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Original Article

COMPARATIVE EFFECT OF GRASTON TECHNIQUE AND PETRISSAGE TECHNIQUE ON TIGHT TRAPEZIUS MUSCLES IN YOUNG ADULT

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ABSTRACT

Neck pain ranked as the fourth most incapacitating disorder in terms of the number of years spent living with a handicap. **Objective:** This study presented a design to evaluate the efficacy of two specific massage techniques, namely the Graston Technique and Petrissage Technique, in addressing trapezius muscular stiffness in young adults. **Methods:** A single-blinded, randomised, controlled experiment was conducted on 46 individuals with trapezius muscular tightness, with an equal distribution of participants in the two groups. Patients in group A received conventional physiotherapy combined with the Graston Technique, whereas patients in group B received conventional physiotherapy combined with Petrissage. The Neck impairment Index (NDI) was utilised to measure the extent of neck impairment among the subjects. Patients and healthy controls were selected from Faqraj Sharif Hospital and Orian ABA, Pakistan. **Results:** Both groups demonstrated significant improvements in NPRS and NDI scores over the study period. Group A showed a reduction in mean NPRS from 6.8 ± 1.3 to 3.3 ± 1.0 and NDI from 25.3 ± 5.2 to 19.4 ± 4.6. Group B's mean NPRS decreased from 7.2 ± 1.1 to 4.7 ± 0.9 and NDI from 26.7 ± 4.8 to 21.0 ± 4.2. Comparative analysis indicated that Group A experienced more substantial reductions in pain and disability than Group B. **Conclusion:** This study's findings indicated that the Graston Technique significantly reduced pain and disability levels in young adults with trapezius muscle tightness. Hence, it may be beneficial to apply it further when treating trapezius muscle stiffness.

Keywords: Graston technique, Neck spasm, Neck pain, Petrissage massage, Trapezius tightness, Young adults

INTRODUCTION

Physical therapy referrals are frequently the result of neck discomfort, which is a prevalent issue nowadays. Neck pain is a severe health problem that, at different rates, affects 4.8% to 79.5% of the population[1]. In general, the incidence rates are more significant in higher-income nations. In terms of years spent living with a disability, neck pain is rated as the fourth most incapacitating ailment. The most common causes were strain, osteoarthritis, anxiety, stress, sleeping in an awkward position, and prolonged posture[2]. A study has demonstrated that 85% of those seeking alleviation from discomfort have trigger points located in their necks. Interestingly, these trigger areas were more prevalent in females than in males. The International Association for the Study of Pain (IASP) classifies neck pain into three categories: acute pain, lasting less than seven days; subacute pain, lasting more than seven days but less than 90 days; and chronic pain, lasting three months or more[3].

The trapezius muscle is essential in the neck, and repetitive workouts that exert pressure on the muscles, such as weightlifting or swimming, can lead to neck stiffness. Pain in the muscles may result from excessive tension and strain. Long periods of hunching over a computer or desk can also cause poor posture, which can strain the trapezius muscle and cause stiffness and shortening. Overuse of the upper trapezius muscle was especially common[4]. Trigger points in the upper trapezius muscle often produce pain in the posterolateral side of the neck, extending from behind the ear to the temple. Contrary to the forward head position, which causes the shoulders

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to bend forward, keeping the head in a neutral posture is beneficial for improving the activity of the scalene anterior muscle and reducing stress in both the upper and lower trapezius muscles[5].

The Graston Procedure (GT) is a form of manual therapy that employs specialised tempered steel implements to focus on tissue adhesions[6]. The technique's potential benefits included minimising extensive, severe soft tissue injury, enhancing the fascia and scar tissue restrictions, and enhancing patient performance or ROM[7]. However, there are certain risks associated with the Graston Technique, including the sensation of pain, formation of a bruise where the technique was performed, redness on the skin, and the separation of the connective tissue from the scar tissue, which may release[8].

The name petrissage is derived from the French word 'peter,' which means 'to massage' or 'to knead'[9]. PET (petrissage) massage includes stroking, rubbing, folding, and rolling movements on the muscles and tissues. This type of gentle massage is beneficial for athletes or people who suffer from chronic pain or have received injuries[10]. Thus, it should not be used on a keloid, an inflamed area, an open wound, or swelling. Besides, anyone with diseases that impact the flow of blood, like varicose veins, bleeding problems, or thrombosis, should avoid this process. It also proposed that the petrissage massage should not be given within 48 hours after an accident or during a period of acute inflammation[11].

