

## **Comparison of Ultrasound Therapy & Transcutaneous Electrical Nerve Stimulation in the Treatment of Upper Trapezitis**

**<sup>1</sup>Brite Sagaya Raina, <sup>2</sup>Dr Arvind Manhas, <sup>3</sup>Muthukumaran Jothilingam, <sup>4</sup>Dr Venkatesh**

<sup>1</sup>Independent Resarcher Physiotherapist, Chennai

<sup>2</sup>In charge Principal Shree Ghantakaran Mahavir Physiotherapy College Godhra

<sup>3</sup>Professor, Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical Science, Chennai

<sup>4</sup>Professor Shree Ghantakaran Mahavir Physiotherapy College Godhra

**Corresponding Author: Muthukumaran Jothilingam**, Professor, Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical Science, Chennai. Emailed: muthukumaranjothilingam3@gmail.com

### **Abstract:**

**Aim:** To compare the effectiveness of ultrasound and transcutaneous electrical nerve stimulation in treatment of upper trapezitis. **Objective:** To determine and compare the effectiveness of ultrasound therapy and transcutaneous electrical nerve stimulation in upper trapezitis. Using convenient sampling method (as the patient comes the odd number will be allotted to Group-A and even number will be allotted to Group-B by the research supervisor) thirty samples with upper trapezitis will be selected based on inclusion and exclusion criteria. Informed consent will be obtained from all the participants. All participants will undergo trigger point assessment by ultrasonogram and their pain will be measured in Numerical pain rating scale (NPRS). Participants will be assigned into two groups 15 numbers in each randomly. Statistical Analysis shows that intervention of Ultrasound Therapy is more significant than Transcutaneous Electrical Nerve Stimulation in treating by reducing Upper trapezius trigger point and reducing pain. From the results, it has been concluded that ultrasound therapy [group A] are more effective than Transcutaneous Electrical Nerve Stimulation [group B] in decreasing pain and trigger point.

**Keywords:** Upper Trapezitis, Ultrasound therapy, TENS

### **Introduction:**

Trapezius is one of two large superficial muscles that extend longitudinally from the occipital bone to the lower thoracic vertebrae and laterally to spine of scapula. Its functions are to

move scapulae and support the arm .The trapezius has three functional regions: descending, ascending and middle .The muscle contribute to scapulo humeral rhythm through attachment on clavicle and scapula ,and to head balance through muscular control of cervical spine  
Origin: The muscle attaches to the medial third of the superior nuchal line, external occipital protuberance, nuchal ligament and spinous processes of C7-T12 vertebrae.Insertion: The muscle inserts on the lateral third of clavicle, acromion and spine of scapula. Nerve supply: Spinal root of accessory nerve and cervical nerves C3 & C4. Blood Supply: Transverse cervical artery. The trapezius commonly contain trigger points ,and referred pain from trigger points bring patient to office more often than for any other problem. Symptoms: headache on the temples / tension , pain behind the eyes , stiff neck, limited range of motion, intolerance to weight on your shoulder Neck pain has been the most common chief complaint among working men and women. Working postures with the neck in extreme flexion increase the load moment three to four times on the neck causing spasm of the neck muscles. Also working tasks that involve continuous arm movements always generate a static load component on these muscles, the principal muscle to carry this load is the trapezius. For people who work at desks and computers, or who spend many hours driving, the upper trapezius becomes very sore and painful. 3 About two thirds of people experience neck pain at some point in their lives. Neck pain prevalence varies widely in different studies, with a mean point prevalence of 13 % (range 5.9% – 38.7 %) and mean lifetime prevalence of 50 % (range 14.2% – 71.0 %). Trapezitis is an inflammation of trapezius muscle which involves myofascial pain syndrome. Muscle spasm occurs early after inflammation. This feels like tightness in the muscles and is sometimes painful. When basic injury is not treated, spasm causes formation of muscle knots, called trigger points. The knots form because the spasm keeps the muscle continuously “on”. As muscles are not designed for this continuous work, over a period the muscle gets overloaded and forms these knots. As a result, treatment of the spasm is necessary to reduce this problem. The Myofascial trigger point in the trapezius is most commonly found at the midpoint of the upper border of the muscle. Trigger points (TrP’s) are typically located by palpation. Simons described criteria for identification of taut band - a tender spot on the taut band, referred pain or altered sensation at least 2 cm beyond the spot, elicited by needle penetration or pressure held for 10 seconds; and restricted ROM in the joint, the muscle crosses. Some authors contend that when pressure is applied to TrP’s, a “jump sign” is elicited or patient reacts with facial grimacing or verbal response. Two main types of trigger points are described: active and latent. Active trigger points are those that

