

Effect of Muscle Energy Technique, Mackenzie & Scapular stability exercises in alleviating Neck Pain and Disability among population working from home.

-An Experimental Study

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ABSTRACT-

BACKGROUND- Owing to covid-19 outbreak the abrupt shift of corporate as well as non corporate sector jobs from institutional settings to home has raised the cases of neck pain and stiffness, due to the lack of standard set up or workstation. Mackenzie, Muscle energy technique, scapular stability exercises followed by static stretching of neck musculature can be effective in patient with neck discomfort.

OBJECTIVE- The aim of this research was to evaluate the effect of Muscle Energy Technique, McKenzie, and Scapular Stabilization Exercises affected patients with neck pain.

METHOD- Random sampling was done. Using the single blind approach, subjects who fulfilled the inclusion criterion were randomly assigned to Group A (control group) or Group B (experimental group). Intervention for GROUP A was HOT PACK, TENS, and STRETCHING OF TRAPEZIUS FOLLOWED BY ISOMETRICS. And for GROUP B were STRETCHING OF TRAPEZIUS, MUSCLE ENERGY TECHNIQUE, MCKENZIE and SCAPULOTHORACIC STABILITY EXERCISES. Treatment to both group was given for 3 weeks & 3 setting per week i.e. treatment session for 9 days. An outcome measure used in this study for data collection was NPRS and NECK DISABILITY INDEX. Analysis followed by intervention was done on Day 1st Pre-treatment and 1st, 5th and 9th day Post treatment.

RESULT- Intervention for Group A showed significant effect in reducing pain among population with neck pain. But Group B protocols are highly effective in alleviating pain and disability as compared to Group B.

CONCLUSION- This study concludes that MET, Mackenzie & Scapular stability exercises was highly effective in reducing pain and disability among population working from home.

KEYWORDS- Neck pain, Muscle energy technique, Scapular stability exercises, Mackenzie

INTRODUCTION

Pandemic have distressed everyone's life in one or other way. Due to COVID-19 flare-up, majority of individuals needed to make an unexpected shift from the corporate setting to working from their home. While some are sufficiently fortunate to have a standard set up from home space, others attempt to utilize the not exactly ideal set up comprising of beds, lounge chairs, couches, feasting table as their workstation. Because of absence of ergonomic set-up or a legitimate work station and Spending hours in wrong slumping stance have raised complain of neck discomfort among individuals working from home.

Increased sedentary behaviour and poor posture seemed to encourage the onset of musculoskeletal disorders, especially lower back and neck pain, according to a report published in the International Journal of Environmental Research and Public Health.(1) There are a few potential causes behind expanding cases of neck pain for example delayed sitting in same position, poor biomechanics, absence of an ergonomic set-up, delayed sitting in forward head position and expanded reliance on screen for work. Patients with neck pain frequently complains of neck stiffness, lessen neck mobility, tightness in neck musculature, along with pain. Musculoskeletal problems of the neck in populace WFH are probably going to be disturbed by sustained static work positions resulting in constant low-threshold motor unit, decreased local blood supply, Ca²⁺ accumulation, and forceful exertions undeniable degree of static contractions, delayed static burdens, abnormal bio mechanics or a mix of these elements are potential reasons for trapezitis.(2)

A wide number of therapeutic interventions for neck pain are available. Including muscle energy technique, Mackenzie, prolonged static stretching of neck musculature along with scapular stability exercises. Fred L. Mitchell, Sr., D. O. developed the Muscle Energy Technique (MET). This is an active procedure in which the patient intentionally uses his muscles in a particular direction from a specific controlled posture against a clearly executed counterforce. MET could be utilized to lengthen tightened or spastic muscle, to reinforce weakened muscles, or to improve confined joint movement. Muscle energy technique is an advanced yet effective stretching technique for the patient with neck discomfort. (3)

