

Screening the Effects of Stretching Exercises with and without Graston Technique on Pain and Disability in Non-Specific Neck Pain

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ABSTRACT

Background: Non-specific neck pain is defined as posterolateral cervical pain without structural pathology and underlying disease. Individuals with Non-specific neck pain often suffer from pain, restriction of cervical joint, range of motion, limited functional activity, participation, restrictions and reduced quality of life.

Purpose: Screening the effects of stretching exercises with and without Graston technique on pain and disability in Non-specific neck pain.

Methodology: Fourteen males and females aged 25 to 65 years having Non-specific neck pain were assessed by NPRS and NDI. The study was conducted at Layyah City Hospital. Subjects were divided into two groups: Group A received stretching with Graston technique and Group B received stretching exercises. Pain and disability were assessed using NPRS and NDI. Both groups were assessed at baseline and after 6 weeks of intervention. Data was analyzed by using SPSS version 22.

Results: Both exercises from baseline post-session (6th week) showed reduction in NDI and NPRS scores (both $p \leq 0.05$). In contrast to group B (stretching group) there was statistically significant reduction in NDI and NPRS scores in Group A (stretching with Graston). It showed that stretching exercises with Graston technique were more effective than stretching exercises without Graston in reducing Non-specific neck pain.

Conclusion: Stretching exercises with Graston technique showed more significant result in reducing Non-specific neck pain.

Keywords: Non-specific neck pain, Graston technique, pain, disability

INTRODUCTION

Neck pain has a multifactorial aetiology; it might be related and modulated to ergonomic or individual factors such as age, behavioural attitude or psychosocial distress such as anxiety or job satisfaction (1). Non-specific neck pain is defined as posterolateral cervical pain without structural pathology and underlying diseases. Individuals with NSNP often suffer from pain, restriction of cervical joint range of motion, limited functional activity, participation restrictions and reduced quality of life. The associated symptoms have exerted socioeconomic issues on patients' well-being and the healthcare system (2). Furthermore, neck pain can also be categorized by mechanism as mechanical when its origins are from the spine's postural disorders, or neuropathic when it results in peripheral nervous system impairments with nerve roots' irritation determined by herniated disk, osteophyte or spinal stenosis (3). Among these interventions, instrument-assisted soft tissue mobilisation (IASTM) is a technique that can break adhesions and cross-linkages. While the instrument is moved, the skin is compressed and then stretched with more mechanical stress compared to manual ways. The increased skin deformation is likely to alter the activities of the mechano-sensitive neurons being compressed and stretched. There are various IASTM tools, such as graston, hawk grips, functional and kinetic treatment and adhesion breakers and fascial abrasion technique, that have their own approach to treatment and instrument design, like material and shape of instruments. Experimental studies have been conducted to determine the effects of IASTM on range of motion

(ROM), pain and inflammation in upper and lower extremities (4). Graston Technique is a form of manual therapy that uses stainless steel instruments to break down tissue adhesions. GT on trigger points has been presumed to increase local blood flow leading to tissue healing and decreased pain, however, the physiological effects on muscle hemodynamics have yet to be proven.¹⁴ There are different strategies to treat neck pain, nonsteroidal anti-inflammatory drugs, painkillers, isometrics, mobilization, strengthening exercises, massage techniques, and stretching exercises. These are widely approved, determined, and conducted around the world. Although many interventions are assumed as the quality of care for mechanical neck pain, marked proof in the aspect of the effectiveness of the nonoperative intervention is not available. Massage therapy, which is compatible and alternative treatments, which encompasses many special techniques that are sometimes used in regular order, likely as stroking, kneading, and percussion (5). The IASTM therapy design to promote the restart the connective tissue by reabsorbing extra fibres encouraging collagen secondary to fibroblast recruited healing. In this turn lead to scar tissue and fascial limitation being released and broken down. Some of procedure for the treatment of neck pain were approved as ideal there was not enough proof of conservative approaches like traction actively or passively training ultrasound TENS. The use of hand treatment (mobilization manipulation) and physical therapies based on evidence (6). Zidni Imanurrohmah Lubis et al (2023) conducted a research on comparison between contract-relax stretching and McKenzie

