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A STUDY TO COMPARE EFFECTIVENESS OF PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION TECHNIQUE Vs SUBOCCIPITAL RELAXATION EXERCISE ON PAIN AND NECK DISABILITY AMONG PATIENTS WITH CERVICOGENIC HEADCHE OF AGE GROUP 20-45 YEARS

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ABSTRACT

Background: Cervicogenic headache is chronic headache in people who are 20 to 45 years. as it mainly affects the upper cervical joints and atlantooccipital joints leading to unilateral dominant headache, neck pain, weakness of cervical flexors, tenderness of upper cervical region, tightness of cervical extensors with the neck pain and neck disability. The cervical flexion-rotation test (CFRT) is highly reliable for diagnosing cervicogenic headache. PNF techniques help improve posture, strengthen cervical flexors, and reduce pain. Suboccipital relaxation targets muscle fatigue and decreases headache severity. This study compares the effects of PNF and suboccipital relaxation on pain and neck disability in CGH patients.

Objective: The objective of the study is to investigate the effect of Proprioceptive neuromuscular facilitation technique versus suboccipital relaxation exercise on pain and neck disability among patients with cervicogenic headache.

Methods: Participants with a positive cervical flexion-rotation test were randomly assigned into two groups using the sealed envelope method. Group A received PNF and Group B received suboccipital relaxation exercises for 60 minutes/day, 4 days/week for 4 weeks. Outcomes were measured using the Neck Disability Index (NDI) and Numeric Pain Rating Scale (NPRS).

Results: The baseline characteristics age, gender, Neck disability index, NPRS, scores were calculated for both the groups. The NPRS for group A (19.04 ± 2.38) and Group B (18.35 ± 0.630) and NDI score was Group A (11.31 ± 5.42) and Group B (13.46 ± 4.57) respectively. Between the groups there is statistically significant difference ($p<0.05$) in post test score of NPRS.

Conclusion: Both PNF and suboccipital relaxation exercises reduced pain and neck disability in cervicogenic headache. However, the PNF group showed greater post-intervention improvement. It significantly enhanced NPRS, NDI scores, and cervical muscle function.

Keywords: PNF, Cervicogenic headache, Suboccipital relaxation exercises, NDI in cervicogenic headache, NPRS cervicogenic head.

INTRODUCTION

Cervicogenic headache is a chronic, hemi cranial pain syndrome in which the sensation of pain originates in the cervical spine or soft tissues of the neck and is referred to the head. Chronic daily as well as refractory intermittent head or face pain can be a perplexing medical disorder, especially in those cases in which it is not recognised that the pain actually originates in the cervical spine or soft tissues of the neck. Head pain referred from the neck region has been confirmed as cervicogenic Headache.1

Primary headaches and secondary headaches are the two main categories for the international classification of headache disorders issued by HIS. Primary headaches are those with an identifiable etiology, such as vascular or muscle abnormalities. Migraine headaches, tension headaches, and other types of primary headaches are among them. Headaches that are secondary in origin refer to those that have another cause, such as a head or neck injury, a degenerative condition, inflammation, etc. Cervicogenic headaches are regarded as "secondary headaches" in accordance with this classification.2 The prevalence of CGH In the general population has been reported to be 2.2%–4.1% and appears to predominate in women four times more than in men.3 Among general population (4%), the frequency of CGH in the survey of health professional students is 17.76%.8The primary clinical signs are a mild, dull headache with occipital pressure and tightening feelings. Neck pain, restricted cervical range of motion, a high Neck Disability Index score, and a diagnosis of cervical spondylotic myeloradiculopathy were all potential risk factors.4

Suboccipital relaxation on cervicogenic headache patients was found to be effective in decrease of muscular fatigue of upper trapezius and Sternocleidomastoids, muscular tone of sternocleidomastoids, and headache intensity. Also, this technique helps to decrease the tightness and pain restricted fascia in cervicogenic headache.5

PNF technique helps to Improve cervical muscle strength and endurance in cervical defects .20 also proved that PNF is more effective in reducing the pain and disability cervical osteoarthritis.6

PNF is also more effective in reducing the pain intensity among mechanical neck pain and neck disability.7 Incorporation PNF techniques on Cervical radiculopathy enhanced function, range of motion, and pain intensity.8

No, the most studies were to identified the effect of PNF technique in Cervicogenic headache. These techniques are rarely applied compared to other physiotherapy techniques and the number of studies done in the literature is very limited. The effects of these two approaches in the treatment of pain severity, disability, to improve the quality of life are not known in the patients with CGH.

