

**“EFFECTIVENESS OF INHIBITIVE DISTRACTION TECHNIQUE ON
HEADACHES DUE TO CERVICAL DYSFUNCTION”.**

By

MISS. KUMUDINI.R.M

Reg . No. : 09_T046_16411

Dissertation submitted to the

Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore

In partial fulfillment

Of the requirements for the degree of

MASTER OF PHYSIOTHERAPY

In

MUSCULOSKELETAL AND SPORTS INJURIES

Under the Guidance of

PRADEEP SHANKAR

Associate Professor, JSS College of Physiotherapy



JSS COLLEGE OF PHYSIOTHERAPY,

JSS Hospital campus, Ramanuja road,

MYSORE-570004

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RAJIV GANDHI UNIVERSITY OF HEALTH SCIENCES,

KARNATAKA, BANGALORE.

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KARNATAKA, BANGALORE.**

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I hereby declare that this dissertation/ thesis entitled **“Effectiveness of Inhibitive distraction technique on headaches due to cervical dysfunction”** is a bonafide and genuine research work carried out by me under the guidance of **PRADEEP SHANKAR, Associate Professor, J.S.S. College of Physiotherapy, Mysore.**

Date:

Signature of the candidate

Place: Mysore

Ms. KUMUDINI.R.M

**RAJIV GANDHI UNIVERSITY OF HEALTH SCIENCES,
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This is to certify that this dissertation entitled “**Effectiveness of Inhibitive distraction technique on headaches due to cervical dysfunction**” is a bonafide research done by **Miss. KUMUDINI.R.M** in partial fulfillment of the requirement for the degree of **MASTER OF PHYSIOTHERAPY**.

Date:

Signature of the guide

Place: Mysore

PRADEEP SHANKAR

ASSOCIATE PROFESSOR

J.S.S. COLLEGE OF PHYSIOTHERAPY,

MYSORE

**RAJIV GANDHI UNIVERSITY OF HEALTH SCIENCES,
KARNATAKA, BANGALORE.**

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This is to certify that this dissertation entitled “**Effectiveness of Inhibitive distraction technique on headaches due to cervical dysfunction**” is a bonafide research done by **MISS. KUMUDINI.R.M** under the guidance of **Mr. Pradeep Shankar** Associate Professor, JSS College of Physiotherapy, Mysore.

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Place: Mysore

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Date:

Signature of the candidate

Place: Mysore

MISS. KUMUDINI.R.M

LIST OF ABBREVIATIONS USED

TTH - Tension type headache

CH - Cervicogenic headache

IDT - Inhibitive Distraction Technique

IHS - International Headache Society

CROM - Cervical Range of motion

Flex -Flexion

Ext - Extension

Lat Flx (Rt) - Lateral flexion right

Lat Flx (Lt) - Lateral flexion left

Rotn (Rt) - Rotation right

Rotn (Lt) - Rotation left

VAS - Visual Analog Scale

NDI - Neck Disability Index

HDIE - Headache Disability Index Emotional

HDIF - Headache Disability Index Functional

TrPs - Trigger points

ABSTRACT

Back ground and purpose: Neck disorders remain a common problem in modern industrialized countries. Around two-thirds of the populations in the world are suffering from neck pain at some point in their lives. Headache (cephalalgia) is an extremely common unpleasant symptom and often incapacitating condition worldwide. It constitutes a major health problem to all countries in the world with a variable prevalence of about 20.2%. Various researches have been found that the main factors contributing for cervicogenic and tension type headache is due to myofascial trigger points, muscle tightness and decreased mobility at suboccipital muscles and upper cervical segments and also proposed significant correlation between forward head posture and headache.

Neuroanatomical explanation of both headaches is due to increase sensitization of trigeminocervical nucleus through trigeminocervico nucleus caudalis. These sensitizations of trigeminal nucleus caudalis happen due to increase peripheral nociceptive input from myofascial trigger points in suboccipital muscles.

Several studies proposed numerous different treatment approaches to overcome headache, includes pharmacological, non pharmacological, anesthetic and surgical intervention. In that spinal manipulation found to be more effective.

Paris et al (1991) described a technique called Inhibitive distraction technique (IDT) done a pilot study found to be effective in short term on headache. IDT in long term basis is not known. So the purpose of my study to find the long term effect of inhibitive distraction technique on CH verses TTH.

Methodology: Prior to intervention the parameters like VAS, NDI, HDI and CROM were measured for both the groups and underwent IDT for 4 weeks at a rate of 3 sessions per week. Outcome measures were taken at 2nd and 4th week.

Subjects: 30 subjects both male and female of age groups 25 – 45 years who has been diagnosed as CH & TTH on the basis of IHS referred by physician of JSSH Mysore.

Procedure: 30 subjects who fulfilling inclusion criteria were included in the study they were randomized into 2 groups. Group A (TTH) n=15 & Group B (CH) n=15. The duration of treatment was 4 weeks 12 sessions. Outcome measures included the CROM, VAS, NDI and HDI scores.

Result: Result showed highly significant improvement in all the parameters within the groups at 2nd and 4th wk following intervention (IDT). Result also showed non significant improvement in all the parameters between the groups.

Conclusion: Study found significant improvement in all the parameters in both the groups. IDT can be used in therapeutic intervention to relieve symptoms of CH & TTH.

Key words: Inhibitive Distraction, VAS, NDI and ROM.

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DEDICATED

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Introduction

Neck disorders remain a common problem in modern industrialized countries. Around two-thirds of the populations in the world are suffering from neck pain at some point in their lives ¹.

Neck pain is generally said to be multifactorial in origin. It includes work environment factors like repetitive work, exposure level, and psychological factors like stress, high job demand, physical risk factors and poor postural mechanics during sitting and activities of daily living (ADL's) ².

Several possible pathophysiological mechanisms of neck pain disorders have been proposed in the literature (Visser and Van Dieen). One of the hypothesis is that selective and sustained activation of type I motor unit leads to Ca^{2+} accumulation inside the active motor units and causes disturbances in homeostasis. This leads to decrease in local blood supply and increases metabolic waste products in muscle compartment, which increases nociceptor sensitization due to increase in intramuscular shear forces resulting in decreasing the mobility of joint segment ³.

This hypothesis show a strong correlation between neck pain and cervical mobility and also several studies proposed limited motion may be the most relevant impairment associated with headache and neck pain ⁴.

Headache (cephalalgia) is an extremely common unpleasant symptom and often incapacitating condition worldwide. It constitutes a major health problem to all countries in the world with a variable prevalence of about 20.2%. Headache may arise when nociceptive input is received from the head or structure that can refer pain to head ⁵.

Headache may also arise when there is dysfunction in the area of the central nervous system involved in the processing and perception of head pain⁵.

Headache is classified as cervicogenic headache, tension type headache and migraine type of headache on the basis of diagnostic criteria proposed by headache classification committee of International Headache Society (IHS). Several studies Granella et al, Leone et al (1994) have proved more validity and inter-rater reliability i.e. (Kappa = 0.89) of International Headache Society (IHS) criteria to differentiate the diagnosis of different types of headaches^{6,7}.

The International headache society (1988) defines cervicogenic headache as headaches that are associated with movement abnormalities in the upper cervical intervertebral segments⁸.

In 1997 Bogduk proposed a new definition that has been adopted by the world cervicogenic headache society. He defined cervicogenic headache as “referred pain perceived in any region of the head caused by a primary nociceptive source in the musculoskeletal tissues innervated by cranial nerves”⁹.

Pathophysiology of cervicogenic headache:

Interneurons within the trigeminocervical nucleus allow for an exchange of sensory information between the upper cervical spinal nerves and the trigeminal nerve. It is through this exchange of sensory information that nociceptive signals from the anatomic structures and soft tissues of the upper region of the neck can be referred to the sensory receptive fields of the trigeminal nerve in the head and face. The topographic arrangement of the trigeminal nucleus caudalis allows the greatest interchange of nociceptive information with the ophthalmic division of the trigeminal referred to the forehead, temple or orbit. There is also some interchange of sensory signals with the maxillary division of cranial nerve V that allow referral of neck pain to the face¹⁰.

Afferent sensory signals ascend or descend up to three spinal cord segments in the dorsolateral tract and substantia gelatinosa before entering the spinal dorsal horn. This can allow nociceptive signals from spinal segments as low as C6 or C7 the potential to interact with interneurons in the trigeminocervical nucleus, and thereby, the referral of pain from anatomical structures or soft tissues in the middle and lower portion of the neck to the head and face¹⁰.

Tension type headache: The IHS recognizes two forms of tension headache – Episodic and chronic headache. In episodic form there are fewer than 15 headache days per month. In chronic form 15 or more headache days per month. Both forms are bilateral and characterized by sensations of pressing and tightening around the head¹¹.

Pathophysiology of tension type headache:

Several mechanisms have been implicated in the pathophysiology of chronic tension headache, including peripheral mechanism, central mechanism, differences in biochemistry, muscular factors and mechanical factors because tension in the muscles of face, head, scalp is prominently involved in chronic tension headache, muscular factors are usually first to be explored when investigating the pathophysiology of this headache type. Possible biochemical basis for the pathophysiology of chronic tension type headache have found the levels of calcitonin gene related peptide (CGRP)¹².

Mechanical factors and sensitization of central nervous system also appear to play a role that is patients with chronic tension headache are more sensitive to pressure, pain, thermal and electrical stimulation. Increased headache intensity is thought to be a result of a peripheral mechanism in episodic tension headache and to a central mechanism in chronic form.

So the perception of any headache depends on the degree of excitation of trigemino cervical nucleus. It has been proposed that nociceptive activity in the trigeminocervical nucleus is normally inhibited by descending neural pathway arising from ventrolateral periaqueductal grey matter in the brainstem via the rostroventro medial medulla. These pathways primarily use serotonin as neurotransmitter. (Fields 1997)¹³.

Minimal cervical dysfunction or painful afferent input from the muscle or fascia is sufficient to trigger more nociceptive input to trigeminonucleus causing cervicogenic headache.

In tension type headache central sensitization that is trigeminonucleus sensitization occurs due to increased peripheral nociceptive input from myofascial trigger points in suboccipital muscles and sternocleidomastoid muscles.

Thus cervicogenic headache and tension type headache have the etiology within the central nervous system which alters the cervical muscle activity leading to cervical dysfunction¹⁴. So the main factors contributing for cervicogenic and tension type headache is due to myofascial trigger points, muscle tightness and decreased mobility at suboccipital muscles and upper cervical segments respectively.

Simons et al (1999)¹⁵ stated that postural abnormalities i.e. forward head posture in the cervical spine might be responsible for the activation of myofascial trigger points in the neck muscles and also result in shortening of the posterior cervical extensor muscles (suboccipital, semispinalis, splenni and upper trapezius).

Postural disorders often contribute to the perpetuation of TrPs. For example, postural strain of the suboccipital muscles may cause TrPs in these muscles¹⁵, leading to further deterioration in muscle structure and function. Such deterioration may result in radiating pain and atrophic changes¹⁶. Suboccipital muscles contain a high density of proprioceptors¹⁷, so atrophic changes lead to a loss in proprioceptive balance and loss of proprioceptive "gate control" at the dorsal horn, giving rise to chronic pain syndromes¹⁶. Hack et al (1995)¹⁸ discovered fibrous connective tissue between the rectus capitis posterior minor muscle and dura matter it was hypothesised that traction of spinal dura matter may increase tension of fibrous connective tissue leading to tension type headache.

Several non invasive physical treatments like TENS, cold packs, hot packs, massage and spinal manipulation are given for these types of headaches. Of all these spinal manipulation are found to be most effective and have shown shorter effect similar to the effect of drug Amitriptyline¹⁹.

Paris et al (1991)²⁰ described a technique called Inhibitive Distraction Technique (IDT) which originated from cranial osteopathy. In this technique therapist uses the fingers of both the hands to exert a sustained ventro cranial force on occiput just caudal to superior nuchal line. The physiological effect of Inhibitive distraction technique involve inhibition of local and general posterior muscle tone, inactivation of suboccipital muscle trigger points, spasm of connective tissue between rectus capitis posterior minor muscle and the dura matter and gentle joint mobilization . These physiological effects probably may reduce peripheral sensitization and indirectly reduce central sensitization helps in reducing both cervicogenic and tension type headache. This mobilization is also found to be effective in activation of descending inhibitory pathway.

Kristin Briems et al (2007) ²¹ did a pilot study on Immediate effect of Inhibitive Distraction Technique (IDT) on active range of cervical flexion in patients on neck pain with headache. Study found increased in CROM immediately following IDT intervention.

Considering the physiological effect of IDT as proposed by Paris and Kristin Briems et al (2007) pilot study on Immediate effect, this study has been proposed to find out the long term effectiveness of IDT in two types of headaches (cervicogenic and tension type headache).