neck exercise on decreasing pain of upper trapezius muscle in peeling onions workers; the aim of the study was Contract relax stretching aims to reduce pain with stretching techniques. McKenzie's neck exercise aims to relax muscles, reduce spasms and return the alignment of the neck to a normal position. This type of research is a pre-experimental study with two pretest and post-test design groups. This design uses two groups to compare the causal relationship between the independent and dependent variables. The research population was peeling onion workers at CV. Anita Jaya Sukses had upper trapezius muscle pain. The sample of this study is a member of the people that meets the inclusion and exclusion criteria with a total of 18 selections. The sampling technique used purposive sampling. The research instrument used is the numeric rating scale (NRS). The Independent Sample T-Test showed that giving contract-relax stretching and McKenzie neck exercise had a significant value of 0.005 ($p < 0.05$), so H_1 was accepted. There is a difference in the effect between contract-relax stretching and McKenzie neck exercise on reducing upper trapezius muscle pain in onion peel workers' CV. Anita Jaya Sukses and McKenzie's neck exercise has proven more effective (7). Conducted a research on short-term effect of adding Graston technique to exercise program in treatment of patients with cervicogenic headache: A single-blinded, randomized controlled trial. The purpose of the study was to investigate the effect of adding the Graston technique to an exercise program on pain intensity, neck disability, cervical range of motion, headache frequency and duration, and medication intake in subjects with cervicogenic headache. The

design of this study was a single-blinded (assessor), randomized controlled trial and the setting was outpatient rehabilitation clinic. Sixty patients, from 35 to 50 years old, with cervicogenic headache have participated in the study. Patients were recruited from the outpatient clinics of Tala general hospital in Menoufia governorate. Patients were assigned randomly into two groups. Patients in the study group received the Graston technique in addition to an exercise program, while patients in the control group received the exercise program only. All patients received 3 sessions a week for 4 weeks. The primary outcome measure was the Visual Analogue Scale (VAS), while the secondary outcome measures were Neck Disability Index (NDI), Cervical Range of Motion (CROM), headache frequency and duration, and medication intake. All outcomes were measured at baseline, after 2 weeks as well as after 4 weeks of intervention. After 2 weeks of the treatment, statistically significant differences were found in all the measured outcomes. ($P < 0.05$) in favor of the Graston group except for neck extension ($P = 0.08$). After 4 weeks of the intervention, statistically significant differences were found in all the measured outcomes in ($P < 0.05$) in favor of the Graston group. Short-term effect of using the Graston technique in combination with an exercise program can reduce pain, decrease headache frequency and duration, and medication intake more than the exercise program alone in the medium-terms (8).

The objective of study was "Screening the effects of stretching exercise with and without graston technique on pain and disability in non-specific neck pain.

Previous literatures showed that comparative effectiveness of routine physical therapy with and without instrument assisted soft tissue mobilization in patients with upper cross syndrome, a comparison between contract-relax stretching and McKenzie neck exercise on decreasing pain of upper trapezius muscle in peeling onions workers, muscle energy technique in the rehabilitative treatment for acute and chronic non-specific neck pain, short-term effect of adding graston technique to exercise program in treatment of patients with cervicogenic headache, hemodynamic effects of graston technique on trigger points in the upper trapezius in patients with neck pain and, effects of deep friction massage and static stretching in non-specific neck pain. In current study we will compare the effects of stretching with and without graston technique in non-specific neck pain.

METHODOLOGY

This study was conducted at Layyah City Hospital. This was a randomized clinical trial study design employed to compare the results of the study with a Non-Probability Purposive Sampling Technique was utilized to select the participants. The study included participants of both genders. A total of 14 participants were included in this study.

The following inclusion criteria were applied:

- Male and Female
- Neck pain for at least 3 preceding months

- Pain intensity being >3 on NPRS
- All studies including at least one of the following outcome (neck pain, disability)
- Whiplash injuries

The following exclusion criteria were considered:

- Age
- Diabetes
- Stroke
- Rheumatoid Arthritis
- Fibromyalgia
- Spondylosis

Data Collection Procedure

The data was collected after the approval of the ethical committee of GCUF Layyah Campus. The researcher completed the consent form, demographics and demonstrated the procedure to participants who were willing to participate in study and would meet the study criteria.

Screening

The subjects who met the inclusion criteria was allocated for this study.

Assessment

Spurling test and distraction test was used to assess the neck pain. Data was collected at based line.

Randomization

After taking informed consent, lottery method was used to randomized the subject.