METHODOLOGY

Study Design: Randomized control trial,

Participants: We consecutively recruited patients with cervicogenic headache from Narayana health city Bengaluru. The study was registered and approved by the Narayana health academic ethical committee and given registration number (ECR/772/Inst/KA/2016/RR-22).

Inclusion criteria: patients with CGH of age group between 18-45years, subjects with frequence of headache for at least twice a week and subjects with 41- 60% Scoring of NDI scale.

Exclusion criteria: We excluded the subjects with features of migraine headache, degenerative cervical pathologies & Previous cervical surgery.

Intervention/Procedure: The participants are who are willing to take part in study for 4 weeks were recruited for the study. The sample size was fifty-two (52). The study included two Group A PNF and Group B suboccipital relaxation groups, both genders were included between age group of 20-45 years.

Interventions: This is an experimental study of pre-test- post-test design. Prior to the commencement of the procedure, informed written consent was taken from the participants. Those willing to take intervention daily for four weeks were recruited for the study. Group A received PNF and Group B received suboccipital relaxation exercise. Total time of treatment will be 60min for both groups.

Procedure for Cervical flexion rotation test: Subject should be in supine lying, therapist should stand behind the patient, and fully flexes the cervical

spine with the occiput resting against the examiner abdomen. The patient head is then rotated to the left and the right. If firm a firm resistance encountered, pain provoked, then the test is considered positive.

Techniques of PNF Group A (26 subjects) Group A Proprioceptive neuromuscular facilitation technique includes the PNF stretching of tighten group of muscles and for weaker muscles slow reversal techniques.

Stretching trapezius: Patient should be in high sitting position. Therapist should stand behind patient and bend the neck laterally to opposite side stretching the muscle hold for 20sec & followed by isometric contraction for 6-10sec relaxing the stretch. again, stretching while exhaling.

Stretching cervical flexors: Patient should be in high sitting position. Therapist should stand behind the patient flexing the neck anteriorly & stretching the muscle hold for 20sec & followed by isometric contraction for 6-10sec relaxing the stretch. again, stretching while exhaling.

Slow reversal technique for lateral flexors: Patient should be in high sitting position. Therapist should stand behind the patient and applying resistance isotonically to contract the agonist muscle first, followed by applying isotonic contraction of the antagonist muscle.

Slow reversal technique for cervical flexors: Patient should be in high sitting position. Therapist should stand behind the patient and applying resistance isotonically to contract the cervical flexors muscle first, followed by applying isotonic contraction of the cervical extensors muscle. PNF will be given as 5 repetitions/set, 3sets/session, 4session /week for 4weeks duration.

Techniques of suboccipital relaxation Group B (26 subjects)

For application of suboccipitalis relaxation, therapist positioned him/herself over head of the subjects, placed fingertip just suboccipital region of subjects supported occiput of the subjects with his/her palm. Suboccipital region was protracted with fingertip so that it would make an axis. Then the head was lightly supported with palm so that the neck wouldn't be fully extended for 5 min, with resting period of 1min in each repetition, releasing the suboccipitalis. Subject will be applied for 4 repetitions in each session totally given for 20min, 4session /week for 4weeks of duration.

Outcome Measures: Measure of outcome was taken before and after application, all patient were evaluated using the NPRS for pain and Neck disability index (NDI) for neck disability.

Statistical Analysis: The study was conducted on 52 subjects with cervicogenic headache to compare the effect of PNF versus suboccipital relaxation exercise on pain and neck disability.

The statistical analysis was performed using SPSS version 27 and R- programming version 4.3.1.

Descriptive statistics: All the categorical variables were expressed using frequency and percentages. All the continuous variables are expressed using mean and standard deviation.

Inferential statistics: Shapiro wilk test was used to check the normality of the data. A p-value of > 0.05 was considered statistically significant. Based on the normality of the data. An independent T test was used to compare the mean between the two groups based on the normality of the data. A p- value of <0.005 was considered as statistically significant.

