A Comparative Study on Dry Needling and Ultrasound Therapy to Treat the Trigger Points

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ABSTRACT

AIM: The aim of this study was to observe the effect of Dry Needling versus ultrasound Therapy to treat Trigger points.

Method:

A total of 60 patients were divided into two groups: Group A(N=30) &Group- B(N=30) Group A patients received Dry needling and Group B patient received Ultrasound Therapy both therapies were given to the patients for 15 days continuously. The pain was measured using a visual analog scale (VAS).

RESULT:

The present study shows that Dry Needling (group -A) significantly reduces pain more effectively than (group B).

CONCLUSION:

Dry needling is more clinically effective in terms of reducing pain in patients with Trigger points than Ultrasound Therapy.

INTRODUCTION:

Musculoskeletal pain is significant and common medical condition up to 85% of the general population will experience. At least one episode of musculoskeletal pain during their lifetime. (1) In 1940 'Steindler first uses the term trigger point. (2) In 7 th century when SUN SIAO discovered what he called 'A- SHI POINTS', which corresponds to the modern-day trigger point. (3) it develops in the myofascial, mainly in the center of a muscle belly where the motor end plate enters. (4) Myofascial pain syndrome is a common painful muscle disorder caused by a myofascial trigger point.(5) Trigger point (TrP) is defined as a hyperirritable spot within a taut band of skeletal muscle fascia, which produces pain on compression at a target and around the surrounding structures.(6) these palpable nodules are present within the tight muscle at the size of 2-10 mm and can demonstrate at different places in any skeletal muscle of the body.(4) Referred pain is an important characteristic of a trigger point. It differentiates a trigger point from a tender point, which is associated with pain at the site of palpation only. Many researchers agree that acute trauma or repetitive microtrauma may lead to the development of a trigger point. eg predisposing activities include holding a telephone receiver between the ear and shoulder to free arms, prolonged ending over a table, sitting on a chair with poor back support, and improper height of the armrest.(5) The formation of a trigger point is caused by the creation of a taut band within the muscle. This band is caused by excessive acetylcholine release from the motor endplate combined with inhibition of acetylcholine esterase and upregulation of nicotinic acetylcholine receptors. Initially, taut bands are produced as a normal protective, physiological measure in the presence of actual or potential muscle damage. They are thought to occur in the response to unaccustomed eccentric or concentric loading, sustained postures, and repetitive low-load stress. However, when sustained they contribute to sustained pain. Pain caused by the trigger point is due to hypoxia and decreased blood flow within the trigger point. Pain caused by the trigger point is due to hypoxia and decreased blood flow within the trigger point. This leads to decreased pH which activates the muscle nociceptors to restore homeostasis. This causes peripheral sensitization .trigger points are also involved in central sensitization. The mechanism remains unclear but the trigger point maintains nociceptive input into the dorsal horn and therefore contributes to central sensitization. (7)The trigger point is often seen in the upper trapezius muscle and causes pain attacks in about 85% of the population.(8)

METHODOLOGY:

Subjects with trigger points 18 – 50 years of age from physiotherapy OPD of University Institute Of Health Sciences, Chhatrapati shahuji maharaj university, Kanpur. The purpose of the study was explained to all the patients and all volunteered to take part in the study. Informed consent was taken from all of them.

Study Design:

A Pre-Post-test comparative analysis design based on a cross-sectional study will be included for the collection of data.

1) Group A- The subjects will receive dry needling therapy for 15 days. Total No. of subjects-30

2) Group B- The subjects will receive ultrasound therapy for 15 days. Total No. of subjects-30

Inclusive Criteria

- The patient will be either sex and age ranging from 18-50 years.
- Patients with a trigger point.

