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Effect of Muscle Energy Technique versus Motor Control Exercise Adjunct to Conventional Therapy on Pain, Range of Motion and Functional Disability in Patients with Chronic Neck Pain – A Research Protocol

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Study Protocol

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ABSTRACT

Background: Physical, neuropathic, or secondary causes can all contribute to neck difficulty. Any other illness might be acute 6 weeks, subacute 3 months, or chronic (lasting more than 6 weeks) (lasting up to three months). Physical consequences, life-distressing or non-life- distressing causes, large and small factors, reliable and inaccurate neck pain. Motor control is a motor retraining programme that focuses on the neck flexors, extensors, and shoulder girdle muscle's coordination and holding skills. MET is a treatment method that makes use of the patient's muscles contracting in a specific, directed manner against a therapist-applied counterforce.
Methodology: The participants in the study will be enrolled of 50 patients who suffer from prolonged neck pain. And each group will be split into 25 people. One group will get MET for four weeks, whilst the other will get MCE and traditional treatment. Pain, ROM, and Functional Disability will be reviewed using a methodical approach.

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Conclusion: We need to see how this experiment affects people of MET versus MCT in addition to conventional therapy core on pain, ROM and functional Impairment on neck discomfort that persists. In conclusion, the focus of this research is to find out the efficacy of MET versus MCT in addition to standard therapy, as well as its impact on chronic Neck discomfort has a negative impact on one's quality of life. This study will aid in the relief of chronic neck pain.

Keywords: Chronic neck pain; muscle energy technique; motor control exercise.

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1. INTRODUCTION

The neck connects the head to the body and is centred between the head and the shoulder. The neck, as well the back of your neck and shoulders are more a distress when individuals in precisely the correlate site for an extended period of time since following Studying, writing, and utilising a laptop all require a substantial amount of time [1].

Different muscle groups make comprise the anatomy of the cervical and neck. The sternocleidomastoid muscle is an oblique band that extends from the sternoclavicular joint to the mastoid process of the skull on either the side of the neck. The neck is divided into two triangles: The anterior and posterior triangle are the two triangles. The manubrium streni and the medial portion of the clavicle enter the temporal and occipital bones' mastoid processes [2]. C2 and C3 are the spinal parts of the accessory nerve. Two actions work together to rotate on the other side while extending the head and bending the neck. The 3rd, 4th, 5th, and 6th cervical vertebrae are located in the neck transverse processes form the scalenus anterior, it goes into the first rib. The muscles are the C4, C5, and C6 spinal nerves [3]. The 1st rib is raised, and the cervix is laterally flexed and rotated. C3-C8 provides the ventral rami nerve the top and lower parts of the longus cervical muscle, as well as the middle vertical section, that connects the from the atlas to the third vertebra. It allows for lateral flexion and opposite side flexion via the oblique part of the neck's lower oblique region.The ventral rami of the C1-C3 nerves supply the longus capitis nerves, which help in head bending [4]. The ventral rami supply the rectus capitis, a short flat muscle that bends the head laterally. The anterior scalnus muscle, which is fed again by the C3-C ventral rami5, Anterolateral flexion, or turn to the other side of the cervical spine, is performed. Ventral rami of C3-C8 ventral rami neurons supply the medius and posterior scalenus, which help in cervical lateral flexion. The sub-occipital nerve, which connects the rectus capitis posterior minor and major, aids stance by shifting the chin in the same direction and extending the head. The superior and inferior actions of the obliquus capitis are to extend and flex the head laterally superiority and inferiority to the dorsal branch of the C1 [5].

Neck discomfort can occur in numerous different ways. Neck pain is categorised as acute, sub-acute, or chronic depending on the severity, aetiology/structure, and kind of pain (6 weeks acute; sub-acute, 3 months; chronic, >3 months). (Neuropathic vs. mechanical) Mechanical, neuropathic, and due to another disease are the three types of neck discomfort (For example, pain referred from coronary artery disease or vascular disease). When the spine or its associated tissues, ligaments, and muscles, for example, are injured, mechanical pain emerges [6].

