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EFFECT OF POSITIONAL RELEASE TECHNIQUE VERSUS ISCHEMIC COMPRESSION ON PRESSURE PAIN THRESHOLD, RANGE OF MOTION, AND HEADACHE DISABILITY IN CERVICOGENIC HEADACHE PATIENTS AMONG COLLEGE GOING, STUDENTS. A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: The International Headache Society (IHS), 2013 defined Cervicogenic Headache (CGH) as a secondary headache, which implies that headache is caused by a disorder of the cervical spine and its components bony, disc and soft tissue elements. CGH can be a perplexing pain disorder that is refractory to treatment if it is perceived. Patients with CGH exhibited decreases in the quality of life comparable to migraine-patients and patients with tension-type headache, with even lower scores for physical functioning. The objective of the study is to see the effectiveness of PRT versus ischemic compression on pressure pain threshold, range of motion, and headache disability in CGH patients.

Methods: Total of 60 patients of CGH was taken based on inclusion and exclusion criteria, who were divided into three groups, i.e., PRT GROUP A, Ischemic Compression GROUP B, and CONTROL group GROUP C. Group A received PRT, Group B received Ischemic Compression and Group C received conventional treatment 3 sessions per week for 4 weeks.

Results: Significant reduction in Headache disability followed by improved physical functioning measured by Headache disability index, improvement in Pressure pain threshold and measured by Pressure algometer and Range of motion measured by Universal goniometer in the group who received Positional release technique along with conventional treatment. ($p < 0.05$) Therefore, it is suggested that the Positional release technique reduces Headache disability, Improves Pressure pain threshold and range of motion in college-going students with Cervicogenic headache.

Conclusion: PRT is an effective approach to improve the pressure pain threshold, Headache disability, and Range of motion, thus improving the patient's physical functioning.

Keywords: Cervicogenic headache (CGH), Positional release technique (PRT), Neck pain, Headache, Trigger point, Ischemic compression.

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INTRODUCTION

Headache classification subcommittee of international headache society, 2013 has classified Cervicogenic headache as a secondary headache, which implies a disorder of the cervical spine causes headache and its segment bony, disc and soft tissue elements [1]. The IHS has differentiated that there are 14 different subtypes and subcategories of headaches. These headaches have been named either primary headaches, coming from the vascular or muscular region, or secondary, which can result from another source, for example, inflammation or head and neck injuries [2].

Headaches are emerging from a musculoskeletal disorder of the cervical spine named Cervicogenic headaches (CGH) [3]. "Cervicogenic" headaches, first portrayed by Sjaastad, are described as unilateral frontotemporal headaches with clinical symptomatology like a migraine. Clinical presentation of Cervicogenic headaches are: predominantly unilateral always on the same side; precipitation either by neck movement or pressure on certain tender spots in the neck; the variable presence of ipsilateral shoulder or arm pain; and pain, stiffness and decreased the range of movement of the neck. Onset might be related to a traumatic incident [4].

CGH is usually associated with sub-occipital neck pain. The IHS classification described as being the pain unilateral and bilateral [5]. The characteristic feature of Cervicogenic headache is the "so-called trigger point, which exhibits as a circumscribed hypersensitive skin and muscle spot with a decreased pain threshold" [6]. While Sjaastad and his colleagues have observed that the manifestations of Cervicogenic headache might be encouraged by firm manual pressure on "certain tender spots in the neck," they originally described them as being over the C2 nerve root, over the greater occipital nerve and the transverse procedure of C4-C5 [7].

Cervicogenic headache can be perplexing pain disorder that is refractory to treatment if it is perceived. The condition's pathophysiology and source of pain have been debated, yet the pain is likely alluded from at least one or more muscular, neurogenic, bony, articular, or vascular structures in the neck [8]. Patients with cervicogenic headache showed decreases in the quality of life comparable to migraine patients and patients with tension-type headache, with even lower scores for physical functioning [9]. The reported pervasiveness of CGH varies from 13.8% to 17.8% of the headache population in various epidemiological studies [10]. The predominance of CGH in the all general population is estimated to be somewhere in the range of 0.4% and 2.5%, with a female dominance (2:1) [11]. However, Sjaastads and Bakketeig [12] reported the prevalence of 4.1% with no female preponderance, yet in pain management clinics, the incidence is as high as 20% of chronic patient headache [13].

