"ARTHROSCOPIC SUBACROMIAL DECOMPRESSION IN THE TREATMENT OF SHOULDER IMPINGEMENT SYNDROME: A PROSPECTIVE STUDY"

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LIST OF ABBREVIATIONS

SIS = Shoulder impingement syndrome

ASD= Arthroscopic subacromial decompression

ASD=Acromioplasty and subacromial decompression

NSAIDs = Non steroidal anti-inflammatory drugs

OSS = Oxford Shoulder Scores

VAS = Visual Analogue Scale

QALY = Quality-adjusted life-years

PRP = Platelet-rich plasma

FAST = Focused Aspiration of Soft Tissue

ASES = American, shoulder and elbow, surgeons

CMS = Constant-Murley score.

ROM= Range of movements

MRI= Magnetic resonance imaging

FAST= Focused assisted sonography in trauma.

e.g. = Example

DA=Diagnostic Arthroscopy

ET=Exercise therapy

SST=Simple Shoulder Test

DASH=Disabilities Of the Arm shoulder and hand

UCLA=University of California Los Angeles

WOSI=Western Ontario shoulder instability Index

MCLDS=

ASAD=Arthroscopic subacromial decompression

FIMPACT=Finnish Subacromial Impingement Arthroscopy Controlled Trial

CMS= Comprehensive Severity Index

CMS =Clinical Mastery Series

ABSTRACT

Objective: To evaluate the efficacy of arthroscopic subacromial decompression (ASD) in improving functional, clinical, and radiological outcomes in patients with shoulder impingement syndrome (SIS).

Methods: A prospective study was conducted at KLE's Dr. Prabhakar Kore Hospital, Belagavi, from June 15, 2022, to June 14, 2023. A total of 61 participants diagnosed with SIS, meeting the inclusion criteria, were enrolled. Participants underwent ASD, and outcomes were assessed preoperatively and postoperatively at 6 weeks, 3 months, and 6 months. Outcome measures included the American Shoulder and Elbow Surgeons (ASES) score, Constant-Murley score, and acromiohumeral distance on radiographs.

Results: The study included 61 participants, with the majority (60.7%) aged between 40-60 years. The gender distribution showed a slightly higher number of females (52.5%) compared to males (47.5%). The right shoulder was more commonly affected (70.5%). Most participants (73.8%) had partial rotator cuff tears, while 26.2% had intact rotator cuffs. Significant improvements in functional outcomes were observed postoperatively, with ASES scores increasing from a preoperative mean of 27.64 to 46.41 at 6 weeks, 66.16 at 3 months, and 88.68 at 6 months ($p < 0.001$). Clinical outcomes, measured by the Constant-Murley score at 6 months, indicated that 49.2% of participants had Good outcomes, 37.7% had Fair outcomes, 8.2% had excellent outcomes, and 4.9% had Poor outcomes. Radiological outcomes showed a significant increase in the acromiohumeral distance, from a preoperative mean of 8.348 mm to 10.07 mm postoperatively. Postoperative infections were relatively uncommon, occurring in only 6.6% of participants.

Conclusion: Arthroscopic subacromial decompression significantly improves functional, clinical, and radiological outcomes in patients with shoulder impingement syndrome. The procedure is effective in alleviating symptoms, enhancing shoulder function, and increasing the acromiohumeral distance. Further research and long-term follow-up studies are recommended to validate these findings and optimize patient care.

Keywords: *ASES score, Constant- Murley score, ASD, SIS*

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INTRODUCTION

Shoulder impingement syndrome (SIS) is a common musculoskeletal disorder defined by the compression of the rotator cuff tendons and subacromial bursa between the humeral head and acromion during shoulder movement [(1)]. First described by Dr. Charles Neer in 1972, SIS encompasses a, Pathologies range from subacromial bursitis to partial and full thickness rotator cuff rupture. Contributing to pain, weakness, and functional limitations[(2)]. The patho physiology of SIS involves mechanical impingement of the subacromial structures due to anatomical abnormalities, such as subacromial spurs, acromial shape variations, and rotator cuff degeneration[(3)]. Additionally, dynamic factors such as scapular dyskinesis and altered glenohumeral kinematics further exacerbate impingement pathology, leading to progressive tissue damage and inflammation [(4)].

Conservative management strategies, including-physical therapy, non steroidal anti-inflammatory drugs (NSAIDs), and corticosteroid injections, are often employed as initial treatment modalities for SIS [(5)]. However, some patients may continue to experience symptoms despite conservative treatments, requiring surgical intervention to relieve impingement and restore shoulder function [(6)]. Arthroscopic subacromial decompression (ASD) has emerged as a minimally invasive surgical technique aimed at creating more space within the subacromial region by removing hypertrophic bursal tissue, subacromial spurs, and the Anterior-Inferior aspect of the acromion [(7)]. ASD offers several potential advantages over traditional open surgical approaches, including smaller incisions, reduced soft tissue trauma, and faster postoperative recovery [(8)].

The efficacy of ASD in the management of SIS has been extensively investigated in the literature, with numerous studies reporting favourable outcomes in terms of pain relief, functional improvement, and patient satisfaction[9]. Gartsman et al. (1990) conducted one of the early prospective studies evaluating the outcomes of ASD, demonstrating significant improvements in pain scores and shoulder function following surgery [10]. Subsequent meta-analyses and systematic reviews have corroborated these findings, reporting superior outcomes with ASD compared to conservative management in select patient populations [11]. However, the evidence regarding the superiority of surgical intervention over non-surgical modalities remains equivocal, with some studies suggesting comparable outcomes between surgical and non-surgical interventions for SIS [12].

Despite the widespread adoption of ASD, controversies exist regarding its indications, optimal surgical technique, and long-term outcomes. Critics have raised concerns regarding the potential for over diagnosis and overtreatment of SIS, emphasizing the importance of appropriate patient selection and shared decision-making in the management of this condition [13]. Furthermore, the role of concomitant procedures such as Rotator Cuff repair and biceps tenodesis during ASD remains a subject of debate, with conflicting evidence regarding their impact on clinical outcomes [14]. Complications associated with ASD include infection, neurovascular injury, stiffness, and recurrent impingement, highlighting the importance of meticulous surgical technique and postoperative rehabilitation [15].

Despite advancements in surgical techniques and peri operative care, challenges persist in optimizing outcomes following ASD for SIS. The identification of predictive factors for treatment success, such as patient age, symptom duration, and

preoperative functional status, remains an area of ongoing research [16]. Additionally, the development of standardized outcome measures and patient-reported outcome instruments specific to SIS will facilitate the comparison of results across studies and enhance the understanding of treatment efficacy [17]. Future research directions may focus on the investigation of adjunctive therapies such as platelet-rich plasma (PRP) injections and biologic agents to augment the healing response and improve clinical outcomes following ASD [18].

Overall, SIS represents a frequent cause of shoulder pain and dysfunction, necessitating a multidisciplinary approach to management encompassing conservative and surgical interventions. Arthroscopic subacromial decompression has emerged as a widely utilized surgical technique for alleviating impingement pathology and restoring shoulder function in select patient populations. While the literature supports the efficacy of ASD in improving pain and function, controversies exist regarding its indications, optimal surgical technique, and long-term outcomes. Continued research efforts are needed to address these challenges and optimize outcomes following ASD forSIS.

AIMS AND OBJECTIVES

To evaluate:

1. Functional outcome.
2. Clinical outcome.
3. Radiological outcome.

after arthroscopic subacromial decompression in the treatment of shoulder impingement syndrome.

REVIEW OF LITERATURE

HISTORICAL PERSPECTIVE

The historical perspective of arthroscopic subacromial decompression (ASD) for the treatment of shoulder impingement syndrome (SIS) traces back to the seminal work of Dr. Charle's Neer in 1972, who first described the concept of anterior acromioplasty for chronic impingement syndrome[(1)]. Neer's pioneering research laid the foundation for the understanding and surgical management of SIS, highlighting the importance of addressing subacromial pathology to alleviate impingement and restore shoulder function. Subsequent advancements in surgical techniques and arthroscopic instrumentation have revolutionized the treatment of SIS, transitioning from traditional open approaches to minimally invasive arthroscopic procedures [(2)]. Ellman's landmark study in 1987 demonstrated the feasibility and efficacy of arthroscopic subacromial decompression, providing further impetus for its widespread adoption [(3)]. The efficacy of ASD in the management of SIS has been extensively investigated in the literature, with numerous studies reporting favourable outcomes in terms of pain relief, functional improvement, and patient satisfaction [(4)]. The historical evolution of ASD reflects the relentless pursuit of innovation and excellence in shoulder surgery, culminating in its status as a cornerstone treatment modality for SIS in contemporary orthopaedic practice.

A study **by Consigliere et al. (2018)** reviews the challenges in managing Subacromial Impingement Syndrome (SIS), notably discussing the shift in understanding its pathogenesis and questioning the effectiveness of surgical decompression. The study highlights that while earlier practices embraced

acromioplasty, recent literature and controlled trials often show no significant difference in patient outcomes between surgical and conservative treatments [19].

Nazari et al. (2019) conducted a systematic review and Meta analysis to compare surgical and conservative interventions for SIS. The poled results from multiple randomized controlled trials suggested that there are no statistically significant or clinically important difference in pain and function outcomes between the two approaches, even in long-term follow-ups [20].

In 2018, Hassaan et al. compared arthroscopic versus open subacromial decompression and found that arthroscopic surgery provided better functional outcomes in the initial three months post-operation. However, there were no significant differences between the two surgical approaches at one-year follow-up, indicating equivalent efficacy [21].

Köhler et al. (2020) evaluated the outcomes of surgical versus conservative treatment for SIS in a prospective comparative study. They reported no significant differences in shoulder function and pain between the two treatment modalities at any follow-up intervals. Notably, the study found that patients treated conservatively returned to work significantly earlier than those who underwent surgery, suggesting an advantage of non-operative treatment in terms of quicker recovery and return to daily activities [22].

Bäck et al. (2021) Investigated the return to work outcomes of patients with shoulder impingement syndrome treated through either arthroscopic subacromial decompression, diagnostic arthroscopy (a placebo surgical intervention), or exercise therapy. Their findings indicated no significant differences in return to work rates

across the treatment groups, suggesting that surgical intervention may not provide additional benefits over placebo or exercise therapy in terms of occupational recovery.

Paavola et al. (2020) conducted a multicentre randomised controlled trial to assess the long-term efficacy of arthroscopic subacromial decompression by comparing it with diagnostic arthroscopy and exercise therapy over five years. Their results showed that arthroscopic decompression did not lead to better outcomes in pain or function compared to the non-operative alternatives, suggesting limited benefits of this surgical approach for shoulder impingement syndrome. [(22)]

In a comprehensive review, **Bernardino (2022)** analyzes the different success rates of conservative and surgical therapy for rotator cuff tendinopathy and subacromial impingement syndrome. The research highlights the absence of significant differences in results between the two treatment modalities, recommending non-surgical treatment as the first line strategy for most patients with subacromial impingement syndrome. [(23)]

Hünnebeck et al. (2020) evaluated different therapeutic options for mechanical outlet and non-outlet impingement, highlighting the importance of differentiating the specific type of impingement for choosing the most effective treatment. Their study suggests that patients with a structural narrowing of the subacromial space might benefit more from surgical management, indicating a nuanced approach to treatment based on individual pathology [(24)].

Brindisino et al. (2020) conducted a survey among Italian physiotherapists and orthopaedics to explore diagnostic strategies and management modalities for subacromial impingement syndrome. The results showed a wide variance in clinical approaches, with a significant proportion of professionals supporting the effectiveness

of combined diagnostic tests and a preference for clinical examination as the gold standard for diagnosing SIS. This study reflects the diversity in clinical practice and underscores the debate over the best management strategies for SIS [25].

RELEVENT ANATOMY OF SHOULDER JOINT:

The Shoulder is a Complex joint composed of several structures, including bones, muscles, ligaments, and tendons. Key components involved in shoulder impingement include:

Acromion: This bony projection of the scapula forms the highest point of the shoulder. Positioned above the shoulder joint, it can impinge on underlying structures, particularly the rotator cuff tendons, during certain movement. (26)

Rotator Cuff Muscles and Tendons: The Rotator-Cuff is a group of four muscles (Supraspinatus, Infraspinatus, Teres minor, and Subscapularis) and their corresponding tendons that surround the shoulder joint. These muscles and tendons play a crucial role in stabilizing the shoulder and facilitating its movements. Impingement can occur when the space between the acromion and the Rotator Cuff tendons narrows, leading to compression and irritation of the tendons.(27)

Subacromial Bursa: Bursa is small, fluid filled sacs that help reduce friction between tissues in the body. The subacromial bursa lies between the Acromion and the Rotator cuff tendons. Inflammation or irritation of this bursa, known as subacromial bursitis, can contribute to impingement syndrome.(28)

Coracoacromial Ligament: This ligament spans between the acromion and the Coracoid process of the Scapula. It forms the Roof of the subacromial space and, along with the acromion, can contribute to impingement if there is a narrowing of this space.(29,30)

During movements: Such as overhead reaching or lifting, the space between the acromion and the rotator cuff tendons may decrease, leading to compression and

irritation of the tendons and bursa. This can result in pain, inflammation, and eventual damage to the structures involved, manifesting as impingement syndrome.

Understanding the anatomy involved in shoulder impingement is essential for diagnosing the condition and developing effective treatment strategies, which may include physical therapy, pain killer medications, corticosteroid injections, and in some cases, surgical intervention to create more space in the subacromial area.

PATHOPHYSIOLOGY AND ETIOLOGY:

The patho physiology and aetiology of shoulder impingement syndrome (SIS) encompass a multifactorial interplay of anatomical abnormalities, biomechanical factors, and degenerative changes within the shoulder complex. Shoulder Impingement Syndrome (SIS) occurs when the Rotator cuff tendons and the Subacromial bursa are compressed between the head of humerus and the Acromion during shoulder movement. . This compression results in pain, inflammation, and a reduction in shoulder function. [(30)]. Anatomical variations, including subacromial spurs, abnormalities in acromial shape, and degeneration of the Rotator cuff, lead to decreasing of subacromial space, increasing the risk of impingement pathology. [(31)].

Shoulder impingement syndrome may ensue from anatomical anomalies such as a hooked acromion (Bigliani type III), presence of acromial bone spurs, acromio clavicular joint osteophytes, or the occurrence of an os acromiale.

These morphological deviations diminish the subacr0mial space, thereby predisposing the rotator cuff tendons to compression and consequent irritation, culminating in shoulder pain and inflammation.

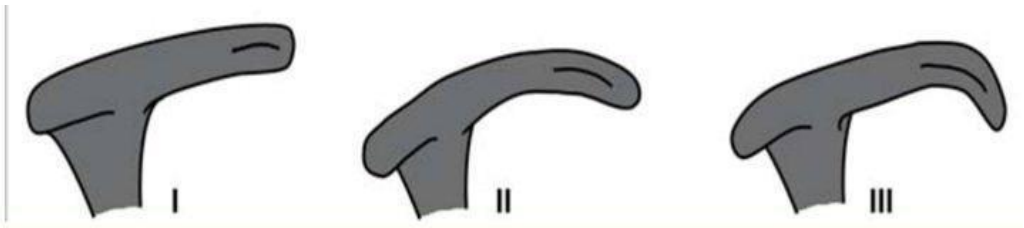

FIGURE 1.VARIOUS SHAPES OF ACROMIAN CLASSIFIED AS FLAT (TYPE1), CURVED (TYPE 2), HOOKED (TYPE 3) [(32)]

Biomechanical factors, including altered glenohumeral kinematics, scapular dyskinesis, and muscle imbalance, further exacerbate impingement by disrupting the dynamic stability of the shoulder joint. Additionally, repetitive overhead activities, poor posture, and trauma may exacerbate impingement pathology, increasing the risk of developing SIS [(33)].

The patho physiology of SIS involves a cascade of tissue damage, inflammation, and fibrosis within, the subacromial space, resulting in pain, and functional limitations [(5)]. Understanding the complex interplay of anatomical and biomechanical factors underlying SIS is essential for guiding clinical decision making and optimizing treatment strategies to alleviate impingement pathology and restore shoulder function.

The glenohumeral joint, responsible for bearing weight and facilitating extensive motion, is a critical component of the shoulder. The rotator cuff plays a pivotal role in this joint, ensuring the proper positioning of the humerus head within the shoulder socket. Impingement syndrome is characterized by soft tissue entrapment, manifests in various forms, with subacromial impingement syndrome being the most prevalent in clinical practice.

Subacromial impingement syndrome occurs when the space beneath the acromion, formed by the acromion, coracoacromial ligament, and coracoid process, becomes congested.

This congestion leads to abnormal friction between the rotator cuff and the roof of the shoulder during arm elevation, causing discomfort and dysfunction.

Shoulder impingement syndrome can be categorized into four types based on the location of the impingement within the shoulder joint:

- Subacromial Impingement Syndrome (External impingement).
- Subcoracoid Impingement.
- Posterosuperior Inner Impingement.
- Anterosuperior Inner Impingement.

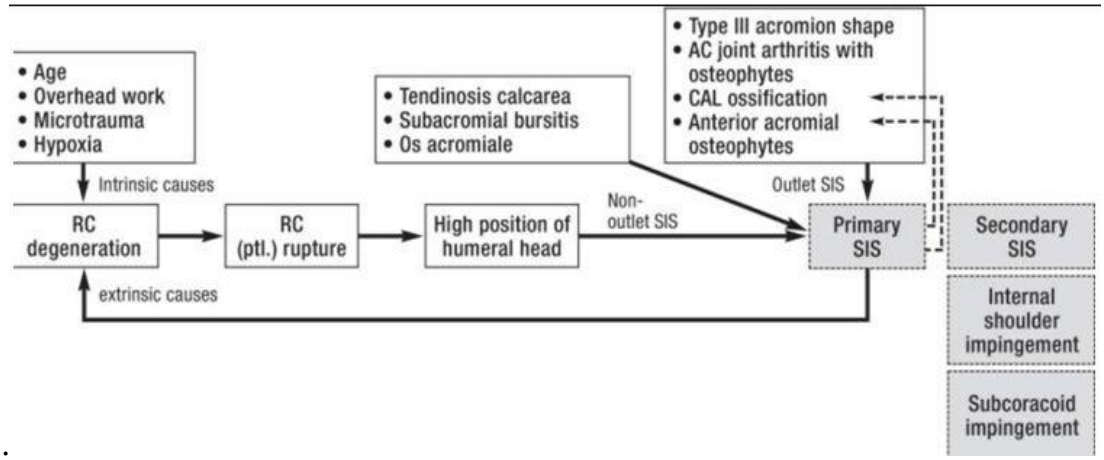

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FIGURE 2. SHOWING AETIOLOGY AND VARIOUS FACTORS CAUSING SIS

Shoulder Impingement Syndrome is a common condition leads to pain and decrease ROM in the Shoulder. Understanding the applied anatomy of the shoulder is crucial for grasping the underlying mechanisms of impingement [(34)].

