



CONSERVATIVE PHYSIOTHERAPY REHABILITATION FOR SUPRASPINATUS TENDINOPATHY WITH SUBACROMIAL BURSITIS IN A COMPETITIVE ARCHER: A CASE REPORT

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Abstract:

Background: The patient was a 24-year-old archer diagnosed with right supraspinatus tendinopathy associated with mild subacromial bursitis due to repetitive overuse during intensive training of the sport. The patient opted for conservative physiotherapy management with the main and important goal of returning to the sport. Rehabilitation was planned using clinical evidence and patient-centered care.

Materials & Methodology: The patient underwent a 6-week physiotherapy intervention programme following pre and post intervention assessment, consisting of Cryotherapy, Muscle Energy technique (MET), progressive therapeutic exercises, neuromuscular rehabilitation, scapular stabilization, and a well-structured home exercise programme. Initially, cryotherapy was used to reduce pain and inflammation, and further MET was applied to reduce muscle tightness and improve mobility of the shoulder joint. Progressive strengthening and various sports-specific exercises were also included and incorporated to improve dynamic stability of the shoulder, restore rotator cuff strength and to enhance functional performance.

Results: The patient showed significant improvements through rehabilitation; the pain decreased from 6/10 to 1/10 on the Visual Analogue Scale (VAS). There was an improvement in shoulder pain and disability index (SPADI) from 48% to 10 % and improved grades of rotator cuff muscle strength. After the completion of the rehabilitation programme, the patient successfully returned to competitive archery.

Conclusion & Discussion: This case highlights the effectiveness of a conservative rehabilitation programme combining various therapeutic approaches in managing rotator cuff tendinopathy in an archer. The integration of evidence-based practice, clinical expertise and patient consistency successfully contributed to his return to sport.

Index Terms – Muscle Energy Technique, Cryotherapy, Archery

I. INTRODUCTION

One of the most common causes of shoulder pain in clinical practice, which is encountered by 30-70% of the population, is rotator cuff tendinopathy ^[1]. This mainly affects individuals who perform overhead activities, which involve athletes who engage in continuous overhead activities ^[2]. Due to continuous overuse and loading of the supraspinatus muscle during drawing the bowstring back and aiming at the target, this puts strain on the muscle, leading to overuse of the supraspinatus, causing functional impairment and discomfort ^[3].

Evidence-based practice integrates the best available information based on scientific evidence, clinical experience, and patient beliefs ^[4,5]. In sports rehab management, this practice helps the therapist to specifically plan a treatment approach according to the patient's needs and demands, functional ability, severity of the symptom and plan rehabilitation aims and goals ^[6]. Archery is an ancient skill that was used for survival (hunting, defence and war) and has now been turned into a sport where the athlete has to shoot an arrow at a given target within a given time period ^[7]. Sports that require overhead shoulder movement have a high chance of shoulder injury, and continuous use of high-energy force predisposes the shoulder joint's dynamic and static stabilisers to long-duration damage and attenuation, which can lead to moderate instability that puts more load and strain on the rotator cuff muscle group ^[8]. Continuous eccentric and concentric loading of the rotator muscles and the upper muscle group of the back during stance and drawing the bow back can lead to fatigue and tendinopathy of surrounding muscular structures ^[8].

Epidemiologically, it was seen that around 50-60 % of the competitive archer population suffered from shoulder injuries ^[9], and the majority of the archers suffered from pain while drawing the bow strings (41.18%) ^[8]. Grover et al. (2016) found that archers with shoulder pain tested positive for the Hawkins-Kennedy test (38.02%) and apprehension test (11.26%). It was also noted that some archers' pain was provoked on performing the speed test, lift-off test and forceful contraction of the supraspinatus ^[8].

Management of rotator cuff injuries was reviewed in five different classes for treatment ^[10], where the first management approach was non-surgical management, which consisted of improving shoulder function and decreasing the pain. The second approach used repairs if the patient didn't respond well to the first approach. In the third approach, if the patient was healthy and asymptomatic, repair was considered as a method of treatment. For cases with chronic cases, debridement, repair and reconstruction were considered in the fourth class and finally, for the last was considered appropriate when there was pseudoparalysis and an irreparable tear arthroplasty was considered ^[10].

