Original Article

Effect of Mulligan's Sustained Natural Apophyseal Glide and Positional Release Technique on Pain, Range of Motion and Headache Disability Among Subjects with Cervicogenic Headache.

J. Prakash[1,2], Nagarani. R[3], A. Yazhini[4], S. Sivakumar[2], Kannabiran Bhojan[3]

[1]Ph D Research scholar, RVS College of Physiotherapy, Affiliated to The TN Dr MGR Medical University, Chennai, [2]Professor, KMCH college of physiotherapy, KMCRET, Affiliated to The TN Dr MGR Medical University, Chennai, [3]Professor, RVS College of Physiotherapy, Affiliated to The TN Dr MGR Medical University, Chennai, [4]Post Graduate Student, KMCH college of physiotherapy, KMCRET, Affiliated to The TN Dr MGR Medical University, Chennai.

How to cite this article: J. Prakash, Nagarani. R, A. Yazhini, S. Sivakumar, Kannabiran Bhojan, Effect of Mulligan's sustained natural apophyseal glide and positional release technique on pain, range of motion and headache disability among subjects with cervicogenic headache. Indian Journal of Physiotherapy & Occupational Therapy / Vol. 19 No. 1, January-March 2025

Abstract

Introdution: Cervicogenic headaches are unilateral frontotemporal headaches with clinical symptoms similar to migraine.A significant issue for many patients with upper cervical dysfunction is cervicogenic headache, which presents significant challenges for physical therapy management.

Objectives: To determine how well the positional release method and Mulligan's SNAGs effect on headache disability, pain, and range of movement in cervicogenic headache patients.

Methodology: A purposive sampling strategy was used in a quasi-experimental investigation. Individuals who met the selection criteria and had a clinical diagnosis of cervicogenic headache of were chosen and two groups were formed for cervicogenic headache. Group B received a home exercise program and positional release technique, while Group A received the Mulligan's SNAG program.

Outcome Measures: Pain, cervical rotation range of motion, headache disability index.

Results: A paired "t" test and an independent "t" test were used to evaluate the data at the 5% significance level. The pre- and post-test mean values indicate a decrease in headache severity. The post-test results showed a considerable variation for the outcome variables ofpain, range of motion, and headache impairment between the two groups; nevertheless, the group showed higher gains.

Conclusion: According to this study, patients with cervicogenic headaches who took Mulligan's C1-C2 sustained natural apophyseal showed improved pain relief, increased range of motion, and decreased headache disability.

Keywords: Cervicogenic Headache, Positional release & Mulligan's SNAG.

Corresponding author: J Prakash. BPT., MPT., (Ph.D.), Professor, KMCH College of Physiotherapy, Kalapatti road, Coimbatore.

Submission: April 2, 2024 **Revision:** Sep 30, 2024 **Published date:** 12/12/2024

Introduction

Among the common issues that people of all ages experience worldwide is headaches. Approximately 47% of people worldwide experience headaches, of which 15-20% have cervicogenic headaches. The population of women is more impacted than that of men [4:1][1,2].

The primary headache, which could be caused by a vascular or muscular lesion, and the secondary headache, which could be caused by something else entirely, such inflammation or head and neck trauma,are the two main categories into which the International Headache Society has classified the fourteen distinct types of headaches1.

Cervicogenic headaches (CGH) are headaches that result from a cervical spine musculoskeletal problem[3]. Sub-occipital cervical discomfort is linked to it. Cervicogenic headaches were initially classified by Sjastad as unilateral frontotemporal headaches with clinical symptoms like those of migraines (7).

Cervicogenic headaches typically appear clinically unilaterally, always on the same side; the most prevalent sites of pain origination are occiput-C1 and C1-C2[5].Ipsilateral shoulder or arm pain, reduced neck range of movement, and stiffnessare some of the various presentations of cervicogenic headaches. Pain is exacerbated by either neck movement or pressure on specific tender sites in the neck[4].Compared to patients with other conditions, those suffering from cervicogenic headaches have a lower quality of life.According to a review of the medical literature, patients who participate in regular exercise and physical conditioning programs seem to benefit the most from physiotherapy treatment methods for the long-term prevention and control of headaches[17].

