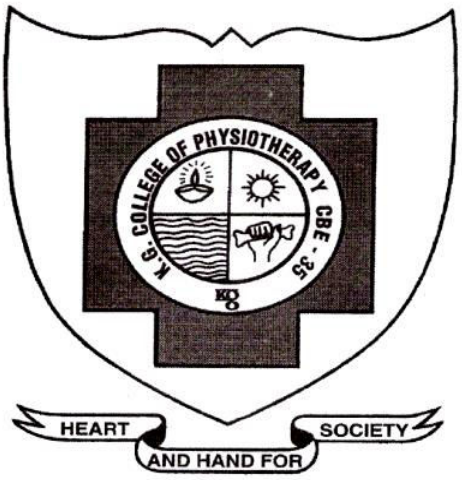
"EEFECT OF INTEGRATED NEUROMUSCULAR INHIBITION TECHNIQUE VERSUS MUSCLE ENERGY TECHNIQUE ON UPPER TRAPEZIUS TRIGGER POINTS IN PATIENTS WITH NON-SPECIFIC NECK PAIN"



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ELECTIVE: PHYSIOTHERAPY IN ORTHOPAEDICS

A DISSERTATION SUBMITTED TO THE TAMILNADU

Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI,

AS PARTIAL FULFILLMENT OF THE

MASTER OF PHYSIOTHERAPY DEGREE

APRIL 2016

CERTIFICATE

Certified that this is the bonafide work of **Ms. A.NITHYA PONNI PRIYA** of K.G. College of Physiotherapy, Coimbatore, submitted in partial fulfillment of the requirements for the Master of Physiotherapy degree course from the Tamilnadu Dr. M.G.R. Medical University under the **Registration No: 271410302** for the April 2016 Examination.

Principal

Place : Coimbatore

Date :

"EFFECT OF INTEGRATED NEUROMUSCULAR INHIBITION TECHNIQUE VERSUS MUSCLE ENERGY TECHNIQUE ON UPPER TRAPEZIUS TRIGGER POINTS IN PATIENTS WITH NON-SPECIFIC NECK PAIN"

Under the guidance of,

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Has been submitted in partial fulfillment for the requirement of the Master of Physiotherapy degree

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Internal Examiner **External Examiner**

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CONTENTS

LIST OF TABLES

LIST OF GRAPHS

I INTRODUCTION

Neck pain is the fourth leading cause of disability in the world. (Cohen 2015). Neck pain is the common musculoskeletal problem next to the low back pain with an annual incidence estimated as 15% (Fritz et al., 2007). It has considerable impact on individuals, family and the community. It is an important personal and social burden. (Carroll et al.,2008). About two thirds of people will experience neck pain at some point of life time. Neck pain affects about 30—50% of adults. (Carroll et al., 2008). 50—85% of individuals with neck pain don't experience complete resolution of symptoms. They develop it as chronic pain. (Carroll 2008).

Neck pain prevalence is higher in the middle age group and women being most affected than men. Approximately 15% of women and 10% of men suffers with chronic neck pain. (Guez et al., 2002). Prevalence of neck pain has widely between 7.6% and the mean life time prevalence of 48.5%. (Makela 1991).Neck pain is common in Indian community which was influenced technological advances. It is one of the common health problems in the general population and particularly among computer workers (Cote et al., 1998). Most people experience some degree of neck pain in their lifetime (Makela 1991).

Causative factors for the neck pain are usually multifactorial, which includes poor posture, anxiety, depression, stress and occupational activities. Maintaining

the neck in upright position in space is by the activities of muscle and ligaments. Prolonged use of these soft tissues result in pain (Vernon et al., 2006, Yoo 2009). Muscle imbalance which leads to tightness of the neck extensor and weakness of the deep neck flexors. (DeStefano et al., 2011). Studies show that myofascial trigger points (MTrPs) from neck and shoulder play a major role in causative of neck pain. (Simons et al., 1999). Myofascial trigger points occur in both sex, female are more affected than males. (Kaur et al., 2014).

Myofascial pain syndrome is one of the common musculoskeletal pain disorders which affect almost 95% of people with chronic pain disorders.(Skootsky 1981, Simons et al., 1999). Trigger point (TrP) is defined as a hyperirritable spot in skeletal muscle that is associated with hypersensitive palpable nodule in taut band. There are several precipitating factors which result in trigger point such as nutritional, metabolic, psychological and mechanical. Features include presence of these tender spot within taut band in skeletal muscles, visible or palpable local twitch, jump sign, and typically referred pain. (Fernandez-de-las-Penas, et al., 2007).

Trapezius is the common muscles which are prone to develop the myofascial pain syndrome in cervical region, especially the upper trapezius. This muscle develops trigger points due to continuous overload and micro trauma as it has very less antigravity function, leading to cervical myofascial pain syndrome. (Si-Huei,

et al., 2008, Simons et al.,1999). Common causes for the trigger point activation included lack of exercise, poor posture, emotional distress, improper positioning during work or poor sitting posture in office as well as other areas. Any postures which shoulders are held for longer duration perpetuate the trigger point in the trapezius muscle. (Rickards et al., 2006, Clair Davies 2004).

Pain is the major problem in the neck pain. Usually the pain tends to be worse at evening. (Bovim et al., 1994). Symptoms usually have postural or mechanical basis, which includes the loss of range of motion, stiffness, tenderness and usually it aggravates by neck movements. (Binder, 2007). Most episodes of acute neck pain will resolved with or without treatment, but nearly 50% individuals will continue to experience some degree of pain or frequent occurrences. It causes severe disability in people about 5%. (Cote et al., 1998). Neck pain produces high level of morbidity which usually affects the occupational activities as well as vocational activities and affects the quality of life of the individual (Hagberg et al., 1987, Westgaard et al., 1993).

Few clinical trials have evaluated treatments for neck pain. Conservative management is the optimal approach for myofascial pain syndrome and trigger points' pain. Physiotherapy techniques include LASER, Trigger point injection, spray and stretch method, dry needling, ultrasound, Transcutaneous Electrical Nerve Stimulation, Trigger point pressure release, muscle energy technique

(MET), Position release therapy (PRT) and INIT techniques. (Chaitow 2001, Farina et al., 2004). Although there are varieties of management there is no concise treatment for the MFPS or TrPs.

Muscle energy technique (MET) is a common soft tissue mobilization technique which involves the voluntary contraction of the subject's muscles in a precisely controlled direction, against a counterforce provided by the therapist. MET is used to decrease pain, stretch the tight tissues, reduce the tone, improve circulation, mobilize the joints and strengthen the weak musculatures. (Fryer et al., 2004).

INIT is also called as Integrated Neuromuscular inhibitory technique, it is coordinated technique involves sequences of actions which commences with the location of the trigger point. This technique involves Ischemic compression (IC), Strain counter strain (SCS). The patients kept the structures in that appropriate length of time during which the tissues are held in ease (20—30 sec) then the patient is guided to introduce an isometric contraction in the tissues which focus on trigger point and held for 7—10 sec, following which the tissues are stretched. (Amit V Nagrale et al., 2010).

There are many modalities play a vital role in the management of neck pain, among this Transcutaneous Electrical Nerve Stimulation (TENS) is one the best modality used in western countries. (Sabine et al., 2003). It is a non invasive

modality and commonly used to treat acute as well as chronic pain conditions. It was introduced in 1972, and it is a best adjunct modality for pain. Subjects usually find relief following application of the TENS.(Robertson et al.,1998 , Reeve et al., 1996) It has been shown in literatures as one of the best modality in controlling chronic neck pain. Still, the mechanism of the analgesic effect of the pain by application of the TENS is still unclear. (Itoh et al., 2009).

The Neck Disability Index (NDI) is a 10 Item questionnaire that measures a patient self reported neck pain related disability. It is a valid and reliable tool to measure when compared with other pain and disability measurement.(Young et al., 2009). Few studies has compared the construct validity of the NDI and found that it is having fair to moderate test-retest reliability and adequate responsiveness. (Cleland et al., 2008)

Visual analog scale (VAS) is a numerical scale which measures the pain of the individual. It is a 10cm line with one end marked as Zero(0) indicates no pain and other end with Ten (10)indicates intolerable pain or worst type of pain. (Wong et al., 1988). Studies show that VAS has high amount of reliability and validity and can be used as a measurement tool. (Ritter et al., 2006)

Though there are many interventions prescribed in the management of neck pain, the evidences are still lacking or the results are controversial.(Gupta et al., 2008; Alvarez et al., 2002). So this study is done to find out the efficacy of the two

therapies in addition to the TENS for the upper trapezius trigger point with chronic neck pain.

1.1 NEED FOR THE STUDY

Neck pain is the second largest cause of work absenteeism after low back pain. (Aker et al., 1996). Pain is the major complaints in neck pain due to disorders in the cervical spine. It causes considerable sufferings like pain, disability, reduced quality of life with great burden to the society. (Cote et al., 2009, Borghouts et al., 1999).

Various structures around the neck, like muscles, ligaments, joints, facets, disk and neural structures which may cause the problem for non specific neck pain. (Sihawong et al., 2010). Upper trapezius and levator scapulae are the most common postural muscles tend to work more to maintain the neck in erect position, due to the over activity the muscles tend to shorten and leads to restricted neck movement. Common reason for the neck pain includes poor posture, neck injuries, psychological problems, sporting activities and occupational traumas. (Binder 2007). One of the common reasons for development of the symptoms is due to trigger point in the upper trapezius muscles.

Janda suggest that postural muscles have tendency to shortening in normal as well as abnormal conditions. Usually the upper trapezius, levator scapulae, & Scalene are most common postural muscles which get shortened and reproduce

pain, with addition to that the Deep neck flexors (Longus colli & Longus Capitis) impaired activity tends to cause severe pain around neck. Janda suggest that the hypertonicity in antagonist should be addressed prior to the agonist or strengthening program. (Chaitow 2006, Falla et al., 2007).

Management of persistent and disabling neck pain is the most challenging and focuses to be on reducing pain and discomfort. (Moffet and Mclean, 2005). It is one of the common conditions managed well by physiotherapist. Despite of the prevalence rate, evidences for the neck pain are lacking. Though there are various treatment options available in the management of the neck pain like heat, cold, massage, manipulation, collar, traction and stimulation, there is no single intervention found to be productive. Wide variety of treatment protocols for the neck pain is available in physiotherapy, but the effectiveness of the treatment is still debate. TENS is one of the easily available modality which gives positive result in the management of neck pain. (Sabine et al., 2003).

Among the various recent approach in the management of the neck pain muscle energy technique (MET) is the best which was shown in the literatures. It is a revolution in physical therapy which involves a movement away from high velocity/low amplitude thrusts. (Chaitow and Liebenson, 1996). Studies conducted by Burns and Wells (2006), concludes that MET is particularly effective in subjects with severe pain and acute dysfunction.

INIT is similar to the MET technique where it includes Ischemic compression with Strain counter strain technique which has proved very effective in neck pain with the trigger points. But there is lack of evidences for the combination of INIT with TENS or MET with TENS, so this study is warranted to find out the difference between the treatment protocols.

