RECOVERY OF A PARESTHESIA IN LOWER LIP CAUSED BY A LARGE PERiapICAL LESION BY APPLYING “TENS” AND ROOT CANAL THERAPY

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ABSTRACT

The aim of this study is to evaluate the effect of Transcutaneous Electrical Neural Stimulator (TENS) as a tool to diminish the level of paresthesia besides the root canal therapy. Forty-year-old female patient was referred to our clinic due to numbness on her left side of lower lip and strong pain in the mandibular left premolar site. The patient was not medically compromised. Following the clinical and radiographical examinations, it was decided that the paresthesia had been linked with a large periapical radiolucency at the periapical area of the mandibular left first premolar, causing pressure to mental foramen. Later RCT (root canal therapy) was applied to the tooth and TENS to her lip. After a 14-month follow-up, it was seen that the lesion was almost disappeared and the paresthesia was totally eradicated. It is concluded that applying the TENS device to accelerate the healing and to subside the RCT together with the proper antibiotic and analgesic medication and vitamin B for quicker nerve regeneration can be recommended.

Key words: Paresthesia, Periapical Lesion, Recovery Process, Root Canal Therapy, Transcutaneous Electrical Neural Stimulator

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**INTRODUCTION**

Paresthesia is a sensation such as burning, pricking or partial numbness caused by neural injury, sometimes following acute traumatic injuries or infection to the teeth and jaws, root-end resection or overfilling of the root canal with impingement upon a nerve.\(^1\)\(^2\)\(^3\)\(^4\) The possible mechanisms of neural injury are mechanical, chemical and thermal factors. Infection related paresthesia is usually coupled with mechanical pressure and ischemia associated with the inflammatory process (edema), or caused by the local pressure to the mental nerve consequent to the accumulation of prulent exudate in the mandibular bone.\(^4\)\(^5\)

The expanding infectious process and the associated host inflammatory process (edema) can cause pressure on the nerve fibers that is severe enough to induce the symptoms of paresthesia. A subsequent hematoma can also cause pressure on the nerve fibers sufficient to induce the paresthesia.

Examination of the affected area can be carried out by using thermal, mechanical, electrical, or chemical tests that elicit subjective responses.\(^6\) A more objective test is based on electrophysiologic analysis of the nerve. A radiographic and neurophysiologic screening is also necessary. Infection-related paresthesia subsides after infection and inflammation resolution (through antibiotic therapy, endodontic treatment, periapical surgery, or tooth extraction).

In our case “Transcutaneous Electrical Neural Stimulator” (TENS) was used as a tool to diminish the level of paresthesia besides the root canal therapy. The use of electricity as a therapeutic modality is not new in dentistry and medicine. The use of “TENS”, and later its dental progeny “electrical dental anesthesia” (EDA) have been developed since mid-1960’s into techniques that appear to have some utility in the fight against pain. Medical and dental uses of TENS and EDA (Electrotherapy) is shown in Table 1.

The mechanism of action;\(^7\)\(^8\)\(^9\) at the low frequency setting of the TENS device (example: 2 Hz for chronic pain management) will produce measurable changes in the blood levels of tryptophan, serotonin and beta endorphins. Tryptophan, a precursor of serotonin, is present in the blood in decreasing amounts as the duration of TENS increases. By contrast, serotonin levels in the blood increase with time. Serotonin possesses analgesic actions, elevating the pain reaction threshold. At the same time, levels of beta endorphins and enephalins in the cerebral circulation also increase.

The application of a low-frequency electrical current to an area that has recently been injured can help the patient in two ways:

1. It helps increase the tissue perfusion produced by capillary and arteriolar dilation while stimulating the concentration of skeletal muscles. It makes a pump effect and helps decrease any edema that may be present in the area, and the increased perfusion and skeletal muscle stimulation act together to cleanse the area of tissue-injury breakdown products. The use of TENS in this manner, thus, speeds the recovery process.
2. It helps the analgesic action. It elevates blood levels of serotonin and endorphins (in low frequency stimulation at 10 min or longer), blocking the pain cycle and keeping the patient comfortable.

**CASE REPORT**

A forty-year-old female patient was referred to our clinic due to the numbness on the left side of her lower lip with strong pain in her mandibular left premolar site. The patient was not medically compromised, yet she was systemically stable. The patient was examined clinically and radiographically. Radiographical examinations (Figure 1) revealed that paresthesia had a possible link with a large periapical radiolucency at the periapical area of the mandibular left first premolar and was causing pressure to the mental foramen. Later that large periapical radiolucency at the periapical area of the mandibular left first premolar was linked with that paresthesia phenomenon. Thus, RCT (root canal therapy) was applied to the tooth. The root canals were instrumented with Pro Taper (Dentsply-Maillefer, Ballaquies, Switzerland) rotary instruments and RC Prep (Premier, Norristown, PA, USA) as a lubricant. The final preparation file was Pro-Taper F3 for both teeth. Copious irrigation with 2.5% sodium hypochlorite solution was employed throughout the procedure. Canals were dried with paper points and dressed with calcium hydroxide paste. After 10 days, obturation of root canals were performed using Pro-Taper (Dentsply-Maillefer, Ballaquies, Switzerland) gutta perca points with lateral compaction and AH 26 (Dentsply-Maillefer, Ballaquies, Switzerland) root canal sealer (Figure 2). Antibiotic, analgesic and vitamin B were prescribed during the root canal therapy period. Following the root canal treatment TENS (Bio. Research Assoc. Inc. Milwaukee Wisconsin USA) was applied to her left lower lip and the...
related area (Figure 3). TENS was applied in three sessions, each 8-10 minutes, 2.5 Hz at the first session and 120 Hz on the others to increase the efficiency and to obtain the anticipated result of the treatment of the numbness at the related site. The electrodes of the TENS are placed at the left lower lip's corner and middle side. Then the frequency of TENS was gradually increased. After a 14-month follow-up, the lesion became smaller and disappeared at the end of the recalls, as well as the paresthesia (Figure 4).

**DISCUSSION**

In the literature MNP (mental nerve paresthesia) and IANP (inferior alveolar nerve paresthesia) due to periapical pathosis are rare.\(^\text{10-12}\) Mostly a foreign body, direct trauma to nerve and chemical use during the RCT are the reported causes of paresthesia in the literature.\(^\text{13,14}\) In our case the lesion was the reason of the paresthesia. In time, following the proper, efficient and good quality RCT, it recovered. TENS application subsided the recovery and accelerated the good result. Generally paresthesia following the endodontic therapy is a matter of discussion, but here in this case it is the endodontic therapy that eliminated the infection together with its pressure and by-products over the neurovascular bundle in the related area. Thus, the aetiology of the paresthesia and numbness were totally eliminated. Based on our case and the related literature in that kind of paresthesia cases, we can recommend applying the TENS device to accelerate the healing and to subside the RCT also with the proper antibiotic and analgesic medication in addition to vitamin B for quicker nerve regeneration.\(^\text{15,16}\)
REFERENCES


CLINICAL DENTISTRY AND RESEARCH

