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Intentional Replantation of a Mandibular Premolar as Treatment for Lower Lip Paresthesia: A Case Report

Ali Hamedi [a], **Hamid Jafarzadeh** [a], **Fateme Bonyadimanesh** [a*]

[a] *Dental Research Center, Mashhad University of Medical Sciences, Mashhad, Iran*

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Corresponding author: Fateme Bonyadimanesh, Dental Research Center, Vakilabad Blvd, Mashhad, Iran
E-mail: bonyadimaneshf@gmail.com

ABSTRACT

Paresthesia can result from some post-endodontic problems, including bacterial infections or mishaps which occur during the cleaning, shaping, and filling of the root canal. There are pharmacological and instrumental methods for the treatment of paresthesia; however, if presenting symptoms are suggestive of nerve injury, surgical approaches, such as intentional replantation, could be considered. In this case report study, we treated paresthesia that had occurred after endodontic treatment using intentional replantation. This case report describes the use of intentional replantation of a mandibular premolar as a successful technique to treat paresthesia involving the lower lip.

Keywords: Cone Beam Computed Tomography; Endodontic Treatment; Paresthesia; Premolar; Tooth Replantation

Introduction

Paresthesia is a sensory disturbance resulting from neuropraxia, characterized by abnormal sensations, such as prickling, burning, tingling, cold, warmth, formication, and partial numbness [1, 2]. There is evidence that paresthesia can develop as the consequence of local factors in dentistry, including mandibular fractures, local infections, impacted teeth, implants, pre-prosthetic surgery, and routine endodontic treatments. The main endodontics-related causes of paresthesia are thought to be periapical infections and iatrogenic problems that may occur during the cleaning, shaping, and obturation of the root canal [3, 4].

The treatment of paresthesia can be based on pharmacological or instrumental methods. The medicaments for such treatments include topical steroids, antibiotics, carnitine, non-steroidal anti-inflammatory drugs (NSAIDs), nerve growth factors (NGFs) and systemic corticosteroids [4]. However, when symptoms associated with nerve injury appear, an instrumental approach may be indicated, such as application of electrical fields to remove the cause of the problem; use of laser therapy or magnetotherapy; and intentional replantation [5, 6].

Intentional replantation (IR) is a surgical procedure defined as the extraction of a tooth and its almost immediate replacement after extra-oral therapeutic procedures [7, 8]. Intentional replantation, which was introduced by Grossman [9], involves several distinct steps: deliberate extraction of the tooth, evaluation of the root surfaces, endodontic obturation or manipulation, repair and finally, placement of the tooth back into its original hollow. When endodontic surgery is necessary but is not possible or practical, intentional replantation is a viable treatment option; with careful case selection, it has a high success rate [10]. Usually, Intentional replantation is less popular than implants and endodontic retreatment and is considered as the last resort. Clinical indications for IR consisting an unfavorable root-end surgery due to anatomical factors or financial factors as barriers to conventional implant treatment and failed previous non-surgical endodontic treatments. IR is an ideal method when the clinician requires easy access to and proper visualization of the apex/furcal area [7, 11]. Traumatically extracted teeth for intentional replantation are not good candidates [12].

This case report aims to document a possible treatment modality for paresthesia following the endodontic treatment of a mandibular second premolar. The affected region (the lower lip) was successfully cured using the intentional replantation technique.

