

# Management of an Ingested Foreign Body in a COVID-Positive Patient

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This case report describes a 51-year-old man who swallowed an amalgam fragment dislodged during dental treatment performed without a throat screen. The patient was transferred to the emergency department, where the foreign body was confirmed to be in the esophagus following radiographic imaging. Foreign body removal from the esophagus is routinely achieved via esophagogastroduodenoscopy (EGD). However, this incident occurred in September 2020, at the height of the COVID-19 pandemic. Because of the patient's preoperative positive COVID-19 test, the option for EGD retrieval was eliminated per hospital protocol. Instead, a noninvasive approach with serial radiographic monitoring was deemed mandatory to observe the fragment as it passed through the gastrointestinal tract, warranted by the small size of the foreign body and the patient's lack of signs and symptoms of respiratory distress. This case report reinforces the importance of using airway protection during every dental procedure. Furthermore, reevaluation of EGD as the gold standard for treatment of ingested small materials may be warranted.

**Key Words:** Case report; Amalgam; Ingestion; Aspiration; Isolation; Foreign body; COVID.

Accidental ingestion and pulmonary aspiration of dental materials are among some of the most common adverse events occurring during dental treatment. According to a study completed by Susini et al<sup>1</sup> that quantified the frequency and type of ingested or aspirated dental materials, 29% were found to be dental prostheses, 27% were burs, and 2.2% were endodontic files. These statistics reinforce the importance of using airway protection (eg, a throat pack or screen) when performing a dental procedure. Currently, the gold standard for treating ingested or aspirated materials is removal via flexible endoscopy.<sup>2</sup>

This case report describes an incident in which a dental provider failed to place any type of throat screen or airway protection, which resulted in the ingestion of an amalgam fragment during the removal of an existing restoration. The patient incidentally tested positive for COVID-19 during workup for the fragment removal, thus eliminating the possibility for esophagogastroduodenoscopy (EGD). This case also highlights alternative management for dental foreign body ingestion and

challenges the necessity for invasive interventions in similar scenarios.

## CASE PRESENTATION

A 51-year-old man (height 69 in [175 cm], weight 170 lb [77 kg], body mass index 25.1 kg/m<sup>2</sup>) with no significant past medical history presented to the dental school clinic for restoration of tooth 18 which had an existing restoration (a mesial-occlusal-lingual amalgam) with a lingual fracture. The treatment plan included removal of the existing restoration and delivery of a monolithic zirconia crown. The dental student provider began removing the amalgam restoration without placing any type of throat protection or rubber dam. During the procedure, a large fragment of the amalgam restoration fractured and was visualized entering the oropharynx. The patient was immediately repositioned upright and stated that he felt the fragment lodged in his throat. At this point, the school's emergency response team, which included the school's dental anesthesiologist, was called to assess the patient. The patient remained hemodynamically stable and maintained the ability to cough, swallow, speak, and breathe, demonstrating adequate airway patency.

The patient was immediately referred to the emergency department (ED) of a nearby hospital for radio-

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**Figure 1.** Initial Anteroposterior Radiograph Containing an Amalgam Fragment

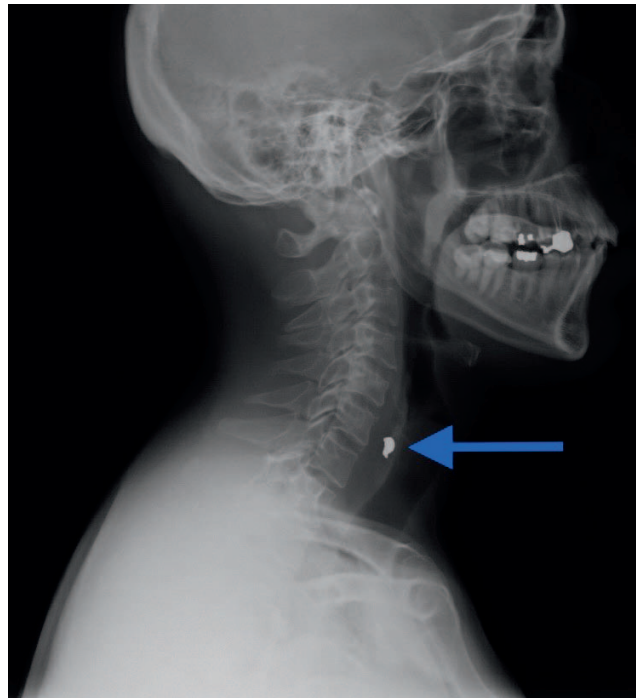


Anteroposterior radiograph obtained upon patient's arrival at the emergency department. The amalgam fragment was located lateral to the midline at the level of C6.

