International Journal of Advances in Medicine
*Kaur N et al. Int J Adv Med. 2025 Nov;12(6):545-552*
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: https://dx.doi.org/10.18203/2349-3933.ijam20253346

**Original Research Article**

# Efficacy of sustained natural apophyseal glides in neck pain: a comparative study

**Navjot Kaur*, Pushpdeep Singh, Shiny George Gill**

Department of Physiotherapy, Dasmesh College of Physiotherapy, Faridkot, Punjab, India

**Received:** 26 April 2025
**Revised:** 31 May 2025
**Accepted:** 01 May 2025

***Correspondence:**
Dr. Navjot Kaur,
E-mail: navjotkaurchahal5@gmail.com



## ABSTRACT

**Background:** Neck pain stems from mechanical and postural factors. When an incorrect alignment or narrowing of intervertebral space occurs due to incorrect posture or collateral medical problems the individual may experience neck pain but also more dangerous symptoms, such as compression of spinal nerves, muscle weakness or functional impairment in the limbs.
**Methods:** Subjects were screened as per inclusion and exclusion criteria in neck pain. A written consent was assigned by the subjects and were rehabilitated for 5 days in a week for a period of 4 weeks. A total of 60 subjects of both genders aged 30-50 years were divided into three groups at random by simple random sampling method. Group A (n=20): treated with hot pack, Maitland and ultrasound. Group B (n=20) treated with hot pack, SNAGS and ultrasound therapy. Group C (n=20): treated with hot pack. Outcome analyzed by using visual analogue scale (VAS) and neck disability index (NDI). Treatment provided for 5 days per week for 4 weeks. Assessment was done before the treatment and after the treatment of four weeks. Results were analyzed by using SPSS software 26.
**Results:** Results showed a statistically significant improvement in VAS and NDI in experimental groups. Group B statistically more improvement than Group A.
**Conclusions:** The study concluded that treatment protocol received by Group B, mulligan mobilization was more effective compared to Group who received Maitlands mobilization.

**Keywords:** Hot pack, Maitland technique, Neck pain, Sustained natural apophyseal glides, Ultrasound therapy

## INTRODUCTION

Neck pain is one of the most prevalent and severe musculoskeletal disorder. It is a public health problem and a common source of disability in the general population.[1] Neck pain (NP) is characterized as ache that occurs between the superior nuchal line, an imaginary transverse line that passes through the tip of the first thoracic spinous process and laterally by sagittal planes peripheral to the neck's lateral border.[2] In Swedish population 18.5% of females and 13.2% of males had neck pain more than 6 months, however, when continuous chronicity was rated, these figures were reduced to 10% and 7%, respectively.[3] The Finnish study reported chronic neck pain in 13.5% of female and 9.5% of males.[4] Lifetime prevalence varies from 14.2% to 71%, with point prevalence ranging from 6% to 22% and up to 38% of the senior population.[5] There is generally not a known cause or irregular anatomical structure for most neck disorders. Non-specific neck pain stems from mechanical and postural factors and is characterized as simple neck pain without any particular underlying condition.[6] Incorrect alignment or narrowing of intervertebral space caused due to poor posture or collateral medical ailments can produce neck pain as well as more complications, such as compression of the spinal nerves, muscular weakness or functional impairment in the limbs. Neck pain may further cause the inability to move and strain the neck easily and make the subjects to avoid

exercising. Anatomical structures in the cervical region such as the zygapophyseal joints, vertebral endplates, muscles, ligaments, neural structures and the intervertebral disc could be a source due to which mechanical neck discomfort is triggered. Although it frequently resolves on its own in a few weeks after symptoms start, it can seriously impair day-to-day functioning, result in significant medical expenses, cause extended sick absence and cause inability to perform any task. Hence, it imposes a Significant Strains on working class and health care systems.[6]

Each year, 27% to 48% of workers suffer Non -Specific Neck Pain. Non-specific neck pain usually Resolve within days or week, but can reoccur or become chronic.[7] ANATOMY "When it comes to the cervical spine, physiotherapists must have an expert's knowledge of the anatomy. In order to properly diagnose and treat issues with the cervical spine, the therapist must have a firm grasp of its anatomy. Thus, protecting the spinal cord that extends from the brain and supporting and absorbing stresses on the head and neck while enabling rotation are the primary roles of the cervical spine.[8] It is located between the skull and the thoracic vertebrae, the cervical spine is the uppermost part of the spinal column. It consists of seven distinct vertebrae, two of which are given unique names.

