CASE REPORT

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Physiotherapy treatments for the patient with Bankart lesion repair: a case report study

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ABSTRACT

Background: Bankart lesion is torn in the anterior membrane covering the shoulder joint (labrum) due to continuous dislocation of the shoulder joint forward. Bankart lesions can occur due to sports activities that use the front of the shoulder, such as javelin throwing. It is not uncommon for injuries to javelin-throwing athletes to require physiotherapy treatment so they can return to playing javelin-throwing.

Aim: This study aims to determine the effectiveness of the training program such as ultrasound therapy and transcutaneous electrical nerve stimulation (TENS), active assisted range of motion (ROM) exercises, active assisted ROM exercises against gravity, strengthening exercises, wall climbing, and open cage exercises. to tourists who are javelin throwing athletes who experience Bankart lesions.

Case Report: In this case, a 42-year-old man from France came to the physiotherapy clinic complaining of pain, stiffness, and limited movement of the right shoulder joint. The patient underwent surgery for Bankart shoulder repair on his right shoulder on October 16th, 2022, due to repeated dislocations three times during javelin throws. The patient has limited movement and pain in the right shoulder. In addition, the right hand also does not swing when walking. On static inspection, the chest, shoulder, and right arm are smaller (atrophied) and positioned lower than the left. There is an incision in the anterior deltoid area (post-Bankart repair shoulder). Intervention modalities included ultrasound therapy applications and transcutaneous electrical nerve stimulation (TENS). Exercise therapy includes active assisted ROM exercises, active assisted ROM exercises against gravity, strengthening exercises, wall climbing, and open cage exercises.

Result: After interventions, the patient's recovery condition improved. An exercise program designed and implemented on patients for two weeks has slowly raised the patient's self-confidence and increased the patient's ability to perform physical activities.

Conclusion: The physiotherapy intervention program for a Bankart lesion patient showed an improvement in the patient's condition, with an increase in ROM, an increase in muscle strength, and a decrease in perceived pain.

Keywords: Bankart repair, javelin throw, limited movement, physiotherapy treatments, shoulder.
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INTRODUCTION

The shoulder is a complex joint composed of the spherical humerus and the socket-shaped glenoid fossa. The edge of the glenoid fossa is surrounded by fibrocartilage called the labrum.[1] The labrum keeps the humeral head in the glenoid fossa and promotes natural joint stability.[2] When the shoulder is dislocated, the anterior part of the labrum is torn, which is called a Bankart injury. The torn or stretched labrum forms a pocket in front of the glenoid fossa and creates space for the humerus to exit the glenoid fossa.[3] The pathology-anatomy of an unstable shoulder is well described for dislocations and subluxations. Anterior instability is commonly a capsule-labral avulsion of the anteroinferior glenoid rim or a Bankart lesion.[4]

Eight thousand nine hundred forty shoulder dislocations were identified, resulting in an overall incidence rate in the United States of 23.9 (95% confidence interval, 20.8 to 27.0) per 100,000 person-years.[5] With an incidence rate ratio of 2.64 (95% confidence interval, 2.39 to 2.88) in relation to the female incidence rate, the male incidence rate was 34.90 (95% confidence interval, 30.08 to 39.73) per 100,000 person-years. It was discovered that men made up 71.8% of the dislocations. According to age groups, patients between the ages of fifteen and twenty-nine accounted for 46.8% of all dislocations, while those between the ages of twenty and twenty-nine experienced the highest incidence rate (47.8 [95% confidence interval, 41.0 to 54.5]).[6] Based on race, there were no appreciable differences. Dislocations most frequently occurred at home (47.7%), at sporting or recreational venues (34.5%), and as a result of falls (58.8%). 48.3% of injuries overall were while doing sports or having

fun. In 40 cases, Hawkins et al. discovered an average one-year delay in diagnosis, with only 30% identified within six weeks of damage.[7]

Bankart lesions are shoulder injuries that are commonly caused by sports activities.[8] Shoulder dislocations can occur from trauma or hyperactivity (genetic or laxity of the capsule and ligaments).[9] In this case report, the patient suffered a shoulder injury from a javelin throw. In this sport, arm muscle strength is the main muscle strength needed because this sport relies on the hands to throw optimally against the javelin. With strong arm muscle strength, it can help in increasing the distance of the javelin throw. The javelin throw is carried out with the hand swung as hard as possible forward. The greater the power to swing the javelin, the farther the throw will be.[10]

Movement in javelin throwing athletes is the fastest athletic movement in the world of sports.[11] The movement when throwing the javelin causes a tear in the labrum[12]. A torn labrum can be repaired with a so-called Bankart repair. Bankart repair is a surgical procedure to prevent repeated anterior dislocation of the shoulder.[13] This procedure aims to reattach and repair the torn shoulder labrum.[14] This surgical procedure uses an arthroscope inserted into the shoulder through a small incision to see more clearly the part of the torn labrum. Then the torn labrum will be sutured to restore stability to the shoulder joint.[15]