Headache is currently the most frequent condition among people worldwide. Patients with cervicogenic headaches experience limitations in their daily activities, social engagement, and emotional anguish in comparison to those with tension-type headaches and migraines. Joint mobilization techniques have a wealth of evidence supporting them, but positional release techniques in the treatment of cervicogenic headaches have only a few published articles.

Nevertheless, it is necessary to compare the effects of joint mobilisation and soft tissue mobilisation approach because the pain is caused by abnormalities of the cervical spine as well as soft tissue structures.

Materials And Methodology

The study was carried out at the KMCH hospitals in Coimbatore in the department of physiotherapy and Rehabilitation. The KMCH medical centre, hospital, and ethics committee all granted their approval. EC/AP/871/12/2021 is cited. Before enrolment, all participants received a thorough explanation of the study's purpose, clinical benefits, and risks, and their informed consent was acquired.Thirty individuals who met the inclusion and exclusion criteria and had a diagnosis of cervicogenic headache were included in the study, both male and Men and female subjects between 18years and 30 years who had a history of unilateral neck and occiput pain were included in the study,pain aggravated by neck movements, tenderness of grade 2 in neck musculature, limited passive neck range of motion and a positive flexion rotation test.If a participant's headache was not of cervical origin, they were eliminated from the study. (i.e., migraine, tension type headache, Bilateral headache),patients with vertebrobasilar insufficiency, recent upper cervical fracture,recent head or neck trauma, cervical disc pathology, radiating pain from neck to upper extremities,An abrupt onset of a new, severe headache, headache associated with fever, skin rash, and a history of cancer, HIV, or other systemic illness, headache associated with focal neurologic signs other than aura, and new headache during or after pregnancy are among the symptoms that may be experienced.

Every individual who satisfied the study's inclusion requirements provided written, informed consent. To choose the subjects, a non-probability purposive sampling approach was employed. There were thirty subjects divided into two groups. GROUP A(n=15) received Mulligan SNAG technique along with home exercise Programme. Positional release method and a home workout program were given to GROUP B (n = 15). Treatment duration was 30-40 min /session for 2 days a week for 4 weeks.

To calculate the pain score, the numerical pain rating scale (NPRS) was employed.Goniometry was used to record cervical rotation ROM;the quality of life and headache impairment were measured using the headache disability index (HDI). The flexion rotation test examined the amount of rotation in C1–C2 by passively flexing the patient's head and then rotating it passively in either direction.To measure the range of motion, a smart phone with a compass application attached to the patient's head using Velcro straps was employed. Research has demonstrated the great intra- and inter-examiner dependability of this assessment procedure. Prior to the treatment, a baseline examination was conducted. (Figure: 1)

Figure: 1 Flexion rotation test.

Group A(experimental group) received mulligan SNAG. patient was positioned in a chair with the hands rest on their thigh. Therapist stood Antero -laterally to the patient in walk standing posture. The patient's head was gently

held in place by the therapist between his right arm and body. The middle phalanx of the little finger rests atop the spinous process of the C2 vertebra, while the right index, middle, and ring fingers encircle the base of the occiput. Overlying the right little finger is the lateral edge of the left thenar eminence. The therapist kept the cranium in neutral while gently applying pressure in a ventral direction to the spinous process of the C2 vertebra. For two days a week for four weeks, four glide repeats were administered and held for ten seconds at end range or the point of pain. The patient was instructed in C1–C2 self-sustained natural apophyseal glide in addition to home exercise. Fig:2

Figure: 2 SELF SNAG

Group B (experimental group) received positional release technique was given to sternocleidomastoid, levator scapulae, upper trapezius, rectus capitus posterior minor.

