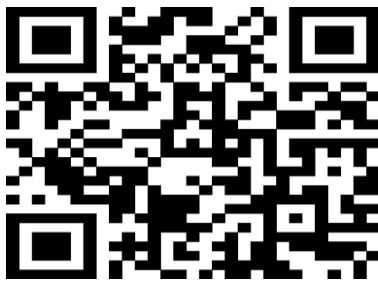


Impact of Cervical Stabilization Exercise on Pain and Craniovertebral Angle among IT Workers

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URL: <https://ijptrs.com/view-issue/144/Fulltext>

DOI: <https://ijptrs.com/public/images/content/570Vimal%20volume%203%20issue%202.pdf>

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Submission: 2nd Feb 2024

Revised: 15th Feb 2024

Publish: 1st April 2024

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ABSTRACT

Background: Nowadays forward head posture and neck pain are very common in people who working in Information Technology companies, it occurs due to many reasons like prolonged use of computers, bad posture, muscle weakness etc., leading to chronic neck pain. About 14-71% of adults experience neck pain at some point of their life, which makes it a common cause for disability among adults. Therefore, the need for the study is to check the effectiveness of cervical stabilization exercise on improving forward head posture and neck pain. The aim of this study was to find out the impact of cervical stabilization exercise on pain and craniovertebral angle among IT workers.

Methodology: 30 people aged from 20 to 40 years selected by convenient sampling method. Subjects who fulfilled the inclusion and exclusion criteria were selected and assigned as groups A and B equally underwent cervical stabilization exercises and conventional exercises respectively. The total study duration was 6 months. Pain was measured by Numerical pain rating scale and Craniovertebral angle was measured by Photogrammetry method.

Result: Paired and Unpaired 't' test was the statistical tool used to compare the two groups. The Statistical Analysis showed a significant difference on pain (NPRS), using unpaired 't' test, at 0.05% as a level of significance, the calculated 't' value was 4.76. And in craniovertebral angle (Photogrammetry method) using unpaired 't' test, at 0.05% as a level of significance, the calculated 't' value is 3.44.

Conclusion: This study concludes that the group which was given cervical stabilization exercise with conventional physiotherapy exercises as an intervention method showed more improvement on pain and craniovertebral angle than the group which was underwent only conventional physiotherapy exercises.

Keywords: Forward head posture, Cervical stabilization exercise, Neck pain, Craniovertebral angle.

INTRODUCTION:

Body posture can be described as a state of alignment of the body for a particular amount of time. The tendency to remain situated for long periods of time is increasing as within the rate of the population that uses a personal computer or smartphone. This may cause changes within the alignment of the spine, leading to improper posture [1].

The static and dynamic postural control of head and neck is contributed by complex arrangement of muscle surrounding the cervical spine. Longus colli, longus capitis, rectus capitis anterior and rectus capitis lateralis are the deep cervical muscles [2]. The imbalance between the stabilizers on dorsal aspect of the neck and deep cervical flexors is caused by impaired muscle function which finally causes impairment of cervical spine [3].

Forward head posture is increasingly prevalent for postural deviation, especially among prolonged computer users. The prolonged placement of head anterior to the body's centre of gravity is a main etiology for forward head posture [4]. Craniovertebral angle is one of the methods used to measure forward head posture.

Forward head posture is generated due to shortness of the cervical extensors and pectoralis muscles and weakness in the deep cervical flexor muscles and mid-thoracic scapular retractors [5]. And there is an anterior shift of head from the line of gravity, rotation of scapula medially, development of thoracic kyphosis and decrease in overall height of the vertebral column. Characteristics of forward head posture are reduced cervical lordosis and compensatory tilting back of the head at atlanto-occipital joint. In the posterior cervical muscles, there is an over action with an eventual shortening of semispinalis capitis and stretching and weakness of semispinalis cervicis.

Neck pain is a musculoskeletal disorder mainly affected due the improper posture with physical impairment or functional limitation. Chronic neck pain is increasingly prevalent in the society. The incidence of neck pain is higher in women and rises with age. Mechanical neck

pain arises gradually and is more often multifactorial in origin. The forward head posture is known to be an internal component that causes neck pain [6].

Cervical stabilization exercises are commonly used to decrease pain, maximize function, and progress physical impairments for individuals with nonspecific neck pain. Cervical stabilization exercises focusing to train deep stabilizer muscles of the cervical spine and improve coordination between superficial and deep cervical muscles have been commonly used in recent years [7].

Craniovertebral angle is also known as cervical angle and forward head angle. Measurement of craniovertebral angle (CVA) is one of the common methods in assessing forward head posture. A forward head posture causes for a posture in which the extended head and upper cervical, and the lower cervical vertebrae flexed. This leads to an increase in the external moment's length (the arm) by moving the gravitational centre (the head) ahead of the weight bearing axis. The continuous loading on the craniovertebral extensor muscles and the noncontractile structures causes an alter in the biomechanical motions, and this elevated stress can cause musculoskeletal injury or pain [8]. The intersection of the horizontal line passing through the C7 spinous process is known as the craniovertebral angle.

The Numerical Pain Rating Scale (NPRS) is an outcome measure that is used as a unidimensional measure to analyse the intensity of the pain in adults, including the subjects with chronic pain [9].

