# Accidental Ingestion of an Inter-occlusal Device Used for the Restoration of Occlusion: A Case Report

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## Abstract

The accidental swallowing of prosthetic devices has been discussed in the relevant literature as an unusual, although ordinary, event in clinical practice. This article aims at reporting the ingestion of an inter-occlusal device used to restore the Vertical Dimension of Occlusion (VDO) which, during the ingestion of an analgesic pill, was accidentally swallowed. The patient was sent to the Clinics Hospital UFMG where, upon taking radiographs, the device was located in the upper third of the esophagus. The device was removed during an endoscopic exam with the help of forceps for removing foreign objects. Dealing with a relevant situation, one may conclude that patients who use removable intra-oral devices must take part in a reevaluation protocol in order to detect adaptation and retention of these devices, as well as proper instruction for the patient.

## Introduction

Aspiration and/or ingestion of foreign objects have been the object of study since the start of the last century [1,2]. In many cases, the foreign objects are either regurgitated or pass through the gastrointestinal tract without causing any complications [3]. Considering the possible complications of aspiration versus ingestion, intuition would be that aspiration would increase the morbidity rate, in relation to ingestion. However, among the potential risks of morbidity as a consequence of ingestion, cases of impaction of dental prostheses in the esophagus may be found where, in many cases, the patients had to undergo complex surgical procedures to remove the prosthesis [4]. There have also been cases of death reported, related to ingestion [5].

Although these events occur rarely, the morbidity associated with even one incident is too relevant to be ignored, especially from the point of view of the total medical team necessary and the high cost [6]. This becomes even more meaningful when one considers that this type of accident can be avoided. The main complications arising from the ingestion of dental objects include: laceration, perforation and hemorrhage of the esophagus and the gastrointestinal tract. This, can cause peritonitis, septicemia, or result in the foreign object causing abscesses or fistulas [7]. However, according to some authors [3], the vast majority (26 to 68%) of foreign objects ingested accidentally are found in the esophagus.

The incidence of ingestion of foreign objects is greater than aspiration [4]. The ingestion occurs primarily in children and in the elderly people. In children, beyond to the habit of putting objects in the mouth, the dentition and the incomplete development of the neuromuscular swallowing mechanisms support the increased incidence among this group [2]. In the elderly, it is reported that the diminished gag reflex, systemic conditions (stroke, Parkinson's), use of local anesthetic and states of altered consciousness, increase the risk of aspiration and/or of swallowing [8]. Among other at-risk groups, prisoners, psychotics, alcoholics, the mentally retarded, and nervous and agitated patients [9] are mentioned.

Other common causes which predispose the ingestion of foreign objects may include car accidents, coughing spells, endotracheal intubation, tracheostomy, unaware ingestion along with food, among others [10-12].

Any object used in the mouth during dental or surgical procedures may be aspirated and/or swallowed. Among the objects, teeth, restorations, restorative material, instruments, components of dental implants, isolation clips, gauze, impression materials and removable prostheses [13] may be included. Among the causes reported for the ingestion of removable prostheses, the size and inappropriate design, lack of periodic maintenance, misuse, among others may be cited [12] and might be considered.

From the outset, this article reports the accidental ingestion of a temporary Removable Partial Denture (RPD), which was being used to restore the Vertical Dimension of Occlusion (VDO), during the initial phase of a plan of oral rehabilitation. The causes and prophylactic behaviors for avoiding this type of accident are discussed.

## Case Report

Patient MGR, a 53 year old female, sought treatment at the Prosthodontics Clinic of the Faculty of Dentistry at UFMG. Following the clinical evaluation, assisted by radiographs, models were mounted on a Semi-Adjustable Articulator (SAA), in order to establish a comprehensive and multidisciplinary plan.

Initially, primary care procedures were performed and at later stage, inter occlusal device (overlay) was constructed to restore the VDO. The removable prosthesis was planned using a telescopic crown on tooth 47 for retention, a "C"-type, action-point retaining-clip on the buccal face of tooth 43, and incisor supports on teeth 31-32/41-42. A test of the metallic structure (*Figure 1*) and polymerization were done of the device, which was then adjusted and installed in the mouth. The patient was instructed to use this prosthesis full-time, removing it only

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for oral hygiene. The device was reevaluated weekly for its adaption and muscular condition.

Prior to the appointment for reevaluation, the patient ingested an analgesic pill and, in performing the oral movements and extending the neck abruptly to help in swallowing the pill, the prosthesis was dislodged and ingested along with the pill. Upon arriving at the Faculty of Dentistry, the patient was then referred to the Clinics Hospital of UFMG where, initially, a thoracic radiograph was taken which identified the foreign object in the upper third of the esophagus, near the upper esophageal sphincter (*Figures 2 and 3*). Next, an endoscopic exam was performed using the Olympus GIF-XQ 140 device (Olympus America, Inc: http://www.olympusamerica.com).