PRT for sternocleidomastoid

The therapist diagnosed the site of sternocleidomastoid muscle tension, and a positional release treatment was administered. The patient was lying down in a supine position. The patient's therapist stood behind them and felt the sternocleidomastoid muscle's painful spot. Using a pincer grasp, the therapist palpated the sternocleidomastoid muscle to identify a painful region while maintaining the muscle in the most comfortable posture. The therapist turned the patient's neck to the same side while keeping an eye on the tender spot with her index finger till the relief was sensed. (fig:3)

Figure: 3 positional releases for sternocleidomastoid.

PRT For Upper Trapezius

The therapist diagnosed an upper trapezius tension, at which point positional release technique (PRT) was administered. The patient was positioned in supine posture with no head rest and shoulder was abducted 90 degrees. Therapist stood behind the patient head. The subject's head was flexed laterally toward the trigger point while the therapist maintained the upper trapezius muscle in the most comfortable position. The therapist held her thumb in that position while keeping an eye on the trigger point with her index finger, applying pressure until she felt a release.(fig:4)

Figure :4 positional release for upper trapezius.

PRT For Rectus Capitis Posterior Minor

Positional release techniquewas administered when the therapist identified the rectus capitis posterior minor muscle as being tense.The patient was positioned in a supine lying posture with head off from the plinth and Therapist stood behind the patient and holds the patient head. With the rectus capitis posterior minor muscle in its most comfortable posture, the therapist palpated the area and used a pincer grasp to locate a painful point. The therapist used her index finger to keep an eye on the sore point and applied pressure by extending the neck until the patient felt release. (fig:5)

Figure :5 positional release for rectus capitis posterior minor.

PRT For Levator Scapulae

The patient was lying down in a supine position. With the patient's levator scapulae muscle in the most comfortable posture, the therapist stepped behind them and used a pin-

cer grasp to palpate the area to identify any painful spots. The therapist used her index finger to monitor the sore region and applied pressure, flexing to the same side of the neck until the patient felt relaxation.(fig: 7)

Figure :6 positional release for levator scapulae.

Three to four treatments were administered, with a 20-second break in between each. For four weeks, there were two treatment days per week. Along with positional release Neck strengthening and stretching exercise also taught to the patient.Home exercise program includes Chin tuck exercise, self-stretching for upper trapezius, self-stretching for levator scapulae and self-stretching for sternoclenomastoid muscle.

Result

Pre-test and post-test data to measure pain, range of motion and headache disability was collected by using numerical pain rating scale, goniometer and headache disability index. Both the independent and paired "t" tests were used to examine and interpret the recorded values. Before and after the intervention, the results within the group were interrupted using a paired "t" test, and the results between the groups were interrupted using an independent "t" test.

The recorded values were examined and interpreted using the independent and paired "t" tests. A paired "t" test was used to interrupt results within the group both before and after the intervention, while an independent "t" test was used to interrupt results between the groups.

Independent 't' test was used to measure and interrupt the values between groups, the posttest values of numerical pain rating scale which was used to measure the pain showed statistical significant difference across both groups, the posttest values of cervical rotation range of motion showed statistical significant difference across both groups and the posttest values of headache disability index scale which was used to measure the headache disability showed statistical significant difference across both groups. when the mean values were compared it was ascertained that group A (Mulligan C1-C2) sustained natural apophyseal glide) showed better improvement in reducing pain, improving range motion and reducing headache disability.

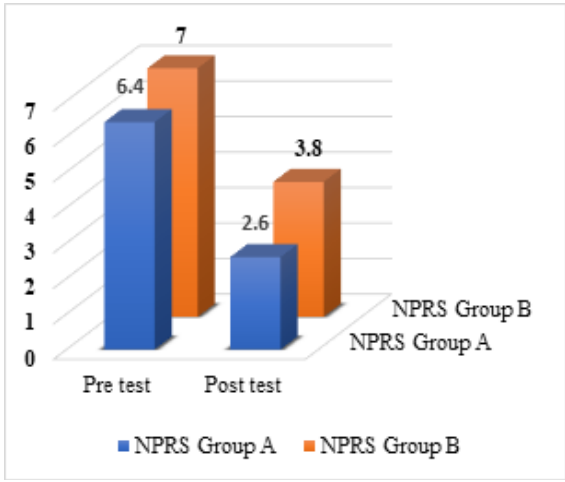

Figure: 7. Mean value changes in numerical pain rating scale (NPRS) scores for group A (mulligan SNAG) and group B (positional release)v

