

## Case Report

## Accidental ingestion of an air-water syringe tip during routine dental treatment: a case report

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**Abstract:** Accidental ingestion of instruments or their components is a possible complication of dental treatment. Although in many cases the foreign object can pass through the gastrointestinal tract without any need for surgical intervention to retrieve it, sometimes such incidents can be life-threatening. This paper reports a case of accidental ingestion of an air-water syringe tip during routine dental treatment for which endoscopic retrieval was required. The present case highlights the need for dental professionals to be aware of the fact that dental equipment comprising multiple components may be associated with a risk of accidental detachment of a component and its ingestion or aspiration by a patient receiving treatment. (J Oral Sci 56, 235-238, 2014)

Keywords: accidental ingestion; foreign object;  
air-water syringe tip; dental treatment; dental instrument.

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### Introduction

During dental practice, accidents and untoward events can occasionally occur. One such event is accidental ingestion or aspiration of dental prostheses, instruments,

or their components by the patient during treatment. Previous retrospective studies have indicated that the incidence of such events is 0.004%, ingestion being the more common (1,2).

In the majority of cases accidental ingestion of a dental prosthesis/instrument is not clinically problematic, and most foreign objects pass through the gastrointestinal tract within a few days or weeks (1). However, such incidents carry a number of risks, and can even have a fatal outcome if not identified and managed promptly. Complications that have been reported after accidental ingestion of a foreign object include intestinal obstruction, perforation with subsequent abscess formation, hemorrhage, fistulas, or failure of the objects to progress through the gastrointestinal tract (3,4). Gastric erosion and perforation of the esophagus caused by ingestion of dental foreign objects have also been reported (5). Early diagnosis and appropriate management play a key role for successful treatment of these cases.

The present article describes a clinical case of accidental ingestion of the tip of an air-water syringe when it became detached during dental treatment, with the aim of drawing attention to the potentially serious consequences of such accidents.

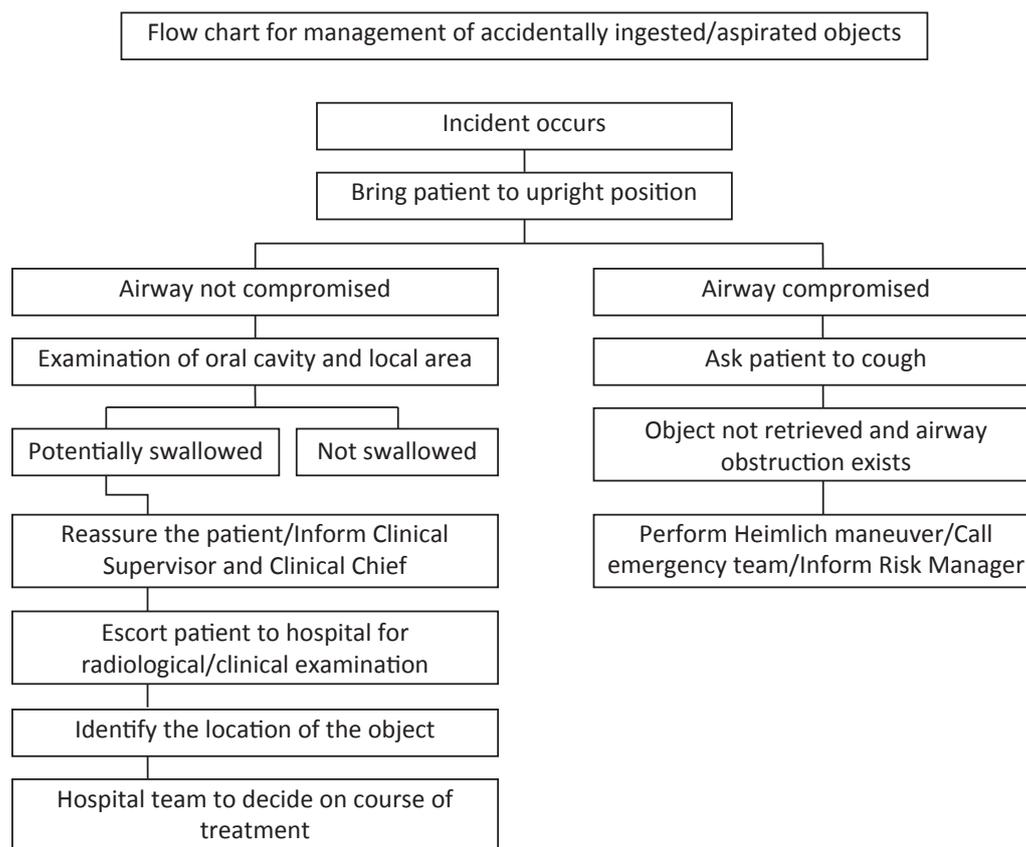
### Case Report

A 37-year-old female patient presented for routine preparation of a lower second molar for inlay restoration at the postgraduate clinic of the Operative Department of the Aristotle University Dental School. Inferior dental block anesthesia was performed and preparation of the cavity was started. However, during drying of the tooth, the