Medical consequences, whether severe or non-distressing, common and unusual diseases, and authentic and the three distinct kinds of possible tends to cause neck discomfort are invalid causes, invalid causes, and invalid causes. Inflammatory arthropathies are less common. These disorders are obviously important as a cause of neck pain since they may be detected through examination and are considered to induce joint pain when they affect the appendicular skeleton's joints. Spondylosis or osteoarthritis are the most common diagnoses for patients with neck discomfort and apparent radiological changes [7].

Neck pain cause due to Poor working ergonomics, long periods of sitting, and maintaining a non-physiologic neck position are among the most prevalent causes.

Neck ache is a frequent problem that affects many people around 23% internationally. Neck pain is the 4 most common cause of cumulative

impairment, resulting in lower productivity and higher absenteeism.

Neck Every year, 10-20% of the wider populace is in agony. (With a point incidence on a global scale of 4.9%), and it will affect 2-3 of people at some time in their lives. In terms of severity, it is just back discomfort comes in second of disability-adjusted life years (DALYs), musculoskeletal illnesses are responsible for one-fifth of all DALYs [8].

Neck pain affects nearly a billion people worldwide, and it is the leading cause of severe, long-term pain and disability. Neck discomfort affects 2.9 percent of people (95 percent confidence interval: 2.21–8.87) [9].

According to the severity of the symptoms, neck pain should be treated medically Conservative therapies for acute neck pain without substantial pathology appear to be the most common. nonsteroidal anti-inflammatory medications (NSAIDs) (NSAIDs). NSAIDs, acetaminophen, and opioids can be used to treat people who have serious neck pain but don't have any major pathology. Neck pain is treated using a range of physiotherapy Rehabilitation. Exercise, physiotherapy, and superficial heat are all conservative treatments for neck discomfort that isn't caused by a major illness. The most frequent therapies for persistent neck discomfort without severe pathology appear to be exercise, meditation, behavioural therapy, acupuncture, biofeedback, progressive relaxation, massage, manual therapy, and multimodal rehabilitation [10].

The purpose of this research is to evaluate the advantages of MET method against MCE as a personage with tenacious neck pain as a complement to established treatment for discomfort, range of motion, and functional impairment.

2. MATERIALS AND METHODOLOGY

2.1 Material Required

Material will be used are Plinth, Stool, Goniometer. For the assessment, a pen and paper are required.

2.2 Methodology

2.2.1 Study setting

A study is being carried out in out patient's department of Ravi Nair Physiotherapy College.

2.2.2 Study design and sample size

It is an Interventional study. The participants number, enrolled in the experimental study will be50 (n=50).

2.2.3 Study population

Individuals with chronic neck pain

2.3 Sample Size Calculation

G* power analysis was used to determine the sample size [9]. Which are 25 individuals in one group and 25 individuals in other group.

2.4 Sample Size

50.

2.5 Inclusion Criteria

Subjects in the age demographic of 18-45 years old, both male and female, have been suffering from for over three months, experienced persistent neck ache.

2.6 Exclusion Criteria

Patient having Degeneration of cervical spine. Tumours/malignancies and any recent surgeries in neck, back or thorax. Past history of Fractures of cervical joint. Cervicogenic pain syndrome and Patients with cervical radiculopathy.

2.7 Participant Timeline

Study duration is of 1 year and intervention duration is 4 weeks so participant will be enrolled during first 11 months of study so 4week intervention will be completed successfully. Assessment will be done on 1st day of visit then in midway (1st week) and end (^{4th} week) of intervention.

2.8 Implementation

Research coordinator and principal investigator will supervise randomization. Participants will be asked to manually select from the envelope, sealed group allocation for the recruitment into either group.

2.9 Blinding

Tester(s) will be blinded to assign the subjects to the group. To ensure binding, subjects will be

mandated not to reveal any details of their treatment to the tester.

2.10 Data Collection and Management

2.10.1 Data collection

Information about study given at time of recruitment (elaborating the purpose, nature, procedure, benefits and after effects of the intervention) with all baseline tests and assessment will be repeated on 2 more occasions.

2.11 Study Procedure

2.11.1 Procedure

All patients who present will be recruited as subjects to the OPD with persistent neck discomfort and assessed for ROM, Muscle strength, and pain level. They will then be randomly apportion coequally Using a sampling technique, Group A and Group B, i.e., a total of 25 (into each group), were created., with both groups receiving hot fermentation. The outcomes of the pre- and post-test will be examined.