So the purpose of my study is to find the long term effect of Inhibitive Distraction Technique on Cervicogenic headache verses Tension type headache considering their effectiveness with respect to parameters like Beta Headache Disability Index (HDI), Neck Disability Index (NDI), Visual Analogue Scale (VAS), Range Of Motion of cervical spine (CROM).

Hypothesis

ALTERNATE HYPOTHESIS:

Inhibitive Distraction Technique is effective in reducing the symptoms of tension type headache & cervicogenic headache due to cervical dysfunction.

NULL HYPOTHESIS:

Inhibitive Distraction Technique may or may not be effective in reducing the symptoms of tension type headache & cervicogenic headache due to cervical dysfunction.

Objectives

1. To find the long term effect of Inhibitive Distraction Technique on cervicogenic headache.
2. To find the long term effect of Inhibitive Distraction Technique on tension type headache.
3. To find the long term effect of Inhibitive Distraction Technique on tension type headache verses cervicogenic headache.

Review of literature

Jacobson GP, Ramadan NM, Norris L, et al. 1995: Conducted investigations to evaluate short term (1 week) test-retest reliability. The short-term test-retest reliability suggested that Headache Disability Inventory was excellent for perceptions of the patient's headache²².

Tuchin PJ, Pollard H, Bonello R 2000: has done a randomized controlled trial study for 6 months duration to evaluate the efficacy of spinal manipulative therapy in the treatment of migraine. The trial consisted of 3 stages: 2 months of data collection (before treatment), 2 months of treatment, and a further 2 months of data collection (after treatment). Comparison of outcomes to the initial baseline factors was made at the end of the 6 months for both an SMT group and a control group. 127 volunteers between the ages of 10 and 70 years were recruited through media advertising. The diagnosis of migraine was made on the basis of the International Headache Society standard, with a minimum of at least one migraine per month. Participants completed standard headache diaries during the entire trial noting the frequency, intensity (visual analogue score), duration, disability, associated symptoms, and use of medication for each migraine episode. The authors concluded that the average response of the treatment group (n = 83) showed statistically significant improvement in migraine frequency (P < .005), duration (P < .01), disability (P < .05), and medication use (P < .001) when compared with the control group (n = 40). 22% of participants reported more than a 90% reduction of migraines as a consequence of the 2 months of spinal manipulative therapy²³.

Anderson AV, Boline P, Bronfort G, et al. 1998: A prospective, randomized, parallel-group comparison was done on a total of 218 patients with the diagnosis of migraine headache to compare the efficacy of Spinal Manipulation, Amitriptyline and

the Combination of both Therapies for the Prophylaxis of Migraine Headache. Improvement was observed in both primary and secondary outcomes in all three study groups over time. The reduction in headache index scores during treatment compared with baseline was 49% for amitriptyline, 40% for spinal manipulation and 41% for the combined group; $p = .66$. During the post treatment follow-up period the reduction from baseline was 24% for amitriptyline, 42% for spinal manipulation and 25% for the combined group; $p = .05$. The authors concluded that Spinal manipulation seemed to be as effective as a well-established and efficacious treatment²⁴.

Gert Bronfort, Willem J.J. Assendelft, Roni Evans, et al. 2001: Have done a randomized controlled trial study to compare spinal manipulative therapy with other intervention for chronic headache (tension, migraine and cervicogenic headache) through a systematic review of randomized clinical trials. Nine trials involving 683 patients with chronic headache were included spinal manual therapy appears to have a better effect than massage for cervicogenic headache²⁵.

Haas M, Spegman A, Peterson D, et al. 2010: have done randomized clinical trials to compare the efficacy of two doses of SMT and two doses of light massage for sample eighty patients with chronic cervicogenic headache. The results showed that for the CGH pain scale, comparisons of 8 and 16 treatment sessions yielded small dose effects: $|AMD| \leq 5.6$. There was an advantage for SMT over the control: $AMD = -8.1$ (95% confidence interval = -13.3 to -2.8) for the profile, -10.3 (-18.5 to -2.1) at 12 weeks, and -9.8 (-18.7 to -1.0) at 24 weeks. For the higher dose patients, the advantage was greater: $AMD = -11.9$ (-19.3 to -4.6) for the profile, -14.2 (-25.8 to -2.6) at 12 weeks, and -14.4 (-26.9 to -2.0) at 24 weeks. Patients receiving SMT were also more likely to achieve a 50% improvement in pain scale²⁶.

Peter J. Tuchin, Grad 1997: A prospective trial was done on patients with the diagnosis of migraine headache to evaluate the efficacy of spinal manipulative therapy. The authors concluded that four selected cases of migraine responded dramatically to SMT, with numerous self reported symptoms being either eliminated or substantially reduced. Average frequency of episodes was reduced on average by 90%, duration of each episode by 38%, and use of medication was reduced by 94%. In addition, several associated symptoms were substantially reduced, including nausea, vomiting, photophobia and phonophobia²⁷.

Gary P. Jacobson, Nabih M. Ramadan, et al. 1994: The study was done to quantify the impact of headache on daily living. They developed 25-item beta version headache disability inventory (HDI) which was modified version of alpha HDI (α -HDI) and consisted of 25 items related to functional and emotional subscales. The study showed more reliable and strong validity with 98% confidence interval. They concluded that the HDI is useful in assessing the impact of headache, and its treatment, on daily living²⁸.

Linda Engh, Marie Fall, Marianne Hennig, et al. 2003: study was done to investigate the intra- and inter-rater reliability of a method aimed to measure the head position relative to shoulders with a universal goniometer. 31 healthy individuals with mean age 31.5 years were included. Two assistants carried out the measurements on two occasions with an interval of eight days. To examine inter-rater reliability, four assistants carried out the measurements. The intraclass correlation coefficient (ICC based on one factor repeated measures ANOVA) was 0.91 for the first assistant and 0.94 for the second. No significant difference was evident between the two assessment occasions for the two assistants. ICC was also used to estimate the inter-rater reliability of the four assistants' measurements and was 0.95. The mean

difference between the four assistants' reading varied from 0.1 to 1.6 degrees. Study concluded that the measurement of head position relative to shoulders with a goniometer is a reliable method²⁹.

Kristin Briem, Peter Huijbregts, Maria Thorsteinsdottir 2007: a pilot study was done to examine the immediate effects of a manual therapy technique called Inhibitive Distraction (ID) on active range of motion (AROM) for cervical flexion in patients with neck pain with or without concomitant headache. Forty subjects (mean age 34.7 years; range 16-48 years) were randomly assigned to an experimental and a control group. The objective of this study was to see whether patient subgroups could be identified who might benefit more from ID by studying variables such as age, pain intensity, presence of headache, or pre-intervention AROM. The study was unable to identify potential subgroups more likely to respond to ID, although a trend emerged for greater improvement in patients with headaches. In the experimental groups the greatest increase in ROM was seen, the increase was 2.0 - 3.4 degree greater than for the respective control groups²¹.

Vernon H, Mior S. (1991): modified the Oswestry Low Back Pain Index and produced a 10-item scaled questionnaire entitled the Neck Disability Index (NDI). Face validity was ensured through peer-review and patient feedback sessions. Test-retest reliability was conducted on an initial sample of 17 consecutive “whiplash” – injured patients in an outpatient clinic, resulting in good statistical significance (Pearson’s = 0.89, p less than or equal to .05). The alpha coefficients were calculated from a pool of questionnaires completed by 52 such subjects resulting in a total index alpha of 0.80, with all items having individual alpha scores above 0.75. Concurrent validity was assessed in two ways. First, on a smaller subset of 10 patients who completed a course of conservative care, the percentage of change on NDI scores

before and after treatment was compared to visual analogue scale scores of percent of perceived improvement in activity levels. These scores correlated at 0.60. Secondly, in a larger subset of 30 subjects, NDI scores were compared to scores on the McGill Pain Questionnaire, with similar moderately high correlations (0.69-0.70). While the sample size of some of the analyses is somewhat small, this study demonstrated that the NDI achieved a high degree of reliability and internal consistency³⁰.

C Lundqvist, JS Benth, RB Grande, et al. 2009: the study was done to validate a vertical against a horizontal VAS for pain intensity registration. Visual analogue scales (VAS) are well-validated instruments for assessing pain intensity. Out-patients with headache or non-headache pain were included. Participants completed a horizontal and a vertical VAS. Both were completed twice for test–retest. Headache was diagnosed according to the International Classification of Headache Disorders, 2nd edition. The results on vertical and horizontal VAS did not differ significantly in the different headache or chronic pain groups. For test–retest evaluation, effect sizes and Cohen's δ values were < 0.029 with $< 1.5\%$ change from test to retest ($P < 0.01$). Correlation coefficients were > 0.95 . Bland–Altman analysis showed good agreement between vertical and horizontal scores with correlation coefficients > 0.84 . A vertical VAS is equally valid as a horizontal VAS for registration of pain intensity in headache and non-headache patients³¹.

M.J.H. McCarthy, M. P. Grevitt, P. Silcocks, et al. 2007: Done a prospective single cohort study to evaluate the NDI by comparison with the SF36 health Survey Questionnaire. The NDI is a simple ten-item questionnaire used to assess patients with neck pain. The SF36 measures functional ability, well being and the overall health of patients. It is used as a gold standard in health economics to assess the health utility, gain and economic impact of medical interventions. One hundred and sixty

patients with neck pain attending the spinal clinic completed self-assessment questionnaires. A second questionnaire was completed in 34 patients after a period of 1–2 weeks. The internal consistency of the NDI and SF36 was calculated using Cronbach's alpha. The test–retest reliability was assessed using the Bland and Altman method. The concurrent validity of the NDI with respect to the SF-36 was assessed using Pearson correlations. Both questionnaires showed robust internal consistency: Cronbach's alpha for the NDI scale was acceptable (0.864, 95% confidence limits 0.825–0.894) though slightly smaller than that of the SF36. The correlations between each item of the NDI scores and the total NDI score ranged from 0.447 to 0.659, (all with $P < 0.001$). The test–retest reliability of the NDI was high (intra-class correlation 0.93, 95% confidence limits 0.86–0.97) and comparable with the best values found for SF36. The correlations between NDI and SF36 domains ranged from –0.45 to –0.74 (all with $P < 0.001$). The authors concluded that the NDI has good reliability and validity and that it compares well with the SF36³².

Granella F, D'Alessandro R, Manzoni GC, Cerbo R, et al. 1994: Conducted a study on interobserver reliability of the International Headache Society (IHS) classification for diagnosis of primary headaches. The study was performed on 103 patients consecutively seen at two Headache Centers. Each patient was given a structured interview recorded on videotape. Four experienced clinicians then reviewed the interviews separately and made a diagnosis of headache according to IHS criteria at the one- and two-digit levels. At both the one- and the two-digit level the agreement was substantial (Kappa = 0.74 and 0.65, respectively). The analysis of reliability for each of nine items necessary for diagnosis showed an agreement ranging from substantial (Kappa = 0.69) to almost perfect (Kappa = 0.89). Results indicated that the IHS classification has a good reliability for the diagnosis of primary headaches at the one- and two-digit levels⁶.

Methodology

Source of data: Patient who has been diagnosed as CH & TTH on basis of IHS referred by physician of JSS hospital Mysore.

Method of collection of data: Personal structured interview

Population – Patients of both genders (male and female) of age group between 25-45 years whom fulfilling inclusion criteria.

Sample size – 30 subjects divided into two groups randomly group A & B on the basis of IHS.

Groups: Two groups

- 15 patients (i.e. Tension type headache)
- 15 patients (Cervicogenic)

Sampling design – Simple random sampling.

Study design – Experimental study with Pre test to Post test design

INCLUSION CRITERIA:

- Patients both male and female of age group 25-45 yrs who has been diagnosed as CH & TTH on the basis of IHS
- Patients suffering from cervical dysfunction includes:
Patients having headache associated with neck pain affecting ADL activities and having decrease CROM
- Cases have been included tension type headache and cervicogenic headache done according to the guidance given by International headache society (IHS)
- Patients having forward head posture with headache.

EXCLUSION CRITERIA:

- Patients showing signs of red flag i.e. conditions like sub arachnoid hemorrhage, brain tumors, intracranial lesions and giant cell arteritis.
- History of neck surgery, trauma to the head and neck area in the 10 days prior to the study treatment, severe spondylarthrosis, rheumatoid arthritis and vertebral artery insufficiency.

