



TO ASSESS THE EFFICACY OF PECTORAL MET VS UPPER TRAPEZIUS AND LEVATOR SCAPULAE MET ON POSTURE, PAIN AND FLEXIBILITY IN PATIENTS WITH MECHANICAL NECK PAIN

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ABSTRACT

Background: Pectoral minor is the only muscle that connects anterior thorax and posterior scapula and function to depress scapula and also pectoral major is connecting thorax to appendicular Skeleton. In mechanical neck pain, as per Janda approach these pectoral muscle are tend to be shorten along with posterior trapezius and levator scapulae. **Objective:** To know pectorals role and compare its effectiveness with posterior muscle upper Trapezius and levator scapulae. **Methodology:** 30 subjects are randomly allocated in two groups with 15 subjects each. One group received pectoral muscle MET along with CT and other group received Trapezius and levator scapulae muscle MET along with CT for 2 weeks. Outcome measures used were NPRS, FHP and cervical ROM. **Conclusion:** Both muscle groups showed significant improvement in all variables. However pectoral group was more significant in improving FHP and trapezius group was more significant in pain reduction while there was no significant difference in ROM of 2 groups.

KEYWORDS : Upper cross syndrome, Forward head posture, MET.

INTRODUCTION

Neck pain is a frequent experience occurring in approximately 10% of the general population [1]. About 50-70% of individuals are believed to experience neck pain at least once in lifetime and about 60% patients account chronic pain after onset of symptoms [1,2]. Mechanical neck pain is defined as pain located in the cervical spine or cervicothoracic junction which is elicited or enhanced by cervical motion or palpation of cervical musculature [2]. Guzman et al (2009) recognized neck pain as symptoms initiating in anatomic region of neck and diverging to head, trunk and upper limb for which it is not possible to identify a specific pathological cause of pain [3,4]. Mechanical neck pain for longer than 12 weeks is considered as chronic neck pain. The Neck Pain of clinical classification in 4 grades with respect to the severity of neck pain.

Grade1: Neck pain with no signs or symptoms of major structural pathology and no or minor interference with activities of daily living.

Grade2: Neck pain with no sign or symptoms of major structural pathology but with major interference with activities of daily living.

Grade3: Neck pain with no sign and symptoms of major pathology but with neurological sign of nerve compression.

Grade 4: Neck pain with signs of major structural pathology (fractures, spinal cord injuries, infection, neoplasm or systematic diseases) [4,5].

Janda described Upper Cross Syndrome as an abnormal posture resulting due to tightness or facilitation of upper trapezius and levator scapulae dorsally and pectoralis major and pectoralis minor ventrally as well as inhibition or weakness of deep cervical flexors ventrally and middle and lower trapezius dorsally. This muscular imbalance results in joint dysfunction, forward head posture, cervical lordosis [6]. Pain resulting is after secondary to muscle imbalance [7]. FHP is associated with an anteriorly positioned head with respect to hypothetical plumb line in frontal plane which is perpendicular through COG of body [8].

Pectoralis minor is the solitary muscle associating the posterior scapula to side of thoracic region and is responsible for the depression of scapula [9,10]. Takayuki Muraki et. al also described that resting length of Pectoralis minor while standing with arm at side has a role in scapular kinematics

[10]. Postural imbalance could be imputed to poor postural sense, muscle fatigue or dysfunction of spine [11].

MET is a form of manual therapy was founded by Dr.Fred L Mitchel, an approach used by osteopaths and manual therapist. Authors related to field of osteopathy asserts that MET can be employed to lengthen shorten muscle and enhance joint function and ROM. MET entails voluntary contraction of individual muscle in a specific controlled direction, against a Counterforce provided by the therapist [12,13,14]. MET is also used for reduced tone of a muscle before stretching via introducing isometric contraction to the targeted muscle produce post isometric relaxation [15]. Therefore, the present study aims to check and compare the effectiveness of MET of upper trapezius and levator scapulae on posterior side and pectoralis major and pectoralis minor on anterior side as per Janda's approach in subjects having mechanical neck pain.

