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Effect of Neck Stabilisation Vs Mckenzie Exercise for Mechanical Neck Pain – A Randomized Controlled Trial of Coastal Patients

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Coastal patients, Mechanical neck pain, neck stabilisation, McKenzie exercise, Visual analogue scale,

Abstract

BACKGROUND: Neck discomfort is a prevalent issue that may impact people in coastal areas as well as people in other areas. Neck pain can be caused by a variety of factors, which include poor posture, muscle fatigue, and injuries Mechanical neck pain is characterized as widespread neck discomfort brought on by prolonged neck postures, neck movements, and pain felt when the cervical musculature is palpated in the absence of pathologies. 30% to 50% of the general population suffers from mechanical neck pain. Activity limitation brought on by neck pain affects 20% to 30% of the working population and young adults.

OBJECTIVE: The study aimed to find the effect of Neck stabilisation vs McKenzie exercise for mechanical Neck Pain among young adults.

METHODOLOGY: It is quasi experimental study 30 participants were diagnosed as Mechanical neck pain from orthopaedic department of MGMCRI. They were randomly assigned to groups that is neck stabilisation group and McKenzie exercise group. Neck stabilisation group received exercise and conventional therapy and McKenzie group received exercise and conventional therapy. Exercises were given for 6 weeks. Pain and functional activity score were assessed before and after the intervention by Visual Analogue Scale (VAS) and Neck Disability Index (NDI).

RESULT: The data were analysed and interpreted using the SPSS version. There was a significant reduction in VAS and NDI score in both groups and a significant difference was found between Neck stabilisation group and McKenzie exercise group (p 0.05). CONCLUSION: From the above study, we conclude that both exercises were effective in treating patients with Mechanical Neck Pain among young adults but McKenzie exercise shows more significant level. As part of their overall physical education routine, young adults with special needs can benefit from neck exercises. These exercises can help improve neck strength and flexibility, which can improve posture, relieve neck pain, and boost overall physical fitness.

1. Introduction

Neck discomfort is a prevalent issue that may impact people in coastal areas as well as people in other areas. Neck pain can be caused by a variety of factors, which include poor posture, muscle fatigue, and injuries. Living near the coast may also expose you to some unique factors that can contribute to neck pain, such as salty air, wind gusts, and changing weather conditions. These factors can sometimes aggravate existing neck pain or cause new episodes to occur. Mechanical neck pain is a serious medical problem among students and adults. Mechanical neck pain is brought on by prolonged forward head posture, reading books, using a computer, a phone, or other

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devices while flexing the neck forward with the shoulders moved forward. These activities put strain on the neck muscles and increase the compressive force in the cervical spine. Neck pain frequently results from poor ergonomics at a PC or workstation or from inadequate posture. In these situations, the muscles are worn out and begin to suffer from overuse. In the general population, neck pain is a prevalent disease that can have a negative impact on a patient's physical, social, and emotional health. According to recent data, 22% to 70% of people suffer from neck pain have experienced pain in their lives [1-2].

Mechanical neck pain can be defined, in the absence of disease, as widespread neck discomfort caused by protracted neck postures, movements, and pain experienced when the cervical muscles are touched. Mechanical neck soreness affects from thirty percent to fifty percent of the general population.. Twenty to thirty percent of working people and young adults experience activity limitations due to neck pain. Regular activities could be one of the root causes. Uncomfortably high or low computer monitors, awkward sleeping postures, spending hours slumped over a desk, poor posture while reading or watching TV, and smartphones [41].

There are various conservative treatments for MNP, yet the most effective plan of action appears to be multimodal therapy, according to the existing evidence. The neck is thought to be the most common discomfort spot among adolescents. Neck pain is typically associated with poor health-related aspects and standards of life, absences from college, and shunning of extracurricular activities and sports. Many teenagers experience chronic neck pain, yet little has been learned about the risk variables and root causes of neck discomfort in this demographic. Adolescence is a period of life characterised by significant changes in both the biological and social settings. [37-38].

The McKenzie exercise is a self-repetitive extension exercise. Poor posture is often the main root cause of neck discomfort, putting unneeded stress on the soft tissue and ligaments of the cervical area. This alters the framework and soft tissue of the cervical spine, restricting its function and causing pain. The therapeutic approach of the McKenzie exercise includes self-therapeutic exercise, mobilisation, manipulation, and education for the patient. This program is expected to help improve neck posture and increase the rate of return to work.. [8]. In addition, it can improve function of patients, reduce recurrence of pain, and associated stress [9]. The McKenzie exercise is an effective musculoskeletal intervention that is frequently utilised in therapeutic practise. Youn and Sung [10] discovered that the McKenzie exercise dramatically improved head and shoulder posture in individuals with persistent neck pain. Furthermore, patients with neck pain who performed McKenzie exercises reported less pain, increased function, and positional alteration. [11].

