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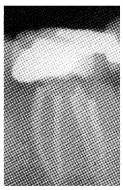

CASE REPORT

Accidental swallowing of an endodontic file

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Abstract

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Aim To report the management of an iatrogenic incident in which an endodontic file was swallowed accidentally and passed into the gastrointestinal tract.

Summary A 51-year-old male swallowed a 21 mm, size 30 endodontic file during root canal treatment without rubber dam. In the absence of clinical complications, the patient was reviewed with serial chest and abdominal radiographs, and stool tests for occult blood until the instrument was discharged at 3 days. This report discusses early differential diagnosis for locating foreign bodies and underlines the importance of serial radiographic evaluation for signs of foreign body migration.

Key learning points

- The use of rubber dam is mandatory for patient safety during root canal treatment.
- Early location of an inhaled or ingested foreign body facilitates appropriate and timely treatment management and referral.
- When a foreign body passes into the gastrointestinal tract, clinical symptoms and signs should be monitored closely until it is excreted or removed.
- An endodontic file can pass through the gastrointestinal tract asymptomatically and apparently atraumatically within 3 days.

Keywords: endodontic file, foreign body, iatrogenic error.

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Introduction

Although rare, ingestion or inhalation of endodontic instruments during treatment without rubber dam can result in clinical complications and subsequent legal proceedings. Grossman (1974) reported that such iatrogenic errors occurred most frequently when treating posterior mandibular teeth. Grossman (1971) also determined that 87% of foreign bodies entered the alimentary tract, whereas 13% aspirated into the respiratory tract. The

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majority of foreign bodies that reach the gastrointestinal tract pass spontaneously. However, 10–20% of cases require nonsurgical intervention, while 1% or less require surgery (Webb 1988). Serious complications include impaction, obstruction, or perforation of the digestive or respiratory tracts, and early diagnosis is the key to preventing serious complications (Reilly *et al.* 1997).

This report presents a case of a patient who accidentally swallowed an endodontic file during the root canal treatment of a mandibular left second molar without rubber dam.

Case presentation

A 51-year-old male arrived at the emergency department of E-DA Hospital complaining of having swallowed an endodontic file. He reported that he had undergone root canal treatment of his tooth 37 (FDI) that morning at a local dental clinic. The general dentist had performed the procedure without rubber dam, and a size 30 file had slipped from the dentist's fingers and fallen into the posterior region of the oral cavity, following which it had been swallowed. The patient reported no discomfort. The dentist assumed that the instrument had been swallowed and hence the patient was admitted to the emergency room for immediate evaluation. Medical history indicated that the patient had undergone left total hip joint replacement and a cholecystectomy with metallic clips in the upper right abdominal region due to gallstones in previous years.

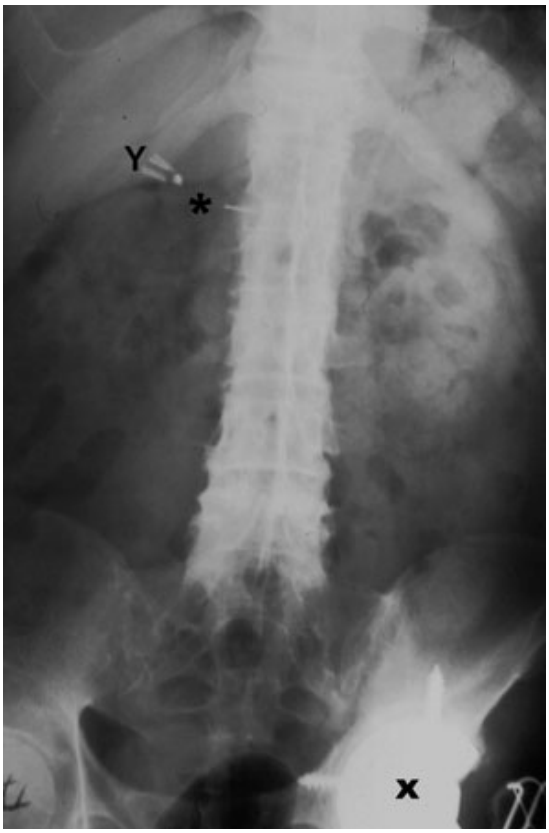

Figure 1 Postero-anterior radiograph of the abdomen taken after ingestion of the endodontic instrument. It revealed that the endodontic instrument * was located in the lower portion of the stomach. The symbol X indicates the left hip joint replacement and Y indicates metallic clips for cholecystectomy.