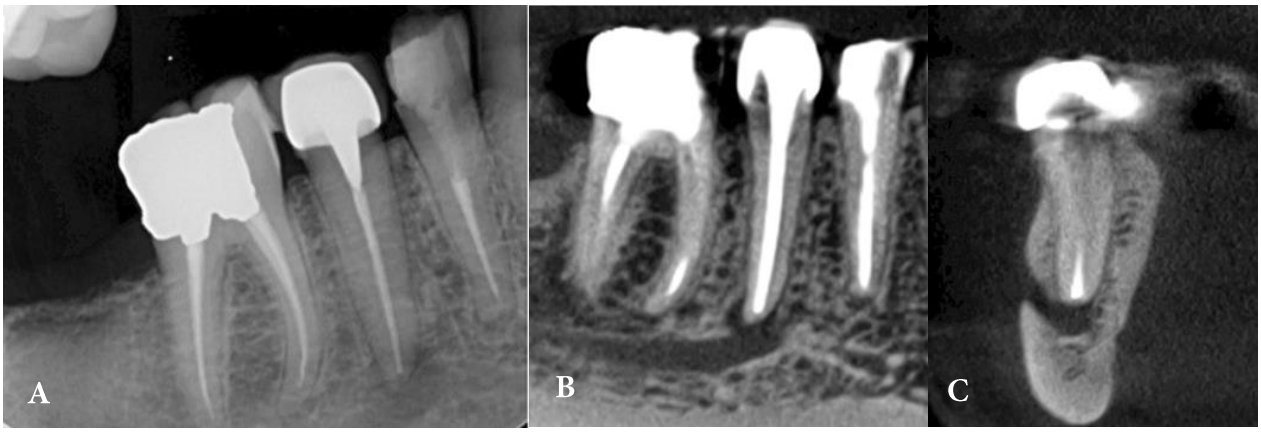

Figure 1. *A*) Preoperative periapical radiograph of the right mandibular second premolar; *B and C*) Sagittal and coronal views of mandibular second premolar, the proximity of the second premolar root apex to the neural canal is clearly seen in all three radiographs

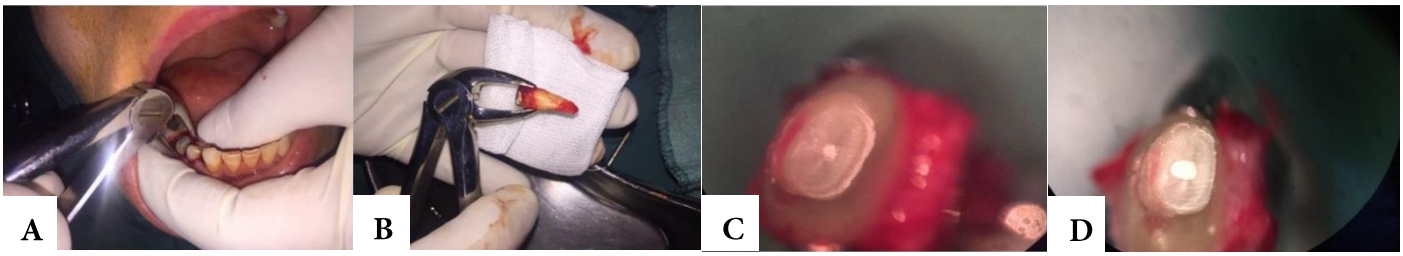

Figure 2. *A*) Forceps was used to ensure atraumatic extraction; *B*) The tooth after extraction; *C)* The tooth after 3-mm root end resection; *D*) Root-end filling with MTA

Case Presentation

A 30-year-old female was referred to the Department of Endodontics at the Faculty of Dentistry, Mashhad University of Medical Sciences. Her medical history was non-contributory, with no allergies or medications. Her chief complaint was "numbness in the right side of her lower lip, which had occurred following the endodontic treatment of her mandibular right second premolar one year earlier". Examining the medical history of the patient revealed that the paresthesia had started one week after the endodontic treatment and had progressed until a complete lack of sensation in the right side of her lower lip. As far as clinical findings, the sensory exam indicated a loss of sensation to light touch and pinprick in the right side of the lower lip. Subsequently, the tooth was restored with a porcelain-fused-to-metal (PFM) crown. At this point, probing depth and mobility were normal.

The periapical radiograph demonstrated that the root apex of the tooth was adjacent to the mental foramen (Figure 1A). So, cone-beam computed tomography (CBCT) imaging was requested to evaluate the positional relation between the root apex and the mental foramen. The CBCT scan revealed that the root apex was situated exactly on the mental foramen (Figure 1B).

