

Original research article**Effect of hyoid bone mobilization and fascia relaxation on cervical motion in cervicogenic headache**¹Dr. Shilpi Kapoor, ²Dr. Urvashi, ³Dr. Vaibhav Choubey, ⁴Dr. Ashish Mishra¹Research Scholar, Department of Physiotherapy, Malwanchal University, Indore, Madhya Pradesh, India²Professor, Department of Physiotherapy, Malwanchal University, Indore, Madhya Pradesh, India**Corresponding Author:**

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Abstract

Background: Defect in any anatomical structure in the neck region can cause neck pain and cervicogenic headache (CGH). Hyoid bone plays a crucial role in posture and movement of neck, but there are small number of studies depicting the effect of hyoid bone mobilization and fascia relaxation on cervical motion in CGH patients in Indian population.

Objectives: Purpose of this study was to examine the effect of hyoid bone mobilization and fascia relaxation on cervical motion in CGH patients from central India.

Methods: In this interventional prospective study, 50 patients having CGH were randomly enrolled using neck lateral motion test. Sociodemographic details of patients were collected. All the patients were given hyoid bone mobilization and fascia relaxation intervention. Cervical range of motion was examined both before and after intervention and the results were statistically compared using students' t test (paired).

Results: There was significant improvement in cervical flexion, extension, right rotation, and left rotation after performing the intervention ($p < 0.05$).

Conclusions: Hyoid bone mobilization and fascia relaxation technique can improve cervical range of motion and asymmetry in cervical motion in CGH patients.

Keywords: Hyoid bone, headache, fascia relaxation, cervical range of motion, cervicogenic

Introduction

Neck pain is a major musculoskeletal disorder in the adults ^[1] with its prevalence ranging from 16.7% to 75.1% worldwide ^[2, 3]. This condition has complex etiopathology and includes a number of factors such as individual factors (age, BMI, genetics, history of musculoskeletal pain), ergonomic factors (inappropriate posture, heavy physical activity, use of force and vibration, repetitive movements), psychosocial factors (stress, anxiety, depression, job satisfaction), and behavioral factors (smoking, level of physical activity) ^[4, 5].

Cervicogenic Headache (CGH) is one of the more common types of headache and may account for 0.4-15% of the headache population and up to 15-20% of all chronic and recurrent headaches ^[6]. CGH is considered a referred pain from a specific structure in the neck up to the head. It commonly starts as an intermittent pain in head but may become a continuous pain. It is usually a steady dull ache or a dull feeling, but sometimes it can be worse in intensity. It can be confused with migraine or tension headaches as both of them can cause neck pain. CGHs are considered to be secondary headaches resulting from an underlying condition, such as neck injuries, neck infections, or very high blood pressure. CGH symptoms are usually unilateral i.e. they occur on one side of the head, neck or facial region ^[7, 8].

Among the various treatments available, manual therapy is the widely used technique in CGH patients. Many studies have reported that myofascial relaxation, a form of manual therapy that applies low-intensity, chronic stretching to myofascial structures, can cause pain reduction and improvement in cervical range of motion ^[9, 10, 11].

Defect in any anatomical structure in the neck region can cause neck pain and CGH. As such, hyoid bone plays a crucial role in posture and movement of neck ^[7, 8], but there are small number of studies depicting the effect of hyoid bone mobilization and fascia relaxation on cervical motion in CGH patients in Indian population.

Aim and Objectives: Purpose of this study was to examine the effect of hyoid bone mobilization and fascia relaxation on cervical range of motion in CGH patients from central India.

Material & Methods

In this interventional prospective study, 50 patients having CGH were randomly enrolled using neck

lateral motion test from patients attending the outpatient department of Physiotherapy, Index Medical College Hospital, Indore, MP, India. Patients with CGH who were 15 to 75 years of age, who had neck pain on cervical spine rotation and who had deviation on the lateral motion test were included in the study. Subjects with severe medical conditions, cervical myelopathy, traumatic neck injury or pain, bladder incontinence (e.g., neuromuscular sensory changes, muscle weakness, or reflexes), history of pregnancy or postpartum, intervertebral disc-related problems, or cervical spine surgery were excluded. 5 patients were excluded from study as they had cervical intervertebral disc problems.

Before the measurements, patients were given detailed explanation and informed consent was obtained. The baseline measurement, flexion, extension, right rotation and left rotation movement range of cervical spine were recorded. The left and right deviations of the hyoid bone were also recorded by measuring the center point. After baseline measurement, the intervention was performed with hyoid bone mobilization and fascia relaxation.

For Hyoid bone mobilization, the patient was laid in an anatomical position, while the therapist sat on the side and fixed the head with one hand. The therapist then palpated the thyroid scar with the other hand and palpated the hyoid bone, which is located 1 cm above. Now the therapist palpated the greater cornua on both sides of the hyoid bone with the thumb and index finger. When grabbing hyoid bone, care was taken not to disturb the breathing and compress the carotid arteries. Mobilize left and right at a speed that allows you to move from the left end to right end in one second, with a range and intensity of some resistance. This was repeated 4 times for 30 seconds to relax the muscles around the hyoid bone.

