

Effect of Cervicospicular Strengthening Exercises and Snags in Improving Cervical Range of Motion and Reducing Neck Pain in Cervicogenic Headache Patients

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Abstract

Objective: To find out the effect of Cervicospicular strengthening exercises and SNAGS in improving cervical range of motion and reducing neck pain in Cervicogenic headache patients. **Materials & Methods:** A quasi experimental study was conducted and Thirty-two patients with Cervicogenic Headache were assigned to either Cervicospicular Strengthening or SNAG. Numeric Pain Rating Scale (NPRS), Neck Disability Index (NDI), Headache Disability Index (HDI) and Goniometer were used to measure pain, function, headache disability and range of motion respectively. Five weeks treatment session, with 3 treatment sessions were given per week to each subject. **Results:** Findings revealed that differences between two groups were statistically significant p-value is <0.05 with respect to pain, neck disability index, Headache disability index but in case of Cervical range of motion both the treatments were equally effective. **Conclusion:** This Study concluded that Sustained Natural Apophyseal Glides were more in effect to decrease neck pain intensity, neck disability index, headache disability index but in case of Cervical range of motion both treatments were equally effective SNAG was also clinically significance than Cervical scapular strengthening exercises.

Keywords: Cervicogenic headache; Sustained natural apophyseal glide; Cervicospicular strengthening

Introduction

Chronic unilateral non-throbbing pain that arises from the neck and spread to the ipsilateraloculo-frontotemporal area which become sever by prolonged neck movements or by triggering tender points. ^[1] Headache mostly affects every individual but among all the types of headache; CGH is 14%-18% prevalent. The average age for CGH is 42 years and 22%-25% more common in female than male. ^[2,3] It may be directly due to cervical spine pathologies ^[4] as upper cervical spines changes more commonly than from its neuroanatomical form ^[5] or may be referred by muscular and ligamentous source, neurogenic origin, osseous, articular, and may be blood supply of the neck. ^[4-6]

Non-invasive treatment include medication and physical therapy interventions which include massage, chiropractic manipulation, osteopathic manipulation, Transcutaneous Electrical Nerve Stimulation (TENS), exercises with general spinal manipulation. ^[7-9]

SNAG (Sustained Natural Apophyseal Glide) is a mobilization technique applied on the cervical spine for treating painful cervical movements. ^[10,11] The glides would be applied on cervical spines mostly on C1-C2 spines. SNAG have a prolonged effect than other physical therapy interventions in cervicogenic headache. ^[12]

Cervicospicular strengthening exercises are exercises which mostly develop strength and control in cervical and upper

thoracic or scapular muscles. ^[13] As strengthening of neck, scapular and shoulder muscle through exercises are beneficial in CGH. ^[14] Strengthening exercises would be static or dynamic improve pain, function and also have a long term effect in CHG's. ^[15]

In this study, effects of Cervicospicular Strengthening and SNAG's mobilization has been given in terms of improvement in pain, headache, disability and ROM in patients with Cervicogenic headache as in previous literature. Unfortunately clinical significant and effect of both treatments to maintain the recovery was not addressed yet. So, its dire need to explore the magnitude of these effects in symptomatic population.

Materials and Methods

This was a quasi-experimental study design. Study was held in Gulab Devi Hospital and Lifeline Hospital Lahore. Study was completed in duration of six months. The time taken in synopsis approval was excluded in this total duration. Base on clinical treatment was expected for improvement in rotation wit flexion rotation test (10% for the SNAG intervention minimal changes

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for place) with power set to 80% and the level of significance of Alpha at 0.5; a mean of 9 subjects per group were determine to be required, 32 patients were recruited. [16]

T tests-Means: Difference between two independent means (two groups) (g power analysis)