Group A: Stretching exercises with graston technique.

Group B: Stretching exercises.

Interventions

Total duration of each session with intervention was 20-25 minutes. After the warm-up session apply hot packs along with interventions. Sessions was given thrice a week for 8 weeks with 3 repetitions. Data was collected at baseline and in the end, for pre-and post-intervention values.

RESULTS

Table 1: Baseline of Demographic and Clinical Character

Demographic Character	Group A (Stretching with Graston Group)	Group B (Stretching Group)	P-value
Age	32.85±7.38	31.42±6.16	0.715
Gender	1.428±0.53	1.571±0.53	0.01
Clinical Character	Group A (Stretching with Graston Group)	Group B (Stretching Group)	P-value
NDI	2.85 ± 0.69	2.74 ± 0.755	0.006
NPRS	2.14± 0.69	2.28 ± 0.755	0.006

This table showed baseline of demographic character (Age and Gender) and baseline of clinical character (NPRS and NDI) of both experimental groups. All p-values were greater than 0.05. All

parameters were shown by mean and standard deviation value. There were no significant differences at baseline.

Table 2: Mean change of pain intensity

Group	Measure	Pre-treatment Mean ± S.D.	Post-treatment Mean ± S.D.	Mean Change Mean ± S.D.	P-value
Group A	Pain Intensity	3.0 ± 0.816	0.28 ± 0.48	0.28 ± 0.47	<0.001
Group B	Pain Intensity	3.28 ± 0.95	2.28 ± 0.48	-2.00 ± 0.26	0.017

For Group A, pre-treatment mean was (3.0 ± 0.816), post-treatment mean was (0.28 ± 0.48) with a mean change (0.28 ± 0.47) and p-value is <0.001. For Group B, pre-treatment mean was (3.28 ± 0.95) and post-treatment mean was (2.28 ± 0.48) with a mean change (-2.00 ± 0.26) and p-value is 0.017. Both groups play an important role in reducing pain intensity. Results show that stretching exercises with graston technique significantly reduces pain intensity as compared to stretching exercises alone.

Table 3: Mean change of personal care

Group	Measure	Pre-treatment Mean ± S.D.	Post-treatment Mean ± S.D.	Mean Change Mean ± S.D.	P-value
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Group A	Personal Care	3.0 ± 0.816	0.28 ± 0.48	-0.42 ± 0.36	0.006
Group B	Personal Care	3.42 ± 0.53	2.28 ± 0.75	-2.00 ± 0.34	0.018

For Group A, pre-treatment mean was (3.0 ± 0.816), post-treatment mean was (0.28 ± 0.48) with a mean change (-0.42 ± 0.36) and p-value is 0.006. For Group B, pre-treatment mean was (3.42 ± 0.53) and post-treatment mean was (2.28 ± 0.75) with a mean change (-2.00 ± 0.34) and p-value is 0.018. Both groups play an important role in improving personal care tasks such as washing and dressing. Results show that stretching exercises with graston technique significantly improve personal care of participants as compared to stretching exercises alone.

Table 4: Mean Changes of Lifting

Group	Measure	Pre-treatment Mean ± S.D.	Post-treatment Mean ± S.D.	Mean Change ± S.D.	P-value
Group A	Lifting	3.42 ± 0.78	0.28 ± 0.48	-0.28 ± 0.41	0.020
Group B	Lifting	3.71 ± 0.75	2.57 ± 0.53	-2.28 ± 0.27	0.08

For Group A, pre-treatment mean was (3.42 ± 0.78), post-treatment mean was (0.28 ± 0.48) with a mean change (-0.28 ± 0.41) and p-value is 0.020. For Group B, pre-treatment mean was (3.71 ± 0.75) and

post-treatment mean was (2.57 ± 0.53) with a mean change (-2.28 ± 0.27) and p-value is 0.08. Both groups play an important role in improving lifting. Results show that stretching exercises with graston technique significantly improve lifting as compared to stretching exercises alone.

4.1: Normality Test

Normality test in Shapiro-Wilk test showed p-value greater than 0.05, and when p-value is non-significant in Shapiro-Wilk test then the data is normally distributed. Therefore, non-parametric tests were used to compare data between groups and within groups.