1.2 AIM OF THE STUDY

- The aim of the study is to find out the effect of Integrated Neuromuscular Inhibition Technique and Muscle energy technique on pain and functional disability in upper trapezius trigger point in non specific neck pain.

1.3 OBJECTIVE OF THE STUDY

- To find out the effect of Integrated neuromuscular inhibition technique on pain and functional disability in upper trapezius trigger point in non specific neck pain.
- To find out the effect of Muscle energy technique on pain and functional disability in upper trapezius trigger point in non specific neck pain.
- To compare the effect of Integrated neuromuscular inhibition technique and Muscle energy technique on pain and functional disability in upper trapezius trigger point in non specific neck pain.

1.4 HYPOTHESIS

NULL HYPOTHESIS

- There is no significant difference between Integrated neuromuscular inhibition technique and Muscle energy technique on pain and functional disability in upper trapezius trigger point in non specific neck pain.

ALTERNATE HYPOTHESIS

- There is a significant difference between Integrated neuromuscular inhibition technique and Muscle energy technique on pain and functional disability in upper trapezius trigger point in non specific neck pain

II REVIEW OF LITERATURE

Kawaldeep Kaur and Sonia Singh et al., (2015)

They conducted a study to compare the MET and deep heating (MWD) in Non specific neck pain. Group A received conventional program, Group B received conventional and muscle energy technique and Group C received conventional program, Muscle Energy Technique and microwave diathermy . The outcome measures they used VAS,NDI and Universal Goniometer. This study concluded that all the three tested protocols were effective in increasing ROM and decreasing pain, disability in non specific neck pain, adding manual therapy technique (MET) resulted in significantly better outcomes.

Lars anderson et al., (2011)

They stated that many adults experienced bothersome neck pain. Research and treatment strategies often centre on the upper trapezius which may be affected. They established a high prevalence of tenderness existing in numerous anatomical locations of the neck/shoulder complex amongst adults with non specific neck pain particularly in the upper trapezius. The upper trapezius muscle is well suited for clinical research due to its bulky and superficial nature.

Amit et al.,(2010)

Proposed that the benefit of the integrated neuromuscular inhibition technique approach may be in the addition of direction ischemic compression and consequent tissue relaxation, due to strain-counter strain. Ischemic compression decreases the sensitivity of aching nodules in muscle. Local pressure may well equalize the length of sacromeres in the concerned trigger point and hence decrease the pain. Additionally , the resultant tissue relaxation created by attaining a position of trigger point ease due to strain- counter strain, has been proposed as a mechanism of facilitating 'unopposed artificial filling' which allow for a decrease of tone in the tissue involved. This reduction in local tone results in adjustment of neural reporting and improving the local circulation. These changes ultimately result in a more normal resting length, greater circulation and decreased pain.

Iqbal Amir et al.,(2010)

Suggested a study to disable myofascial trigger points via means of the blending of ischemic compression technique with strain-counter strain technique. The group A received ischemic compression technique in addition with strain-counter strain technique and group B ischemic compression technique alone where as group C received conventional treatment only. Key outcome measures used were pain pressure threshold to asses with the pressure threshold meter. Pain and function of the patients were measured by a visual analog scale and the Neck disability index

score respectively. The effect was combination of ischemic compression technique with strain-counter strain has been revealed to generate greater improvement in pain pressure threshold , function status and reduction in pain intensity even after one week of the treatment.

Sibby et al.,(2010)

Conducted a study to compare the effects of integrated neuromuscular inhibitory technique and LASER with stretching for reducing pain, improving ROM and functional activities of subjects with neck pain due to upper trapezius trigger points. Group A received INIT and the Group B received LASER with stretching. The outcome measures are Visual numeric scale, cervical range of motion and neck disability index(NDI). Neck disability index exhibited reduction across both groups with the significant difference between the two groups. This study concluded that both Integrated neuromuscular inhibition technique and LASER with stretching are equally effective in managing subjects with neck pain due to upper trapezius trigger point.

Aakanksha Joshi et al.,(2010)

Conducted a study to compare the effectiveness of 2 manual treatment on person with upper trapezius trigger points and concluded as an integrated advanced, that is INIT, to the management of trigger points has been established to

be more valuable to relieve pain and reducing stiffness, and improving practical ability as compared to the METs alone.

Wang et al.,(2009)

Reported a study to test hypothesis that large-diameter myelinated muscle afferents supply to the pathophysiology of myofascial trigger points. The ischemic compression obstruction of large-diameter myelinated muscle afferents is gain with a 7-cm wide tourniquet applied about the upper arm proximal to brachioradialis muscle in 20 subjects. The outcome measures showed that the ischemic compression blockage, which chiefly blocks large-diameter myelinated muscle afferents, was linked with an increase in pain pressure threshold at myofascial trigger points regions but not at the non-myofascial trigger point regions. These results are suggested that large-diameter muscle afferents are involved in pain and mechanical hyperalgesia at the trigger points.

Javier Montanez Aguilera et al.,(2009)

Proposed a study to determine immediate effects of ischemic compression and ultrasound for the treatment of myofascial trigger points in the upper trapezius muscle. 66-subjects, diagnosed with latent myofascial trigger points in the trapezius muscle were randomly placed into 3 groups. Group 1 received ischemic compression, group 2 received ultrasound and Group 3 received sham ultrasound.

The outcome measure were cervical active range of motion measured with goniometer, basal electrical activity of muscle trapezius measured with surface electromyography, and pressure tolerance of trigger point measured with visual analog scale. They established that range of motion of cervical rachis, basal electrical activity of the trapezius muscle and myofascial trigger point sensitivity of the same muscle achieve short-term positive effects through use of ischemic compression.

Macderid et al., (2009)

The NDI has been established to have an adequate supports and importance to retain its existing status as the most commonly used self-report measure for the neck pain..

Schellingerhout JM et al.,(2008)

Conducted a study to identify the subgroups of patients with the non-specific neck pain who may benefit from either physiotherapy, manipulative therapy or usual care. A relevant improvement in the recovery rate up to 25% could be established in the patients receiving a tailored instead of non-advised treatment..

Florian Schwerla et al.,(2008)

Suggested that the chronic non-specific neck pain is the disabling condition. Empirical evidence suggests that manipulative interventions might **be an effective** in alleviating chronic non-specific neck pain symptoms. A series of test-dependent

manipulative interventions may be promising therapeutic regimen for the chronic non-specific neck pain sufferers.

Hugh Gemmell et al.,(2008)

Stated that trigger points are general cause of the severe and disabling pain in many neck painpatients.Trigger points can be found in any skeletal muscleS the majority were found in the upper trapezius. Common manual therapy treatments used for the upper trapezius trigger points includes manual pressure and myofascial release.

Dimitrios kostopoulos et al.,(2008)

Concluded that the passive stretching also known as myofascial stretching is directed at specific muscle under treatment that avoids overstretching and it requires absolute relaxation of the muscle. The target muscle is placed where tension is sensed at finishing of the ROM. The muscle will allow to relax when stretching is increased and the subjects exhales. The newly gained position is held while the subjects exhales. In subsequent movements, further gain is obtain by holding the position for 20-45 seconds at a rate of 3-4mm/sec ,and it allowing the muscle to relax.

Boonstra Ane et al.,(2008)

Conducted a study to find out the reliability and validity of visual analog scale (VAS) as a single-item tool measuring disability in neck pain patients. For the study pertaining to reliability a test-retest design and for the validity study a cross-sectional design was used. The population were used for the study consisted of patients over 18 years of age, suffering from musculoskeletal pain; 52 patients were incorporated in this reliability study, 344 patients in validity study. The conclusion of the study was that the reliability of the Visual Analogue Scale for disability range from moderate to good.

Hugh Gemmell et al.,(2007)

Conducted a study to determined the effects of ischemic compression , trigger point release and ultrasound therapy on pain, degree of cervical lateral flexion and pressure re pain threshold of upper trapezius trigger points in patients with non-specific neck pain. The outcomes mshowed that the ischemic compression is superior to sham ultrasound in immediately reducing pain in the patients with non-specific neck pain and upper trapezius trigger points.

Jari Ylinen et al.,(2007)

Reported a study to differentiate the effectiveness of manual therapy technique and stretching exercise on neck pain and disability. They concluded that both

stretching exercise and manual therapy technique reduces the neck pain and disability in women with the non-specific neck pain. In addition they also concluded that the low-cost stretching exercise can be suggested as an appropriate therapy intervention to relieve the pain.

Leaver et al.,(2006)

Stated that the two out of three will have neck pain at the some points in their life. Most of the case are not owing to some grave diseases or neck problems and frequently the precise causes for the pain is not apparent, known as non-specific neck pain. The probable reasons for these can be minor sprains (or) improper posture. Recovery usually occur.

Chang – Zern Hong et al.,(2006)

Concluded that the myofascial pain syndrome is caused by the myofascial trigger points that are usually activated by soft tissue lesions, rather than muscle itself. The underlying lesions should treated appropriately before the inactivation of active myofascial trigger points.

Arianne et al.,(2006)

Found that the Neck disability index has a good reliability and response with test-retest results after 1 week. High response rates of self-rated questionnaire resulted in a sufficient number of cases.

Chiu et al.,(2005)

Proposed to investigates the outcomes of TENS resting on trigger point and neck exercises in chronic non-specific neck pain.Patients of the Transcutaneous Electrical Nerve Stimulation as well as exercise group have a enhanced and improvement in disability, pain and isometric neck muscle strength.

Jari Ylinen et al.,(2004)

Concluded a study to compare the neck flexion, extension and mainly the rotation strength in women with non- specific neck pain with the healthy controls. They have also been evaluated the repeat in measurement of isometric neck strengthening exercises in patients with neck pain and concluded that the group with neck pain have lower neck muscle strength in every direction tested than the control group.

Simons et al.,(2004)

Travell and simons defined a primary trigger points as " a central trigger point that was apparently activated directly by acute or chronic overload or repetitive overuse of muscle in which it occurs and was not activated as a result of trigger point activity in another muscle".

Farina et al.,(2004)

Proposed a study to compare the short and medium-term effect of frequency modulated neural stimulation with Transcutaneous Electrical Nerve Stimulation in myofascial pain syndrome and they concluded that both FREMS and TENS has positive short- term effects on myofascial pain syndrome.

Rudin et al.,(2003)

Stated that the first construct for the formation of trigger point was described as a result of tissue injury secondary to repetitive muscle overload or direct muscle injury, and subsequent release of kinis and inflammatory mediators. This will lead to sensitization of peripheral nociceptors and the formation of painful local muscle contraction and development of myofascial trigger points. The second constructs briefly mentioned that trigger points are due to muscle spindle dysfunction. Along the same lines, Rudin mentioned that " another theory stated excessive activity of acetylcholine at motor endplate".

Hou et al.,(2002)

Conducted a study to find out the immediate effects of different physical therapy modalities on myofascial pain perceived in the upper trapezius muscles and it was concluded that immediate relief from cervical myofascial pain can be obtained in 6 therapeutic modalities. Hot pack along with active ROM, ischemic compression and TENS provide major pain relief. Application of TENS along with ischemic compression therapy is more effective than hot pack with the active range of motion therapy.

