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TO COMPARE THE EFFECT OF POSTERIOR ANTERIOR VERTEBRAL MOBILIZATION (PAVM'S) VERSUS C1-C2 SUSTAINED NATURAL APOPHYSEAL GLIDE (SNAG'S) ALONG WITH ADVICE ON POSTURAL CORRECTION EXERCISES IN PATIENTS WITH CERVICOGENIC HEADACHE BETWEEN 20-50 YEARS OF AGE.

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INTRODUCTION:

Cervicogenic headache (CGH) is a challenging complaint that is commonly faced by physiotherapists in clinical practice. The International Headache Society (IHS) placed cervicogenic headache in the secondary headache sub-group. The global prevalence of headache is about 47%, whereas 15% to 20% of those are CGH[1,2]

“Cervico” refers to the cervical spine, comprising seven bones more commonly known as the neck; “genic” means that the headache is generated in this area, particularly the upper three bone[3]

The term cervicogenic headache (CGH) was introduced by Sjaasted and colleagues 1983. CGH is defined as “chron-ischemi cranial pain syndrome in which sensation of pain originates in cervical

spine (C0-C3) or soft tissues of neck and is referred to the head”[4]

The IHS defines cervicogenic headache (CGH) as “pain, referred from a source in the neck and perceived in one or more Regions of the head and/or face. It is often exaggerated by neck movement, constant uncomfortable head position or external force over the occipital region or upper cervical on the painful side. Often it is associated with prolonged neck flexion or poor habitual static postures. Cervicogenic headache pain has been mostly related to joint, disk, and ligament pain from the upper cervical spine

Persons with chronic CGH experience significant restriction of everyday function and are limited to social involvement, and emotional sufferings. Beside this, the poorer quality of life is seen in these individuals than normal

Headache may arise from various structures of the cervical spine, containing the zygapophyseal joints

(occiput-C1, C2, C3) arise from dysfunction of the C2-3 and C3-4 discs or facet joints as well as dysfunction of the atlantoaxial (C1-2) and atlanto-occipital (C0-1) joints.

CGH occurs due to activation of trigeminal autonomic system, precipitated by nociception in cranio-cervical region of trigeminal nerve which further generates cranio-autonomic features.

The functional convergence of upper cervical and trigeminal sensory pathway allows

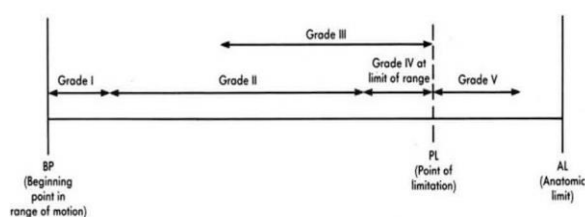
the bidirectional referral and painful sensation between the neck and trigeminal sensory receptive fields of the face, head, eye, temple bones, orbit, etc.



Deep cervical muscle weakness is one of the reasons for cervicogenic headache. The actions of these muscles are craniocervical flexion and maintain intersegmental stability for mid-cervical muscles (sternocleidomastoid and scalene) to act, thus strengthening these muscles is also important

Maitland mobilization is a passive movement, passive movements are performed for the purpose of relieving pain and restoring full range of motion, pain free functional movements. These are performed smoothly, staccato, small or large amplitude, applied in any part of the complete ROM. They are performed slowly (1 or 2/second) or quickly (3/second)

Oscillations (Maitland)



Mulligan Mobilization mnemonic when taking mulligan into consideration is **PILL**

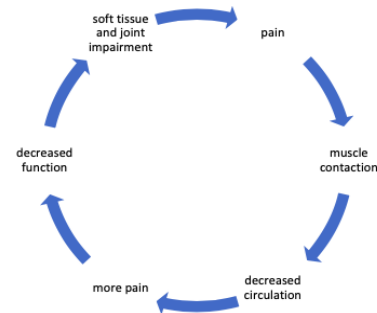
P – Pain free
I - Instant effect
LL – Long Lasting

In SNAG's the gliding direction is always in the plane of the facet joint. The treatment is given in a weight bearing position. There are no grades but the force being applied should be pain free. The direction of force application that the practitioner applies to a joint ranges from a medial, lateral, anterior, posterior and a rotational direction.

The passively applied glide is sustained and maintained.

Postural correction exercise: Musculoskeletal headaches are a common complaint with impaired posture. About 15-20% of chronic and recurrent headaches are diagnosed as cervical headaches and are related to musculoskeletal impairments. Headaches can be caused by faulty postures or related sustained muscular contraction leading to ischaemia.

