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Efficacy of Cranial Base Release Technique on Postural Instability in Cervicogenic Headache Patients

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ABSTRACT

Bachground: Pain which is arising from the neuromusculoskeletal structure of upper cervical spine is known as Cervicogenic Headache (CGH). One of the common reasons associated with all forms of headaches is the presence of trigger points to the posterior sub-occipital muscle which is directly connected with posture and balance. The main purpose of the study was to explore the outcome of cranial base release (CBR) technique on postural instability in the patients with CGH. **Methods:** In this experimental study thirty patients with cervicogenic headache were treated with MFR. Treatment was given 4 days per week for 4 weeks, 20 minutes per session. Wintrack was used to assess postural instability before and after the treatment protocol. **Results**: Student t-test was used to compare the data before and after treatment. There was a considerable improvement in postural deviation ($P<0.05$). **Conclusion:** Based on these findings, sub-occipital myofascial release can be recommended as an effective clinical method to improve postural instability in patients with CGH.

Keywords

Cervicogenic Headache, Sub-Occipital Muscle, Postural Instability, Cranial Base Release

Introduction

The North America Cervicogenic Headache Society (NACHS) defines CGH as a dull, aching pain that is referred to and perceived in any area of the head. Primary nociceptive source in any soft tissue that's innervated by cervical nerves can cause this type of presentation [1-3]. The incidence of CGH is around 0.4%-2.5% of global population and 15%-20% of all headches are CGH[4,5]. If we consider the costs associated with loss of productivity and treatment, headaches are considered a costly disease [6, 7]. According to Cervicogenic Headache International Study

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Group (CHISG), CGH is characterized by pain with neck movement or improper sustained positions, myofascial pain and stiffness and limited range of motion in cervical spine [3, 8]. The problem is usually caused by clinical signs and symptoms, which vary between individuals and also during the disease course [9]. However, it has been realized that tip-top clinical test has high affectability and explicitness for diagnosing CGH in upper cervical flexion-rotation test (FRT) [10-13]. Recent study suggested that, posterior capitis minor muscle is connected with dura matter and that could be the major cause of CGH [14], which may be the major cause of postural instability due to myofascial tightness of that muscle. Facial restriction limit the normal movement of the muscles between the fascial plates with different directions in the sub occipital region [15, 16, 17]. Also it has been considered as a fibrous collagenous tissue that is part of the body tensional force transmission system [18]. Cranial base release is a therapeutic technique that applies gentle pressure and stretching (in both forms of direct and indirect approaches) intended to restore optimal length, to decrease severity of pain, and to accelerate the release of fascial restrictions caused by stress, strain, repetitive use, and traumatic or surgical scarring [19-21]. There are a number of studies done on CBR to increase range of motion, improve joint biomechanics, increase in extensibilities of soft tissues and significant decrease in pain and muscles tone [16, 19, 22]. Study advocates that cervical muscle dysfunction leads to postural intability [23]. Based on common upper crossed syndrome, suboccipital myofascial stiffness is symmetric with the weakness of deep cervical flexors muscles and vice versa in individuals with forward head posture and chronic neck pain and head pain [15, 24, 25]. Apparently, pain and stiffness of suboccipital myofascial structures reduce forceful deep cervical flexors muscle strength so releasing this stiffness can be a justified way for improving neck muscle flexors. Although a lot of invasive and non invasive interventions like injection therapy, nerve block, physical therapy, exercises therapy, electro therapy and spinal mobilization are used for CGH treatment [26-29], CBR has not been studied specifically about suboccipital for CGH. So the main objective was to evaluaate the effectiveness of MFR technique to the suboccipital muscle on postural instability in subjects with CGH.

Methodology

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This experimental study was a pre-post trial and sample was collected through convenient sampling from Department of Physiotherapy, Lovely Professional University, India. A total thirty subjects were participated in this study. All the participant was received both verbal and written information about the study and then the interested subjects were requested to sign the informed consent. The inclusion criteria for the study were as follows: (i) Neck pain referring one-sidedly to suboccipital area [30]; (ii) The pain during flexion rotation test [13]; (iii) Increasing symptoms by pressure to suboccipital area, and (iv) complaning headache last six month at least once per week. Exclusion criteria fot the study were as follows: (i) Having two-sided headaches (typifying tension headache); (ii) Intolerance to flexion rotation test; (iii) History of giddiness, faintness and visual deficiency; (iv) Radiculopathy, stenosis or any kind of degenerative conditions; (v) Any medication for headache. The outcome measures consist of checking postural instability with eyes open and close and measured by Win-Track platform (Win-Track, company-Medicapteurs,). Data were recorded before and after the treatment in bipedal stance position. For the eyes-open testing, each participant was instructed to fix their vision on a large red dot placed at the eye level about 4 meters in front of the win track platform. For the eyes close testing the participant was instracted tostand (directly on Win track platform) for the time of 30 seconds means while blindfolded data was recorded.

Treatment Protocol

In this treatment, the therapist bends metacarpophalangeal and extends the interphalangeal joints by engaging them below the center of the C4-C5 spine and holding them for 1-2 minutes. For the use of the main technique, subjects were advised to lying down on the bed with knee bending and rolls of towel were positioned below the head. The therapist was in the sitting position with forearm and elbow suported on the table then the subject was requested to raise the head of the table. The therapist placed the finger just below the arch of the atlas and the fingers were placed approximately 45 ° at the proximal metacarpophalangeal and proximal interphalangeal joints then the subject was requested to rest the head on the therapist fingers. The technique was performed for two to three minutes for each patient. Treatment frequency was 6 times per week and all the patients were advised to do gentle range of motion exercise.

