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# Effect of Stretching and Mulligan's Nag Technique in Cervicogenic Headache Among Students

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## Abstract

Headache is one of the most common leading problems found in equal population. Moreover, about 90% of population is suffering from different types of headache. Similarly, Cervicogenic Headache (CGH) is a type of headache which is frequently found in students now-a-days due to forward neck posture associated with the symptoms of neck pain. In this research we are concluding if intensity of headache and neck pain decrease and cervical ROM increase after NAG mobilization and stretching in upper cervical region among students suffering from CGH. This study includes the comparison of two conservative treatments to reduce the intensity and frequency of CGH attacks are Mulligan's NAG mobilization and stretching of neck muscles. Assessment of pain intensity and ROM of cervical spine done by VAS scale rating (0-10) and goniometry. Result conclusion shows significant positive results with mulligan in CGH.

**Keywords:** Cervicogenic Headache (CGH), Mulligan Mobilization

## Introduction

Headache is one of the most common leading problems found in equal population. Moreover, about 90% of the population is suffering from different types of headache. Similarly, Cervicogenic Headache (CGH) is a type of headache frequently found in students nowadays due to forward neck posture associated with the symptoms of neck pain. CGH is considered as the third most common headache by some researchers. Mulligan's concept of mobilization with movement (MWM) was first used in the cervical spine for restricted movements and headaches in association with cervical pain. CGH among students occurs chiefly as a result of wrong posture with the neck forwardly flexed, causing neck muscle stiffness and affecting the activity of daily living (ADLs) as well. This study examines the effectiveness of Mulligan's Natural Apophyseal Glide (NAG) mobilization and neck muscle stretching, including deep flexors and extensors, in the treatment of CGH. Naturally, cervical neck mobilizations increase the range of motion (ROM) and reduce the symptoms of CGH and dizziness. However, passive joint mobilization is also effective in cervical pain. All over, about half of the population is suffering from this type of headache. Due to the lack of knowledge about CGH, the self-medication trend is increasing, which has a negative impact on health. They frequently use analgesics rather than manual treatment, which may lead to analgesic abuse. Mostly, cervical mobilization techniques are performed in the supine or

prone position, which is appropriate to take advantage of gravity. Comparatively, Mulligan's NAG technique is performed in a sitting position, which is beneficial, and movements occur only in the spinous process with physiologic movement. Neck stretching can heighten and increase the range of motion and elasticity of neck muscles that contribute to CGH. By definition, stretching is an exercise where a definite muscle or tendon is voluntarily stretched or extended to gain elasticity and functional movements. CGH is believed to be mostly caused by the cervical spine, producing symptoms of unilateral pain, but sometimes it can be bilateral. Cervicogenic pain and headache are often associated with symptoms like nausea, visual disturbances, ear-fullness, sweating, and swallowing problems. One-third of the people suffering from CGH due to whiplash injuries and trauma. In a recent study, it was found that 64% of students with CGH had muscular pain around the neck and shoulder region. Currently, CGH affects 22-25% of adults with sub-occipital pain and lightheadedness. However, surveys indicate that females are more prone to CGH than males. The International Health Society (IHS) identified 14 different subtypes of headache in which CGH is the secondary type with pain referred to the neck. Although several headaches have been described as arising from the dysfunction of C2-C3 spinous processes, muscles, ligaments, and other soft tissues. This dysfunction is caused by prolonged poor static posture, upper cervical tenderness, and restrictions often present with patients with CGH. According to the Cervicogenic Headache International Study Group (CHISG), CGH pain is induced by improper posture and external stress on the cervical spine. Deep neck flexors and extensors have more contribution to supporting and straightening the cervical lordotic curve at the craniocervical junction. Hall et al. (2007) conducted a study on the efficiency of Mulligan's Mobilization in adults with CGH and concluded that it is a clinically effective treatment. Mulligan's mobilization on the cervical spine has immediate effects compared to isometric exercises and ergonomic advice. It also restores function and normal biomechanics by reducing stress. Beeton and Jull stated that the deep neck flexors are responsible for the stabilization of the cervical spine. Dysfunction of these muscles can lead to chronic and symptomatic. Comparatively, to other manual therapies, the application of Mulligan’s NAG techniques reduces the duration and intensity of CGH. In fact, recent studies reported the cause of CGH is due to hypo function of cervical vertebrae. Watson et al. suggested that the cause of CGH might be uncomplicated and pain-free due to prolonged sustained posture and can be a source of painful conditions and micro-tears of internal soft tissues. In this study, we aim to investigate the effect of NAG Mobilization and stretching of neck muscles to reduce the episodic attacks of CGH. Basically, CGH is characterized by a dull type of headache, including stiffness of the neck, pressure on the back of the eye, and discomfort in the jaw, which can be aggravated by proceeding activities occurring in forward neck postures. Similarly, Brian Mulligan also demonstrated Reverse NAG (RNAG) technique in comparison with NAG. In essence, Reverse NAG is the inferior facet glides up on the superior. If NAG proved unsuccessful, then this technique should be applied to reduce the adverse effect of NAG. Reverse NAG can be done bilaterally, but usually, it can be done unilaterally on the painful side. Comparatively, Mulligan’s Sustained Natural Apophyseal Glides (SNAG) is also effective for the treatment of CGH. Moreover, we have Visual Analog Scale (VAS) for the assessment of pain severity and a test to recognize the diagnosis of CGH. Globally, Spurling test and Neck distraction test are significantly used for the diagnostic purpose of CGH. O'Leary et al. concluded that addressing these musculoskeletal problems by people may reduce CGH symptoms. Several exercises for chronic neck pain have been suggested. However, Jull et al. reported neck muscle exercises specifically for CGH. In Helsinki, 1970, Mulligan introduced a technique known as Pain Release Phenomenon Technique (PRPT). Although this technique is similar to the RNAG