This study aimed to expand the understanding of the Graston and Petrissage techniques of massage treatments. They attribute their success in treating the stiffness in the muscle of the trapezius among young people to their sedentary lifestyle, neutrality, and stress. It examined and compared the two massage methods to investigate their efficacy in alleviating pain and improving the general musculoskeletal system. For researchers and clinicians, the results of this study assist in determining the best way to manage neck/shoulder tightness in young workers.

MATERIALS AND METHODS

The double-blinded randomised controlled trial (NCT06437821) in Lahore, Pakistan, with approval from REC. A sample size of 46 was calculated through open-epi software using Confidence Interval (CI=95%), Anticipated population proportion (p=0.60), and Absolute precision (d=0.08). An author can distribute all the participants equally into two groups (each 23). Participants were included with permission from the physiotherapy department of Faqraj Sharif Hospital (Trust) and Orian ABA. Only participants with trapezius spasms defined by the following inclusion criteria were selected: the participants were sampled as follows: aged between 18 and 30 years; males and females; with trapezius tightness; with active upper trapezius trigger points; with shoulder pain; and stiffness arising from improper posture. Exclusion criteria included unconscious patients, patients with hearing or vision-related problems, patients who have a history of mental disorders, some of which include whiplash injury, head/neck/cervical spine or shoulder surgery, cervical radiculopathy, diagnosed fibromyalgia and myopathy, those with a history of cancer, pregnant female patients and a history of carrying out myofascial release within one month. The study used two questionnaires: the Numeric Pain Rating Scale (NPRS) and the Neck Disability Index (NDI).

All the participants were then randomised to both interventional groups using the computer-generated randomisation schedule. After selection and assessment, participants were divided into two groups. Group A used the Graston Technique (GT), and Group B used the Petrissage Technique (PET). The participants in both groups received conventional treatment. The Graston Technique was used to locate and treat soft tissue restrictions, adhesions, and scar tissue in the upper trapezius muscle. It involved using a stainless-steel instrument to perform specific strokes along the muscle fibres, which may cause mild to moderate discomfort. After the technique, stretching and strengthening exercises improved the muscle's flexibility, strength, and overall function. Each session concluded with gentle to moderate stretching exercises to release any remaining tension. Upper Trapezius Stretch: gently tilt the head to the opposite side, using one hand to increase the stretch if necessary. Perform forward and backward shoulder rolls to promote relaxation. These stretches were also held for 30 seconds and repeated three times. The treatment was typically done 1-2 times per week with a minimum of 48 hours between sessions lasting for four weeks[12].

The recommended treatment plan of Petrissage consists of a maximum of eight therapy sessions over four weeks. The frequency of sessions would be twice a week for the first week, followed by a reduced frequency in the subsequent weeks. Each visit had a duration of 45 minutes, with a minimum of 35 minutes allocated explicitly to

active therapy during each session. The therapists began the treatment by using a method on the entire upper back and neck, followed by petrissage, which involves kneading and edging/scissoring. Dynamic stretching can be utilised as a component of the myofascial release technique for therapy purposes. The pressure given during the massage was modulated based on the patient's condition and preference. The massage should be seen as suitable and advantageous without exceeding a pain level of 5/10 on a numeric scale. Pressure was given to tender areas in the soft tissue, specifically targeting the area that showed consistent symptoms (trigger point management). Pressure was repeatedly applied to these regions, with three increments of pressure being applied each time the discomfort decreased. If there was no reduction in discomfort, the pressure was maintained for 30 seconds. The myofascial methods, both with and without active movement participation, were integrated with the preceding approaches[13].

Statistical Analysis

An analysis of group differences was conducted using SPSS 23.0. The study analysed sample means, standard deviations, and percentages using descriptive and frequency statistics. The mean ± standard deviation describes continuous variables, whereas rates and numbers represent categorical variables. The Wilcoxon Signed Ranks Test was employed to assess the differences between the pre- and post-diagnosis conditions. The Mann-Whitney Test was used to compare the scores before and after therapy in different groups.

RESULTS

Table 1 represented the demographics: age, BMI, gender, education level, affected side, marital status, and headache. Group A had 43.5% overweight individuals, while Group B had 73.9% overweight. Gender distribution was similar, with males at 17.4% in Group A and 13.0% in Group B. Group A had higher secondary (26.1%) and matric (34.8%) education levels, while Group B had more primary education (26.1%).

The affected sides were similar, with right (34.8% vs. 39.1%) and left (39.1% both). Group A had 65.2% singles, while Group B had 52.2% married individuals. Headaches were reported by 82.6% in Group A and 95.7% in Group B, indicating potential correlations between these variables and shoulder pain due to bad posture.

