# EFFECTS OF SUSTAINED NATURAL APOPHYSEAL GLIDES VERSUS CERVICAL MANIPULATION ON PAIN AND DISABILITY IN NON-SPECIFIC NECK PAIN AMONG WRESTLERS

## Shumana Zakaullah <sup>1</sup>, Sabiha Arshad <sup>2</sup>, Muniba Afzal Dar <sup>3</sup>

<sup>1</sup> Gujranwala Institute of Medical and Emerging Sciences, Gujranwala, Pakistan
<sup>2</sup> Department of Rehabilitation and Allied Health Sciences, Riphah International University, QIE campus, Lahore, Pakistan
<sup>3</sup> Gujranwala Institute of Rehabilitation Sciences, Gujranwala, Pakistan

## **ABSTRACT:**

**Background:** Due to the high prevalence of neck pain and disability among elite wrestlers, both SNAGs and cervical manipulation are frequently employed manual therapy techniques on these athletes.

**Objective**: To compare the effects of SNAGs versus cervical manipulation on pain and disability in non-specific neck pain among wrestlers.

**Methodology:** This study was a randomized clinical trial. Participants were allocated randomly into two main groups A and B. Group A was the SNAG group. Group B was the cervical manipulation. All participants were selected according to the inclusion and exclusion criteria. Data was collected from players in Gujranwala wrestling clubs and Pakistan sports board. NDI and NPRS both questionnaires were used to find the disability and deformity in neck and intensity of pain respectively. Informed consent was taken from all participants. The study was conducted over a period of six months. Data was collected before the treatment and after six weeks at the completion of treatment. There were two sessions per week. Group A participants received snags while group B received cervical manipulation to compare the effects of both techniques. SPSS version 25 was used for data analysis.

**Results:** Parametric tests were used after the Shapiro-Wilk test confirming that the data was normal. Results showed that using both techniques resulted in a considerable decrease in neck pain and disability. Additionally, the p-value of <0.005 indicated a statistically significant difference and the mean difference showed sustained natural apophyseal glides were more effective.

**Conclusion:** It was concluded that neck pain and disability were significantly reduced in participants receiving either SNAGs or cervical manipulation, although SNAGs were reported to be more effective overall than cervical manipulation.

Keywords: Cervical manipulation, Disability, Neck injury, Pain, Snags.

### Introduction:

Non-specific neck pain (NP) is characterized as pain in the posterior and lateral aspect of the neck between the superior nuchal line and the spinous process of the first thoracic vertebra that is not associated with neurological symptoms or any particular pathologies, such as traumatic sprains and fractures, tumors, infectious or inflammatory diseases, or cervical spondylosis, and that does not significantly interfere with daily activities (1).

According to the data that is currently available, two-thirds of the population has neck pain at some point in their lives, making cervicalgia or neck pain a frequent musculoskeletal disease. Tenderness, tightness, and functional loss are common signs of localized and radiating pain. Although it frequently affects the neck, neck discomfort can also be brought on by a variety of other spinal issues. It affected over 330 million individuals worldwide (4.9% of the population). Women are more likely than men to experience it (5.7% vs. 3.9%). The frequency of low back pain is lower (2).

Neck pain in sports is typically brought on by mild sprains, strains, and contusions. Neck pain sufferers may experience movement issues in their upper thoracic and/or cervical regions. Additionally, these athletes may struggle with muscle recruitment, strength and endurance, positional accuracy, postural stability, and eye-movement control (3).

The most common condition that can negatively impact a person's active daily life and cause them to take medications, become disabled, or stop work is a neck disorder. Many different techniques are employed in manual therapy technique to treat musculoskeletal discomfort. It entails mobilization, manipulation, soft tissue therapies, different kinds of massage, focal soft tissue therapy, trigger point therapy, acupressure, and manual traction (4).

