

ACOUSTIC HEALING-AN ULTRASONIC SOLUTION TO CHRONIC PAIN

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Abstract:

Treatment of myofascial trigger points which are hyperexcitable palpable discrete loci within taut bands of skeletal muscles has always been an area of continuous exploration. Various invasive and non-invasive therapies with positive results had been suggested by many authors in the literature. However, owing to the complex anatomic nature of temporomandibular joint and multifactorial etiology that leads to the disorders of the joint, a definite treatment modality cannot be assured.

One potential non-invasive therapy that has been suggested by authors is of therapeutic ultrasound massage therapy, which has been traditionally believed to have strong biophysical effect. Ultrasound massage contributes in healing of the temporomandibular joint via both thermal and non-thermal effects.

Because therapeutic ultrasound massage therapy, showed positive outcomes in TMDs, therefore an attempt was made to test the efficacy of the same in patients suffering with myofascial pain dysfunction syndrome.

Hence, we present case report of two patients, clinically diagnosed with myofascial pain dysfunction syndrome, were subjected to ultrasound massage therapy.

Keywords:

Temporomandibular Joint Disorders (TMDs), Ultrasound Massage Therapy, RDC Criteria

Introduction:

As diverse as the etiology of temporomandibular joint disorders, so are the available treatment modalities. Managing Temporomandibular joint diseases has always been multifold, owing to the complexity of the joint anatomy as well the factors influencing its normal physiology.

One such modality is Ultrasound Massage Therapy, which has been part of clinical practice since 1950s and still remains a popular bring about biological tissues, ultrasound massage therapy gives promising results. However, this area holds immense potential to navigate

Literature states number of pharmacological and non-pharmacological methods of dealing with the orofacial pain rendered due to temporomandibular joint dysfunction. Some of the non-invasive therapies which have drawn attention in recent past includes: Transcutaneous Electrical Nerve Stimulation (TENS), physiological exercises, behavioral therapies, ozone oil therapy etc.

intervention for wide range of clinical problems including musculoskeletal disorders of TMJ. Because of its ability to interact with tissues to

Ultrasound Massage Therapy:

Ultrasound is a form of mechanical energy, which is derived from soundwaves beyond the human audible limit (16Hz to something approaching 15-20,000 Hz). Usually, frequencies of 1MHz and 3MHz fall into the therapeutic range (1MHz = 1 million cycles per second).

Sound waves are longitudinal in nature, producing compression and rarefaction waves with each oscillation. These oscillations have two types of effects over tissues: thermal and non-thermal. [1]

An increase in the molecular vibrations within tissues will create heat within tissues, providing therapeutic thermal effect. Haar et al divided non-thermal effects into: cavitation and other mechanical effects, who was of the idea that majority of the healing effect of ultrasound massage is derived from the non-thermal interaction mechanism. [2]

Cavitation is defined as the formation and life of bubbles in liquids, which in ultrasound massage therapy refers to the tiny gas bubbles formed in the tissues as the result of vibration. Another mechanism that plays important role is “acoustic streaming”, is described as “localized liquid

flow in the fluid around the vibrating bubble. Microstreaming possess the ability to alter the tissue membrane permeability and enhances cell activity occurring at the boundary of cell membrane and tissue fluid. [3]

To have these effects over the masticatory muscles and the temporomandibular joint, it is essential for ultrasound wave to reach these regions, which will depend on the thickness of the tissue and the frequency at which the machine is used.

As it is difficult, if not impossible to know the thickness of each of these layers in an individual patient, average half value depths are employed for each frequency:

- 3 MHz 2.0 cm
- 1 MHz 4.0 cm

Because of the abundant literature available, describing the effective results in providing symptomatic relief to patients with temporomandibular joint disorders, an attempt was made to study the effectiveness of ozone oil as a treatment modality for temporomandibular joint disorders

CASE- REPORTS:

CASE REPORT 1:

A 32 year old male patient reported to the department of Oral Medicine and Radiology, Teerthanker Mahaveer Dental College and Research Centre, with the chief complaint of pain on the left side of the face while opening and closing the mouth since 3 months.

