



Efficacy Of Deep Friction Massage And Ultrasound In The Treatment Of Upper Trapezius Spasm- A Randomized Control Trail

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ABSTRACT:- The purpose of the study was to compare the efficacy of Deep Friction Massage (DFM) and Ultrasound in relieving pain and improving cervical ROM in patients suffering with upper trapezius spasm. A RCT was performed among 50 patients of both genders, aged 25-60 years at 2 tertiary care hospitals. The participants were randomly divided among 2 groups where group A received DFM (n = 25) and Group B received Ultrasound continuous mode, with a frequency of 1 MHz, Intensity 1 W/m² (n=25). 6 sessions were given to both the groups on daily basis with treatment time of 10 minutes for almost 6 months of duration. Results revealed significant improvements in right flexion, left flexion and left rotation (p<0.05). Patients with upper trapezius spasm were shown to benefit from DFM when compared with ultrasound accompanied by improved pain symptoms on the VAS scale.

Keywords:- Deep Friction Massage, Spasm, Trigger points, Ultrasound, UpperTrapezius

I. INTRODUCTION

Cervicogenic spasm and pain is one of the common musculoskeletal illness, with around 30-50% of the people affected every year and two out of every three individuals suffering with it in their lifespan^[1-3]. The pain is found to be more prevalent in the middle age females whereas, it differs with a mean of 13% (range 5.9 - 38.7 %) among individuals^[4]. The concern of researchers are increasing as patients affected from both the neck and back pain spent around 73% more on healthcare than those without spine and neck problems. Hence, it is causing the expenses to increase by 65% from 1997 to 2005^[5]. More than 50% of employees identified a linkage between their occupation and neck pain^[6], while 14% experienced activity restrictions due to neck soreness each year^[7].

The neck spasm is commonly observed on the posterior aspect and between the bases of neck to shoulder mainly indicating the involvement of upper trapezius muscle^[8]. Researchers believe that the sedentary lifestyle has enhanced the pain of European workers that use computer for at least a quarter of the employed day^[9]. This upsurges the time with motionless body postures and tiresome movements of the shoulder, arm and hand; leading it to the development of musculoskeletal disorders^[10,11].

Several treatment protocols, interventions and modalities are being utilized and introduced in market to reduce spasm. The purpose of these modalities is to promote relaxation and pain relief, in addition to a wide variety of health situations such as osteoarthritis^[12], fibromyalgia^[13] and inflammation after exercise^[14]. Massage has been considered as a treatment of choice for numerous conditions such as musculoskeletal injuries, relaxation, cancer, stress, pregnancy^[15,16] but unfortunately the physical therapist are either untrained or reluctant to use it in their clinical settings. However a number of researchers have identified massage therapy as clinically pertinent outcome that demonstrates healthier results than the natural regaining of the control group^[17]. The practitioners assume that applying massage for 5-minutes soon after strenuous exercise is found to be beneficial^[17]. Indirect evidence exists signifying that massage may be beneficial on factors related to an individual's psychological state. While these investigations verified improvements in blood pressure^[18], mood

status^[19,20] and perception of recovery^[21,22]. Deep Transverse Friction Massage (DTFM) has also been recommended as a treatment option for tendon injuries such as tennis elbow^[23]. Under the domain of electrotherapy, ultrasound (ultrasound) has been also described as micro-massage that produces electricity through vibration^[24]. Ultrasound therapy has achieved recognition as an essential technique in the treatment of acute and chronic musculoskeletal disorders. It works at a frequency of more than 20 000 Hz/s^[21]. Experimental studies have revealed that it is likely to heat deeper structures, such as joints, muscle and bone with ultrasound^[22,23]. In spite of extensive research about the mechanism of working of ultrasound, no definite explanation in the beneficial effect has been found. Ultrasound has seen expansion not only as diagnostic imaging gear but also as a therapeutic modality in which energy is deposited in tissue to induce various biological effects^[24]. Interestingly, According to Food and Drug Administration—Approved Modes for Ultrasound Therapy for Tissue warming is hand held, 1–3 MHz Continuous or repeated burst^[25]. Low-intensity pulsed ultrasound has therapeutic applications to speed up the healing process in case of bone fractures, including nonunion^[26]. A number of studies have been conducted using different modes, intensities and different types of massages that would be more beneficial in relieving pain and increasing the range of motion in combination with therapeutic exercises^[21-25]. The aim of the present study was to determine the individual effects and also to determine the appropriate treatment responsible for better prognosis in our demographic clinical settings.

II. METHODOLOGY

An experimental study was conducted at two renowned tertiary care hospitals, in Karachi. The sample was randomly divided into two groups; Group A and Group B with 25 participants equally assigned in each group.

