International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

# Management of Cervicogenic Headache: A Case Study

**Dr.Mohammed Abdul Rahman Khan[1], Dr. Farha Shah[2], Dr.N.S.S.N.S.Balaji[3]**

[1]Senior Physiotherapist, Al Wasl Sports Club, Dubai, UAE.
[2]Physiotherapist, Icare clinics-Emirates Hospital Groups, Dubai, UAE.
[3]Senior Physiotherapist, professor, Vice-Principal of MNR sanjeevani college of physiotherapy, Telangana, India.

**Abstract:**
**Background**: This patient was a 30-year-old woman with complaint of headache. She was functionally limited with posture. She also demonstrated impairments in cervical mobility and muscular performance.
**Methods and measures**: This patient was treated 8 sessions over a 8 week period.
**Study design**: Case study
**Intervention**: Intervention included manual upper cervical spine mobilization techniques, muscle re-education for deep neck flexors muscles and scapular stabilization exercises.
**Results**: Following treatment, the patient demonstrated in an increase in cervical mobility, improved muscular performance, a decrease in headaches, and resolution of functional limitations. Statistical analysis of the data showed significant differences from pre to post intervention from Day 1 to Day 8. There was clinical and statistical significance found in ROM and functional ability.
**Conclusion**: Findings suggest that the mulligans manual therapy with exercises is more effective in reducing headache, improving range of motion of cervical spine and functional ability in patients with Cervicogenic Headache.

**Keywords**: Cervicogenic headache (CGH), mulligans mobilization, snags, manual therapy, sub occipital muscle release.

## INTRODUCTION:

Headache is one of the most common disorders globally with a potential for majority disability. Migraine , tension–type headache (TTH)and cervicogenic headache (CGH) are most common types of headache which negatively impact on the quality of life, work activities and family life posing direct or indirect economic burden on society[2]. Headache arising from musculoskeletal disorders of the cervical spine, termed cervicogenic headaches are a common form of chronic and recurrent headache[36].

The causes of headache are many and varied and majority of people will experience a headache at some time in their lives. The term cervicogenic headache has been coined to describe headaches that arise from the cervical spine[38].

The world cervicogenic headache society defines cervicogenic headache as referred pain perceived in any part of the head caused by a primary nociceptive source in the musculoskeletal tissues innervated by

the cervical nerves. These structures may include muscles, facet joints , capsules, ligaments of the upper 3 cervical segments, nerves, Dura mater, spinal cord or vertebral artery[35].

Cervicogenic headache is a form of entrapment pain and explained its pathogenesis with the congregation theory. According to this theory, lesions in the structures innervated by the high cervical nerves ( Great occipital, Lesser occipital and Great auricular nerve belong to the second and third cervical nerve) cause afferent injurious sensory messages from the high cervical nerves that are connected[1].

Prevalence of the cervicogenic headache was estimated at 1%, 2.5% or 40% of the total population and up to 17.5% in patients with severe headaches. The prevalence is up to 53% in patients with post – whiplash headache[1].

**SYMPTOMS:**

Individuals with cervicogenic headache (CGH) present with a pattern of characteristic symptoms, however, there can be some degree of variance in their complaints[35].

The location of symptoms is usually unilateral and doesn't change sides, they begin in neck and spread to the head. Pain can range from a dull, deep ache to heavy pressure of moderate or severe intensity[35].

Cervicogenic headaches may be present upon walking or can begin or worsen in intensity as the day goes on, especially with sustained neck postures or movements while this type of headache can begin at any age, it often increases in frequency and intensity over a period of years and may or may not accompany a history of neck trauma or cervical joint degenerative disease[35].

Even though well defined in the third edition of the International classification for headache disorders (ICHD) 2018, headache diagnosis can be difficult due to the overlap of symptoms between migraine, tension-type headache (TTH) and cervicogenic headache (CGH)[2].

Moreover in clinical practice multiple headache forms may co-exist in up to 55% of cases. This may explain the uncertainty in the initial diagnosis and subsequent shift in the headache categorization that occurs in 40% of cases at subsequent follow up. Thus it is important to identify the prominent type of headache before planning management for optimum patient[2].

The non-pharmacological management of common headache types can include physiotherapy. This may consists of exercise and spinal manual therapy latter of which often provided due to the presence of neck pain in these patients. Neck pain is characteristic of cervicogenic headache (CGH) but it is also very common in people who suffer from migraine and tension-type headache (TTH)[2].

In migraine, neck pain is more prevalent than nausea and is positively associated with headache frequency and increases overall headache related disability[2].

It has been thought that neck pain occurring with headache could be due to cervical articular impairment or poor motor control of neck muscles. In contrast, neck pain may also be a symptom of headache which may be unrelated to musculoskeletal issues. Various physical examination tests have been described to identify musculoskeletal dysfunction in headache which can guide non-pharmacological management. However the evidence regarding the importance of function in headache diagnosis is poor[2].

Various systematic reviews favor the use of manual therapy as a part of non-pharmacological management of migraine, tension-type headache (TTH) and cervicogenic headache (CGH). It has been thought that manual therapy may modify identified articular dysfunction, particularly in the upper cervical spine as well as improve muscle function and motor control[2].

In addition to postulated biomechanical effects, manual therapy has been shown to reduce the sensitivity of the trigeminocervical nucleus which is known to be a factor in headache pathophysiology. For example, headache reproduction and resolution following manual palpation of the upper cervical spine in patients with primary headache indicates that manual therapy has the capacity to modulate the sensitivity of this nuclues[2].

Sensitization of the trigeminocervical nucleus appears to be a common feature in migraine, tension-type headache (TTH) and cervicogenic headache (CGH). Although such sensitization may have arisen through different means in each of the headache forms, desensitization of this nucleus by manual therapy and exercise may theoretically be a viable treatment option[2].

Mulligan manual therapy (MMT) is a relatively new concept that utilizes pain free low-velocity joint mobilization techniques that can include an active movement component. In this concept, pain-free sustained manual force is applied to the upper cervical spine in an attempt to modify headache or increase upper cervical spine mobility[2].