RESULTS

In this study 52 subjects were included; the statistics was done by using unpaired t test and independent t test to see the effectiveness of both the intervention PNF and suboccipital relaxation exercise among cervicogenic headache. The paired 't' test analysis for pre-test and post-test variables for the NPRS for measuring pain in patient with cervicogenic headache, which was shown in table 3. both the group shows significant differences in the pre-test and post-test values. The mean value for group A is 7.15 ± 1.12, the value for the group B is 6.65 ± 1.23 and difference between the pretest and post-test of group A and group B are 2.69 ± 0.79 and 3.81 ± 1.20 respectively. The result showed that there was no significant difference when compared between pre-test and post-test difference in on NPRS with' p' value<0.01(statistically significant), at the duration of 4weeks

The paired 't' test analysis for pre-test and post-test variables for the NDI for measuring disability in patient with cervicogenic headache, which was shown in table 2 and graph 1&2. Both the group

shows significant differences in the pre-test and post-test values. The pre-test value for group A is 23.38 ± 4.98, for the group B is 21.58 ± 4.47 and post-test value of group A and group B are 11.31 ± 5.42 and 13.46 ± 4.57 respectively.

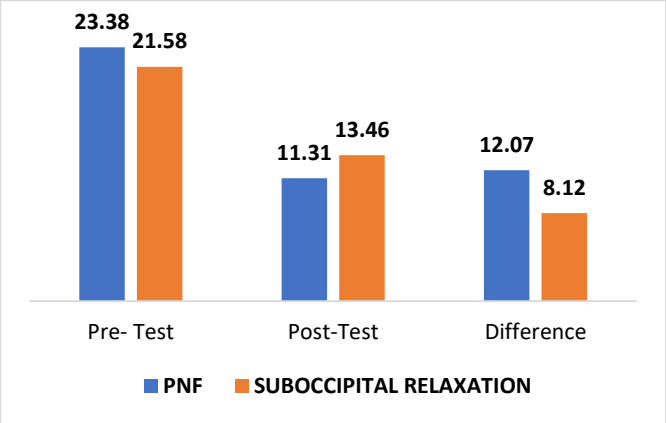
Table 1: shows baseline characteristics of the study

PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION			**SUBOCCIPITAL RELAXATION**		
S. No	**Parameter**	**N (%)**	**S. No**	**Parameter**	**N (%)**
1	Gender		1	Gender	
	Female	15 (57.7)		Female	20 (76.9)
	Male	11 (42.3)		Male	6 (23.1)
2	Affected Side		2	Affected Side	
	Left	12 (46.2)		Left	11 (42.3)
	Right	14 (53.8)		Right	15 (57.7)

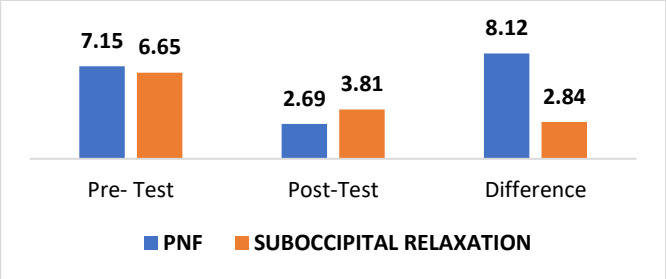
Table 2: comparison between the groups

S. No	**Parameter**	**Pre-Test**	**Post-Test**	**t**	**P-Value**
		Mean ± Standard Deviation			
	PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION				
	Neck Disability Index				
1	Pre- Test vs Post-Test	23.38 ± 4.98	11.31 ± 5.42	11.012	<0.001*
	NPRS				
2	Pre- Test vs Post-Test	7.15 ± 1.12	2.69 ± 0.79	19.964	<0.001*
	SUBOCCIPITAL RELAXATION				
	Neck Disability Index				
3	Pre- Test vs Post-Test	21.58 ± 4.47	13.46 ± 4.57	26.567	<0.001*
	NPRS				
4	Pre- Test vs Post-Test	6.65 ± 1.23	3.81 ± 1.20	31.271	<0.001*

Graph-1 Comparing pre-test and post-test scores of neck disability index



Graph 1: Bar graph shows the comparison of pre and post -test Neck disability index scores in group A (Proprioceptive neuromuscular facilitatory techniques) and group B (suboccipital relaxation exercise) with pre and post scoring difference of 12.07 for group A and 8.12 for group B among cervicogenic headache.