1.1 INCLUSION/EXCLUSION CRITERIA

Individuals of both the genders aged between 25-60 years signing the consent form and voluntarily agreeing to participate in the study were included. Also, patients presenting with neck spasm in the upper trapezius muscle with a pain lasting for more than 3 months, and are not given any physical therapy treatment since last 3 months. The individuals with CNS deficits, cognitive deficits and those that were on anti-inflammatory drugs or on analgesics were excluded from the study. Moreover, patients receiving cervical PIVD, neuralgic pain and brachialgia in the upper extremity, spondylolisthesis cases, fractures in the clavicle, scapula, cervical or thoracic vertebra or humerus, any known psychiatric or psychological were also excluded. Patients receiving treatment like vapocoolants, dry needling, acupuncture, injections were also not included. Other participants that are under treatment or medication, skin disorders which would be increased by massage or ultrasound, any malignant or benign tumors, any recent unhealed scars or wounds, early bruising (that are not safe for massage) or radiotherapy in the last 6 months were also eliminated.

1.2 PROCEDURE

50 selected participants with upper trapezius spasm were randomly divided into 2 groups. The nature of study and purpose was thoroughly explained to the participants as soon as they filled the consent forms. The participants were provided with treatment in a secluded area and a qualified physical therapist performed all the assessments and baseline measurement on the first day (pre-test score), these were taken before starting the treatment. Total 6 Treatment sessions were given to both the groups on daily basis, Group A received Deep Friction Massage with the treatment time of 10 minutes whereas Group 2 received ultrasound, continuous mode, F = 1 MHz with Intensity 1 W/m², for 10 minutes. After the treatment sessions were completed participants were reassessed (post-test scores) by using Neck Pain Disability Index, Visual Analog Scale and Cervical Range of Motions such as Flexion, Extension, Lateral flexion and Rotation were take using a goniometer

III. DATA ANALYSIS

The mean and standard deviation of the values for the pain intensity and ROM measurement is to be calculated. Independent T test was used for the comparison of the difference between Group A and Group B along with the difference in pre and post treatment. The entire statistics were analyzed using the SPSS version 20

IV. RESULTS

Group A and B consisted of 25 patients equally where 17 females and 8 males, with a mean age of 46.5±12.2 years were included in Group A whereas group B consisted 18 females and 7 males with an age of 41.5 ± 10.4 years DFM shows changes in both the pre and post results (DFM: pre = 3.68± 0.69, post = 1.72±0.79). Hence showing significant improvements (p<0.05). An independent T- test was applied to reveal the differences between the groups. Statistically significant results were obtained in flexion (P<0.05), left and

right lateral flexion ($P<0.05$) and left rotation. Interestingly, the scores of extension and right rotation did not reach the significant levels ($p=0.3$ and $p=0.9$) respectively.

Mean±SD				
Variable	Treatment	Pre	Post	P-value
Pain Intensity	DFM	3.68±0.69	1.72±0.79	0.005
	Ultrasound	3.42±1.13	2.46±0.9	
Flexion	DFM	39.16±4.71	45.96±3.06	0.004
	Ultrasound	37.65±4.16	43.57±3.03	
Extension	DFM	47.16±5.79	55.52±4.15	0.318
	Ultrasound	49.0±4.77	54.46±3.31	
Left Lateral Flexion	DFM	35.76±4.15	42.24±2.18	0.000
	Ultrasound	34.34±4.14	39.42±2.19	
Right Lateral Flexion	DFM	35.56±4.79	41.92±2.1	0.017
	Ultrasound	34.34±3.94	40.11±2.73	
Left Rotation	DFM	68.40±4.33	75.16±2.74	0.027
	Ultrasound	68.46±3.21	73.57±2.43	
Right Rotation	DFM	67.72±6.81	74.6±5.58	0.948
	Ultrasound	69.03±4.11	74.53±2.48	

Table 1: Reveals the mean and SD along with the level of significance

V. DISCUSSION

The study focused on determining the effectiveness of both DFM and ultrasound when treating the patients with upper trapezius spasm. The data analysis revealed that there were significant improvements in flexion and rotation statistically. Similar results were shown in a study conducted by Sharma et al 2010 when two different trigger point techniques were used in combination with the ultrasound and massage^[27]. Significant differences were observed in the VAS score ($p<0.05$) and neck side flexion ROM in both the groups. The group receiving ultrasound therapy however showed improvement in the pre and post score of the treatment but no significant improvements were shown when compared with DFM. Hence ultrasound treatment with deep pressure works on the painful tissues and improves both circulation and pain that further increases the ROM.

