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Outcome analysis of accelerated physiotherapy rehabilitation following arthroscopic repair of bankart lesion and soft tissue reconstruction: A case report

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ABSTRACT

Introduction: Arthroscopic repairs of shoulder injuries are widely performed acceptable and safest procedures for anterior shoulder instabilities. Such injuries are common in athletes. Bankart lesion surgeries followed by a proper and customized physiotherapy regime have been found highly effective in declining further surgery-related complications and future chances of dislocations. Rotator cuff muscles act as stabilizers to the shoulder joint, providing stability and mobility to the joint. Tear of these muscles causes impingement in the shoulder, loss of motion, and pain in the joints. As per our knowledge, our case report is the first which has used the DeLorme protocol for physiotherapy rehabilitation post-Arthroscopic repair of bankart lesion and rotator cuff tear. *Case Presentation:* A 22-year-old male visited AVBRH with complaints of weakness and sudden hanging of the left shoulder which occurred due to a household activity on 10.09.2021. After which the patient was diagnosed with Bankart's lesion and partial thickness tear of the supraspinatus muscle of the left side. Therefore the patient was managed with Arthroscopic Repair surgery of Bankart's lesion and soft tissue reconstruction surgery of supraspinatus which was done under general anesthesia on 15.09.2021. *Conclusion:* A customized and organized physical therapy program has shown tremendous enhancements in the patient's quality of life and general health. This case report will describe the importance of physiotherapy and its integral role in rehabilitating patients, and how it contributed to ROM progression, Regaining the strength of muscles of the back, and achieving ADLs back.

Keywords: Bankart's lesion, Arthroscopic repair, Supraspinatus tear, Physiotherapy rehabilitation, ADLs.

1. INTRODUCTION

The shoulder capsule encases the GH articulation, the joint is shielded superiorly by acromion, a bony anterior- superior scapular projections. These

surfaces are covered by hyaline cartilage that covers only around one-quarter of the humeral head. The shoulder labrum surrounds such a shallow socket, increasing the capacity of the glenoid fossa by 50% and acting as reinforcement for the glenoid fossa. Thus acting as a stabilizing agent (Bakhsh and Nicandri, 2018). Bankart repair surgery is defined as a lesion occurring at the glenoid labrum's anterior aspect which is caused due to repeated subluxations of the shoulder anteriorly. The varieties of Bankart lesions comprise soft and bony. Bony Bankart lesions involve anteroinferior glenoid rim's fracture and Soft Bankart lesions comprise anteroinferior tear of labrum and capsule (Levy et al., 2016).

The most invariably deployed approach in the Arthroscopic bankart repair is a curative procedure for symptomatic shoulder instability. The initial description of arthroscopic Bankart repair was published in 1993, and since then, its popularity has been significantly expanding over the last several years. Arthroscopic instrumentation and procedures have been around for decades and have progressed. According to ABOS, for the updated surgical advances in bankart repair surgery, the fraction of the population in need of repair has risen dramatically. Compared to open Bankart repairs, arthroscopic bankart repairs are more effective (DeFroda et al., 2017). The repeated recurrence of shoulder dislocations commonly affects young athletes who are more involved in sports activities like volleyball, Kabaddi, and basketball. This recurrence results in restricted ROM, accompanied by glenoid bone loss.

Post arthroscopic repair requires rehabilitation to accelerate tissue healing, protect the surgical site postoperatively, and re-establish movement and strength. Because tendon tissue has a slower metabolic cycle than muscle tissue, it's been believed that gradually increasing tendon stress will aid in tendon repair. This includes starting rehabilitation at the proliferative phase of healing and continuing into the remodelling phase so that the collagen is loaded in a way that promotes tendon production and strength. This signifies that immobility after surgery may reduce tendon strength, increasing the chance of re-tear. Immobilization can also cause adhesions and a reduction in range of motion. As a corollary, early passive motion after surgery has gained prominence (Kjær et al., 2018). Nerve damage, deep venous thrombosis, reflex sympathetic dystrophy, infection, and anesthesia-related problems are small potential effects, post-operative shoulder stiffness remains one of the most common complaints and one that therapists should be conscious of during rehabilitation (Audigé et al., 2015). Treatment can help with this ailment by soothing symptoms and improving physical well-being, thus improving quality of life (Saklecha et al., 2022).

