

Review Article

Accidental ingestion of foreign body in dental practice and its management

Dr. Disha D. Kandi¹, Dr. Nitin Gulve², Dr. Sheetal Patani MDS³, Dr. Amit Nehete MDS⁴,

Dr. Hrushikesh Aphale MDS⁵

¹Post Graduate students, ²Professor and Head, ^{3,4}Professor, ⁵Lecturer, Dept. of Orthodontics and Dentofacial Orthopaedics, M.G.V.'s K.B.H. Dental College and Hospital, Panchawati, Nashik- 422002, India.

***Corresponding author**

Dr. Disha D. Kandi

Email: drdishajain@gmail.com

Abstract: Foreign body aspiration or ingestion can be a potential complication during routine dental treatment. The handling of dental objects requires particular care, especially where the patient is supine or semi-recumbent. Dentist must be able to manage emergency situations in which patients accidentally swallow dental instruments or materials during treatment and procedures. This article reviews the complications, management and prevention of aspiration or ingestion of foreign bodies.

Keywords: supine or semi-recumbent, aspiration or ingestion

INTRODUCTION

Ingestion or aspiration of foreign bodies is recognized as a complication in all clinical specialties of dentistry [1] as it has the potential to result in acute medical and life threatening emergencies [2].

The ingestion of foreign bodies is most commonly a problem in young children. In adults, it occurs accidentally more commonly among those with psychiatric disorder, mental retardation, use of local anaesthetics, and altered consciousness associated with intravenous sedation [3], as also patients with excessive gag reflex, prisoners and alcoholics. In addition patients with difficult access site secondary to anatomical restrictions (small oral cavity, short palate, macroglossia, large tongue) and patients with increased intra abdominal pressure as in overweight and pregnant women are at increased risk of ingestion [4].

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, orthodontic appliances, restorative materials, instruments, implant parts, rubber dam clamps, gauze packs and impression materials. 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, and pneumothorax or haemorrhage [3].

Depending on the shape, size, and flexibility of the object, some events may have minimal risk, while some may even be fatal. Therefore, we can say that dental treatment requires working with dangerous tools in a sensitive place like oral cavity which is the entrance of respiratory and digestive systems. Prevention is the best method, but when happened, an efficient management of the event would be critical to save the patient's life [5].

The GDP must be able to recognize signs and symptoms of air obstruction, if a dental object is lost into the oropharynx. If retrieval is not possible, emergency life support measures must be instigated, whilst waiting for help to arrive. If the airway is not compromised, the patient must be escorted to the hospital for clinical and radiographical examination, to identify the location of the object. Treatment thereafter will depend on the findings of the examination.

SIGNS AND SYMPTOMS [3]

This is highly variable and depends on whether it is a child or an adult. Any symptoms or signs are also largely dependent on where the object is impacted. About 75% of children who have an impacted foreign body will have it at the level of the upper esophageal

sphincter while roughly 70% of affected adults having impaction at the level of the lower esophageal sphincter.

Foreign bodies at Oropharyngeal level-

Overall, about 60% of foreign bodies become trapped at this level, Patients usually have a clear sensation of something being trapped, discomfort, Drooling of saliva, inability to swallow, Airway compromise and also infection and perforation may occur.

Foreign bodies at esophageal level-

In adults there is usually an acute presentation, vague sensation of something being stuck in the centre of the chest or epigastric region, dysphagia and salivary pooling/drooling.

In children it presents with gagging, vomiting, retching, neck and/or throat pain, inability to feed, failure to thrive, fever, recurrent aspiration pneumonitis/pneumonia or respiratory embarrassment/Stridor (due to tracheal impingement).

Foreign bodies at Sub-esophageal level-

It may present with a range of symptoms such as abdominal distension and discomfort, fever, recurrent vomiting, passing rectal blood/melena and/or other symptoms of acute or subacute intestinal obstruction may be present.

Symptoms due to gastrointestinal perforation-

It presents with acute mediastinitis with chest pain, dyspnoea and severe dysphagia (pain associated with swallowing), along with signs of pneumonitis/pleural effusion and acute/sub-acute peritonitis.