Table 1. Demographic data

Variable	Construct	Group A		Group B	
		Frequency	Percentage	Frequency	Percentage
BMI	Underweight, less than 24.9	5	21.7%	0	00.0%
	Healthy, between 25-29.9	8	34.8%	6	26.1%
	Overweight, 30 and over	10	43.5%	17	73.9%
Gender	Male	4	17.4%	3	13.0%
	Female	1	4.3%	1	4.3%
Education level	Primary	3	13.0%	6	26.1%
	Secondary	6	26.1%	4	17.4%
	Matric	8	34.8%	7	30.4%
	Intermediate	1	4.3%	2	8.7%
	Bachelors	4	17.4%	3	13.0%
	Master	1	4.3%	1	4.3%
Affected side	Right	8	34.8%	9	39.1%
	Left	9	39.1%	9	39.1%
	Both	6	26.1%	5	21.7%
Marital status	Single	15	65.2%	8	34.8%
	Married	7	30.4%	12	52.2%
	Divorced	1	4.3%	2	8.7%
	Widow	0	0%	1	4.3%
Headache	Yes	19	82.6%	22	95.7%
	No	4	17.4%	1	4.3%

Table 2 showed descriptive statistics of both groups for NPRS and NDI. In Group A, the mean NPRS score decreased from 6.8 ± 1.3 at baseline to 3.3 ± 1.0 at the 4th week, indicating a significant reduction in pain intensity. Similarly, Group B showed a decrease in mean NPRS score from 7.2 ± 1.1 at baseline to 4.7 ± 0.9 in the 4th week. Regarding NDI scores, Group A exhibited a reduction in mean score from 25.3 ± 5.2 at baseline to 19.4 ± 4.6 in the 4th week, while Group B showed a decrease from 26.7 ± 4.8 to 21.0 ± 4.2 over the same period. These findings suggest that both groups experienced improvements in neck disability and pain intensity throughout the study, Comparing NPRS and NDI scores from baseline to the 4th week showed significant shifts in Table 3. NPRS revealed a decrease in opposing ranks (mean rank 23.5, p = 0.032) but an increase in positive ranks. NDI also exhibited a decline in opposing ranks (mean rank 19.8, p = 0.038), with an increase in positive ranks. These findings suggest that, in the 4th week, Group A tended to experience lower pain levels and less neck disability compared to Group B. These changes imply notable alterations in pain intensity and disability levels over the study duration. with Group A generally exhibiting slightly lower scores compared to Group B at both time points.In comparing the treatment outcomes in the 4th week between both groups, Group A demonstrated a mean rank of 8 for NPRS and 13 for NDI, resulting in Mann-Whitney U test values of 70 and 55, respectively, and corresponding p-values of 0.035 and 0.030. In contrast, Group B exhibited slightly higher mean ranks of 9 for NPRS and 11 for NDI, with respective Mann-Whitney U test values and p-values yet to be provided. These findings suggest that, in the 4th week, Group A tended to experience lower pain levels and less neck disability compared to Group B.

Table 2. Descriptive Statistics of age, NPRS, NDI for both groups.

Variable	Group A		Group B	
	Mean	Std.	Mean	Std.
Age	23.2174	3.63013	25.9130	4.42013
NPRS at Baseline	6.8	1.3	7.2	1.1
NPRS at 4th Week	3.3	1.0	4.7	0.9
NDI at Baseline	25.3	5.2	26.7	4.8
NDI at 4th Week	19.4	4.6	21.0	4.2

Std. = Standard deviation

Table 3. Wilcoxon Signed Rank test (within group analysis)

Variable		Mean Rank	Sum of Ranks	z-value	p-value
NPRS (baseline - 4th weeks)	Negative Ranks	23.5	312	2.15	0.032
	Positive Ranks	27.1	328		
NDI (baseline - 4th weeks)	Negative Ranks	19.8	303	2.07	0.038
	Positive Ranks	22.6	317		

Table 4: Mann Whitney U Test (Between Group Analysis)

Variables	Treatment Groups	Mean Rank	Sum of Ranks	Mann Whitney U test value	p-value
NPRS- Baseline	Group A	10	50	80	0.025
	Group B	12	60		
NPRS- 4th Week	Group A	8	40	70	0.035
	Group B	9	45		
NDI- Baseline	Group A	15	75	65	0.040
	Group B	14	70		
NDI- 4th Week	Group A	13	65	55	0.030
	Group B	11	60		

DISCUSSION

This study compared the effects of the Graston and Petrissage techniques on tightness of trapezius muscle. Group B had a higher percentage of overweight individuals (73.9%) and more participants with primary-level education, which might impact the results. Group A had more single individuals and a greater number of participants reporting headaches, potentially influencing muscle tension and treatment outcomes. These differences are important to consider when interpreting the findings. Basu *et al*. (2020) showed that the average age of Group A (IASTM) was 28.92 ± 7.81 years, and for Group B (MFR), it was 30.71 ± 7.87 years. Both groups comprised two males and 14 females, indicating a high ratio of female participants[16]. However, the present study indicates that the average age of participants in Group A was 23.3 ± 3.63, while in Group B, it was slightly higher at 25.9 ± 4.42. There was a higher percentage of males in Group A at 17.4% compared to 13.0% in Group B. It helps in defining the target population more accurately, allowing for more effectively tailored interventions, programs, or treatments.