According to Silberstein, cervicogenic headache is characterized as pain either in the cranial region, neck, upper trapezius, or sternocleidomastoid (SCM) region, which radiates as per their particular pattern [14]. It has been suggested that the suboccipital muscles are a causative factor in both cervicogenic neck pain and headache and also, may become atrophic further complicating the pain syndrome [15,16]. Chronic postural pressure has been proposed to cause hypertonicity of the suboccipital musculature, prompting tension being transmitted to the pain-sensitive Dura resulting in chronic headaches. Patients with CGHs often have the tightness of the SCM, upper trapezius, levator, scalenes, sub-occipitals, pectoralis minor, and major muscles [17].

Physical therapy is commonly used for the management of people with CGH [18]. Previous systemic reviews reported preliminary evidence for the application of upper cervical spine manipulation or mobilization for the management of CGH [19].Chaibi A et al., 2012 in a systemic review of manual therapies proposes that spinal manipulative therapy may be a viable treatment in the management of CGH patients [20]. A study conducted in Australia revealed that upper cervical spine mobilization and manipulation was the most utilized intervention by physical therapists [21]. There are different treatment procedures that healthcare practitioners can use in the treatment of CGH, which incorporates invasive and non-invasive techniques; the invasive treatment technique includes injections, dry needling, and surgery [22] The non-invasive treatment comprises of Ultrasound [23] TENS, Massage, Exercises, manipulation, [24] or mobilization [25] Treatment choices for trigger points incorporate ischemic compression [26] and Positional Release Therapy (PRT) [27].

PRT is a method in which muscles are placed in a position of greatest comfort, and this causes normalization of muscle hypertonicity and fascial tension. Also, it decreases joint hypomobility, increases circulation, followed by a reduction in swelling, decreased pain, and increase muscle strength [27]. Therefore, the purpose behind this study was to assess the effectiveness of Positional release technique versus ischemic compression alongside conventional treatment in the management of CGH in college-going students and to check whether positional release technique and ischemic compression are viable for reducing trigger points in cervical muscles causing Cervicogenic headache.

METHODOLOGY

This study was carried out at Physiotherapy OPD of SGT hospital, Gurugram. The Ethical Research Committee approved this study at Faculty of Physiotherapy SGT University (SGTU/FOP/2018/37), Gurugram. The whole procedure was explained to the subjects, and informed consent was taken from all the subjects included in the study. The therapist informed the subjects that the part to be treated should be exposed during the treatment according to the treatment need, and consent was taken prior. All the subjects selected for the study had undergone an assessment which was done by the physician, and then subjects were reassessed by the Physiotherapist.A baseline measurement was taken on day one of the studies for which Pressure Algometer measured Pressure Pain Threshold, Universal Goniometer measured a range of motion and headache

disability measured by Headache disability index (HDI). All measurements were repeated after the last day of 2nd and 4th week.

Sixty subjects were incorporated into the study who have fulfilled the criteria of Age – 18 to 30 years, Both male and female [28] and they had to be present with the diagnosis of CGH according to the criteria of Sjaastad and Fredriksen [29],1) Unilateral pain starting in the neck and radiating to the frontotemporal region, 2) Pain aggravated by neck movement, 3) Restricted cervical range of motion, 4) Joint tenderness in at least one of the upper cervical spine (C0-C3). Headaches frequency of at least once per week and more than three months.

Trigger point diagnosis by Simons et al [30]: Presence of a palpable taut band in a skeletal muscle, Presence of a hypersensitive spot within the taut band, Palpable or local visible twitch on snapping palpation, Reproduction of referred pain elicited pain by palpation of the sensitive spot, Headache disability index- moderate disability subjects were taken in the study, Pressure pain threshold- minimum 3.2kg/cm2 pressure pain threshold should be present across all cervical segments and tenderness grade 3 subjects were included in the study.

Participants were excluded if they had any malignancy, spinal infection, vestibular dysfunction, vertebral tumor, and fractures if they had a severe head or neck trauma within last 12 months, any neck or intracranial surgery, radiating pain to upper extremities and cervical disc condition and arthritis of the cervical spine. Participants were excluded if they had other primary headaches (i.e., migraine and tension-type headache) bilateral headaches — any contraindication to manual therapy [28].

Subjects were divided into three groups by block random sampling method, i.e., GROUP A (Positional release technique group), GROUP B (Ischemic compression group), and GROUP C (Conventional treatment group). Treatment was given to the subjects for three times a week for four weeks, for 45 minutes of duration [31].

