CASE REPORT

An unusual swelling following endodontic and prosthodontic treatment of a mandibular molar due to a foreign body reaction

M. H. Ree
Department of Cariology Endodontology Pedodontology, Academic Centre for Dentistry Amsterdam (ACTA), Amsterdam, the Netherlands

Abstract

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Aim The purpose of this case report is to stress the importance of taking a proper history and the appropriate evaluation of diagnostic tests in order to prevent incorrect diagnosis and treatment. Moreover, the management of postoperative problems in a healthcare system in which specialists take on specific parts of the treatment is discussed.

Summary This article describes the diagnosis and treatment of an unsuspected flare-up 1 week after root canal treatment. The swelling and pain appeared to be associated with an accidentally embedded piece of impression material. General practitioners and specialists should be aware of alternate treatment plans and treatment procedures and take these into consideration whenever there is a postoperative problem to be solved.

Key learning points

- Impression materials can cause a foreign body reaction when embedded in the soft tissues.
- History taking and evaluation of diagnostic tests are of paramount importance in order to prevent incorrect diagnosis and treatment.
- Both general practitioners and specialists have the responsibility to evaluate patients with a broad vision.

Keywords: diagnosis, foreign body reaction, impression taking, root canal treatment, swelling.

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Correspondence: M. H. Ree, Department of Cariology Endodontology Pedodontology, Academic Centre for Dentistry Amsterdam (ACTA), Louwesweg 1, 1066 EA Amsterdam, the Netherlands (fax: +31 20 6692881; e-mail: M.Ree@acta.nl).

Introduction

Pain and/or swelling following a dental procedure can be a significant problem.

In the endodontic context, a flare-up may be defined as the occurrence of pain and/or swelling following endodontic treatment, requiring an unscheduled visit and active treatment (Walton & Fouad 1992). Factors that are frequently related with the occurrence of flare-ups are the presence of a periapical lesion (Genet *et al*. 1987, Torabinejad *et al*. 1988, Trope 1990, Walton & Fouad 1992) presence of preoperative pain and/or swelling (Genet *et al*. 1987, Torabinejad *et al*. 1988, Walton & Fouad 1992), and retreatment procedures (Torabinejad *et al*. 1988, Trope 1990).

The following case report documents postoperative problems in a patient following completion of a non-complicated endodontic treatment.

Report

A 42-year-old woman with a non-contributory medical history was referred for endodontic treatment of tooth 46 (FDI annotation). The tooth was treatment planned for a new porcelain fused to metal crown and after removing the existing cast restoration and amalgam core, there was insufficient sound tooth structure remaining to provide adequate retention and resistance for a new crown (Fig. 1). The tooth responded within normal limits to a cold test and the radiograph revealed no periapical radiolucency.

Under local anaesthesia the amalgam core was removed to reveal a direct pulp cap, which was performed approximately 15 years previously. The content of the mesial canals appeared to be necrotic, the distal canals harboured vital pulp tissue.

After placing a rubber dam, the four root canals were cleaned and shaped with GT rotary files (Dentsply/Tulsa Dental Products, Tulsa, OK, USA) using a crown-down technique under copious irrigation with 2.0% sodium hypochlorite delivered with an ultrasonic device (EMS Piezon Master 400; EMS, Nyon, Switzerland) using a size 15 endosonore file (Maillefer, Ballaigues, Switzerland).

Because there was insufficient time to obturate the root canals, an interappointment intracanal dressing of calcium hydroxide (Ultracal XS; Ultradent Products Inc., South Jordan, UT, USA) was placed and the access cavity sealed with a Cavit temporary restoration (ESPE, Seefeld, Germany).