**ARTICULAR DYSFUNCTION**:

Cervical facet joints have been recognized as a source of CGH. Several studies have documented cervical pain referral patterns through use of fluoroscopically guided facet injections. The upper 3 cervical segments are capable of referring pain to the head. The typical referral patterns include symptoms in the occipital region, upper posterolateral and upper posterior cervical region, temporal area and vertex of the head.

Cervical zygapophyseal joint blocks have been used to identify the source of referred pain. Because this invasive procedure is inappropriate in the physical therapy setting, manual examination is performed in an attempt to reproduce the headache and identify dysfunction that correlates with symptoms. Jull et al found physical examination by a skilled manual therapist to be as accurate as radiological controlled diagnostic blocks in detecting symptomatic joints in the cervical spine. It is the belief of some textbook authors that passive accessory and passive physiologic motion assessment of the involved joints can reveal altered quality of movement, abnormal end feel, and reproduction of headache pain[35].

**MUSCLE DYSFUNCTION:**

Although muscle tightness has not been shown to be strong feature in CGH. Jull et al used an inflatable pressure sensor to indirectly assess deep cervical flexor muscle activation and both studies found significantly inferior performance in subjects with CGH compared to control studies[35].

Others have found subjects with neck pain and headache to demonstrate 43% to 46% less isometric cervical flexor muscle strength than control subjects. Others have also shown that general cervical flexor muscle strength was significantly lower in individuals with cervicogenic headache[35].

Jull et el, describe a cranio-cervical flexion test used to assess upper cervical flexion muscular control/performance. In this low-load test, the patient must perform upper cervical flexion slowly and precisely without substitution strategies involving the middle and lower cervical muscles[35].

Although studies have been done to assess the effectiveness of manual therapy on headaches, few have incorporated muscle re-education of the deep neck flexors. The purpose of this case study was to report the effects of cervical joint mobilization and deep neck flexor muscle training in an individual with suspected CGH[35].

**DIAGNOSTIC CRITERIA:**

The international headache society (IHS) (1998) diagnostic criteria for cervicogenic headache include pain localized to the neck and occiput which can spread to other areas of head. Sjaastad et al state that cervicogenic headache typically present unilaterally and do not change sides although they acknowledge that bilateral cases can occur. The headache tend to be of varying duration and of moderate intensity. The pain is usually non-throbbing and starts in the neck before spreading to the head which is often the worst affected area. Other associated symptoms may be present[1,2,35].

Aggravating factors include sustained or awkward head postures and cervical movements. A history of head or neck trauma is related to onset in about 50% of cases but in other s there appears to be no known precipitant[1,2].

People with cervicogenic headache demonstrate resistance to or limitation of passive neck movements. A painful motion abnormality at a relevant segment in the cervical spine is also a feature headache sufferers have been shown to demonstrate weakness and loss of endurance of upper cervical flexor muscles and often exhibit a forward head posture. This muscle dysfunction is thought to result from imbalance in activity levels between different muscles[2].

**PURPOSE**

- To describe the use of manual therapy and muscle education for an individual with cervicogenic headache (CGH).
- To describe whether headache symptoms change in response to a manipulative physiotherapy programme.
- To describe whether physical signs in cervical spine were altered in response to a manipulative physiotherapy programme.
- To determine whether any changes in signs and symptoms were maintained once the programme had been described.

**OUTCOME MEASURES:**

1. Headache Disability Index (HDI)
2. ROM

**1. Headache Disability Index (HDI):**

It is a 25-items headache questionnaire derived from case history responses of subjects with headache and it sub grouped into functional and emotional subscales to assess the impact of headache and its treatment on daily living.

The purpose of the scale is to identify difficulties that patient may be experiencing because of her headache.

Each item is marked either ‘YES’, ‘SOMETIMES’ or ‘NO’.

Answering each question as it pertains to her headache only.

Using this system, if ‘YES’ is checked on any given line that the answer is given ‘4’ points.

‘SOMETIMES’ is given ‘2’ points.

‘NO’ answer is given ‘0’ points.

Using this system, a score of 10-28% is considered to constitute mild disability.

30-48% is considered to constitute moderate disability,

50-68% is considered to constitute severe disability,
72% or more is considered to constitute complete disability.

**2. NECK RANGE OF MOTION (ROM):**

Neck ROM was measured by the Universal Goniometer. The cervical ROM measurement was done in a standardized sitting position to eliminate errors and prevent improper movements. The patient was required to sit with their back straight closed to the back of the chair. The reference points for the placement of UG were determined according to the method Youdous et.al.

To measure cervical flexion and extension, the UG axis was held on the tragus of the ear so that the movable arm was parallel with the base of the nares and fixed arm was ventricle for side flexion, the UG axis was held on a sternal notch , the stationary arm tracked an imaginary line running from the patient's acromion process and the axis of the UG was placed above the midpoint of the patient's head. The fixed arm of UG followed and imaginary line between the person's acromion process, while the movable arm was placed along the top of the person's nose.

Both the outcome measures were measured before beginning of the first session while assessing the patient and after each session to mark the difference.

**CASE DESCRIPTION**

**Background**:

The patient was a 30-year- old female with a primary complaint of left –sided sub occipital headache. She was referred to physical therapy by her family physician.

**History**:

**Chief Complaint:**

The patient described her symptoms as an aching pressure on the back of her neck at the base of the skull that extended into the occipital region. Pain intensity ranged from 5/10 to 8/10 with 0 being no pain an d10 being the worst pain imaginable. Nausea and vomiting were not associated with her headaches. She denied having dizziness diplopia, dysarthria, dysphagia, drop attacks or paresthesias. She had no difficulty chewing and no difficulty in sleeping. Patient denied complaints of visual or aural disturbances and photophobia or phonophobia.

**Aggravating factors:**

the headcahe was continously present but would increase in intensity as the day went on, her neck felt as though it may "pop" with movement and " fatigued" after about 2 hours of computer use or paper work at her desk. She was employed as a software engineer which required her to work at a computer most of the day. The most intense headaches would come on about 3 times per week and would last 2-6 hours. She attributed these more severe episodes after prolong sitting at the desk.

**Past history and intervention:**

the patient stated that the headaches began insidiously after a car accident an year. The headache sincreased in intensity and frequency to such a degree that she sought treatment. Symptoms with that episode partially resolved with medication like analgesics prescribed by her physician but never completely eliminated.

