REMUNOM
ISSN 2178-6925

Received: 13/10/2026 - **Accepted:** 12/11/2026
Vol: 13.23
DOI: 10.66104/1trwh972
Pages: 1-19

SURGICAL REMOVAL OF A DENTAL BUR FROM THE MAXILLARY SINUS USING THE CALDWELL-LUC APPROACH: A CASE REPORT

REMOÇÃO CIRÚRGICA DE BROCA ODONTOLÓGICA DO SEIO MAXILAR PELA TÉCNICA DE CALDWELL-LUC: RELATO DE CASO

REMOCIÓN QUIRÚRGICA DE UNA FRESA ODONTOLÓGICA DEL SENO MAXILAR MEDIANTE LA TÉCNICA DE CALDWELL-LUC: REPORTE DE CASO

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REMUNOM
ISSN 2178-6925

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Abstract

The displacement of foreign bodies into the maxillary sinus is an uncommon complication of dental procedures. Foreign bodies may remain undetected for prolonged periods and be associated with chronic inflammatory changes. This case report describes the surgical removal of a dental bur lodged in the left maxillary sinus using the Caldwell-Luc approach. A 63-year-old woman was referred following the incidental detection of a suspected foreign body on a panoramic radiograph. She reported a history of tooth extraction in the left posterior maxillary region approximately five years earlier, as well as mild nasal congestion and headache. Cone-beam computed tomography (CBCT) revealed a metallic structure consistent in appearance with a No. 702 surgical bur, measuring approximately 24 mm in length, and partial opacification of the maxillary sinus. The instrument was removed via the Caldwell-Luc approach, followed by debridement of the sinus cavity and excision of adjacent reactive tissue. Histopathological examination revealed fibrosis and changes consistent with chronic sinusitis. Postoperative CBCT, performed seven days after surgery, confirmed the complete removal of the instrument. Mild paresthesia in the infraorbital nerve distribution was reported at the seven-day follow-up visit but was no longer present at the 30-day assessment. In this case, cone-beam computed tomography facilitated diagnosis and surgical planning, and the Caldwell-Luc approach enabled successful foreign body removal under the documented clinical and anatomical conditions.
Keywords: Maxillary Sinus; Foreign Body; Maxillary Sinusitis; Oral Surgery.

Resumo

O deslocamento de corpos estranhos para o interior do seio maxilar é uma complicação incomum de procedimentos odontológicos. Esses corpos estranhos podem permanecer despercebidos por períodos prolongados e estar associados a alterações inflamatórias crônicas. Este relato de caso descreve a remoção cirúrgica de uma broca odontológica alojada no seio maxilar esquerdo, por meio da abordagem de Caldwell-Luc. Uma paciente do sexo feminino, de 63 anos, foi encaminhada após a identificação incidental de um possível corpo estranho em uma radiografia panorâmica. A paciente relatou histórico de exodontia na região posterior da maxila esquerda aproximadamente cinco anos antes, além de congestão nasal leve e cefaleia. A tomografia computadorizada de feixe cônico (TCFC) revelou uma estrutura metálica com características compatíveis com uma broca cirúrgica nº 702, medindo aproximadamente 24 mm de comprimento, além de opacificação parcial do seio maxilar. O instrumento foi removido por meio da abordagem de Caldwell-Luc, seguida de desbridamento da cavidade sinusal e excisão do tecido reacional adjacente. O exame histopatológico revelou fibrose e alterações compatíveis com sinusite crônica. A TCFC pós-operatória, realizada sete dias após a cirurgia, confirmou a remoção completa do instrumento. Na consulta de acompanhamento de sete dias, foi relatada parestesia leve na região de distribuição do nervo infraorbitário, que não estava mais presente na avaliação realizada aos 30 dias. Neste caso, a tomografia computadorizada de feixe cônico facilitou o diagnóstico e o planejamento cirúrgico, enquanto a abordagem de Caldwell-Luc possibilitou a remoção bem-sucedida do corpo estranho nas condições clínicas e anatômicas documentadas.
Palavras-chave: Seio Maxilar; Corpo Estranho; Sinusite Maxilar; Cirurgia Bucal.

Resumen

El desplazamiento de cuerpos extraños hacia el interior del seno maxilar es una complicación poco frecuente de los procedimientos odontológicos. Estos cuerpos extraños pueden permanecer inadvertidos durante períodos prolongados y estar asociados con cambios inflamatorios crónicos. Este reporte de caso describe la extracción quirúrgica de una fresa odontológica alojada en el seno maxilar izquierdo mediante el abordaje de Caldwell-Luc. Una paciente de sexo femenino, de 63 años, fue remitida tras la identificación incidental de un posible cuerpo extraño en una radiografía panorámica. La paciente refirió antecedentes de exodoncia en la región posterior del maxilar izquierdo aproximadamente cinco años antes, además de congestión nasal leve y cefalea. La tomografía computarizada de haz cónico (TCHC) reveló una estructura metálica con características compatibles con una fresa quirúrgica n.º 702, de aproximadamente 24 mm de longitud, además de una

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opacificación parcial del seno maxilar. El instrumento fue retirado mediante el abordaje de Caldwell-Luc, seguido del desbridamiento de la cavidad sinusal y la escisión del tejido reactivo adyacente. El examen histopatológico reveló fibrosis y cambios compatibles con sinusitis crónica. La TCHC posoperatoria, realizada siete días después de la cirugía, confirmó la extracción completa del instrumento. En la consulta de seguimiento a los siete días, se informó parestesia leve en el territorio de distribución del nervio infraorbitario, que ya no estaba presente en la evaluación realizada a los 30 días. En este caso, la tomografía computarizada de haz cónico facilitó el diagnóstico y la planificación quirúrgica, mientras que el abordaje de Caldwell-Luc permitió la extracción exitosa del cuerpo extraño en las condiciones clínicas y anatómicas documentadas.
Palabras clave: Seno Maxilar; Cuerpo Extraño; Sinusitis Maxilar; Cirugía Bucal.

