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Effect of neural flossing technique on pain, cervical range of motion and functional ability in subjects with acute, sub-acute trapezitis: An experimental study

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Abstract

Study Design: Pre- post experimental study.

Background and Objectives: Trapezitis is defined as an inflammatory condition of trapezius muscle leading to stress pain, which is present even during rest and on activity is aggravated. The technique of neural gliding is an attempt to take the nerve throughout its entire available Range of Motion, releasing the entrapments of the spinal accessory nerve and potentially affecting the nerve physiologically and mechanically. The present study intends to evaluate the efficacy of Neural Flossing technique in subjects with Acute, Sub-acute trapezitis.

Methods: Thirty subjects were assigned in the study. These subjects received Neural Flossing Technique on the affected side for 4 sessions. The subjects were then evaluated for baseline characteristics and functional disability using Visual Analogue Scales (VAS), Neck Disability Index (NDI) and Cervical Range of Motion pre and post treatment. Data was then analysed.

Results: The difference between pre and post of VAS and Cervical Range of Motion in the group was statistically highly significant ($p=0.0001$). The p value of NDI questionnaire was done with paired t test was statistically highly significant with p value of 0.0001.

Conclusion: Subjects who received Neural Flossing technique had decreased intensity of pain, increased Cervical Ranges and improved functional ability.

Keywords: Neural Flossing Technique, Trapezitis, NDI questionnaire, Cervical Ranges and VAS

Introduction

Neck pain is a very common complaint in the region of the upper trapezius muscle supplied by spinal accessory nerve. At some point in life about two third people experience neck pain. Neck pain prevalence varies widely in various studies, with a mean lifetime prevalence of 50% (range 14.2%-71.0%) a study done by The cervical spine is the most intricate region, and so are the muscles of this region.

Trapezius muscle is a triangular and flat muscle. The origin of the muscle is from medial one-third of superior nuchal line of occipital bone, ligamentum nuchae, spinous process and from supraspinatus ligament of twelve thoracic vertebrae. Upper fibre is inserted into posterior border of lateral one-third of clavicle. The spinal root of accessory nerve supplies sternocleidomastoid (SC) and trapezius muscle. This nerve arises from upper five segments of the spinal cord and it enters the posterior triangle of the neck through the posterior border of SC muscle and it leaves the triangle by passing deep to the anterior border of the upper trapezius muscle 5cms above the clavicle. The nerve then communicates with the spinal part of cranial nerves C3 and C4 and ends supplying the trapezius muscle.

Trapezitis is defined as an inflammatory condition of trapezius muscle leading to stress pain, which is present even during rest and on activity is aggravated a study done by A. kumaresan G. Deepthi (2012) ^[1] and Alagesan J, Shah US (2012) ^[2]. Trapezitis condition has subdivision as Acute, Sub acute and chronic which are based on period of time, where acute trapezitis occurs less than 1 month, and time period for Sub acute trapezitis is 1-3 months this was studied by Dr. Chris Healthype.

Recent studies by Alagesan J, Shah US (2012) ^[2] have hypothesized the trapezitis pathogenesis in which the stressed soft tissue receives less oxygen, glucose, nutrients delivery and accumulated subsequently high levels of metabolic waste products, in long

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standing cases there can be entrapments of spinal accessory nerve leading neck and shoulder pain as spinal accessory nerve (SAN) is the major motor supply to the trapezius and sternocleidomastoid muscles. This creates potential restriction in the functional activities and limited Range of Motion.

Sometimes referred to neuro dynamic mobilization, the technique of neural gliding is an attempt to take the nerve throughout its entire available Range of Motion, potentially affecting the nerve physiologically and mechanically was stated by Neural flossing does improve actual excursion of the nerve to move freely, helps decrease the ischemic pain and to oxygenate the nerve and decreases adhesions and also allows overall reduction in the symptoms.