The first cervical vertebrae (C1) are known as the atlas. The second cervical vertebrae (C2) are known as the axis. The cervical vertebrae have three main features which distinguish them from other vertebrae:

Triangular vertebral foramen. Bifid spinous process - this is where the spinous process splits into two distally. Transverse foramina-transversal processes with holes in them. Cervical Spine primary function is supporting and enhancing motion of the head and neck. Due to the low weight-bearing capacity at this level, large vertebral bodies are superfluous. More mobility is more important than bigger and stiffer vertebrae. The risk of spinal cord damage and other neurovascular structures may rise with increasing range of motion and flexibility.[9]

## METHODS

Patients were taken from the OPD of Dasmesh college of physiotherapy, Faridkot and written informed consent was received from all patients enrolled in the study. Inclusion criteria: Patients of both genders were taken, 60 patients between the age of 30-50 years were included according to inclusion criteria i.e., patient with primary complaint of neck pain, pain of sufficient intensity (greater than 2 out of 10 on visual analog scale). Pain and stiffness for at least 2 weeks, pain aggravated by movement, headache. Patients were divided into 3 groups, Group A: 20 patients treated with hot pack, Maitland and Ultrasound therapy (US). Group B: 20 patients underwent treatment with a combination of ultrasound, a heated pack and Sustained Natural Apophyseal Glides (SNAGs). Group C: 20 patients treated with hot pack. Protocol five times weekly for four weeks in a row, a total of twenty therapy sessions were administered. The permission document was signed by every patient. Patients were instructed not to take any pharmacological or non-pharmacological treatment during the treatment period.

### *Procedure*

*Group A (n=20)*

In this group subjects were treated with hot pack, Maitland and Ultrasound therapy (US).

*Hot pack*

With the patient in fully comfortable position preferably supine lying; placed a standard cervical moist hot pack measuring 6×18 inches in length regulated at 55-degree Celsius temperature by thermostat knob, wrapped with four layers of towel for 20 minutes in each session. Hot Pack was applied over cervical region covering C0-C7 and cervical region. Subjects received treatment for 5 days per week for 4 days.[10]

*Maitland technique*

The therapist was standing at the patient's head while the patient was resting prone with a hand beneath their head. The therapist would place the points of their thumbs on the spinous processes of the vertebrae that needed mobilization, ensuring that their thumbs were in opposition to each other and back-to-back. Grade 3 (Large amplitude movement performed up to the limit of the range) Maitland's manual treatment methods were used to provide posteroanterior oscillatory pressure on the patient's head and neck while straddling their fingers. This rhythmic movement was done three times, each time with a 2 Hz frequency, for a duration of 2 minutes each. Every mobilization was separated by a one-minute rest period.[11]

*Ultrasound therapy*

The first group was undergoing continuous ultrasonography at a frequency of 1 MHz and an intensity of 1.5 W/ $cm^2$. Ultrasound was applied perpendicular from sitting position on the upper fibers of trapezius for 4 minutes using slow circular movements.[12]

*Group B (n=20)*

In this group subjects were treated with hot pack, SNAGs and Ultrasound therapy.

*Hot pack*

With the patient in fully comfortable position preferably supine lying; placed a standard cervical moist hot pack measuring 6×18 inches in length regulated at 55-degree Celsius temperature by thermostat knob, wrapped with

four layers of towel for 20 minutes in each session. Hot Pack was applied over cervical region covering C0-C7 and cervical region. Subjects received treatment for 5 days per week for 4 days.[10]

*Sustained natural apophyseal glides technique*

While seated, the patient was instructed to tilt their head towards the direction that causes their symptoms. As soon as the patient moves their head, the physiotherapist was placing the medial border of one thumb's distal phalanx on the end of spinous process of the vertebra above the suspected site of the lesion. The thumb nail would slope at approximately 45° in the direction of eyeball and other thumb enforce it. The patient is not supposed to experience any pain while the glide is being applied and they are told to stop moving if they do. This movement was repeated 10 times.[13]

*Ultrasound therapy*

As for group B, used 1 MHz of continuous ultrasound with an intensity of 1.5 W/cm$^2$. Ultrasound was applied perpendicular from sitting position on the upper fibers of trapezius for 4 minutes using slow circular movements.[12]

*Group C (Control group) (n=20)*

In this group subjects were treated with hot pack.

*Hot pack*

With the patient in fully comfortable position preferably supine lying; placed a standard cervical moist hot pack measuring 6×18 inches in length regulated at 55-degree Celsius temperature by thermostat knob, wrapped with four layers of towel for 20 minutes in each session. Hot Pack was applied over cervical region covering C0-C7 and cervical region. Subjects received treatment for 5 days per week for 4 days.[10] Patients of all three groups were advised to avoid forward neck bending for longer duration (>15 mins), use towel roll below neck in supine and side lying with height to maintain neck in neutral position. Jumping/ running were contraindicated throughout the treatment.