2. CASE PRESENTATION

Patient Information

A 22-year-old male from Yavatmal with the dominance of the left side, a Kabaddi player by profession, visited AVBRH with complaints of weakness in the left shoulder and clicking sounds from the left shoulder. On taking a thorough history of the patient, it revealed that the patient was well 2 years back when he allegedly fell on his outstretched hand while playing Kabaddi due to a collision, sustaining an injury to the left shoulder. The patient developed immediate pain which was sudden in onset and gradually progressive but due to some personal circumstances and the COVID-19 situation in the country he could not approach for proper medical treatment. On September 2021 while washing clothes he suddenly heard a popping sound and felt a sudden hanging of shoulder along with clicking sounds on movements of shoulder. He gave a history of several episodes in the past 2 years. He rushed immediately to a nearby clinic with his brother where there was a lack of proper medical staff so he came to AVBRH (Sawangi) for further treatment. After consulting the orthopaedecian MRI was performed. The patient underwent arthroscopic repair of the Bankart lesion and soft tissue reconstruction of partial-thickness tear of the supraspinatus. Supraspinatus tear was repaired by loaded anchor suture placed in greater tuberosity at supraspinatus insertion and then the incision was closed in layers via sterile dressing.

3. CLINICAL FINDINGS AND DIAGNOSTIC ASSESSMENT

The patient had signed a consent form where it was appropriately written and the patient was well explained. The patient was awakened, cooperative, and oriented to time, person and place. The patient's vitals were stable. Observation, Inspection, and Palpation were subheadings patients were examined in a supine lying position. The patient was a fairly built 22-year-old male. Posture assessment was done in anterior view in which shoulders were symmetrical, elevated, and, protracted; Scar mark was present on the lateral aspect of the shoulder with no muscle wasting. Grade 2 tenderness was present over the incision site. The patient graded pain 9/10 on activity and 5/10 on rest. The range of motion and manual muscle testing has been mentioned in (table 1 & 2).

Table 1 Pre Rehabilitation Range of motion assessment values

Joint	Right limb		Left limb	
Joint movement	Active	Passive	Active	Passive
Shoulder Flexion	0 - 172	0 - 176	0 - 20	0 - 40
Shoulder extension	172 - 0	176 - 0	20 - 0	4 - 0
Shoulder Abduction	0 - 175	0 - 178	0 - 10	0 - 25
Shoulder Adduction	175 - 0	178 - 0	40 - 0	40 - 0
Shoulder I.R	0 - 65	0 - 68	0 - 10	0 - 15
Shoulder E.R	0 - 80	0 - 85	0 - 18	0 - 25

Table 2 Pre-rehabilitation Manual Muscle Testing assessment values.

	Right limb	Left limb
SHOULDER FLEXORS	4/5	2/5
SHOULDER EXTENSORS	4/5	2/5
SHOULDER ABDUCTORS	4/5	2/5
SHOULDER ADDUCTOR	5/5	2/5
SHOULDER MEDIAL RT	4/5	2/5
SHOULDER LATERAL RT	5/5	2/5

Timeline

The patient-reported history of injury occurred due to a fall in March of 2019. In August of 2021, the patient was diagnosed with a partial tear of the supraspinatus muscle. In the same month, the patient underwent arthroscopic Bankert's repair surgery and then he got discharged from AVBRH in September of 2021 after which the same month the patient-initiated physiotherapy rehabilitation. The last session of physiotherapy intervention was in December of 2021 after which the patient was recommended to undergo regular follow up and a home exercise program was explained to him.

