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Original Research

From mouth to misadventure: a comparative analysis of aspiration and ingestion in dental practice

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ABSTRACT:
Foreign body accidents in dentistry are potential complications which can occur during dental procedures. It can involve either aspiration or ingestion of dental objects, such as crowns or teeth. Both can cause serious health complications if not promptly recognized and managed. This paper primarily examines accidental aspiration and ingestion of dental objects by reviewing ten case reports involving patients ranging from paediatric to geriatric age groups. Most aspiration events occurred during dental procedures or when dental items became loose, with foreign bodies commonly lodged in the bronchus. Many patients were initially asymptomatic, which complicated early diagnosis. Most of the patients presented with late symptoms like dyspnea which led to diagnose through radiographic investigation. Bronchoscopy, both rigid and flexible, was the main diagnostic and therapeutic tool used to locate and remove these aspirated objects. Ingestion of dental objects, which is usually less emphasized, also represents a critical risk, requiring careful monitoring and management to prevent gastrointestinal complications. This paper highlights the necessity for dental professionals to exercise heightened vigilance during dental procedures, especially with paediatric and geriatric patients who are more vulnerable. Early recognition, diagnosis, and intervention are crucial to avoid serious outcomes such as infection, airway obstruction, or gastrointestinal injury.

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INTRODUCTION

Accidental aspiration and ingestion of dental objects are recognized but often underestimated complications in dental practice. These events may occur during routine procedures,emergency treatments,or even outside the clinical environment. Although many dental materials—such as teeth, crowns, burs, impression fragments and prosthetic components—are small and easily displaced, their unexpected entry into the airway or digestive tract can create significant clinical concern. Understanding the nature, risks and outcomes of these events is there fore essential for ensuring patient safety.

Aspiration, defined as the entry of a foreign object into the respiratory tract, poses immediate risks due to the possibility of airway Obstruction, infection and respiratory distress. Even small objects, such as tooth fragments or crowns, can lodge in the bronchi and compromise breathing. On the other hand, ingestion, the passage of a foreign object into the gastrointestinal tract,is generally considered less dangerous, as it exits the body without needing any medical intervention. However, ingestion can still cause mucosal injury, gastrointestinal discomfort or obstruction, especially when the object has sharp edges or irregular shape.

Patients of all ages are susceptible to these incidents, and the literature reflects a wide demographic distribution—from young children to elderly adults. Pediatric patients may be at higher risk due to limited cooperation, smaller airway size, and accidental swallowing during treatment. Older adults, particularly those with neurological conditions, reduced gag reflex or impaired consciousness, may also be vulnerable. Medical conditions such as

dementia, stroke, meningitis, or reduced motor control can further elevate the risk of aspiration during dental procedures or postoperative periods. Additionally, anxiety, impaired swallowing reflexes, sedation, and supine positioning can contribute to loss of control over dental materials.

The aim of this review is to analyze and summarize published case reports describing aspiration and ingestion of dental materials, and to raise awareness among dental professionals about early recognition, timely management, and effective preventive measures, identify common patient characteristics and clinical settings associated with these events, and highlight the reasons why aspiration cases are reported more frequently than ingestion cases despite the latter being more common in everyday practice .

MATERIALS AND METHODS

This review was conducted to identify and analyze published case reports describing the accidental aspiration or ingestion of dental objects. A comprehensive search of electronic databases—including PubMed, Google Scholar, Research Gate, and major dental and medical journals—was performed using combinations of relevant keywords such as “dental aspiration, ” “dental ingestion, ” “foreign body, ” “accidental swallowing, ” “dental procedures, ” “airway obstruction, ” and “gastrointestinal foreign body.” Additional manual searches were carried out using cross-references from selected articles to ensure completeness.

A total of 50 articles published in English were initially identified. These records were screened based on titles, abstracts, and full-text availability. During the first stage of screening, 10 articles were excluded because only abstracts were available, with no accessible full-text data for analysis. In the second stage, 15 articles were excluded as they were unrelated to dental procedures or did not involve dental objects as foreign bodies. An additional 15 articles were excluded in the final screening phase due to insufficient clinical information, or incomplete case documentation. After applying all inclusion and exclusion criteria, 10 articles met the requirements and were included in this review.

Inclusion criteria

1. Published case reports describing accidental aspiration or ingestion of dental objects.
2. Articles published in English.
3. Articles providing clear clinical details, including presentation, diagnosis, anatomical location, management, and outcomes.
4. Cases specifically involving dental-related foreign bodies (e.g., teeth, crowns, burs, prosthetic components).

Exclusion criteria

1. Articles available only as abstracts without accessible full-text data.
2. Reports involving non-dental foreign bodies or ingestion/aspiration unrelated to dental procedures
3. Studies lacking adequate clinical information or missing essential details (age, object type, location, management, or outcome).
4. Reviews, editorials, letters, or opinion pieces without original patient data.
5. Non-English publications.

Data extraction and analysis

All eligible articles were screened and selected independently. Extracted data included patient demographics (age, gender, medical conditions), type of dental object aspirated or ingested, clinical presentation, anatomical location of the object, imaging techniques used, treatment methods, and patient outcomes. The collected data were organized and analyzed descriptively due to the qualitative nature of the available evidence.

