

## REVIEW ARTICLE

# Management of Foreign Body Aspirations in Dental Clinics

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## Abstract

Foreign Body Aspiration is a potential complication in dental practice. The aspiration of a tooth or its fragments represents a serious medical situation because it can rapidly block the airways partially or completely. The edges of the tooth may traumatize the lining of respiratory mucosa. Many dental materials and instruments are of small size, and when exposed to saliva with limited opening of oral cavity it becomes all the more difficult to manipulate them correctly. When the patient is placed in the supine or semi-raised position, such objects might be swallowed or aspirated into the oropharynx. Foreign Body Aspiration episodes have the potential to result in acute medical and life-threatening emergencies. Prevention is clearly the best approach however when such cases and situation are presented rapid intervention is essential for ensuring patient safety. This review article highlights the protocol of management of Foreign Body Aspirations in Dental Clinics.

**Key words:** Dental Clinics, Foreign Body Obstruction

<http://dx.doi.org/10.18049/jcmad/212>

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## Introduction

Foreign body aspiration is an act of inhaling or breathing foreign bodies into the respiratory tract. Foreign Body Aspiration is an acute emergency and it occurs more frequent in children than adults<sup>[1]</sup>. Failure of the dentist to isolate the operative field from the rest of the oral cavity while performing dental treatment increases the risk of aspiration of filling materials, tooth fragments, denture and prosthetic materials. In adults teeth or dental materials are the commonest foreign bodies to lodge in the bronchi<sup>[2]</sup>. Aspirated foreign bodies most commonly are lodged in the right main stem and lower lobe. Foreign bodies are lodged preferentially in the right bronchial tree because of its more vertical position<sup>[3,4]</sup>. Dentists should do whatever they can to keep their patients from aspirating dental material during dental treatments. Dentists should use a rubber dam whenever possible. They can also insert a piece of gauze secured with a thread to prevent swallow objects that fall onto their tongue. However when such a situation is presented an early diagnosis and definitive patient treatment

should be initiated. If these cases are not properly managed and timely intervention is not carried out, it can prove to be lethal. Therefore, general dental practitioners should be aware of a protocol of management and prevention of swallowing or aspiration of dental objects.

## Incidence

Dental procedures involving single tooth cast or prefabricated restorations involving cementation have a higher likelihood of aspiration<sup>[5]</sup>. Foreign body ingestion is a commonly seen in children (80%), elderly, mentally impaired, or alcoholic individuals, whereas it may occur intentionally in prisoners or psychiatric patient<sup>[6]</sup>. studies by Hisanaga R *et al*; reported 29.7% accidental ingestions and no accidental aspirations in dental college between Apr 2008 and March 2009. Commonly involved were crowns followed by inlays. Retrospective and longitudinal studies of accidental ingestion and aspiration in large populations have also reported that its incidence of ingestions and aspiration was around 0.004%, and that ingestion is more common than aspiration<sup>[7, 8]</sup>. The incidence of aspiration or swallowing of

foreign bodies of dental origin varies considerably in the literature. Tamura (1986) *et al*; in a review reported the range being 3.6 – 27.7 per cent of all foreign bodies, the number being considerably higher in adults than children <sup>[9]</sup>. For endodontic instruments the prevalence for aspirations was 0.0009 per 100,000 RCTs and prevalence of aspiration was 0.08 per 100,000 RCTs <sup>[10]</sup>

## Symptoms & Sign of Aspiration

They may grasp their throat with their hand (universal choking symbol) and, in the case of complete airway obstruction, will be unable to speak. The following signs may be noted in patients;

- a. Frequent touching of the throat by the distressed patient
- b. Facial paleness or cyanosis
- c. Dyspnoea / Choking.
- d. Excessive coughing
- e. vomiting
- f. Loss of Consciousness

### If Partial Obstruction

- a. Snoring
- b. Gurgling
- c. Wheezing
- d. Crowing

### If Total Obstruction

- a. No noise

### Early complications

1. Acute Respiratory Distress (dyspnoea)
2. Respiratory depression or arrest due to airway obstruction (asphyxia)
3. Laryngeal edema
4. Cardiac arrest is possible
5. Risk of pleural perforation and pneumothorax

### Patients with increased risk <sup>[12]</sup>:

The following patients have an increased risk of swallowing or aspirating foreign objects

- Prisoners
- Patients with psychiatric disorders
- Alcoholics
- Senile, debilitated, nervous and/or hyperactive individuals
- Patients with an extreme gag reflex

- Patients with hiatus hernias and symptoms of reflux oesophagitis (impaired swallowing reflex)
- Patients with increased intra-abdominal pressure (e.g., obese or pregnant individuals) may suffer from dysphagia (difficulty swallowing), especially when the upper body is reclining
- Difficult or limited access to the patient's head-and-neck region or oral cavity due to anatomic peculiarities, such as barrel chest, microstomia or macroglossia.
- Patients with depressed or impaired central nervous system function (e.g., due to the use of sedatives, tranquilizers or opiates)
- Patients wearing full dentures (reduced tactile perception capacity in the region of the palatal mucosa) <sup>[13]</sup>.

