

# Clinical negligence or endodontic mishaps: A surgeons dilemma

Department of Conservative  
Dentistry and Endodontics, CSM  
Medical University, Lucknow,  
Uttar Pradesh, India

Rakesh Kumar Yadav, Sharad Chand, Promila Verma, Anil  
Chandra, Aseem Prakash Tikku, Kulwinder Kaur Wadhvani

**Address for correspondence:**  
Dr. Rakesh Kumar Yadav,  
Department of Conservative  
Dentistry and Endodontics,  
CSM Medical University,  
Lucknow, Uttar Pradesh, India.  
E-mail: rakeshanita10@yahoo.in

## ABSTRACT

Complications may occur during and after endodontic treatment, which may be due to negligence of the operator. The surgical treatment of a case presenting pain and persistent pus discharge and swelling due to the extrusion of the root canal filling to the base of the nasal floor between left maxillary lateral and canine teeth is presented in this report. First, carelessness was during root canal treatment that was over obturated and second time during extraction in which overextended gutta-percha remained in the bone, caused the complications like pain, persistent pus discharge, and headache. Clinicians should be aware of the fact that endodontic instruments and filling materials (solid or liquid) can be extended in such a degree that can lead to neurological or sinus complications.

**Key words:** Gutta-percha, mishaps, overobturation, sinusitis

## INTRODUCTION

The main objective of endodontic treatment is to provide hermetic obturation of the root canal system with an inert, biocompatible, and dimensionally stable filling material. According to a satisfactory obturation of the root canal, the filling material and the endodontic instruments should be limited to the root canal without extending to periapical tissues or other neighbouring structures (Poveda *et al.*; 2006).<sup>[1]</sup> Filling material, broken file, and gutta-percha extruded in the periapical area cause a foreign reaction on the connective tissue (Kafas *et al.*; 2009).<sup>[2]</sup> Depending on the organism's immune system, the connective tissue tends to absorb the foreign body or more frequently surround it with a fibrous capsule.

There are numerous examples reported in the literature that cite and document many disabling complications

to the alveolar bone, neurovascular anatomy, and maxillary sinus following overextension of root canal filling materials. Neural complications, a consequence of endodontic obturation as well as other server outcomes to overextended obturating material, are serious problem. These injuries require a thoughtful strategy for prevention during endodontic procedures as well as a responsible systematic approach to management, should the outcome of endodontic therapy produce an injury. This monograph will focus on measures that can prevent obturation mishaps which occur under the most vulnerable circumstances during the course of endodontic therapy. Endodontic mishaps or procedural accidents are those unfortunate occurrences that happen during treatment. Recognition of such incidence is the first step in its management.

The mishaps may be observed by radiographic or clinical observation.

Correction of such mishap may be accomplished in one of several ways depending on the type and extent of procedural accident.

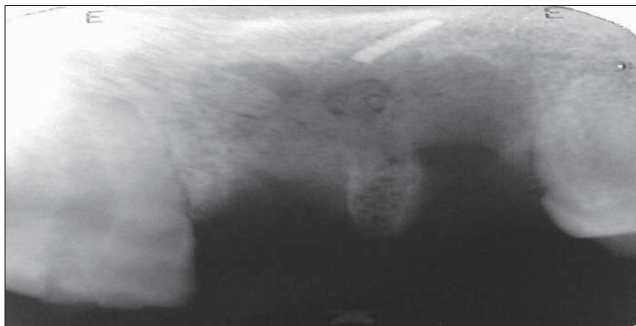
Endodontic mishaps are either (a) access related, (b) instrumentation related, (c) obturation related, or (d) miscellaneous.

