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## ORIGINAL ARTICLE

### COMPARATIVE STUDY BETWEEN STATIC STRETCHING AND DYNAMIC STRETCHING ON MECHANICAL NECK PAIN

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### ABSTRACT

**Back and objective of the study:** Individual with neck pain that lack an identifiable patho-anatomic cause for their symptoms are usually classified as having mechanical neck pain. Stretching is believed to provide many physical benefits including improved flexibility, injury prevention, improved muscle or athletic performance. Aim of the study was to find out the effects of static stretching and dynamic stretching on mechanical neck pain and also to compare the effectiveness between static and dynamic stretching on mechanical neck pain. **Methodology:** Comparative study with Quasi Experimental design conducted at ACS Medical College and hospital, Chennai. Both genders of thirty patients were selected for the study. Convenient sampling method used to select the samples on the basis of selection criteria. Visual analogue scale and neck disability index were used as measurement tools for data collection. The study conducted for duration of four weeks. **Results:** The results shows significant difference in neck pain and neck function between static stretching and dynamic stretching with F value 1733 and <0.0001. Static stretching found more effective than and dynamic stretching with more mean difference of VAS and NDI scores 5.33 and 22.8 compared to 1.73 and 12 respectively. **Conclusion:** The static stretching is more effective than dynamic stretching in improving pain and functional disability in patients with mechanical neck pain.

**Keywords:** Mechanical neck pain, Neck Disability Index, Static stretching, Dynamic stretching

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## INTRODUCTION

Mechanical neck pain is one the common musculoskeletal disorder. Roughly two thirds of the general population has neck pain at some time in their lives and the prevalence is highest in middle age.

Neck pain as defined by Mersky is the pain “anywhere within the region bounded superiorly by superior nuchal line, inferiorly by an imaginary line through the tip of the first thoracic spinous process and laterally by sagittal plane tangential to the lateral borders of the neck<sup>1,2</sup>.

Individuals with neck pain that lack an identifiable pathoanatomic cause for their symptoms are usually classified as having mechanical neck pain. This type of pain is also known as non-specific or simple neck pain disorder. Pain prevalence ranges from 6% to 22% and upto 38% of the elderly population, while lifetime prevalence ranges from 14.2 to 71%<sup>3, 4</sup>.

It arises insidiously and is generally multifactorial in origin, including poor posture, anxiety, depression, neck strain and sporting or occupational activities. In an estimated 50-80% of cases involving back or neck pain, an underlying pathology cannot be definitively determined. Upper trapezius and levator scapulae are the most common postural muscles that tend to get shorten leading to restricted neck mobility<sup>5,6</sup>.

Stretching is believed to provide many physical benefits including improved flexibility, injury prevention, improved muscle or athletic performance, improved running economy, promotion of healing and possibly decreased onset of muscle soreness<sup>7,8,9</sup>.

**Objectives of the study:** The main objective of the study is to compare the effectiveness of static stretching over dynamic stretching among mechanical neck pain patients. The secondary objective of the study was to find the effect of static stretching and dynamic stretching among mechanical neck pain patients.

## METHODOLOGY

Comparative study with Quasi Experimental design conducted at ACS Medical College and hospital, Chennai. Both genders with age group between 19 to 30 years of thirty patients were selected for the study. Convenient sampling method used to select the samples on the basis of selection criteria. Visual analogue scale and neck disability index were used as measurement tools for data collection. The study conducted for duration of four weeks.

**Procedure:** On base of selection criteria 30 mechanical neck pain patients were included for the study and equally divided into two groups. Baseline measurements and post data after the treatment were taken from all the patients for pain intensity (VAS) and NDI score.

**Measurement of Pain:** Pain intensity was evaluated by means of a Visual Analogue Scale (VAS) ranging from 0 cm to 10 cm, wherein the patient marked a point according to her level of pain, a higher score corresponded to more intense pain<sup>10</sup>.

**Measurement of neck function:** Neck Disability Index used to collect data for neck function from the patients. The NDI questionnaire was filled by patients them self<sup>11</sup>.

**Intervention**

**Group A:** Consists of 15 patients with mechanical neck pain. Patients in Group A received static stretching for upper trapezius and levator scapulae muscle, 3 times a week. Dosage for stretch was 5 repetition held for 30 seconds followed by 10 seconds rest for each session.

**1. Static stretching of upper trapezius:**

Ask the patient to put the right hand behind lower back/ tilt head to left, followed by slow deep breaths.

**2. Static Stretching of Levator Scapulae:**

Ask the patient to rotate the head 45 degree to left. Place the left hand behind the head and gently pull it an angle toward knee for 30 sec.

**Group B:** Consists of 15 patients with mechanical neck pain. These patients received dynamic stretching for upper trapezius and levator scapulae muscle, 3times a week.

**Dynamic stretching of upper trapezius:** Ask the patient to bring the chin down to the chest, and bring the head to neutral.