According to the intensity of their symptoms, people with neck pain must be divided into one of four groups, according to the Task Force on Neck Pain. The Quebec Task Force generated this whiplash categorization, which was also a part of the classification used in the current article. The Quebec Task Force recognized as a Grade 0 occurrence, which denotes an injury but no suffering, which is the main distinction between the two categories. This is the only difference between the two groups. Neck pain that scores a grade of I to III according to the Task Force on Neck Pain is classified as non-specific. Grade I and grade II neck discomfort differ in how much it interferes with daily activities. When objective neurologic signs (such as diminished deep tendon reflexes, weakness, or sensory abnormalities) coexist with positive provocation and reduction test results, grade III neck pain is suggested. This is the most excruciating neck pain imaginable. The term "cervical radiculopathy" refers to this particular type of neck discomfort. Grade IV neck discomfort indicates major issues for the sufferer. Certain kinds of neck pain are associated with this grade (5).

Elite wrestlers use their cervical spine to carry heavy loads. These athletes are susceptible to trauma from recurrent injury occurrences and are at risk for cervical radiculopathy. These are the most difficult situations for team doctors and athletic trainers to address these injuries in order to enable the player to return to competition safely and quickly (6).

Rapidly losing considerable amounts of weight makes wrestlers more vulnerable to sports injuries. Elite wrestlers from South Korea had the great majority of their injuries during times of rapid weight loss. The kind of wrestling, the wrestler's weight class, and his or her gender all have an impact on the severity and location of the injury (7).

Methods of manipulation and militarization are frequently utilized to treat acute neck pain. These therapies can either be used independently or in conjunction with other forms of therapy. Numerous studies, including statistical studies, have demonstrated that nine or twelve sessions of manipulation are preferable than three for reducing the discomfort and impairment caused by cervicogenic headaches. Both the recommended dosage and the best method of administration must be understood. MWM, or "mobilizations with movement," is the synchronization of patient-performed active physiological movements with therapist-applied accessory movements. Natural apophyseal glides, or more commonly known as SNAGs, and persistent natural apophyseal glides are both taken into account by the Mulligan model for the spine. Additionally, MWM is a factor that is taken into account (8, 9).

Basic SNAGs concepts in clinical therapy include an immediate decrease or cessation of pain and an increase of range of motion. It is still a little bit mysterious how this MWM achieves its more significant positive effects in practical practice. Mulligan asserts that the impact of mobilization with movement is based on the idea that pain is connected to "positional defects" in joints, which have a subtle biomechanical impact such as joint stiffness and limitation. It is suggested that joint problems, which may be the root of many ailments, can be resolved by combining a movement pattern in joint glide with a physiological spinal movement (10).

The idea of Brian's mulligan (MWM), which is defined as the simultaneous cooperation of both therapist-applied accessory and patient-performed active physiological movements, is the mobilization with movement. Sustained natural apophyseal glides, natural apophyseal glides (SNAGs), and MWM for the spine are all included in the Mulligan concept (11).

Brian Mulligan developed Snags, which combines a prolonged glide with movement applied at the facet joint between the cervical vertebrae C2 and C7. On facet joints, it can be done while standing or sitting. The glides are performed sustained with active movement and overpressure and glides are maintained. The C1-C2 sustained natural apophyseal glides (SNAGs) of Mulligan are a very effective treatment for reducing head pain and enhancing range of motion, according to numerous studies (12).

The aim of the current study was to determine whether sustained natural apophyseal glides and cervical manipulation were beneficial in reducing pain and disability caused by non-specific acute neck pain in wrestlers. SNAGs and manipulation can help athletes return to play sooner and relieve discomfort faster. It can also be used to highlight the significance of manual therapy techniques for treating cervical-regional problems.

### Methodology:

This study was a randomized clinical trial. After the approval of the synopsis, the study was completed in six months. Non-probability convenient sampling technique was used. Study population was professional and elite wrestlers of Pakistan sports Board and Gujranwala city. Sample size was calculated using epitool online software. The mean values of the outcome measuring tools from the previous study were used to calculate the sample size. Mean 1 and Mean 2 were 67.5 and 69.3 respectively, Variance was 5 with 95% Confidence level, 2 Tails and 0.8 Power. After 10% attrition rate, sample size was calculated as 56. Wrestlers between the ages of 18 and 35 who experienced acute, non-specific neck pain were eligible to participate in this study. Wrestlers with a history of discogenic cause of neck pain, who had previously undergone surgery, as well as those with any musculoskeletal (MSK) injury that affected their performance, such as a fracture, and individuals not willing to participate were excluded from the study (13).

