Effectiveness of the Muscle Energy Technique Vs Mulligan Mobilization for Patients with Mechanical Neck Pain

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Abstract

This research set out to see how individuals with mechanical neck discomfort responded to Muscle Energy Technique vs Mulligan Mobilization. Forty participants met the study's inclusion and exclusion criteria and were randomly assigned to either the Muscle Energy Technique or Mulligan SNAGS groups, both of which received conventional treatment. Patients who volunteered to take part in the research were split into two groups: those who received conventional physiotherapy (TP) and those who received traditional physiotherapy combined with Mulligan mobilization (TPMM), both for the purpose of comparing pre- and post-treatment outcomes. Post-treatment effects were compared between the Muscle Energy Technique and Mulligan SNAGS groups using the Paired t-test or Wilcoxon signed ranks test (Intra-group Comparison) and the unpaired t-test or Mann-Whitney U test (Inter-group Comparison). The VAS, NDI, and Cervical ROM scores of both groups were comparable. When it comes to relieving pain, improving mobility, and expanding range of motion, the Muscle Energy Technique and Mulligan SNAGS are on par.

Keywords: Mechanical Neck Pain; Mulligan Mobilization; musculoskeletal.

1. INTRODUCTION

Neck discomfort, back pain, and injuries to the upper and lower extremities are just some of the many conditions that might benefit from Mulligan Manual Therapy. Developed to ease suffering and increase mobility The Mulligan approach is a method for treating musculoskeletal injuries that makes use of Natural Apophyseal Glides (NAGS), Sustained Natural Apophyseal Glides (SNAGS), and Mobilization with Movement (MWM).

A physiotherapist using manual therapy methods may notice loss of joint mobility, discomfort during movement, or pain during certain functional tasks as indicators that a patient might benefit from these approaches. The next step is painless accessory glide achieved with passive accessory joint mobilization, which may be administered either in a plane parallel to or perpendicular to the joint's plane of motion. The therapist will use a variety of parallel and perpendicular glides to determine the best treatment plane and intensity level. After finishing, the corresponding indicator should show considerable improvement, such as more mobility or relief from discomfort.

The treatment of MNP includes manual therapy, physiotherapy techniques, exercise, medicinal therapy, injection, and patient education. Mobilization-based neuroprotection (MNP) therapy, which employs mobilization strategies, has been cited as producing superior outcomes than those achieved by other approaches. In cases of musculoskeletal diseases, the Mulligan mobilization technique (MMT) has been shown to be beneficial for correcting biomechanics and decreasing activity-related discomfort.

In 1948, Fred Mitchell Sr, D.O. created a method known as Muscle Energy Technique (MET). Osteopathy relies heavily on this kind of manual treatment, which entails the application of light isometric contractions to induce muscular relaxation (through autogenic or reciprocal inhibition) and lengthening. While the therapist performs most of the effort during static stretching, the patient is actively involved in MET. Autogenic inhibition and reciprocal inhibition are the basis for MET. Autogenic inhibition MET occurs when a submaximal contraction of the muscle is followed by a stretch of the same muscle; reciprocal inhibition MET occurs when a submaximal contraction of one muscle is followed by a stretch of the opposite muscle.

As was previously established, METs function via autogenic inhibition. Post Isometric Relaxation (PIR) and Post facilitation Stretching (PFS) are the two most common forms of MET based on autogenic inhibition (PFS).

In contrast to PIR and PFS, the principle of Reciprocal Inhibition is the basis of Reciprocal Inhibition Muscle Training (MET), which includes contracting one muscle and then extending the opposing muscle.

