

# The Effect of Transcutaneous Electrical Nerve Stimulation, Cervical Spine Mobilization & Home Exercise Program in Cervicogenic Headache - A Case Study

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## ABSTRACT

Cervicogenic headache refers to a headache of cervical origin. TENS in general is commonly used for managing pain in all conditions. Manual therapy (Cervical Spine Mobilizations) is also found effective in managing Cervicogenic Headache. And the effects of these 2 interventions along with home exercise program were helpful in maintaining long-term benefits. Most of the other symptoms of cervicogenic headache can also be effectively treated with above physical therapy means. Deep knowledge about the cause, symptoms and remedies on cervicogenic headache is much essential for the physical therapist to deal in right direction. This is a case report of a 52 year old male having Cervicogenic Headache for last 4 years (chronic). He reported symptoms like pain in right side neck and face, stiffness in neck, sensitivity to bright light and occasional nausea. Physical therapy with TENS, Cervical spine Mobilization and Home exercise program was prescribed for 4 weeks. Numerical Pain rating scale, Neck Disability Index and Flexion Rotation test (Passive) were used as Outcome Measure. Physical therapy intervention helped the client on reduction of pain from 8 to 3 on NPRS, decrease in NDI questionnaire score from 38 to 10 and increase in Flexion Rotation Test (Passive) range from 20 degrees to 34 degrees. There is a drastic reduction in other symptoms like bright light sensitivity and nausea. Physical therapy with TENS, Cervical spine mobilization & home exercises can be used as an effective intervention protocol for reducing symptoms and increasing comfort in long standing cases of Cervicogenic Headache.

**Keywords:** Transcutaneous electrical nerve stimulation, Cervical Spine mobilization, Cervicogenic Headache, Numerical Pain Rating Scale, Neck Disability Index

## INTRODUCTION

A Cervicogenic headache is a headache which originates from neck and perceived in Head. Cervicogenic headaches are categorized as secondary headaches as there is an underlying condition such as neck injuries, strains, sprains or infections. This differentiates them from primary headaches such as migraines and cluster headaches.<sup>1</sup>

In cervicogenic headache pain begins in the neck (Ligamentum Nuchae, spinous process of cervical vertebra) and the

back of the head (Occipital region) and radiates towards the front of the head (Frontal Region). It's often difficult for the Individuals, Consultants and Physical therapist to differentiate cervicogenic headaches with migraines and tension headaches as both of this cause neck pain.<sup>2</sup>

In cervicogenic headaches patients experience a headache associated with neck pain and stiffness<sup>6</sup>. Sometimes neck movements can aggravate cervicogenic headaches. In 90% of the cases,

cervicogenic headaches occur in one side of the face, back of the head and neck.

Some people develop cervicogenic headaches because of their work style involving strains in neck. Some medical conditions like tumors, fractures, infections, arthritis of the upper spine, whiplash or injury to the neck can be a cause for cervicogenic headaches. Cervicogenic headaches are often accompanied by disturbances like pain in neck, eyes, shoulder, or arm, reduced ROM, sensitivity to light and noise, nausea and blurred vision<sup>3</sup>.

The prevalence of cervicogenic headache is estimated as a range between 0.4% and 2.5%, In pain management clinics, the prevalence is found to be as high as 20% of patients with chronic headache<sup>4,10</sup>. The mean age of patients with cervicogenic headache is 42.9 years, and cervicogenic headache is four times more prevalent in women than men. Patients had declines in quality of life measurements and had greater loss in determinants of physical functioning<sup>27</sup>.

It's believed that there is a functional convergence of upper cervical and trigeminal sensory fibers leading to bidirectional referral of pain sensations in region between the neck and trigeminal sensory receptor fields of the face and head. Similar to that, there is another belief that there is a functional convergence of sensorimotor fibers in the spinal accessory nerve and upper cervical nerve roots which converge with the descending tract of the trigeminal nerve and cause referred pain to head<sup>2</sup>.