Diagnostic Assessment

MRI showed a hyper-intense signal in the supraspinatus tendon suggesting partial-thickness tear and glenohumeral effusion, mild collection was noted in the sub-acromial bursa and right bicipital groove along the biceps tendon (Fig 1).

Figure 1 MRI Image showing Bankart lesion.

Therapeutic Interventions

Physiotherapy Intervention is mentioned in table 3.

Table 3 Physiotherapy Intervention

Intervention	Dosage	Rationale
Cryotherapy	10-15 minutes.	To reduce pain, and swelling inflammation.
Active and active-assisted movements.	10 repetitions of 3 sets each.	Maintains ranges of shoulder, elbow, and wrist.
Wand Exercises and pendulum exercises	10 repetitions of 3 sets each (Fig 2)	Improve Grip strength. Improves end range of motion.
Strengthening Exercises using DeLorme's technique for shoulder using weight cuffs, Resistance band shoulder pulleys.	10 reps with ½ of 10 RM 10 reps with ¾ of 10 RM 10 reps with a complete 10 RM. (Fig 3)	Build strength of muscle, and flexibility, decrease the risk of injury and atrophy. Improves posture.
Ultrasonic therapy	1MHz, 0.821W/cm^2 for 6- 8 minutes.	Promote healing, Provide deep friction massage to tissues. Increase tendon extensibility.
Russian currents	Frequency of 50-70 Hz. Pulse duration 50-175µs. (Fig 4)	Reduce muscle spasm Contraction of scapular muscles.
Scar mobilization	8-10 minutes.	Breaks Adhesion.
Manual therapy (Maitland Mobilization)	10 repetitions of inferior and AP glide.	Increase ROM of joint Reduce stiffness. Improve the quality of joint movement.
Diaphragmatic Breathing Exercises.	10- 15 times /day and between exercise intervals.	Promote Relaxation To mobilize shoulder girdle. Improves lung compliance and vital capacity.
Resistance Exercises	10 repetitions of 3 sets each.	Maintains tone, contractility, and strength of muscles.

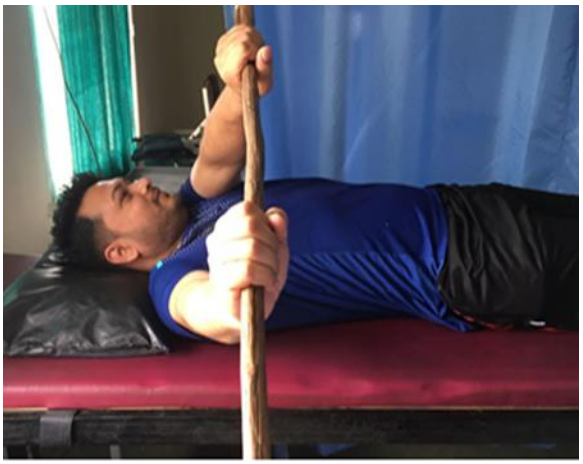

Figure 2 Patient performing Wand Exercises

Figure 3 Strengthening Exercises using Weight cuff for strength building

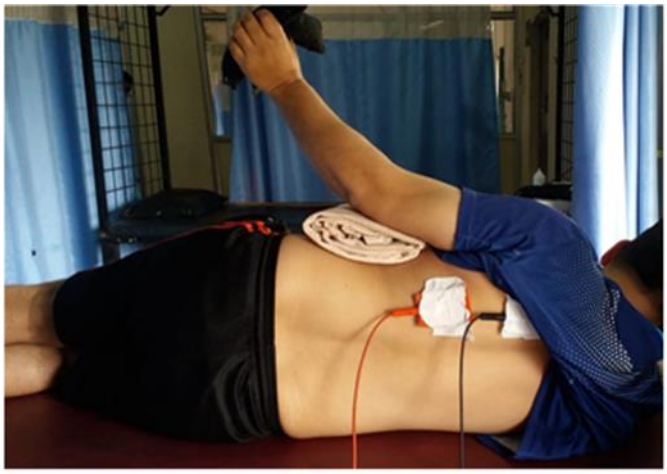

Figure 4 Russian currents

Follow-up and outcome of interventions

Pre and Post-rehabilitation values are mentioned in table 4 & 5.