## Strategies to Prevent Aspiration

As the old adage says, 'prevention is better than cure', same applies here.

- Use a more upright position if possible.
- Use of a rubber dam
- Use high velocity suctions during dental procedures.
- Use of a dental floss ligature to secure small instruments or root pins, (Attach floss to a closed loop on loose components while placing them in position intra-orally).
- All removable appliances must have adequate retention and regularly supervised.
- In some situations when adjusting small components on orthodontic appliances it would be advisable to use a barrier such as a gauze napkin called as gauze screen secured with floss. (Use of gauze to cover the oropharynx of intubated patients during treatment) <sup>[14]</sup>
- Patients with impaired coordination of swallowing and coughing reflexes should always be treated in a sitting or only slightly reclining position.
- Removal of broken prostheses Polymethyl methacrylate (PMMA) is only slightly radiopaque; therefore, swallowed or aspirated pieces of prostheses made of this material are very difficult to identify in X-

- rays due to shadowing from radiodense structures, among other things.
- Incorporation of a steel wire in prostheses helps to stabilize broken prostheses and makes it easier to identify them in X-rays<sup>[15]</sup>.
- Keep up to date with CPR as the recommendations do change.

**Imaging:** Chest radiography is diagnostic for aspirated radiopaque objects. There is no problem identifying a tooth in plain and lateral radiography<sup>[3, 16]</sup>.

**Treatment:**

Immediately after a foreign body disappears in the throat of a patient

- I. Prop up the patient's upper body at a 20 to 30-degree angle** with the head reclined. Finger sweep / grasp: should be done only if object is visible and will not be wedged deeper.
- II. Ask the patient to cough**<sup>[17]</sup>: aspirated foreign objects can often be ejected in this manner, especially if they have not passed the level of the glottis. If the patient is coughing forcefully, allow them to continue to cough, as this is their best chance for clearing their airway. If the patient's airway is not compromised, this situation should be maintained and monitored as a search of the oral cavity and local area is carried out. Retrieval, identification, and confirmation that the object is intact should be followed immediately by reassurance for the patient. If coughing leads to choking, respiratory difficulties or inspiratory stridor, the foreign body is already caudal to the larynx and can no longer be coughed up. If the patient is conscious, but continues to choke and is unable to breathe, abdominal thrusts should be used.
- III. Heimlich maneuver**<sup>[11]</sup>: The Heimlich maneuver is performed only in cases where there is total obstruction of the airways and the patient is at risk of choking to death. A foreign body can often be ejected from the throat by forcefully thrusting the abdomen in the direction of the diaphragm to raise the pressure in the tracheobronchial system. It is best to have a second person inspect the patient's throat in order to remove the

ejected foreign body either by hand or with a pair of Magill's forceps.

- Rescuer stands behind victim and wraps his arms around victim's waist.
- Rescuer makes a fist with one hand and places the thumb side of the fist against the victim's abdomen, slightly above the navel and below the rib cage.
- Rescuer grasps fist with other hand and presses into victims abdomen with a quick thrust
- Thrust is repeated several times if necessary.

**IV. If the patient falls unconscious**

1. Tilt the head back and open the mouth by pulling the chin downward and forward.
2. Remove all visible obstructions.
3. Assess the breathing by the "seeing-listening-feeling" method.
4. Administer Oxygen via nasal tube
5. If O<sub>2</sub> not available then administer two breaths of effective Artificial Respiration.
6. While performing these measures, have someone call an emergency medical service.

**Send the patient to a hospital** to remove the foreign body by bronchoscopy once its position has been identified radiographically. Whenever an object disappears in the Oropharynx, X-rays must be taken to assess the possibility of aspiration regardless of whether one believes it was swallowed or aspirated.

