



**ORIGINAL RESEARCH PAPER**

**Physiotherapy**

**COMPARISON BETWEEN MCKENZIE EXERCISE AND ISOMETRIC EXERCISE FOR NON-SPECIFIC NECK PAIN AMONG COLLEGE STUDENTS - COMPARATIVE STUDY**

**KEY WORDS:** Non-Specific Neck Pain, Mckenzie Exercise, Isometric Exercise, Numeric Pain Rating Scale (NPRS).

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**ABSTRACT**

**BACKGROUND:** Neck pain is one of the most common musculoskeletal disorders. It occurs more commonly in college going students. Non-specific neck pain causes pain and contributes substantial socioeconomic burden internationally. Mckenzie exercise and Isometric exercise play a major role in reducing neck pain. Hence the study was done to evaluate the compare the effect of Mckenzie exercise and Isometric exercise for Non-specific neck pain among college students. **MATERIALS AND METHODOLOGY:** 20 subjects were selected between the age group of 18-23 years among college students and categorised into two groups – Group A and Group B. Group A with 10 individuals received Mckenzie exercise and Group B with 10 individuals received Isometric exercise. This study was conducted for a period of 4 weeks. The improvement of the subjects were measured using Numeric Pain Rating Scale (NPRS) after the intervention. **RESULTS:** Statistical analysis were done using independent 't' test and paired 't' test and the results showed that there is a significant difference in the both groups. On comparing the post-test values of Group-A and Group-B, it found that there was a greater significant effect in Group A (Mckenzie Exercise) than the Group B (Isometric Exercise). **CONCLUSION:** From this study it is concluded that both exercises are effective in decreasing Non-specific Neck Pain. But the Mckenzie Exercise can be more effective in decreasing Non-Specific Neck Pain than the Isometric Exercise among college students.

**INTRODUCTION**

Neck pain according to the International Association for the Study of Pain is defined as "pain perceived as arising from anywhere within the region bounded superiorly by superior nuchal line, inferior by an unoriginally transverse line through the tip of the first thoracic spinous process, and laterally by sagittal plane tangential to the lateral border of neck"<sup>[1]</sup>. Neck pain disability is considerable and is now ranked fourth among global disabilities, ahead of anxiety disorders, diabetes and osteoarthritis<sup>[2]</sup>.

Non-specific neck pain is not associated with a particular disease or modification of anatomical structures. This little-known dysfunction is thought to have a multifactorial cause and contributes to substantial health care costs, work absenteeism and loss of productivity at all levels<sup>[3]</sup>.

Non-specific neck pain causes pain and disability and contributes substantial socioeconomic burden internationally. Up to 50% of adults experience neck pain annually, leading to reduce the quality of life<sup>[4]</sup>.

The McKenzie method is a classification-based treatment for patients with spine pain and was introduced by physical therapist Robin McKenzie<sup>[5]</sup>.

The McKenzie protocol has been commonly used in low back condition may be employed in the treatment of mechanical neck pain in three syndromes<sup>[6]</sup>.

1. Postural syndrome.
2. Dysfunction syndrome.
3. Derangement syndrome.

McKenzie method emphasizes the centralization phenomenon in the assessment and treatment of spinal pain, in which pain originating from the spine refers distally, and through targeted repetitive movements the pain migrates back toward the spine<sup>[7]</sup>.

McKenzie exercise are indicated based on directional preference, and their indication is the same direction of

directional preference. For example, if a patient exhibits a directional preference for spinal extension (most common), the exercise performed will be in spinal extension<sup>[7]</sup>.

Isometric contraction produces force without change in length of muscle which is common in muscle responsible for grip i.e. of forearm and hand.

Activation of motor unit that occur during isometric contraction is significantly higher than that occur during concentric or eccentric contraction<sup>[8]</sup>.

Multiple angles of isometric exercise is a type where resistance is applied, manually or mechanically, at multiple joint positions within the available Range Of Motion<sup>[8]</sup>.

**AIM AND OBJECTIVES**

**AIM:**

To compare the effectiveness of Mckenzie exercise and isometric exercise for non-specific neck pain among college students.

**OBJECTIVES:**

To find the effect of Mckenzie exercise to reduce pain for subjects with non-specific neck pain among college students.

To find the effect of Isometric exercise to reduce pain for subjects with non-specific neck pain among college students.

To compare the effect of Mckenzie exercise and Isometric exercise to reduce pain for subjects with non-specific neck pain among college students.

**MATERIALS AND METHODOLOGY**

This is a comparative study done among college students and categorised into two groups – Group A and Group B. Group A with 10 individuals received Mckenzie exercise and Group B with 10 individuals received Isometric exercise. This study was conducted for a period of 4 weeks. The improvement of the subjects were measured using Numeric Pain Rating Scale (NPRS) after the intervention.

