SHORT REPORT

Effect of Graston technique versus ischaemic compression in students who developed neck pain during distance learning in COVID-19: A pilot study preceding the randomised clinical trial

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Abstract

Many people experienced neck pain during COVID-19 quarantine period due to prolonged use of electronic devices for academic activities and work from home. The aim of this study was to determine the effects of Graston Technique versus Ischaemic Compression on pain, range of movement (ROM), and functional performance in students with neck pain, due to distance learning during COVID-19 pandemic. A pilot study (randomised clinical trial) was performed. Fifty-four subjects were included in the study on the basis of sample selection criteria and were divided into two groups, Group A and Group B. The outcome measures were pain, range of movement (ROM), and disability assessed by Numeric pain rating scale (NPRS), goniometry and Neck disability index (NDI) respectively. Group A received treatment with hot pack and Graston technique, while Group B received a hot pack and Ischaemic compression. Three sessions per week on alternate days for four weeks were given to each patient. Both groups were reassessed after four weeks of treatment. Data was analysed using SPSS 26. There was a statistically significant change within both the groups in NPRS, NDI, and cervical ROM ($p< 0.05$). Both were effective but the group using Graston Technique showed more improvement.

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Introduction

Pain that is felt in the neck region and may or may not be associated with any one or both upper extremities, and lasting for minimum one day is known as neck pain.[1] Neck pain is a common symptom caused due to muscles strained by bad posture, like hunch back posture while working on the laptop and leaning forward on the work table.[2] In March 2020, to prevent the spread of COVID-19 infection, several countries restricted unnecessary outdoor activities, or as is commonly said imposed the "lockdown". The restrictions affected physical activity level along with greater predisposition towards sedentary lifestyle habits.[3] During the quarantine period, due to the use of electronic devices in incorrect postures, people often experienced neck pain and low back pain while working from home and E-Learning.[4] A study by Bhattacharya S. et al in 2021 suggested that poor working pattern during COVID-19 pandemic resulted in increased prevalence of text neck syndrome in the population. Scientists believe we should learn to stay with coronavirus pandemic.[5] Graston technique is one of the famous instrument-assisted soft tissue mobilisation (IASTM) techniques used for treating a variety of conditions like strain, sprain. and various other soft tissue conditions. Some medical practitioners have discovered that by misusing this technique various soft tissue ailments can be effectively managed.[6] For treating myofascial trigger points, a variety of interventions have been used; ischaemic compression (IC) is one of these and involves application of manual pressure over trigger points and then gradually increasing the pressure. It creates local interruption in blood supply (ischaemia) followed by reperfusion upon releasing pressure. This results in reduction of pain and improvement in the sensitivity of the trigger points due to enhancement of metabolic status of muscles leading to improvement in recovery of soft tissues.[7]

Literature shows that both Graston Technique and Ischaemic Compression affects pain, ROM, and functional disability. In previous studies, both the interventions were analysed separately but no comparison was made between them. In this study we have analysed the effects of Graston Technique versus Ischaemic Compression on students who developed neck pain during distance learning in COVID-19 to evaluate which is more effective.

Patients and Methods

This was a pilot study of the registered randomised clinical trial (RCT). The trial was registered in WHO registry of Iranian Registry of Clinical Trials (IRCT reference no.

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IRCT20210716051905N1). The study was conducted in Sargodha Institute of Health Sciences, Sargodha, and Fatima Hospital, Sargodha, on the students who fulfilled the inclusion criteria. The study was completed within duration of 6 months, from July 2021 to December 2021 and data collection procedure done from 01-08-2021 to 01-09-2021. Sample size of 54 was calculated by using G-power Analysis Software, Version (3.1.9.4)[8] with 0.80 power of study, 0.5 margin of error and 95% confidence interval. After addition of 10% attrition rate, a sample size of 54 was calculated. Inclusion criteria was: male and female subjects aged 18-25 years, neck pain from previous two to three months, mobile phone usage >4 hours daily, neck pain with limited cervical mobility, Numeric pain rating scale (NPRS) value ≥4, Neck disability index (NDI) score >10. All subjects who had inflammatory or infectious disease of the spine, migraine, neck trauma or surgery, and VBI (vertebrobasilar artery insufficiency) were excluded. Non-probability convenient sampling technique was used to recruit the individuals for the study and then randomisation was done by lottery method to divide the participants in two interventional groups—group A & group B. Group A received treatment with hot pack (7-10 minutes) and Graston technique (5 minutes).[9] Subjects were in relaxed sitting position. Firstly, scanning was done by sweep stroke to locate myofascial trigger points and taut band which was followed by brushing stroke on the targeted area. Tools and hands were properly sanitised before and after treating the patients for safety reasons. Group B received hot pack (7-10 minutes) and Ischaemic Compression with subjects in relaxed sitting position. Firstly, trigger points and taut band was palpated in upper trapezius region. After palpation Ischaemic Compression was applied by sustained pressure directly over the trigger point with a thumb and pressure was gradually increased as the pain lessened. One set of five repetitions was given; the duration of one repetition was 60 seconds, while the total duration of the technique was five minutes.[10] Both the groups were reassessed before and after four weeks of treatment via goniometry, NPRS, and NDI. Data was analysed using IBM SPSS software version 26 for Windows. Statistical significance was set at p=0.05. After assessing normality of data by Shapiro – Wilk test, parametric test was used for analysis of within a group or between group difference. Paired sample t-test was used for with in group and independent t-test was used for between group differences.