NEERS CLASSIFICATION

Neer's classification of impingement syndrome outlines three distinct stages, each characterized by different pathological changes and clinical presentations:

1. **Stage 1:** This stage typically affects individuals younger than 25 years. It involves temporary swelling and bleeding in the Supraspinatus tendon and the long head of the Biceps brachiii. Patients typically experience aching discomfort due to inflammation of these structures.

2. **Stage 2:** Patients in this stage are usually aged between 25 and 40 years. Fibrotic changes occur in the supraspinatus tendon and subacromial bursa, leading to pain during activity. This stage represents a progression from the reversible changes seen in Stage 1 to more chronic, fibrotic changes.

3 **Stage 3:** This stage is typically observed in individuals older than 40 years who have a prolonged history of shoulder pain. It is characterized by osteophyte formation and may involve either partial- or Full-Thickness tears in Rotator-Cuff. These changes reflect the chronicity and degeneration of the condition over time.

Understanding these stages can help clinicians in diagnosing and managing impingement syndrome effectively, tailored to the specific stage of the condition and the patient's age and clinical presentation. [31]

A study by Garving et al. (2017) focused on the multifactorial aetiologies of shoulder impingement syndrome, emphasizing the critical role of a precise diagnosis for effective treatment outcomes. The study found that non-invasive treatments, such as non steroidal anti-inflammatory drugs (NSAIDs) and structured physical exercises, resulted in satisfactory outcomes in 60% of cases within two years.. This highlights the potential benefits of conservative management before considering surgical interventions [35].

A study by Grainger (2008) explored the controversies around internal impingement syndromes, distinguishing them from external impingement syndromes. The study reviewed the aetiology of soft tissue injuries in these conditions, concluding that internal impingement is often a normal physiological occurrence in certain shoulder positions, which complicates the diagnosis and management of these syndromes [(36)].

In 2020, Koukoulithras et al. conducted a narrative review on the various types of shoulder impingements and their management strategies. The study highlighted that while physiotherapy combined with conservative treatments typically provides good outcomes, surgical interventions should be reserved for cases where conservative therapies fail, especially in athletes less than 40 years of age. This comprehensive approach to treatment underscores the importance of tailored therapeutic strategies based on individual patient needs [(37)].

Burns and Whipple (1993) examined the anatomical relationships involved in shoulder impingement syndrome through detailed examination of autopsy specimens. Their study provided insight into how different shoulder motions can lead to impingement pain, revealing specific anatomical sites on the coraco acromial arch responsible for compressing subacromial structures. This anatomical perspective is crucial for developing more effective treatment and prevention strategies [(38)].

Koester, George, and Kuhn (2005) reviewed Shoulder impingement typically presents with pain, and limited range of motion, especially when lifting the arm overhead. Based on their findings, the recommended approach for managing this condition begins with conservative, non operative treatments such as medication and physiotherapy. Surgery is reserved for cases where conservative treatments fail, and

specific criteria are met, ensuring that it is only considered when absolutely necessary and likely to be effective. [39].

In their study, Tibone et al. (1985) evaluated the effectiveness of anterior acromioplasty in athletes with shoulder impingement syndrome. The results indicated that while the surgery effectively reduced pain both at rest and during activities only 43% of athletes could return to their pre-injury levels of competitive sports. This study highlights the limitations of surgical intervention in fully restoring athletic performance, suggesting that patients and clinicians should temper expectations regarding a return to competitive sports [40].

Seeger et al. (1988) focused on using Magnetic Resonance Imaging (MRI) to identify specific abnormalities associated with shoulder impingement syndrome. Their findings demonstrate that MRI is capable of depicting various soft-tissue and bony abnormalities, including bursitis and rotator cuff injuries, which are significant in diagnosing and managing shoulder impingement. The study confirms the utility of MRI as a valuable tool in early detection and intervention, potentially preventing the progression to more severe conditions [41].

Conroy and Hayes (1998) investigated the role of joint mobilization within a comprehensive treatment regimen for primary shoulder impingement syndrome. Their research revealed that incorporating joint mobilization techniques significantly reduced pain during the 24-hour pain and subacromial compression tests compared to comprehensive treatment alone. However, the study also emphasized the need for larger-scale studies to thoroughly assess the impact of mobilization on ROM and functional outcomes, suggesting that joint mobilization is a promising component of comprehensive therapy. [42]

Leroux et al. (1994) conducted a study to determine if an imbalance in the shoulders internal and external rotator muscles could be an etiological factor in impingement syndrome. They found significant differences in shoulder rotational strength and muscle ratio between control groups and patients with impingement syndrome. This study underscores the importance of muscular balance in the shoulder, suggesting that abnormalities in muscle strength ratios can contribute to the development and persistence of impingement symptoms. The findings advocate for incorporating specific strength training to correct these imbalances as a part of treatment strategies [(43)].

Volpin et al. (1996) explored impingement syndrome following direct shoulder injuries. The study found that direct trauma can significantly influence the development of impingement syndrome and associated pain, particularly when combined with rotator cuff tears and other structural damages. They concluded that surgical intervention, particularly anterior acromioplasty and decompression, is highly successful in these cases, provided physical therapy and analgesics have failed to provide relief. This study highlights the direct link between trauma and impingement syndrome, emphasizing the effectiveness of timely surgical intervention in specific scenarios [(44)].

CLINICAL EVALUATION

Clinical Manifestations: [45, 46]

1. Symptoms

- Manifestation of shoulder discomfort accentuated by activities involving overhead motion.
- Impaired functionality in actions such as reaching behind the body or elevating the arm.
- Onset characterized by a gradual escalation of symptoms rather than sudden onset.
- Nocturnal exacerbation of shoulder discomfort, particularly evident when lying on the affected side.

2. Signs

- Presence of a painful arc phenomenon during abduction within the range of 60 to 120 degrees.
- Palpable tenderness localized at Insertion site of the Rotator-Cuff.
- Positive results on specialized impingement tests including Neer's and Hawkins-Kennedy manoeuvres.
- Restricted ROM, notably in Abduction and External Rotation.
- Potential manifestation of weakness in shoulder abduction and external rotation.
- Possible indication of scapular dyskinesis, signifying aberrant scapular movement patterns.

3. Radiological investigation

❖ **Plain Radiography (X-ray)**

Purpose: Initial imaging method for shoulder evaluation.

Findings

- **Acromial Morphology:** Displays the structure of the acromion.
- **Osteophytes:** Identifies bony growths.
- **Calcific Deposits:** Detects calcium deposits in soft tissues.

Clinical Importance:

- **Rule out Bony Pathologies:** Excludes fractures and arthritis.
- **Assess Osteoarthritis:** Determines joint degeneration.
- **Acromion Type Assessment:** Classifies acromion shape for treatment planning.

❖ **Ultrasound** [47]

Purpose: Dynamic assessment of shoulder structures.

Findings

- Identifies rotator cuff tears, tendinopathy, and bursal thickening.
- Assesses dynamic impingement.
- Cost-effective imaging modality.
- Real-time imaging capability.

- Useful for guiding therapeutic injections.

❖ Magnetic Resonance Imaging (MRI) [48]

Purpose: MRI is utilized for detailed imaging of soft tissues in the body.

Findings: It can detect various abnormalities including:

- Rotator cuff tears.
- Tendon degeneration.
- Muscle atrophy.
- Bursitis.

Clinical Importance: MRI offers high sensitivity and specificity for diagnosing soft tissue abnormalities.

Guidance for Management: These precise findings help in guiding treatment decisions, whether it's surgical intervention or conservative management strategies.

TREATMENT MODALITY

Non-Operative Management

1. Steroid Injections

- **Purpose:** Steroid injections have historically been employed in the management of tendinopathies owing to their potent anti-inflammatory properties, seeking to assuage discomfort and mitigate the inflammatory response associated with tendon afflictions.

- **Drawbacks:** Nevertheless, their application is not devoid of drawbacks. Prolonged or repetitive administration of steroids may precipitate tendon atrophy, engendering a diminishment in tendon integrity. Moreover, the cytotoxic effects of steroids can induce cellular necrosis within the tendon milieu, compromising its inherent reparative capacity.[49,50]

- **Effectiveness:** Despite their prevalent use, studies suggest that steroid injections as a standalone intervention offer marginal efficacy, often failing to address the underlying aetiology of tendinopathies and impart sustained remediation.[51,52]

2. Platelet-Rich Plasma (PRP) Injections

- **Purpose:** PRP injections represent a paradigm shift in tendon therapeutics, endeavouring to harness the regenerative potential of the body by delivering a concentrated concoction of growth factors and cytokines to the locus of injury, thereby catalyzing tissue repair.

- **Composition:** PRP is concocted through the centrifugation of autologous blood to isolate plasma rich in platelets, which is subsequently injected into the ailing tendon.

- **Efficacy:** Albeit a commonplace intervention for tendinopathies, the evidentiary landscape surrounding PRP therapy remains nebulous. Controlled clinical trials elucidating its efficacy have been scant, with outcomes exhibiting variability. While certain studies espouse affirmative results, others evince no discernible disparity vis-à-vis placebo or conventional treatments.[53]

- **Safety:** PRP injections generally enjoy a favourable safety profile, owing to their autologous nature, which obviates concerns pertaining to immunogenicity or transmissible infections. However, the enduring ramifications and optimal dosimeter of PRP therapy are subject of ongoing scrutiny and conjecture.

3. Focused Aspiration of Soft Tissue (FAST) Procedure

- **Purpose:** The FAST procedure represents a burgeoning modality in the armamentarium for tendon pathologies, distinguished by its precision in targeting afflicted tissue. It entails the meticulous ablation of degenerated tissue under Ultrasonography guidance.

- **Procedure:** During the FAST procedure, an ultrasound-guided needle is meticulously positioned over the hypo echoic region of the affected tendon, indicative of pathological alterations. Subsequently, the needle is employed to excise, emulsify, and aspirate the diseased tissue, fostering a milieu conducive to tissue regeneration and restructuring.

- **Recovery Time:** Notably, the FAST procedure proffers expedited convalescence vis-à-vis conventional modalities such as surgical intervention or protracted immobilization. Patients undergoing the FAST procedure typically manifest accelerated recovery trajectories, culminating in a restoration of pre morbid functional status within a span of 4 to 8 weeks.

- **Benefits:** By selectively obliterating degenerative tissue whilst preserving anatomical integrity, the FAST procedure endeavours to expedite the convalescent trajectory and foster a swifter convalescence. Moreover, its minimally invasive nature confers a diminution in the incidence of iatrogenic sequelae characteristic of more intrusive surgical interventions.

NONOPEARATIVE REHABLITATION

Structured non-operative rehabilitation program for shoulder impingement syndrome, drawing from evidence-based practices documented in scientific literature.[54,55]Divided into four phases, the program aims to gradually restore shoulder function and alleviate symptoms through a combination of therapeutic modalities, exercises, manual techniques, and education. Each phase targets specific goals, such as reducing inflammation [56], improving range of motion [57], strengthening muscles [58], enhancing neuromuscular control, and progressing towards functional activities like throwing. The program emphasizes individualized treatment tailored to address underlying causative factors and prioritize patient-specific goals. Through a systematic approach, it aims to facilitate a return to prior levels of function while minimizing the risk of re-injury.

OPERATIVE TREATMENT

Open Acromioplasty

This procedure involves removing the front edge and underside of the acromion bone to relieve pressure on the rotator cuff tendons, especially the supraspinatus tendon. It may also involve addressing issues with the biceps tendon and trimming any overgrown bone at the acromio-clavicular joint. (59)

Neer, Charles S. II. Et al. (1972) conducted study on 46 patients, and concluded that anterior acromioplasty seem promising based on their statistical analysis, with good outcomes reported in patients with various degrees of shoulder pathology, including partial and complete tears of the supraspinatus tendon. However, it's noted that pre-existing deltoid weakness and scar tissue can impact the results in some cases.

SHOULDER ARTHROSCOPY

Indications

While many cases of shoulder impingement can be managed conservatively with physical therapy, anti-inflammatory medications, and activity modification, there are certain indications for shoulder arthroscopy in cases where conservative measures fail. These indications may include:

1. **Failure of conservative treatment:** When conservative treatments such as rest, physical therapy, and medication fail to provide relief from symptoms after a reasonable period (typically 3 to 6 months), shoulder arthroscopy may be considered.

2. **Persistent pain and functional impairment:** If the patient continues to experience significant pain and limitations in shoulder function despite conservative management, arthroscopic surgery may be warranted to address the underlying structural issues contributing to impingement.

3. **Structural abnormalities:** Shoulder arthroscopy allows for direct visualization of the structures within shoulder, joint, making it useful for identifying and addressing structural abnormalities such as bone spurs, inflamed bursa, or partial or complete Tears of the Rotator cuff tendons.

4. **Diagnostic uncertainty:** In cases, where the diagnosis is unclear or there is suspicion of other concomitant shoulder pathologies (such as labral tears or glenohumeral instability), arthroscopic surgery can be both diagnostic and therapeutic.

5. **Younger patients with significant symptoms:** In younger patients with significant symptoms and evidence of structural pathology on imaging studies, shoulder arthroscopy may be considered earlier to prevent further damage to the shoulder joint and preserve long-term function [57, 58, 59].

EFFICACY OF ARTHROSCOPIC SUBACROMIAL DECOMPRESSION

Beard et al. (2017) conducted a multicenter, pragmatic; parallel-group, placebo-controlled, three-group, randomized surgical trial was conducted to evaluate the effectiveness of arthroscopic subacromial decompression (ASD) for subacromial shoulder pain. The study included 313 patients who were randomly assigned to one of three groups: decompression surgery, investigational arthroscopy only, or no treatment. At the six-month mark, the mean Oxford Shoulder Score was 32.7 for the decompression group, 34.2 for the arthroscopy group, and 29.4 for the no-treatment group. The differences in scores between, the decompression and arthroscopy groups was not statistically significant (p=0.3141). The study concluded that decompression surgery did not provide additional benefits compared to arthroscopy alone, raising doubts about the value of the procedure for these indications. [60].

Beard et al. (2015) The CSAW Study looked at whether a type of shoulder surgery called arthroscopic subacromial decompression (ASD) works well for people with shoulder pain. They studied 300 patients using three different groups. They measured how well the patients felt using a score called the Oxford Shoulder Score after 6 months. They wanted to see if ASD could make a difference of at least 4.5 points on this score. They made sure to account for some patients dropping out during the study. They also wanted to understand why the surgery might help, including

looking at placebo effects. Overall, the study aimed to see if ASD was effective and worth the cost for treating shoulder pain. [61].

Paavola et al. (2017) designed the Finnish Subacromial Impingement Arthroscopy Controlled Trial (FIMPACT) to compare the efficacy of ASD versus diagnostic arthroscopy (DA) and supervised exercise therapy (ET) in patients with shoulder impingement syndrome. The trial included 210 patients randomized to ASD, DA, or ET. Primary outcomes were pain at rest and arm activity, assessed using the Visual Analogue Scale (VAS). The study found no significant differences in pain relief and functional improvement between the groups at 24 months [62].

Rombach et al. (2019) conducted a cost-effectiveness analysis of a placebo-controlled randomized trial evaluating ASD in patients with subacromial shoulder pain. The study assessed the use of resources, costs, and quality-adjusted life-years (QALYs) at six month and one year. The decompression group had a mean QALY of 0.640 and costs of £3147, while the no treatment group had a QALY of 0.522 and costs of £1451. The study concluded that the evidence for cost-effectiveness at 12 months was not conclusive, with a probability of decompression being cost-effective close to 0% at 6months and approximately 50% at 1 year. [63]

Paavola et al. (2020) this study followed 210 patients over five years to compare treatments for shoulder pain. It compared ASD (acromioplasty and subacromial decompression) with diagnostic arthroscopy and exercise therapy. After five years, both treatments showed similar results in reducing pain based on the Visual Analogue Scale (VAS). The mean differences in VAS scores between ASD and diagnostic arthroscopy were not statistically significant: -2.0 at rest and -8.0 during arm activity. This suggests that ASD did not provide additional benefit over

diagnostic arthroscopy and exercise therapy for managing shoulder impingement syndrome over the long term. (64)

Bäck et al. (2021) in a secondary analysis of the FIMPACT trial involving 184 patients, the study examined return-to-work rates following ASD (arthroscopic subacromial decompression), diagnostic arthroscopy, and exercise therapy. The findings indicated no significant difference in return-to-work rates among the groups. By the 24-month mark, 88% of patients in the ASD group, 88% in the diagnostic arthroscopy group, and 90% in the exercise therapy group had resumed working. Therefore, the study concluded that ASD did not offer any superior advantage over diagnostic arthroscopy or exercise therapy in terms of facilitating return to work. (65)

Paavola et al. (2018) compared ASD (acromioplasty and subacromial decompression) with diagnostic arthroscopy and exercise therapy for shoulder impingement. This randomized, double-blind, sham-controlled trial involved 210 patients, with primary- outcomes assessed at 24 months. Results showed that both ASD and diagnostic arthroscopy provided similar outcomes. Specifically, the mean changes in pain measured on a visual analogue scale (VAS) were 36.0 at rest and 55.4 on activity for ASD, and 31.4 at rest and 47.5 on activity for diagnostic arthroscopy. Importantly, the study concluded that there were no clinically significant differences between the two procedures. (66)

Chahal et al. (2012) conducted a systematic review and meta-analysis to determine the efficacy of arthroscopic rotator cuff repair with and without subacromial decompression. The review included four randomized trials with 373 patients. The meta-analysis found no statistically significant differences in disease-

specific quality of life, shoulder-specific outcome measures, or reoperation rates between patients treated with and without subacromial decompression [67].