Foreign body aspiration in airway-

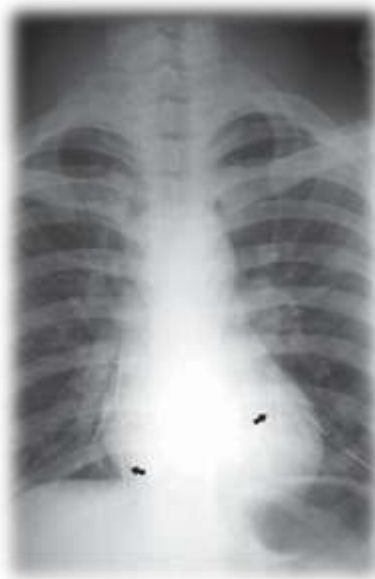
It is an acute emergency and presents with respiratory arrest, Stridor, and classic triad of wheezing, coughing and dyspnea.

DIAGNOSIS:

- Careful examination of entire oral cavity, pharynx, larynx and esophagus.
- Investigations such as Abdominal and Chest X-rays, Endoscopy, CT scans of thorax and abdomen.



Abdominal X-ray showing rubber dam clamp in large intestine



Postero-anterior chest X-ray showing multiple pins.

COMPLICATIONS-

- Scratches, lacerations or abrasions of mucosa.
- Perforation
- Infection and abscess formation
- Esophageal necrosis and stricture formation
- Mediastinitis and peritonitis
- Pneumothorax and/or pneumo mediastinum
- Pericarditis/cardiac tamponade
- Tracheoesophageal fistula, Aorto-oesophageal fistulae or other mediastinal vascular injury
- Acute or sub-acute gastro-intestinal obstruction.

MANAGEMENT

Many reports in literature describe accidental ingestion or aspiration of dental instruments, restorations and prosthesis during dental treatment³. Neuha users suggested that patients in a supine position are more or less prevented from swallowing foreign objects [6]. Barkmeier *et al.*; stated that supine position increases the risk of swallowing [7]. Management of this emergency in the clinic is the most critical aspect that should occur. A variety of management options are available. However, the clinician will need to confirm

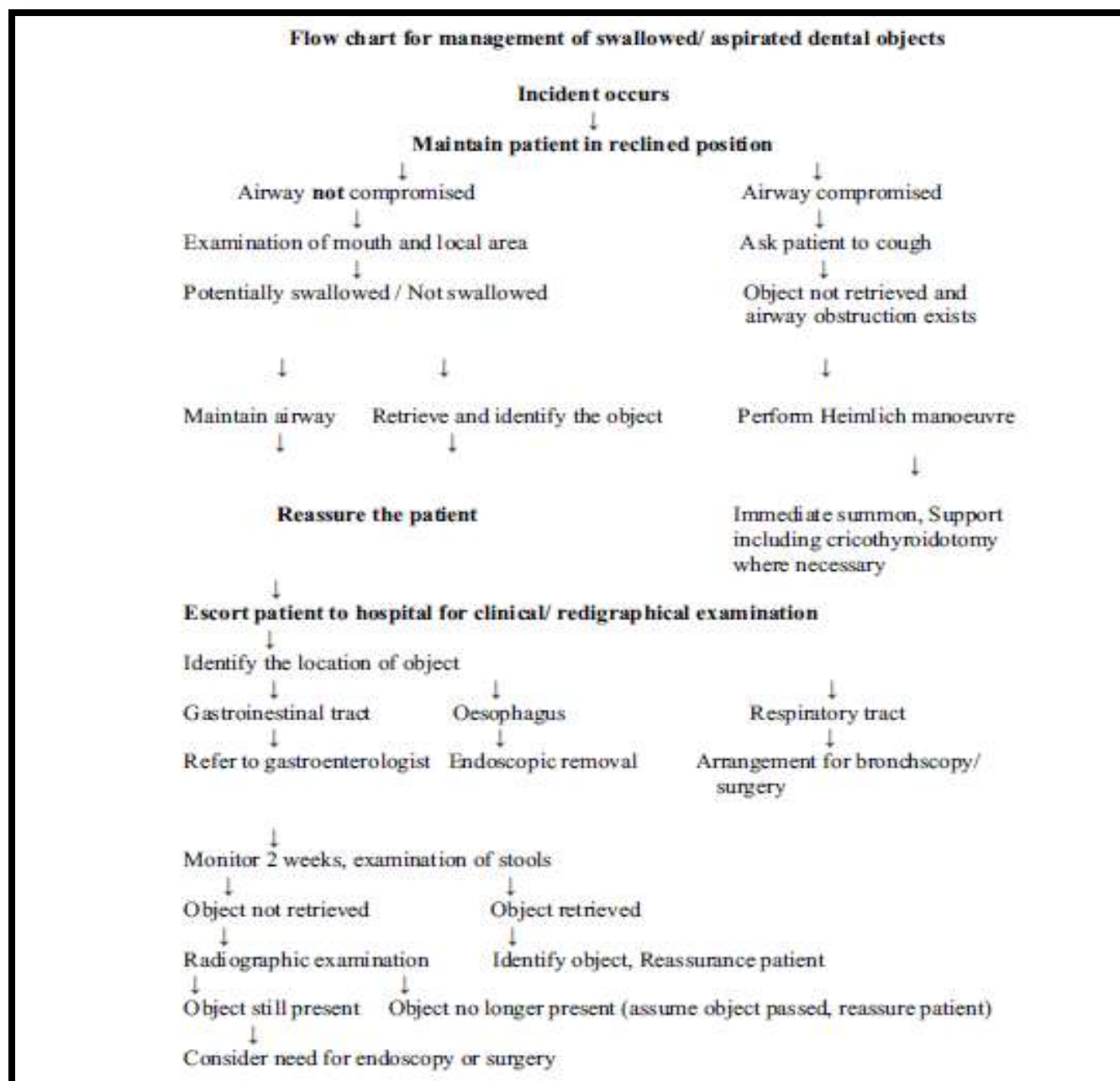
that accidental ingestion or aspiration may have occurred by elucidating a proper history