During scapular alignment, patients with nonspecific neck pain often have altered dynamic scapular stabilisation. Because of the close relationship between the neck and the scapula, it's equally significant to ensure we include the scapular stabilisation exercises in the protocol of patient with neck pain. (4)

The McKenzie procedure was first proposed in Sweden in 1985 and was first used in the United States in 1990 as a therapeutic tool for patients with mechanical spine problems. Today, physiotherapists in essential consideration frequently utilize this strategy as both an assessment and treatment tool. A randomised controlled trial comparing the McKenzie procedure, general exercises, and ultra sound treatment effects on patients with neck pain. McKenzie therapy was shown to be more beneficial than others. (5)

Owing to covid-19 outbreak the abrupt shift of corporate as well as non corporate sector jobs from institutional settings to home. Have lead tremendous rise in cases of neck discomfort due to prolonged abnormal static posture of neck while working on screen motivated us to engage in this study and to find out the best solution for it. Mackenzie, Muscle energy technique, scapular stability exercises followed by static stretching of neck musculature can be effective in patient with neck discomfort. Numerous interventions for reducing neck discomfort are available in physical therapy. However the most effective treatment for neck discomfort still remains an area of discussion. Objective of this study is to assess the effect of Muscle energy technique, McKenzie and scapular stability exercises in patient with neck pain.

REVIEW OF LITERATURE TABLE-

Study	Population	Objective	Conclusion
(Apoorva Phadke et al, 2015)	Mechanical neck pain	To compare the effect of MET with passive stretching on pain and functional disability in people with mechanical neck pain.	Muscle energy technique was better than stretching technique in improving pain and functional disability in people with mechanical neck pain.
(Seyda Toprak Celenay et al, 2015)	Chronic mechanical neck pain	To assess and compare the effectiveness of cervical and scapulothoracic stabilization exercise treatment with	Stabilization exercises with and without connective tissue massage might be effective for reducing pain, anxiety and

		and without connective tissue massage on pain, anxiety, and the quality of life in patients with chronic mechanical neck pain.	physical health while increasing the quality of life in patients with chronic mechanical neck pain.
(Shereen Louw et al, 2018)	Nonspecific neck pain	To assess the effectiveness of therapeutic exercise versus no therapeutic exercise on reducing neck pain and improving quality of life in office workers with non-specific neck pain.	Strengthening exercise therapy can improve pain and quality of life in office workers with non-specific neck pain.
(Yong Gon Seo et al, 2019)	Nonspecific chronic neck pain	To systematically review the effect of scapular stabilisation exercise on pain and dysfunction in patients with nonspecific chronic neck pain.	Scapular stabilisation exercise could be considered an effective intervention for patients with nonspecific chronic neck pain.
(Kumar Neeraj et al, 2016)	Neck pain	To study the efficacy of McKenzie treatment, Isometric Strengthening Exercise and Hot Pack in the treatment of neck pain.	The McKenzie protocol has been found to be more beneficial than the Isometric Strengthening exercise and Hot pack.
(Yasir Jalal et al, 2018)	Neck pain	To assess the effectiveness of muscle energy technique on cervical range of motion and neck pain.	Muscles energy technique, post facilitation stretch is effective in the treatment of restricted cervical range of motion and cervical pain.
(Mansi Ray et al, 2020)	Neck pain	To compare the immediate effect of Muscle energy technique and passive stretching of upper trapezius muscle in neck pain patients.	A single session of Muscle energy technique for upper trapezius muscle reduced the pain intensity and increased the cervical rotation and cervical side flexion.
(Kyue-nam Park et al, 2013)	Unilateral neck pain	To compare the immediate effects of upper trapezius muscle stretching in more tensed position and less tensed position on the change of range of motion	Both upper trapezius stretching methods in more tensed position and less tensed position were effective for increasing the reduced range of motion for neck rotation in patients