**Present history and intervention:**
symptoms had insidiously become more intense and more frequent over the past 6 months. Intervention for this episode included medication an over-the-counter pain reliever containing acetaminophen and caffeine. She would take medication only when the headaches were at their worst and this helped to decrease pain intensity. The patient did a magnetic Resonance Imaging(MRI) scan after her car accident and found that muscle spasm with no structural bony abnormality. Her goals were to decrease the frequency of the intense headaches and to be able to tolerate computer work or desk work.

**Physical examination:**
**On observation:**
Patient did not appear to be in acute physical distress. Seated and standing subjective postural assessment revealed flattened cervical lordosis and thoracic kyphosis, slight forward rounded shoulders with the right being greater than the left and moderate forward head held with the chin extended forward into moderately excessive upper cervical extension.

**Range of motion (ROM):**
Shoulder ROM was normal and did not reproduce symptoms. Full active ROM for flexion and extension was present based on visualization; however, left sided upper cervical pain was reproduced at the end range extension.
No signs and symptoms of vertebra basilar artery insufficiency (VBI) were present with sustained cervical extension testing was performed to differentiate between upper and lower cervical extension ROM. Upper cervical spine extension mobility was tested with the patient's chin guided out forward while allowing the lower cervical spine to flex and the upper cervical spine to extent. Lower cervical spine extension mobility testing was performed with upper cervical regions maintained in a relatively flexed position and chin nodded down towards the throat. The headache was reproduced with upper cervical spine extension ROM but not with isolated lower cervical spine extension.
Active cervical rotation measurements were 80 degrees to the left and 85 degrees to the right . No complaints of pain and no signs and symptoms of VBI were present with sustained rotations.
CRANIO-VERTEBRAL STRESS TEST were negative for the alar ligament and transverse ligament laxity. Passive ROM for cervical rotation was slightly limited to the left compared to the right. This symmetry was more pronounced when rotation was localized to the upper cervical spine with lower cervical spine held in full flexion. Cervical lateral flexion ROM was affected on left side with 5 degrees lesser than right side and thoracic AROM was not assessed at this time.

**MUSCLE TESTING:**
Upper extremity strength assessed with manual muscle testing was 5/5 throughout myotomes C2 through T1. Strength of middle trapezius was 4+/5 bilaterally and lower trapezius muscle was 4+/5 on right side and 4-/5 on the left side. Cervical extension strength was 5/5 without symptoms.
Manual muscle testing for upper cervical flexor muscles was not done, however, performance of these muscles was assessed using the pressure biofeedback method described by jull et al. this patient was able to hold an increase in pressure of 2mm/hg for 10 seconds 1 time but demonstrated significant substitution with the sternocleidomastoid (SCM)muscle. This substitution was evident through visual observation and palpation of the SCM muscle as it contracted.

Flexibility of the upper trapezius muscle was slightly limited bilaterally, however the patient did not complain of discomfort in this area and testing did not reproduce the patient's headache. Tenderness was present moderately deep palpation to the left upper cervical extensor muscles. Moderate limitation in the length of these muscles was also noted during passive upper cervical flexion with the C2 vertebra stabilized. There were no significant flexibility limitations found in the Levator scapula or scalene muscles and they were not tender to palpate.

**Differential diagnosis based on the physical examination**:

The finding of reproduction of headaches obtained during the physical examination supported the diagnosis of cervicogenic headache. Impairments were found in posture. Cervical ROM, muscle performance and accessory motion.

Although studies attempting to link forward head posture to headaches have been inconclusive, this patient demonstrated a posture with excessive upper cervical extension. This could have closed down the upper cervical facets and may have contributed to her symptomatic state, especially during sustained postures and cervical extension ROM.

The weakness in this patient's middle and lower trapezius could have contributed to her limited endurance and tolerance of sustained postures. Poor function of these scapular these scapular stabilizers may also have leads to excessive strain on the cervical spine and muscles, which could have contributed to symptoms during work activities.

Significant limitation was found in upper cervical flexor muscle performance. Poor strength, endurance or control of these deep neck flexors could have contributed to the patient's neck pain and headache during sustained postures.

Tenderness of the upper cervical extensor muscles may have related to short in their length position secondary to the patient's postural deviation. These muscles when dysfunctional refer pain to the head.

## RESULTS

### COURSE OF TREATMENT:

Patient received 8 treatment sessions per week for 8 weeks and each treatment session did not extend beyond 30 minutes.

The patient was informed that her designated intervention has been shown to improve headache symptoms.

The patient received the following structured exercise program encompassing conventional cervical flexion loading exercise, upper quarter low load endurance training, stretching and generalized mobility exercises.

All the exercises were supervised during each session and exercise parameters were adjusted as required but without any modifications in the type of exercise. Exercises were performed in the following sequence.

1. A conventional cervical flexion loading exercise is performed with the subject in a supine position with the knees bent and neutral head/neck position. The head lift exercise was taught ensuring that the cranio-cervical spine was maintained in a neutral position while lifting the head from the supporting surface.

2. Scapular retraction in prone with the subject arms by the side, performed against gravity resistance. For the first two weeks, 2 sets of 5-10 repetitions with 10 second hold of the above exercises were performed, building slowly to 3 sets of 15 repetitions with 10-15 second hold over the next 4 weeks.
3. Passive static self stretching exercises for the upper trapezius, levator scapulae, scalene and sternocleidomastoid muscles were delivered . Stretching was maintained for 30seconds with 3 repetitions given to each tight muscles.
4. Active mobility exercises of the neck for flexion, extension, side flexion and rotation to either sides were included. Two sets of 10repetitions were performed. Patient was advised to undertake similar exercises at home, unsupervised once a day. Patient was asked to maintain an exercise diary to monitor compliance.

**MULLIGANA MANUAL THERAPY:**

**C1-C2 SNAG:** Flexion-rotation test was evaluated in the assessment, if a 10degree of restriction was identified compared to the reference standard of 44degrees a unilateral postero-anterior mobilization was applied to the transverse process of the first cervical vertebrae on the contralateral side of restriction on flexion rotation test.

Patient was asked to rotate the head towards the restricted side of the flexion-rotation test as far as she was able to without pain.

A maximum of 3 repetitions were applied in a single treatment session. If impairment is not identified on the FRT and there is no headache symptoms present then only exercise was provided as there was no further.

