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Effectiveness Of Acupuncture In The Management Of Patients With Temporomandibular Joint Disorders: A Pilot Study

Research Article

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Abstract

Background: Acupuncture is one of the Traditional Chinese Medicine (TCM). It is widely used in the management of pain. Temporomandibular joint disorders symptoms include chronic orofacial pain, trismus, clicking. The main aim of this study was to determine the effectiveness of acupuncture in the management of patients with temporomandibular joint disorders
Methods: This study was conducted in the department of Oral Medicine and Radiology with the sample size of 6 patients in the time period of January 2021-February 2021. Each patient was subjected to three 20-minute needle therapy acupuncture session, once a week. Pain was measured by the visual analog scale (VAS) during each visit.
Results: Kruskalwallis test was used to find the difference between mean values of VAS scores between three follow-ups. Level of significance was set at p value less than 0.05. Based on the statistical analysis it was found that mean of third visit VAS was significantly lower than mean of first visit VAS in 4 patients, with one drop out. There was no improvement of VAS in one patient
Conclusion: Results of this pilot study show that acupuncture sessions were effective in four patients in which pain intensity is reduced when comparing to their first session. No adverse reactions were evident during the period of study

Keywords: TMD; Acupuncture; VAS, Muscle Oain, Mobility Disorders.

Introduction

Acupuncture (acus=needle and puncture=prick) is one of the keycomponents of Traditional Chinese Medicine (TCM). In this alternative form of medicine, thin needles are inserted into the body [1]. It was believed to have originated around 100 B.C in China. Earlier instead of needles sharpened stones and longsharp bones were used around 6000BCE for acupuncture treatment. It-developedoverthe next few centuries and gradually became one of the standard therapies used in China. It was complementedand supported by use of diet, massage, herbs and heat therapy.[5] It was in the 15th century that Bronze statues with acupuncture points that are in use today were depicted. The Communist Government in 1949 revived the traditional forms of medicine including acupuncture. Acupuncture research institutes were established in the 1950s throughout China and the practice became available in several hospitals. It was accepted in the USA when an NIH consensus conference reported that there was positive evidence for its effectiveness.[9]

Acupuncture works on the stimulation of specific anatomic skin points, which are known as acupoints or acupuncture points.(3) It aims at healing, preventing diseases and developing body balance by establishing the lost harmony between physical and psychic-parts. There are various methods in acupuncture. Among them, Needle therapy is one of the most commonly used methods. Other methods include, application of heat therapy, laser, electricity and with suction cups. Since it is a pseudoscience, it is assumed to be works on the principle of qi.[14] However, there is no proven theory of acupuncture mechanism, but there are various models and hypotheses for different clinical applications.

Temporomandibular joint disorders is a non-specific diagnosis which represents a heterogeneous groups of orofacial painful or masticatory dysfunctional conditions. [14, 7] It can also involve muscles of mastication. The etiology of temporomandibular joint disorders were multifactorial. [8] Some ofthem include occlusal abnormalities, post orthodontic treatment, trauma, joint laxity,

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psychological stress, bruxismetc. The signs and symptoms were orofacial pain or pain in preauricular region, TMJ clicking, masticatory pain which can be acute or chronic, tenderness of the masticatory muscles, deviation of jaw. [10] Till date, there is a lack of the most efficacious treatment strategy for TMD due to its multifactorial etiology. Various treatment modalities were used, which includes pharmacological therapy, psychological therapy, physicaltherapy,jaw exercise, hot and cold fomentation, cognitive therapy, occlusal therapy, acupuncture therapy and finally surgical interventions [12].

Acupuncture is used in the management of TMD as it aims at relaxation of the muscles.[6] Several clinical trials demonstrated the validity of acupuncture as an effective therapeutic intervention for TMD pain. But there are only limited studies available on Indian population, the main aim of this pilot study was to assess the effectiveness of acupuncture in the management of temporomandibular joint disorder.