		for neck rotation, and the range of motion for conjunct neck motions at end-range of neck rotation toward the painful side in patients with unilateral neck pain.	with unilateral neck pain.
(H Ahmed et al, 2021)	Mechanical neck pain	To determine the effectiveness of post-isometric relaxation and LASER treatment in minimizing pain and increasing neck range of motion and function in people with upper Trapezius trigger point pain.	Both Post isometric relaxation and LASER treatment have been effective in reducing pain-pressure threshold and pain intensity in the management of muscle trigger point pain.
Ana Cláudia Violino Cunha et al, 2008	Chronic neck pain	To Compare the effect of conventional static stretching and muscle chain stretching, as proposed by the global posture re-education method, in the manual therapy of patients with chronic neck pain.	Conventional stretching and muscle chain stretching in association with manual therapy were equally effective in reducing pain and improving the range of motion and quality of life of female patients with chronic neck pain.

METHODOLOGY

STUDY DESIGN- Experimental study.

SAMPLE SIZE-16

SAMPLING TECHNIQUE- Random sampling, single blind. Subjects meeting the inclusion criteria were randomly allocated to Group A (control group) or Group B (Experimental group), using Single blind method, where every subject were supposed to randomly choose an envelope enclosed with GROUP A and GROUP B in it.

INCLUSION CRITERIA-

- Age group: 25 - 65years.
- Male & Female.
- Patient presenting with neck pain along with stiffness.
- Patient complaining of reduce neck mobility.
- Unilateral and bilateral trapezitis.
- Patient with neck pain (acute or chronic) without radiation.
- Patient presenting with SCM and trapezius tightness.
- Subjects willing to participate.
- Patients who are not under medication.

EXCLUSION CRITERIA-

- Psychological problems.
- Any other cervical instability or degenerative disorder.
- Recent spinal surgeries.
- Cervical radiculopathy.
- Thoracic outlet syndrome.
- Pregnancy.
- Cardiac problem
- Vertebro- Basilar Insufficiency

PROTOCOL-

The subjects were selected on the basis of inclusion and exclusion criteria. Patients were described the type of intervention, possible risk factor and duration of the study and there after Consent Form was obtained from them. Patients were randomly allocated to respective GROUP A (CONTROL) & GROUP B (EXPERIMENTAL). Intervention for GROUP A was HOT PACK, TENS, and STRETCHING OF TRAPEZIUS FOLLOWED BY ISOMETRICS. And for GROUP B were STRETCHING OF TRAPEZIUS, MUSCLE ENERGY TECHNIQUE, MCKENZIE and SCAPULOTHORACIC STABILITY EXERCISES. Treatment to both groups was given for 3 weeks & 3 setting per week i.e. treatment session for 9 days. An outcome measure used in this study for data collection was NPRS and NECK DISABILITY INDEX. Analysis followed by intervention was done on Day 1st Pre-treatment and 1st, 5th and 9th day Post treatment.

PROCEDURE-

MUSCLE ENERGY TECHNIQUE-

Muscle energy technique is used for numerous reasons including lengthening of tightened and strengthening of weak muscles. MET can assist to loosen up the shorten muscle and promotes the recovery mechanism. It is precise in its utility as subjects provide preliminary efforts at the same time as therapist enables the stretching. For Group B, Post isometrics relaxation technique was applied to the targeted tightened neck musculature for nearly about 5 repetitions using 20% of maximal isometric contraction for 20 seconds, the stretch was carried beyond the resistance barrier. (3)

SCAPULAR STABILISATION EXERCISE-

Patient suffering from neck pain may develop scapular instability because of close association of neck and scapula. According to numerous studies weakness & tightness of axioscapular muscles like trapezius, rhomboids can lead to scapular dyskinesia in patient with neck pain. Scapular stabilisation exercises are equally important in patient with acute or chronic neck pain. Supine deep breathing, supine shoulder at 90° of flexion with scapular protraction, arm rise in the quadruped pose, lateral arm raise with 2 kg dumbbells, posture education, and scapular retraction were all recommended to the patient. Scapula stabilization exercise programs were given to experimental group, Every programme consisted of three sets of ten repetitions for 20 seconds each, with a 20-second break in each set. (4)