may be responsible for the presenting pain complaint. They may also be associated with less readily definable symptoms such as weakness, paresthesia, or temperature changes, and they reproduce spontaneous pain. Latent trigger points present with muscle shortening and pain occurs only on the application of external pressure. These trigger points may become activated by a variety of stimuli, including poor posture, overuse, or muscle imbalance. 4 Fascia is a tough connective tissue which spreads throughout the body in a three-dimensional web form, from head to toe. The fascia is ubiquitous, surrounding every muscle, bone, nerve, blood vessel and organ all the way down to the cellular level. Tightening of the fascial system is a histologic and physiologic and bio mechanic protective mechanism that is a response to trauma. The fascia loses its pliability, becomes restricted and is a source of tension to the rest of body. The ground substance solidifies, the collagen becomes dense and fibrous and the elastin loses its resiliency. Over time this can lead to poor muscular biomechanics, altered structural alignment and decreased strength, endurance. Ultrasound was originally introduced into physiotherapy as an alternative diathermy technique. Its main use has been in the treatment of soft tissue injuries, It has been demonstrated both in the laboratory, and in clinical trials that ultrasound can stimulate tissue repair and wound healing if correctly applied. Ultrasound has been shown to enhance collagen synthesis by fibroblasts. Ischemic compression ,stretch of upper trapezius muscle ,transverse friction massage are manual techniques to help patients with TM. These manual therapy appear to have instant improvement on pain . Ischemic compression and dry needling can both be recommended. Trapezitis is an inflammation of trapezius muscle which involves myofascial pain syndrome. Muscle spasm occurs early after inflammation. This feels like tightness in the muscles and is sometimes painful. When basic injury is not treated, spasm causes formation of muscle knots, called trigger points. The knots form because the spasm keeps the muscle continuously “on”. As muscles are not designed for this continuous work, over a period the muscle gets overloaded and forms these knots. As a result, treatment of the spasm is necessary to reduce this problem. This happens most often with injuries to the neck and back. Physiotherapy in upper trapezitis includes Ultrasound Therapy (UST), Inter Ferential Therapy (IFT), Transcutaneous Electrical Nerve Stimulation (TENS), Stretching and Exercises. Hence this study was undertaken with an attempt to compare the effectiveness of UST & TENS in treatment of upper trapezitis.

## **Method:**

Study design: Experimental study Design, Reference and Source population: Sample were selected from Physiotherapy outpatient department Saveetha medical college and hospital, Saveetha University, Thandalam ,Chennai-602105 according to the inclusion and exclusion criteria, Sampling Technique: simple Random Sampling Technique, Sample size: 30, Inclusion Criteria 1. Both genders Aged between 18 and 40 years. 2. Palpable trigger Point in upper trapezius muscle 3. Positive Jump Sign. Exclusion Criteria: 1. Cervical Radiculopathy 2. Pain above 8 in NPRS. MATERIALS: a) Therapeutic Ultra sound machine b) Diagnostic ultrasonogram c) Transcutaneous Electrical Nerve Stimulation (TENS) d) Pillow.

Using convenient sampling method (as the patient comes the odd number will be allotted to Group-A and even number will be allotted to Group-B by the research supervisor) thirty samples with upper trapezititis will be selected based on inclusion and exclusion criteria. Informed consent will be obtained from all the participants. All participants will undergo trigger point assessment by ultrasonogram and their pain will be measured in Numerical pain rating scale (NPRS). Participants will be assigned into two groups 15 numbers in each randomly Group A: (n=15) Ultrasound therapy : Patient will be made to sit in a well-supported chair & lean forward in a comfortable manner. His/her head & arms will be supported with pillow. Ultrasound will be given on the trapezial trigger points 5days/week for one week.

Treatment Protocol: Frequency - 3 MHZ Intensity - 1.0 W cm<sup>2</sup> Duration - 10 minutes After giving treatment with the modality subject is assessed for the reduction of inflammation by using ultrasonogram at the end of one week.

Group B: (n=15) TENS: Patient will be made to sit in a well supported chair & lean forward in a comfortable manner. His/her head & arms will be supported with pillow. TENS will be given on the trapezial trigger points.5days/week for one week. Treatment Protocol: Frequency : 100-150Hz Pulse width : 100 and 500 ms Duration : 10 minutes After giving treatment with the modality subject is assessed for the reduction of inflammation by using ultrasonogram at the end of one week

Assessment of Trigger Point using Ultrasonogram Outcome measures will be taken before intervention and after one week of treatment and considered as pre and post values. Statistically analyzed, results will be obtained. ULTRASONOGRAM : Each participant will under go US examination after one week of treatment .The upper tapeziues will be visualized

in longitudinal and transverse views with the subject sitting upright in a comfortable position. Based on clarity of trigger point 2D or 3D image will be taken to participant.

