



## COMPARATIVE STUDY OF MULLIGAN (SNAGS) AND MAITLAND MOBILIZATION IN NECK PAIN

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### Abstract:

**Objectives:** Comparative Study of Mulligan (SNAGs) and Maitland's Mobilization in Neck Pain. **Design:** Randomized Control Trial. **Methodology:** A total of 50 patients were included as per pre define inclusion and exclusion criteria and randomly assigned into two groups each having 25 patients. Group A was given conventional therapy (Active, Isometrics exercises, moist hot packs) plus SNAG while Group B was given conventional therapy (Active, Isometrics exercises, moist hot packs) plus Maitland's mobilization for 4 weeks, 3 sessions per week one session per day. The patient's outcome measures were assessed by visual analog scale, NDI (Neck disability Index) and Goniometry for Cervical Range of Motion. Pre and post treatment values were recorded for comparison of results. **Results:** Results revealed that means and S.D of both group were clinically significant but statically the Group of patients treated with conventional therapy plus SNAGS managed pain (pre=4.25±1.6, post=2.35±0.3), NDI (pre= 15.81±2.5, post= 8.18±1.7) and range of motion (flexion pre=48.9±8.9, post=53.9±4.9, extension pre=55±4.1, post=63.9±3.1, Rt side flexion pre=38.5±2.1, post=43.1±2.0 and Lt. side flexion pre=38.5±2.1, post=43.6±1.8, Rt side rotation pre= 61.7±6.3, post=65.7±5.5) Lt. side rotation pre=60.5±3.01, post=67.6±3.5) is not better than group of patient treated with conventional therapy plus Maitland's mobilization in terms of pain (pre=4.27±1.5,

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post=1.73±0.19), NDI (pre=17.1±3.31, post=8.10±1.10) and range of motion (flexion pre=48.5±4.7, post=56.7±6.5, extension pre=57.1±4.8, post=67.9±3.9, Rt side flexion pre=35.6±2.9 post=43.1±2.2, Lt Side flexion pre=38.1±2.1, post=42.5±2.0, Rt side rotation pre=58.5±5.5 post=67.1±5.4, Lt Side rotation pre=59.6±5.6, post=67.7±4.3. **Conclusion:** The result of study suggests that both SNAG and Maitland's improves the symptoms of Neck pain. Better improvement was shown by Maitland's group than SNAGs group. Based on these results Maitland mobilization with conventional therapy should be the treatment of choice for Neck pain rather than SNAGs with conventional therapy.

**Keywords:** SNAGs, neck pain, Maitland's, exercise

## 1. Introduction

The neck pain is a common cause of disability and health problem in the general population<sup>1</sup>. Neck pain is one of the common musculoskeletal problems. Neck Pain can be caused by the stress over the musculoskeletal system due to postural disorders and may also be associated with other causes such as intervertebral disc herniation, nerve compression, or fracture<sup>2,3</sup>. Prevalence of Neck pain is reported to range from 43% to 66.7%, which increases along with aging<sup>3</sup>. Study conducted by March et al., on individuals over 65 years of age, the prevalence of NP was found to be 38.7%<sup>4</sup>. According to Rajesh Gautam et al, 2014 the prevalence of neck pain is 13% and life time prevalence of 50 % Neck pain is a common problem in our society and, at any given time, affects about 10% of the general population. Estimates of the prevalence of chronic neck pain vary<sup>5</sup>. Each year, 27% to 48% of workers suffer Non Specific Neck pain<sup>6</sup>. Non-specific neck pain usually resolves within days or week, but can reoccur or become chronic<sup>5</sup>.

