



Original Article

Comparison of Sustained Natural Apophyseal Glide and Natural Apophyseal Glide Effects on Pain, Range of Motion and Neck Disability in Patients with Chronic Neck Pain

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ABSTRACT

Neck pain is very common in this era, and people have been suffering for many years. As the more advanced techniques of Mulligan, Sustained Natural Apophyseal Glide and Natural Apophyseal Glide are used to relieve pain, increase range of motion, and reduce neck disability in patients with chronic neck pain. **Objectives:** To compare the efficacy of sustained natural apophyseal glides and natural apophyseal glides in patients of with chronic neck pain. **Methods:** In this study, randomized clinical trial was done, a total of 45 subjects met the inclusion criteria out of which 5 were dropped out. 40 participants were included, both male and females diagnosed with chronic neck pain between the age of 25-50 years, and 20, 20 patients were randomly allocated into group A and B. Outcome measure tools were visual analog scale and Neck Disability Index (NDI) to assess. Group A received sustained natural apophyseal glides, Group B received natural apophyseal glides three times per week for 2 weeks. **Results:** In this study, the intragroup analysis revealed that relief of pain, improvement in range of motion, and reduction in disability were statistically significant in groups A and B ($p < 0.5$). While Group A was statistically significant as compared to Group B. **Conclusions:** This study concluded that both the groups are effective, but the Sustained Natural Apophyseal Glides technique was more effective in pain relief, improvement of cervical range of motion, and reduction of neck disability in patients with chronic neck pain.

INTRODUCTION

Pain in neck is a prevalent musculoskeletal pain syndrome. It is multifactorial that can be due to muscles, joints, tendons, nerves soft tissues or bones, periosteum, neural tissue, and ligaments. Neck pain can be categorized in many types including acute or chronic, non-specific, mechanical, uncomplicated and radiating pain [1]. The pain that lasts for more than 3 months even after the elimination of the insulting factor or the healing of damaged tissue known as chronic pain. There are many causes of chronic neck pain that can be due to an external factor or an internal

structure insult [2]. It can be acute subacute or chronic with different duration of persistence [3]. Neck pain incidence raises with age and is greatest in the third and fourth decades of life with more prevalence in females [4, 5]. Seven vertebrae for the cervical spine. Each vertebra consists of an anterior body and posterior arch. The first two, are atypical: C1 is called atlas while C2 is called axis. The remaining vertebrae from C3-C7 are distinctive vertebrae, with a pedicles, spinous processes, laminae, body and facet joints. It functions is to give stability and

provide mobility to the head and connected with relatively immobile thoracic spine [6]. Over used injury constitutes an important component in over 50% of musculoskeletal injuries which is characterized by poor posture, muscle imbalance and strain. Approximately 25% of all sick-leave taken in the occupation being due to such problems [7]. .Reading and writing tasks with unsupported postures for the arm while writing. These can create anxiety inside the upper arm and scapular stabilizing musculature[8]. Lack of normal cervical lordosis with intense muscle spasm. Neck pain exacerbate with any movement of neck. Limit of range of motion. Neck pain can radiates to the shoulder and can cause headache[9]. There are many methods of diagnosis both radiological and manual testing. Radiological tests include X.RAY, MRI, and CT. while manual testing includes compression and traction tests to rule out neurological or joint dysfunction. Palpation to check tenderness and manual muscle testing for neck muscles strength [10]. Treatment include pharmacological interventions including NSAIDS, muscle relaxants and opioids and rehabilitative interventions [11]. Physical therapy technique is a popular non-surgical method which is notably safe and likely effective inside the control of patient with neck ache [12]. Physical therapy interventions for chronic neck pain include diverse treatment approaches including manual therapy, isometrics, heating modalities stretching etc. that not only reduces pain but also increases functional ability of patient [13]. From physiotherapist point of view it's important to use an effective manual technique that provides us with highest pain relief, improve mobility and maximum functional restoration and NAGS and SNAGS by brain mulligan are an effective approach [14] but little literature is available at time that has compared two techniques of mulligan that's why we conducted this study to know the effectiveness of SNAGS and NAGS on neck pain, ROM and neck debility in the patients with chronic neck pain.

METHODS

The randomized clinical trial was done at Mayo hospital OPD, physiotherapy department, Lahore. Sample size was of 40 patients was taken. Inclusion Criteria for this study was participants having age group among 25–50 years and neck pain that persist greater than 3 months of duration as core ongoing problem. Exclusion Criteria of cervical trauma, injury or any neurologic signs including vertebrobasilar artery insufficiency, any current cervical surgery, continuing inflammatory arthritis, any infection, tumor and congenital anomalies of cervical spine. Total number of 45 individuals fall in the inclusion criteria from which 5 dropped out 2 from group A and also 3 from group B

