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Original Research Article

TO STUDY THE EFFECT OF MUSCLE ENERGY TECHNIQUE VERSUS MULLIGAN SNAGS ON PAIN, RANGE OF MOTION AND FUNCTIONAL DISABILITY FOR INDIVIDUALS WITH MECHANICAL NECK PAIN: A COMPARATIVE STUDY

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ABSTRACT

Background: Mechanical Neck Pain is very common condition in general population. It still constitutes a major burden on patients in terms of pain, disability, loss of income, and on society in terms of healthcare costs and time of work. A wide variety of treatment protocols for mechanical neck pain are available, however, the most effective management remains an area of debate.

Objective: Aim of the study is to compare the effectiveness ofMuscle Energy Technique and Mulligan SNAGS on pain, functional disability and active cervical range of motion for individuals with mechanical neck pain.

Methodology: 40subjectsaccording to inclusion and exclusion criteria were randomly divided in to two groups for the study, Muscle Energy Technique plus conventional therapy and Mulligan SNAGS plus conventional therapy.

Results: The results were analyzed by Paired t-test or Wilcoxon signed ranks test (Intra- group Comparison) and unpaired t-test or Mann-Whitney U test (Inter-group Comparison) comparing Muscle Energy Technique and Mulligan SNAGS groups for post-treatment effects. Both the groups showed equal effectiveness regarding to VAS, NDI and Cervical ROM.

Conclusion: Muscle energy Technique and Mulligan SNAGS can be used as alternate treatment along with conventional therapy for mechanical neck pain.

Keyword: Muscle energy Technique (MET), Mulligan SNAGS, Mechanical Neck Pain, VAS, NDI.

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INTRODUCTION

Neck pain is a common musculoskeletal disorder in the era of technology. The International Association for the Study of Pain (IASP) has defined neck pain as:"Pain perceived as arising from anywhere with in the region bounded superiorly by superior nuchal line, inferior by an unoriginally transverse line through the tip of first thoracic spinous process, and laterally by saggital plane tangential to the lateral border of neck [1].

Mechanical Neck Pain is a common complaint; with appoint prevalence of nearly 13% and life time prevalence of nearly 50%. Pain and Impairment of the Neck is common. It is estimated that 22%to 70% of population will have neck pain

sometime in their lives. Prevalence of neck pain increases with age and is most common in women [2].

Mechanical neck pain can result from hypertonic posterior cervical muscles that may occur due to sustained partial neck flexion when reading, writing, operating a computer terminal for prolonged periods, sewing, by holding a stooped posture or by gross trauma [3].

The aetiology of mechanical neck pain is poorly understood and mostly multifactorial, including poor posture, depression, anxiety, neck strain and occupational or sporting activities [5,6]. Some researchers state that any event or condition (e.g. incorrect posture, ageing, acute injury, congenital or developmental defects) which leads to altered joint mechanics or muscle structure or function, can result in mechanical neck pain [5].

Many types of therapeutic modalities that have been applied fall into several categories: physical interventions, thermal modalities, electrical treatment, exercise therapies, meridian therapies, laser therapy, traction, and behavioral treatment [4].

Although many interventions are accepted as standard of care for mechanical neck pain, substantial evidence regarding the effectiveness of no operative interventions is lacking.

Muscle Energy Technique (MET) is a type of manual therapy which was founded by Dr Fred L. Mitchell Sr., an osteopathic physician. According to Green man MET "involves the voluntary contraction of the patients muscle in a precisely controlled direction, at varying levels of intensity, against a distinctly executed counterforce applied by the operator" [6].

MET uses muscles and soft tissues for its effects; nevertheless, the impact of these methods on joints is clearly profound since it is impossible to consider joints independently of the muscles which support and move them [7]. The other advanced technique is Mulligan's mobilization in the form of SNAGS. The concept has its foundation built on Kaltenborn's (1989) principles of restoring the accessory component of physiological joint movement [8].

The opportunity to develop new approaches to treat mechanical spinal pain has arisen as there is question over the efficacy of common conventional therapies.

So, the intent of the study is to compare the efficacy of muscle energy technique and Mulligan SNAGS on pain, functional disability and cervical ROM in individuals with mechanical neck pain.