Michael cummings et al.,(2001)

Reported that trigger points were the primary source of pain in 74% of 96 patients with musculoskeletal non- specific neck pain admitted to a comprehensive pain center. Myofascial trigger point pain is defined , as pain arising from 1 or more myofascial trigger points, which are hyper irritable spots in skeletal muscle that are associated with hypersensitive palpable nodules taut bands. These spots are found to be painful on compression and give rise to typical referred pain, tenderness , motor dysfunction and autonomic phenomena.

Myles et al.,(1999)

Visual analogue scale (VAS) score is a linear scale. Change in the VAS score represents a relative change in the degree of pain sensation. VAS in the comparative analgesic trials can help to quantify differences in potency and efficacy.

Simons et al.,(1999)

Found that there are five diagnostic criteria of myofascial trigger point as : (1) presence of a palpable taut band in the skeletal muscle; (2) presence of a hyper sensible tender spot in the taut band; (3) local twitch response elicited by the snapping palpation of the taut band; (4) reproduction of the typical referred pain pattern of the trigger point in response to compression; and (5) spontaneous presence of the typical referred pain pattern or patient recognition of the referred pain. If the first four criteria were satisfied the trigger point was considered as latent. If all of these criteria were present trigger point was considered to be active.

Marja Mikkelsson et al.,(1997)

Stated that neck disorders are common cause of non-specific neck pain, affecting 70% of people at some point in their life. Females are more commonly affected than males.

Goodridge et al.,(1997)

Defined that muscle energy techniques are osteopathic procedures which are used to mobilize joints with limitation in movement, stretch tight muscle and fascia, improve local muscle circulation and balance neuromuscular relationships to alter muscle tone.

David G Simons et al.,(1996)

Suggested that myofascial trigger points are a frequent cause of musculoskeletal pain. Reliable examination requires both training and experience. Quite a few consideration are available which help to decide the most suitable diagnostic criteria of myofascial trigger points. They also recommended that the typical electrical activity of trigger points most probably originate at dysfunctional endplates of extrafusal muscle fibers and this dysfunction appear to have a key role in the pathophysiology of trigger points.

Lean Chaitow et al.,(1996)

Proposed that stretching of the muscles with either active or passive methods is helpful in treating both the shortness and trigger points as this reduces the contraction (taut band) as well as increase circulation to the area.

Hayes et al.,(1993)

Found that transcutaneous electrical nerve stimulation is very effective in the treatment of neck pain. It reduces pain in patient spinal level by closing pain gate.

Vernon et al.,(1991)

They conducted a study to evaluate the reliability and validity of NDI. The study is aimed at evaluating the test-retest reliability and validity of NDI. A group of 52 subjects with cervical pain were included in this study. Test – retest scores were analysed using peralson correlation. NDI scores were compared to Mc Gill pain questionnaire. The correlation was high(0.69-0.70). The results concluded that NDI achieved a high degree of reliability & internal consistency than McGill questionnaire.

Graff- Raadford et al.,(1989)

Stated that TENS alone might be insufficient for the long-term treatment of myofascial pain because myofascial trigger point appeared to remain unaltered. The pain-reducing properties of TENS coupled with stretching would produce the desired effect of reducing pain and myofascial trigger point sensitivity.

Bogduk et al.,(1988)

Found that the pain may arises from any of the structures in the neck. These structures include the intervertebral discs, ligaments, muscles, facet joints and dura

and nerve roots. These are a large number of potential causes of neck pain. These vary from tumors, trauma (e.g. fractures, whiplash), infection inflammatory disorders (e.g. rheumatoid arthritis) and congenital disorders.

Russell A. Foley et al.,(1984)

Stated that TENS relieves pain through a spinal cord gating mechanism. Input from mechanoreceptors is conveyed through large diameter A and A Gamma fibers to the dorsal horn of the spinal cord. These fibers synapse with cells in various lamina including the substantia gelatinosa (SG) and laminae II and III. Interneuron from the SG exert an inhibitory influence on the T cells of the pain fibers in lamina V. These interneurons " close the gate" to pain transmission at the spinal cord level through a presynaptic or postsynaptic inhibitory events. The interneurons that close the gate to pain transmission may invlove the variety of neurochemical inhibitory processes using enkephalon or dynorphin through opiods receptors. High TENS is an approach that activates the large diameter peripheral nerve fibers to neuromodulate pain through a spinal neurochemical gating mechanism.

Poland et al.,(1984)

They conducted a study in neck pain patients with neck disability index as a tool to measure the disability in activities of daily living. On the basis of study

findings they concluded that neck disability index is a valid tool in assessing neck pain and disability.

Melzack and Wall et al.,(1982)

Conventional TENS relieves pain through a spinal cord gating mechanism. It stimulates the muscle through large diameter A beta and A Gamma fibers and close the gate to nociceptive (pain) transmission at the spinal cord level through a presynaptic and postsynaptic inhibitory events.

III METHODOLOGY

3.1 STUDY DESIGN:

Pre test and post test experimental study design

3.2 STUDY SETTING

Department of Physiotherapy, K.G Hospital, Coimbatore

3.3 STUDY POPULATION:

50 patients with neck pain who volunteered for the study were assigned for the assessment. A blinded assessor does the assessment and the patients were selected for the study based on strict selection criteria. 40 patients who fulfils the criteria of upper trapezius trigger point were included in the study and they all be divided into two equal groups.

3.4 STUDY DURATION:

Study was conducted for duration of 6 months and individual patient underwent 6 weeks.

3.5 SELECTION OF SAMPLES:

Total of 40 samples were selected, using systematic sampling method.

3.6 SELECTION CRITERIA:

INCLUSION CRITERIA:

- Age group of 20-40 years

- Patients with non specific neck pain with upper trapezius trigger points are included for this study
- If patients complains any these symptoms are consider for the study
    - Local tenderness
    - Jump sign
    - Muscle spasm
    - Taught band during palpation over the Trapezius muscle(Alvarez D 2002)
- Both male and female patients are included
- Duration: neck pain of less than 3 months duration

EXCLUSION CRITERIA:

- Patients with moderate to severe cervical, thoracic, shoulder degenerative pathology.
- Patients with cervical radiculopathy or neuromuscular entrapment
- Patients having recent history of trauma to the neck or shoulder
- Patients with any systemic disorder
- Patients with congenital and acquire spinal deformity
- Patients with any space occupying lesion in neck and shoulder region
- Patients with any metal implants, open wounds or infection, malignant condition in cervical region.

3.7 VARIABLES

DEPENDENT VARIABLE:

- Pain
- Function

INDEPENDENT VARIABLE:

- Tens and Integrated Neuromuscular Inhibition Technique
- Tens and Muscle Energy Technique

3.8 PARAMETERS:

- Pain
- Function

3.9 OPERATION TOOLS:

- Visual Analog Scale (VAS)
- Neck Disability Index (NDI)

3.10 PROCEDURE OF THE STUDY:

The patients with non- specific neck pain with upper trapezius trigger points who visited the outpatient department of physiotherapy of K.G Hospital were selected by systematic sampling method. All the participants were examined by orthopedician and detailed examination was done by senior physiotherapist. A clear explanation about the study was given to every individual subject.

All 40 subjects signed the informed consent and were then randomly assigned to two groups. Group A – 20 subjects underwent TENS was applied for 15 minutes followed by integrated neuromuscular inhibition technique, Group B – 20 subjects underwent Muscle energy technique with TENS was applied for 15 minutes. A systematic random sampling was done by writing all the participants name in a ledger and selecting odd number for experimental group and even for the control. This ensured that there were even numbers of subjects in each group to which they were originally assigned.

Group A : TENS followed by Integrated Neuromuscular Inhibition Technique

20 patients underwent TENS followed by Integrated Neuromuscular Inhibition Technique

- **TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION:**
    - Conventional or high rate TENS for 30 mins, (2 pole method, pulse width -100ms, 70 – 120 Hz). The intensity will be set at a level that each subject could feel.
- **INTEGRATED NEUROMUSCULAR INHIBITION TECHNIQUE:**
    - 20 subjects were treated with INIT. The trigger points to be treated within the upper trapezius muscle is identified by placing the subject in high sitting position to reduce tension in the upper trapezius muscle with their

arm positioned In slight shoulder abduction with the elbow bent and hand resting on the stomach. Using a pincer grasp, the fibers of the upper trapezius are moved and made note of any trigger points. Once the trigger point is identified, treatment is started with the ischemic compression.

- **Ischemic compression:** The subject will be positioned in the high sitting position, with the involved side exposed appropriately. The therapist will stand behind the subject. Slow and increasing levels of pressure will be maintained until a release of the tissue barrier is felt. This process will be repeated until tension/ tenderness is unable to identified or 90 seconds have elapsed, whichever would come first. All identified trigger points will be treated.
- **Strain- counter strain:** Ischemic compression is followed by the application of strain counter strain. If pain is unable to identified, pressure will be increased. If pain is reproduced, the pressure is maintain over the active trigger point as the position of ease is identified. The position of ease is often produced through positioning the muscle in a shortened or relaxed position. Ease is defined as the point where a reduction of at least 70% is produced. For upper trapezius, high sitting with the head side bent towards the involved side while the practitioner positioned the ipsilateral arm in flexion, abduction and external rotation to reduce the trigger point

pain. Once the position of ease is identified, it will be held for 20 -30 seconds and will be repeated for three to five times.

- **Muscle energy technique:** lastly the patient will receive muscle energy technique direct towards the involved upper trapezius. The patient will be asked to take the stabilized shoulder towards the ear (a shrug movement) and the ear towards the shoulder. The degree of contraction will be mild and pain free (20% of maximum voluntary contraction). The contraction will be sustained for 10 seconds and upon complete relaxation of effort, the therapist will gently ease the head/neck into a increased degree of side bending, flexion and the shoulder will be stretched caudally. The stretch will be maintained for 30 seconds and repeated three to five times per treatment session.
- **FREQUENCY OF TREATMENT:** Weekly three times the patient visit the department and on alternate days.
- **TREATMENT DURATION:** 4 Weeks

Group B : Muscle Energy Technique

20 patients underwent TENS followed by Muscle energy technique

- **MUSCLE ENERGY TECHNIQUE:** 20 subjects were treated with Muscle Energy Technique. The patient will be asked to take the stabilized shoulder towards the ear (a shrug movement) and the ear towards the

shoulder. The degree of contraction will be mild and pain free (20% of maximum voluntary contraction). The contraction will be sustained for 10 seconds and upon complete relaxation of effort, the therapist will gently ease the head/neck into a increased degree of side bending, flexion and the shoulder will be stretched caudally. The stretch will be maintained for 30 seconds and repeated three to five times per treatment session.

- **FREQUENCY OF TREATMENT:** Weekly three times the patient visit the department and on alternate days.
- **TREATMENT DURATION:** 4 Weeks

3.11 ETHICAL APPROVAL:

The study was approved by the ethical committee of K.G Hospital, Coimbatore.

3.12 STATISTICAL TOOLS:

Statistical analysis was done using Student t-test.