On elaborating the history of present illness, it was found that pain was of dull continuous nature that aggravated on chewing,

especially hard food stuff. Pain referred to areas of forehead and was more on waking in the morning. No contributory medical and dental history was given by the patient.

On extra-oral examination, tenderness was present on the right pre-auricular region. There was no deviation or deflection noticed. Left pterygoid and medial pterygoid were found to be tender, on intra-oral examination. Oral hygiene was compromised with distal pocket present irt 38.

On the basis of the history given by the patient and clinical examination done, a diagnosis of Myofascial Pain Dysfunction Syndrome (MPDS) of left lateral pterygoid and left temporal muscle was given.

The diagnosis was made according to the Research Diagnostic Criteria, given by **Dworkin SF, Leresche L et al. 1992**

CASE REPORT 2:

A 25-year-old female reported to the department of Oral Medicine and Radiology, Teerthanker Mahaveer Dental College and Research Centre, Moradabad; with the chief complaint of pain on right side of her face since 2 years.

On elaborating the history of present illness, pain was sudden in onset and is constant but dull in nature. Pain radiated to pre-auricular as well to the neck region. She had difficulty in chewing and while swallowing. She had consulted private physician for the same complain and was put on some unknown medications which rendered no relief. There was no other contributing past dental history. However, she mentioned about being stressed.

On VAS scale, tenderness was rated “MODERATE” for both the muscles at the first visit.

All the measurements were tabulated in patient’s visiting chart.

On examination, bilaterally temporalis, masseter, medial and lateral pterygoid were tender. Trapezius and sternocleidomastoid also presented with tenderness. Odontogenic factors for pain were ruled out. Oral hygiene condition was good with grade I stains and calculus.

On the basis of the history given by the patient and clinical examination done, a diagnosis of Myofascial Pain Dysfunction Syndrome (MPDS) involving all the above-mentioned muscles was given.

The diagnosis was made according to the Research Diagnostic Criteria, given by **Dworkin SF, Leresche L et al. 1992.**

Tenderness was graded “SEVERE” on VAS scale.

These measurements were tabulated in patient’s visiting chart.

Cases	Visits	Masseter		Temporalis		Lateral Pterygoid		Medial Pterygoid	
		Right	Left	Right	Left	Right	Left	Right	Left
CASE 1	1 st visit						Moderate		Moderate
	2 nd visit						Moderate		Moderate
	3 rd visit						Mild Pain		Mild Pain
	4 th visit						Mild Pain		Mild Pain
	5 th visit						No Pain		No Pain
CASE 2	1 st visit	Severe		Severe		Severe		Severe	
	2 nd visit	Severe		Severe		Severe		Moderate	
	3 rd visit	Moderate		Moderate		Moderate		Moderate	
	4 th visit	Mild pain		Mild pain		Mild pain		Mild pain	
	5 th visit	No pain		No pain		No pain		No pain	

RIGHT ACCESSORY AND STRAP MUSCLES	1 ST VISIT	2 ND VISIT	3 RD VISIT	4 TH VISIT	5 TH VISIT
CASE 1	-----	-----	-----	-----	-----
CASE2 (SCM, Trapezius)	SEVERE	SEVERE	MODERATE	MILD	NO PAIN

TABLE 1: TENDERNESS TABLE

	<u>1ST VISIT</u>	<u>2ND VISIT</u>	<u>3RD VISIT</u>	<u>4TH VISIT</u>	<u>5TH VISIT</u>
<u>CASE 1</u>	MODERATE	MODERATE	MILD	MILD	NO PAIN
<u>CASE 2</u>	SEVERE	SEVERE	MODERATE	MILD	NO PAIN

TABLE 2: PAIN TABLE

TREATMENT:

Both the patients were advised to initiate the ULTRASOUND MASSAGE THERAPY.

MODE OF APPLICATION:

Patient was comfortably seated on the dental chair. Ultrasound Massage machine manufactured by the Physio Company was used under the following specifications:

- Frequency 1MHz

- Pulse- 1:1,1:3, 1:5, 1:10,
- Output power 2.5 W/ sq.cm
- Power source A.C adapter power supply

Each patient was administered 10 minutes ultrasound massage on either side of the jaw. Special attention was given to avoid bacterial contamination from the head source of the machine.