1. Introduction

The maxillary sinus is the largest of the paranasal sinuses and is located within the body of each maxilla. Each sinus has an approximately pyramidal shape, with its superior wall forming part of the orbital floor, its medial wall adjacent to the nasal cavity, and its floor closely related to the alveolar process. These anatomical relationships are clinically relevant, particularly in procedures performed in the posterior maxillary region, where the root apices of the maxillary premolars and molars may lie close to the sinus floor (Iwanaga et al., 2019; Whyte; Boeddinghaus, 2019).

The relationship between the teeth and the maxillary sinus varies among individuals that must be considered during surgical planning. In some cases, the root apices are separated from the sinus cavity by a thin layer of bone and the overlying mucosal lining. Pneumatization following posterior tooth loss may extend the sinus toward the residual alveolar ridge. Combined with root morphology and local pathological changes, this anatomical configuration may increase the complexity of tooth extractions and predispose patients to sinus floor perforation, oroantral communication, or displacement of dental structures or instruments during surgical manipulation (Tucker, 2015; Lim et al., 2021).

The internal surface of the maxillary sinus is lined by the Schneiderian membrane, a mucoperiosteal lining containing ciliated and mucus-producing cells that help protect the sinus and eliminate secretions. Mucus contributes to particle entrapment, while cilia transport these secretions toward the natural opening of the maxillary sinus, or ostium. Since this opening is located in the superior portion of the medial sinus wall, the clearance of secretions depends primarily on ciliary

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movement rather than gravity alone. Sinus contents are transported toward the middle meatus of the nasal cavity and subsequently directed toward the nasopharynx. This process is essential for clearing secretions and trapped particles, thereby contributing to the protection and physiological homeostasis of the region (Whyte; Boeddinghaus, 2019; Somayaji et al., 2023).

Impairment of this mechanism may contribute to the development and persistence of sinus disease. Inflammation can cause mucosal edema and thickening, impair ostial drainage, and promote secretion retention. This retention may contribute to microbial proliferation and the persistence of the inflammatory process. In the dental context, periapical infections, periodontal disease, and surgical complications involving the posterior maxillary region may contribute to maxillary sinus dysfunction. Therefore, the assessment of this region should consider not only the condition of the teeth and surrounding tissues but also maxillary sinus drainage function (Silva et al., 2024; Psillas et al., 2021).

Among the complications associated with dental treatment, foreign body displacement into the maxillary sinus warrants attention. Although uncommon, this complication has been reported following tooth extractions, endodontic procedures, and implant-related interventions. Reported foreign bodies reflect several mechanisms of entry, including displacement of teeth or tooth roots, implant migration, extrusion of root canal filling materials, and the introduction of instrument fragments. Impression materials and dental burs have also been reported in the literature (Tanasiewicz et al., 2017; Tucker, 2015; Tilaveridis et al., 2022).

The displacement and retention of surgical burs within the maxillary sinus are iatrogenic events involving the accidental entry and retention of dental instruments or their fragments in the sinus cavity. Although uncommon, these events may be associated with instrument fracture or accidental displacement during dental procedures, particularly tooth extractions, and may require surgical intervention for foreign body removal. Review of the dental history, combined with clinical assessment and imaging examinations, helps establish the origin, location, and characteristics of the displaced object, thereby contributing to accurate diagnosis and therapeutic planning. Preoperative anatomical assessment,

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REMUNOM
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appropriate surgical planning, and careful instrumentation are important measures for minimizing the risk of such complications (Oliveira et al., 2025; Smith II; Emko, 2007).

Tissue responses to retained foreign bodies vary. While some patients remain asymptomatic, others may develop clinical manifestations such as facial pain, headache, inflammation of the sinus mucosa, and chronic sinusitis. In addition to its local irritative effects, prolonged retention of such material may promote inflammatory and infectious processes, as well as compromise the physiological function of the maxillary sinus. The material's physicochemical and biological properties may also influence the tissue response. Furthermore, when a persistent oroantral communication is present, the entry of microorganisms from the oral cavity may contribute to maxillary sinus contamination and perpetuation of the infectious process (Tucker, 2015; Monteiro et al., 2026; Hung et al., 2026).

Given the variability of clinical presentation, a history of procedures involving the posterior maxillary region should be investigated even when a foreign body is detected incidentally. The absence of severe pain, swelling, or a visible fistula does not rule out the presence of abnormalities within the sinus cavity. Clinical examination should include facial and intraoral inspection, assessment of the oral vestibule, assessment for nasal discharge, and assessment of tenderness on palpation of the affected region. Examination of adjacent teeth also contributes to differentiating odontogenic conditions from pain manifestations associated with sinus involvement (Oliveira et al., 2025; Smith II; Emko, 2007).