Exclusive Criteria

- Patients with Headaches due to trauma
- Patients suffering from Tumor, Psychiatric, inflammatory, rheumatic, neurological, and connective tissue disorders
- Patients having Diabetes mellitus.
- Those who have not given their consent for the study.
- In a patient with needle phobia.
- Unwilling patient- patient beliefs fear
- In to a muscle or area in patients on anticoagulant therapy or with thrombocytopenia, where hemostasis by manual compression can not be carried out appropriately.
- Into an area or limb with lymphoedema.
- Compromised immune system.
- Infection
- Pregnancy
- epilepsy
- Study Duration
- The period of study will be 6 months

Treatment was given for 3 sessions per week and the total treatment period was for 15 days.

GROUP A: DRY NEEDLING: The patient was asked to prone lying or supine on the couch according to the muscle to be palpated and the therapist in a sitting position to reach the muscle in a comfortable position. The muscle was carefully palpated using pincer and flat palpation accordingly and the taught or trigger points were identified and needled until the muscle was observed or to the patient's tolerance level.

GROUP B: ULTRASOUND THERAPY: Ultrasound therapy will be given in group B. The subject was laid or in a sitting position on a couch and the affected side was kept on the couch in a comfortable positioning according to the muscle. The therapist will stand or sit on the affected side and treat with the head of the ultrasound therapist with a frequency of 1 or 3 MHz.

DATA ANALYSIS AND INTERPRETATION

STATISTICAL TOOL:

1. **PAIRED 't' TEST:**

To calculate the parameter we will use the following formula:

$$t = \frac{\bar{d}}{\sqrt{\frac{s^2}{n}}}$$

where'd bar' is the mean difference between two samples

S^2 is the sample variance,

n is the sample size and

t is a paired sample t–test with n-1 degrees of freedom.

An alternate formula for paired sample t-test is:

$$t = \frac{\Sigma d}{\frac{\sqrt{n(\Sigma d^2) - (\Sigma d)^2}}{n-1}}$$

2. UNPAIRED 't' TEST: The test is used only when it can be assumed that the two distributions have the same variance. (when this assumption is violated, see below.) the *t* statistic to test whether the means are different can be calculated as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{x_1x_2} \cdot \sqrt{\frac{1}{n1} + \frac{1}{n2}}}$$

$$S_{x_1x_2} = \frac{\sqrt{(n_1 - 1)S^2X_1 + (n_2 - 1)S^2X_2}}{n_1 + n_2 - 2}$$

Note that the formulae above are generalizations of the case where both samples have equal sizes (substitute n for n_1 and n_2).$S_{x_1x_2}$ is an estimator of the common standard deviation of the two samples: it is defined in this way so that its square is an unbiased estimator of the common variance whether or not the population means are the same.

In these formulae.

n = number of participants.

1= group one , 2 = group two.

N – 1 is the number of degrees of freedom for either group, and

The total sample size minus two (that is, $n_1 + n_2 - 2$) is the total number of degrees of freedom, which is used in significance testing.

DATA PRESENTATION

TABLE 1. The comparative mean value, mean difference, standard deviation and paired t-values between pre-test and post- test of VAS for pain in Group A.

S. NO	TEST	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED t VALUE & P VALUE
1.	PRE- TEST	7.20	5.4	1.070	27.643 P= 0.001
2.	POST- TEST	1.80			

TABLE 2. The comparative mean value, mean difference, standard deviation and paired t-values between pre- test and post- test of NPRS for pain in Group A.

S. NO	TEST	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED t-VALUE & P VALUE
1.	PRE-TEST	7.87	6.07	1.015	32.743 P= 0.001
2.	POST-TEST	1.80			

TABLE 3. The comparative mean value, mean difference, standard deviation and paired t-values between pre-test and post-test for VAS for pain in Group B.

S. NO	TEST	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED T-VALUES & P VALUE
1.	PRE-TEST	7.60	3.77	1.006	20.502 P=0.001
2.	POST-TEST	3.83			

TABLE 4. The comparative mean value, mean difference, standard deviation and paired t-values between pre- test and post- test of NPRS for pain in Group B.