Dekker et al. (2016) investigated the impact of anxiety and depression on outcomes after ASD. The study included 86 patients and found that those with higher preoperative anxiety and depression scores had worse outcomes. The non-depressed group had less pain and higher Oxford Shoulder Scores (OSS) at six weeks and six months compared to the depressed group. The study concluded that preoperative anxiety and depression negatively affect outcomes [68].

Karaman et al. (2012) in their prospective study involving 31 patients who underwent arthroscopic subacromial decompression, the researchers found promising results. They reported a mean follow-up period of 18.6 months. Prior to surgery, the patients' average Constant-Murley score was 42.8, indicating the severity of their condition. Following the procedure, there was a significant improvement in the Constant-Murley score, which averaged 79.2 postoperatively. The study concluded that 87% of the patients experienced very good and good results from the surgery. This suggests that arthroscopic subacromial decompression is an effective treatment for shoulder impingement syndrome, based on their findings. [69]

COMPLICATIONS AFTER SHOULDER ARTHROSCOPY: [70]

Postoperative complications impose a substantial burden on society, mental health, and economics, encompassing patient welfare, diminished productivity, and escalated healthcare expenditures. Discerning the determinants underlying complications in frequently conducted procedures holds paramount significance in curbing subsequent adversities and directing enhancement initiatives in quality. Such insights serve as pivotal instruments in pre-empting foreseeable challenges, thereby enhancing outcomes and curbing expenses.

These can be categorized as: [70, 71]

1. **Surgical: (around 5-8%)**

- Stiffness or arthrofibrosis (2-3%).
- Persistent pain (1-2%).
- Recurrent instability.
- Infection (<1%): most common species being *Propionibacterium acnes* infection.
- Nerve palsy/neuropraxia (<1%).
- Vascular injury, soft tissue injury.
- Wrong side surgery.
- Need for revision surgery.

2. **Medical complications: (around 1-2%)**

- Respiratory failure or hypoxia (<1%).
- Thromboembolism(0.1%).
- Pneumonia.
- CVA (0.04%).
- Death.

3. **ANASTHETIC COMPLICATION (1%)**

- Nerve block related/ general complications.

OUTCOME

There are various scoring systems used to assess shoulder Functional, Clinical, and Radiological Outcomes in patients with Shoulder conditions. Here are some of the commonly used ones:

1. **Constant-Murley Score:** This scoring system evaluates shoulder function based on pain, daily routine activity, ROM, and strength.
2. **American, Shoulder and Elbow Surgeons (ASES) Shoulder Score:** It assesses shoulder function based on pain, activities of daily living, and ROM.
3. **Simple Shoulder Test (SST):** This is self-administered questionnaire that evaluates shoulder function in terms of daily activities.
4. **Disabilities of the Arm shoulder and hand-(DASH) Score:** Although it's a broader assessment tool, it includes questions related to shoulder function and can be used to assess outcomes after shoulder surgery or injury.
5. **University of California Los Angeles (UCLA) Shoulder Score:** It evaluates Shoulder function based on pain, function, and ROM.
6. **Western Ontario shoulder instability Index (WOSI):** This scoring system is specifically designed to evaluate outcomes in patients with shoulder instability.
7. **Rowe Score:** Primarily used to assess outcomes after shoulder instability surgery, it evaluates shoulder function and recurrence of instability.
8. **Imaging-Based Scoring Systems:** Various scoring systems exist for evaluating radiological outcomes, such as the acromiohumeral distance, glenoid version,

Hill-Sachs lesion grading, and others, depending on the specific pathology being assessed.

- **AMERICAN SHOULDER, AN, ELBOW SURGEONS SHOULDER (ASES SCORE):**

Objective: The ASES Score was formulated by the Society of the American shoulder, and elbow, surgeons with the aim of standardizing Outcome evaluation and fostering collaborative research endeavours in shoulder and elbow surgery. [72]

Constituents: It contains both clinician and patient, rated segments, with the pain visual analogue scale (VAS) and a battery of 10 functional inquiries typically constituting the core elements for scoring.

Quantification: The aggregate score spans a spectrum up to 100 points, wherein the dimensions of pain and function are accorded equal weighting. Pain assessment (maximum 5o points) entails a calculated derivation by subtracting the VAS from 1o and then amplifying the resultant by five. Functional appraisal (maximum 50 points) derives from a series of 10 questions rated on a scale from 0 to 3, subsequently augmented by a factor of 5/3. [73]

To quantify the aggregate score:

Pain Assessment (maximum 50 points)

- Subtract the Visual Analogue Scale (VAS) score from 10.
- Multiply the result by 5.For example:
- If VAS score = 2,

- 10-2=8,
- 8 * 5 = 40 points for pain assessment.

Functional Appraisal (maximum 50 points):

- Rate each of the 10 questions on a scale from 0 to 3.
- Multiply the sum of the ratings by 35. For example:
- If the sum of ratings = 24,
- 24×35 =40 points for functional appraisal.

Aggregate Score

- Add the scores from pain assessment and functional appraisal together. For example:
- Pain assessment score = 40 points.
- Functional appraisal score = 40 points
- Aggregate score = 40 (pain) + 40 (function) = 80 points.

This process allows for a comprehensive evaluation of pain and function, with each dimension accorded equal weighting on a scale up to 100 points.

Psychometric Attributes: Rigorous scrutiny has affirmed its validity, reliability, and responsiveness across an array of shoulder pathologies, encompassing rotator cuff ailments, glenohumeral arthritis, shoulder instability, and prosthetic interventions [74, 75].

Clinically Relevant Thresholds: The minimal clinically important difference varies contingent upon the specific shoulder malady under consideration, oscillating between 6.4 and 12-17 points, contingent upon the level of statistical confidence.[76]

Multilingual Validation: While validated in German, its availability in other linguistic variants remains comparatively limited vis-à-vis other assessment tools such as the Disabilities of the arm, shoulder, and hand (DASH) questionnaire.

Limitation

- The inherent emphasis on Pain And patient-reported functional status may introduce an element of bias into the results.
- The absence of direct clinician input in the final scoring schema could be construed as a nuanced feature with both merits and demerits.
- Certain iterations have omitted the shoulder instability VAS, thereby potentially influencing its comprehensive evaluative capacity.
- Notably, individuals with elevated functional capacities may encounter limitations due to ceiling effects inherent in the response structure.[77]

❖ CONSTANT-MURLEY SCORE

Introduction and Background: The Constant-Murley score - (CMS) was created in 1986 and officially published in 1987 to evaluate the functional status of both healthy and pathological shoulders. It has gained widespread acceptance in Europe and continues to be the most frequently cited outcome measure in this field. [78]

Composition of the CMS: The CMS integrates two primary measurements: physical assessment results concerning motion and strength (weighted sixty-five points) and

patient-reported selective assessment of shoulder functionality (weighted thirty five points). The initial publication did not clarify the criteria for item selection or the proportional weighting of each component. [79]

Advantages and Disadvantages: Despite concerns about the reliability of the Constant-Murley Score (CMS) stemming from discrepancies between patient self-assessment and objective shoulder function measurements, several studies have identified acceptable correlations between the CMS and alternative patient-reported outcome measures.[80]

Reliability Issues: The Comprehensive Severity Index (CMS) faces challenges with inter observer reliability, as different observers often assign significantly varied scores, sometimes differing by as much as 10 units. These discrepancies stem from inconsistent interpretation and implementation of strength testing methodologies, which were not adequately standardized in the original CMS description. Improving clarity, standardization, and training in these methodologies is essential to enhance reliability and ensure consistent severity assessments across observers.[81]

Modifications and Guidelines: In 2008, the CMS (Clinical Mastery Series) underwent modifications and guideline updates aimed at enhancing reliability. These changes focused on standardizing strength testing methods and improving the consistency of scoring. The goal was to ensure more accurate and dependable assessment results, reinforcing the CMS's effectiveness in both clinical and educational contexts. [82]

Advantages and Applications: Despite reliability issues, the Constant-Murley (CMS) has advantages such as widespread use and the establishment of normative

values and minimum clinically important differences (MCIDs). It is valuable for comparing outcomes across procedures and time periods. [83]

Limitations: The emphasis on range of motion and strength can prove advantageous for conditions such as rotator cuff repairs and shoulder arthritis. However, it might result in ceiling effects among patients dealing with instability. [84]

Conclusion: While the CMS provides a comprehensive assessment of shoulder function, its reliability and validity should be considered, particularly regarding inter observer variability and potential limitations in specific patient populations. [84]

In conclusion, the Constant-Murley score serves as a valuable tool in evaluating shoulder function, but its application should be accompanied by an understanding of its limitations and potential sources of error.

- **ACROMIOHUMERAL DISTANCE**

Effectiveness of arthroscopic subacromial decompression (ASAD) in improving patient's acromiohumeral distance and alleviating symptoms associated with shoulder impingement. The significant increase in mean values of post-operative X-rays compared to pre-operative X-rays indicates a positive outcome in terms of widening the subacromial space. [85]

METHODOLOGY

Study Design: The study employed a **prospective design**, aiming to evaluate the Efficacy of Arthroscopic sub-acromian decompression in managing Shoulder impingement syndrome (SIS). By prospectively assessing the effects of ASD on SIS, the study aimed to provide Evidence to guide clinical decision-making and optimize patient care.

Study Setting: The Study was conducted at **KLE's Dr. Prabhakar Kore Hospital,** MRC and Charitable Trust Hospital in Belagavi. As a tertiary care hospital with specialized orthopaedic services, the study setting offered access to state-of-the-art facilities, equipment, and expertise necessary for conducting comprehensive assessments and interventions for SIS.

Study Duration: The study spanned a period of **one year,** commencing from June 15, 2022, to June 14, 2023. This duration allowed for the recruitment of participants, completion of preoperative evaluations, performance of surgical procedures, and longitudinal follow-up assessments postoperatively. By capturing data over a one-year timeframe, the study aimed to account for potential variations in patient outcomes and treatment effects over time.

Study Participants: Participants included individuals presenting to the orthopaedics outpatient department with symptoms suggestive of shoulder impingement syndrome, such as shoulder pain and restricted ROM. Eligible participants were adults over 18 years old who met the clinical criteria for SIS and were deemed suitable candidates for arthroscopic subacromial decompression. Participants were Selected Based on

predefined Inclusion and Exclusion criteria to ensure homogeneity and representativeness of the study population

Inclusion Criteria:

1. Age more than 18 years
2. Patient clinically Diagnosed with SIS by an experienced shoulder surgeon
3. Patient with or without Rotator Cuff Tear (RC tear less than or equal to 5 cm)
4. Failed conservative management (minimum duration of 6 month)

Exclusion Criteria:

1. Massive Rotator-Cuff tear
2. History of Fracture around the Shoulder
3. Pre-existing neurological affecting the shoulder
4. Patient refuses to participate in study

Study Sampling: Consecutive sampling was employed to recruit participants during the study period. Consecutive sampling involves selecting all individuals who meet the eligibility criteria and consent to participate in the study. This sampling approach helps minimize selection bias and ensures that the study sample is representative of the target population. By consecutively enrolling eligible participants, the study aimed to maximize the generalizability of its findings to the broader population of patients with SIS.

Study Sample Size: 61. The Sample Size for the study was determined based on the Prevalence Rate of SIS and the desired level of precision in estimating treatment

effects. A Sample Size of 61 participants was deemed sufficient to detect clinically meaningful differences in outcomes following arthroscopic subacromial decompression. This sample size calculation considered factors such as the Expected Effect size, Level of Significance, and Statistical Power, ensuring adequate statistical precision and reliability of study findings.

The Minimum Sample Size Formula, Based on Prevalence Rate is

$$n = \frac{z_\alpha{}^2 P(1-P)}{d^2}$$

Where P is the Prevalence rate and d is the percentage likely difference in the prevalence. z α is linked with the level of significance. For 5% level of the significance z α = 1.96.

Ref: The Parameter Considered in the, Calculation is the proportion of good postoperative score With P = 50% and, d = 25% of P = 12.5%, the sample size is 61.

Study Data Collection: Data collection involved a systematic approach to gathering information from participants at various stages of the study. Preoperatively, participants underwent clinical and radiological evaluations to confirm the diagnosis of SIS and establish baseline characteristics. Postoperatively, participants were followed up at specified Intervals, Including, 6-Weeks, 3-Months, and 6-Months, to assess changes in outcomes over time. During follow-up visits, participants underwent reassessment.

Study Procedure: All participants underwent evaluation and diagnosis by a shoulder surgery specialist. They were diagnosed with shoulder impingement syndrome

following both a clinical evaluation and radiographic finding. Clinical symptoms included shoulder pain and signs of impingement, while radiological evidence showed a decrease in the acromiohumeral distance, sometimes accompanied by a rotator cuff tear. Patients with rotator cuff tears more than 5cm were not included. Before the study, all patients received conservative treatment, including pain relief and physiotherapy for a period of six weeks to three months. Prior to enrolment, patients provided written consent.

OPERATIVE STEPS

The steps involved in a shoulder arthroscopy procedure for shoulder impingement syndrome:

1. PREPARATION

The Patient is Positioned Supinely or in Lateral Decubitus position on operating table under the administration of appropriate anaesthesia, such as general or regional anaesthesia.

2. POSITION

- Beach chair position
- Lateral decubitus position-The arm of the affected shoulder is supported in 70 degrees of abduction (out to the side) and 15 degrees of forward flexion (slightly forward).

3. STERILE DRAPING

The surgical site is meticulously cleansed and draped to establish and maintain a sterile field throughout the procedure.

4. PORTAL PLACEMENT

The surgeon makes precise, small incisions (portals) at strategic points around the shoulder joint to facilitate the introduction of surgical instruments, and the arthroscopy.

a. Posterior Mid-Glenoid Portal :

Approximately 2 to 3 cm Inferior and 1 to 2 cm Medial**.** This describes where Portal is situated relative to the posterolateral acromial angle.

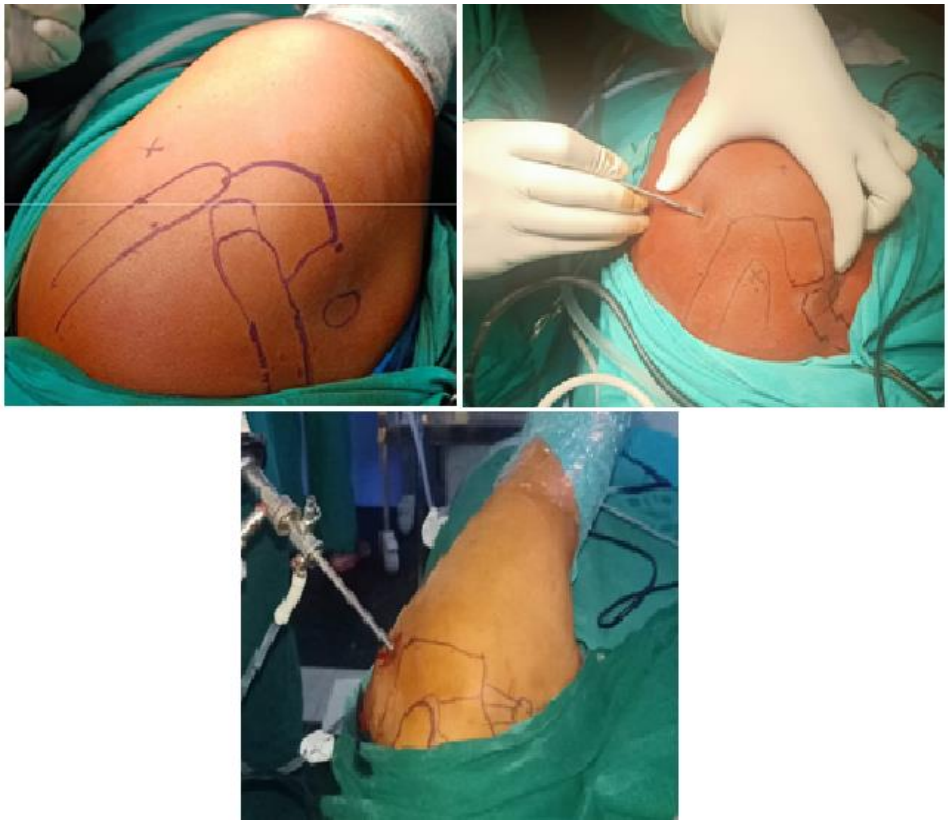


IMAGE 1. PLACEMENT OF POSTERIOR PORTAL

b. Anterior Mid-Glenoid Portal

Three cm- Inferior (downward) and 2 cm- Medial (towards the midline ofthe body) from the anterior edge of the Acromian, which is the bony prominence at the top of the shoulder.

c. Anterior-Superior Portal

One cm of the anterior lateral corner of the acromion into the joint, through the rotator interval so that it passes, anterior to the biceps tendon.

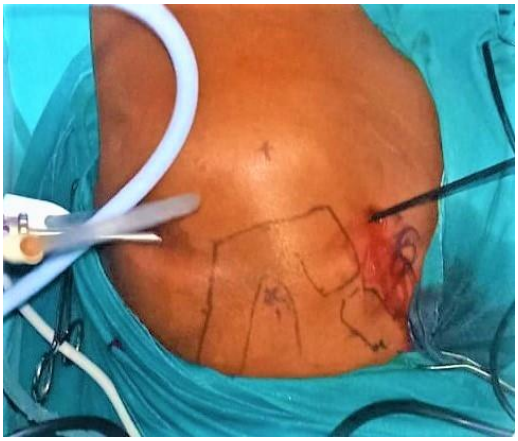


IMAGE 2. PLACEMENT OF ANTERIOR PORTAL

d. Mid lateral subacromial portal

3 to 4 cm lateral to the edge of the acromion near the mid-acromial orientation line made in line with the posterior margin of the AC joint.

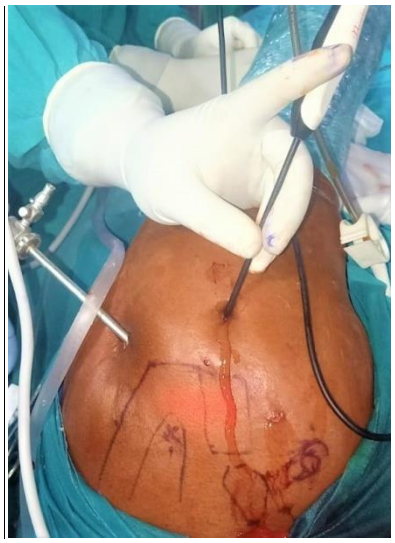


IMAGE 3. PLACEMENT OF SUBACROMIAL PORTAL

- **DIAGNOSTIC ARTHROSCOPY**

An arthroscope, equipped with a camera system, is introduced through one of the portals to conduct a thorough intra-articular inspection of the shoulder joint structures.