With cervical headaches the joints and ligaments of upper cervical spine are inflamed/ in dysfunction.



Increasing joint flexibility and mobility in the suboccipital muscles will help to relieve tension in the region.

Thus postural correction exercises are helpful in conditions like cervicogenic headache.

MATERIALS AND METHODS :

Study Design, Settings and Duration: : A Comparative study was conducted for a year

(July19⁷-July20⁷) at Dr.Vasantrao Pawar Hospital,Nasik

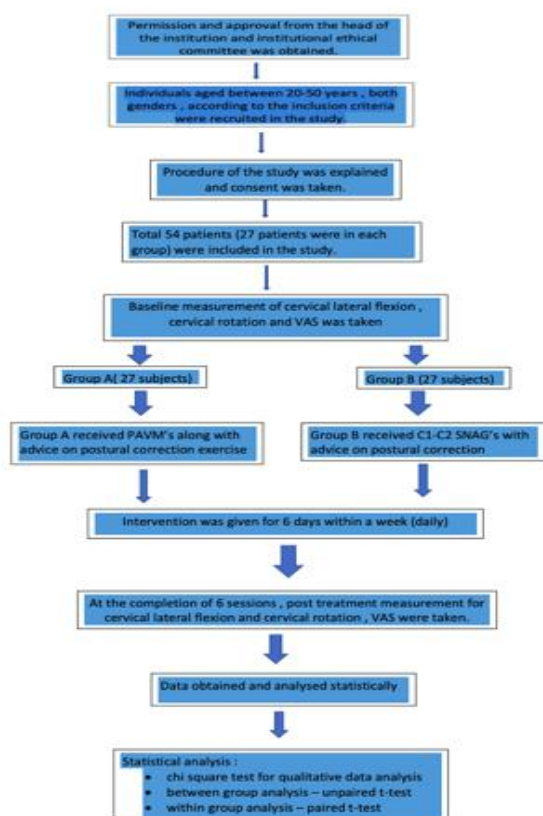
Sampling: A convenient sampling strategy was utilized. Patients having a history of at-least one episode of cervicogenic headache in previous 3 months, patients complaining of headache radiating to head were selected for the study. Of the 54 participants eligible for our study, both male and female participants between the age of 20-50 years were recruited. All participants voluntary and willingly participated in the study. Patients with any history of transient ischaemic attack, cerebrovascular accident, depression, upper cervical instability, patients suffering from migraine, pregnant females were excluded from the study.

Participants not willing to participate or who were not able to perform tests included in the study due to pain were given complete freedom to withdraw from the study as mentioned in consent form

Data collection tool:

Goniometer was used to take the cervical rotation and neck flexion for the ipsilateral side. VAS scale was used to assess the pain intensity of the patient. HIT-6 Questionnaire was used to assess the impact of CGH on the daily life of the patient.

Procedure :



Group A(PAVM's): The patient was in a prone lying position and the therapist was standing at the head end of the plinth. Upper cervical spine C1-C2 was palpated to perform the glides. Central posterior-anterior vertebral mobilization was given to the joint. Dosage was of 3-5 repetitions. Grade III & IV mobilization was performed. the oscillation's were given at the frequency of 30-60 oscillations per minute

Group B (C1-C2 SNAG'S) : The patient was in a sitting position and the therapist was standing behind the patient. Thumbs were placed over the spinous process of the vertebra above the site of lesion. The glide was given at the spinous process in the direction of the eyeball, the glide was maintained and the patient was asked to turn (rotate) his head slowly in restricted painful direction. The glide was maintained until head returned to the midline. Four repetitions of the glide were given and were maintained for 10 seconds at the end range or till there was onset of pain.

POSTURAL CORRECTION EXERCISE : On day 1 & 2 the stretching exercise were done: 1 set of 5 repetitions. Strengthening exercise: 1 set of 10 repetitions.

On day 3 and 4: stretching – 2 sets 5 repetitions each and strengthening – 2 sets of 10 repetitions each. Day 5, 6 & 7: stretching – 2 sets of 10 repetitions and strengthening – 1 set of 10 repetition and then 2 sets of 15 repetitions.

Data analysis procedure: The entire data of the study was entered and cleaned in MS Excel before it was statistically analysed in “GraphPad Instat version 3.05”. All the results are shown in tabular as well as graphical format to visualize the statistically significant difference more clearly.