Graph-2 Comparing pre-test and post-test score of NPRS

Graph 2: Bar graph shows the comparison of pre and post-test NPRS in group A (Proprioceptive neuromuscular facilitatory techniques) with pre and post scoring difference of 8.12 for group A and 2.84 for group B among cervicogenic headache

DISCUSSION

Damage of soft tissue and increase of tension in neck limits stationary contraction of deep cervical muscle, posing difficulty in sustaining upright neck posture with this process, cervical pain and Cervicogenic headache occurs and as pain occurs or aggravates from the motion of returning to normal posture, most of cervicogenic headache patients take forward neck posture.5

The C1-C3 nerves relay pain signals to the nociceptive nucleus of the head and neck, the trigeminocervical nucleus. This connection is thought to be the cause for referred pain to the occiput and/or eyes. 9

Andres Jung et al in their study showed that prevalence is estimated to be approximately 0.17% to 4.1% in the general population. The International Headache Society and the Cervicogenic Headache International Study Group describe the CGH as "usually accompanied by neck pain." Features that distinguish CGH from migraine and tension-type headache are unilateral pain with a posterior-to-anterior radiation and worsening by provocative manoeuvres and sustained head/neck positions. 10

Bjorn Becher et al reported that physiotherapeutic exercise is more effective in reducing the frequency, duration and severity of the pain. It also helps to improve the level neck disability with the decreased NPRS and NDI score. They concluded that therapeutic exercises are helpful and clinically meaningful type of treatment for Cervicogenic headache. 11

Ana Yousuf et al experimented on 30 cases with cervicogenic headache, they reported that PNF are effective in treating cervicogenic headache, significantly reducing pain intensity and improving cervical ROM and functional disability. PNF exhibited a superior efficacy in enhancing cervical rotation and reducing NDI scores, with the additional benefits in the management of cervicogenic headache. 12

Tomasz Maicki et al showed improvement on 80 patients with cervical osteoarthritis to reduce the pain & level of disability, randomly divided into PNF and manual therapy group. The PNF group showed a greater improvement in performing daily activities such as sleeping, personal care, travelling, work, recreation, lifting, walking and standing as well as decreased intensity and frequency of pain compared to the manual therapy group. PNF achieved greater improvement in reducing the pain and disability level. 13

Dae Jung Yang et al in their study proved that suboccipital relaxation exercise is more effective in reducing the pain among cervicogenic headache. They included 30 subjects, the intervention given for 5 times a week for 4 weeks. They concluded that suboccipitalis relaxation on cervicogenic headache patients was found to be effective in decrease of muscular fatigue of upper trapezius and sternocleidomastoids, muscular tone of sternocleidomastoids, and headache intensity.5

Overall findings support the use of proprioceptive neuromuscular facilitation technique and suboccipital relaxation exercise as a valuable therapeutic approach for individual with cervicogenic headache, providing substantial improvement in severity, frequency of pain, neck disability, & strengthening of weaker muscles.

Baseline characteristics: the study began by comparing the baseline characteristics of the participants in both Group A & Group B. the number of participants in each group was equal (26 participants each) and the gender distribution was also relatively balanced; there were 15 females and 11 males in Group A while Group B consists 20 females and 6 males.

Within the group pre and post-test comparison. The study assed the effect of the intervention within each group by comparing pre-test and post-test scores for different outcome measure. Compared to Group B, Group A showed significant improvement in various measures following the intervention. The outcome measures include NDI and NPRS.

Between group comparison: the study conducted between group comparison using independent T test to asses if there were significant difference between the two groups in terms of their responses to the intervention. The analysis revealed that there was significant difference between the groups. The

results suggest that combination of the stretching and slow reversal technique of PNF and suboccipital relaxation has improved the pain and disability among cervicogenic headache.

In the present study, the post intervention scores within the groups for NDI of group A (11.31 ± 5.42 with P value of 0.128) and group B (13.46 ± 4.57), the NPRS score of group A (2.69 ± 0.78 with P value of <0.001*) and group B (3.81 ± 1.20). Group A intervention was more effective in improving the pain and neck disability compared to the Group B intervention.

CONCLUSION

The study concluded that, both PNF and suboccipital relaxation exercise found to be effective in reducing pain, improving level neck disability and strengthening of the suboccipital muscles, among cervicogenic headache. But the PNF group showed more significant improvement than suboccipital relaxation group.

Conflict of interest: The authors declares no conflict of interest.

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