MACKENZIE

McKenzie was performed by Group B in the form of neck retraction exercise. Subjects were asked to stand against the wall and were instructed to perform chin tuck along with moving head backward towards the wall by maintaining forward facing position. It is important to achieve the optimal movement. When the procedure is over neutral position of head and neck is maintained. (5)

PASSIVE STRETCHING

Passive stretching of tightened neck muscle is significant in patient with neck pain or trapezitis. Controlled, static and progressive passive stretch was applied to the subjects at end range with constant intensity according to patients comfort. The stretch was carried for 30 seconds & was repeated for three to five times. (3)

DATA COLLECTION

Data was collected via NPRS AND NECK DISABILITY INDEX SCALE on Day 1st Pre-treatment and 1st, 5th and 9th day Post treatment.

RESULT

Table 1: demographic value of Group A and Group B

	Subjects		p-value
	Group A	Group B	
Age (years)			0.0001
Mean	38.50	48.00	
Standard Dev.	10.0623059	10.25391911	
Gender			
Female	3	5	
Male	5	3	

Table 2 Comparison between before and after the treatment of Group A and Group B

Parameters	SUBJECTS		p-value
	Group A (pre)	Group A(post)	
NPRS			
Mean	6.75	4.875	0.001
Standard Dev.	0.88	0.99	
NDI			
Mean	18.875	15.5	0.003
Standard Dev.	3.52	3.85	

Group B (pre)		Group B(post)	
NPRS			
Mean	7.25	3.625	0.001
Standard Dev.	1.03	0.75	
NDI			
Mean	20.75	12	0.001
Standard Dev.	3.370036	2.618615	

Table 3 Comparison between post treatment of Group A and Group B

Parameters	SUBJECTS		p-value
	Group A (POST)	Group B(POST)	
NPRS			
Mean	4.875	3.625	0.023
Standard Dev.	0.99	0.74	
NDI			
Mean	15.5	12	0.002
Standard Dev.	3.85	2.61	

GRAPH-

Variables	Mean	P – value
Pre NPRS	6.75	0.001
Post NPRS	4.875	

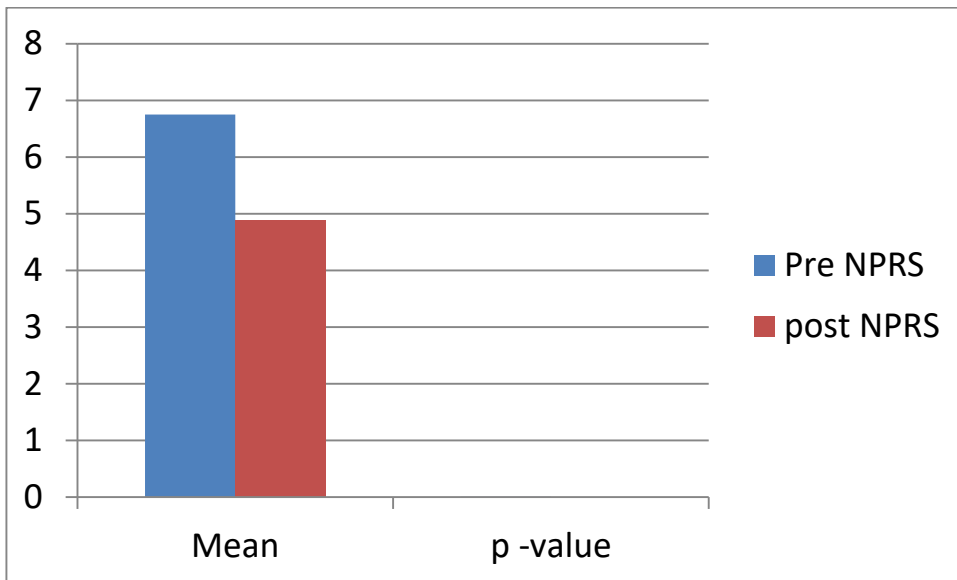


Fig1 comparison of NPRS within group A
[CONTROL GROUP]