MATERIALS USED:

- Universal goniometer
- Couch

VARIABLES/ OUTCOME MEASURES:

- **Visual Analogue Scale (VAS)**
- **Neck Disability Index (NDI):** The NDI is a 10-item questionnaire that aims to measure the self-perceived disabling effects of neck pain on daily life. NDI has a high degree of reliability and internal consistency with high degree of correlations with McGill Pain Questionnaire ($r = 0.69-0.70$).
- **Beta Headache Disability Index (HDI):** HDI aims to measure the self-perceived disabling effects of headache on daily life. Consist of 25-item questionnaire. This index has got good internal consistency and correlation between the emotional & functional subscale scores and the total score were both excellent ($r = 0.89$).
- **Range of Motion of Cervical spine (CROM).**

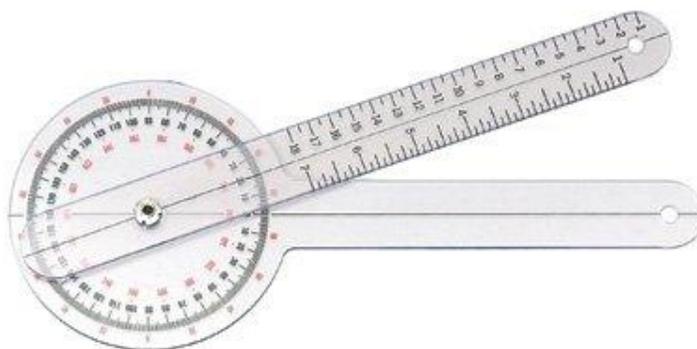
Duration of the study: Nov 2010- May 2011

Procedure:

An Ethical clearance for the study was obtained from the Ethical Committee of JSS College of Physiotherapy. Informed consent was taken from the patients after screening inclusion criteria prior to the evaluation and treatment sessions.

Thirty patients who met the inclusion criteria were randomly assigned equally into two groups, (i.e. cervicogenic and tension type headache) according to guidance given by International Headache Society (IHS). 15 subjects in each group. Parameters like VAS, HDI, NDI and CROM was noted prior to the intervention in both the groups.

Testing procedures CROM was done using universal goniometer:



Several studies shown ICC inter-rater reliability of universal goniometer for measuring CROM ($r = 0.95$)

Procedure of measuring CROM using universal goniometer:

Position: Subject sitting, with the thoracic and lumbar spine well supported by the back of chair. The cervical spine was positioned in 0 degrees of rotation and lateral flexion.

Flexion: Goniometer alignment

- The fulcrum of the goniometer was centered over the external auditory meatus
- Proximal arm was aligned such that it is either perpendicular to the ground
- Distal arm was aligned with the base of the nares.

Extension:

The testing position and alignment were the same as for measuring cervical flexion.

Lateral flexion:

- The fulcrum of the goniometer was centered over the spinous process of the C7 vertebra
- The proximal arm was aligned with the spinous processes of the thoracic vertebrae so that the arm is perpendicular to the ground
- Distal arm with the dorsal midline of the head, using the occipital protuberance for reference.

Rotation:

- The fulcrum of the goniometer was centered over the center of the cranial aspect of the head
- Proximal arm was parallel to the imaginary line between the two acromial processes
- Distal arm with the tip of the nose.

After taking CROM Inhibitive Distraction Technique was applied for both the groups.

Inhibitive Distraction Technique:

Paris et al (1991) described a technique called Inhibitive Distraction Technique (IDT) which originated from cranial osteopathy.

Procedure of IDT:



Patient was made to lie in supine position with the head slightly out of couch and the therapist supports the head on his thenar eminences and places the fingertips on the suboccipital muscular structures caudal into superior nuchal line and induces sustained force in ventro cranial direction, creating compressive force as well as distraction to the cervical and suboccipital structures. The force was applied slowly. The force applied varied from light pressure and no distraction force applied when weight of the subject's head was partially supported by the therapist's thenar eminences, to the full weight of the subjects head resting on therapist's fingertips and distraction applied. This intervention applied for 3-3.5mins and done for 3 times a week for 4 weeks.

Parameters like cervical ROM, VAS, NDI and Beta HDI was taken for both subjects on 2nd week and 4th week.

Result of the study was statistically analyzed using repeated measure **ANOVA**.

Results

DATA ANALYSIS

Statistical software:

The Statistical software SPSS for windows (version 140) were used for the analysis of the data, Microsoft word and Excel have been used to generate graphs, tables etc.

Statistical Methods: Descriptive statistical analysis has been carried out in the present study. Results were analyzed repeatedly 2nd & 4th week using the repeated measure ANOVA test taking level of significance $p < 0.05$

Study design: An experimental study was conducted to evaluate the effectiveness of Inhibitive distraction technique on headaches due to cervical dysfunction on pain and functional activities.

Results: Result showed highly significant improvement in all the parameters within the groups at 2nd and 4th week following intervention (IDT). Result also showed non significant improvement in all the parameters between the groups.

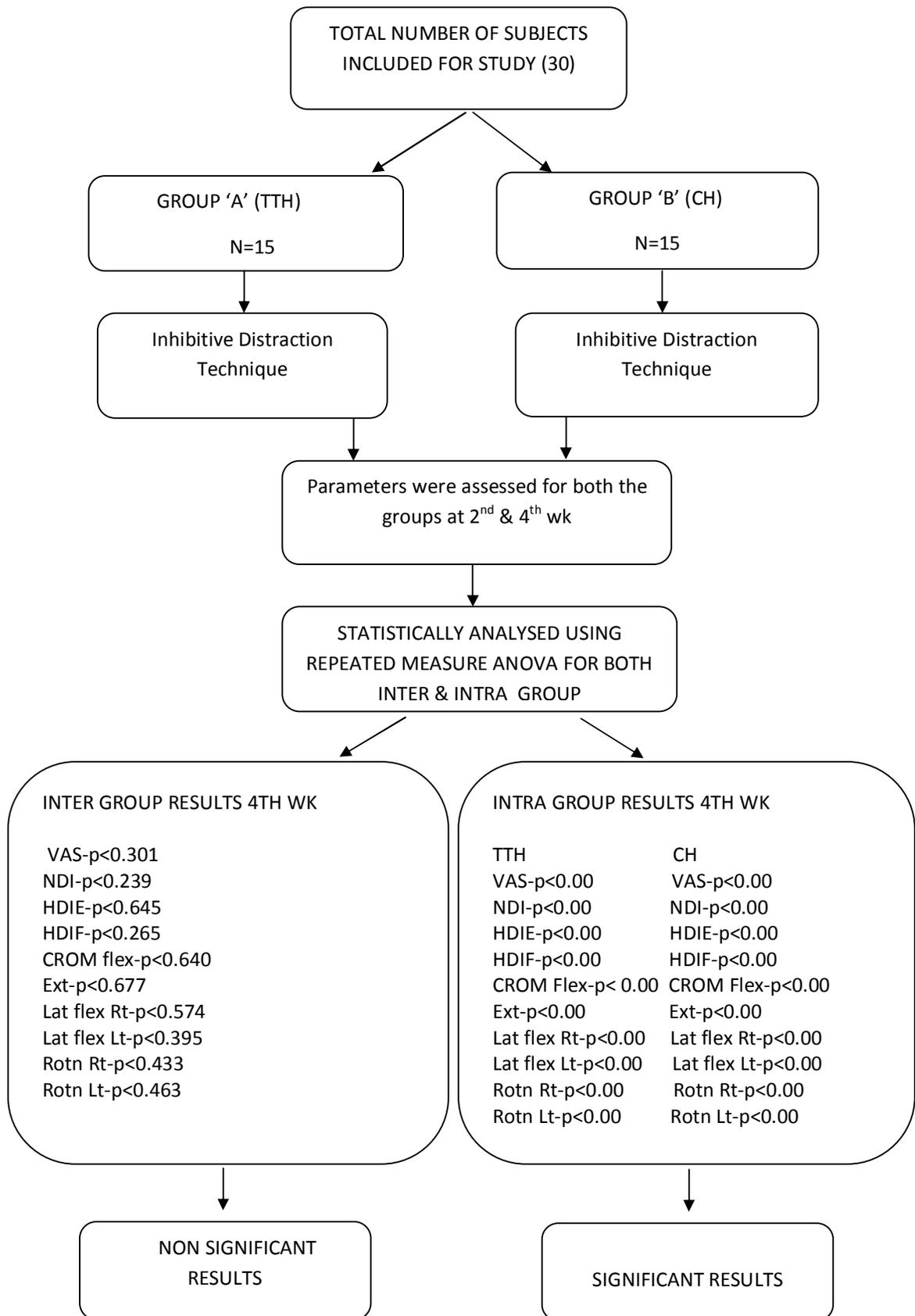


Table 1

Inter and Intra group analysis of VAS

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|---------------|--------------|-------------|-----------------------|----------|
| VASPRE | TTH | 6.27 | 1.100 | 15 |
| | CH | 5.93 | .961 | 15 |
| | Total | 6.10 | 1.029 | 30 |
| VAS2WK | TTH | 3.80 | 1.207 | 15 |
| | CH | 3.53 | .743 | 15 |
| | Total | 3.67 | .994 | 30 |
| VAS4WK | TTH | 1.93 | .799 | 15 |
| | CH | 1.60 | .632 | 15 |
| | Total | 1.77 | .728 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 283.089 | 2 | 141.544 | 451.509 | .000 |
| CHANGE * GROUP | .022 | 2 | .011 | .035 | .965 |
| Error(CHANGE) | 17.556 | 56 | .313 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 1330.178 | 1 | 1330.178 | 677.455 | .000 |
| GROUP | 2.178 | 1 | 2.178 | 1.109 | .301 |
| Error | 54.978 | 28 | 1.963 | | |

Result of the study shown significant improvement in VAS in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.301$)

Estimated Marginal Means of MEASURE_1

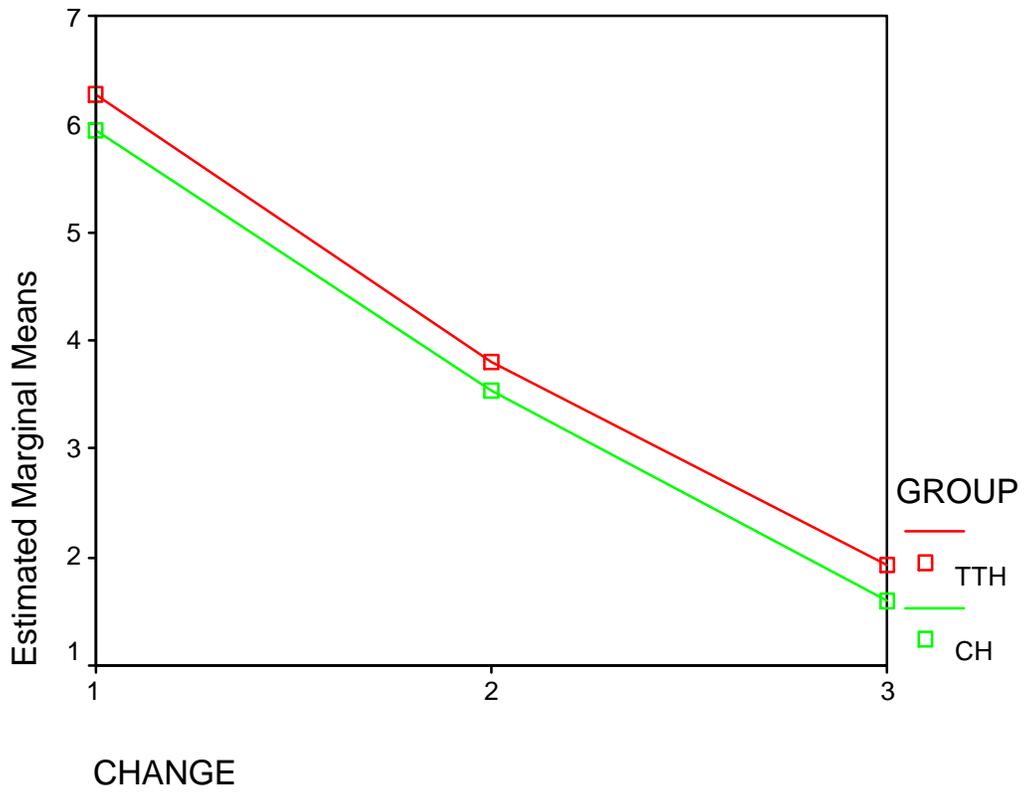


Table 2

Inter and Intra group analysis of NDI

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|---------------|--------------|-------------|-----------------------|----------|
| NDIPRE | TTH | 29.47 | 4.172 | 15 |
| | CH | 29.07 | 5.230 | 15 |
| | Total | 29.27 | 4.653 | 30 |
| NDI2WK | TTH | 18.93 | 5.284 | 15 |
| | CH | 16.67 | 3.754 | 15 |
| | Total | 17.80 | 4.649 | 30 |
| NDI4WK | TTH | 10.73 | 5.405 | 15 |
| | CH | 8.80 | 3.075 | 15 |
| | Total | 9.77 | 4.431 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 5762.689 | 2 | 2881.344 | 220.297 | .000 |
| CHANGE * GROUP | 14.867 | 2 | 7.433 | .568 | .570 |
| Error(CHANGE) | 732.444 | 56 | 13.079 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 32300.278 | 1 | 32300.278 | 883.364 | .000 |
| GROUP | 52.900 | 1 | 52.900 | 1.447 | .239 |
| Error | 1023.822 | 28 | 36.565 | | |