Methodology

This was a comparative experimental study conducted at Gurugram University. Total 30 patients were included in the study after screening for inclusion(both male and female of age 18 -50, subacute and chronic neck pain, NPRS (4-8), UCS muscle tightness, FHP and exclusion criteria(Sign of serious pathology (e.g., malignancy, inflammatory disorder, infection, history of cervical spine surgery, history of trauma and fracture in cervical spine, signs of cervical radiculopathy or myelopathy, vascular syndrome). Subject were randomly allocated in 2 groups with 15 subjects in each group. Whole procedure was explained to the subjects and the informed consent was taken prior to testing. The study was conducted from 15th February, 2022 to 10th October, 2022. The data were collected and entered in Microsoft excel sheet and were analysed using statistical package for social science (SPSS) version 28. Level of significance selected for the study was $p < 0.05$. Following parameters are recorded and checked by therapist by procedures described as follows: NPRS for pain measurement pre and post treatment, Goniometry was done in sitting position for all neck ROM.

FHP-For measuring FHP Reference points just as lateral malleolus, mid knee joint, acromion process and external auditory meatus were marked. Subjects were asked to stand with reference to plumb line such that the plumb line falls slightly anterior to lateral malleolus. The subjects were selected if auditory meatus was lying in front of plumb line. Then using a Carpenter's tri square scale FHP was measured

where distance between tragus and wall was measured. If this distance was > 10cm in men and > 9.5cm in women, they were included in the study. **Group A**-patient was in supine lying and MET of pectorals was provided with isometric contraction with 20%force and 7 sec holds while holding breath and then asked to exhale while stretching muscle to new length and stretch force maintained for 10 sec. There were 3 reps in each session for pectoral major and minor, for 5 days in 2 weeks. Also, isometric and active exercises were executed. **Group B**-patient was in supine lying and MET of trapezius and levator scapulae were provided with isometric contraction with 20%force while holding breath for 7 sec hold and then asked to exhale and relax while stretching muscle to new length and holding that stretch for 10 second. Both muscles were provided 3 MET rep per session for 5 days in 2 weeks. Isometric and active exercise were also executed.

RESULTS

Table.1, Distribution of group A subjects according to NPRS scale and FHP scale.

VARIABLES	Pre-Treatment Mean ± SD	Post-Treatment Mean ± SD	t -value	p-value
NPRS	6.533 ± 1.0873	3.666 ± 0.788	13.316	<0.001
FHP	12.4867 ± 0.9817	8.4667 ± 1.4755	19.5	<0.001

Table.2, Distribution of group A subjects according to variables.

VARIABLES	Pre-Treatment Mean ± SD	Post-Treatment Mean ± SD	t-value	p-value
FLEXION	44.8 ± 11.4	61.67 ± 9.13	16.1778	<0.001
EXTENSION	27.7334 ± 8.0867	42 ± 8.4290	13.9092	<0.001
ROTATION (L)	41 ± 6.4083	58.7334 ± 8.2741	8.738	<0.001
ROTATION (R)	38.3334 ± 6.6399	54.8 ± 8.6425	6.66	<0.001
LATERAL FLEXION (L)	28.4667 ± 5.8294	35.6667 ± 4.9889	12.29	<0.001
LATERAL FLEXION (R)	30 ± 6.055	36.8 ± 4.8	10.802	<0.001

Table.3, Distribution of group B subjects according to NPRS scale and FHP scale

VARIABLES	Pre-Treatment Mean ± SD	Post-Treatment Mean ± SD	t-value	p-value
NPRS	7.1334 ± 0.956	2.4 ± 2.8	15.4919	<0.001
FHP	12.34 ± 1.2924	9.98 ± 1.5396	12.5714	<0.001

Table.4, Distribution of group B subjects according to variables.