***Figure 1**. Test of the metallic structure in mouth.*

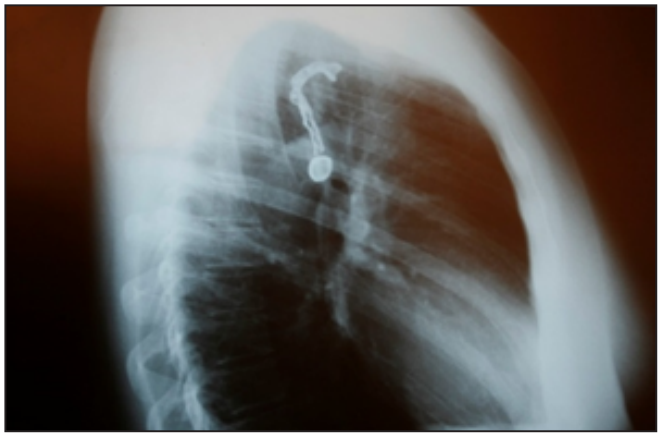

***Figure 2**. Lateral thoracic radiograph identifying the foreign object in the upper esophagus.*

***Figure 3**. Front thoracic radiograph identifying the foreign object in the upper esophagus.*

For this procedure, topical anesthesia was applied to the oropharynx with Xylocaine spray, and intravenous sedation with 2.5 mg Midazolam and 30 mg Dolantine (pethidine hydrochloride), diluted in 05 ml and 10 ml distilled water, respectively. The patient was positioned lying down on the left side, and the endoscopic device was introduced into the oropharynx. Shortly after the transposition of the upper esophageal sphincter, the foreign object was visualized. The metallic part of the prosthesis showed a "C"-shaped structure, with a small pointed part touching the esophageal mucosa. With the help of an alligator-type forceps for foreign objects, the prosthesis was carefully mobilized in order to position the metallic part without making contact with the mucosa. Next, the prosthesis was retracted slowly, passing the upper esophageal sphincter and reaching the mouth (*Figure 4*).

After removal of the prosthesis, new evaluations of the mucosa were done which showed small lacerations without, however, any signs of perforation. After recovering from the effects of the sedation, the patient was released and, after two days, returned to normal activities.

## Discussion

Dental restorations are ingested occasionally by accident. However, in one study of prevalence, it was demonstrated that there is no trend for any particular moment of occurrence. There was also no relationship found between age and gender [14]. Education of patients wearing removable dental prostheses is critical to prevent accidental impaction in the esophagus [15]. The esophagus has four points of natural narrowing:

1) Cricopharyngeal or upper esophageal sphincter (located ± 15 cm from the incisors), which is the place where foreign objects most frequently are lodged;

2) The aortic arch (located ± 7 cm from the cricopharyngeus);

3) Compression of the left bronchus (located ± 4 cm from the previous;

4) Lower esophageal sphincter (located ± 40 cm from the incisors) [2,3].

To remove a foreign object safely, it is important to select the proper equipment, taking into consideration the characteristics of each patient as well as the type and location of the object. Rigid bronchoscopes, attached to telescopes, are best suited for the removal of aspirated foreign objects. These instruments allow good access to the airways, with good

***Figure 4**. Partial denture after removal.*

visualization, permitting the passage of forceps for grasping foreign objects, while still permitting the administration of oxygen [16]. For ingested objects, the tool of choice is the flexible endoscope [17]. Nevertheless, due to anatomical limitations, surgical procedures involving the neck, thorax or abdomen may be necessary in cases of acute or chronic complications [18].

In some clinical situations, locating foreign objects through radiographic analysis becomes difficult since many materials used in dentistry, especially removable prostheses, have radiolucid characteristics [1,11,19]. Therefore, objects that are not radiopaque require more time and increased costs with the use of other devices [20]. Nevertheless, authors report that radiographic examination is important because, even if it cannot detect the object, it enables the exclusion of clinical conditions such as pneumomediastinum and gases within the tissues [11]. In our case, the foreign object was identified easily by radiograph owing to the presence of a metallic infrastructure in the ingested device.

Even more important than creating conditions for locating and removing ingested devices is the prevention of these accidents. Prevention must be approached in two distinct phases: planning and proservation. In the planning for the prosthesis, the dentist must create conditions for stability through the proper selection of retainers and clips, to prevent the prostheses from dislodging [21]. We can make direct and indirect retentions, mainly in patients with neurological/psychological disorders. In relation to proservation, it is worth highlighting that the prostheses must be reevaluated and maintained periodically, regarding the stability and effectiveness of the clips, in programs of periodic maintenance. In those cases in which loss of stability and effectiveness of the clips is identified, reline with materials in an acrylic resin base and reactivation of the clips may be done. In case these procedures do not result in improvements, replacement of the prosthesis is the best recourse.

## Clinical Significance

From the above, it may be concluded that the ingestion of prostheses are uncommon, but not rare, accidents. The professional must be attentive to the design criteria of the prosthetic devices during the planning phases. The use of radiopaque materials favors the location and removal of foreign objects from possible ingestion/aspiration.

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