extension		
Abduction		
Adduction		
Internal rotation		
External rotation		

INTRA-OPERATIVE PERFORMA

- TYPE OF ANAESTHESIA:
- POSITION:

- PORTALS:
- EXAMINATION:

  RANGE OF MOVEMENTS: EXTERNAL ROTATION:

  FORWARD ELEVATION:

  ABDUCTION:

  ANTERIOR INSTABILITY:

- ROTATOR CUFF:
  1) SUPRASPINATUS:

     TYPE OF TEAR:

     SIZE OF TEAR:

     SHAPE OF TEAR:
  2) INFRASPINATUS:

     TYPE OF TEAR:

     SIZE OF TEAR:

     SHAPE OF TEAR:
  3) SUBSCAPULARIS:

     TYPE OF TEAR:

     SIZE OF TEAR:

     SHAPE OF TEAR:

- ANCHORS USED:
- ANCHORS NUMBER:
- ANCHORS TYPE:

- CLOSURE:

ANNEXURE III

Azadi Ka Amrit Mahotsav

BLDE

(DEEMED TO BE UNIVERSITY)

Declared as Deemed to be University u/s 3 of UGC Act, 1956

Accredited with 'A' Grade by NAAC (Cycle-2)

The Constituent College

SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA

BLDE (DU)/IEC/ 976/2022-23

10/4/2023

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this University met on **Saturday, 18th March, 2023 at 11.30 a.m. in the CAL Laboratory, Dept. of Pharmacology,** scrutinizes the Synopsis/ Research Projects of Post Graduate Student / Under Graduate Student /Faculty members of this University /Ph.D. Student College from ethical clearance point of view. After scrutiny, the following original/ corrected and revised version synopsis of the thesis/ research projects has been accorded ethical clearance.

TITLE: "EVALUATION OF CLINICAL OUTCOME OF ARTHROSCOPIC ROTATOR CUFF REPAIR".

NAME OF THE STUDENT/PRINCIPAL INVESTIGATOR: DR.SARAGUR ANAND D.

NAME OF THE GUIDE: DR. S.S. NANDI , PROFESSOR AND HOD, DEPT. OF ORTHOPAEDICS

Dr. Santoshkumar Jeevangi
Chairperson
IEC, BLDE (DU),
VIJAYAPURA

Chairman,
Institutional Ethical Committee,
BLDE (Deemed to be University)
Vijayapura

Dr.Akram A. Naikwadi
Member Secretary
IEC, BLDE (DU),
VIJAYAPURA

MEMBER SECRETARY
Institutional Ethics Committee
BLDE (Deemed to be University)
Vijayapura-586103. Karnataka

Following documents were placed before Ethical Committee for Scrutinization.

- Copy of Synopsis/Research Projects
- Copy of inform consent form
- Any other relevant document

Smt. Bangaramma Sajjan Campus, B. M. Patil Road (Sholapur Road), Vijayapura - 586103, Karnataka, India.
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College: Phone: +918352-262770, Fax: +918352-263019, E-mail: bmpmc.principal@bldedu.ac.in

MASTERCHART

UCLA Score at 3 months	UCLA Score at 6 months	Constant Score at 6 weeks	Constant Score at 3 months	Constant Score at 6 months	VAS at 6 weeks	VAS at 3months	VAS at 6 months	Complications	Length of hospital stay	Time to return to daily activities	Patient satisfaction
23	25	61	67	80	6	5	1	None	5	7	3
25	27	64	68	86	7	5	1	None	5	10	4
18	24	66	75	84	6	3	2	None	5	11	5
27	32	68	78	85	5	3	0	None	5	7	3
18	25	59	65	78	7	3	0	Annchor failure	5	9	3
20	27	65	74	80	6	3	0	None	5	12	5
27	30	70	78	90	6	4	2	None	5	8	3
28	34	72	80	90	7	4	4	None	5	12	5
24	30	66	74	86	6	4	2	None	5	9	5
24	28	60	75	78	7	3	2	None	5	7	5
16	24	55	71	75	5	4	3	None	5	12	4
24	28	60	73	78	5	3	2	None	5	8	4
26	32	52	68	76	5	3	2	None	5	12	3
22	27	54	66	78	7	5	1	None	5	12	5
24	30	64	74	82	6	2	2	None	5	8	4
28	31	65	75	80	7	5	1	None	5	9	3
26	30	68	84	90	6	2	2	None	5	9	4
28	32	68	82	93	5	3	2	None	5	6	3
26	32	66	80	90	6	2	0	None	5	12	5
28	31	70	82	94	7	4	2	None	5	10	3
21	28	66	76	88	6	2	1	None	5	10	4
24	28	72	78	90	6	2	1	None	5	12	4