The primary form of treatment for most patients who are affected with rotator cuff tendinopathy is usually conservative management. Recent management guidelines include a multistructural approach which include patient education and progressive exercise therapy; manual therapy is considered before conservative management.

In the physiotherapeutic approach, strengthening exercises were prescribed to the patient in which the subject had to perform resisted exercises (shoulder rotations, scapular retractions), upper thoracic stretching techniques, prone-positioned scapular retraction and elevation of the shoulder in the shape of "Y", "T", lawnmower pull, plank exercise ^[11]. Each of these exercises was performed with 2-3 repetitions of 10 sets.

II. CASE PRESENTATION

2.1 History

The patient was a 24-year-old right-hand-dominant male, a competitive archer, who presented with the complaint of gradually increasing pain in his right shoulder for the past four weeks after archery training. There was no history of any direct trauma or any recurrent shoulder dislocation. MRI was performed one week after the onset of symptoms, which revealed supraspinatus tendinopathy with mild subacromial bursitis without any evidence of full rotator cuff tear or other associated shoulder pathology.

The patient had no significant medical or surgical history and was not on any ongoing medications. He had been participating in competitive archery for the past 6 years. He also presented to the Physiotherapy Outpatient Department after 3 weeks of diagnosis for treatment purposes.

The patient was selected for this case study because of his regularity, willingness to participate and his dedication to the prescribed Home Exercise Programme. His primary goal was to return to his sport without any pain before the upcoming National Tournament. After discussing the treatment options, he agreed to undergo a six-week physiotherapy intervention programme consisting of Muscle Energy Technique (MET), cryotherapy and progressive Therapeutic Exercises.

2.2 Examination

The chief complaints reported by the patient were pain over the anterolateral aspect of the right shoulder (VAS: 6/10 during playing and 2/10 at rest), mild weakness during the drawing phase of the sport, having difficulty in performing overhead activities, shoulder fatigue and discomfort while sleeping on the affected side ^[12].

Although MRI confirmed Supraspinatus Tendinopathy with mild subacromial bursitis, a detailed Physiotherapy Examination was done to check any further pathologies. A few special tests were done, which came out positive – Empty Can Test, Hawkins-Kennedy Test, Neer Impingement Test & Painful Arc. These special tests were performed according to standardised shoulder examination procedures ^[12].

Mild Scapular dyskinesis was noted during shoulder elevation on observation; there was no swelling or deformity visible. Mild tenderness was present over the supraspinatus tendon and greater tubercle. Shoulder Range Of motion was assessed using a universal goniometer ^[13]. It showed ranges as follows – Flexion of 160°, Abduction of 150°, external rotation of 75° and internal rotation of 70° with pain at the end range. MMT showed Grade 4/5 strength of the supraspinatus and external rotators due to pain, while the other muscles showed normal strength.

Based on all the above findings, the Physiotherapist diagnosed the patient with Right Rotator Cuff Tendinopathy associated with pain, mild weakness, decreased mobility of the shoulder and mild impairment in scapular control. The short-term goals were to reduce pain, improve ROM, strengthen the muscle and restore muscle function, whereas the long-term goal was his safe and pain-free return to archery ^[14]. Considering the patient's young age, absence of any shoulder pathology and high dedication, the prognosis was considered good.

2.3 Treatment

The patient agreed to participate in a six-week physiotherapy programme, attending three sessions per week, and each session lasting approx. 50-60 min. The Rehabilitation programme consisted of Muscle Energy Technique (MET), cryotherapy, progressive therapeutic exercises, neuromuscular re-education and a home exercise programme afterwards. Recent clinical approaches suggest that a multimodal rehabilitation approach that combines various aspects like patient education, therapeutic exercise, manual therapy and progressive loading for individuals with rotator cuff tendinopathy as explained in Table 1 ^[12].

