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Research Article

# Effects of Neural Mobilization on Quality of Life of Patients with Primary Tension Headache

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## Abstract

Headache is the utmost common type of pain, affecting 66% of the worldwide population [1]. In India prevalence of problem is 63.9%. Females are found to be more affected 74.3% than males (32.6%) [2]. As a result, it is a severe health issue that affects both quality of life and productivity of work. A tension headache is the most common type of problem. It is pain or uneasiness in the head, scalp, or neck, and is often associated with muscle tension in these areas,neck and scalp muscles become tense or contract; contractions possibly be a result of stress, depression, head injury, or anxiety. A definite disc protrusion was responsible for cervical radiculopathy in 21.9% of patients; 68.4% were related to spondylosis or both. Radiculopathy accompanied with headache is the key concern in most of patients.[3]Mobilisation of nervous system has recently developed an as an adjunct to assessment and management of pain. Themain aspect of this approach is the healthy mechanics of nervous system allows pain free posture and movement to be achieved. However , in the presence of pathomechanics of neural tissue symptoms may be triggered by during daily events. The neural mobilization move the neural tissue in order to gain mobility and their sensitivity to mechanical stress in order to improve their mechanical and physiological function [4].

**Keywords:** Neural Mobilization; Quality; Life; Patients; Tension Headache

## Introduction

Increase tenderness of pericranial muscles has been described in patients with TTH . Centrally the mechanical interface is formed by cranium and spinal and radicular canals; peripherally it consist of the nerve bed in the limbs and torso in which nerves are present in between bones, fascia etc against which the neural structures contact during the daily movement and postures [4]. As the body moves, the mechanical interface changes its Dimensions which directs forces on the neural structures. The nervous system is protected against any compromise due to dimensional changes of the container which occur simultaneously with the body movements, these dynamic changes occur at many sites along with central and peripheral nervous system. When dynamic protective mechanism fails the symptoms may result and it may cause neural consequences [5].

By addressing the psychological (i.e., thoughts, emotions, and behaviors), social (i.e., work and playing status, culture, and religion), and neural factors that are known to play a significant role in headaches, this paper encourages a paradigm shift in clinical decision making away from the traditional tissue-based model of pain and toward a more comprehensive neuro-psycho-social model.

It has been proposed that further research is required to fully comprehend the effects of neural mobilization as a treatment technique. It can be difficult to choose the best course of action

for each headache sufferer, as their clinical presentation is likely to vary. The majority of headaches are brought on by abnormal upper cervical and occipital mechanics.It involves combination of Forward head posture , hypoactive longus coli muscle, hyperactive and shortened rectus capitis posterior and stiff cervical joint. Stiff thoracic spine and excessive kyphosis also alters the forces on the cervical region to compensate for stiffness. Furthermore, As a result of severe thoracic kyphosis, this causes an increase in neural stress in the dura and thoracic cord.The correct interpretation of the symptoms of the peripheral and central sensitization mechanisms causing headaches must be taken into account while selecting the appropriate treatment. The treatment of individuals with tension-type headaches must therefore go beyond the local tissue level and include techniques aimed at restoring or lessening sensitivity of the central nervous system.

## Objective

- To evaluate the efficacy of neural mobilization on quality of life in management of patients with primary tension headache.
- To Decrease the central sensitization with this intervention targeting the CNS and PNS.

### Hypothesis

- **Null :** There will be no significant difference in enhancement in quality of life of patients with primary tension headache with neural mobilization.
- **Alternative :**There will be significant difference in enhancement in quality of life of patients with primary tension headache with neural mobilization.

## Methodology

- **Study design:** Experimental
- **Sampling design:** Randomised control trial
- **Sample size:** 30 in each group ( Experimental and control)
- **Study centre:** JRNRVU, Dept. of Physiotherapy (Dabok) Udaipur. Rajasthan
- **Study duration:** 6 Weeks

### Inclusion criteria

- **Gender:** Both male and female
- **Age:** Between 18years to 65years with headache [6].
- Headache causing neck stiffness or pain
- Subject who scores more than 50 in Headache impact test (HIT- 6) [7].
- subjects with cervical radiculopathy was included in the study.