Numeric pain rating scale (NPRS) and neck pain disability index (NDI) tools were used. The NDI questionnaire was a standard scale to measure the disability due to neck pain. There were ten sections in this questionnaire. The possible scores for each of the ten questions range from 0 to 5. As a result, the highest possible score was 50. Participants were asked to check or circle the response option that best fits the problem they were experiencing. The percentage score was created by multiplying the recorded score by two. Both researchers and clinicians used this questionnaire. The potential participants were taken into account who met the above-listed criteria. Written consent was taken from each participant. The randomization was carried out using the lottery method, and the concealment was accomplished using sealed, opaque envelopes. Participants were recruited for treatment into groups A and B using it (14, 15).

#### **INTERVENTIONAL PROTOCOLS:**

### Group A:

Wrestlers in Group A (SNAGs Group) with pain and any disability on the neck underwent prolonged natural apophyseal glides while sitting. On the dorsal side of the neck, the SNAG approach was used. Six weeks of treatment were provided, with two sessions each week. The treatment technique included participants in sitting positions in an erect posture. The therapist placed his one hand's thumb on the C1 spinous process and with other hand applied and maintained the sustained accessory zygapophyseal joint glide on C2 spinous process for 3 repetitions while the patient performs the uncomfortable and symptomatic movements. For rotation on the restricted site, therapist placed thumb over the thumb of the C1 transverse process and applied unilateral glide ventrally with active rotation on the affected site of 3 repetitions. Pain intensity was measured by NPRS Scale.

#### Group B:

Group B (the manipulation group) was subjected to a single high-velocity, low-amplitude thrust on both the right and left sides. Cervical manipulation was given for vertebral adjustment to the control group. The pain was assessed by using the NPRS and the functional recovery was measured by using the neck disability index (NDI) (16).

Data were calculated before and after 6 weeks of the treatment plan from each participant. Two sessions of treatment per week were given to wrestlers. SPSS version 25 was used to analyze the data using statistical significance p=0.05. The value of the Kolmogorov-Smirnov test was greater than 0.05, indicating that data was normally distributed. So, parametric tests were used for analysis. Descriptive statistics was explained by frequency tables, histograms, and charts to show the summary. Paired sample t-test was used for differences within the group and an independent sample t-test was used for differences across the group.

#### **Results:**

This study recruited 56 wrestlers who met the inclusion criteria. Participants were assigned to either Group A or Group B randomly. Group A received SNAGs, while group B received cervical manipulation. There were 28 participants in each group. The participants had intensive treatment for six weeks, including two sessions per week. SPSS version 25 was used for data analysis. The mean and standard deviation were used to get the frequency percentages of categories and demographic parameters. A significance level of p=0.05 was determined to be adequate. For numerical variables, the definitional formula was mean plus standard deviation. The normality hypothesis was tested using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Because the data was shown to have a normal distribution, parametric tests could be applied in the investigation. The Kolmogorov-Smirnov test result was greater than 0.05.

Table 1 showed the statistics and demographic age in both group A (snags) and group B (cervical manipulation) with mean and standard deviation  $(S.D) = 26.655\pm5.5002$  and mean and S.D =  $27.259\pm4.4858$  respectively. And statistics showed the pre- treatment NPRS and NDI and post treatment NDI and NPRS mean and S.D.

Table 2 showed the values of test of normality, which showed the p value was greater than 0.05 in both SNAGs and cervical manipulation group A and B respectively with their pre-treatment values on both scales.

Table 3 showed across the group comparison of NDI and NPRS by using Independent sample t-test. In across the group comparison both pain scale NDI and NPRs showed the more reduction in neck pain intensity in group A (snags) than group B (cervical manipulation) in their post NDI and Post NPRS scales.

Table 4 showed within the group comparison of NDI and NPRS by using pair sample t-test that indicated that the p value <0.05 which showed significant results.