graphic imaging to rule out pulmonary aspiration of the amalgam fragment. Anteroposterior and lateral radiographs capturing the neck and upper chest were obtained, and upon review, a 1-cm, well-defined radiopacity was noted within the prevertebral soft tissues at the level of C6 (Figure 1). The foreign body's location was confirmed to be in the esophagus based on a lateral film of the neck (Figure 2) as interpreted by the otorhinolaryngologist on staff at the hospital. However, the lateral position of the foreign body as noted in Figure 1 provoked interest for further investigation. A radiologist at New York Medical College was consulted and suspected that the foreign body may have been lodged in a Zenker's diverticulum, a pouch that forms at a weak spot in the hypopharynx between the cricopharyngeus muscle and the lower inferior constrictor muscle.<sup>3</sup> The location of the esophagus and the potential Zenker's diverticulum have been outlined in red as shown in Figures 3 and 4.

Because of the caustic contours of the fragment with the potential for esophageal irritation and rupture, especially given the thin lining of a Zenker's diverticulum, the ED staff consulted gastroenterology regarding

**Figure 2.** Initial Lateral Radiograph Containing an Amalgam Fragment



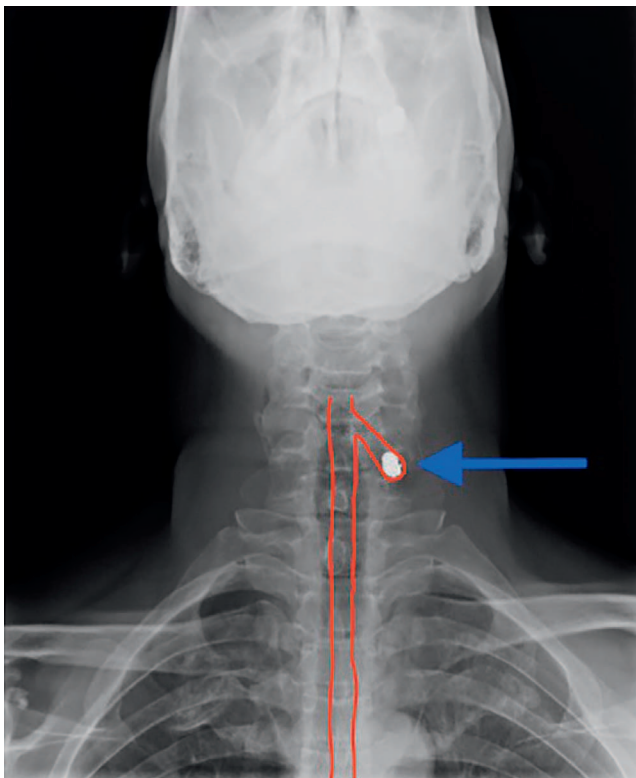
Lateral radiograph obtained upon patient's arrival at the emergency department. The amalgam fragment was located within the esophagus at the level of C6.

the potential for endoscopic removal of the amalgam fragment, to which the gastroenterology team agreed.

As this event occurred during the COVID-19 pandemic, hospital protocol mandated a negative COVID-19 test before undergoing EGD to remove a foreign body. This patient's COVID-19 test returned positive, presenting an interesting dilemma: was it safe to allow a potentially sharp amalgam fragment to pass through the esophagus and the gastrointestinal (GI) tract now that the gold standard of endoscopic retrieval was not possible? The patient was otherwise asymptomatic for COVID-19 at this time and remained hemodynamically stable. As such, the treating physicians decided that a nonoperative approach presented a moderate yet acceptable risk for esophageal rupture, thus requiring inpatient monitoring with serial imaging. It was decided that if repeat imaging displayed signs of esophageal wall infiltration, lifesaving maneuvers would supersede the COVID-19 mandate and warrant emergent endoscopic retrieval.