RESULTS

Among the ten analyzed cases, 80% involved aspiration and 20% involved ingestion of dental objects. The patient age range was 4–93 years, and most of the patients were geriatric, with 60% males and 40% females. It is evident that most 62% of aspiration cases occurred during dental procedures. In accidental aspiration cases, all patients presented with symptoms associated with dyspnea, cough or wheezing. On investigation, it was observed that the foreign body was lodged in right respiratory tract. One patient presented with aspirational pneumonia and atelectasis in right - middle and lower lobe. Foreign body retrieval was performed by bronchoscopy in all cases.

In the current review, there were two cases involving ingestion, one of which involved a paediatric patient. Immediate investigation was done to confirm the location of the foreign body in the gastrointestinal tract. Imaging confirmed the foreign body was in the gastrointestinal tract and 100% of ingested objects passed spontaneously without endoscopic or surgical intervention. Across all ten cases, no major complications and 0% mortality were reported, and all patients recovered fully.

DISCUSSION

This review integrates ten published case reports of accidental aspiration and ingestion of dental objects, offering important insights into their incidence, risk factors, and outcomes. In the present analysis, aspiration accounted for 80% of events, reflecting previous findings that aspiration—although less frequent in everyday dental settings—is more likely to be reported due to its higher clinical risk. The patient age range extended from 4 to 93 years, with a notable representation of geriatric patients, who formed a substantial proportion of those affected. Older adults are inherently more vulnerable due to reduced

oropharyngeal muscle tone, age-related decline in protective airway reflexes, diminished coordination, cognitive impairment, and delayed response time during unexpected events. These physiological and functional changes increase the likelihood of foreign body entry into the airway during dental procedures. Similar trends have been highlighted in prior literature, which consistently recognizes older adults as a high-risk group for aspiration-related complications[11].

Gender distribution in the present review showed 60% males and 40% females, a finding that corresponds with several earlier studies where males were slightly more represented in foreign body aspiration incidents[12]. Although the reasons remain unclear, behavioral factors, greater restlessness during procedures, or differences in care-seeking patterns have been suggested as possible contributors.

A significant observation was that 62% of aspiration events occurred during active dental procedures, supporting longstanding evidence that operative dentistry carries inherent risk due to the confined working field adjacent to the airway[13]. Challenges such as restricted visibility, sudden patient movement, anxiety, limited mouth opening, and compromised neuromuscular control further increase the likelihood of accidental displacement of small instruments, crowns, or tooth fragments.

All patients involved in aspiration incidents presented with respiratory symptoms, predominantly dyspnea, cough, or wheezing which are typical manifestations of airway irritation or obstruction. One geriatric patient developed aspiration pneumonia accompanied by atelectasis in the right middle and lower lobes. The physiological mechanisms underlying these complications include mucociliary disruption, localized inflammation, bacterial colonization, and partial airway blockage leading to impaired ventilation–perfusion matching. These processes highlight the critical need for early detection, especially in geriatric patients who may exhibit subtle or atypical symptoms due to diminished physiological reserves.

Radiographic findings showed that the majority of aspirated objects were lodged in the right bronchus, a well-established anatomical pattern. Because the right main bronchus is wider, shorter, and more vertically aligned than the left, it provides the path of least resistance for inhaled objects. This anatomical predisposition has been consistently reported in previous studies[14] and aligns closely with the observations in this review.

In all aspiration cases, bronchoscopy served as the definitive diagnostic and therapeutic approach, with successful retrieval achieved without major complications. Both rigid and flexible bronchoscopy demonstrated high reliability.

In contrast, ingestion-related presentations were largely uncomplicated. Patients with ingested dental objects mostly reported only mild throat discomfort or anxiety immediately after the event. Radiographic evaluation confirmed gastrointestinal localization in all ingestion cases. It was observed that, every ingested object in this review progressed spontaneously without requiring endoscopic retrieval or surgical intervention. This favourable trajectory aligns with evidence that ingestion of small, smooth dental objects poses minimal risk unless the object is large, sharp, or fails to advance through the gastrointestinal tract. Nonetheless, careful monitoring and follow-up remain essential to rule out rare complications such as mucosal injury or impaction. Overall ingestion cases required only observation and conservative management, reinforcing that ingestion is typically less clinically threatening compared with aspiration.

These findings reinforce the importance of robust preventive strategies in dental practice. Measures such as floss ligatures on prostheses and small instruments, rubber dams whenever feasible, gauze throat screens, optimized chair positioning (slightly upright in high-risk geriatric patients), effective suction, and the use of conscious sedation for anxious or poorly cooperative individuals significantly reduce the likelihood of foreign body incidents. Enhanced clinician vigilance, periodic instrument inspection, and clear team communication further contribute to safer clinical practice. Overall, this review underscores that aspiration poses a significantly greater clinical threat than ingestion, particularly for geriatric patients who face increased physiological risk. Prompt recognition, immediate radiographic assessment, and timely bronchoscopy are essential to ensure favourable outcomes.

CONCLUSION

This review highlights clear demographic and clinical patterns associated with accidental aspiration and ingestion of dental objects. Geriatric patients and males were more frequently represented. Aspirated objects demonstrated a consistent tendency to lodge in the right bronchus, and bronchoscopic retrieval was effective in all cases. Ingestion events followed a predictable and uncomplicated gastrointestinal course, with spontaneous passage confirmed in every instance.

The findings emphasize the value of structured preventive measures during dental procedures and the importance of early recognition when foreign body displacement is suspected. Establishing systematic response protocols and prompt referral pathways further contributes to reliable and favourable outcomes when these incidents occur.

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