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Efficacy of scapular stabilization and stretching exercises on rounded shoulders among it workers

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Abstract
Background: Rounded shoulder is a protrusion of the acromion of the shoulder joint relative to the centerline of gravity of the body, causing stooped posture along with scapula elevation, protraction, and downward rotation and an increased angle between the lower neck bone and upper spine. It is most commonly observed in computer workers who work in a table-and-chair work environment. Due to the high prevalence of RSP especially in modern societies, proper treatment of this problem is necessary for prevention of further complications.
Aim: This study purpose is to find out the effectiveness of Scapular Stabilization Exercises and Pectoralis Minor Stretching on correcting Rounded Shoulders among IT workers.
Method: Total 15 Subjects were selected as per the inclusion criteria. Participants were informed about the study & written consent was taken prior to participation. In pretest assessment, subjects were assessed by Acromion to Wall index. They were given scapular stabilization exercises and pectoralis minor stretching as a treatment of rounded shoulder posture for 40-50 minutes per day, 3 days a week and were continued for 4 weeks. Post test assessment was done by using same outcome measure. Interpretation of the study was done on the basis of comparing pretest and posttest assessment. Thus, the study was concluded with the help of statistical analysis by using paired 't' test.
Results: The study showed effect of Scapular Stabilization Exercises and Pectoralis Minor Stretching on rounded shoulder posture among IT workers is ($p>0.0001$), which is extremely significant.
Conclusion: On the basis of the results of our study, it is concluded that scapular stabilization exercises and pectoralis minor stretching show significant effective in correcting rounded shoulder posture among IT workers.

Keywords: Rounded shoulder postures, office workers, IT workers, scapular stabilization exercise, pectoralis minor stretching

Introduction

Round shoulder posture is characterized by a scapula protracted, downwardly rotated and anteriorly tipped position with increased cervical lordosis and upper thoracic kyphosis.

In Normal posture is the line of gravity (LOG) passes through the external auditory meatus, the bodies of cervical spine and the acromion, and anterior to the thoracic spine.

According to Kendall *et al*, there should be vertical alignment between midline of the shoulder and the mastoid process. If the acromion processes are more anteriorly positioned compared with mastoid processes, a condition is known as Forward Shoulder Posture or Rounded Shoulder Posture or Protracted Shoulders.

Excess sedentary worker is common and apparently 'inevitable' for people who work at a desk for 8 h a day. Among these postures, an RSP has affected many people's lives and mental health to a considerable degree. An RSP directly affects the appearance and image of people, and it is a catalyst for various diseases. These types of workers are likely to suffer from lower back, neck, and shoulder aches and other sorts of work-related musculoskeletal injuries. Due to the high prevalence of RSP especially in modern societies, proper treatment of this problem is necessary for prevention of further complications. Abnormal posture is caused by abnormal relationship of body parts and is a common finding in patient with musculoskeletal problems. One of the most common abnormal postures in upper quarter is rounded shoulder posture. Neck bone curvature Change leads to upper-crossed syndrome due to an imbalance in muscular pattern which subsequently leads to rounded shoulder posture (RSP).

Change in the neck bone curvature of the cause's upper-crossed syndrome due to an imbalance in muscular pattern, which subsequently leads to rounded shoulder posture (RSP). Due to these malalignments, joints, ligaments and muscles go under stress so the consequence would be pain and disability. Leading to muscle imbalance, deficiency of scapulohumeral rhythm and finally shoulder impingement, bursitis, tendinitis, shoulder pain and instability occur.

Due to the high prevalence of Rounded Shoulder Posture especially in modern societies, proper treatment of this problem is necessary for prevention of further complications.

Some of the reasons causing rounded Shoulders are loss of lower trapezius and serratus anterior activity ،tightness in pectoralis minor, greater thoracic kyphosis, scapular anatomical structure, musculoskeletal compensation, old age, adapting malposture for long time and psychological stressors.

The changes occurring in Rounded Shoulders are shortening of pectoralis major, pectoralis minor, and levator scapulae, serratus anterior and upper trapezius. Weakening of the lower and middle trapezius, rhomboid. Upper cervical is extensively extension and Lower cervical is extensively flexion. Scapula is prolonged, downwardly rotated, and anteriorly tipped, with enhanced cervical lordosis and upper thoracic kyphosis. The resting position of the scapula is altered. Above these changes leads to increase muscle tension and stress in the neck and shoulder, Failure of the

head alignment with longitudinal axis, reduced scapulohumeral rhythm.

In Rounded Shoulders, the shoulders appear to be bent forward, caused by scapulae elevation and acromion protraction. Also, it causes discomfort, inter-scapular pain, cervical pain, feel pain in the head, temporo-mandibular joint, neck, thoracic, shoulder and arms. There is numbness, loss of function and a variety of neuromuscular symptoms, affecting the upper body

Scapular stabilization exercise (SSE) is a type of exercise program used to enhance stability and strength of muscles surrounding the scapular with the intention of keeping the proper scapular position and reducing the associated pain and symptoms. It is frequently prescribed as a main component of rehabilitation programs for different types of shoulder pain syndromes. Several researchers suggested that the Scapular stabilization exercise improve scapula position and scapular muscle performance and control. Scapular stabilization exercises focused on coordinated activation and co-activation of dynamic restraints are applied as dynamic isolated tasks of scapular maintenance in retraction and depression positions, voluntarily performed without external load, and reinforced by multiple sources of feedback.