2.11.2 Muscle energy technique group (Group A)

The extent of the subject will be assessed in this group of motion, muscle strength in sitting. The Subject will be given hot fomentation for 10 min on neck region. The subject will be asked to change the position to supine lying from sitting. Therapist is standing behind the subject. The MET group will receive 3-5 iterations of post-isometric relaxation for 7-10 seconds of 30-50 % isometric contraction of the muscle to be stretched, followed by a 5-second rest time, followed by 10-60 seconds of Stretch. 5 sessions a week for 4weeks. The pre-and post-examination effects will then be analysed [11].

2.11.3 Motor control exercise and static stretching group (Group B)

In this group subject will be checked for the range of motion, muscle strength in sitting. The subject will be given hot fermentation for 10 min on neck region with static stretching and motor control exercise. Pre and post test results will then be analysed.

2.12 Motor Control Exercise

The following exercise will be delivered to the group.

1. Flexors and extensors of the cranio-cervical region
2. Flexor and extensor co-contraction
3. The strength of the superficial deep flexor muscle can be trained up.
4. Scapular muscle retraining
5. Re-education of posture.
6. The group was treated five times each week for four weeks. Each lesson will be 30 minutes long [12].

2.13 Static Stretching

After each stretch, a thorough warm-up will be performed anchor for 15-30 seconds, then recurring 2-4 times For the next four weeks, the subject will be managed in five sessions each week [12,13].

2.14 Outcome Measures

2.14.1 Primary

1. Visual Analog Scale: - The visual analogue scale is a pain assessment scale, consisting straight line of 10-cm, the left edge shows “no pain” (0) and the far right edge shows the “worst pain imaginable” (10) [10,14]. The left-hand the line's end indicates no agony, while the right-hand end indicates pain. On the line where they believe their pain is, subjects were asked to label.
2. Neck Disability Index: - It is a questionnaire used to measure how Neck discomfort has undermined our ability to function in daily life [12]. It is the most commonly used questionnaire for evaluating functional limitation in neck pain clinical research.

2.14.2 Secondary

3. Manual Muscle Testing: - It is a test to check the strength of the muscle. Strength of cervical flexors, extensor and rotators will be taken
4. Range Of Motion: - It is an instrument for evaluating the range of motion of the join
5. ROM of Cervical flexion, extension and cervical rotation will be taken.

3. DISCUSSION

This interventional study's objective is to see how chronic neck pain patients respond to MET versus MCE coupled with conventional treatment. This research would help determine

the immediate and long-term consequences of MET and MCE in individuals with persistent neck pain as compared to standard therapy. Motor control therapy seems to be more efficacious than other forms of therapy in reducing severe neck pain and disabilities [5,15]. Muscle energy technique was shown to be successful in enhancing neck motion and work in mechanical neck pain in the 5-review studied. (Nugrah etal2020). Static Stretching improve disability of the neck and there is Cervical range of motion has improved markedly and NDI score [4,16].

4. CONCLUSION

The primary aim of this study is to evaluate Muscle Energy Technique versus Motor Control Exercise, in adjunct to traditional treatment, on outcomes namely pain, ROM, and functional impairment in chronic neck pain patients. This study will aid in the alleviation of chronic neck pain and it will be determined after the statistical analysis which will be done following data collection. Conclusion will be drawn post the study. Samples will be collected and statistical analysis will be done and conclusion will be drawn based on the data collected.

CONSENT

Principal Investigators will obtain the written informed consent from the participant on a printed form (local language) with signatures and give the proof of confidentiality.

- **Confidentiality**

The study program will be explained to the participant, the principal investigator will take subjective information. The consent form will include the confidentiality statement and signatures of the principal investigator, patient and witnesses. If required to disclose some information for the study, consent will be taken from the patient with complete assurance of his confidentiality.

ETHICAL APPROVAL

After the Ethical approval from the Institutional Ethical Committee of Datta Meghe Institute of Medical Science. The participant individuals of the study and DMIMSU who will fund it will be able to retrieve findings of study. After completion of study and publication of results data will be stored in the DMIMSU data repository

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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