Stabilisation exercise corrects muscular anomalies and restores muscle function to support and stable the spine [12-13]. The McKenzie approach, on the other hand, combines postural awareness and repetitive motions based on the core principle of a reverse force, which may reduce discomfort and regain function [14]. Although neck pain stabilisation exercises have become more common, few randomised clinical trials have investigated the beneficial effects of cervical and scapulothoracic stabilisation exercises for the management of Mechanical Neck Pain. [15].

Certain methods, in addition to exercises, may be used during the rehabilitation process to restore function and decrease pan. A good strategy for restoring ROM, decreasing pan, and increasing function in the soft tissues and joints. Neck pain has been treated using manual therapy, which includes manipulation or mobilisation. [16]. Interferential therapy, on the other hand, is a characterized by the interference of two medium frequency currents[1-10khz] which combine to produce low frequency [1khz]. Interference therapy is applied transcutaneous via electrode pads, either by bipolar or by quadripolar.

Application in the rehabilitation process, some techniques additional to exercises may be used to restore function and decrease pain. A useful method for the soft tissues and joints to restore ROM, decrease pain, and increase function is the manual therapy including manipulation or mobilization to improve neck pain. The purpose of this study is to compare the effects between the neck stabilization exercise and McKenzie exercise in pain and functional activity to incorporate the techniques in the clinical area.

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2. Methodology

It is a study where 30 patients have been recruited with mechanical neck pain from the OPD of Physiotherapy Department in Mahatma Gandhi Medical college and Hospital in the coast of Bay of Bengal. Informed consent has been obtained from all the participants who were included in this study. Participants who were included were from the age group 18 to 30 of both genders with mechanical neck pain for the past 6 weeks of duration. The participants with a history of severe trauma such as fracture, dislocation, any neurological deficit, systemic illness, who have undergone cervical surgeries, tumor or with any congenital disorders of the spine were excluded from the study.

DATA COLLECTION PROCEDURE

After the selection process the selected participations were randomly allocated in two groups. (Group A) Neck stabilisation exercises and (Group B) McKenzie exercises were given through convenient sampling The neck stabilisation exercises and McKenzie exercises were given for 3 days, one session per day for a duration 45 minutes. Both of the techniques were given for a period of 6 weeks so totally there were 18 sessions for each technique. Informed consent was obtained from each participant prior to participation. A brief description of the procedure has been given to the participants before commencing the study.

OUTCOME MEASURE

The outcome includes mechanical neck pain level and functional activity. All measurements were performed at baseline (week 0) and at the end of the intervention (week 6).

Measurements of mechanical neck pain level

The intensity of pain is measured by using visual analogue scale (VAS) it is a 10-points scale encompassing a number from 0 through 10; 0 represents “no pain”, and 10 indicates the “worst imaginable pain”. Patients are told to select the one number of the scale that the most accurately describes their level of pain [33-34].

Measurements of functional activity level

The Neck disability index, consistency, reliability, validity and an excellent ability to distinguish patients with different levels of disability tool is used by the participants to report their neck function. Lower the score imply greater the function on the 10 categories that make up the Neck disability index, which include for each section the total possible score is 5 if the first statement is marked the section score = o, if the last statement is marked it 5. If all ten sections are completed the score is calculated Minimum Detectable Change (90% confidence) 5 points or 10% [35-36].

TREATMENT PROCEDURE

Neck stabilization exercises (Group A):

Neck stabilisation conditioning aims to improve cervical muscular endurance and coordination. The next few exercises were completed by all members of this group.

Chin tuck: Whilst standing, the participant pulls back the chin (as if attempting a double chin) while keeping the eyes level. This was repeated 15 times.

Cervical extension: The participant either sits or stands and grasps the base of the neck with both hands, attempting to extend the neck as far as feasible. This was done 15 times. Shoulder shrugs: The participant stands and shrugs his or her shoulders up towards the ears. This was done 15 times.

Shoulder rolls: The participant stands and rolls his or her shoulders forward in a circle. Roll the shoulders backwards in a circle. The individual then relaxes and repeats the technique three times. Shoulder retraction: In the back of your neck, bring your shoulder blades together. Relax and repeat 15 more times.