Mulligan is one of the mobilization techniques that can be applied in case of NP. Being an important treatment tool used by most of the manual physical therapists, Mulligan mobilization techniques (MMTs) include several methods such as sustained natural epiphyseal glides (SNAGs) and natural epiphyseal glides that target the spine<sup>3,5</sup>. An immediate improvement in pain-free range of motion (ROM) in the involved joints is reposted as a result of applying this treatment approach<sup>7,8</sup>. Maitland's techniques involve the application of passive and accessory oscillatory movements to spinal and vertebral joints to treat pain and stiffness in 5 grades<sup>5,9</sup>. Maitland also prescribes stretching techniques to deal with muscle spasm<sup>5,10,11</sup>. Manual therapy is frequently a common approach to diminish neck pain which has been suggested to be an effective one as well by a number of clinical guidelines<sup>12</sup>. Variety of procedures is used in manual therapy related to the musculoskeletal structures for treating mechanical pain. It includes soft tissue therapies, such as the many types of massage, focal soft tissue therapy, such as trigger point therapy, shiatsu, acupressure, mobilisation, manipulation, and manual traction<sup>13</sup>. Central postero anterior mobilisation is a technique that is achieved by applying a force on a vertebral segment in a postero anterior direction (back to front) with the patient in the prone position<sup>12</sup>. Similarly, the sustained natural

apophyseal glide (SNAG) technique and central postero anterior (CPA) mobilisation produces sympathoexcitatory effects that aimed at gaining range and reducing pain<sup>14</sup>.

The primary object of this study is to investigate the outcomes of neck pain treatment and establish if Maitland central postero anterior (CPA) mobilisation is more effective than Mulligan SNAG mobilisation in reducing neck pain.

## 2. Material and Methods

The study was designed as Randomized Control Trial and has two groups Group A was given conventional therapy (Active, Isometrics exercises, Moist hot packs) plus SNAG while Group B was given conventional therapy (Active, Isometrics exercises, Moist hot packs ) plus Maitland's Mobilization. It was conducted at Physical Therapy Department of Prince Sultan Military Medical City, Riyadh, Saudi Arabia.

### 2.1 Inclusion criteria<sup>5,14,17</sup>:

- Age group between 30-50 years.
- Patient with primary complaint of non-specific neck pain.
- Pain of sufficient intensity (greater than 2 out of 10 on numerical pain scale) to permit clinically worthwhile effect to be demonstrated.
- Pain and stiffness for at least 2 weeks
- Pain aggravated by movement
- Willingness to adhere to treatment and measurement regimes.

### 2.2 Exclusion criteria<sup>5,14</sup>:

- Osteoporosis.
- Weight loss, fever, history of malignancy.
- Inflammatory arthritis (AS).
- Structural abnormality effecting neck.
- Patient taking anticoagulants.
- Neck pain due to trauma
- Previous fracture

A total of 50 patients were included as per inclusion criteria. Patient was randomly assignment into two groups A and B with 25 patients in each group. Pain, Range of motion and Neck disability were assessed by Numerical pain rating scale, Universal goniometer and Neck disability Index (NDI). Sessions were given 4 weeks, 3 sessions per week one session per day to both groups<sup>15</sup>. Home plan consisted of exercise therapy.

### 2.3 Mulligan SNAG technique

Patient's received SNAGs as described by Mulligan<sup>16</sup>. The participant, in the sitting position, is asked to move their head in the direction that particularly produces their symptoms. As the participant moves their head, the physiotherapist gently glides the painful vertebra anteriorly and sustains the glide through the movement. During the

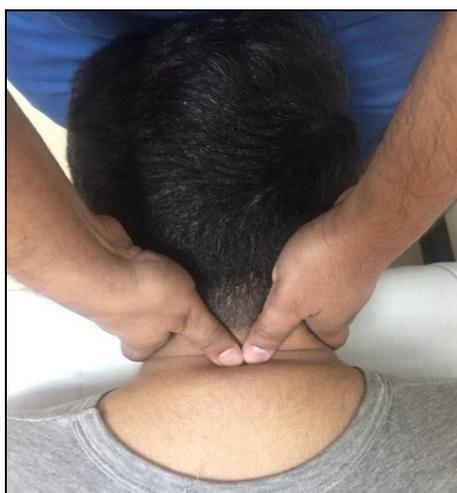
application of the glide, the participant should stay symptom free and is instructed to stop moving if any PAIN is produced. This movement was repeated for 10 times (fig. 1). After mobilization subject had to perform same exercises as conventional group<sup>17</sup>.



