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A CHILD WITH AN UNUSUAL RETAINED ORAL FOREIGN BODY

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□ **Abstract—Background: Pediatric foreign-body ingestions are common. Oral foreign bodies are rare but can be life-threatening. Management of their extraction requires knowledge and careful consideration of removal techniques, pharmacology, and potential complications. Case Report: A 5-year-old boy presented to the emergency department with a wooden block retained in his mouth after a fall. The block was lodged behind the patient's primary central incisors without causing apparent oral or dental trauma. Initial manipulation was unsuccessful given patient apprehension and muscle spasm. The patient was given i.v. diazepam for anxiolysis and muscle relaxation, and a tenaculum was used to extract the object. He was observed for a period of time and had no complications. Why Should an Emergency Physician Be Aware of This?: Retained oral foreign bodies in children require a careful approach and understanding of pharmacologic anxiolysis, as patients may not be candidates for moderate sedation. Emergency physicians must be aware of potential complications of oral foreign bodies, including palatal injury, temporomandibular joint dislocation, epiglottitis, and retained foreign bodies.** © **2018 Elsevier Inc. All rights reserved.**

□ **Keywords—oral foreign body; partial airway obstruction; anxiolysis; wood foreign body; pediatric trauma**

INTRODUCTION

Young children may explore objects by putting them in their mouth, placing them at increased risk for foreign body ingestions and trauma to the oral cavity (1). There were nearly 68,000 pediatric foreign-body ingestions reported to the American Poison Control Centers in 2016 (2). However, it is rare that a foreign body becomes retained in the oral cavity. Here we describe a case of a wooden block becoming lodged in a boy's mouth after a fall. This case required careful consideration of an appropriate extraction technique and approach to bedside sedation and airway management, given the foreign body's high-risk location.

CASE REPORT

A previously healthy 5-year-old male presented to the pediatric emergency department with a wooden block lodged in his mouth. Emergency Medical Services (EMS) initially responded to the patient's school after his teachers found the object lodged in his oral cavity. Reports from teachers indicated that the patient may have tripped and fallen face-forward while running with the block in his mouth. He did not sustain any obvious head trauma during the fall and remained conscious throughout. Initial attempts by the teachers and EMS personnel to dislodge the block proved unsuccessful.

On examination, the patient was alert but anxious. He was unable to speak and indicated with hand gestures and nodding that he had discomfort of his temporomandibular joint (TMJ) and the roof of his mouth. His vital signs included a temperature of 36.3°C (axillary), heart rate 167 beats/min, respiratory rate 18 breaths/min, and blood

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pressure 131/81 mm Hg. He weighed 25.2 kg. There was a 4.5-cm cube retained in the oral cavity. Corners of the block were flush with the hard palate and gingiva posterior to the central maxillary and mandible incisors, respectively, without any obvious mucosal violation or bleeding (Figure 1). The lateral corners of the block within the oral cavity were visible, not flush with the oral mucosa, and well anterior to the soft palate. By retracting the cheeks, most of the block except for the posterior aspect was visible and appeared intact without any debris or evidence of splintering. There were no obvious injuries to the teeth. The patient could not swallow his saliva, which was blood-tinged from a 0.5-cm mucosal abrasion to the lower lip. The TMJs were not clinically dislocated and were mildly tender. There was no tenderness to palpation of the mandible. The patient had strong, symmetric carotid pulses without bruit or hematoma. The cervical spine was not tender. Linear abrasions were noted on his mental process. The remainder of the head, neck, heart, lung, and abdominal examinations were normal.

An initial attempt to gently manipulate the block proved unsuccessful as the patient bit down harder, possibly due to apprehension or muscle spasm. Pediatric surgery was consulted as the inaccessibility of the patient's airway warranted consideration of operative removal of the block. After careful consideration, the decision was made to proceed again with attempted manual removal of the block in the emergency department with anxiolysis and pediatric surgery at bedside.

Ten minutes prior to attempted removal, the patient was administered one dose of 2.5 mg i.v. diazepam (0.1 mg per kg) for anxiolysis and relaxation of his muscles of mastication. A child life specialist was present for the procedure providing distraction with an iPad and explaining the procedure in age-appropriate terms. An airway cart was at the bedside. With the patient in a seated position leaning forward, an assistant applied gentle downward traction to the mandible. The block was grasped with a large tenaculum (Figure 2), rotated clockwise 45°, and carefully extracted. Post-extraction examination revealed no damage to the hard palate or oral mucosa, nor any tenderness, mobility, or fracture of the dentition. The patient was able to speak and eat without issue and only complained of mild residual TMJ soreness. He was observed in the emergency department for any developing signs of respiratory distress or vascular injury. His tachycardia and hypertension resolved, and he was discharged home after 2 h. He had no further related visits.

DISCUSSION

Oral foreign bodies present a rare and serious challenge in pediatric emergency medicine, given the potential for injury and airway obstruction. The position and size of the foreign body in our patient's oral cavity limited our ability to fully visualize the object or airway posterior to the block. We considered that any potential dirt or loose fragments on the obscured posterior aspect of the block could become dislodged with excessive manipulation; however, we felt this was unlikely as the block appeared intact, and the patient willingly put it in his mouth prior to the fall. We considered sawing the block with the patient in a prone position or extracting the central incisors, which would naturally exfoliate in the next year, but reserved these strategies for the operating room where more comprehensive airway measures could be pursued prior to attempted removal.

