

Paraesthesia Caused by the Separated Endodontic Instrument: Case Report

Mehmet Selcuk Ozbek^{1*}, Suleyman Kaman², Kemal Ozgur Demiralp³

¹Department of Endodontics, Ministry of Health, Oral and Dental Health Hospital, Eskişehir, Turkey

²Department of Oral and Maxillofacial Surgery, Ministry of Health, Oral and Dental Health Hospital, Eskişehir, Turkey

³Ministry of Health, Public Hospitals Agency, Ankara, Turkey

*Corresponding author: selcuk233@yahoo.com

Abstract In endodontics, separated endodontic instruments located in the mandibular canal may cause an injury of the inferior alveolar nerve (IAN) resulting in disabling sensory disturbances such as pain, paraesthesia, and dysaesthesia of the lower lip and chin area. In clinically paraesthesia usually manifests as numbness, tingling or any deviation from normal sensation. The suggested therapeutic sequence for endodontic related paraesthesia is the control of pain and inflammation and, whenever possible, the surgical elimination of the cause. A healthy 33-year-old woman was referred to the Department of Endodontics, Oral and Dental Healthy Hospital, Eskişehir suffering from pain and paraesthesia in the left lower lip and chin. Radiographic examination revealed the presence of a separated endodontic instrument beyond the apex of the mandibular left second molar and this instrument was inside the left mandibular canal. Damage to the IAN secondary to extrusion of a separated endodontic instrument was diagnosed. Extraction of the tooth was decided and after prednisone and pregabalin treatments both pain and paraesthesia on the left side of the lower lip and chin were gone.

Keywords: *separated endodontic instrument, inferior alveolar nerve, pregabalin*

Cite This Article: Mehmet Selcuk Ozbek, Suleyman Kaman, and Kemal Ozgur Demiralp, "Paraesthesia Caused by the Separated Endodontic Instrument: Case Report." *International Journal of Dental Sciences and Research*, vol. 4, no. 2 (2016): 17-19. doi: 10.12691/ijdsr-4-2-1.

1. Introduction

Paraesthesia is defined as an abnormal sensation with clinical manifestations such as burning, prickling, tingling, numbness, itching or any deviation from normal sensation [1,2]. The possible etiologic factors for endodontic related paraesthesia are periapical infection and iatrogenic injury to the nerve [2,3]. Overinstrumentation during root canal treatment with manual or rotary instruments allowing overfilling of mandibular molars and premolars is a potential iatrogenic cause of IAN injury [4]. The common symptom of this type IAN injury is sudden pain expressed by the patient during root canal treatment, which persists after the disappearance of the local anesthetic effects [5]. The pain can be accompanied by local inflammatory signs, with the endodontically treated tooth being painful to percussion, painful on palpation of the vestibular alveolar process, or a combination of signs of mechanical lesions and inferior dental nerve inflammation with pain or paraesthesia of the lower lip or [5,6].

Treatment of endodontic related paraesthesia remains controversial, varying from a wait-and-see approach to early, if not immediate, surgical debridement of the inferior alveolar nerve via a number of possible approaches [7-9]. The primary aim of surgical treatment should be the entire removal of the foreign body and protection of the nerve [10]. The duration of paraesthesia can vary from days to weeks or to several months and in

some cases paraesthesia might even become permanent [11].

It has been reported that antiepileptic drugs such as pregabalin have been used for the treatment of neuropathic pain [12]. Pregabalin is a gamma-aminobutyric acid (GABA) analogue which has antiepileptic, analgesic and anxiolytic activity. Its ability to reduce neurotransmitter release from activated neurons in pain pathways and fear circuits may contribute to its role as an adjuvant in pain management and as anxiolytics [13].

The aim of this paper is to describe a case of labio-mandibular paraesthesia caused by a separated endodontic instrument penetration within the mandibular canal after root canal treatment of the mandibular left second molar, with resolution of pain and paraesthesia after extraction of tooth and fragmented instrument, including treatment with pregabalin.

2. Case Report

A 33-year-old woman was referred to the Department of Endodontics, Oral and Dental Health Center, Eskişehir, Turkey, with a chief complaint of pain and paraesthesia on the left side of the lower lip and chin. She was very restless and angry because her sleep was disturbed by pain radiating to the left ear and side of the neck for 7 days. Medical histories showed no significant information and physical (extra- and intraoral) examination was within normal limits except for the pain and paraesthesia.

The patient reported that 10 days earlier she underwent an endodontic treatment initiated by a general dentist in her left mandibular second-molar without radiographic examination. Three days after endodontic treatment she had severe pain in the treated tooth and paraesthesia on the left side of the lower lip. On reporting this, Amoxicillin 1g every 12 hours and paracetamol 500 mg every 12 hours was prescribed by her dentist. The prescribed analgesic reduced pain but paraesthesia in the left lower lip and chin continued and promoted referral by his dentist.