Imaging examinations complement this investigation and guide therapeutic planning. Periapical and panoramic radiographs may reveal radiopaque objects; however, their two-dimensional representation, superimposition of anatomical structures, and limitations in spatial assessment can hinder precise localization. Computed tomography allows assessment of the foreign body's position, its relationship with the sinus walls, and the presence of associated abnormalities, such as mucosal thickening or opacification. Multiplanar cone-beam computed tomography reconstructions permit evaluation of the location and extent of these abnormalities, thereby assisting in surgical access planning. Imaging findings

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should be interpreted in conjunction with the patient's medical history and clinical examination, as sinus opacification may correspond to different contents and pathological processes (Oliveira et al., 2025; Tucker, 2015).

Planning for foreign body removal should consider the object's dimensions and location, the condition of the sinus mucosa, and the feasibility of surgical access. In some cases, removal can be performed through an existing surgical access, whereas in other situations, an additional surgical approach is required, particularly when visualization or retrieval through this route is not feasible (Moraes et al., 2024). One option is the Caldwell-Luc procedure, which provides access to the maxillary sinus through an opening in the anterior wall, in the region of the canine fossa, via an intraoral vestibular approach. This access provides direct exposure of the sinus cavity and facilitates the localization and removal of the foreign body (Rezende et al., 2022; Moraes et al., 2024).

Endoscopic techniques offer alternatives for the assessment and treatment of the sinus cavity, with the potential to reduce the extent of surgical access in certain situations. The choice between an open and an endoscopic approach depends on the characteristics of the foreign body, its accessibility, associated abnormalities, and the available resources. Surgical planning should address not only the retrieval of the foreign object but also the management of concomitant sinus disease and any associated oroantral communication. The selection of an appropriate surgical technique should balance successful foreign body removal with the preservation of adjacent structures and the reduction of surgical morbidity (Smith II; Emko, 2007; Tucker, 2015).

The prolonged retention of foreign bodies within the maxillary sinus, often associated with subtle clinical manifestations or the absence of symptoms, highlights the importance of reporting such cases and discussing the available therapeutic approaches. In this context, the present study describes the surgical removal of a dental bur lodged in the left maxillary sinus using the Caldwell-Luc procedure in a patient who had undergone tooth extraction approximately five years before diagnosis, emphasizing the importance of clinical and tomographic assessment for diagnosis and surgical planning.

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2. Methods

This descriptive case report presents the clinical and imaging findings related to the diagnosis and surgical removal of a dental bur lodged in the left maxillary sinus using the Caldwell-Luc procedure. The report was prepared in accordance with the ethical principles of the Declaration of Helsinki. The patient provided written informed consent for the publication of her clinical information and imaging findings, with measures taken to protect her identity.

3. Case Report

A 63-year-old woman was referred to the Oral Surgery Clinic at Universidade Brasil, Fernandópolis Campus, São Paulo, Brazil, by a dentist at a municipal primary health care unit after a radiographic finding suggested a foreign body in the maxillary sinus. The finding was incidental on a panoramic radiograph obtained during a routine dental assessment (Figure 1A).

During history taking, the patient reported a diagnosis of type 2 diabetes mellitus, managed with metformin 500 mg once daily, and regular follow-up with an endocrinologist. Preoperative laboratory assessment revealed a glycated hemoglobin (HbA1c) level of 5.7%, indicating adequate glycemic control at the time of evaluation. She reported no other comorbidities or relevant habits. Extraoral and intraoral physical examinations were unremarkable. The patient reported no pain but described mild nasal congestion and headache.

The patient reported a history of tooth extraction in the left posterior maxillary region approximately five years before the current assessment. Although this history suggests a possible period of foreign body retention, the exact time of displacement could not be established, as no previous clinical or imaging records were available to confirm when the instrument entered the maxillary sinus.

For further assessment, cone-beam computed tomography (CBCT) of the maxilla was obtained (Figures 1B–1E). The examination revealed a foreign body morphologically resembling a No. 702 surgical bur. Coronal reconstruction indicated a length of approximately 24 mm (Figures 1B and 1E). The axial (Figure 1C) and

