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Original Research Article

To Study the Immediate Effect of Suboccipital Muscle Energy Technique on Craniovertebral Angle and Cranio-Horizontal Angle on Subjects with Forward Head Posture

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ABSTRACT

Background: Forward head posture is a head-on-trunk malalignment, which results in musculoskeletal dysfunction and neck pain. To improve forward head posture, both the Deep Neck Flexor Exercise and the Suboccipital Muscle Energy Technique have been used.
Objectives: The purpose of this study was to compare the immediate effects of deep neck flexor exercise and suboccipital release combined with deep neck flexor exercise on craniovertebral angle and cranio-horizontal angle on subjects with forward head posture.
Methods: In total, 40 subjects (20 males, 20 females) with forward head posture assessed by Electronic Head Posture Instrument were recruited. Experimental Group performed deep neck flexor exercise and suboccipital muscle energy technique whereas Control Group performed deep neck flexor endurance exercise. Craniovertebral Angle and Cranio- Horizontal Angel were measured before and after the intervention. t test was used for statistical analysis.
Results: Craniovertebral angle ($p<0.05$) and Cranio-Horizontal Angle ($p<0.05$) showed significant difference after suboccipital muscle energy technique combined with deep neck flexor exercise compared to deep neck flexor exercise alone on Forward Head Posture
Conclusion: The addition of suboccipital muscle energy technique to deep neck flexor exercise provided superior benefits relative to craniocervical flexion exercise alone as an intervention for subjects with forward head posture.

Keywords: Craniovertebral angle; Cranio-Horizontal Angle; Suboccipital Muscle Energy Technique; Deep Neck Flexor Exercise; Forward Head Posture.

INTRODUCTION

Forward head posture is a head-on-trunk misalignment, which results in musculoskeletal dysfunction and neck pain. [(1)] FHP increases lower cervical spine lordosis, resulting in increased upper cervical spine extension and lower cervical spine flexion. [(2)] These changes in neck posture can lead to abnormal cervical movement patterns, causing cervical muscle imbalance. FHP is associated with weakness in the deep cervical flexors and shortening of the opposing cervical extensors. [(3)] A previous study demonstrated that increased FHP was associated with a decreased

Cranio-vertebral angle (CVA) and increase in Cranio-Horizontal Angle (CHA). [(4)]

To improve FHP, exercises are aimed for strengthening of the deep neck flexors muscles giving low load to particular muscle in early rehabilitation in individuals who cannot perform high load exercise.

Muscle energy technique is an established osteopathic manipulative intervention often used to treat somatic dysfunctions of the spine. [(5)] Heredia Rizo et al [(6)] (2012) reported that suboccipital release technique significantly improved CVA in asymptomatic patients. Soft tissues mobilisation reduced tightness and hyperactivation of shortened deep cervical muscle. For the present study, the muscle energy procedure was used to lengthen potentially shortened cervical muscles and fascia to normalize the FHP**.**

Aims and Objectives:

1) To determine the effect of Suboccipital MET on Cranio-Vertebral Angle
2) To determine the effect of Suboccipital MET on Cranio-Horizontal Angle
3) To determine the effect of Suboccipital MET on Forward Head Posture

PROCEDURE:

Ethics approval was taken by Ethical Committee-SSPC. The study design was Experimental study conducted for 6 months at Shree Swaminarayan Physiotherapy College, Ranip, Ahmedabad. Simple Random Sampling was done with cheat and envelope method with sample size of 40 subjects. Inclusion Criteria was Forward Head Posture as determined by the presence of a CVA < 51 [(7)] in both males and females between18-25 years.

Exclusion Criteria was Medical/health care for neck, shoulder, or lower back pain over the past year, musculoskeletal pain, Dysfunction of the cervical, thoracic, or shoulder girdle fractures or anomalies. Obesity, defined as a BMI >30. Written Consent forms were taken from the subjects and Forward head posture were assessed by Electronic Head Posture Instrument. [(8)] Subjects were divided into two groups. In each group 20 subjects were distributed. Individuals in Group A were given deep neck flexor exercise. In Group B individuals were given Deep neck flexor exercise and Suboccipital muscle release technique. Craniovertebral and Cranio-horizontal angle were measured of all the subjects from Group A and Group Band were documented. Further analysis was done.