Statistical analysis revealed the significant difference post treatment

P – Value = 0.001

Variables	Mean	P-value
Pre NDI	18.875	0.003
Post NDI	15.5	

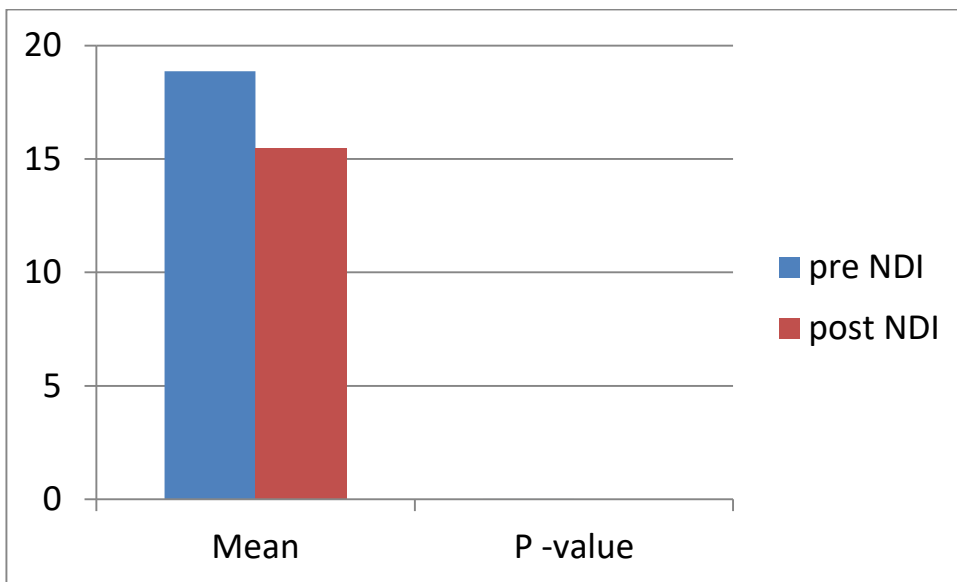


Fig.2 comparison of NDI within group A [CONTROL GROUP]

Statistical analysis revealed the significant difference post treatment

p- Value = 0.003

Variables	Mean	P-value
Pre NPRS	7.25	0.001
Post NPRS	3.625	

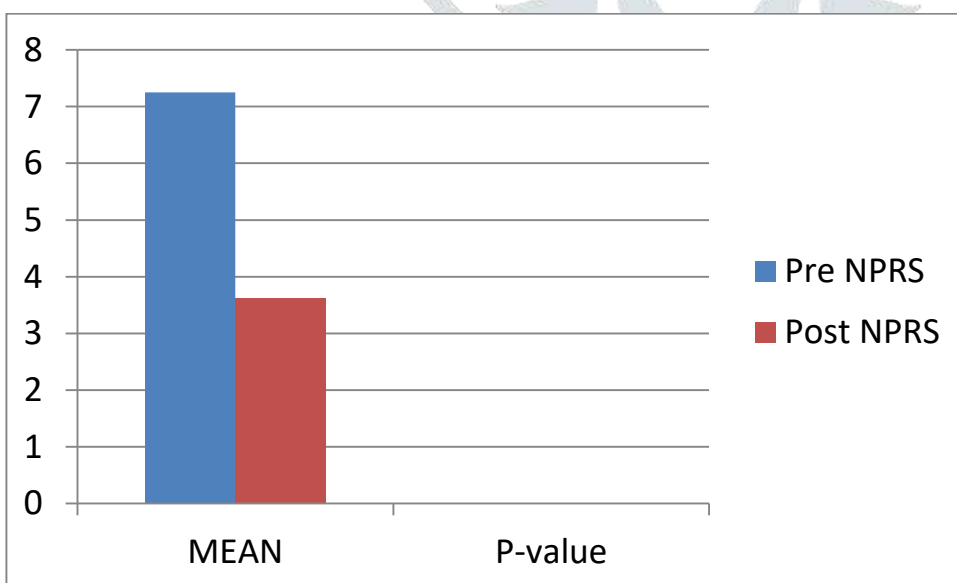


Fig.3 comparison of NPRS within group B [EXPERIMENTAL GROUP]

Statistical analysis revealed the significant difference post treatment.