than total of 40 subjects were randomized into 2 experimental groups of 20 subjects each by computerized generated list, including both males and females. Prior to any examination or treatment, a consent is taken after that intersegmental mobility is checked for cervical spine using posteroanterior glides to find out the restricted segment. Base line treatment for both groups is same including heat therapy for 15 mints using hydro-collateral hot pack and neck isometrics with 15 repetition each with 10 sec holds. Group A received SNAGS with 6 repetitions followed by base line treatment while Group B received NAGS with 6 repetitions followed by baseline treatment. Frequency of treatment sessions were 3 per week for 2 consecutive weeks. The assessment was done on the first day before treatment and after 2 weeks of interference for cervical joint ROM, neck disability and pain by utilizing a goniometer, NDI and VAS questionnaire respectively. The data for 40 subjects was analyzed by SPSS version 16.0. To compare the effectiveness in the group A and B independent sample-t test was used and results were presented in form of mean and standard deviation to find the change in pain on VAS, ROM by goniometer and functional status by NDI.

RESULTS

The average age of the participants in SNAGS group (Group A) was 43.50 ± 5.996 years, and in NAGS (Group B) was 41.80 ± 5.278 . Total 40 participants who participated in the study. 11 males and 9 females were in Group A while 10 males and 10 females were in Group B. The values of before treatment Visual analogue score within the group was 6.65 ± 0.813 and 6.25 ± 1.209 in Group A and B respectively while after treatment values of Visual analogue score was 1.75 ± 0.639 , and 3.00 ± 1.298 in Group A and B respectively (Table 1).

Post treatment Neck Disability Index score of patients for Group 1 and 2	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.009	.926	-3.476	38	.001	-5.500	1.582	-8.703	-2.297
Equal variances not assumed			-3.476	37.972	.001	-5.500	1.582	-8.703	-2.297

Table 1: Difference in means of both groups (pre and post) Pain rating score of patients of post treatment for Group 1 and 2

The mean reduction in Visual analogue score was 4.900 ± 0.641 , and 3.250 ± 0.639 , respectively in Group A and B. while before treatment values of neck disability index within the groups was 37.65 ± 6.325 and 37.65 ± 8.229 , respectively in Group A and B. While after treatment values of neck disability index was 13.35 ± 4.934 , and 18.10 ± 4.610 , in Group A and B respectively. The mean reduction in neck

disability index was 24.3000 ± 6.309 and 19.550 ± 5.596 , in Group A and B respectively (Table 2).

Post treatment Neck Disability Index score of patients for Group 1&2	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.009	.926	3.476	38	.001	-5.500	1.582	-8.703	-2.297
Equal variances not assumed			3.476	37.972	.001	-5.500	1.582	-8.703	-2.297

Table 2: Difference in means of both groups Post treatment Neck Disability index score of patients for Group 1 and 2

Pre-interventional flexion measurement within the Groups was 33.65 ± 5.174 and 33.70 ± 5.202 in Groups A and B respectively. Whereas post interventional flexion measurement was 43.64 ± 2.793 and 41.25 ± 3.754 degrees in Group A and B respectively. Mean increase in range of motion was 10.000 ± 3.713 degrees and 7.550 ± 3.859 degrees in Groups A and B respectively interventional extension measurement within the groups was 31.35 ± 4.283 degrees and 31.95 ± 4.395 Degrees in Groups A and B respectively. Whereas post interventional extension measurement was 43.55 ± 2.438 degrees and 40.95 ± 2.645 degrees in Group A and B respectively. Pre-interventional lateral flexion on the right side measurement within the groups was 33.75 ± 3.892 degrees and 32.40 ± 3.939 degrees in Groups A and B respectively whereas post interventional lateral flexion measurement was 41.75 ± 2.673 degrees and 38.10 ± 2.532 degrees, in Groups A and B respectively-interventional lateral flexion on the left side measurement within the groups was 30.35 ± 7.604 degrees and 31.70 ± 2.812 degrees in Groups A and B respectively whereas post interventional lateral flexion measurement was 41.45 ± 2.089 degrees and 38.30 ± 2.203 degrees, in Groups A and B respectively. Pre-interventional cervical right rotation measurement within the groups was 58.95 ± 7.790 degrees and 54.90 ± 7.174 degrees in Groups A and B respectively whereas post interventional cervical rotation measurement was 70.15 ± 5.622 degrees and 64.45 ± 4.850 degrees, in Groups A and B respectively. Mean increase in rotation range of motion was 11.200 ± 3.778 degrees and 9.550 ± 3.634 degrees in Groups A and B respectively. Pre-interventional cervical left rotation measurement within the groups was 55.40 ± 6.469 degrees and 54.60 ± 6.353 degrees in Groups A and B respectively whereas post interventional cervical rotation measurement was 68.30 ± 5.620 degrees and 64.55 ± 5.433 degrees, in Groups A and B respectively. Intergroup comparison for pain, ROM and

functional disability using independent “t” test showed Group A is statistically more significant over Group B in reducing pain improving ROM and improving neck functional status (Table 3).

