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Comprehensive Rehabilitation Following Arthroscopic Rotator Cuff Repair in an Elderly Patient: A Case Study

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Case Report

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Abstract

Background:
Rotator cuff tears are a common cause of shoulder pain and functional limitation, particularly in elderly individuals. Arthroscopic double-row rotator cuff repair is considered an effective surgical technique for restoring tendon integrity and improving shoulder biomechanics. However, postoperative challenges such as persistent weakness, limited range of motion, and scapular dyskinesis may delay functional recovery. Targeted physiotherapy focusing on scapular stabilization and progressive strengthening is therefore essential to optimize outcomes.

Case Presentation:
A 64-year-old female presented for physiotherapy at 12 weeks following arthroscopic double-row repair of a complete supraspinatus tear with partial infraspinatus involvement of the right (dominant) shoulder. She reported difficulty performing overhead activities, weakness during reaching tasks, and discomfort during abduction and external rotation. Clinical examination revealed reduced active range of motion with mild end-range pain, decreased strength of the right external rotators (3/5), and impaired scapular control. Passive movements were nearly full. Pain intensity improved from 5/10 to 2/10 on the Visual Analog Scale during rehabilitation. Functional assessment using the Quick Disabilities of the Arm, Shoulder, and Hand (QuickDASH) questionnaire showed improvement from 75/100 at baseline to 50/100 at follow-up, indicating a clinically meaningful reduction in upper limb disability.

Intervention:
A structured rehabilitation program was implemented, including wall crawl exercises for range of motion, scapular stabilization exercises (wide-grip resistance band rows and side-lying external rotation), rotator cuff strengthening with resistance bands, proprioceptive neuromuscular facilitation (D2 flexion pattern), scapular clock exercises, and whole-body vibration therapy. Resistance was progressively increased using color-coded TheraBands based on pain tolerance and movement quality.

Outcome and Conclusion:
Following intervention, the patient demonstrated improved shoulder mobility, enhanced scapular control, reduced pain, and better performance in daily activities. This case highlights the importance of integrating scapular-focused rehabilitation and progressive strengthening to restore scapulohumeral rhythm and optimize functional recovery after arthroscopic rotator cuff repair in elderly patients.

INTRODUCTION

In the general population, shoulder discomfort is one of the most common musculoskeletal symptoms, with a lifetime frequency of up to 67%[1]. Chronic shoulder discomfort and dysfunction are frequently caused by rotator cuff disease, particularly in middle-aged and older persons. According to epidemiological research, shoulder pain is prevalent in working populations and develops with age [1, 2].

Rotator cuff tears frequently cause pain, weakness, and difficulties with overhead activities, especially when the arm is raised and rotated externally[3, 4].

Surgery is usually recommended for full-thickness rotator cuff injuries in order to reduce pain and restore function, especially in cases when symptoms are severe or persistent. Traditional open or mini-open procedures have mostly been replaced by arthroscopic rotator cuff repair, which is now the gold standard surgical method for reparable injuries. Arthroscopy provides similar clinical results to open repair with the benefits of fewer incisions, less deltoid dislocation, and quicker rehabilitation[5]. The two most common methods are the double-row or suture-bridge repair (medial and lateral rows of anchors providing a wider footprint compression) and the single-row repair (anchors implanted in a single medial row fastening the tendon edge)[5]. According to Lorbach et al., double-row constructions can offer enhanced initial adherence strength and a larger footprint contact area from a biomechanical standpoint[6]. Double-row repairs for larger tears have been found to reduce re-tear rates in certain trials[7].

At any age, rotator cuff (RC) tears can cause severe shoulder problems, which typically include shoulder pain, decreased range of motion, limited scapular motion, and aberrant shoulder muscle activity[8]. By coordinating the scapulothoracic and glenohumeral joints, lifting the arm can still be accomplished in cases of RC tears.However, the RC's centralizing effect is insufficient, and scapula dyskinesis, an abnormal scapular movement pattern, occurs, indicating a disturbed kinetic chain[9].

Scapular dyskinesis (SD) is linked to numerous shoulder joint diseases, and the scapula is an essential part of shoulder joint movement[10]. In individuals with rotator cuff tears, this dyskinesis exacerbates the disruption of normal shoulder mobility by changing the scapula's function in the scapulohumeral rhythm[11]. The benefits of scapular stability exercises in individuals with subacromial pain syndrome were examined by Yuksel et al. He discovered that adding scapular stabilization exercises improved shoulder function, decreased discomfort, increased muscle strength, and improved scapular dyskinesis[12]. The objective of the case study is to provide information about arthroscopic rotator cuff repair and exercise intervention to improve function and scapular motion.