2.4 Cryotherapy

Cryotherapy was done during the initial two weeks of rehabilitation to reduce pain and local inflammation before therapeutic exercises. A cold pack wrapped in a moist towel was applied over the anterolateral aspect of the right shoulder for 15 minutes, and the patient was sitting in a comfortable position with the arm supported. Cryotherapy has been advised to provide an analgesic effect, reduce inflammation and improve patient tolerance to exercise during the early phase of rehabilitation ^[1,4,15].

Table 1. Therapeutic exercise progression

exercises	Week1	Week 2	Week 3	Week 4	Week 5	Week 6
Cryotherapy	15 mins	15 mins	10 mins	10 mins	-	AR
MET	3*5 contractions	3*5 contractions	3*5 contractions	3*5 contractions	2*5 contractions	-
Pendulum exercises	3 Sets * 15 reps	3 Sets * 15 reps	-	-	-	-
Wand-assisted shoulder flexion	3 sets*10 reps	3 sets*12 reps	3 sets*15 reps	-	-	-
Wand-assisted shoulder external rotation	3 sets*10 reps	3 sets*12 reps	3 sets*15 reps	-	-	-
Scapular retraction	3 sets*12 reps	3 sets*15 reps	3 sets*15 reps	3 sets*15 reps	3 sets*15 reps	3 sets*15 reps
Isometric external rotation	3 sets*10 reps (10 sec hold)	3 sets*10 reps	3 sets*12 reps	-	-	-
Isometric abduction	3 sets*10 reps	3 sets*10 reps	3 sets*12 reps	-	-	-
TheraBand external rotation (yellow to red)	-	-	3 sets*12 reps	3 sets*15 reps	3 sets*15 reps	3 sets*15 reps(green)
Scaption 1-2 Kg dumbbell	-	-	3 sets*10 reps	3 sets*12 reps	3 sets*15 reps	3 sets*15 reps
Serratus punches	-	-	3 sets*15 reps	3 sets*15 reps	3 sets*15 reps	3 sets*15 reps
Prone horizontal abduction	-	-	-	3 sets*10 reps	3 sets*12 reps	3 sets*15 reps

Wall pushes	-	-	-	3 sets*10 reps	3 sets*12 reps	3 sets*15 reps
Rhythmic stabilization	-	-	-	3*30 secs	3*45 secs	3*60 secs
Stability Ball weight shift	-	-	-	3*30 secs	3*45 secs	3*60 secs
Sports-specific archery	-	-	-	-	15 mins	20-30 mins

Abbreviations: - (-) exercise not performed that week, (reps) repetitions, (sec) seconds, (AR) As Required.

2.5 Muscle Energy Technique (MET)

After Cryotherapy, MET was performed to reduce muscle tightness, improve mobility of the shoulder and restore normal joint mechanics. Post-isometric relaxation techniques were applied to the levator scapulae, upper trapezius, pectoralis minor and infraspinatus^[16]. The patient was made to perform a gentle isometric contraction of approx. 20-30% of maximal effort against the resistance provided by the therapist for 7-10 seconds, which is followed by passive stretching and relaxation. Seeing the pain tolerance of the patient, each exercise was repeated 3-5 times. Manual therapy combined with exercise has been considered to reduce pain, improve mobility of the shoulder and enhance function in patients with rotator cuff disorders^[16,17].

2.6 Therapeutic Exercises

Progressive therapeutic exercises were started after MET. During the first two weeks, pendulum exercises, active-assisted range of motion using a wand, scapular setting exercises, isometric rotator cuff strengthening, and posterior capsule stretching were emphasised. As pain decreased, resistance exercises using elastic bands were initiated, including external rotation, internal rotation, scaption, serratus anterior strengthening along with lower trapezius activation^[1,18]. During the last two weeks, closed kinetic chain exercises, rhythmic stabilisation, proprioceptive training using a stability ball, and sport-specific exercises were incorporated to improve dynamic stability of the shoulder joint, which facilitated return to the sport^[19]. Progressive strengthening and neuromuscular training are some essential components of rehabilitation for overhead athletes in such sports with rotator cuff tendinopathy^[20].