2. LITERATURE AND REVIEW

Hisham Mohamed Hussien et al (2017) The goal of this research was to determine whether persistent nonspecific low back pain may be alleviated by supplementing a standard treatment regimen with lumbar sustained natural apophyseal glide (SNAG) (LBP). A total of forty-two people with chronic, nonspecific LBP were randomly split into two groups. Physical therapists used SNAG (based on the Mulligan concept) to the afflicted lumbar levels in the study group (aged 27.1 8.3, 20 men, 3 women), whereas the control group (aged 28.9 7.7, 13 men, 6 women) applied the same conventional program without SNAG three times a week for a month. Primary result was repositioning error; secondary outcomes were pain and function as assessed by an isokinetic dynamometer, a visual analog scale, and the Oswestry Disability Index. Before and after the therapy time ended, measurements were taken. Test scores improved significantly (P >.001) for all dependent variables in both the study and control groups between before and after therapy. There was a statistically significant increase in repositioning error reduction, pain reduction, and functional improvement when SNAG was added to the standard program (P =.02,.002, and.008, respectively). The results of this exploratory research showed promising signs of development in both groups. The addition of SNAG to standard programs for the treatment of chronic nonspecific LBP may lead to larger gains in repositioning error correction, pain relief, and functional enhancement.

Shabana Khan (2018) Aims: A Review of Snags and Maitland's Mobilization for Chronic Low Back Pain. Methodology: Randomized controlled trial design. Methodology: According to the established inclusion and exclusion criteria, a total of 60 patients were selected and then split evenly between two groups of 30. They gave group A Group A received SNAG, which includes stretches, strengthens, and posture correction exercises; Group B received Maitland's mobilization included stretching, strengthening, and posture correction exercises performed 3x/week, once daily, for 4 weeks. The patient's outcomes were evaluated using a visual analog scale, an objective disability index, and goniometry of lumbar range of motion. Before and after the therapy time ended, measurements were taken. The statistically significant (p=.000) results showed that the averages and standard deviations of both groups were different, but clinically the group of patients treated with SNAGS in addition to stretching, strengthening, and postural correction exercises had better pain management (pre=7.81±1.16, post=0.35±0.37), ODI (pre=40±19.18, post=9±4.39) and range of motion (flexion pre=30±6.05, post=51±10.15, extension pre=16±2.33, post=30±5.21 Rt side flexion pre=10±2.15, post=20±4.15 and lt. side flexion pre=10±2.75, post=20±4.53, Rt side rotation pre= 9±1.57, post=18±2.35) lt. side rotation pre=8±2.09, post=17±2.45 better than group of patient treated with Maitland's mobilization along with stretching strengthening and postural correction exercises in terms of pain (pre=6.27±1.31, post=2.73±1.19), ODI (pre=42±20.52, post=24±11.7) and range of motion (flexion pre=24±5.85, post=36±10.66, extension pre=14±2.35, post=20±5.42, Rt side flexion pre=10±2.45 post=16±2.48, lt Side

Sharick Shamsi (2015) The prevalence rate of neck discomfort is 13.1%. (Bovim G et al 1994). It is estimated that 66 percent of adults may have neck discomfort at some time in their life (Binder AL 2007) As a result of our increasingly sedentary lifestyles, the prevalence, duration, and severity of neck discomfort are all on the rise. Even though there are a variety of mobilization strategies used to treat neck discomfort, few studies directly evaluate the efficacy of two distinct mobilization approaches. The NPRS, NDI, and universal goniometer were used to measure pain, disability, and range of motion, respectively. Evaluations were performed on days 0 and 15, and also at the end of 30 days of therapy. There was some usage of the Anova and the paired t-test. The 5% cutoff for significance was chosen statistically. The results of this research demonstrated that compared to conventional mobilization, mulligan mobilization is superior in reducing pain, increasing range of motion, and decreasing disability. Mulligan mobilization was shown to be more successful in reducing pain, increasing range of motion (ROM), and reducing disability than the other experimental group. When it comes to non-invasively treating frozen shoulder, physical therapy is the gold standard. In this respect, Maitland's and Mulligan's approaches have been equally successful. Here, we compared the two methods to see which is better at helping people recover from frozen shoulders. While the pain VAS score was reduced after receiving both the Maitland and Mulligan treatments, the reaction to the Mulligan method was more favorable. The range of motion that can be increased by the Mulligan mobilization method is greater than that which can be achieved by the Maitland technique, but the other ranges of motion are comparably enhanced by either approach.