Positive history [1]

- If this occurs outside the confines of the clinic, a positive history can often be elicited.
- However, it should be noted that a negative history in itself does not exclude FB swallowing, and a high degree of suspicion should be maintained in children and impaired adults with missing appliance fragments or components.

Clinical retrieval [1]

- Head may be turned to one side to encourage the object to fall into the cheek rather than the oropharynx.
- Oral cavity and oropharynx should next be examined under good illumination and if the object is visible, it should be retrieved with forceps or high-volume suction.
- Observation is generally indicated for asymptomatic patients with a positive history of non-threatening FB ingestion over periods of less than 24 hours and without any respiratory symptoms.



Non- invasive management-

- Unlike ingested FBs, treatment of aspirated FBs demands urgent attention.
- Cyanosis, loss of consciousness, and permanent brain damage occurs within 4 to 6 minutes if the obstruction is not relieved. Therefore, speed and updated cardiopulmonary

resuscitation (CPR) skills are vital on the part of the clinician.

- If the FB is obstructive and the patient is in respiratory distress, dislodgement should initially be attempted with back blows and abdominal thrusts (Heimlich maneuver [8]).



- If this fails to dislodge the object, positive airway pressure needs to be maintained by artificial respiration until emergency services arrive.

Invasive emergency measures-

- The object should be bypassed and an emergency airway established (by an experienced medical practitioner).
- Even if the object has passed the vocal cords and there is no sign of airway obstruction, the patient should still be referred for immediate medical attention.
- If the airway is not compromised, the patient must be escorted to the hospital for clinical and radiographic examinations to identify the location of the object for planning the means of retrieval.

- FB in trachea and esophagus – endoscopy under LA for intrathoracic objects.
- Use of Foley’s catheter-This involves passing a balloon distal to the ingested object, usually under fluoroscopic guidance, inflating the balloon, and then withdrawing the catheter along with the object proximally.

Surgical intervention-

- Surgery, often the last resort and although rarely performed.
- Performed when all other options have failed.

PREVENTION

There are several strategies to avoid aspiration of objects during routine dental treatment, such as

- # Use a more upright position of patient if possible.
- # Use of high velocity evacuation-



The easiest and most common procedure for routine restorative and endodontic procedures is the-

Use of rubber dam- It offers effective protection against aspiration or swallowing of endodontic instruments, broken burs, restorative materials and pins. While the rubber dam reduces the risk of aspiration during restorative procedures, it is