### **Results:**

The collected data was tabulated and analyzed using descriptive and inferential statistics . To all parameters mean and standard deviation were used .Paired t-test was used to analyze significant change between pre-test and post –test measurements. Unpaired t-test was used analyze significant between two groups.

The pre-test value of NPRS is 6.00 (SD is 0.85) and post-test mean value is 2.60 (SD is 0.85 ) this shows that NPRS scores are gradually increased, with P value ( $<0.0001$ ) extremely statistically significant.

The pre-test mean value of trigger point assesment is 1.907(SD is 0.24) and post- test mean value is 1.107 (SD is 0.13) this trigger point are gradually decreased, with P value ( $<0.0001$ ) extremely statistically significant.

The pre-test value of NPRS is 6.00 (SD is 0.85) and post-test mean value is 3.0 (SD is 0.47 ) this shows that NPRS scores are gradually increased, with P value ( $<0.0001$ ) extremely statistically significant.

The pre-test mean value of trigger point assesment is 1.387(SD is 0.21) and post- test mean value is 0.860 (SD is 0.11) this trigger point are gradually decreased, with P value ( $<0.0001$ ) extremely statistically significant.

Statistical Analysis shows that intervention of Ultrasound Therapy in more significant than Transcutaneous Electrical Nerve Stimulation in treating by reducing Upper trapezius trigger point and reducing pain,

### **Discussion:**

Neck pain has been the most common chief complaint among working men and women. Working postures with the neck in extreme flexion increase the load moment three to four times on the neck causing spasm of the neck muscles. Also working tasks that involve continuous arm movements always generate a static load component on these muscles, the principal muscle to carry this load is the trapezius. Trapezitis is an inflammation of trapezius

muscle which involves myofascial pain syndrome. Muscle spasm occurs early after inflammation. This feels like tightness in the muscles and is sometimes painful. When basic injury is not treated, spasm causes formation of muscle knots, called trigger points. The knots form because the spasm keeps the muscle continuously “on”. As muscles are not designed for this continuous work, over a period the muscle gets overloaded and forms these knots. As a result, treatment of the spasm is necessary to reduce this problem. In the study, the subjects were chosen from 18 to 40 years. The data obtained from the study was statistically analyzed using paired and unpaired t-test. The result of the study reveals that there was a reduction in trigger point assessed by ultra sonogram and a decrease in pain by NPRS in both Groups, A and B after the respective protocol. The reduction of pain and trigger points in group A which received Ultrasound therapy was more significant than group B which received TENS. Hence, the result of this study proves that, there will be a beneficial effect of Ultrasound therapy in treatment of Upper trapezitis. The main significance of this study is outcome of the trigger point was measured by Diagnostic Ultra sonogram. and the disadvantage is we limit with just measuring the length of the taught band which was hypo echoic in ultrasound instead of measuring the area of the taught band. This shall be considered as recommendation for future researches.

### **Conclusion:**

From the results, it has been concluded that Ultrasound therapy is more effective in decreasing trigger point and pain in upper trapezitis. Limitations of the study are small sample size and The duration of the treatment. A study with large sample size is recommended, Further investigation in this area may include a follow up study which could examine for how long did the strength of trapezius muscle lasted after intervention are recommended.

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**Table -1**

**Pre test –Post test values of group –A of NPRS & Trigger point assessment**

Group As	Test	Mean	Standard deviation(SD)	T value	P value
NPRS	Pre test	6.00	0.85	12.2202	Less than 0.0001
	Post test	2.60	0.85		
	Pre test	1.907	0.24		



Trigger point assessment	Post test	1.107	0.13	11.267	Less than 0.0001
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**Table -2**

**Pre test –Post test values of group –B of NPRS & Trigger point assessment**

Group B	Test	Mean	Standard deviation(SD)	T value	P value
NPRS	Pre test	6.00	0.85	13.114	Less than 0.0001
	Post test	3.0	0.47		
Trigger point assessment	Pre test	1.387	0.21	12.441	Less than 0.0001

**Table – 3**

**Comparison between the post test values group A and group B.**

Group A	Test	Mean	Standard deviation(S D)	T value	P value
NPRS	Post test			2	Less than 0.0001
	Group-A	2.6	0.86		
	Post test				

	Group-B	3.0	0.21	. 3	
Trigger point assessment	Post test Group- A	1.107	0.1335	5.232	Less than 0.0001
	Post test Group- B	0.860	0.21		