### Exclusion criteria

- Participants with Cluster headache
- Headache following trauma/injury in the neck/head.
- Any other systemic disease.
- Headache following vascular disorder in cranial/cervical region are excluded.
- Patients who were taking prophylactic headache medication was excluded.
- Non cooperative patient and patient undergoing psychotherapy.

### Materials

- Treatment couch
- Pillow
- Pen
- Chair

### Outcome measure

### Headache impact test (HIT-6)

### The Headache Impact

HIT-6 was created to analyze a variety of components that affect headache burden, and it has been useful in providing quantitative and useful data on the impact of headache. Pain, social function, role function vitality, cognitive function, and psychological distress are 6 items with 5 response options

- Never, 6 points.
- Rarely, 8 points.
- Sometimes, 10points.
- Very often, 11 points.
- Always, 13 points.

with a total score ranging from 36 to 78 points

### Northwick park neck pain questionnaire (NPQ) [8]

NPQ analyses patient impairments as a result of neck pain. It helps to analyze the outcome and track symptoms in populations with short-term or long-term neck pain and is simple to complete and score.

The NPQ questionnaire consist of following sections,

- Neck pain intensity,
- Neck pain and sleeping
- Pins and needles or numbness in the arms at night,
- Duration of symptoms
- Carrying,
- Reading and watching television
- Working and/or housework
- Social activities

### Procedure

### Group A (Experimental Group)

### Trigeminocervical neural mobilization

Patient will be supine with knees and hips bent, place one hand under the occiput and other hand with the web space against the maxilla.

The mobilization has two alternating positions

- Neck flexion, craniocervical extension, and mouth opening .
- Neutral neck position, craniocervical flexion and mouth closed [9].

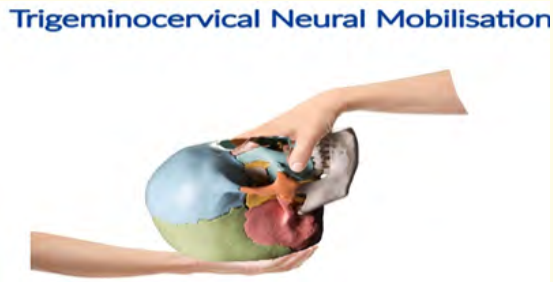


**Figure a**

### Facial nerve mobilization

**Figure b**

Gently hold the lower part of the auricle between the index finger and thumb. The thumb is placed at the opening of the external auditory meatus and the index finger is placed behind the auricle [10].

**Figure c**

Apply a gentle horizontal traction and circular movements to the auricle.

### Vagus nerve mobilization [11]

**Figure d**

- Upper cervical flexion
- Contralateral neck lateral flexion
- Ipsilateral neck rotation
- Maintaining this position gently push the upper abdomen in a caudal and then cephalic direction

**Figure e**

- With the neck maintained in a position operator leans over and pushes the patient in caudal and then cephalic direction. (Black arrows)
- Upper cervical flexion and contralateral lateral flexion: loads the intracranial part of the nerve.
- Ipsilateral neck rotation: loads the cervical tract.
- Gently pushing the upper abdomen in a caudal and then cephalic direction: loads and unloads the thoracic tract [11].

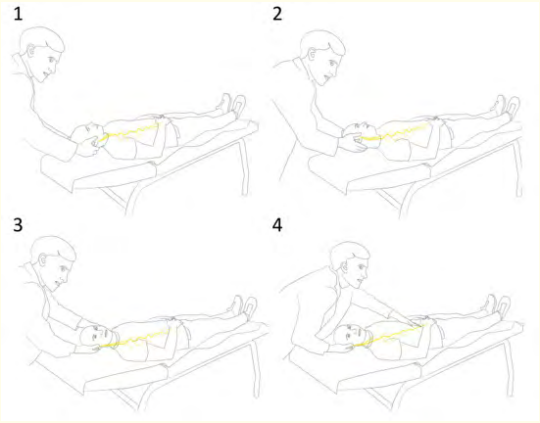


**Figure f**

Sequence of the vagus nerve neurodynamic test (VN-NDT) with

- Starting position with upper cervical spine in flexion.
- Contralateral lateral flexion.
- Ipsilateral neck rotation.
- The end position of the test with gentle movements of the upper abdomen caudally and cranially as discrimination maneuverers.