Materials And Methods

This study was conducted in Saveetha Dental College, Chennai during thetime period of January 2021- March 2021. Six patients with TMD symptoms were selected from a pool of patients attending the Department of Oral Medicine and Radiology. Patients were aged between 20-50 years. Approval for this study was obtained from the Institutional Ethical Committee of Saveetha University with IHEC Ref no of IHEC/SDC/OMED/20001/TH-01. Patients were clinically examined with regard to pain and dysfunction of the masticatory system. The inclusion criteria were presence of TMJ pain, pain due to muscular origin, trismus. Patients with history of TMD surgery, systemic conditions, arthritis, trauma were excluded.

This is a preliminary longitudinal study with a small sample size and there is nocontrol group. Sample was made up of 6 patients who were referred to the Department of Oral Medicine and Radiology for the management of TMD pain. Each patient was treated with four acupuncture sessions. To check the level of pain intensity on each visit, VAS was recorded. Each patient was subjected to three 20-minute sessions, once aweek.

From the total sample (n=6), 3 were female and 3 were male. Initially skin was cleaned with cotton soaked in spirit. Needles were sterilized, disposable and packed with a guide. The parts of the needle include tail, handle, root, swaft and tip.

Five acupoints were used in the study (LI4, SJ5, ST7, ST6, SI18). The needles were manually inserted and rotated clockwise and anti clockwise to achieved eqisensation. Three needles were inserted in the face and two were in the contralateral hand. After insertion, patients felt numbness, pain or distention around the area. It may irradiate along the pathway of the meridian to which stimulated point belongs. Acupuncture session was performed by dentist qualified in acupuncture treatment.

Five acupuncture points were used in this study (LI 4, SJ 5, ST 7, ST 6, SI 18). LI 4 is also known as Hegu meaning “the great eliminator”. It is one of the six important distal points. It islocated in the web between the fore finger and thumb on the posterior aspect of the hand, and may be located by adducting the fore finger and the thumb, and locating the needle at the highest point on the muscle on the back of the hand or at the midpoint of line drawn from the junction of the 1st and 2nd metacarpal bones to the middle point of the border of the web. This acupoint is indicated in the disorders of the thumb, fore finger and wrist joints. It also includes the disorders of large intestine, lung etc. It is the best analgesic point of the body for both therapy and anesthesia.

ST 6 is located at the most prominent point of the masseter muscle, which is felt on clenching the jaws. This acupointis amotorpoint. It is indicated in the cases of facial paralysis, trigeminal neuralgia, toothache, parotitis, spasm of the masseter muscle and trauma to the facial structures.

ST 7 is located in the depression on the lower border of the zygomatic arch and it is indicated in facial paralysis, trigeminal neuralgia, tooth ache and arthritis of the mandibular joint.

SJ5 also known as point Waiguan, which is located 2 cm proximal to the midpoint of the dorsal transverse crease of the wrist, between the radius and theulna. Its indications include paralysis of the upper limb, temporal headache, ear disorders, stiffneck.

SI 18 is the regional analgesic point, located in the depression below the prominence of the zygomatic bone on a vertical line drawn downwards from the outer canthus of the eye. This acupoint is indicated in cases of toothache, trigeminal neuralgia, facial paralysis.

Statistical Analysis And Results

Pre and Post VAS data was entered in Microsoft excel sheet and analyzed using SPSS (IBM software; NY; Version 23). Chi-square test was used to find the difference between the age groups and Gender with TMJ factors. Mann Whitney U test was used to find

Figure 1. Location of acupoints in face.

Figure 2. Location of acupoints in hand.

Figure 3. Parts of acupuncture needle used in the study.