CASE REPORT

A 64-year-old female with a mesomorphic body type presented to the rehabilitation department at 12 weeks following arthroscopic rotator cuff repair of the right shoulder performed at regional hospital. The patient reported a history of a fall one year prior that was managed conservatively, followed by a second fall, after which she experienced worsening pain and functional limitation leading to surgical intervention. Pre-operative MRI revealed a complete tear of the supraspinatus tendon, a partial tear of the infraspinatus tendon, and mild joint effusion. Post-operative radiographic imaging demonstrated the presence of two suture anchors, suggesting a double-row repair technique(figure 1). The patient’s dominant hand is the right side, which is also the affected limb. On presentation for post-operative

rehabilitation, the patient complained of difficulty with overhead activities, weakness during reaching tasks, and discomfort particularly during external rotation and abduction. Clinical findings were consistent with post-surgical rotator cuff weakness, reduced shoulder range of motion, and impaired scapular control, necessitating structured physiotherapy aimed at restoring mobility, strength, and functional independence.

ASSESSMENT

The patient, a 64-year-old female teacher, had a history of fall, concomitant diabetes mellitus that was treated with medication, and chronic right shoulder dysfunction after arthroscopic rotator cuff repair. Although she reported a slow improvement with physical therapy treatments, her major complaints were that she had trouble completing overhead tasks and everyday life activities.

On the Visual Analog Scale, the level of pain decreased from 5/10 at first presentation to 2/10 at re-evaluation. She had a well-healed surgical scar across her right shoulder, a modest build, normal postural alignment, and symmetrical limb attitude at the time of observation. Grade I pain without swelling was palpable on right shoulder over Greater tuberosity.Passive motions were almost full with no limitation, suggesting persisting capsular stiffness, especially impacting external rotation and abduction consistent with a capsular pattern, whereas active range of motion was somewhat reduced with mild pain at end range. Manual muscle testing revealed normal strength in the left upper limb (5/5), but reduced strength in the right shoulder external rotators (3/5) and other shoulder muscles (4/5). Both upper limb lengths and girth measurements were equal, and there was no sign of muscle atrophy. Overall, the results point to an improved postoperative state with modest mobility limitations and persistent weakness affecting functional overhead tasks.

OUTCOME MEASURES

VAS (VISUAL ANALOGUE SCALE)

The VAS pain score is a patient-based outcome measure that enables the assessment of shoulder pain on a Likert scale of 0–10, where 0 represents no pain at all and 10 represents the greatest agony ever experienced[13].

Quick Disabilities of the Arm, Shoulder, and Hand (DASH) Questionnaire

Particularly for the upper limb, the QuickDASH questionnaire was employed as the subjective disability measure. The sum of all response scores was used to get the overall score, which was then divided by the number of questions (minimum answers = 10 of 11), subtracted by 1, and multiplied by 25. Eight points were required for QuickDASH Minimal Clinically Important Difference (MCID) [14].

In the above questionnaire there is a significant decrease in upper limb impairment and a clinically significant improvement in functional status, as evidenced by the patient's QuickDASH score, which went from 75/100 at baseline assessment to 50/100 at follow-up.

INTERVENTION

GENERAL PROTOCOL

- During the first 0–2 weeks, strict shoulder immobilization in a sling is recommended, allowing only active movements of the hand and wrist to protect tendon healing.
- From weeks 2–6, immobilization is continued while initiating protected passive range of motion (PROM) exercises in the scapular plane, along with active elbow motion with the arm at the side.
- By weeks 4–6, PROM progresses to active-assisted range of motion (AAROM) under supervision, provided pain is controlled and adequate motion (external rotation >30° and forward flexion >120°) is achieved.
- Between weeks 6–12, patients advance from AAROM to active range of motion (AROM) with low muscle activation levels, ensuring proper scapulohumeral rhythm and avoiding compensatory movements; progression requires full, pain-free motion and tolerance to light isometric exercises.
- In weeks 12–20, strengthening and endurance training are introduced with gradual increases in resistance using bands and light weights, targeting moderate supraspinatus activation while restoring functional movement patterns.
- Finally, during weeks 20–26, higher-load strengthening is implemented to enhance muscle power and functional capacity, preparing the patient for return to higher-demand activities. The protocol highlights individualized progression based on tear size, tissue quality, and patient response to rehabilitation [15].

Although the patient has been following the conventional postoperative rehabilitation protocol after rotator cuff repair, she continues to present with restricted external rotation and abduction (figure 2 A and B). This limitation may be attributed to reduced shoulder mobility and muscle activation, as she was unable to perform exercises during postoperatively due to pain.