Result of the study shown significant improvement in NDI in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.239$)

Estimated Marginal Means of MEASURE_1

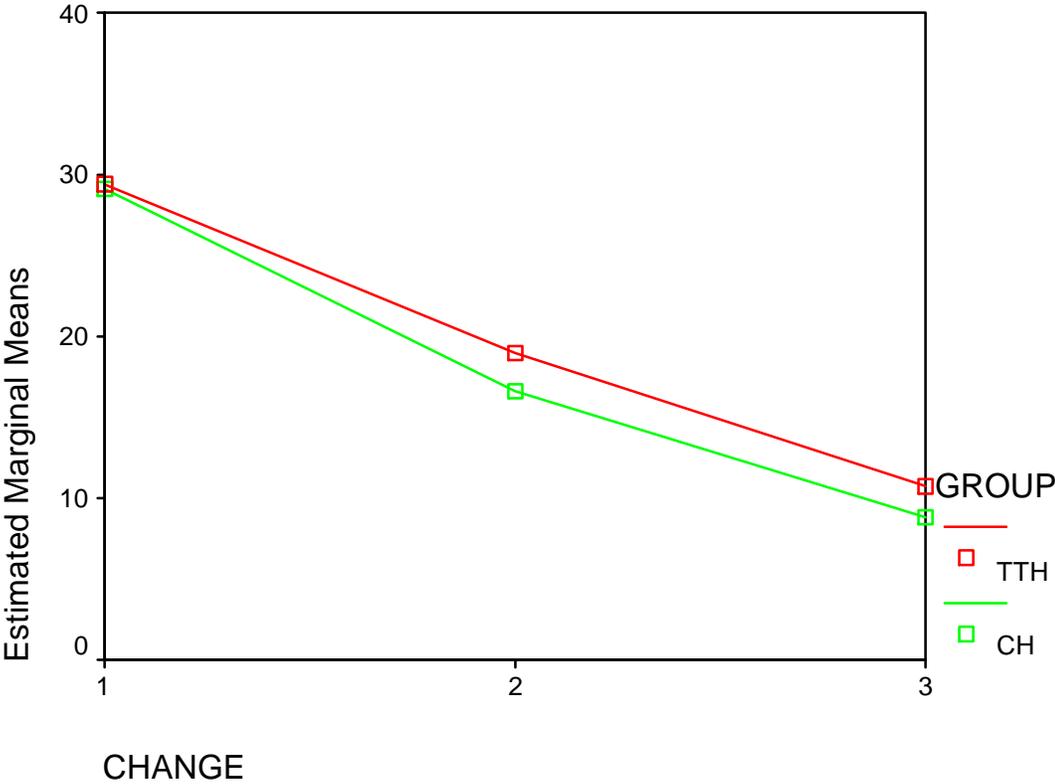


Table 3
Inter and Intra group analysis of HDIE

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|----------------|--------------|-------------|-----------------------|----------|
| HDIEPRE | TTH | 17.33 | 9.552 | 15 |
| | CH | 18.20 | 8.368 | 15 |
| | Total | 17.77 | 8.834 | 30 |
| HDIE2WK | TTH | 9.80 | 5.074 | 15 |
| | CH | 10.13 | 4.103 | 15 |
| | Total | 9.97 | 4.537 | 30 |
| HDIE4WK | TTH | 3.00 | 2.236 | 15 |
| | CH | 4.33 | 2.440 | 15 |
| | Total | 3.67 | 2.397 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 2993.400 | 2 | 1496.700 | 89.913 | .000 |
| CHANGE * GROUP | 3.756 | 2 | 1.878 | .113 | .894 |
| Error(CHANGE) | 932.178 | 56 | 16.646 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 9859.600 | 1 | 9859.600 | 133.044 | .000 |
| GROUP | 16.044 | 1 | 16.044 | .217 | .645 |
| Error | 2075.022 | 28 | 74.108 | | |

Result of the study shown significant improvement in HDIE in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.645$)

Estimated Marginal Means of MEASURE_1

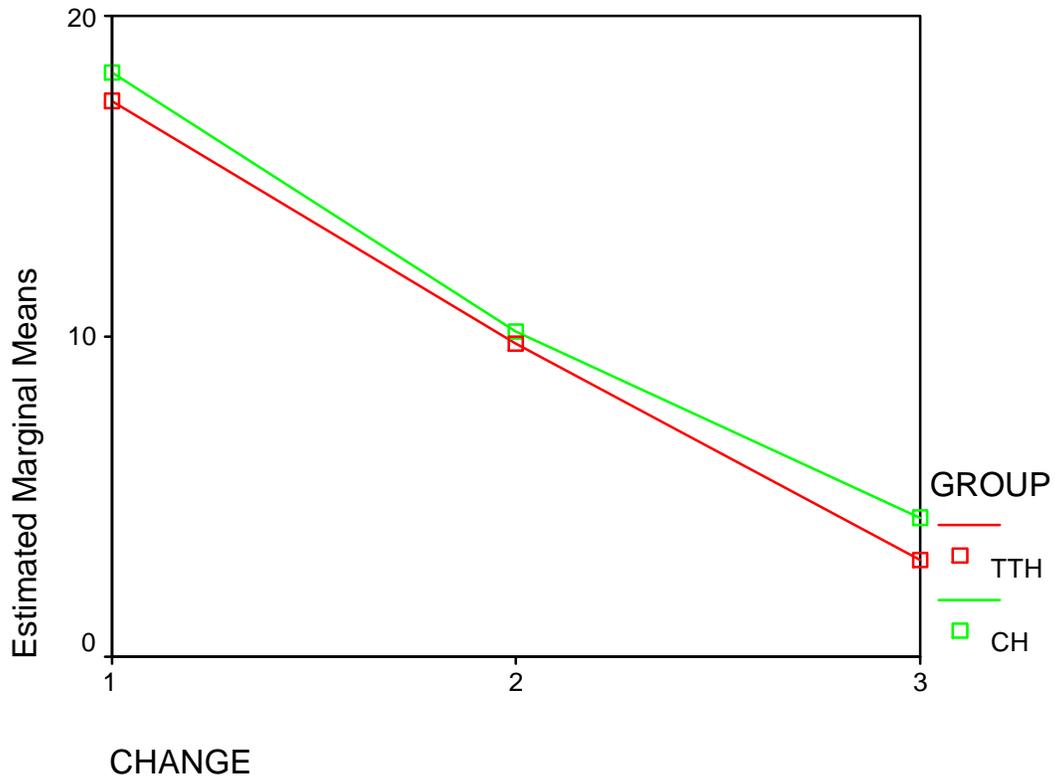


Table 4

Inter and Intra group analysis of HDIF

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|----------------|--------------|-------------|-----------------------|----------|
| HDIFPRE | TTH | 23.33 | 7.509 | 15 |
| | CH | 26.13 | 8.052 | 15 |
| | Total | 24.73 | 7.781 | 30 |
| HDIF2WK | TTH | 13.87 | 5.579 | 15 |
| | CH | 16.33 | 8.682 | 15 |
| | Total | 15.10 | 7.279 | 30 |
| HDIF4WK | TTH | 5.67 | 3.658 | 15 |
| | CH | 8.73 | 10.299 | 15 |
| | Total | 7.20 | 7.752 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 4626.289 | 2 | 2313.144 | 118.152 | .000 |
| CHANGE * GROUP | 1.356 | 2 | .678 | .035 | .966 |
| Error(CHANGE) | 1096.356 | 56 | 19.578 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 22121.344 | 1 | 22121.344 | 164.556 | .000 |
| GROUP | 173.611 | 1 | 173.611 | 1.291 | .265 |
| Error | 3764.044 | 28 | 134.430 | | |

Result of the study shown significant improvement in HDIF in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.265$)

Estimated Marginal Means of MEASURE_1

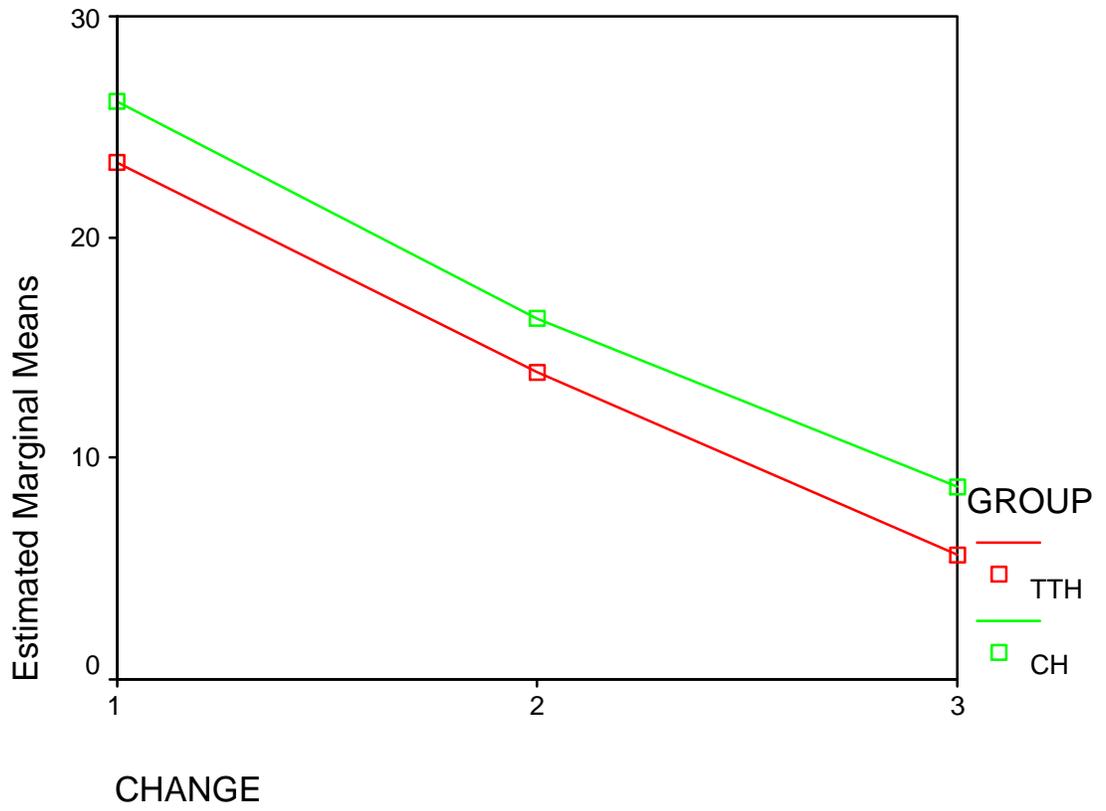


Table 5

Inter and Intra group analysis of Flexion CROM

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|----------------|--------------|-------------|-----------------------|----------|
| FlexPRE | TTH | 38.87 | 7.120 | 15 |
| | CH | 38.93 | 6.330 | 15 |
| | Total | 38.90 | 6.619 | 30 |
| Flex2WK | TTH | 45.33 | 7.078 | 15 |
| | CH | 43.33 | 6.102 | 15 |
| | Total | 44.33 | 6.572 | 30 |
| Flex4WK | TTH | 49.33 | 5.420 | 15 |
| | CH | 48.00 | 6.761 | 15 |
| | Total | 48.67 | 6.059 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 1436.867 | 2 | 718.433 | 198.732 | .000 |
| CHANGE * GROUP | 16.689 | 2 | 8.344 | 2.308 | .109 |
| Error(CHANGE) | 202.444 | 56 | 3.615 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 173976.100 | 1 | 173976.100 | 1457.513 | .000 |
| GROUP | 26.678 | 1 | 26.678 | .223 | .640 |
| Error | 3342.222 | 28 | 119.365 | | |

Result of the study shown significant improvement in Flexion CROM in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.640$)