Variables		Group A SNAGs (n=28) Mean± S.D	Group B Cervical manipulation (n=28) Mean± S.D	
Participants	s Age (in Years)	26.655±5.5002	27.259±4.4858	
Gender	Male	28	28	
	Female	0	0	
NPRS(F	PRE) Values	7.379±1.4246	7.482±1.2518	
NPRS (1	Post) Values	2.724±0.7510	3.778±1.1209	
NDI(P)	RE) Values	60.620±6.0321	60.667±6.2573	
NDI(Post) Values		18.482±6.4233	30.778±4.5601	

This table showed demographic comparison between both groups. The mean age with S.D of Group A (snags) was  $26.655\pm5.5002$  and the mean age with S.D of group B (cervical manipulation) was  $27.259\pm4.4858$ . There were 28 male wrestlers in each group and no female wrestler was found in mentioned study settings.

### **Table No. 2: Test of Normality**

		Kolmogorov -smirnov		Shapiro -wilk		rilk	
Tools	Groups	statistics	df	sig	statistics	df	Sig
NPRS(PRE)	Group A	.191	29	.008	.932	29	.061
	(SNAGs)						
	Group B	.168	27	.048	.940	27	.119
	(Cervical						
	manipulation)						
Neck	Group A	.149	29	.100	.939	29	.095
Disability	(SNAGs)						
index(PRE)	Group B	.163	27	.063	.935	27	.090
	(Cervical						
	manipulation)						

This table indicated the normality of the data. Shapiro-Wilk test showed significance values greater than 0.05 that indicated the data was normally distributed.

Variables		Treatme	(df)	P value	
		Group A SNAGs (n=28) Mean± S.D	Group B Cervical manipulation (n=28)		
			Mean± S.D		
NPRS	Pre value	7.379±1.4246	7.482±1.2518	53.8	0.77
	Post value	2.724±0.7510	3.778±1.1209	54	0.00
NDI	PRE value	60.620±6.0321	60.667±6.2573	53.3	0.97
	Post value	18.482±6.4233	30.778±4.5601	54	0.00

Table No. 3: Across the group comparison of NDI and NPRS by using Independent sample t-test

This table showed the between group comparison of NDI and NPRS. It indicated that in Group A (SNAGs) post NPRS mean and S.D was  $2.724\pm0.7510$  and post NDI was mean and S.D was  $18.482\pm6.4233$ . But in Group B (cervical manipulation) post NPRS mean and S.D was  $3.778\pm1.1209$  and Post NDI was mean and S.D was  $30.778\pm4.5601$ . And p-value <0.005 indicated that that was statistically significant.

Table No. 4: Within the group comparison of NDI and NPRS by using pair sample t-test

Variables		Treatment groups			
		Group A SNAGs (n=28) Mean±S.D	Group B Cervical manipulation (n=28) Mean±S.D		
NPRS -	Pre NPRS	7.3793 <u>+</u> 1.4246	7.4815 <u>+</u> 1.25178		
	Post NPRS	2.7241 <u>+</u> 0.75103	3.7778 <u>+</u> 3.7778		
	Mean Difference	4.6552 <u>+</u> 0.67357	3.7037 <u>+</u> 2.52602		
	P-Value	0.00	0.00		
NDI -	Pre NDI	60.620 <u>+</u> 6.0214	60.666 <u>+</u> 6.257		
	Post NDI	18.482 <u>+</u> 6.42329	30.7778 <u>+</u> 4.514		
	Mean Difference	42.138 <u>+</u> 0.8018	29.8882 <u>+</u> 1.743		
	P-Value	0.00	0.00		

Table no. 4 showed the pre-treatment and post-treatment values of within the group comparisons of NPRS and NDI which showed the P-values were less than 0.05.

### **Discussion:**

The goal of this study was to determine the effects of cervical manipulation and continuous natural apophyseal glides on neck pain and disability. The wrestlers aged from 18 to 35 years old were included. The results of the normality test as well as the comparative results of both groups showed a significant p-value. Shapiro-Wilk test showed significance values greater than 0.05 that indicated the data was normally distributed, so parametric tests were applied. The pre and post-values of the NDI and NPRS both tools revealed statistically significant

differences, and the p-value in paired t-test was less than 0.05 indicating that both techniques were effective. Similarly, a comparison between the groups by an independent t-test revealed a p-value less than 0.05, but the mean difference revealed that the SNAGs group had greater effects than the cervical manipulation group.

