

# A SINGLE BLIND RANDOMIZED CONTROLLED TRIAL REVIEWING THE SUITABILITY OF THE ALEXANDER AND MULLIGAN TECHNIQUES (SNAGS) IN THE TREATMENT OF NON-SPECIFIC NECK PAIN

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## ABSTRACT

**Objective:** To determine the suitability of the alexander and mulligan techniques (snags) in the treatment of non-specific neck pain.

**Material & Methods:** A single blind randomized controlled trial was conducted. Subjects were allocated randomly in treatment and control groups through lottery method. The neck disability index and the visual analogue scale served as the outcome measures. The study took place in physiotherapy departments of two hospitals of Peshawar, Pakistan from November 2021 to April 2022. Data was collected from neck pain patients of age 18 to 40 years and randomization was done. Group A received alexander plus mulligan technique and isometric exercises. Group B received mulligan technique plus isometric exercises. Both groups were treated for 4 weeks.

**Results:** Participants in the experimental group were  $30.14 \pm 5.367$  years old, while those in the control group were  $28.69 \pm 7.158$ . With a p-value of less than 0.001, the experimental group's visual analogue scale scores before and after treatment showed a significant difference, falling from  $8.48 \pm 0.63$  to  $4.40 \pm 0.828$ . With a p-value of 0.023, the visual analogue scale score in the control group decreased from  $7.81 \pm 0.733$  to  $5.81 \pm 0.734$ . The experimental group's mean neck disability index scores decreased from  $32.93 \pm 2.823$  to  $17.52 \pm 2.61$  with a p-value of 0.002, while the control group's mean scores decreased from  $34.81 \pm 3.959$  to  $25.90 \pm 1.445$  with a p-value of 0.023.

**Conclusion:** In treating neck pain and disability, Alexander combined with the Mulligan technique proved to be more effective than the latter alone.

**Key Words:** Alexander technique, Effectiveness, Mulligan technique, Neck pain

This article may be cited as: Fatima S, Rahman MU. A single blind randomized controlled trial reviewing the suitability of the alexander and mulligan techniques (snags) in the treatment of non-specific neck pain. Ann Allied Health Sci. 2024;10(2):54-59.

## INTRODUCTION

Globally, neck pain is becoming more and more prevalent. It is more significantly affecting people's lives and their families, healthcare systems, and communities.<sup>1,2</sup> Numerous medical professionals have stated that stress on the shoulders and bottom of the head is the main cause of neck pain.<sup>3</sup> Overall, between 0.45% and 86.8% of people have neck pain.<sup>4</sup>

Neck pain was reported to affect 16.4% of production line workers and 74.0% of crane workers annually. In office workers, the prevalence of neck pain ranged from 12.1% to 71.5%.<sup>5,6</sup> The causes of neck pain and how it affects a person are complex and multifaceted. Uncertainty surrounds the precise etiology, origin, and pathophysiological mechanism of pain.<sup>7</sup>

Poor posture, psychopathology, genetics, low job satisfaction, the workplace, women, a sedentary lifestyle, poor coping mechanisms, poor health, secondary gain, smoking, sleep issues, sports injuries, and headaches are some potential causes and/or risk factors, though etc.<sup>8-11</sup> Neck pain is referred to as non-specific neck pain (NS-NP) or idiopathic neck pain when a pathophysiological and pathoanatomical diagnosis cannot be made.<sup>1</sup>

As long as no significant pathology is present, diagnosis of NS-NP is made solely on the basis of clinical evidence.<sup>1</sup> A clinical physiotherapist must perform a comprehensive physical examination, which includes evaluating neurological signs, performing special tests, excluding red flags, and making both formal and informal observations. History of drug abuse, TB, and inflammatory arthritis.<sup>14</sup> Malignancy, vascular insufficiency (dizziness, drop attacks, blackouts), and infection are examples of red flags.<sup>15</sup> Sensation loss in multiple dermatomes and weakness in one or more myotomes.<sup>16</sup> Lhermitte's sign, lower motor symptoms (hyporeflexia and atrophy), and upper motor symptoms (planter reflex, clonus, and spasticity). neurological symptoms like hand clumpiness, abnormalities in gait, and symptoms related to the bowels and bladder. Valsalva's maneuver, the Spurling test, and the neck-distraction test are examples of special tests. Tests for upper limb tension to rule out radiculopathies.<sup>17</sup> Acute or chronic neck pain may or may not be linked to radiological findings.<sup>18</sup>