Access this article online	
<b>Quick Response Code:</b> 	<b>Website:</b> www.njms.in
	<b>DOI:</b> 10.4103/0975-5950.102174

## CASE REPORT

A 30 years male patient reported to the Department of Conservative Dentistry and Endodontic, Faculty of Dental Sciences, CSM Medical University, Lucknow, with a chief complaint of continuous pain and heaviness in the infraorbital region and pus discharge. His medical history was insignificant and dental history revealed that his maxillary lateral incisor and canine of left side got fractured due to trauma 1 year back. He had been treated in a private clinic with root canal treatment, but patient was not totally asymptomatic. After 10 months, he had developed swelling and pain with pus discharge in upper left anterior region. The Consultant Dentist in that private clinic had extracted both the teeth but pus discharge continued and pain was present, which was refractory to several courses of antibiotics and analgesics.

Intraoral examination showed sinus in relation to maxillary left lateral incisor and canine region with unhealed sockets. Extra oral examination showed slight swelling in the left maxillary lateral incisor and canine region. Radiograph revealed the foreign body [gutta-percha] in the upper left anterior infraorbital region near the nasal floor [Figure 1]. Routine blood



**Figure 1:** Radiograph showing foreign body in relation to #22 and #23



**Figure 3:** Photograph showing retrieval of gutta-percha

investigation was done and was planned for surgical intervention to remove foreign body. Mucoperiosteal flap was raised and curettage was done to remove the granulation tissues [Figure 2]. A foreign body was visible in the bone, which was removed by taking care of nasal floor [Figure 3]. The object was identified as no-40 gutta-percha point [Figure 4]. The cavity was cleaned and flap was repositioned and sutured. After 7 days, sutures were removed and patient was found to be totally asymptomatic and socket was also in healing stage [Figure 5].

## DISCUSSION

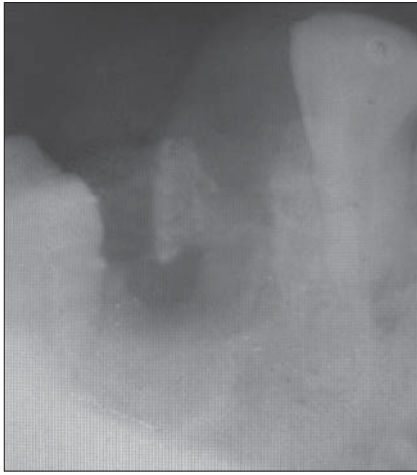
One of the most iatrogenic complications in endodontic is overfilling of the root canal, which has a negative effect on prognosis of endodontically treated teeth (Brkic *et al.*; 2009).<sup>[3]</sup> More than a half of the overfilled teeth heal satisfactorily after proper endodontic therapy, but in case of injury of any nerve or presence of obturating material in soft tissues or sinus spaces a surgical approach is necessary (Brkic *et al.*; 2009).<sup>[3]</sup> Overfilling



**Figure 2:** Photograph showing operative procedure



**Figure 4:** Retrieved gutta-percha



**Figure 5:** Postoperative radiograph

of the root canal sometimes cause severe complications. Endodontic etiology can affect the maxillary sinus, which include extension of periapical infections into the sinus, the introduction of endodontic instruments, and materials beyond the apices of posterior teeth in close proximity to the sinus (Hauman *et al.*, 2002).<sup>[4]</sup>

The study of (Nimigeen *et al.* 2006)<sup>[5]</sup> presents the various problems encountered during endodontic treatment of posterior maxillary teeth. About 125 cases of odontogenic chronic sinusitis were reviewed retrospectively.

In the case described above, the overextension of filling material from the apical foramen of the root canal<sup>[6,7]</sup> did show damage of the periapical tissues according to the normal bone density of the area shown from the radiographic examination. Overextension filling of left lateral incisor and canine root canal were the causal factors of a chronic inflammation of the corresponding sites.

The neural distribution to the sinus is diagnostically important. The nerve supply is from the maxillary division of the trigeminal nerve, with branches coming from the posterior, middle, and anterior superior portions. The inflammatory effects of overfilled endodontic materials as well as dental sepsis can affect the differential diagnosis of pain localized to the sinuses. Gross overextension of obturation materials usually indicates faulty technique. However, as long as the overextension is not in contact with vital structures, such as the inferior alveolar nerve or sinuses, and the apical terminus is well filled in three dimensions, permanent harm is potentially small, unless the obturation materials contain paraformaldehyde.

