

CASE REPORT

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EFFICACY OF NEURAL MOBILIZATION AND ADVICE ON POSTURAL CORRECTION IN CERVICOGENIC HEADACHE: A CASE REPORT

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ABSTRACT

Background: This report was based on a patient who was suffering from cervicogenic headache. Patient required intense treatment for pain relief due to this headache. The main aim of this report is to explain the management of cervicogenic headache by using postural correction and neural mobilization techniques.

Method: A 42 year old female patient was suffering from headache since 20 years with no definite cause. Her chief complaints were chronic, gradual bilateral fronto-temporal headache associated with pain radiating to right arm, which has led to an inability to do household work. The aggravating factors were stress, watching television, use of mobile phone. The relieving factors were rest, or taking analgesics. The headache usually increased by evening.

Results: Various tests which included both musculoskeletal and neurological were used to assess the patient. The outcome measures were the headache impact test, VAS (visual analogue scale) and headache diary. After one month intervention for five days a week, patient reported decreased frequency and intensity of headache and this improvement was associated with the analysis of chief complaints along with observation and examination by physical therapist. Further use of manual therapy, i.e., daily neural mobilization, stretching and strengthening of appropriate muscles proved to be highly beneficial.

Conclusion: This study concluded that neural mobilisation is also an effective treatment in treating cervicogenic headache.

Keywords: Cervicogenic headache, neural mobilization, headache disorders, migraine, pain.

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INTRODUCTION

The term cervicogenic headache (CGH) was introduced by Sjaasted and colleagues 1983. CGH is defined as “chronic craniocervical pain syndrome in which sensation of pain originates in cervical spine (C0-C3) or soft tissues of neck and is referred to the head” [1,2]. The awkward positioning of neck, any undue pressure over upper cervical spine/occiput on symptomatic side and neck movement worsen the symptoms [3]. Headache is affecting 66% of population globally and among this, tension type headache patients are approximately 38%, migraine 10%, chronic daily headache 3% and CGH 2.5-4.1% [4]. In case of headaches and migraine, females are affected more than males [5], the additive reason being the menstruation and hormonal shifts⁶. CGH occurs due to activation of trigeminal autonomic system, precipitated by noci-perception in cranio-cervical region of trigeminal nerve which further generates cranio-autonomic features [4]. As the trigemino-cervical nucleus allows the exchange of sensory information between the upper cervical spinal nerves and trigeminal nerve, nociceptive signals from autonomic structures and soft tissue of cervical spine are sent to the receptive fields of trigeminal nerve in head and face, pain is also transferred to eye, temple bone and orbit etc [2].

Medically it is treated by NSAIDS, antiepileptic drugs, anti-depressant drugs, muscle relaxants, anaesthetic blockade, neurolytic procedures, and botulinum toxin injections etc [7]. Apart from these, postural correction, mobilization and manipulation of cervical spine are being used for treatment of CGH. Postural correction includes strengthening of deep flexors of cervical spine and upper trapezius, stretching of pectoralis major, minor, scaleni. It has been proved that patients with CGH often have impairment of these muscles and vice versa [8], therefore this might result in headache associated with tension in these structures. Watson DH and colleagues 1993 concluded that subjects with forward head posture usually have low endurance of upper cervical muscles when headache group was compared to non-headache group. Mobilization of cervical spine includes lateral glide techniques, wherein, the arm is positioned from an unloaded to a preloaded position, posterior-anterior slide of vertebra over another, thoracic spine manipulation (TSM) technique, bilateral translator facet joint traction manipulation to the upper thoracic inter vertebral segment, cervical high velocity low amplitude technique, Mulligan’s mobilization, Maitland’s mobilization etc., have been found to be beneficial [9]. David M. Bondi et al 2004, concluded that there was relief of pain when various osteopathic treatment techniques like muscle energy, craniocervical/strain counterstrain techniques were used along with muscle stretching and manual cervical traction [2,7]. Further, it is thoughtfull that conservative physical therapy management and recent advances used together may produce highly significant results. Stephanie Racicki et al observed that when combination of mobilization, manipulation and cervico-scapular strengthening exercises were given for treatment of CGH, it was found that

the treatment was very effective [10]. It has been observed that no work has been done to find out the efficacy of neural mobilisation on CGH. Therefore, the main objective of this intervention was to decrease intensity and frequency of headaches and improve posture.