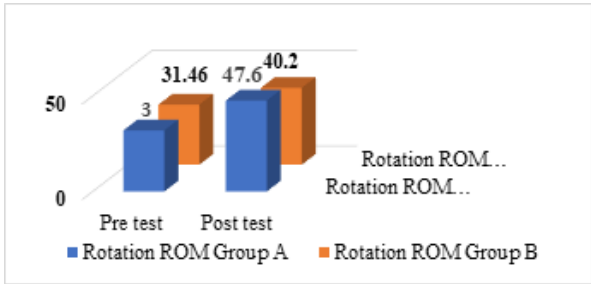

Figure:8. Mean value changes in cervical rotation range of motion scores for group A (Mulligan's SNAG) and group B(positional release)

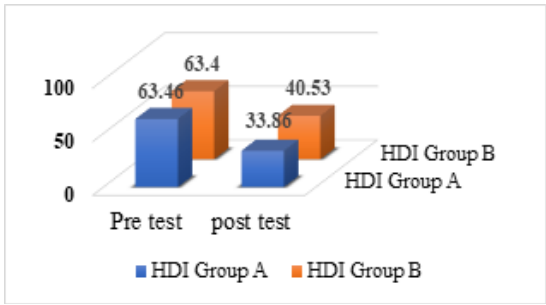

Figure:9.: Mean value changes in headache disability index scores for group A (Mulligan's SNAG) and group B (positional release)

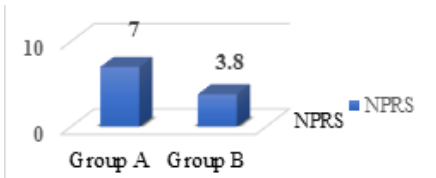

Figure: 10. Post- test values of Numerical pain ratind scale(NPRS) scores between group A(Mulligan SNAG) and group B (Positional release)

Figure:11. Post- test values of cervical rotation ROM scores between group A(Mulligan SNAG) and group B (Positional release)

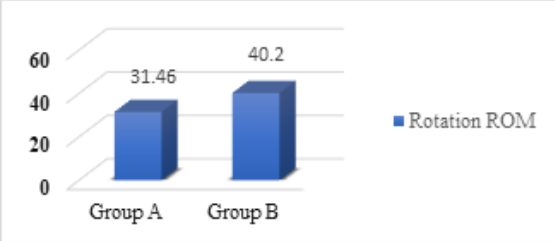

Figure: 12.Post- test values of headache disability index between group A(Mulligan SNAG) and group B (Positional release)

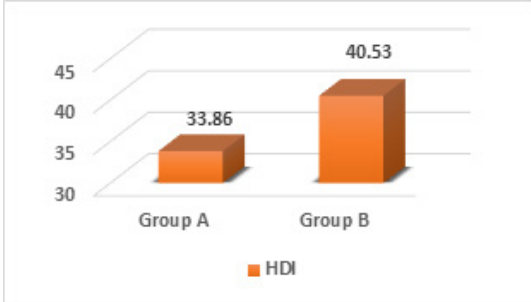

Table: 1 Independent 't' test analysis of pre – test and post – test of numerical rating scale

Outcome measure		Mean value ± S.D		Calculated 't' value	Table 't' value	Level of significance
Numerical pain rating scale	Pre test	Group A	Group B	1.89	2.048	P>0.05 insignificant
		6.4± 1.54	7±1.15			
	Post test	2.6±0.70	3.8±1.71	3.24	2.048	P<0.05 Significant

Table: 2 Independent 't' test analysis of pre – test and post – test of cervical rotation range of motion.