There were three systematic reviews which included neural gliding with different conclusions. for benefit to reduce pain recommended to apply neural flossing technique, were as concluded saying there were no benefits of neural gliding, but there was a third systematic review by Goodyear – concluding that there was benefit in reduction of surgical intervention with the use of neural gliding. However there is paucity of literature of neural flossing technique on spinal accessory nerve in subjects with trapezititis therefore this was the primary aim of the present study, to evaluate the effects of neural flossing technique on pain, cervical ROM and functional ability in trapezititis

Methods and Methodology

A pre- post experimental study was conducted on 30 subjects in a tertiary health care Hospital, where the inclusion criteria was age group between 25 to 45 years subjects diagnosed with acute and sub-acute trapezititis and subjects complaining of non-specific pain in neck radiating to shoulder and upper back region. Exclusion criteria was history of recent surgery to neck, shoulder and upper back region, subjects on pain relieving medications. A written informed consent was taken from the subjects included in the study. For each subject baseline assessment was obtained before the intervention and brief demonstration about the intervention was explained and shown to the subjects. All the subjects were instructed to discontinue if they had any form of discomfort during the study period.

Procedure

Ethical clearance was obtained from the Institutional ethical review committee. All the subjects were screened as per the inclusion and exclusion criteria of the study. A written informed consent was obtained from all the subjects. They were also evaluated for the baseline data. The subjects were informed about the aims and objectives of the study, they were evaluated for outcome measures i.e. Visual Analogue Scale, Cervical Range of Motion and Neck Disability Index. Before the procedure started the subjects were shown the technique by the principle investigator and were advised to stop if any sort of discomfort. Since neural flossing is “active, releasing technique” all were performed actively by the subjects and positions were supervised and maintained by a physiotherapist. Each flossing was performed with 10 repetitions starting from shoulder, neck and then whole nerve flossing. At the end of the session again post assessment was documented for pain, movements of neck and level of disability of neck and upper limb using Neck Disability index, Visual Analogue Scale and Cervical Range of Motion. The subjects received physiotherapy treatment

for 4 consecutive days, neural flossing was carried out for 10 repetitions for 4 days. Amplitudes and speed were adjusted such that no pain was elicited with the technique.

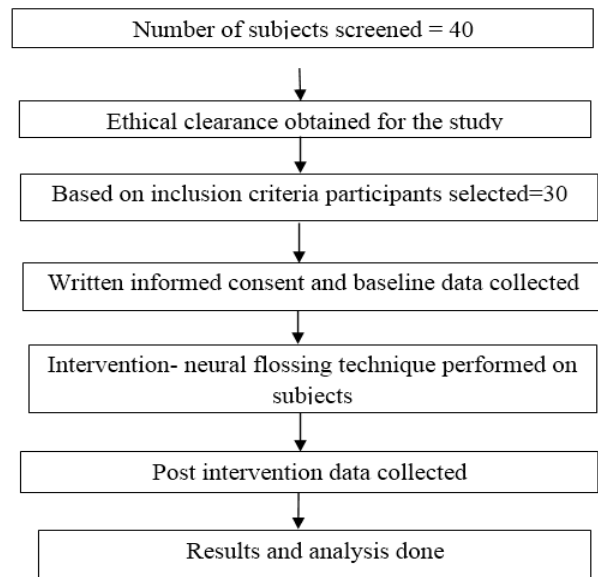


Fig 1: Flow chart

Data Analysis

Statistical analysis was done using SPSS software for statistical measures such as mean, standard deviation, paired t test and test of significance.

Kolmogorov-Smirnov Ztest was applied to analyse the normality of Visual Analogue Scale and Cervical Range of Motion.

Comparison of pre-treatment scores and post-treatment scores were analysed using students paired t test.

Results

Age distribution

On analysing the demographic profile (Table 1) of the subjects the mean age of the subjects in the study was 31.26 ± 9.07 . There was no significant difference in gender and age of participants. This information suggests less possibility of influence on result from age and gender aspects.

VAS scores: Visual Analogue Scale was used to assess the severity of pain. There was 96% of change in the intensity of pain that occurred after the treatment. The VAS scores reduced from 7.266 ± 1.285 (baseline) 0.233 ± 0.504 (post intervention). The mean difference Pre-treatment and Post treatment scores was about 7.033. The p value by paired t test was found to be 0.0001 which is highly significant.

Cervical Range of Motion: Universal goniometer was used to assess the cervical ranges there were significant changes in the ranges with flexion and right lateral flexion showing 24.08% and 24.06% of change compared to other movements. The p value by paired t test was found to be 0.0001 which is highly significant.

NDI: Neck Disability Index was used to assess the Activities of Daily living. There was improvement observed in the participants after undergoing a session with Neural Flossing Technique. There was 78.19% of change in the

intensity of pain that occurred after the treatment. The NDI scores reduced from 28.433±9.518 (baseline) 6.2±3.908 (post intervention).The p value by paired t test was found to be 0.0001 which is highly significant.