MATERIALS AND METHODS:

This study was a pre-test and post-test experimental study design. The study setting was done at Outpatient department of Physiotherapy, K.G. College of Health Sciences Coimbatore. 30 people aged from 20 to 40 years were selected by convenient sampling method. A total of 30 subjects who fulfilled the inclusion criteria [both male and female, subjects with age of 20 to 40 and subjects with neck pain < 5 in NPR scale] and exclusion criteria [participants with any congenital abnormalities

in neck or shoulder, recent surgery in neck, shoulder or

thorax, recent trauma to the neck, shoulder or thorax, any history of cervical spondylosis, any problems of systemic, muscular, neurological or connective tissue disorder] were selected and assigned as groups A and B equally underwent cervical stabilization exercises and conventional physiotherapy respectively. The total study duration was 6 months.

Numerical pain rating scale for pain and photogrammetry method for craniovertebral angle were used as outcome measures.

GROUP A: The Experimental Group was given Cervical Stabilization exercises along with Conventional Physiotherapy treatment. The exercise program included axial elongation exercise, craniometrical flexion exercise, cervical extension exercise, and cervico-scapulothoracic strengthening exercises. Each subjects done exercises for 6 weeks.

GROUP B: The Conventional Group was given only Conventional treatment which included cervical isometric exercises, transcutaneous electrical nerve stimulation (TENS) and hot packs. TENS was given for 10 min, at the intensity of 10-30 mA with a frequency of 80 Hz. All the subjects accomplished cervical isometric exercises in the sitting position by applying resistance at the forehead (cervical

flexion, extension, rotation, and side bending) maintained for 10 sec having 15-sec breaks between holds with 10-15 repetitions increasingly.

RESULTS:

In this study 30 subjects were selected to find out the effect of cervical stabilization exercise on pain and craniovertebral angle among IT workers.

Out of 30 subjects, 13 male participants of which 7 were in group A and 6 were in group B, and 17 female participants of which 8 were in group A and 9 were in group B, took part in this study.

The correlation between post-test values of numerical pain rating scale both groups A and B showed that, the mean value of group A is 1.40 and for group B its 3.20. Using unpaired 't' test with 28 degrees of freedom and 0.05% as a level of significance, the calculated 't' value is 4.76, which was greater than the tabulated 't' value 2.04.

The correlation between post-test values of craniovertebral angle both group A and group B showed that, the mean value of group A is 47.76 and for group B is 46.46. Using unpaired 't' test with 28 degrees of freedom and 0.05% as a level of significance, the calculated 't' value is 3.44, which was greater than the tabulated 't' value 2.048.

**COMPARISON OF PAIN BETWEEN GROUP A AND GROUP B
(USING NUMERICAL PAIN RATING SCALE)**

Post test values	Mean	't' value	p-value
Group A	1.40	4.76	p< 0.05
Group B	3.20		

**COMPARISON OF CRANIOVERTEBRAL ANGLE
BETWEEN GROUP A AND GROUP B
(USING PHOTOGRAMMETRY METHOD)**

Post test values	Mean	't' value	p-value
Group A	47.76	3.44	p< 0.05
Group B	46.46		

DISCUSSION:

The main aim of this study was to find out the impact of cervical stabilization exercise on pain and craniovertebral angle among IT workers.

About 14-71% of adults experience neck pain at some point of their life, which makes it a common cause for disability among adults^[10]. One of the major causes of pain or discomfort is usually poor posture. A kind of poor posture associated with increased kyphosis in thoracic region and anterior shoulder positioning is forward head posture (FHP). It is an internal factor causing neck disability and pain. As a result of extension of head and upper cervical region and flexion of lower cervical vertebrae, forward head posture occurs. This causes the centre of gravity to move ahead of the weight bearing axis leading to increased length of external moment arm^[11].

Forward head posture is generated due to shortness in the cervical extensors and pectoralis muscles and weakness of the deep cervical flexor muscles and mid-thoracic scapular retractors.

Prolonged load on craniovertebral extension muscle and non-contractile structure leads to a change in biomechanical movement and this increased stress causes musculoskeletal damage or pain. Some studies revealed that forward head posture can lead to reduction in number of sarcomere and shortening of muscle fibre, which has an adverse effect on muscular contraction and further it leads to pain and dysfunction.

Forward head posture is the most common postural fault in the sagittal plane. It is also associated with neck pain and dysfunction, cervicogenic headache and even an increased falling risk in the elderly. Due to the increased uses of computer, cell phones in college students, the forward head posture is very common^[12]. It can also result in the weakness of neck muscle. Forward head posture makes changes to strength and length of neck muscle and likely shortens the posterior muscles in the

neck while lengthening and weakening of anterior neck muscles^[13].

In this study we analysed that, cervical stabilization exercise will help to reduce and to prevent forward head posture by improving the muscle function, which also helped to reduction of pain along with the conventional physiotherapy treatment.

Treatment methods like cervical stabilization exercises, conventional exercises including neck isometric exercises and pain-relieving modalities were used in this study. These treatment methods were shown to be effective in reducing pain and forward head posture. There is also a significant reduction in forward head posture.

CONCLUSION:

This study concludes that the cervical stabilization exercises is effective on forward head posture and neck pain. Group which was given cervical stabilization exercise along with conventional physiotherapy as an intervention method showed more improvement on pain and craniovertebral angle than the group which was underwent only conventional physiotherapy treatment.

ACKNOWLEDGEMENT:

The authors sincerely thank Dr. G. Bakthavathsalam, Chairman, Mrs. Vasanthi Raghu, Vice Chairman and Prof. V. Mohan Gandhi, CEO, KG Hospital, Coimbatore, Tamilnadu, India for their constant support and logistical help to conduct this research.

ETHICAL CLEARANCE – Institutional Ethical Committee, K.G. College of Physiotherapy, Coimbatore, Tamilnadu, India. Reference number: ECKGH-00315; 15.05.2023.

SOURCE OF FUNDING – Self.

CONFLICT OF INTEREST – Nil.

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