Trigger points are usually found in the sub occipital, cervical, and shoulder muscles, and these trigger points can also refer pain to the head. Occasionally patient may report scalp paresthesia or dysesthesia.

A wide variety of medications like Non-steroidal anti-inflammatories (aspirin or ibuprofen), muscle relaxants, and other pain relievers have been used to treat cervicogenic headache. Nerve block may temporarily relieve pain and help to work

better with physical therapy. Physical therapy means like stretches, exercises, spinal manipulations and other means like deep breathing exercises, Yoga and Acupuncture is also found to be adopted in the treatment of cervicogenic headache

Physical therapy is an essential component in the treatment of cervicogenic headache. Physical therapy is adopted as first line modality incorporated with pain relieving medications. The therapist plays a vital role in addressing all symptoms and should try arranging appropriate remedies.

TENS helps in people with cervicogenic headache. TENS is the use of small electrodes placed on the skin (neck dermatomal region) to send small electrical signals to stimulate nerves near the source of pain<sup>5</sup>. Cervical Spine Mobilization is generally used to increase the range of motion of neck and is also helpful in improving muscle balance between flexors/extensors and between right and left side flexors<sup>6</sup>. Home exercises are also considered effective in reducing the symptoms of cervicogenic headache.<sup>9</sup>

Numerical Pain rating scale, Neck Disability Index and Flexion Rotation test (Passive) were used as Outcome Measure. Flexion Rotation test (Passive) is an objective test which is used to note the recovery pattern and in differential diagnosis of cervicogenic headache.<sup>8</sup>

This particular case study focuses on supporting evidence based practice in use of TENS, cervical spine mobilization and home exercise programme in the management of cervicogenic headache.

## CASE STUDY

A 52 year old male diagnosed with Right side Dominant Cervicogenic Headache was referred for physical therapy OPD. Patient gave a history of severe headache and has received medications and physiotherapy for last 4 years. Patient was not regular in both medications and physical therapy. He presented to OPD with Severe Headache (NPRS 8) in Right side face, back of head and in neck, Severe Neck Disability

(NDI Questionnaire 38), and restricted range of motion (20 degrees on Passive Flexion Rotation Test). He had adopted an abnormal flexion at neck and shoulders protruding forward (On Observation). There was a decrease in general range of motion at upper back and shoulders (right > left) and determinants of Physical Functioning. Apart from the above, he also suffered sensitivity to bright light and experienced occasional Nausea and discomfort.

Goal plan for him were to reduce pain, reduce neck disability and to improve neck Range of motion. Informed written consent was obtained from him and clear explanation about physical therapy procedure, session duration, Number of therapy session, effectiveness of home exercise programme was given. Physical therapy including TENS, Cervical spine Mobilization and six home exercises was carried over and monitored for 4 weeks on a trial basis.

**Intervention:** Physical therapy with TENS and Cervical spine Mobilizations was carried out for 6 days (Monday to Saturday) in initial 2 weeks and 3 days in the final 2 weeks on alternate day basis(Monday, Wednesday and Friday) (Total of 18 sessions).

**TENS**

Auto mode 2 channel tens units was used (to reduce pain).

Placement of electrodes: 2 electrodes in either side of C4 spinous process (below the posterior hairline) and 2 electrodes on either side of C7 spinous process,

Duration of TENS application is 10 minutes

**Cervical spinal Mobilizations**

- 1) Central and 2) unilateral postero-anterior pressures (Maitland) (for reducing stiffness and improving range of motion)
- 3) Inhibitory distraction (sustained pressure with the fingertips at the base of the skull),
- 4) Physiological rotation of the C1-2 joint in sitting,
- 5) Occipital nod on the atlas (Paris).

Duration of Cervical spine Mobilizations is 15 minutes

The total treatment time is for about 25-30 minutes.