CASE DESCRIPTION

A 42 year old female visited the centre with headache and radiating pain to right arm.

The patient presented with constant, throbbing pain in her head specifically right side which started from cervical spine first and then radiated to sub occipital area since 20 years which was of idiopathic origin. According to the patient, the intensity of pain was between 8-10/10. She had bilateral fronto-temporal headache with shortening of eye. She did not report nausea, dizziness, diplopia, dysarthria, no difficulty in chewing and talking.

Aggravating Factors were routine household activities like watching television, lifting objects, cooking and washing dishes. Relieving factors were rest and analgesics.

She stated that the pain increased irrespective of the treatment since 20 years. She consulted a physician who prescribed her analgesics, which gave her slight temporary relief. Later she was prescribed anti-depressants and anti-epileptics which were ineffective. 5 years earlier she was referred to a physical therapist who treated her with electrotherapy modalities and some exercises of cervical spine. Patient stated that her pain intensity dropped to 4/10, but pain remained constant and with time, the pain has radiated to the arm and long sitting was bit difficult. She denied having any other problem and reported least physical activity and she required support during ambulation.

The interventions included three sessions of neural mobilization weekly, home exercises to correct posture. There was no daily record to determine whether the patient was performing the exercises. Medication included NSAIDS which she took when pain was excruciating.

Physical examination

Observation: The patient attended the physiotherapy outpatient department with physical assist. Postural examination revealed rounded shoulders; forward head with chin slightly upright, thoracic kyphosis, loss of cervical lordosis was almost flat.

Palpation revealed tenderness over C2-C3 spinous processes, over the transverse process of C3-C7, over temporalis muscle, and below mastoid process.

Range of Motion (ROM) Active ROM was done for all cervical movements and it was found that lateral flexion and rotation to the right were painful and restricted along with radiating pain to the right. While performing end range cervical movements, patient did not complaint of nausea or dizziness, therefore, vertebra-artery syndrome was in evident. Also, neck extension rotation test [10] was performed for differential diagnosis of the same. Compression test was positive as there was radiating pain on ipsilateral side. Passive range of movement was limited and painful.

Muscular impairments were observed with respect to trigger points, muscle length and muscle imbalance. The muscles (upper trapezius, Sternocleidomastoid (SCM), masseter, temporalis, sub-occipital and other muscles of the face and neck) were examined for trigger points by direct palpation when possible [11,12]. Further muscular impairments were examined using cranio-cervical flexion test (CCF test) [13] which indicates impaired activation of deep cervical flexor muscle. Muscle imbalance was assessed using

- Head and Neck Flexion Test—this test is done to assess deep cervical flexors. The test is found to be POSITIVE when SCM and sub-occipitalis is tight and deep neck flexors are inhibited.
- Shoulder abduction test—is POSITIVE when patient elevates or rotates shoulder prior to 60 degrees abduction, this shows overactive upper trapezius and/or levator scapulae and inhibited lower scapular stabilizers.
- Push-up test—is POSITIVE while doing push ups. Winging of scapula suggests that serratus anterior and tight pectoralis major and minor muscles are inhibited.

Flexibility of Sternocleidomastoid (SCM), scalenes, pectoralis major / minor, sub occipital, levator scapulae, upper trapezius were assessed by using physiological movements and it was observed that SCM, Scalene, Pectoral muscles were tight and others were lengthened.

Neural mobilization headache has been classified into cluster headache, migraine, tension type headache and cranial neuralgia and its role on posture and cervical joints, but nothing about neurodynamics has been explained. To our knowledge, no study has been done to find the effective treatment of CGH. According to Shack lock, if a patient holds his neck in FHP and upper cervical spine extended for prolonged period results in reduction of tension in brainstem and increased pressure on occipital nerves as they pass through rectus capitis muscle on their way to the head. In addition to this, the increased kyphosis may result in increased neural tension in thoracic cord and dura. Therefore, in the present case report, neural mobilisation has been used for the treatment of CGH [14].

