

Odontogenic maxillary sinusitis associated with foreign body displacement after tooth extraction: report of an unusual case

Sinusite maxilar odontogênica por corpo estranho após extração dentária: relato de um caso incomum

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ABSTRACT

Background: Odontogenic maxillary sinusitis caused by a foreign body presents diagnostic and therapeutic challenges due to its infrequent occurrence and unique characteristics compared to sinusitis originating from other sources. **Case Report:** Illustrating such fact, this report presents the clinical case of a 37-year-old woman referred complaining of pain in the same region where she had extracted her upper right first molar five days before. The intraoral examination revealed the presence of an orifice in the region, suggesting oroantral communication. Imaging exams revealed opacification of the right maxillary sinus and the unexpected presence of a highly radiodense object. With the diagnosis of maxillary sinusitis due to a foreign body established, the surgical approach initially consisted of administering preoperative medication, preceded by access to the maxillary antrum using the Caldwell-Luc technique. The object was found and removed, consisting of a surgical drill. At follow-up there was complete absence of symptoms and complete closure of communication. **Conclusion:** Cases of odontogenic maxillary sinusitis caused by drill detachment after tooth extraction are fairly uncommon. A thorough clinical evaluation proved to be essential and the Caldwell-Luc access was effective, safe and with good postoperative results, even with the absence of standardized diagnostic and management methods.

KEYWORDS

Foreign body; Maxillary sinusitis; Oral surgery; Oroantral fistula; Retained surgical instrument.

RESUMO

Contexto: A sinusite maxilar odontogênica causada por corpo estranho apresenta desafios diagnósticos e terapêuticos devido à sua ocorrência infrequente e características únicas em comparação com sinusites originadas de outras fontes. **Relato do Caso:** Ilustrando tal fato, este relato apresenta o caso clínico de uma mulher de 37 anos de idade encaminhada com queixa de dor em mesma região que havia extraído o primeiro molar superior direito cinco dias antes. Ao exame intraoral verificou-se a presença de um orifício na região, sugerindo comunicação oroantral. Os exames de imagem revelaram opacificação do SM direito e a inesperada presença de um objeto altamente radiodense. Com o diagnóstico de sinusite maxilar por corpo estranho estabelecido, a abordagem cirúrgica consistiu inicialmente na administração de medicação pré-operatória, precedida pelo acesso ao antro maxilar através da técnica de Caldwell-Luc. O objeto foi encontrado e removido, consistindo em uma broca cirúrgica. Ao acompanhamento houve ausência completa dos sintomas e total fechamento da comunicação. **Conclusão:** Casos de sinusite maxilar odontogênica causada por descolamento da broca após extração dentária são bastante incomuns. Uma avaliação clínica minuciosa mostrou-se primordial e o acesso de Caldwell-Luc eficaz, seguro e com bons resultados pós-operatórios, mesmo com as ausências de métodos de diagnóstico e manejo padronizados.

PALAVRAS-CHAVE

Corpo estranho; Sinusite maxilar; Cirurgia bucal; Fístula oroantral; Instrumento cirúrgico retido.

INTRODUCTION

The paranasal sinuses are pneumatic anatomical bone cavities composed of four groups: the maxillary, ethmoid, frontal, and sphenoid sinuses. Procedures performed near these sinuses are common and can inadvertently cause injuries to the mucosal lining, leading to an inflammatory process known as sinusitis. Among these cavities, the maxillary sinus (MS) is the most affected, with odontogenic origin as the most prevalent source of maxillary sinusitis, caused by pathological, traumatic or iatrogenic conditions such as insertion of foreign bodies (FBs) [1-3].

Odontogenic maxillary sinusitis caused by FB diagnosis is challenging due to its infrequency and differences compared to sinusitis originating from other sources. Failures in the systematic clinical examination and in the request for complementary imaging exams contribute to the difficulty in diagnosing this condition [3,4]. These negligence factors often complicate the therapeutic approach, which typically involves treating both sinusitis and the underlying odontogenic cause, thereby prolonging and worsening the patient's clinical condition [1].

To highlight the diagnostic and therapeutic challenges involved, this report presents an unusual clinical case of odontogenic maxillary sinusitis caused by the displacement of a surgical drill in the MS after tooth extraction.

CLINICAL CASE

A female patient, 37 years old, with no significant medical history, was referred to the Surgery and Diagnosis department, complaining of headache, nasal congestion, pressure on the right side of the face and pain in the same region where her right upper first molar had been extracted five days earlier. On extraoral examination, no facial alterations were identified. However, during intraoral examination, an opening was noted in the alveolar region of the tooth, suggesting an oroantral communication.