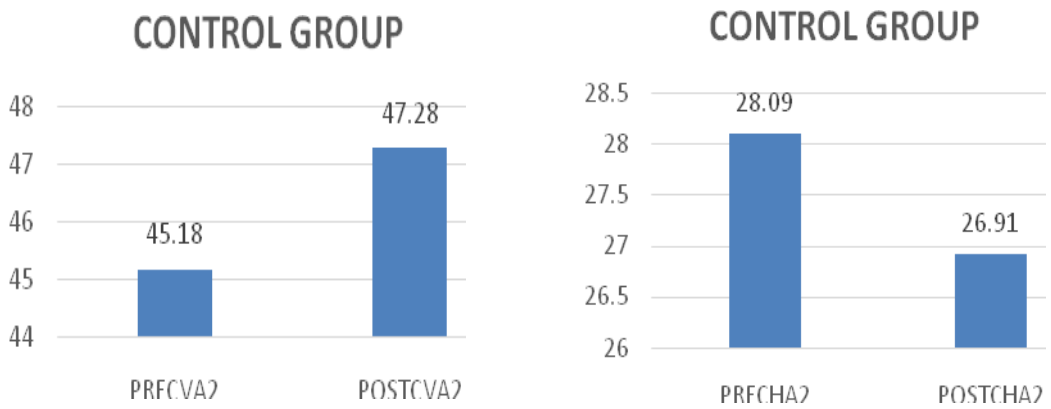
Control Group: Deep Neck Flexor Exercise **Experimental Group: Muscle Energy Techniques**

RESULTS

Data were analysed in SPSS v 16. Data was not in normal distribution by Kolmogorov Smirnov test for normality, so Wilcoxon signed ranked test was used for analysis within the group. Mann-Whitney U test was used for analysis between the groups.

TABLE 1: Comparison Between Pre And Post Craniovertebral Angle And Cranio-horizontal Angle Of Control Group

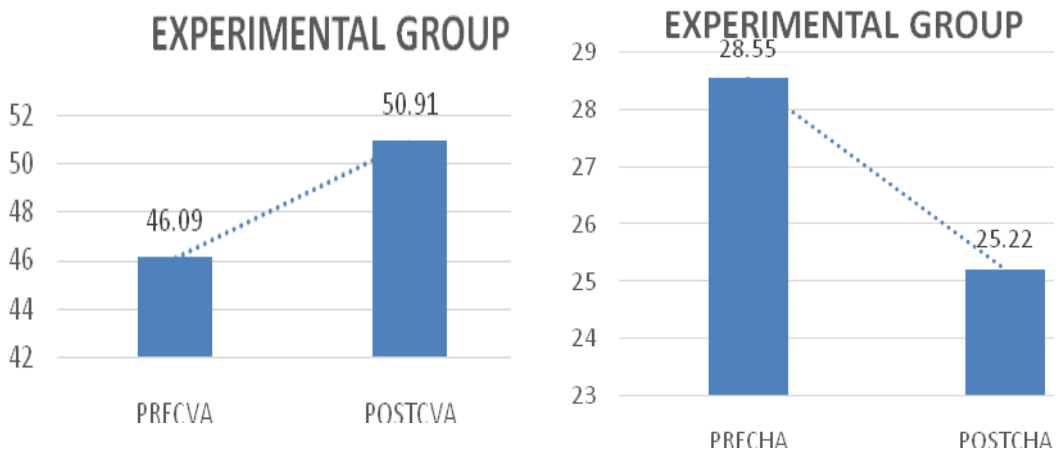
Craniovertebral Angle Cranio-horizontal Angle	Difference in MEAN (± SD)	Wilcokson signed ranked test	p-value
PRE CVA and POST CVA	2.83+0.203	0.02	P<0.005
PRE CHA and POST CHA	1.18±0.237	0.02	P<0.005



GRAPH 1: Comparison Between Pre And Post Craniovertebral Angle And Cranio-horizonal Angle Of Control Group.