Based on the clinical and radiographic findings, the diagnosis was made as paresthesia caused by the proximity of the endodontically treated second premolar. After the patient had been informed about the expected prognosis as well as treatment alternatives, intentional replantation was planned for this tooth. The patient accepted and a written informed consent form was obtained before starting the treatment.

Local anesthesia was administered with 2% lidocaine containing 1:100,000 epinephrine (Daroupakhsh, Tehran, Iran) using inferior alveolar nerve block and buccal infiltration techniques. Next, a mucoperiosteal flap was elevated to allow access to the tooth apical to the crown margin. Then, as demonstrated in Figures 2A and 2B, the tooth was carefully extracted through the use of forceps (Juya, Tehran, Iran). At this stage, the PFM crown was removed unintentionally during pulling and extraction.

After the socket was examined for any fracture, it was thoroughly rinsed with normal sterile saline (Ghazi Co., Tabriz, Iran). Under the dental operating microscope (DOM), 3 mm of the root was resected and evaluated for any cracks, fractures, or missed canals (Figure 2C). Next, 3 mm of the root canal was retrogradely prepared using ultrasonic surgical tips (NSK, Tokyo, Japan), and was then irrigated with normal sterile saline. Subsequently, the canal was dried utilizing paper points (AriaDent, Tehran, Iran) and mineral trioxide aggregate (MTA) (Angelus,

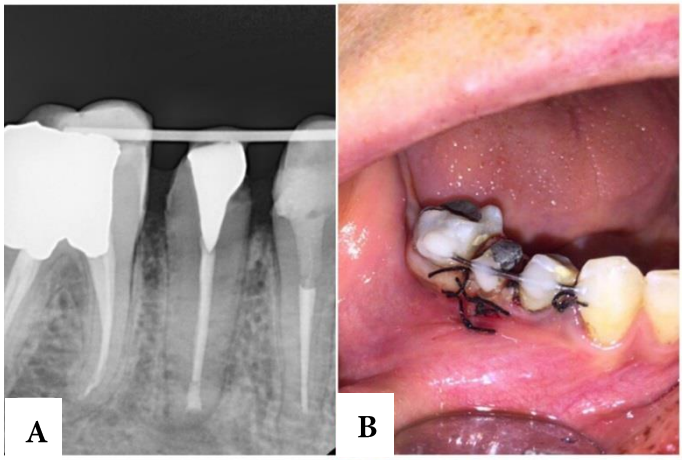

Figure 3: *A)* Periapical radiograph of the tooth after replantation; *B)* Clinical view of the tooth after replantation, stabilizing, and suturing

Londrina, PR, Brazil) was used as the retro filling material (Figure 2D). During this procedure, the tooth was held in forceps throughout the procedure, the extracted tooth were kept with a moist gauze (Figure 2A). Once the socket had been thoroughly rinsed with normal sterile saline, the tooth was replanted into the socket in less than 10 min from extraction. The tooth was splinted to the adjacent teeth using a semi-rigid splint wire: 0.5 mm orthodontic wire (Remanium Ligature Wire 503-050, Dentaurum, Germany) composite resin (Filtek Z350 XT, 3M, USA). Repositioning and stabilizing of the flap was accomplished by using 4-0 silk sutures (SUPASIL, SUPA Medical Devices, Tehran, Iran). Finally, a post-operative periapical radiograph was taken (Figure 3).

The patient was advised to take 400 mg ibuprofen every 6 h as well as 500 mg amoxicillin every 8 h for 5 days and to rinse her mouth with 0.12% chlorhexidine gluconate solution twice a day for 1 week. She was also advised to have a soft diet for 2 weeks. The sutures and the splint were removed one week and two weeks later, respectively. On the 2-week follow-up visit, the patient reported no improvement in symptoms. On the 3-month recall appointment, the tooth was asymptomatic and functional, and the patient reported complete recovery of the sensation in the lower lip.

