

# Accidental ingestion and aspiration of foreign objects during dental practice

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Dr. Dimitrios Dionysopoulos (DDS, MSc, PhD, Research Associate) was born in Thessaloniki. He was graduated from Aristotle University of Thessaloniki, Faculty of Dentistry with the degree of DDS, and he completed his Post-graduate Program in Operative Dentistry. Later he received his PhD degree entitled “*In vitro* comparative study on cariostatic effect of contemporary fluoride-releasing materials for conservative restorations” in Operative Dentistry from Aristotle University of Thessaloniki. After that, he became a Research Associate and a clinical instructor at the Department of Operative Dentistry of Aristotle University of Thessaloniki. He carried out a wide research and has many publications in SCI covered local and international journals. He is an editorial member and reviewer in various international journals and member of professional and scientific societies.

Accidental ingestion or inhalation of dental objects during daily clinical practice may cause various clinical complications such as damage to the digestive tract, abscess formation, peritonitis, septicemia, pneumonia, foreign-body granuloma, fistulas and duodenocolic fissures.<sup>[1]</sup> The severity of the situation depends on the anatomical direction that the object followed and the anatomical location that may cause obstruction. Size, shape and sharpness of the objects determine the consequences which may be life-threatening. The risk of injury increases when the size of the swallowed object is more than 5 cm or has a pointed shape.<sup>[2]</sup>

In most of the cases, the foreign bodies pass through the gastrointestinal tract without difficulty, in 10-20%

of the cases require non-surgical intervention, while 1% or less require surgical intervention to retrieve such foreign objects.<sup>[2]</sup> In the literature there are many cases which have reported ingestion or aspiration of burs, endodontic posts, impression materials, temporary restorations,<sup>[3]</sup> dental inlays or crowns,<sup>[4]</sup> fixed<sup>[5]</sup> or removable<sup>[6]</sup> prosthetic restorations. It has also been reported that inter-occlusal devices used for the restoration of occlusion,<sup>[7]</sup> air-water syringe tips,<sup>[8]</sup> endodontic instruments including dental clamps,<sup>[9]</sup> hand files or reamers,<sup>[10]</sup> hypodermic needles,<sup>[11]</sup> apex locator lip clips,<sup>[12]</sup> orthodontic brackets and/appliances,<sup>[13]</sup> and implant components<sup>[14]</sup> have been aspirated.

Patients that have ingested dental objects during



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clinical practice experience considerable anxiety which usually makes the management of the situation difficult. When accidental ingestion of a foreign object occurs, the dental practitioner should immediately confirm that there are not any signs of obstruction to the throat such as dyspnea, choking, labored breathing or cyanosis. Subsequently, the dentist has to comfort the patient, explain the situation and refer the patient to the emergency room for radiographic examination to locate the exact position of the object. In some cases, a radiographic examination may not be enough to detect the exact location of the dental object.<sup>[15]</sup> For this reason, more specific examinations may be needed such as fluoroscopy, which is an imaging technique that uses X-rays to obtain real-time moving images of the interior of an object. In the case of an object that is not radiopaque, diagnostic bronchoscopy or computed tomography for localization is indicated.<sup>[16]</sup>

Dentists have to be aware of patient-related factors which make the patient more prone to swallow foreign bodies, children, e.g. patients with an excessive gag reflex, small oral cavity, and short palate. Also patients with acroglossia, a thick neck, overweight patients, pregnant women, alcoholic patients or patients taking medication (especially those with psychiatric diseases).<sup>[13]</sup>

The prevention of such accidents is of great importance. The patients with the above characteristics should be informed and instructed to control the swallowing reflex if the object falls and then to turn the head to one side. Patients in whom the coordination of the deglutition and cough reflexes are affected, or the intra-abdominal pressure is increased should be treated in a more upright position.<sup>[3]</sup>

In endodontics, it is possible to minimize the risk of inhalation or ingestion of root canal instruments by using a rubber dam. The patient must be placed in an upright position to avoid swallowing of foreign objects and if possible to tether with a ligature any object which is prone for swallowing.<sup>[17]</sup> Moreover, for radiographic examinations X-ray films or digital sensors should be tethered, or the use of the paralleling technique with a paralleling instrument may be more appropriate.

In most of the cases, the foreign objects pass through the gastrointestinal tract and are evacuated in two to five days without symptoms<sup>[18]</sup> or may lodge in the duodenum or colon leading in some cases to severe pathological situations such as peritonitis.<sup>[19]</sup> Consequently, it is necessary the patient be under medical surveillance until the evacuation of the object. In such cases, food with coarse fiber may be beneficial for pass through of foreign object.

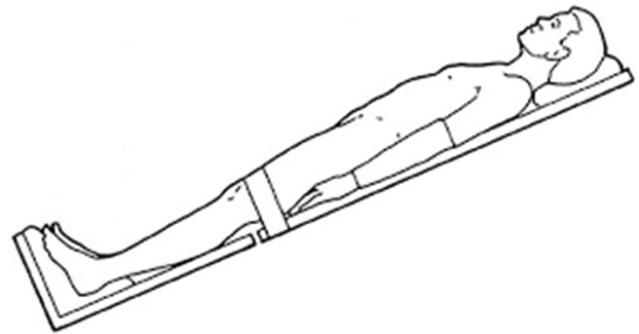


Figure 1: The reverse Trendelenburg position

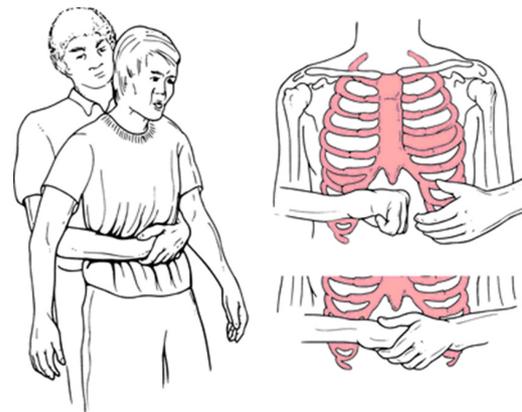


Figure 2: The Heimlich maneuver

Inhalation of a foreign object is a more serious condition than ingestion and dentist should be educated to manage it. Bronchoscopy has been demonstrated 99% effective on retrieve the aspirated dental objects. Nevertheless, the complication rate is between 2.4% and 5.0%.<sup>[20]</sup> If a dentist realizes that a dental object dropped into the patient's oropharynx, she/he should place the patient in reverse Trendelenburg position (the upper part of the body is raised 20°-30°) [Figure 1] and tell her/him to cough. If the object is not retrieved, the Heimlich maneuver should be followed [Figure 2], and if again there is no relief the patient should be transferred immediately to the nearest emergency room.<sup>[13]</sup> If the patient is asymptomatic, he/she should be reassured and informed calmly about the complication and the necessity of immediate medical examination. Frontal and lateral chest and abdominal radiographs should reveal whether the object has been ingested or inhaled.<sup>[3]</sup>

In conclusion, dentists have to be aware of precautions and educated for the management of an accidental swallowing or aspiration of foreign objects during clinical practice. More caution is necessary for patients that are prone to swallow foreign objects.

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## Conflicts of interest

There are no conflicts of interest.

## Patient consent

Not applicable.

## Ethics approval

Not applicable.

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