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Capsular Stretches and Shoulder Mobility Exercises to Improve Range of Motion of Secondary Adhesive Capsulitis Following Recurrent Shoulder Dislocation: A Case Report

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ABSTRACT

Background and purpose: The majority of patients will experience some post-traumatic stiffness following traumatic anterior shoulder dislocation, but this typically goes away on its own. Rarely do traumatic anterior shoulder instability result in secondary frozen shoulder. However, a tiny but expected percentage of patients who first have frozen shoulder may later experience secondary frozen shoulder, which causes pain and stiffness and slows rehabilitation. It's possible that this will happen after a period of shoulder immobilization, albeit the exact cause is still unknown. This case report details the results of professional physical therapy interventions used to treat secondary adhesive capsulitis after recurrent anterior shoulder dislocations using a conservative approach. This case study aimed to show how physical therapy can help people with secondary adhesive capsulitis restore, range of motion, strength and improve shoulder function.

Case description: A 30-year-old male who had recurrent anterior shoulder dislocations who was conservatively managed by immobilizing the shoulder with sling presented to physical therapy with secondary adhesive capsulitis post immobilization. The patient's main concerns about his condition were his inability to move his right shoulder due to post-stiffness in the joint after immobilization, his inability to work, his inability to care for himself, and his lack of independence with daily life activities. The patient also felt anxious ever since he fell while playing Kabaddi. For eight weeks, the problem was addressed with both supervised and unsupervised physical therapy. Six days a week, for 45 to 60 minutes each day, the patient received education on the issue, mobility exercises, exercise therapy for rotator cuff and scapular strengthening and stabilization.

Outcome: All short-term objectives were accomplished as the patient improved in shoulder strength and active range of motion. He was self-sufficient enough to handle all of his everyday responsibilities. His UEFI, SPADI, and TSK all indicated 90% improvement.

Discussion: The functional limitations of this patient were improved by physical therapy procedures. Clinicians are introduced to specific therapies in this case report that were used to reduce functional restrictions caused by secondary shoulder adhesive capsulitis.

KEYWORDS: Case report, secondary shoulder periarthritis, frozen shoulder, anterior shoulder dislocation, instability, physical therapy, functional status, physical function.

INTRODUCTION

Joint dislocations in humans are most frequently seen in the shoulder, where 95% of dislocations happen anteriorly. The majority of cases of primary dislocation are in young male patients under the age of 20, with the frequency decreasing with age in men but steadily rising in women.[1,2] Particularly in young people, primary anterior shoulder dislocation or subluxation with trauma frequently develops to recurrent dislocation. After a shoulder dislocation or subluxation, there may be some limited motion due to pain or fear for a while, but this normally resolves on its own.[3,1] This group of patients is thought to not experience the same three-phase response of freezing, frozen, and thawing that could take many months to resolve as primary adhesive capsulitis.[4,5] Adhesive capsulitis is typically divided into two categories and is characterized by a restricted range of motion (ROM). The first form is primary adhesive capsulitis, for which there is no known underlying cause or comorbid condition. The second type of adhesive capsulitis is secondary, and it has an underlying cause. The three types of secondary adhesive capsulitis are intrinsic, extrinsic, and systemic. The clinical characteristics of adhesive capsulitis after dislocation, which is classified as the extrinsic form of secondary adhesive capsulitis, are still unknown.[1,6] This case study was created to demonstrate the advantages of expert outpatient physical therapy for treating adhesive capsulitis-related pain, stiffness, loss of strength, and lack of functional independence.

Case description

Patient history

A 30-year-old male who had recurrent anterior shoulder dislocations who was conservatively managed by immobilizing the shoulder with sling visited the outpatient physiotherapy clinic with secondary adhesive capsulitis post immobilization. The patient dislocated his right anterior shoulder after falling while playing Kabaddi, and the injury returned when he tried to put on his shirt. The patient gave written consent to take part in this case study. Conservative treatment for the anterior shoulder dislocation involved relocating the shoulder and immobilizing it using sling for 6 weeks. His inability to move his right shoulder due to post-immobilization stiffness in the joint, his inability to work, his inability to care for himself, and his loss of independence with everyday tasks were the patient's main concerns over his condition. The patient's physical treatment goals included assisting him in regaining range of motion and shoulder strength so he could resume his driving career.