Figure1. Flow chart of selection criteria of the subjects

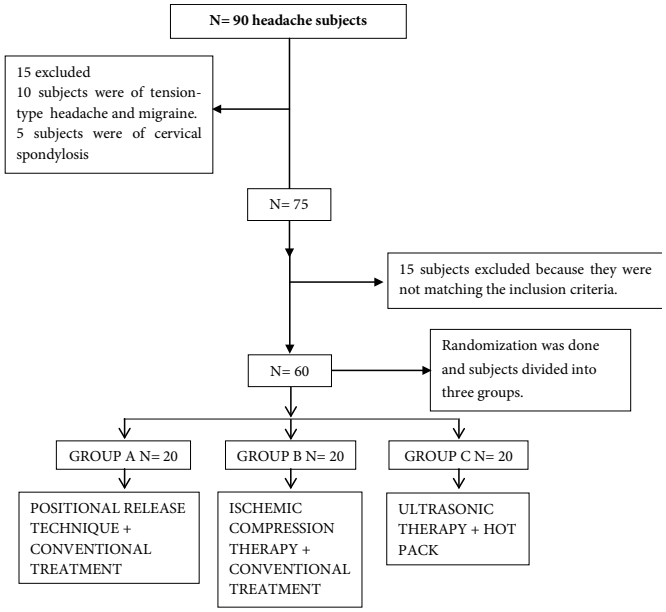
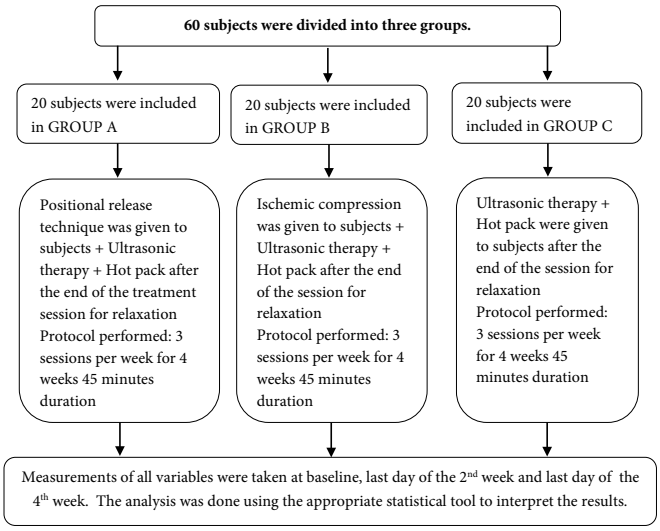


Figure2. Flow chart of treatment protocol given to subjects



PROCEDURE

Group A (positional release technique [27]and conventional treatment)

Subjects in Group A got PRT [22] along with conventional treatment, which includes ultrasonic therapy for 5 minutes for each muscle (SCM, UPPER TRAPEZIUS, and RCPMN). The intensity was depended according to the location of the muscle, either superficial or deep (1Hz for deep muscles & 3Hz for superficial muscles). 3MHz at 1.0 watts/cm2 intensity was for Upper trapezius, 3MHz at 1.0 watts/cm2 intensity was used for Sternocleidomastoid muscle, and 1MHz at 1.0 watts/cm2 intensity was used for Rectus capitis posterior minor muscle then PRT was given at the most hyperirritable spot in the muscle belly. Three muscles were taken for the treatment i.e.

Upper trapezius: Positional release technique (PRT) was given at the point of a tension of the upper trapezius, which was diagnosed by the therapist. The subjects were in a supine position, the therapist kept the upper trapezius muscle in the greatest comfort position, the subjects head was flexed laterally toward the trigger point, and her shoulder was abducted 90 degrees. In that position, the therapist monitored the trigger point with her index finger and maintained pressure from the thumb on that position until release was felt. This was repeated for 3-4 times with 20 second relaxation time with every repetition.

Sternocleidomastoid: PRT was given at the point of the tension of the sternocleidomastoid muscle, which was diagnosed by the therapist. The subjects were in a supine position; the therapist kept the sternocleidomastoid muscle in a position of greatest comfort and therapist palpated to find a tender spot with a pincer grasp. Therapist monitored the tender point with her index finger and maintained pressure on that tender point by turning the neck on the same side until release was felt. This was repeated for 3-4 times with 20 second relaxation time with every repetition.

