

Extrusion of Root Canal Filling into the IDN Canal: Case Report

Bushara Ping^{1*}, Boriroth Rith² and Chum Chenda³¹Oral and Maxillofacial Surgeon, Faculty of Dentistry, University of Health and Sciences, Phnom Penh, Cambodia.²Oral and Maxillofacial Surgeon, Department of Oral and maxillofacial Surgery, Preah Ang Duong Hospital, Phnom Penh, Cambodia.³Endodontist, Siem Reap, Cambodia.

ORCID ID: 0009-0007-8759-273X

ABSTRACT

Extrusion of root canal medicaments can cause complications such as pain, swelling, and paresthesia by irritating the periapical and neural tissues. This case report aims to provide insights into both surgical and nonsurgical management strategies for dealing with this issue. It concludes that nonsurgical approaches can be effective when there is no apical infection, but surgical intervention is necessary when there are clinical symptoms or radiographic evidence of progressively worsening periapical lesions.

KEYWORDS

Inferior alveolar Canal, IAN, Extrusion of Root Canal Obturation Material.

Corresponding Author Information

Bushara Ping

Oral and Maxillofacial Surgeon, Faculty of Dentistry, University of Health and Sciences, Phnom Penh, Cambodia.

Received: Aug 25, 2025; **Accepted:** Sep 29, 2025; **Published:** Oct 10, 2025**Copyright:** © 2025 ASRJS. This is an openaccess article distributed under the terms of the Creative Commons Attribution 4.0 International license.**Citation:** Bushara Ping, Boriroth Rith, Chum Chenda. Extrusion of Root Canal Filling into the IDN Canal: Case Report. J Oral Dental Care. 2025;2(1):1-4.

Introduction

Root canal treatment is necessary for teeth with infections that involve the pulp chamber, whether the teeth are vital or non-vital. The primary goals are to eradicate bacteria, remove necrotic tissue, facilitate the healing of periapical tissues, and prevent future infections. Ideally, the filling material should reach the root apex and seal the apical foramen, without extending into periapical tissues. However, excessive or incorrect instrumentation can result in the extrusion of materials such as dressing agents, irrigation solutions, sealers, and microorganisms into surrounding structures, causing a foreign-body reaction and leading to complications such as pain, swelling, and paresthesia.

Sometimes, the connective tissue either absorbs the foreign material or, more commonly, encapsulates it with a fibrous capsule. However, the extrusion of root canal sealers can irritate the periapical tissues,

potentially causing pain, swelling, and sensory disturbance [1], and often required the immediate treatment. Various treatment modalities have been prescribed in the literature review such as non-surgical approach, including treatment with prednisone and pregabalin [2,3] and surgical procedures accounting from Extraction, Apicoectomy, Osteotomy toward Bilateral Sagittal Split Osteotomy (BSSO), and Micro reconstructive surgery were mentioned in the study by Castro, R et al., [4]. This present report describes the unintentional extrusion of root canal sealer into the inferior alveolar nerve canal, observed four days after root canal obturation.

Case Report

A 37-year-old female patient was referred to Oral and Maxillofacial Surgery Department at Preah Ang Duong Hospital, Phnom Penh, Cambodia. She Reported non-resolving paresthesia of the left lower

lip immediately after undergoing endodontic treatment under local anesthesia on her left mandibular second molar (#37). It had been filled with gutta-percha and zinc oxide–eugenol cement 4 days previously. Clinical examination, sharp pinprick testing revealed significant anesthesia in the left lower lip and chin regions and pain upon percussion of tooth #37. No intraoral swelling was observed (Figure 1) (Figure 2). Panoramic radiographs imaging revealed significant extent of the extruded root canal sealer, which occupied approximately 4 cm within the mandibular canal (Figure 3).



Figure 1: Pinprick test mapping the area of paresthesia in the lower lip and chin.



Figure 2: Second left mandibular molar with coronal temporary restorative material and of swelling.



Figure 3: Panoramic radiograph 4 days after root canal treatment. Radiopaque material can be seen in the inferior Dental canal, posterior and anterior to tooth # 37.

After discussing treatment options, the patient refused bilateral sagittal split osteotomy (BSSO) surgical debridement of the inferior alveolar canal. Localized decompression with tooth extraction combination with systemic corticosteroid therapy was therefore approved, and surgical consent form was obtained.