RESULTS : The age wise distribution of subjects is given in table 1

	Group A	Group B	p-value
Age in years	n(%)	n(%)	0.140(not significant)
20-30	12(44.4%)	7(25.9%)	
31-40	4(14.8)	10(37.03%)	
41-50	11(40.74%)	10(37.03%)	
Range (MAX-MIN)	20-50	20-50	

Table 1 : Age distribution of the patients.

The age and gender distribution of Groups A and B is equal. There is significant difference observed between pre and post treatment values of cervical lateral flexion for Group A($p < 0.0001$) and Group

B($p < 0.0001$). There is significant difference observed between pre and post treatment values of cervical rotation for Group A ($p < 0.0001$) and Group B ($p < 0.0001$). There is significant difference observed between pre and post treatment values of VAS for Group A ($p < 0.0001$) and Group B ($p < 0.0001$). The average difference of pre-treatment and post treatment of cervical lateral flexion shows non-statistical significance between two study groups ($p = 0.7601$). The average

difference of pre-treatment and post treatment of cervical rotation shows non-statistical significance between two study groups ($p = 0.7756$). The average difference of pre-treatment and post-treatment of VAS shows non-statistical significance between two study groups ($p = 0.7118$). The percentage of subjects with no impact is 17% , with some impact is 18% , with substantial impact is 28% , with severe impact is 37%.

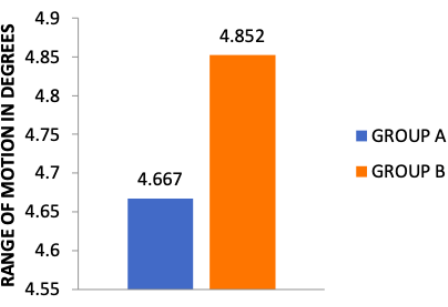
OUTCOME	PAVM's			SNAG's		
	PRE	POST	P-VALUE	PRE	POST	P-VALUE
CLF	32.519 ± 3.332	37.185 ± 2.113	<0.0001	31.778 ± 4.051	36.630 ± 3.733	<0.0001
CR	75.963 ± 6.572	81.926 ± 4.976	<0.0001	77.22 ± 5.760	82.963 ± 4.544	<0.0001
VAS	6.778 ± 1.582	4.567 ± 1.523	<0.0001	6.615 ± 1.397	4.307 ± 1.416	<0.0001

Table 2 : Pre and post treatment values of the outcome measures. (paired t-test).

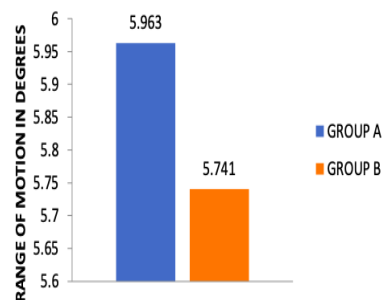
OUTCOME	PAVM'S	SNAG'S	P-VALUE
CLF	4.667 ± 2.287	4.852 ± 2.143	0.7601
CR	5.963 ± 2.653	5.741 ± 3.033	0.7756
VAS	2.211 ± 1.040	2.307 ± 0.8557	0.7118

Table 3 : Intergroup comparison for outcomes (unpaired t-test).

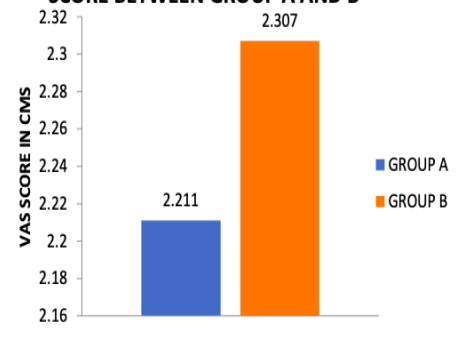
INTERGROUP COMPARISON OF CERVICAL LATERAL FLEXION BETWEEN GROUP A AND B



INTERGROUP COMPARISON OF CERVICAL ROTATION BETWEEN GROUP A AND B



INTERGROUP COMPARISON OF VAS SCORE BETWEEN GROUP A AND B



Graph 1 : Showing difference of Mean for Pre & Post treatment of cervical lateral flexion between Group A and Group B:

Graph 2 : Showing difference of mean for Pre & Post treatment of cervical rotation between Group A & Group B

Graph 3 : Showing difference of mean for Pre & Post treatment of VAS between Group A & Group B

Discussion : the purpose of this study was to evaluate and compare the effect of the posterior anterior vertebral mobilization and C1-C2 sustained natural apophyseal glides each along with postural correction exercise on patients with cervicogenic headache between 20-50 years of age.