S.NO	TEST	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	PAIRED t-VALUE & P VALUE
1.	PRE – TEST	7.53	3.56	0. 774	25.244 P= 0.001
2.	POST- TEST	3.97			

TABLE 5. The comparative mean value, mean difference, standard deviation and unpaired 't' values of VAS & NPRS between Group A and Group B.

OUTCOME	ANALYSIS	GROUP	MEAN	t VALUE	P VALUE
VAS	PRE	A	7.20	- 1.258	.213
	PRE	B	7.60		
	POST	A	1.80	- 6.568	0.001
	POST	B	3.83		
NPRS	PRE	A	7.87	1.306	.197
	PRE	B	7.53		
	POST	A	1.80	- 10.418	0.001
	POST	B	3.97		

IN THE ANALYSIS AND INTERPRETATION OF VAS IN GROUP A

The paired t- value was 27.643 which showed that there was a statistically significant difference at 0.001 levels between pre and post result. The pre test mean was 7.20 and the post test mean was 1.80 and the mean difference was 5.4 which showed that there was statistically significant pain relief in the trigger points due to the effect of the dry needling.

IN THE ANALYSIS AND INTERPRETATION OF THE NPRS IN GROUP A

The paired t-value was 32.743 which showed that there was statistically significant difference at 0.001 levels between pre and post result. The pre test mean was 7.87 and the post test mean was 1.80 and the mean difference was 6.07 which showed that there was statistically significant pain relief in the trigger points due to the effect of the dry needling.

IN THE ANALYSIS AND INTERPRETATION OF THE VAS IN GROUP B

The paired t- value was 20.502 which showed that there was statistically significant difference at 0.001 levels between pre and post result. The pre test mean was 7.60 and the post test mean was 3.83 and the mean difference was 3.77 which showed that there was statistically significant pain relief in the trigger points due to the effect of the ultrasound therapy.

IN THE ANALYSIS AND INTERPRETATION OF NPRS IN GROUP B

The paired t- value was 25.244 which showed that there was statistically significant difference at 0.001 level between the pre and post result. The pre test mean was 7.53 and the post test mean was 3.97 and the mean difference was 3.56 which showed that there was statistically significant pain relief in the trigger points due to the effect of ultrasound therapy.

IN THE ANALYSIS AND INTERPRETATION OF VAS IN GROUP A AND GROUP B

The unpaired t- value was post test of Group A and Group B was -6.568 which showed that there was statistically significant difference at 0.001 level between Group A and Group B . The pre mean of Group A was 7.20 and Group B was 7.60 and the post mean of Group A was 1.80 and Group B was 3.83 which showed that there was statistically significant reduction in pain in response to treatment in Group A when compared to Group B.

Therefore, the study was rejecting the null hypothesis and accepting the alternate hypothesis.

IN THE ANALYSIS AND INTERPRETATION OF NPRS GROUP A AND GROUP B

The unpaired t- value was post test of Group A and Group B was - 10.418 which showed that there was statistically significant difference at 0.001 level between Group A and Group B. The pre mean of Group A was 7.87 and Group B was 7.53 and the post mean of Group A was 1.80

and Group B was 3.97 which showed that there was a statistically significant reduction in pain in response to treatment in Group A when compared to Group B.
Therefore, the study was rejecting the null hypothesis and accepted the alternate hypothesis.

CONCLUSION

Trigger points must be considered an etiology for pain. Treatment of trigger points is a good alternative when other conservative treatments have failed. Dry needling is a relatively safe and simple treatment modality. Excellent patient satisfaction is often seen when dry needling is combined with conventional modalities. This study shows that there was reduced pain statistically in trigger points pain patients after the treatment with dry needling than with ultrasound therapy. Thus the study concluded that dry needling was an effective treatment or trigger points pain and the visual analogue scale and numerical pain rating scale could be used as assessment tools for trigger points pain patients.

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