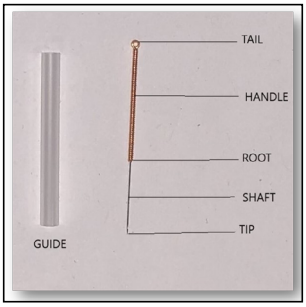
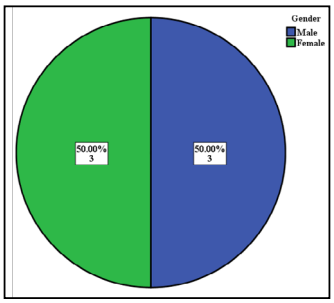


Figure 4. Distribution of Study subjects based on Gender.



the difference between the age groups and Gender with TMJ factors. Kruskal Wallis test was used to used to find the difference between mean values of VAS scores and various time-period. Level of significance was set at p value less than 0.05. The sample consist of 6 patients, out of which one was dropout. Figure 1 & 2 shows the location of acupoints in face and hand region and Figure 3 shows the parts of the acupuncture needle used in the study. In all the cases the pain intensity was reduced as compared to their first visit except one patient. There was no adverse effect observed during the acupuncture sessions. There was a reduction in the muscle tenderness as the acupuncture helps in reduction of pain and clicking sound by relaxing the muscles. Thereby reducing the anterior displacing force on the meniscus of the TMJ. There was significant reduction of mean VAS after acupuncture treatment. The average number of treatment session was three. Table 2 shows Comparison of Age groups with TMJ Factors and table 3 shows Comparison of Gender with TMJ Factors. Kruskal Wallis test was used to compare the VAS scores at different treatment sessions, which gives significant results ($p<0.01$).

Discussion

The etiology of temporomandibular joint disorders was multifactorial. It often presents with acute or chronic pain which causes great discomfort and decreases the functional jaw movements. This results in trismus and affects the individual's ability to perform daily activities like eating, talking etc.[16] There are various approaches for pain relief in TMDs. One among them was acupuncture, which is a non-invasive technique. Acupuncture used in the treatment of temporomandibular joint disorders by relieving its symptoms. Especially relieves muscle tenderness and decreases the local inflammatory process.[2] Thereby, relieving pain and helps in better sleep patterns, appetite improvement, sensation of wellbeing and improvement in quality of life in patients. There are various methods in acupuncture. [17] In this study, needle therapy was used as it has minimal adverse effects and is comfortable to the patient. There are five important physiological effects on needling. They are analgesic, sedative, homeostatic (regulatory), immune-enhancing, anti- inflammatory and motor recovery [18].

The mechanism of acupuncture was not clearly understood till date. According to Traditional Chinese Medicine, acupuncture works on the principle of Qi(energy). It is the force that makes up and binds together all things in the universe. [13] Previous studies reported that they are effective to control pain intensity based on selection of appropriate acupoints. Various theories were given for effectiveness of acupuncture in TMD management. [11] Porporatti AL et al., 2016 says that needle insertion in the skin can cause mild inflammation which lead to release of neurotransmitters like serotonin, encephalin and endorphin production. These neurotransmitters can block painful stimuli propagation by impairing its perception by the brain. Therefore, pain intensity will be decreased. Wen.,2004 reports that acupuncture can stimulate the blood circulation with release of hormones like endorphins and cortisol, which results in increase in host resistance by stimulating hypothalamus and other important glands for systemic recovery. List T et al.,1997 said pain reduction in acupuncture therapy was due to analgesic effect and relaxation of muscles. Alves- Rezende

Table 1. Shows Distribution of Study subjects based on Age.

Age	N	Mean	Std. Deviation
20-26 years	3	22.33	3.21
above 26 years	3	39.66	6.8
Overall	6	31	10.62

Table 2. Comparison of Age groups with TMJ Factors.

TMJ Factors		Age Groups		Chisquare value	P value
		20-26 years	above 26 years		
Pain (region)	Unilateral (surrounding right TMJ region)	2(66.7)	2(66.7)	0	1
n(%)	Bilateral (right and left TMJ region)	1(33.3)	1(33.3)		
Clicking	No clicking	1(33.3)	2(66.7)	0.67	0.41
n(%)					
	Clicking in Right TMJ while opening	2(66.7)	1(33.3)		
Crepitations felt on left side	No crepitation	3(100.0)	2(66.7)	1.2	0.27
n(%)	crepitations felt on left side	0(0.0)	1(33.3)		
Muscle tenderness	Absence of Muscle tenderness	2(66.7)	0(0.0)	4	0.26
n(%)	Lateral Pterygoid	1(33.3)	1(33.3)		
	Lateral Pterygoid and Medial Pterygoid	0(0.0)	1(33.3)		
	Masseter and Temporalis	0(0.0)	1(33.3)		
TMJ Factors		**Age Groups**		**Mann-Whitney U test value**	**P value**
		20-26 years	**above 26 years**		
Mouth Opening		34.00±3.60	32.66±6.65	4.5	1
Mean ± SD					
VAS Baseline		7.33±0.57	7.66±0.57	3	0.45
Mean ± SD					

Table 3. Comparison of Gender with TMJ Factors.