Table 1: Demographic Data

Gender	N	Age
F+M	30	31.26±9.07

Table 2: Comparison of pre and post-test VAS by paired t test

VAS	Time	Mean±SD	Mean Diff ± SD Diff	% of change	Paired t	P value
	Pre-test	7.266±1.285				
Post-test	0.233±0.504					

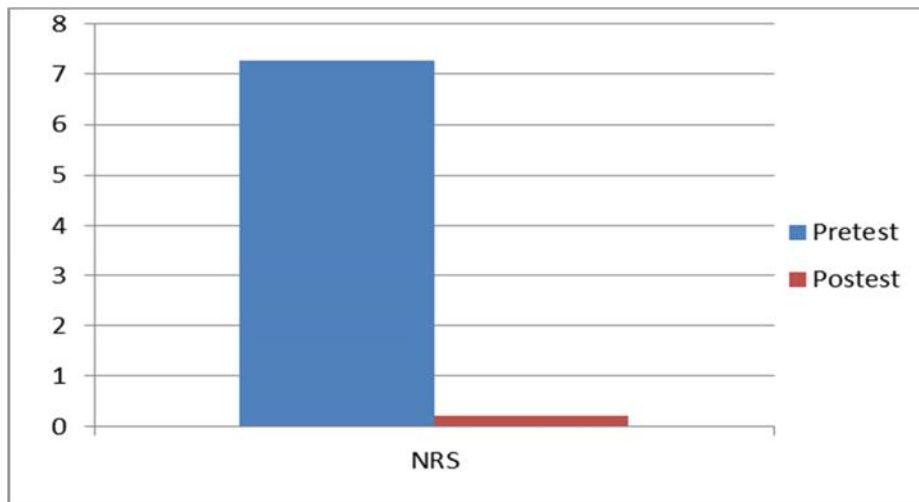


Table 3: Comparison of pre and post-test movements of Cervical ranges by paired t test

Movements of Cervical	Time	Mean±SD	Mean Diff.±SD Diff.	% of change	Paired t	p value
Flexion	Pre-test	34.267±5.132	11.303±0.827	24.80%	14.813	0.0001*
	Post-test	45.567±4.305				
Extension	Pre-test	48±9.823	13.833±0.143	22.37%	8.147	0.0001*
	Post-test	61.833±9.966				
Right Rotation	Pre-test	62.33±13.606	15.67±9.065	20.08%	7.183	0.0001*
	Post-test	78±4.541				
Left Rotation	Pre-test	62.66±14.681	15.5±10.177	19.83%	6.613	0.0001*
	Post-test	78.16±4.504				
Right Lateral Flexion	Pre-test	33.033±5.543	10.467±2.894	24.06%	11.968	0.0001*
	Post-test	43.5±2.649				
Left Lateral Flexion	Pre-test	34.266±4.697	9.267±1.959	21.28%	11.942	0.0001*
	Post-test	43.533±2.738				

(*p<0.05)

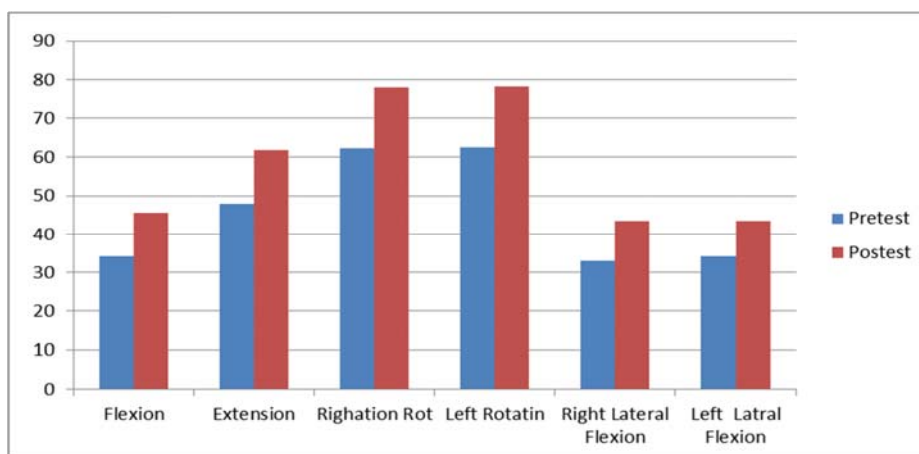
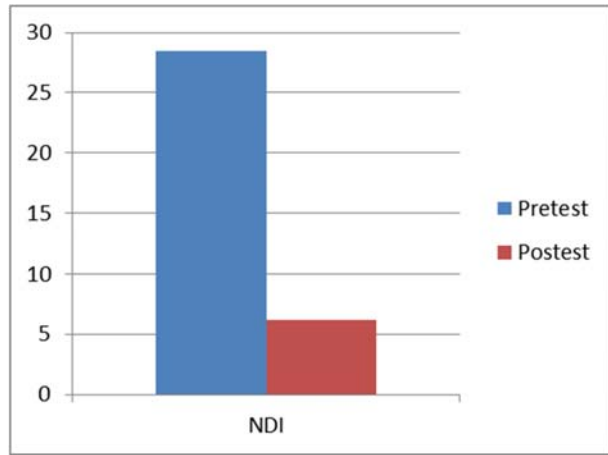