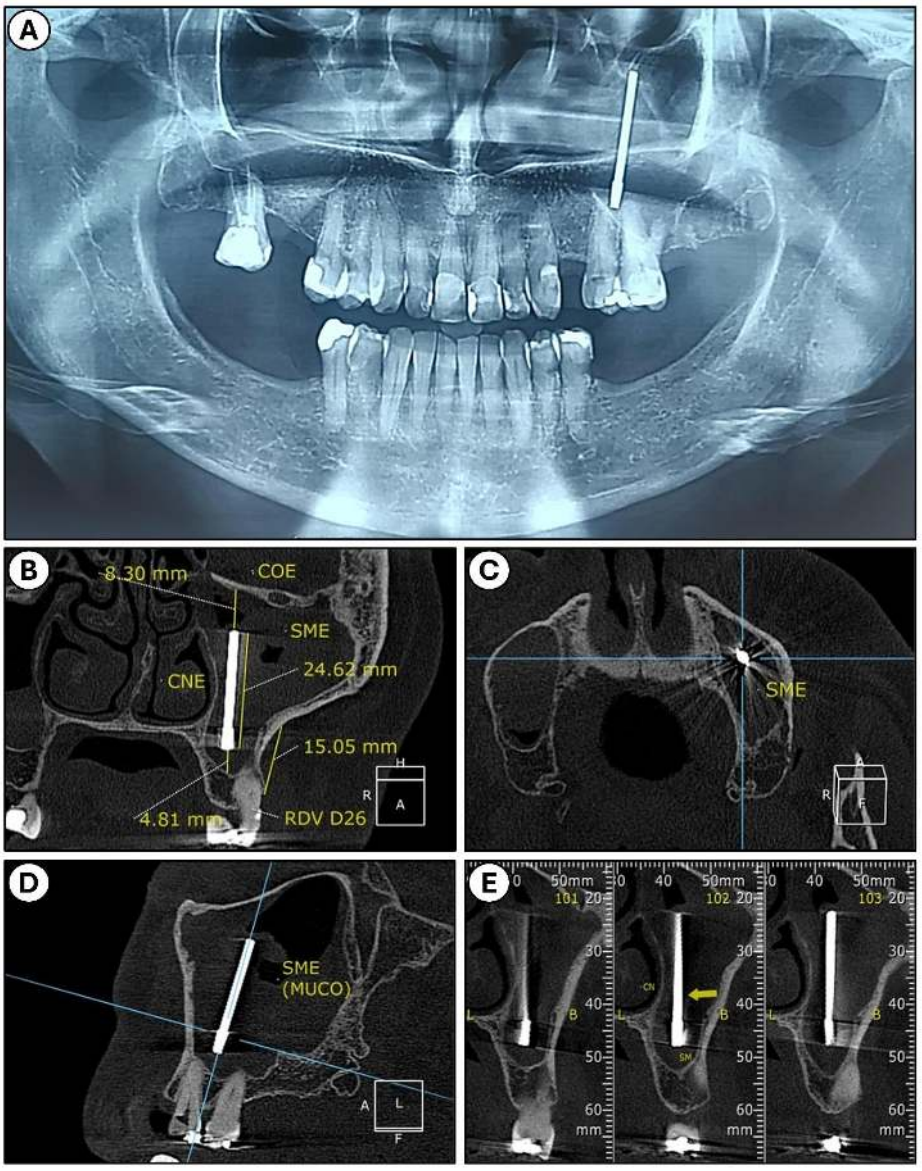
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sagittal (Figure 1D) sections demonstrated the presence of the foreign body within the maxillary sinus, in an anterior position, associated with partial sinus opacification, which could reflect retained secretions or inflammatory changes in the sinus mucosa.

Figure 1 – Initial imaging assessment. A: Panoramic radiograph showing an image suggestive of a foreign body within the left maxillary sinus**; B** and **E:** coronal cone-beam computed tomography sections; **C:** axial cone-beam computed tomography section; **D:** sagittal cone-beam computed tomography section. **Yellow arrows:** foreign body.



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Following clinical and tomographic assessment and surgical planning, the patient received preoperative antibiotic therapy consisting of amoxicillin 500 mg combined with potassium clavulanate 125 mg, administered every 8 hours for seven days. This regimen was prescribed before surgery to address the suspected sinus infection.

Subsequently, the patient underwent surgical removal of the foreign body located in the left maxillary sinus. At the preoperative examination, the mucosa exhibited normal coloration, with no signs of bone fenestration or swelling in the region (Figure 2A). Following antisepsis of the operative field, local anesthesia was administered through regional nerve blocks of the anterior, middle, and posterior superior alveolar nerves and the greater palatine nerve, supplemented by local infiltration. A solution of 2% mepivacaine hydrochloride with epinephrine (1:100,000) was used (Figure 2B).

The Caldwell-Luc procedure was selected for surgical access. A low monoangular incision was made using a No. 15 scalpel blade (Figure 2C), followed by mucoperiosteal flap elevation to expose the surgical site (Figure 2D). A circular osteotomy was then created in the anterior wall of the maxillary sinus using a No. 10 carbide round bur (Figure 2E), providing access to the sinus cavity (Figure 2F).

After exploration of the maxillary sinus with surgical curettes, the surgical bur was identified and removed (Figure 2G). The sinus cavity was then debrided, with removal of abundant mucus (Figure 2H) and reactive tissue adjacent to the foreign body (Figure 2I). The retrieved bur and tissue were measured using a millimeter ruler (Figure 2J). The tissue specimen was submitted for histopathological examination. Microscopic analysis revealed a soft tissue fragment lined by maxillary sinus epithelium, with dense fibrous connective tissue, large-caliber blood vessels, and neural structures. An intense subepithelial chronic inflammatory infiltrate and an area of hemorrhage were also observed. The microscopic findings were consistent with fibrosis and chronic sinusitis.

At the end of the procedure, the sinus cavity was thoroughly irrigated with 250 mL of 0.9% saline solution containing gentamicin (40 mg/1 mL) (Figure 2K). Finally, the mucoperiosteal flap was repositioned and sutured using simple interrupted 5-0

