

Surgical Ciliated Cyst of the Maxilla Following Tooth Extraction: A Case Report

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Abstract

Surgical ciliated cyst (SCC), also known as postoperative maxillary cyst, is a rare non-odontogenic cystic lesion resulting from the entrapment of respiratory epithelium within bone following surgical manipulation of the maxillary sinus. Although most reported cases are associated with orthognathic surgery, its occurrence after simple tooth extraction remains uncommon.

We report the case of a 56-year-old woman who presented with progressive swelling of the left posterior maxilla and difficulty with inserting the maxillary denture. The patient was totally edentulous and had no history of orthognathic surgery or sinus augmentation; however, she reported multiple tooth extractions in the same region more than 20 years earlier.

Clinical examination revealed a fluctuant intraoral swelling without signs of acute inflammation. Panoramic radiography and cone-beam computed tomography (CBCT) demonstrated a well-defined radiolucent lesion extending toward the maxillary sinus. Fine-needle aspiration yielded brownish fluid. Complete surgical enucleation was performed. Cytological analysis of the aspirated fluid revealed a fibrinous background rich in erythrocytes, without evidence of cellular atypia. Histopathological examination showed a cystic cavity partially lined by pseudostratified ciliated columnar epithelium with focal squamous metaplasia, supported by a thick fibrous wall containing chronic inflammatory infiltrate, thereby confirming the diagnosis of a surgical ciliated cyst.

This case highlights an unusual delayed presentation of a surgical ciliated cyst following tooth extraction. Awareness of this entity is essential, even in the absence of a significant surgical history. Histopathological evaluation remains mandatory for definitive diagnosis.

Keywords: Surgical ciliated cyst, maxillary, post-extraction, case report

Introduction

Post-Surgical Ciliated Cyst (PSCC) was formally incorporated into the classification of jaw cysts of the 5th edition of the World Health Organization of Head and Neck Tumors (2022) as a distinct clinicopathological entity [1]. It had previously been described in the literature under various terminologies, including respiratory implantation cyst and postoperative maxillary cyst [2]. The true incidence of PSCC remains unclear. PSCC is a benign epithelial lesion that primarily develops in the

maxilla [3]. Although rare, it may also affect the mandible, most commonly following double-jaw orthognathic surgery [4], and can potentially occur in other facial bones. The typical age at diagnosis ranges between 40 and 50 years, with no significant gender predilection [5]. The lesion is frequently detected incidentally during routine radiographic examinations, as it is often asymptomatic.

The pathogenetic mechanism is attributed to the entrapment of Schneiderian membrane cells, which line the maxillary sinus cavity, or nasal mucosal cells within bone tissue as a consequence of trauma or surgical procedures involving the maxillary sinus or nasal mucosa. Recognized etiological factors include orthognathic maxillary surgery, sinus lift procedures, apicoectomy, maxillary implant placement, and Caldwell-Luc antrostomy [6].

PSCC can mimic other cysts and tumors of the maxillary region, potentially leading to significant bone defects, cortical plate thinning, and facial aesthetic impairment, particularly if left untreated for a prolonged period [7]. The clinical presentation varies depending on the lesion's location, growth pattern, size, and extent of bone resorption.

Although PSSC typically presents as asymptomatic, symptoms such as pain and swelling may occur. Clinically, it can manifest as a palpable swelling or mass in the mucobuccal fold of the maxilla or mandible, the palate, the naso-orbital region, or the midface. The clinical and radiological features are not sufficiently specific to establish a definitive diagnosis when compared to other jaw cysts. However, a positive history of nasomaxillary fracture or previous maxillary surgical procedures may guide clinicians toward a suspected diagnosis, which is ultimately confirmed by histopathological examination [8]

In the present report, we aim to present an unusual case of PSSC occurring two decades after simple teeth extraction in a totally edentulous patient, and to discuss its diagnostic challenges and therapeutic management. We further discuss the main clinical, radiological, and histological findings, as well as the appropriate management of this unusual entity.

Case presentation

A 56-year-old woman in apparent good general health presented with a chief complaint of progressive swelling of the posterior maxilla evolving over the previous two months. The patient was totally edentulous and reported no history of orthognathic surgery, sinus augmentation, or maxillofacial trauma. However, she recalled multiple tooth extractions in the same region more than 20 years earlier.