Estimated Marginal Means of MEASURE_1

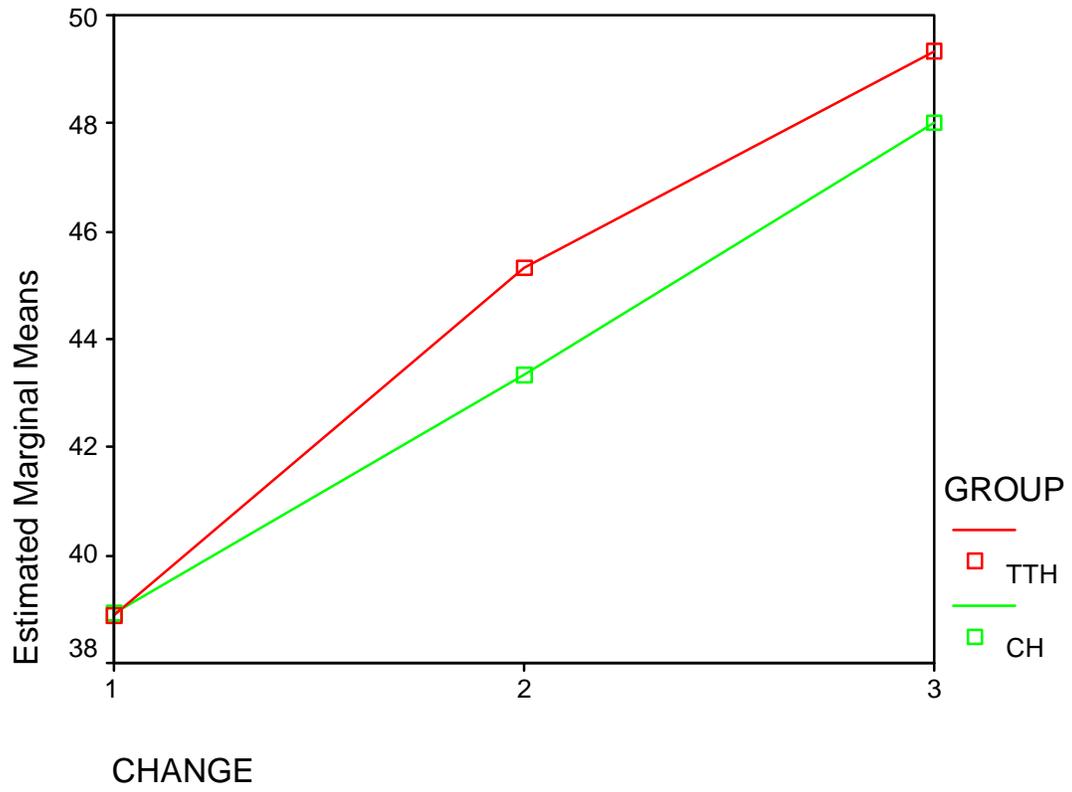


Table 6

Inter and Intra group analysis of Extension CROM

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|---------------|--------------|-------------|-----------------------|----------|
| ExtPRE | TTH | 39.00 | 9.297 | 15 |
| | CH | 39.13 | 6.255 | 15 |
| | Total | 39.07 | 7.786 | 30 |
| Ext2WK | TTH | 45.13 | 7.039 | 15 |
| | CH | 43.87 | 6.209 | 15 |
| | Total | 44.50 | 6.553 | 30 |
| Ext4WK | TTH | 50.00 | 6.814 | 15 |
| | CH | 48.00 | 5.916 | 15 |
| | Total | 49.00 | 6.352 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 1484.422 | 2 | 742.211 | 171.311 | .000 |
| CHANGE * GROUP | 17.622 | 2 | 8.811 | 2.034 | .140 |
| Error(CHANGE) | 242.622 | 56 | 4.333 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 175739.211 | 1 | 175739.211 | 1265.424 | .000 |
| GROUP | 24.544 | 1 | 24.544 | .177 | .677 |
| Error | 3888.578 | 28 | 138.878 | | |

Result of the study shown significant improvement in Extension CROM in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.677$)

Estimated Marginal Means of MEASURE_1

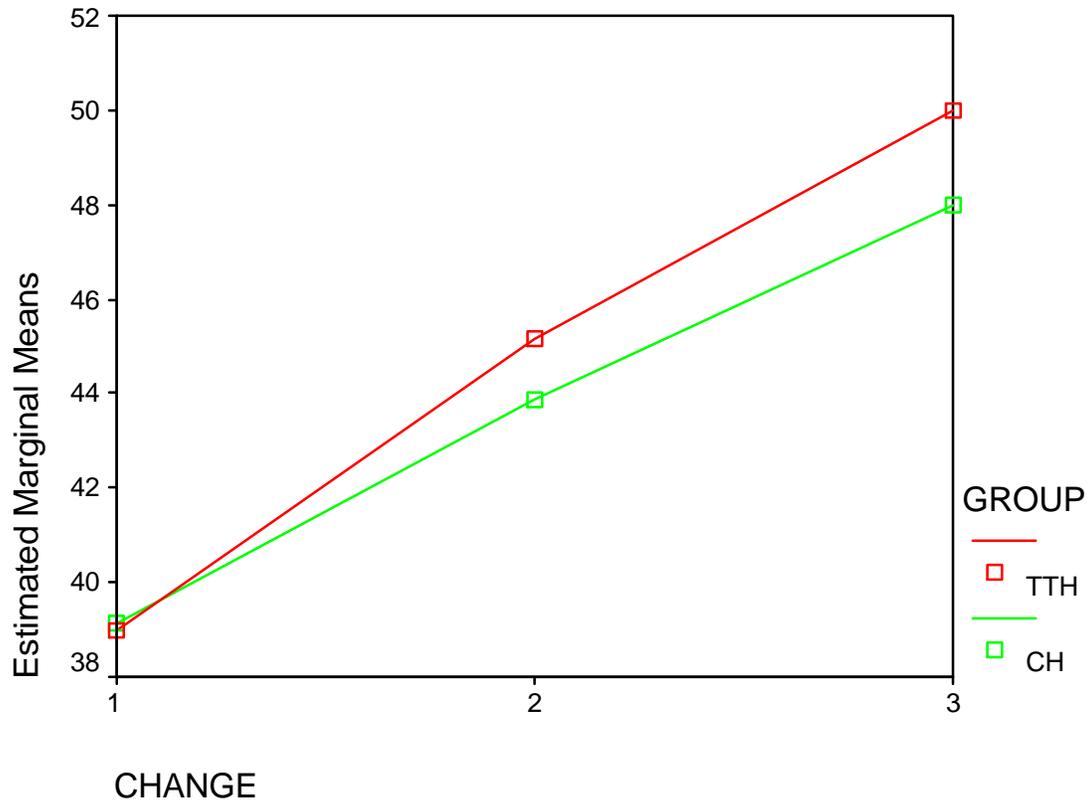


Table 7

Inter and Intra group analysis of Lateral Flexion (Rt) CROM

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|---------------|--------------|-------------|-----------------------|----------|
| LFOPRE | TTH | 38.73 | 8.548 | 15 |
| | CH | 40.33 | 4.639 | 15 |
| | Total | 39.53 | 6.806 | 30 |
| LFO2WK | TTH | 44.00 | 7.010 | 15 |
| | CH | 44.80 | 4.617 | 15 |
| | Total | 44.40 | 5.846 | 30 |
| LFO4WK | TTH | 48.00 | 6.928 | 15 |
| | CH | 49.33 | 4.577 | 15 |
| | Total | 48.67 | 5.809 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 1253.067 | 2 | 626.533 | 135.061 | .000 |
| CHANGE * GROUP | 2.489 | 2 | 1.244 | .268 | .766 |
| Error(CHANGE) | 259.778 | 56 | 4.639 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 175827.600 | 1 | 175827.600 | 1632.231 | .000 |
| GROUP | 34.844 | 1 | 34.844 | .323 | .574 |
| Error | 3016.222 | 28 | 107.722 | | |

Result of study shown significant improvement in Lateral flexion (Rt) CROM in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.574$)

Estimated Marginal Means of MEASURE_1

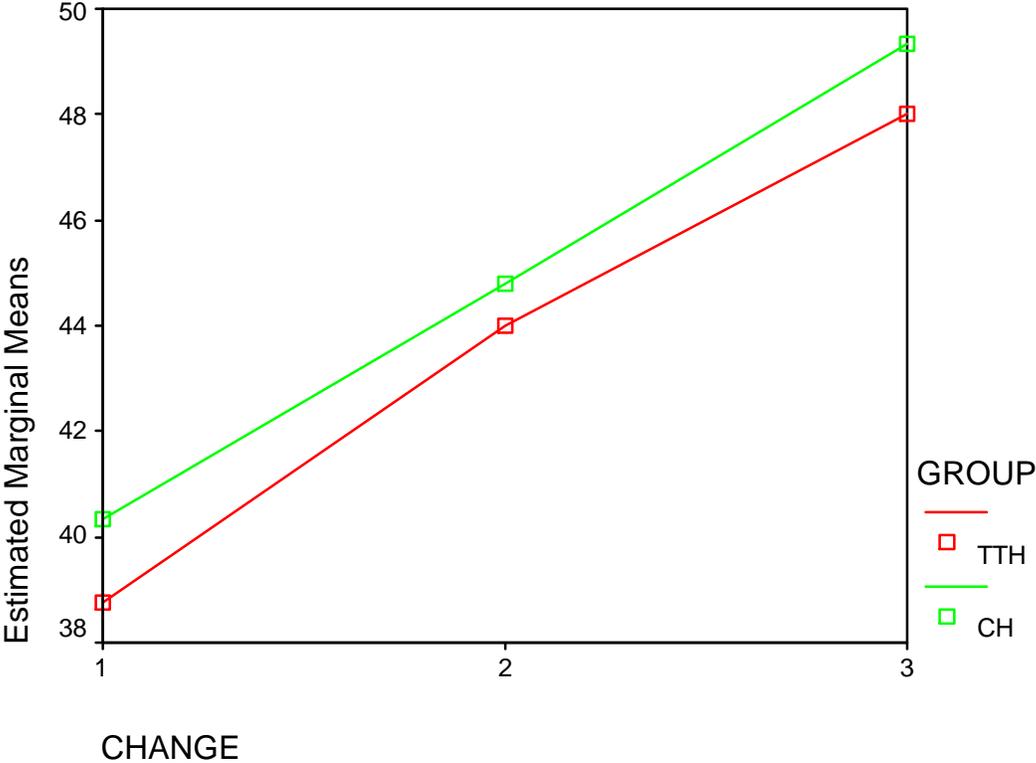


Table 8

Inter and Intra group analysis of Lateral Flexion (Lt) CROM

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|----------------|--------------|-------------|-----------------------|----------|
| LFOLPRE | TTH | 39.33 | 7.287 | 15 |
| | CH | 41.00 | 3.873 | 15 |
| | Total | 40.17 | 5.796 | 30 |
| LFOL2WK | TTH | 43.93 | 7.235 | 15 |
| | CH | 46.20 | 4.329 | 15 |
| | Total | 45.07 | 5.971 | 30 |
| LFOL4WK | TTH | 48.87 | 7.415 | 15 |
| | CH | 50.33 | 3.519 | 15 |
| | Total | 49.60 | 5.751 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 1335.489 | 2 | 667.744 | 242.956 | .000 |
| CHANGE * GROUP | 2.600 | 2 | 1.300 | .473 | .626 |
| Error(CHANGE) | 153.911 | 56 | 2.748 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 181800.278 | 1 | 181800.278 | 1859.291 | .000 |
| GROUP | 72.900 | 1 | 72.900 | .746 | .395 |
| Error | 2737.822 | 28 | 97.779 | | |

Result of the study shown significant improvement in Lateral flexion (Lt) CROM in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.395$)

Estimated Marginal Means of MEASURE_1

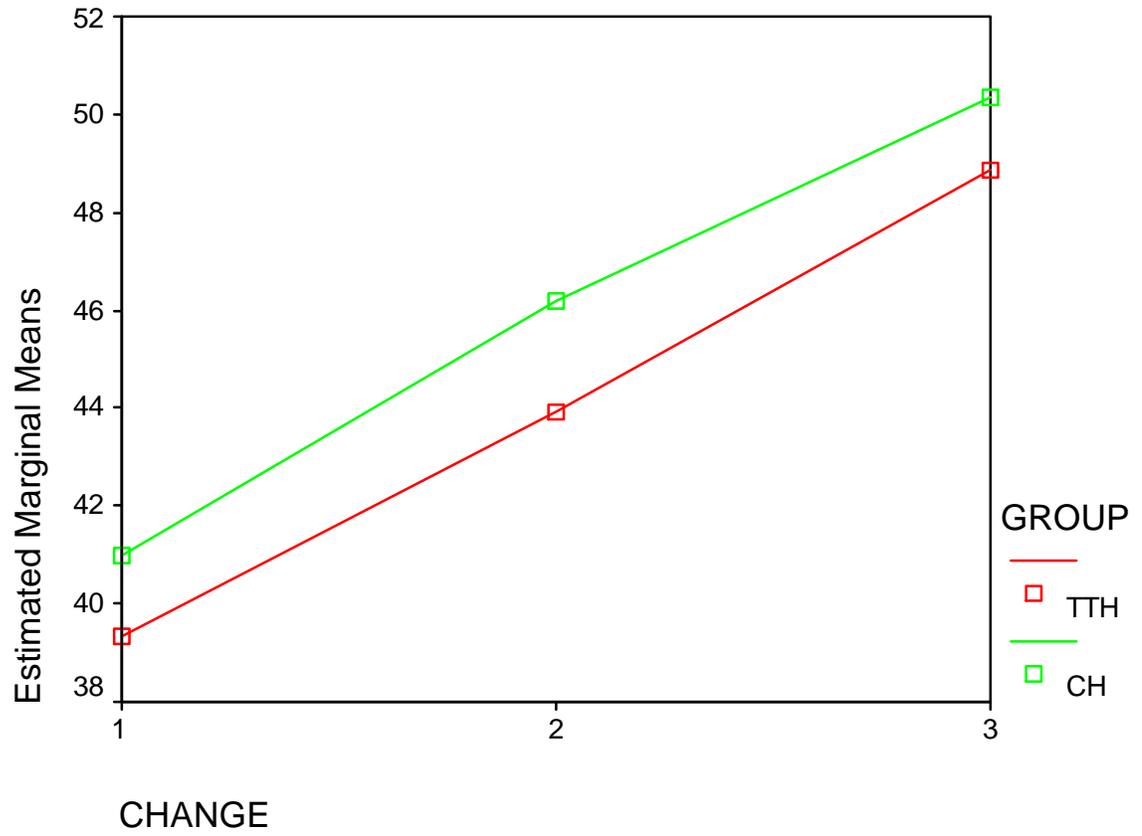


Table 9

Inter and Intra group analysis of Rotation (Rt) CROM

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|---------------|--------------|-------------|-----------------------|----------|
| ROTPRE | TTH | 49.67 | 3.994 | 15 |
| | CH | 48.33 | 4.082 | 15 |
| | Total | 49.00 | 4.026 | 30 |
| ROT2WK | TTH | 55.13 | 4.224 | 15 |
| | CH | 53.67 | 4.419 | 15 |
| | Total | 54.40 | 4.312 | 30 |
| ROT4WK | TTH | 59.33 | 3.200 | 15 |
| | CH | 58.67 | 4.419 | 15 |
| | Total | 59.00 | 3.806 | 30 |