**HEADACHE SNAG:** a postero-anterior mobilization of the second cervical vertebrae was sustained for 10-30 seconds with the aim to reduce headache intensity at the time of application. A maximum of 6 repetitions were given as there was reduction in the headache at the time of the first application.

**UPPER CERVICAL TRACTION:** in terms of pain reduction to the previous techniques, upper cervical traction was delivered with the participant in a supine position. The therapist pronates her forearm against the patient's occiput while fixing the patient's chin. The resultant traction force was sustained for 10-30 seconds with the aim to reduce headache intensity. A maximum of 10 repetitions were delivered in single session.

On follow up the very next day of the first session, no increase in headache intensity or neck pain for more than 1 hour or dizziness during and after the intervention is found.

Weekly assessment was done to find the change in outcome measures i.e, HDI and ROM.

On first session no exercises were taught. Patient was treated only with Mulligans Manual Therapy techniques without overpressure applied. After the session the patient was asked to rate the HDI and it was a score of 82%, which was considered as severe on the scale. ROM of cervical flexion was 60 degrees, cervical extension was 70 degrees, cervical lateral flexion to the right 45 degrees and cervical lateral flexion to the left was 30 degrees.

On the next second session patient showed reduction of symptoms, same Mulligans Manual therapy techniques were applied with over pressure applied by the patient and no exercises had been taught on that session too. After the session, the patient was asked to rate the HDI and it was a score of 72% with ROM of cervical flexion 60 degrees, cervical extension 70 degrees and cervical lateral flexion to the right is 45 degrees and cervical lateral flexion to the left is 30 degrees.

On the third session, mulligans manual therapy was provided with over pressure applied by the patient and exercises were began to improve endurance and holding capacity of the lower trapezius and deep neck flexors. Following the instruction in the deep neck flexor exercise, the patient was able to perform 3 repetitions of 7 seconds hold, she was instructed to carry out the exercises 2 times per day performing at least 3 sets of 3 repetitions at each sitting. The deep neck flexor exercise was continued at each physical therapy session Prone middle trapezius muscle strengthening and prone row exercises were introduced (2 sets of 10 repetitions), patient complained upper extremity fatigue during second set. She was instructed to add these exercises to her home exercise program. Scapular stabilization exercises were also introduced 1 set of 10 repetitions and asked to continue as home exercise program. . After the session the patient was asked to rate the HDI and it was the score of 70%, ROM of cervical flexion was 65 degrees, cervical extension was 70 degrees, cervical lateral flexion to right was 45 degrees and cervical lateral flexion to left was 30 degrees.

On the fourth session, mulligans manual therapy provided along with the exercises same as the previous session. The deep neck flexor exercise was continued at each physical therapy session. The exercise was progressed in number of repetitions and hold time (up to 10 seconds) as the patient's performance of exercise improved and she was able to complete more repetitions. The exercise was progressed in number of repetitions and hold time (up to 10 seconds) as the patient's performance of exercise improved and she was able to complete more repetitions. Patient was asked to rate the HDI, It was the score of 66% and considered as severe on scale. Change in the neck ROM was noted. Cervical flexion was 70 degrees, cervical extension was 70 degrees, cervical lateral flexion to right was 45 degrees and cervical lateral flexion to left was 40 degrees.

On the fifth session, the same treatment was provided as in the previous session but all the exercises were progressed to 2 sets of 10 repetitions in the home programme, no symptoms were reproduced after the previous session, HDI was marked as 48% which is considered as moderate on scale. But there was slight improvement in Neck ROM. Cervical flexion was 70 degrees, cervical extension was 70%, cervical lateral flexion to right was 45 degrees and cervical lateral flexion to the left was 45 degrees.

On the sixth session, the same treatment was provided as the provided in the previous session, HDI was marked as 43 %which was considered to constitute moderate disability. Further improvement in neck ROM was noted. Cervical flexion was 75degrees, cervical extension was 70 degrees, lateral flexion to the right was 45 degrees and lateral flexion to the left was 45 degrees.

On the $7^{th}$ session, the treatment session was provided as same as the previous session, HDI was marked less than 34% which is equal is considered to be marked as moderate disability. Further improvement in

neck ROM was noted. Cervical neck flexion was 80 degrees, cervical extension was 70 degrees, cervical lateral flexion to the right was 45 degrees and cervical lateral flexion to the left was 45 degrees

On the 8th session,the treatment session was provided as same as the previous session. HDI was marked as 12%, which is considered as mild difficulty ranging between 10-28%. Complete neck ROM was achieved. Cervical flexion was 90 degrees, cervical extension was 70 degrees, cervical lateral flexion to right and left was 45 degrees which was considered to be normal.

The patient's goals were met at this point and it was mutually decided between the patient and therapist to discontinue formal physical therapy in the clinic.

The patient was advised to continue her home exercise program at least 3-4 times per week and she expressed motivation to do this.

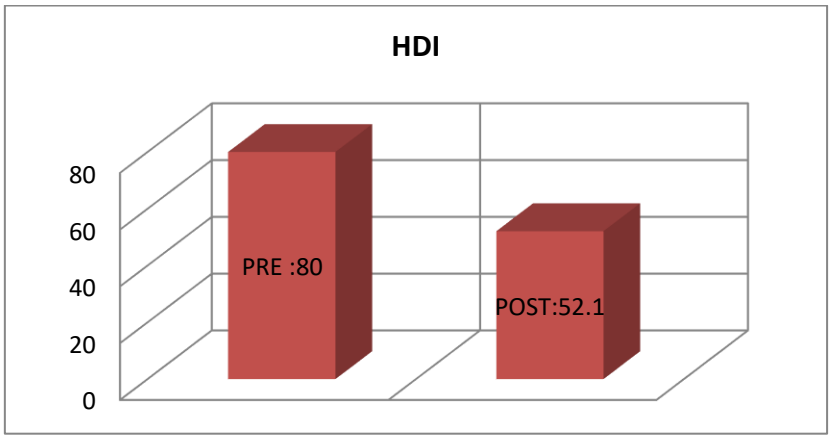
At a one month follow- up phone call, patient reported that she had been performing her home exercise program 2 to 3 times per week and had experience of no headaches.