when the patient proceeds in the direction of unexpected and apposite effects. This form of therapy is an effective treatment regime when the patient presents with anomalous and serious symptoms. Mostly, Mulligan's technique in the cervical spine describes PILL response as a result that is pain-free and instant result along with long-lasting effects of intervention. Comparatively, Maitland technique in CGH and dizziness has no significant effect on patients in relieving their symptoms Chiefly, the effect of Mulligan's NAG technique in students provide awareness and knowledge about postural guidance that will make them to focus on **self-care**. Moreover, it will reduce the addiction of **self-medication** by performing active stretching **and prevent from compromising** the immune system, that cause to more prone towards disease.

**Methodology**

Cervicogenic headache is the second most non-migraine headache which is frequently experiencing nowadays in students. Nearly all the patients with CGH use medication for their pain management. As this disorder related to muscle imbalance and the temporary changes in internal structure of cervical spine it can be treated by conservatively and non-pharmacologically which has low risk of adverse effect health wise. This study includes the comparison of two conservative treatments to reduce the intensity and frequency of CGH attacks are Mulligan's NAG mobilization and stretching of neck muscles. Assessment of pain intensity and ROM of cervical spine done by VAS scale rating (0-10) and goniometry. Participation information sheet was provided to all participants.

**Intervention Procedure**

All subjects were allocated randomly after getting informed consent. They were positioned comfortably. Pre-treatment phase include evaluation of pain through VAS scale, ROM of cervical spine through goniometry, physical examination along with the small interview which was based on assessment form with each participant to follow the exclusion criteria. The procedure of examination was based on clinical inspection, active and passive ROM of cervical spine and Vestibular Artery Insufficiency (VBI) test was performed**.** (Birdd et.al; 2004). In the intervention phase**,** a total of 40 students were randomized into 2 groups. One group receives the NAG technique of mulligan mobilization treatment was given at $C_2$-$C_3$joint after the palpation of restricted spinous process and the other group received the stretching of neck muscles which includes scalene muscle, sternocledomastoid and trapezius group with holding a stretch of 5 seconds with relaxation phase. Mobilization of 3 sets with each set of 5 repetitions followed by relaxation phase applied on each individual student. Follow up of the treatment was two days in a week. All the readings and result was being recorded by the authors during intervention with the help of patient participation sheet. Assessment of pain by VAS Scale was also included as post-treatment after completion of whole treatment to see the effect of applied intervention through perception of participants**.** After the intervention phase, all the participants were gathered for their educational session and postural guidance. At the termination of study, included participants which reports increasing the symptoms of CGH were given the opportunity the contact for further treatment with respect to physical therapy. Moreover, the students were also instructed to perform self-mobilization by using towel as a home program. During study there was no obligation for participant to continue the study.

**Statistical Analysis**

All statistical analyses were performed using the SPSS software (IBM Corporation). Descriptive statistics were presented as mean ± standard deviation of continuous variables. Normality of distributions was assessed. WILCOXON SIGN RANK test was used to compare the two techniques. Opinions towards distance education and attitudes according to socio- demographic variables were analyzed by t-test and/or ANOVA test in independent groups.

**Ethics Statement**

This study is conducting under the supervision of Ziauddin College OF rehabilitation sciences and ethical approval will provided by the authorities of Ziauddin University.