**INCLUSION CRITERIA:**

- Age between 18-23 years

- Both males and females
- Students with non-specific neck pain
- Acute (Less than 7days) and Sub acute (more than 7 days but less than 3 months) cases of neck pain
- Numeric Pain Rating Scale more than 3

**EXCLUSION CRITERIA:**

- Cervical tumour
- Infection
- Neuritis
- Spinal fracture or Trauma
- Cervical surgeries
- Vertebro basilar Insufficiency
- Structural deformity
- Spinal stenosis
- Open wounds in the neck region
- Cervical spondylosis
- Cervical disc Prolapse
- Inflammatory conditions of cervical spine like RA, Spondylitis
- Non- cooperative patients
- Chronic neck pain
- Severe psychological disorder
- Torticollis
- Subjects with neurological deficit
- Trigger point
- Neck pain radiating to arm

**PROCEDURE**

**GROUP A - MCKENZIE EXERCISE: 10-15 repetition, thrice per 15 minutes, 3times/week for 4weeks.**

**Step 1:Retraction**

The researcher was assisted to move the head backward as far as possible from protruded position so that it is oriented more directly above the spinal column in seated on an upright chair with rather high back and sit against the back of the chair allowing the head to adopt a neutral relaxed position.

**RETRACTION OF NECK WITH ASSISTED (SITTING)**



**Step 2:Retraction and extension**

The researcher make the Head and neck retraction and extension of the subject done followed immediately by the movement of the head and neck into the fully extended position is seated on an upright chair with rather height back and sit against back of the chair allowing the head to adopt a neutral relaxed position.

**RETRACTION AND EXTENSION OF NECK (SITTING)**



**Step 3:Retraction and extension (supine lying)**

The researcher was instructed to retract the head of the subject by pulling the chin down as far as possible and to remain supine. The researcher place his both hand behind the occiput and the researcher assist to extend the head of the patient over the end of the treatment table so that the Head, neck and shoulders unsupported down to the level of 3rd 4th thoracic vertebra.

**RETRACTION AND EXTENSION OF NECK (SUPINE LYING)**



**Step 4:Retraction and extension (prone lying)**

The patient instructed to lie prone on the treatment table leaning on the elbows to raise the upper trunk followed by retracting and extending the head and neck of the patient by the researcher.

**RETRACTION AND EXTENSION OF NECK (PRONE LYING)**



All the Mckenzie procedure hold it for 2 seconds and 3 minutes rest between each set.

**GROUP B - ISOMETRIC EXERCISE: 8-10repetition, 3times/week for 4 weeks**

**POSITION: Sitting**

**STATIC FLEXION:**

Subjects are instructed to sit upright and neck in neutral position and the subjects both hands placed over their forehead and gently push against their resistance. Then they

were instructed to tighten their neck muscles but not to let their head move forward.

**STATIC EXTENSION:**

Subjects are instructed to place both hands against their lower back of their head. Then asked to apply slight forward pressure but make sure to resist the movement as they push their head back into their hands.

**ISOMETRIC LATERAL FLEXION:**

Subjects are instructed to place their right hand on the right side of their head, just above the right ear. Then tightened their neck muscles and resist the pressure to move their head sideways. Do the same procedure to their left side.

**ISOMETRIC ROTATION:**

Subjects are instructed to place their right hand on the right side of lateral aspect of forehead. Then tightened their neck muscles and resist the pressure to move their head rotate. Do the same procedure to the left side.

All the Isometric neck exercise hold it for 10 seconds and rest for 15 second. Repeat 8 to 10 times.

**DATA PRESENTATION**

**PAIRED 't' TEST**

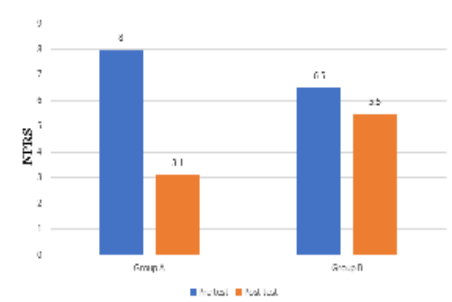
MEASUREMENT TOOL	GROUP	MEAN VALUES		CALCULATED 't' VALUE	TABLE 't' VALUE	P VALUE AND LEVEL OF SIGNIFICANT
		PRE TEST	POST TEST			
Numeric pain rating scale	Group A	8	3.1	10.18	2.26	P<0.05 Significant
Numeric pain rating scale	Group B	6.5	5.5	2.44	2.26	P<0.05 Significant

**INDEPENDENT 't' TEST**

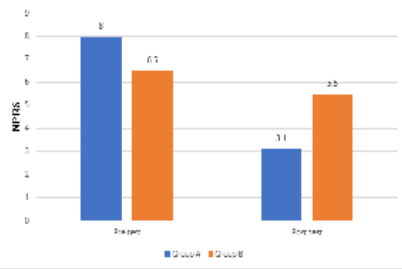
MEASUREMENT TOOL		MEAN VALUES		CALCULATED 't' VALUE	TABLE 't' VALUE	P VALUE AND LEVEL OF SIGNIFICANT
		GROUP A	GROUP B			
Numeric pain rating scale	Pre Test	8	6.5	0.2	2.08	P>0.05 not Significant
Numeric pain rating scale	Post Test	3.1	5.5	4.71	2.08	P<0.05 Significant

**GRAPHICAL PRESENTATION**

**PAIRED 't' TEST**



**INDEPENDENT 't' TEST**



**DATA ANALYSIS AND INTERPRETATION**

**PAIRED 't' TEST**

**NUMERIC PAIN RATING SCALE(NPRS) GROUP-A (MCKENZIE EXERCISE)**

For 14 degree of freedom at 5% level of significance the calculated 't' value is 10.18 and the table 't' value is 2.26. Since the calculated 't' value is greater than table 't' value, the null hypothesis is rejected. So, there is significant difference between pre test and post test values of group A in this Numeric Pain Rating Scale (NPRS).

