Accidental Ingestion of Instruments in Pediatric Dental Patients: Report of Three Cases

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Abstract
Very young children are at risk of swallowing or aspirating numerous household things. This risk is enhanced during dental procedures of these children as they tend to be very unco-operative due to their age and lack of maturity to understand the importance of the treatment. Use of physical barriers, sedation or general anesthesia is not practically possible in every child scheduled for dental treatment. Dentist must be able to manage emergency situations in which patients accidentally swallow dental instruments or materials during treatment and procedures. This article presents ingestion of dental objects in 3 children and attempts to discuss the management and prevention of such mishaps.

Key words: Foreign bodies, Aspiration/Ingestion, Dental objects, Bur, Management, Prevention.

Introduction
The ingestion of foreign bodies is a common problem in young children, and especially peaks in children aged six months to three years. In adults, it occurs accidentally more commonly among those with psychiatric disorder, mental retardation, and altered consciousness associated with intravenous sedation. Swallowing of dental materials and devices may lead to serious complication during dental treatment. Any object routinely placed into or removed from the oral cavity during dental or surgical procedures can be aspirated or swallowed. These items can include teeth, restorations, restorative materials, instruments, implant parts, rubber dam clamps, gauze packs and impression materials. The incidence of aspiration or swallowing of foreign bodies of dental origin varies considerably in the literature. Tamura et al (1996) in a review reported the range being 3.6-27.7% of all foreign bodies. The majority of foreign bodies that reach the gastrointestinal tract pass spontaneously. However, 10-20% of cases require nonsurgical intervention, while 1% or less may require surgery. Patients swallowing foreign bodies are usually asymptomatic but symptoms may arise later. Foreign body aspiration or ingestion may cause damage to gastric mucosa, septic abscess, intestinal perforations, partial or complete airway obstruction, post obstructive pneumonia, respiratory distress, pneumothorax or haemorrhage. If these cases are not properly managed and timely intervention is not carried out, it can be lethal.

Therefore, pediatric as well as general dental practitioners should be aware of a protocol of management and prevention of swallowing or aspiration of dental objects.

Case Description
Case 1: A 4 yrs. normal child was scheduled for a root canal therapy for his 55 tooth in the Department of Pediatric dentistry in Sinhgad Dental College and hospital. The child was very un-cooperative and since only single tooth required root canal treatment sedation or anesthesia was not justifiable. The patient was seated in the father's lap so as to restrict his body movements and was in supine position. After administering local anesthesia the access cavity preparation was being done with an airotor hand-piece. As the airotor was removed the bur popped out directly and fell into the patient's oral cavity and attempts to retrieve the bur failed as the patient ingested it. (Fig. 1)

Case 2: A 6 yrs. old male child was scheduled for restoration of his decayed 64, 65 teeth in the Department of Pediatric dentistry in Sinhgad Dental College and hospital. The child was cooperative and was comfortably seated in the dental chair in supine position. The teeth were restored with tooth color filling material and were checked for any high points. As the child complained for the same, a slow speed contra angle Micro-motor hand piece with finishing bur was used to reduce the restoration and relieve the high points, when an accidental slippage of the bur occurred and fell into the patient's oropharynx and attempts to retrieve the bur failed as the patient ingested it. (Fig. 2)
Case 3: A 12 yrs. old female child was scheduled for restoration of her decayed upper teeth in the Department of Pediatric dentistry in Sinhgad Dental College and hospital. The child was cooperative and was comfortably seated in the dental chair in supine position. When the tooth was being drilled with a high speed contra-angle hand piece an accidental slippage of the airotor cap occurred and it fell into the patient’s oropharynx and attempts to retrieve the cap failed as the patient ingested it. (Fig. 3)

Management of the pediatric patients done in above cases:
The patients did not have any immediate symptoms like cough, dyspnoea, drooling or any other symptom of respiratory distress. The patients were immediately taken to the Department of Radiology, S. K. N. Medical College & General Hospital for postero-anterior view of chest and antero-posterior abdominal radiographs.