(i) Paired 't' test

To compare the pre test and post test values of visual analogue scale and maximal mouth opening within the group.

$$t = \frac{\bar{d}\sqrt{n}}{SD}$$

$$SD = \sqrt{\frac{\sum d^2 - n\left(\bar{d}\right)^2}{n-1}}$$

Where,

n = Total number of subjects.

SD = Standard deviation.

d = Difference between initial and final value.

$\bar{d}$ = Mean difference between initial and final value.

(i) Unpaired 't' test:

To compare the pre test and post test values of visual analogue scale and maximal mouth opening between the groups.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s} \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

$$s = \sqrt{\frac{(n_1 - 1)s_1^{\,2} + (n_2 - 1)s_2^{\,2}}{n_1 + n_2 - 2}}$$

$$s_1 = \sqrt{\frac{\sum x_1^{\,2} - n_1\left(\bar{x}_1\right)^2}{n_1 - 1}}$$

$$s_2 = \sqrt{\frac{\sum x_2^{\,2} - n_2\left(\bar{x}_2\right)^2}{n_2 - 1}}$$

Where,

n_1 = Number of subjects in Group A.

n_2 = Number of subjects in Group B.

$\bar{x}_1$ = Mean of Group A.

$\bar{x}_2$ = Mean of Group B.

s_1 = Standard deviation of Group A.

s_2 = Standard deviation of Group B.

S = Combined standard deviation.

Level of Significance : 5%

IV DATA ANALYSIS AND INTERPRETATION

TABLE I

DEMOGRAPHIC DATA

S.NO	AGE GROUP CLASSIFICATION	MALE	FEMALE
1	20-24	3	2
2	25-28	3	3
3	29-33	3	5
4	34-37	7	6
5	38-40	4	4
	TOTAL	20	20

GRAPH I

AGE GROUP CLASSIFICATION

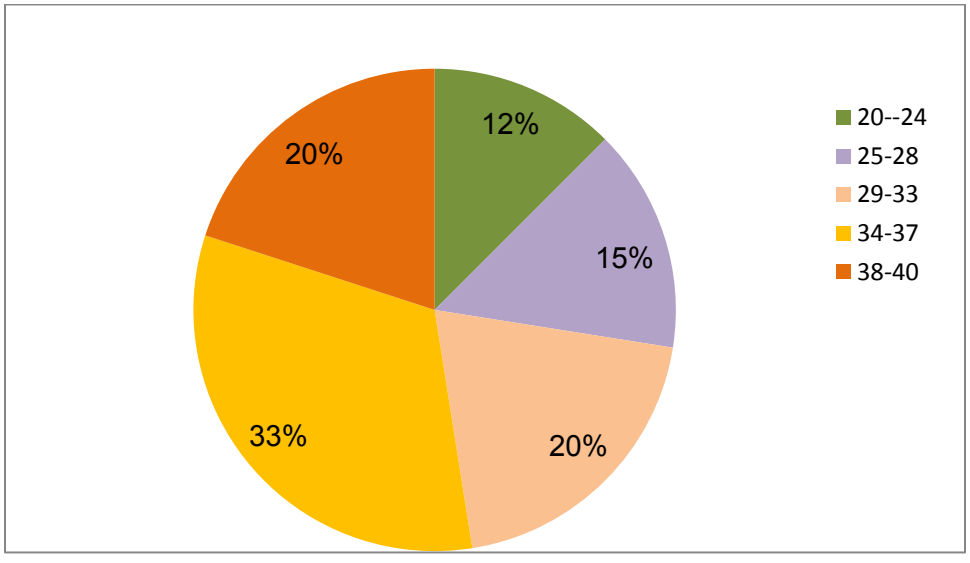


TABLE –II

PAIRED 't' TEST

COMPARISON BETWEEN THE PRE TEST AND POST TEST VALUES OF GROUP A

VISUAL ANALOGUE SCALE

The comparative mean values, mean differences, standard deviation and Paired 't' test values of Group A

S.NO	GROUP A	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED 't' VALUE
1.	Pre test	5.75	4.8	0.91	30.8
2.	Post test	0.95		0.60	

The table I shows analysis of VAS on paired't' test. The't' value for Group A was 30.8 at 0.05% level of significance, which was greater than the tabulated't' value 2.145. The result shows that there was marked difference between pre test and post test values.

GRAPH-II

GRAPHICAL REPRESENTATION OF PRE TEST AND POST TEST VALUES OF GROUP A

VISUAL ANALOGUE SCALE

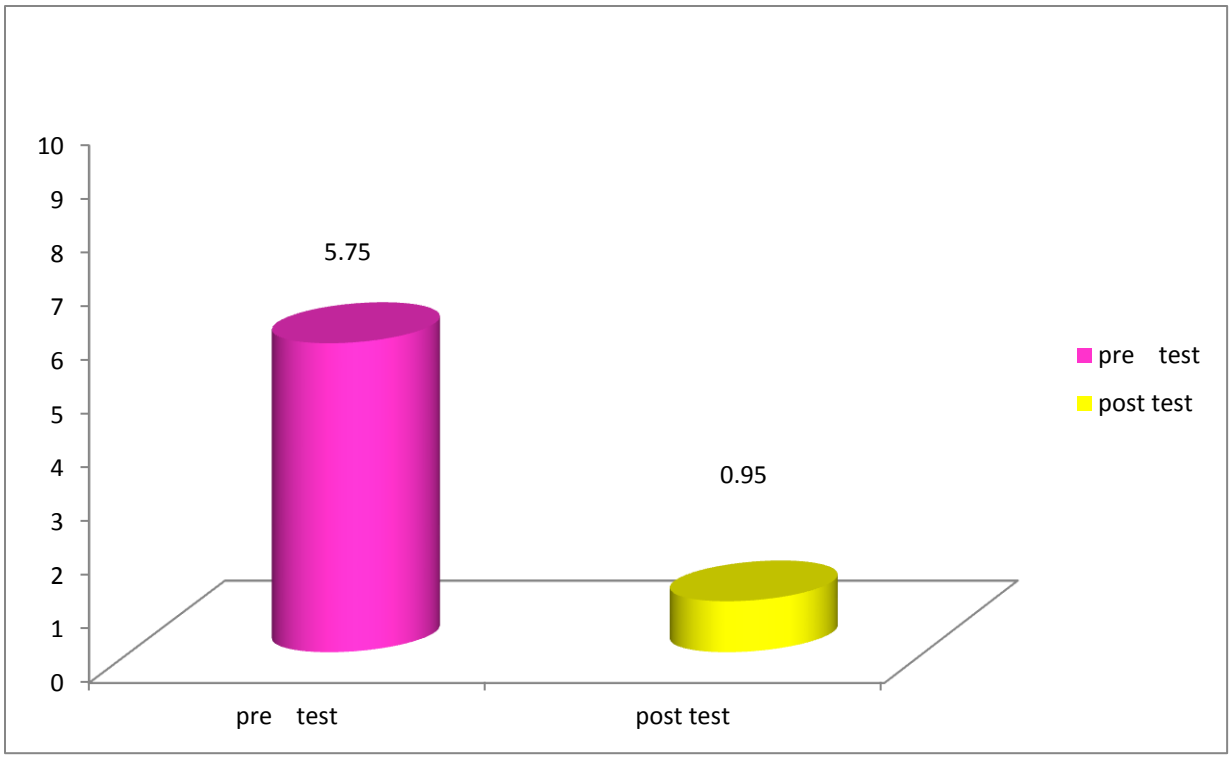


TABLE -III

PAIRED‘t’ TEST

COMPARISON BETWEEN THE PRE TEST AND POST TEST VALUES OF GROUP B

VISUAL ANALOGUE SCALE

The comparative mean values, mean differences, standard deviation and Paired‘t’ test values of Group B

S.NO	GROUP B	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED ‘t’ VALUE
1.	Pre test	5.45	2.3	1.00	14.03
2.	Post test	3.15		0.88	

The table II shows analysis of VAS on paired ‘t’ test. The‘t’ test value for Group B was 14.03 at 0.05% level of significance, which was greater than the tabulated ‘t’ value 2.145. The result shows that there was marked difference between pre test and post test values.

GRAPH-III

GRAPHICAL REPRESENTATION OF PRE TEST AND POST TEST VALUES OF GROUP B

VISUAL ANALOGUE SCALE

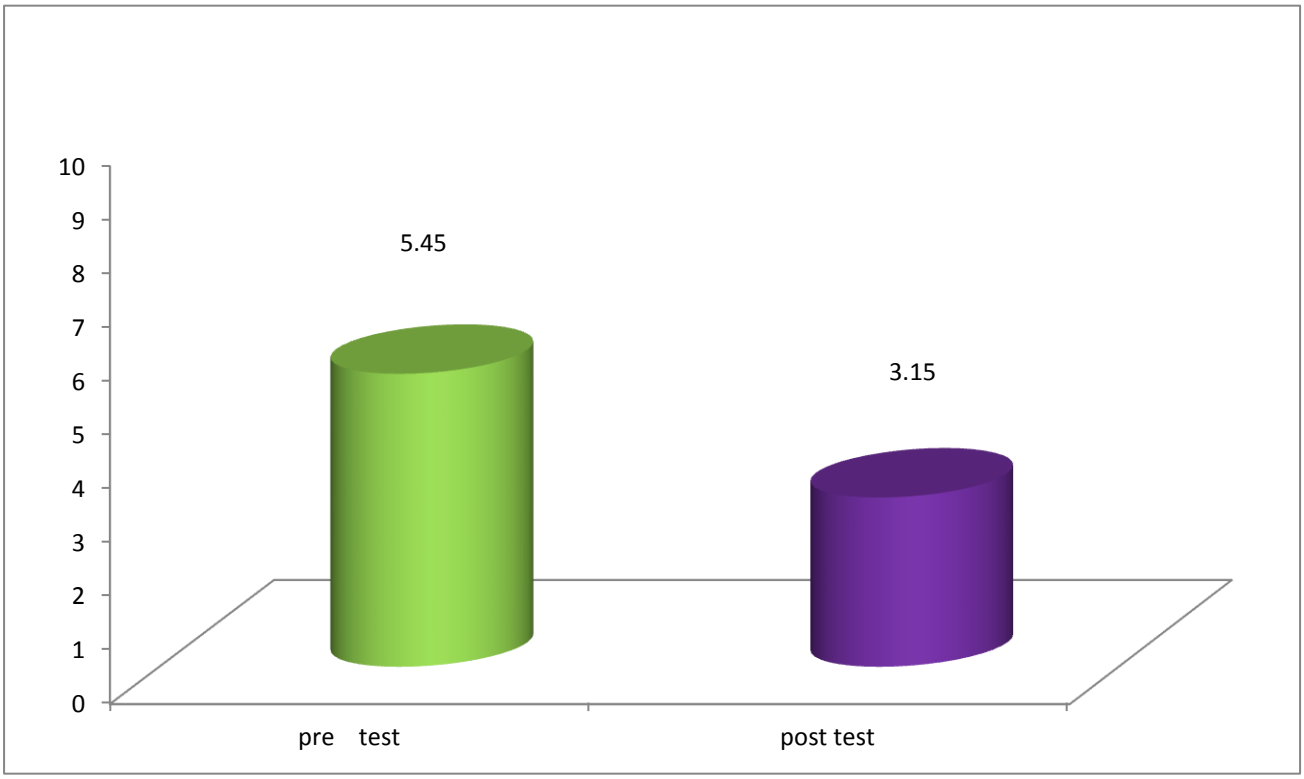


TABLE -IV

PAIRED‘t’ TEST

COMPARISON BETWEEN THE PRE TEST AND POST TEST VALUES OF GROUP A

NECK DISABILITY INDEX

The comparative mean values, mean differences, standard deviation and Paired ‘t’ test values of Group A

S.NO	GROUP A	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED ‘t’ VALUE
1.	Pre test	18.05	14.8	1.19	48.6
2.	Post test	3.25		1.16	

The table III shows analysis of VAS on paired‘t’ test. The‘t’ value for Group A was 48.6 at 0.05% level of significance, which was greater than the tabulated‘t’ value 2.145. The result shows that there was marked difference between pre test and post test values.