For the initial evaluation, a panoramic radiograph (PR) was requested, which revealed a relative radiopacity in the right MS and a highly radiopaque image parallel to the sinus floor and perpendicular to the long axis of the teeth, indicative of a spherical surgical drill (Figure 1). Subsequently, cone-beam computed tomography

(CBCT) was performed to assess the position, displaying three-dimensional axial, coronal, and sagittal sections, demonstrating opacification of the MS and the intensely hyperdense metallic FB (Figure 2A, B, and C). Based on the clinical and radiographic findings, the diagnosis of odontogenic sinusitis resulting from a FB was established.

To control the painful symptoms was initially instituted the use of 3 drops of Decadron (Dexamethasone 5mg + Neomycin 3.5mg + Phenylephrine hydrochloride 5mg) three times a day for three days. The surgical procedure was scheduled for four weeks later, and the patient was closely monitored during this period. On return patient's return, partial closure of the oroantral communication was observed, although she reported occasional pain relapses. One hour before surgery, prophylactic administration of antibiotic (Amoxicillin 500mg + Potassium Clavulanate 125mg) and steroidal anti-inflammatory drug (Dexamethasone 4mg) was given to manage pain and prevent infection.

Under local anesthesia with mepivacaine hydrochloride 2% (20mg/mL) + epinephrine 1:100.000 ($\mu\text{g/mL}$), an incision was made over the alveolar ridge, extending from the region of the upper first molar on the right side to the second premolar and extending to the vestibular sulcus of the canine tooth on the same side (Figure 3A). After subperiosteal detachment, the anterior maxillary bone portion was exposed and access was performed using the Caldwell-Luc technique, which consisted of osteotomy with a rotary instrument and access to the MS cavity (Figures 3B and C). The metallic instrument, corresponding to a surgical drill, was found and accidentally sucked.



Figure 1 - PR showing an intensely radiopaque foreign body in the floor of the right MS.

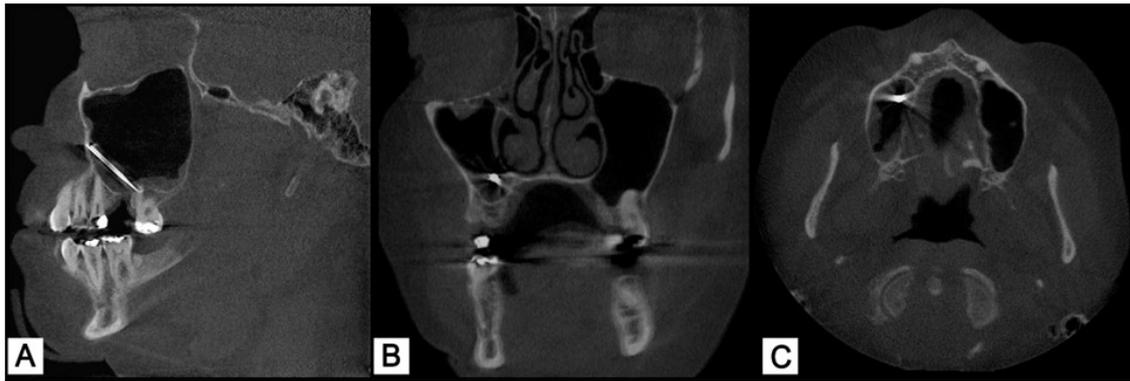


Figure 2 - **A** - CBCT in sagittal section showing the correct positioning of the object in the right MS; **B and C** - CBCT in coronal and axial sections showing, respectively, an intensely hyperdense image surrounded by an opaque area in the right MS.