Outcome measure		Mean value ± S.D		Calculated 't' value	Table 't' value	Level of significance
Cervical rotation range of motion	Pre test	Group A	Group B	1.026	2.048	P>0.05 insignificant.
		32±5.29	31.46±5.03			
	Post test	47.6±5.44	40.2±4.41	4.244	2.048	P<0.05 Sigificant

Table: 3 Independent 't' test analysis of pre – test and post – test of Headache disability index

Outcome measure		Mean value ± S.D		Calculated 't' value	Table 't' value	Level of significance
Headache disability index	Pre test	Group A	Group B	0.32	2.048	P>0.05 insignificant.
		63.46±8.41	63.4± 7.68			
	Post test	33.86±6.98	40.53±8.82	2.43	2.048	P< 0.05 Significant.

Discussion

The study's objective was to determine whether positional release methods and Mulligan's SNAG were beneficial for treating cervicogenic headache patients during a four-week home exercise regimen. This assessment revealed that both groups had significantly reduced pain, improved range of motion, and decreased headache disability.

A persistent, recurrent headache is called a cervicogenic headache. According to Castein R (2019), the most prevalent origins of pain are the upper cervical joint segments,

occiput-C1 and C1-C2. Some writers proposed that the common cause of myofascial cervicogenic headache is the sternoclenomastoid muscle. Myofascial painful sites are seen in most people with cervicogenic headaches. According to Pfaffenrath et al., cervicogenic headache pain is thought to be a deep musculoskeletal pain that is carried by unmyelinated C-fibres.Because the nucleus caudalis in the spinal trigeminal tract is so close, pain impulses originating in the upper cervical roots are sent to the trigeminal area.

ROM reveals the investigation of segmental dysfunction. Flexion rotation test (FRT) was used to measure it; it has great sensitivity and acceptable reliabilityin identifying the restriction in C1/C2 rotation range. so, this study compares the joint mobilization technique and soft tissue technique in patients with cervicogenic headache.Adham A. Mohamed et al;2019 demonstrated that by modulating the afferent of aberrant signals originating from the upper cervical spine, SNAG mobilization for the upper cervical spine promotes stimulation of proprioceptors in both joints and muscle. They promote cervical SNAG as a non-invasive treatment option.

Kiran satpute et al;2021 imply that their research will strengthen the body of evidence supporting the use of manual therapy to treat headaches and improve clinical judgment. Neeti Christian 2017 they reported that Mulligan SNAGs has shown reduction in cervicogenic headache and its associated disability.

The severity of headache was measured by using headache disability index. Manual therapy groups showed more reduction in headache disability scores and it was useful in assessing the impact of headache. [18]

According to Susan A. et al. (2008), joint hypomobility will cause pain, which will further limit range of motion. This current study, which has demonstrated improvement in range of motion, pain, and headache impairment, supports the aforesaid notion.

Conclusion

This study shows significant difference in both groups, but in comparison, Mulligan's C1-C2 Sustained Natural Apophyseal Glide shows better result in reducing pain, improving range of motion and decreasing headache disability.

Funding: self-funding.

Conflict of interest: conflict of interest was reported by the authors.