Extraoral examination revealed no facial asymmetry, cutaneous changes, or cervical lymphadenopathy. Intraoral examination showed a localized soft swelling of the posterior maxilla measuring approximately 2 × 2 cm, resulting in obliteration of the left buccal vestibule. The lesion was fluctuant on palpation, non-tender, and covered by intact mucosa without signs of acute inflammation (Figure 1). No discharge or oroantral communication was observed. The mandible presented no abnormalities.





Figure 1. Intraoral examination showing buccal obliteration in the posterior maxilla.

Panoramic radiography demonstrated a well-defined unilocular radiolucent lesion with corticated borders in the posterior maxilla extending toward the floor of the maxillary sinus (Figure 2).

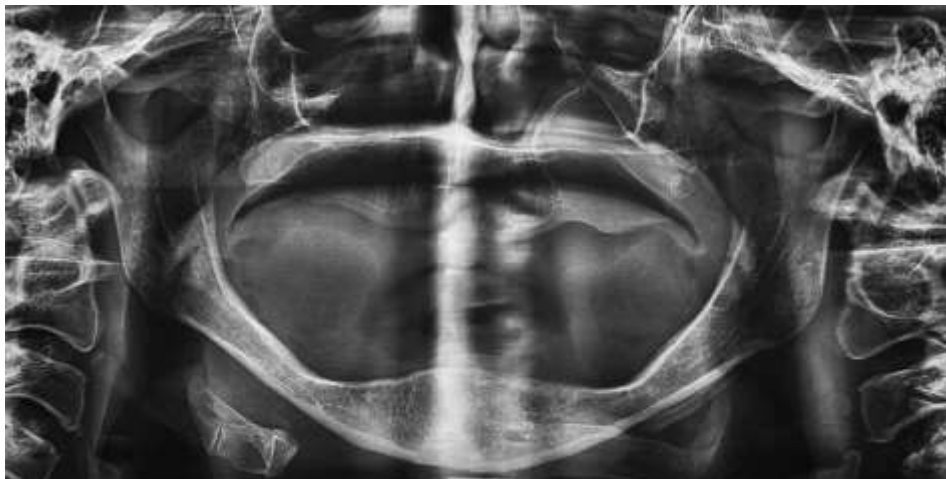


Figure 2. Initial panoramic radiograph showing a unilocular radiolucency in the posterior maxilla.

CBCT revealed a well-circumscribed intraosseous radiolucent lesion with bicortical thinning, extending toward the maxillary sinus cavity (Figure 3).



Figure 3. CBCT images demonstrating unilocular cavitation with important buccal cortical involvement.

Based on the clinico-radiological findings, fine-needle aspiration was performed and yielded a brownish fluid (Figure 4). Cytological examination showed a fibrin-rich hemorrhagic background without cellular atypia.

At this stage, differential diagnoses included a residual cyst arising from a previously extracted tooth, odontogenic keratocyst (OKC), ameloblastoma, and benign fibro-osseous lesion (BFOL).



Figure 4: Aspiration of the maxillary lesion yielding brownish fluid.

Under local anesthesia, complete surgical enucleation of the lesion was performed. Intraoperatively, the cystic cavity was easily separable from the surrounding bone and was found to communicate with the maxillary sinus (Figure 5). No associated dental remnants were identified. Bone reconstruction was not required. The excised specimen measured approximately 2×2.5 cm and was submitted for histopathological analysis.

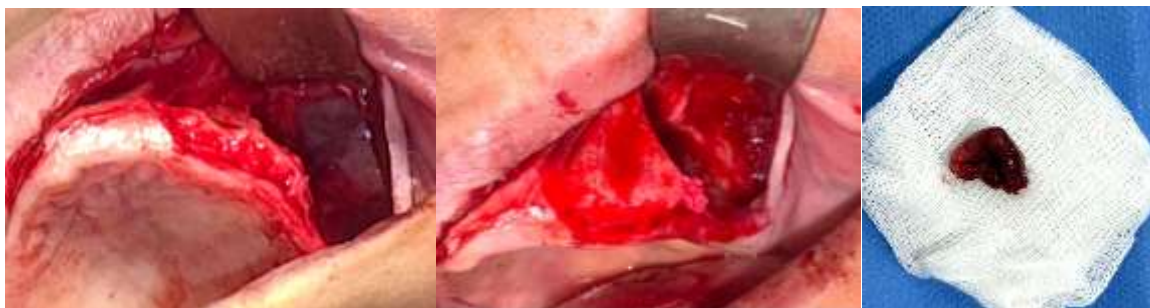


Figure 5. Surgical enucleation of the lesion. (A) Intraoperative view; (B) Final enucleation; (C) Excised specimen.