METHDOLOGY

Study design: Comparative study.

Study setting: Various outpatient physiotherapy departments.

Sampling technique: Simple Random sampling**.**

Study duration: 6 days a week for 2 weeks

Study sample: 40 Patients of Mechanical Neck Pain randomly allocated and divided into 2 groups

Group A (Joint MET): 20 patients

Group B (Mulligan SNAGs): 20 patients

Inclusion criteria: Subjects diagnosed with Mechanical neck pain as per Schalkwyk and Smith diagnostic criteria [11], Age between 18 to 45 years for both males and females [1], Mechanical neck pain since < 3 months [1]

Exclusion criteria [1,12]: Cervicogenic headache, Radiculopathies, Steoporosis, Whiplash associated disorders, Previous cervical spine surgeries, Vascular Diseases of neck and progressive neurological deficit, Verteberobasilar insufficiency, Diagnosed pregnancy, Any deformity(eg.Torticollis, sprengel'sdeformity, scoliosis), Un- cooperative patient

Procedure: The proposed title and procedure was being approved by ethical committee members and patients were taken with written consent who fulfilled inclusion and exclusion criteria. Pre and Post measurement of all 3 Outcomes (VAS, NDI and ROM) were taken.

Group A were given MET plus conventional therapy (moist heat pack and Isometric Neck Exercises), Group B were given Mulligan SNAGs plus conventional therapy.

Therapeutic intervention:

Conventionaltherapy for both groups: Conventional therapy in form of moist heat pack and Isometric Neck Exercises were given once a day for 6 consecutive days a week for 2 weeks

Moist heat pack: Moist heat pack to neck region was given for period of 15 to 20 minutes, before intervention [9].

Isometric Neck exercise: Isometric exercises were performed in the seated position by resistance applied by the therapist at the forehead (cervical flexion, extension, rotation and side-bending) for 10 sec holds for 10–15 repetitions, after intervention[1].

Interventional therapy for both groups: Interventional therapy was given once a day for 3 days a week for 2 weeks to the subjects of both the groups.

Treatment Group A – Muscle Energy Technique [6,10]:

Fig. 1: MET Lower cervical vertebrae.

For Lower cervical vertebrae (C3- C7),

For example C3-C4, patient was taken in supine position with neck slightly flexed passively by the therapist

The right middle finger was placed over the right pillars of C3-C4 and the neck taken to the maximum position of side-bending rotation to the right, engaging the barrier.

The left hand was placed over the patient's left parietal and temporal areas.

With this hand offering counterforce, the patient was invited to side-bend and rotates to the left, for 5 seconds.

Post isometric relaxation of these muscles following the 5-7-second mild contraction, after which the neck was taken to its new barrier, and the same procedure repeated 2 or 3 times.

For Upper Cervical vertebrae (C1-C2),

The patient lies supine and the therapist passively flexed the subject's head and neck approximately 45º until a sense of resistance was palpated.

If the direction of restriction was at left, then rotated the head to the left until a restrictive barrier was palpated.

The subject was then instructed to gently push into the practitioner's hand (rotate to the right) for 5 seconds, followed by 5 seconds of relaxation for 3 times.

Fig. 2: MET for Upper cervical vertebrae.

Treatment Group B–Mulligan SNAGS:

Rotation and Lateral flexion-

Indications: painful and/or limited Rotation or lateral flexion

Position: Patient sitting upright with head in neutral.

Contact: medial border distal phalanx of one thumb on articular pillar, other thumb reinforces it to provide the mobilization force.

Glide: up toward the eyeball in the plane of the facet.

Movement: rotates or laterally flexes the head towards painful side while therapist maintains glide.

Extension and Flexion

Indications: painful and/or limited extension or flexion.

Position: patient sitting upright with head in neutral.

Contact: Medial border distal phalanxes of one thumb on spinous process, other thumb reinforce sit to provide the mobilization force.

Glide: up centrally toward the eyeballs in the plane of the facets.

Movement: extends or flexes while therapist maintains glide.

The technique was repeated 6 times. For progression repetitions of the SNAG was increased from 6 to10.