4.2: Mean Change of Work

For Group A, pre-treatment mean was (2.85 ± 0.69), post-treatment mean was (0.42 ± 0.53) with a mean change (-0.71 ± 0.39) and p-value is 0.022. For Group B, pre-treatment mean was (3.57 ± 0.78) and post-treatment mean was (2.42 ± 0.53) with a mean change (-2.00 ± 0.28) and p-value is 0.039. Both groups play an important role in improving walking. Results show that stretching exercises with graston technique significantly improve walking as compared to stretching exercises alone.

4.3: Mean Change of Headache

For Group A, pre-treatment mean was (3.0 ± 0.81), post-treatment mean was (0.42 ± 0.53) with a mean change (-0.57 ± 0.42) and p-value is 0.055. For Group B, pre-treatment mean was (3.57 ± 0.78) and post-treatment mean was (2.57 ± 0.78) with a mean change (-2.14 ± 0.35) and p-value is 0.14. Both groups play an important role in improving sitting. Results show that stretching exercises with graston

technique significantly improve sitting as compared to stretching exercises alone.

4.4: Mean Change of Concentration

For Group A, pre-treatment mean was (3.0 ± 0.81) , post-treatment mean was (0.28 ± 0.48) with a mean change (-0.57 ± 0.42) and p-value is 0.055. For Group B, pre-treatment mean was (3.57 ± 0.78) and post-treatment mean was (2.57 ± 0.78) with a mean change (-2.28 ± 0.34) and p-value is 0.057. Both groups play an important role in improving standing. Results show that stretching exercises with graston technique significantly improve standing as compared to stretching exercises alone.

4.5: Paired Sample t-Test on NDI of Group A

Paired sample t-test was applied to compare the mean NDI score of Group A pre-treatment and post-treatment session. Mean NDI before session was 2.71 ± 0.48 while mean NDI post-treatment was 0.42 ± 0.53 . p-value for paired sample t-test was <0.001 . There is a significant difference in mean values of pre-treatment and post-treatment with a mean difference of -0.14.

4.6: Paired Sample t-Test of NDI of Group B

Paired sample t-test was applied to compare the mean NDI score of Group B pre-treatment and post-treatment session. Mean NDI before session was 3.14 ± 0.69 while mean NDI post-treatment was 2.14 ± 0.69 . p-value for paired sample t-test was <0.001 . There is a significant difference in mean

values of pre-treatment and post-treatment with a mean difference of -0.14.

4.7: Comparison Between Groups

The table showed both NDI and NPRS score comparison between Group A and Group B. Pre-treatment mean with standard deviation and post-treatment mean with standard deviation values were given. Pre-treatment mean of NDI of Group A was 2.71 and post-treatment mean was 2.14. Mean change of NDI for Group A was 0.28 with p-value of 0.006. Pre-treatment mean of NDI of Group B was 2.85 and post-treatment mean was 0.42. Mean change of NDI for Group B was 0.26 with p-value of 0.062.

Pre-treatment mean of NPRS of Group A was 2.28 and post-treatment mean was 1.57. Mean change of NPRS for Group A was 0.28 with p-value of 0.006. Pre-treatment mean of NPRS of Group B was 2.14 and post-treatment mean was 0.28. Mean change of NPRS for Group B was 0.26 with p-value of 0.007.

DISCUSSION

Previous literatures showed that comparative effectiveness of routine physical therapy with and without instrument assisted soft tissue mobilization in patients with upper cross syndrome, a comparison between contract-relax stretching and McKenzie neck exercise on decreasing pain of upper trapezius muscle in peeling onions workers, muscle energy technique in the rehabilitative treatment for acute and chronic non-specific neck pain, short-term effect of adding graston technique to exercise program in treatment of patients with cervicogenic headache, hemodynamic effects of graston technique on trigger points in the upper trapezius in patients with neck

pain and effects of deep friction massage and static stretching in non-specific neck pain. In current study we will compare the effects of stretching with and without graston technique in non-specific neck pain.

CONCLUSION

Both stretching exercises along with graston technique and stretching exercises alone were effective in reducing non-specific neck pain. However, stretching exercises with graston technique showed statistically significant reduction in pain intensity and disability.

Limitations and Recommendations

This study had several limitations. First, the generalizability of the results is limited by small sample size and hence, it reduces the power of the study. Second, the intervention period was short and a 6-month follow-up was not possible after the experiment, limiting the ability to quantify and compare the results. Further studies will be needed in the future to overcome these limitations.

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