Sharick Shamsi (2014) No reports of research on NAGs and their effects on function can be found in the literature. There are still many unsolved issues concerning NAGs, such as whether or not they are effective in reducing ADL-impairing discomfort and stiffness. However, many therapists all across the globe regularly include this method within their work. Case studies and case series have shown that the Mulligan Concept may quickly alleviate pain and stiffness in areas of the spine and the periphery.

3. METHODOLOGY

Forty patients with mechanical neck pain were randomly assigned to one of two groups and followed for two months, six days a week.

- Group A (Joint MET): 20 patients
- Group B (Mulligan SNAGs): 20 patients

Subjects had to meet the Schalkwyk and Smith diagnostic criteria for Mechanical neck discomfort to be considered for inclusion. Individuals (male and female) between the ages of 18 and 45, Since around three months ago, I've had a mechanical neck discomfort.

Conditions such as whiplash-associated illnesses, vascular diseases of the neck, and progressive neurological deficits are not candidates for cervical spine surgery. Spinal stenosis, having received a positive pregnancy test, Torticollis, Sprengel's deformity, scoliosis, or any other deformity, Irreconcilable patient

Process: Members of the ethical committee authorized the study's planned title and procedure, and patients meeting the study's inclusion and exclusion criteria were recruited with their written agreement. All three Outcomes (VAS, NDI, and ROM) were measured both before and after treatment.

Treatment for Group A included MET and traditional methods (a wet heat pack and isometric neck exercises), whereas Treatment for Group B included MET and Mulligan SNAGs.

Therapeutic intervention:

Normal treatment for both populations: Moist heat pack and Isometric Neck Exercises, the gold standard of conventional treatment, were used once day, six days a week, for two weeks.

Prior to intervention, 15–20 minutes were spent applying a moist heat pack to the patient's neck.

After the therapist applied resistance at the forehead, the patient did isometric neck exercises (cervical flexion, extension, rotation, and side bending) for 10 second holds, 10-15 times.

Curative interventions for both cohorts: Each group received 2 weeks of daily interventional treatment. Proposed Muscle Energy Technique Treatment Group A

During passive cervical flexion and extension (C3-C4), the therapist would place the patient in the supine position with the patient's neck slightly flexed. The barrier was engaged by placing the right middle finger across the right pillars of C3 and C4, and then rotating the head to its extreme right-side bend. The patient's left parietal and temporal regions were massaged with the left hand. The patient was instructed to bend to the left side and spin for 5 seconds while this hand provided counterforce. After a modest contraction of 5-7 seconds, the neck was moved to its new barrier, and the process was repeated twice or thrice. This is known as post isometric relaxation. Useful for the C1-C2 vertebrae of the neck (C1-C2), The patient is positioned supine, and the therapist flexes the head and neck passively by around 45 degrees until some resistance is felt. If the constraint was felt to the left, the head was turned in that direction until it was no longer possible to do so. Next, the individual was told to rotate to the right by pushing lightly against the practitioner's palm for 5 seconds, followed by 5 seconds of relaxation, 3 times.

Fig. 1: MET Lower cervical vertebrae.

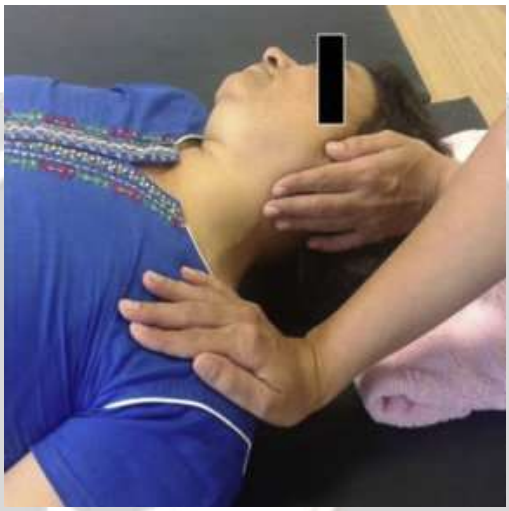

Fig. 2: MET for Upper cervical vertebrae.