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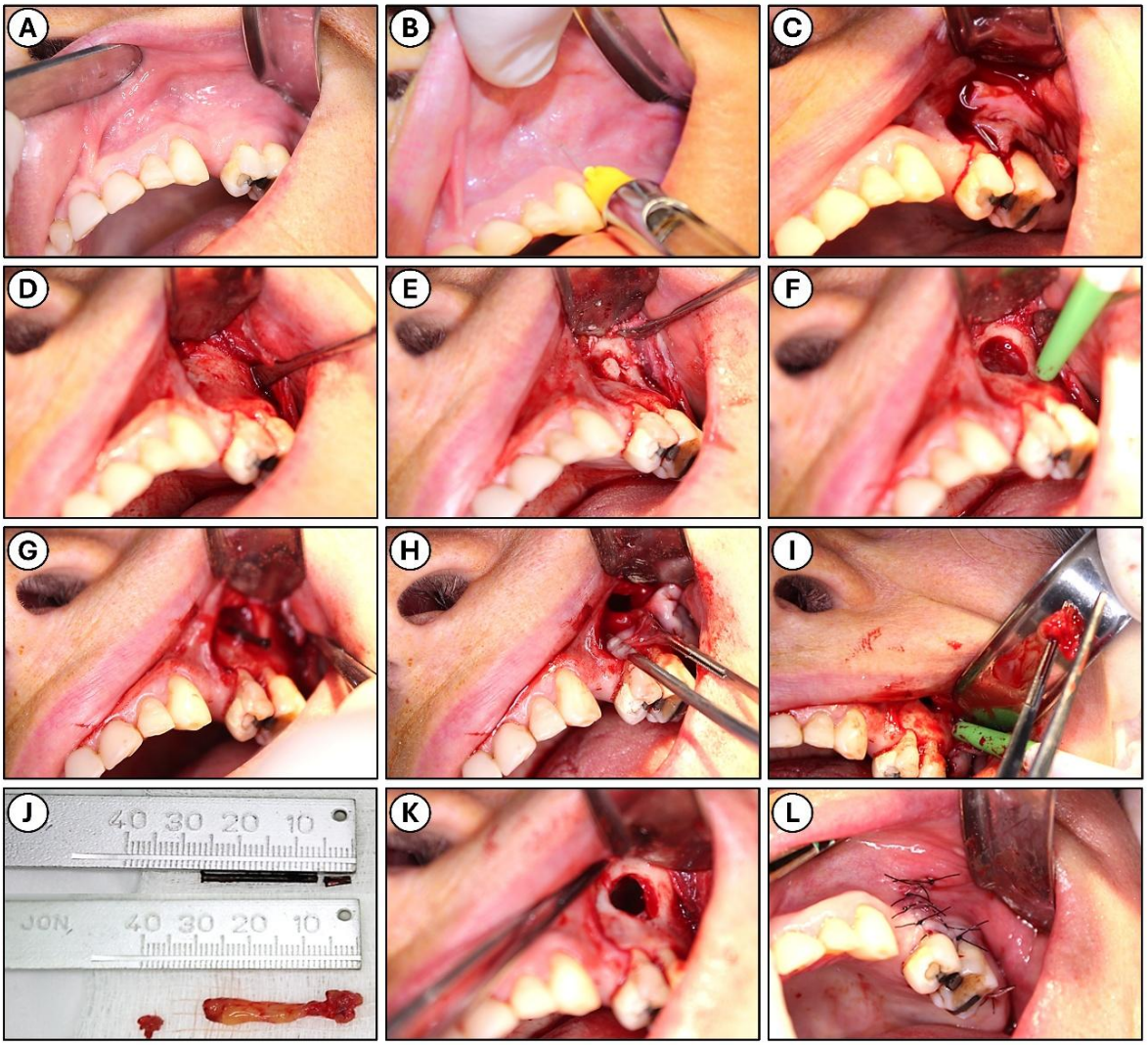
nylon sutures (Figure 2L). Postoperatively, the patient was prescribed amoxicillin 500 mg combined with clavulanate potassium 125 mg every 8 hours for 7 days. Nimesulide 100 mg every 12 hours was prescribed for 3 days for postoperative inflammatory control, and dipyrone 1 g every 6 hours was recommended as needed for pain relief.

Figure 2 – Surgical procedure using the Caldwell-Luc technique. A: Initial intraoral clinical appearance; **B:** Local anesthesia administered through regional nerve blocks and supplementary infiltration; **C:** Low monoangular incision to access the anterior wall of the maxillary sinus; **D:** Dissection and elevation of the mucoperiosteal flap; **E:** Osteotomy of the anterior wall of the maxillary sinus; **F:** Exposure of the sinus cavity; **G:** Identification and removal of the surgical bur from the maxillary sinus; **H:** Removal of mucous contents from the maxillary sinus; **I:** Removal of reactive tissue adjacent to the foreign body; **J:** Measurement of the removed surgical bur and reactive tissue; **K:** Irrigation of the sinus cavity with saline solution combined with gentamicin; **L:** Repositioning and suturing of the mucoperiosteal flap.

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At the seven-day postoperative visit, the sutures were intact, with no signs of infection or wound dehiscence, and were removed. CBCT obtained at that visit confirmed the complete removal of the surgical bur from the maxillary sinus (Figures 3A, 3B, 3C, and 3D). The patient reported mild paresthesia in the distribution of the infraorbital nerve. Etna® was prescribed at a dosage of two tablets every 12 hours for seven days. Photobiomodulation therapy was also performed twice weekly using a Therapy Plus laser device (DMC, São Carlos, São Paulo, Brazil), with red laser irradiation (660 nm) and infrared laser irradiation (808 nm) to manage the sensory disturbance. At the 30-day follow-up, the surgical site showed satisfactory healing, and the patient reported no complaints or residual paresthesia. Although complete

