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Effect Of Rotator Cuff Strengthening on The Outcome of Adhesive Capsulitis Using Pilates and Kettlebell Exercises: A Case Report

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Abstract

Adhesive capsulitis is a very common and painful condition seen in wide range of population all over the world. This study focuses on the non-diabetic adhesive capsulitis and a modification in treatment protocol. This study suggests rotator cuff strengthening as adjacent therapy for adhesive capsulitis using Pilates and kettle bell exercises. After a four-week plan of 12 alternate day session the results were appreciative. This study suggests the use of rotator cuff strengthening using Pilates and kettle bell as adjacent therapy with more research and randomised control trial.

Keywords: Adhesive capsulitis, Pilates, kettle bell, rotator cuff strengthening

INTRODUCTION

Adhesive capsulitis also known as arthrofibrosis is a pathological process in which there is formation of excessive scar tissue around the glenohumeral joint which causes excessive pain, stiffness and dysfunction. It is the shoulder joint capsule which undergoes thickening **(1)**. In general, adhesive capsulitis is further categorized into 2 stages; as primary; generally idiopathic and insidious in nature; and secondary; due to trauma or immobilization. Furthermore, the clinical stages of adhesive capsulitis are divided into three stages; the freezing stage, also known as the painful stage, frozen or transitional, and the thawing stage **(2).**

The anatomical structure of the rotator cuff consists of the muscle's supraspinatus, Infraspinatus, teres minor and subscapularis. The head of the humerus is attached to this rotator cuff, holding it in place in the glenoid cavity. P.Rawat and et al suggested the use of rotator cuff strengthening as an adjunct to the standardized protocol for the treatment of adhesive capsulitis in their randomized control trial**(3).**Pilates is a physical training strategy that focuses, through posture and movement exercises, on posture, flexibility, segmental alignment and core control. The aim of this research was to determine the impact of a Pilates training program during a functional shoulder flexion assignment on arm-trunk posture, strength, flexibility and biomechanical patterns **(6).** From simple full body movements to exercises that are unilateral or more complex involving rotation, Kettle bell exercises can be advanced. Kettle bells, moreover, are smaller, require less physical space, are more accessible and may be less intimidating than barbells and weight plates. Kettle bell exercises are ballistic, and training to increase maximum power output and increase the rate of force development through ballistic type movements has been reported. Training with kettlebells over a long period can establish new neuromuscular patterns even in older populations, resulting in more effective and reliable afferent and efferent signals used to control weight **(7).** Therefore,

we will be incorporating the same protocol in our case report.

CASE REPORT: A 57-year-old, right hand dominant male visited our physiotherapy department with the chief complaint of resting right shoulder pain since 6 months and restricted movement of both shoulders since 2 months. Because of his profession he had to drive for 20 kilometres daily in a car since two years. Before that he used to drive on a bike and he did that for 10 years. He has been travelling this much since 10 years. He lives in a well cemented house with 2 floors. He has no history of diabetes mellitus, hyper/hypotension or hypo/hyperthyroidism. Adhesive capsulitis is generally a late complication of diabetes mellitus or any underlying pathological disease, but in this case the patient exhibits no history of diabetes or any other disease **(8).** On numerical pain rating scale the patient had a scoring of 8 out of 10. On observation, patient exhibited forward drooping shoulders in anterior view and decreased cervical lordosis in lateral view. The patient had an apprehensive expression on his face. On palpation, there was grade 2 tenderness on both shoulders along the deltoid region. On general examination he exhibited weakness in upper back, trunk and scapular region. On range of motion examination, the patient exhibited a restricted range of motion of the right shoulder in the capsular pattern i.e. lateral rotation, abduction and medial rotation (table 1). However, shoulder flexion and extension, abduction were more affected in the right shoulder than the ranges of the left shoulder. However, muscle power was not affected. According to the shoulder pain and disability index (SPADI) scale the severity was 4.

INTERVENTION: A 12 session treatment protocol spanning over 4 weeks was designed for the patient. The patient was called on alternate days. Thermotherapy along with Transcutaneous Electrical Nerve Stimulation (TENS) was applied for 15 minutes followed by glenohumeral joint mobilization which included posterior glenohumeral glide and inferior glenohumeral glides were given. Rotator cuff strengthening was given using a Pilates exercises combining with kettle bell exercises. Shoulder Pilates combined with wall exercise and ladder exercise were given to help strengthen scapular region upper back and trunk. Kettle swing exercises combined with pendulum exercise were given to loosen up the stiffness in both the shoulder joints. 15 repetitions were performed in 3 sets. The treatment protocol was for right shoulder as well as left shoulder.

RESULTS: After a 12 session 4-week program, the patient showed a significant reduction in pain and stiffness felt on the both the shoulders. The score on shoulder pain and disability index (SPADI) reduced to 2. The pain after 4 weeks was 2 on numerical pain rating scale. There was significantly improve in the range of motions of the right shoulder (table 1)

Range of motions (in degrees)	Pre intervention record		Post intervention record	
	Left Shoulder	Right shoulder	Left Shoulder	Right shoulder
Flexion	120	110	150	140
Extension	30	20	30	25
Abduction	80	50	140	130
Adduction	100	90	100	90
Internal Rotation	60	40	80	70
External rotation	45	30	80	85

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DISCUSSION: As discussed above, adhesive capsulitis is a painful and restrictive condition caused due to formation of scar tissue around the glenohumeral joint **(1).** According to a research paper published by M. Zappia; et.al, ultrasound imaging reveals synovial hypertrophy at the rotator cuff interval **(4)**. The research study done by P. Rawat suggested that rotator cuff strengthening can be valuable adjunct along with conventional therapy for treating adhesive capsulitis, we followed the same protocol which yielded a better prognosis after 4 weeks **(3).** According to research work of J.E. Khun; et al, rehabilitation of rotator cuff by physical therapy can lead to better prognosis of the patient **(5).**In the study held byManocchia, Pasqualeet altraining with kettlebells over a long period can establish new neuromuscular patterns even in older populations, resulting in more effective and reliable afferent and efferent signals used to control weight (7). The objectives of this study conducted by KimEmeryet al were to determine the effect of a Pilates training program on arm–trunk posture, strength, flexibility and biomechanical patterns during a functional shoulder flexion task. And the study resulted as the Pilates training program was effective in improving abdominal strength and upper spine posture as well as in stabilizing core posture as shoulder flexion movements were performed **(8).**

CONCLUSION: There is a scarcity of research in India which suggests the use of rotator cuff strengthening as adjunct therapy in treating adhesive capsulitis. A single case report cannot suggest the effectiveness of Pilates and kettle bell exercise as an effective treatment protocol. But our case report can act as a hypothesis for further studies. Hence, further studies in the form randomised clinical trials are encouraged to evaluate the efficacy of the treatment protocol.

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