Examination – Tests and Measures

A comprehensive checkup was conducted on the patient at the first visit. For evaluating the ROM, strength, flexibility, feeling, and palpation of the left and right shoulders, the results for the left shoulder were used as a baseline for the right shoulder. The patient admitted that his shoulder soreness and stiffness, inability to drive or engage in overhead tasks, incapacity to care for himself, and lack of independence with everyday activities posed the biggest obstacles. According to Norkin and White's instructions, a conventional 12-inch goniometer was used to measure the passive range of motion (PROM) and the active range of motion (AROM).[7] In the beginning, the patient's right shoulder displayed PROM and AROM dysfunctions (Table 1). The assessment of AROM and PROM was greatly complicated by capsular involvement. The examiner used the Kendall's scale of zero to five to measure strength during manual muscle testing (MMTs).[8]The patient's RC and scapular muscles displayed generalized weakness (Table 1). The patient underwent a light touch examination to assess his feeling in both upper extremities, and the results showed intact light touch. To assess whether myofascial pain was present, the examiner

palpated several muscles all over the patient's neck and upper extremity. Right Upper Trapezius was Tender to palpation (TTP). Lateral scapular slide test—also known as Linnie's test—performed to ascertain the bilateral resting scapula's position which showed weakness of the scapula stabilizers. Joint play was performed to assess joint mobility in both upper extremities where the right shoulder displayed decreased mobility. The patient's subjective level of function was assessed using the SPADI, TSK scale and the Upper Extremity Functional Index (UEFI). Test-retest reliability, an exceptional intraclass correlation coefficient, and excellent inter- and intra-rater reliability have all been demonstrated for the UEFI, SPADI and TSK.[9,10,11,12] His UEFI, SPADI and TSK scores of 56%, 86.2% and 83% respectively, indicated that he had a moderate to severe level of impairment.

Clinical Impression:

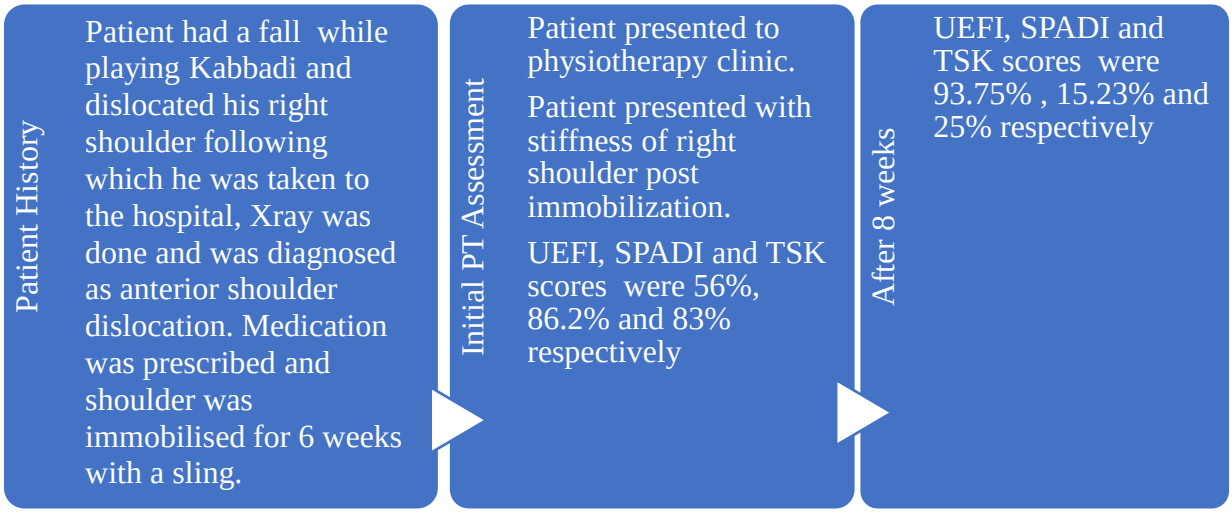
Evaluation, Diagnosis, Prognosis –

In light of the preliminary evaluation findings, the original clinical impression was confirmed, and the patient was qualified to engage in skillful physiotherapy operations. The patient, who also had apprehension concerns, had significant deficits in right shoulder strength, range of motion, flexibility, and tissue extensibility. Despite these structural and functional limitations, which reduced the patient's tolerance for ADLs like dressing, personal care duties, overhead activities, and work-related tasks, the patient continued to be suitable for this case study. For this patient, shoulder stiffness was the primary physical therapy diagnosis, while a recurrent anterior shoulder dislocation was the official medical diagnosis. Because of the patient's high prior level of function, his supportive family, and his strong desire to return to work and raise ADL tolerance, the prognosis was determined to be excellent. The patient's subjective comments and a functional daily assessment were noted at each treatment session. Progress reports were produced every 30 days. The patient's new assessments of range of motion, strength, and scapular position by the physical therapist, UEFI, SPADI, and the TSK score were all included in these reports. Six visits each week for eight weeks were the number of visits specified in the care plan. T, Y and rotator cuff strengthening exercises were used to stabilize and strengthen the scapular retractors and RC muscles. PROM and AROM exercises were used to increase shoulder mobility, stretching of the right trapezius, levator scapulae, pectoralis minor and major, and anterior inferior capsular stretches were used to relieve soft tissue restrictions. Supraspinatus initiation technique was used to increase supraspinatus activation. During the initial assessment, physical therapy goals were discussed and created with the patient based on examination findings and personal goals. The right shoulder range of motion and strength were to be improved, as well as tolerance to ADLs. A comprehensive list of both short-term and long-term goals can be found in (Table 2).