Fig. 3: SNAGs for Flexion- Extension.

Fig. 4: Starting Position of SNAG for Side flexion and Rotation.

The post interventional measurements were recorded on the end of 2weeks of treatment in the form of VAS, NDI and active cervical ROM.

Thus, Obtained pre and post interventional measurements of all 3 outcome measures, such as VAS, NDI and active cervical ROM were subjected to the statistical analysis.

RESULT

Data was analysed using SPSS software version 20 and Microsoft Excel 2007.

Table 1: Tests used to compare outcome measures within and between groups.

Outcome measure	Tests usedto compare within group A	Tests usedto compare within group B	Tests usedto compare between group A and B
VAS	Paired t test	Paired t test	Unpaired t test
NDI	Wilcoxon signed ranks test	Wilcoxon signed ranks test	Mann-Whitney U test
ROM	Wilcoxon signed ranks test	Wilcoxon signed ranks test	Mann-Whitney U test

Table 2: Shows the Intra-group comparison of Visual Analogue Scale (VAS).

Groups	Pre Treatment		Post Treatment		't' value	'p' value
	Mean VAS	±SD	Mean VAS	±SD		
GROUP'A'	6.64	1.26	3	1.28	25.43	0.001
GROUP'B'	6.82	0.75	2.4	0.58	35.45	0.001

Table 3: Shows the Inter-group comparison of Visual Analogue Scale (VAS).

Difference in VAS score	GROUP'A'	GROUP'B'	't' value	'p' value
Mean	3.73	4.3	2.78	0.16
±SD	0.71	0.4		

Table 4: Shows the Intra-group comparison of Neck Disability Index (NDI).

GROUPS	Pre Treatment		Post Treatment		'Z' value	'p' value
	Mean NDI	±SD	Mean NDI	±SD		
GROUP'A'	30.78	9.09	12.72	3.28	-3.72	0.001
GROUP'B'	32	6.56	13.47	3.56	-3.82	0.001

Table 5: Shows the Inter-group comparison of Neck Disability Index (NDI).

Difference in neck disability	GROUP'A'	GROUP'B'	'U' value	'p' value
Mean	18.05	18.52	155.5	0.571
SD	7.4	6.08		

Table 6: Shows Intra-group comparison of cervical ROM of Group A

ROM	GROUP'A'				'Z'value	'p'value
	Pre treatment		Post Treatment			
	Mean (Degrees)	±SD	Mean (Degrees)	±SD		
Flexion	37.39	6.1	43.94	4.1	-1.23	0.01
Extension	39.72	5.2	50.72	4.2	-0.73	0.001
Lt.SideFlexion	32.44	4.2	39.83	3.4	-1.4	0.001
Rt.SideFlexion	33.67	4.6	39.5	3.2	-1.02	0.001
Lt.Rotation	56.67	7.7	68.61	4.3	-0.45	0.001
Rt.Rotation	57.89	7.4	69.6	5.1	-1.54	0.001

Table 7: Shows Intra-group comparison of cervical ROM of Group B.

ROM	GROUP'B'				'Z' value	'p' value
	Pretreatment		Post Treatment			
	Mean (Degrees)	±SD	Mean (Degrees)	±SD		
Flexion	38.42	6.8	47	3.58	-3.44	0.001
Extension	41.58	4.6	53.42	3.3	-3.82	0.001
Rt.SideFlexion	33.37	4.8	40.42	3.3	-3.83	0.001
Lt.SideFlexion	30.81	3.5	39.74	2.8	-3.73	0.001
Rt.Rotation	54.37	5.8	67.42	4.1	-3.82	0.001
Lt.Rotation	61.89	7.3	71.89	3.8	-3.81	0.001

Table 8: Mean difference of cervical rom of between the groups.

ROM	GroupA		GroupB		'U'value	'P'value
	Mean (Degrees)	±SD	Mean (Degrees)	±SD		
Flexion	8.11	4.2	8.57	5.4	130.5	0.215
Extension	11	3.9	11.84	4.2	148	0.282
Rt. SideFlexion	7.39	3.4	8.94	3.6	125	0.16
Lt. SideFlexion	5.83	2.8	7.05	3.9	137.5	0.305
Rt.Rotation	11.94	4.9	13.05	5.2	156	0.647
Lt.Rotation	12.11	4.1	10	5.5	120	0.125

DISCUSSION

In present Study, when the mean reduction values of VAS, NDI and ROM were analyzed within the groups, it was statistically significant in both the groups. But when comparison was done between that, both the groups were equally effective in reducing pain and disability and improving ROM.