Interventions performed by physical therapists are commonly used and often recommended for shoulder problems. Treatment of patients with shoulder problems by a physical therapist usually starts when the patient experiences a progressive loss of ROM and persistent pain. Physical therapists are most consistently prescribed to maintain and improve motion and function, but there needs to be more consensus about which physical therapists are most effective. Recovery from postoperative burn repair tends to be difficult and takes a long time.[16] Active participation of the patient is needed during the rehabilitation process to restore joint range of motion and muscle strength.[17] The recovery time after a burn repair operation varies greatly. It takes at least 4-6 months to restore shoulder function, and in some cases, it takes 9-12 months to recover.[18] Muscle strengthening, stabilization exercises, and neuromuscular control are important components of a rehabilitation program to support injured ligaments and tendons in the dislocated area to reduce pain and the risk of recurrent dislocation.[19]

CASE DESCRIPTION

In this case, a 42-year-old man from France came to the physiotherapy clinic with pain, stiffness, and limited movement of the right shoulder joint. The patient underwent Bankart shoulder repair surgery on his right shoulder on October 16th, 2022, due to repeated dislocations three times during javelin throws. The patient was limited movement and pain in the right shoulder. In addition, the right hand also does not swing when walking. On static inspection, the chest, shoulder, and right arm were atrophied and positioned lower than the left. There was an incision in the anterior deltoid area (post-Bankart repair shoulder). There was no history of nervous disorders or family history at the time of information retrieval and approval for publication.

Assessments

The range of motion of the joints on the right and left shoulder was measured using a goniometer. The patient was asked to move the right action and left shoulders in the direction of flexion and extension, abduction, and adduction. Pain and limited range of motion were found in the right shoulder operated on by Bankart repair shoulder (Table 1). A limited range of motion in the right shoulder indicates muscle weakness in the right shoulder compared to the left shoulder.

Shoulder muscle strength was measured manually with manual muscle testing (MMT). Measurements were made by instructing the patient to perform flexion, extension, abduction, and adduction movements.[20] The MMT value before being given exercises on the right shoulder when doing shoulder extension was three, the flexion movement was three, the abduction movement was three, and the adduction movement was three. The MMT value indicates a decrease in muscle strength compared to the left shoulder (Table 2).

The pain was measured using the Visual Analogue Scale (VAS) (Table 3). Pain measurement with VAS (0 – 10), which was a scale in the form of a long straight line 10 cm (or 100 mm) long with a verbal description at each end (such as 0 no pain and ten severe pain). Pain measurements were carried out by instructing the patient to move the marker on the VAS where the more to the right the pain was felt more intense, while the further to the left the pain decreased. The VAS interpretation is 0 – 4 mm (no pain at all), 4 – 44 mm (mild pain), 44 – 45 mm (moderate pain), and 75 – 100 mm (severe pain/excruciating).[21]

Interventions

Physiotherapy management, in this case, aims to reduce pain, increase the range of motion of the joints in the range of motion of the shoulder region, and increase the strength of the shoulder muscles. The intervention was given for two weeks with three

Table 1. Measurement of right and left shoulder range of motion (rom) before and after intervention

Shoulder	Range of Motion (ROM)	
	Before intervention	After intervention
Right		
Flexion	105°	115°
Extension	25°	40°
Abduction	90°	100°
Adduction	20°	20°
Left		
Flexion	180°	180°
Extension	80°	80°
Abduction	180°	180°
Adduction	30°	30°

Table 2. Measurement of right and left shoulder muscle before and after interventions

Shoulder	Manual Muscle Testing (MMT)	
	Before intervention	After intervention
Right		
Flexion	3	4
Extension	3	3
Abduction	3	4
Adduction	3	4
Left		
Flexion	5	5
Extension	5	5
Abduction	5	5
Adduction	5	5

0, no contraction/movement; 1, there was slight contraction; 2, movement without against gravity; 3, movement with against gravity; 4, movement with minimal strength; 5 movement with optimal strength.

