

# Effectiveness of Pilates training among subjects with forward head posture

<sup>1</sup>Priyanka Misra, <sup>2</sup>A.Anitha

<sup>1</sup>Student, <sup>2</sup>Assistant Professor  
Saveetha college of Physiotherapy

## *Abstract-*

**BACKGROUND:** There were many health problems that occurs which hamper the daily activities of the person. Among them, one of the most common health problems that affect the individual is Forward Head Posture. As more people use computers and smartphones, the propensity to be seated for longer period of time is rising. Musculoskeletal system is impacted by neck and shoulder overload, which also reduces job capacity and causes increased muscular fatigue; Therefore, causing changes in the spine alignment and incorrect posture. This study's objective is finding out efficiency of the Pilates exercises in terms of reducing discomfort and improving the cranio-vertebral angle among forward head posture.

**AIM:** To find out effect of the Pilates training in those with Forward Head Posture.

**OBJECTIVE:** To determine effectiveness of Pilates training in correcting Forward Head Posture, thereby improving functional performance among those with Forward head posture.

**MATERIALS AND METHOD:** Experimental study was done in Saveetha Physiotherapy OPD, Saveetha Medical College and Hospital, Thandalam, Chennai-602105. All the patients were assessed for Craniovertebral angle and Neck disability questionnaire before the intervention and for 4 weeks the patients were treated with Pilates exercises. After 4 weeks they are assessed again and pot values were noted and analyzed.

**RESULT:** The experimental group's post-mean value for the craniovertebral angle was 49.26 and the control group as 48.49. This demonstrates that the experimental group's craniovertebral angle has significantly improved relative to the control group.

**CONCLUSION:** Pilates exercises with stretching showed extremely significant improvement in the Craniovertebral angle than the conventional exercises.

**Keywords:** Rounded shoulder, Pilates exercises, Stretching, Craniovertebral angle, Neck Disability Index.

## **INTRODUCTION**

Ideal posture refers to a condition of maintaining balance in the body with the least amount of musculoskeletal activity while producing no pain or discomfort. Body alignment for a predetermined amount of time is referred to as posture. Both the propensity to spend extended amounts of time seated and the proportion of people who use smartphones or personal computers are rising. As a result, the spine's alignment may shift, which might result in bad posture like rounded shoulders or a forward-facing head position.[1] Text neck or scholar's neck is anterior orientation of cervical spine. It's a postural issue that is brought on by a number of things, such as head lifted too high and using laptops, PCs, and mobile devices for extended periods.[2] India currently has between 300 and 400 million smartphone users.[3] In 2017, India had 291.6 million smartphone users. By extrapolating, it is predicted that 490.9 million people will be using smartphones by 2025. [4] The ligaments in the neck or lumbar region are harmed by holding a posture that is constant. This posture also causes muscle ache and a reduction in physical activity. Among various ages, Forward-head posture (FHP) is typical postural variation. This term "forward head posture" refers to position of head in the sagittal plane when it head is even forward with respect to neck. This posture is associated with excessive extension of upper cervical region (C1-C3) and bending of the lower cervical spine. (C4-C7). According to certain research, FHP is pathogenic if craniovertebral-angle (CVA) is lesser than 50° [5] Because users must bend their heads to view the small displays, which are often held downward, prolonged immobile sitting with an unsupported arm may cause aberrant neck alignment. This causes the neck muscles to work harder. The musculoskeletal system is impacted, work capacity is reduced, and muscular fatigue is increased in the neck and shoulders when they are overloaded.[6] A prolonged flexed head position may create a forward displacement of the head and neck, a loss in cervical range of motion, and postural abnormalities in the sagittal plane. These deficiencies might impact head balance or control, increasing mechanical strain and dysfunction.[7] In general, neck pain significantly increases morbidity and interferes with 2 daily activities and employment. Some people with acute neck discomfort may go on to have persistent or recurrent pain. Throughout the cervical range, the major neck muscles retain least 80% of their maximum force generating potential.[8] Various techniques have been used, including Stretching, proprioceptive exercises, isometric training, [9] endurance activities, and joint mobilization are started. [8] apart from which postural corrections in the form of posture re-education approaches, biofeedback techniques [10] and ergonomic modifications must be taken into account when treating forward head posture. As the immediate underlying causes of FHP include prolonged poor sitting posture, inadequate muscular flexibility, weakness and balance impairment, and decreased joint movements, these elements have to be addressed immediately to prevent long term ill effects. These strategies that are intended to treat the causes of FHP are posture correction management which indirectly increases the muscular flexibility, muscle strength and joint mobility. Pilates is one such training that focuses on placing control of body position and movement with emphasis concentrated on breathing, centring, attention, control, and

precision. [12] This approach mainly depends on body alignment, which requires sufficient adjustment of head, arm, pelvic girdle in neutral position while holding the vertebral alignment, and also the axial orientation of lower extremities and balanced weight-bearing by both feet in the upright position.[11] Pilates and strengthening exercises have shown to be effective in preventing mechanical neck pain, back pain and reducing its severity. The splenius capitis, semispinalis and trapezius work together to control extension while the sternocleidomastoid, longus coli, and longus capitis control flexion. The scalenes, sternocleidomastoid, and fibers from the trapezius work together to govern lateral bending.[12] Thus, an attempt is made in this study to find the efficiency of Pilates training in maintaining the neck posture and functional performance in subjects with Forward Head posture.

