



Case Report

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Mini Molar Mishap: Management Following Accidental Ingestion of an Endodontic File in a 4-Year-Old Child- A Case Report

Moon Roy¹, Roli Agrawal², Sowmya NR³, Manish AT⁴, Soumya R Patra⁵

¹ PG Student, Department of Pediatric and Preventive Dentistry, Triveni Institute of Dental Sciences, Hospital and Research Center, Bilaspur- 495220, Chhattisgarh, India

² Head of Department, Department of Pediatric and Preventive Dentistry, Triveni Institute of Dental Sciences, Hospital and Research Center, Bilaspur- 495220, Chhattisgarh, India

³ Senior Lecturer, Department of Pediatric and Preventive Dentistry, Triveni Institute of Dental Sciences, Hospital and Research Center, Bilaspur- 495220, Chhattisgarh, India

⁴ Senior Lecturer, Department of Oral Pathology and Microbiology, Triveni Institute of Dental Sciences, Hospital and Research Center, Bilaspur- 495220, Chhattisgarh, India

⁵ PG Student, Oral Medicine and Radiology, Triveni Institute of Dental Sciences, Hospital and Research Center, Bilaspur- 495220, Chhattisgarh, India

Abstract

Accidental aspiration and ingestion is a potential clinical complication commonly seen in all the field of dentistry. It is observed that ingestion is the most prevalent emergency during dental procedures and 80% of cases occurring in children. Early diagnosis of foreign bodies ingestion in a dental operatory and awareness of its signs and symptoms are very crucial. 80-90% of ingested foreign items will pass through the gastrointestinal tract uneventfully while 10%-20% may require endoscopic removal but only 1% or less may necessitate surgical intervention. A 4-years-old patient with his parents reported to the Department of pediatric & preventive Dentistry with the chief complaint of pain in primary mandibular left first molar tooth. On clinical examination, primary mandibular left first molar was carious and diagnosed with symptomatic irreversible pulpitis, so routine pulpectomy procedure was performed. During the procedure, an endodontic instrument (Pro Taper hand file, Dentsply) slipped from the operator's hand as the patient abruptly moved his head. Due to the uncooperative behavior of the child rubber dam placement during the procedure was difficult. An unsuccessful attemptation was done to retrieve the file. Then the patient was immediately transferred to a neighbouring medical emergency center for the further investigations. Antero-posterior chest & stomach radiographs confirmed the position of the file in the descending colon, and serial radiographs were used to monitor its transition and clearance through the gastrointestinal tract. Ingestion of dental instruments can be life threatening and should be managed cautiously, with early input from different specialist physicians for possible endoscopic retrieval, emergent laparotomy, or surgical intervention with various imaging studies.

Keywords: Accidental, Ingestion, Endodontic file, Pulpectomy, Perforation.

INTRODUCTION

Inadvertent ingestion of endodontic instruments can be dangerous and require immediate medical intervention. During the endodontic procedures there are few reports of inadvertent ingestion of files, reamers, irrigation needles, crowns and rubber dam clamps in uncooperative children due to the lack of rubber dam placement [1-2]. Few reports also suggest that broken molar bands, brackets, parts of fixed and partially removable prostheses may be swallowed or aspirated even after the completion of dental procedure [3].

Children who are in pre-cooperative stage, uncooperative and also those with impaired motor function, intellectual disability, psychosis, Alzheimer's disease, Parkinson's disease, severe gag reflex, are all at risk for these kind of mishaps [4].

Currently, there are no obvious guidelines dictating whether to treat an ingested foreign particle with endoscopy, surgery, or conservative measures, as 80 - 90% of this kind of ingestion passes through the gastrointestinal tract while 10% - 20% may require endoscopic removal and only 1% or less may need surgical intervention [5].

Grossman [6] observed that 13% of inadvertently swallowed foreign objects aspirated into the pulmonary system, while 87% of them entered the alimentary canal. Sometimes serious complications may also result in choking, esophageal tissue perforation, intestinal ulceration or perforation, bronchial stenosis, abscess formation, bleeding, or fistula, some of which are potentially fatal [7].

*Corresponding author:

Dr. Moon Roy

PG Student, Department of Pediatric and Preventive Dentistry, Triveni Institute of Dental Sciences, Hospital and Research Center, Bilaspur-495220, Chhattisgarh, India
Email: moonroy809@gmail.com

The dentist needs to take proper precautionary measures to avoid such accidental mishaps. For instance proper placement of rubber dam reduces the chance of swallowing, patient with impaired cough reflex and deglutition coordination should be seated in upright position and the smaller instruments like endodontic files or reamers that are prone for swallowing should be secured with a dental floss. For radiographic examination, X-ray films or digital sensors should be tethered or use of paralleling technique is more appropriate to prevent accidents [8].

CASE REPORT

A 4 year old, male child accompanied with the parent reported to the Department of Paediatric & Preventive dentistry with the chief complaint of pain on his lower left back tooth since 15 days. Parents mentioned history of a spontaneous and continuous pain which aggravated during mastication. Based on the history, clinical and radiographic examination tooth number #75 was diagnosed with a symptomatic irreversible pulpitis and pulpectomy was advised.

During the procedure local anesthesia was administered and rubber dam placement attemptation was done. As the patient exhibited discomfort with the placement of the rubber dam, the procedure was carried out without rubber dam isolation. An endodontic instrument (Pro Taper hand file, Dentsply) slipped from the operator's hand because of abrupt head movement during the cleaning and shaping procedure which lead to the ingestion of the instrument.