Analysis: A priori: Compute required sample size

Input: Tail(s)=Two

Effect size $d=1.05$

α err prob=0.05

Power ($1-\beta$ err prob)=0.80

Allocation ratio $N2/N1=1$

Output: Noncentrality parameter $\delta=2.9698485$

Critical $t=2.0422725$

Df=30

Sample size group 1=16

Sample size group 2=16

Total sample size=32

Actual power=0.8195426

Purposive sampling technique was used. Inclusion Criteria included patients having Age 18 years-45 years with unilateral headache without side shift. Headache for the previous 3 months as a minimum once per week. Positive flexion rotation test with restriction larger than 20 degree and numeric pain rating scale ≥ 7 . Exclusion criteria included headache with autonomic involvement, dizziness, visual disturbance, congenital condition of cervical spine for example pseudo achondroplasia, Klippel-Feil syndrome, Contra-indication to manipulative therapy and Inability to tolerate FRT. In treatment, cervioscapualr strengthening was applied on the cervical and scapular muscle bilaterally. The contraction was maintained for 7 seconds to 10 seconds followed by complete relaxation of effort for 2 seconds to 3 seconds, then and again contraction was made. Repeat the whole procedure for 3 times to 5 times. The treatment was given for 5 weeks, 3 sessions/week in group. [17] A Patient was in sitting position as comfortably sitting on the chair or couch. Therapist placed his hand on upper scapular region of same side of scapular muscles being treated, where scapular muscles (Upper Trapezius) muscle was getting inserted and his stabilizing hand placed on the origin site of muscle. Patient was instructed to perform lift or elevate his shoulder isometrically against the force applied by therapist followed by relaxation of muscle. Similarly; hand was placed on the back of the neck at the level of occipital bone, the front of the head and sides of the head and same patient was instructed to move his head in the direction in which therapist applied the force. On group B, SNAG technique applied on the dorsal side of the neck. The treatment was given for 5 weeks, 3 sessions/week. Treatment technique included patient was in sitting position in erect posture. Therapist placed his one hand's thumb on the C1 spinous process and with other hand applied on C2 spinous process for 3 repetitions as maintained the sustained accessory zygapophyseal joint glide while 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. [18] Ultra Sound therapy (US) was given at intensity 1.5 Watt/cm^2 , frequency 1 MHZ on neck region for 7 minutes to 8 minutes [17] as a baseline treatment to both groups. The researcher completed a study by case history, full physical examination and cervical Spine regional assessment. The participants fulfill neck disability index and headache disability index. Treatment then last according to the allocated groups. The follow up visit involved: The researcher reassess the patient. Afterward completion of 15 sessions of treatment the patient fulfill a neck disability index and headache disability index as a part of subjective assessment. All participants a whole of treatment sessions over a week period, which involved of treatment sessions perweek. Numeric Pain Rating Scale (NPRS), Neck Disability Index (NDI) and Headache Disability Index (HDI) were used as outcome measure tool. The Data were analyzed using SPSS for window software version 25. After assessing normality of data by Shapiro wilk test's it was revealed that data was normally distributed. Frequency table, pie cart, bar cart was use to describe summary of groups. Independent sample t test (parametric test and mean \pm SD) were used between groups. The study was approved from ethical review committee of Gulab Devi Hospital and Lifeline Hospital Lahore.

Results

Thirty two subjects were assessed on basis of inclusion and exclusion criteria. 16 subjects were allocated to either cervicoscapular Strengthening exercises or SNAG. Baseline values of socio-demographic data of both groups were comparable on basis of to mean \pm std. deviation in The mean age of participants in group A was 28.38 years \pm 7.33 years compared to 29.94 years \pm 7.95 years in SNAG group B. Data showed that there was no difference between groups. Baseline measurements for pain score at NPRS, NDI, HDI and cervical range of motions in all three cardinal planes were similar and comparable ($p\text{-value}<0.05$) mentioned in normality of data was tested by Shapiro-Wilk test, which showed that data was normally distributed ($p\text{-value}>0.05$). Parametric test was applied to compare the two population at various intervals. Independent t-test was applied to compare between group analysis. The result showed that there was no statistically significant difference between two groups for NPRS score ($p\text{-value}<0.05$). Pain intensity decreased to greater extent in SNAG group with means value 25.00 ± 6.09 as compared to cervicoscapular strengthening with mean 38.00 ± 15.76 . Improvement in pain was greater decreased in SNAG group with higher mean difference as compared to Cervicoscapular strengthening so SNAG was more effective. There was greater reduction in neck disability index with mean in 34.63 ± 9.93 SNAG compared to mean 46.38 ± 19.11 in cervicoscapular strengthening group as there was no statistically significant difference found between two groups. The greater change in mean value of NDI were observed in group B for pre-treatment and post-treatment values compared to group A showed that statistically no significant difference found between two treatment groups for NPRS ($p\text{-value}<0.05$).

There was greater reduction in NPRS with mean 3.25 ± 1.13 in SNAG group compared to 4.13 ± 1.09 .

Discussion

The study was conducted to find out the effective physiotherapy treatment for cervicogenic headache. According to the results of the study; it was showed that both cervicospicular Strengthening exercises and SNAG's played important role in decreasing the symptoms of headache and it's recurrence which eventually lead to increase the ranges of cervical spine.

According to the study; both treatment when applied individually produce marked effects in patients as there was no significant difference. But when the results of both groups were compared there was marked difference between both groups as SNAG's showed better results in decreasing pain, increasing range of motion at cervical spine and decreasing the recurrence of headache in these patients.