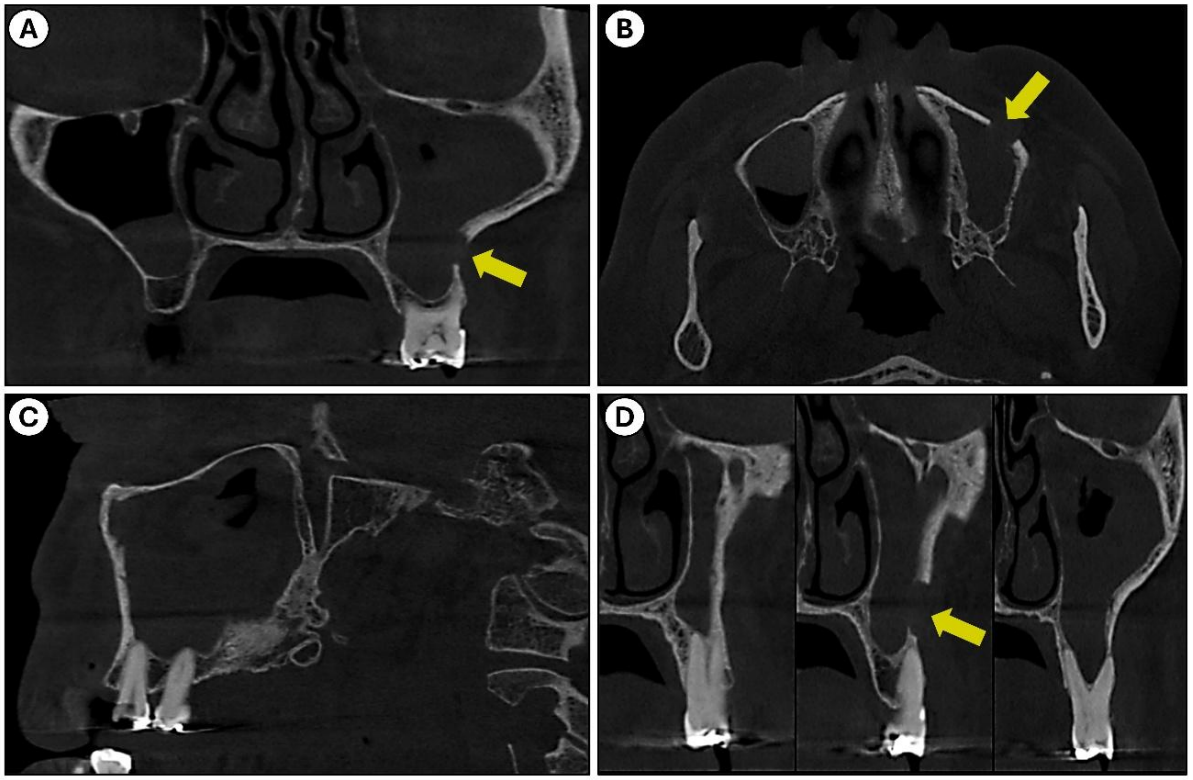
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removal of the foreign body had been confirmed by CBCT and the transient infraorbital paresthesia had resolved, the 30-day follow-up period was insufficient to confirm complete resolution of the underlying sinus disease. The patient was subsequently discharged from specialist follow-up.

Figure 3 – Final imaging assessment. A and **D:** Cone-beam computed tomography (CBCT) coronal sections; **B:** Cone-beam computed tomography axial section; **C:** Cone-beam computed tomography sagittal section. **Yellow arrows**: surgical access created using the Caldwell–Luc approach.



Source: Authors.

4. Discussion

The presence of foreign bodies in the maxillary sinus can occur as a complication of dental procedures, typically involving the accidental displacement of tooth roots, implants, endodontic materials, or surgical instruments. These materials may remain within the sinus cavity for prolonged periods and may be associated with inflammatory conditions, including chronic sinusitis, even when clinical manifestations

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are mild or absent. In a retrospective study involving 27 patients, Tilaveridis et al. (2022) identified different types of foreign bodies of dental origin within the maxillary sinus, including one case of dental bur displacement, and reported associated inflammatory changes in the sinus. In the present case, a surgical bur was identified incidentally approximately five years after a tooth extraction in the left posterior maxillary region, a procedure that may have been associated with its displacement. A similarly mild clinical presentation has also been described in other reports involving foreign bodies within the maxillary sinus (Smith II; Emko, 2007; Borrás-ferreres et al., 2022).

Clinical manifestations of retained foreign bodies vary and may include nasal congestion, headache, nasal discharge, and facial discomfort. However, symptom severity does not always correlate with the extent of sinus abnormalities. In the present case, the patient reported only mild nasal congestion and headache, with unremarkable extraoral and intraoral findings. Nevertheless, tomographic assessment revealed partial opacification of the left maxillary sinus, while histopathological examination identified fibrosis and changes consistent with chronic sinusitis. These findings support consideration of an odontogenic origin when investigating unilateral sinus abnormalities, particularly in patients with a history of surgical procedures involving the posterior maxilla (Craig et al., 2021; Arimbrathodi et al., 2020).

Imaging examinations are important for identifying and localizing foreign bodies within the maxillary sinus, as well as in guiding treatment selection and surgical planning. In the present case, panoramic radiography enabled the initial identification of the object, whereas cone-beam computed tomography (CBCT) provided detailed information on its dimensions, location, and relationship with adjacent anatomical structures. The examination revealed a metallic structure resembling a No. 702 surgical bur, approximately 24 mm in length, located in the anterior portion of the left maxillary sinus. Three-dimensional assessment informed surgical planning, as two-dimensional imaging techniques have limitations in determining the spatial position of such materials (Costa et al., 2018; Borrás-ferreres et al., 2022).