The conservative approach to managing NS-NP includes seeing a general practitioner, a clinical physiotherapist, and an Alexander technique instructor.<sup>19</sup> Physical agents, soft tissue therapy, neck and shoulder muscle strengthening and stretching exercises, and the application of therapeutic modalities like electrical stimulation, low-level laser therapy, therapeutic ultrasound, and mobilization (Maitland and Mulligan techniques) are used in physiotherapy.<sup>13,15,20</sup> As part of the Alexander Technique (AT), postural correction lessons are taught. It is a technique for teaching people how to let go of negative stress and carry out any task with ease and independence. It teaches people to modify their daily bad posture habits and dysfunctional movement patterns.<sup>21</sup>

According to some research, there are four fundamental mental directions that involve the kinesthetic sense and aid in teaching the mind how to correct bad posture. These directions are as follows: To allow the head to balance forward and upward, the neck should be freely relaxed. The torso ought to be elongated and expanded. The torso should be separated from the legs. It is necessary to release the shoulders to the sides.<sup>22</sup>

The fact that studies conducted for the treatment of NS-NP have produced contradictory results and call for more investigation is particularly noteworthy. There is insufficient evidence in the literature currently available on AT and MT to either validate or disprove these treatment modalities in the management of NS-NP. In order to compare the efficacy of AT and MT for the treatment of NS-NP, this clinical trial was necessary.

## **MATERIAL AND METHODS**

The study was designed as a single blind randomized controlled trial. To prevent bias, the blinded assessor in the study assigned subjects at random to the treatment and control groups. Participants with non-specific neck pain were sourced from Irfan General Hospital and Maqsood Medical Complex (MMC). According to [www.openepi.com](http://www.openepi.com), the sample size was 84 patients, with 42 patients in each group. This study was carried out between November 2023 and April 2024, a period of six months. Following participant recruitment using the consecutive sampling technique, simple random sampling using the lottery method was used for randomization. In order to ensure that there was an equal chance of participant randomization in both groups, a jar was filled with envelopes containing cards from an equal number of the control group (N=42) and experimental group (N=42). Participants in the study had to be between the ages of 18 and 40 and have non-specific neck pain. The study excluded participants with a history of cervical radiculopathy, neoplasm or malignancy, fractures or trauma to the neck, shoulder, or upper back, or any surgery related to these areas. Khyber Medical University ethical committee, as well as the heads of the MMC and Irfan General Hospital departments, granted their approval.

In the experimental group the subjects received alexander technique along with Mulligan technique (SNAGS) and isometric exercises. The thirty-minute Alexander technique session taught the patient about mind-body training that helped them with their posture. The mulligan technique involved active motion followed by overpressure, as well as prolonged natural apophyseal glides to the cervical spine. Patients were administered central SNAGS to improve flexion and extension, and unilateral SNAGS to improve side-bending and rotation. For twenty minutes, the process was carried out in three sets of ten repetitions. In neck isometrics, the palm was pressed against the forehead, side, and back of the head while the neck muscle provided resistance. The action was held for 10 seconds, then relaxed and repeated five times. In the control group subjects received mulligan technique and isometric exercises only.

A thorough physical examination and a variety of specialized tests, including palpation using cotton and pins, evaluation for clumpiness of hands, weakness in myotomes or dermatomes, loss of sensation, red flags, dizziness, blackouts, drop attacks, and upper limb tension tests, were used to assess participants with NS-NP. Each participant's pain intensity was measured using the Visual Analogue Scale (VAS) before and after treatment, and their neck disability was measured using the Neck Disability Index (NDI). Following recruitment, both groups received treatment twice a week for four weeks in a row. They were also told to continue with their regular daily activities while avoiding any excessive neck strain. The Neck Disability Index (NDI) and Visual Analogue Scale (VAS) were used to gauge the effectiveness of the treatment. Both the Alexander (AT) and Mulligan (SNAGS) treatment methods were regarded as independent variables, whereas neck pain and disability were regarded as dependent variables.