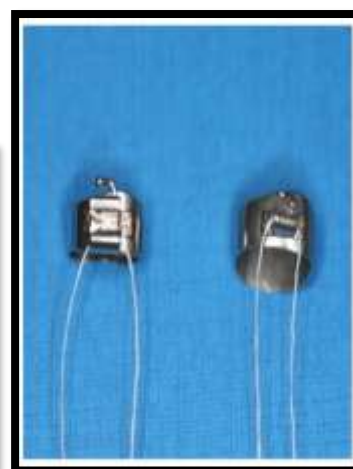
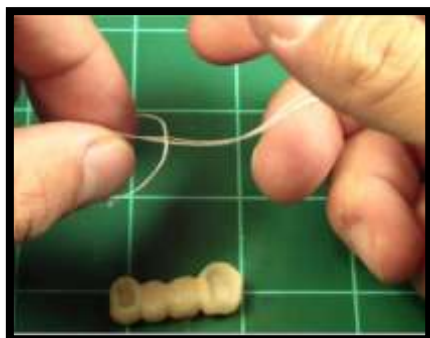
possible for the dam clamp itself to be aspirated. To reduce this risk, dental floss should be tied to secure rubber dam clamp. Many dental techniques preclude the use of the rubber dam, particularly during routine oral surgery and Prosthodontic procedures[3].



an alternative is to place a 4×4 inch gauze protective barrier in the oral cavity distal to the area where small items are being manipulated.



The dentist may also prevent small appliance such as bands, cast restorations, etc.. being aspirated by using dental floss.



#Dentist should also instruct patients that if an object falls on the tongue, they should try to suppress the swallowing reflex and turn their heads to the side.

One prosthetic procedure that does not easily allow for the above barrier techniques is full arch impressions. An impression procedure may put a patient at a risk of aspirating the impression material if a large amount of material and/ or low viscosity material is introduced to the posterior oral cavity. Therefore, use of

the most viscous material available that will achieve the desired level of accuracy for the impression procedure is recommended [3].

Precautions with removable appliances-All metal retentive components should be inspected at every appointment for any sign of fracture due to repeated wear. Prefabrication of the appliance is indicated if this is observed[1].

It is recommended that the acrylic used to fabricate the appliance be preferably radio-opaque. This will facilitate easier localization in the event of ingestion of the appliance or parts [1].

CONCLUSION-

To summarize, the relevance of the aforementioned situations among possible clinical emergencies is that they comprise a subgroup that are totally preventable. Conscientious patient selection, meticulous adherence to clinical procedures, periodic inspection of instruments and appliances for wear and timely replacement if warranted, appropriate use of high-volume suction during high-risk procedures, as well as proper patient education are all vital factors in prevention. If despite following standard operating procedures, an emergency situation does arise, the dental practitioner must be capable of recognizing and managing it early and effectively so that patient discomfort and morbidity may be kept minimal. In this litigious era, it is our recommendation that appropriate consideration be given to the inclusion of such emergencies and their management in contemporary graduate curricula.

REFERENCES-

1. Umesan U, Chua K, Balakrishnan P; Prevention and management of accidental foreign body ingestion and aspiration in orthodontic practice 2012; 8: 245–252.
2. Milton TM, Hearing SD, Ireland AJ; Ingested foreign bodies associated with orthodontic treatment: report of three cases and review of ingestion/aspiration incident management. Br Dent J. 2001; 190(11):592–596.
3. Parolia A, Kamath M, Kundubala M, Manuel TS, Mohan M; Management of foreign body aspiration or ingestion in dentistry. Kathmandu University Medical Journal 2009; 7(2): Issue 26, 165-171.
4. Negi N, Vaid S, Chainta D, Negi KS; Accidental Ingestion of a Foreign Body in Orthodontics. J Ind Orthod Soc 2013; 47(4):225-228.
5. Hoseini M, Mostafavi SM, Rezaei N, Boluri EJ; Orthodontic Wire Ingestion during Treatment: Reporting a Case and Review the Management of Foreign Body Ingestion or Aspiration (Emergencies) 2013, Article ID 426591.
6. Neuhauser W; Swallowing of a temporary bridge by a reclining patient being treated by a seated dentist. Quintessence Int Dent Dig. 1997; 6: 9-10.
7. Barkmeier WW, Cooley RL, Abrams H; Prevention of swallowing or aspiration of foreign objects. J Am Dent Assoc. 1978; 97: 473.
8. Heimlich HJ; “The Heimlich maneuver: prevention of death from choking on foreign bodies,” Journal of Occupational Medicine, 1977; 19(3): 208–210.