Rectus capitis posterior minor: PRT was given at the point of a tension of the rectus capitis posterior minor muscle which was diagnosed by the therapist. The subject

was in a supine position; the therapist kept the rectus capitis posterior minor muscle in a position of greatest comfort and therapist palpated to find a tender spot with a pincer grasp. Therapist monitored the tender point with her index finger and maintained pressure on that tender point by extending the neck until release was felt. This was repeated for 3-4 times, with 20 seconds of relaxation time with every repetition. A hot pack was given for 10 minutes to subjects after treatment for relaxation.

Group B (ischemic compression [26] and conventional treatment)

Subjects in Group B got Ischemic compression along with conventional treatment, which includes ultrasonic therapy for 5 minutes for each muscle (SCM, UPPER TRAPEZIUS, and RCPMN). The intensity was depended according to the location of the muscle, either superficial or deep (1Hz for deep muscles & 3Hz for superficial muscles). 3MHz at 1.0 watts/cm2 intensity was for Upper trapezius, 3MHz at 1.0 watts/cm2 intensity was used for Sternocleidomastoid muscle, and 1MHz at 1.0 watts/cm2 intensity was used for Rectus capitis posterior minor muscle then Ischemic compression was given at the most hyperirritable spot in the muscle belly. Threemuscles were taken for the treatment i.e.

Upper trapezius: For upper trapezius muscle subjects was in a supine position on the couch; therapist kept the upper trapezius muscle in lengthening position the therapist was utilized a pincers grasp, placing the thumb and index finger over the active trigger point. The pressure was maintained until a release of the tissue barrier was felt. The pressure will be applied intermittently initially and then continuously for 90 seconds according to subjects tolerability. This was repeated 3-4 times with 20 second relaxation period.

Sternocleidomastoid: For SCM muscle, the therapist has utilized a pincers grasp, placed her thumb and index finger over the active trigger point of the sternocleidomastoid muscle. The pressure was maintained until a release of the tissue barrier was felt. The pressure was applied intermittently initially and then continuously for 90 seconds according to subjects tolerability. This was repeated 3-4 times with 20 second relaxation period.

Rectus capitis posterior minor: For Rectus Capitis Posterior Minor (RCPMN) subjects were in a prone position, and the therapist has utilized a pincers grasp, placed her thumb and index finger over the active trigger point of RCPMN muscle. The pressure was maintained until a release of the tissue barrier was felt. The pressure was applied intermittently initially and then continuously for 90 seconds according to subjects tolerability. This was repeated 3-4 times with 20 second relaxation period. A hot pack was given to subjects for 10 minutes after treatment for relaxation.

`GROUP C (ultrasonic therapy and hot pack)

Subjects in Group C got ultrasonic therapy, which included Ultrasonic therapy for 5 minutes for each muscle (SCM, UPPER TRAPEZIUS, and RCPMN). The intensity was depended according to the location of the muscle, either superficial or deep (1Hz for deep muscles & 3Hz for superficial muscles). 3MHz at 1.0 watts/cm2 intensity was for Upper trapezius, 3MHz at 1.0 watts/cm2 intensity was used for Sternocleidomastoid muscle, and 1MHz at 1.0 watts/cm2 intensity was used for Rectus capitis posterior minor muscle. A hot pack was given for 10 minutes to the subjects after treatment for relaxation.

DATA ANALYSIS

The data were analyzed by using the software package SPSS 24 for window version. Mean, and standard deviation of all the variables were calculated. The level of significance was set at $p<0.05$. Paired T-test was used to compare within the group differences in the analysis of the data collected for Pressure pain threshold, Range of motion, and Headache disability at baseline, 2nd, and 4th week of intervention.

RESULTS

Mean comparison of Age, Weight, Height, and BMI was done. The study was done on 60 subjects who were equally divided into three groups, with 20 subjects in each group. Between-group analysis of these baseline characteristics showed that there was no significant difference in mean age, mean height, mean weight, and mean BMI of the subjects in all three groups($p>0.05$). (Refer figure 1).