As the patient came for physiotherapy at 12^{th} week, Exercises given are as follows:

1. RANGE OF MOTION EXERCISE:

Wall crawl exercise:

Position: The participant places their hands shoulder-width apart and faces a wall with their feet near it. The fingertips barely touch the wall due to the shoulders' modest flexion.

Movement: The participant actively flexes the shoulder in the sagittal plane, reaching as high as they can within a reasonable range, then lowers the arm back down to "crawl" their fingers up the wall. In the sagittal plane, this exercise encourages posterior depression and anterior tilt of the scapula

2. SCAPULAR STABILIZING EXERCISES

Wide-Grip Resistance Band Row:

(Middle Trapezius and Rhomboid)

Hold the ends of the resistance band with both hands wider than shoulder-width apart, fix the middle, bend the elbows, and retract the scapula. Pull the resistance band slightly wider than shoulder-width in the direction of the body's sides[16].

Side-Lying External Rotation:

(Lower Trapezius)

Hold a dumbbell while lying on your side on a treatment table with your elbow flexed at a 90-degree angle and your shoulder in a neutral position. Place a towel between your elbow and your body. To avoid compensatory motions, rotate your shoulder externally while maintaining contact with the towel with your elbow[17].

Rotator cuff exercises:

Shoulder external and internal rotation:

One end of the resistance band is fixed while the participant grips the other end, keeping the forearm parallel to the ground, with the elbow flexed at a 90-degree angle and held near the torso. To engage the teres minor and infraspinatus, externally rotate the forearm. To activate the subscapularis, internally rotate the forearm[16].

Shoulder abduction:

Hold the opposite end of the resistance band in one hand, thumb facing up, and secure the other end beneath the foot. Lift the resistance band to shoulder height to engage the deltoid and supraspinatus muscles, then carefully drop it back down after doing shoulder abduction along the scapular plane[16].

3. **Proprioceptive neuromuscular facilitation pattern:**

The patient performs the D2 Flexion pattern with their chin tucked in, holding one end of the TheraBand under their unaffected side's foot and the other end in their affected side's hand. The patient then uses the TheraBand to extend, adduct, and internally rotate the shoulder of the affected extremity across the body. The exercise is completed with the shoulder in the externally rotated, flexed, and abducted position[18].

4. **Scapular – clock exercise:**

To promote joint kinesthesia and range of motion in addition to the scapular motions of elevation, depression, protraction, and retraction. Using an imaginary clock in his head, the individual stood next to

a plinth, placed his hand on a ball, and moved it to indicate 3, 6, 9, or 12 o'clock[19].

5. **Whole body vibration therapy**

A promising alternative therapy is whole-body vibration exercise (WBVE). WBVE uses neurogenic potentiation to increase muscular strength and activity[20]. This type of training is believed to enhance neurological elements such proprioceptor response, muscular activation, and synchronization through the use of vibrating platforms that produce mechanical oscillations[21].

The different stages of tubing exercises with TheraBand were shown to the subjects.These bands are color-coded, with each colour denoting a distinct resistance.Exercise difficulty was raised in accordance with subjective pain severity and shoulder mobility quality. The subjectsreceived appropriate adjustments to the degree of tube resistance during the course of treatment. Initially the participant used yellow (thin) later red (medium) TheraBand were used. Every tubing exercise was done in three sets of ten repetitions, separated by a 60-second rest period[19].

The patient shows greater result after giving the above exercises.

DISCUSSION

This case highlights the importance of comprehensive, scapula-focused rehabilitation following arthroscopic double-row rotator cuff repair in an elderly patient. Although double-row techniques provide improved footprint coverage and initial fixation strength compared to single-row repair [6, 7], surgical success alone does not guarantee optimal functional recovery. Effective rehabilitation remains crucial to restore strength, mobility, and coordinated shoulder mechanics [5, 15].

Rotator cuff tears commonly result in pain, weakness, and difficulty with overhead activities, particularly during abduction and external rotation [3, 4]. Even after repair, altered scapulohumeral rhythm and persistent scapular dyskinesis may limit functional recovery [8, 10, 11]. The rotator cuff plays a key role in centralizing the humeral head; when its function is compromised, compensatory scapular movement patterns may develop, disrupting the kinetic chain [9]. Therefore, addressing scapular control is essential in postoperative management.

The inclusion of scapular stabilization exercises in this case is supported by current evidence. Yuksel et al. [12] demonstrated that adding scapular stabilization to conventional therapy significantly improves pain, muscle strength, and shoulder function. Similarly, Moezy et al. [19] reported improvements in mobility and posture following scapular-based exercise programs. Strengthening exercises such as resistance band rows and side-lying external rotation promote activation of the middle and lower trapezius and rotator cuff muscles, contributing to improved neuromuscular control. Conscious scapular correction during exercises has also been shown to enhance trapezius muscle activation [17].