DIAGNOSTIC SHOULDER ARTHROSCOPY

This 15-point anatomy review outlines the key structures visualized during a glenohumeral joint evaluation, particularly during arthroscopic examination. Here's a breakdown:

Steps 1–10 Illustrating via the Posterior Portal:

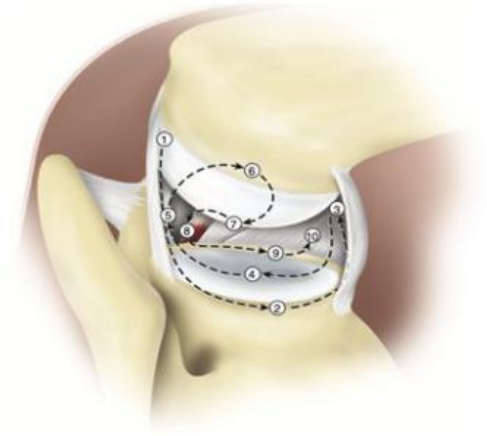


IMAGE 4. VARIOUS STEPS BY POSTERIOR PORTAL IN DIAGNOSTIC SHOULDER ARTHROSCOPY

1. **Biceps Tendon and Superior labrum:** This is where the Long Head of the Biceps tendon attaches to the superior labrum.

2. **Posterior Labrum and posterior capsule recess:** Observation of the back portion of the labrum and the recess formed by the posterior capsule.

3. **Insertion of inferior capsule on head of humerus and inferior axillary recess:** Examination of the inferior portion of the Joint space and the insertion of the capsule on head of humerus.

4. **Inferior Labrum And Glenoid Articular surface:** Viewing of inferior labrum along with the joint surface of the glenoid.

5. **Supraspinatus tendon of rotator cuff:** Identification of the tendon from the supraspinatus muscle.

6. **Posterior Rotator-Cuff Insertion and Bare area of Head of Humerus:** visualization of the attachment of the posterior portion of the cuff and the bare area on the head of humerus.

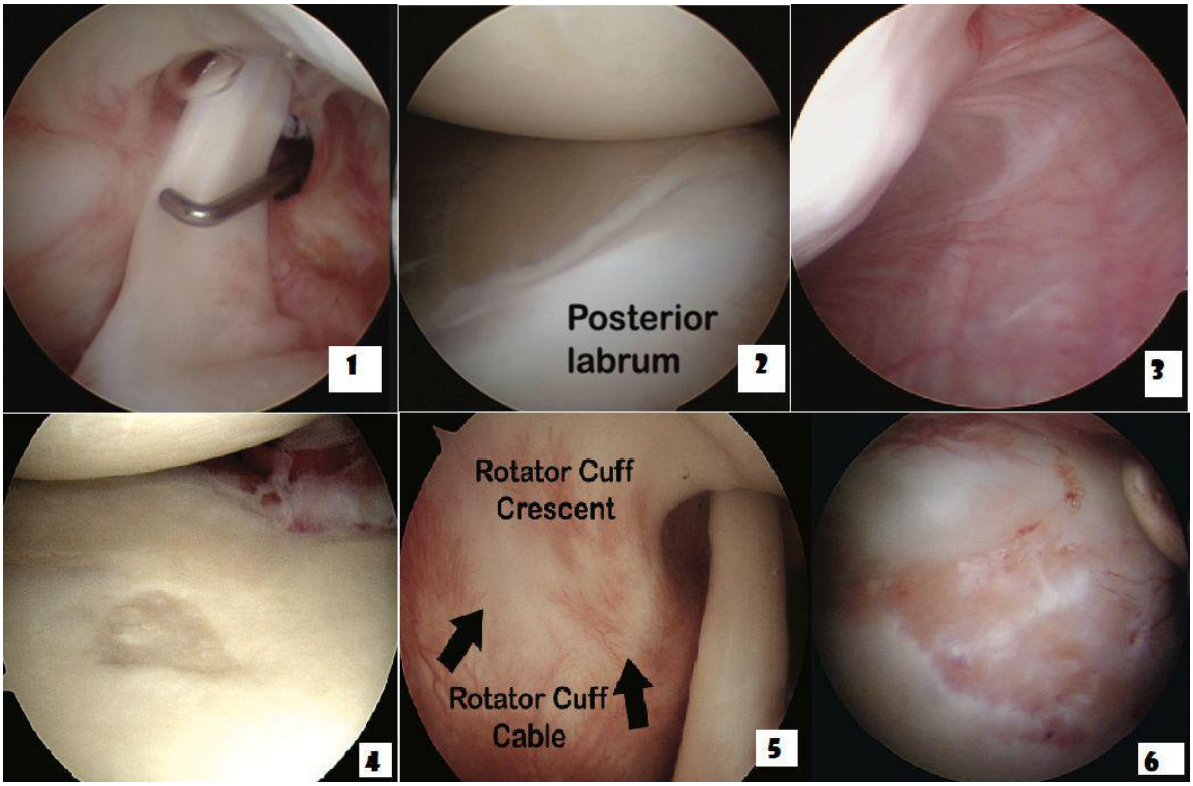


IMAGE 5. STEPS 1 TO 6 BY POSTERIOR PORTAL IN DIAGNOSTIC SHOULDER ARTHROSCOPY

7. **Posterior Glenoid labrum and insertion of capsule on the Head of Humerus:** Observation of the Posterior Aspect of the Labrum, the capsule's insertion into the head of humerus.
8. **Posterior Rotator-Cuff which include infraspinatus and the supra-spinatus tendons:** Examination of the Posterior Rotator-Cuff, which include the Infraspinatus and Supraspinatus tendon.
9. **Anterior-Glenoid Labrum and Inferior Glenohumeral Ligament attachments to head of humerus:** Observation of the anterior labrum, the attachments of the Inferior Glenohumeral -Ligament to Head of humerus.
10. **Sub-scapularis tendon and Recess and Middle- glenohumeral ligament attachment to labrum:** Identification of the subscapularis tendon, its recess, along with the attachment of the middle glenohumeral ligament to the labrum.

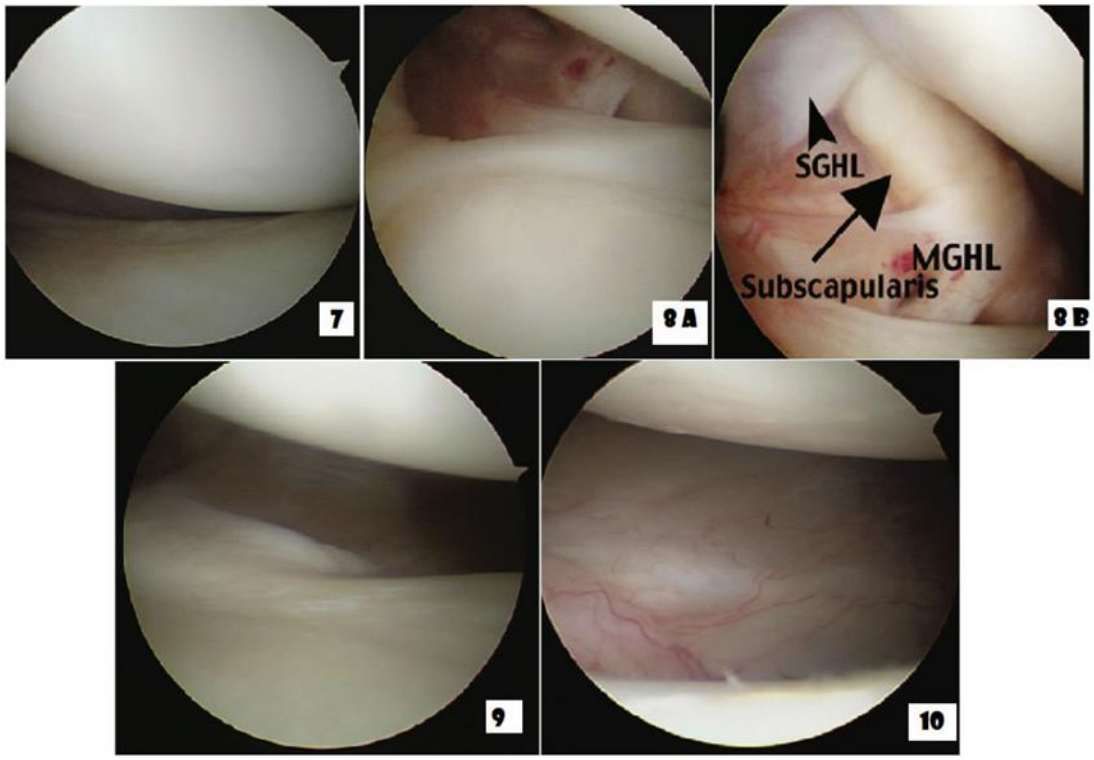


IMAGE 6. STEPS 7 TO 10 BY POSTERIOR PORTAL IN DIAGNOSTIC SHOULDER ARTHROSCOPY

Steps 11–15: Illustrating via the Anterior Portal:

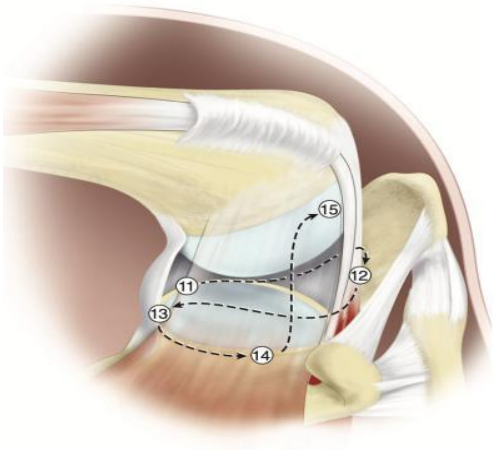


IMAGE 7. VARIOUS STEPS BY ANTERIOR PORTAL IN DIAGNOSTIC SHOULDER ARTHROSCOPY

11. Anterior surface of Head of Humerus with Sub-Scapularis attachment and Biceps tendon passage via the Rotator-interval: Final examination of the anterior surface of the head of humerus, including the attachment of the Sub-Scapularis tendon and the passage of the biceps tendon through the Rotator interval.

12. Posterior Rotator-Cuff which include infraspinatus and the supraspinatus tendons: Examination of the Posterior Rotator-Cuff, which include the Infraspinatus and Supraspinatus tendon.

13. Anterior-Glenoid Labrum and Inferior Glenohumeral Ligament attachments to head of humerus: Observation of the anterior labrum, the attachments of the Inferior Glenohumeral -Ligament to Head of humerus.

14. Sub-scapularis tendon and Recess and Middle- glenohumeral ligament attachment to labrum: Identification of the subscapularis tendon, its recess, along with the attachment of the middle glenohumeral ligament to, the labrum.

15. Anterior surface of Head of Humerus with Sub-Scapularis attachment and Biceps tendon passage via the Rotator-interval: Final examination of the anterior surface of the head of humerus, including the attachment of the Sub-Scapularis tendon and the passage of the biceps tendon through the Rotator interval.

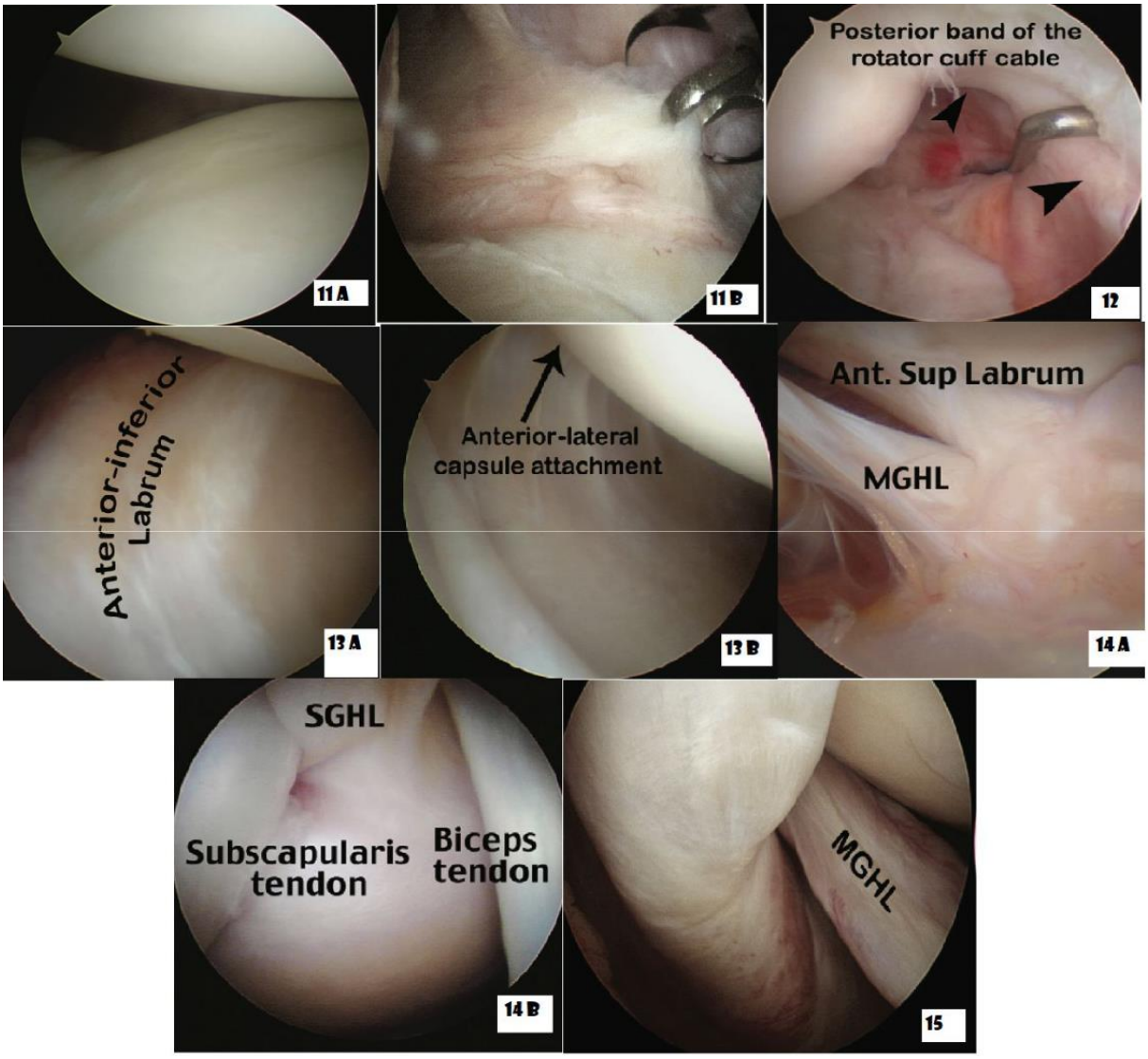


IMAGE 8. STEPS 11 TO 15 BY ANTERIOR PORTAL IN DIAGNOSTIC SHOULDER ARTHROSCOPY

DIAGNOSTIC BURSOCOPY

Eight-point bursal anatomy review during shoulder bursoscopy:

Position 1: Inferior surface of the acromion and coracoacromial ligament. Evaluate ligament integrity and look for fraying or bursitis.

Position 2: Lateral edge of the acromion and lateral bursal shelf. Differentiate the shelf from the rotator cuff.

Position 3: Greater Tuberosity of the Humerus and tendon attachments. Assess smoothness and Integrity of the Tuberosity and Rotator Cuff.

Position 4: Critical area just medial to the tendon-bone junction. Look for early cuff tears and calcifications.

Position 5: Medial wall of the subacromial bursa and AC joint. Check for adhesions, especially post-surgery.

Position 6: Posterior bursal curtain. Evaluate for thickness or scarring and consider debridement if necessary.

Position 7: Posterior Aspect of the Rotator-Cuff attachment. Note any calcifications or abnormalities post-bursa removal.

Position 8: Anterior cuff, rotator interval, and anterior bursal recess. View anterior cuff tears and subscapularis tendon area.

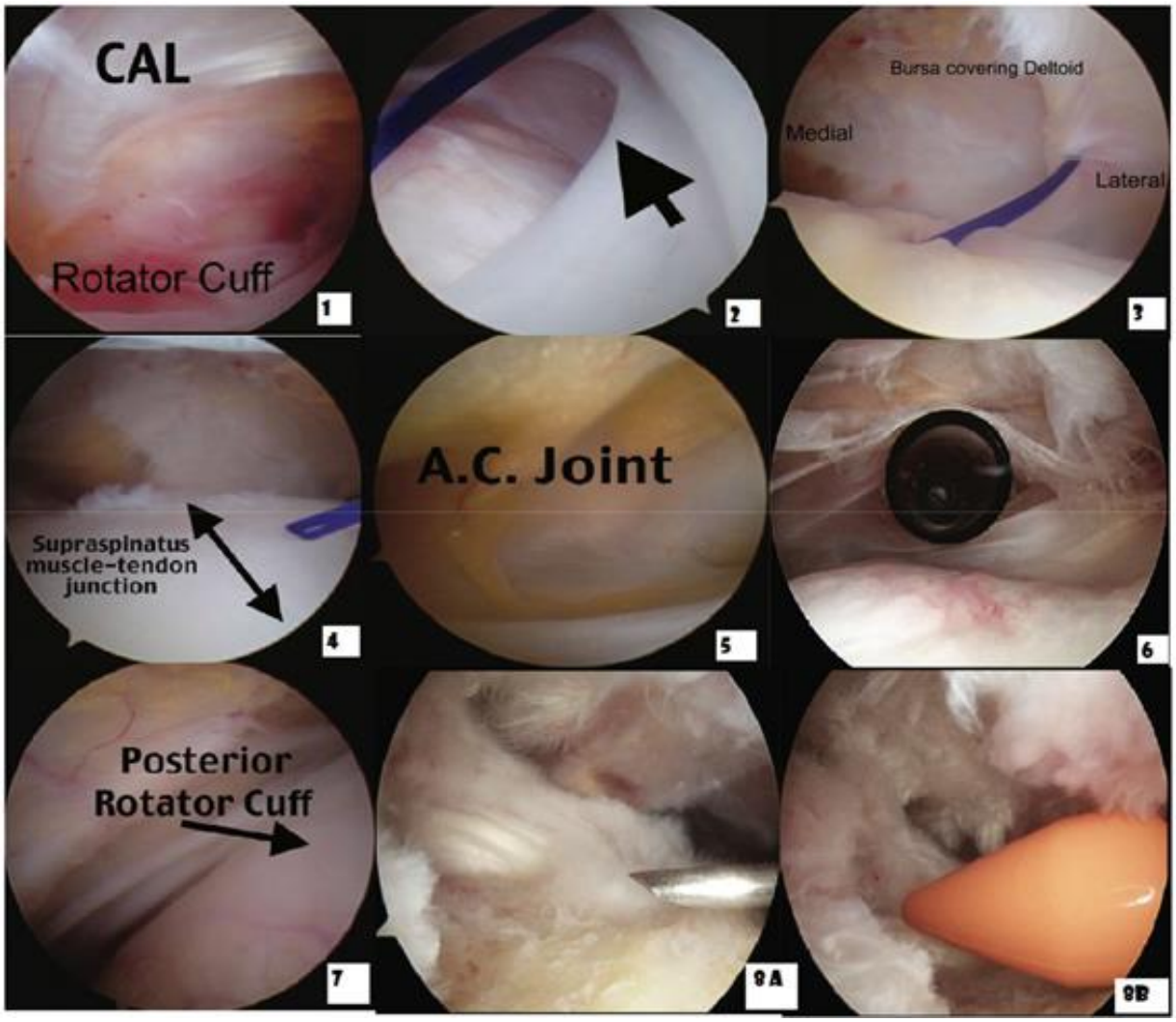


IMAGE 9. POSITION 1 TO 8 IN DIAGNOSTIC BURSOSCOPY

DEBRIDEMENT AND DECOMPRESSION

In the presence of impingement pathology, meticulous debridement of inflamed or damaged soft tissue and meticulous subacromial decompression procedures are performed to alleviate pressure on the rotator cuff and associated structures.