TABLE 2: Comparison between Pre and Post Craniovertebral Angle and Cranio-horizontal Angle of Experimental Group

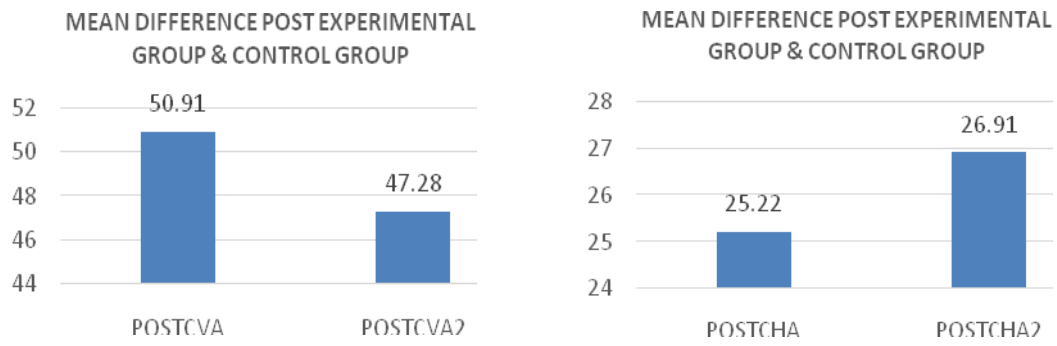
Craniovertebral Angle Cranio-horizontal Angle	Difference in MEAN (± SD)	Wilcoxon signed ranked test	p-value
PRE CVA and POST CVA	4.01± 0.302	0.03	P<0.005
PRE CHA and POST CHA	3.33± 0.438	0.02	P<0.005



GRAPH: Comparison Between Pre and Post Craniovertebral Angle and Cranio-horizontal Angle of Experimental Group

TABLE 3: Comparison Between Post Craniovertebral Angle And Post Cranio-horizontalangle Of Experimental And Control Group

Craniovertebral Angle Cranio-horizontal Angle	Difference in MEAN (± SD)	U-value	p-value
POST CVA and POST CVA	3..36+1.57	5.26	P<0.005
POST CHA and POST CHA	1.69±0.621	4.13	P<0.005



GRAPH: Comparison Between Post Craniovertebrtal Angle Post Cranio-horizontal Angle Of Experimental And Control Group

DISCUSSION

We compared the immediate effects of DNFE and MET on CVA and CHA. The sub occipital muscles are the "proprioceptor monitors" that contribute significantly to regulation of head posture, and they have the most muscle spindles in the human body.[(9)] Muscle Energy Technique decreases hyperactivation and tightness in shortened deep cervical extensors in subjects with FHP. The mechanism behind this result may be neurophysiologic mechanism that it activated Golgi Tendon Reflex, inhibits the alpha motor neuron and thereby inhibited Suboccipital muscles. Secondly, traction provided by the therapist stretched the fascia of the posterior neck and the suboccipital muscles and there by increased extensibility and viscoelasticity of the muscles. In addition, Vernon et al. (2009) [(10)] reported that craniocervico-thoracic muscles in the deep segmental region could be activated following suboccipital release (SR), providing a stable base for cervical movement. Consequently, SR could help to regain normal flexibility of the cervical flexors and extensors and to re-establish normal autonomic function and ROM. It is also believed that suboccipital release improved the tone of the rectus capitis posterior minor which normalize dural blood flow. [(11)] The connective tissue bridge between the dorsal spinal dura at the level of atlanto-occipital junction and rectus capitis posterior minor is important to the control of cervical movement. Applying muscle energy technique to suboccipital muscle induced the Downstream Effect from neck to shoulders as these muscles are important part of the myofascial superficial back lines, so releasing the suboccipital muscles induced release of neck and shoulder muscles and thereby it improved forward head posture. [(9)]

Limitation: Short Term Effect was seen, Small Sample Size, No other cervical problems were included

CONCLUSION

Addition of Muscle Energy Technique (MET) to Deep Neck Flexor Exercise (DNFE) in interventions designed for subjects with Forward Head Posture can provide superior benefits compared to Deep Neck Flexor Exercise (DNFE) alone.

Conflict Of Interest: Nil

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