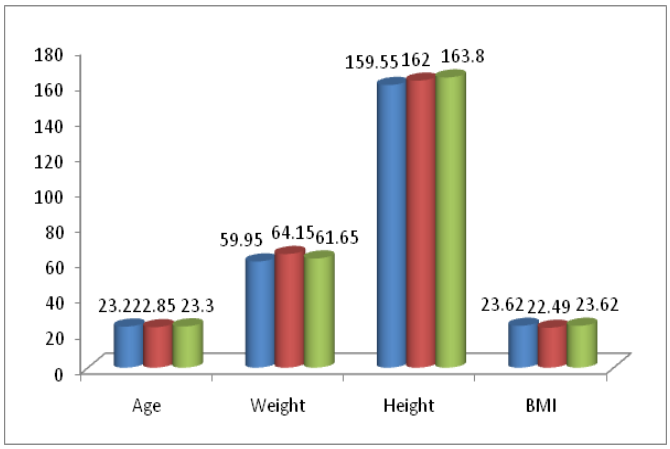


Figure 1: Shows the mean comparison of Age, Weight, Height, and BMI between Group A, Group B, and Group C.

NS: Nonsignificant

The between-group analysis of Pressure pain threshold of all three muscles i.e., Upper trapezius, Sternocleidomastoid muscle and Rectus capitis posterior minor muscle (Right and Left side), Range of motion of all four ranges i.e., Flexion, Extension, Lateral flexion and Rotation(Right and Left side) and Headache disability was done using Independent T-test which shows that there was no significant difference seen in the mean value of Group A, Group B and Group C at baseline but at 2nd week the mean value of all three groups has improved significantly and at 4th week Group A (Positional release technique) has shown highly significant difference by the end of 4th week following intervention.

Table 1: Pre and post-treatment values ofHeadache Disability

HEADACHE DISABILITY	Mean ± SD	p-value
Pre values **Group A** **Group B**	56.80± 13.03 47.10± 9.85	.012
Group B **Group C**	47.10± 9.85 47.30 ±9.78	.95
Group A **Group C**	56.80± 13.03 47.30 ±9.78	.013
Post values **Group A** **Group B**	10.80 ± 4.83 35.20± 8.52	.005
Group B **Group C**	35.20± 8.52 39.20 ± 9.59	.010
Group A **Group C**	10.80 ± 4.83 39.20 ± 9.59	.001

*p-value< .05 or .001 (significant or highly significant respectively)

*p-value> .05 (non-significant)

Note: Data was presented as mean ± SD. Results of the analysis were done by independent T-test, which shows that group A showed the Highly significant difference, which is an experimental group where participants received Positional release technique along with conventional treatment. P-value (P<0.01) was seen at the 4th week, which showed that there was a highly significant difference in Headache disability at the end of 4th week.

Table 2: Pre and Post-treatment values of Pressure pain threshold in Upper trapezius, Sternocleidomastoid, and Rectus capitis posterior minor muscle (Right and left side).

UPPER TRAPEZIUS RIGHT	Mean ± SD	p-value	UPPER TRAPEZIUS LEFT	Mean ± SD	p-value
Pre values **Group A** **Group B**	3.58± 8.01 3.21± 8.01	.131	**Pre values** **Group A** **Group B**	3.47± .45 3.33± .48	.022
Group B **Group C**	3.21± 8.01 3.21± .62	.017	**Group B** **Group C**	3.33± .48 2.8± .64	.064
Group A **Group C**	3.58± 8.01 3.21± .62	.312	**Group A** **Group C**	3.47± .45 2.8± .64	.954
Post values **Group A** **Group B**	4.27± 6.04 3.21±8.01	.002	**Post values** **Group A** **Group B**	3.87± .46 3.53 ± .67	.003
Group B **Group C**	3.21±8.01 3.82± .73	.018	**Group B** **Group C**	3.53 ± .67 3.52 ± .84	.020
Group A **Group C**	4.27± 6.04 3.82± .73	.001	**Group A** **Group C**	3.87± .46 3.52 ± .84	.001
STERNO-CLEIDO-MASTOID MUSCLE RIGHT	**Mean ± SD**	**p-value**	**STERNO-CLEIDO-MASTOID MUSCLE LEFT**	**Mean ± SD**	**p-value**
Pre values **Group A** **Group B**	3.89± .56 4.08± .50	.274	**Pre values** **Group A** **Group B**	3.61± .49 3.83± .46	.154
Group B **Group C**	4.08± .50 3.63 ±.60	.015	**Group B** **Group C**	3.83± .46 3.46 ±.60	.035
Group A **Group C**	3.89± .56 3.63 ±.60	.163	**Group A** **Group C**	3.61± .49 3.46 ±.60	.390
Post values **Group A** **Group B**	3.07± .58 3.66± .49	.005	**Post values** **Group A** **Group B**	2.81± .49 3.43± .46	.001
Group B **Group C**	3.66± .49 3.43± .60	.012	**Group B** **Group C**	3.43± .46 3.25± .58	.020
Group A **Group C**	3.07± .58 3.43± .60	.002	**Group A** **Group C**	2.81± .49 3.25± .58	.000
RCPMN MUSCLES RIGHT	**Mean ± SD**	**p-value**	**RCPMN MUSCLES LEFT**	**Mean ± SD**	**p-value**
Pre values **Group A** **Group B**	3.93± .49 4.14± .55	.207	**Baseline–** **Group A** **Group B**	3.68± .52 3.83± .57	.376
Group B **Group C**	4.14± .55 3.73±.72	.049	**Group B** **Group C**	3.83± .57 3.52±.67	.120
Group A **Group C**	3.93± .49 3.73±.72	.307	**Group A** **Group C**	3.68± .52 3.52±.67	.405
Post values **Group A** **Group B**	3.11± .50 3.69± .54	.004	**4thWeek–** **Group A** **Group B**	2.88± .53 3.43± .57	.005
Group B **Group C**	3.69± .54 3.52±.72	.030	**Group B** **Group C**	3.43± .57 3.32±.67	.085
Group A **Group C**	3.11± .50 3.52± .72	.001	**Group A** **Group C**	2.88± .53 3.32± .67	.001