2.7 Home Exercise Programme

Because the success of a rehabilitation programme depends on doing regular exercises at home other than in the clinic, the patient was educated regarding the importance of compliance with a structured home exercise programme (HEP)^[2]. The HEP included pendulum exercises, scapular retraction, posterior capsule stretching, wand-assisted shoulder mobility, isometric rotator cuff exercises, and strengthening with TheraBand, which had to be performed five days per week^[2,18]. Exercise dosage, repetitions and resistance were progressed according to pain and improvement at each follow-up visit. Patient education regarding posture, activity modification, warm-up before archery practice, and gradual return to sport was reinforced throughout the rehabilitation programme (Table 2)^[19]. Adherence to a structured home exercise programme has been associated with improved pain relief, shoulder function, and long-term clinical outcomes in individuals with rotator cuff disorders^[20].

Table 2. Home Exercise Protocol

Initial Home Exercises (Week 1-2)	Parameters
Pendulum exercises	3sets *15 repetitions
Wand assisted shoulder flexion	3sets *10 repetitions
Wand assisted shoulder external rotation	3sets *10 repetitions
Scapular retraction	3sets *12 repetitions
Isometric shoulder external rotation	3sets *10 repetitions (10 second hold)
Isometric shoulder abduction	3sets *10 repetitions (10 second hold)
Posterior capsule stretch	3 repetitions *30 second hold
Pectoralis minor stretch	3 repetitions *30 second hold
Home Exercises (Week 5-6)	Parameters
TheraBand external rotation (Day 1)	3 sets * 12- 15 repetitions
TheraBand internal rotation (Day 1)	3 sets * 12- 15 repetitions
Scaption with dumbbell (Day 1)	3 sets * 10-12 repetitions
Serratus Punches (Day 1)	3 sets * 15 repetitions
Wall Push-ups (Day 2)	3 sets * 12 repetitions
Prone Horizontal Abduction (Day 2)	3 sets * 10 repetitions
Rhythmic stabilization (Day 2)	3 sets * 30 second hold

Day 1 exercises were performed on Monday, Wednesday and Friday.

Day 2 were performed on Tuesday, Thursday and Saturday.

III. RESULTS & DISCUSSION

Throughout the six-week rehabilitation programme, the patient showed significant improvement in pain, mobility of the shoulder joint, muscle strength and functional performance. He sincerely attended all the treatment sessions with utmost dedication and showed excellent compliance with the prescribed Home Exercise Programme. Gradual restoration of shoulder range of motion and the strength of rotator cuff muscles helped the patient to resume sport-specific training without any further aggravation of symptoms. Outcome measures demonstrated clinically meaningful improvement, with the Visual Analogue Scale (VAS) decreased from 6/10 to 1/10. Shoulder pain and disability index improved from 48% to 10%, as well as the improvement in muscle strength.

In this case study, there was evaluation of the effectiveness of MET and cryotherapy combined to treat archers with rotator cuff injury. It was noted that there is continuous involvement of the shoulder joint in archery, where the athlete performs repetitive movement of drawing the bowstring back ^[8]. Statistically, it was noted that archers who suffered from shoulder pain were around 50-60% of the population ^[9], with 38.02% testing positive for the Hawkins-Kennedy test, causing their performance to be affected due to reduction of ROM.

In this case study, there was significant improvement in the patient with reduction in pain, improvement in shoulder ROM, and improvement of strength in the shoulder joint after performing MET and cryotherapy. The improvement of the athlete can be attributed to the combined physiological effects of cryotherapy and MET. These findings are consistent with previous studies conducted where cryotherapy was proven beneficial as it aided in reducing pain and helped improve function for a short duration ^[21].

The limitations that were faced in this study were that there were very few participants in the study and the duration of the treatment was short as the archer had time constraints. Future randomised controlled trial studies having a larger population size are needed to compare the effectiveness of MET and cryotherapy in archers with rotator cuff injury.

IV. ACKNOWLEDGMENT

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