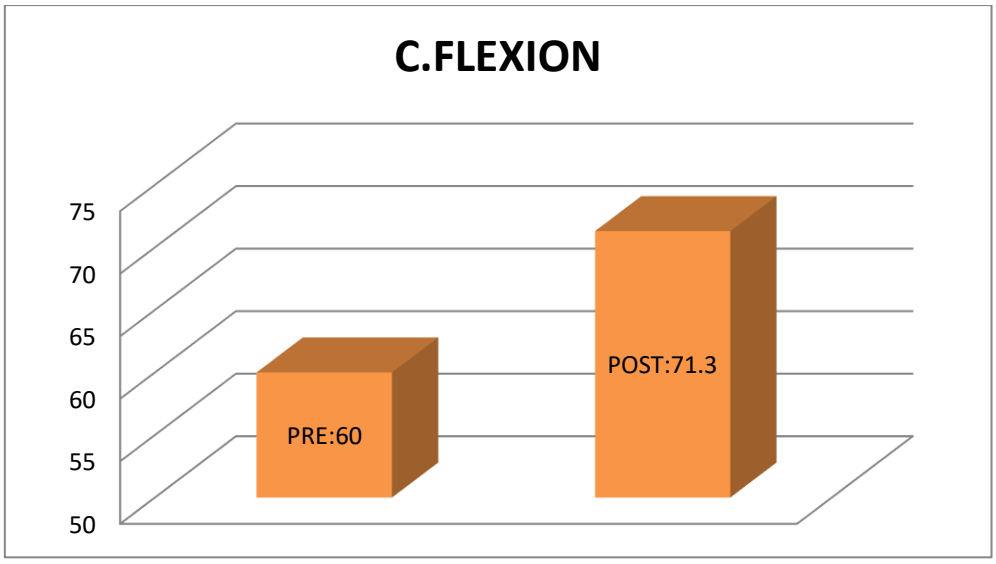
**STATISTICS**

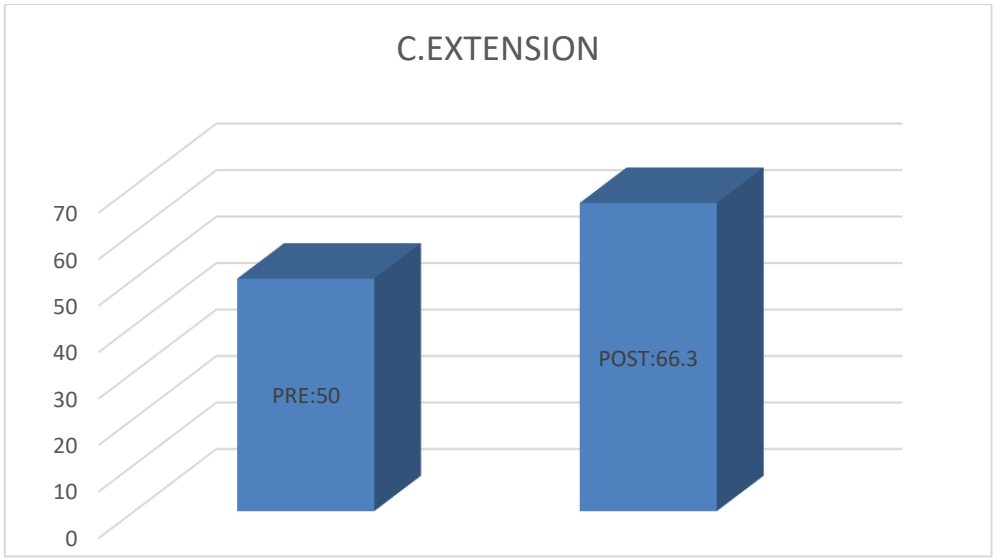
| | HDI | C.FLEXION | C.EXTENSION | RT.L.F | LT.L.F |
|---|---|---|---|---|---|
| PRE | 80 | 60 | 50 | 42.5 | 30 |
| POST | 52.1 | 71.3 | 66.3 | 45 | 38.8 |
| | | | | | |
| P VALUE | 0.01008 | 0.01732 | 0.0004 | 0.03315 | 0.01265 |
| S.D | | | | | |
| PRE | 0 | 0 | 0 | 2.7 | 0 |
| POST | 22.6 | 10.3 | 7.4 | 0 | 7.4 |

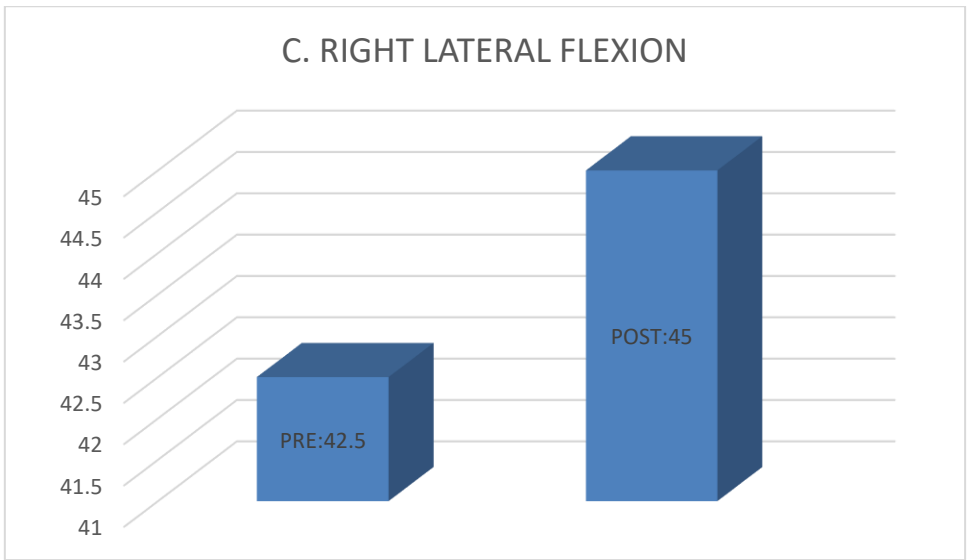
The above provided table shows the statistical values of the pre session and post session ROM of cervical flexion, extension, lateral flexion to the right and lateral flexion to the left, HDI.

