Efficacy of Cervical Thoracic Spine Correction Exercise in Reducing Pain and Improving Neck Posture in People with Cervical Spondylitis

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Abstract

Background: The development of osteophytes and the involvement of adjacent soft tissue structures are the initial indications of degenerative changes in the intervertebral discs in cervical spondylitis. Forward head posture also has an effect on the muscles at the head and shoulders, which aggravates postural deformity.

Purpose: The purpose is to determine Efficacy of cervical thoracic spine correction exercises in reducing pain and improving neck posture in people with cervical spondylitis.

Methods: This experimental study has been conducted from December 2022 to April 2023. Patients willing to participate in the study were screened for inclusion and exclusion criteria. The total number of subjects (30) were taken from Sai charan physio clinic and they are divided into 15 subjects for the experimental group, they are given cervical thoracic spine correction exercises with ultrasound. The control group consisting of 15 subjects, are isometric exercises with ultrasound. NPRS and Neck disability index are used as outcome measures. The treatments were given for 5 days per week and continued for 2 weeks.

Results: From statistical analysis made with the quantitative data revealed statistically significant differences between the Group A and Group B, with the P value of <0.0001. Thus, the experimental group has higher statistical differences than the conventional group.

Conclusion: According to the findings of this study, Cervical thoracic spine correction exercises in the experimental group were found to be more beneficial than isometric exercises in conventional groups in lowering pain and leading to faster recovery in participants with forward neck posture.

Keywords: Cervical Spondylitis, Posture Correction, Isometric Exercise, NPRS, NDI.

Introduction

The development of osteophytes and the participation of nearby soft tissue regions are the initial indications of discs between the vertebrae that experienced deterioration in cervical spondylitis. However, it can be challenging to distinguish between healthy aging and disease because many patients indicate equivalent aberrations on simple cervical vertebral column radiographs. Early spondylitis has been correlated with...
degenerative disc changes that can lead to dehydration of the disc, thereby decreasing the disc’s capacity to deal with or tolerate increased axial loads along the cervical spine.\textsuperscript{3,4}

A forward-facing posture is one of the wrong postures that can lead to neck pain. It is most frequently office workers were noticed and is distinguished by excessive upper cervical spine extension, excessively lower vertebrae in the flexing, increased thoracic the condition known as and increased strain on the cervical spine muscles and joints as a consequence of the restricted movement of the cervical and thoracic spine.\textsuperscript{5,6} Prevalence- In middle age, predominance is greatest. In an adult general practice survey, 20\% of men and 25\% of women reported having recent neck pain. Forward Head Posture also affects the trapezius, sternocleidomastoid, suboccipital, and temporal muscles in the area of the head and shoulders, aggravating postural deformity. As a result of these modifications, the muscles, fascia, and nerves in the neck and shoulders are continuously and abnormally compressed.\textsuperscript{8} Of these, back extensor strengthening exercises are the most frequently used intervention. The thoracic kyphosis is significantly reduced, and muscle strength and endurance are increased with progressive back strengthening exercise among other benefits.\textsuperscript{9}

To determine the level of pain, the NPRS was used (Numeral Pain Rating Scale). Based on the level of neck pain, the neck disability index questionnaire was utilized to determine the neck impairment’s severity.\textsuperscript{10}

**Aim**

The aim is to determine Efficacy of cervical thoracic spine correction exercises in reducing pain and improving neck posture in people with cervical spondylitis.

**Material and Method**

Patients willing to participate in the study were screened for inclusion and exclusion criteria. The total number of subjects (30) are divided into 15 subjects for the experimental group; they are given cervical thoracic spine correction exercises. The control group consisting of 15 subjects, are isometric exercises. NPRS and Neck disability index are used as outcome measures. Convenient sampling with a random allocation method was used in the study.

**Study period:** From December 2022 to April 2023.

**Inclusion Criteria**

- Subjects of both genders,
- Pain and reduced movements were mainly diagnosed for cervical spondylitis,
- Subject with a numerical pain rating scale of more than five to seven points,
- Subject with moderate disability in Neck disability index.

**Exclusion Criteria**

- Previous surgery or trauma scars.
- Speech or hearing problems.
- Present of any metal implants.
- A cardiac pacemaker or cancer.

**Outcome Measures**

- Numeric Pain Rating Scale (NPRS)
- Neck Disability Index (NDI)

**Procedure:**

For inclusion and exclusion criteria, patients who were willing to participate in the study were assessed. The total number of subjects (30) are divided into 15 subjects for the experimental group (Group A), they are given cervical thoracic spine correction exercises with ultrasound. The control group (Group B) consisting of 15 subjects, were given isometric exercises with ultrasound. NPRS and NDI are used as outcome measures. Both the groups were treated with ultrasound therapy.

**Experimental Group (Group A)**

The experimental group was given Cervical thoracic spine correction exercises for 3 sets each per session and each set consists of 15 repetitions with ultrasound given. This treatment strategy is applied for five days of the week and performed for 2 successive weeks. Patient is given rest after each session. After 2 weeks post-test values for NPRS and Neck disability index are taken, tabulated, and then statistically evaluated for results.
Cervical Thoracic Spine Corrections Exercises:

1. Thoracic Roll Stretching Exercises
   - Kneel up while reclining on a flat surface like the floor.
   - Position the Pettibone thoracic roll under the nape of the neck.
   - Roll the back over the foam while pushing with your feet, stretching your thoracic muscles until you notice a noticeable increase in mobility.
   - Until the spine is flexible, add lateral flexion or rotation of the upper body while causing it to travel over the roll.

2. Shoulder Bracing (Shoulder Retraction):
   - Place your feet shoulder-width apart while standing.
   - Extend the elbows slightly and abduct the shoulders.
   - Perform three sets of 20 repetitions.