54 subjects who met the inclusion criteria were recruited into the study. They were divided into 2 groups (27 each) . Group A was given posterior anterior vertebral mobilization along with postural correction exercises as a home programme and Group B was given C1-C2 sustained natural apophyseal glide along with postural correction exercise as a home exercise programme. Outcome measures used were Range of motion for cervical lateral flexion and cervical rotation towards the painful side & VAS. Pre intervention and post intervention assessment (at the end 1weeks) was taken. Age range between both the groups were 20-50 years.

In Group A - 7 subjects (i.e. 25.92%) were males and 20 subjects (i.e. 74.07%) were females. And in Group B - 9 subjects (i.e.33.33%) were males and 18 subjects (i.e. 66.66%) were females. Cervicogenic headache is found to be more prevalent in females than in males. Females are more predisposed to CGHs affecting four times as many women as men. This is because of the hormonal effect in females Limitation of C2/C3 intersegmental movement is seen in cervicogenic headache which can be treated with a Maitland glide ,especially with a unilateral PA technique directed 30-40° medially on the ipsilateral side.

Neuromodulation effect of joint mobilization is a possible physiological explanation by which C1-C2 mobilization could have reduced headache symptoms. Stimulation of mechanoreceptors within the joint inhibits the pain at spinal cord level as in pain gate theory. Other explanation may be that mobilization is thought to break down adhesions and stretch surrounding tissues hence increase range of motion and decrease pain. This opinion was presented by Muhammad Khan et al in their study. Susan A. et al. (2008) proposed that joint hypomobility- will lead to pain which further restricts the ROM. The end range of rotation with SNAG mobilization may engage the descending pain inhibitory system which may be activated and mediated by areas like periaqueductal gray of the midbrain was said by Muhammad et al. The underlying mechanism of the effect of cervical SNAGs seems likely to be either purely mechanical, reflexogenic, or a combination of the two (Hearn and Rivett, 2002) Mulligan suggested that the superior facet of the affected functional spinal unit (FSU) at the side of pain may be trapped postero-inferiorly in an extension or 'closed down' position; hence, ipsilateral rotation could cause pain due to excessive 'closing down' of the zygapophyseal joint. Application of the accessory glide component of a cervical SNAG may therefore reposition the superior facet supero-anteriorly, allowing a greater range of pain-free ipsilateral rotation. Due to poor postural habits there is a static contraction of neck muscles, these continuous contractions accumulate Ca^{++} , and there will be disturbances in active muscles due to impaired metabolic waste removal mechanism and poor

blood circulation. These changes will lead to micro lesions and pain due to lack of O₂ & nutrition also from awkward postures, prolonged static positions and repetitive movements may reduce the length of soft tissues which will limit/restrict the available ROM. The manual therapy may hypothetically reduce the symptoms as was stated by Neeti Christian. Due to muscle contraction during the exercises the impaired blood supply will get a boost and there will be a better blood flow through the tissues washing off the metabolites and increasing the blood flow to the lesioned tissue helping it to heal and regain its normal function. Strengthening exercises of the cervical muscles are very important in cases of mechanical neck pain (Silverman et al., 1991). Exercises increase muscle strength, elasticity, range of motion, and endurance (Borestein et al., 1996). As during the treatment procedures given to the individuals there were mechano-receptors that got stimulated during the treatment procedure there was significant amount of reduction in the intensity of pain during the mobilization procedures. It was further aided by easy and free gliding of the spinal segments. In SNAG's it is stated that it activates the descending pain pathway suppressing the pain symptom. The rapid pain-relieving mechanical effect was based on the presence of bony positional faults and the ability of mobilization with movement to correct these faults (Vicenzino et al., 2007). The phenomenon of centralization is well recognized as a positive prognostic change and should be used to guide the treatment used by therapists employing SNAGs in clinical practice. The physiological movement that peripheralizes symptoms may, in fact, centralize pain when combined with the appropriate SNAGs to the correct segment (Miller et al., 1999). Headaches have a psychological component as the pain in the head and the neck disturbs the person's ability to concentrate. According to the HIT-6 there are times when the individual feels like lying down when having an episode of headache which can give way to loss of a lot of productive hours at home and work ; and can be a reason for work absenteeism.

Conclusion : Posterior anterior vertebral mobilization along with postural correction exercise and C1-C2 sustained natural apophyseal glide along with postural correction exercise are equally effective in increasing the cervical lateral flexion and cervical rotation range and for reducing neck pain in patients with cervicogenic headache.

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