**GROUP - B (ISOMETRIC EXERCISE)**

For 14 degree of freedom at 5% level of significance the calculated 't' value is 2.44 and the table 't' value is 2.26. since the calculated 't' value is greater than table 't' value, the null hypothesis is rejected. So, there is significant difference between pre test and post test values of group B in this Numeric Pain Rating Scale (NPRS).

**INDEPENDENT 't' TEST**

**NUMERIC PAIN RATING SCALE(NPRS)**

**PRE-TEST VALUES OF GROUP A & GROUP B**

For 28 degree of freedom at 5% level of significance the calculated 't' value is 0.2 and the table 't' value is 2.08. Since the calculated 't' value is lesser than table 't' value, the null hypothesis is accepted. So, there is no significant difference between group A & group B in the pre test values of Numeric Pain Rating Scale (NPRS) and so the both groups are homogenous.

**POSTTEST VALUES OF GROUP A & GROUP B**

For 28 degree of freedom at 5% level of significance the calculated 't' value is 4.71 and the table 't' value is 2.08. Since the calculated 't' value is greater than table 't' value, the null hypothesis is rejected. So, there is significant difference between group A & group B in the post test values of Numeric Pain Rating Scale (NPRS).

**DISCUSSION**

Mckenzie protocol abolishes pain and restore function. The Mckenzie method of care has been successful in the treatment of neck pain in the short term. This therapy can not only be used as a set of exercises, but also an intervention to lessen pain and enhance functional activity level.

Pain reduction due to isometric exercises might occur due to cortical changes, motor neuron pool recruitment and changes at the level of tissues.

Multiple angles of isometric exercise is a type where resistance is applied, manually or mechanically, at multiple joint positions within the available Range of Motion. This approach is used when the goal of exercise used to improve strength throughout the Range of motion.

Khan et al. evaluated the effectiveness of isometric exercises as compared to general exercises in chronic non-specific neck pain. Totally 68 subjects taken for this study and simple randomisation method was used to assign participants into isometric exercise group and general exercise group with study duration of 12 weeks. This study concluded that both interventions are effective but isometric exercises are clinically more effective than general exercise.

Faiza Amjad et al. Compared the effects of McKenzie traction and exercises on neck pain, cervical ranges, functional activities and posture secondary to upper crossed syndrome randomized control trials was conducted over a period of 6 months. Totally 120 patients of 20-60 years age group were allocated in 2 groups (experimental & control). Results are based on independent sample t-test value. In this study, they concluded that both general exercises and McKenzie treatment improved neck pain but McKenzie treatment better than general exercise.

In my study was conducted with 20 subjects who were selected based on the inclusion and exclusion criteria. They were divided into two groups. Subject in group A received Mckenzie exercise whereas group B received isometric exercise.

Both groups were assessed by using Numeric Pain Rating Scale (NPRS) to evaluate the intensity of pain that is pre-test value were assessed.

Paired 't' test was used to interpret the results within the group and after the intervention and Independent 't' test was used to interpret the results between the group.

At the end of the treatment protocol, again assessed by using the same NPRS to evaluate the pain intensity that is post-test value assessed to both the groups. Compare the results of the both groups.

Group A have effect of relieving pain than the Group B. Hence pain relief is better in the group A which received Mckenzie exercise than the group B which received isometric exercise.

**SUMMARY AND CONCLUSION**

This study was done to find out the effect of Mckenzie exercise and isometric exercise on subjects with Non-specific neck pain among college students. 20 students were selected with purposive sampling method and randomly divided into two groups.

Group A having 10 subjects: They received Mckenzie exercise.

Group B having 10 subjects: They received Isometric exercise.

For pain, Numeric Pain Rating Scale (NPRS) were used before the intervention and after the intervention for a period of 4 weeks.

Pre-test and post-test values of the study were collected and assessed by using independent 't' tests and paired 't' tests.

The study revealed that there was significant difference in both the groups, but Group A showed more reduction in the level pain than Group B.

Thus, the study is proved that Mckenzie exercise helps to reduce the pain in neck than isometric exercise.

**LIMITATIONS AND SUGGESTIONS**

**LIMITATIONS:**

- Sample size is small.
- Only age group of 18 to 23 were taken.
- Only one outcome measure was used.
- Study duration was too short.

**SUGGESTIONS:**

- Large sample size can be included.
- Age group of adult population can be used.
- Many outcome measures can be used.
- Study duration can be prolonged.

**REFERENCE**

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