Differential diagnosis

Diagnosis was made using criteria laid down by International headache society for the diagnosis of cervicogenic headache table I. The findings from physical examination and observation by the physical therapist supported the diagnosis. The patient had abnormal posture, muscle impairment, cervical ROM was not full. These alterations would have led to pain in neck which further radiated to the head and face.

Course of treatment

The patient was asked to visit the physical therapy department of Guru Jambheshwar University of Science and Technology (G.J.U.S&T), Hisar, for one week. The treatment included patient counselling (which included examination of posture, assessment of peripheral nervous

system and explaining patient about faulty posture and its after effects) exercise, and neural mobilization sessions. The main objective of the treatment protocol implemented was to reduce intensity and frequency of headaches and enable patient to carry on house hold work with no or little assistance after undergoing neural mobilization regularly.

Protocol

Initial assessment was done prior to intervention using **Headache impact test (HIT-6)**

The HIT- 6 items measures the negative effect of headache on social functioning, role functioning, vitality, cognitive functioning and psychological distress and the severity of headache. **Headache diary:** An approach used to check the headache progression of a patient throughout the treatment period. It provides measurements of headache intensity, headache duration and headache frequency. Patient was explained the purpose; course, benefits and possible dangers of the study, then Pre-test HIT – 6, and Headache diary was measured. The treatment sessions were started as explained in Table I.

Table I: Treatment sessions and protocol

Session	Manual Intervention	Exercises(prescribed for home)
1 (day 1)	Right side (level 1) cervicalexension with ipsilateral Median neuro-dynamic test 1(MNT1) one set of 10 repetitions.	1. Stretching of pectoralis major & minor, trapezius upper fibres, and levator scapulae. One set of 5 repetitions. 2. Strengthening of neck flexors, and trapezius. One set of 10 repetitions.
Day 2	Same as day 1	Same as day 1
2 (day 3)	(Level 2) cervical flexion, and contralateral lateral flexion with MNT1. one set of 10 repetitions	1. Stretching of pectoralis major & minor, trapezius upper fibres, and levator scapulae. Two sets of 5 repetitions. 2. Strengthening of neck flexors, and trapezius. One set of 10 repetitions. Two sets of 10 repetitions.
Day 4	Same as day 3	Same as day 3
3(day 5)	Level/type 3b upper cervical flexion followed by lower cervical spine flexion (passively). The patient then sits up by flexing their thoracic spine, followed by lumbar and hips. one set of 10 repetitions	3. Stretching of pectoralis major & minor, trapezius upper fibres, and levatorscapulae. Two sets of 10 repetitions. 4. Strengthening of neck flexors, and trapezius. One set of 10 repetitions. Two sets of 15 repetitions.
Day 6	Same as day 5	Similar as day 5 but advised as home exercise program.
4(day 7)	Level/type 3c left side lateral flexion with upper cervical slump test. one set of 10 repetitions	Similar as day 4&5 but advised as home exercise program.

RESULTS

After the treatment session the outcome measures were documented. When pre intervention readings were compared to post intervention readings marked improvement was observed in scores(Table II). When patient was asked about degree of improvement, she was satisfied and motivated. Both frequency and intensity of headache decreased and she was able to perform the routine household activi-

ties without any assistance. After the completion of 7 days treatment, she was advised to perform strengthening and stretching exercises at home. When she was contacted after one month, she reported only 2 episodes of headache with intensity of 4/10 and she expressed her willingness to participate in the treatment sessions.

Table II: Pre and post intervention data

Outcome measure	Pre- intervention	Post- intervention
HIT-6	74	42
Headache diary	Pre- intervention	Post- intervention
Headache duration	7	4
Headache frequency	7	3
Headache intensity	8	4

DISCUSSION

The main objective of this report was to find effect of neural mobilisation and postural exercises on cervicogenic headache. The use of neural tension tests is a major part of the mobilization of nervous system approach. An aim of using this tests in assessment is to stimulate mechanically and move the neural tissues in order to gain an impression of their mobility and sensitivity to mechanical stresses. In the presence of abnormality, the purpose of treatment via these tests is to improve their mechanical and physiological function [15].