TMJ Factors		Gender		Chisquare value	P value
		Male	Female		
Pain (region)	Unilateral (surrounding right TMJ region)	2(66.7)	2(66.7)	0	1
n(%)	Bilateral (right and left TMJ region)	1(33.3)	1(33.3)		
Clicking	No clicking	2(66.7)	1(33.3)	0.67	0.41
n(%)	Clicking in Right TMJ while opening	1(33.3)	2(66.7)		
Crepitations felt on left side	No crepitation	3(100.0)	2(66.7)	1.2	0.27
n(%)	crepitations felt on left side	0(0.0)	1(33.3)		
Muscle tenderness	Absence of Muscle tenderness	1(33.3)	1(33.3)	4	0.26
n(%)	Lateral Pterygoid	2(66.7)	0(0.0)		
	Lateral Pterygoid and Medial Pterygoid	0(0.0)	1(33.3)		
	Masseter and Temporalis	0(0.0)	1(33.3)		
TMJ Factors		**Gender**		**Mann-Whitney U test value**	**P value**
		Male	**Female**		
Mouth Opening		34.66±4.04	32.00±6.08	4	1
Mean ± SD					
VAS Baseline		7.33±0.57	7.66±0.57	3	0.45
Mean ± SD					

Table 4: Comparison of VAS Scores at different time periods.

GROUPS	N	Mean	Std. Deviation	Kruskal Wallis test value	P value
BASELINE	5	7.6	0.54	10.46	0.01*
1ST FOLLOW UP	5	7.6	0.54		
2ND FOLLOW UP	5	6.8	0.44		
3RD FOLLOW UP	5	6.4	0.54		

MC et al., 2013 has compared occlusal splint to acupuncture in female TMD patients and reported that acupuncture had better results in the improvement of mouth opening than occlusal splint. This can be due to relaxation of masticatory muscles. (15)Smith P et al., 2007 compared sham acupuncture with placebo acupuncture. Sham acupuncture showed superior results than the placebo. In the previous literature, most of them used ST 7 acupoint. This study used five different acupoints to achieve maximum pain reduction in shorter duration oftime.

The results of this study show that three acupuncture sessions were reports reduction of pain intensity in TMD patients. Out of 6 patients, one was dropout after the initial session. 4 showed improvement in pain reduction. The mean age of the patients and standard deviation were 31 and 10.62. Comparison of age and gender groups with TMJ factors like VAS, presence of muscle tenderness, clicking and crepitations were tabulated. Only VAS on the day of first session with third session were compared in the study. It is difficult to specify the exact number of sessions for TMD cases and they are dependent on the severity of the pain. Some patients would require ten sessions, once or twice in a week to obtain long lasting benefits.

There were no adverse effects reported in this study. But previous studies reported side effects like sweating, vertigo, bleeding in 7 to 11% of patients.[18] Acupuncture is safe and should be provided by aqualified professional. It was recognized by the Federal Council of Dentistry in 2008, as a important treatment modality. This study results indicate that the acupuncture can be recommended in the management ofTMD.

Limitations of this study include small sample size. As this is pilot study, low number of patients were taken into consideration. There was no control group in the study. For future research, comparison with pharmacotherapy and other types of acupuncture can be done.

Conclusion

In our study, satisfactory pain intensity reduction was achieved within three weekly sessions of acupuncture. Further standardization with large sample size needs to be done to establish the therapeutic role of acupuncture in temporomandibular disorders. Based on this study, it is concluded that acupuncture can be used either as primary or adjuvant therapy in the management of pain relief in TMD patients

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