Table 4 Describing ROM assessment values pre and post-rehabilitation

Joint	Pre- Rehabilitation values of the affected extremity		Post – Rehabilitation values of the affected extremity	
MOVEMENT	ACTIVE	PASSIVE	ACTIVE	PASSIVE
Shoulder flexion	0-20	0-40	0-70	0-80
Shoulder extension	20-0	4-0	70-0	80-0
Shoulder abduction	0-10	0-25	0-68	0-75
Shoulder adduction	40-0	40-0	65-0	75-0
Shoulder I.R	0-10	0-15	0-25	0-32
Shoulder E.R	0-18	0-25	0-32	0-40

Table 5 Describing manual muscle testing assessment values pre and post-rehabilitation.

	MMT values Pre-Rehabilitation	MMT values Post-Rehabilitation
SHOULDER FLEXORS	2/5	4/5
SHOULDER EXTENSORS	2/5	4/5
SHOULDER ABDUCTORS	2/5	4/5

SHOULDER ADDUCTORS	2/5	4/5
SHOULDER MEDIAL RT.	2/5	4/5
SHOULDER LATERAL RT	2/5	4/5

Outcome Measures

Outcome Measures are mentioned in Fig 5.

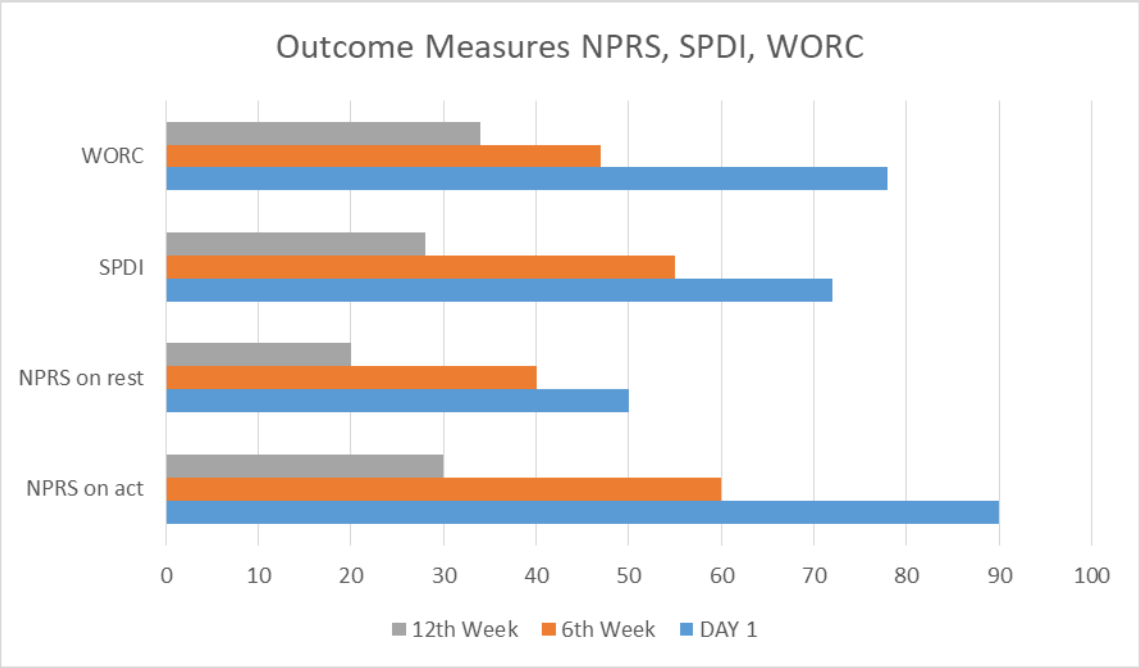

Figure 5 Outcome Measures at Day 1, 6th Week, 12th Week.