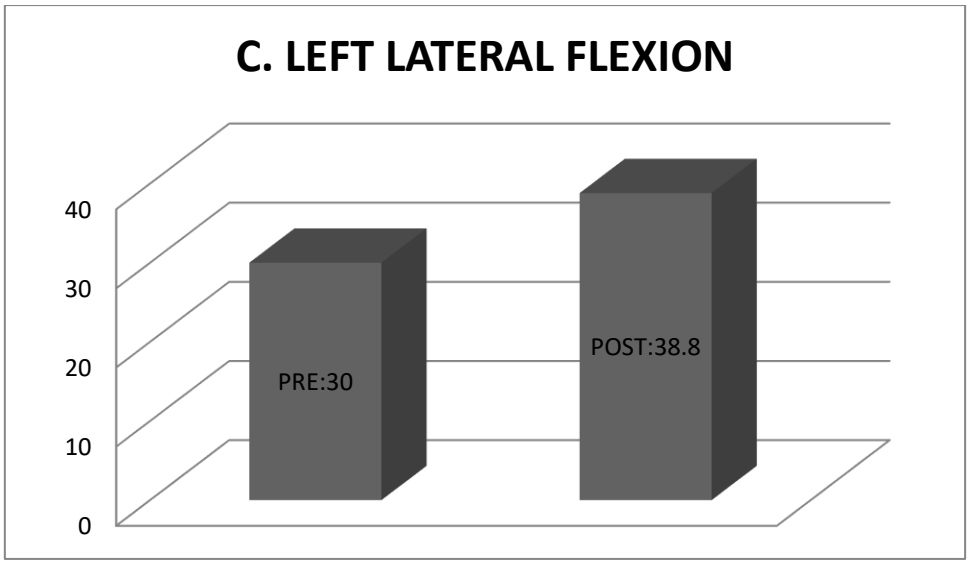
**Graphical representation of the values:**




C.FLEXION
75
70
65
60
55
50
PRE:60
POST:71.3


C.EXTENSION
70
60
50
40
30
20
10
0
PRE:50
POST:66.3


C. RIGHT LATERAL FLEXION
45
44.5
44
43.5
43
42.5
42
41.5
41
PRE:42.5
POST:45




All the statistical analysis in this study was done using SPSS ver.16.0. the general characteristics of the participants were expected in terms of mean and standard deviation by using descriptive analysis. To compare the pre and post session results, paired t-test was performed and independent t-test was used for comparing differences between the pre and post session values. The statistical significance level was set at equal to or less than (p value- 0.05) for all the tests.

**RESULTS:**

There was significant difference exists between the pre and post session of HDI,ROM of cervical flexion, extension, lateral flexion to right, lateral flexion to left. There was clinical and statistical significance difference exists between the pre and post HDI,ROM of CERVICAL FLEXION,EXTENSION and LATERAL FLEXION TO THE LEFT and RIGHT, the p value for each outcome measure was less than 0.05

**DISCUSSION**

Headache arising from musculoskeletal disorders of the cervical spine, termed as cervicogenic headache, are the common form of chronic and recurrent headache. Physical therapies are recommended as a first line of management. Many randomized controlled trials provided evidence of therapeutic exercise regimen were effective for cervicogenic headache. The subject chosen for this study fulfilled the symptomatic criteria for cervicogenic headache and was found to have articular signs and changes in muscle function that were commensurate with upper cervical dysfunction and headache.

Analyzing her diary reports, it became evident that she had described one headache form i.e, Cervicogenic headache, clearly related to different provocative factors. The unilateral headache was associated with mechanical precipitants such as neck posture and working on system for longer duration. The results of this study indicated that the unilateral headaches decreased in frequency and intensity following the manipulative physiotherapy management programme. The overall reduction of the unilateral headache pattern followed the improvement gained with treatment of the cervical articular and muscular dysfunction suggesting that this subject's unilateral headaches were of cervical origin.

Furthermore, the chronic nature of this subject's condition suggest that the improvements in cervical signs and headache symptoms were due to a spontaneous remission. The improvement of unilateral headache suggests that effect of the manipulative physiotherapy programme was response effective.

The symptomatic hypo mobility in the left C1/C2 zygapophyseal joint lessened with local joint treatment and this was associated with an increase in active C1/C2 rotation and decrease in frequency of headache. Not, unexpectedly, there was little change in gross active ranges of movement over the study period with exception of cervical lateral flexion. The segmental motion findings therefore appeared to be better indicators of physical improvement than active range of movement.

Cervicogenic headache is the most common type of headache which negatively impact on quality of the work activities. The aim of the conservative treatment (non- pharmacological) treatment is to decrease pain and improve function to provide opportunity for the recovery and increase in function and quality of life.

Many treatment alternatives are available such as rest, medication like anti-inflammatory drugs, superficial thermal application (hot and cold packs), exercise therapy and electrotherapy modalities. However optimal treatment of cervicogenic headache is still controversial.

The purpose of the study was to describe the use of manual mulligans therapy and exercises for an individual with cervicogenic headache (CGH).To describe whether headache symptoms change in response to a manipulative physiotherapy programme, to describe whether physical signs in cervical spine were altered in response to a manipulative physiotherapy programme, to determine whether any changes in signs and symptoms were maintained once the programme had been described.

MMT and exercises demonstrated statistically significant improvement in ROM of neck and functional abilities. Exercises which included in this study to improve the strength of muscles which was made to do during the session and as a home exercise programme had shown good improvement in reducing the headache frequency.

The result of this study showed significant decrease in pain and improvement in ROM after 8 weeks of treatment. HDI and range of motion of cervical flexion, cervical extension, cervical lateral flexion to the right and lateral flexion to the left showed improvement both clinically and statistically significant. Taking the pain characteristics of headache into account, we realized that focusing on the results of activity pain might be more essential than focusing on the pain at rest. Moreover, although improvements were observed in both at rest pain and activity pain.

This study will contribute to the evidence base for manual therapy management of headache and will lead to improve clinical decision making in the field of non-pharmacological management of headaches.

Beeton and jull concluded in their study that a comprehensive physiotherapy management programme directed at the cervical spine followed by improvement in signs and symptoms of unilateral cervicogenic headache. The continuation of the home programme may have contributed to the further improvement or maintenance of improvement in the short term following the cessation of treatment.

