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Role of Tens and Recent Advances in Management of TMJ: A Review

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ABSTRACT

Background and Purpose The purpose of this review was to assess the evidence concerning the effectiveness of Transcutaneous Electrical Nerve Stimulation (TENS) in the management of Temporomandibular disorders (TMD). Methods A literature search of published and unpublished articles resulted in the retrieval of 13 potential articles. Discussion.13 article were reviewed ,out of which one study favors effectiveness of TENS in the management of TMD .eight study evidence for the use of TENS in combination with other therapies to reduce pain and to improve oral opening. However, in another two studies no significant result found in TENS as compared to Occlusal splint therapy. One study favors Micro current electrical nerve (MENS) stimulation over TENS .one study favors muscular awareness relaxation training over TENS. Conclusion In the presented review, 8study out of 13 studies were in support of the effectiveness of TENS as an therapeutic module in alleviating pain in TMD patients.

KEYWORDS TENS, TMJ

INTRODUCTION

Temporomandibular Disorder (TMD) -a group of disease functionally affecting the masticatory system ,especially masticatory muscle & the temporomandibular joint(TMJ).It has different etiologies & various treatment among one of which is transcutaneous electrical nerve stimulation(TENS) Epidemiological studies -approx. 75% peoples have some TMD sign. While 33% have at least one symptom. Yap AU et al TMD- an overview. Singapore Med J. 1999; 40(3):179-82 whenever possible, one should treat the cause of pain. TENS therapy electric current to the skin surface to relax hyper active muscle & promote pain relief. The purpose -assess the evidence concerning the effectiveness of TENS therapy in the management of TMJ TMD also referred as craniomandibular disorders consist of group of pathologies affecting the masticatory muscles, TMJ,& related structure. Several symptoms may be present in TMD, being pain, predominantly in masticatory muscle one of the most common symptoms.

Clinical presentation includes -Jaw moments changes or limitations, Face head or cervical pain ,Joint noises, Headache or Earache ,Dizziness,& Hearing problems, In addition chronic TMD patient often reports depression, poor sleep qualities & low morale.(5)

ETIOPATHOGENESIS AND SIGN & SYMPTOMS

Several factors may influence TMD evolution, such as muscle hyperactivity, trauma, emotional stress and malocclusion, together with several predisposing factors which may trigger or perpetuate the disorder The importance of occlusal factors as etiologic or risk factors for TMD has been widely investigated in recent years. Occlusal treatments, such as occlusal adjustment of natural teeth, orthodontic treatment and occlusal splints were widely used based on the principle that unfavourable occlusal contacts could lead to neuromuscular changes. Cause and effect relationship between occlusion and TMD is considered poor or inexistent, based on epidemiologic data and systematic reviews It is known that skeletal muscles are major sources of generally diffuse and under diagnosed pain, varying from pain after exercises to painful myofascial syndrome. In this latter case, there may be areas of hyperirritability, called myofascial trigger points (MTP), which are sensitive sites in muscle bands, tendons or ligaments which may generate local or referred pain with a typical pattern. These points, when present in masticatory muscles, are directly related to TMD manifestations, as observed in a systematic review where myofascial pain was the most common diagnosis among studied patients. Currently, most authors advocate the idea of a multifactorial aetiology for most TMD. Especially in muscle pain, considering that its aetiology has not been yet totally explained, conservative and reversible treatments are recommended as the standard

MANAGEMENT OF TMD

TMD require single or many require multidisciplinary approach

- Education
- Self-care therapy
- Physical therapy
- Intra oral appliance therapy
- Pharmacotherapy
- Behavioral/relaxation techniques

There are numerous physical therapy which are effective to treat TMD such as moist heat, ultrasound, microwave laser, exercise & TENS. These methods aim at decreasing musculoskeletal load & pain.

APPLICATION OF TENS IN THE MANAGEMENT OF TMD

Historical context

In year 1965, Melzack and Wall who provided a physiological rationale for electro analgesic effect. They proposed that the transmission of noxious information could be inhabited by activity large diameter peripheral afferents or by activity in pain inhibitory pathways descending from the brain. High frequency percutaneous electrical stimulation of large Diameter peripheral afferents were shown to relive neuropathic pain and stimulation of dorsal columns to relieve chronic pain. Initially, TENS was use to predict the success of dorsal column stimulation implants.(14)TENS is a non-invasive analgesic tech. that is used to relieve nociceptive, neuropathic & musculoskeletal pain. TENS : delivers electricity across the intact surface of the skin to activate underlying nerve.-A Standards TENS devices biphasic pulsed current in a repetitive manner using pulse duration of 50-250 µs & pulse frequency of 1-200 pulse/sec.-Patient can self administer TENS & trite dosage as required & there is no potential for toxicity

Technique for application of TENS
- Conventional TENS (low intensity, high frequency)
- Acupuncture like TENS (high intensity, low frequency)
- Intense TENS (high intensity, high frequency). (14)

Mechanism of Action
1)Segmental Mechanism -mostly for conventional TENS. Reduce on going Nociceptive cell activity& Sensitization in CNS. It induces Aδ activity cause long term depression of central nocicptive cell activity up to 2 hours.