*p-value< .05 or .001 (significant or highly significant respectively)

*p-value> .05 (non-significant)

Note: Data was presented as mean ± SD. Results of the analysis were done by independent T-test, which shows that group A showed the Highly significant difference, which is an experimental group where participants received Positional release technique along with conventional treatment. P-value for upper trapezius muscle right and left side was (P<0.001) and (p<0.001), for sternocleidomastoid muscle right and left side it was (p<0.002) and (p<0.000) and for rectus capitis posterior minor muscle right and left side it was (p<0.001) and (p<0.001) was seen at 4th week which showed that there was a highly significant difference in pressure pain threshold readings at the end of 4th week.

Table 3: Pre and Post-treatment values Cervical Flexion and Extension Range of motion.

FLEXION	Mean ± SD	p-value	EXTENSION	Mean ± SD	p-value
Pre values **Group A** **Group B**	43.00± 8.01 44.75± 4.44	.398	**Pre values** **Group A** **Group B**	47.75± 7.86 42.75± 4.44	.39
Group B **Group C**	44.75± 4.44 48.00±5.23	.041	**Group B** **Group C**	47.75± 7.86 41.25±4.83	.041
Group A **Group C**	43.00± 8.01 48.00±5.23	.025	**Group A** **Group C**	47.75± 7.86 41.25±4.83	.003
Post values **Group A** **Group B**	53.75 ±6.04 50.00± 4.29	.006	**Post values** **Group A** **Group B**	57.75 ±7.86 47.75± 4.99	.005
Group B **Group C**	50.00± 4.29 51.70 ± 4.77	.025	**Group B** **Group C**	47.75± 4.99 45.10 ± 4.94	.030
Group A **Group C**	53.75 ±6.04 51.70 ± 4.77	.003	**Group A** **Group C**	57.75 ±7.86 45.10 ± 4.94	.002

*p-value< .05 or .001 (significant or highly significant respectively)

*p-value> .05 (non-significant)

Table 4: Pre and post-treatment values of Lateral flexion and Rotation (Right and Left side) Range of motion.

LATERAL FLEXION RIGHT	Mean ± SD	p-value	LATERAL FLEXION LEFT	Mean ± SD	p-value
Prevalues Group A Group B	 35.50± 6.86 32.25± 3.90	.072	Pre values Group A Group B	 37.75± 6.38 37.50± 5.50	.895
Group B Group C	32.25± 3.90 35.00±4.29	.038	Group B Group C	37.50± 5.30 39.00±5.76	.405
Group A Group C	35.50± 6.86 35.00±4.29	.784	Group A Group C	37.75± 6.38 39.00±5.76	.519
Post values Group A Group B	 42.25 ±4.44 37.25± 3.80	.005	Post values Group A Group B	 43.50 ±2.86 41.25± 3.93	.004
Group B Group C	37.25± 3.80 38.35 ± 4.74	.423	Group B Group C	41.25± 3.93 43.00 ± 5.76	.035
Group A Group C	42.25 ±4.44 38.35 ± 4.74	.003	Group A Group C	43.50 ±2.86 43.00 ± 5.76	.002
ROTATION RIGHT	Mean ± SD	p-value	ROTATION LEFT	Mean ± SD	p-value
Pre values Group A Group B	 71.00± 9.68 70.00± 9.46	.743	Pre values Group A Group B	 76.00±10.59 77.25± 9.10	.691
Group B Group C	70.00± 9.46 70.50±9.30	.867	Group B Group C	77.25± 9.10 78.25±10.04	.743
Group A Group C	71.00± 9.68 70.50±9.30	.657	Group A Group C	76.00±10.59 78.25±10.04	.495
Post values Group A Group B	 86.75 ±7.30 74.75± 8.96	.005	Post values Group A Group B	 88.25 ±6.74 81.25± 7.76	.004
Group B Group C	74.75± 8.96 74.50 ± 9.30	.050	Group B Group C	81.25± 7.76 81.25 ± 8.90	0.30
Group A Group C	86.75 ±7.30 74.50 ± 9.30	.002	Group A Group C	88.25 ±6.74 81.25 ± 8.90	.001

