

Comparison of the Effectiveness of Trapezius Strengthening Exercise Vs Conventional Physiotherapy on Pain in Patients with Rounded Shoulder

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Abstract

Background: Rounded shoulders are a fairly common issue that affects both young and old people. One of the most prevalent musculoskeletal irregularities of the shoulder complex that causes discomfort in the shoulder joint is rounded shoulders. Trapezius muscle plays an important role in scapula movement, while the lower trapezius is especially crucial for stabilizing this scapula.

Purpose: To evaluate effectiveness of trapezius strengthening exercise vs conventional therapy on pain in patients with rounded shoulders.

Materials and Methods: 40 subjects were selected from RENU'S Physiotherapy & Rehabilitation Centre. The study duration was from October 2022 to July 2023 with procedures and evaluation that lasted 2 weeks. The subjects were workers and college students who use smartphones, computers, or laptops during work and leisure time. A simple test was used to check the rounded shoulder posture of these 40 subjects to find the rounded shoulder pain. 40 individuals were chosen for the Test-Wall Contact. Further, they were divided into two groups of 20 each according to inclusion and exclusion criteria. They were informed about the procedure, and an informed consent form was obtained.

Results: Post-test of NPRS scale in trapezius strengthening group mean was 4.35 and post-test mean of combination group with IFT was 2.25 .

Conclusion: Combination of stretching and strengthening with interferential therapy is much more effective and useful for treating complaints of rounded shoulder pain and rounded shoulder posture.

Key words: Stretching, Trapezius, Strengthening exercise, Pectoralis minor, Rounded shoulder pain, IFT

Introduction

One of the most prevalent musculoskeletal malformations of the shoulder complex, rounded

shoulders cause pain in the shoulder joint.¹ Combined forward head position and thoracic kyphosis are other names for rounded shoulder pain [RSP].

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Scapular alignment, kinematics and muscle activity are all impacted by improper sitting posture.² RSP is frequently brought on by maladaptive posture that worsen with repetitive motion and poor posture. It can be identified by the extended, downwardly rotated, anteriorly tipped scapula posture, as well as the enhanced upper thoracic kyphosis and cervical lordosis.³ These elements may also cause pain in the upper quadrant.⁴ Because rounded shoulders provide the appearance of having a hollow chest when the scapula is lifted, the term "abduction" is used to describe this posture in the literature.⁵ The middle and lower trapezius muscles are especially susceptible and will become a rounded shoulder posture, as opposed to serratus anterior, pectoralis minor, pectoralis major and upper trapezius muscle.⁶ Long-term smartphone use can cause bad posture, including hunched over posture, rounded shoulders and a slouched back.⁷ This is the main cause of rounded shoulder posture. It causes the muscles surrounding the shoulder joint to become weak and shortened, putting more strain on the biomechanical structures, altering muscle balance and changing shoulder alignment.^{8,9} The third, fourth and fifth ribs which are close to the sternocostal junction are the origin of the pectoralis minor muscle, which inserts into the coracoid process of the scapula.¹⁰ They aid in increasing scapula or posterior tilting and decreasing internal scapular rotation when the arm is raised.^{11,12}

The lower trapezius is particularly necessary for stabilizing the scapula.¹³ Trapezius muscles are important for scapula movement. Pectoralis minor shortness is one possible reason causing neck and shoulder pain.¹⁴ Theoretically, posterior scapular stabilizer strengthening and pectoral muscle stretching could help with muscular imbalance, rounded shoulders and normalize scapulohumeral rhythm.^{15,16} Stretching in the evening is typically a part of thorough treatment programs for people with shoulders.¹⁷ An earlier study found that strengthening the lower trapezius muscle in relation to the upper trapezius muscle reduced muscular imbalance and enhanced scapular thoracic posture. When the top fiber of the trapezius muscle is short and the lower trapezius muscle is weak, there is a muscular imbalance in the scapulothoracic area, according to cools et al. The lower trapezius and serratus anterior are the only muscles that are engaged during the

final third of arm motions in a study of patients with glenohumeral laxity Interferential therapy [IFT] is a well-known treatment for pain.¹⁷

Aim

To evaluate effectiveness of trapezius strengthening exercise vs conventional therapy on pain in patients with rounded shoulder.

Material and Method

This is an experimental study done with 40 subjects with rounded shoulder, aged between 18 to 40 years of both genders from RENU'S Physiotherapy & Rehabilitation Centre, Vellore. Samples were randomly selected and allocated into two groups. one group is for trapezius strengthening[20] subjects and another group for pectoralis minor stretching with IFT[20] subjects.

