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Scapular dyskinesia and physiotherapy

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Abstract
The purpose of this study was to find the effect of blackburns exercise along with conventional physiotherapy on scapular dyskinesia. The subject of the study was a 30 year old male with scapular winging and shoulder pain and difficulty in overhead activities.
Method: Blackburn exercise along with conventional physiotherapy was given to the subject and assessment for outcome measures (VAS, ROM, LENNIT TEST) was measured in the beginning after 3 and 6 weeks of interval.
Result: Result of the study shows the considerable improvement in patients, Visual analogue scale, ROM and functional mobility to the patient after blackburns exercise protocol .
Conclusion: Present study concludes that blackburn exercise included in the routine exercise protocol will be effective in improving the stability as well as mobility of scapulothorasic and glenohumeral joint. And help in dealing with the root cause of scapular dyskinesia.

Keywords: Scapular dyskinesia, winging, blackburns execrsie, physiotherapy

Introduction

It is one of the body's least congruent joints, the scapulothoracic articulation. The lack of a bony articulation between the scapula and thorax allows for a great deal of mobility in a variety of directions, including protraction, retraction, elevation, depression, anterior/posterior tilt, internal/external and upward/downward rotation. Only ligamentous attachments at the acromioclavicular joint hold the scapula to the thorax. The serratus anterior, rhomboid major and minor, levator scapulae, and trapezius are the main stabilizers of scapula. 3 tso stabilise the scapula and control mobility, these muscle groups contracts synergistically.3
Scapular dyskinesis refers to abnormal scapular position and movement. Various factors are responsible for the development of scapular dyskinesis including posture or previous fracture. Joint causes including acromioclavicular joint instability, acromioclavicular joint arthrosis, and glenohumeral joint internal derangement. Neurological causes including cervical radiculopathy or nerve palsy. Soft tissue factors including inflexibility (tightness) or intrinsic muscle problems, and alterations in periscapular muscle activation.1
The glenohumeral joint is more prone to injury when the scapula is unable to fulfil its stabilising function, which also leads to lower neuromuscular performance. The scapula plays a key role in maintaining position the glenohumeral joint and arm in space and also withstands the large loads generated by the upper extremity. The capacity to lift, pull, and push big things as well as carry out daily tasks might be hampered by scapular winging, a rare but potentially crippling disorder.3, the scapula may translate medially or laterally along the posterior thoracic wall due to unopposed muscle contraction of the other functioning scapular muscles, a distinction known as medial (serratus anterior paralysis) or lateral (trapezius or rhomboid paralysis) winging. This abnormal scapular position can cause wide range of physical functional disabilities such as decreased strength, range of motion disruptions and pain2.
Blackburn exercise increases the strength of scapulothoracic and rotator cuff musculature (upper, middle and lower trapezius, serratus anterior, rhomboid, deltoid infraspinatus, teres major and minor) and help to reduce the muscle imbalance.

Case report

30 yr old male patient came to OPD with the complaint of pain in right shoulder and scapular region and difficulty in elevating the right arm since 15 – 20 days. He was preparing for physical fitness exam. Doing moderate to heavy workout since 2 months. He performed evening exercise session which includes running, push-ups, disc throw, jawelian throw. Mild jerk was felt by him during throw. Next day morning he experinced pain in right shoulder and upper back region and had difficulty in elevating his right arm. He consulted a nearby doctor and was under medication for few days but no improvement is seen in shoulder movement. X ray of cervical spine and rt. Shoulder AP/lateral was done reports were normal. Patient was referred for physiotherapy for further management.
Assessement and examination of patients was done by the physiotherapist. VAS score was 6/10 during activity. Grade 1 tenderness on ant. Aspect of rt shoulder and AC joint noted. Neers impingement test, hawkins kennedy test, push up test, painful arc test positive.
Shoulder ROM (flexion, abduction) markedly reduced. Elbow and wrist ROM was normal measured with goniometer. Scapulohumeral rhythm was altered, the subject was assessed for the scapular position and upper extrimity function. spinoscapular distance measured using measuring tape. Detail explanation of physiotherapy treatment was given to the patient.

