



Paresthesia diagnosed using cone-beam computed tomography: a case report

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Various dental procedures, such as injection administration, surgical treatment, and endodontic treatment, can cause injury to the nerves. The most commonly injured nerves are the inferior alveolar and lingual nerves. This can manifest as altered sensation to the area of innervation of the injured nerve, such as the lower lip, chin, teeth, tongue, and mucosa. Altered sensations or loss of sensation are relatively infrequent complications in daily dental practice. Here, we report an uncommon case of altered sensation in the midfacial region caused by an endodontic procedure and discuss the need to consider local dental causes in the differential diagnosis of numbness in the facial region.

Keywords: Altered Sensation; Cone-Beam Computed Tomography; Delayed Paresthesia.



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INTRODUCTION

Paresthesia is defined as a temporary or permanent unpleasant alteration in sensations or loss of sensation caused by nerve lesions [1]. The etiology is known in 83% of all cases of facial paresthesia, and dental procedures account for 48% of the cases [2]. The inferior alveolar and lingual nerves are the most commonly involved nerves in paresthesia resulting from dental procedure. Various dental procedures, such as injection administration, surgical treatment, and endodontic treatment, can injure the inferior alveolar nerve and manifest as altered sensation in the area of innervation, such as the lower lip, chin, teeth, tongue, and mucosa [1,3]. The

patient usually notes altered sensation or paresthesia on the day of the dental procedure after recovery from local anesthesia. However, rarely, delayed paresthesia can occur a few days to months after the procedure [4]. In a retrospective study of 1377 third molar surgeries by Kipp DP et al., only 5% of the 60 cases of delayed paresthesia were reported [5]. Doh et al. reported a case of delayed paresthesia induced by inflammatory edema after third molar surgery involving the inferior alveolar nerve [6]. Delayed paresthesia occurs a few days to months later than classic paresthesia, which occurs immediately after the procedure [3]. Considering the limitations (superimposition, distortion, etc.) of two-dimensional radiography, the introduction of cone-beam computed tomography (CBCT) devices improved the

Received: February 4, 2019 • Revised: March 13, 2020 • Accepted: March 29, 2020

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Fig. 1. An extraoral preoperative photograph shows the area with altered sensations.

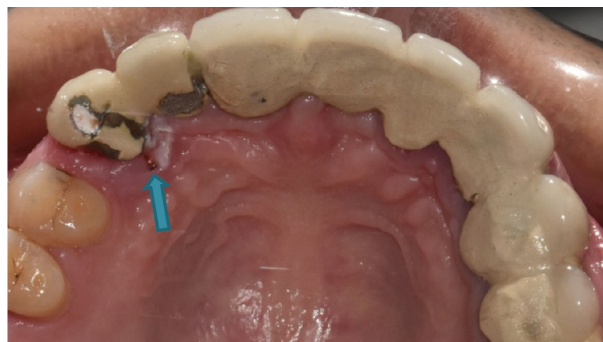


Fig. 2. An intraoral preoperative photograph shows gingival recession on the palatal side with sloughing in relation to 13.

endodontic evaluation of the morphology of teeth, including the location and number of canals, pulp chamber size and degree of calcification, root structure, direction and curvature, fractures, iatrogenic defects, and the extent of dental caries. CBCT, which provides a small field of view, has become the standard of care for endodontic diagnosis, treatment planning, and follow-up [7].

Here, we report an uncommon case of altered sensation in the midfacial region caused by an endodontic procedure diagnosed using CBCT and discuss the need to consider local dental causes in the differential diagnosis of numbness in the facial region.

CASE REPORT

A 53-year-old woman was referred to the Unit of Endodontics at the Oral Health Science Centre, PGIMER, Chandigarh, India, for the management of numbness of



Fig. 3. An intraoral preoperative radiograph shows inadequate root canal filling with a large periapical radiolucency in relation to 13.



Fig. 4. Sagittal cone-beam computed tomography shows inadequate root canal filling and a large periapical radiolucency in relation to 13.

the right side of the face. She had undergone emergency root canal treatment for toothache in the upper right canine and had subsequently developed numbness on the right side of the face from the upper lip to the infraorbital

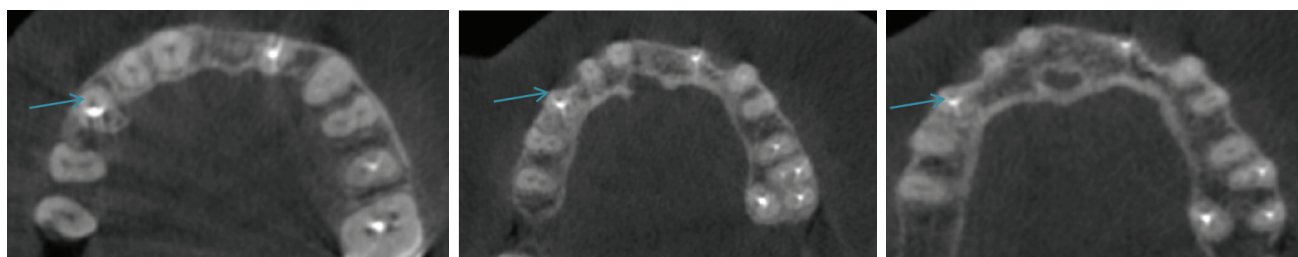


Fig. 5. Cross-sectional cone-beam computed tomography shows inadequate root canal filling in the periodontal ligament space and a large periapical radiolucency in relation to 13.