GRAPH-IV

GRAPHICAL REPRESENTATION OF PRE TEST AND POST TEST VALUES OF GROUP A

NECK DISABILITY INDEX

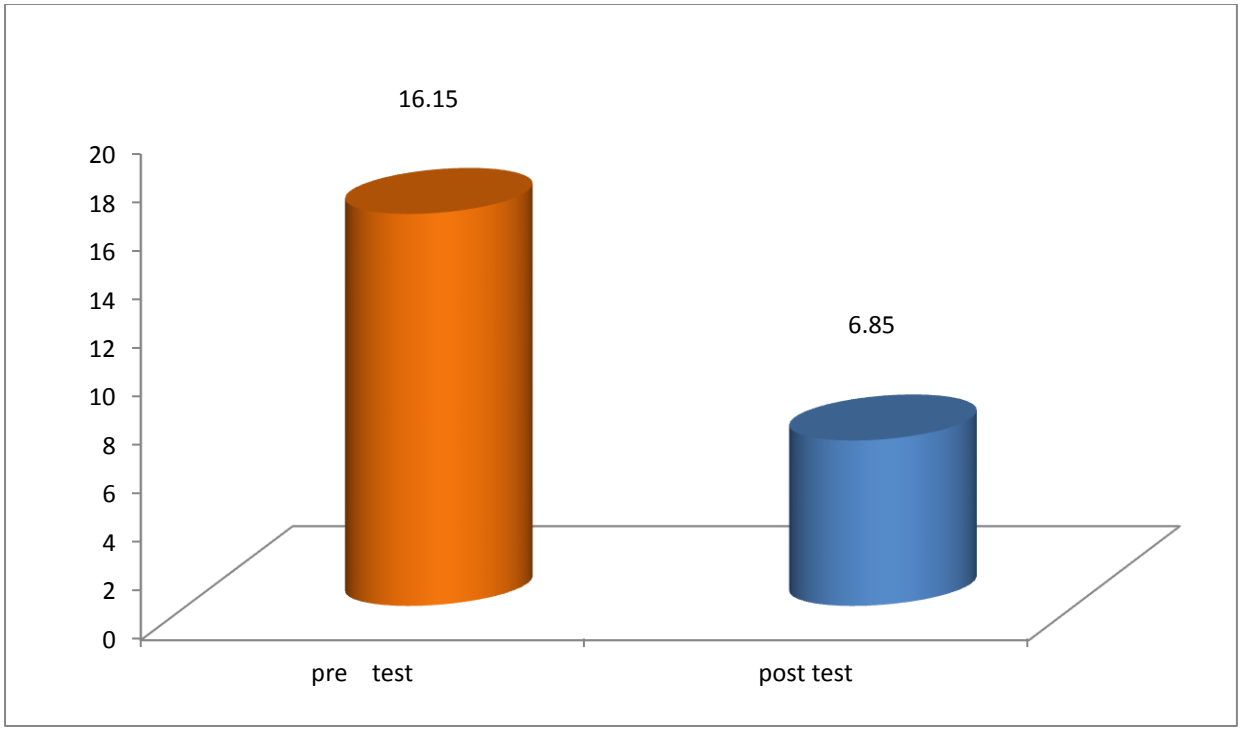


TABLE -V

PAIRED‘t’ TEST

COMPARISON BETWEEN THE PRE TEST AND POST TEST VALUES OF GROUP B

NECK DISABILITY INDEX

The comparative mean values, mean differences, standard deviation and Paired ‘t’ test values of Group A

S.NO	GROUP A	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED ‘t’ VALUE
1.	Pre test	16.15	9.30	4.39	8.36
2.	Post test	6.85		1.46	

The table IV shows analysis of VAS on paired‘t’ test. The‘t’ value for Group B was 8.36 at 0.05% level of significance, which was greater than the tabulated‘t’ value 2.145. The result shows that there was marked difference between pre test and post test values.

GRAPH-V

GRAPHICAL REPRESENTATION OF PRE TEST AND POST TEST VALUES OF GROUP B

NECK DISABILITY INDEX

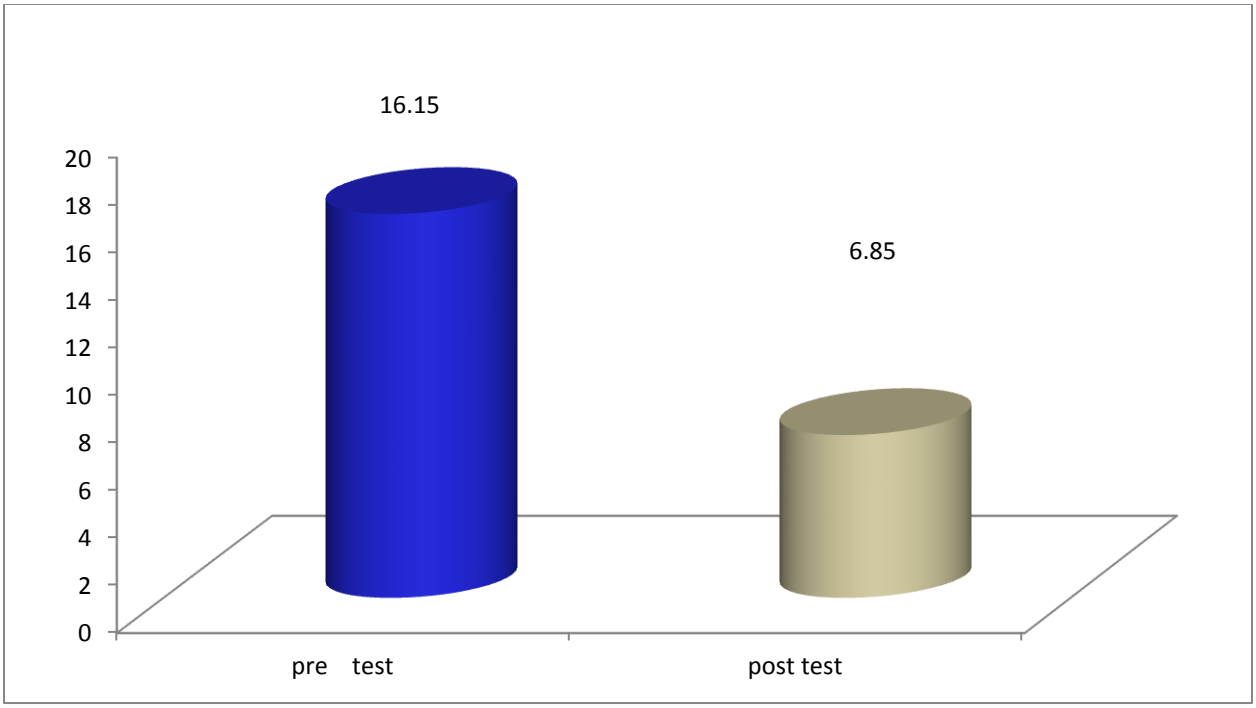


TABLE -VI

UNPAIRED‘t’ TEST

COMPARISON BETWEEN THE PRE TEST VALUES OF GROUP A AND GROUP B

VISUAL ANALOGUE SCALE

The comparative mean values, mean differences, standard deviation and Unpaired ‘t’ test values of Group A and Group B

S.NO	GROUPS	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	UNPAIRED ‘t’ VALUE
1.	Group A	5.75	0.30	0.91	0.99
2.	Group B	5.45		1.00	

The table V shows analysis of VAS on unpaired‘t’ test. The pre test value for Group A and Group B was 0.99 at 0.05% level of significance, which was lesser than the tabulated‘t’ value 2.048. The result shows that there was no marked difference between Group A and Group B.

GRAPH-VI

GRAPHICAL REPRESENTATION OF PRE TEST VALUES OF GROUP A AND GROUP B

VISUAL ANALOGUE SCALE

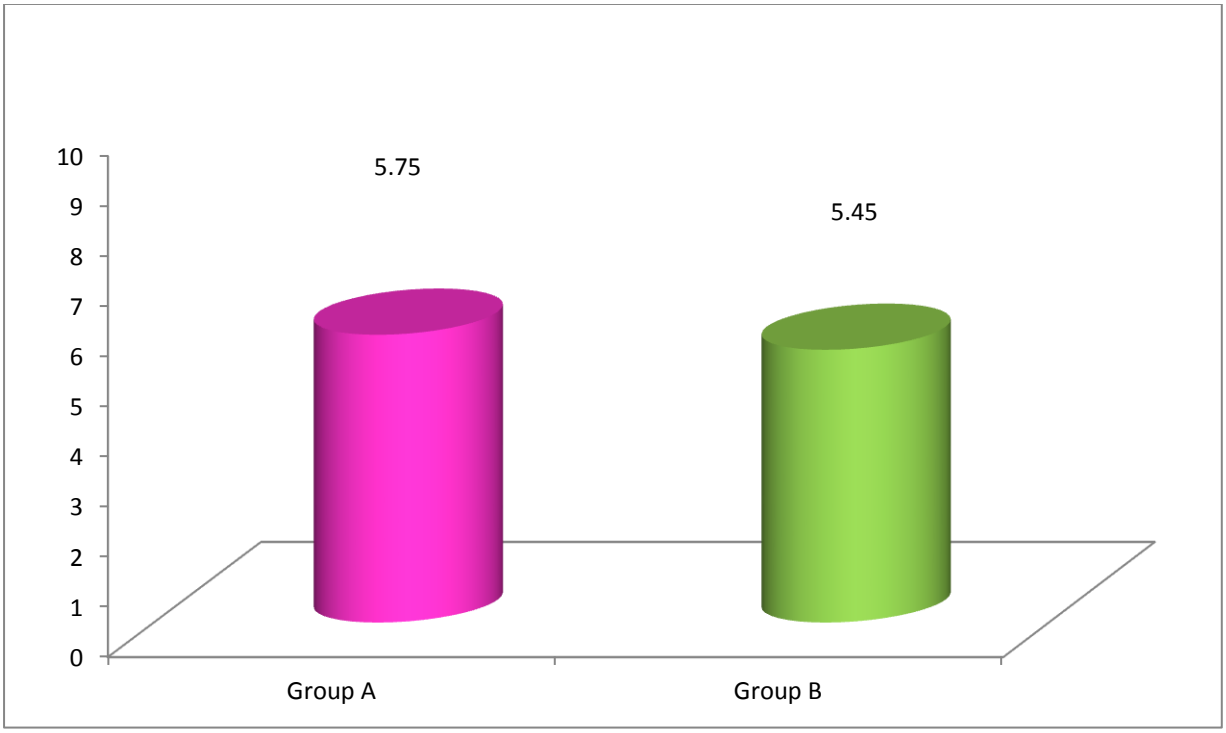


TABLE -VII

UNPAIRED‘t’ TEST

COMPARISON BETWEEN THE POST TEST VALUES OF GROUP A AND GROUP B

VISUAL ANALOGUE SCALE

The comparative mean values, mean differences, standard deviation and Unpaired ‘t’ test values of Group A and Group B

S.NO	GROUPS	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	UNPAIRED ‘t’ VALUE
1.	Group A	0.95	2.20	0.60	9.24
2.	Group B	3.15		0.88	

The table VI shows analysis of VAS on unpaired‘t’ test. The post test value for Group A and Group B was 9.24 at 0.05% level of significance, which was greater than the tabulated‘t’ value 2.048. The result shows that there was marked difference between Group A and Group B.