Tests of Within-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 1503.200 | 2 | 751.600 | 624.681 | .000 |
| CHANGE * GROUP | 2.756 | 2 | 1.378 | 1.145 | .326 |
| Error(CHANGE) | 67.378 | 56 | 1.203 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 263737.600 | 1 | 263737.600 | 5556.455 | .000 |
| GROUP | 30.044 | 1 | 30.044 | .633 | .433 |
| Error | 1329.022 | 28 | 47.465 | | |

Result of the study shown significant improvement in Rotation (Rt) CROM in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.433$)

Estimated Marginal Means of MEASURE_1

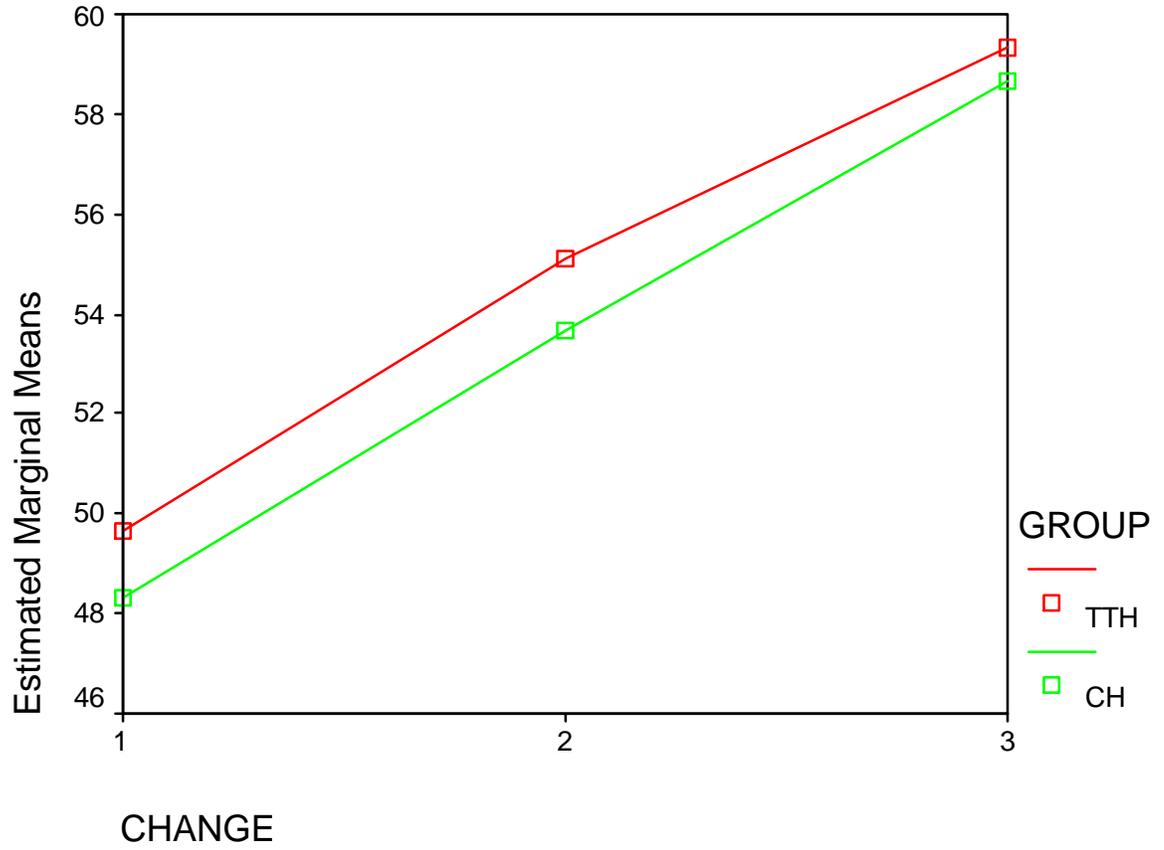


Table 10

Inter and Intra group analysis of Rotation (Lt) CROM

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|----------------|--------------|-------------|-----------------------|----------|
| ROTLPRE | TTH | 47.67 | 8.633 | 15 |
| | CH | 47.33 | 4.952 | 15 |
| | Total | 47.50 | 6.917 | 30 |
| ROTL2WK | TTH | 55.33 | 7.669 | 15 |
| | CH | 52.33 | 5.300 | 15 |
| | Total | 53.83 | 6.654 | 30 |
| ROTL4WK | TTH | 59.67 | 6.935 | 15 |
| | CH | 58.00 | 5.606 | 15 |
| | Total | 58.83 | 6.254 | 30 |

Tests of Within-Subjects Effects

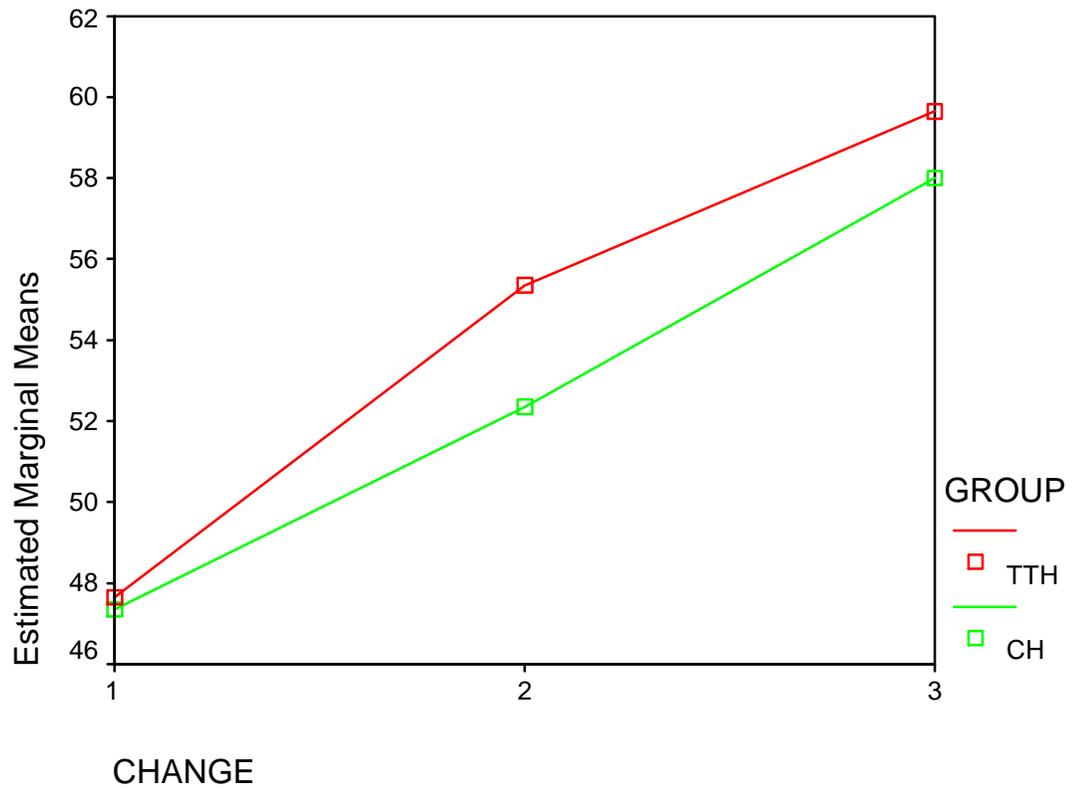
| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|--------------------------------|-----------|--------------------|----------|-------------|
| CHANGE | 1935.556 | 2 | 967.778 | 97.747 | .000 |
| CHANGE * GROUP | 26.667 | 2 | 13.333 | 1.347 | .268 |
| Error(CHANGE) | 554.444 | 56 | 9.901 | | |

Tests of Between-Subjects Effects

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|---------------|--------------------------------|-----------|--------------------|----------|-------------|
| Intercept | 256533.611 | 1 | 256533.611 | 2271.485 | .000 |
| GROUP | 62.500 | 1 | 62.500 | .553 | .463 |
| Error | 3162.222 | 28 | 112.937 | | |

Result of the study shown significant improvement in Rotation (Lt) CROM in both the groups. However the study shown significant difference within the group ($p < 0.00$) and non significant difference between the groups ($p < 0.463$)

Estimated Marginal Means of MEASURE_1



Discussion

The purpose of the study was to find the efficacy of Inhibitive distraction technique on cervicogenic headache against tension type headache.

The result of the study shown significant improvement in reducing the pain, improving ROM and to overcome of their disability due to tension type headache and cervicogenic headache following IDT.

In the study the criteria for diagnosing CH & TTH was classified on the basis of International headache society (IHS). Several studies like Granella et al, Leone et al (1994) has shown more validity and reliability of IHS criteria for differentiate the diagnosis of CH & TTH^{6,7}.

Several mechanisms have been implicated in pathophysiology of both TTH & CH. Mechanism includes peripheral mechanism, central mechanism, muscular factor, mechanical factors leading to myofascial trigger points¹².

Neuroanatomical explanation of both headaches is due to increase sensitization of trigeminocervical nucleus through trigeminocervico nucleus caudalis. These sensitizations of trigeminal nucleus caudalis happen due to increase peripheral nociceptive input from myofascial trigger points in suboccipital muscles³³. Several studies Fernandez-de-las-Penas C et al (2006) proposed myofascial trigger points of suboccipital muscles are main contributor factor for TTH & CH. Suboccipital muscle myofascial trigger points happen due to forward head posture^{34,35,36}.

Fernandez-de-las-Penas C et al (2006) proposed significant correlation between forward head posture and headache^{34,35,36}. Postural deviations ie forward head posture results in suboccipital compression, trigeminocervical complex stimulation compression of facet joints, alteration of cervical spine biomechanics and

proprioceptive input. It has been proposed that forward head posture results in cranio-cervical extension, suboccipital muscles hypertonicity and decreased cranio-cervical flexion mobility³³.

Several studies proposed numerous different treatment approaches to overcome headache, includes pharmacological, non pharmacological, anesthetic and surgical intervention. Non pharmacological treatment included spinal manipulation, TENS, biofeedback, relaxation therapy, acupuncture, psychotherapy. Of the above treatment many studies found spinal manipulation therapy is more effective than other type of physical therapy treatments. It was also proposed that spinal manipulation is as effective as use of amitryptaline medication³⁷.

Nilsson et al (1997) proposed osteopathic cervical manipulation found to be more effective³⁸.

Since suboccipital muscle tightness or myofascial trigger points of suboccipital muscles, are the main stimulus for centralization pain for gaining headache.

Paris et al (1991)²⁰ proposed Inhibitive Distraction Technique which has its origin of cranial osteopathy to inhibit the trigger point muscle and to gain improvement in ROM. In his pilot study found significant improvement with respect to pain and ROM following intervention. He proposed the effect could be due to inhibition of local and general muscle tone of sub occipital muscle by giving ischemic pressure on these muscles through finger tips and improving the pain and ROM through neurophysiologic and mechanical effect of distraction and ventro cranial glide. The same physiological effect might have happen in our study assisted in increasing the ROM and reducing the pain in both TTH and CH. There was also significant improvement in emotional and functional ability in both the groups following intervention.