***Outcome measures***

Patients were assessed pre and post intervention by assessment of neck pain using visual analogue scale (VAS), assessment of neck disability using NDI.

## RESULTS

Paired t-test was used to compare within each group while ANOVA was used to compare between the three groups. The p value was set at level less than 0.05.

The mean age across groups A, B and C is similar (40.35, 41.00 and 40.00 years, respectively), with standard deviations ranging from 6.260 to 6.696, indicating a comparable spread in age distribution. The age range is consistent across groups, with a maximum of 50 years and a minimum between 30-31 years. The ANOVA test results show an F-value of 0.120 and a p value of 0.887, which is much higher than the 0.05 threshold, indicating no significant difference in age between groups. Tukey's pairwise comparison confirms this, as the mean differences between groups (A vs. B: 0.65, A vs. C: 0.36, B vs. C: 1.00) are all non-significant. Hence, age is evenly distributed across all three groups.

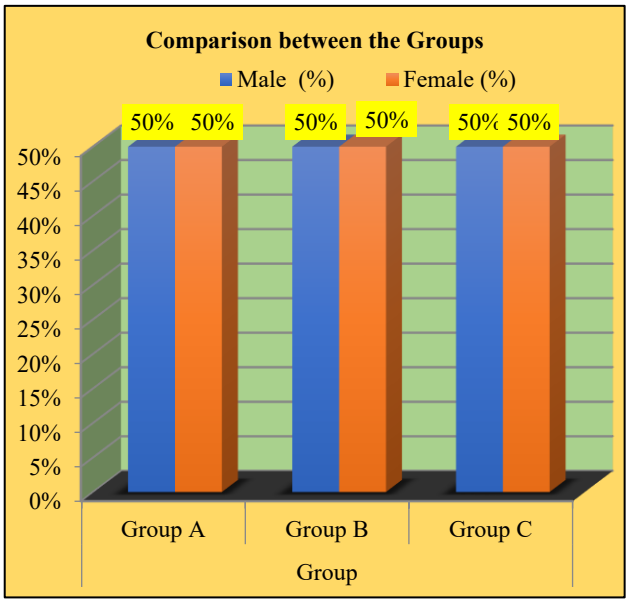


**Figure 1: Intergroup comparison of gender.**

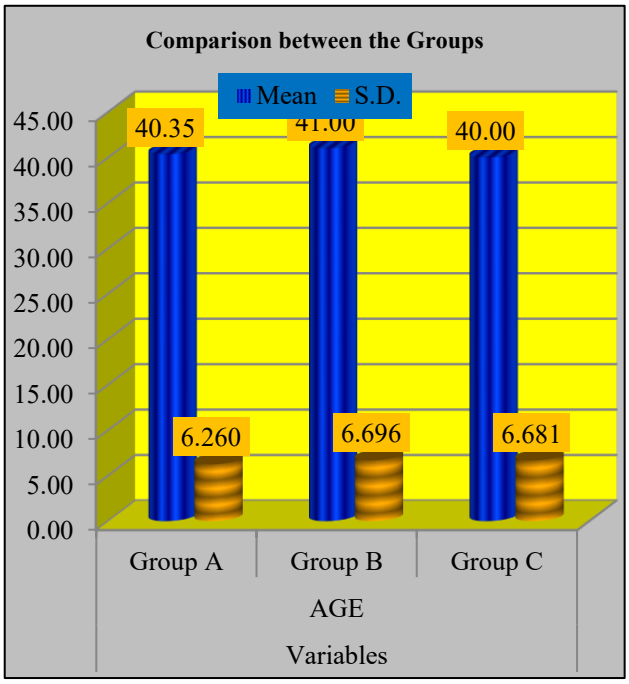


**Figure 2: Intergroup comparison of age.**

The VAS scores in Group A showed a significant reduction from 7.15 (pre) to 3.60 (post), indicating a

substantial decrease in pain levels after intervention. The SD decreased from 0.875 to 0.681, showing a more consistent response in post-treatment scores. The range also narrowed from 3 to 2, further suggesting reduced variability in pain levels. A paired t-test value of 31.105 with a p value <0.001 confirms a statistically significant improvement, as it exceeds the table value (2.09 at df 19, α=0.05). This suggests that the intervention was highly effective in reducing pain levels within Group A.