Both the patients were given five sessions once a week and the tenderness and pain score was recorded at each visit on VAS scale.

Patients were instructed to follow soft diet, avoid stressful events, physiotherapy exercises etc for prevention of aggravating episodes.

No pharmacological aid was provided to them during the entire 5 visits sessions.

At the third visits, both of them were advised to go for oral prophylaxis and pocket treatment (first patient).

DISCUSSION:

Temporomandibular joint is considered to be a compound joint controlling complex movements of jaw in coordination with masticatory apparatus. Together, the TMJ joint and masticatory muscles, allows a person to chew and talk. Therefore, even slight disturbance disrupting the balance of TMJ will hamper person's day today life activities.

People with compromised temporomandibular joint activity, experiences crucial pain and discomfort which can be acute or even last for chronic periods. TMDs are common between age groups of 20-40 and effects women with higher frequency. There are many symptoms of TMDs including per-auricular pain, joint clicking, reduced mouth opening, referred pain to temporal and cervical region etc.

However, diagnosis of TMDs can be a tiring process because the signs and symptoms resemble that of toothache, neuralgias, sinusitis, earache etc. A thorough history and clinical examination can guide a dentist towards the provisional diagnosis of musculoskeletal disorder of TMJ.

CONCLUSION:

Treating the TMDs has always been an equally complex process with several modalities listed in literature such as pharmacological approach, physiological methods, TENS, Ultrasound Massage therapy etc.

Since, many researchers such as *Majlesi et al* in 2004 reported positive results of therapeutic ultrasound massage therapy intreating temporomandibular joint pain disorders(musculoskeletal), therefore we tried to evaluate the effects of the same in the presented case reports.

In these case-reports, both the patients visited to the department of Oral Medicine and Radiology and were clinically diagnosed with Myofunctional Pain Dysfunction Syndrome, a musculoskeletal disorder, which falls under the umbrella of Temporomandibular Joint Pain Disorders. The diagnosis was given based on the chief complaint of the patient, the explored history and the clinical examination done.

All the points were corelated with the RDC criteria and thereby a diagnosis of MPDS was given.

Patients were informed about the treatment modality given to them and informed consent was taken from both the subjects. Ultrasound Massage therapy was conducted in the department of Oral Medicine and Radiology for 20 minutes (10 minutes on each side) * 5 sessions in both the patients.

In the first visit, the tenderness on VAS scale for first patient was MODERATE and for second patient it was recorded to be SEVERE. By the third visits, both of them showed considerable improvement and VAS was noted to be MILD and MODERATE in first and second patients respectively.

By the end of the fifth visit, they had considerable relief, marking the VAS scale with NO PAIN.

Myofunctional Pain Dysfunction syndrome is one of the most debilitating disorders encountered by the oral physicians. The entity is characterized by the presence of trigger points (hyperirritable spots within taut bands of skeletal muscle fibers).

The syndrome is recognized by the muscle's tenderness, referred pain, increased pain while opening mouth and on wakening few patients. History plays an important role in formulating the diagnosis. Parafunctional habits as history of stress or long duration of work can be contributing factors.

Since time immemorial, there have been no definite treatment modality for the particular dysfunction. However, literature is flushed with

some promising therapeutic modalities, one of which is Ultrasound Massage Therapy.

Early applications were those for which tissue heating was the goal, and so it was used for soft tissue injuries such as may be incurred during sport. More recently, attention has been drawn both to high intensity focused beams that may be used for thermal ablation of selected regions, and also to low intensity fields that appear to be able to stimulate physiological processes, such as tissue repair, without biologically significant temperature rises.

Because the ultrasound therapy is a non-invasive treatment modality, thus can be applied to heal the chronic pain of temporomandibular joint disorders more frequently in clinical practice.

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How to cite this article: Surangama Lehri, Anjali
Nayak, Chhavi Srivastava, M K Sunil. Acoustic healing-
an ultrasonic solution to chronic pain. TMU J Dent
2021;8(1) 4-10.