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Fig. 1: Neck stabilization exercise

McKenzie Exercise (Group B):

- McKenzie exercise used in the form of neck retraction exercise. The patient is instructed to move the head backwards as far as possible but at the same time maintain forward facing position. It is important that the movement is made to the maximum. On completion the patient returns to the neutral rest.

- During the first week, the patient was lying supine with his chin tucked in and his head retracted. For maintaining slight bending, a tiny pillow was placed under the occiput. The patient was instructed to pull his head and neck posteriorly into a position where his head was directly over the shoulder girdle for one second before relaxing into rest posture. This technique was performed in four sets of 10 to 15 repetitions with one to three minutes break in between.

- In the second week, the addition of neck extension with chin tucked in provided progression in the sitting position. The therapist applied end-of-motion overpressure. This process was performed in six sets of one to two minutes pause between each set.

- The therapist used retraction and extension exercises with traction in the third week while the patient was resting supine on the couch. Throughout the range of motion, retraction and extension were maintained. The patient was requested to do the sitting progression with an extra session of retraction with lateral flexion, neck rotation, and finally combined retraction and neck flexion with overpressure performed by the therapist in the fourth week. This treatment was performed in four sets of 10 to 15 repetitions, with one to two minutes break between each set.

Fig. 2: McKenzie exercise

Conventional therapy for both groups:

Patients were checked for all the contraindications for IFT before starting the treatment. Four carbon rubber Electrodes were placed in the Neck Region+ in follows time: 15 Minutes.

- **Intensity:** As per Patient's Tolerance. A Proper Check was kept throughout the treatment.

- **Frequency:** 90-120 Hz.

- **Duration:** 2 weeks

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Fig. 3: Conventional therapy

STATISTICAL ANALYSIS

The statistical analysis was performed by using SPSS 17 version. All results are presented together with the mean and standard deviation. All outcome measure baseline scores were displayed. The Shapiro-Wilk test was used to assess the normality of the data. Paired T test was used for all the outcome measures to compare within-group changes in pre-intervention changes and post intervention changes on day 1 and at the end of 6 weeks.

3. Result Analysis

Table 1 and graph 1 shows the data of group A analysed using paired t test, the calculated Mean value of pre-test and post test scores VAS were 7.533±0.71 and 5.466±1.45 respectively. The obtained T value was 6.25 and P value 0.002 (<0.05), shows that there is significant difference between pre and post intervention scores of VAS scale.

Table 2 and graph 2 shows the data of group B analysed using paired t test, the calculated mean value of pre-test and post test scores VAS were 7.466±0.61 and 3.06±1.12 respectively. The obtained T value was 12.13 and P value 0.001(<0.05), shows that there is significant difference between pre and post intervention scores of VAS scale.

Table 3 and graph 3 shows the data of group A analysed using paired t test, the calculated mean value of pre-test and post test scores NDI were 22.13±3.72 and 13.13±3.18 respectively. The obtained T value was 0.961 and P value 0.001(<0.05), shows that there is significant difference between pre and post intervention scores of NDI scale.

Table 4 and graph 4 shows the data of group B analysed using paired t test, the calculated mean value of pre-test and post test scores NDI were 22±3.50 and 9.8±3.24 respectively. The obtained T value was 8.33 and P value 0.0001(<0.05), shows that there is significant difference between pre and post intervention scores of NDI scale.

TABLE 1: ANALYSIS OF INTRAGROUP PRE AND POST VALUES OF VAS FOR GROUP A

VAS	MEAN	S.D	T VALUE	P VALUE
PRE-TEST	7.533	0.71	6.25	0.002
POST-TEST	5.466	1.45		

TABLE 2: ANALYSIS OF INTRAGROUP PRE AND POST VALUES OF VAS FOR GROUP B

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VAS	MEAN	S.D	T VALUE	P VALUE
PRE-TEST	7.466	0.61	12.13	0.001
POST-TEST	3.06	1.12		