Procedural Interventions

The patient received physical therapy. He has participated in therapeutic exercises, therapeutic activities, and hot pack therapy during 45-minute physical therapy sessions each for eight weeks. Each session began with a subjective assessment of the patient's response to the previous session's treatment and any additional relevant information since then. The patient would also talk about how well he was adhering to his home exercise regimen. To address the patient's shoulder range of motion, scapular and shoulder stabilizers strength, Faradic stimulation, Scapular stabilizing and strengthening and RC strengthening exercises were used. The patient also underwent anterior inferior capsular stretches. A comprehensive list of exercises is mentioned in (Table 3). The patient received a cold pack at the conclusion of each therapy session to help ease pain and inflammation.

TIMELINE



OUTCOMES

Over the course of treatment, the patient showed improvement in shoulder range of motion, strength, and functional independence with everyday activities. He also regained his ability to care for himself. These adjustments are reflected in improved right shoulder abduction increased from 50° to 180°, right shoulder external rotation increased from 5° to 75°, as was shown, indicating an improvement in AROM. Right active shoulder flexion increased from 55° to 175°. The strength of the right Serratus anterior increased from 2/5 at the initial examination to 5/5, Supraspinatus increased from 2/5 to 5/5, Infraspinatus muscles increased from 2/5 to 5/5, Teres minor increased from 2/5 to 5/5, Middle trapezius from 3/5 to 5/5 and Lower trapezius from 3/5 to 5/5. His UEFI, SPADI and TSK were 56%, 86.2% and 83% respectively at the time of his initial evaluation; after eight weeks of treatment, they were 93.75%, 15.23% and 25% respectively. The patient's first evaluation's short-term goals were completed, and each of his long-term goals was at least partially met. The patient received professional physical therapy treatments over the eight weeks covered by this case report, and with ongoing care, he was able to regain functional independence and go back to work.

DISCUSSION

Patients with frozen shoulder syndrome were divided into "primary" and "secondary" groups by Lundberg.[13] Patients who arrive with mobility loss and pain but no notable abnormalities on the history, clinical examination, or radiographic evaluation are said to have primary adhesive capsulitis. Patients with secondary adhesive capsulitis, on the other hand, reveal an injury or surgery to the affected upper extremity before developing shoulder symptoms.[14] Due to the patient's immobilization for anterior shoulder instability, subsequent secondary adhesive capsulitis is the diagnosis in this case report.

In this case study, physical therapy was gradually given to a 30-year-old patient who had secondary adhesive capsulitis post shoulder immobilization after an anterior shoulder instability. Evidence-based research and clinical judgement, both of which supported a patient-centered perspective, were the plan of care's key contributions. Physical therapy was used to increase the patient's functional mobility, independence with ADLs, and gross upper extremity strength in order to help him regain his previous

level of function. The patient appeared to have benefited from shoulder mobility, rotator cuff strengthening and scapular muscles strengthening and stabilization, and neuromuscular control exercises.

Early research has shown that adhesive capsulitis of the shoulder patients frequently have SD and that there is a direct connection between SD and scapular muscle imbalance.[15]According to recent research, scapular control is a crucial aspect of scapular rehabilitation, and scapular stabilization exercises are useful for lowering discomfort and enhancing function.[16] Exercises for scapular stabilization that focus on scapular posture and kinematics, as well as stretching and strengthening, enable the scapula to perform the function of energy transfer, acting as the basis for muscle activation, and acting as a link in the kinetic chain.[17]

In the study by Rawat et al., isometric and isotonic exercises using a TheraBand and dumbbells were paired with TENS and mobilization to strengthen the rotator cuff muscles. For individuals with adhesive capsulitis, this combination improved pain, range of motion, and function more than TENS and mobilization alone.[18]

PNF has reportedly been successful in reducing pain and enhancing functional capabilities. The greatest potential for muscular functioning is offered by PNF techniques, particularly those that involve reciprocal activation of the agonist and antagonist to the desired action.[19]

Table 1: - Prognosis/Improvement in the scores of outcome measures.