**Home exercises**

Home exercises like Deep breathing, cervical retraction with forward head nodding overpressure, Corrected posture holds, Doorway pectoralis major stretch, Scapular Squeezes, Supine snow angels were demonstrated and made patient to do in home once in a day for all 18-20 days. Initially patient was not able to complete 2 sets of each exercise, later in the second week patient reported completion of 2 sets in all exercises. Client was found to be much more confident, cooperative and comfortable in the final 2 weeks as compared to that of initial 2 weeks.

**RESULTS**

There was a marked reduction in NPRS Score from 8 to 3 in cms. Similarly there was a marked reduction in Neck Disability index score from 38 to 10. Passive Flexion Rotation Range of motion increased from 20 to 34 degrees. There is also reduction in frequency of other symptoms like sensitivity to bright light and nausea. The client by profession is a hair stylist in a Saloon. He was able to return back to his daily work with greater degree of comfort and confidence.

NPRS		NDI		FLEXION ROTATION TEST (PASSIVE)	
Pre	Post	Pre	Post	Pre	Post
8	3	38	10	20	34

**DISCUSSION**

The use of TENS and Cervical spine mobilizations in adult with Cervicogenic

Headache has been very less commonly addressed. Improvements in terms of reduction in pain increase in range of

motion and functional capabilities have been achieved in 52 year old male. This particular case study proved that this structured treatment protocol is highly effective.

There are many studies conducted on the effectiveness of isolated application of TENS, combined application of Manipulations and Mobilizations in various outcome measures. Even there are many comparative studies conducted between Manipulations and Mobilizations and found that both are equally effective.<sup>5,6</sup>

It is believed that TENS stimulates the inhibition of interneurons in the substantia gelatinosa in the posterior horn of the spinal cord, in particular large diameter fibers (A-beta) which inhibit the transmission of stimuli by small diameter fibers. The other theory states that nerve stimulation produces endorphins, which is known to have an analgesic effect.<sup>5</sup>

The cervical spine starts at the base of skull and extends down to the thoracic spine. Flexibility of neck movement allows and maximise necessary positions for head functions and its sensory organs. A Zygo apophyseal joint is formed by articulation of inferior facets of vertebrae and superior facet of adjacent vertebrae. Direction and range of movement of these joints depend on orientation of articular facets. These joints allow flexion, extension, rotation and lateral flexion. Degenerative changes at these joints are very common due to weight-bearing functions. As reported in various studies the cause for cervicogenic headache is due to strain the neck. Structures involved can be a muscle, tendon or ligament<sup>11,12</sup>.

The long standing issues in these structures may affect zygo apophyseal facet joints as well. The activities like Poor posture, holding neck in an awkward position, Lifting something too heavy, Collision or fall, Performing a new activity, Repetitive motions also cause cervicogenic headache. Application of Cervical spine mobilizations helps in bringing the alignment of structures to normalcy thereby soft tissue length, bony movements can be

achieved back and also it could remove inflammatory exudates and relieve compression of adjacent structures. The client in this particular study is a hair stylist by profession and he has long working hours and possibilities of adopting poor awkward position, performing skilled activity with numerous repetitions. This could be the cause for his cervicogenic Headache.<sup>3</sup>

Administration of TENS, Cervical spine Mobilizations and home exercise programme shows great improvement in this particular client by bringing back normal degrees of movements, free from awkward posture, pain, sensitivity to light and nausea. Though this therapy protocol is not commonly used, its relative effectiveness and advantages will definitely help in patients with cervicogenic headache of various age groups and can be strongly recommended in acute and sub-acute cases also.

## CONCLUSION

Use of TENS, Cervical spine Mobilizations and home exercise programme in pain, Disability, restricted ROM, Light sensitivity and in nausea has shown marked improvement in the present case of Right dominant cervicogenic headache. TENS reduces pain, Mobilizations improves ROM, home exercise programme strengthens the muscle maintain muscle balance and promote posture and alignment in chronic cases and in advanced age of clients. So the final conclusion of the study is application of these 3 segments of physical therapy in right direction for 4 weeks will have beneficial result.

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