VARIABLES	Pre-Treatment Mean ± SD	Post-Treatment Mean ± SD	t-value	p-value
FLEXION	45.13 ± 10.54	63 ± 7.66	14.8561	<0.001
EXTENSION	40.4 ± 7.4458	45.53 ± 9.2004	9.4814	<0.001
ROTATION (L)	39.6 ± 6.4270	59.3334 ± 7.7356	11.56	<0.001
ROTATION (R)	39.6667 ± 6.4773	59.1334 ± 8.6810	9.8723	<0.001
LATERAL FLEXION (L)	29.3334 ± 6.7197	38.1334 ± 5.72557	7.9952	<0.001
LATERAL FLEXION (R)	29.1334 ± 5.9650	37.8 ± 4.4572	12.237	<0.001

Table no.5, Comparison of pectorals MET group post and trapezius & levator scapulae MET according to post interventions

Variabl es	Pectorals Met Group Post Mean ± Sd	Trapezius & Levator Scapulae Met Group Post Mean ± Sd	t-value	p-value
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NPRS	3.6667 ± 0.7888	2.4 ± 2.8	3.712	<0.001
FHP	8.4666 ± 1.4755	9.98 ± 1.5396	3.1755	0.005

Table.6. Distribution variables according to pectorals MET group post and trapezius & levator scapulae MET post interventions

VARIABLES	PECTORALS MET GROUP POST MEAN ± SD	TRAPEZIUS & LEVATOR SCAPULAE MET GROUP POST MEAN ± SD	t-value	p-value
FLEXION	61.6667 ± 9.13	63 ± 7.66	1.3333	>0.2
EXTENSION	42 ± 8.4290	45.53 ± 9.2004	1.0667	>0.2
ROTATION (L)	58.7334 ± 8.2741	59.3334 ± 7.7356	0.0775	>0.2
ROTATION (R)	54.8 ± 8.6425	59.1334 ± 8.6810	1.3573	>0.2
LATERAL FLEXION (L)	35.6667 ± 4.9989	38.1334 ± 5.7255	1.2152	>0.2
LATERAL FLEXION (R)	36.8 ± 4.8	37.8 ± 4.45	0.3237	>0.2

DISCUSSION

In present study, neck pain reduction and improvement of CROM are consensus with previous studies [9,16,17,18]. Nagrale et. al showed significant improvement in neck pain in 2 weeks [16]. Burns and wells in their study found great improvement in CROM in all 3 planes in asymptomatic patients [19]. Prerana Toshiwal et. al shows neck pain reduction, correction of FHP and improved ROM [9]. Gilani et. al and Mahajan et al did not found MET more significant than other treatment in improving CROM [20,21].

The viable mechanism for neck pain reduction could be explained by inhibitory Golgi Tendon reflex that get activated during isometric contraction which leads to reflex relaxation of muscle. Joint mechanoreceptors and muscle activation leads to sympathetic excitation evoked by somatic efferent and localized activation of periaqueductal gray matter that contribute in pain modulation [22]. Effect of MET for increasing mobility and correcting FHP can be described on the basis of physiological mechanism behind the muscle extensibility alterations which includes reflex relaxation, viscoelastic changes and increased stretch tolerance. Reflex relaxation takes place due to activation of Golgi tendon organ and inhibition of alpha motor neuron pool. Combination of contraction and stretches might contribute for producing more viscoelastic changes than passive stretching because greater forces produce greater viscoelastic changes and more extensibility [9].

CONCLUSION

Pectoral and trapezius muscle MET both are highly significant in reducing neck pain, correcting FHP and enhancing cervical range of motion. While trapezius and levator scapulae muscle MET is advantageous in lowering pain score and enhancing range of motion. However, treating the trapezius and levator scapulae muscles alone may not be as effective as treating both the anterior and posterior group muscles with combined MET.

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