Jull et,al, concluded in this study that the manipulative therapy and exercise can reduce symptoms of cervicogenic headache and effects are maintained.

Shannon concluded in his study that the combination of manual therapy and muscle re-education was successful in relieving headaches and improving function in the patient with cervicogenic headache.

Xin jin et.al, concluded in this study that the mulligans maneuver can improve pain levels and regulate pain-induced negative emotions by modulating the function of relevant brain regions in cervicogenic headache patients.

## CONCLUSION

This study concluded that ,when analyzed before and after the treatment, MMT and exercises have

shown statistical significant effects on reduction of pain, improvement of cervical ROM (flexion, extension, lateral flexion to right and lateral flexion to left) and functional ability in subjects with cervicogenic headache.

MMT and exercises found to be clinically and statistically more effective with greater percentage of improvement, further on comparison we found that there is statistical significant difference and better improvement of all the outcome measures from session 1 to session 8.

In conclusion, the present study provides evidence to support the use of physical therapy regimen in the form of adding MMT and exercises for the better improvement in ROM and function in patients with cervicogenic headache.

**REFERENCES**

1. Xin Jin, Hong-Gen Du,Ning Kong,Jian-Liang shen,Wen-Jun Chen,Clinical Efficacy of The Mulligan Maneuver for Cervicogenic Headache: A Randomized Controlled Trail, Scientific Reports(2023)13:22034.
2. Kiran Satpute,Rashi RATHOD & Toby Hall, Reliability and measurement properties of upper cervical Flexion-Extention range of motion testing in people with cervicogenic headache and asymptomatic controls, Journal of Manual & Manipulative Therapy,2023.
3. Yasemin OZEL ASLIYYUCE, Ozlem ULGER, PHYSIOTHERAPY IN CERVICOGENIC HEADACHE FROM THE PERSPECTICTIVE OF CERTIFIED MULLIGAN CONCEPT PRACTITIONAERS-A DELPHI STUDY, Turk J Physiother Rehabil.2023:34.
4. Mahdi Tavakkoli,Farid Bahrpeyma, Elastic Modulus of Suboccipital muscles,Cervical Range of Motion and Forward Head Posture in Cervicogenic Headache. J Biomed Phys Eng 2023;13(5).
5. Bjorn Becher,Cristina Lozano-Lopez,Ester Moreira de castro-Carletti,Juan Mesa –Jimenez,Cesar Fernandez-de-las-penas,Susan Armijo-Olivo,Effectiveness of therapeutic exercise for the management of cervicogenic headache:A systematic review,Musculoskeletal Science & Practice,Volume 66,102822,2023.
6. Beata Mielanczuk-Lubecka,Krzysztof Glowacki,Izabela Domitrz,Neurologist and physiotherapist cooperation in the diagnostic process and treatment of cervicogenic headache,Arch Med Sci 3,1st May/2023.
7. Gopal Nambi, Mshari Alghadier,Elturabi Elsayed Ebrahim,Arul Vellaiyan, Jaya Shanker Tedla,Ravi Shankar Reddy,Venkata Nagaraj Kakarparthi,Osama R.Aldhafian,Naif N.Alshahrani,Ayman K.Saleh,Comparative Effects Of Mulligan's Mobilization,Spinal Manipulation,and Conventional Massage Therapy in Cervicogenic Headache-A Prospective,Randomized Controlled Trial,Healthcare(Basel),2023 Jan.
8. Jean-Philippe Paquin, Jean-Pierre Dumas, Thomas Gerard and Yannik Tousignant-Laflamme. A Perspective on the use of the Cervical Flexion Rotation Test in the physical Therapy Management of cervicogenic headache. Archieves of Physiotherapy(2022)12;26.
9. Patricia Nunez-Cabaleiro, Raquel Leiros-Rodriguez, Effectiveness of Manual Therapy in the treatment of cervicogenic headache: A systematic Review, Headache.2022;62:271-283.
10. Kashif,Muhammad,Manzoor,Nosheen,Safdar,Rimsha,Khan,Hafsa,Farooq,Maryam,Wassi,Ahmed,Effectiveness of sustained natural apophyseal glides in females with cervicogenic headache: A randomized controlled trial,Journal of Back and Musculoskeletal Rehabilitation,Vol.35,no.3,pp.597-603,2022.