SL. NO	NAME	AGE	SEX	LATERALITY	TENDON	Type of tear	ADDITIONAL FINDINGS	Mechanism	Pre-op UCLA Score	Pre-op Constant Score	Size of tear	Shape of tear	Number of anchors used	Technique used (Single row/Double row)	UCLA Score at 6 weeks
1	TARABAI	41	F	LEFT	SUPRASPINATUS AI	COMPLETE		Degenerative	8	23	Massive	U-shaped	3	Double row	16
2	SOMANING	59	M	RIGHT	SUPRASPINATUS	COMPLETE		Degenerative	14	24	Medium	L-shaped	4	Double row	15
3	REKHA	50	F	LEFT	SUPRASPINATUS	COMPLETE		Degenerative	12	30	Large	Crescent	3	Single row	12
4	SAYYAD USMAN	32	M	LEFT	SUPRASPINATUS	COMPLETE		Traumatic	18	50	Medium	Crescent	1	Single row	22
5	PREETHI	37	F	LEFT	SUPRASPINATUS	COMPLETE		Degenerative	8	24	Massive	L-shaped	3	Double row	12
6	KHEERU RATHOD	50	M	LEFT	SUPRASPINATUS AI	COMPLETE		Degenerative	6	26	Massive	L-shaped	5	Double row	14
7	MAHABUBBI	77	F	LEFT	SUPRASPINATUS	COMPLETE		Degenerative	17	35	Small	Crescent	2	single row	20
8	NILABAI	45	F	LEFT	SUPRASPINATUS	PARTIAL	PASTA LESION	Traumatic	21	57	Small	Crescent	1	Single row	22
9	NILABAI	61	M	RIGHT	SUPRASPINATUS	PARTIAL		Traumatic	16	42	Large	Crescent	3	Single row	20
10	LAXMI	51	F	RIGHT	SUPRASPINATUS	COMPLETE		Traumatic	14	35	Massive	Crescent	3	Single row	18
11	MALLAPPA	40	M	RIGHT	SUPRASPINATUS	COMPLETE	BICEPS TENDON TEAR	Degenerative	8	28	Massive	L-shaped	4	Double row	12
12	HANAMANTH	50	M	RIGHT	SUPRASPINATUS	COMPLETE		Degenerative	10	30	Medium	L-shaped	3	Single row	16
13	GOURABAI	58	F	B/L	SUPRASPINATUS AI	COMPLETE		Traumatic	19	46	Small	L-shaped	1	Single row	22
14	SHIVANAGOUDA	35	M	RIGHT	SUPRASPINATUS	COMPLETE		Degenerative	10	28	Massive	U-shaped	3	Double row	14
15	MANOJ	39	M	RIGHT	SUPRASPINATUS	COMPLETE		Traumatic	16	40	Medium	L-shaped	3	Double row	18
16	RAMESH	32	M	RIGHT	SUPRASPINATUS	COMPLETE		Traumatic	17	45	Medium	U-shaped	2	Single row	23
17	BASANAGOUDA	41	M	LEFT	SUPRASPINATUS AI	COMPLETE		Degenerative	16	50	Small	Crescent	2	Double row	20
18	RAJESHWARI	46	F	LEFT	SUPRASPINATUS	COMPLETE		Traumatic	22	54	Small	Crescent	2	Double row	22
19	MANJULA	48	F	RIGHT	SUPRASPINATUS	PARTIAL	PASTA LESION	Traumatic	20	59	Small	Crescent	2	Double row	20
20	SUVARNA	60	F	RIGHT	SUPRASPINATUS	COMPLETE		Traumatic	24	58	Small	L-shaped	2	Double row	24
21	BHIMAPPA	55	M	LEFT	SUPRASPINATUS	COMPLETE		Degenerative	14	32	Medium	Crescent	1	Single row	16
22	JAYASHREE	35	F	RIGHT	SUBSCAPULAR	COMPLETE		Degenerative	16	40	Small	Crescent	2	Double row	18

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