On the other hand, overextension of the root canal filling material risks are serious and possibly permanent

consequences should the underlying inferior alveolar nerve be adjacent to the root terminus or initially penetrated with files to create a mishap scenario that includes the possibility for severe injury.

In most cases, irritation of the periapical tissues from extrusion of endodontic cement is transitory with subsequent reabsorption of the excess material, leading to complete healing in a few months. This phenomenon may be considered to be an expected complication, and at times, even sought after by many dentists as a sign of a successfully completed intervention.<sup>[8]</sup> There is notable controversy in the literature, regarding the presence of cement beyond the apex. Some authors, among them Schilder (1967),<sup>[9]</sup> refute the hypothesis that the presence of cement beyond the apex favors healing of the periapical lesions, maintaining their benign nature. He asserts that extrusion beyond the apex must be avoided solely in the interest of potential discomfort created for the patient during the obturation phase.

Other authors have reported significant cytotoxicity of both commonly used cements and gutta-percha following research studies carried out *in vitro* with SEM (scanning electron microscope).<sup>[10]</sup> This cytotoxicity can induce periradicular inflammation or necrosis of the periodontal ligament, and for this reason, overfilling should be avoided as much as possible because it can lead to failure of short-term treatment or a long negative prognosis.<sup>[9]</sup>

In reality, the prognosis for an endodontically treated tooth with overfilling depends on the response of the periradicular tissue to the canal obturation material which is, in its own way, a consequence of the complex, and at times an unpredictable interaction between the materials and the host defences.<sup>[11]</sup>

According to the American Dental Association, overfilling by more than 2 mm past the radiological apex represents a technical error ascribable to over-instrumentation, inadequate measuring, or a lack of an apical stop. However, the latter was difficult to obtain, as in the presence of resorbed roots caused by inflammatory processes or by particularly wide apices.<sup>[12]</sup> "Vertical condensation of warm gutta-percha during the obturation phase offers a higher probability of closure of the lateral and accessory canals.<sup>[13,14]</sup> At the same time however, warm vertical compaction techniques also result in a greater risk of the obturation material being extruded into periradicular tissues.<sup>[8,15]</sup> The material, usually cement, acts as a lubricant, as it aids in the progression of the principal obturation material (core) during the compaction phase. Furthermore, it also aids in the filling of the lateral and accessory canals which would otherwise be impossible to fill with a single core of gutta-percha. In addition, it improves the adaptation



to discrepancies and irregularities which, even after correct shaping, may persist on the root canal wall. The prognosis for an endodontically treated tooth with overfilling depends on the response of the periradicular tissue to the canal obturation material which is, in its own way, a consequence of the complex, and at times an unpredictable interaction between the materials and the host defences.<sup>[11]</sup>

Over instrumentation, in particular, may extrude infected material contained in the canals beyond the apex, interfering, or impeding the healing process of the periapical tissue. Gutta-percha cones, which had been extruded past the apices, have demonstrated the presence of a "biofilm" on the cones.<sup>[12]</sup> This "biofilm" allows undisturbed growth of the bacteria and renders them particularly resistant to the defences of the host and may be responsible for foreign body reactions. The consequences of overfilling can, therefore, result in infective periapical periodontitis caused by the transport of bacteria beyond the apex and an incomplete cleansing, foreign body reactions, and pain symptoms which are ascribable to irritative stimuli, even in the absence of radiological evidence.<sup>[16]</sup>

Some meta-analyses have recognized that, over time, the best results for canal obturations occur when the gutta-percha extrudes 0-1 mm from the apex and, on the contrary, when considering measurements of greater than 1 mm (above or below the apex), the results are less favorable.<sup>[17]</sup>

Finally, the prognosis for an endodontically treated tooth with overfilling depends on the response of the periradicular tissue to the canal obturation material which is, in its own way, a consequence of the complex and, at times, an unpredictable interaction between the materials and the host defences.<sup>[11]</sup>

## CONCLUSION

Knowledge of dento-antral relationships as well as the skill of the operator is important particularly in the prevention of sinus accidents. The anatomical and clinical significance of the maxillary sinus in relation to conventional and surgical endodontic therapy is considered. Mechanical and chemical effects may have contributed to the development of these iatrogenic complications. Clinicians should be aware of the fact that endodontic instruments and filling materials [solid or liquid] can be extended in such a degree that can lead to sinus complications, i.e., sinusitis, due to the

proximity of the apices of maxillary posterior teeth to the sinus floor membrane.