X-ray reports of the patients confirmed the presence of a radio opaque foreign body in the gastro-intestinal tract and as the patients did not have any symptoms and the object ingested was small and blunt, a wait and watch approach was advised by the gastroenterologist and so the patients were discharged after 24 hrs. of observation. The patients were advised to take normal diet, examine stools for discharge of objects and recalled after 3-4 days. Parents of the Patient in second case found dental object in stool on 3rd day. Repeat X-rays were taken for all the three patients after one week which did not show any foreign body, suggesting the passage of the ingested objects in the stools.

Following is the summary for the management of swallowed/aspirated objects:

**FLOW CHART FOR MANAGEMENT OF SWALLOWED DENTAL OBJECTS**

<table>
<thead>
<tr>
<th>Incident occurs</th>
<th>Maintain patient in reclined position</th>
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<tbody>
<tr>
<td>Airway not compromised</td>
<td>Airway compromised</td>
</tr>
<tr>
<td>Examination of mouth and local area</td>
<td>Ask patient to cough</td>
</tr>
<tr>
<td>Potentially swallowed/ not swallowed</td>
<td>Object not retrieved and airway obstruction exists</td>
</tr>
<tr>
<td>Maintain airway</td>
<td>Retrieve and identify the object</td>
</tr>
<tr>
<td>Perform HEIMLICH manoeuvre</td>
<td></td>
</tr>
<tr>
<td>Reassure the patient</td>
<td>Immediate summon support including Cricothyroidotomy where necessary</td>
</tr>
<tr>
<td>Escort patient to hospital for clinical/radiographical examination</td>
<td></td>
</tr>
<tr>
<td>Identify the location of object</td>
<td></td>
</tr>
<tr>
<td>G. I. Tract</td>
<td>Oesophagus</td>
</tr>
<tr>
<td>Refer to Gastroenterologist</td>
<td>Endoscopic removal</td>
</tr>
<tr>
<td>Monitor 2 weeks, examination of stools</td>
<td></td>
</tr>
<tr>
<td>Object retrieved</td>
<td>Object not retrieved</td>
</tr>
<tr>
<td>Identify the object</td>
<td>Radiographic examination</td>
</tr>
<tr>
<td>Reassure the patient</td>
<td>Object still present</td>
</tr>
<tr>
<td>Object no longer present</td>
<td></td>
</tr>
<tr>
<td>Consider for endoscopic surgery</td>
<td>Assume object passed and re-assure the patient</td>
</tr>
</tbody>
</table>

Discussion

Many reports in literature describe accidental ingestion or aspiration of dental instruments, restorations and prosthesis during dental treatment. Any patient may swallow or aspirate foreign objects, but the risk is greater in pediatric patients, elderly patients and those under the effect of narcotics, sedation or nitrous oxide because of diminished protective reflexes. There is no consensus in the literature regarding the position of the patient to minimize the risk of foreign bodies' aspiration. Neuhauser suggested that patients in a supine position are more or less prevented from swallowing foreign objects. Barkmeier et al stated that supine position increases the risk of swallowing.
When any dental instrument is aspirated/swallowed above mentioned flow chart should be followed in systemic manner to avoid serious complications. Complications after ingestion of foreign bodies are intestinal obstruction, perforation or hemorrhages, which are at times, can be life threatening. Thus, the best approach towards management of ingested/aspirated foreign bodies goes with saying “Prevention is better than Cure”.

**Strategies to prevent aspiration/ingestion**

- Use a rubber dam
- Use a gauze throat pack
- Use floss to tie dental instruments
- Use high vacuum evacuation
- Use a high viscosity type of impression material
- Use a custom tray, with an open palate design for maxillary arch impression
- Observe the entire impression procedure
- Use a more upright position if possible
- Provide thorough instructions to the patients
- Proper checkup of the instruments like airotors before use.

**Conclusion**

Generally the dental instruments are ingested than aspirated and in most of the cases pass out asymptotically and atraumatically within 4 days to 4 weeks. However the dentist must be aware of the associated risks of such complications. And they should take all the necessary steps to avoid such emergencies during routine dental treatment. But sometimes it is very difficult to prevent ingestion of dental instruments thus pediatric as well as general dentist must be aware of a correct protocol to manage those patients who are suspected of having ingested/aspirated a foreign body.

**References**


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