area. She had no relevant medical or family history. Physical extraoral and intraoral examinations were unremarkable, except for paresthesia. Extraoral examination of the affected area showed altered sensation in a 15–20-mm region from the upper lip to the infraorbital area (Fig. 1). Intraoral examination revealed a dressing through a porcelain-fused-to-metal (PFM) crown on the maxillary right canine. On the palatal side, gingival recession along with sloughing was noted through which gutta percha was seen (Fig. 2). The patient reported of tingling sensation of the gums in the first quadrant, particularly in the canine and premolar regions. The tooth was slightly tender to percussion. No swelling could be seen at the buccal sulcus. Radiographic examination revealed inadequate root canal filling and a large periapical radiolucency at the maxillary right canine with loss of the periodontal ligament (PDL) space and a wide lamina dura (Fig. 3). However, an intraoral periapical radiograph could neither reveal whether the material was inside or outside the canal nor precisely confirm which tooth was responsible for the symptoms and signs. CBCT confirmed the presence of radiopaque filling materials adjacent to the root canal in the PDL space and revealed empty root canals (Figs. 4 and 5). No extruded filling material was found beyond the canine apex. The patient was diagnosed with classic paresthesia from symptomatic apical periodontitis due to mechanical pressure and ischemia related to inflammatory processes (edema) or due to toxic metabolic or inflammatory products of bacteria. Retreatment was planned, and informed consent was obtained from the patient. When the dressing was removed, gutta percha was found outside of the canal



Fig. 6. A photograph shows gutta percha retrieved from the periodontal ligament space in relation to 13.

(Fig. 6). Irrigation was performed thoroughly with normal saline and povidone-iodine solutions. At the 1-week follow-up, the patient reported of rapid improvement of numbness. The root canal treatment was completed by her dentist a few weeks later, and the lost sensation recovered.

DISCUSSION

The basic principle of endodontic treatment is elimination of the diseased pulp and dentin with adequate shaping and cleaning and three-dimensional sealing of the root canal space using biocompatible filling materials [1,8]. The filling materials should be limited within the root canal space without overextending to the periapical

tissue or neighboring structures; otherwise, serious neurotoxic complications, such as anesthesia, hypoesthesia, paresthesia, and dysesthesia, can occur [9,10,11]. Neuropraxia is the mildest form of nerve injury, as classified by Seddon. It results from temporary loss of sensation due to blunt injuries or pressure from a local infection [12]. Altered sensations or loss of sensation are relatively infrequent complications in daily dental practice that are caused by improper treatment, particularly endodontic treatment. Instrumentation and overfilling beyond the root canal or in the PDL space while performing an endodontic procedure with hand or rotary files can produce serious clinical manifestations, such as pain, swelling, and, occasionally, altered sensations [3,8].

In our patient, although the root did not seem overfilled, the master cone along with other accessory gutta percha was introduced into the PDL space from access preparation through the PFM crown. Based on the rate of recovery of sensory sensations, the most probable cause was pressure from an acute infection of the periradicular tissue because chemical effects from filling materials on the nerve usually take longer to recover. The typical feature of such types of nerve injury is the fast recovery of sensory function after elimination of pressure from the local infection. In the present case, after removal of obturated materials from the canal prepared in the periradicular region, followed by irrigation with normal saline and povidone-iodine solutions, immediately relieved the pressure, leading to recovery within a short period of 2–3 weeks. Although the area of altered sensation in this case was supplied by the anterior and middle superior alveolar nerves along with the infraorbital nerve, branches of the maxillary nerve could have sustained trauma during instrumentation of the PDL space, or local infection could have blocked the accessory nerve branches or alveolar nerve plexus [11,13].

This case highlights the need to exercise great care during non-surgical endodontic procedures, particularly when performing through a crown. The requisites of endodontic procedures are straight-line access preparation, instrumentation within the canal, passive

irrigation, and proper sealing. Positioning the file inside the root canal space during instrumentation should be ensured with an electronic apex locator and radiograph; otherwise, over instrumentation or instrumentation within the PDL space may cause damage to the nerves, leading to paresthesia.

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CONFLICT OF INTEREST: All authors declare that they have no competing interests.

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