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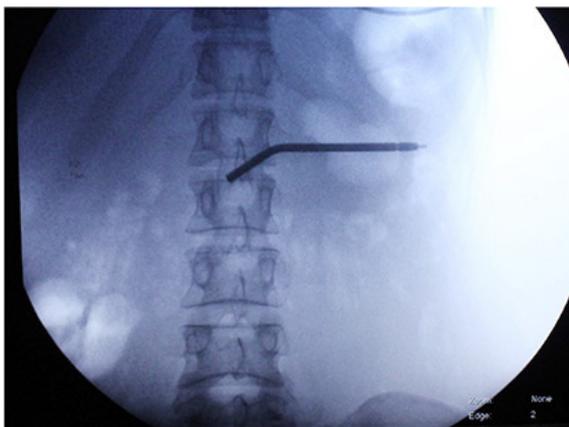
**Fig. 1** Flow chart of our Departmental Risk Management Protocol for cases of accidental ingestion/aspiration of a foreign object during dental treatment.

tip of the air-water syringe being used became detached and dropped into the oral cavity. The patient was placed upright to allow her to expectorate the detached tip, but she mentioned that she had already swallowed it. The object was metallic and had a total length of approximately 9 cm.

As soon as the incident had occurred, the post-graduate student who had been treating the patient acted immediately in accordance with the departmental risk management protocol, shown as a flowchart in Fig. 1. The Clinical Supervisor and the Postgraduate Clinical Chief were informed, and a decision was made to refer the patient to the Radiology Department of the University General Hospital of Thessaloniki, AHEPA, for radiographic evaluation of the location of the object, as it was evidently no longer in the oral cavity. As the hospital is situated next to the Dental School, the patient was referred to the Radiology Department within 15 min after the incident. She was transferred on a gurney to avoid unnecessary movements that might lead to movement of the tip. At no point did the patient complain of discomfort; she had no respiratory distress and was hemodynamically stable. A chest and abdominal X-ray

examination was conducted to visualize the object, which was found to be located in the stomach (Fig. 2). Due to the large size of the object, immediate removal was considered necessary, as it was considered unlikely to pass through the gastrointestinal tract without problem. The options were either endoscopic retrieval or surgery. It was decided to evaluate the situation endoscopically and attempt endoscopic retrieval of the foreign object in the first instance.

The procedure was performed with the patient under sedation. The fact that the patient had had a morning appointment and had not eaten breakfast was helpful when considering sedation, as it minimized the possibility of vomiting during the procedure. Furthermore, smooth muscle relaxation in the stomach and esophagus was achieved by administering a muscle relaxant (Buscopan). Endoscopy visualized the air-water syringe tip in the stomach. An endoscopic grasper was used to grasp the object, which was then gently retrieved along with withdrawal of the endoscope, under full visualization throughout the whole process (Fig. 3). The procedure was carried out without trauma to the esophagus and was incident-free. The patient was then moved to the recovery



**Fig. 2** Chest and abdomen X-ray indicating the location of the air-water syringe tip in the patient's stomach.

room, where she stayed until fully recovered from sedation. Antibiotic cover and postoperative instructions were given, and the patient was discharged.

Within a week, a recall appointment was arranged at the Dental School to check on the patient's well-being and to continue dental treatment. She presented with no complaints and reported that she had not experienced any problems after the endoscopic procedure. It was not considered necessary to perform a repeat chest and abdominal X-ray examination in view of the patient's good recovery and lack of symptoms. A report of the incident was filed.

### Discussion

A number of factors have been associated with accidental ingestion or aspiration of dental objects. These factors can be related either to the type of dental object, the patient, the dentist's experience, or the site of treatment. According to the literature, the objects most commonly ingested during dental treatment are inlays, cores and crowns, dental burs and rubber dam clamps (1,6). The present case was interesting due to the type and the relatively large size of the foreign body ingested, and the low frequency of involvement of this type of object in dental accidents.