Treatment Group B–Mulligan SNAGS:

Rotation and Lateral flexion

Indicators: discomfort and/or restriction Alternating between rotation and lateral flexion

The patient is seated straight with his or her head at rest.

One thumb's distal medial border makes contact with the articular pillar, while the other thumb presses down on that thumb to generate the necessary mobilizing force.

Slide: along the plane of the facet, upward toward the eye.

Action: as therapist glides, patient turns or flexes head toward uncomfortable side.

Extending and Collapsing Problems with uncomfortable or restricted range of motion in either the extension or flexion directions are cause for concern. The patient should be seated erect with their head in a relaxed position.

One thumb's distal phalanx should rest on the spinous process, while the other thumb should press down and inward to give the mobilizing force.

Move: along the middle vertical axis of the face, up toward the eyes.

Flexes or extends as the therapist glides.

There were six total iterations of the procedure. The SNAG's repetition count was increased from 6 to 10 for advancement.

Fig. 3: SNAGs for Flexion- Extension.

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

At the conclusion of the first two weeks of therapy, post-interventional assessments were taken using a visual analog scale, a neck disability index, and active cervical range of motion. Accordingly, statistical analysis was conducted on the VAS, NDI, and active cervical ROM data collected both before and after the intervention.

4. RESULT

SPSS version 20 and Excel 2007 were used for data analysis.

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	Wilcoxon signed	Mann-Whitney

	ranks test	ranks test	U test

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

	Pre Treatment		Post Treatment			
Groups	Mean VAS	±SD	Mean VAS	±SD	't' value	'p' value
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		
±SD	0.71	0.4	2.78	0.16

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).

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

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

	GROUP'A'					
	Pre treatment		Post Treatment			
ROM	Mean (Degrees)	±SD	Mean (Degrees)	±SD	'Z'value	'p'value
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'

	Pretreatment		Post Treatment			
	Mean (Degrees)	±SD	Mean (Degrees)	±SD	'Z' value	'p' value
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.

	GroupA		GroupB			
ROM	Mean (Degrees)	±SD	Mean (Degrees)	±SD	'U'value	'P'value
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

for Looking at the difference between before and after therapy, Patients who volunteered to take part in the trial were randomly assigned to either the conventional physiotherapy (TP) group or the traditional physiotherapy-Mulligan mobilization (TPMM) group, with consideration given to their gender and age.

Table 9: Comparing pretreatment and posttreatment participants in both groups.