Treatment/ methods

The patient was treated by electrotherapy and exercise therapy. To reduce the pain therapeutic ultrasound was applied for 8 mins 1 MHZ, pulsed mode after that conventional TENS were applied for 10 mins. Strength and endurance training session was incorporated. Begining with active assisted to active ROM, self-assisted wand exercise and capsular stretching to improve the shoulder ROM. Isometric exercise to shoulder and rotatorcuff musculature to maintain muscle propertise. Once the pain subsides and improvement in ROM is seen strength and stabilization exercise was initiated which includes wall clock exercise (even & uneven surface), strengthening exercise for scapular and rotator cuff muscule using therabands, and blackburns exercise. Blackburn exercise consist of 6 stages all performed in prone position 3 sets of 20 repetation with 3-6 sec hold was given. Rest period of 10 sec after every set was provided. Warm up and cooldown period for 5 mins each was included in the procedure.

After every 2 weeks hold duration and repitation was increased gradually.

Blackburn exercise protocol 7:
1. Prone horizontal abduction (neutral):
2. Prone horizontal abduction (full external rotation):
3. Prone horizontal scaption (neutral):
4. Prone horizontal scaption (full external rotation):
5. Prone horizontal external rotation:
6. Prone horizontal extension:

Outcome measures
1. VAS : To assess pain 5
2. Universal Goniometer: To measure ROM 6
3. LENNIT TEST - to measure spinoscapular distance using measuring tape 10

Results

After physiotherapy treatment significant improvement in seen in pre and post values of shoulder ROM. pain is reduced from 6/10 to 0/10 score on visual analogue scale. Considerable improvement in spinoscapular distance reduction was also noted at the end of 6 weeks.

Table 1: ROM in degrees

Shoulder ROM	Pre Treatment	Post treatment after 3 weeks	Post treatment after 6 Weeks
FLEXION	95	123	164
ABDUCTION	98	128	171

Table 2: Spinoscapular Distance

	Pre Treatment		Post Treatment after 6 Weeks	
	Left side	Right side	Left side	Right side
At T2	9.5 cm	9 cm	9.5 cm	9.4 cm
T4	9 cm	9.2	9 cm	9 cm
T8-T9	10.3 cm	11 cm	10.3 cm	10.5cm

Discussion

Present case study was conducted to study the effictiveness blackburns exercise on scapular dyskinesia. Weakness of the scapulothoracic muscles potentially leads to abnormal positioning of the scapula, disturbances in scapulohumeral rhythm, and generalized shoulder complex dysfunction. The serratus anterior and lower trapezius are the most commonly weak or inhibited muscles of the scapulothoracic joint that may lead to abnormal movement.

Scapular muscles not only work to stabilize the scapula but also contracts to rotate it as the glenohumeral elevation proceeds .The middle and lower serratus anterior are the only scapulothoracic muscles with the capability to both upwardly rotate and posteriorly tilt the scapula on the thorax Their line of action will also directly approximate the scapula to the thorax, which can serve as a stable base4, 7..

Studies have shown that scapular dyskinesis includes a higher activation of the Upper Trapezius and a decreased control of the Lower, middle trapezius (MT) and Serratus anterior which causes alteration in normal scapular position as well as scapulohumeral rhythm and leads to functional impairment. Blackburn exercise deal with the root cause of condition. Blackburns exercise which consist of 6 stages focuses on scapular and glenohumeral stabilizers. And helps to maintain the length tension relationship amongst glenohumaral and scapular stabilizers as well as mobilizers8.

Abbey Schory in their systematic review identified optimal positions and exercises for periscapular stability exercises. According to this study, prone positions with the elbow flexed to 90° had the better ratios for activating the middle trapezius. Prone external rotation with the shoulder abducted to 90 degrees and the elbow flexed showed optimal ratio for lower trapezius and rhomboids 8. Maximum activity of serratus anterior is found in prone neutral scaption. Which will help in improving the reduced upward rotation and posterior tilting of scapula during elevation movement. Thus helps in correcting the altered muscle action during humeral elevation movement 9.Prone scaption with external rotation & prone horizontal external external rotation will focus on supraspinatus which will help in glenohumeral stabilization7. Blackburn exercise will help in correction of the altered muscle mechanics and in turn helps to maintain normal scapular position as well as scapulohumeral rhythm.

Conclusion

This case study suggests that blackburns exercise is effective treatment mode in the scapular dyskinesia rehabilitation along with conventional physiotherapy.

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