



EVALUATION OF ULTRASOUND THERAPY AND TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION IN REDUCING PAIN FOR TEMPOROMANDIBULAR JOINT DISORDER

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ABSTRACT

Objective: Evaluation of reduction of pain using transelectric nerve stimulation (TENS) and ultra sound therapy in reduction of pain in temporomandibular joint disorders. **Background:** Common signs and symptoms involve mainly TMJ and masticatory muscles, Patients usually manifest pain in preauricular region, Joint click, Joint crepitus and restricted jaw movements. There is no well defined etiology or a single contributing factor although several associated factors have been identified as malocclusion, trauma, emotional stress, and par functional habits (e.g bruxism). **Methodology:** The study included a total of 30 patients who visited our OPD at PG Department of Oral medicine and Radiology ,Govt Dental College Srinagar during period(2020-2021). Included patients were irrespective of Gender , were in age group 20-30 years, presented with signs and symptoms of pain in masticatory muscles being inclusion criteria, Patients were excluded on the basis of having any recent tmj dislocation , Hairy surfaces , radiculopathy or any other neurological deficits **Procedure :** A total of 30 patients were selected , falling in our inclusion criteria , study and procedure is explained to them , the patients are advised to not take any analgesic drugs during this time ,Subjects are randomly divided into two groups Group A: TENS received for a duration of 15 min Group B: Received a continous mode of ultrasound of 3Hz for a duration of 5 min , after 4 weeks , VAS score of pain is taken again. **Results:** there was significant difference in mean values of VAS scoring between group A and group B , mean of group B being more than group A **Conclusion :** Hence in our study we conclude ultrasound is more effective compared to TENS in pain reduction for temporomandibular joint disorders.

KEYWORDS :

INTRODUCTION

The temporomandibular joint is composed of bilatrel, diarthroidal,temporomandibular joints (TMJ's) ,Each joint is formed by mandibular condyle and it's corresponding temporal cavity (glenoid fossa and articular eminence) .^[1] Muscles of mastication have primary role in joint movement. ^[2] Each TMJ has a disk that separates the joint into an upper and a lower joint.^[3] The temporomandibular joint (TMJ) is the most regularly used joint in the human body. It opens and closes about 1500 to 2000 times a day and is instrumental in several functional movements such as chewing, breathing and pronunciation.^[4] Temporomandibular disorders(TMD) include abnormalities of the intra articular discal position and or structre as well dysfunction of associated musculature. ^[5]Symptoms and signs include painful joint sounds , restricted or deviating range of motion and cranial or muscular pain known as orofacial pain , while upto 25% population may experience symptoms of TMD ,^[6]only a small amount seeks management Pain related conditions and intra-articular disorders are the most common TMD conditions, and internal derangement is the most common form.^[7]

An alternative mode of management is Transcutaneous Electric Nerve Stimulation (TENS). It is a method of pain relief by the application of an electronic device, which produces pulsed biphasic electrical waves through the electrodes placed on the skin surface. TENS is defined as the application of electrical stimulation to the skin for pain control. It is a well-known form of physical therapy, which is useful for the relief of pain. It is a safe, noninvasive, effective, and swift method of analgesia, and the potential adverse reactions of other methods of pain control are eliminated. ^[8] by the use of controlled, low-voltage electrical pulses applied to the nervous system. It is safe noninvasive in expensive and an effective method of providing analgesia with reduced potential adverse reaction related to other methods.^[9] Ultrasonic massage therapy treatment(US therapy) , in this therapeutic method includes thermal and non-thermal effects. It may induce increase in blood flow, reduction in muscle spasm, and increase in extensibility of collagen fiber. Non-thermal effects include cavitation and acoustic microstreaming, which stimulate fibroblast repair and collagen synthesis, tissue regeneration, and bone healing. ^[10] Therapeutic ultrasound is a non-invasive therapeutic method which includes vibrations >16,000 vibrations/second or 16 Hz (range audible to the human ear); the frequency used is between 1.0 and 3.0 MHz.^[11]

MATERIALS AND METHODS

This study has been carried out at department of oral medicine and radiology ,Govt dental college Srinagar during time period of (2020-21) .A total of 30 patients included were selected randomly based on an

inclusion criteria ,include both genders ,age group included was 20-30 years ,though subjects with temporomandibular joint dislocations, hairy surfaces and neurological or radiological deficits have been excluded from study.