Data analysis was done using SPSS) 22.0. The Shapiro-Wilk test was used to assess the data's normality. The data was not normally distributed, as indicated by the probability value (p-value) being less than 0.05. Pre and post pain (VAS) and disability (NDI) scores within groups were analyzed using the Wilcoxon test, while pain (VAS) and disability (NDI) scores between groups were analyzed using the Mann Whitney U-test. P-values below 0.05 were regarded as significant.

## RESULTS

This study was conducted from November 2021 to April 2022 and recruited a total of 84 participants. Participants in the experimental group (EG) were  $30.14 \pm 5.367$  years old, while those in the control group (CG) were  $28.69 \pm 7.158$ . There were 19 (45.2%) male participants and 23 (45.2%) female participants in the control group, compared to 8 (19.0%) and 34 (81.0%) in the experimental group. In CG, there were 22 (52.4%) housewives, 15 (35.7%) students, 3 (7.1%) people in other professions, and 2 (4.8%) laborers. In EG, there were a lot of laborers 13 (31.0%), followed by housewives (10 (23.8%)), others (10 (23.8%)), and students (9 (21.42%)). **(Table 1)**

The Wilcoxon test was used for the group analysis. The VAS scores before and after treatment in the EG showed a significant correlation with a p-value of less than 0.05, indicating that the simultaneous application of AT, MT, and isometric exercises decreased the VAS score from  $8.48 \pm 0.63$  to  $4.40 \pm 0.828$ . In the CG, the VAS score decreased from  $7.81 \pm 0.733$  to  $5.81 \pm 0.734$ , with a p-value of 0.023. **(Table 2)** The post-treatment VAS scores made it clear that both groups had improved, but EG had improved significantly. In EG, the mean NDI scores decreased from  $32.93 \pm 2.823$  to  $17.52 \pm 2.61$  with a p-value below 0.05, and in CG, they decreased from  $34.81 \pm 3.959$  to  $25.90 \pm 1.445$  with a p-value below 0.05. **(Table 3)**

The Mann Whitney U test was used to score both groups prior to treatment. The study's analysis revealed that the baseline values for neck disability (NDI) and pain (VAS) were nearly identical. The Mann Whitney U test was also used to measure both groups' follow-up. The study's analysis demonstrated a significant difference between the groups to a greater degree and showed that, with a 95% confidence interval (CI) and a p-value less than 0.05, the group receiving Alexander and Mulligan technique along with isometric exercises had significantly improved neck pain and disability compared to the group receiving mulligan technique and isometric exercises alone. The measure of size effect for post VAS scale was  $r=0.5$  which means there was moderate effect of treatment in terms of pain (VAS) while for neck disability it was  $r=0.8$  which showed large effect of treatment. **(Table 4)**

**Table 1: Demographic characteristics of the study participants**

Variable	Control group(N=42)	Experimental group(N=42)
Age (mean ± SD) years	28.69 ±7.158	30.14±5.367
Gender f(%)	Male: 19(45.2%)	8(19.0%)
	Female:23(54.8%)	34(81.0%)
Occupation f(%)	Student: 15(35.7%)	9(21.42%)
	House wife :22(52.4%)	10(23.8%)
	Labor: 2(4.8%)	13(31.0%)
	Others: 3(7.1%)	10(23.8%)
Marital status f(%)	Single: 18(42.85%)	23(54.76%)
	Married: 24(57.1%)	19(45.2%)
BMI f(%)	Underweight: 7(16.7%)	8(19.07%)
	Normal: 22(52.4%)	24(57.14%)
	Overweight: 13(31.0%)	10(23.8%)
	Obese: 0	0

**Table 2: Pre and post treatment VAS scores**

Variable	Mean	Std. Deviation	Median(IQR)	P-value
Experimental group VAS pre-treatment	8.48	0.634	9(1)	0.001
Experimental group VAS post-treatment	4.40	0.828	5(1)	
Control group VAS pre-treatment	7.81	0.733	8(1)	0.023
Control group VAS post-treatment	5.81	0.734	6(1)	

**Table 3: Pre and post treatment NDI scores**

Variable	Mean	Std. Deviation	Median(IQR)	P-value
Experimental group NDI pre-treatment	32.93	2.823	35(5)	0.002
Experimental group NDI post-treatment	17.52	2.616	18(5)	
Control group NDI pre-treatment	34.81	3.959	35(10)	0.023
Control group NDI post-treatment	25.90	1.445	26(3)	