Results

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Statistical analysis was done by using SPSS-16 and paired t-test was used to compare the pre and post outcomes. Demographic variables (age, weight, height, BMI) are showing in the (Table-1) Statistical analysis revealed significant improvement (P<.05) postural deviation with eyes open and eyes close (Table-1, fig-1 and fig-2)

Discussion

Main purpose of the study was to find out the effectiveness MFR on postural instability in patient with CGH. The result of the study showed that thaere was significant improvement on postural instability. The improvement seen after treatment with CBR techniques are probably due to stretching of the elastic component, into a comparatively softened state which involves the change of thixotrophic gel change into fluid substance. This gel reduces the pressure on the structures which are more sensitive to pain and enhances their extensibility by rehydrating them again [31.32]. In the cervical spine especially in the occipital region there is more distinguishing proprioceptive system than the lumbar spine. This is because of the prescence of more muscle spindles and the mechanoreceptors subserving proprioception in the suboccipital region. It seems that when impairment occure in postural control due to neck pain there will be difficulty in standing balance, altered control in eye movement and distorted kinesthesia. [33]

A study by Castro-Sánchez-2011 found that improvement in postural instability and physical function after myofascial releas in patients with fibromyalgia syndrome. [34]

In this study along with the interventions we taught some postural exercises to the patients that helped to reduce the load on spine due to that the patient developed postural instability. Unfortunately, there are few studies focusing on the effectiveness of MFR technique in patients with CGH. Studies with larger sample sizes and assessing by muscle's sonography or EMG-activation and follow up to see the long-term effects are recommended.

Conclusion

The present study among the patients with CGH showed a significant improvement in all the 30 patients for improving postural instability. So CBR technique could be a part of treatment protocol for the management of patients with Cervicogenic Headache.

Source of Funding

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- Self funding

Conflict of Interest

Author does not have any conflict of interest

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Table 1: Demographic charecterstics of data

Variables	Mean ± SD
Age(y)	38±11.31
Weight(kg)	67.82±7.53
Heihgt(cm)	166.35±7.52
Gender	(M=12) (F=18)
BMI(kg/m2)	24.52±2.55

BMI=Body Mass Index, M=Male, F=Female

Table 2: Paired t-test for postural instability before and after the treatment

Parameters	Pre (mean ±sd)	Post (mean ±sd)	Improvement	P-value
Latero-Lateral deviation(Eyes oppen)	3.20 ± 2.10	0.93 ± 0.68	2.27	0.001
Latero-Lateral deviation(Eyes close)	5.09 ± 2.76	2.26 ±0.99	2.84	0.001
Antero-Posterior deviation(Eyes close)	3.09 ± 1.75	0.82 ±0 .74	2.27	0.001
Anterio-Posterio deviation(Eyes close)	4.84 ± 5.63	1.30 ± 0.79	2.55	0.001

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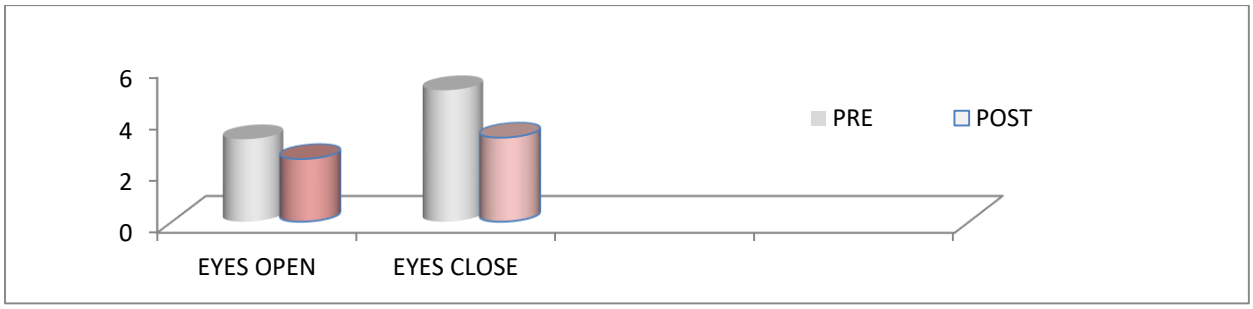

Fig 1: Latero-Lateral deviation with eyes opens and closes before and after treatment protocol

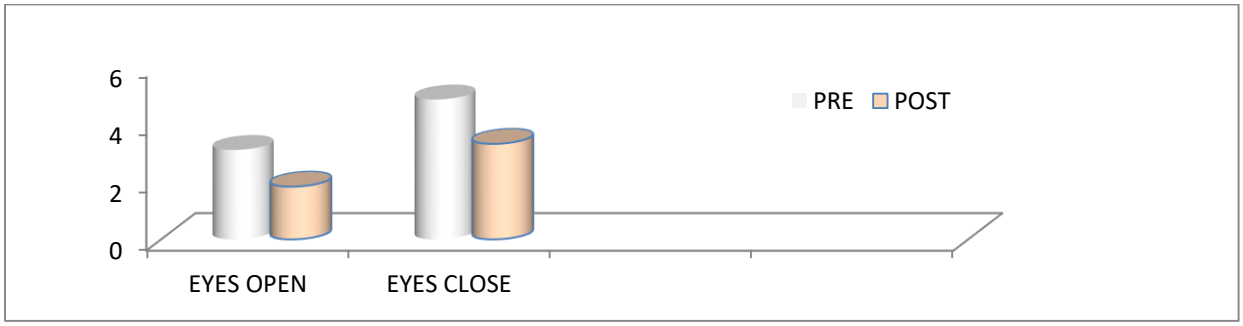

Fig 2: Antero-posterior deviation with eyes opens and closes before and after treatment protocol