Outcomes for Right shoulder	**Baseline**		**2 week**		**6 week**		**8 week**	
Range of motion								
Flexion	$0\text{-}55^0$		$0\text{-}90^0$		$0\text{-}160^0$		$0\text{-}180^0$	
Extension	$0\text{-}20^0$		$0\text{-}33^0$		$0\text{-}45^0$		$0\text{-}50^0$	
Medial rotation	$0\text{-}60^0$		$0\text{-}65^0$		$0\text{-}70^0$		$0\text{-}75^0$	
Lateral Rotation	$0\text{-}5^0$		$0\text{-}35^0$		$0\text{-}65^0$		$0\text{-}80^0$	
Abduction	$0\text{-}50^0$		$0\text{-}100^0$		$0\text{-}165^0$		$0\text{-}180^0$	
Manual Muscle Testing (MMT)								
Serratus anterior	2/5		3/5		4+/5		5/5	
Supraspinatus	2/5		3/5		4/5		5/5	
Infraspinatus	2/5		3/5		4/5		5/5	
Teres Minor	2/5		3/5		4/5		5/5	
Middle Trapezius	3/5		4/5		4+/5		5/5	
Lower Trapezius	3/5		4/5		4+/5		5/5	
Pain on								
Rest	0/10		0/10		0/10		0/10	
Activity	8/10		6/10		3/10		0/10	
Lateral scapular slide test at 0 degree	Right	Left	Right	Left	Right	Left	Right	Left
T2 T3 T7	10cm 10cm 14cm	9cm 9cm 11cm	9cm 9.5cm 13cm	9cm 9cm 11cm	9cm 9cm 11cm	9cm 9cm 11cm	-	-

UEFI	56%	70%	86%	93.75%
SPADI	86.2%	68%	27%	15.23%
TAMPA	83%	63%	46%	25%

Table 2: Short- and Long-term goals.

Short term goals (4 weeks)	Long term goals (8 weeks)
The patient will be able to do functional activities at the shoulder level such as driving with minimal to moderate discomfort/difficulty	The patient will achieve full AROM degrees in all planes without any end range pain in order to return to full work activities.
In order to be independent with self-care tasks, the patient will be able to undertake self-care/bathing activities with less discomfort/difficulty most of the time.	The patient will be able to achieve maximum strength of rotator cuff and scapular muscles to facilitate return to prior levels of function.
The patient will achieve AROM in right shoulder flexion up to 100 degrees, 120 Abduction, 35 degree of Internal rotation and attain 25 degrees of external rotation.	The patient will be gradually able to return to full ADLs, work, and recreational activities.
The patient will begin scapular stabilizing exercises and strengthening exercises for Middle and lower trapezius and Rotator Cuff muscles in order to increase the strength from 3/5 to 4/5	

Table 3: Progressive Rehabilitation Protocol

Interventions	Week 0-2	Week 2-4	Week 4-6	Week 6-8
Neuromuscular electrical stimulation for supraspinatus and Infraspinatus	Faradic stimulation 30 contractions	-	-	-
ROM Exercises for flexion, abduction, external and internal rotation	With wand 10reps for 3 sets	Progress AROM in scapular plane10reps for 3 sets	-	-
Anterior inferior capsular stretches	10sec hold x 3 rep	15sec hold x 5 rep	15sec hold x 5 rep	-
MET for Pectoralis major and minor	10sec hold x 10 rep	10sec hold x 10 rep	10sec hold x 10 rep	-

Supraspinatus activation	10 sec holds x 10 rep	20 sec holds x 10 rep	-	-
Scapular stabilization exercises for middle (T) and lower trapezius (Y)	10second holds x 10 rep each	With 0.5 kg dumbbell 10sec hold x 10 rep each	With 1 kg dumbbell 10sec hold x 10 rep each	With 2kg dumbbell 10sec hold x 10 rep each
PNF Exercises	10 reps	15 reps	20 reps	25 reps
Neuromuscular re-education	Weight bearing in quadruped position with scapular protraction	Weight bearing in tripod position with scapular protraction	Weight bearing in unstable surfaces with scapular protraction	Weight bearing in unstable surfaces with scapular protraction
Strengthening of Infraspinatus and Teres minor muscle	10second holds x 10 rep each	With 0.5 kg dumbbell 10sec hold x 10 rep each	With 1 kg dumbbell 10sec hold x 10 rep each	With 2kg dumbbell 10sec hold x 10 rep each
Serratus anterior strengthening with dumbbell in supine	10second holds x 10 rep each	With 0.5 kg dumbbell 10sec hold x 10 rep each	With 1 kg dumbbell 10sec hold x 10 rep each	With 2kg dumbbell 10sec hold x 10 rep each
Scapular strengthening exercises	10second holds x 10 rep each	With 0.5 kg dumbbell 10sec hold x 10 rep each	With 1 kg dumbbell 10sec hold x 10 rep each	With 2kg dumbbell 10sec hold x 10 rep each

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