

# Efficacy of Cervical Spinal Stabilization Exercise on Reducing Pain for People with Cervical Spondylosis

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## Abstract

**Background:** The synovial joint capsule, subchondral bone, and joint cartilage are all impacted by the gradual degenerative condition known as OA. This research work is designed to check the efficacy of modified progressive resistance training for OA knee patients.

**Purpose:** To compare the effectiveness of cervical stabilization exercises and conventional physiotherapy exercise in reducing pain for patients with cervical spondylosis.

**Materials and Methods:** The study took place in Eyan Physiotherapy Centre, Sriperumbudur, A total no of 40 subjects were recruited for this study through the purposeful sampling method. All subjects were recruited based on the inclusion and exclusion criteria. The recruited subjects were assigned to two groups (Group A: 20 Subjects) underwent Cervical Stabilization Exercise and (Group B: 20 Subjects) underwent Conventional Exercise. All individuals are assessed for pain using Algometer as a pre-test prior to the intervention and again after 6 weeks of intervention. The entire study process was performed from November 2022 to April 2023.

**Results:** This study states that cervical stabilization exercises are found to be more significant and more effective in reducing pain compared to conventional therapy. The comparison of post mean value of Algometer of both the groups. Group-A(Cervical Stabilization Exercise) was 4.30 and Group B(Conventional Exercise) was 3.65 which shows gradual increase with p value <0.0001 statistically significant.

**Conclusion:** This study recommended that clinicians consider incorporating cervical stabilization exercises into the treatment plan for individuals with cervical spondylosis. The evidence supporting the efficacy of cervical stabilization exercise in reducing pain in individuals with cervical spondylosis.

**Key Word:** cervical spondylosis, cervical stabilization, conventional, exercise, pain, reduction.

## Introduction

The term “cervical spondylosis” describes a wide range of gradually degenerative changes that

affect all of the structural components of the cervical spine, such as the intervertebral discs, facet joints, joints of Luschka, ligamenta flava, and laminae. It is

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a characteristic sign of aging and often appears after the fifth decade of life.<sup>1</sup>

Neck discomfort, stiffness, and, in cases where neural structures are compressed, radicular symptoms, are all signs of cervical spondylosis.<sup>2</sup>

The second most prevalent complaint after low back pain is neck pain, which is a widespread issue. Healthcare professionals must identify symptomatic cervical spondylosis and offer evidence-based, economical therapies due to the disease's considerable burden of illness, which is accompanied by significant impairment and financial expense.<sup>3</sup>

Exercise plans for treating neck pain vary in terms of length, training frequency, intensity, and method of exercise. Previous research has indicated that isometric workouts and strength training help reduce neck discomfort.<sup>4,5,6</sup> Neck stabilisation exercises (NSE) were established as a rehabilitation regimen, however, to reduce discomfort, maximize function, and avoid future damage.<sup>7,8,9</sup>

The cervical spine is the most intricate region of the spine, and so are the muscles of that region. The condition can lead to neck pain, stiffness, and reduced neck mobility, affecting an individual's daily activities and overall quality of life. Cervical stabilization exercises involve targeted exercises that aim to strengthen the deep neck flexors, including muscles such as the longus colli and longus capitis. These muscles play a vital role in maintaining proper alignment and stability of the cervical spine. By strengthening these muscles, cervical stabilization exercises aim to improve spinal stability, reduce excessive cervical spine movement, and alleviate pain and functional limitations associated with cervical spondylosis. The specific exercises included in cervical stabilization exercise programs may vary, but commonly prescribed exercises include chin tucks, deep neck flexor exercises, and isometric neck exercises.<sup>10</sup>

Conventional therapy exercises are an integral component of physical therapy for individuals with cervical spondylosis. These exercises target pain reduction, improved flexibility, enhanced strength, and postural alignment. By incorporating a variety of exercises into the therapy program, individuals can experience pain relief, improved function, and

enhanced overall well-being. Conventional therapy exercises offer a safe and effective intervention for managing cervical spondylosis and optimizing the quality of life for individuals affected by this condition. Conventional therapy exercises aim to address various aspects of the condition, including pain reduction, improved flexibility, and enhanced strength and stability. They are typically performed in a controlled manner, with an emphasis on proper form and alignment. The specific exercises included in conventional therapy programs for cervical spondylosis may vary, but they often target the neck, shoulders, and upper back muscles.<sup>11</sup>

### Aim

To compare the effectiveness of cervical stabilization exercises and conventional physiotherapy exercise in reducing pain for patients with cervical spondylosis.

