Management of Rotator Cuff Tear in a Kathakali Dancer with a History of Trauma: A Case Report

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Abstract— This case report presents a conservatively managed case of a 43 year old male professional Kathakali dancer with a traumatic under surface fibre failure (TUFF) of sub-scapularis tendon along with partial thickness tear of supraspinatus and infraspinatus tendon at its “critical zone” and tendinosis of the pulley segment of long head of biceps brachii . The patient reported to our rehabilitation center with a history of road traffic accident (RTA) Conservative treatment started immediately after the diagnosis was made. Sub-scapularis muscle is the largest muscle of 4 muscles contributing to form rotator cuff and providing over 50% of muscle and tendon mass to support shoulder joint. Despite its importance and impact on conservative and surgical management it is often under-looked.Hence, while working on the weaken scapular muscles one must not forget the importance of relaxing the shoulder muscles first, especially subscapularis and then initiate the strengthening protocol.

Key words: Rotator Cuff Tear, Kathakali Dancer

I. INTRODUCTION

Dancers are prone get their subscapularis impinged due to the biomechanical stress imposed on it with repetitive overuse. The roller wringer effect has been described in literature as closely associated degeneration of the subscapularis tendon with age. This refers to the effect of impingement (pinching), which can cause the undersurface fibers of the coraco-acromial arch to tear. This condition is called traumatic undersurface fiber failure (TUFF) [1]. Because of the shape of the coracoid process and the way the subscapularis passes under it, the tendon can get rolled and wrung out like a wet towel. Hence the name “roller wringer effect” . Moseley and Goldie (1963) noted a zone of diminished vascularity near the insertion of the supraspinatus [2,3] . They termed this the “critical zone”. Rothman and Parke (1965) stated that the “critical zone” of relative avascularity was not a pathological state but was associated with advancing age [4].

II. CASE REPORT

A 43 year old male professional dancer reported to our rehabilitation center presenting with left shoulder pain during overhead activities with a complaint of pain along with restricted global movement patterns. The patient had a history of RTA three months back that landed him up with acute pain and swelling that persisted for 10-15 days. For a week the patient continued with his professional activities (dancing) which further aggravated the condition. On radiographic examinations a partial thickness bursal surface tear of supraspinatus at its insertional footprint, tendinosis in anterior third of infraspinatus, partial thickness tear in deep fibres of subscapularis at its insertional site along with tendinosis in pulley segment of long head of biceps brachi was concluded. The patient was put on a sling with arm placed in adduction and internal rotation.This position brings maximum relief to the patient as prevents loading of the IGHL. Though this decreases the tension in the ligament , however in this position the IGHL(specially the axillary pouch) slackens , further triggering the tightening of structures inferiorly around the GH joint. On observation , right shoulder appeared depressed and left protracted with prominent left clavicle in AP view. On PA view , atrophy of scapular muscles was observed. The depression in the infraspinatus fossa was visually more marked over left scapula. Left scapular winging was also concluded. On lateral view patient presented with forward head posture. Clinical examination revealed, inferior capsule tightness, multiple tenderpoints over supraspinatus and infraspinatus. The patient had no radiation of symptoms distally. There was tightness of pectorals, subscapularis, upper trapezius and weakness of anterior superior serrate along with rhomboids. Active range of motion (AROM) was noted 40^0 on abduction and 45^0 on forward flexion on standing and 150 ER (external rotation), 30^0 IR (internal rotation) from adducted position was noted. Ranges for external and internal rotation in erect posture with abduction could not be taken due to excessive pain (NPRS: 6/10). The rehabilitation was initiated two months after the incidence. The primary goals were to decrease pain and prevent further deterioration in ROM. The patient reported to our rehabilitation center 3 times a week. Initial first month the patient was given active rest and splinting to decrease further deterioration. Gentle global passive movements for maintaining ROM and isometrics as per patients tolerance. As an adjunct U.S therapy was administered with pulsed mode for 6 minutes with an n intensity of $1.5W/cm^2$ at the insertional site of rotator cuff muscles. Post 6 weeks the patient was re-evaluated. There was considerable improvement in pain (NPRS: 2/10). Gentle mobilization of shoulder complex was started. The patient showed symptoms of secondary impingement syndrome. To allow better clearance of humeral head subscapularis was relaxed via MET techniques. Scapular strengthening and stabilization exercises were started in prone. By the end of 8 weeks 110^0 forward flexion, 90^0abduction, 15^0ER and 30^0IR from abducted position was noted. Post exercise session cryotherapy was advised. Strengthening exercises within the available painfree range was incorporated. PNF patterns were given to enhance proprioception. Gradually, strengthening with elastic resistance was initiated once ROM reached near normal by 10th week. Patient was able to perform light functional activities and dance moves that did not involve overhead movement of shoulder. After 12 weeks, rigorous functional training was started, once diagnostic U.S revealed nearly a completely healed status of the microruptured tendons of cuff. Plyometrics was incorporated and patient was encouraged to perform more of his dance moves with overhead shoulder complex

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movement. By the end of 4th month the patient was able to perform all global movements and had a 4/5 score on MMT.

III. Discussion

Tendinosis, sometimes called chronic tendinitis, chronic tendinopathy, or chronic tendon injury, is damage to a tendon at a cellular level (the suffix "osis" implies a pathology of chronic degeneration without inflammation)[5,6]. It is thought to be caused by microtears in the connective tissue in and around the tendon, leading to an increase in tendon repair cells. This may lead to reduced tensile strength, thus increasing the chance of tendon rupture. Tendinosis is often misdiagnosed as tendinitis due to the limited understanding of tendinopathies by the medical community [7]. Classical characteristics of "tendinosis" include degenerative changes in the collagenous matrix, hypercellularity, hypervascularity, and a lack of inflammatory cells which has challenged the original misnomer "tendinitis. Ultimately leading to narrowing of the subacromial outlet and a positive impingement test.

The pattern of upper facial chains (spiral lines) may also contribute to shoulder impingement syndrome. The upper part of the line travels from the splenius capitis and cervicis muscles crossing over to the opposite side rhomboids major and minor, serratus anterior, external oblique and contralateral internal oblique. This fascial connection and movement patterning assists in upper body rotation and functionally works with the latissimus dorsi and subscapularis. When we move, our brain thinks of them as one cohesive movement pattern. One common dysfunction observed in dancers is an inhibited external/internal oblique and latissimus dorsi pattern leading to overuse of the serratus anterior and subsapularis. Inefficient obliques causes poor torso rotation and now the body must find other muscles in a pattern to accomplish the movement. The overuse of the serratus is an attempt to over protract the shoulder to assist in torso rotation. When one cannot rotate to optimal, the arm will come across the body more to complete the pattern. The facilitated (up-regulated) serratus anterior now has a dysfunctional relationship with other shoulder blade stabilizers. Since the serratus anterior protracts and upwardly rotates the shoulder blade we can get impingement syndrome in the AC joint. While treating rotator cuff tears it is not to be forgotten that our body is a complete chain. Tightness of the overlying fascia can strongly contribute in shoulder impingement. Hence, while working on the weaken scapular muscles one must not forget the importance of relaxing the shoulder muscles first and then initiate with the strengthening protocol to avoid shoulder impingement due to biomechanical errors.

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