Procedure

A total of 30 subjects were included according to a preset inclusion criteria , study was explained to each one of them ,they were advised not to take any analgesics or any other form of therapy, an informed consent was taken , subjects were divided into two groups

Group A

A total of 15 subjects recived TENS therapy for a duration of 15 min ,over the course of 1 month once a week, using TENS apparatus (Accord pvt limited , {Manufacturer }) , TENS is inexpensive , non invasive and safe with no major side effects method to relieve pain .^[12] TENS apparatus adjusted to 50 Hz with a pulse width 0.5 msec at 0-60 mHz.^[13]

TENS therapy

The stimulation is given in sitting position by placing an electrode over masseter muscle (over sigmoid notch)

Group B

A total of 15 subjects were subjected to ultrasonic massage therapy , with a frequency of 1 MHz and pulse setting at 1:1 for 8 min each session ,once a week for 4 comparative weeks ,^[14] It is known to accelerate healing, decrease joint stiffness alleviate pain, increases the extensibility of collagen fibers, and reduce muscle spasm. ^[15]

Ultrasound therapy

The ultrasound therapy is treated by which the sound head is moved inferiorly over the TMJ toward the angle of mandible^[16] The total excursion movement was approximately 3-5 cm, then moved back over the TMJ, next in anterior and inferior direction along the articular eminence of the joint^[17] This pattern allowed the sound head to pass frequently and diminished the risk of periosteal overheating^[18]

Data Analysis

The data was collected and tabulated and analysed using inferential statistics , Mean and standard have been used to assess with all parameters , paired t and unpaired t-test , Paired t-test has been used to find out difference in improvement between pre and post treatment values for ultra sound therapy and TENS within a group ,the student unpaired t test was used to compare difference between two groups .

The data was collected and tabulated and analysed using inferential statistics, Mean and standard deviation have been used to assess with all parameters, Paired *t*-test has been used to find out difference in improvement between pre and post treatment values for ultrasound therapy and TENS within a group, the student unpaired *t* test was used to compare difference between two groups.

Table 1 shows, mean, SD, *t*-test, degree of freedom, *p*-value on a visual analog scale (VAS) between group A and group B pre-test and post-test. This table shows that there is no significant difference in pre-test values of group A and group B (**p* < 0.01). The table also shows there is significant difference in post-test values between group A and group B (**p* < 0.05). Both groups showed a considerable decrease in means of post-test results, with group A showing a relative lower mean hence is more effective compared to group B.

RESULTS

Comparison of the mean between group A and group B, we see a considerable increase in post values, and higher mean value in group B ultrasound therapy (3.73) than Group A TENS (5.06) at *p* < 0.01. Hence Null hypothesis is rejected, on comparing group A and group B on VAS test values show significant difference in mean values at *p* < 0.001.

Table 1: Comparison of TMJ mean value between Group-A and Group-B (pre- and post-test) VAS score

VAS	Group A	Group B	<i>t</i> -test	Df	Significance
	Mean±SD	Mean±SD			
Pre-test	6.8±1.8	7.32±1.16	0.860	28	0.396***
Post-test	5.06±1.7	3.73±0.86	2.59	28	0.014

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TMJ: Temporomandibular joint, VAS: Visual analog scale

Table 2: Comparison of TMJ mean values within Group A and Group B between (pre and post test) value

VAS	Group A	Group B	<i>t</i> -test	Significance
	Mean±SD	Mean±SD		
Pre-test	6.83±1.88	5.06±1.77	2.64	0.06
Post-test	7.32±1.16	3.73±3.96	9.56	0.00

Group A (**P* > 0.05). # Group B (***P* < 0.05). VAS: Visual analog scale,

DISCUSSION

TMJ disorder is more common in age group 20-35 years with no specific gender predilection. Limitation of jaw movements is a common in TMJ disorders. Our study compared effectiveness of TENS and ultrasound therapy in TMJ disorders. Ultrasound therapy was given to 15 and TENS was given to 15 patients. Pre and post test were recorded as per visual analog scoring. In our study results showed a statistical significance of ultrasound therapy and TENS within group analysis. A pre and post intervention showed decrease in pain levels, As per our results the Ultrasound therapy is more effective than TENS therapy.

The table reveals the mean, SD, independent *t*-test, and *p*-test values of VAS between Group-A and Group-B (*P* < 0.01). The table shows that there is statistically significant difference in post-test value of VAS between Group-A and Group-B (*P* < 0.05). Both the groups show significant increases in the post-test mean values, but Group-B which has the higher mean value is more effective than Group-A, but ultrasound therapy is more effective than TENS.

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