Table 3. Visual analogue scale (VAS) measurements of the right and left shoulders before and after intervention

Shoulder	Visual Analogue Scale (VAS)*	
	Before intervention	After intervention
Right		
Flexion	7	5
Extension	6	5
Abduction	7	5
Adduction	7	4
Left		
Flexion	0	0
Extension	0	0
Abduction	0	0
Adduction	0	0

*VAS scale ranges from 0 to 10, which a 0 presented for no pain and 10 for severe pain.

sessions a week. The interventions were modalities and exercise therapy. Intervention modalities include ultrasound therapy applications and transcutaneous electrical nerve stimulation (TENS). Exercise therapy is provided in active assisted ROM exercises, active assisted ROM exercises against gravity, strengthening exercises, wall climbing, and open cage exercises. The first intervention modality was ultrasound which aims to repair postoperative tissue in the capsule shoulder joint and reduce pain. Ultrasound was applied with an intensity of 1.2 W/cm2 for 5 minutes on the anterior shoulder. The next modality was the application of TENS which aims to reduce pain in the shoulder. TENS was applied using two electrodes and four pads on the anterior, superior, posterior, and lateral shoulder with an intensity of 15 W/cm2, a frequency of 100 Hz, for 15 minutes.

Patients were also given several exercise therapies, the first being Active assisted ROM exercises and active-assisted ROM exercises against gravity. The exercise aims to increase the range of motion of the shoulder area. Patients in the side-lying position were asked to make active flexion, abduction, and internal and external rotation, assisted by the therapist's movements with 2x10 repetitions. AAROM (Active Assisted Range of Motion) exercises help facilitate movement and increase the degree of range of motion of the patient's joints which was moved actively and facilitated or assisted by a physiotherapist. The following exercise was strengthening, which aims to increase the endurance and strength of the atrophied pectoralis, deltoid, and biceps brace muscles. The exercise was carried out by instructing the patient to make active flexion, abduction, and internal and external rotation movements by carrying a 1 kg weight in hand for 2 x 10 repetitions. Then the patient was given wall climb and open cage exercise.

The wall climb exercise aimed to increase the range of motion while helping to mobilize the shoulder into the flexion range. The exercise was performed with the patient facing the wall with the fingers alternately moving as if walking towards a higher wall, 2 x 10 repetitions. While the open cage exercise aims to increase the range of motion in the abduction plane of the shoulder and help stretch the pectoralis major muscle. The exercise was carried out with the patient standing and instructed to flex the shoulder 90° and the elbow 90°, then do the shoulder abduction movement. Exercise is done as much as 2x10 repetitions.

EVALUATIONS

Evaluation after intervention shows that the patient's recovery condition is getting better. An exercise program designed and implemented on patients for two weeks has slowly raised the patient's self-confidence and increased the patient's ability to perform physical activities, making patients more motivated to carry out activities independently. The exercise program designed for two weeks for

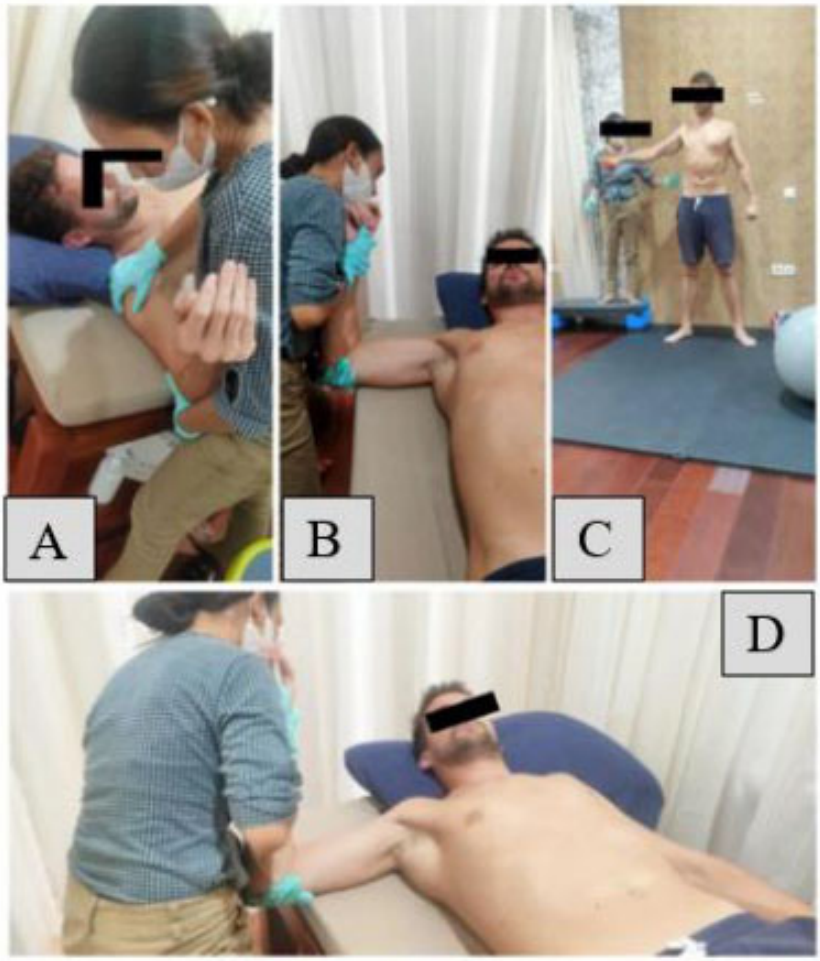

Figure 1. Physiotherapy interventions, A. Active assisted range of motion (AAROM) abduction supine position, B. Isometric internal rotation, C. Active range of motion (AROM) abduction standing position, and D. AAROM horizontal adduction supine position.

patients with this case aims to maximize patient recovery and improve the patient's shoulder function and mobility.