The patient was sent for repeat imaging approximately 4 hours after the initial radiographs, at which point the amalgam fragment was noted to no longer be in the patient's esophagus and was presumed to have passed to the stomach (Figures 5 and 6). Zenker's diverticula often

**Figure 3.** Anteroposterior Radiograph With an Outline of the Esophagus and a Potential Zenker's Diverticulum



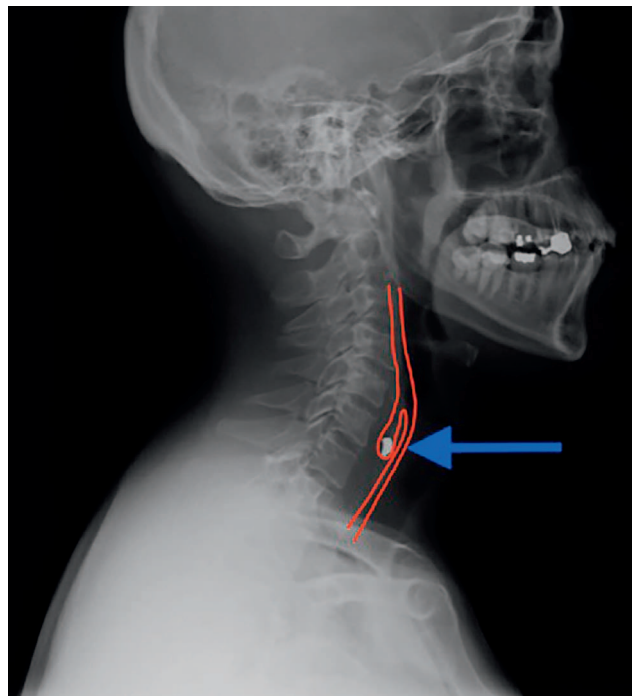
The esophagus and likely position of the Zenker's diverticulum on the anteroposterior radiograph have been outlined in red. This provides an explanation for the lateral positioning of the amalgam fragment seen in Figure 1.

fill and empty spontaneously, which, in addition to the patient's consistent forceful coughing, may have been enough to dislodge the amalgam fragment.<sup>4</sup> The patient also reported that the throat irritation he felt was improving. He was discharged to home with a prescription for aluminum hydroxide–magnesium hydroxide as prophylaxis for any GI discomfort. The patient was instructed to return to the ED or call the GI clinic with any new or worsening symptoms.

## DISCUSSION

Regardless of whether a patient is sedated, precautions should always be taken to minimize the risk of pulmonary aspiration or ingestion of foreign materials during dental treatment. Precautions may include ligating small items like implant drivers or rubber dam clamps with floss and placing a 10.2 cm × 10.2 cm cotton gauze in the throat to act as a barrier between the mouth and the oropharynx. A rubber dam or isolating

**Figure 4.** Lateral Radiograph With an Outline of the Esophagus and a Potential Zenker's Diverticulum



The esophagus and likely position of the Zenker's diverticulum on the lateral radiograph have been outlined in red. This outline has been provided to explain the lateral positioning of the amalgam fragment seen in Figure 1.

suction system could also be used as throat protection during dental procedures. In addition, continuous high-speed suction is always recommended for any dental procedure.

However, when these primary prevention measures are omitted or fail and a foreign body passes into the oropharynx, secondary measures must be considered. If the object cannot be readily retrieved, the patient should be turned on their side with their upper body hanging over the side of the dental chair to allow gravity to facilitate dislodgement and expulsion of the foreign body from the patient's mouth.<sup>5</sup>

If the foreign body is not retrieved, the patient should be evaluated for signs and symptoms consistent with foreign body obstruction and pulmonary aspiration. The most common signs and symptoms of esophageal obstruction by a foreign body are dysphagia and hypersalivation, but patients may also present with choking, regurgitation, wheezing, or hemoptysis.<sup>6</sup> However, foreign body aspiration may present initially with only a cough.<sup>7</sup> Patients experiencing obstruction of the airway may present with acute-onset tachypnea, tachycardia, wheezing, stridor upon inspiration, and subsequently decreased oxygen saturation levels.<sup>8</sup> If a patient

**Figure 5.** Anteroposterior Radiograph After Passing the Amalgam Fragment



Anteroposterior radiograph obtained approximately 4 hours after the initial anteroposterior radiograph showing the amalgam fragment no longer present and presumed to have passed into the stomach.

is presenting with signs and symptoms consistent with airway obstruction, the provider may be able to relieve the obstruction with back blows, abdominal thrusts, or use of the Heimlich maneuver.<sup>7</sup> If this is unsuccessful and the obstruction persists, the patient may become unstable, in which case it is critical that the patient be managed accordingly. This may include ventilation/oxygenation using bag-valve-mask and reestablishing airway patency through endotracheal intubation or even with a surgical airway in extreme cases.<sup>8</sup>