## Conclusion

Prevention of Foreign Body Aspiration is the best approach, via the mandatory use of precautions during all dental procedures. The General Dental Practitioner must be able to recognize signs and symptoms of air obstruction, if a dental object is lost into the Oropharynx and if retrieval is not possible, emergency life support measures must be initiated, 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. Dental Practitioners including their support staff

should make effort to train themselves to deal with this situation and practice protocol to follow in an event such a situation arises.

**Source(s) of support:** Nil

**Conflict of Interest:** None declared

## References

1. McGuirt WF, Holmes KD, Feehs R, Browne JD, Tracheobronchial foreign bodies. *Laryngoscope* 1998; 615-8. [Pubmed]
2. S Kant, S verma and S Mahajan 'Spontaneous expulsion of aspirated teeth in left lung following maxillofacial trauma: A case report, *The Internet Journal of Pulmonary Medicine* ;8(2): <http://ispub.com/IJPM/8/2>. [Accessed on 20-02-2014.]
3. Zerella JT, Dimler M, McGill LC, Pippus KJ. Foreign body aspiration in children: value of radiography and complications of bronchoscopy. *J Pediatr Surg* 1998; 33:1651-1654.
4. Inci I, Ozcelik C, Ulku R, Tas S, Eren N, Ozgen G. Tracheobronchial foreign body aspirations in childhood: a 10 years experience. *J Bronchol* 1998; 5:104-109.
5. Ku` rkciyan, I, Frossard M, Kettenbach J, Meron G, Sterz F, Ro` ggla M, Laggner AN. Department of Emergency Medicine, General Hospital of Vienna, University of Vienna, Austria, 1996. *Z. Gastroenterol.* 34 (3), 173-177.
6. Pavlidis TE, Marakis GN, Triantafyllou A, Psarras K, Kontoulis TM, Sakantamis AK.. Management of ingested foreign bodies: how justifiable is a waiting policy? *Surg. Laparosc Endosc Percutan Tech* 2008; 18(3); 286-287.
7. Ryuichi Hisanaga, Keiko Hagita, Kunihiro Nojima, Akira Katakura, Kazuki Morinaga, Tatsuya Ichinohe, Reiko Konomi, Toshiyuki Takahashi, Nobuo: Survey of accidental ingestion and aspiration at Tokyo Dental College Chiba Hospital. *Bull Tokyo Dent Coll* 2010; 51: 95-101.
8. Sugawara C, Takahashi A, Maeda N, Kubo. M, Kudoh H, Hosoki H, Iwasaki Y. An investigation of accidental aspiration and swallowing during the dental treatment at Tokushima University Dental Hospital. *Shikoku Shigakukai Zasshi* 2007; 19; 255-262.
9. Tamura N, Nakajima T, Matsumoto S, Ohyama T, Ohashi Y. Foreign bodies of dental origin in the air and food passages. *Int Jour of Oral and Maxillofacial Surgery* 1986; 15:739-751.
10. Susini, G, Camps J. Accidental ingestion and aspiration of root canal instruments and other dental items in a French population. *European Cells and Materials* 2007; 13(S1)34: 1473-2262. [Pubmed]
11. International medical college. IMC, Das Offene, universitare Medizin-Lexikon "Aspiration of derbies during dental treatment" Article in German Language. <http://www.med-college.de> (accessed on 20 Feb 2014).
12. Prakash UBS, Cortese DA (1994) Tracheobronchial foreign bodies Chapter 18, In: Prakash UBS (Ed.). *Bronchoscopy*. 2. Aufl. Raven Press, New York, 253-277
13. Maleki M, Evans WE. Foreign-body perforation of the intestinal tract. Report of 12 cases and review of the literature *Arch Surg* 1970; 101: 475-7.
14. Dibiasi AT, Samuels RHA, Ozdiler E, Akcam MO, Turkkahraman H. Hazards of Orthodontics appliances and the oropharynx. *Journal of Orthodontics* 2000; 27(4): 295-302.
15. Herdach F, Große-Sende S. Verschlucken und Aspiration von Fremdkörpern während der zahnärztlichen Behandlung *Int Poster J Dent Oral Med* 2002; 4(2) Poster 118.
16. Oguzkaya F, akcali Y, Kahraman C, Bilgin M, Sahin A. Tracheobronchial foreign body aspirations in childhood: a 10 years experience. *Eur J Cardiothorac Surg* 1998; 14:388-392.
17. Zitzmann NU, Fried R, Elsasser S, Marinello CP 'the aspiration and swallowing of foreign bodies. The management of the aspiration or swallowing of foreign bodies during dental treatment *Schweiz Monatsschr Zahnmed* 2000;110(6):619-32. [Pubmed]