### Material and Method

The study included 40 participants with Cervical spondylosis. The individuals were randomly assigned to one of two groups: the experimental group (n = 20), who received Cervical spine stabilization exercise, and the conventional group (n = 20), which received Conventional therapy. All individuals were assessed for pain using an algometer as a pre-test prior to the intervention and again after 6 weeks of intervention.

#### Inclusion Criteria:

- Adults aged 40-65 years.
- Clinically diagnosed with cervical spondylosis based on radiographic findings.
- Experiencing neck pain of at least moderate intensity.
- Willingness to participate in a supervised exercise program for a duration of 8 weeks.

#### Exclusion Criteria:

- History of cervical spine surgery.
- Presence of any other significant musculoskeletal or neurological condition.
- Recent trauma or injury to the cervical spine.
- Severe comorbidities that may limit participation in exercise therapy.

**Outcome Measures:**

An algometer is a device used in clinical and research settings to objectively measure pressure pain thresholds (PPTs).

**Procedure**

The recruited subjects were assigned to two groups. (Group A: 20 Subjects) and (Group B: 20 Subjects) underwent pre-test analysis on the pain assessment tool using Algometer to analyze the impact of the interventions on the overall quality of life for Cervical spondylosis Patients. After the pre-test analysis, Group A received Cervical stabilization exercises for 3 sessions per week for the period of 6 weeks, Whereas Group B received Conventional Exercise Therapy for 3 sessions per week for the period of 6 weeks. After 6 weeks, the Post-test analysis was carried out, and the data were tabulated through SPSS.

**Exercise Protocol for Cervical Stabilization****Exercise 1: Deep Neck Flexor Exercise**

Purpose: Strengthen the deep neck flexor muscles to enhance cervical stability and improve postural alignment.

**Instructions:**

1. Begin by lying on your back on a firm surface with knees bent and feet flat on the floor.
2. Gently tuck your chin inwards, aiming to create a double chin appearance without lifting the head or neck off the surface. Hold this position for 5 seconds, focusing on activating the deep neck flexor muscles.
3. Relax and repeat for 10 repetitions.
4. Progressively increase the duration of the hold up to 10 seconds as the exercise becomes easier.

**Exercise 2: Isometric Neck Extension Exercise**

Purpose: Strengthen the muscles in the back of the neck to improve cervical stability.

**Instructions:**

1. Sit or stand with your spine in a neutral position, shoulders relaxed. Place your palms against the back of your head, fingers interlaced. Push your head gently backward

into your palms, resisting the movement with your palms.

2. Hold the contraction for 5 seconds while maintaining a stable neck position.
3. Relax and repeat for 10 repetitions.
4. Progressively increase the duration of the hold up to 10 seconds as the exercise becomes easier.

**Exercise 3: Cervical Retraction Exercise**

Purpose: Promote postural alignment and improve neck muscle control.

**Instructions:**

1. Sit or stand with your spine in a neutral position.
2. Gently retract your head by bringing your chin straight back without tilting it up or down. Hold the retracted position for 5 seconds, feeling a stretch at the base of your skull.
3. Relax and repeat for 10 repetitions. Progressively increase the duration of the hold up to 10 seconds as the exercise becomes easier.

**Exercise 4: Scapular Retraction Exercise**

Purpose: Strengthen the muscles between the shoulder blades to improve postural alignment and reduce strain on the neck.

**Instructions:**

1. Sit or stand with your spine in a neutral position, shoulders relaxed. Squeeze your shoulder blades together by pulling them toward your spine.
2. Hold the contraction for 5 seconds while maintaining a stable neck position.
3. Relax and repeat for 10 repetitions.
4. Progressively increase the duration of the hold up to 10 seconds as the exercise becomes easier.

**Exercise 5: Shoulder Shrugs**

Purpose: Improve shoulder and neck muscle control and relieve tension in the upper trapezius muscles.