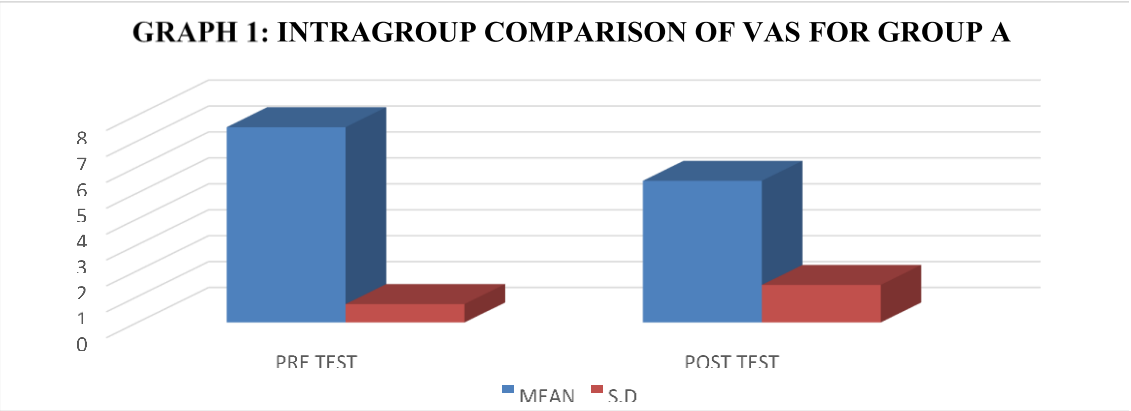
TABLE 3: ANALYSIS OF INTRAGROUP PRE AND POST VALUES OF NDI FOR GROUP A

VAS	MEAN	S.D	T VALUE	P VALUE
PRE-TEST	22.13	3.72	0.961	0.001
POST-TEST	13.13	3.18		

TABLE 4: ANALYSIS OF INTRAGROUP PRE AND POST VALUES OF NDI FOR GROUP B

VAS	MEAN	S.D	T VALUE	P VALUE
PRE-TEST	22	3.5	8.33	0.0001
POST-TEST	9.8	3.24		

GRAPH 1: INTRAGROUP COMPARISON OF VAS FOR GROUP A



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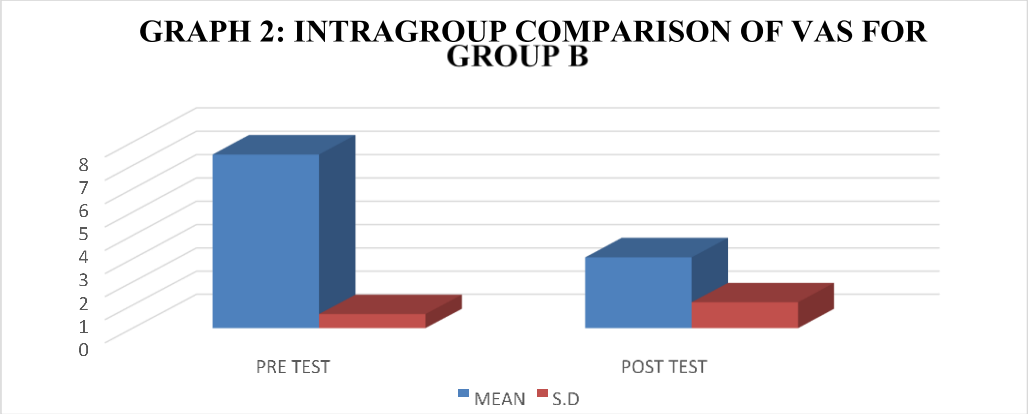