Any offending bony prominences, such as subacromial spurs, are excised and acromioplasty performed utilizing specialized instrumentation to optimize subacromial space.

The partial tear in the rotator cuff underwent debridement, where only the edges of the tear were trimmed without repairing it surgically.

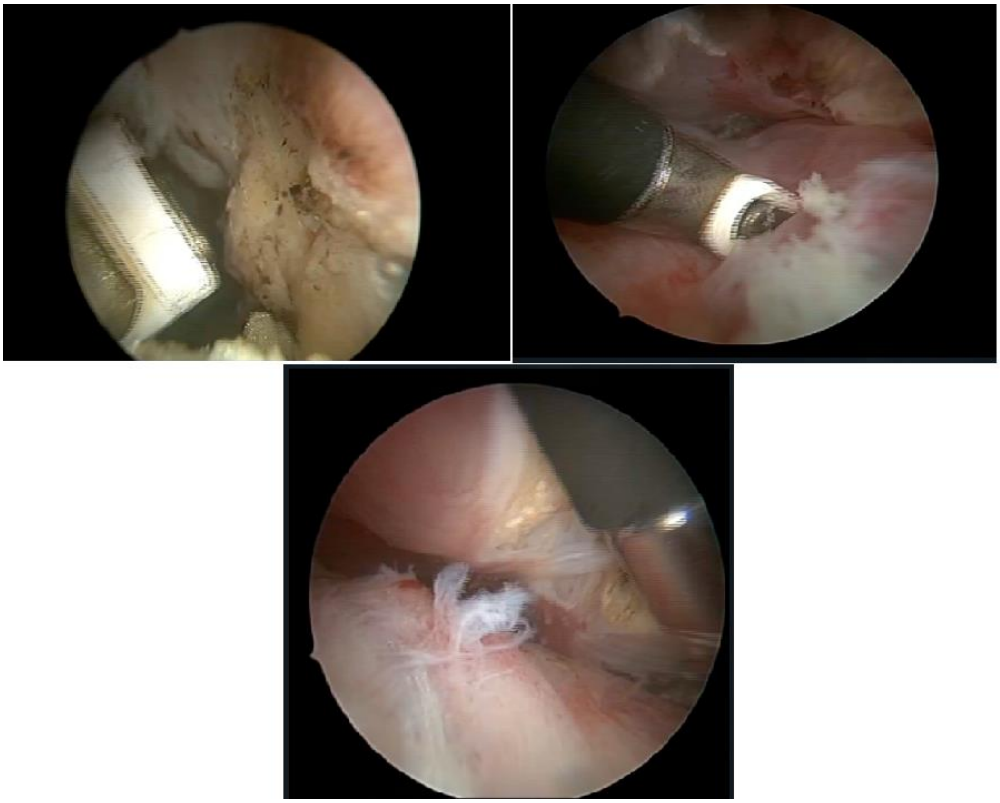


IMAGE 10. DEBRIDEMENT OF SUBACROMIAL SPACE

CLOSURE

Following completion of the necessary surgical manoeuvres, the arthroscope and ancillary instruments are withdrawn from the portals, and the incisions are meticulously closed utilizing appropriate suturing or adhesive techniques.

Recovery and Postoperative Care

Postoperatively, the patient is closely monitored in the recovery area until regaining consciousness.

Patients were promptly initiated into post-surgery physiotherapy, incorporating a regimen of movement and strength exercises. Given that not all patients underwent rotator cuff repair,

We instructed patients to engage in a ROM Exercises following procedure. Specifically, patients were motivated to elevate their shoulders to ninety degrees during the initial 2 weeks, progressing to full ROM thereafter.

Study Parameters: This study assessed multiple outcome measures to comprehensively evaluate the effectiveness of arthroscopic subacromial decompression for SIS. These outcome measures included: The ASES Score was calculated for the functional outcome at various time points such as pre-operative (ASES1) and postoperatively at 6 weeks (ASES2), at 3-months (ASES3), at 6-months (ASES4). The Constant score was evaluated for the clinical outcome at postoperatively 6 months and the score was Graded as poor-(<70), Fair-,(70-79), Good-,(80-89) and Excellent-,(90-100). The Acromiohumeral distance anterioposterior (AP-view) was measured in computerized system on plain radiograph, with adjustment of the ratio to increase accuracy- preoperatively and post operatively.

By employing a multidimensional approach to outcome assessment, the study aimed to capture the full spectrum of changes in patient symptoms, function, and radiographic findings following ASD.

Study Data Analysis: Data analysis encompassed a thorough review of gathered data to evaluate the efficacy of arthroscopic subacromial decompression for subacromial impingement syndrome (SIS).Descriptive statistics such, as mean, standard deviation, and median, were calculated to summarize continuous variables, while categorical variables were expressed in terms of rates, ratios, and percentages. Inferential statistics, including unpaired t-tests, paired t-tests, chi-square tests, and nonparametric tests, were employed to compare preoperative and postoperative outcomes and assess associations between variables. Additionally, regression analysis, correlation analysis, and other advanced statistical techniques were utilized as needed to explore relationships between study variables and identify potential predictors of treatment outcomes. By applying rigorous statistical methods, the study aimed to derive valid

and reliable conclusions regarding the efficacy of ASD for SIS and elucidate factors influencing treatment response.

Ethical Consideration: The study adhered to ethical principles and guidelines governing the conduct of research involving human participants. Ethical considerations included obtaining informed consent from all participants prior to enrolment, ensuring voluntary participation, protecting participant confidentiality, and minimizing risks to participants. The Study Protocol was Reviewed and Approved by the Institutional Review Board or Ethics committee to ensure compliance with ethical standards and safeguard the rights and welfare of participants. Additionally, researchers adhered to principles of beneficence, non malfeasance, justice, and respect for persons throughout the conduct of the study, upholding the highest standards of ethical conduct in research involving human subjects.

RESULTS AND ANALYSIS

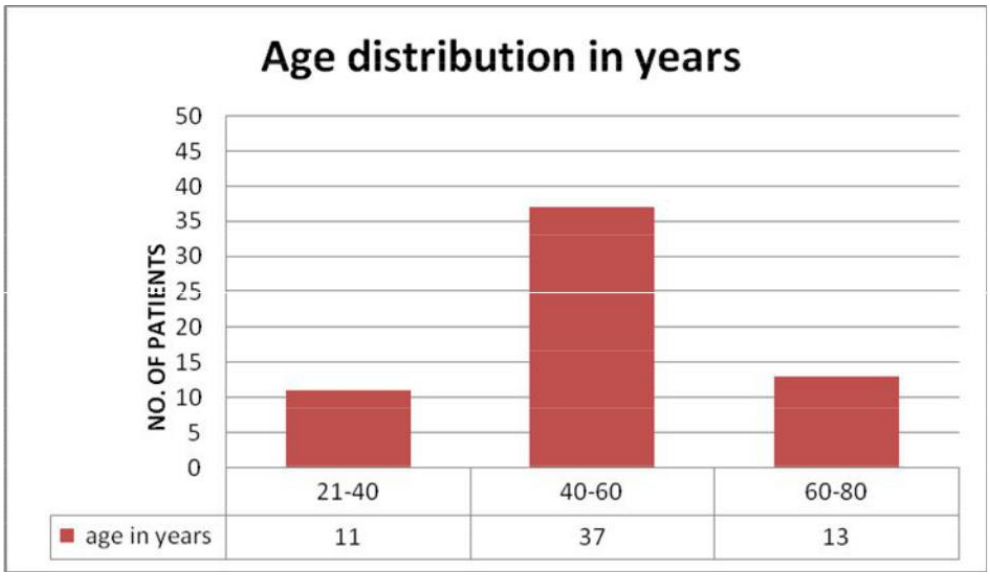
A **Prospective study** of **61** patients who underwent clinical and radiological for diagnosis of shoulder impingement syndrome and underwent the Arthroscopic Subacromial Decompression. All observations were recorded and analysed statistically using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS) software. All the parameters were assessed for the study, including age, gender, education status, occupation, duration and treatment for shoulder pain, functional assessment. Preoperative and Postoperative functional assessment by **ASES score**, postoperative clinical assessment by using **Constant-Murley score** and radiological assessment by using **Acromiohumeral distance**. All the parameters were assessed for their significance using chi- square test.

AGE

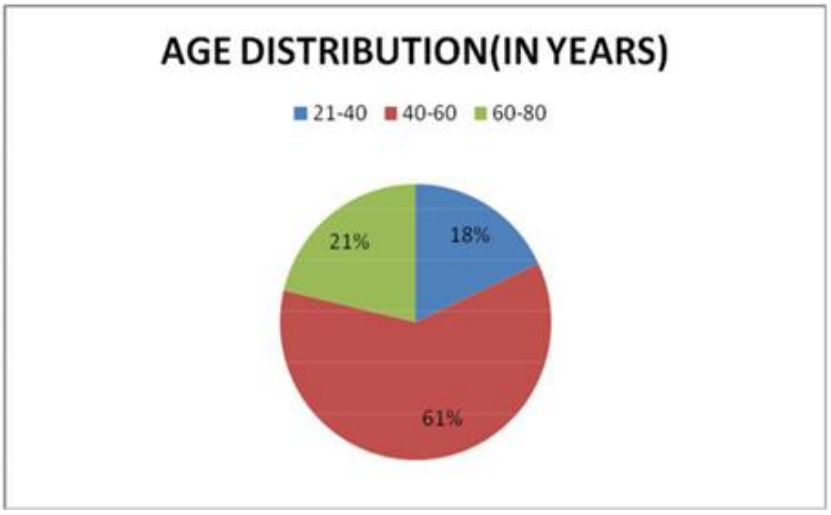
The study table shows the age distribution of 61 patients. The majority of patients, 60.7% (37 patients), were between 40-60 years old. Patients aged 60-80 years accounted for 21.3% (13 patients), while the 21-40 age group comprised 18.0% (11 patients). This data indicates that the largest age group in this study was those between 40 and 60 years old.

Table 1. Distribution of age in years

	Frequency	**Percent**
21-40	11	18.0%
40-60	37	60.7%
60-80	13	21.3%
Total	**61**	**100.0%**



Graph 1. Bar graph of Distribution of age in years



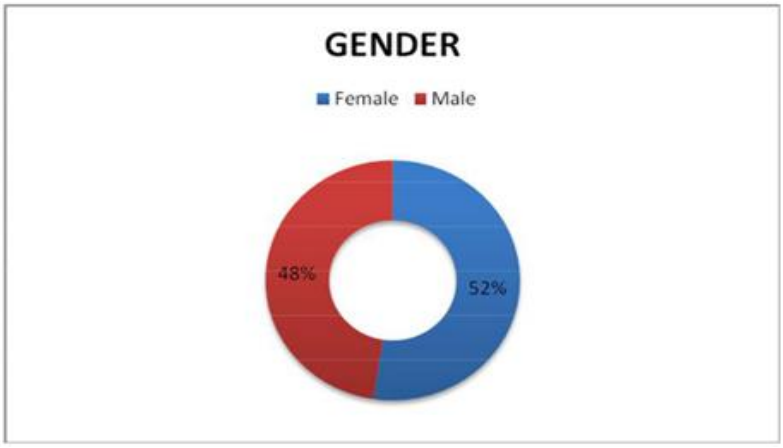
Graph 2. Pie chart of Distribution of age in years

GENDER

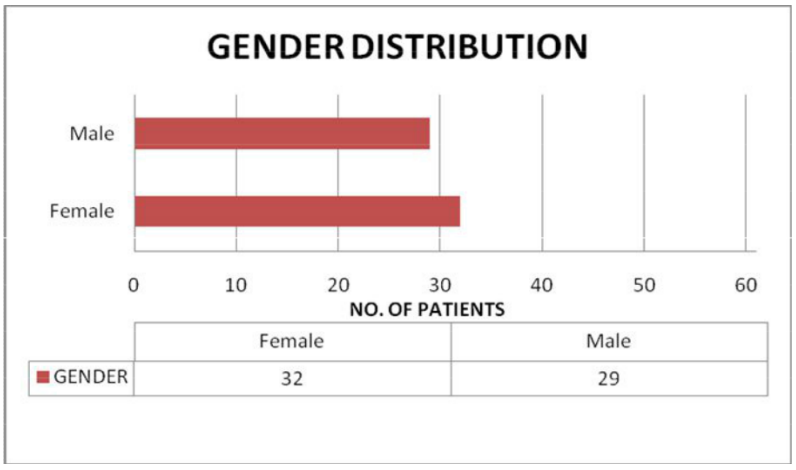
The study table presents the gender distribution of 61 patients. Females constituted 52.5% (32 patients) of the cohort, while males made up 47.5% (29 patients). This data indicates a slightly higher representation of females compared to males in the study.

Table 2. Distribution of Gender

	Frequency	Percent
Female	32	52.5%
Male	29	47.5%
Total	**61**	**100.0%**



Graph3. Pie chart of Distribution of Gender



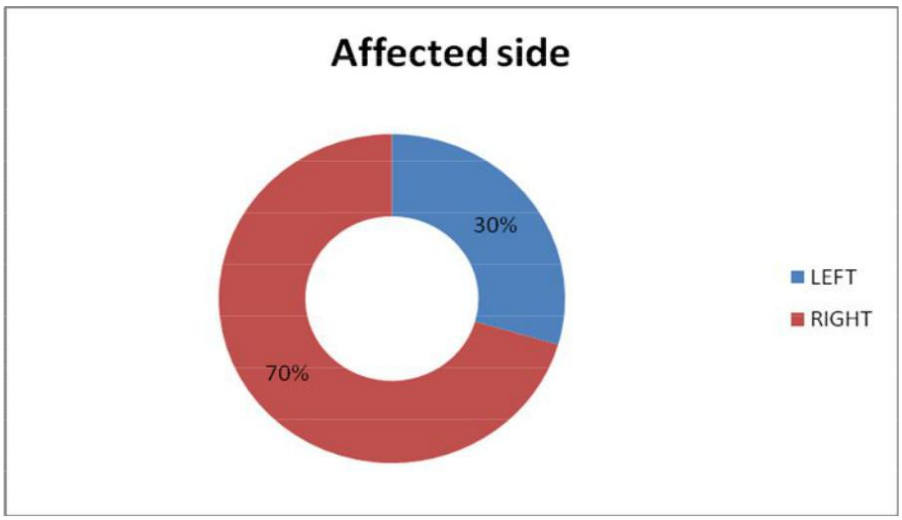
Graph4. Bar graph of Distribution of Gender

AFFECTED SHOULDER

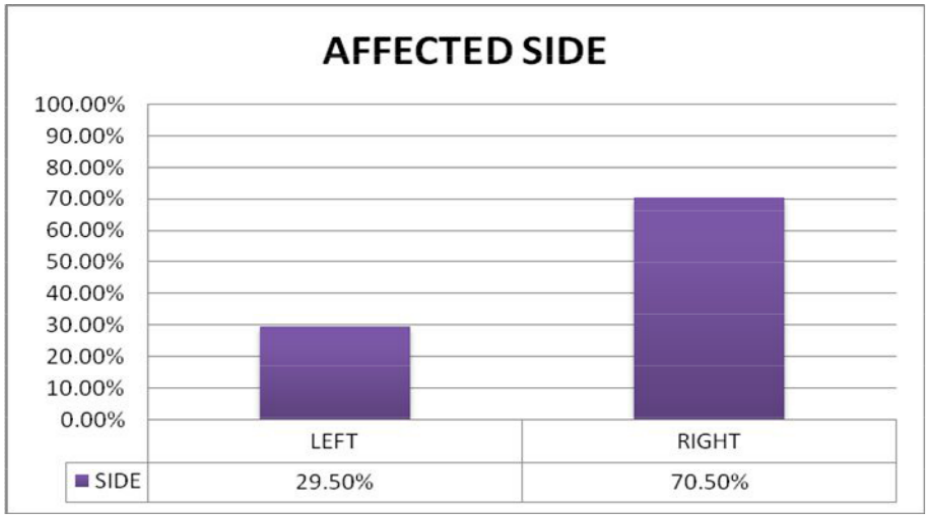
The study table indicates the laterality distribution of a condition among 61 patients. It shows that 70.5% (43 Patients) had the condition on the Right-side, While 29.5% (18 Patients) had it on The Left side. This data suggests that the condition was more commonly observed on the right side.