**Instructions:**

1. Sit or stand with your spine in a neutral position.
2. Lift both shoulders towards your ears, squeezing them up as high as possible. Hold the shrug for 5 seconds, feeling the tension in your upper trapezius muscles.
3. Relax and repeat for 10 repetitions.
4. Progressively increase the duration of the hold up to 10 seconds as the exercise becomes easier.
5. It is important to note that each exercise should be performed with proper technique and within a pain-free range of motion. If any exercise causes pain or discomfort, it should be modified or discontinued. It is recommended to start with low repetitions and progress gradually as the exercises become easier.
6. Incorporating these cervical stabilization exercises into a regular exercise routine, under the supervision and guidance of a healthcare professional, can contribute to improved spinal stability, reduced pain, and enhanced functional abilities in individuals with cervical spondylitis.

**Exercise Protocol for Conventional Physiotherapy:**

The following exercise protocol outlines a set of exercises commonly used in conventional physiotherapy for individuals with cervical spondylosis. These exercises aim to improve neck flexibility, strengthen supporting muscles, and enhance posture and range of motion. It is important to note that this protocol should be implemented under the guidance of a qualified healthcare professional, such as a physical therapist, who can assess the individual's specific needs and tailor the exercises accordingly.

**Exercise 1: Neck Range of Motion Exercises**

Purpose: Improve neck mobility and flexibility.

**Instructions:**

1. Sit or stand with your spine in a neutral position.
2. Perform gentle neck movements in different directions, including flexion (chin to chest), extension (looking up), lateral flexion (ear to

shoulder), and rotation (turning head from side to side).

3. Perform 10 repetitions in each direction, moving within a pain-free range of motion.
4. Gradually increase the range of motion as tolerated.

**Exercise 2: Shoulder Rolls**

Purpose: Mobilize and strengthen the shoulder girdle muscles.

**Instructions:**

1. Sit or stand with your spine in a neutral position.
2. Roll your shoulders forward in a circular motion, completing 10 repetitions.
3. Reverse the motion, rolling your shoulders backward for another 10 repetitions.
4. Maintain relaxed and controlled movements throughout.

**Exercise 3: Upper Trapezius Stretch**

Purpose: Stretch and relieve tension in the upper trapezius muscles.

**Instructions:**

1. Sit or stand with your spine in a neutral position.
2. Gently tilt your head to the side, bringing your ear closer to your shoulder.
3. Hold the stretch for 15-30 seconds, feeling a gentle stretch in the upper trapezius muscle.
4. Repeat on the opposite side.
5. Perform 3-5 repetitions on each side.

**Exercise 4: Deep Breathing with Chin Tucks**

Purpose: Promote relaxation, improve posture, and enhance deep neck flexor muscle activation.

**Instructions:**

1. Sit or stand with your spine in a neutral position.
2. Take a deep breath in, expanding the diaphragm.
3. As you exhale, gently tuck your chin inwards, creating a double chin appearance without lifting the head or neck.

4. Hold this position for the duration of the exhalation.
5. Relax and repeat for 10 repetitions, coordinating deep breathing with chin tucks.

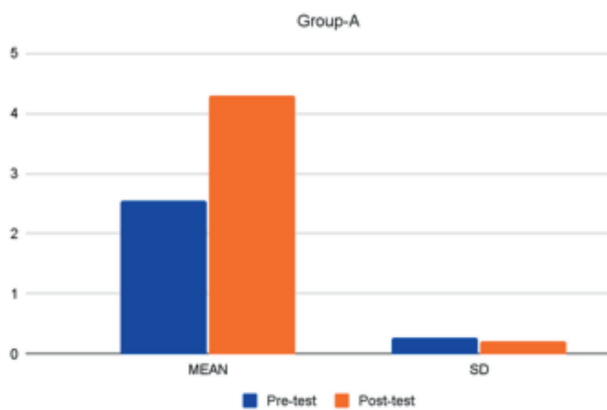
**Exercise 5: Postural Exercises**

Purpose: Improve postural awareness and alignment.