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Foreign body removal from the maxillary sinus can be performed using different techniques, including the Caldwell-Luc approach and endoscopic endonasal procedures. Endoscopic surgery may offer a less invasive alternative, although anatomical accessibility varies among patients. The Caldwell-Luc approach may be considered in selected cases, particularly when direct access through the anterior wall of the maxillary sinus facilitates the localization and removal of the foreign material, as observed in the present case. Hara et al. (2018), in a review of cases published in the Japanese literature, identified the Caldwell-Luc approach as one of the most frequently used techniques for removing sinus foreign bodies, highlighting its applicability in different clinical situations. Selection of the surgical approach should consider the characteristics of the foreign body and the anatomical and clinical conditions of each patient (Wojtera; Woźna; Komisarek, 2022).

In the present case, the Caldwell-Luc approach was selected primarily because of the anterior location of the surgical bur, its approximate length of 24 mm, and the associated sinus changes identified on imaging. An osteotomy was performed on the anterior wall of the maxillary sinus, providing direct access to the sinus cavity and allowing removal of the instrument, together with the mucosal contents and adjacent reactive tissue. This approach allowed both foreign body retrieval and collection of tissue for histopathological examination. The suitability of this approach depends on the specific characteristics of each case, including the accessibility and dimensions of the foreign body and the condition of the surrounding tissues (Friedlich; Rittenberg, 2005; Sahin et al., 2012).

Histopathological examination revealed fibrosis and findings consistent with chronic sinusitis, potentially associated with prolonged instrument retention within the sinus cavity. The dental history, retained foreign body, and tissue findings are consistent with a chronic inflammatory process of odontogenic origin. Removal of the suspected contributing foreign body is an important component of management, and clinical follow-up is necessary to assess the progression of the condition and the possible persistence of sinus alterations (Craig et al., 2020; Lin et al., 2024).

This case illustrates that foreign bodies may remain within the maxillary sinus for several years without causing significant symptoms. The incidental identification

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of the surgical bur and its association with chronic inflammatory changes underscore the value of considering both the dental history and complementary imaging findings. The Caldwell-Luc technique provided effective surgical access for instrument removal in this patient under the anatomical conditions observed, reinforcing that the choice of surgical approach should be based on the specific clinical and imaging characteristics of each case.

5. Conclusion

The presence of foreign bodies in the maxillary sinus may occur as complications of dental procedures. Clinical manifestations vary, and foreign bodies may be detected incidentally on imaging. In the present case, cone-beam computed tomography (CBCT) enabled localization of the surgical bur and informed surgical planning. The Caldwell-Luc technique enabled the removal of the instrument and the associated reactive tissue, supporting its use as a feasible option under the clinical and anatomical conditions described.

References

Arimbrathodi, N., et al. “Endoscopic Removal of an Uncommon Iatrogenic Foreign Body from the Maxillary Sinus: A Dental Burr.” *Case Reports in Otolaryngology*, vol. 2020, 2020, article 8861701. https://doi.org/10.1155/2020/8861701.

Borrás-Ferreres, J., M. Armengot-Carceller, and C. Gay-Escoda. “Odontogenic Maxillary Sinusitis and Fungus Ball Development Secondary to a Dental Root Retained for More than 25 Years: A Case Report.” *Journal of Clinical and Experimental Dentistry*, vol. 14, no. 6, 2022, pp. e510–e513. https://doi.org/10.4317/jced.59663.

Costa, E. D. da, et al. “Foreign Bodies in the Interior of the Maxillary Sinus: Diagnosis by Cone Beam Computed Tomography.” *General Dentistry*, vol. 66, no. 3, 2018, pp. 38–40. https://pubmed.ncbi.nlm.nih.gov/29714698/.

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REMUNOM
ISSN 2178-6925

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Craig, J. R., et al. “Diagnosing Odontogenic Sinusitis: An International Multidisciplinary Consensus Statement.” *International Forum of Allergy & Rhinology*, vol. 11, no. 8, 2021, pp. 1235–1248. https://doi.org/10.1002/alr.22777.

Craig, J. R., et al. “Management of Odontogenic Sinusitis: Multidisciplinary Consensus Statement.” *International Forum of Allergy & Rhinology*, vol. 10, no. 7, 2020, pp. 901–912. https://doi.org/10.1002/alr.22598.

Friedlich, J., and B. N. Rittenberg. “Endoscopically Assisted Caldwell-Luc Procedure for Removal of a Foreign Body from the Maxillary Sinus.” *Journal of the Canadian Dental Association*, vol. 71, no. 3, 2005, pp. 200–201. https://pubmed.ncbi.nlm.nih.gov/15812999/.

Hara, Y., et al. “A Large-Scale Study of Treatment Methods for Foreign Bodies in the Maxillary Sinus.” *Journal of Oral Science*, vol. 60, no. 3, 2018, pp. 321–328. https://doi.org/10.2334/josnusd.18-0109.

Hung, M., et al. “Management Strategies and Determinants of Clinical Decision-Making in Oroantral Communication among Dental Practitioners.” *Oral and Maxillofacial Surgery*, vol. 30, 2026, article 20. https://doi.org/10.1007/s10006-026-01508-w.

Iwanaga, J., et al. “Clinical Anatomy of the Maxillary Sinus: Application to Sinus Floor Augmentation.” *Anatomy & Cell Biology*, vol. 52, no. 1, 2019, pp. 17–24. https://doi.org/10.5115/acb.2019.52.1.17.