Histopathological examination demonstrated cystic fragments partially lined by pseudostratified ciliated columnar epithelium with focal areas of stratified squamous metaplasia. The underlying wall consisted of dense fibrous connective tissue with moderate chronic inflammatory infiltrate. These findings confirmed the diagnosis of surgical ciliated cyst (Figure 6).

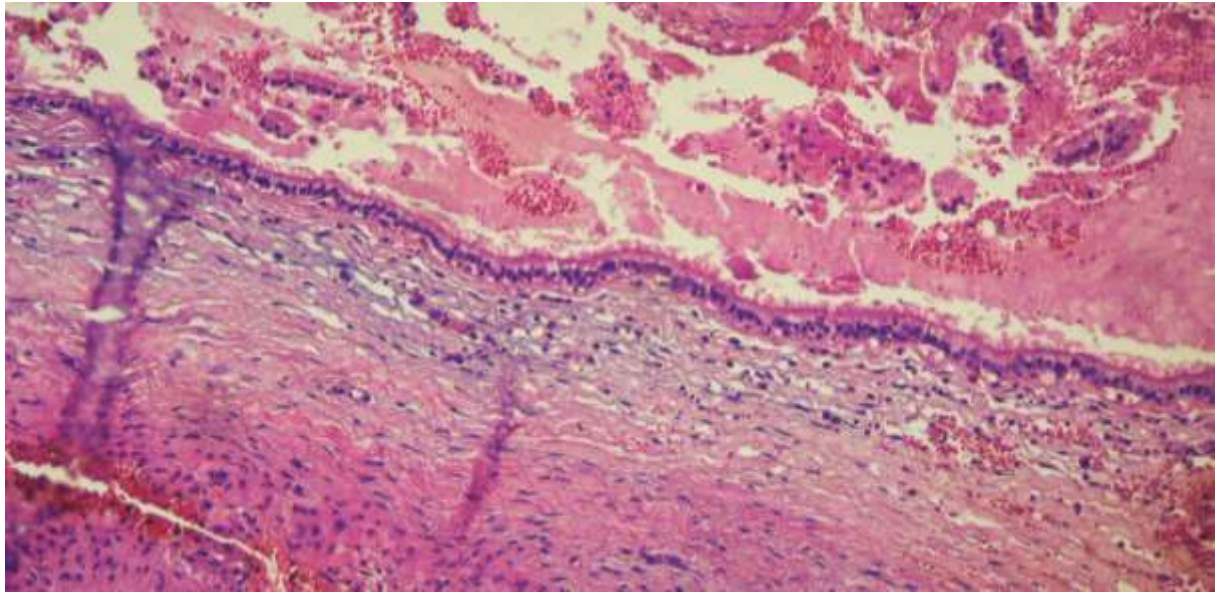


Figure 6. Histopathological examination showing pseudostratified ciliated columnar epithelium with focal squamous metaplasia (x40) (H&E stain).

The postoperative course was uneventful. At six months of follow-up, clinical and radiological examination demonstrated satisfactory bone regeneration without evidence of recurrence (Figure 7).



Figure 7. Follow-up panoramic radiograph showing progressive bone regeneration.

Discussion

Surgical ciliated cyst (SCC) was first described by Kubo I. et al. in 1927 and is most commonly reported after surgical procedures involving the maxillary sinus. It is believed to result from the entrapment of ciliated columnar epithelium during radical sinus surgery, such as the Caldwell–Luc procedure or orthognathic surgery involving the maxilla [14,15]. In addition, SCC has occasionally been reported following maxillary sinus bone grafting procedures, with a typical latency period ranging from 2 to 10

years [9]. Although rare, SCC has also been associated with upper molar extraction or retrograde endodontic treatment, which aligns with the present case [10]. Entrapped epithelial cells may proliferate following an inflammatory stimulus, leading to the formation of a distinct epithelium-lined cavity with progressive mucin secretion and gradual enlargement [11] (Figure 8).