Table 3: Comparison of pre and post-test NDI by paired t test

NDI	Time	Mean±SD	Mean Diff.±SD Diff.	% of change	Paired t	p value
	Pretest	28.433±9.518				
Posttest	6.2±3.908					



Discussion

The present experimental, Pre-Post comparison study aimed to analyse the Effects of Neural Flossing Technique on Pain, Cervical ROM and Functional ability in subjects with Acute, Sub-acute trapezititis. The results of the study concluded that the treatment was effective in reduction of pain and increasing the cervical ROM followed by significant improvement in disability. The outcome measures used in this study were Visual Analogue, Cervical Range of Motion using Universal Goniometer and Neck Disability Index.

A study conducted by L Carroll *et al* (2000) concluded that the age-standardized lifetime prevalence of neck pain between the age group of 20-69 years is 66.7%, as it is a working-age population group. In the present study the age group taken were in 25-45 years and the mean age was 31.26±9.07, however this study somewhat correlates with the present study.

The incidence was seen more in females than in males in the same above study and also many different studies

Explained the association of these musculoskeletal pain in women is due to the fluctuating levels of oestrogen during their menstrual cycles. Oestrogen can either alleviate or worsen the pain depending on the type of chronicity of pain. Neural mobilization is performed to normalize the structures and function of C4-C5 nerve root through proper facilitation of nerve gliding according to hence reducing the intraneural swelling, pressure and inflammation. There was decreased neural mechano-sensitivity and automatic improvement of axoplasmic flow. Also many studies proved that Neural Mobilization attempts to restore normal neurodynamics in conditions where nerve sliding may be affected. Therefore, as the root of accessory nerve is upper 5 segments of the vertebrae in the present study spinal accessory nerve flossing was performed in an attempt to restore the neurodynamics and improve neck mobility. The effectiveness of neuromobilization techniques has been reported by several researchers for ulnar, radial and sciatic nerves.

The result in pain reduction was of VAS was found to be significant (96%) correlating to a case study by were VAS was 8 before treatment and after four weeks of neural mobilization reduced to 1 on activity. This Suggests that neural flossing would be highly significant on increasing the session frequency. The NDI score in the same study shows highly reduced neck disability and increased function correlating to the current study (78.19%).

Proposed a study where he checked effect of different neurodynamic mobilization techniques i.e. tensioners and sliders on knee extension ROM. The study findings indicated significant effect on improving ROM hence correlating to the present study as post intervention there was significant increase ($p < 0.0001$) in the cervical ROM. This could also decrease the sensitivity of the spinal accessory nerve.

There were 2 studies by Anikwe EE *et al* (2015) [3] and conducted neural flossing techniques in acute and sub-acute sciatica showing statistically significant changes in ROM, functional ability and VAS, correlating to the present study were similar changes were noted.

Limitations

The limitations in the study were that follow up in the study was not monitored. The tension in the nerve was not measured and the examiner was not blinded.

Future Scope

The study can be done with a large sample size to get better and appropriate results.

Conclusion

Neural Flossing technique is an efficient technique in decreasing the pain intensity and increasing the cervical ROM and improving the functional ability in subjects with Acute, Sub-acute Trapezitis.

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