Figure 1. Area of paraesthesia on the first visit

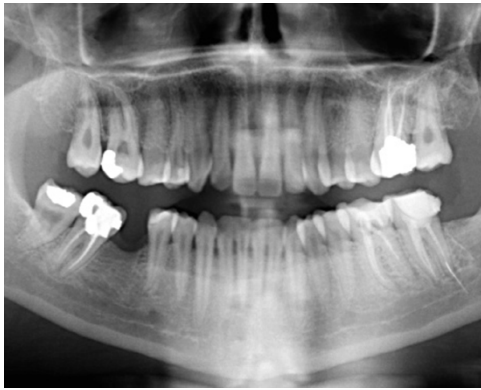


Figure 2a. Panoramic radiograph of separated instrument located in the apices of left second mandibular molar with an extension toward mandibular canal



Figure 2b. Periapical radiograph revealed the instrument located beyond the apex of the distal root of left second mandibular molar

Clinical examinations using a dental probe showed paraesthesia extending from the mandibular midline to the left first premolar both intraorally and extraorally (Figure 1). The left mandibular second molar showed pain both percussion and palpation. Panoramic and intra-oral periapical radiograph was revealed the separated

endodontic instrument located beyond the apex of the distal root of the mandibular left second molar and this instrument was inside the left mandibular canal (Figure 2a and Figure 2b). After complete evaluation, diagnosis of acute apical periodontitis with mandibular paraesthesia was established.

The patient informed about the separated endodontic instrument and the possible nerve sensory disturbances. After discussing treatment options with the patient, it was decided to extract the lower left second molar and monitor the progress with periodic follow-up visits. Local anaesthesia was administered in the form of inferior alveolar nerve block. The left mandibular tooth was extracted and separated endodontic instrument was removed with distal root (Figure 3).

Postoperatively, the patient's symptoms of pain disappeared over the next 3 days. But complaint of paraesthesia did not resolve within 1 month. Therefore the same treatment protocols reported by López-López et al. [4] were used, the patient was prescribed with 1 mg kg^{-1} per day prednisone (Dacortin[®], 30 mg) in two doses, in a gradually reducing regimen on a daily basis, and 150 mg per day pregabalin (Lyrica[®], 75 mg; Pfizer SL, Barcelona, Spain), two doses by day, monitoring the progress with periodic follow-up visits. Three weeks after drug used, she showed significantly less paraesthesia compared with the initial situation and pregabalin treatment was completed. The patient reported a gradual reduction in paraesthesia over the following ten days, and one month after prednisone and pregabalin treatment, paraesthesia on the left side of the lower lip and chin were gone. The patient was followed for 12 months without any complaints



Figure 3. Retrieved separated instrument

3. Discussion

During endodontic treatment, over-instrumentation of the canal with hand or mechanically driven instruments and damage of the apical foramen can lead to direct physical injury of the nerve [2,10]. Preventive measures such as the use of an electronic apex locator and the application of a good apical stop will help avoid endodontic complications such as those caused by separated endodontic instruments [4]. The use of an electronic apex locator together with a radiograph taken with the instruments in position will not only ensure the correct working length but also prevent perforation of the canal and possible subsequent damage to the inferior alveolar nerve resulting from the endodontic treatment [5].

Second mandibular molars require a careful radiographic diagnosis when endodontic treatment is planned because in these teeth the distance between the apex and the mandibular canal is often less than 1 mm [14]. In the present patient, paraesthesia in the left lower lip and chin was caused by the separated endodontic instrument irritating the inferior alveolar nerve sheath. This injury classified as Sunderland's first degree of nerve injury [15].

Previously reported chemical or thermal IAN injuries caused by overextended filling materials (such as paraformaldehyde, calcium hydroxide) never recovered from the paraesthesia despite the removal of the offending foreign bodies [15]. In the case discussed here, because no endodontic pastes or filler materials were extruded into the mandibular canal, the injury was mechanical and the patient recovered from her nerve injury within 2 months. Along similar lines, Nayak et al. [16] reported after the surgery named simple deroofing technique the patient complete recovered from her nerve injury within four months [15].

Pregabalin is a safe and well-tolerated new treatment for neuropathic pain which has shown analgesic activity in preclinical and clinical models [4,12,13]. Peak plasma levels occur approximately 1 hour after oral doses and oral bioavailability is approximately 90%. Pregabalin is not protein-bound and exhibits a plasma half-life of 6 hours, which is not dose-dependent [13]. Taking into account that separated endodontic instrument extruded into the mandibular canal damages the inferior alveolar nerve triggering neuropathic pain, the use of pregabalin in the case reported here was justified.

The complete resolution of the paraesthesia and the control of pain achieved in the present case suggest that surgical removal of separated endodontic instrument extruded into the mandibular canal with the use of prednisone and pregabalin is a good option in the management of inferior alveolar nerve injury.

4. Conclusion

This case demonstrates separated endodontic instrument overextension may lead to direct physical injury of the alveolar nerve. Over preparation of the canal and violation of the apical foramen can lead to direct physical injury of the nerve. Present case shows great care must be taken with all endodontic techniques especially when the root apices are in close proximity to vital anatomic structures such as the inferior alveolar canal.

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