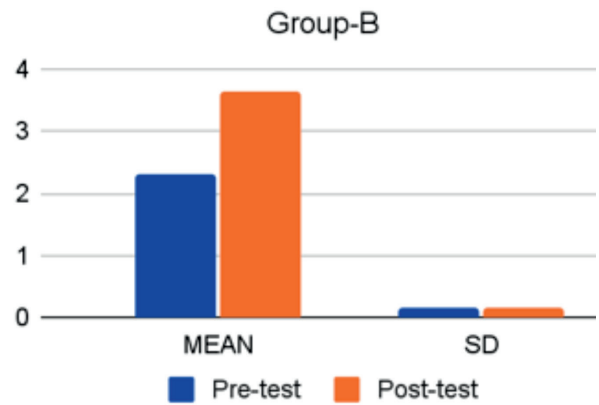
**Instructions:**

1. Sit or stand with your spine in a neutral position.
2. Engage the core muscles by gently drawing the belly button towards the spine.
3. Imagine lengthening the spine and lifting the crown of the head towards the ceiling.
4. Maintain this tall and aligned posture for 10-15 seconds.
5. Relax and repeat for 5-10 repetitions throughout the day, especially
6. during prolonged sitting or sedentary activities.
7. It is important to perform these exercises with proper technique and within a pain-free range of motion. If any exercise causes pain or discomfort, it should be modified or discontinued. It is recommended to start with low repetitions and progress gradually as the exercises become easier.

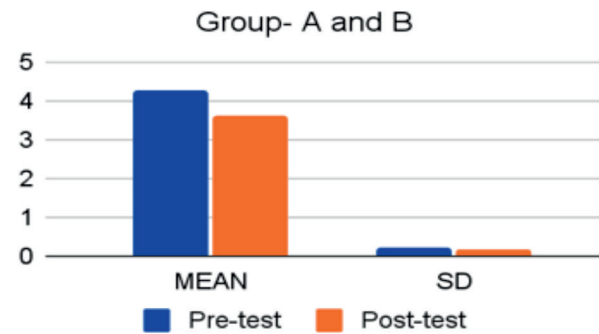
**Data Analysis**



**Graph 1: Comparison between Pre-test and Post-test values of Algometer for Group A Cervical Stabilization Exercise**



**Graph 2: Comparison between Pre-test and Post-test values of Algometer for Group B conventional therapy**



**Graph 3: Comparison between Pre-test and Post-test values of Algometer for Group A Cervical Stabilization Exercise and Group B Conventional Exercise.**

**Result**

The study showed a statistically significant p-value of less than 0.0001. Statistical analysis was done for all the collected data using a paired t-test. The test shows significant effects (p 0.0001) in both groups. A statistically significant difference between Group A (Cervical Stabilization Exercises) and Group B (Conventional Exercise Program) as well as within each group was found by statistical analysis of quantitative data. Using the Algorithm, the pain assessment tool (Cervical Stabilization Exercise) group A's post-test mean was 4.30, whereas the conventional exercise group B's was 3.65. This demonstrates that Group A (Cervical Stabilization Exercise) received a higher Algometer score than Group B (Conventional Exercise Program).

## Discussion

The results of this study demonstrated that both cervical stabilization exercises and conventional physiotherapy led to a significant reduction in pain intensity, improved range of motion, and decreased functional disability in individuals with cervical spondylosis. However, when comparing the two interventions, it was observed that the group receiving cervical stabilization exercises showed greater improvements in pain reduction and functional outcomes compared to the conventional physiotherapy group.

In a previous study Yi-Liang Kuo states that preliminary evidence shows significant changes in neck pain, control of deep cervical flexors, and physical impairment measures among university violin players with nonspecific neck pain who underwent a cervical stabilization exercise program. Similarly in this study involving cervical spondylosis patients revealed that cervical spinal stabilization exercise was more effective compared to conventional therapy.<sup>10</sup>

In a previous study Roshni G found that various interventions, such as cervical traction, asanas, manual therapy, acupuncture, and more, effectively reduced pain and improved cervical range of motion in those with cervical spondylosis. Similarly in this study comparing cervical stabilization exercises and conventional therapy for cervical spondylosis revealed greater effectiveness in the former.<sup>11</sup>

## Conclusion

In conclusion, this study supports the effectiveness of cervical stabilization exercises in reducing pain and improving function in cervical spondylosis. These exercises offer better results than conventional physiotherapy, but individualized treatment plans should consider patient preferences and conditions. Further research is needed to explore long-term effects beyond the 3-month follow-up period.

**Ethical Clearance:** Taken from institutional ethical committee (Application number: 03/ 098/ 2022/ ISRB/ SR / SCPT)

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**Conflict of Interest:** Nil

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