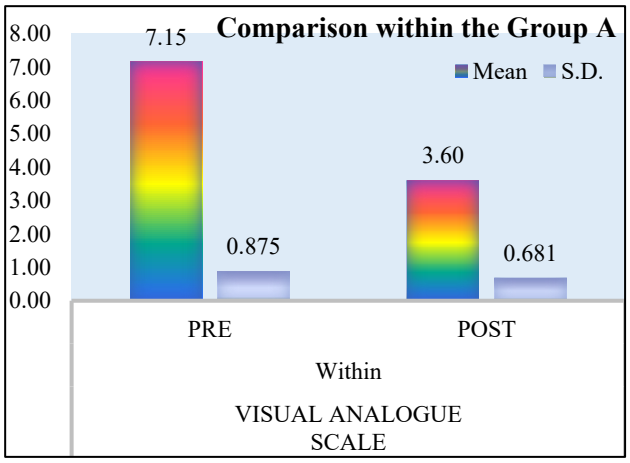


**Figure 3: Intragroup comparison of VAS scores in group A.**

Showed a significant reduction from 7.15 (pre) to 3.60 (post), indicating a substantial decrease in pain levels after intervention. The standard deviation (S.D.) decreased from 0.875 to 0.681, showing a more consistent response in post-treatment scores. The range also narrowed from 3 to 2, further suggesting reduced variability in pain levels. A paired t-test value of 31.105 with a p-value.

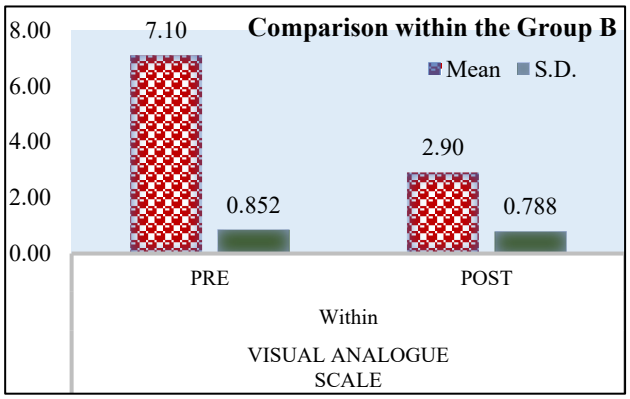


**Figure 4: Intragroup comparison of VAS pre and post of group B.**

In Group B, the VAS scores significantly decreased from 7.10 (pre) to 2.90 (post), indicating a strong reduction in pain levels after the intervention. The standard deviation (S.D.) slightly decreased from 0.852 to 0.788, suggesting consistent improvement across participants. The range remained stable at 3 (pre) and 2 (post). A mean difference of 4.20 highlights a notable reduction in pain. The paired t-test value of 35.904 with a p value.

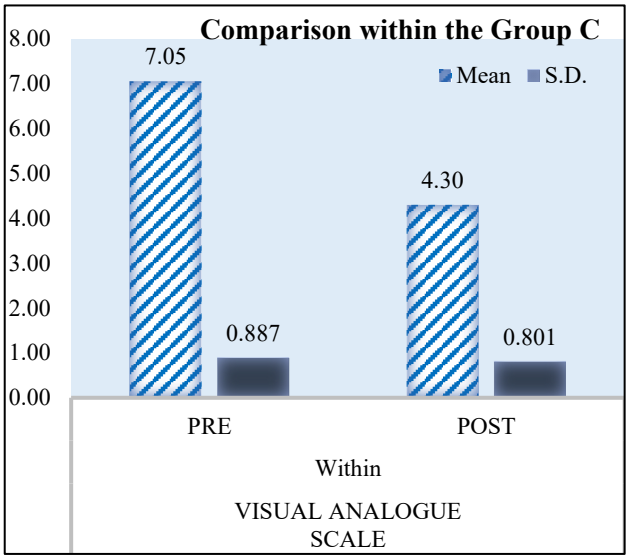


**Figure 5: Intragroup comparison of VAS pre and post of group C.**

In Group C, the VAS scores showed a significant reduction from 7.05 (pre) to 4.30 (post), indicating a decrease in pain levels after the intervention. The standard deviation (S.D.) slightly reduced from 0.887 to 0.801, reflecting consistency in improvement among participants. The range remained constant at 3 (pre and post). A mean difference of 2.75 suggests a moderate reduction in pain compared to other groups. The paired t-test value of 27.683 with a p-value.