**Ethical Consideration**

The treatment in this research project was under observation of the higher authorities from all three universities through permission letter provided by ZIAUDDIN COLLEGE OF rehabilitation sciences and part of ordinary treatment use for CGH. All the patients were informed of the possible side effects and risk factors for their clarification and knowledge. Furthermore, they gave their informed consent before participation that means the participants have enough information to decide that if they want to participate in the research or not. They were fully aware from all the test and intervention performed during study and confirmed by signing a document. They also were being assured about the confidentiality of their data and the benefit of not being forcefully participation. They also confirmed that they can participate voluntarily or quit at any time. All the personal information will be confidential from other participant

**Results**

The result of this study, in which 70 participants whose age between 18 to 25 years were included and their CGH less than 3 months. The result shows only 7.1% students were already diagnosed by CGH and 92.9% were those who were not diagnosed. Most of them were spent their time on study was 2-3 hours (41.4) with neck down posture(34.3%) and the most common posture during study was sitting(41.4). There were 32.9% students were complained that they had headache last for half day.

**Demographic Characteristics of Participants**

A total of 70 students participated 88.2% of the students were female, and 37.9% of them were in their first year. The mean age of the students was 20.24± 1.70 years. 87.6% of thestudents

**Table 1.** Demographic characteristics of participants.

| Variables | | N | % |
|---|---|---|---|
| Age | | | 20.24± 1.70 |
| Gender | Female | 142 | 88.2 |
| | Male | 19 | 11.8 |
| Academic year | First year | 61 | 37.9 |
| | Second year | 29 | 18.0 |
| | Third year | 48 | 29.8 |
| | Fourth year | 23 | 14.3 |

**Discussion**

Chronic headache is a significant medical and socioeconomic problem resulting in severe disability and impairment. The term "cervicogenic headache" was coined by Sjaastad in 1983, Who also proposed criteria for its diagnosis. Cervicogenic headache as described by Sjaastad et al. is characterized as recurrent, long lasting, severe unilateral headache arising from the neck. Numerous authors have proposed various theories ranging from neurophysiologic basis. sensitive structures involved in head movement. Thus, CGH should be considered as a descriptive term rather than a final diagnosis. CGH is diagnosed from three features: (1) unilateral headache triggered by head/neck movements or posture; (2) unilateral headache triggered by pressure on the neck; (3) unilateral headache spreading to the neck and the homolateral shoulder/arm. However, their clinical pictures were never sufficiently systematized, at least not in order to permit the research on their pathogenesis. The results of the study showed significant improvement in all measured variables in each treatment group. Comparison between the two groups showed significant differences in all measured variables after intervention in favor of mobilization techniques with the exception of the functional NDI. The study examines a total of 70 participants, all are suffering from CGH. 25 participants got treatment of stretching 25 participants got mulligan's NAG mobilization at C2-C3. The goal characteristics of the participants in this study show very close similarities to those of other studies. Demographics includes (gender & age) and physical (height weight), differences between both the treatments of cervicogenic participants arrive at statistical significance ($p<0.05$). These results are in conformity with studies conducted by Hong et al (2010) who examined 22 CGH subjects with 14 healthy subjects and found no statistical difference in gender, age and BMI between both groups. Among the cervicogenic group, females constituted 95% (n=19) with a mean age of 36.5 years which is in accord with Page (2011)16 & Hall et al (2008)16 where 85-88 % female prevalence in cervicogenic patients was mentioned. The female dominance in mainstream of the studies can be associated with hormonal shifts (Page 2011)16 or the fact that females tend to seek medical concentration more than men (Hall et al may also be the case in the existing study as more females suffered from headaches. Key strengths of our study were to control the symptoms of CGH by cure, as well as have power over of awareness and the effects of the tolerant. The chief restriction was short sample size. There is valid self-confidence in the examination of main effects as comparisons had 25 in each group. Though, the pair-wise comparisons had only 25 per group. Jull et al (1999)16 experienced the upper cervical muscle tautness of 15 cervicogenic subjects and extensively higher muscle tightness was found in upper trapezius of the cervicogenic group. Page (2011)16 concluded that the tightness in upper trapezius can be linked to the forward head Posture (upper crossed syndrome) of cervicogenic headache patients involving ascending fibers from the Cl and C2 nerve roots to multiple pain generators in pain.

**Conclusion**

Now -a-days, CGH is the condition of nervous system which is mostly initiated by student because of their different neck posture during their study hours and muscle tightness especially trapezius. This study was based on the compression between two treatment regimens including NAG mobilization and muscle stretching in two groups of participants having CGH. Although, this research study showed low level of significance difference between both treatment regimens including repetitive mobilization and stretching but it showed outcome that these both treatments can be used as a conservative management of CGH. It was also notice that for long term effects, mobilization and exercise therapy in combination can be used conservatively. On conclusion of this research, both the treatment forced effective in the CGH. This study also associated CGH with muscle imbalance caused by forward head posture during prolong study hours in students.

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