Parameter		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Flexion Range of motion of patients post treatment for Group 1 and 2	Equal variances assumed	1.958	.170	2.310	38	.026	2.400	1.039	.296	4.504
	Equal variances not assumed			2.310	34.763	.027	2.400	1.039	.290	4.510
Extension Range of motion of patients post treatment for Group 1 and 2	Equal variances assumed	1.179	.284	3.306	38	.002	2.700	.817	1.047	4.353
	Equal variances not assumed			3.306	37.555	.002	2.700	.817	1.046	4.354
Right Lateral Flexion Range of motion of patients post treatment for Group 1 and 2	Equal variances assumed	.341	.563	4.434	38	.000	3.650	.823	1.983	5.317
	Equal variances not assumed			4.434	37.889	.000	3.650	.823	1.983	5.317
Left Lateral Flexion Range of motion of patients post treatment for Group 1 and 2	Equal variances assumed	.309	.582	4.640	38	.000	3.150	.679	1.776	4.524
	Equal variances not assumed			4.640	37.894	.000	3.150	.679	1.775	4.525
Right Rotation Range of motion of patients post treatment for Group 1 and 2	Equal variances assumed	.311	.580	3.122	38	.003	4.850	1.554	1.705	7.995
	Equal variances not assumed			3.122	37.976	.003	4.850	1.554	1.705	7.995
Left Rotation Range of motion of patients post treatment for Group 1 and 2	Equal variances assumed	.095	.760	2.143	38	.039	3.750	1.750	.208	7.292
	Equal variances not assumed			2.143	37.961	.039	3.750	1.750	.208	7.292

Table 3: Independent Samples Test Post treatment for Group 1 and 2

DISCUSSION

This comparative study was conducted to know the effectiveness of Sustained Natural Apophyseal Glides and Natural Apophyseal Glides in chronic pain of neck to reduce pain improve range of motion and to improve functional ability, with a baseline treatment of moist heat therapy and Isometric neck exercises to both the groups. While Group A received SNAGS and Group B received NAGS for 3 sessions per week for 2 consecutive weeks. Moist heat has superficial affect it causes local vasodilation also increases the extensibility of viscoelastic structures by decreasing viscosity, it also increases the Golgi reflex and decreases spinal reflex thus reducing spasms and provides immediate relief [13, 14]. Isometric exercises are strengthening exercises that increases overall muscle performance by increasing intramuscular co-ordination by activating motor neurons [15]. Mulligan has many mobilization approaches toward spinal treatment including NAGS, SNAGS. Reverse NAGS and for limbs including SMWLM's [16]. Lewit stated that reduction in joint mobility can be due to a mechanical restriction from an intrinsic factor. Due to reflex arc of joint, mobility can decrease due to reflex muscle guarding that helps to prevent from further damage and decreases nociceptor discharge within the joint by holding them in the middle range. It is recommended that treatment focused on the joint will also influence muscle activity and contrariwise. So to affect muscle activity reflexively with the joint afferents the

mobilization performed [17]. Pain reduction and ROM improvement is in concern with the mulligan concept that is positional fault. These techniques facilitate pain-free movement throughout the available range, and because the movement is under patient control, they reduce the potential problems associated with passive end-of-range motion in degenerative motion segments [18]. Pain relief with mulligan mobilization has a concept of mechanical receptor activation by gliding in end range inhibiting pain gate cycle [19]. Facet joints guides the spinal movement hence there mobilization increases range of motion by application of NAGS and SNAGS [20]. Facet joints may have mechanical problems that makes movement difficult and painful SNAGS might decrease joint capsular strain thus causing pain relief [21]. The poster-o-anterior passive mobilization techniques, may include restoring normal joint mechanics hence improving function of a muscle, its mobility, and the muscle flexibility [22]. Many studies in the literature showing the effectiveness of SNAGS in improving range of motion and in this study it showed that SNAGS is an effective treatment for improving range of motion and is statistically more significant than NAGS [19, 21, 23]. By improving ROM and reducing pain and correcting positional fault these techniques are improving the neck functional status [24]. According to evidence combination of manual therapy techniques and exercise therapy is effective [25]. A study was conducted on comparison between NAGS and SNAGS for mechanical neck pain has showed SNAGS is more beneficial in reducing pain [26]. Hence it is proved that both techniques of mulligan are effective and beneficial in reducing pain enhancing ROM and improving functional ability of the patient, but SNAGS is statistically more effective and beneficial in comparison with the NAGS.

CONCLUSION

This study concluded that both the groups A and B (Sustained natural apophyseal glides and Natural apophyseal glides) respectively are effective in eliminating pain, enhancing ROM, and improving neck functional ability in patients of chronic neck pain. However, Sustained Natural Apophyseal Glides technique was more effective than the Natural Apophyseal Glides techniques in reducing neck pain and improving ROM.

Conflicts of Interest

The authors declare no conflict of interest.

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