In this study, a female patient with cervicogenic headache was involved, assessed on basis of criteria laid by International headache society. The features of the CGH were similar to the features observed by other authors [16]. There are various studies in the literature that have documented that physical therapy is an effective tool in treatment of cervicogenic headache where pain is present due to musculoskeletal abnormalities like incorrect posture or any problem in muscular structures like tightness or weakness of muscles [1,6,17,18]. There is one study which states there may be a problem present in the neural structures [1]. But, there is no study on effect of neural mobilization and postural correction on cervicogenic headache. In this report, two techniques has been used for treatment of cervicogenic headache, neural mobilization and postural correction exercises, and the outcome measures used in the study was HIT-6 and Headache diary, which are reliable tools.

HIT-6 has been found to be the valid and reliable tool for measurement of effect of headache on activity of daily life in migraine patients. As CEH also impairs activity of daily living, therefore, this tool was chosen for analysis of headache. The scoring and interpretation method of this test is easy and sensible as it helps clinicians in treatment evaluation along with frequency of headache days [19]. Another outcome measure that is headache diary used to find out duration, intensity and frequency of headache. Therefore, use of prospective diary helps in obtaining more valid and reliable information from patients. These help in maintaining records and quantify the result of the treatment given to the patient and also help in follow up [20]. In this report,

the value showed highly significant improvement in HIT-6 and headache diary by incorporating the postural correction and neural mobilization.

Jull noted the role of physical impairments in the articular, muscular and nervous system. It was concluded from her study that combination of articular and muscular impairments along with poor neuro-motor control are suggestive of cervical headache. Other physical impairments that are often present in a cervical headache patient include postural abnormalities, muscle tightness, and neural tissue mechano-sensitivity. Therefore, in this case study, patient had complaints of radiating pain on right side, so neural mobilisation was chosen as treatment of choice because the patient had already undergone the postural correction exercises. As explained by various authors in their studies, that patient suffering from CGH have forward head posture, rounded shoulders, which results in tight pectoral muscles and weak scapular muscles. Such imbalance of muscles results in headaches [1,9]. Therefore, training of these musculature and life style modifications which includes ergonomic changes are advised to the patient [1]. Due to continuous holding of this position by the patient, it results in stiff thoracic spine, reduction in tension in brain stem and increase in pressure on the occipital nerves as they pass through the rectus capitis muscle on their way to head [21,22]. Further, it is also possible that increase in neural tension in thoracic cord and dura could be a product of excessive thoracic kyphosis or insufficient periodic reduction of tension with daily movement [22,23]. Therefore, while performing any tension tests the resistance to the movement has to be kept of importance. As it has been noted, that if this resistance is neglected while performing these tests this may result in headaches. Therefore, it can be counted as one of the reasons of headache that patient unknowingly may continue to stay in such a position that irritates dura and finally resulting in headache. Further, we suggest that while assessing the patient suffering from any headache, therapist must assess neural system which can be a possible cause. Instead of sticking to postural correction only or treating the imbalance of musculature, neural structures must be given equal importance. In this study, the patient's pain improved both in frequency and intensity when treated with neural mobilisation. The patient reported that she did not do any posture correction exercises prescribed to her. Her radiating pain improved and she could sit in long sitting for longer duration as compared to previous duration.

Future scope of study was future studies should see and compare the similar effects for longer duration. The relatively small sample size used in the report need to be addressed and similar effects need to be investigated on a large sample size, comparison between the postural correction and neural mobilization may be done in order to see which technique is much better. Along with this, role of neural mobilisation can be also seen.

CONCLUSION

This case report illustrates that the postural correction and neural mobilization may be an effective intervention which can be used in patients having cervicogenic headache. Improper posture is a cause of cervicogenic headache, so proper posturing technique must be given to patients in order to get more benefits and according to Shaclock, the tension generated in the nerve causing cervicogenic headache, so mobilization of nerve was given in order to relieve the sign and symptom of pain having neural in origin.

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