The initial treatment included extraction of the affected tooth, flap opening, buccal bone was removed gently with #16 round bur for better virtualization, removal of excess sealer through the socket, and thorough irrigation.

After the operation, An anti-inflammatory regimen of prednisone (1 mg/kg per day, in two divided doses with gradual tapering), along with regular follow-up visits. The patient showed rapid improvement within the first few days. After one week, the pain had resolved and paraesthesia in the lower left lip had decreased, allowing discontinuation of prednisone. Two weeks later, paraesthesia was markedly reduced. Over the following two weeks, symptoms continued to improve in the affected area, although mild paresthesia persisted but local pain on the affected tooth have disappeared.

The patient expressed satisfaction with the regained sensitivity and the reduction in the size of the area of reduced sensitivity (Figure 4).



Figure 4: Pinprick test show the reduction size of numbness area 1 months Post-Op. apparently, still some pain to pin prick.

Secondary intervention, which involved debridement of the inferior alveolar canal was explained again to the patient. Despite thorough discussion about the hoped-for benefits of BSSO surgical debridement, the patient ultimately declined to undergo the treatment.

Discussion

Injury to the inferior alveolar nerve following endodontic treatment of posterior molars is rare but can lead to sensory disturbances, the degree of nerve injury has been classified into three types (neuropraxia, axonotmesis and neurotmesis) by Seddon [5].

Chemical neurotoxicity and mechanical compression caused by extruded materials are possible causes. Although some root canal materials may possibly resorb over time, they are expected to last

many years, so early surgical intervention is recommended in cases with persistent symptoms [1]. Treating mandibular second molars as they pose an increased risk of injury by virtue of their proximity to the IAN. One study demonstrated that more than 50% of mandibular second molars ($n = 272$) had an intimate relationship between the roots and mandibular canal [6].

Chemical Neurotoxicity:

The biocompatibility of sealers holds significant importance as they interact with peri-radicular tissues during the compaction of the root canal filling material, potentially influencing the success of root canal treatment (RCT). Various materials have been developed in the journey for an ideal sealer, drawing from substances such as glass ionomer cement, zinc oxide eugenol, calcium hydroxide, epoxy/methacrylate resins, calcium silicate, and silicone for obturation purposes. However, many of these materials have demonstrated varying degrees of toxicity, contingent upon their chemical composition, as evidenced in studies [7]. Extrusion of sealers has been demonstrated to exert cytogeno-, and neurotoxic effects on peri-radicular or adjacent anatomical tissues. When root canal sealers come into contact with a nerve, there have been reports suggesting that they can disrupt nerve transmission, leading to nerve injury. This can result in various symptoms including pain, neurogenic inflammation, and sensory disturbances [7,8].

Mechanical Compression

Extruded materials can exert pressure on the inferior alveolar nerve, leading to nerve compression and associated sensory disturbances. This mechanical effect has been documented in various case reports and studies [9,10].

Management Strategies:

As the duration of the injury increases, the severity of nerve damage typically escalates. Accordingly, it's crucial to conduct early surgical exploration with removal of the material and decompression of the inferior alveolar nerve (IAN) immediately upon the onset of sensory disturbances, regardless of the root canal filling material used.

Castro R, et al. [4] mentioned Patients who underwent early surgery within 72 hours achieved a 100% rate of complete recovery, whereas only 29% of those treated surgically after 72 hours achieved full recovery. Among patients managed medically, six received delayed treatment, with three achieving full recovery and three showing only partial recovery. One patient who received early medical therapy reported complete recovery. In contrast, among 51 patients who received no treatment, follow-up revealed partial sensory recovery in 74% and persistent asymptomatic status in 16%.

Moreover, in instances of widespread nerve injuries, the effectiveness of surgical management may be reduced, and accurately predicting the improvement of functional sensory recovery can be challenging [1,9].