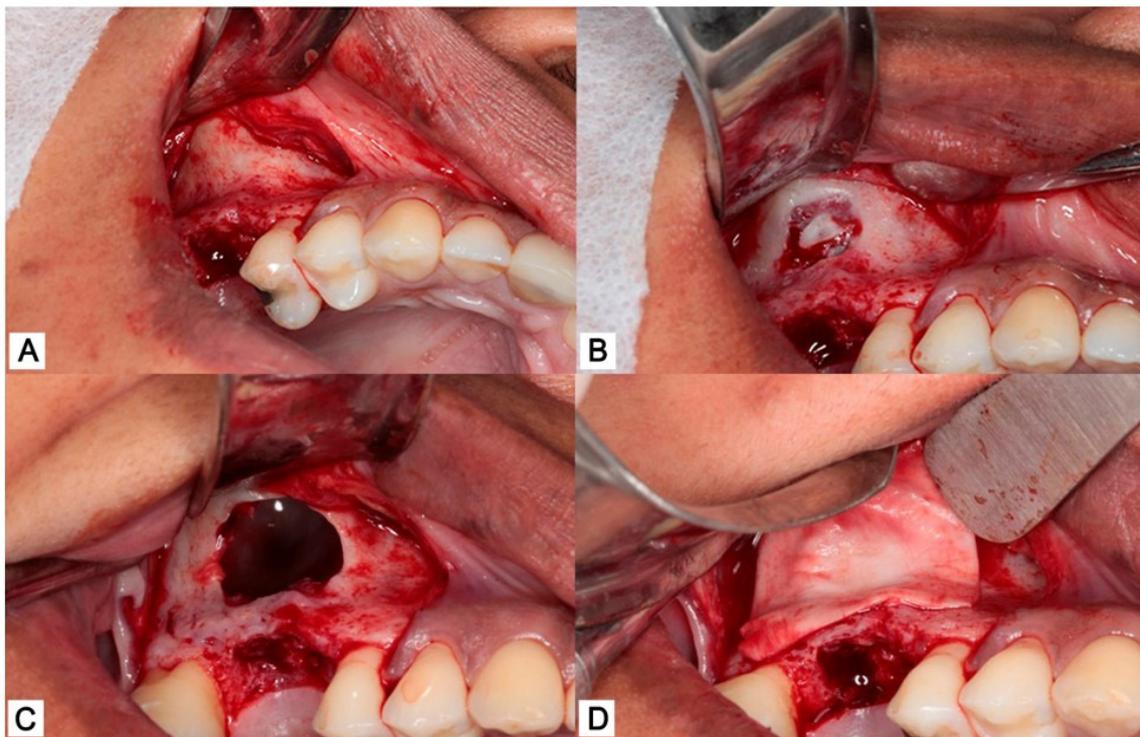


Figure 3 - **A** - Incision and detachment region; **B and C** - Surgical access to the MS using the Caldwell-Luc technique; **D** - Closure of the access with a collagen membrane.

All secretion present inside the sinus were removed by abundant irrigation with saline solution. To confirm the removal of the surgical drill, a transoperative PR was performed, which revealed successful removal (Figure 4). Finally, the access to the MS was closed using a collagen membrane (Geistlich Bio-Gide®, 25 x 25 mm.) and the surgical bed was sutured (Figure 3D).

Postoperatively, the patient continued with the preoperative antibiotic and anti-inflammatory therapy for seven and two days, respectively. Additionally, Lexoprofen 60mg was prescribed for five days, along with three days of Decadron and five days of



Figure 4 - Transoperative PR showing successful removal of the drill previously present in the right MS.