The procedure was immediately halted, and attempts were made to remove the file from the posterior part of the oral cavity, but were unsuccessful. The patient showed no symptoms of respiratory distress and without any choke or cough reflex. The patient was immediately transferred to a neighbouring medical emergency center for the further investigations. After the clinical follow up the patient was advised for the chest and abdomen radiographs to inspect for the positioning of the ingested file. A sharp foreign body was located in the descending colon on an antero-posterior radiograph of the chest and stomach (Figure 1).

The consent general surgeon advised for "wait and watch" instead of performing an endoscopic retrieval since the patient was asymptomatic. The parents were reassured and emphasised upon to give high-fibrous diet, as well as oral laxatives were prescribed. The parents were instructed to examine the stools for the presence of the instrument within next 24 hours. Within 12 hours of the incident the parents confirmed the presence of a long thin sharp instrument which was unbroken and undamaged and with no evidence of bleeding in stool or any other discomfort to the child (Figure 2). Further, second confirmatory X-ray (Figure 3) of the abdomen was obtained and did not show any foreign object in the gastrointestinal tract which justifies that the ingested file passed through the tract without any signs of an obstruction or perforation.



Figure 1: Showing the location of endodontic file



Figure 2: Long thin sharp object



Figure 3: Follow-Up radiograph showing no residual foreign body

DISCUSSION

Clinical scenario such as ingestion of a dental instrument could challenge the treatment outcome as fear and anxiety poses a greater risk in children. In such condition, dentist first act is to make sure that there should be no symptoms of airway obstruction, such as cyanosis, hypnoea, choking, or difficulty in breathing. In case of young children seeking the dental treatment, parents or bystander should be made aware of the potential consequences of ingestion and as well as about the emergency care. To find the precise location of the object, radiographic examination such as a frontal and lateral chest and abdomen radiograph of the patient should be recommended right away so that position of the object will be revealed. Fluoroscopy is one of the specific test that can be used in conjunction with it. CT scan or diagnostic bronchoscopy should be used if the object is not radiopaque.

The ingested endodontic instrument has 2 pathways. The most common one being the gastrointestinal tract (GIT) and the other one is the respiratory tract [6]. The most common and in comparison, simpler pathway is the GIT. After inadvertent consumption, most patients are asymptomatic and ingested object get removed with stool from the body in two to five days. However, the patient needs to be monitored by medical professionals until the swallowed object is removed. When an object becomes lodged in the colon or duodenum, complications might arise that result in serious pathologic conditions such peritonitis. [9].

The respiratory pathway is the more complex and less prevalent one. The patient may exhibit gagging and profuse salivation in addition to complain of some entrapment in the throat region. Dentist needs to be trained and also well-equipped in handling this kind of mishaps. In order

to handle a scenario like this, analysis of the circumstances and prompt response without panicking are crucial. The most successful method is Bronchoscopy, which retrieves 99% of aspirated dental objects. The dentist should make an effort to determine the location of the aspirated object. If it located in the oropharynx, the patient needs to be put in the Reverse trendelberg position right away, and should be instructed to cough. However, Heimlich maneuver should be performed if it cannot be retrieved. Inform and reassure the patient about the situation if he is asymptomatic, and send him for an immediate medical examination.

Surgery might be necessary in certain instances of unintentional ingestion in order to remove the ingested object from the stomach, duodenum, colon, or appendix to avoid complications. Bronchoscopy or CT is recommended for radiolucent things, including as acrylic teeth, resin fillings, and impression materials. Even in cases where the patient is asymptomatic, aspirating an object need prompt medical attention in order to minimize the risk of perforation.

The size, shape, sharpness, and anatomical direction of the object can determine the seriousness of the situation. When an object is larger than 5 cm or has sharp end, there is a higher chance of perforation. The ingested object can perforate the digestive tract and might result in abscess formation, peritonitis, septicemia, foreign body granuloma, fistulas, and duodeno-colonic fissures if it remains in the alimentary canal. The object passes through the tract more slowly and differently in patients with limited peristaltic movement, such as those with Crohn's disease. The lower esophagus and terminal ileum are the most common sites of perforation with sharp objects. Serial radiographs are a dependable way to track the object progression and any signs of an intestinal perforation.

Additionally, the parents should watch out for symptoms like blood in the feces. Endoscopy is recommended if the object is lengthy, pointed and non-radiopaque, or if more than one instrument is ingested^[10]. The timing of the endoscopy is crucial because if it is delayed, the file may pass the pyloric sphincter and enter the duodenum, making retrieval potentially impossible. Therefore, if an endoscopy is scheduled, it should be completed as soon as possible, ideally, two hours, but at the latest within six hours after intake. The object may need to be located by rectum colonoscopy and laproscopic examination if its position in the lower abdomen doesn't seem to change. The object may then need to be removed by ileotomy, colostomy, or appendectomy^[1, 6, 10].

Endodontic treatment should ideally be performed under rubber dam application to prevent any kind of accidental ingestion. If a traditional rubber dam application on a young patient poses great challenge for dentist, so the more modern barrier techniques such as opradam can be employed. To prevent the child from ingesting any foreign objects, their head should be inclined to one side. Precautions to avoid inadvertent instrument ingestion include utilizing the high evacuation suction, hand files tied with floss so that instruments are properly locked in headpiece and gauge screens should be advocated^[6].

CONCLUSION

It can be challenging to prevent dental equipment from being inadvertently swallowed or aspirated during treatments, particularly in case of young patients. Even though these incidents are rare in dentistry, there is too much risk of morbidity from even one occurrence. Therefore, general practitioners and paediatric dentists should be aware of the hazards associated with these situations and the significance of prompt and adequate treatment.

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Conflicts of Interest

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ORCID ID

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