GRAPH-VII

GRAPHICAL REPRESENTATION OF PRE TEST VALUES OF GROUP A AND GROUP B

VISUAL ANALOGUE SCALE

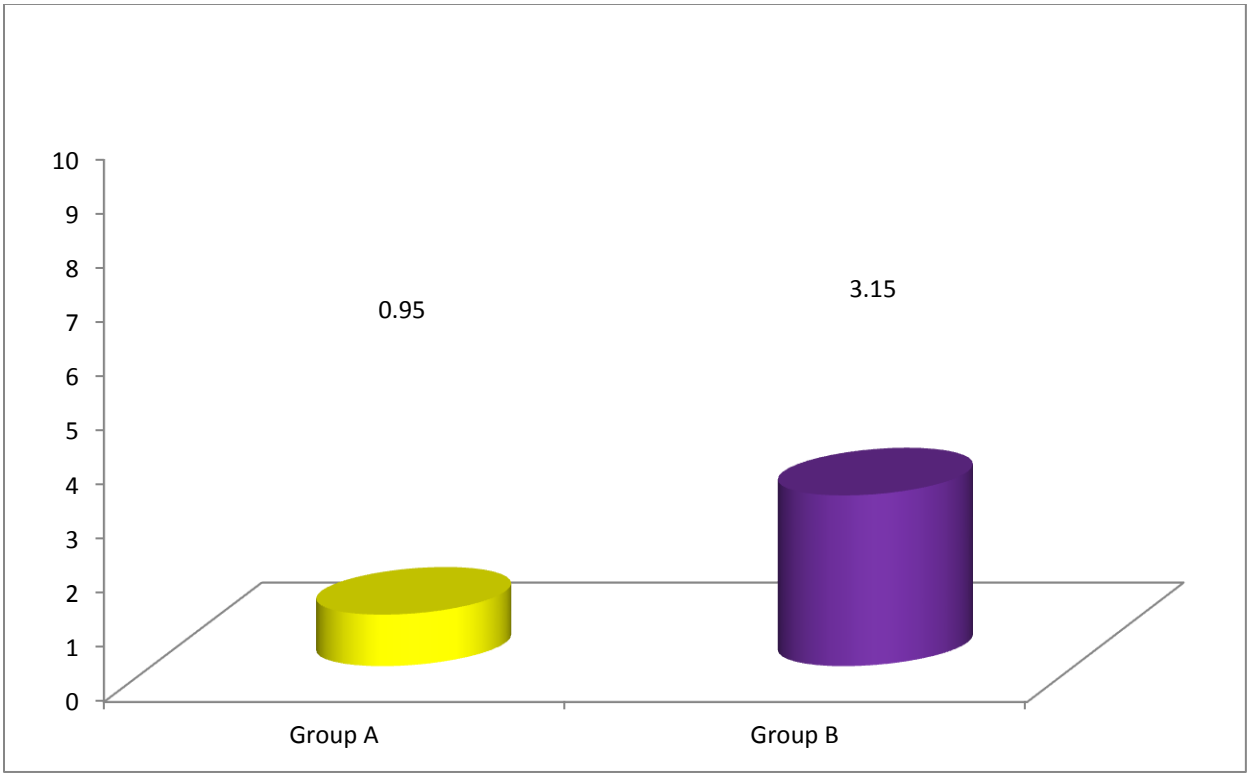


TABLE -VIII

UNPAIRED‘t’ TEST

COMPARISON BETWEEN THE PRE TEST VALUES OF GROUP A AND GROUP B

NECK DISABILITY INDEX

The comparative mean values, mean differences, standard deviation and Unpaired ‘t’ test values of Group A and Group B

S.NO	GROUPS	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	UNPAIRED ‘t’ VALUE
1.	Group A	18.05	1.90	1.19	1.86
2.	Group B	16.15		4.39	

The table VII shows analysis of Neck disability index on unpaired‘t’ test. The pre test value for Group A and Group B was 1.86 at 0.05% level of significance, which was lesser than the tabulated‘t’ value 2.048. The result shows that there was no marked difference between Group A and Group B.

GRAPH-VIII

GRAPHICAL REPRESENTATION OF PRE TEST VALUES OF GROUP A AND GROUP B

NECK DISABILITY INDEX

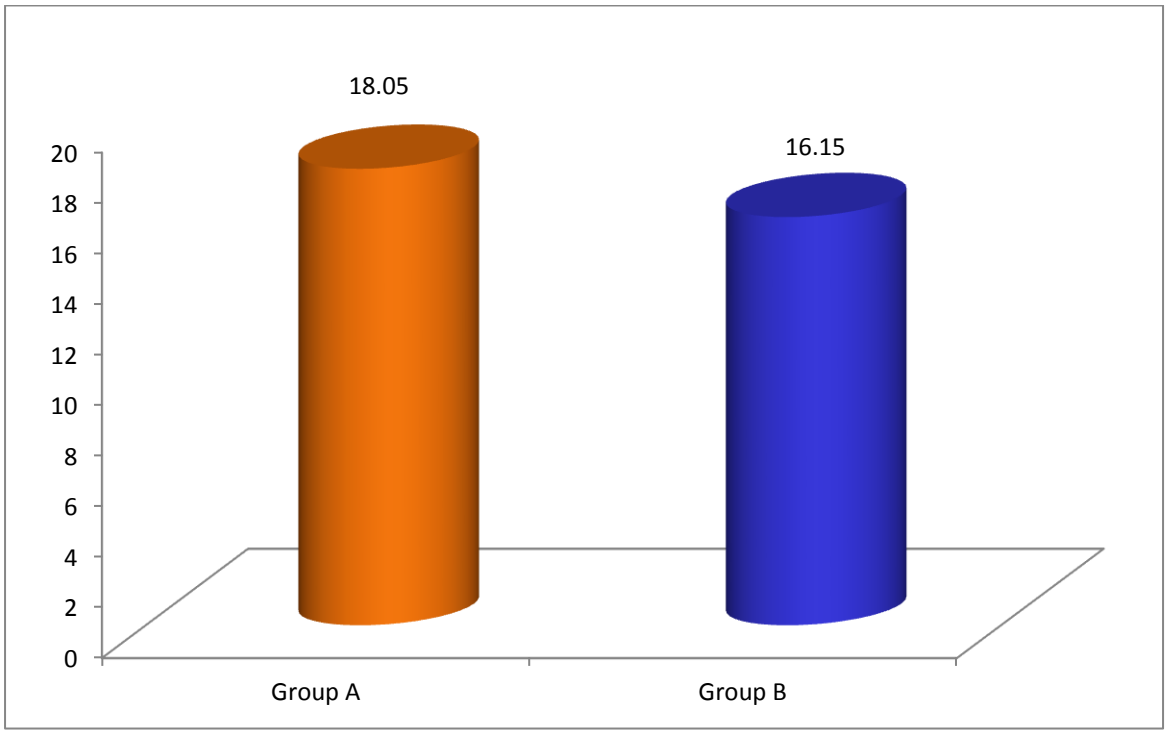


TABLE -IX

UNPAIRED‘t’ TEST

COMPARISON BETWEEN THE POST TEST VALUES OF GROUP A AND GROUP B

NECK DISABILITY INDEX

The comparative mean values, mean differences, standard deviation and Unpaired ‘t’ test values of Group A and Group B

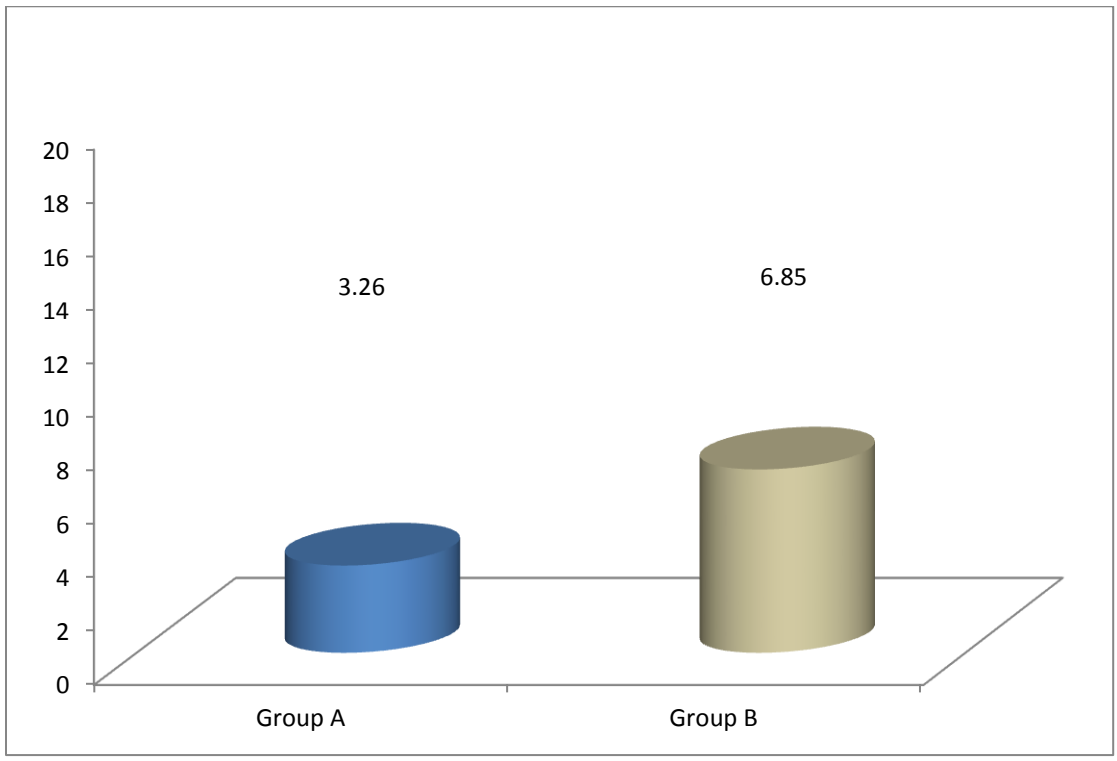
S.NO	GROUPS	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	UNPAIRED ‘t’ VALUE
1.	Group A	3.20	3.65	1.15	8.77
2.	Group B	6.85		1.46	

The table VIII shows analysis of Neck disability index on unpaired‘t’ test. The post test value for Group A and Group B was 8.77 at 0.05% level of significance, which was greater than the tabulated‘t’ value 2.048. The result shows that there was marked difference between Group A and Group B.