It has been proposed that nociceptive activity in the trigeminocervical nucleus is normally inhibited by descending neural pathway arising from ventroperiaqueductal grey matter in the brainstem via rostroventral medial medulla these pathways primarily use serotonin as a neurotransmitter for inhibition (Fields 1997)¹³.

Various studies shown there is a modification of adrenocorticotrophic hormone and decrease in plasma serotonin in the patients suffering from headache. This change in neurohormonal axis impact on neuromodulation of sleep, pain and mood^{39,40,41}. These above studies correlate with the result of the studies where there was higher score in emotional and functional aspects in HDI which was reduced following the intervention. This could be due to inhibiting myofascial trigger and improving cervico-occipital joint mobility helped in reducing more nociceptive input from trigeminocervical nucleus might have assisted in increase in serotonin formation and helped in overcoming disturbance of emotional and functional aspect.

However in the present study TTH and CH group showed non significant differences between them in their symptoms followed 4th wks of IDT intervention, shows long term IDT is effective in relieving symptoms of both TTH and CH.

LIMITATIONS

- Number of subjects taken in a study was low
- Quantification of the pressure applied by therapist on patient was not measured
- In this study most of the patients were undergoing medications for the same inspite strongly recommended not to take medications
- Other types of headache were not included.

RECOMMENDATIONS

- Further studies required to do the same on large number of subjects
- Further studies required to do the same technique application on other types of headache
- Further studies required effect of IDT only on these TTH & CH without using medications.
- In the present study universal goniometer was used but it is less reliable compare to inclinometer, in future studies inclinometer can be used to check the ROM of cervical spine.

Conclusion

The study concludes Inhibitive Distraction Technique is highly effective in relieving symptoms of Cervicogenic headache & Tension type headache.

So the study concludes that IDT can be used in therapeutic intervention to relieve symptoms of Cervicogenic headache & tension type headache.

Summary

Headache (cephalalgia) is an extremely common unpleasant symptom and often incapacitating condition worldwide. Headache may arise when nociceptive input is received from the head or structure that can refer pain to head. The perception of any headache depends on the degree of excitation of trigemino cervical nucleus. There is a significant correlation between forward head posture and headache and the main factors contributing for headache is due to myofascial trigger points, muscle tightness and decreased mobility at suboccipital muscle and upper cervical segments.

Numerous different treatment approaches to overcome headache includes pharmacological, non pharmacological, anesthetic and surgical intervention. In that spinal manipulation is found to be more effective.

Paris et al proposed and performed a pilot study on Inhibitive distraction technique which is originated from. The study found effective in relieving symptoms of headache. No literatures or studies of this technique on cervicogenic headache and its long term on CH & TTH were not there. So the study was proposed to find its long term efficacy on CH & TTH was proposed.

In our study thirty patients were taken and divided into two groups i.e. Group A (tension type headache) and Group B (cervicogenic headache) on the basis of IHS classification. Prior to the intervention parameters were checked for both the groups and later intervention applied 3 times a week for 4 weeks. Data collected at 2nd and 4th week. Results were statically analyzed using repeated measure ANOVA.

Results showed highly significant improvement in all parameters within the groups at 2nd & 4th week and showed non significant improvement in all parameters between the groups. IDT is highly effective in relieving symptoms of CH & TTH. Hence IDT can be used in therapeutic intervention to relieving symptoms of CH & TTH.

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Annexure

ANNEXURE I

CONSENT FORM

I.....hereby agree to provide my fullest consent and co-operation as a subject for the dissertation work of **MS. KUMUDINI.R.M** entitled “**EFFECTIVENESS OF INHIBITIVE DISTRACTION TECHNIQUE ON HEADACHES DUE TO CERVICAL DYSFUNCTION**” towards her post graduation in physiotherapy. The benefits and possible risks of the procedure and duration of the study have been explained to me. The questions and queries I have posed have been answered to my satisfaction and I am aware that I can discontinue the study at any time I wish to do so.

Place:

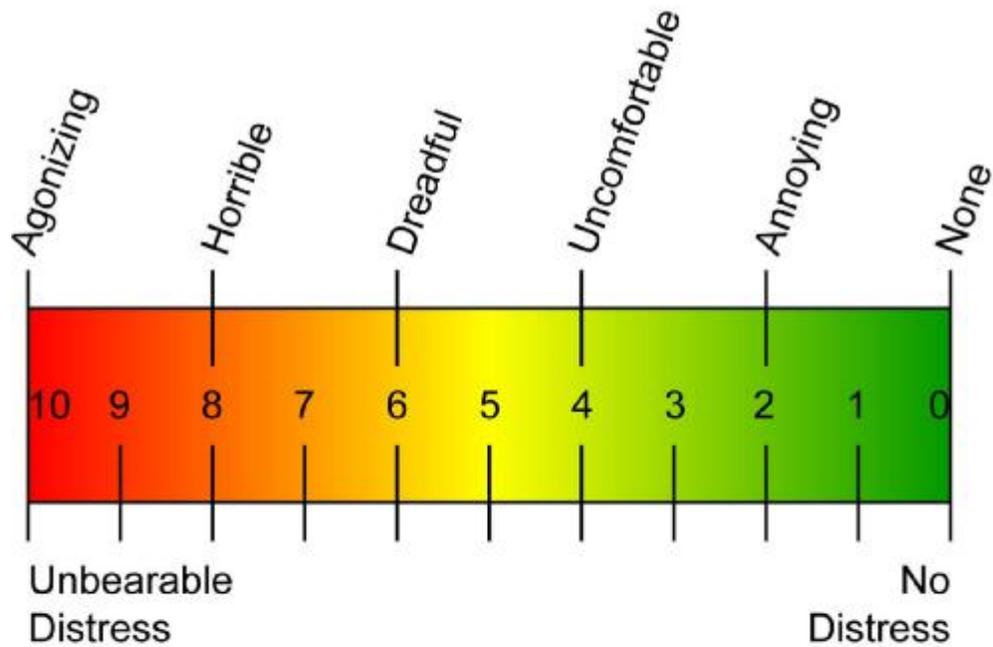
Signature of the participant

Date:

ANNEXURE II

Visual Analogue Scale (VAS)

VAS attempts to represent measurement quantities/ intensity of pain in terms of a straight line that is believed to range across a continuum of values and cannot easily be directly measured. Operationally a VAS is usually a horizontal line, 100mm in length, anchored by word descriptors at each end.



ANNEXURE III

Neck Disability Index

This questionnaire has been designed to give us information as to how your neck pain has affected your ability to manage in everyday life.

Please answer every section and **mark in each section only the one box that applies to you.** We realize you may consider that two or more statements in any one section relate to you, but please just mark the box that most closely describes your problem.

Section 1: Pain Intensity

I have no pain at the moment

The pain is very mild at the moment

The pain is moderate at the moment

The pain is fairly severe at the moment

The pain is very severe at the moment

The pain is the worst imaginable at the moment

Section 2: Personal Care (Washing, Dressing, etc.)

I can look after myself normally without causing extra pain

I can look after myself normally but it causes extra pain

It is painful to look after myself and I am slow and careful

£ I need some help but can manage most of my personal care

£ I need help every day in most aspects of self care

£ I do not get dressed, I wash with difficulty and stay in bed

Section 3: Lifting

£ I can lift heavy weights without extra pain

£ I can lift heavy weights but it gives extra pain

£ Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed, for example on a table

£ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned

£ I can only lift very light weights

£ I cannot lift or carry anything

Section 4: Reading

£ I can read as much as I want to with no pain in my neck

£ I can read as much as I want to with slight pain in my neck

£ I can read as much as I want with moderate pain in my neck

£ I can't read as much as I want because of moderate pain in my neck

£ I can hardly read at all because of severe pain in my neck

£ I cannot read at all

Section 5: Headaches

£ I have no headaches at all

£ I have slight headaches, which come infrequently

£ I have moderate headaches, which come infrequently

£ I have moderate headaches, which come frequently

£ I have severe headaches, which come frequently

£ I have headaches almost all the time

Section 6: Concentration

£ I can concentrate fully when I want to with no difficulty

£ I can concentrate fully when I want to with slight difficulty

£ I have a fair degree of difficulty in concentrating when I want to

£ I have a lot of difficulty in concentrating when I want to

£ I have a great deal of difficulty in concentrating when I want to

£ I cannot concentrate at all

Section 7: Work

£ I can do as much work as I want to

£ I can only do my usual work, but no more

£ I can do most of my usual work, but no more

£ I cannot do my usual work

£ I can hardly do any work at all

£ I can't do any work at all

Section 8: Driving

£ I can drive my car without any neck pain

£ I can drive my car as long as I want with slight pain in my neck

£ I can drive my car as long as I want with moderate pain in my neck

£ I can't drive my car as long as I want because of moderate pain in my neck

£ I can hardly drive at all because of severe pain in my neck

£ I can't drive my car at all

Section 9: Sleeping

£ I have no trouble sleeping

£ My sleep is slightly disturbed (less than 1 hr sleepless)

£ My sleep is mildly disturbed (1-2 hrs sleepless)

£ My sleep is moderately disturbed (2-3 hrs sleepless)

£ My sleep is greatly disturbed (3-5 hrs sleepless)

£ My sleep is completely disturbed (5-7 hrs sleepless)

Section 10: Recreation

£ I am able to engage in all my recreation activities with no neck pain at all

£ I am able to engage in all my recreation activities, with some pain in my neck

£ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck

£ I am able to engage in a few of my usual recreation activities because of pain in my neck

£ I can hardly do any recreation activities because of pain in my neck

£ I can't do any recreation activities at all

Score: /50 Transform to percentage score x 100 = %points

Scoring: For each section the total possible score is 5: if the first statement is marked the section score = 0, if the last statement is marked it = 5. If all ten sections are completed the score is calculated as follows:

Example: 16 (total scored)

50 (total possible score) x 100 = 32%

If one section is missed or not applicable the score is calculated: 16 (total scored)

45 (total possible score) x 100 = 35.5%

Minimum Detectable Change (90% confidence): 5 points or 10 %points

ANNEXURE IV

Headache disability index

Overview: The Henry Ford Hospital Headache Disability Inventory (HDI) can be used to periodically evaluate a patient with headache. It can be used to determine the effectiveness of a management strategy over time.

Domains:

(1) emotional: 13 items

(2) functional: 12 items

INSTRUCTIONS: Please CIRCLE the correct response:

1. I have headache: [1] 1 per month [2] more than but less than 4 per month

[3] more than one per week.

2. My headache is: [1] mild

[2] moderate

[3] severe

INSTRUCTIONS: PLEASE READ CAREFULLY: The purpose of the scale is to

identify difficulties that you may be experiencing because

of your headache Please check off “YES”, “SOMETIMES”, or “NO” to each item.

Answer each item as it pertains to your headache only.

YES

SOMETIMES

NO

- E1. Because of my headaches I feel handicapped.
- F2. Because of my headaches I feel restricted in performing my routine daily activities.
- E3. No one understands the effect my headaches have on my life.
- F4. I restrict my recreational activities (e.g. sports, hobbies) because of my headaches.
- E5. My headaches make me angry.
- E6. Sometimes I feel that I am going to lose control because of my headaches
- F7. Because of my headaches I am less likely to socialize.
- E8. My spouse/significant other, or family and friends have no idea what I am going through because of my headaches.
- E9. My headaches are so bad that I feel I am going to go insane.
- E10. My outlook on the world is affected by my headaches.
- E11. I am afraid to go outside when I feel a headache is starting.
- E12. I feel desperate because of my headaches.
- F13. I am concerned that I am paying penalties at work or at home because of my headaches.
- E14. My headaches place stress on my relationships with family or friends.
- F15. I avoid being around people when I have a headache
- F16. I believe my headaches are making it difficult for me to achieve my goals in life.
- F17. I am unable to think clearly because of my headaches.

F18. I get tense (e.g. muscle tension) because of my headaches.

F19. I do not enjoy social gatherings because of my headaches.

E20. I feel irritable because of my headaches.

F21. I avoid traveling because of my headaches.

E22. My headaches make me feel confused.

E23. My headaches make me feel frustrated.

F24. I find it difficult to read because of my headaches.

F25. I find it difficult to focus my attention away from my headaches and on other things.

MCC USE ONLY: Scoring

Total: ____; E ____; F ____

(100) (52) (48)

| Response | Points |
|-----------------|---------------|
| yes | 4 |
| sometimes | 2 |
| no | 0 |

Interpretation:

- minimum score: 0
- maximum emotional subscale: 52
- maximal functional subscale: 48
- maximum score: 100
- The higher the score the greater the disability caused by the headache.
- A decrease in the total HDI of ≥ 29 points as a consequence to a management strategy is considered a significant improvement.

ANNEXURE V

IHS classification of Tension type headache

Section A] in the criteria for TTH relates to the frequency of the headaches for the purposes of classification into episodic or chronic tension type headache.