		TP group			TPMM group			
		Before median (IQR)	After median (IQR)	$p1$	Before median (IQR)	After median (IQR)	$p1$	$p2$
VAS (0–10)								
Rest		5 (4–7)	2 (0–3)	0.007*	4 (2–5.5)	0	0.002*	0.171
Activity		7 (4–8.5)	2 (0–4)	0.005*	7 (5–8)	1 (0–2)	0.002*	0.224
ROM								
Cervical flexion		34 (32.2–36.3)	41 (39.2–43.3)	0.005*	35 (33.3–36.5)	46 (40.8–47.5)	0.003*	0.165
Cervical extension		35 (34.6–36.2)	40 (35.4–42.3)	0.005*	33 (32.5–36.4)	41 (37.4–45.2)	0.003*	0.089
Cervical lateral flexion	Right	32 (30.2–33.4)	38 (35.7–39.7)	0.005*	33 (30.4–38.5)	42 (40.2–48.5)	0.002*	0.153
	Left	32 (29.6–34.3)	37 (34.5–39.6)	0.005*	34 (31.6–36.3)	40 (38.4–45.7)	0.003*	0.083
Cervical rotation	Right	42 (39.2–43.1)	45 (40.01–44.8)	0.007*	45 (39.6–46.5)	52 (45.7–53.5)	0.012*	0.091
	Left	39 (34.4–42.5)	42 (39.2–44.03)	0.008*	35 (32.7–36.5)	48 (45.5–52.4)	0.003*	0.079
NDI (0–35 points)		17 (15–18)	7 (4–8)	0.005*	18 (16–20)	5 (4–6)	0.002*	0.116
TSK (17–68 points)		41 (40–41)	38 (37–41)	0.005*	40 (39–42)	36 (35–40)	0.003*	0.057
BDI		15 (7–19)	7 (3–9)	0.005*	13 (10–14)	6 (4–8)	0.002*	0.098
Quality of life (SF-36)	Physical component	35.8 (33–41.2)	40.4 (40.5–42.7)	0.005*	36.4 (34.6–36.9)	42.3 (41.8–46.5)	0.182	0.091
	Mental component	39.8 (37.5–43.6)	43.3 (40.6–46.3)	0.005*	38.7 (36.5–40.2)	45.7 (41.5–48.7)	0.003*	0.131
	Total	70.5 (69.2–76.7)	80.3 (78–85.5)	0.005*	72.4 (70.2–75.9)	88.2 (85.4–89.1)	0.002*	0.052

TP: traditional physiotherapy, TPMM: traditional phyisotherapy + Mulligan mobilization, IQR: interquartile range, VAS: visual analog scale, ROM: range of motion, NDI: neck disability index, TSK: Tampa scale of kinesiophobia, BDI: Beck depression inventory, SF-36: Short Form-36. p1 denotes the differences between before and after treatment scores for both groups with using "Wilcoxon paired two sample test," and p2 denotes the differences between the baseline scores of two groups with using "Mann–Whitney U test." $*p < 0.05$.

Table 3: Comparing the gains of the participants in both groups

		TP group Δ median (IQR)	TPMM group Δ median (IQR)	*p*
VAS (0–10)				
Rest		−3 (−6 to −3)	−4 (−6 to −2)	0.862
Activity		−5 (−5 to −4)	−6 (−6 to −3)	0.083
ROM				
Cervical flexion		6.4 (4.2–6.9)	10.2 (8.3–12.4)	≤0.001*
Cervical extension		5.3 (3.7–6.4)	8.4 (5.8–9.7)	≤0.001*
Cervical lateral flexion	Right	6 (4.4–7.1)	9 (8.01–11.2)	0.004*
	Left	5 (3.5–6.8)	6 (5.4–8.2)	0.089
Cervical rotation	Right	3 (2.7–4.7)	7 (5.6–8.3)	0.527
	Left	3 (2.9–4.5)	13 (10.5–15.6)	0.354
NDI (0–35 point)		−10 (−12 to −8)	−13 (−14 to −7)	0.335
TSK (17–68 point)		3 (4–6)	5 (4–8)	0.006*
BDI		−8 (−11 to −4)	−7 (−10 to −4)	0.007*
Quality of life (SF-36)	Physical component	4.5 (2.1–6.2)	5.9 (4.3–6.7)	0.002*
	Mental component	4.7 (3.2–10.43)	7.3 (5.25–9.82)	0.092
	Total	10.5 (4.3–12.4)	16.1 (8.9–20.21)	0.002*

TP: traditional physiotherapy, TPMM: traditional phyisotherapy + Mulligan mobilization, VAS: visual analog scale, ROM: range of motion, NDI: neck disability index, TSK: Tampa scale of kinesiophobia, BDI: Beck depression inventory, SF-36: Short Form-36. $*p < 0.05$.

5. CONCLUSION

For both individuals and the economy as a whole, neck discomfort is the second most prevalent musculoskeletal problem. The current study's intervention helped participants in both groups, decreasing pain and disability and enhancing range of motion (ROM). Therefore, it can be stated that the Muscle Energy Technique and Mulligan SNAGS are both beneficial in reducing pain and impairment and expanding range of motion.

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