3. Superman Pose:
   - Lie on your stomach with your arms straight out in front of you.
   - Then lift your arms, legs, and chest off the ground, as high as you can.
   - Holding the position for 10 seconds before lowering yourself back down.
   - Do it for 3 sets.

4. Chin Tuck (Cervical Retraction)
   - Place one foot flat on the ground and either stand up or sit down on a chair. Drop your shoulders.
   - Direct your gaze forward. Set your chin up straight and lean back. It barely moves at all. Do not tilt your face up or down or bend your neck forward.
   - Hold for five seconds, then release.
   - Repetition five times.
   - Try not to hunch your shoulders or arch your back.

Control Group (Group B)

Generalized isometric workouts with ultrasonography alone were administered to the control group. The therapy plan was offered five days a week and executed for two straight weeks. Post-test results for the Neck Disability Index and NPRS are measured at the conclusion of the treatment plan and recorded for tabulation and statistical analysis.

Isometric Exercises:
   - Put your hand to your forehead and press. Use your neck muscles to fight back. Ten seconds of holding and relaxing with 5 Repetitions.
   - Repeat the exercise while applying pressure on your side of the head with 5 Repetition and change sides.
   - Repeat the technique while applying pressure on your back of head with 5 Repetition.

Data Analysis

Using tabular and inferential statistics, the gathered data was evaluated. The mean and standard deviation were utilized for all parameters.

The statistically significant differences between pre-test and post-test measures were examined using a paired t-test.

When utilizing the unpaired t-test to look at significant changes in the experimental group, the significance level of \( p \ 0.0001 \) was determined to be statistically significant.

Graph-1 Group A comparison of pre and post-test for NPRS
Results

Statistics used to analyze quantitative data revealed a statistically significant difference between group A and group B’s values.

The pre-test and post-test values for groups A and B are contrasted in Table 1.

For Group A, the NPRS pre-test value was 6.00, whereas the post-test value was 2.47.

For Group B, the NPRS pre-test value was 5.73, but the post-test value was 3.74. With a p-value of 0.0001, the results are therefore regarded as statistically significant.

Table 2 compares the pre-test and post-test values for groups A and B. The NDI pre-test value for Group A was 15.87, and the post-test value was 12.13.

The NDI pre-test value for Group B was 15.87, whereas the post-test value was 13.27. As a result, the findings are considered statistically significant with a p-value of 0.0001.
Discussion

The study’s aim is to identify the Efficacy of the cervical thoracic spine correction exercises and the isometric exercises with ultrasound. The comparison is recorded over the course of a week. Both NPRS and Neck Disability Index were used to measure the outcomes. The effects were significantly greater in the cervical thoracic spine exercises than the isometric exercises with the ultrasound. The main findings of the study are treatment of cervical thoracic spine correction exercises to a group showed a higher rate of reduction of patients with cervical spondylitis than the treatment of isometric exercises to the other group. Both the groups showed the improved movements and significant reduction of pain.

Early spondylitis is linked to degenerative disc alterations where desiccation of the disc takes place, leading to total fall of disc height and a decrease in the disc’s ability to sustain or bear increased axial loads throughout the cervical spine. Cervical spondylitis can occasionally cause the spinal canal within the spine’s bones, or vertebrae, to become more constrained. The susceptibility of the neck’s bones and protective cartilage to wear and tear might lead to cervical spondylitis. Some occupations or hobbies (such as construction require heavy lifting or repetitive motions. This may increase spinal pressure and cause early wear and tear. Cervical spondylitis is a frequent aging-related condition. Neck injuries - It seems that previous neck injuries raise the possibility of cervical spondylitis. Forward head posture, which occurs the most typical postural aberration is when the head seems to be in front of the body and outwardly extends from the sagittal plane. Back extensor strengthening exercises, abdominal exercises, and postural education have all been included in prior studies. Of these, back extensor strengthening exercises are the most frequently used intervention. According to the statistics analysis, the difference between the pre-test and post rest score for both group A and B is significant. 30 individuals’ pre and post -test values are identified independently and their respective mean values for both groups are determined. Using the results, the collected data is tabulated and evaluated. The mean and standard deviation are applied to all parameters. Significant differences between pre and post treatments data were analyzed using a paired t-test for both group A and B, the unpaired t-test was employed to examine significant differences in post -test values between the two groups. Jong-Hyuck Weon et al (2010 oct) conducted study on Scapular upward rotators’ response to forward head position during maximal shoulder flexion and suggested that in comparison to FHP during loaded shoulder flexion, maintaining NHP is favorable in lowering sustained upper and lower trapezius activity and increasing serratus anterior activity. To determine the level of pain, the NPRS was used (Numeral Pain Rating Scale). Based on the level of neck pain, the neck disability index questionnaire was utilized to determine the neck impairment’s severity.

The goal is to find the Efficacy of cervical thoracic spine correction exercises in reducing pain and improving neck posture in people with cervical spondylitis. Both groups experienced considerable modifications. According to statistical analysis, group A with cervical thoracic spine correction exercises was more effective at reducing neck pain than group B with isometric exercises. The study concludes that cervical thoracic spine correction exercises bring about a significant reduction of pain in patients with cervical spondylitis.

Conclusion

According to the findings of this study, Group A with cervical thoracic spine correction exercises in the experimental group was found to be more beneficial than Group B with isometric exercises in the control group in reducing pain for cervical spondylitis. As a result, cervical thoracic spine exercise is suggested for the people with forward head posture on cervical spondylitis to reduce the pain.

Ethical Clearance: The ISRB committee of a private hospital and institution in Chennai has provided its clearance for the conduct of human research that complies with all applicable national laws, institutional regulations. (Application Number 03/043/2022/ISRB/SR/ SCPT).

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Reference


