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A rare case report on physical therapy rehabilitation of arthroscopic repair of full-thickness supraspinatus tear in a 61-year-old woman

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ABSTRACT

Background: Supraspinatus tear is common in adults post 60 years of age but a full-thickness tear of this muscle, solely is rare. In such cases, the arthroscopic repair is done. Rehabilitation post arthroscopic repair lasts for 4-6 months depending upon the extent of the tear and focuses on reducing pain and inflammation and improving ROM and strength. The primary goal of therapy is to prevent contractures and stiffness, maintain the integrity of the repair and make the patient independent. The treatment protocol has four phases:- immediate post-operative phases, protection and protective active motion phase; early strengthening phase advanced strengthening phase. **Case Description:** A female 61 years of age visited AVBRH due to extreme shoulder pain and difficulty performing overhead activities after pressurizing her shoulder while attempting to balance with a stick. An MRI revealed a full-thickness supraspinatus tear in the right shoulder, which was treated with the arthroscopic repair of the torn muscle. **Diagnosis, Therapeutic intervention and outcomes:** A full-thickness supraspinatus tear was diagnosed in the patient. Patient education, ROM exercise, and exercise strengthening were part of the therapeutic intervention. The overall intervention resulted in an improvement in ADL. **Conclusion:** This study suggests that surgical intervention and physical therapy can help increase muscle strength and range of motion and reduce pain. It also improves the quality of life by increasing ADL activities.

Keywords: Supraspinatus tear, arthroscopic repair, physical therapy, rehabilitation

1. INTRODUCTION

Shoulder pain due to tear of rotator cuff muscles is common in older patients of age 60 and above (Hughes et al., 2021). Rotator cuff tear prevalence is 39% in asymptomatic individuals and 64% in symptomatic individuals

(Sambandam, 2015). Participation in the society and activities at the physical level are hindered at a significant rate in such patients (Mischke et al., 2016). The tendons of the rotator cuff connect with the joint capsule and coracohumeral ligament before inserting into the humeral tuberosity. The largest and strongest rotator cuff muscle is subscapularis. The other rotator cuff muscles are the infraspinatus and teres minor, which are embedded in the greater tuberosity on the middle and inferior facets, respectively.

The Supraspinatus muscle is primarily in charge of arm abduction and humeral head depression. Rotator cuff tears can be either traumatic or degenerative or both (Pandey and Jaap Willems, 2015). Rotator cuff tears are classified as either crescent-shaped or U-shaped. U-shaped tears typically extend much further medially than crescent tears, often to the glenoid or even medial to the glenoid (Burkhart, 2000). When there is failure of conservative treatment for a symptomatic rotator cuff tear, surgical intervention is frequently required. Historically, arthroscopic and open repair of complete or high-grade partial-thickness rotator cuff tears provided adequate pain relief. While precise surgical method is required for successful arthroscopic rotator cuff repair, it is clear that an individualized rehabilitation protocol overseen by an experienced therapist is essential.

2. PATIENT AND OBSERVATION

A 61-year-old housewife with right-hand dominance had gone on a religious trip where she used a stick to balance while climbing a hill when suddenly she applied more pressure on the stick and developed pain in her right shoulder. After a week, she went to a local clinic since she had severe pain, where she was prescribed medication for the same, which did not relieve her pain, and she was referred to AVBRH Sawangi Meghe. She came to AVBRH in November 2021 and was asked to do an MRI, which revealed a large full-thickness tear of the supraspinatus muscle and was advised a surgical repair, but instead, she opted for some indigenous treatment, but there was no relief, so she come came back to AVBRH for further management on December 3 2021. On December 6, 2021, the patient underwent arthroscopy supraspinatus repair and was immobilized in an abduction sling for five weeks. On December 7 2021, due to severe pain in his right shoulder and difficulty performing abduction, flexion, and internal rotation, the patient was referred to physiotherapy. The pain was dull, aching, gradual in onset and progressive in nature, aggravated by shoulder movements (abduction and flexion) and relieved by rest, with an NPRS intensity of 9/10. In 2007, the patient had a hysterectomy. PAN 40 mg and zerodol SP were given to the patient to help with pain and inflammation. She had trouble sleeping because of shoulder pain, and she has no significant family history. On December 22 2021, the patient was discharged and returned for physiotherapy treatment on an outpatient basis.

3. CLINICAL FINDINGS

Table 1 shows the ROM of the shoulder joint.