It is effective in the early rehabilitation and the balance of both sides of the trapezius with the movement and couple motion of the scapula and also for placing cage of the thorax at the normal central position, restore normal alignment of the neck and correct its awkward posture through correcting position and restoring kinematics of the scapula. The scapular stabilization exercises follow the basic stabilization training principles of learning motor control by developing awareness of muscle contractions and spinal position used to strengthen the muscles which are responsible for stabilizing the scapula. They also restore the position and movement of scapula to prevent secondary damage and abnormal postures as forward head posture or rounded shoulder.

Stretching the Pectoralis minor is a method used to correct abnormal posture or shoulder impingement the effectiveness of such stretching depends on the duration, stretching position, and method. The appropriate duration for stretching is around 20–30 s, because muscle relaxation occurs during the first 20 s of stretching as for the stretching position and method, they must be specific to the muscle.

Materials and Methodology

Populations study for the past 6 months from year of January 2023-june 2023 done. And according to the simple random sampling method totally 18 selected 15 met inclusion criteria. The study was conducted in Out-Patient Department of Cherraan's College of Physiotherapy, Coimbatore Pre-assessment were taken with Acromion to wall index. The data collection sheet consisted of demographic data such as name, age, gender, exercise frequency, working hours per day in front of computer along with pre-test parameters. After the pretest, participants were instructed about exercise program. This study scapular stabilization exercises trial are selected according to the literature regarding scapular muscle dysfunction and new insights derived from recent research. After completion of 4 weeks, post-test assessment was taken with use of same parameters as pre- test. The interpretation of the study is done on the basis of comparing pretest and post-test assessment of all outcome measures.

Inclusion Criteria

- 21 to 35 years of age
- Male
- BMI between 18 and 28
- Subjects working for minimum 1 year
- Minimum 2 hours usage of desk work per day
- Subjects with Acromion to wall index of >2.5cm
- Subjects with clinical stable before the study

Exclusion Criteria

- Above 35 years and below 21 years of age
- Females
- Obese
- Any history of injury, surgery, fracture
- Current shoulder pathology
- Any other structural deformity related to the spine
- Unwilling and Uncooperative patients

Procedure

Treatment Duration: 40-50 minutes per day, 3 sessions per week, for 4 weeks

Intervention

Subjects performed a brief warm-up involving 3 repetitions of active neck, shoulder, elbow, wrist range of movement before exercises

Exercises in standing:	Patient in sitting	Exercises in prone lying:
Scapular clock exercise Wall press-ups	Scapular squeeze Shoulder rolls	Scapular squeeze I Exercise Y Exercise T Exercise

Pectoralis Minor Stretching

- Subject in standing. One arm positioned at wall. Abduct the shoulder with elbow flexion into 90-degree and place the palm of hand on a flat surface. Next rotate the trunk to opposite direction. Hold for 30 seconds. Repeat 2 sets and 3 times each set.
- Subject stands at table and places hands on edge of the table for support. Then performs stretching with squat slowly. Hold for 30 seconds. Repeat 2 sets and 3 times each set.

Data Analysis

The statistical data was performed using Excel Data Analysis Tool. The below table shows that out of 15 samples pre and post test mean, mean difference, standard deviation and 't'' value. Table-1 shows analysis of Acromion to Wall Index on paired test. The calculated value for this group was

13.55 at 0.05% level of significance.

Table 1: Pretest and Post-Test Values of Acromion to Wall Index for Rounded Shoulders

Outcome measures	Mean	Mean difference	SD	T Value	P Value
Pre-Test	62.5	14	4	13.55	P value < 0.0001
Post-Test	48.5				

Results & Conclusion

A total number of 15 subjects of age group 22-35 years old with rounded shoulders were randomly selected for the study. The subjects are given the treatment over 4 weeks.

Before the treatment the pretest was checked by using Acromion to wall test are measured. After 4 weeks of treatment the post test values of acromion to wall test are measured.

The paired "t" test was used to compare the pre-test and post-test values of acromion to wall test of the subjects. The t-value is 13.55. The standard deviation is 4. The man difference is 14.

Based on the statistical analysis, the result of the present study shows that there is remarkable improvement $p < 0.0001$ following the effect of scapular stabilization exercises

An experimental study is to analysis the effectiveness of Scapular Stabilization Exercises and Pectoralis Minor Stretching on correcting Rounded Shoulders among IT workers.

Rounded shoulders are measured using Acromion to wall index. This study supports the alternative hypothesis.

The analysis of the study concluded that giving Scapular Stabilization Exercises and

Pectoralis Minor Stretching on correcting Rounded Shoulders among IT workers is effective.

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