Results

There were 54 participants who met the inclusion criteria. They were randomly allocated to Graston technique group and Ischaemic Compression group. There was no drop out and all the patients received their treatment. There were 25 (92.6%) females and 2 (7.4%) males in the Graston Technique group and 22 (81.5%) females and 5 (18.5%) males in the Ischaemic Compression group. Mean age of the Graston Technique group was 21.93±2.84 years and the Ischaemic Compression group was 22.85±2.39 years. Statistical difference was observed in the results between and within both groups (p<0.05) as shown in intergroup analysis in table 1 & 2.

Table-1: Inter-Group Analysis of Neck pain and Disability.

Variables	Time Periods	Groups	Mean ± SD	*p*-value
NPRS	Pre-Treatment	GGT	6.93±1.96	1.000
		GIC	6.93±1.96	
	Post-Treatment	GGT	2.07±1.04	0.000***
		GIC	5.19±1.39	
NDI	Pre-Treatment	GGT	19.93±3.22	1.000
		GIC	19.93±3.22	
	Post-Treatment	GGT	3.37±1.18	0.000***
		GIC	11.15±2.52	

GGT: Graston Technique, GIC: Ischemic Compression, p<0.05=*, p<0.01=**, p<0.001=***; NPRS: Numeric Pain Rating Scale, NDI: Neck Disability Index.

Table-2: Inter-Group Analysis of Neck Range of Motion.

Variables	Time Periods	Groups	Mean ±SD	*p*-value
Flexion	Pre-Treatment	GGT	32.22±8.01	0.870
		GIC	32.59±8.48	
	Post-Treatment	GGT	50.74±6.46	0.000***
		GIC	39.07±7.73	
Extension	Pre-Treatment	GGT	32.22±8.01	1.000
		GIC	32.22±7.64	
	Post-Treatment	GGT	49.07±4.61	0.000***
		GIC	38.52±6.17	
Right Rotation	Pre-Treatment	GGT	49.81±12.21	0.169
		GIC	54.44±12.19	
	Post-Treatment	GGT	64.44±7.76	0.020*
		GIC	58.33±10.65	
Left Rotation	Pre-Treatment	GGT	54.44±12.19	0.169
		GIC	49.81±12.21	
	Post-Treatment	GGT	67.78±8.13	0.000***
		GIC	56.29±8.94	
Right Side Bending	Pre-Treatment	GGT	26.85±7.23	0.568
		GIC	27.96±6.97	
	Post-Treatment	GGT	35.37±5.87	0.025*
		GIC	31.67±5.88	
Left Side Bending	Pre-Treatment	GGT	26.85±7.23	0.420
		GIC	28.52±7.82	
	Post-Treatment	GGT	36.85±5.03	0.020*
		GIC	33.15±6.23	

GGT: Graston Technique, GIC: Ischaemic Compression; p<0.05=*, p<0.01=**, p<0.001=***

Discussion

This study aimed primarily to evaluate the effects of Graston technique versus Ischaemic compression on students who developed neck pain during COVID-19 pandemic. Also, it was assumed that by applying a set of interventions, cervical range of motion improved grossly

and significantly in patients with neck pain; furthermore, it was postulated that functional disability as evaluated using NDI questionnaire, also improved considerably. Results indicated significant improvements in both the groups receiving interventions. However, mean change in values in Graston technique group was more as compared to Ischaemic compression group.

Literature is limited about the direct effects of Graston technique on blood flow of the neck musculature although it has been proposed that combination of various strokes and standard protocol in this technique leads to enhancement in blood circulation in the treatment area more efficiently as compared to other tools of instrument-assisted soft tissue mobilisation technique (IASTM).[8]

Graston technique when compared with IC (Ischaemic compression) leads to statistically significant changes in reduction of pain and improvement in ROM (range of movement) with resultant enhancement in pain threshold and ROM.[11] In contrast to our current study which showed improvements by using Graston technique, literature showed Ischaemic compression to be more effective than the instrument-assisted soft tissue mobilisation technique in increasing pain pressure threshold and functional improvement.[12]

The current study did not categorise patients according to chronicity of neck pain. Due to ethical considerations, proper upper back area could not be exposed for treatment in female patients and only upper fibres of trapezius was targeted. The study was conducted during the COVID-19 pandemic, so SOPs had to be followed which made it difficult to examine the participants and even in giving treatment sessions to participants. More studies should be done on comparison of Graston technique versus Ischaemic Compression technique while targeting other muscles of the body.

Conclusion

Graston Technique was more effective and has positive effects in comparison with ischaemic compression in terms of mentioned outcome measures in managing patients with neck pain.

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