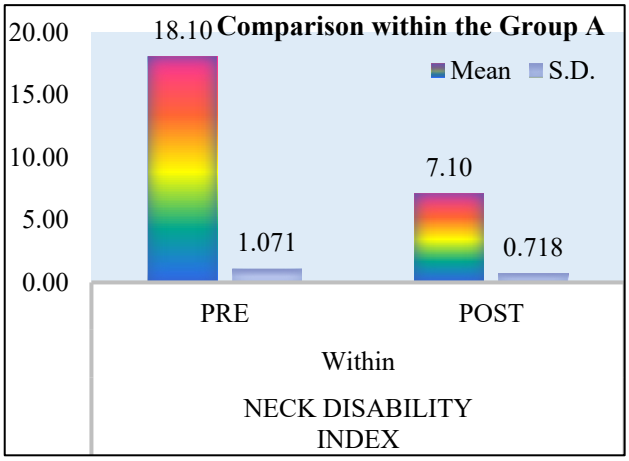


**Figure 6: Intragroup comparison of neck disability index pre and post of group A.**

In Group A, the NDI scores significantly decreased from 18.10 (pre) to 7.10 (post), indicating a substantial improvement in neck function after the intervention. The SD reduced from 1.071 to 0.718, showing less variability in post-treatment scores. The range also decreased from 4 to 2, suggesting more consistent improvement across

participants. A mean difference of 11.00 highlights a strong reduction in disability. The paired t test value of 87.541 with a p value.

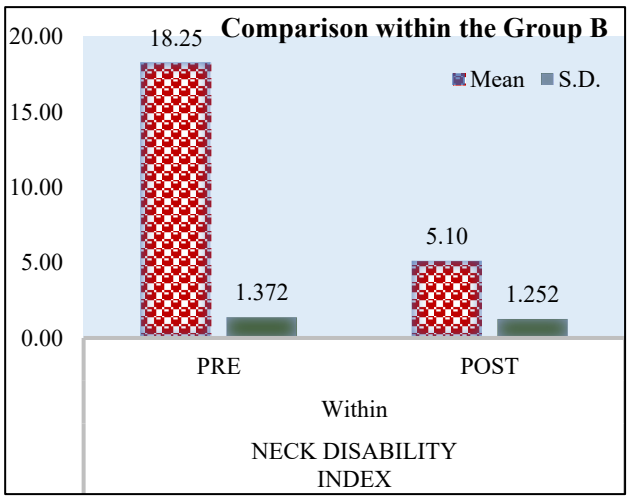


**Figure 7: Intragroup comparison of neck disability index pre and post of group.**

In Group B, the NDI scores showed a significant reduction from 18.25 (pre) to 5.10 (post), indicating a marked improvement in neck function. The standard deviation (S.D.) decreased slightly from 1.372 to 1.252, suggesting more consistency in post-treatment scores. The range also reduced from 5 to 4, reflecting a more uniform response among participants. The mean difference of 13.15 demonstrates a substantial reduction in disability. The paired t-test value of 78.921 with a p-value.

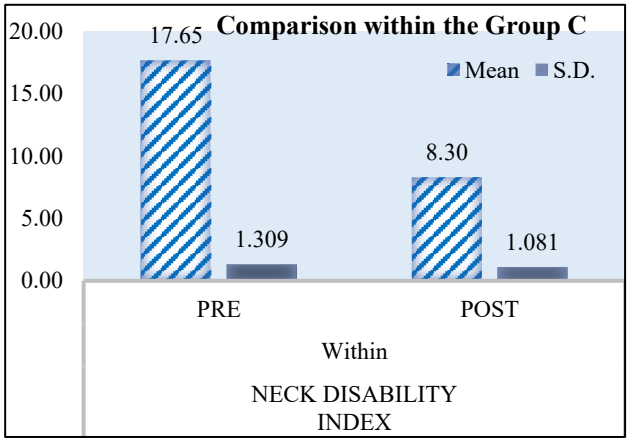


**Figure 8: Intragroup comparison of neck disability index pre and post of group C.**

In Group C, the NDI scores significantly decreased from 17.65 (pre) to 8.30 (post), indicating improvement in neck function. The SD slightly reduced from 1.309 to 1.081, showing more consistency in post-treatment scores. The range remained constant at 4, indicating similar variability before and after intervention. The mean difference of 9.35 reflects a notable reduction in disability. The paired t-test value of 71.217 with a p value.