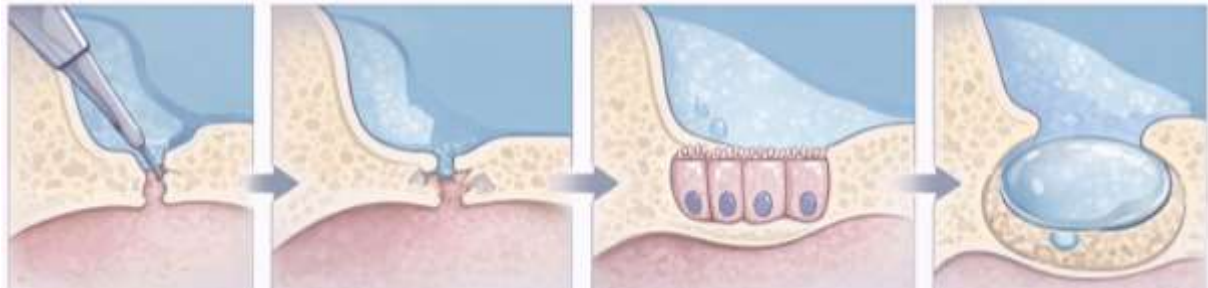


Figure 8. Schematic illustration of the proposed pathogenesis of surgical ciliated cyst showing entrapment of Schneiderian membrane epithelium and progressive cyst formation.

This lesion is characterized by slow growth, with an average development time reported to be approximately 18 years after the initial surgical or traumatic event [5]. In mandibular cases, transplantation of respiratory epithelium has been linked to the use of nasal osteocartilaginous grafts or maxillary bone grafts performed during genioplasty procedures [12]. Accidental transfer of sinus mucosa via surgical instruments during bimaxillary procedures has also been proposed as a potential mechanism.

Another important entity to consider, particularly in patients with a history of sinus augmentation, is the so-called “grafting void” described by Park et al. (2022) [13]. These postoperative cavities may radiographically resemble SCC on CBCT imaging. However, histological examination reveals the absence of ciliated respiratory epithelium, as these cavities are lined by fibrous connective tissue rather than true cystic epithelium.

Rare cases without documented sinus surgery or trauma have been reported. D’Souza et al. (2022) described a non-surgical ciliated cyst of the maxilla and questioned the strict use of the term “surgical” in such contexts. The authors suggested that chronic periapical infection may result in a microscopic oroantral communication, permitting migration and proliferation of Schneiderian membrane epithelium within the periapical region [14]. A recent systematic review by Brisset et al. (2024) analyzed reported mandibular PSCC cases and confirmed the strong association with prior maxillofacial surgery (94.4%) [12].

The radiographic differential diagnosis includes odontogenic and non-odontogenic cysts such as residual cyst, odontogenic keratocyst, central giant cell granuloma, benign fibro-osseous lesions, traumatic bone cyst, aneurysmal bone cyst, as well as odontogenic tumors including ameloblastoma and odontogenic fibroma, mucocoeles, retention cysts, and pseudocysts of the maxillary sinus [15]

In the present case, the patient was totally edentulous, and the well-defined radiolucency in the posterior maxilla initially favored the diagnosis of a residual cyst. However, histopathological examination ultimately established the diagnosis of SCC.

Previous reports indicate that pure respiratory epithelium predominates in approximately 58% of cases, while squamous metaplasia may be observed in up to one-third of lesions [3]. In the present case, identification of respiratory-type epithelium confirmed the diagnosis.

Regardless of etiology, definitive management of SCC involves complete surgical enucleation with primary closure, which is generally curative given the benign nature of the lesion. The most frequently employed surgical approaches include the direct intraoral approach and the Caldwell–Luc procedure, although transnasal endoscopic techniques have also been described, marsupialization have also been used [8]. However, in the case of large lesions, bone perforation, or recurrence, a more aggressive approach with subsequent bone reconstruction may be necessary.

Recurrence is thought to occur with incomplete removal of the cyst lining and is reported to range from 6 to 20% [16]. The prognosis seems to be excellent after complete enucleation in reported cases [17]

Conclusion

Surgical ciliated cyst should be considered in the differential diagnosis of maxillary radiolucent lesions, even decades after dental extraction or maxillary surgery. Although uncommon, delayed presentation is possible and may mimic odontogenic pathology.