## REFERENCES

1. Poveda R, Bagán JV, Fernández JM, Sanchis JM. Mental nerve paresthesia associated with endodontic paste within the mandibular canal: Report of a case. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006;102:e46-9.
2. Kafas P, Upile T, Angouridakis N, Stavrianos C, Dabarakis N, Jerjes W. Dysaesthesia in the mental nerve distribution triggered by a foreign body: A case report. *Cases J* 2009;2:169.
3. Brikic A, Gurkan B, Olgac V. Surgical approach to itraogenic complications of endodontic therapy: A report of two cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;107:52-3.
4. Hauman CH, Chandler NP, Tond DC. Endodontic implications of maxillary sinus: A review. *Int Endod J* 2002;35:127-41.
5. Nimigeen VR, Nimigen V, Maru N, Andressakis D, Balatsouras DG, Danielidis V, *et al.* The maxillary sinus and its endodontic implication: A clinical study and review. *B-ENT* 2006;2:167-75.
6. Holland R, De Souza V, Nery MJ, de Mello W, Bernabé PF, Otoboni Filho JA. Tissue reactions following apical plugging of the root canal with infected dentin chips. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1980;49:366-9.
7. Costerton JW, Stewart PS, Gerenberg EP. Bacteria biofilms: A common cause of persistent infections. *Science* 1999;284:1318-24.
8. Dulac KA, Nielsen CJ, Tomazic TJ, Ferrillo PJ Jr, Hatton JF. Comparison of the obturation of lateral canals by six techniques. *J Endod* 1999;25:376-80.
9. Schilder H. Filling root canals in three dimensions. *Dent Clin North Am* 1967;89:723-44.
10. Nguyen TN. Obturation of the root canal system. In: Cohen S, Burns RC, editors. *Pathways of the pulp*. 7th ed. St Louis: Mosby Inc; 1994. p. 219-71.
11. Gutierrez JH, Brizuela C, Villota E. Human teeth with periapical pathosis after overinstrumentation and overfilling of the root canals: A scanning electron microscopic study. *Int Endod J* 1999;32:40-8.
12. Pascon A, Leonardo MR, Safavi K, Langeland K. Tissue reactions to endodontic materials: Criteria, assessment and observations. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1991;72:222-37.
13. Lin LM, Rosenberg PA, Lin J. Do procedural errors cause endodontic treatment failure? *J Am Dent Assoc* 2005;136:187-93.
14. Sjögren U, Figdor D, Persson S, Sundqvist G. Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. *Int Endod J* 1997;30:297-306.
15. Al-Dewani N, Hayes SJ, Dummer PM. Comparison of laterally condensed and low temperature thermoplasticized gutta-percha root fillings. *J Endod* 2000;26:733-8.
16. Kececi AD, CelikUnal G, Sen BH. Comparison of cold lateral compaction and continuous wave of obturation technique following manual or rotary instrumentation. *Int Endod J* 2005;38:381-8.
17. Peng L, Ye L, Tan H, Zhou X. Outcome of root canal obturation by warm gutta-percha versus collateral condensations. A meta-analysis. *J Endod* 2007;33:106-9.

**How to cite this article:** Yadav RK, Chand S, Verma P, Chandra A, Tikku AP, Wadhvani KK. Clinical negligence or endodontic mishaps: A surgeons dilemma. *Natl J Maxillofac Surg* 2012;3:87-90.

**Source of Support:** Nil. **Conflict of Interest:** None declared.