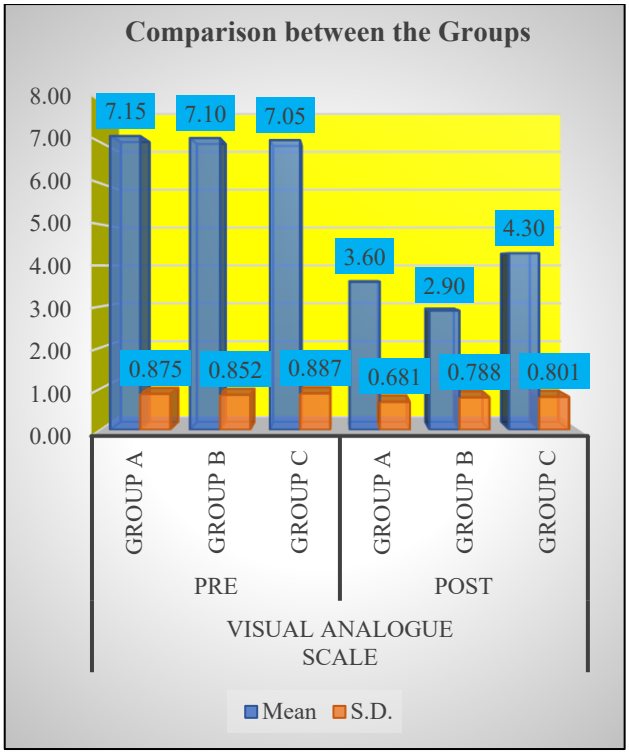


**Figure 9: Intergroup comparison of VAS pre and post.**

***Pre-treatment analysis***

The mean VAS scores for Group A (7.15), Group B (7.10) and Group C (7.05) are nearly identical. The F-test value (0.066) is much lower than the table value (3.159) at p=0.936, indicating no significant difference between groups before treatment.

***Post-treatment analysis***

The mean VAS scores decreased to 3.60 (Group A), 2.90 (Group B) and 4.30 (Group C) after treatment. The F-test value (17.030) is much higher than the table value (3.159) at p<0.001, showing a statistically significant difference in post-treatment pain reduction among groups.

***Pairwise comparison (Tukey's test)***

*Pre-treatment*

No significant differences were found between Group A vs. B (0.06 NS), Group A vs. C (0.11 NS) or Group B vs. C (0.05 NS).

*Post-treatment*

Group A vs. B (0.7 Sig)–Significant difference, with Group B showing better pain reduction. o Group A vs. C (0.7 Sig)–Significant difference, with Group A performing better than Group C. o Group B vs. C (1.4 Sig) – Highly significant difference, showing Group B had the greatest pain reduction compared to Group C.

***Pre-treatment analysis***

The mean NDI scores were 18.10 (Group A), 18.25 (Group B) and 17.65 (Group C). The F-test value (1.234) is lower than the table value (3.159) at p=0.299, indicating no significant difference between groups before treatment.

The mean NDI scores significantly reduced to 7.10 (Group A), 5.10 (Group B) and 8.30 (Group C) after treatment. • The F-test value (48.207) is much higher than the table value (3.159) at $p < 0.001$, showing a statistically significant difference in post-treatment neck disability among groups. Pairwise Comparison (Tukey's Test) Pre-Treatment: No significant differences between groups (A vs. B = 0.15 NS, A vs. C = 0.46 NS, B vs. C = 0.61 NS).

***Post-treatment***

Group A vs. B (2 Sig) Significant difference, with Group B showing better improvement. o Group A vs. C (1.2 Sig) Significant difference, with Group A performing better than Group C. Group B vs. C (3.2 Sig) Highly significant difference, indicating Group B had the greatest improvement in neck disability compared to Group C.