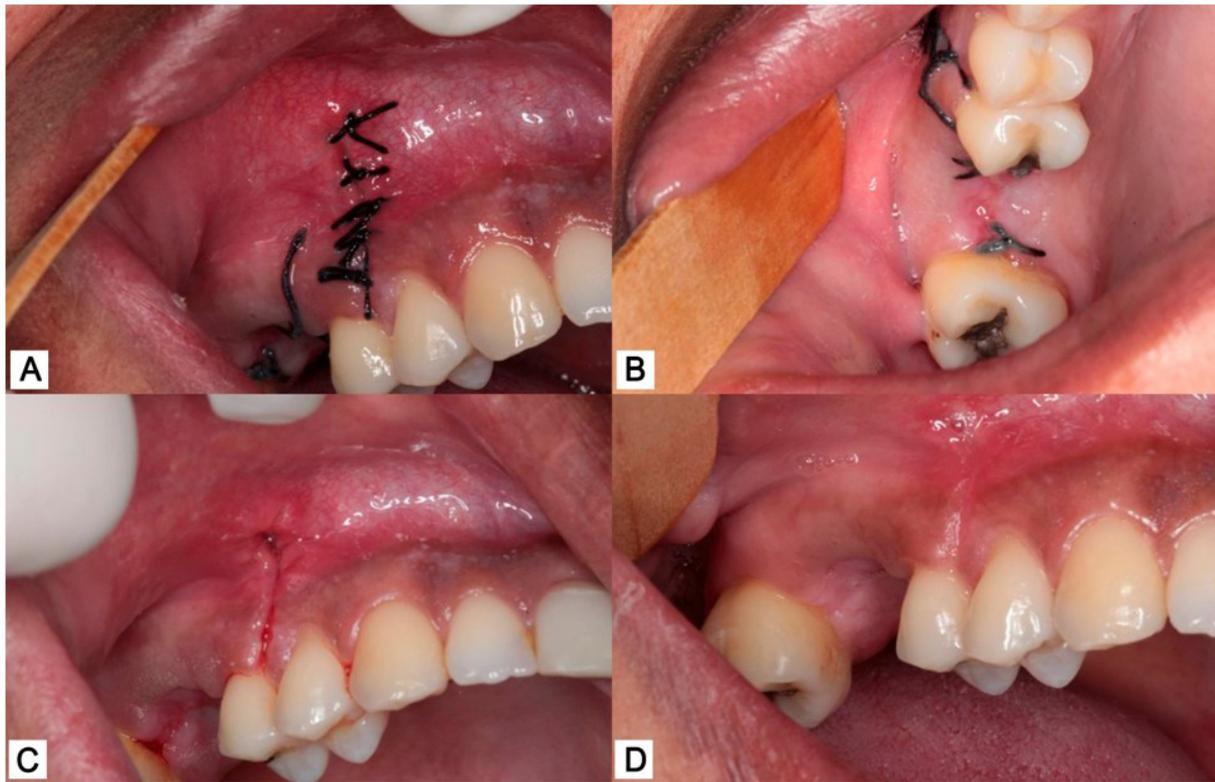


Figure 5 - **A** - Appearance of the sutured tissue 7 days after the surgical procedure; **B** - Occlusal view of the tissue showing closure of the oroantral communication after 7 days; **C** - Aspect of the mucosa without sutures, after 7 days; **D** - Mucosa showing complete healing and closure of the oroantral communication 15 days after the surgical procedure.

Rinosoro® (Sodium Chloride 9mg, Benzalkonium Chloride 0.1mg, and Distilled Water q.s.p. 1mL) for external use. The suture was removed after seven days, showing satisfactory signs of healing in the operated region and oroantral communication (Figure 5A, B and C). After fifteen days, complete remission of symptoms, along with full repair and closure, were observed (Figure 5D).

DISCUSSION

The development of MS begins in the third month of fetal life and ends with the eruption of permanent teeth between 12 and 14 years of age, when it reaches an average volume of 15 to 20 ml. Although these dimensions remain relatively stable, some individuals present continuous expansion and pneumatization, what projects the sinus floor towards the maxillary alveolar bone [5]. This characteristic provides an intimate anatomical proximity of the MS to the roots of the upper molars and premolars, increasing the probability of complications, such as oroantral communication, which occurs more frequently after tooth extraction, becoming a gateway for FB [1].

While literature reports the iatrogenic insertion of various dental materials in the MS, the displacement of drills is a rare occurrence. In a literature review by Hara et al. [6] examining treatment methods for FBs in the MS, it was found that out of the 402 cases investigated, only 19 (4.7%) involved different dental equipment, including drills. Similarly, in the retrospective study of foreign bodies of dental iatrogenic origin displaced in the maxillary sinus conducted by Tilaveridis et al. [7], there was 1 case (3.7%) of iatrogenic displacement of a dental bur among the 27 cases identified. The persistence of these FBs can lead to sequelae, such as sinusitis [6].

Currently, the diagnostic criteria for odontogenic sinusitis are extremely heterogeneous, as demonstrated in the systematic review conducted by Allevi et al. [8], wherein the radiographic criterion was the most used, revealing the need for more comprehensive clinical evaluations and highlighting the diagnostic challenge of this pathology. In addition to sinusitis, other sequelae such as mucous cyst, FB granuloma and, in more severe cases, pneumonia or lung abscess due to pneumatic aspiration, reasons why preventive FB removal is widely recommended [9].

Standardized management methods for removing objects displaced to MS are scarce in the literature, which makes it difficult to assess the effectiveness of different therapeutic approaches [10]. Factors such as FB size and location influence the appropriate choice [11]. It is suggested that functional endoscopic sinus surgery be considered the gold standard for the treatment of FB in MS [8]. However, the inability of most dental professionals to perform this procedure [10] and the need for ample visualization of the cavity are disadvantages of this technique [12]. These aspects are not observed when Caldwell-Luc surgical access technique is employed, which offers ample space for the removal of FBs of different sizes and positions [12], which is why this technique was used in this report.

CONCLUSION

Odontogenic maxillary sinusitis caused by drill detachment after tooth extraction is an infrequent event. The need for surgical planning to avoid or predict oroantral communication is evident, especially in approaches involving upper posterior teeth. With the lack of established diagnostic criteria, a complete clinical and radiographic evaluation become mandatory procedure. Although further studies are needed to standardize management methods, the Caldwell-Luc technique has been shown to be effective, safe and with good postoperative results in removing the FB.

Author's Contributions

MBM: Conceptualization, Methodology, Software, Validation, Formal Analysis and Writing – Original Draft Preparation. LAAS: Software, Investigation and Writing – Original Draft Preparation. JSL: Investigation and Writing – Original Draft Preparation. TISC: Software and Data Curation. GNO: Writing – Review & Editing. LARS: Writing – Review & Editing. FVR: Project Administration, Conceptualization, visualization, Formal Analysis and supervision

Conflict of Interest

The authors have no proprietary, financial, or other personal interest of any nature or kind in any product, service, and/or company that is presented in this article.

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Regulatory Statement

This report followed the ethical principles of research in human beings, having been submitted and approved by the Ethics Committee in Research in Human Beings of the Faculty of Dentistry of São José dos Campos – UNESP, under protocol CAAE: 70969823.4.0000.0077.

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