*p-value< .05 or .001 (significant or highly significant respectively)

*p-value> .05 (non-significant

Note: Data was presented as mean ± SD. Results of the analysis were done by independent T-test, which shows that group A showed the Highly significant difference, which is an experimental groupwhere participants received Positional release technique along with conventional treatment. P-value for flexion range of motion was (P<0.003) and for extension it was (p<0.002), for lateral flexion right and left side it was (p<0.003) and (p<0.002) and for rotation right and left side it was (p<0.002) and (p<0.001) was seen at 4th week which showed that there was a highly significant difference in cervical range of motions at the end of 4th week.

DISCUSSION

This trial provided evidence that Positional release technique versus ischemic compression therapy, when compared with conventional treatment regime, was effective for cervicogenic headache patients, even though there was no statistical evidence of an additive effect when the two treatments were utilized at the same time. Beneficial effects were found in headache frequency and intensity as well as in pressure pain threshold, cervical range of motion, and headache disability for both restorative techniques utilized alone and in combination with conventional treatment. The subject in this study had similar baseline values for all dependent variable, suggesting that all groups had a homogeneous distribution of subjects.

One of the inclusion criteria of this study was that all participants had to be between 18 and 30 years of age. The age range was restricted to eliminate chances of degenerative changes [33]. Active myofascial trigger points are also most commonly found in people younger than 50 years of age, as these are the most active years [34]. Thus the mean age of all three groups fell within the seage limits. All the subjects met the inclusion criteria for the study falling between the age of 18 and 30 years, with the mean age of the 60 participants being 23. 20 years. No statistically significant difference was found with regards to age; thus, all three groups are comparable in terms of age.

In this study within-group analysis of group A, Headache disability index showed significant improvement in headache disability which was 80.99%, in group B it was 25.26%, and in group C it was 17.12% by the end of 4th week. (Refer table 1) Therefore, group A shows a highly significant difference by reducing headache disability and improving physical functioning in college-going students with Cervicogenic headache by 80.99%. The evidence for proving our result is that a recent pilot study by Premlata et al., 2019, have also shown a reduction in pain and headache disability in cervicogenic headache patients and have significant improvement in headache disability by 80.29% [35]. A. Kumaresan et al., 2012., proposed in their study that PRT, with the treatment time, selected produced significant pain relief. Pain relief could have occurred due to the decrease in the intrafusal and extrafusal fiber disparity and reset of the inappropriate proprioceptive activity [36]. The treatment of PRT relaxes the muscle spindle mechanism of the counterstained tissue, decreasing abberent gamma and alpha neuronal activity, thereby breaking the sustained contraction followed by a reduction in pain and improvement in patient's physical functioning [37].

The result of this study revealed that within-group analysis for Pressure pain threshold of both sides (Right and Left side) in all three muscles (upper trapezius, sternocleidomastoid and rectus capitis posterior minor muscle) which was measured by Pressure algometer showed 19.95% and 20.46% improvement in Upper trapezius, 21.08% and 22.16% in Sternocleidomastoid muscle and 20.67% and 21.74% in Rectus capitis posterior minor muscle. In group B it was 9.60% and 10.34 for Upper trapezius, 10.29% and 16.45 for Sternocleidomastoid muscle and 0.3% and 10.45% in Rectus capitis posterior minor muscle. In group C it was 7.97% and 8.75% for Upper trapezius muscle, 5.6% and 6.04 for Sternocleidomastoid muscle and 5.38% and 5.69 for Rectus capitis posterior minor muscle by the end of 4th week. (Refer table 2)Bode's Pardo et al.,2013 [28], in their study manual treatment for cerviogenic headache and active trigger point therapy in the sternocleidomastoid muscle showed that patients who received trigger point intervention experienced more significant improvement in pressure pain threshold levels than those received simulated trigger point therapy. In PRT, the muscles are placed in