**Figure 1:** SNAGs technique

#### **2.4 Maitland CPA technique**

The patient lying in prone and the therapist stood at the head of the patient. His thumbs were placed in opposition at the level of the facet of the hypo mobile cervical vertebra and a unilateral posteroanterior (PA) oscillatory pressure was applied using Grade II and Grade III Maitland's manual therapy techniques. This oscillatory mobilization was performed at a frequency of 2 Hz for 2 min and repeated 3times. The rest time between each mobilization was 1 min<sup>18</sup> (fig-2). After mobilization subject had to perform same exercises as conventional group.



**Figure 2:** Maitland technique

### 2.5 Maitland's grades of oscillatory mobilizations<sup>19</sup>:

- Grade 1: Small amplitude movement performed at the beginning of motion.
- Grade 2: Large amplitude movement performed within the range.
- Grade 3: Large amplitude movement performed up to the limit of the range.
- Grade 4: Small amplitude movement performed at the limit of range.
- Grade 5: High velocity thrust performed at the limit of the range.

### 2.6 Treatment procedure for Conventional therapy<sup>5,15</sup>:

- **Moist Hot pack:** All subjects received MHP in sitting position for 15 minutes on cervical region with head resting on table with a pillow (Figure 3).



Figure 3: Moist hot pack application procedure

- **Active exercises:** 10 repetitions in all direction in pain free range.
- **Isometrics:** 5-10 seconds brief but maximum contraction each held for 5-16 seconds for flexors, extensors, side flexors and rotators.

### 2.7 Data Analysis

Data was analyzed with SPSS 20. Outcome measures were calculated as mean and standard deviation and compared by using paired and independent sample t-test. P-value  $\leq 0.05$  was taken as significant. The study was approved by PSMCMC Ethical Review Committee and Physical Therapy Department of PSMCMC. Informed consent was taken from all patients before enrollment in the study to assure willingness, adherence, confidentiality of information and to aware the patients about all procedure and interventions.

### 3. Results

In this study, 50 patients participated with a mean age of  $45.55 \pm 13.30$  in group A and  $45.65 \pm 14.40$  in Group B ranging from 30 to 50 years.

Table 1: Mean and SD of age between group A and B

	Group A (N=25) Mean $\pm$ SD	Group B (N=25) Mean $\pm$ SD
Age ( Yrs)	45.55 $\pm$ 13.30	45.65 $\pm$ 14.40

### 3.1 Mean reduction in VAS

Both groups had clinically significant difference in pre Rx to Post Rx values as p values for group A and B were p=0.06 and p=0.005 respectively.

**Table 2:** Mean reduction in VAS values between group A and B.  
 Mean and standard deviation at pre Rx, Post Rx with p values

Groups	Pre Rx	Post Rx	Pre Rx to Post Rx	
			Mean±SD	P value
Group A (N=25) Mean±SD	4.25±1.6	2.35±0.3	2.36±0.74	0.06
Group B (N=25) Mean±SD	4.27±1.5	1.73±0.9	4.31±1.20	0.005

### 3.2 Disability Index of the Subject

**Table 3:** Neck Disability Index of the Subject

Group	Pre Rx	Post Rx	Pre Rx to Post Rx	
			Mean±SD	p value
Group A (N=25) Mean±SD	15.81±2.5	8.18±1.7	2.56±0.84	0.05
Group B (N=25) Mean±SD	17.1±3.31	8.10±1.10	5.31±1.19	0.005

### 3.3 Mean reduction in ROM

Both groups had significant difference in pre Rx to Post Rx p=0.000 respectively.

**Table 4:** Mean reduction in ROM values between group A and B.  
 Mean and standard deviation at pre Rx, Post Rx with p values

ROM	Group A (N=25) (Mean±S.D)		Group B (N=25) (Mean±S.D)		p-value (<0.05)
	Pre Rx	Post Rx	Pre Rx	Post Rx	
Flexion	48.9±8.9	53.9±4.9	48.5±4.7	56.7±6.5	0.001
Extension	55±4.1	63.9±3.1	57.1±4.8	67.9±3.9	0.000
Rt. Side flexion	38.5±2.1	43.1±2.0	35.6±2.9	43.1±2.2	0.000
Lt. Side flexion	38.5±2.1	43.6±1.8	38.1±2.1	42.5±2.0	0.002
Rt. Rotation	61.7±6.3	65.7±5.5	58.5±5.5	67.1±5.4	0.000
Lt. Rotation	60.5±3.1	67.6±3.5	59.6±5.6	67.7±4.3	0.000