**Dynamic stretching of levator scapulae:** The patient in Sitting or standing with upright position and shrugging your shoulders toward your ears. Keep your arms straight and at your sides. Begin with a fluid up and down movement and then hold your shoulders at the top of the stretch for a few seconds.

**Statistical Analysis:** The collected values were tabulated and analyzed using inferential statistics. Dependent t test used to find the effect of static stretching and dynamic stretching among mechanical neck pain patients. ANOVA used to compare the effectiveness of static stretching over dynamic stretching among mechanical neck pain patients.

**RESULTS**

The results shows significant difference in neck pain and neck function between static stretching and dynamic stretching with F value 1733 and <0.0001. Static stretching found more effective than and dynamic stretching with more mean difference of VAS and NDI scores 5.33 and 22.8 compared to 1.73 and 12 respectively.

Group A	N	Mean Diff	SD SEM	df	95% CI Level	t	P value	Sig. different (P< 0.05)
VAS Pre-Post	15	5.33	1.54 0.39	df=14	6.188 to 4.479	t=13.39	<0.0001	****

**Table 1:** Paired t Test to find the effectiveness of static stretching on mechanical neck pain patients

The above table 1 shows significant difference in VAS after static stretching exercise with mean difference of 5.33 and P<0.0001 among mechanical neck pain patients.

Group A	N	Mean Diff.	SD SEM	Df	95% CI Level	t	P value	Sig. different (P< 0.05)
NDI Pre-Post	15	22.8	2.18 0.56	df=14	24.01 to 21.59	t=40.55	<0.0001	****

**Table 2:** Paired t test to find the effectiveness of static stretching on NDI among mechanical neck pain patients

The above table 2 shows significant difference in Neck Disability Index after static stretching exercise with mean difference of 22.8 and  $P < 0.0001$  among mechanical neck pain patients.

Group B	N	Mean Diff.	SD SEM	Df	95% CI Level	t	P value	Sig different (P< 0.05)
VAS Pre-Post	15	1.73	1.67 0.43	df=14	2.66 to 0.81	t=4.03	<0.0013	****

**Table 3:** Paired t Test for VAS with in dynamic stretching exercise group

The above table 3 shows significant difference in VAS after dynamic stretching exercise with mean difference of 1.73 and  $P < 0.0013$  among mechanical neck pain patients.

Group B	N	Mean Diff.	SD SEM	Df	95% CI Level	t	P value	Sign. different (P< 0.05)
NDI Pre-Post	15	12	2.42 0.62	df=14	13.34 to 10.66	t=19.2	<0.0001	****

**Table 4:** Paired t test for Neck Disability Index within dynamic stretching exercise group

The below Table 4 shows there is significant difference in NDI between the pre and post test values ( $p < 0.0001$ ).

Group A and Group B	N	MS	DF	SS	F	P value	Sig. different (P < 0.05)
VAS Pre-Post NDI Pre-Post	120	2435	119	17202	1733	<0.0001	****

**The above table 5:** shows significant difference in neck pain and neck function between static stretching and dynamic stretching with F value 1733 and  $P < 0.0001$ .

Static stretching found more effective than and dynamic stretching with more mean difference of VAS and NDI scores 5.33 and 22.8 compared to 1.73 and 12 respectively.

## DISCUSSION

A comparative study with 30 patients with mechanical neck pain was undertaken. Each group consisted of 15 patients. Group A received static stretching and Group B received dynamic stretching. In this study static stretching showed beneficial results in treatment of mechanical neck pain. So Group A has shown improvement than Group B which is proved statistically<sup>12, 13</sup>.

The reduction in the pain following static stretching can be explained on the basis of inhibitory effect of GTO (which causes a dampening effect on the motor neuronal discharges, thereby causing relaxation of the musculo-tendinous unit by resulting its resting length and pancinian corpuscle modification. These reflexes will allow relaxation in musculotendinous unit tension and decreased pain perception. Most authors suggest that 10-30 seconds is sufficient for increasing flexibility<sup>14, 15, 16</sup>.

Ylinen et al found significant decrease in neck pain in the stretching group after 4 weeks. The results show that Static stretching is more effective than dynamic stretching in subjects with mechanical neck pain. In a study conducted by (Mohammad Taghi et.al, 2011) static stretching exercises have a positive impact on the range of motion. The results prove that static stretching exercises are suitable to be used to improve the flexibility and range of motion<sup>17, 18, 19</sup>.

**Ethical clearance:** Ethical clearance has obtained from the Institution to conduct this study with reference number: IV C-026/PHSIO/IRB/2017-18 dated 08/01/2018.

**Conflict of interest:** There was no conflict of interest to conduct this study.

**Fund for this study:** Self

## CONCLUSION

The study concluded that static stretching is more effective than dynamic stretching in improving pain and functional disability among patients with mechanical neck pain.

**Limitations:** The study was performed only for age group between 19-30 years. Study sample size was small and conducted for a short duration of two weeks.

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