Pain declined in both the groups after the treatment. Moist heat therapy which is a superficial entity helps to relieve pain by reducing spasm and also produce a relaxing effect. By reducing viscosity of viscoelastic collagen, heat increases tissue extensibility and makes connective tissue less resistant active or passive stretch [14].

Isometric Neck Exercises increase intramuscular co-ordination by enhancing motor unit activation synchronization and/or firing rate within a given muscle. A static contraction generates higher level of tension than concentric contraction. This will lead to increase in muscle strength and improve mobility [15].

One of the reasons of improvement in VAS score in Group A may be the hypoalgesia effect of MET. Some studies suggest MET and related post-isometric techniques reduce pain and discomfort when applied to the spine or muscles. The mechanisms are not known, but may involve central and peripheral modulatory mechanisms, such as activation of muscle and joint mechanoreceptors that involve centrally mediated pathways, like the PAG in the midbrain, or non opioid serotonergic and noradrenergic descending inhibitory pathways [16]. Thus MET has profound effect on pain and disability.

The present study gives similar result as a study conducted by Viswas Rajadurai (2011) [17] suggesting that MET reduces tension in the jaw muscles and subsequently reducing pain and improving Maximal Mouth Opening (MMO) in patients with Temporomandibular Dysfunction. Where Gupta S.etal (2008) [1] also suggested that Postisometric relaxation is more effective in decreasing pain and disability and increasing cervical Range Of Motion(ROM)in nonspecific neck pain.

In Mulligan SNAGS potentially, the accessory glide component could ameliorate any of these problems by either separating the facet surfaces or releasing the entrapped meniscoid, or by allowing the entrapped meniscoid to return to its intra- articular position, or perhaps by stretching adhesions. The other mechanism such as in the gate control theory. In addition, descending pain-inhibitory systems may be activated, the end range positioning in movement with the SNAG may engage these inhibitory systems and reduce pain and disability [18].

A systemic review by BillVetal(2006) [19] on Mulligan's mobilization with movement, positional faults and pain relief, found that it has rapid ameliorative effects on pain and function during and initially after a single treatment application and also after a course of treatment. On the other hand Reid SA et al (2007) [20]stated that that Mulligan SNAGS are clinically and statistically very effective in reducing neck pain in subjects of cervicogenic dizziness. It has significant immediate and sustained effect in reducing dizziness and disability too.

Now for the improvement of ROM other possible mechanism rather than pain mechanism is explained by some researchers.

Mulligan proposed that when an increase in pain-free range of movement occurs with a SNAG it is primarily the correction of a positional fault at the zygapophyseal joint, although a SNAG also influences the entire spinal functional unit [13].One study conducted by Maria Moutzouri (2008) [21], examined the effect of Lumbar SNAGS in asymptomatic subjects and did not found any significant improvement in lumbar flexion ROM.

On the other hand Self SNAGS were also found to be effective in treatment reducing pain and disability and improving cervical ROM in the study conducted by Shilpi Chhabra et al (2008),among Computer professionals.

So both the techniques are proved to be effective in reducing pain and disability and in improving ROM in mechanical neck pain.

CONCLUSION

The result of the present study showed that subjects of both the groups were improved after the study intervention by reducing their

pain and disability and increasing ROM. Hence, concluded that the Muscle energy technique andMulligan SNAGS are equally effective for reduction of pain and disability and increase in the ROM. These techniques were very simple and easy to apply on mechanical neck pain patients. So, it can be further recommended to include in Mechanical neck pain treatment regime.

Conflicts of interest: None

REFERENCES

[1]. Gupta S., Jaiswal, P. And Chhabra, D. A comparative study between postisometric relaxation and isometric exercises in non-specific neck pain.Journal Of Exercise Science And Physiotherapy,2008; 4(2):88-94.