P – Value = 0.001

Variables	Mean	P-value
Pre NDI	20.75	0.001
Post NDI	12	

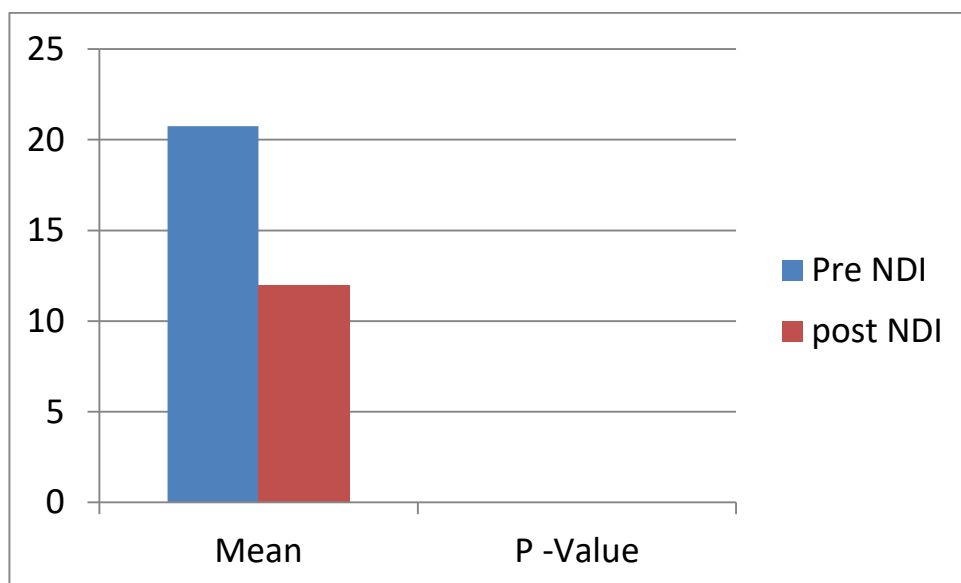


Fig.4 comparison of NDI within group B [EXPERIMENTAL GROUP]

Statistical analysis revealed the significant difference post treatment.