GRAPH-IX

GRAPHICAL REPRESENTATION OF PRE TEST VALUES OF GROUP A AND GROUP B

NECK DISABILITY INDEX



V RESULTS

The paired ‘t’ test analysis for the pre test and post test variable for the visual analog scale for measuring pain in patients with upper trapezius trigger point in non-specific neck pain patients which was shown in table I and II . Both the groups show significant differences in the pre test and post test values. The‘t’ value for the Group A is 30.84,the ‘t’ value for the Group B is 14.03

The unpaired‘t’ test analysis for the post test variables for the both group for visual analog scale for pain in patients with upper trapezius trigger point in non-specific neck pain patients is shown in the table III and IV. There was a significant difference shown between the Groups. Subjects in Group A show superior mean difference than Group B. The‘t’ value for the post test variables for both groups is 9.24 .

The paired ‘t’ test analyses for the pre test and post test variables for the neck disability index for measuring disability following upper trapezius trigger point in non-specific neck pain which was shown in table V and VI.

Both the group show significant differences in the pre test and post test values. The ‘t’ value for the Group A is 48.62 ; the ‘t’ value for the Group B is 8.36

The unpaired ‘t’ test analysis for the post test variables for the both group for neck disability index scale for disability in patients with non specific neck pain is shown in the table. There was a significant difference shown between the Groups. Subjects in Group A show superior mean difference than group B. The ‘t’value for the post test variables for both groups is 8.77

VI DISCUSSION

Purpose of the study is to find out the effects of Integrated Neuromuscular Inhibition Technique(INIT) and Muscle energy technique(MET) on pain and functional disability in upper trapezius trigger point in non specific neck pain. 40 patients who complain of neck pain were selected for this study following stratified sampling method. All subjects were divided into two equal groups, 20 subjects in each group. Group A Subjects underwent Transcutaneous electrical nerve stimulation with INIT whereas Group B receives Transcutaneous electrical nerve stimulation with METs.

Neck pain is the most common musculoskeletal pain following low back pain. It is predominant since sedentary nature of lives, occupational schedules, and poor postures. (Binder 2007). It is a great burden to the healthcare system. (Nagrale et al., 2010). Prevalences of neck pain has increasing in the past two decades. It increases rapidly in age of 50 years and gradually declines. Neck pain is found more in females, about 37% of individuals developed persistent symptoms. (Cagnie et al., 2007). Disability following neck pain is one of the major contributors of the disability worldwide. Around 70% of population experienced neck pain at some point on their lives. (Eng-Ching Yap 2007).

Neck pain builds up considerable pain, disability and impaired quality of life. This influences great socioeconomic burden on both patient and the society (Cote et al., 2009; Borghoutset al., 1999). A long term habitual posture can be result in abnormal loading of ligaments and muscles, which leads to development of neck pain.(Yoo et al., 2009). Stress and strain on the upper back and neck are the common factors for the neck pain. Numerous structures in the neck and nearby regions such as muscles, joint structures, ligaments, intervertebral disks, and neural structures may be the sources of nonspecific neck pain (Sihawong et al., 2010). Trapezius trigger point is the major feature for the development of pain in the neck region. Trigger points can develop at any age. Myofascial trigger points occur in both sexes although it appears to be more common in females than males. (Simon & Travell 1999).

The management of persistent and disabling neck pain is challenging and focuses on helping the patient to come to terms with their pain (Moffet and Mclean, 2005). Several interventions are used for the treatment of neck pain but the results are controversial (Gupta et al., 2008; Alvarez et al., 2002). Among recent approach in the treatment of nonspecific neck pain is muscle energy technique (MET). It is a revolution in physical therapy which involves a movement away from the high velocity and low amplitude thrusts.

Both the participating group underwent Transcutaneous electrical nerve stimulation (TENS) for 6 weeks as an adjunct modality to them. TENS is a simple, noninvasive modality in physiotherapy that is commonly used to control both the acute and chronic pain arising from several conditions. Analgesia may be produced by the modulation of nociceptive input in the dorsal horn of the spinal cord by the peripheral electrical stimulation of the large sensory afferent nerves. This is the 'gate control theory' of pain (Toyota et al., 1999). Alternatively, electrical nerve stimulation of certain receptor sites in the dorsal horn of the spinal cord may release the endorphin, in turn, producing analgesia that can reversed by naloxone (Brodsky et al., 1997 & Benedetti et al., 1997).

In this study the subjects in Group A, underwent TENS with INIT. All the subjects in the group underwent six weeks of training programme. Following the treatment, the pre test values and the post test values was calculated and analyzed for results.

INIT is one of the best methods which used to elongate the soft tissues (muscles, tendons and ligaments). Shortening of the soft tissues are due to a pathological disorders, which can cause pain and reduced movement in the neck. Stretching of these structures will be rapidly improve ROM and reduces the pain due to spasms or fibrosis (Fryer, 2011). Movements owned by the INIT technique are includes muscle energy technique, isometric contraction of certain muscle

groups are contracting without changes in motion. With the motion control which is gentle on muscles and accompanied by the provision of light pressure will prevent damage and inflammation of the tissue (Chaitow, 2006), reducing muscle spasm, reducing restriction in joint, disability and reduce pain (Fryer, 2011). In addition to other technique used are strain counter strain principled restoration of actin and myosin in a position before the contraction, so that reached the degree of muscle length and flexibility are normal. The process sarcomer will affects the muscles and fascia in myofibril to participate and elongated. Elongation sarcomer and fascia will reduce myofilament overlapping in a muscle band that contains a link tender point. The strain counter strain effective in reaction hypoalgesia and lower the reaction tender points in muscles experience spasm. (Chaitow, 2006).

Travell described that the ischemic compression decreases the pain sensitivity nodules in the muscles and they also proposed that the local pressure may equalize the length of the sarcomere in the involved muscle and decrease the pain, in addition,SCS has been proposed as a mechanism of facilitating unopposed arterial filling which allows for the reduction of tone in muscle and decrease pain.

Various studies indentify the efficacy of the INIT technique and its effect on Neck pain. Sibby et al. (2009) compared the effectiveness of INIT and LASER with stretching in reducing pain and improving Range Of Motion and functional activities of subjects with neck pain due to upper trapezius trigger points and that is

concluded with both INIT and LASER with stretching are equally effective in managing subjects with neck pain due to upper trapezius trigger point.

Group B subjects underwent TENS with MET technique. All the subjects in the group underwent six weeks of training programme. Following the treatment, their pre test values and the post test values were calculated and analyzed for the results.

One of the best methods in the recent times in the treatment of nonspecific neck pain is muscle energy technique (MET). Effectiveness of the MET is increasing the ROM based on physiological mechanisms behind the changes in muscle extensibility. A fixed head and neck posture for long duration causes shortening of posterior cervical muscles and lengthening of anterior neck muscles. (Yoo et al., 2009). MET can be used to lengthen shortened musculature and improve joint function and range of motion. The combination of contractions and stretching (post isometric relaxation) used in MET would be more effective for producing greater viscoelastic change and passive extensibility than passive stretching alone (Mahajan et al., 2012).

MET is known for its hypoalgesic effect. The mechanism behind it is inhibition of the golgi tendon reflex gets activated during the isometric contraction to facilitate reflex relaxation of muscle. Activation of muscle and joint

mechanoreceptors will leads to sympathetic excitation evoked by somatic efferent's and localized activation of PAG causes descending modulation of pain. Furthermore there are changes in pacinian corpuscles tend to result in relaxation of musculotendinous unit tension and decrease the perception of pain. Met work on two physiological principle, Post isometric relaxation (PIR) and reciprocal inhibition (RI). PIR refers to the assumed effect of reduced tone experienced by a muscle, or group of muscles, after brief periods following an isometric contraction. Another variation involves the physiological response of the antagonists of a muscle which has been isometrically contracted- reciprocal inhibition (RI). (Falla et al., 2007). Post isometric relaxation was claimed to be an effective method for acute tension in soft tissue problems that preclude immediate spinal adjustments, reduces muscle spasm that is responsible for spinal fixation, reduces pain and lengthen the tightened neck muscles to normalize gross cervical range of motion (Digiovanna and Schiowitz, 1996). PIR stimulates joint proprioceptors, via the production of joint movement, or the stretching of a joint capsule(Hamilton et al., 2007)

Similar studies have identified the similar results, Gupta et al. (2008) in their study compared the effect of PIR and isometric exercises in nonspecific neck pain. They have concluded that Post isometric relaxation is more effective technique in decreasing pain and disability and increasing cervical range of motion in patients

with nonspecific neck pain. Another study conducted by Parmar et al. (2011) reported isolytic form of MET was considered as viable method to decrease pain and improve range of motion.

The possible mechanism for pain reduction in MET group can be explained by inhibitory Golgi Tendon reflex, activateS during the isometric contraction and that leads to reflex relaxation of the muscle. Activation of the muscles and joints mechanoreceptors leads to sympathoexcitation evoked by the somatic efferents and that localized activation of periaqueductal gray matter that plays a major role in descending modulation of pain.(Fryer et al., 2004) Whereas the effects of Muscle Energy Technique component for increase in ROM post treatment can be explained on the basis of physiological mechanisms behind the changes in muscle extensibility – reflex relaxation, viscoelastic change, and changes to stretch tolerance. (Falla et al., 2007 & Fryer et al., 2004). Nociceptive inhibition then occurs at the dorsal horn of the spinal cord, as simultaneous gating takes place of nociceptive impulses in the dorsal horn, due to mechanoreceptor stimulation (Fryer et al, 2004).

Based on the statistical analysis the result of the study shows that the INIT technique has shown remarkable reduction of pain and improvement in disability than the group underwent METS for upper trapezius trigger point.

VII SUMMARY & CONCLUSION

SUMMARY

The purpose of the study is to find out the effect of Integrated Neuromuscular Inhibition and Muscle energy technique Technique on pain and functional disability in upper trapezius trigger point in non specific neck pain.

40 patients who complain of neck pain were selected for the study following stratified sampling method. All were selected following inclusion and exclusion criteria. A detailed examination was done by orthopedic surgeon and senior physiotherapists for the inclusion of the participants for the study. After a clear explanation to the patients, those who are willing were selected and randomly assigned into two equal groups.

All were subjects were divided into two equal groups, 20 subjects in each group. Group A Subjects underwent Transcutaneous electrical nerve stimulation with INIT whereas Group B receives Transcutaneous electrical nerve stimulation with METs. Following the 6 weeks of interventions the outcome were measured pain was measured using Visual Analogue scale, Functional disability was assessed using neck disability index.