The range of motion in the patient has improved, as shown in Table 1. In addition, the exercises given in this study could also increase the patient's muscle strength, as shown in Table 2. The pain felt by the patients was also reduced, as shown in Table 3. The evaluation results took a right and left shoulder range of motion (ROM), muscle testing (MMT), and visual analog scale (VAS). In measuring range of motion (ROM), there was an increase of right shoulder flexion 115º, extension 40º, abduction 100º, and adduction still 20º. While the difference between left shoulder there was no change. MMT measures were evaluated to have muscle strength left and the right shoulder; from these measurements, there was only a slight change in the right shoulder flexion 4º, abduction, and adduction 4º. Measurement of pain using the VAS showed a reduction in the degree of motion and pressure pain. Pain in motion position ROM decreased from 7 to 5 in flexion, 6 to 5 in extension, 7 to 5 in abduction, and adduction decreased from 7 to 4. The duration of practice for two weeks is fairly short, but the patient has started to show the expected results.

DISCUSSION

Muscle strengthening, stabilization exercises, and neuromuscular control are important components of a rehabilitation program to support injured ligaments and tendons in the dislocated area to reduce pain and the risk of recurrent dislocation. Intervention modalities include ultrasound therapy applications and transcutaneous electrical nerve stimulation (TENS). Exercise therapy includes Active Assisted ROM exercises, Active Assisted ROM exercises against gravity, Strengthening exercises, wall climbing, and Open cage exercises. After intervention shows that the patient's recovery condition is getting better. An exercise program designed and implemented on patients for two weeks has slowly raised the patient's self-confidence and increased the patient's ability to perform physical activities.

In this case, the patient is given an ultrasound. Ultrasound can provide effects in the form of thermal and non-thermal effects. The thermal effect produced by ultrasound aims to increase tissue temperature, blood circulation, and extensibility and reduce the viscosity of the fluid elements in tissues. At the same time, the non-thermal effect will accelerate the process of tissue metabolism by promoting cellular permeability and ion transport. With these effects, ultrasound therapy, in this case, can reduce pain and muscle spasms, joint stiffness, and tissue injury.

Research conducted by Putri (2018) states that providing active resistance exercises combined with modalities can reduce shoulder pain and increase the shoulder joint's range of motion with a frozen shoulder diagnosis. In addition, active resisted exercise given to patients with weak shoulder muscles shows that active resisted exercise can increase muscle strength in patients with frozen shoulders. This is because this exercise can increase the recruitment of motor units so that stimulated motor units will be added. The muscle fibers will also contract and cause the muscle strength to increase.[22]

Giving wall climbing exercises, in this case, is the right exercise to increase the shoulder joint's range of motion and strength of the shoulder muscles. This research is in line with Eun-Jong (2018), who examined The Effects of Therapeutic Climbing

on Shoulder Muscle Activity according to the Inclination of the climbing wall. This study shows that exercises using wall climbing can increase the strength of the muscles in the shoulders because it can increase muscle mass and activity.

Thus, the exercise program given to patients effectively increased the range of motion, improved muscle strength, and reduced pain. However, these results were influenced by several factors, including methodological issues and substantive differences between studies. The next section discusses the influence of the quality of evidence, differences in patient characteristics, the treatment program applied, and the outcome measures chosen.

CONCLUSION

Through the exercise program provided, it can be concluded that there were an increase in the results of ROM measurements and a decrease in the pain scale. This case can be used as a reference for providing exercise interventions in patients with postoperative Bankart Repair conditions with other complications of comorbidities. Further studies with larger patient groups and long-term evaluations are needed to evaluate the safety and efficacy of the exercise program in these cases.

CONFLICT OF INTEREST

This research has no conflict of interest.

ETHICAL CONSIDERATION

The patient had permitted the authors to publish her case in a scholarly journal without disclosing any personal information for scholarly purposes.

FUNDING

Any grant source did not fund this study.

AUTHOR CONTRIBUTION

GV, NLVR, and MAPR carried out the study, were in charge of the research plan, and compiled the findings. NKMJ, EDK, NMLS, and PAL completed drafts of the manuscript and literature study.

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