#### METHODOLOGY:

**Study type:** Experimental type of study **Sampling:** Convenient technique **Sampling size:** 30

**Inclusion criteria:** □ Subjects of age: 18-30 years

- Both males and females
- Craniovertebral angle less than 50°

#### Exclusion criteria:

- Cervical radiculopathy patients
- Subjects with cervical myelopathy
- Cervical spine fractures
- Surgeries around cervical spine

#### DATA COLLECTION AND ANALYSIS:

The subjects were split into two groups, with total of 15 subjects in each group; based on inclusion and exclusion criteria. Pilates training along with stretching was given to the Experimental group for 4 session/week for 4 weeks, 2 sets every session and each set containing 10 repetitions, Conventional exercises were given to the Control group for 2 sets every session and each containing 10 repetitions for 4 sessions/week for 1 month (4 weeks).

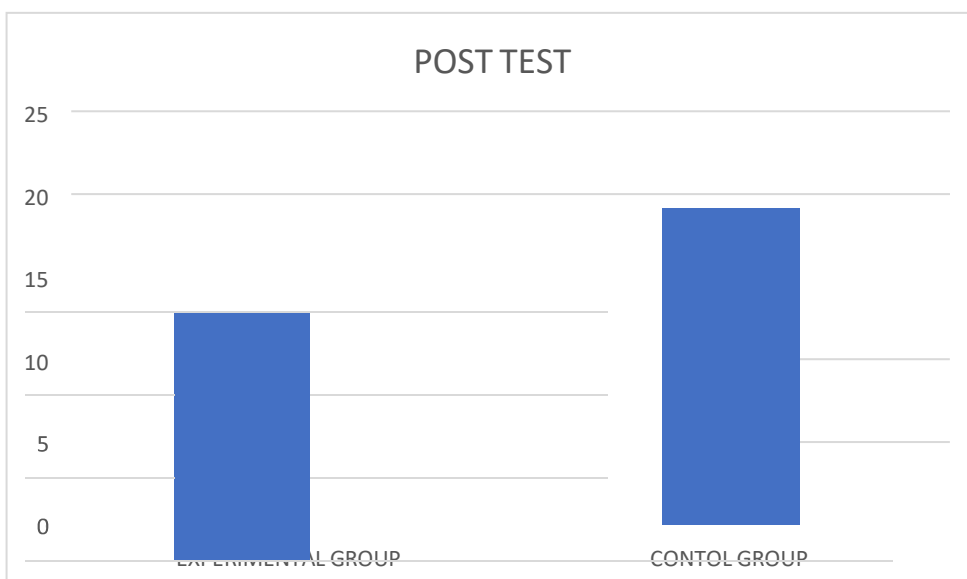
#### Statistical analysis:

Using the paired and the unpaired t-test, the values were assessed statistically. The analysis made with the quantitative data obtained from craniovertebral angle measurements and neck disability index revealed a statistical difference between both groups and also within the group.

TEST (post-test)	Mean	Standard Deviation	P-value
Experimental group	14.80	6.04	<0.0001
Control group	19.13	4.24	

**TABLE 1:** Comparison between Post mean values: Experimental and Control groups using Neck disability questionn

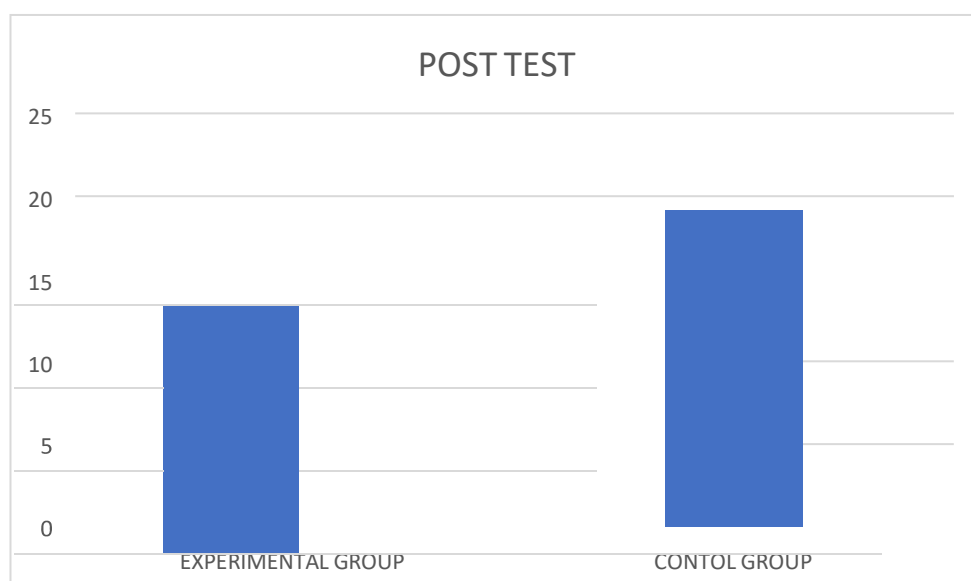
**GRAPH 1:** Comparison between post-test mean values: Experimental and Control groups using the Neck disability questionnaire.