Student‘t’ test was used to find the difference between the pre-test outcome as well as the difference between the two groups. Based on this statistical analysis

the Group B patients showed a marked reduction in pain and functional disability when compared to the Group A.

CONCLUSION

- There is a significant reduction of pain in both the groups.
- There is a significant reduction of functional disability in both the groups.
- When compared with Group B (Control group), the Group A (Experimental group) shows a Significant reduction in pain.
- When compared with Group B (Control group), the Group A (Experimental group) shows a significant reduction in functional disability.

So this study concludes that the following application of Integrated Neuromuscular inhibitory technique produced significant changes in pain and functional disability when compared with intensive Muscle energy technique alone.

VIII LIMITATIONS AND RECOMMENDATIONS

LIMITATIONS

- Study is short term study
- Study focused on upper trapezius trigger point with neck pain patients other muscle are not considered.
- Study not focused on various occupational
- Ergonomic care was not advised
- Home exercise was very brief.
- Inter rater and Intra rater reliability was not analyzed
- Certain factors like Medications, Life style, sleeping pattern are not controlled.

RECOMMENDATIONS

- Future study can be done on subjects with other type of neck pain
- Future study can focus on identifying effect of INIT alone
- Future studies can be done with a large group of patient with longer duration of follow up.

- Further analysis in the same study can be done like age group and gender analy

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APPENDIX I

VISUAL ANALOGUE SCALE

The visual analogue scale (VAS) is designed to present to the patient a rating scale with minimum constraints. Patient mark the location on 10- centimeter line corresponding to the amount of pain they experienced. This gives them the greatest freedom to choose their pain's exact intensity. It also gives the maximum opportunity for each patient to express a personal response style.

Visual Analogue Scale (VAS) data of this type is recorded as the number of millimeters from the left of the line with the range 0- 100.

0_____10

No pain Severe pain

APPENDIX II

NECK DISABILITY INDEX

The neck disability index is an instruct to assess the neck pain complaints. It was developed from oswestry index for back pain disability index. The authors are from the Canadian memorial chiropractic college in Toronto, Canada. The NDI has become a standard instrument for measuring self-rated disability due to neck pain and is used by clinicians and researches alike.

Each of the 10 items is scored from 0 – 5. The maximum score is therefore 50. The obtained score can be multiplied by 2 to produce a percentage score. Occasionally, a respondent will not complete one question or another. The average of all other items is then added to the completed items.

Pain instructions:

The questionnaire has been desired to give the doctor information as to how your neck pain affected your ability to manage his everyday life. Please answer every section which applies to you. We realize you may consider that two of the statements in any one section relate to you which most closely describe your problem.

NECK PAIN DISABILITY INDEX QUESTIONNAIRE

PLEASE READ:

This questionnaire is designed to enable us to understand how much your neck pain has affected your ability to manage your everyday activities. Please answer each section by circling the ONE CHOICE that most applies to you.

We realize that you may feel that more than one statement may relate to you, but please just circle the one. Choice which Most closely describes your problem right now.

SECTION 1 - Pain Intensity
A I have no pain at the moment.
B The pain is very mild at the moment.
C The pain is moderate at the moment.
D The pain is fairly severe at the moment.
E The pain is very severe at the moment.
F The pain is the worst imaginable at the moment.

SECTION 2 -Personal Care (Washing, Dressing, etc.)
A I can look after myself normally without causing extra pain.
B I can look after myself normally, but it causes extra pain.
C It is painful to look after myself and I am slow and careful.
D I need some help, but manage most of my personal care.
E I need help every day in most aspects of self care.
F I do not get dressed, I wash with difficulty and stay in bed.

SECTION 3 - Lifting
A I can lift heavy weights without extra pain.
B I can lift heavy weights, but it gives extra pain.
C Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example, on a table.
D Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
E I can lift very light weights.
F I cannot lift or carry anything at all.

SECTION 4 - Reading
A I can read as much as I want to with no pain in my neck.
B I can read as much as I want to with slight pain in my neck.
C I can read as much as I want to with moderate pain in my neck.
D I cannot read as much as I want because of moderate pain in my neck.
E I cannot read as much as I want because of severe pain in my neck.
F I cannot read at all.

SECTION 5 - Headaches
A I have no headaches at all.
B I have slight headaches which come infrequently.
C I have moderate headaches which come infrequently.
D I have moderate headaches which come frequently.
E I have severe headaches which come frequently.
F I have headaches almost all the time.

SECTION 6 - Concentration
A I can concentrate fully when I want to with no difficulty.
B I can concentrate fully when I want to with slight difficulty.
C I have a fair degree of difficulty in concentrating when I want to.
D I have a lot of difficulty in concentrating when I want to.
E I have a great deal of difficulty in concentrating when I want to.
F I cannot concentrate at all.

SECTION 7 - Work
A I can do as much work as I want to.
B I can only do my usual work, but no more.
C I can do most of my usual work, but no more.
D I cannot do my usual work.
E I can hardly do any work at all.
F I cannot do any work at all.

SECTION 8 - Driving
A I can drive my car without any neck pain.
B I can drive my car as long as I want with slight pain in my neck.
C I can drive my car as long as I want with moderate pain in my neck.
D I cannot drive my car as long as I want because of moderate pain in my neck.
E I can hardly drive at all because of severe pain in my neck.
F I cannot drive my car at all.

SECTION 9 - Sleeping
A I have no trouble sleeping.
B My sleep is slightly disturbed (less than 1 hour sleepless).
C My sleep is mildly disturbed (1-2 hours sleepless).
D My sleep is moderately disturbed (2-3 hours sleepless).
E My sleep is greatly disturbed (3-5 hours sleepless).
F My sleep is completely disturbed (5-7 hours)

SECTION 10 – Recreation
A I am able to engage in all of my recreational activities with no neck pain at all.
B I am able to engage in all of my recreational activities with some pain in my neck.
C I am able to engage in most, but not all of my recreational activities because of pain in my neck.
D I am able to engage in a few of my recreational activities because of pain in my neck.
E I can hardly do any recreational activities because of pain in my neck.
F I cannot do any recreational activities at all.

PATIENT NAME _____
DATE _____
SCORE _____ / 50

Simply add the score from your answers to the questions above and check the sum against the score.

RAW SCORE	LEVEL OF DISABILITY
0-4	No disability
5-14	Mild disability
15-24	Moderate disability
25-34	Severe disability
35-50	Completely disability

APPENDIX III

PROCEDURE :

TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION:

- Conventional or high rate TENS for 30 mins, (2 pole method, pulse width - 100ms, 70 – 120 Hz). The intensity will be set at a level that each subject could feel.

APPENDIX IV

INTEGRATED NEUROMUSCULAR INHIBITION TECHIQUE

Integrated Neuromuscular Inhibition Technique (INIT) is the creation of celebrated author, teacher and Osteopath Leon Chaitow DO. INIT links three separate treatment modalities into one, efficient, treatment series. The three treatment modalities are: Neuromuscular Technique (NMT), Postural Release Technique (PRT), and Muscle Energy Technique (MET).

First, in NMT, a trigger point is located by palpation, most usually with the fingers. A trigger point is a localized area of deep tenderness. The experienced practitioner will often notice a palpable change as a finger passes over the trigger point. Pressure on a trigger point will often cause twitching (called fasciculation) in the muscle that houses the trigger point. If digital pressure is maintained on the trigger point, the trigger point will produce a pain which refers to an area outside the muscle which houses it. This area does not have to be contiguous with the muscle containing the trigger point. There may well be a number of different trigger points and their reference areas may well overlap.

The next step in the procedure is that digital (i.e. finger or thumb pressure) is applied to the trigger point. Typically this extra pressure may be applied for five seconds and this can be repeated a number of times until it feels to either the

Therapist or the patient that the trigger point is starting to change. This concludes the Neuromuscular Technique part of the INIT protocol and the next stage of the procedure involves the application of Positional Release Technique.

In PRT, the objective is to put the muscle housing the trigger point into a "position of ease". This position is the reverse of a stretched position. So, rather than being lengthened, the muscle is ideally shortened in all three dimensions. That is to say, "slack" is put into the muscle. Additionally, the Therapist may even compress the muscle shorter still. This should feel very easy and relaxed and non-stressful for the patient. If the patient is in an acute phase and full of pain, ideally the position of ease would reduce substantially that pain. The objective of the position of ease is that the patient's nervous system will relax and calm down. Hopefully, any hyertonicity or spasm in the muscles will be reduced. The patient will be held or kept in the position of ease for, say, ninety seconds. After this position of ease, the next stage is Muscle Energy Technique.

In MET it is recognised that a muscle is at its most relaxed just after it has been contracted. So the Therapist will invite the patient to push against him for a few seconds using relatively little force, say less than 20% of the patient's available strength. If the patient is at the acute stage or is still otherwise full of pain, then the patient may be invited to push much more gently. In certain cases, even eye movements will produce enough muscular contraction.

After the contraction has occurred the Therapist will then attempt, gently, to lengthen the muscle housing the (former!) trigger point. This procedure can be repeated a number of times, if patient tolerance permits. In conclusion, it can be said that INIT is a very safe way to treat trigger points and other soft-tissue dysfunction. It can be safely applied to the acute patient who is in considerable pain, if necessary omitting the MET stage.

In 2000 and 2002, Chiropractor Andrew Hunter DC was able to study with Leon Chaitow DO at both at undergraduate and post-graduate level: Neuromuscular Techniques (NMT), Positional Release Techniques (PRT), Muscle Energy Techniques and Integrated Neuromuscular Inhibition Technique as an external student at Westminster University. If you would like to experience INIT at one of Andrew Hunter's three London clinics (Canary Wharf, Moorgate in The City, or Blackhealth).

Identification of upper trapezius trigger point by the pincer method

Positional release therapy

Ischemic compression

APPENDIX V

MUSCLE ENERGY TECHNIQUE

The term “Muscle Energy” was given by Fred L. Mitchell, Sr. D. O. to the techniques he developed in the 1950s, first to treat mechanical problems in the pelvis. It is unclear how he named the techniques, except that the techniques involved using isometric and isotonic contractions. First Fred used the patient’s muscles to restore physiologic movement to the pelvis, which has passive joints, i.e. they are not moved by direct muscle action. He then expanded the concept to include treatment of all joints except the cranial sutures. Next he developed techniques for the spine using isometric and isotonic contractions of the patient’s muscles to treat vertebral dysfunctions. After the contraction the patient is asked to relax the contraction before the operator “takes up the slack”. Initially he recommended strong isometric contractions, but eventually evolved to using very light isometric contractions.

Muscle energy technique

APPENDIX –VI

PATIENT CONSENT FORM

I ……voluntarily consent to participate in the project named **"EEFECT OF INTEGRATED NEUROMUSCULAR INHIBITION TECHNIQUE VERSUS MUSCLE ENERGY TECHNIQUE ON UPPER TRAPEZIUS TRIGGER POINTS IN PATIENTS WITH NON-SPECIFIC NECK PAIN"**

The candidate has explained to me that treatment approach in brief, risk of participation and has answered the questions related to the study to my satisfaction.

Participant's Signature :

Signature of witness :

Signature of candidate :

Date