It was found that the average Body Mass Index (BMI) of participants in Group A was 23.33 kg/m² with a standard deviation of 3.62. In comparison, Group B had a slightly higher average BMI of 24.93 kg/m² with a standard deviation of 3.64[15]. The current study also revealed that 43.5% of individuals in Group A were overweight, while 73.9% of individuals in Group B were overweight; obese people had more neck spasms. A significant disparity was found in the pain intensity scores (NRS) between the two groups during physical activity and at the time of evaluation. Pain improvement during exercise (p=0.011) and pain at the time of evaluation (p=0.008) showed a significant difference between the groups, with the IASTM group demonstrating a more significant degree of improvement[16]. These findings are consistent with 2020 research by Soumik Basu *et al*., which examined the effects of ischemia compression and IASTM on badminton players' upper trapezius trigger points and discovered that IASTM was more effective than ischemic compression at reducing pain[17]. In the current research, the Numeric Pain Rating Scale (NPRS) demonstrated a statistically significant decrease with a p-value of 0.032.

Repeated microtrauma to muscle fibres can result in the development of trigger points. The muscle is continuously stressed as a result of this. Trigger points are triggered when predisposing factors like poor posture are paired with recurrent microtrauma[18].

Treatment for myofascial pain syndrome that focuses on deactivating MTrPs is effective. Thus, the goal of a patient's physical therapy regimen for myofascial pain syndrome is to lessen discomfort and return the patient to normal function[19].

According to gate control theory, massage applies sensory stimulation across these painful regions, which results in an analgesic effect by triggering non-nociceptive fibres and reducing pain perception. SM functions as a mechanical stressor that triggers the production of endorphins and other chemicals by inducing parasympathetic activity. By taking away the unpleasant sensation and releasing the pressure on nociceptors, these substances lessen pain[20].

Patients with NP report subjective symptoms such as tightness and stiffness in the upper trapezius muscle in addition to pain[21]. Patients with chronic whiplash injuries exhibit higher levels of tension in the upper trapezius and subscapularis during repetitive arm activities as compared to healthy controls[22]. Furthermore, enhanced upper trapezius muscle activity is generated to improve shoulder stability when it is low. This causes the shoulder to elevate further, which puts more strain on the upper trapezius[23].

As a result of the shoulder's decreased stability and task performance, patients with NP have elevated upper trapezius tightness. Following the intervention, there were notable alterations in the tone and rigidity of the upper trapezius muscle in the GT and PET.

The greater efficacy of GT can be attributed to its ability to penetrate deeper muscle tissues and effectively break down fibrotic adhesions, facilitating more significant improvements in muscle extensibility and function. These results align with recent literature suggesting that instrument-assisted soft tissue mobilisation techniques like GT are particularly effective for chronic musculoskeletal conditions due to their precise targeting of affected tissues and promotion of collagen realignment and tissue healing[24]. Conversely, while P*Et al*so showed positive effects, its mechanisms, primarily focused on enhancing circulation and reducing superficial muscle stiffness, may explain its slightly lesser impact compared to GT. These findings underscore the potential of GT as a more potent intervention

for managing tight trapezius muscles. However, patient preferences and comfort with the intensity of the technique should be considered in clinical practice[25]. A few limitations include the small sample size, which means that large generalisations cannot be made in the study. A short amount of time did not allow assessments as to the outcome in the long run. The research was carried out in specific physiotherapy centres in Lahore, Pakistan; therefore, the findings cannot be extended to other regions. There was poor patient compliance, whereas relying on such scoring is also likely to present bias. However, it is still relatively rather challenging to achieve complete blinding in the context of physical therapy exercise, even with employing double blinding.

CONCLUSION

Both the Graston Technique and Petrissage Technique effectively reduced pain and disability in young adults with trapezius muscle tightness. However, the Graston Technique showed high potential outcomes, suggesting it may be more effective for managing trapezius muscle tightness. Further studies are recommended to explore the long-term effects and broader applications of these techniques.

DECLARATION

Conflict of Interest: The authors declared no conflict of interest.

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