Discussion

Endodontic treatment aims to cleanse and then shape the root canals with appropriate filling material to restore the function of the tooth as well as to prevent re-infection and periodontitis [13]. However, root canal treatment may fail due to persistent infection, imperfect or inappropriate root canal preparation, incomplete or improper root canal fillings, and neural injuries [14].

In the present case, the initial endodontic treatment of the mandibular second premolar tooth had been satisfactory, but subsequently, the patient had developed symptoms due to neural injury, which had ultimately led to paresthesia in the lower lip. Paresthesia can occur as the consequence of the neurotoxic effect of the endodontic material, mechanical trauma resulting from over-instrumentation, or bacterial infection beyond the apex [15, 16] . Furthermore, the inferior alveolar nerve injury following endodontic procedures performed beyond the apex may result in paresthesia. Morse *et al.* [17], reported a case of mental paresthesia due to infection of the mandibular first premolar in which paresthesia began one day after initial endodontic treatment. The treatment plan for the paresthesia included irrigation, antibiotics and dexamethasone and the problem was completely resolved in seven weeks. Genc Sen *et al.* [18], also showed that conventional endodontic treatment, with prescribing antibiotics, resolved paresthesia caused by endodontic infection, in eight weeks.

Both surgical and nonsurgical clinical modalities have been convenient for the treatment of endodontically-induced symptomatic IAN injuries. All suggested techniques are primarily based on case reports and small case-series studies [19]. In the present case, paresthesia was related to the proximity of the root apex of the tooth to the mental foramen. There was a choice between different treatment strategies, such as retreatment, extraction, and intentional replantation [20]. Intentional replantation was selected for this case, because it promised better operational efficiency, helped to avoid delicate anatomical structures, and, more importantly, allowed for saving the tooth. Also, intentional replantation relieves the pressure on the mental foramen, which is a significant contribution to the treatment of paresthesia. The replanted tooth was not rigidly splinted because of the immediate initial stability and because we wanted to avoid any negative effects on the prognosis due to ankylosis and complications during root development, which are problems that have been described in the literature [21-23].

With regard to intentionally replanted teeth, the most common causes of failure are external inflammatory resorption; replacement resorption; ankylosis resulting from damage to the periodontal ligament (PDL); and further necrosis of the PDL and the cementum [8, 24].

The success or failure of intentional replantation depends on the vitality of the PDL cells. It is possible to keep these cells vital while the tooth is out of the socket as long as the tooth is kept moist for at least 15 to 20 min. Accordingly, moistening the PDL with solutions such as saline solution seems to prolong the vitality of the PDL cells [8, 24].

Antibiotic premedication is prescribed when dictated by the patients' medical history, particularly if there are cardiovascular or prosthetic concerns [25]. Postoperatively, antibiotics are not routinely required unless a graft has been placed to augment the post replantation support, or the rupture of a periapical lesion

during the extraction occurs within the socket. In this case, transient bacteremia may result, and antibiotic coverage for three to five days would be prudent [25].

In the present case, the tooth extraction was accomplished by using surgical forceps. Surgical elevators were not selected for this particular purpose to avoid root fracture, replacement resorption, ankyloses, and to maintain the viability of the PDL cells [8, 24]. Also, the socket was rinsed with normal sterile saline, and the tooth was replanted into the socket in less than 10 min from extraction. The follow-up examinations revealed a clinically asymptomatic and functional tooth, with no signs of paresthesia in the lower lip. Despite all efforts, the patient was not cooperative to take a follow-up radiography. However, since the purpose of presenting this case was only to eliminate paresthesia symptoms, the follow-up image seems not to be necessary in this case.

Conclusion

This case report demonstrated the successful use of intentional replantation for the management of an endodontically treated tooth which had induced lower lip paresthesia.

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Conflict of Interest: 'None declared'.

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