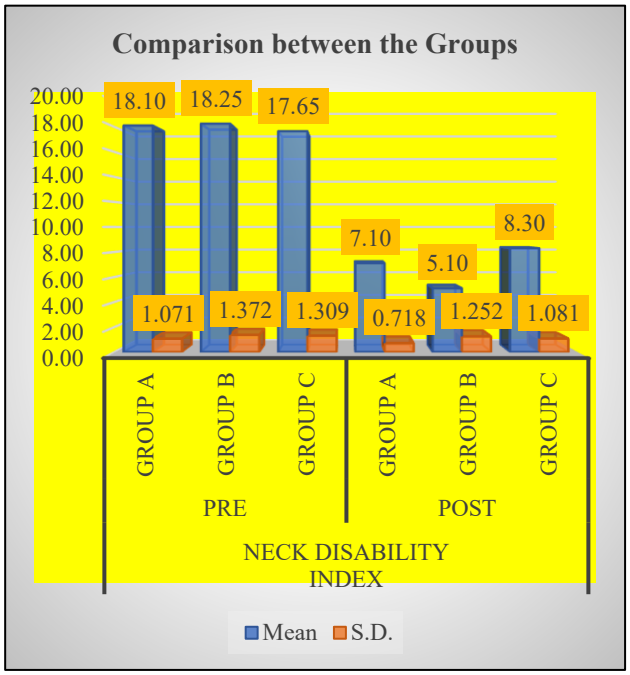


**Figure 10: Intergroup comparison of neck disability index pre and post.**

## DISCUSSION

The aim of the study was to find out effectiveness of Maitland technique and mulligan in cervical pain. This study compared the effectiveness of Maitland's mobilization technique against mulligan's SNAG technique in cervical pain along with conventional therapy. Paired t-test was applied to compare Pain, disability status pre and post values within Group A, Group B and Group C to analyze the significance and to check for the changes within variables. Paired t-test within Group A shows significant improvement in Pain VAS with $p<0.001$ and NDI with $p<0.001$. Paired t-test within Group B shows significant improvement in Pain VAS with $p<0.001$ and NDI with $p<0.001$. Paired t-test within Group C shows significant improvement in Pain VAS with $p<0.001$ and NDI with $p<0.001$. Nevertheless, a significant difference in VAS and NDI was seen after therapy among three groups but Group B showed more improvement as compared to other groups. To identify differences in pain and disability status, we used analysis of variance (ANOVA) to compare pre and post-test scores for Groups A, B and C. When the three groups' VAS were compared before treatment began, there was no statistically significant difference ($p=0.936$). Nevertheless, a significant difference in VAS was seen after treatment among the three groups ($p<0.001$). The NDI of the three groups did not vary significantly ($p=0.299$) before therapy began. Nevertheless, a significant difference in NDI was seen after therapy among the three groups ($p<0.001$).

According to Edmonston and Singer, the SNAG technique developed by Mulligan plays a crucial role when addressing painful movement issues linked to degenerative changes. These strategies decrease the potential issues related to end range passive movements in degenerative motion segments and provide pain-free movement across the available range because the patient controls the movement.[14] Brian Mulligan's theory of joint "positional fault" suggests that mal--positions between joint surfaces may cause patient symptoms. These "positional faults" are primarily diagnosed through clinical examination using the Mulligan concept and correcting them can alleviate symptoms.

Manual therapy techniques, including those from the Mulligan Concept, may activate the sympathetic nervous system, leading to pain reduction, especially on the same side of the body where the technique is applied. For peripheral joints, the Mulligan Concept employs "mobilization with movement (MWM)" techniques, which involve specific directions and repetitions to resolve pain. The key aspects of the Mulligan Concept are patient participation and pain elimination, making it a safe and effective method with no significant adverse effects reported.[15] Similar study was done in which they compared Maitland and mulligan mobilization in patients with Colle's fracture, conclude that mulligan mobilization could be used effectively when pain predominates while Maitland mobilization could be effectively used to restore mobility when pain is not the major concern.[16]

The neurophysiological impacts of Maitland mobilization are significant enough to fundamentally alter the way scientists and clinicians see the advantages of mobilization. There have been prior reports of immediate hypoalgesia and an increase in pressure pain thresholds as neurophysiological effects of central posteroanterior

(CPA) mobilization. A pain response is triggered when nociceptors or pain nerve receptors, are stimulated by joint tissue that is stretched beyond its usual extensibility.

Alarab et al performed a Research comparing the McKenzie method to Mulligan mobilization for individuals with non-specific neck discomfort. There are 24 participants for this study, split into 2 groups. The group A (n=12) and the group B (n=12). The group A received Mulligan mobilization while the group B received McKenzie technique treatment. The result revealed that both techniques are effective in decrease pain and increase ROM according the study.[17]

Andrews et al conducted research to uncover the immediate impacts of the Mulligan idea on a group of young adults diagnosed with mechanical neck pain who were athletes. We enlisted 10 patients, all between the ages of 15 and 18, who were suffering from mechanical neck discomfort. The research found that patients with neck discomfort had rapid pain alleviation and an improvement in cervical range of motion after using Mulligan concept Positional SNAGs, both during and after treatments.[18]

Duymaz et al performed research to see if the Mulligan Mobilization Technique was beneficial in treating mechanical neck discomfort. Forty people with mechanical neck discomfort, ranging in age from 25 to 50, were a part of the study. A control group and a Mulligan Mobilization group were each given a random number. Home exercise programs were sent to the subjects in both groups. Within a two-week period, the subjects received ten treatments. When compared to a control group, patients receiving mulligan mobilization therapy showed significant improvements in pain, mobility and muscular strength.[19]

Mobilisation procedures could stimulate joint mechanoreceptors to alleviate pain (neurophysiologic effect) and to expand the joint tissues (mechanical effect). By activating mechanoreceptors that block nociceptive pathways at the brain stem or spinal cord level, the oscillations may have an inhibitory influence on the perception of painful stimuli.

Therefore, from the literature available and the statistical analysis of data obtained following the treatment concludes that, “Mulligan mobilization is better than Maitland mobilization in improving Pain and Disability”.

### *Limitations*

The number of patients were less, study just limited to short follow up, so inferences cannot be drawn about long-term advantages of treatment. The study was limited to certain area of Punjab. It can also involve other areas; age group was limited i.e. most of the patients was in 30 to 50 years age group. Range of motion of cervical region was not measured.