Bingamin Hidalgo (2021) has concentrated on the top two issues in his study. First, mobilisation therapy (MT) was found to be much more beneficial when combined with exercise than either MT or exercise alone. Second, mobilisation therapy does not need to be administered at the symptomatic level for NP patients to improve. Both of these assertions were correct. The Mulligan technique was found to be effective in the current investigation in reducing the participants' overall levels of nonspecific neck pain. This discovery has demonstrated to decrease the overall intensity of nonspecific neck pain in the participants and has a probability of error of less than 0.05 and was statistically significant as a stand-alone treatment (17).

The study conducted by Carles Gever Montoro et al. on the effectiveness of spinal manipulation and mobilization in the treatment of neck pain in 2021. The two approaches were evaluated in the study to determine which was more effective. The information gathered showed that SMT was effective in treating acute, subacute, and chronic neck pain in addition to low back pain. Spinal manipulation therapy (SMT) was considered to be beneficial as other conservative treatments for the management of non-specific and chronic primary spine pain. This research supports the current investigation's results. Also, the p-value for cervical manipulation is less than 0.05, which means that the results of the current research were statistically significant. However, the current study revealed that manipulation was more successful than spontaneous, long-lasting apophyseal glides (18).

In a study conducted in 2021 by Carlos Uterrera et al, manual therapy was combined with therapeutic exercise to treat general neck soreness and postural instability. Researchers found that therapeutic exercise and manual therapy both led to statistically significant improvements (p 0.05) when compared to the control group on the visual analog scale and the overall balance index. This research supported the findings of the present study, which showed that cervical manipulation had a p-value of less than 0.05, meaning that the findings were statistically significant (19).

In a study done in 2019 by Valera Calero et al on individuals suffering from chronic mechanical neck pain, the neuroendocrine response to cervical manipulation and mobilization was as follows: Instantaneous cervical manipulation and mobilization both induced cortisol levels to rise in a similar and statistically significant way (both P=0.001). Both the cervical manipulation and mobilization groups demonstrated appreciable decreases in neck disability at the one-week follow-up (both P=0.001). Following cervical manipulation (P=0.001), cervical mobilization (P=0.001), and sham manipulation (P=0.001), neck discomfort statistically significantly decreased. (P=0.001). After either type of therapy, the majority of range-of-motion directions did not manifest any noticeable improvement. In the current trial, cervical manipulation also significantly reduced neck discomfort (20).

In 2018, a study was carried out by Abdullah al Shehri et al. This study's objective was to compare the effects of mulligan snagging and Maitland mobilization. The results of the study showed that Maitland's and SNAG are equally effective in reducing neck stiffness. The group led by Maitland made significantly more improvements than the group led by SNAG. These findings suggested that for the treatment of neck pain, Maitland mobilization technique should be used in conjunction with conventional therapy rather than conventional therapy combined with NAGs. The results of the current study, which found that snags were preferable to cervical manipulation, were contradicted by this evidence. These results suggest that snags were more effective than cervical manipulation (21).

### **Conclusion:**

It was concluded from results that sustained natural apophyseal glides and cervical manipulation both techniques were beneficial in reduction of neck pain. But on comparison sustained natural apophyseal glides were more effective than cervical manipulation. **References:** 

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### **Authors Detail**

First Author: Shumana Zakaullah

Senior Lecturer at Gujranwala Institute of Medical and Emerging Sciences, Gujranwala, Pakistan

Second Author: Sabiha Arshad

Senior Lecturer / Physiotherapist at Department of Rehabilitation and Allied Health Sciences, Riphah International University, QIE campus, Lahore, Pakistan

Third Author: Muniba Afzal Dar

Senior Lecturer at Gujranwala Institute of Rehabilitation Sciences, Gujranwala, Pakistan

#### **Corresponding author: Sabiha Arshad**