There was a long discussion regarding the relative risks of immediate emergency department extraction vs. delaying an attempt to transport and anesthetize the

Figure 1. A boy with a retained wooden block in his oral cavity.

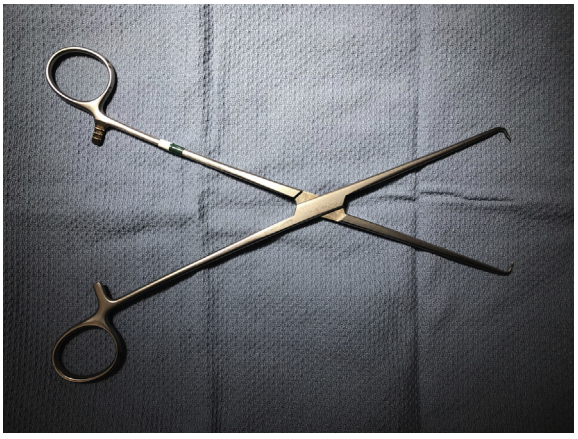

Figure 2. A surgical tenaculum used for oral foreign body extraction.

patient in the operating room. Ultimately, it was believed to be safer to attempt gentle extraction with anxiolysis given that the patient was fully oriented and able to lean forward to prevent aspiration, the block was mostly visible and appeared intact, and the foreign body was obviously larger than the airway and unlikely to be deeply aspirated. Given the orientation of the block and our ability to visualize the lateral soft palate by retracting the buccal mucosa, we were confident that the block was not abutting or at risk for injuring the great vessels. We felt the size and strength of the tenaculum allowed the surgeon to have firm and adequate control of the foreign body. We were prepared to perform advanced airway maneuvers, including a surgical airway with the necessary equipment and pediatric surgery at the bedside. Prior to attempting the extraction, the team, including a pediatric surgery attending and resident; a pediatric emergency attending and resident; a child life specialist; nursing; and an emergency department technician, discussed the procedure as well as indications to abort the attempt. These included evidence of the block fracturing, bleeding, the patient becoming agitated or crying, any respiratory distress, or more than one simple attempt at extraction.

The patient's apprehension and pain with initial manipulation made it necessary for pharmacologic analgesia or anxiolysis to successfully remove the foreign body. This patient was not a candidate for conscious sedation with propofol or ketamine, given the inability to provide bag-valve-mask ventilations or orally intubate the patient. There is a risk of laryngospasm from ketamine, especially with posterior palatal stimulation as in this case. Ketamine also carried the potential to increase muscle tone and worsen masseter muscle spasms, making extraction of the wooden block more difficult (3–5). Propofol has some muscle relaxant effect, but carries a relatively high risk of respiratory depression (5).

A single dose of i.v. diazepam was thought to be the ideal agent given its anxiolytic and muscle relaxation effects, its 4- to 5-min onset, and the low risk of respiratory complications (5). We prioritized treating anxiety and muscle spasm over pain, and while we considered also administering fentanyl given its rapid onset of analgesia, we decided to avoid giving both a benzodiazepine and narcotic, given the potential for cumulative respiratory depression. We avoided intranasal midazolam, given concern for dislodgement of a foreign-body fragment and subsequent aspiration if the patient sneezed, coughed, or became upset.

Following successful removal of the wooden block, focus turned to detection of potential secondary injuries and complications. The natural tendency for wood to splinter raised concern for retained fragments, which may lead to abscess formation, as the porous composition of wood promotes bacterial growth (6,7). The patient denied trismus or severe jaw pain lessening concern for a TMJ injury or a mandibular fracture sustained during the fall. The patient exhibited no signs or symptoms of internal carotid artery injury, such as soft-palate bruising or penetration, carotid bruit, cervical hematoma, respiratory distress, headache, or neurologic deficits (8,9).

A rare phenomenon observed following attempted retrieval of oral foreign bodies, especially those located or protruding deep into the oral cavity, is non-infectious epiglottitis (10). Blind finger sweeps during attempted removals may cause traumatic injury to the epiglottis with eventual onset of epiglottitis. Symptoms include dysphagia, drooling, respiratory distress, and stridor (10). Prior reports suggest that patients without respiratory distress or need for supplemental oxygen can be safely discharged post-extraction (11). Our patient was discharged home following 2 h of observation in the emergency department with strict instructions to return should he develop any signs of respiratory distress or vascular injury.

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

Although rare, retained oral foreign bodies in children require a careful approach and understanding of pharmacologic anxiolysis, as patients may not be candidates for moderate sedation. Emergency physicians must also be aware of potential complications of oral foreign bodies, including palatal injury, TMJ dislocation, epiglottitis, and retained foreign bodies. This case emphasizes the need for careful consideration and possible multidisciplinary involvement in patients with this high-risk condition.

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