The age, and physical and mental ability of the patient are factors that can contribute to accidental ingestion or aspiration. Elderly patients may have diminished sensory and motor nerve responses, which could compromise the gag/cough reflex. Children, on the other hand, can be impatient during dental treatment, which also puts them at high risk (7). Anesthesia can also be a contributing factor due to diminished sensation and abolition of the gag reflex.

In a retrospective study at a University Hospital in



**Fig. 3** The air-water syringe tip after endoscopic retrieval.

Japan it was found that in the majority of cases of ingestion the teeth that were being treated at the time were mainly lower molars, followed by upper molars, and upper incisors; no lower incisors were involved (2). This could be attributed to the position of lower molar teeth in the dental arch, which is closest to the pharyngeal cavity, and objects being manipulated in this area may easily be lost. In the case of upper molars and incisors, patients are generally seated in a horizontal supine position, which may make it easier for dental objects to fall into the pharynx.

A correlation between the dentist's experience and dental accidents has been reported. It appears that accidental ingestion is more likely to occur when dental practitioners have had less than five years experience after graduation (2). This is because they have less ability to perform normal preventive measures, either because of limited time for individual dental treatment or lack of experience. However, this does not exclude experienced dental practitioners, as it has been reported that they can also make mistakes in this respect (1,2).

A regular check of the dental equipment is also advisable, as faulty equipment can potentially attribute to accidents. In this case the handle to which the tip was fixed was checked for possible wear, but no problems were found. The air pressure in the unit was additionally checked, but this was also found to be within the normal tolerance range. However, if detachment of the tip had been due to high pressure that would propel the tip into the pharynx, serious problems might ensue due to injury of the pharyngeal wall. Based on the postgraduate student's report and the patient's comments, the present incident took place in the middle of treatment and not at the very beginning, and the tip dropped into the mouth with no pressure. One possible explanation was that the button that fixes the tip to the handle was accidentally pressed during use, causing the tip to move from its secure position and detach when the postgraduate student used it at a later stage. Although it is routine practice at our clinic to double check moveable and cutting instruments prior to use, i.e. the tip of an air-water syringe, dental burs

etc., accidents can still occur. The limited experience of the postgraduate student, who was a young dentist with less than 5 years of practice, might have contributed to a slower reaction when attempting to hinder subsequent ingestion/aspiration of the fallen object, in addition to the fact that inferior block anesthesia was performed and the tooth being treated was a lower second molar.

Once a foreign object is ingested it is very important for the practitioner to act promptly. The possibility of the object being in the oral cavity should be ruled out initially. If this is not the case, then adequate radiographic evaluation of the chest and abdomen should be performed. As a precaution, the swallowed foreign object should be assessed radiographically until it is egested. The patient should be closely monitored and if symptoms of perforation occur, such as pain or vomiting, tenderness or abdominal guarding, or if the object has not passed through the gastrointestinal tract after 2 weeks, then surgical intervention should be considered (2). It has been reported that as soon as a foreign object has reached the stomach, there is a greater than 90% chance that it will pass through the gastrointestinal tract as a result of peristaltic movement without complications, usually after a 7-10-day period (8).

Endoscopy is currently the most commonly used method for removal of foreign bodies of any shape (8). As a procedure it has many advantages, the greatest one being the option of direct examination and evaluation of the degree of esophageal injury caused by the foreign object (9). Other advantages include avoidance of surgical procedures, reduced cost, accessibility of the technical equipment, clear visualization, simultaneous diagnosis of other diseases, and reduction of the morbidity rate (5). However, the size and shape of some foreign objects, such as an air-water syringe tip in the present case, can make endoscopy rather difficult, as grasping of such objects can be challenging. Removal of such foreign objects can also cause trauma to the esophagus. In such cases, if extraction of the foreign object is dangerous or even impossible, or when perforation or aorto-esophageal fistula is present, surgery is considered unavoidable.

Prevention is always better than management. The use of a rubber dam during routine restorative dental treatment and not only during endodontic treatment, or the

use of throat packs and retaining ligatures are possible preventive measures that can protect the patient and the dental team from such accidents. Additionally, when an accident occurs, inclining the patient's head to one side can help catch objects in the buccal pouch (2). The best countermeasure is for the dentist to take scrupulous care to use dental instruments in a proper manner and to take time to check that multiple components in any piece of equipment are fixed tightly. Additionally, patients should be informed of the possibility of dental objects dropping into the oral cavity and instruct them to be alert and spit them out immediately in such cases. Finally, if accidental ingestion or aspiration does occur, the dentist should be prepared to take appropriate measures to manage the situation successfully.

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