Table 3. Affected shoulder

	Frequency	Percent
Left	18	29.5
Right	43	70.5
Total	61	100.0



Graph 5. Pie chart of affected shoulder



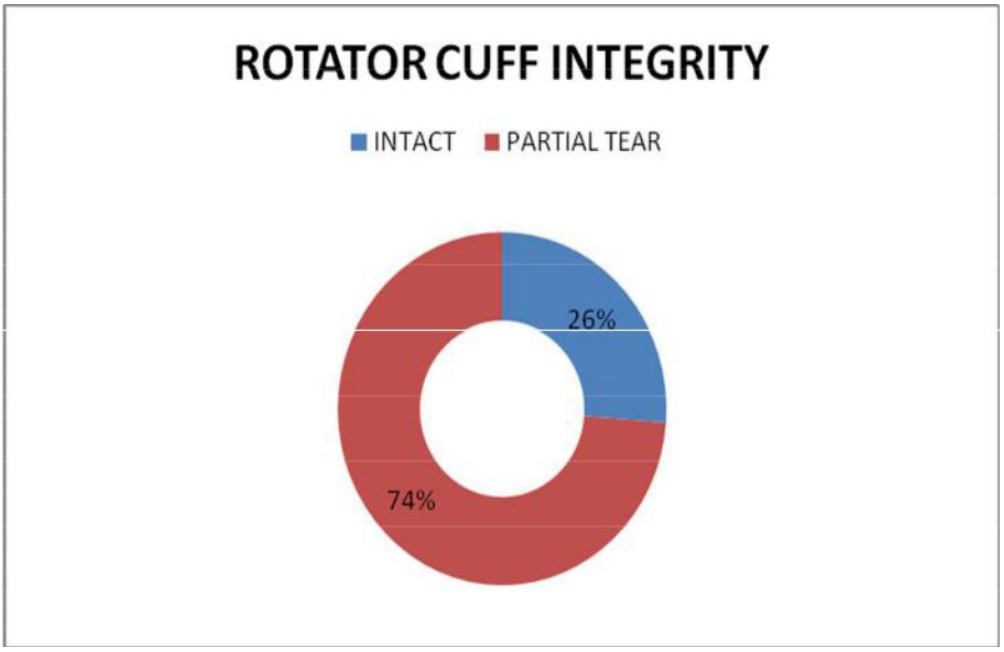
Graph6: Bar graph of affected shoulder

ROTATOR CUFF INTEGRITY

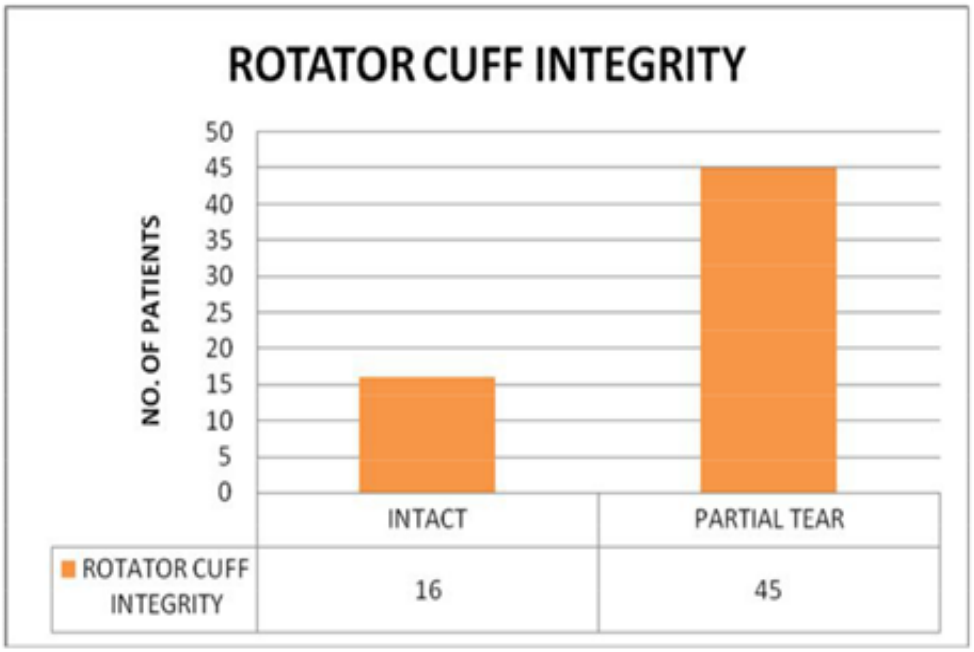
The study table presents the integrity of the rotator cuff among 61 patients. A significant majority, 73.8% (45 patients), had a partial tear in the rotator cuff, while 26.2% (16 patients) had an intact rotator cuff. This data indicates that partial tears were considerably more common than intact rotator cuffs in this patient group.

Table 4. Rotator cuff integrity

	Frequency	**Percent**
Intact	16	26.2
Partial Tear	45	73.8
Total	61	100.0



Graph7. Pie chart of Rotator cuff integrity



Graph8. Bar graph of Rotator cuff integrity

FUNCTIONAL OTCOME

The study table presents the functi0nal 0utc0mes measured by the American, shoulder and elbow surgeons (ASES) score across different time points for 61 patients. Initially, patients exhibited diminished shoulder and elbow function, reflected by a preoperative American shoulder and elbow Surgeons (ASES) score ranging from, 24 to 30, with a mean of 27.64. Following surgery, substantial improvement was observed with scores ranging from 40 to 53 at 6 weeks postoperatively, with a mean score of 46.41, indicating early recovery. This upward trend continued, with scores ranging from 59 to 73 at 3 months (mean: 66.16) and further advancing to 76 to 92 at 6 months (mean: 88.68). These findings underscore a progressive enhancement in functional outcomes over the recovery period following surgical intervention, with both minimum and maximum scores demonstrating consistent improvement over time.

Table 5. Functional outcome

	N	Minimum	Maximum	Mean	Std. Deviation
preop - ASES1	61	24	30	27.64	1.703
6 week - ASES2	61	40	53	46.41	2.789
3 month - ASES3	61	59	73	66.16	3.817
6 month – ASES4	61	76	92	88.68	3.047

COMPARISION OF ASES SCORING AT VARIOUS POINTS

The comparison of ASES (American shoulder and elbow surgeons) scores at various Time points reveals significant improvements in functional outcomes post-surgery. From preoperative (ASES1) to 6 weeks postoperative (ASES2), there is a mean difference of - 18.77049 ($p < 0.001$), indicating a notable enhancement. Further improvements are observed from preoperative to 3 months postoperative (ASES3), with a mean difference of -38.52459 ($p < 0.001$), and from preoperative to 6 months postoperative (ASES4), with a substantial mean difference of -61.049 ($p < 0.001$). Comparisons between 6- weeks and 3- months (ASES2-ASES3) and between 6 weeks and 6 -months (ASES2-ASES4) show mean differences of -19.75410 and -42.279, respectively (both $p < 0.001$), indicating continuous improvement. Additionally, the difference between 3-months and 6-months (ASES3-ASES4) with a mean difference of -22.525 ($p < 0.001$) highlights the significant progress. Overall, these findings demonstrate a consistent and significant enhancement in shoulder function over time post-surgery.

Table 6. Comparison of ASES scoring at various points

ASES		Mean difference	Std. error	p value
Pair 1	ASES1-ASES2	-18.77049*	0.41843	<0.001
Pair 2	ASES1-ASES3	-38.52459*	0.53522	<0.001
Pair 3	ASES1-ASES4	-61.049*	0.447	<0.001
Pair 4	ASES2-ASES3	-19.75410*	0.60533	<0.001
Pair 5	ASES2-ASES4	-42.279*	0.529	<0.001
Pair 6	ASES3-ASES4	-22.525*	0.625	<0.001

ROTATOR CUFF INTEGRITY VS. CLINICAL OUTCOME

The study compares the clinical outcomes at six months postoperative based on rotator cuff integrity. Patients with an Intact Rotator-Cuff had a Mean ASES Score of 90.75 (SD = 1.183), while those with a partial tear had a mean ASES sc0re of 87.95 (SD = 3.176), with a p-value of 0.90, indicating no statistically significant difference. Similarly, the mean Constant Score for patients with an Intact Rotator-Cuff was 85.12 (SD = 4.256), compared to 79.15 (SD = 7.728) for those with a partial tear, with a p-value of 0.48, also indicating no statistically significant difference. These results suggest that, at six months postoperative, there is no significant difference in clinical outcomes between patients with an Intact Rotator-Cuff and those with a partial tear.

Table 7.Rotator-Cuff integrity vs. ASES4 and Constant score:

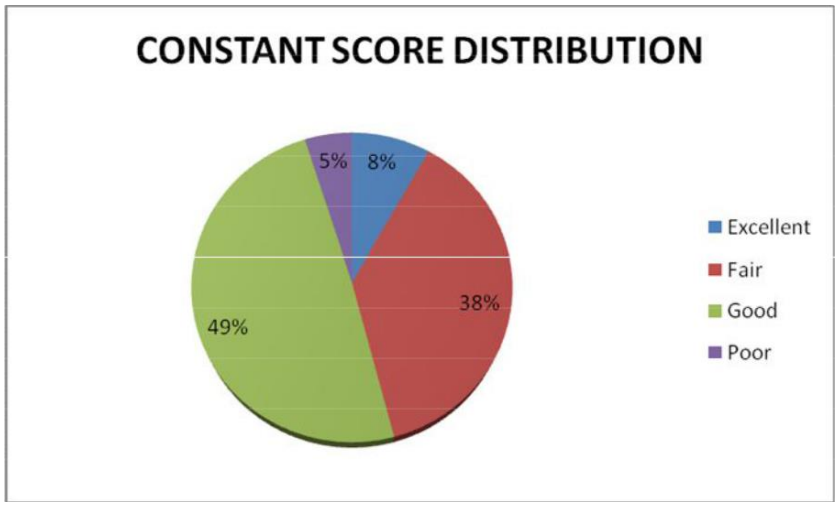
Clinical outcome	Rotator cuff integrity		p- value
	Intact	Partial tear	
Mean ASES at six months postoperative(SD)	90.75(1.183)	87.95(3.176)	0.90
Mean Constant score (SD)	85.12(4.256)	79.15(7.728)	0.48

CONSTANT SHOULDER SCORE

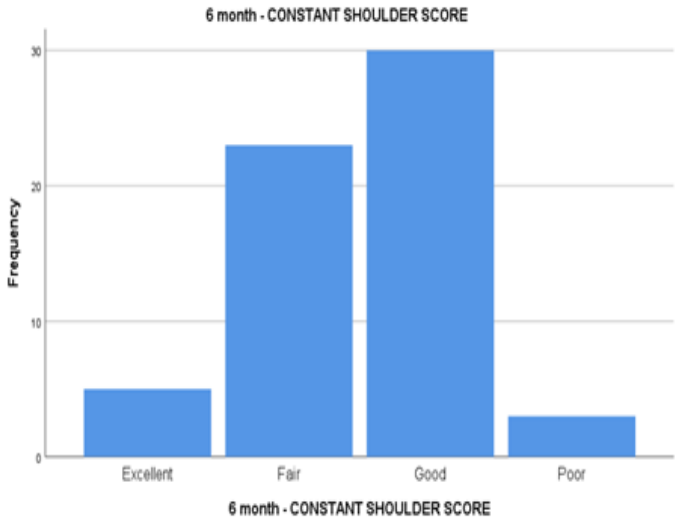
The study table presents the distribution of Constant shoulder scores among 61 patients. The majority, 49.2% (30 patients), achieved a Good rating, while 37.7% (23 patients) were rated as Fair. A smaller percentage of 8.2% (5 patients) had an excellent rating, and 4.9% (3 patients) received a Poor rating. This data indicates that most patients had favourable outcomes, with nearly half of the patients achieving a good score and a substantial portion receiving a fair rating.

Table 8. Constant shoulder score

	Frequency	Percent
Excellent	5	8.2
Fair	23	37.7
Good	30	49.2
Poor	3	4.9
Total	61	100.0



Graph9. Pie chart of Constant shoulder score



Graph 10. Bar graph of Constant shoulder score

ACROMIOHUMERAL DISTANCE

The study table presents the acromiohumeral distance measurements preoperatively and postoperatively for 61 patients. Preoperatively, the acromiohumeral distance ranged from 7.2 to 9.6 mm, with a mean of 8.348 mm and a standard deviation of 0.5620. Postoperatively, the distance increased, ranging from 9.60 to 10.42 mm, with a, mean of 10.07 mm and a standard deviation of 0.172. This data indicates a significant increase in the acromiohumeral distance following surgery, suggesting an improvement in shoulder joint space.

Table 9.Acromiohumeral Distance

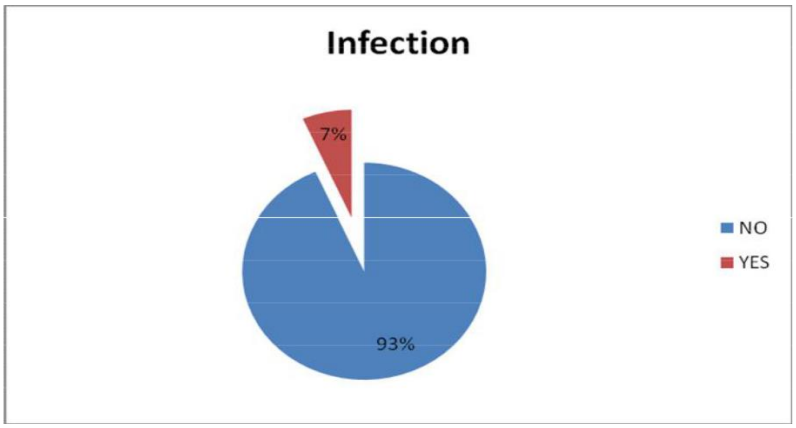
	N	Minimum	Maximum	Mean	Std. deviation
Pre op – Acromiohumeral Distance	61	7.2	9.6	8.348	0.5620
Post op – Acromiohumeral Distance	61	9.60	10.42	10.07	0.172

INFECTION

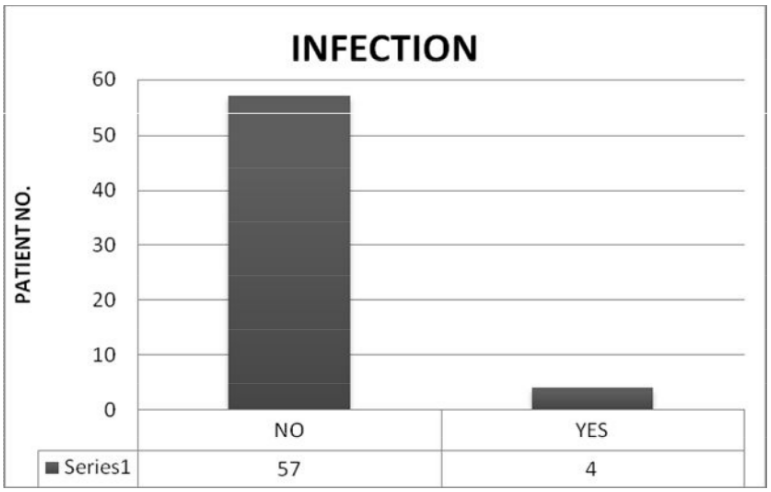
The study table presents the distribution of infection among 61 patients. A vast majority, 93.4% (57 patients), did not experience any infection, while 6.6% (4 patients) did. This data indicates that infections were relatively uncommon in this patient cohort.

Table 10. Distribution of Infection

	Frequency	Percent
No	57	93.4
Yes	4	6.6
Total	61	100.0



Graph 11. Pie chart of Infection



Graph 12. Bar graph of Infection

DEFICITS – NEUROVASCULAR

The study table shows the distribution of neurovascular deficits among 61 patients. Remarkably, 100% (61 patients) had no neurovascular deficits, while 0% (0 patients) experienced any deficits. This data indicates that there were no neurovascular complications observed in this patient group.

Table 11. Deficits – Neurovascular

	Frequency	Percent
No	61	100.0
Yes	0	0.0

OTHERS

The study table shows the distribution of other complications among 61 patients. All patients, 100% (61 patients), reported no other complications, while 0% (0 patients) experienced any additional issues. This data indicates that no other complications were observed in this patient cohort.

Table 12. Other complications

	Frequency	Percent
No	61	100.0
Yes	0	0.0

SUMMARY TABLE

The summary table provides an overview of various factors studied among 61 patients. The mean age was 50.88 years (SD = 10.49). Gender distribution showed 52.5% females (32 patients) and 47.5% males (29 patients). Regarding rotator cuff integrity, 26.2% (16 patients) had an intact rotator cuff, while 73.8% (45 patients) had a partial tear. The Mean Acromiohumeral Distance increased significantly from 8.4 mm pre-operatively (SD = 0.56) to 10.07 mm post-operatively (SD = 0.172) with a p-value of 0.01. Post-operative Constant scores showed 8.2% (5 patients) with excellent scores (90-100), 37.7% (23 patients) with fair scores (70-79), 49.2% (30 patients) with good scores (80-89), and 4.9% (3 patients) with poor scores (<70). This data highlights significant improvements in acromiohumeral distance and varied post-operative shoulder function outcomes.

TABLE 13. Summary Table

Factors		Number(n)	Percentage(%)	Mean (SD)	p-Value.
Age(in years)		61	100	50.88(10.49)	
Gender	Female	32	52.5		
	Male	29	47.5		
Roatator cuff integrity	Intact	16	26.2		
	Partial tear	45	73.8		
Acromiohumeral distance (in mm)	Pre-operative			8.4(0.56)	0.01
	Post-operative			10.07(0.172)	
Post-operative Constant score	Excellent(90-100)	5	8.2		
	Fair(70-79)	23	37.7		
	Good(80-89)	30	49.2		
	Poor(<70)	3	4.9		
ASES score	ASES 1			27.64	0.0001
	ASES 2			46.41	
	ASES 3			66.16	
	ASES 4			88.68	
Complication	Infection	4	6.6		
	Neurological deficit	None			
	Others	None			

DISCUSSION

Arthroscopic Sub-Acromial Decompression (ASD) is a Commonly Performed Surgical procedure for Shoulder impingement syndrome (SIS). Previous research has consistently demonstrated Positive results in terms of Pain, Relief, Functional outcomes, and Patient Satisfaction following surgical procedures. However, the level of improvement can differ among various patient demographics and the severity of the condition before the surgery. Our study supports these findings, showing significant improvements in functional, clinical, and radiological outcomes. Significantly, our findings Suggests that ASD has a remarkable Impact on reducing pain and enhancing shoulder mobility, supporting the results seen in previous studies.