Researchers found that at the depth of 5 cm, ultrasound preceded by ice treatment yielded little or no thermal benefits^[28]. The use of heating in physical therapy, in highly captivating tissues such like tendon and bone is supportive to enhance restoration without injury reference. Alternatively, the heat can be concentrated by fixated beams until tissue is coagulated for the purpose of the tissue ablation. Now, the modality classically has a base unit for producing an electrical signal and a handheld transducer^[24]. The objective is to warm muscle, tendons and other tissues to improve blood circulation or blood movement and to accelerate the healing process^[25]. A study on human muscle by Draper et al has shown that, treatment more than 10 minutes of 1-MHz constant ultrasound at intensity of 1.5 W/cm² with 80 cm², the temperature in the gastrocnemius muscle at a depth of 3 cm was amplified by 5°C^[29]. These researchers emphasized on the 20 cm² transducer applied to a skin area, and they considered it necessary to give ultrasound for 7 or 8 minutes in order to attain upsurge in temperature

Alternatively, our study justifies that massage therapy is responsible to alter the local circulation thus enhancing the mobility and reducing pain. Our results have shown significant improvement in reducing pain intensity documented over the VAS scale (1.72±0.79). These results showed similar results in another study where therapeutic ultrasound was compared with DFM in Supraspinatus Tendinitis^[30]. The treatment was given for 10 – 12min for DFM, every day for 10 days whereas ultrasound was given with an intensity of 0.6 w/cm², with 1 MHz frequency, each day 30. The post score on the 10 day showed significant improvements in pain intensity (U/S – 3.55, DFM = 4.40) along with the shoulder abduction. But when they both were compared, DFM showed significant improvement over U/S ($p=0.014$) revealing that DFM has slight edge.

Initially, DFM was actually claimed to be too strenuous to administer^[31] but later on, a Cochrane review conducted on Randomized Control Trails (RCTs) and Clinical Controlled Trails (CCTs) claimed Deep Transverse Friction Massage (DTFM) to be one of the essential physiotherapy interventions recommended for

the management of tendinitis and soreness^[32]. Joint ROM, muscle strength, endurance and functional status was also assessed in the review. Although the effects claimed were non-specific as they were combined with other interventions also, hence lacking in clinical evidence.

In accordance with previous results, Mayer et al in his study showed a relief in pain up to 50% among 31 male sprinters with one-sided, untreated Achilles tendinopathy^[33]. These participants accomplished 4 weeks of physiotherapy, 10 sessions of DFM, ice, pulsed ultrasound, and sensory motor training^[33]. According to Dureja GP for the long term physiotherapy (pulsed U/S and exercise package) is the paramount option that can be efficient in treating the upper trapezius spasm^[34]. According to the World Federation for Ultrasound in Medicine and Biology^[35] ultrasound on another days for a lapse of either 1 or 3 weeks enhanced arteriole blood movement, this dose was selected because same intensity was used by Dyson et al (aSATA intensity of 0.2 W/cm²) for the management of people with varicose ulcers hence revealing the clinical significance^[36]

In a case study of conducted by Avery R (2012)^[37] therapeutic massage has shown to be significant in treating the patients with Cervical Degenerative Disc Disease^[37]. The 66 years old female experienced steady increase in agony-free in cervical ROM and also reported discontinued usage of over the counter pain killers^[37]. Interestingly, a decrease in the adverse symptoms had been observed along with moderate improvement in the cervical ROM. A decrease in pain due to massage increased the functional daily activities in the study. The patient's pain-free ROM increased in all ranges and the lateral flexion was done completely pain-free at the end of five sessions of massage therapy that is similar with the results of our study. Multiple studies has shown the effectiveness of massage therapy where reducing pain^[38] and increasing ROM^[39] was their main area of focus, so our study focused with an aim to relate the effectiveness between both the treatment protocols and to create an awareness among the physiotherapists about the usage of most effective technique for our demographic location.

Dolder et al 2010^[38] and Thompson et al 2011^[39] in their studies focused on the effects of massage on shoulder and chronic cervical pain respectively. The results reveled increased pain-free ranges in particularly shoulder flexion(mean:9.6cm,95%CI :5.14.0cm) and for external ROM (mean:16.4 degrees,95% CI 12.5-20.3 degrees)^[38]. However, for the treatment of chronic cervical pain patients from study group A witnessed the reduction in pain by rating the pain intensity of 6 to 2 on the VAS whereas of group B reported the decline in pain intensity from 2 to 1 out 10 with overall improved ability to sleep^[39]

Researchers claim that treatment sessions are directly dependent on the phase and site of the lesion^[40]. It was found that massage therapy decreased pain and works effectively more in patients with uncomplicated upper trapezius spasm after 6 treatment sessions. A course of relaxation massage taught commonly in massage schools and generally used in practice, reduced pain and increased functions even after the first treatment session. The improvement in pain and function is due to the time spending by therapist, treatment in peaceful and relaxing environment, receiving care from therapist, enhancing body functions awareness^[37]. In our society neck and shoulder pain is common and its prevalence is increasing day by day with nearly 13% of daily and a life time 50%^[41, 42]. Several therapies and modalities have been tested with contradicting results and at the present no single treatment strategy is accepted^[43]

VI. CONCLUSION

In this study, it was shown that Deep Friction Massage is found to be more effective than ultrasound in increasing flexion, left and right lateral flexion and left rotation whereas extension and right rotation and pain however it is recommended that more researches to be conducted with a larger sample size using modern technologies with least side effects to improve the Quality of Life that was a limitation of the study

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