2) Extra Segmental Mechanism - Mostly for high intensity TENS. Induce activity in small diameter afferent (Aδ) lead to activation of decreasing inhibitory pathways & inhibition of descending pain facilitatory pathways

3) Peripheral Mechanism-Mostly in intense TENS.Generate nerve impulse that will collide & extinguish noxiously induced impulse arising from peripheral structure peripheral blockage is more when TENS activate A δ fibers.

4) Neurotransmitters--TENS are mediated by many neurotransmitters including opoids, serotonin, acetylcholine, nor-epinephrine, Gamma Amino Butyric Acid (GABA).- Low frequency involve μ-opoid, 5HT2 & 5HT3 receptors.- High frequency involve δ-opoid receptor. TENS applied to dentistry aims at controlling chronic pain in selected cases & relaxing masticatory muscle.- According to some authors it has been observed that at rest muscular TMD patients have higher myoelectric activity & TENS application has promoted pain relief with simultaneous decreases in myoelectric activity.(14)

Recent Developments
- Interferential current therapy
- Micro current electrical therapy
- Transcutaneous spinal electro analgesia
- Trans cranial electrical Stimulation
- Transcutaneous electrical Acupoint stimulation

DISCUSSION
Some studies have shown the effectiveness of TENS in the management of TMD, both combine with other therapies & to improve stomatognathic system functionally. Grossmann E et.al.2012 has been presented review article on the effectiveness of TENS for TMD, conclude that TENS is a treatment alternative for pain & TMD in duly selected patients. Monaco A, Callaeno Ret.al 2012. performed studies on 60 female subject for the effect of TENS on Electromyographic & Kinesiographic activity of patient with TMD, conclude that TENS could be effective to reduce the sEMG Activity in masticatory muscle and to improve the inter occlusal distance of TMD patients. Madani AS, mirmortazavi et.al , 2011 performed studies on 20 patients with TMD For the comparison of 3 treatment options (splint therapy, physical therapy ultrasound and TENS and physical therapy in addition to splint therapy) for painful TMJ clicking conclude that splint therapy is better than the other two mentioned therapy. Raj Phurohit B, Khatri S M et.al, 2010 performed a comparative study on 60 subjects with bruxism to find the effectiveness of TENS and MENS conclude that MENS could be used as an effective Pain Relieving adjunct to TENS. Cooper, Barry C, Kleinberg, 2008performed a comparative studies on 313 patients with TMD using EMG Device, mandibular tracing device and TENS conclude that EMG and mandibular tracing device in conjunction with low frequency, low voltage can be effective. Kato MT, Santos CN, Konawa EM et.al , 2006 performed a comparative study on 18 patients with chronic TMD using TENS and low level laser therapy in the management of TMD conclude both therapy were effective for decreasing the symptoms of TMD patience and a cumulative effect may be responsible for the improvement. Nunez SC, Suzuki SS et.al 2006 performed a comparative study on 10 patients, 18–56 years old with TMD using TENS and low level laser therapy (LLLT)in the management of mouth opening in patient with TMD. All patients received both methods of treatment in two consecutive weeks Comparing the two methods, the values obtained after LLLT were significantly higher than those obtained after TENS ($p < 0.01$). Conclude both methods are effective to improve mouth opening by comparing the two methods LLLT was more effective than TENS. Delaine R, olivera AS, Berzin F et.al, 2004 performed a study on 40 female subject (of TMD 20 with myogenic TMD and 20 normal individual) using TENS and conclude that TENS reduces the Pain intensity. Alverez-arenal A, junquera LM et.al, 2002 performed a comparative study on 24 patients with bruxism to find the effect of occlusal splints and TENS conclude that both TENS and occlusal splints did not significantly improved the sign and symptoms. Gracia R, Radke J, Kmyszek G et.al, 2001 performed a study on 39 patients out of which 29 patients with resting muscle hyper activity and 10 without resting muscle hyper activity to find the electrographic evidence of reduced muscle activity when ultra low frequency TENS is applied to Vth and Vllth cranial nerves in TMD patient and conclude that ULF-TENS as an activity reducing effect on resting EMG level of both relaxed and hyper active muscles

CONCLUSION
TENS is a treatment alternative for pain and TMD in duly selected patients. Due to the variability of TMD groups, controlled randomized studies are needed in specific populations to identify patients and diseases responsive to this type of treatment. In addition, it is also necessary to identify facial pain syndromes where adjuvant TENS therapy may be beneficial. Currently, the option to use TENS largely depends on clinical experience and its handling by health professionals.

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