Inclusion Criteria:

- People between age group 18-40
- Both Male and Female people with rounded shoulders.
- People using smartphones, computer or laptops in a sitting position more than 4-7 hrs per day
- People who drive vehicle for more than 3-5 hrs per day
- People who have not received any treatment for shoulder and neck pain in the past 4 weeks.

Exclusion Criteria:

- Fractures and dislocation of shoulder joint.
- People with diabetes mellitus, hypertension
- People with neurological deficits
- People with external wound

Outcome Measure:

- NPRS.²⁰
- Researcher made Questionnaire:

Questions like below were included:

1. On average, how many hours do you use your smartphones during the weekdays?
2. On average, how many hours do you drive a vehicle?

3. On average, how many hours do you use your computer for work during the weekdays?
4. On average, how many hours do you use your computer for work during the weekends?
5. On average, how many hours do you usually use your smartphone during the weekends?

Procedure

College students and employees who use smartphones, computers, or laptops for work and leisure were chosen as the 40 subjects. The RSP was determined by using a straightforward test to examine the rounded shoulder posture of 40 individuals. Test-Wall Contact: The participant must stand straight up against a wall to have their posture evaluated. They should be able to simultaneously keep their head, mid-back, and back of their back in contact with the wall. They may have forward shoulders if it is difficult for one or both of their shoulder blades to fully make contact with the wall. A numerical pain rating scale was utilized to assess the shoulder pain rating in the 40 subjects who were chosen based on the RSP test. Samples were randomly selected and allocated in to two groups. one group is for trapezius strengthening[20] subjects and another group for pectoralis minor stretching with IFT[20] subjects.

Trapezius strengthening:

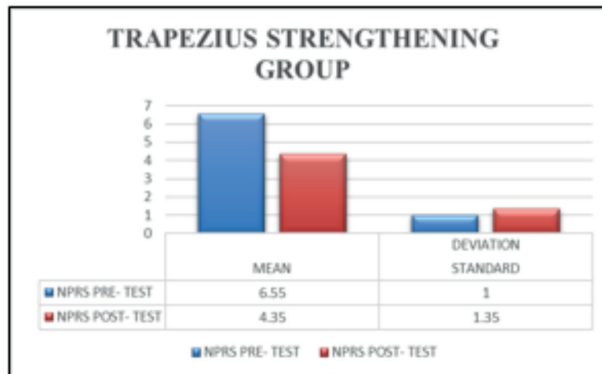
Exercises for the trapezius, such as the wall slide, shoulder abduction to 120 degree ,modified prone cobra,shoulder abduction elbow should be flexed,shoulder external rotation and scapular protraction, were given to the strengthening groups.

Conventional physiotherapy:

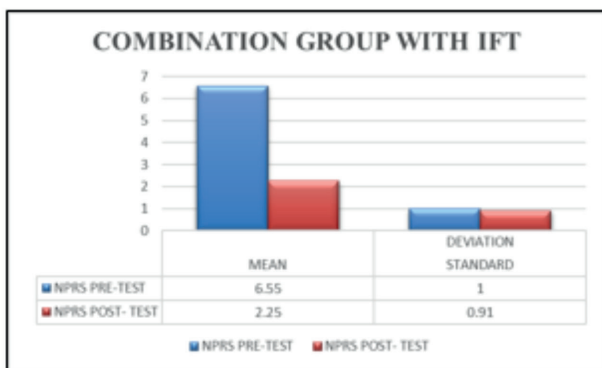
Stretches for the Pectoralis Minor, including the Spine Pec Minor Stretch, Wall Stretch, 4 Point Kneel, Floor Pec Stretch, and Stretch with Foam Roller, were given to the combination group.

IFT was applied close to the uncomfortable area. For four weeks, the therapy was delivered five days a week. Treatment sessions lasted 20 minutes and consisted of 15 repetitions. IFT was administered for 15 minutes each day, five days a week, for four weeks. The pre-test measurements and the post-test measures were both taken.

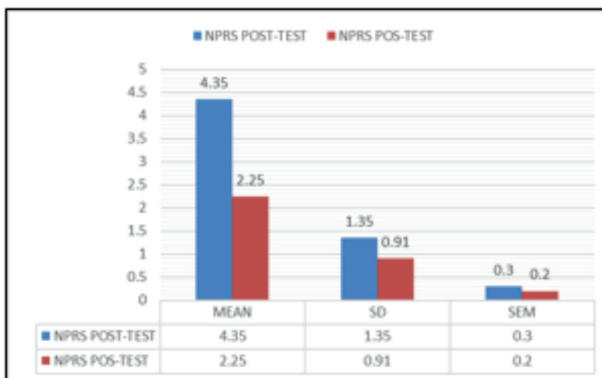
Data Analysis



Graph-1 Comparison Of Pre -Test And Post-Test Of NPRS Scale IN Trapezius Strengthening Group Using Unpaired T-test



Graph 2: Comparison Of Pre -Test And Post-Test Of NPRS Scale In Pectoralis Minor Stretching With IFT Group Using Unpaired T-Test.