One week after initial treatment, the patient returned sign and symptom free. The root canals were irrigated with a 17% EDTA solution followed by a final flush 2% NaOCl and obturated with gutta-percha (Autofit; Analytic, Glendora, CA, USA) and pulp canal sealer (Kerr Co. Romulus, MI, USA) using the continuous wave of condensation (System B;

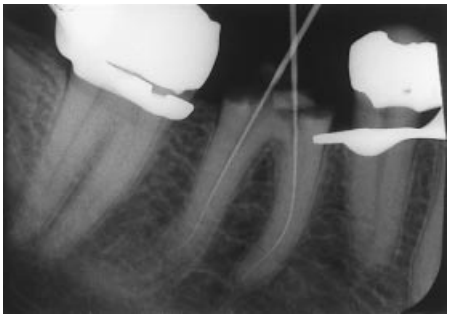

Figure 1 Radiograph showing files in place for length determination and loss of coronal tooth structure.

Figure 2 Radiograph of tooth 46 after root canal obturation and placement of a titanium post and a core of resin composite.

Analytic, Glendora, CA, USA) and a warm thermoplasticized gutta-percha as a back filling (Obtura II; Obtura/Spartan, Fenton, MO, USA).

The remnants of the eugenol containing sealer were removed by finishing the cavity walls with a fine diamond bur. Immediately following obturation and after dentinal conditioning, a post of titanium alloy (Parapost XH; Whaledent, Mahwah, NJ, USA) was cemented into the distolingual canal with Panavia F (Kuraray Co., Osaka, Japan) and a core of resin composite material was placed (Clearfil core; Kuraray Co., Osaka, Japan) (Fig. 2).

The patient was referred back to her general dentist in order to complete the restoration. One week after obturation, the patient returned to the endodontist because of a painful swelling on the tooth that had received root canal treatment. Clinical examination revealed a reddish, circumscribed swelling on the buccal aspect of the mesial root of tooth 46. There was tenderness to palpation on the buccal alveolar mucosa but no pain on percussion. Diagnostic tests revealed that all the other teeth in the area responded within normal limits to sensitivity tests and the radiographic features were within the normal range.

The temporary crown was intact and in place and the patient reported that the tooth had been prepared for a crown and an impression (Permadyne; ESPE, Seefeld, Germany) had been made 2 days prior to the emergency visit.

Upon request it was discovered that the general dentist had used a retraction cord (Ultrapak, Ultradent Products Inc., South Jordan, UT, USA) with a haemostatic agent containing aluminium chloride (Hemogin-L, Van R Dental Products, Oxnard, CA, USA).

Because it was improbable that the swelling was associated with the root canal treatment, it was suspected that a foreign body could be the cause of the postoperative swelling.

Anaesthesia was obtained with a local infiltration of Septanest SP 4% with 1 : 200 000 adrenaline (Septodont, Saint-Maur-des Fossés Cedex, France) and a surgical exploration was performed by making a horizontal incision in the alveolar mucosa at the base of the swelling (Fig. 3). A foreign body of 5 × 5 mm, that consisted of a thin piece of polyether impression material was removed (Fig. 4).

Healing was uneventful and at a one-week recall there were no symptoms and the patient was free of complaints (Fig. 5).

Discussion

A swelling of endodontic origin was excluded because:

1 the patient did not experience spontaneous pain following the endodontic treatment, neither was the involved tooth tender on biting and/or percussion; a swelling caused by a flare-up of the endodontically treated tooth would usually have been preceded by spontaneous pain and/or tenderness on biting

Figure 3 Clinical view during surgical procedure showing the piece of impression material in the incision wound.

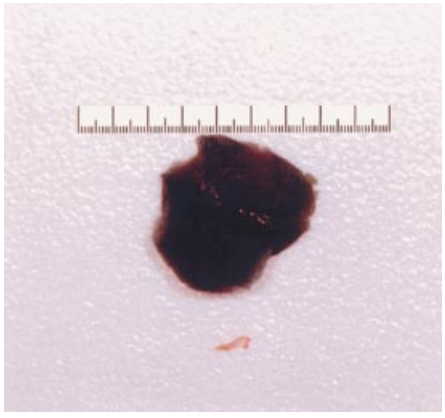

Figure 4 The retrieved piece of impression material.

Figure 5 Clinical view showing the alveolar mucosa after healing.

2 the time span between finishing the endodontic procedure and the emergency visit was 7 days and

3 the clinical examination revealed a swelling which was firm on palpation and no fluctuation could be detected.