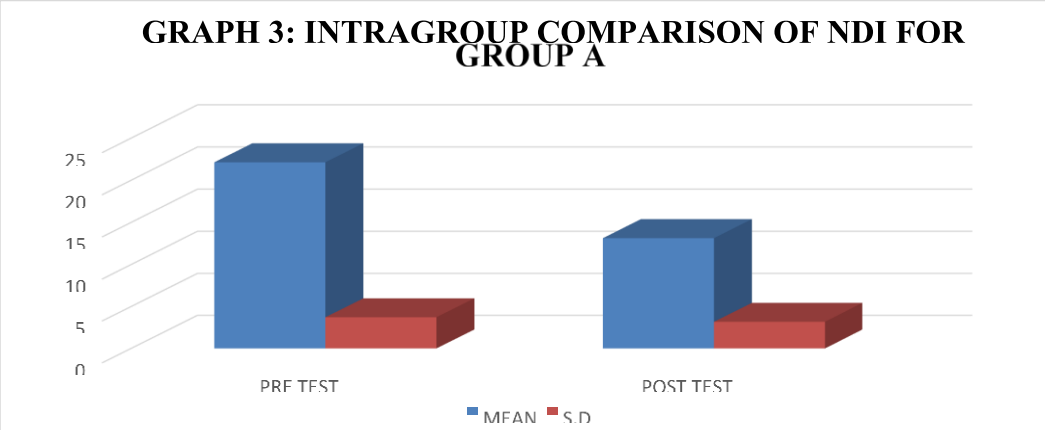

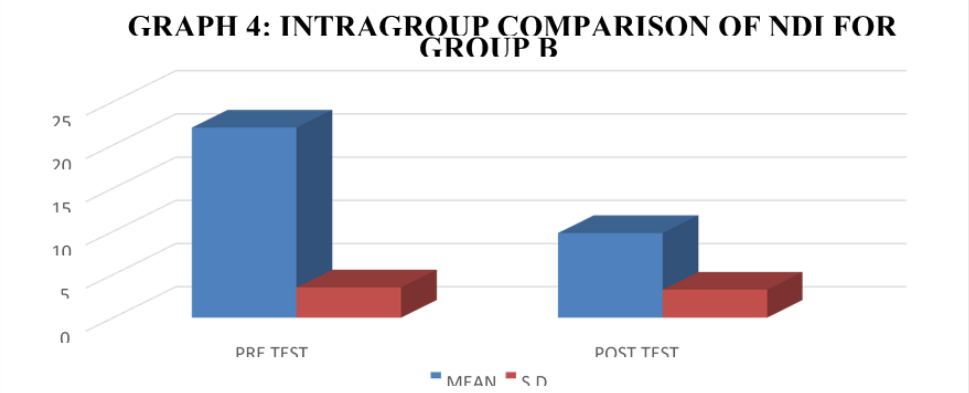

4. Discussion

The purpose of this study was to compare the effects of Neck stabilisation exercise and McKenzie exercise in patients suffering from Mechanical Neck pain. According to the findings of this study, the neck stabilisation exercise and McKenzie exercise groups had a significant difference in their baseline and post-intervention Visual Analogue Scale (VAS) and Neck Disability Index (NDI) scores. When the mean difference between the groups was compared, the participants in the McKenzie exercise group showed greater gains in pain reduction and functional ability after 6 weeks of the intervention. When the post-test VAS and NDI scores of both groups were analysed, there was a significant improvement in pain reduction and functional ability of the neck.

Our findings matched those of Dusunceli et al. (2009), who discovered that cervical stability exercises dramatically reduced pain and improved function in people with persistent neck pain after a year. The

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current study differs in that it is conducted over a 6-week period for mechanical neck discomfort. The current study's findings agreed with those of Cho (2011), who found that performing cervical stabilisation exercises reduced pain and increased maximum cervical muscle strength, endurance, range of motion, and muscular cross-sectional areas in patients with chronic neck pain. This study agreed with another study that found that neck stabilisation reduced pain, disability, and quality of life in patients with cervical radiculopathy. [43][45].

Participants in the McKenzie exercise group saw larger gains in terms of pain reduction and functional abilities. Another study was conducted on 350 individuals with low back pain and compared the McKenzie approach to spinal manipulation during a two-month period. When compared to manipulation, the McKenzie treatment produced better results. Our findings were similar to theirs, but the difference was that they did the intervention on patients with low back pain, whereas our trial was conducted on adults with mechanical neck discomfort. [41].

Mckenzie exercise is a potential treatment, according to the current study findings, and it exhibited superior benefits in lowering pain and enhancing functional activity among patients with mechanical neck pain. Additionally, neck stabilisation exercises improved pain and functional activity. As a result, both exercises can be used by people suffering from mechanical neck pain.

Limitation

The study's limitations start with the fact that the sample size was tiny. As a result, the findings cannot be applied generally. The participants' daily activities were not entirely under control, which is a challenge to overcome. Third, psychological and long-term consequences were not quantified. Fourth, it's possible that patients did not follow the home exercise routine. The current study did not involve in a long-term follow-up. Implementing this study on a specific neck condition rather than mechanical neck pain with any of these exercises is required to evaluate the efficacy of the exercises.

5. Conclusion

Neck discomfort is a prevalent issue that may impact people in coastal areas as well as people in other areas. Neck pain can be caused by a variety of factors, which include poor posture, muscle fatigue, and injuries From the obtained results of the study, we conclude that the both the neck stabilisation exercise and the McKenzie exercise is effective in decreasing the neck pain and improving the functional performance. This study also profoundly states that the McKenzie exercise is more effective than the Neck stabilisation exercise in decreasing the neck pain and improving the functional performance among mechanical pain patients. As part of their overall physical education routine, young adults with special needs can benefit from neck exercises. These exercises can help improve neck strength and flexibility, which can improve posture, relieve neck pain, and boost overall physical fitness.

CONFLICT OF INTEREST

NIL

FUNDING – NIL

AUTHOR CONTRIBUTION

Data collection and communication was done by S. Suhara. The sample design and the study design were done by M. Srinivasan. Overall supervision and text correction was done by E.

Shanmugananth.

IHEC approval – yes

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