Application of Transcutaneous Electrical Nerve Stimulation in Dentistry

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Abstract

Transcutaneous electrical nerve stimulation (TENS) is a non-pharmacological procedure commonly used by medical and paramedical practitioners in a variety of circumstances for the treatment of acute and chronic pain. Similarly, it can be used during different dental procedures to relieve pain as well as pain due to different conditions that affect the maxillofacial area.

Keywords: *TENS therapy, Dentistry, Anaesthesia, Pain.*

Introduction

In western and developing countries, TENS is commonly used to alleviate a wide variety of debilitating symptoms, including non-malignant acute and chronic pain and cancer pain and care.[1-3]. It is a non-invasive and non-pharmacological way for electrodes to electrically activate the nerves. [4]

TENS induces electrical stimuli that has a greater speed than the impulse of pain and enters the dorsal horn substantia gelatinosa to close the gate for pain impulses, resulting in a reduction in the severity of pain. Activation of opiate-like peptides such as endorphins is also provided by TENS [5]. Several experiments have been performed using TENS in dentistry for pain relief [6-8]. For physical therapists in recovery and chronic pain management, TENS has had the best utility.[9]

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Advantages

1. It is non-invasive, secure and can be used in needle-phobic patients to obtain anaesthesia.

2. There is no postoperative anaesthesia relative to local anaesthesia until the TENS unit is switched off.

3. Patients can self-administer TENS therapy and learn to titrate dosages to control their painful condition accordingly.[10]

Contraindications

TENS therapy is contraindicated with the following patients like, patient with undiagnosed pain, history of heart disease and a pacemaker, history of epilepsy, pregnant woman mostly first trimester and over the uterus (Unless it is recommended by a medical practitioner).[11]

TENS should not be applied over the carotid sinus, on broken skin, on dysaesthetic skin and Internally (mouth).[11]

Application in dentistry

Dental treatment in Pediatric patients

Fear of syringes is a widely reported detrimental

trait in paediatric patients. The use of TENS has a positive influence on paediatric patient behaviour, which in turn lowers the amount of fear as it reduces the "fear of the needle". Studies have found that 53% to 78% of children prefer TENS to local anaesthesia. TENS has been successfully used in paediatric patients to manage discomfort during various operations, such as insertion of pit and fissure sealants, preparing cavity, minor extractions and endodontic treatments. [12-14]

TENS and Tooth Pulp

A handpiece that provided the tooth with tiny electrical impulses while cavity preparation was described in early accounts of the use of TENS in dentistry. The subliminal current has successfully minimised pain. Andersson et al. stated that if good TENS is offered to the cheek, tooth preparation can be achieved without pain. It was appropriate to lift the pain threshold three or four-fold. Studies has used TENS in tooth extractions and small surgical procedures to achieve electroanalgesia. In the immediate postoperative phase, a 100 Hz current was added ipsilaterally to the side of the extraction for 30 minutes. By stimulation at the mental foramen and angle of the mandible, the best findings were achieved.[15,16,17]

Trigeminal Neuralgia

It is possible to regulate trigeminal neuralgia, the extreme paroxysmal facial pain condition, by causing a refractory condition in the afferent fibres of the trigeminal mandibular fibres. Sheldon et al. induce activation at 14 KHz with an implanted receiver inductively triggered. In extended trials, this system is successful, but the patient numbers are small.[18]Studies has reported that there is significant result using TENS therapy in trigeminal neuralgia. [19]

Temporomandibular joint disorder

The alternative modality used to treat Temporomandibular joint disorder (TMD)is TENS, which uses regulated, low voltage electrical pulses applied to the nervous system to relieve pain and related symptoms. In addition, other positive effects are also found, such as local tissue temperature rise and sedation, and the initial action of TENS is to produce analgesia.[19-21]In many studies, it shows the efficacy of TENS therapy in reducing pain and distress in TMD patients. Also, many studies observed that TENS therapy was significantly reducing pain in Temporomandibular joint region, it also helps in reduced pain and discomfort alsohelped in relieving muscular and chronic painalso in improvement in mouth opening in the treatment of TMD.[22-26]

Orthodontic pain

In order to monitor orthodontic pain and the duration of pain relief after TENS application, a recent study tested the efficacy of the new portable TENS unit. This study included were patients who experienced immediate pain following orthodontic adjustment and found that pain has been reduce after application of mild electric current. Studiesresult showed a significant decrease of pain by using TENS in patients who experienced immediate pain following orthodontic adjustment.[27-28]

Myofascial pain dysfunction syndrome

Myofascial pain deficiency (MPD) syndrome is believed to be a mix of occlusal disharmony and an underlying psychiatric stress disorder. One theory is that spasms in the mastication muscles cause the pain associated with this condition. In general, care consists of reducing the harmonies of the occlusal and to alleviate muscle spasms. TENS already has been used in many ways for treatment of MPD. Study reported usingTENS to reduce muscle spasms with MPDpatients. Electrodes were mounted either on the skin or in the patient's mouth and current, usually the latter, was administered for 3 to 15 minutes. Studies stated that this treatment resulted in substantial pain relief for the patient.[29,30]

In post-herpetic neuralgia

Many of the larger myelinated afferent nerve fibres are destroyed in post-herpetic neuralgia, so natural presynaptic suppression of C fibre inputs does not occur. This is responsible for the pain seen in post-herpetic neuralgia and excessive sensitivity of the skin. The reason for using TENS is that, by increasing the activity of residual broad fibres, it will reintroduce the regular inhibition. Study reported using TENS to relive pain of severe post-herpetic neuralgia in whom all other

forms of therapy had failed. Patients has been treated by using TENS apparatus. In30 patients,11 patients were seen good results. Another study has used TENS in 10 patients suffering from pain of post-herpetic neuralgia. was successful in achieving 50% or more reduction in pain in 60% of patients. They found that patients with a shorter duration of post-herpetic neuralgia responded better to TENS therapy.[31-32]

In patients with xerostomia

TENS application improves the salivary flow rate of both healthy people and xerostomia patients. After adding TENS to the skin overlying the parotid glands, the analysis observed improved salivary flow in two thirds of healthy adult participants. Their findings have indicated that baseline saliva flow should be present for TENS to be more successful.[33,34]

Conclusion

To conclude, while TENS does not substitute local anaesthesia, it can be used during multiple dental procedures for pain relief. Its physiological effect, both analgesic and non-analgesic, could be used in the management of a range of conditions affecting the maxillofacial area.

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Conflict of Interest- Nil.

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