### Supra orbital nerve mobilization [12]


**Figure g**

**Palpate the supraorbital nerve just above the supra orbital foramen whilst the patient opens their mouth.**

**Figure h**

**Palpate the supraorbital nerve just above the supra orbital foramen .**

**Positive test: Increase pain or tension on mouth opening** [12]

### Strengthening deep neck flexors

For strengthening deep neck flexors, the patient was taught to perform cranio-cervical flexion exercises, by placing the patient in supine position with the cervical spine in neutral and instructed to flatten the curve of the neck by nodding the head. This position was held for 10 seconds and was repeated 10 times.

### Group B (control group)

### Craniocervical flexion against elastic band loop

Begin with cervical spine in protraction. Maintain hand position while retracting against the tension in the band [13].

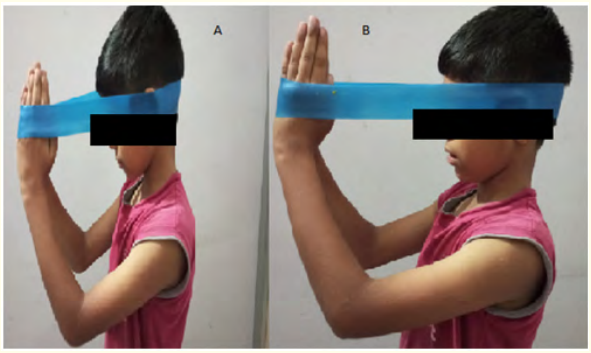


**Figure i**

**Cervical stabilization using a mini-ball with resisted scapular retraction** [13].

**Figure j**

**Pain management**

- **TENS:** Continuous mode – 10 min [14].
- **US:** Continuous mode – 8 min.

**Pectoralis doorway stretch** [15].

**Deep neck flexor strengthening** [16].

**Limitations of the study**

- Less number of subjects in each group taken for the study.
- Long term carryover of the treatment effect was not evaluated.
- The amplitude of neural tissue mobilizations varies subjectively and needs more clear description to avoid bias in the studies.
- Subjects with a wide range group between 18 to 65 yrs, thus the results cannot be generalized to individual age.

## Recommendations for further studies

- Further studies can be done with a larger sample size.
- Study can be done with long term follow-up, so that long term effects will be known.
- Study may be further conducted on the other nerves .
- A similar study should be conducted using more objective tools for measuring the study variables (EMG, NCV etc).
- Furtherstudy is needed to find effect by increasing frequency of session in short term duration of study lesser than 4 weeks of treatment.

## Discussion

This study was designed to find out the effect of neural mobilizationon quality of life of patients with primary tension headache.Sixty patients from both genders were divided equally and blindly into two equal groups. First group (experimental) received neural mobilization (trigeminal nerve, facial nerve, vagus nerve, supraorbital nerve) along with strengthening deep neck flexors wheres Group B (control group) recieves conventional strengthening exercise of deep neck flexors and scapular stabilizors along with pain management techniques.

It was found from the analysis that 6 weeks of interventions consisting application of Neural Mobilization for the subjects in Group A shown statistically significant greater percentage of improvement in primary tension headache, functional disability and severity of the radicular symptoms than Group B (control group).

Primary tension is the most prevalent form of headache. Neural mobilization techniques intend to improve adaptability, reduce mechanosensitivity, and activate analgesic mechanisms by mechanically stimulating the nerves with palpation, elongation, and sliding, Based on these arguments by Alejandro Ferragut et alin management of patients with primary tension headache for improving their quality of life [6]. Neural tissue managing is one physiotherapy intervention advocated for nerve-associated neck and arm pain (Butler 2000, Childs., *et al*. 2008, Elvey 1986) [17]. A study by Srinivasulu., *et al*. found that that neural mobilization was