The presence of pus was thought improbable and the suspicion of a foreign body was plausible.

Fragments of impression material that penetrate the epithelial attachment and remain in the tissue to produce a foreign body response can cause diagnostic problems. Kanarek

(1965) was one of the first authors to describe a case of a piece of polysulphide impression material that was forced through an oro-antral fistula into the maxillary sinus during impression taking. Despite the worldwide use of impression materials, only a limited number of case reports have been described in the literature from 1965 to date (Olson 1968, van de Poel 1972, Price & Whitehead 1972, O'Leary *et al*. 1973, Clark 1974, Glenwright 1975, Gettleman & Agranat 1976, Gullet & Caulder 1978, Eliasson & Haasken 1979, Winstock & Warnakulasuriya 1986, Kent *et al*. 1988).

The impression materials may be in the soft tissues (Price & Whitehead 1972, van de Poel 1972, Gullet & Caulder 1978), subperiosteally (Olson 1968, Price & Whitehead 1972, Gettleman & Agranat 1976, Eliasson & Holte 1979, Kent *et al*. 1988) or even within the cancellous bone (van de Poel 1972, Price & Whitehead 1972, O'Leary *et al*. 1973, Glenwright 1975). A severe inflammatory response occurred in all cases.

Almost all these reports involved a polysulphide impression material, which often contains lead peroxide in the catalyst paste in order to activate the polymerization reaction. The lead is presumed to be responsible for the toxicity of this material (Gettleman *et al*. 1978). Polyethers and addition silicones, which currently dominate the market, may not cause the level of irritation seen with polysulphides (O'Leary *et al*. 1973, Gettleman *et al*. 1978).

The lead peroxide in polysulphide impression materials is responsible for a degree of radiopacity. Detection of the foreign body by radiographs can be a problem because of insufficient radiopacity. Price & Whitehead (1972) were the first to quantify the radiopacity of impression materials. They found that radiopacity was a function of composition and thickness. Since then, several studies addressed the importance of the radiopacity of any impression material in assisting the diagnosis and retrieval of accidentally embedded materials (Eliasson & Haasken 1979, Shillingburg *et al*. 1988, 1989, Parissis *et al*. 1994).

Polysulphide is the most radiopaque material, whereas polyether and addition silicone are the most radiolucent materials (Eliasson & Haasken 1979, Shillingburg *et al*. 1988, Parissis *et al*. 1994). The thickness of the specimen also plays a role in radiographic detection. Even the most radiopaque materials might not be detected if the retained section has insufficient mass (Eliasson & Haasken 1979).

Another aspect to be mentioned is the colour of the impression material. Several studies described the need for contrasting colours, necessary for easy detection in a surgical field (Gettleman *et al*. 1978, Shillingburg *et al*. 1988). Brown materials did not provide good contrast against a red background, whilst blue, green and pink colours are highly visible should retrieval be required (Shillingburg *et al*. 1988).

Impression materials can be embedded in the tissues for a variety of reasons. In all the case reports mentioned, electrosurgery and/or retraction cord with a haemostatic agent were used prior to taking the impression. If there is a narrow band of attached gingiva, then a disruption can easily take place following subgingival crown preparation and subsequent retraction of the gingival margins. During removal of the impression tray thin pieces of impression material can easily be torn off, especially if they are lodged in undercuts.

The management of postoperative problems following a certain treatment procedure can be confusing for both patients and healthcare providers in a system in which specialists take on different aspects of the care. In this case the general practitioner assumed that the swelling was of endodontic origin and referred the patient to the endodontist. Both general practitioners and specialists should be aware of alternate treatment plans and treatment procedures and take these into consideration whenever there is a postoperative problem to be solved. The role of the general practitioner should be considered that of a manager who may refer the patient to a specialist for a specific aspect of the treatment but who is finally responsible for the oral health of the patient.

Conclusion

The main object in reporting this case is to draw attention to the fact that pain and swelling 1 week after endodontic treatment may not necessarily be an endodontic flare-up. History taking and evaluation of the correct diagnostic tests revealed a piece of accidentally embedded impression material that acted as a foreign body and caused the swelling and pain.

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