**Table 4: Post-treatment VAS and NDI scores between the groups**

Variable	Mean	Std. deviation	Mean Rank	P-value
Control group VAS post-treatment	5.81	0.734	58.25	0.002
Experimental group VAS post-treatment	4.40	0.828	26.15	
Control group NDI post-treatment	25.90	1.445	63.50	0.001
Experimental group NDI post-treatment	17.52	2.616	21.50	

## DISCUSSION

Numerous research studies have demonstrated a variety of approaches to treating neck pain, such as medication, traditional physical therapy, low-level laser therapy, acupuncture, mobilization (Mulligan and Maitland) techniques, and Alexander techniques.<sup>23</sup> Numerous positive conclusions have emerged from research, indicating that the Alexander technique can help improve posture and musculoskeletal disorders associated with it. There aren't many published studies that examine the results of simultaneously using the Alexander technique and mobilization. Reviews of the literature revealed more or less conflicting statements regarding the evidence supporting the efficacy and utility of these treatment modalities<sup>24</sup>. The value of both the Alexander and Mulligan techniques was determined concurrently in the current study. Creating ease and freedom in neck movements was the aim of both treatment approaches. There were 84 participants in all, with more women than men. They were divided into two groups at random, with 42 people in each group. Group 2 received only MT and isometrics, while Group 1 received AT and MT along with neck isometrics. The study's findings demonstrated that while both therapies were successful in reducing neck pain, the group that received AT in conjunction with MT and isometrics experienced greater reductions in neck pain and disability. In a study on the effectiveness of the Alexander technique, J. Becker et al. found that, following treatment, posture improved and there was less muscle fatigue, and that neck pain and related disability decreased by up to 30% (p-value less than 0.001). According to the current study, the effects of the treatment persisted for five weeks after it ended. According to earlier research, the one-on-one Alexander technique is highly beneficial for treating persistent back, knee, and neck pain as well as for correcting posture. J. Becker went on to say that while the exact mechanism by which AT reduces musculoskeletal pain is still unknown, one study contends that people gain awareness of their posture and pain, gain control over it, and thereby lessen pain and associated disability. Additionally, research indicated a positive relationship between forward head posture and neck pain. The fact that reduced muscle surface activation is closely linked to less pain following treatment is another mechanism that suggests AT is beneficial for neck pain. A prior study demonstrated that following AT sessions, sternocleidomastoid muscle (SCM) activity decreased, resulting in less SCM pain<sup>24-28</sup>

According to Hugh et al., acupuncture treatments are more beneficial for back pain and headaches for roughly 12 and 24 months, respectively. For around a year after treatment sessions, the Alexander technique was more beneficial in treating back and neck pain.<sup>26</sup> The effectiveness of AT among musicians was demonstrated in a different study by Sabine et al. Regarding the reduction of posture-related problems and neck pain, the study's findings were equivocal. However, AT was successful in treating musicians' anxiety and depression, and it also enhanced their respiratory systems. In contrast, AT was found to be effective in treating neck pain and related disabilities in the current study.<sup>27,28</sup>

The value of mobilization techniques combined with exercises for neck pain was determined by a study conducted by G. Shanker et al. With a p-value greater than 0.05, the study found no statistically significant difference between the groups that received mulligan mobilization with exercises and maitland mobilization with exercises. With a p-value less than 0.001, overall pain scores on the VAS and disability scores on the NDI improved. According to the study, mulligan SNAGS can reduce pain by separating facet surfaces, releasing the trapped meniscoid, allowing it to return to its intra-articular position, or stretching the adhesions.<sup>29</sup>

Another study by Tomris et al. found that neck pain and disability could be effectively treated with mulligan mobilization (SNAGS) and exercises. Improvements in VAS and NDI scores were observed, with a p-value of less than 0.05, which was consistent with the current investigation. Tomris went on to say that the use of mobilization techniques is more effective than soft tissue massage and electrotherapy. This is because repositioning in the bony structures that provide movement restoration reduces pain during activity and helps correct positional errors.<sup>30</sup>

With a few exceptions, practically all of the literature was relevant to the current investigation. The current study's outcome measures have been used by many others. According to the results of every study, patients with neck pain should be treated using the Alexander technique in addition to other physical therapy techniques.

## CONCLUSION

The study found that while both the mulligan technique and Alexander in combination were useful in treating neck pain and disability, the combination of the two was more successful in lowering neck-related pain and disability.

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