TEST(POSTTEST)	MEAN	STANDARD DEVIATION	P- value
Experimentalgroup	49.26	0.755	<0.001
Control group	48.49	0.804	

**TABLE 2:** Post mean values: Experimental and Control groups using Craniovertebralangle.

**GRAPH 2:** Post mean values: Experimental group and Control group usingCraniovertebral angle.



**RESULT:**

The statistical analysis made with quantitative data obtained from the Neck Disability questionnaire and Craniovertebral angle revealed statistically differences between both the groups and also within group. The post test mean value of the Neck disability questionnaire in experimental group: 14.80 and control group: 19.13. Post-test mean value of Craniovertebral angle in the Experimental group was found to be 49.26 and that of control group as 48.49.

**DISCUSSION:**

Cervical spine is anteriorly positioned in the Forward Head Posture (FHP). It's a postural issue brought by a number of things, such as lifting head too high while sleeping and spending much time on PCs, laptops, and mobile phones.[20] The immediate underlying causes of FHP include end-range sitting posture, reduced muscular flexibility, weakness and improper balance, and decreased joint movement. Postural corrections/modification strategies can be incorporated to treat the condition. The focus of the so-called Body-Mind movements, which include Pilates movements, is on controlled movement, posture, and breathing. Through controlled movements performed as mat exercises or with equipment to tone and develop the body, Pilates enhances both mental and physical well-being, promotes flexibility, and strengthens muscles. This body conditioning method directs towards development of both body and mind of the individual. Pilates exercise can help people with reduced body awareness and unnatural patterns of movements because it improves their ability to function, confidence in their movements, awareness of their bodies, posture, and control over their movements.

Participants use gravity to assist stabilize their core throughout the mat sessions, usually sitting or lying supine or prone. Of note, many of these exercises are non-weight bearing and have a strong flexion bias. It is especially important for people with back pain to become aware of the neutral spine and to strengthen underlying muscle groups which support the spine. Pilates method also trains patients to be aware of movement patterns that could put strain on their spines and assists them in switching to patterns that maintain alignment in neutral. The Pilates method also trains patients to be aware of movement patterns that could put strain on their spines and assists them in switching to patterns that maintain neutral alignment. Awareness of tension and proper focus helps the patient use their body efficiently.[20] People having chronic backache are shown to have greater stability and decreased pain and also disability while using the Pilates technique and the aerobic activities, claim Naiane Teixeira Bastos de Oliveria et al. The results, however, are not specific to older persons because research looking into the efficiency of Pilates do not include older adults or focus on subjects between the ages of 18 and 80, which is a vast range of age. Furthermore, compared to younger patients, older individuals exhibit a reduced response rate to aerobic therapies. Thus, little is known about how aerobic exercise and the Pilates approach affect older persons with low back discomfort. Thus, the outcomes of this study will aid in establishing whether these activities are likewise [24] beneficial for senior citizens. With both treatments, we anticipate that there will be a rise in balancing and functionality along with the pain relief. Researchers Lee and Ho SuebSet al [21] examined the relationship between the number of hours students at Gachon University spent using their smartphones and neck pain. A self-reporting questionnaire was utilized to collect information from 2353 students about their smartphone usage habits, primary smartphone functions, and level of discomfort. The degree of pain was assessed using the neck disability index. 66.97% of them said they would use their mobile devices in excess of two hours each day, and 48.18% said they would use them for between 10 and 30 minutes each day. No disability (0–4 score, 62.92%) made up the majority of the scores. (5–14 score, 32.85%) Mild disability and 15 to 24 score, 1.19 percent) moderate disability. They discovered that, on average, female students scored considerably higher on the NDI than did male students. This study thereby concludes that Pilates exercises are efficient in reducing pain and increasing the Craniovertebral angle among subjects having Forward Head Posture (FHP)

**CONCLUSION:**

This finding indicates that a Pilates exercise regimen combined with stretching was more successful in improving the Craniovertebral angle and hastening the recovery of subjects having Forward Head Posture than conventional therapy.

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