	Pre-interventional ROM		Post-interventional ROM	
	Active ROM	Passive ROM	Active ROM	Passive ROM
(shoulder)				
Flexion	25°	30°	155°	160°
Extension	45°	50°	55°	60°
Abduction	20°	20°	145°	150°
Adduction	40°	40°	45°	50°
internal rotation	50°	55°	65°	65°
external rotation	25°	25°	75°	80°

Table 2 shows the strength of the muscles of the right shoulder.

Motion(shoulder)	Pre-intervention RIM	Post-intervention MMT
Flexors	weak and painful	3
Extensors	weak and painful	3
Abductors	weak and painful	3
Adductors	weak and painless	4

internal rotators	weak and painful	3
external rotators	weak land painful	3

Therapeutic interventions

The short-term objectives are as follows:

1. To educate the patient to position the arm in an abduction sling for five weeks, remove it during exercise.
2. To relieve pain and inflammation.
3. To ensure the repair's integrity.
4. To lessen the tenderness.
5. Increase the range of motion in the right upper limb.
6. To improve muscle strength.
7. To modify daily activities, posture education.
8. To educate the patient to avoid.
9. To teach the patient regular shoulder movements post pain reduction as the patient was performing trick movements due to pain (Jawade, 2020)

The long-term goals:

1. To promote muscle endurance.
2. To reestablish functional day-to-day living activities.

The patient was rehabilitated six days a week for 20 weeks every week, and interventions were planned based on short and long-term goals, which are detailed in Table 3. Passive ROM exercises implemented are shown in figure 1, and the incision site is shown in figure 2.

Table 3 shows phase-wise Interventions.

Rationale	Treatment
Phase I: Immediate postsurgical phase (Week 1-4)	
To reduce pain and inflammation.	Cryotherapy.
To reduce referred pain.	Interferential therapy 4PV was applied on the shoulder.
To improve Range of motion.	Scapular isometrics.
	Pendulum exercises.
	Passive ROM exercises for the shoulder joint.
	Active ROM for elbow, wrist and fingers.
Phase II: Protection phase (week 4-10).	
To decrease pain	Cryotherapy.
To improve ROM	Initiate AAROM exercises.
	Flexion in supine position (AAROM), external & internal rotation.

Progressive PROM until full ROM is achieved but in pain-free range.

Gentle Anterior and posterior glides of glenohumeral joint Mobilization.

Active ROM to elbow, wrist and fingers.

Phase III: Intermediate phase (10-14 weeks).

To enhance ROM and Muscle strength.

Active ROM exercises.

Strengthening program to shoulder muscle with Theraband.

Phase IV: Advanced strengthening exercises (week 16-22)

To enhance the functional activities and endurance

Open-chain proprioceptive activities

ROM and self scapular stretching exercises (Lakhwani and Phansopkar, 2021)

Progressive strengthening exercises

All exercises were done ten times and in two sets.



Figure 1 shows passive ROM exercises being implemented



Figure 2 shows incision sites of arthroscopic repair: anterior, lateral and posterior.

4. DISCUSSION

In the case of an irreversible full-thickness tear, arthroscopic STT repair is usually preferred in the elderly. People with supraspinatus tear alone, along with symptoms have decreased ROM, weakness in external rotation, and pain/disability. Clinically, altered glenohumeral kinematics is thought to be associated with restrictions that imply capsular tightness, constrained passive ROM, limitations in muscle strength, and larger rotator cuff tears. Normal glenohumeral joint function during scapular plane abduction may be possible if the tear is limited to the supraspinatus tendon and there are no capsular restrictions (Mattar et al., 2022).

The primary goal of post-operative physical therapy rehabilitation following STT repair arthroscopy is to focus on tendon healing while lowering muscle wastage and stiffness caused by prolonged immobilization. In this report, the rehabilitation is centered on reducing inflammation and pain, improving ROM and muscle strength, and increasing the patient's level of independence. Exercise therapy improved glenohumeral joint kinematics and outcomes in patients with small full-thickness supraspinatus tears by increasing rotator cuff muscle strength and joint stability. This study could lead to the discovery of prognostic factors predicting how a rotator cuff tear patient will respond to exercise therapy (Miller et al., 2016). The patient gave his or her written permission. The physical examination and intervention were discussed with the patient.

On general examination, the patient appeared to be awake, aware of time and place, and cooperative. The patient was afebrile and hemodynamically stable with a blood pressure of 110/75 mmHg, a pulse rate of 80 beats per minute, and a respiratory rate of 18 breaths per minute. There was no evidence of cyanosis, icterus, clubbing, or oedema in the patient (Zhang et al., 2020).

5. CONCLUSION

A full-thickness tear of the supraspinatus is unusual. The protocol described above significantly reduced tenderness and pain, improved muscle strength, range of motion, and endurance, and assisted the patient in regaining independence in this case.

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Author Contributions

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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