the greatest comfort position. The resultant relaxation of tissue leads to an improvement in vascular circulation and removal of the chemical mediators of inflammation. Thus, PRT may eliminate peripheral & central sensitization.This technique may also reduce the central sensitization directly by the damping influence on the facilitated segment in the spinal cord [38].

In this study within-group analysis of group A, there was significant improvement in cervical range of motion (refer table 3 and 4) that is flexion, extension, lateral flexion and rotation which was measured by Goniometer showed 24.88% improvement in cervical flexion, 20.96% in cervical extension, 18.87% and 15.38% on the right and left side lateral flexion and 22.11% and 16.05% on the right and left side rotation. In group B it was 23.04% cervical flexion, 11.70% cervical extension, lateral flexion right and left side 15.52% and 9.86% and for the rotation, the right and left side was 6.71% and 2.65%. In group C significant improvement was occurred for Flexion showed 5.72% and extension 9.46%, for lateral flexion right and left side it was 8.57% and 10.25%, for Rotation right and left side it was 10.67%, and the end saw 3.85% improvement of 4th week. Thus, group A showed Highly significant improvement by gaining a range of motion by the end of the 4thweek. Bode's Pardo et al., 2013 [28], in their study manual treatment for cerviogenic headache and active trigger point therapy in the sternocleidomastoid muscle experienced a more significant increase in the active cervical range of motion in subjects who received trigger point therapy than those received simulated trigger point therapy. D'Ambrogio et al.,1997, demonstrated that PRT is a technique in which muscles are placed in a position of greatest comfort, and this causes normalization of muscle hypertonicity & fascial tension, a reduction of joint hypomobility which in turn improved Range of motion, increased circulation & reduced swelling, decreased pain and enhanced muscular strength [27].

Wong et al., 2004, [39]in their randomized controlled study evaluated the reliability and validity of a tender point palpation scale (TPPS) and the effect of Strain Counter Strain (SCS) on painful tender points. The experimental design employed a convenience sample of 49 volunteers with bilateral hip tender points, randomly assigned to three groups, each receiving SCS, exercise (EX), or SCS and EX. Pain. By the end of the study, all groups demonstrated significant pain decreases in both muscle groups showed with the Visual analog scale (VAS) and (TPPS). However, the SCS groups tended toward more significant pain reductions than the exercise group for hip abductors and adductors.

Lewis et al., 2001 [40]in their pilot study showed that four cases of low back pain were treated with SCS as the sole treatment. Outcome measures were derived from the McGill Pain Questionnaire and the Oswestry Low Back Pain Disability Questionnaire. All patients registered reductions in pain and disability following SCS intervention. No experimental evidence for the effectiveness of SCS was offered; however, outcomes suggested that a controlled study was warranted to examine the efficacy of SCS for the treatment of low back pain.

There are so many evidence to support this study where the reduction of headache symptoms after the management of trigger points by different procedures was seen but the effectiveness of PRT in the improvement of patients with cervicogenic headache remains unclear [39]. This study focuses on a patient with Cervicogenic headache and trigger points in their cervical muscles (Upper trapezius, Sternocleidomastoid, and Rectus capitis posterior minor muscles) where Positional Release Technique treated them.

The main goal of Positional release technique is to reduce pain by reducing swelling, decreasing headache disability followed by improving physical functioning. We discovered that patients with CGH received Positional release therapy versus ischemic compression along with conventional treatment experienced a decrease in pressure pain sensitivity and improvement in pressure pain threshold, gain in cervical range of motion is experienced and enhancement in physical functioning by decreasing the headache disability. PRT can be an ideal treatment for treating CGH patients. The study was limited to small sample size. It can be done on large sample size.The samples were limited to an age group between 18-30 years. It can be generalized to other age groups. So, the elderly population can also be taken into consideration for the study with other variables.

CONCLUSION

This study showed that all the variables had improved significantly in the Positional release technique group so it was concluded that positional release technique could be an effective application to improve Pressure pain threshold, gaining Range of motion and reducing Headache disability by improving patients physical functioning.

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