Lim, H. C., et al. “Factors Affecting Maxillary Sinus Pneumatization Following Posterior Maxillary Tooth Extraction.” *Journal of Periodontal & Implant Science*, vol. 51, no. 4, 2021, pp. 285–295. https://doi.org/10.5051/jpis.2007220361.

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REMUNOM
ISSN 2178-6925

Received: 13/10/2026 - **Accepted:** 12/11/2026
Vol: 13.23
DOI: 10.66104/1trwh972
Pages: 1-19

Lin, J., et al. “Expert Consensus on Odontogenic Maxillary Sinusitis Multi-Disciplinary Treatment.” *International Journal of Oral Science*, vol. 16, no. 1, 2024, article 11. https://doi.org/10.1038/s41368-024-00278-z.

Monteiro, T. M., et al. “Endodontic Filling Material Extrusion into the Maxillary Sinus: Clinical Presentation, Microbiology, Management, and Outcomes—A Systematic Review.” *Odontology*, 2026. https://doi.org/10.1007/s10266-026-01469-2.

Moraes, Michelle B., et al. “Odontogenic Maxillary Sinusitis Associated with Foreign Body Displacement after Tooth Extraction: Report of an Unusual Case.” *Brazilian Dental Science*, vol. 27, no. 1, 2024. https://doi.org/10.4322/bds.2024.e4054.

Oliveira, Taís Santos de, et al. “Remoção de Broca Cirúrgica Deslocada para o Seio Maxilar após Exodontia: Relato de Caso.” *Journal of Health & Biological Sciences*, vol. 13, no. 1, 2025, pp. 1–5. https://periodicos.unichristus.edu.br/jhbs/article/download/5650/2184/23097.

Psillas, G., et al. “Odontogenic Maxillary Sinusitis: A Comprehensive Review.” *Journal of Dental Sciences*, vol. 16, no. 1, 2021, pp. 474–481. https://doi.org/10.1016/j.jds.2020.08.001.

Rezende, Natália C., et al. “Three-Hundred and Sixty Degrees of Surgical Approaches to the Maxillary Sinus.” *World Journal of Otorhinolaryngology–Head and Neck Surgery*, vol. 8, no. 1, 2022, pp. 42–53. https://doi.org/10.1002/wjo2.12.

Sahin, Y. F., et al. “Chronic Maxillary Sinusitis Associated with an Unusual Foreign Body: A Case Report.” *Case Reports in Otolaryngology*, vol. 2012, 2012, article 903714. https://doi.org/10.1155/2012/903714.

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REMUNOM
ISSN 2178-6925

Received: 13/10/2026 - **Accepted:** 12/11/2026
Vol: 13.23
DOI: 10.66104/1trwh972
Pages: 1-19

Silva, E. J. N. L., et al. “Dental Pathophysiology of Odontogenic Sinusitis: Endodontic Infections.” *Otolaryngologic Clinics of North America*, vol. 57, no. 6, 2024, pp. 941–955. https://doi.org/10.1016/j.otc.2024.06.007.

Smith II, Joseph L., and Precha Emko. “Management of a Maxillary Sinus Foreign Body (Dental Bur).” *Ear, Nose & Throat Journal*, vol. 86, no. 11, 2007, pp. 677–678. https://doi.org/10.1177/014556130708601120.

Somayaji, K., et al. “A Literature Review of the Maxillary Sinus with Special Emphasis on Its Anatomy and Odontogenic Diseases Associated with It.” *The Egyptian Journal of Otolaryngology*, vol. 39, 2023, article 173. https://doi.org/10.1186/s43163-023-00536-7.

Tanasiewicz, Marta, et al. “Foreign Body of Endodontic Origin in the Maxillary Sinus.” *Journal of Dental Sciences*, vol. 12, no. 3, 2017, pp. 296–300. https://doi.org/10.1016/j.jds.2013.02.033.

Tilaveridis, I., et al. “Foreign Bodies of Dental Iatrogenic Origin Displaced in the Maxillary Sinus: A Safety and Efficacy Analysis of a Retrospective Study.” *Annals of Maxillofacial Surgery*, vol. 12, no. 1, 2022, pp. 33–38. https://doi.org/10.4103/ams.ams_190_21.

Tucker, Myron R. “Doenças Odontogênicas dos Seios Maxilares.” *Cirurgia Oral e Maxilofacial Contemporânea*, by James R. Hupp, Edward Ellis III, and Myron R. Tucker, 6th ed., Elsevier, 2015, ch. 19. E-book. ISBN 978-85-352-8102-6.

Whyte, Andrew, and Rudolf Boeddinghaus. “The Maxillary Sinus: Physiology, Development and Imaging Anatomy.” *Dentomaxillofacial Radiology*, vol. 48, no. 8, 2019, article 20190205. https://doi.org/10.1259/dmfr.20190205.

Wojtera, B., A. Woźna, and O. Komisarek. “The Management of Foreign Body

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REMUNOM
ISSN 2178-6925

Received: 13/10/2026 - **Accepted:** 12/11/2026
Vol: 13.23
DOI: 10.66104/1trwh972
Pages: 1-19

Displacement into the Maxillary Sinus as a Complication of Maxillofacial Interventions: Systematic Review." *Indian Journal of Otolaryngology and Head & Neck Surgery*, vol. 74, suppl. 2, 2022, pp. 1088–1093. https://doi.org/10.1007/s12070-020-02153-9.

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