4. DISCUSSION

Because the shoulder is used anatomically more for mobility, there is a compromise in its stability due to inadequate joint capsule laxity and congruency. As a result, the shoulder joint is known to be exceedingly unstable, ranking first among the most dislocated joints in the body. Dynamic stabilizers provide stability. Abduction, extension, and external rotation movements can cause glenohumeral joint dislocations. According to Kim et al, (2003) reported number of dislocations is not always proportional to the size of the labral lesion. Acute, high-intensity trauma can result in widespread labral lesions. For instance, during a combination of anterior-inferior and superior labral lesions extensive labral lesions might potentially develop over time as a result of persistent dislocations. According to Kim et al., (2003) patients in the rapid rehabilitation group, which included immediate ROM and strengthening, regained external rotation faster, returned to their prior activity faster, and experienced less discomfort. This study, however, did not focus solely on young athletes. Early recovery and strong functional outcomes were documented in a separate trial aimed at a young athletic group (under 30 years old) employing an accelerated rehabilitation protocol.

According to a study conducted by Littlewood and Bateman et al., (2015) for the most part, a gradual return to function and sports is recommended starting at around 13 weeks. Progressive resistance training using the DeLorme technique which was the primary strengthening protocol of our study has been examined as a method of intervention for, neurological diseases, musculoskeletal diseases, gerontologic diseases, and cardiopulmonary diseases with some studies indicating benefits as suggested by Lombardi Jr et al., (2008). According to Narvani et al., (2020) 88 percent of patients returned to sports activity, with 68 percent returning to the same sport they had been doing before the accident. Additionally, 78 percent of patients said they were able to return to an athletic level that was better or equivalent to what they had before the operation. The total rate of return to sports was 84.7 percent, with 65.9% of patients returning to play at a similar level after 4–17 months. We also credit our success to our patient's consistency in completing home programs and attending frequent sessions.

Concluding, our study, muscle re-education, electrotherapy, strengthening exercises, and other physical therapy procedures led to substantial enhancements in functional independence and muscle strength after four weeks of rehabilitation in this patient (Phansopkar et al., 2020). Breathing exercises enhanced increased inspiratory muscle strength and endurance, breath control, and

decreased respiratory problems in our case. Stretching activities stretch certain muscles, tendons, and muscle groups, and have been shown to improve flexibility. Scapular strengthening workouts target the scapular muscles specifically to increase strength. All of the components necessary to maintaining posture in static and functional activities along with strengthening are discussed in our case report. This case study shows the value of structured physical rehabilitation and the need for it following Arthroscopic repair of Bankart lesion and soft tissue reconstruction of partial-thickness tear of the supraspinatus.

5. CONCLUSION

Physiotherapy has improved postoperative results in Arthroscopic Bankart repair surgeries. The functional goals have continuously improved as a result of the properly planned and structured protocol. Pain relief, better range of motion, enhanced shoulder, arm, and forearm strength, and posture corrective exercise all helped to improve the condition of the patient.

Abbreviations

ADLs: Activities of daily living.
AVBRH: Acharya Vinoba Bhave Rural Hospital.
ROM: Range of Motion.
MRI: Magnetic Resonance Imaging.
SPDI: Shoulder Pain Disability Index.
WORC: Western Ontario Rotator Cuff Index score
NPRS: Numerical Pain Rating Scale.
TNF: Tumour Necrosis Factor

Patient Perspective

"I'm very happy with the physiotherapy rehabilitation; it has contributed a lot for faster recovery and regaining my confidence back and has improved my day-to-day activities which I was unable to perform earlier."

Informed consent

The patient was told about the trial, and informed permission was obtained.

Authors' contributions

Each of the authors contributes equally.

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This study has not received any external funding.

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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