[2]. K.Kotteesswaran,J.Muthukumaran, VaiyapuriAnandhet al. The effects of thoracic thrust manipulation and neck flexibility exercises for the management of patients with mechanical neck. Pain. International Journal Of Pharmacutical Science And HealthCare.2012;1:254-63.

[3]. Travell,J.G.And Simons, D.G. Myofascial Pain and dysfunction: the trigger point manual (upperextremities).Baltimore,hongkong,london,munich,philadelphia, sydney. Tokyo: williamsand wilkins.1998 .711p.

[4]. RandS.Swenson. Therapeutic modalities in the management of nonspecific neck pain. Physmedr ehab journal.2003;14605–627.

[5]. Binder, A.LCervicalS pondylosisand NeckPain.British Medica lJournal,2 007;334:527-531.

[6]. Chaitow L. Muscle energy techniques 2nd ed. 2006 Edinburgh: Churchill Livingstone;1-187.

[7]. Grubb ER, Hagedorn EM, etal. Muscle Energy. UniversityofKentucky, AT 690, Spring2010.

[8]. Hearn, A., Rivett, D A. Cervical SNAGS: a biomechanical analysis. Manual Therapy,2002;7(2):71-79.

[9]. ChhabraS,Chabra D, SachdevaJ, ChaudharyA.The effectiveness of self SNAGS over conventional physiotherapy management in chronic neck pain among computer professionals. Indian Journal of Physiotherapy and Occupational Therapy2008;2(3):30-34.

[10]. Fryer,G .and Ruszkowski,W. The influence of contraction duration in muscle energy technique applied to the atlanto axial joint. J. Osteopathic Med., 2004;7(2):79-84.

[11]. John Krauss, Doug Creighton, the immediate effects of upper thoracic translatoric spinal manipulation on cervical pain and range of motion: a randomized clinical trial.The journal of manual & manipulative therapy 2008;16(2):93-99.

[12]. Richa Mahajan, Chitra Kataria, Kshitija Bansal. Comparative Effectiveness of Muscle Energy Technique and Static Stretching for Treatment of Subacute Mechanical Neck Pain. International Journal of Health and Rehabilitation Sciences.July2012; 1(1):16-22.

[13]. Wilson E, Payton O, Donegan-ShoafL, DecK.MET technique in patients with acute low back pain: a pilot clinical trial. J OrthopSportsPhys Ther2003; 33:502e12.

[14]. Exelby,L. The Mulligan Concept: Its application in the management of spinal conditions. ManualTherapy,2002;7(2):64-70.

[15]. Kisner C, Colby N: Therapeutic Exercise 5th Edi.2007; F.A. Devis,Philadelphia.

[16].Gary Fryer, Muscle energy technique: An evidence -informed approach, International Journalo fOsteopathicMedicine,2011;14:3-9.

[17]. Viswas Rajadurai. The effect of Muscle energy Technique on Tempero mandibular Joint Dysfunction. A Randomised Control trial. Asian Journal of Scientific Research.2011;4(1):71-77.

[18]. Hearn, A., Rivett, D A. Cervical SNAGS: a biomechanical analysis. Manual Therapy,2002;7(2):7179.

[19]. Bill Vicenzino Mulligan's mobilization- with- movement, positional faults and pain relief: Current concepts from a critical review of literature. Manual Therapy 2007;12:98–108.

[20]. SusanA.Reid,DarrenA.Rivett. Sustainednatural apophysealglid es(SNAGS) are an effective treatment for cervicogenic dizziness. Manual Therapy 2006.

[21]. Maria Moutzouri, EdvokiaBills.ET.al. The effects of the Mulligan Sustained Natural Apophyseal Glide (SNAG) mobilization in the lumbar flexion range of asymptomatic subjects as measured by the Zebris CMS203-D motion analysis system. BMC Musculoskeletal Disorders2008;9:131.

[22]. ChhabraS, ChabraD, SachdevaJ, ChaudharyA. The effectiveness of self SNAGS over conventional physiotherapy management in chronic neck pain among computer professionals. Indian Journal of Physiotherapy and Occupational Therapy2008; 2(3):30.

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