## 4. Discussion

The aim of the study to find out effectiveness of Maitland techniques in cervical pain. This study compared the effectiveness of Maitland's mobilization technique against mulligan's SNAG technique in cervical pain along with conventional therapy (Active, Isometrics exercises, Moist hot packs) on numeric pain rating scale, ROM and neck disability index. In a general results shows that subjects in both the groups improved well. A significant difference was found in both groups clinically. VAS and NDI scores

reduced in both groups, but comparison between groups showed that Group B was better than group A statistically.

Group B receiving Maitland Mobilization showed better improvement on VAS score (4.31) than group A received Mulligan SNAGs (2.36) after four weeks of treatment. This result is different from study (Tanveer et al. 2017) that found more improvement in group 1 received SNAGs (3.52) than group 2 received Maitland Mobilization (2.36) and group 3 received conventional treatments (2.04)<sup>20</sup>. These differences may result from our smaller number of subjects and differences of individual characteristics. In the previous study conducted by Rajesh Gautam et al. 2014 to compare Maitland and Mulligan mobilization techniques for neck pain and ROM, found that Mulligan mobilization was more effective than Maitland in improving neck pain, functional status of neck and ROM<sup>5</sup>. These results are consistent with study (Inderpreet et al. 2013) that depicted decrease in pain intensity of neck with mean difference 3.58 for Maitland mobilization group, 3.2 for Mulligan mobilization group and 3.50 for conservative group after three weeks treatment<sup>21</sup>. Another study by Keyur M. Patel 2016 also supports our results, which concluded that Maitland mobilization is significant in reducing the patient symptoms when it compared with conventional therapy and SNAGs mobilization<sup>17</sup>. This indicates that Maitland approach is clinically beneficial in treating chronic neck pain.

The improvement in the Mulligan group can be attributed to the neurophysiological effects found at the site of treatment and at areas remote to the local area of treatment. These effects include improved pain related measures like increased pressure pain threshold and decreased visual analogue scale pain rating<sup>22</sup>. The neurophysiological effects of mobilisation are important enough to cause a categorical and substantial change in how clinicians and scientists understand the benefits of mobilisation. Neurophysiological effects of central posteroanterior (CPA) mobilisation previously have been identified including immediate hypoalgesia and an increase in pressure pain thresholds. When joint tissue is strained at the limits of normal tissue extensibility, nociceptors (pain nerve receptors) are activated, causing a pain response. Mobilisation techniques could stimulate joint mechanoreceptors to decrease pain (neurophysiologic effect), and to stretch the joint tissues (mechanical effect). The oscillations may have an inhibitory effect on perception of painful stimuli by stimulating mechanoreceptors that block nociceptive pathways at the spinal cord or brain stem levels<sup>23</sup>.

For the ACROM, both groups improved significantly overall and Group B improved more on Extension, right side flexion and rotation. These results are consistent with studies that reported that mobilization applied to both the neck and spine at the same time improved cranial vertical angle and cranial rotation angle and research that showed that endurance exercise of the neck, stabilization exercise, and strength training improved the joint range of motion<sup>24</sup>.

#### 4.1 Future recommendations:

- A long duration of study with a proper follow-up can be done.
- Future research is required to investigate the effect of joint mobilization and therapeutic exercise on the functional impairments caused by chronic neck pain using diverse subjects and intervention periods, and research on the persistence of the effect also needs to be conducted.

#### 4.2 Conclusion

In this study, subjects were treated with Maitland mobilization plus conventional therapy, and Mulligan (SNAGs) mobilization plus conventional therapy in both groups respectively. Both mobilization techniques are clinically significant in reducing the subject symptoms. But Maitland mobilization is statistically significant in reducing the subject symptoms when it is compared Mulligan SNAGs mobilization.

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