Figure 2 Three hours later, the instrument passed to the small intestine. The instrument had a vertical position, with its handle downwards.

Physical assessment revealed smooth breathing sounds with no cough. Frontal chest and abdominal radiographs confirmed that the endodontic instrument was located in the stomach (Fig. 1). It was decided to attempt immediate removal of the instrument. Inspection and removal was attempted via gastroscopy. However, attempts to find the foreign body in the stomach failed. A second radiograph taken 3 h later showed that the file had passed into the small intestine (Fig. 2). Consequently, the patient was advised to remain in the hospital under close observation. Laparotomy was planned in the event of adverse peritoneal signs. Serial radiographic examination was performed to monitor the migration of the instrument. The patient was fed a high-fibre diet to encourage instrument movement. A third radiograph taken on day two demonstrated that the file was located in the caecum of the large intestine (Fig. 3), and the routine occult blood test of stool was negative. Finally, on day three, the file was found in the faeces and was no longer revealed in the radiograph (Fig. 4).

Discusssion

When ingested or aspirated foreign bodies are not diagnosed and treated appropriately, they may cause serious complications. Because of the shape and sharpness of the endodontic file, there was a high risk of perforation (Rosenberg 1965). Hence, once an instrument is lost into the oropharynx, it is critical to immediately determine whether it has entered the gastrointestinal or the respiratory tract. Early removal by bronchoscopy or gastroscopy is the ideal outcome. In the current case, an attempt to identify and extract the foreign body by gastroscopy was unsuccessful because of the delayed consultation.

Figure 3 On the second day after it was swallowed, the instrument moved to the caecum of the large intestine.

Radiographic examination is mandatory for differential diagnosis of the location, nature and size of a foreign body. This can begin with the acquisition of anteroposterior and lateral chest, lateral neck and supine abdominal radiographs to complete the evaluation from the nasopharynx to the rectum. This preliminary information can determine the definitive methods for treatment. The major limitation of the initial radiographic evaluation is the potential failure to visualize a radiolucent object. In this scenario, locating the foreign body may be difficult, requiring endoscopic examination, computed tomography, or simple monitoring of physical signs (Samarasam *et al.* 2006). Fortunately, in this case the instrument was radiopaque and visible with plain radiography (Figs. 1, 2, and 3).

Generally, endodontic instruments that enter the gastrointestinal tract pass asymptomatically and atraumatically within 4 days to 2 weeks (Govila 1979, Lyons & Tsuchida 1993). The current case was also asymptomatic, and passage occurred rapidly. Careful monitoring with serial radiological follow-up for signs of the foreign body migration combined with a high-fibre diet is generally the preferred management protocol (Govila 1979). Abdominal pain and/or a positive stool occult blood test may indicate signs of intestinal perforation, impaction or obstruction; and medical or surgical intervention for removal is required in such cases.

Inflammatory bowel disease, tumours, diverticula, hernias, and adhesions, anatomic narrowing, or acute angulations of the alimentary canals also increase the risk of perforation (Lyons & Tsuchida 1993). Fortunately, the present patient had good general health with no history of bowel diseases.

Entry of a foreign body to the respiratory tract is potentially life threatening, and the object requires prompt removal (Zerella *et al.* 1998, Ulku *et al.* 2005). Vigorous and

Figure 4 On the third day, the radiograph revealed that the instrument had been passed complete.

spasmodic cough and difficulty in breathing frequently occur immediately; however, a period without symptoms can last for years. The most common signs and symptoms of foreign body aspiration include coughing, wheezing and decreased breathing sounds (Sersar *et al*. 2006). Foreign bodies tend to be lodged preferentially in the right bronchial tree because of its anatomical vertical disposition (Burton *et al.* 1996, Zerella *et al.* 1998).

Dentists must be aware of the risk and associated complications of accidental ingestion or aspiration of dental instruments during root canal treatments. Ingestion or aspiration of foreign bodies can be easily prevented by the universal use of rubber dam isolation (Cohen & Schwartz 1987). To undertake root canal treatment without rubber dam is below the accepted standard of care in general or specialist practice.

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