Pain was decreased in both groups with p-value of 0.03. Statistical analysis of NPRS showed that in group of patients receiving strengthening exercise 4.12 ± 1.08 and the group who were receiving SNAG's 3.25 ± 1.12 with p-value 0.03 which lead to conclusion that SNAG had better results in decreasing the pain in cervicogenic headache patients.

As according to similar studies; SNAG played more effective role in relieving pain in headache than another physiotherapy treatment. In Mulligan technique; SNAG had better results and more effective than other mulligan techniques like reverse SNAG technique for relieving the pain [Table 1].

Similar but most effective results were shown to decrease pain intensity in the headache when SNAG was used in the combination with manipulation than another treatment like modalities, exercises which were mostly used alone. [19] Cervicospicular strengthening exercises were also helpful in decreasing pain. But there were very few studies that were showed only therapeutic effects of the exercises. According to studies; pain reduction by using exercises mainly depend on the region on which they were applied and duration of effectiveness also depend on the region of application. [20] But for better results; Strengthening always combined with other techniques like mobilization or stretching. [21]

NDI was improved in both groups but when groups were compared with each other NDI was markedly reduced in the patients who were taking SNAG as there therapy. Statistical analysis of NDI showed in group of cervicospicular strengthening 46.37 ± 19.10 while the group of SNAG had

34.62 ± 9.92 with p-value of 0.040. Similar to recent studies it was proved that SNAG not only decreased pain intensity but it also lead to decrease disability index in patients which enables patients to live their lives more easily.

For reducing disability index; studies had shown that cervicospicular strengthening had minor effect in improving functions as it mostly needed cervicospiculothoracic strengthening or stabilization exercises. [22]

HDI was reduced in both groups but better results were seen in who were taking in SNAG as Statically; analysis of HDI in group of cervicospicular strengthening 38.00 ± 15.76 and in group of SNAG 25.00 ± 6.09 with p-value 0.006. Recent studies showed that HDI was mostly less in patients who were taking mobilization mostly self-SNAG at the level of C1-C2 than another physiotherapy treatment. [22]

According to studies it was proved that SNAG was the best treatment in not only decreasing the pain and symptoms in the patients but it also lead to increasing the ranges of neck? [23] As when it was applied on the cervical region it showed immediate results by decreasing the stiffness in cervical region which lead to improve movements at cervical region. [24]

Strengthening also lead to increase the ranges of neck but for these studies concluded that thoracic Strengthening or stabilization also required. In other studies it was shown that alignment of whole spine was required along with the active Strengthening exercises for improving the ranges which lead to improve person life. [25]

For the effective treatment of cervicogenic headache physiotherapy played important role in not only decreasing the pain but it also lead to increase the ranges of cervical spine with reduce its symptoms and its recurrence. Among all the techniques; SNAG was the most effective technique in not only decreasing the pain but also reduced stiffness, increase ranges of cervical spine and reoccurrence of the symptoms. Strengthening was also play important role in improving the cervicogenic headache but it showed better results when it was combined with other physiotherapy techniques.

Conclusion

This study concluded that sustained natural apophyseal glides were more effective in reducing neck pain intensity, neck disability index score, and headache disability index but in case of cervical range of motion both treatments were equally effective SNAG was more clinically significant as compared to cervicalsapular strengthening exercises.

Table 1: Between group comparison of headache disability index, NDI and NPRS.

		Treatment group		P-value
		Cervicospicular strengthening exercises (n=16)	SNAG's (n=16)	
Headache disability index	Pre-treatment (Mean ± SD)	64.81 ± 6.65	66.75 ± 4.68	0.348
	Post-treatment (Mean ± SD)	38.00 ± 15.76	25.00 ± 6.09	0.004
Neck disability index score	Pre-treatment (Mean ± SD)	67.50 ± 7.92	71.19 ± 7.65	0.19
	Post-treatment (Mean ± SD)	46.38 ± 19.11	34.63 ± 9.93	0.037
NPRS	Pre-treatment (Mean ± SD)	7.75 ± 0.68	8.13 ± 1.09	0.252
	Post-treatment (Mean ± SD)	4.13 ± 1.09	3.25 ± 1.13	0.033

Limitations

Due to time limitation it is difficult to apply the results over whole population.

Recommendations

Well randomized clinical trial is recommended with proper random sampling technique on this topic so that the results of that study could be generalized over entire population. Further research is advocated to check the long-term effects of interventions by proceeding follow-up sessions.

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