B] Headache lasting from 30mins to 7days

C] At least 2 of the following pain characteristics:

- 1) Pressing/ tightening (non pulsating) quality
- 2) Mild or moderate intensity (may inhibit, but does not prohibit activities)
- 3) Bilateral location
- 4) No aggravation by walking stairs or similar routine physical activity

D] Both of the following

- 1) No nausea or vomiting (anorexia may occur)
- 2) Photophobia and phonophobia are absent, or one but not the other is present

E] At least one of the following:

- 1) History, physical and neurological examination do not suggest one of the disorders, but it is ruled out by appropriate investigations
- 2) Such disorders is present, but tension type headache does not occur for the first time in close temporal relation to the disorder

IHS classification of Cervicogenic headache

Major criteria of cervicogenic headache

- 1) Symptoms and signs of neck involvement
 - i) Precipitation of comparable head pain by:
 - Neck movement or sustained awkward head posture &/or
 - External pressure over the upper cervical or occipital region on the symptomatic side
 - ii) Restriction of ROM in the neck
 - iii) Ipsilateral neck, shoulder or arm pain
- 2) Confirmatory evidence by diagnostic blocks
- 3) Unilaterality of head pain, without side shift
- 4) Head pain characteristics
 - i) Moderate – severe non throbbing and non lancinating pain usually starting in the neck
 - ii) Episodes of varying duration
 - iii) Fluctuating continuous pain

Other characteristics of some importance
- 5)
 - i) Only marginal effect or lack of effect of indomethacin
 - ii) Only marginal effect or lack of effect of ergotaunine and sumatriptan
 - iii) Female sex

iv) Not infrequent history of head or indirect neck trauma, usually of more than medium severity

Other features of lesser importance

6) Various attack related phenomena, only occasionally present and/or moderately expressed when present

i) Nausea

ii) Phonophobia and photophobia

iii) Dizziness

iv) Ipsilateral blurred vision

v) Difficulties on swallowing

vi) Ipsilateral oedema, mostly in periocular area

MASTER CHART

Group A (Tension type headache)

| TTH | VAS Pre | Post 2nd wk | Post 4th wk | NDI Pre | Post 2nd wk | Post 4th wk | HDIE Pre | Post 2nd wk | Post 4th wk | HDIF Pre | Post 2nd wk | Post 4th wk | CROM Pre flex | Post 2nd wk | Post 4th wk | Pre ext | Post 2nd wk | Post 4th wk | Pre Lat flex R | Post 2nd wk | Post 4th wk | Pre Lat flex L | Post 2nd wk | Post 4th wk | Pre Rotn R | Post 2nd wk | Post 4th wk | Pre Rotn L | Post 2nd wk | Post 4th wk |
|-----|---------|-------------|-------------|---------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|---------------|-------------|-------------|---------|-------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|------------|-------------|-------------|------------|-------------|-------------|
| TTH | 6 | 4 | 3 | 34 | 24 | 14 | 22 | 10 | 4 | 26 | 12 | 6 | 30 | 40 | 50 | 45 | 45 | 50 | 30 | 30 | 32 | 40 | 41 | 45 | 50 | 55 | 60 | 40 | 45 | 50 |
| TTH | 7 | 4 | 3 | 26 | 16 | 12 | 24 | 14 | 2 | 26 | 22 | 14 | 35 | 40 | 45 | 40 | 45 | 50 | 45 | 47 | 50 | 45 | 48 | 50 | 50 | 55 | 60 | 50 | 55 | 60 |
| TTH | 7 | 4 | 2 | 30 | 16 | 10 | 24 | 11 | 4 | 26 | 12 | 2 | 50 | 55 | 58 | 40 | 45 | 50 | 45 | 50 | 52 | 45 | 50 | 58 | 50 | 55 | 60 | 55 | 60 | 65 |
| TTH | 8 | 6 | 3 | 28 | 16 | 8 | 24 | 16 | 6 | 22 | 20 | 10 | 45 | 48 | 52 | 40 | 45 | 50 | 40 | 45 | 48 | 35 | 40 | 45 | 50 | 55 | 60 | 60 | 65 | 70 |
| TTH | 7 | 4 | 2 | 24 | 18 | 8 | 8 | 6 | 4 | 20 | 14 | 4 | 40 | 45 | 50 | 40 | 45 | 50 | 35 | 40 | 45 | 35 | 40 | 45 | 45 | 50 | 55 | 40 | 45 | 50 |
| TTH | 5 | 2 | 1 | 34 | 28 | 6 | 12 | 10 | 6 | 34 | 18 | 3 | 45 | 55 | 55 | 40 | 57 | 60 | 45 | 50 | 55 | 40 | 50 | 55 | 50 | 59 | 60 | 30 | 65 | 65 |
| TTH | 7 | 3 | 2 | 34 | 26 | 10 | 2 | 0 | 0 | 18 | 10 | 8 | 35 | 40 | 45 | 20 | 30 | 35 | 50 | 55 | 56 | 40 | 45 | 50 | 45 | 50 | 55 | 40 | 45 | 50 |
| TTH | 7 | 5 | 3 | 34 | 30 | 26 | 24 | 16 | 4 | 20 | 14 | 8 | 20 | 30 | 35 | 15 | 30 | 35 | 17 | 38 | 42 | 20 | 25 | 30 | 55 | 58 | 60 | 45 | 55 | 60 |
| TTH | 8 | 6 | 2 | 30 | 16 | 14 | 22 | 14 | 4 | 36 | 22 | 10 | 40 | 45 | 50 | 40 | 45 | 50 | 40 | 45 | 50 | 45 | 50 | 55 | 50 | 55 | 60 | 55 | 60 | 65 |
| TTH | 5 | 3 | 1 | 28 | 18 | 14 | 8 | 6 | 0 | 12 | 4 | 2 | 40 | 45 | 50 | 40 | 45 | 50 | 42 | 45 | 50 | 45 | 45 | 50 | 45 | 50 | 55 | 45 | 50 | 55 |
| TTH | 5 | 3 | 1 | 24 | 16 | 4 | 26 | 14 | 2 | 36 | 20 | 4 | 40 | 45 | 50 | 50 | 50 | 55 | 32 | 35 | 40 | 30 | 35 | 40 | 60 | 65 | 65 | 60 | 65 | 65 |
| TTH | 6 | 3 | 2 | 22 | 14 | 6 | 18 | 12 | 3 | 20 | 10 | 2 | 38 | 42 | 45 | 40 | 45 | 50 | 45 | 50 | 55 | 45 | 50 | 55 | 45 | 50 | 55 | 40 | 45 | 50 |
| TTH | 6 | 4 | 1 | 32 | 14 | 6 | 34 | 12 | 6 | 22 | 14 | 4 | 45 | 50 | 55 | 45 | 50 | 55 | 40 | 45 | 50 | 45 | 50 | 55 | 50 | 60 | 65 | 50 | 60 | 65 |
| TTH | 5 | 2 | 1 | 34 | 16 | 9 | 4 | 2 | 0 | 20 | 10 | 6 | 40 | 45 | 50 | 45 | 50 | 55 | 45 | 50 | 55 | 45 | 50 | 55 | 50 | 55 | 60 | 55 | 60 | 65 |
| TTH | 5 | 4 | 2 | 28 | 16 | 14 | 8 | 4 | 0 | 12 | 6 | 2 | 40 | 45 | 50 | 45 | 50 | 55 | 30 | 35 | 40 | 35 | 40 | 45 | 50 | 55 | 60 | 50 | 55 | 60 |

MASTER CHART

Group B (Cervicogenic headache)

| CH | VAS Pre | Post 2nd wk | Post 4th wk | NDI Pre | Post 2nd wk | Post 4th wk | HDIE Pre | Post 2nd wk | Post 4th wk | HDIF Pre | Post 2nd wk | Post 4th wk | CROM Pre flex | Post 2nd wk | Post 4th wk | Pre ext | Post 2nd wk | Post 4th wk | Pre Lat flex R | Post 2nd wk | Post 4th wk | Pre Lat flex L | Post 2nd wk | Post 4th wk | Pre Rotn R | Post 2nd wk | Post 4th wk | Pre Rotn L | Post 2nd wk | Post 4th wk |
|----|---------|-------------|-------------|---------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|---------------|-------------|-------------|---------|-------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|------------|-------------|-------------|------------|-------------|-------------|
| CH | 7 | 4 | 2 | 28 | 16 | 14 | 20 | 12 | 4 | 36 | 18 | 12 | 45 | 50 | 60 | 40 | 50 | 50 | 35 | 40 | 45 | 35 | 40 | 45 | 55 | 60 | 65 | 55 | 60 | 65 |
| CH | 5 | 3 | 1 | 30 | 18 | 12 | 8 | 6 | 0 | 12 | 6 | 4 | 40 | 43 | 45 | 40 | 45 | 50 | 42 | 45 | 45 | 45 | 48 | 50 | 50 | 55 | 60 | 50 | 55 | 60 |
| CH | 5 | 3 | 1 | 34 | 16 | 9 | 6 | 2 | 2 | 24 | 16 | 10 | 42 | 45 | 45 | 40 | 45 | 45 | 50 | 52 | 55 | 45 | 50 | 55 | 50 | 55 | 60 | 50 | 55 | 65 |
| CH | 6 | 4 | 2 | 30 | 14 | 10 | 24 | 12 | 6 | 36 | 18 | 6 | 50 | 55 | 60 | 37 | 40 | 45 | 33 | 35 | 40 | 40 | 45 | 50 | 55 | 60 | 65 | 55 | 60 | 65 |
| CH | 6 | 4 | 2 | 32 | 14 | 8 | 22 | 12 | 4 | 34 | 14 | 6 | 40 | 45 | 50 | 45 | 48 | 50 | 45 | 50 | 55 | 45 | 50 | 55 | 50 | 55 | 60 | 50 | 55 | 60 |
| CH | 5 | 3 | 1 | 20 | 12 | 10 | 18 | 14 | 6 | 20 | 10 | 4 | 35 | 40 | 45 | 40 | 45 | 50 | 40 | 45 | 50 | 40 | 45 | 50 | 45 | 50 | 55 | 45 | 50 | 55 |
| CH | 7 | 4 | 2 | 32 | 16 | 8 | 8 | 4 | 2 | 24 | 18 | 6 | 40 | 42 | 45 | 40 | 45 | 50 | 45 | 50 | 55 | 45 | 50 | 55 | 50 | 60 | 65 | 50 | 60 | 65 |
| CH | 6 | 4 | 1 | 22 | 14 | 10 | 16 | 12 | 4 | 22 | 12 | 4 | 35 | 40 | 45 | 35 | 40 | 45 | 40 | 45 | 50 | 40 | 45 | 50 | 45 | 50 | 55 | 45 | 50 | 55 |
| CH | 5 | 3 | 1 | 28 | 14 | 9 | 22 | 12 | 4 | 20 | 14 | 6 | 40 | 45 | 50 | 40 | 45 | 50 | 40 | 45 | 50 | 40 | 45 | 50 | 45 | 50 | 55 | 45 | 50 | 55 |
| CH | 5 | 2 | 1 | 34 | 16 | 8 | 24 | 12 | 6 | 28 | 16 | 4 | 47 | 50 | 55 | 45 | 50 | 55 | 45 | 50 | 55 | 45 | 50 | 55 | 50 | 55 | 60 | 50 | 55 | 60 |
| CH | 6 | 3 | 2 | 24 | 18 | 6 | 8 | 4 | 2 | 20 | 14 | 8 | 35 | 40 | 45 | 35 | 40 | 45 | 40 | 45 | 50 | 40 | 45 | 50 | 45 | 50 | 55 | 40 | 45 | 50 |
| CH | 7 | 3 | 1 | 34 | 16 | 4 | 24 | 16 | 10 | 20 | 18 | 6 | 25 | 30 | 35 | 20 | 25 | 30 | 35 | 40 | 45 | 35 | 40 | 45 | 45 | 50 | 55 | 45 | 50 | 55 |
| CH | 5 | 4 | 2 | 34 | 26 | 6 | 12 | 10 | 3 | 34 | 16 | 6 | 40 | 45 | 50 | 45 | 45 | 50 | 40 | 45 | 50 | 45 | 45 | 50 | 50 | 55 | 60 | 40 | 45 | 50 |
| CH | 8 | 5 | 2 | 30 | 18 | 14 | 20 | 16 | 4 | 35 | 12 | 6 | 40 | 45 | 50 | 40 | 45 | 50 | 40 | 45 | 50 | 40 | 45 | 50 | 50 | 55 | 60 | 50 | 55 | 60 |
| CH | 6 | 4 | 3 | 34 | 24 | 14 | 26 | 12 | 6 | 22 | 10 | 4 | 30 | 35 | 40 | 45 | 50 | 55 | 35 | 40 | 45 | 35 | 40 | 45 | 40 | 45 | 50 | 40 | 45 | 50 |