For myofascial relaxation, the patient was laid in an anatomical position, and therapist sat on the side and held the head in one hand. The therapist then palpated the thyroid cartilage notch with the other hand, and palpated the hyoid bone 1 cm above. The patient was moved outward along the hyoid body with his thumb and index finger to palpate the greater cornua on both sides of the hyoid bone. This was repeatedly gently for 30 seconds to two minutes to change the length of the fascia.

After the intervention, same therapist measured the flexion, height, right turn, left turn range and center point to record the left and right deviations of the hyoid bone. To determine the asymmetry of the left and right rotations, the difference before and after the intervention was summed to obtain the mean and standard deviation.

Statistical analysis: All data were analysed using SPSS version 22. Statistics were represented with percentages and mean with SD. $p < 0.05$ was taken as statistically significant.

Results

Table 1 describes the socio-demographic characteristics of study sample. Majority patients (n=29, 58%) were female and belonged to rural areas (n = 30, 60%). The mean age height, weight and BMI of study subjects were about 33 years, 175 cm, 51 Kg and 17 Kg/m², respectively.

Table 1: Socio-Demographic Data Characteristics (N = 50)

| Variable | |
|--------------------------------------|---------------|
| Age (Years) (Mean ± SD) | 32.96 ± 11.4 |
| Gender | |
| Male, N (%) | 21 (42) |
| Female, N (%) | 29 (58) |
| Residence | |
| Rural, N (%) | 30 (60) |
| Urban, N (%) | 20 (40) |
| Height (cm) (Mean ± SD) | 174.18 ± 3.21 |
| Weight (Kg) (Mean ± SD) | 51.08 ± 9.80 |
| BMI (Kg/m ²) (Mean ± SD) | 17.18 ± 6.21 |

Table 2 describes the cervical range of motion before and after hyoid bone mobilization and fascia relaxation intervention. There was statistically significant improvement in the cervical flexion, extension, right and left rotation after the intervention.

Table 2: Cervical range of motion before and after intervention

| Variable | Pretreatment (Mean ± SD) | Post treatment (Mean ± SD) | P value |
|--------------------|--------------------------|----------------------------|------------|
| Cervical Flexion | 43.94 ± 11.15 | 77.88 ± 10.14 | P < 0.0001 |
| Cervical Extension | 29.1 ± 9.05 | 69.18 ± 11.26 | P < 0.0001 |
| Right Rotation | 34.96 ± 7.65 | 76.58 ± 9.28 | P < 0.0001 |
| Left Rotation | 25.76 ± 5.97 | 72.44 ± 10.41 | P < 0.0001 |

Discussion

Hyoid bone plays a crucial role in posture and movement of neck [7, 8]. As there are small number of

studies describing the effect of hyoid bone mobilization and fascia relaxation on cervical range of motion in CGH patients from central Indian population, this study was planned to investigate the impact of hyoid bone mobilization and fascia relaxation on cervical range of motion in CGH patients.

We found that there was significant improvement in cervical flexion, extension, right rotation and left rotation after performing the hyoid bone mobilization and fascia relaxation in CGH patients ($p < 0.05$).

Some previous studies have suggested that hyoid mobilization has an effect on pain relief. In previous studies, pain severity was reduced after hyoid mobilization^[9], in a study on patients with acute neck pain, both the average pain value and most severe pain value were decreased after Hyoid mobilization.^[10] Also, there was a significant change in pain and movement disorders when myofascial relaxation was applied to patients with chronic lumbar disc herniation. However, this was different from the present study^[11].

The myofascial relaxation (MFR) technique is an effective passive therapy that releases the damaged areas in sliding fascial mobility and reduces pain in patients with nonspecific neck or low back pain^[12]. MFR applied to the neck and upper limbs was found to be effective in reducing the pain intensity^[2]. Also, in a systematic review and meta-analysis, MFR decreased pain levels and improved joint motion range^[13]. Therefore, hyoid bone mobilization and fascia relaxation can be a useful tool in reducing pain and improving movement disorders in CGH patients.

Although neck movement and the role of the hyoid bone and muscles are interrelated, there has been limited number of studies on hyoid lateral deviations after hyoid bone fascia mobilization and fascia relaxation intervention. A previous study reported that physiotherapy techniques can change the anatomical relationship in the head and neck^[14]. Although, a previous study on young adults showed no effect on the relationship between head posture and various hyoid bone positions; in a recent study, suggested that the hyoid bone position changed significantly after treatment for myofascial pain^[15]. Further studies are needed to determine the effect of hyoid fascia relaxation and mobilization on the hyoid bone deviation.

Limitations of study: Our study assessed the effect of Hyoid bone mobilization and fascia relaxation on cervical range of motion CGH patients. The small sample size derived from one out patient department may not lead to dependable results and conclusions. Most similar studies were done on patients with neck pain, but our study population specifically included CGH patients. This difference may affect the findings. Another limitation was the absence of a comparison group. Such a group if studied could lead to different results and interpretations.

Conclusion

Hyoid bone mobilization and fascia relaxation technique can improve cervical range of motion and asymmetry in cervical motion in cervicogenic headache patients.

Conflicts of interest: None.

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