## CONCLUSION

This study concluded that the SNAGs (Sustained Natural Apophyseal Glides) along with hot pack and ultrasound therapy is effectively relieved neck pain. Statistically it was concluded that mulligan mobilization along with ultrasound therapy and hot pack is greater in effectiveness in improving neck pain as compared to Maitland mobilization along with hot pack and ultrasound therapy. Thus, the SNAGs (Sustained Natural Apophyseal Glides) along with hot pack and ultrasound therapy must be advised to the patients with neck pain in physiotherapy protocol. It will be advantageous in eliminating pain and thus bettering the functional status of someone with pain in neck.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Côté P, Cassidy JD, Carroll L. The epidemiology of neck pain: what we have learned from our population-based studies. J Canad Chiropract Assoc. 2003;47(4):284.
2. de las Penas CF, Cleland J, Dommerholt J, editors. Manual therapy for musculoskeletal pain syndromes: An evidence-and clinical-informed approach. Elsevier Health Sci. 2015.
3. Guez M, Hildingsson C, Nilsson M, Toolanen G. The prevalence of neck pain. Acta Orthopaedica Scandinavica. 2002;73(4):455-9.
4. Mäkela M, Heliövaara M, Sievers K, Impivaara O, Knekt P, Aromaa A. Prevalence, determinants, and consequences of chronic neck pain in Finland. American J Epidemiol. 1991;134(11):1356-67.
5. Fejer R, Kyvik KO. The prevalence of neck pain in the world population: a systematic critical review of the literature. Euro Spine J. 2006;15(6):834–48.
6. Binder A. The diagnosis and treatment of nonspecific neck pain and whiplash. Europa Medicophys. 2007;43(1):79-89.
7. Borghouts JA, Koes BW, Bouter LM. The clinical course and prognostic factors of non-specific neck pain: a systematic review. Pain. 1998;77(1):1-3.
8. Bortoluzzi A, Furini F, Scirè CA. Osteoarthritis and its management-Epidemiology, nutritional aspects and environmental factors. Autoimm Rev.2018;17(11):1097-104.
9. Edmonston S. Anatomical and biomechanical consideration for manual therapy. Manual Ther. 2014;2(3)123-31.
10. Funk D, Swank AM, Adams KJ, Treolo D. Efficacy of moist heat pack application over static stretching on hamstring flexibility. J Stren Condit Res. 2001;15(1):123-6.
11. Ali H, Nasir RH, Hassan D. Effectiveness of Cervical Mobilization and Cervical Traction in Management

of Non Specific Neck Pain. J Riphah Coll Rehabil Sci. 2015;3(2):80-5.
12. Ay S, Doğan ŞK, Evcik D, Başer ÖÇ. Comparison the efficacy of phonophoresis and ultrasound therapy in myofascial pain syndrome. Rheumatol Int.2011;31(9):1203-8.
13. Patel KM, Balaganapathy DM, Patel HM. Effect Of maitland mobilization versus mulligan (Snags) mobilization on head repositioning accuracy (Hra), pain and functional chronic neck pain, a randomized controlled clinical trial. Int J Curr Res. 2016;8:31144-9.
14. Holland GJ, Tanaka K, Shigematsu R, Nakagaichi M.Flexibility and physical functions of older adults: a review. J Aging Phys Act. 2002;10(2):169-206.
15. Westad K, Tjoestolvsen F, Hebron C. The effectiveness of Mulligan's mobilisation with movement (MWM) on peripheral joints in musculoskeletal (MSK) conditions: a systematic review. Musculosk Sci Pract. 2019;39:157-63.
16. Varsha C. Effectiveness of Maitland versus Mulligan mobilization technique following post-surgical management of colle's fracture Indian J Physioth Occupat Therapy. 2007;5:14-8.
17. Alarab A, Talahma I, Awwad H, Sharawi A, Amro O, Hilal R, et al. Mulligan technique versus McKenzie technique on patients with non-specific neck pain. J Palestine Ahliya Univer for Res Stud. 2022;1(2):54-66.
18. Andrews DP, Odland-Wolf KB, May J, Baker R,Nasypany, A, et al. Immediate and short-term effects of Mulligan concept positional sustained natural apophyseal glides on an athletic young-adult population classified with mechanical neck pain: an exploratory investigation. J Manual Manipulative Therap. 2018;26(4):203-11.
19. Duymaz T, Yagci N. Effectiveness of the Mulligan mobilization technique in mechanical neck pain. J Clin Analyt Med. 2018;9(4):304-9.

**Cite this article as:** Kaur N, Singh P, Gill SG. Efficacy of sustained natural apophyseal glides in neck pain: a comparative study. Int J Adv Med 2025;12:545-52.