Graph-3 Comparison of post-test values of NPRS scale in trapezius strengthening group and combination group (pectoralis minor stretching and trapezius strengthening) with IFT using paired t-test.

Result

Total 40 subjects participated and were divided into 20 each of two groups as the Trapezius strengthening group and Combination group. There is a significant improvement in comparison of both the groups.

The NPRS post mean value in the Trapezius group is 4.35 and in the Combination group is 2.25 significantly different in comparing both the groups .

Discussion

College students and employees with rounded shoulders participated in this study. The information was gathered using a researcher-made questionnaire that asks about the typical number of hours spent operating a car, using a smartphone, computer, or laptop, and their shoulder discomfort numerical pain rating scale, which spans from 0 to 10. Out of 80 participants, 40 were chosen for the intervention and divided into two groups because they experienced moderate to severe shoulder pain during shoulder range of motion. To determine its efficacy, IFT was combined with RSP and Pectoralis minor stretching for hospital management staff and college students in this study. Statistics were used to analyze the data. The major goal of this study is to determine whether the IFT programme, along with Trapezius strengthening and Pectoralis Minor stretching, reduces shoulder pain in participants with rounded shoulders. From graph 3, the study demonstrates that the Pectoralis Minor Stretching with IFT group experienced a substantial reduction in discomfort and an improvement in muscular strength and posture compared to the Trapezius strengthening group. The shoulder joint protrudes outward from the body's center of gravity resulting in a hunched-over posture, scapular elevation, protraction, and downward rotation, as well as a widened angle between the lower neck bone and upper spine. The quality of life of those who have rounded shoulders is impacted by the symptoms, which include pain, poor posture, and discomfort. Incorrect posture, such as a forward-facing neck position, rounded shoulders, and a slouched posture, can result from prolonged smartphone use.¹⁸

In 2017, Mi-Kyoung Kim et.al came to the conclusion that the effects of a 4-week shoulder

stabilization exercise programme that combined a stretching exercise for the pectoralis minor and a stabilization exercise that used an elastic band to enhance balance and maximum shoulder muscle strength in people with RSP. Static balance, dynamic balance, and muscle strength were all enhanced by the shoulder stabilization and stretching activities.¹⁹

In 2016, Tae-Woon Kim et.al came to the conclusion that exercise programmes utilizing elastic bands, which are readily available and have no time or space restrictions, can be utilised effectively to modify posture. These results show that the study's elastic band workout regimen is efficient at extending the pectoralis major and reversing forward head and rounded shoulder posture.

Ji-hyun Lee et.al (2014) drew the following conclusion: "The shoulder brace and stretching the PM may help correct RSP and restore the length of the PM. "The exercise that involved posterior tilting followed by PM stretching was the most successful at increasing LT muscle activation.

The findings of this study, according to Il-Keun Cho et.al in 2021 demonstrated that lower trapezius strengthening exercises, in addition to general physical therapy (INTERFERENTIAL THERAPY), significantly reduced pain, increased muscle strength, thickness, and improved scapular position in patients with chronic neck pain and rounded shoulders. As a result, it is believed that individuals with round shoulders and chronic neck pain should receive both general physical therapy and lower trapezius strengthening exercises rather than only general physical therapy (INTERFERENTIAL THERAPY).

In 2023 Ahmad H. Alghadir, Amir Iqbal et.al concluded that LTr-M strengthening and PMi-M stretching are more beneficial than PMi-M stretching alone in correcting rounded shoulder posture among young Saudi females. This beneficial effect was achieved due to sustaining the gained length of PMi-M by strengthening the LTr-M simultaneously.

Conclusion

This study aimed to investigate the effects of trapezius strengthening exercise vs conventional therapy on pain in patients with rounded shoulder. Based on the result, it is noted that Pectoralis minor

stretching and Lower Trapezius Strengthening with IFT are more beneficial than Lower Trapezius strengthening alone in correcting rounded shoulder posture among medical college students and hospital workers. This beneficial effect was achieved due to sustaining the gained length of Pectoralis minor muscle, strengthening the Lower Trapezius muscle simultaneously and placing IFT over the painful region. Stretching, doing warm up exercises before using a computer or laptop, and maintaining good posture while using smartphones and any electronic devices will improve the flexibility of muscles and may prevent the shortening of pec muscles and weakening of trapezius muscles.

Ethical clearance: Taken from institutional Ethical committee. ISRB Number: 03/093/2022/ISRB/SR/SCPT

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Conflict of Interest: The authors state that there is no conflict of interest

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