The significance of our study lies in its thorough assessment of the effectiveness of ASD through functional, clinical, and radiological results. Through a thorough analysis of previous research, we further validate the procedure's dependability and success in addressing SIS. In addition, our innovative approach provides strong evidence in support of ASD, adding to the current body of research with the latest data. This study contributes to the improvement of patient selection criteria and surgical techniques, which can potentially enhance post-operative recovery and overall patient care in clinical practice.

The age distribution findings of our study align with previous research, suggesting that shoulder impingement syndrome tends to be more prevalent among middle-aged adults. Previous research conducted by (Pastora-Bernal et al., 2017) [(86)] and (Siron et al., 2021) [(87)] has indicated a greater occurrence of SIS in individuals between the ages of 40 and 60. Our findings align with this, as 60.7% of our patients fall within this age bracket. Individuals in this age group are often more susceptible to

SIS as a result of the gradual deterioration of the shoulder structures and increased engagement in activities that put strain on the shoulder. In both our study and historical data, the Younger-Age Group (21-40 years) and the Older-Age group (60-80 years) are not as well-represented. Interestingly, a considerable number of older adults (21.3% in our study) also seek ASD, which aligns with the fact that the aging population often experiences degenerative changes that can contribute to impingement syndrome. When it comes to outcomes, previous studies have indicated that middle-aged patients tend to experience improved post-operative recovery and functional outcomes compared to older patients. This is likely because of their generally better health and stronger tissue healing capacity. Our study supports these findings, noting positive functional, clinical, and radiological outcomes primarily in the 40-60 years age group. These findings highlight the importance of customizing treatment methods that take into account age-related factors to enhance recovery and ensure patient contentment after ASD.

The distribution of genders in our study, with 52.5% of patients being Female and 47.5% being Male, is consistent with certain previous research but differs from others. In the past, 52Research has yielded conflicting findings on the prevalence of gender in SIS. For example, studies by (Hallgren and Adolfsson, 2021) [(88)] and (Kim et al., 2021) [(89)] discovered that men tend to have a higher occurrence of shoulder impingement. This is often attributed to their involvement in occupational and sports activities that frequently require overhead movements. On the other hand, there have been other studies, like the one conducted by (Penning et al., 2014), [(90)] that have found a greater occurrence of this phenomenon in women. This could possibly be attributed to variations in anatomy, hormonal factors, and activity levels. Our research indicates a slightly higher occurrence of SIS in females, which aligns with more

recent studies. There are several factors that could contribute to shoulder impingement in women, such as biomechanical and hormonal differences. In addition, it is worth noting that there may be a higher likelihood for females to seek medical assistance for shoulder pain in comparison to males. This could be attributed to various societal and behavioural factors that influence the utilization of healthcare services. In terms of outcomes, previous research has shown that there is no significant difference between genders when it comes to post-operative recovery and functional improvement after ASD. Men and women typically experience similar improvements in pain relief, shoulder function, and overall satisfaction after the procedure. Our study confirms these observations, as we discovered similar enhancements in clinical, functional, and radiological outcomes among male and female patients. This highlights the idea that ASD is a successful treatment for SIS in all genders, ensuring fair advantages from the surgical procedure.

In our study, it was found that a majority of patients experienced impingement in their right shoulder, while a smaller percentage had involvement in their left shoulder. This right-dominant pattern aligns with the results observed in previous studies. Research conducted by (Atik, 2019) [(91)] and (Witten et al., 2018) [(92)] have also observed a greater occurrence of SIS in the right shoulder. This phenomenon is commonly linked to the fact that most people are right-hand dominant, resulting in greater reliance and stress on the right shoulder during everyday activities and work-related duties. Right shoulder impingement is often associated with activities that involve repetitive overhead movements, heavy lifting, and certain sports that put more strain on the dominant hand, leading to increased stress on the shoulder structures. As a result, the right shoulder is more prone to developing impingement syndrome. In terms of clinical outcomes, previous research has generally indicated that there are no

notable disparities in post-operative results when comparing surgeries performed on the left and right shoulder. Both sides typically show comparable improvements in pain relief, shoulder function, and patient satisfaction after ASD. Our study supports these findings, as we found similar functional, clinical, and radiological outcomes in patients, regardless of which shoulder was affected. This consistency highlights the effectiveness of ASD in treating SIS in various shoulder cases, ensuring successful recovery and positive patient outcomes regardless of the impingement side.

Our study findings reveal that a majority of patients, specifically 73.8%, experienced partial tears in their rotator cuffs, while the remaining 26.2% had intact rotator cuffs. This distribution aligns with findings from previous studies, which frequently indicate a high occurrence of rotator cuff issues in individuals with shoulder impingement syndrome. Research conducted by (Khoschnau et al., 2019) [(93)] and (Srian et al., 2023) [(94)] has indicated a high occurrence of Rotator cuff tears in individual experiencing shoulder impingement, especially among older populations who are more likely to have degenerative changes. Our study found a high prevalence of partial Rotator cuff tears, which supports the idea that Rotator cuff issues play a major role in shoulder impingement. Partial tears may result in impingement symptoms caused by changes in biomechanics and inflammation in the Sub-Acromial Space. It is Crucial to assess the condition of the Rotator cuff when diagnosing and planning treatment for SIS, as this finding highlights its significance. When it comes to outcomes, previous studies have indicated that individuals with partial Rotator cuff tears can experience significant enhancements in pain relief and shoulder function after undergoing ASD. Research conducted by (Mirzayan, 2023) [(95)] and (Godshaw et al., 2022) [(96)] has shown that a certain treatment can effectively alleviate symptoms and enhance functional outcomes, even when rotator cuff tears are present. The study

findings are in line with our observations, showing notable enhancements in clinical, functional, and radiological outcomes for patients with partial tears, comparable to those with intact rotator cuffs. The Results of this Study demonstrate the effectiveness of ASD in addressing shoulder impingement syndrome, regardless of the severity of Rotator cuff issues. The procedure play a crucial role in treating both the mechanical impingement and associated rotator cuff issues, resulting in positive outcomes for a wide range of patients.

The Functional outcomes Measured by the American shoulder and elbow surgeons (ASES) score demonstrated a steady and gradual enhancement over time after the surgical procedure, as indicated by the data provided in the table. Before the surgery, patients had ASES scores ranging from 24 to 30, with an average of 27.64, which indicates their initial level of function. After the surgery, there were noticeable improvements observed at every stage of the recovery process. By the 6-week mark, there was a noticeable increase in the average score, which reached 46.41. The range of scores varied from 40 to 53. The progress continued at 3 months, with scores ranging from 59 to 73 and a mean of 66.16. At the 6-month mark, there was a Significant Improvement in the ASES Scores, ranging from 76 to 92, and with an average score of 88.68. Previous research has consistently demonstrated that surgical intervention for shoulder and elbow conditions can result in enhanced functional outcomes, as assessed by tools like the ASES score. As an illustration, a study conducted by (Wylie et al., 2018) [(97)] revealed that individuals who underwent surgical treatment for shoulder issues saw notable enhancements in their ASES scores after the operation. In a study conducted by (Dawsonet al., 2008), [(98)] they found positive results in patients who had undergone elbow surgery. The patients showed significant improvements in their ASES scores during follow-up assessments. When

we compare the findings of our study with previous research, we notice a consistent pattern of better functional outcomes after surgery. Nevertheless, our study suggests a significant increase in ASES scores, suggesting potential progress in surgical techniques or rehabilitation protocols. The results of these studies highlight the positive impact of surgical procedures on improving the functional recovery of individuals with shoulder and elbow issues.

Throughout the different stages of the procedure, specifically before the operation, 6-weeks after the Operation, 3-months after the Operation, and 6-months after the Operation, Significant improvements were observed. The mean differences were -18.77049, -38.52459, and -61.049, respectively. These improvements were statistically significant, as indicated by p-values less than 0.001. In addition, when comparing different time points after surgery, such as 6-weeks and, 3-months or 3-months and 6- months, there were consistently noticeable differences in the average results. This suggests a continuous pattern of improvement over time. These findings align with previous research, reaffirming the well-known fact that surgical procedures have proven to be effective in improving functional recovery for individuals with shoulder and elbow conditions. When comparing our findings to other studies in the field, the similarities are quite remarkable (Curtis et al., 2021) [(99)] found similar patterns of improvement in ASES scores after surgery, which supports the consistency of these findings among various groups. In a study conducted by (Hohmann et al., 2020), [(100)] they found consistent differences in ASES scores at different points after surgery. This provides additional evidence supporting the effectiveness of surgical intervention in enhancing functional outcomes. The consistency observed across studies not only strengthens the reliability of our findings but also highlights the wider implications for clinical practice. The results of this study have significant

implications for patient care, highlighting the importance of timely surgical intervention in order to achieve the best possible outcomes after surgery and improve the quality of life for individuals dealing with shoulder and elbow problems. Our Study Provides Valuable Insights into the progressive nature of functional improvement following surgery. This information can help healthcare providers make informed treatment decisions and develop personalized rehabilitation strategies for their patients, leading to more effective care.

The analysis of clinical outcomes at six months after surgery provides intriguing insights into the correlation between the condition of the Rotator cuff and the progress of in average ASES scores between patients who had a fully functioning Rotator cuff and those who had a partial tear. In this study, it was found that patients who had a fully intact Rotator cuff had an average ASES score of 90.75 (SD = 1.183). On the other Hand, Patients with a partial tear had a slightly lower mean score of 87.95 (SD = 3.176), although the Differences were Not Statistically Significant (p-value = 0.90). Similarly, the average Constant scores also showed no Significant Difference between the two groups. Patients with an intact rotator cuff scored 85.12 (SD = 4.256), while those with a partial tear scored 79.15 (SD = 7.728), resulting in a p-value of 0.48.In contrast to similar studies, our findings may differ from earlier research that emphasized the significance of rotator cuff integrity in predicting postoperative outcomes. As an illustration, a study conducted by (Woodmasset al., 2022) [(101)] highlighted notable disparities in functional outcomes among patients with intact rotator cuffs compared to those with tears. Nevertheless, the findings of our study emphasize the intricate nature of the connection between the condition of the Rotator cuff and the outcomes experienced by patients. This underscores the importance of conducting additional research to better understand the various factors

that impact recovery after surgery. These findings have significant implications for clinical practice, highlighting the need for personalized patient care and thorough evaluation when dealing with rotator cuff issues.

The distribution of shoulder scores among the 61 patients in the study indicates a predominantly positive trend in postoperative outcomes. A significant number of patients, around 49.2% or 30 individuals experienced a positive outcome on the Constant shoulder score, indicating a favourable functional recovery. Furthermore, 23 patients, accounting for 37.7% of the total, were given a rating of Fair, indicating a moderate improvement in shoulder function. A smaller percentage of patients, 8.2% (5 individuals), had outstanding postoperative outcomes, being rated as Excellent. On the other hand, only 3 patients, or 4.9%, were given a Poor rating, indicating a less satisfactory functional recovery. In general, the results suggest that most patients had favourable outcomes after their surgery, with almost half of them achieving a good score and a significant number receiving a fair rating. Our distribution of Constant shoulder scores is consistent with the broader trends observed in the literature regarding postoperative shoulder function, as seen in similar studies. As an example, a study conducted by (Longo et al.,2020) [(102)] discovered that a significant number of patients experienced positive results ranging from good to fair after undergoing shoulder surgery. In our study, we found that a small number of patients received poor ratings. This aligns with previous research suggesting that advancements in surgical techniques and rehabilitation protocols have resulted in better outcomes for individuals undergoing shoulder procedures. These findings highlight the significance of continuous research and improvement of treatment methods to further improve postoperative results and quality of life for people with shoulder issues.

The study's data reveals important discoveries about different aspects of patient outcomes and complications after shoulder surgery. Firstly, the analysis of the acromiohumeral distance measurements shows a notable increase in the shoulder joint space after the surgery, suggesting a successful intervention to enhance shoulder function and alleviate impingement. When it comes to complications, it's worth noting that the incidence of infection among the patients was quite low. Only 6.6% of them experienced any postoperative infection. It appears that infection control measures were successful in most instances, leading to favourable results overall. In all patients, successful surgical procedures have effectively preserved nerve and vascular integrity, reducing the risk of postoperative complications related to neurovascular deficits. Similarly, the lack of additional complications highlights the overall effectiveness and safety of the surgical procedures conducted in this group of patients. When comparing these findings with existing literature, our results are Consistent with Previous Research that suggests positive outcomes and minimal complications after shoulder surgery. Research conducted by (Zadro et al., 2021) [(103)] and (Babatunde et al., 2021) [(104)] has highlighted the positive impact of advanced surgical techniques and infection control protocols on patient outcomes. These studies have consistently shown low rates of infection and neurovascular complications following surgery, underscoring the effectiveness of modern medical practices.

RECOMMENDATIONS

Utilizing a range of different approaches, such as physiotherapy and patient education, is crucial for maximizing postoperative rehabilitation and guaranteeing lasting results. Additional research should prioritize the development of customized treatment approaches that take into Account the Unique characteristics and

Preferences of Each patient. It is crucial to consistently monitor postoperative outcomes in order to identify areas for improvement and enhance clinical practice.

LIMITATIONS

The study's Sample Size is Relatively Small and The Design is limited to a single centre, which may affect the Applicability of the Findings to larger populations. It is crucial for future studies to evaluate the long-term effects of treatment to ensure its effectiveness over time.

FUTURE ASPECTS

Further research is required with larger groups of participants and longer periods of observation to confirm our findings and assess the long-term effectiveness of the treatment. The incorporation of cutting-edge imaging techniques and biomarkers can offer a more comprehensive Understanding of the Underlying causes of diseases, leading to the creation of more precise and effective treatment methods. Investigating innovative minimally invasive methods and upcoming technologies shows potential for improving the safety and effectiveness of arthroscopic subacromial decompression in the future.

SUMMARY

This study included a total of 61 patients who were scheduled to Undergo Arthroscopic Sub-Acromial Decompression (ASD) for shoulder impingement syndrome (SIS).

Our study examined the effectiveness of Arthroscopic Sub-Acromial Decompression (ASD) in addressing Shoulder impingement syndrome (SIS) using different measures.

The patient demographics showed an Average Age of 50.88 years, with a fairly Equal distribution between genders. This emphasizes the common occurrence of SIS among middle-aged adults of both sexes.

The analysis showed that a significant number of patients in the cohort had rotator cuff issues. Specifically, 26.2% had an intact Rotator cuff, while 73.8% had a partial tear.

After the surgery, there was a noticeable improvement in the shoulder joint space. The mean acromiohumeral distance increased from 8.4 mm Before the Operation to 10.07 mm After the Operation (p-value = 0.01).

The constant scores showed a range of outcomes, with a small percentage achieving excellent scores, a larger percentage achieving fair scores, a majority achieving good scores, and a small percentage achieving poor scores. This reflects the diverse nature of postoperative recovery among patients. There was a noticeable improvement in ASES scores over time, with the average scores increasing from 27.64 before the operation to 88.68 six months after the operation.

The incidence of postoperative infections among patients was relatively low, with only 6.6% experiencing complications. There were no instances of neurological deficits or any other complications reported.

CONCLUSION

In conclusion, this study affirms the efficacy of Arthroscopic Sub-Acromial Decompression (ASD) as a Treatment for Shoulder Impingement Syndrome (SIS). The results indicate notable enhancements in functional, clinical, and radiological outcomes following the surgical procedure. The study underscores the significance of taking patient demographics, including age and gender, into account when devising treatment plans, underscoring the necessity for individualized care. The Findings also Suggest that the state of the Rotator-Cuff does not have a significant effect on the functional recovery after surgery. The study affirms the favourable effects of ASD on shoulder function and alleviation of pain, as demonstrated by the enhancements in ASES scores. The study also emphasizes the minimal occurrence of complications such as infections and neurovascular deficits, further confirming the safety and effectiveness of the surgical procedure. The study suggests utilizing a multidisciplinary approach and conducting additional research to enhance postoperative rehabilitation and enhance long-term results. Future research should prioritize larger populations and longer-term follow-up to validate the findings and evaluate the long-term effectiveness of ASD. Incorporating advanced imaging techniques and biomarkers can enhance our understanding of the underlying causes of SIS and potentially enhance treatment methods. Investigating less invasive techniques and cutting-edge technologies shows potential for improving the safety and efficiency of ASD in the future.

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ANNEXURE 1 - INFORMED CONSENT

KAHERs JNMC

BELAGAVI

Arthroscopic Subacromial Decompression in the treatment of Shoulder Impingement Syndrome: A Prospective Study

Name of Student/Principal Investigator: Dr.

Name of Guide/Co Investigators: Dr.

Objective

1. To evaluate functional outcome after arthroscopic subacromial decompression in the treatment of shoulder impingement syndrome.
2. To evaluate clinical outcome after arthroscopic subacromial decompression in the treatment of shoulder impingement.
3. To evaluate radiological outcome after arthroscopic subacromial decompression in the treatment of shoulder impingement.

Introduction: Shoulder impingement syndrome (SIS) a leading cause of shoulder disability constitutes major health problems in adult. Up to 65% of all shoulder pathology is associated with SIS, a problem causing shoulder disability, pain and loss of function. The shoulder impingement syndrome is a progressive, degenerative disease of rotator cuff with entrapment of the soft tissue.

SIS mainly a clinical diagnosis and imaging modalities act as an adjunct to identify the pathology and rule out the other causes of shoulder pain. A plain radiograph is a useful guide as a narrowed acromiohumeral distance is a sign of rotator cuff tendinopathy or tear. MRI and CT arthrography can evaluate the rotator cuff tendon succinctly.

There is no specific gold standard treatment for SIS and treatment is often based on the surgeon's preference and patient specific. Many treatment option described in literature ranging from conservative to surgical intervention such as arthroscopic with or without repair and with or without subacromial decompression. With the advancing technologies and instrument enhancement, the arthroscopic technique has gained popularity among the surgeons treating SIS. Arthroscopic acrominoplasty or more commonly called arthroscopic subacromial decompression (ASAD) has shown to have a good outcome and is comparable to open techniques in treating SIS. We aim to conduct a prospective study to evaluate functional, clinical and radiological outcomes of arthroscopic subacromial decompression for shoulder impingement syndrome in Prabhaker Kore hospital and medical research centre and charitable hospital Belagavi.