11. Yasemin Ozel Asliyuse,Ozlem Ulger,Mulligan Mobilization for cervicogenic headache-A systematic review, International Journal of Osteopathic Medicine,volume 43,march 2022,Pages 31-38.
12. Kyle North,Koki Kawaguchi,Michelle Perri,Meghan Mormile,Russell T.Baker,James May, and Alan Nasypany, Efficacy of Mulligan Concept Sustained Natural Apophyseal Glide Technique for Cervicogenic Headache: A Critically Appraised topic, International Journal of Athletic Therapy and Training, Volume 28: Issue 1,Page Range:1-6,2022.
13. Kiran Satpute,Nilima Bedekar,Toby Hall,Effectiveness of Mulligan Manual Therapy Over Exercise on Headache Frequency, Intensity and Disability For Patients with Migrane,Tension-Type Headache and Cervicogenic Headache-A Protocol of Pragmatic Randomized Controlled Trail.BMC Musculoskeletal Disorders(2021)22:243.
14. Piotr Szominski, Dominika Bacz,The Effectiveness of headache treatmentusing manual therapy techniques according to the Brian Mulligan concept.Physiotherapy Review,2021,25(2),26-31.
15. Jean-Philippe Paquin,Yannick Tousignant-Laflamme,Jean-Pierre Dumas,Effect of SNAG mobilization combined with a self –SNAG home-exercise for the treatment of cervicoenic headcahe: a pilot study, Journal of Manual & Manipulative Therapy,Volume 29,2021.
16. Anum Manzoor,Abdul Hannan,Muhammad Salman Bashir,Naveed Anwar,Kehkshan Khalid and Mehwish Saghir,cervicoscapular strengthening Exercises and Snags in Improving Cervical Range of Motion and Reducing Neck pain in Cervicogenic Headcache Patients,Ann Med Health Sci Res.2021;11:1532-1535.
17. ADHAM A. MOHAMED,WAEL S.SHEDNDY,MOATAZ SEMARY,HUSAM S. MOURAD,KADRYA H. BATTTECHA,ELSADAT S. SOLIMAN, SHEREEN H.EL SAYED,GHADA I.MOHAMED, Combined use of cervical headache anag and cervical snag half rotation techniques in the treatment of cervicogenic headache,J Phys.Ther. Sci. 31:376-381,2019.
18. Rebecca Barm Herzig,William Kingston,Occipital Neuralgia and Cervicogenic Headache:Diagnosis and Management. Curr Neurol Neurosci Rep(2019)19:20.
19. Mohamed Khalil,Hamed Alkhozamy,Salwa Fadle,Abdelsalam M Hefny,Effect of Mulligan Upper cervical manual traction in the ,treatment of cervicogenic headache:a randomized controlled trial.Physiotherapy Quarterly (ISSN 2544-4395) 2019,27(4),13-20.
20. Ghada Ismail Mohamed,Wael Salah Shendy, Effect of natural apophyseal glides on cervicogenic headache: A randomized controlled trial,Physical Therapy and Rehabilitation,ISSN 2055-2386,2018.
21. Gehan M.Ahmed, Mohamed A. Samir,Ahmed M. moustafa and Amina Awad, Comparing Mulligan Technique and Muscle Energy Technique in Changing Cervical mobility in cervicogenic headache.Curr.Sci.Int.,7(3):402-406,2018.
22. RAMESH CHANDRA PATRA,PATITAPABAN MOHANTY,AJAY P GAUTAM, EFFECTIVENESS OF C1-C2 SUSTAINED NATURAL APOPHYSEAL GLIDE COMBINED WITH DRY NEEDLING ON PRESSURE POINT THRESHOLD AND HEADACHE DISABILITY IN CERVICOGENIC HEADACHE, ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH,Vol 11,Issue 1,2018.
23. Neeti Christian,COMPARATIVE STUDY TO FIND THE EFFECTS OF MULLIGANS SNAG TECHNIQUE (C1-C2) VERSUSMAITLANDS TECHNIQUE (C1-C2) IN CERVICOGENIC HEADACHE AMONG INFORMATION TECHNOLOGY PROFESSIONALS, INTERNATIONAL JOURNAL OF PHYSIOTHERAPY,ARCHIVES,VOL 4,ISSUE 3,2017.

24. Kerstin Leudtke,Angie Allers,Laura H Schulte,Arne May,Efficacy of interventions used by physiotherapists for patients with headache and migraine- systematic review and meta-analysis,Cephalgia An International Journal of Headache, 2016,Vol 36(5)474-492.
25. Peter K. Farmer,Suzanne J.Snodgrass,Anthony J.Buxton Rivetl,An Investigation of Cervical Spinal Posture in Cervicogenic Headache.Phys Ther.2015;95:212-222.
26. Paul D. Howard, William Behrn, Melanie Di Martino, Amanda Di Mambro, Kristin Mclyntyre,Catherine Shurer,Manual Examination in the Diagnosis of Cervicogenic Headache:A Systematic Literature Review. J Man Manip Ther.September,2015;23(4):210-218.
27. Naveen Ganer,Multidisciplinary Manual Therapy Management of Cervicogenic Headache: A Case Report, International Journal of Health Sciences &Research,Vol.5;Issue:5;May 2015.
28. Euo-Ju Shin, Byoung-Hee Lee,The Effect of sustained natural apophyseal glides on headache,duration and cervical function in women with cervicogenic headache, Journal of Exercise Rehabilitation 2014;10(2):131-135.
29. Susan A.Reid,Darren A.Rivett,MichaelG.Katekar,Robim Callister,Comparison of Mulligan Sustained Natural Apophyseal Glides and Maitlad Mobilizations for Treatment of Cervicogenic Dizziness:A Randomized Controlled Trial.Physical Therapy,Volume 94,number 4, 2013
30. Phil Page, CLINICAL SUGGESTION CERVICOGENIC HEADACHE:AN EVIDENCE-LED APPROACH TO CLINICAL MANAGEMENT, The International Journal of Sports Physical Therapy, Volume 6,Number 3,September 2011,Page 254.
31. Jari Ylinen,Riku Nikander,Matti Nykanen,Hannu Kautianinen,BA,Arja Hakkinen,EFFECT OF NECK EXERCISES ON CERVICOGENIC HEADACHE:A RANDOMIZED CONTROLLED TRIAL. J Rehabil Med 2010;42:344-349.
32. Toby Hall,Management of Headache: from evidence to practice,espace.curtin.edu.au,2010.
33. Nikolai Bagduk, Jayantilal Govind,Cervicogenic Headache: An Assessment of the Evidence on Clinical Diagnosis, Invasive Tests and Treatment.www.thelancet.com/neurology vol 8.2009.
34. Toby Hall,Kathy Briffa,Diana Hopper,Clinical Evaluation of Cervicogenic Headache: A Clinical Perspective, J Man Manip Ther.2008;16(2):73-80.
35. Shannon M. Peterson,Articular and Muscular Impairments in Cervicogenic Headache: A Case Report.J Orthop Sport Phys Ther.2003;33:21-30.
36. Gwendolen Jull, Patricia Trott,Helen Potter,Guy Zito,Grad Dip Manip Ther,S ken Niere, Debra Shirley,Jonathan Emberson,Ian Marschner,Carolyn Richardson,A Randomized Control Trial of Exercise and Manipulative Therapy for Cervicogenic Headache,Spine.volume 27.Number 17.2002.
37. Sydney Kim Schoenser,Gail Jensen,Garvice Nicholson,Marilyn Gossman,Charles Katholi,the Effect of Mobilization on Cervical Headaches, JOSPT.volume 21. Number 24.April 1995.
38. Karen Beeton,Gwendolen Jull,Effectiveness of Manipulative Physiotherapy in Management of Cervicogenic Headache:A single Case Study,Physiotherapy,July 1994,vol 80,no.7.
39. Prachi G.Wade,C.V.John Franklin,The Effect of Mobilisation and Core Muscle Strengthening For Cervical Spine in Relieving Cervicogenic Headache,IOSR Journal of Nursing and Health
40. Science(IOSR-JNHS),e-ISSN:2320-1959,p-ISSN:2320-1940 Volume 4,Issue 5 Ver.1(Sep-Oct.2015),PP13-16.