Current standards of care suggest that if the foreign body is not dislodged and recovered within the dental clinic, the patient should be transferred to a hospital immediately for further evaluation and radiographic imaging. If possible, the provider should send the patient with a sample of the foreign body to help with identification during imaging, particularly if the lost item is not metallic. If a sample is unavailable, the patient should be sent with a description and/or drawing of the foreign body including its composition and estimated size. Variables that must be reviewed when

**Figure 6.** Lateral Radiograph After Passing the Amalgam Fragment



Lateral radiograph obtained approximately 4 hours after the initial lateral radiograph. The amalgam fragment is no longer present and presumed to have passed into the stomach. Extracorporeal radiopacities represent hospital gown buttons (green arrowheads).

deciding on intervention include the location, size, and shape of the object.

Aspirated materials must be retrieved via bronchoscopy and/or laryngoscopy, as they can lead to airway obstruction, which can potentially be life-threatening. However, as demonstrated in this case report, ingested materials including those lodged in the esophagus do not always need to be retrieved, as 75% of accidentally ingested foreign bodies spontaneously pass through the GI tract.<sup>9</sup> However, if the foreign body is sharp or pointed, there is a greater risk of complications, including esophageal hemorrhage, esophageal ulceration, and in severe cases esophageal perforation, which can be life-threatening.<sup>9</sup> Up to 12% of esophageal perforations are caused by ingested foreign bodies.<sup>10</sup> If the patient is at risk of esophageal perforation and is showing signs or symptoms of esophageal obstruction or if the object has not exited the esophagus into the stomach on its own within 24 hours, endoscopic retrieval is the gold standard of treatment to prevent

such potential complications.<sup>6</sup> If the foreign body does pass through the esophagus and into the stomach without complications, it is unlikely to cause an obstruction or perforation in the distal GI tract.<sup>11</sup>

Performing a risk-benefit analysis is critical before choosing an approach for foreign body removal given that there are risks involved with EGD as well. These risks include mucosal laceration (2%), GI hemorrhage (1%), and perforation (0.8%).<sup>12</sup> When compared to the risk involved with allowing sharp or pointed objects to pass through the GI tract, less than 1% of reported cases have led to bowel perforation.<sup>13</sup> Other complications may include partial obstruction, complete obstruction, or peritonitis.<sup>11</sup> However, no study or meta-analysis currently exists that evaluates outcomes when comparing noninvasive vs invasive treatment (ie, endoscopic retrieval) for ingested foreign objects. The ED team in this case most likely assumed that once the amalgam fragment exited the esophagus, the patient was safe to be discharged because of the very slim chance of complications arising as it passed through the remaining GI tract. However, if a noninvasive approach is used, serial daily radiographs should be taken to follow the foreign body's passage along the GI tract.<sup>6</sup> In addition, laxatives may be prescribed to accelerate the passage of the foreign body.<sup>6</sup> Upon discharge, the patient should also be instructed to check their stool for the foreign body to ensure it has been passed.<sup>6</sup>

This case supports that foreign bodies less than 1 cm in size with potential sharp edges pose little to no risk of esophageal perforation. There have been several other reported cases that support the idea that sharp dental materials of even larger sizes will pass through the GI tract atraumatically. Venkataraghavan et al<sup>14</sup> highlighted a case in which a 5-year-old child swallowed a 21-mm K file, which passed in the stool uneventfully 48 hours later.

In this case, the ED team was forced to choose against the gold standard treatment of EGD because of the ongoing COVID-19 pandemic. Successful management of this patient via the nonstandard approach begs the question: should EGD still be the first line of treatment, or has this case perhaps highlighted a need for reevaluation with an emphasis on noninvasive monitoring as a first-line treatment in similar scenarios?

## CONCLUSION

Airway protection is of the utmost importance when performing dentistry regardless of whether a patient is sedated to avoid accidental ingestion or pulmonary aspiration. Any lost foreign body that has passed the oropharynx warrants immediate imaging to determine

the ideal management approach. Aspiration of dental materials requires intervention for removal, whereas ingestion may not. Although a positive COVID-19 test introduced an unexpected obstacle when managing this patient who swallowed an amalgam fragment, emergent removal was ultimately not required because the patient was not demonstrating signs of foreign body obstruction, the fragment was less than 1 cm, and the fragment passed to the stomach within 24 hours. A risk-benefit analysis of endoscopic retrieval vs serial imaging should be performed for any adult patient who has ingested dental materials.

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