P-value = 0.001

GROUP	VARIABLES	MEAN	P – VALUE
GROUP A	POST NPRS	4.875	0.023
GROUP B	POST NPRS	3.625	

GROUP	VARIABLES	MEAN	P – VALUE
GROUP A	POST NDI	15.5	0.002
GROUP B	POST NDI	12	

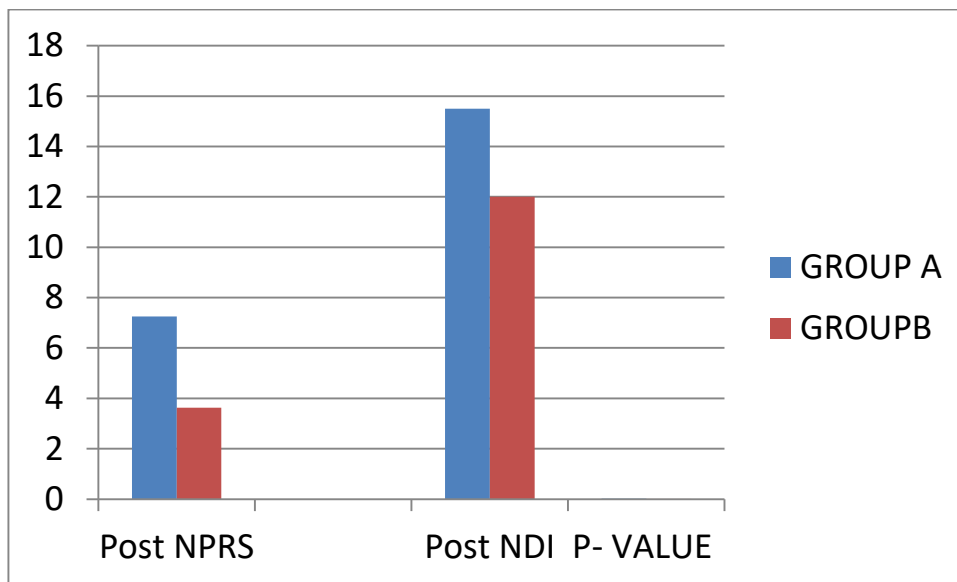


Fig.5 comparison of NPRS and NDI of group A and Group B respectively

Statistical analysis revealed the significant difference between group A and group B respectively

P-Value for group A: 0.023 P-value for group B: 0.002

DISCUSSION-

The aim of this study was to see how efficient Muscle Energy Technique, McKenzie, and Scapular Stabilization Exercise are at reducing pain and disability among population suffering from neck pain and discomfort.

In GROUP B, Patients experienced positive improvements in disability and discomfort after implication of Mackenzie the logical reason for this could be the deep stabilisers inhibited by pain, resulting in an imbalance around the spine, causing the spine to become more strained and painful. The longus capitis and longus colli, which are important for neck stability, are corrected by McKenzie stabilisation exercises in the form of neck retraction. (6)

Marked reduction of neck disability was seen among the patient of GROUP B, the significant cause for reduction in disability followed by application of Muscle energy technique could be When a muscle is contracted isometrically, afferent feedback from the proprioceptive sensory receptor organ inhibits the muscle, resulting in relaxation when the contraction is released, which moderated the influence of MET. It's helpful because muscle tightness is a significant contributor to somatic dysfunction. (7) Improvements in the viscoelastic properties of the soft tissue, accompanied by the implementation of the technique, are also the mechanism for decreased pain and increased mobility. A rise in stretch resistance has been suggested as the reason for improved flexibility. (8)

Scapular Stabilization Exercises reduced pain severity in the subjects. When compared to treatment of GROUP A, scapular stabilisation exercises is more successful in improving disability in neck pain patients. In recovery, Scapular movement pattern correction is an integral aspect of muscle recruitment techniques. The serratus anterior and trapezius muscles must be reactivated in order to heal from neck dysfunction. Scapular stabilisation is a series of movements to stabilise the shoulder girdle muscles so that proper scapular function can be restored and dyskinesia can be corrected.(4)

Intervention for GROUP A, Static stretching also showed positive response in alleviating the neck pain by Inhibition of Golgi tendon organ can result in a reduction in pain intensity during passive stretching. The musculotendinous will relax and pain tolerance will be reduced as a result of these reflexes. (3)

The pain in this study was significantly reduced. It's possible that this is due to the induction of mechanoreceptors. The pain gate action on both A delta (fast) and C (slow) path fibres in the posterior horn caused by high frequency, low intensity electric pulses stimulating mechanoreceptors (A beta) fibres, also known as standard TENS. On the C fibre system, a morphine-like reaction occurs.(9) This is attributed to the production of enkephalin by interneurons in the posterior horn that have been activated by mechanoreceptor stimulation. Morphine-type (enkephalin) action on C fibre through midbrain centres, involving serotonin as a neurotransmitter; often triggered by low-frequency, high-intensity A delta stimulation.

Intervention for both, group A & B have shown significant effect in pain reduction among patient working for home. However, as opposed to GROUP A, treatment for GROUP B results in a significant reduction in pain and impairment.

CONCLUSION-

The findings of this research show that MET, Mackenzie, and Scapular stabilisation exercises are particularly successful in minimising neck pain and impairment in people working from home.

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