References

1. Classification and Diagnostic Criteria for Headache Disorders, Cranial Neuralgias and Facial Pain. Headache classification committee of the International Headache Society. Cephalalgia. 1988;8(Suppl 7):1-96.
2. Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Scher AI, Steiner TJ, Zwart JA. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia. 2007 Mar;27(3):193-210.
3. Jull G, Trott P, Potter H, Zito G, Niere K, Shirley D, Emberson J, Marschner I, Richardson C. A randomized controlled trial of exercise and manipulative therapy for cervicogenic headache.
4. Jaeger B. Are "cervicogenic" headaches due to myofascial pain and cervical spine dysfunction?Cephalalgia. 1989 Sep;9(3):157-64.
5. Hall T, Chan HT, Christensen L, Odenthal B, Wells C, Robinson K. Efficacy of a C1-C2 self-sustained natural apophyseal glide (SNAG) in the management of cervicogenic headache. journal of orthopaedic & sports physical therapy. 2007 Mar;37(3):100-7.
6. Moore MK. Upper crossed syndrome and its relationship to cervicogenic headache. Journal of manipulative and physiological therapeutics. 2004 Jul 1;27(6):414-20.
7. Premlata el al, to evaluate the role Positional release technique on Pain and Headache disability in cervicogenic headache patients in middle aged population. A Pilot study. International journal of medical science and diagnostic research. 2019 Jan; Vol 3; Issue 1: 6874.
8. Kumaresan A, Deepthi G, Anandh V, Prathap S. Effectiveness of positional release therapy in treatment of trapezitis. International Journal of Pharmaceutical Science and Health Care. 2012;1(2):71-81.
9. Speicher TE, Draper DO. Top-10 Positional-Release Therapy Techniques to Break the Chain of Pain: Part 2. Athletic Therapy Today. 2006 Nov;11(6):56-8.
10. Van Suijlekom HA, Lamé I, Stomp-Van den Berg SG, Kessels AG, Weber WE. Quality of life of patients with cervicogenic headache: a comparison with control subjects and patients with migraine or tension-type headache. Headache. 2003 Dec;43(10):1034-41.
11. McPartland JM, Brodeur RR. Rectus capitis posterior minor: a small but important suboccipital muscle. Journal of Bodywork and Movement Therapies. 1999 Jan 1;3(1):30-5.
12. Hack GD, Koritzer RT, Robinson WL, Hallgren RC, Greenman PE. Anatomic relation between the rectus capitis posterior minor muscle and the dura mater. Spine. 1995 Dec 1;20(23):2484-6.
13. Knackstedt H, Bansevicius D, Aaseth K, Grande RB, Lundqvist C, Russell MB. Cervicogenic headache in the general population: the Akershus study of chronic headache. Cephalalgia. 2010 Dec;30(12):1468-76.

14. Biondi DM. Cervicogenic headache: a review of diagnostic and treatment strategies. Journal of Osteopathic Medicine. 2005 Apr 1;105(s4):16-22.
15. Castien R, De Hertogh W. A neuroscience perspective of physical treatment of headache and neck pain. Frontiers in neurology. 2019 Mar 26; 10:276.
16. Veena krithika s, Padmanabhan k, Selvaraj Sudhakar et al., Is mulligan sustained natural apophyseal glide (SNAG) or muscle energy technique is effective in non-surgical management of cervicogenic headache? A two-group pretest posttest randomized control trial. Asian journal of pharmaceutical and clinical research. 2018 vol 11, issue 8.
17. Satpute K, Bedekar N, Hall T. Effectiveness of Mulligan manual therapy over exercise on headache frequency, intensity and disability for patients with migraine, tension-type headache and cervicogenic headache–a protocol of a pragmatic randomized controlled trial. BMC Musculoskeletal Disorders. 2021 Dec;22(1):1-9.
18. Christian N. Comparative study to find the effect of mulligans snag technique (c1-c2) versus maitlands technique (C1-C2) in cervicogenic headache among information technology professionals. International Journal of Physiotherapy. 2017 Jun 8:178-83.
19. Ghanbari A, Rahimijaberi A, Mohamadi M, Abbasi L, Sarvestani FK. The effect of trigger point management by positional release therapy on tension type headache. NeuroRehabilitation. 2012 Jan 1;30(4):333-9.
20. Rishi P, Singh G. 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. International Journal of Physiotherapy. 2019 Aug 9:140-8.
21. Mohamed AA, Shendy WS, Semary M, Mourad HS, Battecha KH, Soliman ES, Sayed SH, Mohamed GI. Combined use of cervical headache snag and cervical snag half rotation techniques in the treatment of cervicogenic headache. Journal of physical therapy science. 2019;31(4):376-81.
22. Reid SA, Rivett DA, Katekar MG, Callister R. Sustained natural apophyseal glides (SNAGs) are an effective treatment for cervicogenic dizziness. Manual therapy. 2008 Aug 1;13(4):357-66.