Delayed surgical repair of the IAN may also be warranted and

beneficial for neurosensory recovery in cases of irreversibly damaged IAN. Nonsurgical management, including “wait-and-see” approaches and anti-inflammatory plus neuropathic pain medications such as Pregabalin, may be effective in some cases without apical symptoms [2,10]. Surgical treatment options and medical therapeutic possibilities are gathered and integrated into a decision-making tree, aiming to provide clear therapeutic guidelines to practitioners such mentioned in the study [4]. Some authors, have managed such cases using corticosteroids, B1-B6 vitamins therapy, and pregabalin. In classical paper by Gatot and Tovi [11] noted that prednisone can shorten the disease course, reduce fibrosis, and lessen sequelae. For example, one case used 40 mg prednisone for 10 days after the accident, followed by tooth removal and a two-month course of 20 mg prednisone daily, leading to full recovery. Similarly, López-López, et al. [3] reported complete recovery after one month using prednisone (1 mg/kg twice daily in two divided doses with gradual tapering) and pregabalin (150 mg daily in two doses). However, despite some successes, many patients still experience sensory sequelae, and no randomized studies exist to compare treatment strategies [9].”

Conclusion

Although the incidence of inferior alveolar nerve (IAN) injuries resulting from endodontic procedures is relatively low and documented primarily through limited case reports, it remains crucial for clinicians to recognize which teeth pose a higher risk and to understand how to promptly manage such complications if they arise. This case underscores the necessity for diligence during root canal treatment, particularly when dealing with teeth whose root apices are closely situated to the mandibular canal. Radiographic imaging plays a vital role in identifying high-risk cases, ensuring precise root canal measurements, and verifying the quality of root fillings.

In instances where material extrusion is detected, we strongly advise immediate referral to an oral surgeon for expedited surgical decompression, along with consideration for early steroid therapy. This approach aims to enhance the potential for nerve repair after irritated by the extruded material and optimize patient outcomes.

References

1. Bastien AV, Adnot J, Moizan H, Calenda É, Trost O. Secondary surgical decompression of the inferior alveolar nerve after over filling of endodontic sealer into the mandibular canal: Case report and literature review. *J Stomatol oral Maxillofac Surg.* 2017; 118: 389-392.
2. Alonso-Ezpeleta O, Martín PJ, López-López J, Castellanos-Cosano L, Martín-González J, et al. Pregabalin in the treatment of inferior alveolar nerve paraesthesia following overfilling of endodontic sealer. *J Clin Exp Dent.* 2014; 6: e197-e202.
3. López-López J, Estrugo-Devesa A, Jané-Salas E, Segura-Egea JJ. Inferior alveolar nerve injury resulting from overextension of an endodontic sealer: non-surgical management using the GABA analogue pregabalin. *Int Endod J.* 2012; 45: 98-104.
4. Castro R, Guivarch M, Foletti JM, Catherine JH, Chossegros

-
- C, et al. Endodontic-related inferior alveolar nerve injuries: A review and a therapeutic flow chart. *J Stomatol oral Maxillofac Surg.* 2018; 119: 412-418.
5. Seddon HJ. Three types of nerve injuries. *Brain.* 1943; 66: 237-288.
 6. Chong BS, Quinn A, Pawar RR, Makdissi J, Sidhu SK. The anatomical relationship between the roots of mandibular second molars and the inferior alveolar nerve. *Int Endod J.* 2015; 48: 549-555.
 7. Kursat Er, Ayar A, Kalkan OF, Canpolat S, Tasdemir T, et al. Neurotoxicity evaluation of three root canal sealers on cultured rat trigeminal ganglion neurons. *J Clin Exp Dent.* 2017; 9: e34-e39.
 8. Ruparel NB, Ruparel SB, Chen PB, Ishikawa B, Diogenes A. Direct effect of endodontic sealers on trigeminal neuronal activity. *J Endod.* 2014; 40: 683-687.
 9. Hanya Mahmood, Johnathan Hoare SA. Chemical neurotoxicity to the inferior alveolar nerve-A rare sequela of endodontic treatment. *Oral Surgery.* 2022; 15: 663-668.
 10. Blagova B, Shekeroova S, Yanev N. Non-Surgical Management of Extrusion of a Root Canal Material into Periapical Tissues: A Case Report. *Interv Pediatr Dent Open Access J.* 2020; 4: 340-344.
 11. Gatot A, Tovi F. Prednisone treatment for injury and compression of inferior alveolar nerve: report of a case of anesthesia following endodontic overfilling. *Oral Surg Oral Med Oral Pathol.* 1986; 62: 704-706.