Explanation of procedure

Patient who come to orthopaedic OPD at KLE's Dr. Prabhakar Kore Hospital and Medical Research Centre and Charitable Trust Hospital, Belagavi with symptom of shoulder pain and restricted range of motion of affected shoulder joint are diagnosed shoulder impingement syndrome via clinical and radiological evaluation.

After admission and before surgery and postoperatively followed up at, 6 week, 3 months,6 months by using ASES score, functional outcome will be evaluated.

After postoperative followed up at 6 month by using CS score, clinical outcome will be evaluated.

After admission and before surgery and postoperatively followed up, by plain x rays of shoulder joint ,measure the acromiohumeral distance, radiological outcome will be evaluated.

Withdrawal from participation in the study: Participation in this study is voluntary. You will be free to decide whether to participate in this study or continue participation once enrolled. In case you decide to withdraw your participation, you are free to do so. However, please convey the decision to the principal investigator.

Possible benefits from participating in the study: You will/will not have nor get any benefits by participating in this study. The data gathered will help the population at large.

Possible risks from participating in the study: There are no risks involved in participating in this study.

Privacy and confidentiality: The information collected from you will be coded, to prevent any person from identifying you. Your identity will never be revealed. The data collected from you will be kept confidential and only processed or aggregated data will be used for publication.

Financial incentives: You will not receive any payment for participating in this study.

Authorization for publication of aggregated data: Results obtained after processing of the aggregated data will be published for scientific purposes and or presented to scientific groups. However, your identity will never be revealed.

Questions: In case of any questions with regard to this study, you are free to contact:

If you have any question or complaints with regard to your right as study participant you may contact

Dr

Legal rights: By signing this consent form, we are not waving any of your legal rights.

CONSENT STATEMENT

I am making a voluntary decision to participate in the study **Arthroscopic Subacromial Decompression in the Treatment of Shoulder Impingement Syndrome: A Prospective Study**. My signature below indicates that I have decided to participate and I have read the information provided above or the information provided above has been read to me in the language that I understand best. I was given the opportunity to ask questions and that they have been answered to my satisfaction.

Name of the participant:

Signature or left thumb impression of the participant:

Name of the witness:

Signature or left thumb impression of the witness:

Name of the investigator:

Signature of the investigator:

ANNEXURE 2- PROFORMA

Arthroscopic Subacromial Decompression in the Treatment of Shoulder Impingement Syndrome: A Prospective Study

Patient No. :

Date :

Age :

Sex :

Occupation :

CHIEF COMPLAINTS

History of Shoulder Trauma :

History of Prior Shoulder Surgery :

History of Shoulder Pain Related Treatment :

Clinical Evaluation :

Affected Shoulder :

Range of Motion	**Active**	**Passive**	**Restricted**
Flexion			
Extension			
Abduction			
Adduction			
Internal Rotation			
External Rotation			

Unaffected Shoulder

Range of Motion	Active	Passive	Restricted
Flexion			
Extension			
Abduction			
Adduction			
Internal Rotation			
External Rotation			

Special Test

Name of the Test	Result	Inference
Neer Test		
Hawkins Kennedy Test		
Drop Arm Test		
Full Can Test		
Empty Can Test		
Palpation Of Tendon Defect		
External Rotation Lag Sign At Zero Degree		
Supraspinatous Strength Test		
Infraspinatous Strength Test		
Painful Arc Test		

Radiological Investigation :

X-Ray of Shoulder Joint :

Finding :

MRI Of Shoulder Joint :

Finding :

Diagnosis :

FUNCTIONAL OUTCOME

ASES - Orthopedic Scores

ASES 1 (Pre-Operative) :

ASES 2 (At 6 Weeks) :

ASES 3 (At 3 Months) :

ASES 4 (At 6 Months) :

ASES Shoulder Score :

Name :

Age :

Sex :

1. **Usual Work**
2. **Usual Sport/Leisure activity?**

3. **Do you have shoulder pain at night?**

   Yes No

4. **Do you take pain killers such as paracetamol (acetaminophen), diclofenac?**

   Yes No

5. **Do you take strong pain killers such as codeine, tramadol, or morphine?**

   Yes No

6. **How many pills do you take on an average day?**
7. **Intensity of pain?**

10	9	8	7	6	5	4	3	2	1

8. Is it difficult for you to put on a coat?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

9. Is it difficult for you to wash your back/do up bra?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

10. Is it difficult for you to comb your hair?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

11. Is it difficult for you to lift 10 lbs. (4.5kg) above your shoulder?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

12. Is it difficult for you to do your usual work?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

13. Is it difficult for you to sleep on the affected side?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

14. Is it difficult for you manage toileting?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

15. Is it difficult for you to reach a high shell?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

16. Is it difficult for you to throw a ball overhand?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

17. Is it difficult for you to do your usual sport/leisure activity?

a) Unable to do b) Very difficult to do

c) Somewhat difficult d) Not difficult

Total ASES score is:

CLINICAL OUTCOME

After 6 Months Postoperative

Constant Shoulder Score

1. Pain

a) Severe b) Moderate

c) Mild d) None

2. Activity Level

a) Unaffected Sleep

Yes No

b) Full Recreation/Sport

Yes No

c) Full Work

Yes No

3. Arm Positioning

a) Up to waist b) Up to xiphoid c)Up to neck

d) Up to you of head e) above head

4. Strength of Abduction (Pounds)

a) 0 b) 1-3 c) 4-6 d) 7-9

e) 10-12 f) 13-15 g) 15-18 h) 19-21

i) 22-24 j) >24

5. Forward Flexion

a) 31-60 degrees b) 61-90 degrees

c) 91-120 degrees d) 121-150 degrees

e) 151-180 degrees

6. Forward Flexion

a) 31-60 degrees b) 61-90 degrees

c) 91-120 degrees d) 121-150 degrees

e) 151-180 degrees

7. External Rational

a) Hand behind head, Elbow forward b) Hand behind head, Elbow back

c) Hand to top of head, Elbow forward d) Hand to top of head, Elbow back

e) Full Elevation

8. Internal Rotation

a) Lateral Thigh b) Buttocks

c) Lumbosacaral Junction d) Waist (L3)

e) T12 vertebra f) Interscapular (T7)

RADIOLOGICAL OUTCOME

Acromio-Humeral Distance :

Pre-Operative :

Post-Operative

ANNEXURE 3- MASTER CHART

Sl. No.	AGE	GENDER	AFFECTED SHOULDER	ROTATOR CUFF INTEGRITY
1	53	F	RIGHT	PARTIAL TEAR
2	54	M	RIGHT	PARTIAL TEAR
3	51	M	RIGHT	PARTIAL TEAR
4	50	M	RIGHT	PARTIAL TEAR
5	49	M	RIGHT	PARTIAL TEAR
6	58	M	LEFT	PARTIAL TEAR
7	32	F	RIGHT	INTACT
8	44	F	RIGHT	PARTIAL TEAR
9	40	M	RIGHT	PARTIAL TEAR
10	39	M	RIGHT	INTACT
11	33	F	RIGHT	INTACT
12	60	F	LEFT	PARTIAL TEAR
13	52	F	RIGHT	PARTIAL TEAR
14	53	F	RIGHT	PARTIAL TEAR
15	49	M	LEFT	PARTIAL TEAR
16	45	F	LEFT	INTACT
17	50	M	RIGHT	PARTIAL TEAR
18	50	F	RIGHT	PARTIAL TEAR
19	52	F	RIGHT	PARTIAL TEAR
20	50	F	RIGHT	PARTIAL TEAR
21	62	M	LEFT	PARTIAL TEAR
22	32	F	RIGHT	PARTIAL TEAR
23	58	F	LEFT	PARTIAL TEAR
24	42	M	RIGHT	INTACT
25	55	F	RIGHT	PARTIAL TEAR
26	60	M	RIGHT	PARTIAL TEAR
27	34	M	RIGHT	INTACT
28	68	M	RIGHT	PARTIAL TEAR
29	62	F	RIGHT	PARTIAL TEAR
30	30	F	RIGHT	PARTIAL TEAR
31	54	F	RIGHT	INTACT
32	49	F	RIGHT	PARTIAL TEAR
33	53	F	RIGHT	PARTIAL TEAR
34	43	F	LEFT	PARTIAL TEAR
35	53	F	RIGHT	PARTIAL TEAR
36	39	M	RIGHT	PARTIAL TEAR
37	61	F	RIGHT	INTACT

Sl. No.	AGE	GENDER	AFFECTED SHOULDER	ROTATOR CUFF INTEGRITY
38	52	F	RIGHT	PARTIAL TEAR
39	55	M	LEFT	INTACT
40	27	M	LEFT	PARTIAL TEAR
41	65	M	LEFT	PARTIAL TEAR
42	65	F	RIGHT	PARTIAL TEAR
43	41	M	LEFT	INTACT
44	67	F	RIGHT	PARTIAL TEAR
45	31	M	LEFT	INTACT
46	54	M	RIGHT	PARTIAL TEAR
47	47	M	RIGHT	INTACT
48	38	F	RIGHT	PARTIAL TEAR
49	63	M	RIGHT	PARTIAL TEAR
50	50	F	RIGHT	PARTIAL TEAR
51	51	M	LEFT	INTACT
52	62	F	LEFT	PARTIAL TEAR
53	62	M	RIGHT	INTACT
54	54	F	RIGHT	PARTIAL TEAR
55	69	F	LEFT	PARTIAL TEAR
56	61	M	LEFT	PARTIAL TEAR
57	56	M	LEFT	INTACT
58	52	M	RIGHT	PARTIAL TEAR
59	48	F	RIGHT	PARTIAL TEAR
60	44	M	RIGHT	INTACT
61	71	F	LEFT	PARTIAL TEAR

Sl. No.	DIAGNOSIS	FUNCTIONAL OUTCOME			
		ASES1	ASES2	ASES3	ASES4
		Pre op	6 week	3 month	6 month
1	Right partial tear of supraspinatous &shoulder impingement	28	45	64	86
2	Right partial tear of supraspinatous &shoulder impingement	27	48	60	88
3	Right partial tear of rotator cuff & shoulder impingement	28	50	64	84
4	Right partial tear of rotator cuff & shoulder impingement	30	46	70	90
5	Right partial tear of rotator cuff & shoulder impingement	26	43	60	80
6	Left partial tear of rotator cuff & shoulder impingement	30	45	65	90
7	Right supraspinatous tendonosis & shoulder impingement	26	43	62	92
8	Right partial tear of supraspinatous &shoulder impingement	26	49	61	90
9	Right partial tear of supraspinatous &shoulder impingement	30	44	66	88
10	Right shoulder impingement	28	44	62	90
11	Right shoulder impingement	27	48	61	92
12	Left partial tear of rotator cuff & shoulder impingement	30	43	70	88
13	Right partial tear of rotator cuff & shoulder impingement	30	45	63	90
14	Right partial tear of supraspinatous &shoulder impingement	28	44	66	86
15	Left partial tear of rotator cuff & shoulder impingement	27	42	64	78
16	Left shoulder impingement	28	42	63	90
17	Right partial tear of rotator cuff & shoulder impingement	30	50	61	88
18	Right partial tear of rotator cuff & shoulder impingement	27	43	70	90
19	Right partial tear of rotator cuff & shoulder impingement	28	45	65	90

Sl. No.	DIAGNOSIS	FUNCTIONAL OUTCOME			
		ASES1	ASES2	ASES3	ASES4
		Pre op	6 week	3 month	6 month
20	Right partial tear of supraspinatous &shoulder impingement	26	47	59	92
21	Left partial tear of rotator cuff & shoulder impingement	28	44	65	90
22	Right partial tear of rotator cuff & shoulder impingement	30	45	60	76
23	Left partial tear of rotator cuff & shoulder impingement	30	47	62	86
24	Right shoulder impingement	28	43	65	92
25	Right partial tear of rotator cuff & shoulder impingement	26	42	69	87
26	Right partial tear of rotator cuff & shoulder impingement	30	49	64	87
27	Right shoulder impingement	28	44	69	90
28	Right partial tear of rotator cuff & shoulder impingement	24	49	66	87
29	Right partial tear of rotator cuff & shoulder impingement	26	40	69	87
30	Right partial tear of rotator cuff & shoulder impingement	27	46	64	87
31	Right shoulder impingement	28	46	69	90
32	Right partial tear of rotator cuff & shoulder impingement	26	49	65	87
33	Right partial tear of supraspinatous &shoulder impingement	24	44	68	88
34	Left partial tear of supraspinatous & shoulder impingement	30	49	61	88
35	Right partial tear of rotator cuff & shoulder impingement	28	47	66	88
36	Right partial tear of rotator cuff & shoulder impingement	30	48	66	88
37	Right supraspinatous tendonosis & shoulder impingement	28	43	73	92
38	Right partial tear of rotator cuff & shoulder impingement	25	52	60	88
39	Left supraspinatous tendonosis & shoulder impingement	26	49	60	90

Sl. No.	DIAGNOSIS	FUNCTIONAL OUTCOME			
		ASES 1	ASES 2	ASES 3	ASES 4
		Pre op	6 week	3 month	6 month
40	Left partial tear of rotator cuff & shoulder impingement	27	50	65	89
41	Left partial tear of supraspinatous & shoulder impingement	30	47	67	89
42	Right partial tear of supraspinatous &shoulder impingement	26	45	67	89
43	Left shoulder impingement	25	45	69	92
44	Right partial tear of rotator cuff & shoulder impingement	27	53	65	89
45	Left shoulder impingement	27	43	73	92
46	Right partial tear of rotator cuff & shoulder impingement	28	50	68	89
47	Right supraspinatous tendonosis & shoulder impingement	30	45	70	89
48	Right partial tear of rotator cuff & shoulder impingement	30	48	69	89
49	Right partial tear of rotator cuff & shoulder impingement	29	48	67	89
50	Right partial tear of rotator cuff & shoulder impingement	26	49	70	89
51	Left supraspinatous tendonosis & shoulder impingement	28	51	70	89
52	Left partial tear of rotator cuff & shoulder impingement	26	46	69	90
53	Right supraspinatous tendonosis & shoulder impingement	25	47	70	90
54	Right partial tear of supraspinatous &shoulder impingement	27	49	68	90
55	Left partial tear of rotator cuff & shoulder impingement	28	47	70	90
56	Left partial tear of supraspinatous & shoulder impingement	26	47	71	90
57	Left shoulder impingement	27	48	72	90
58	Right partial tear of supraspinatous &shoulder impingement	28	48	72	91
59	Right partial tear of supraspinatous &shoulder impingement	26	47	65	91
60	Right shoulder impingement	28	46	70	92
61	Left partial tear of rotator cuff & shoulder impingement	30	50	72	92

Sl. No.	CLINICAL OUTCOME	RADIOLOGICAL OUTCOME		COMPLICATION		
	CONSTANT SHOULDER SCORE	ACROMIOHUMERAL DISTANCE		INFECTION	NEUROVASCULAR DEFICITS	OTHERS
	6 month	PRE OP	POST OP			
1	78	8.4	10	NO	NO	NO
2	87	9	10.1	NO	NO	NO
3	74	8.8	10.11	NO	NO	NO
4	88	7.8	10.26	NO	NO	NO
5	66	8.4	10.14	YES	NO	NO
6	78	8.6	9.9	NO	NO	NO
7	88	7.9	9.8	NO	NO	NO
8	69	8.9	10.17	NO	NO	NO
9	70	9.6	10.19	NO	NO	NO
10	84	8.6	10.22	YES	NO	NO
11	86	7.8	9.6	NO	NO	NO
12	70	9.1	10.21	NO	NO	NO
13	70	8.6	9.8	NO	NO	NO
14	71	7.8	10.11	NO	NO	NO
15	88	7.4	10	NO	NO	NO
16	81	8.8	10.28	NO	NO	NO
17	71	9	10.3	NO	NO	NO
18	72	7.8	9.8	NO	NO	NO
19	72	8.8	10	NO	NO	NO
20	72	7.7	10.4	NO	NO	NO
21	73	7.9	9.9	NO	NO	NO
22	62	8.8	10	YES	NO	NO
23	74	9	10.13	NO	NO	NO
24	86	7.8	10	NO	NO	NO
25	74	8.4	10.15	NO	NO	NO
26	75	8.6	9.8	NO	NO	NO
27	88	8.7	10.4	NO	NO	NO
28	75	8.5	10.18	NO	NO	NO
29	76	8.2	10	NO	NO	NO
30	76	7.4	10.2	NO	NO	NO
31	80	7.6	9.9	NO	NO	NO
32	76	7.8	10	NO	NO	NO
33	77	8.8	10.42	NO	NO	NO

Sl. No.	CLINICAL OUTCOME	RADIOLOGICAL OUTCOME		COMPLICATION		
	CONSTANT SHOULDER SCORE	ACROMIOHUMERAL DISTANCE		INFECTION	NEUROVASCULAR DEFICITS	OTHERS
	6 month	PRE OP	POST OP			
34	78	9.1	10	NO	NO	NO
35	79	7.2	10.1	NO	NO	NO
36	81	8.2	10.11	NO	NO	NO
37	81	8.5	10.2	NO	NO	NO
38	81	8.6	9.9	NO	NO	NO
39	75	8.8	10.14	YES	NO	NO
40	82	9	10	NO	NO	NO
41	83	7.6	9.6	NO	NO	NO
42	84	7.4	10.12	NO	NO	NO
43	84	8.8	9.9	NO	NO	NO
44	85	9	10.14	NO	NO	NO
45	85	7.8	10	NO	NO	NO
46	86	8.6	10.15	NO	NO	NO
47	86	7.5	10	NO	NO	NO
48	87	8.8	10.18	NO	NO	NO
49	87	8.1	10	NO	NO	NO
50	87	8.4	10.28	NO	NO	NO
51	88	8.6	10.1	NO	NO	NO
52	88	8.6	10.1	NO	NO	NO
53	88	8.2	10.24	NO	NO	NO
54	89	9	10.11	NO	NO	NO
55	89	7.9	9.9	NO	NO	NO
56	89	7.5	10.32	NO	NO	NO
57	90	8.9	10.11	NO	NO	NO
58	90	7.7	10.14	NO	NO	NO
59	91	8.5	9.9	NO	NO	NO
60	92	7.8	10.12	NO	NO	NO
61	92	8.8	10.14	NO	NO	NO