clinically effective in reducing disability and improving the range of motion and functional levels. Brown, Cynthia Srinivasulu M., *et al*., stated that neural mobilization may be clinically significant in the dispersion of intraneural fluid in the presence of intraneural edema found in pathological nerves such as those found in compression syndromes [18]. One paper by Kinfe TM., *et al*. described a major reduction of the number of headache days per month [19]. Based on animal research, direct and indirect connections of the trigeminal and vagal nerves at the level of the brainstem are suggested to be part of the pathways involved in headache pain [20-23]. Darzi, Amin Norouzi Fashkhami (2010) stated that neural mobilization techniques can increasingly be useful in the treatment of abdominal neural tensions [24]. Nawal Abdel Raaof Abo Shady., *et al.* includedneural mobilization techniques (NMTs) in their study due to its immediate analgesic effect [25]. According to David Butler et al. Impairments in nonneural tissues that provide clinical evidence for a musculoskeletal cause of peripheralneuropathic pain need to be addressed during management [26]. According to study by Faizan Zaffar Kashoowhen., *et al*. facial nerve mobilization helps in a rapid recovery in bell's palsy [10]. Pre intervention score of HIT -6 and NPQ scores were compared with post intervention there was a statistically significant difference in between groups with reduction in symptoms after 6 weeks of treatment. Therefore, based on findings it was found that mobilizing trigeminal nerve, facial nerve, vagus nerve and supraorbital nerve was found to be effective in treating primary tension headache along with improving quality of life in these patients.

## Result

| HEADCHE IMPACT TEST - 6 | | | | | | |
|---|---|---|---|---|---|---|
| GROUP | PRE SCORE | | POST SCORE | | T TEST | P VALUE |
| | MEAN | SD | MEAN | SD | | |
| CONTROL (N= 30) | 68.97 | 12.88 | 60.17 | 6.47 | 4.05 | <0.001* |
| EXPERIMENTAL (N= 30) | 69.73 | 6.64 | 45.47 | 5.89 | 26.57 | <0.001* |
| T TEST | 0.29 | | 9.2 | | | |
| P VALUE | 0.77 | | <0.001* | | | |

**Table 1:** Comparison between and within control and experimental group according to hit-6 score.

Pre HIT-6 score among control and Experimental group was 68.97 ± 12.88 and 69.73 ± 6.64 respectively and there was insignificant difference in pre HIT-6 scores among control and experimental group (P > 0.05) and Post HIT-6 score among control and Experimental group was 60.17 ± 6.47 and 45.47 ± 5.89 respectively and there was significant difference in post HIT-6 scores among control and experimental group (P < 0.001).

Also, among both control and experimental group there was significant decrease in HIT-6 score at pre and post test (P < 0.001).

| NORTHWICK PARK NECK PAIN QUESTIONAIRE | | | | | | |
|---|---|---|---|---|---|---|
| GROUP | PRE SCORE | | POST SCORE | | T TEST | P VALUE |
| | MEAN | SD | MEAN | SD | | |
| CONTROL (N = 30) | 26.40 | 2.59 | 11.83 | 4.09 | 26.37 | <0.001* |
| EXPERIMENTAL (N = 30) | 26.10 | 2.56 | 7.57 | 1.38 | 41.75 | <0.001* |
| T TEST | 0.45 | | 5.41 | | | |
| P VALUE | 0.64 | | <0.001* | | | |

**Table 2:** Comparison between and within control and experimental group according to NOQ score.

Pre NOQ score among control and Experimental group was 26.40 ± 2.59 and 26.10 ± 2.56 respectively and there was insignificant difference in pre NOQ scores among control and experimental group ($P > 0.05$) and Post NOQ score among control and Experimental group was 11.83 ± 4.09 and 7.57 ± 1.38 respectively and there was significant difference in post NOQ scores among control and experimental group ($P < 0.001$).

Also, among both control and experimental group there was significant decrease in NOQ score at pre and post test ($P < 0.001$).

## Conclusion

After analyzing the data of the present study , it can be concluded that both conventional physiotherapy and neural mobilization is effective in improving quality of life of in subjects with primary tension headache, however neural mobilization was found to be more superior for improving quality of life of these subjects.

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