The integration of PNF D2 flexion patterns facilitated multiplanar functional movement and coordinated muscle activation, which is consistent with evidence supporting neuromuscular retraining approaches in shoulder rehabilitation [18]. Furthermore, progressive resistance using color-coded TheraBand aligns with contemporary, criterion-based rehabilitation principles that emphasize gradual loading based on tissue healing and patient response [15].

The observed reduction in pain is consistent with clinically meaningful improvements reported after arthroscopic rotator cuff repair [13], and continued functional gains are expected to meet established minimal clinically important difference values for upper limb disability measures [14].

In conclusion, this case reinforces that optimal outcomes after rotator cuff repair require not only structural healing but also restoration of dynamic scapular stability, rotator cuff strength, and coordinated scapulohumeral rhythm. Incorporating targeted scapular stabilization and progressive strengthening is essential for enhancing functional recovery and independence in elderly postoperative patients.

CONCLUSION

This case study highlights the importance of structured postoperative rehabilitation following arthroscopic double-row rotator cuff repair and emphasizes the critical role of scapular stabilization in restoring shoulder function. Although conventional rehabilitation effectively reduced pain and improved general mobility, persistent limitations in external rotation and abduction were observed due to early postoperative inactivity and impaired scapular mechanics. The addition of specific scapular stabilization exercises improved neuromuscular control, supported proper scapulohumeral rhythm, and facilitated functional recovery. Therefore, incorporating scapular-focused interventions into postoperative rehabilitation protocols is essential for optimizing outcomes, enhancing range of motion, and promoting independence in activities of daily living in patients following rotator cuff repair.

Declarations

The participant provided written informed consent to share the clinical findings including images and videos for publication and sharing in platforms.

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Figures

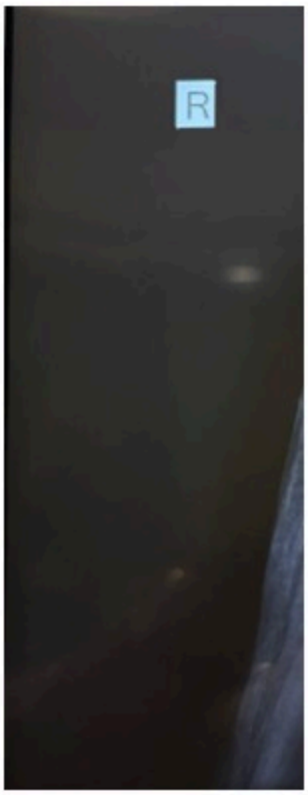


Figure 1: shows x-ray of double-row repair

Figure 1

See image above for figure legend.

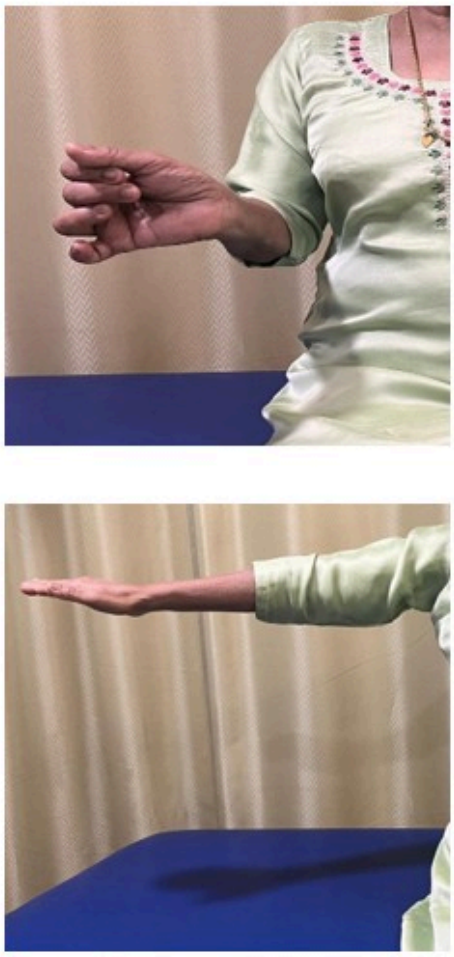


Figure 2: A shows limitation in external rotation

Figure 2: B shows limitation in doing abduction

Figure 2

See image above for figure legend.



Figure 3: shows forward flexion

Figure 3

See image above for figure legend.



Figure 4: shows abduction

Figure 4

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