Definitive diagnosis relies on histopathological examination. Early recognition and complete surgical enucleation ensure favorable outcomes and help prevent sinus complications and morbidity for the patients. Careful surgical technique remains essential to reduce the risk of epithelial entrapment.

References

1. Vered M, Wright JM. Update from the 5th Edition of the World Health Organization Classification of Head and Neck Tumors: Odontogenic and Maxillofacial Bone Tumours. *Head Neck Pathol.* 2022 Mar;16(1):63–75.
2. Dey S, Majumdar SK, Das AK, Burman S, Chattopadhyay A. Postoperative Maxillary Cyst Following Maxillary Tooth Extraction: A Rare Surgical Predicament. *Cureus.* 2024 Aug;16(8):e66407.
3. A. Berberi, G. Aad, S. Kebbe, R. El Hachem, and N. Nader, “Treatment of mucous retention cyst in association with sinus lift and implant placement: a case report with 1-year followup,” *Case Reports in Dentistry*, vol. 2023, Article ID 6968487, 7 pages, 2023.
4. J. Cano, J. Campo, M. A. Alobera, and R. Baca, “Surgical ciliated cyst of the maxilla. Clinical case,” *Medicina Oral, Patología Oral y Cirugía Bucal*, vol. 14, pp. E361–E364, 2009.
5. Sfondrini D, Pagella F, Pellegrini M, Ghizzoni M, Scribante A, Tore C, et al. Maxillary Postsurgical Ciliated Cysts (PSCCs): A Series of Three Cases. *Case Rep Dent.* 2024;2024:5584515.
6. L. D. Gonzalez and J. Guzman, “Bilateral postoperative maxillary cyst: a case report,” *Journal of Clinical Case Reports*, vol. 7, no. 1, p. 2, 2017.
7. M. Cai, G. Shen, X. Lu, and X. Wang, “Two mandibular surgical ciliated cysts after Le Fort I osteotomy and genioplasty,” *The British Journal of Oral & Maxillofacial Surgery*, vol. 53, no. 10, pp. 1040–1042, 2015.
8. J. C. Soares, N. C. Villalba, J. F. Sanromán et al., “Surgical ciliated cysts in orthognathic surgery,” *The Journal of Craniofacial Surgery*, vol. 32, no. 1, pp. e2–e5, 2021.
9. Kahn, A.; Matalon, S.; Salem, R.B.; Kats, L.; Chaushu, L.; Vered, M.; Rosen, E. Sinus Floor Augmentation—Associated Surgical Ciliated Cysts: Case Series and a Systematic Review of the Literature. *Appl. Sci.* 2021, 11, 1903.
10. R. S. Redman and C. J. Rodriguez-Feo, “Surgical ciliated cyst of the maxilla: report of two cases with striking radiological features and unusual antecedent surgical histories,” *Oral and Maxillofacial Surgery Cases*, vol. 6, no. 4, pp. 1–5, 2020.

11. P. Siwach, T. Joy, S. Gaikwad, and V. Meshram, "Postoperative maxillary cyst," *Indian Journal of Dental Research*, vol. 31, no. 1, pp. 157–159, 2020.
12. Brisset M, Cambronner C, Ferrer M, Cousty S, Dubuc A. Surgical ciliated cysts of the mandible: A systematic review of case reports. *Oral Dis*. 2024 Jul;30(5):2858–64.
13. Park WB, Pandya M, Han JY, Kang P. Large Grafting Void Resembling a Surgical Ciliated Cyst following Maxillary Sinus Augmentation. Four Case Reports with Histological Observation. *Medicina (Kaunas)*. 2022 Sep 18;58(9):1300.
14. D'Souza ZI, Sattar S, Padhye M, Desai RS. Non-Surgical Ciliated Cyst of the Maxilla - An Unconventional Variant. *Contemp Clin Dent*. 2022;13(4):392–4.
15. Theofilou NE, Lombardi T and Scolozzi P: Maxillary surgical ciliated cysts following advancement Le Fort I osteotomy with concomitant autogenous bone grafting: A simple coincidence or a cause-effect relationship? *J Stomatol Oral Maxillofac Surg* 122: 618-624, 2021.
16. Li CC, Feinerman DM, MacCarthy KD, Woo SB (2014) Rare mandibular surgical ciliated cysts: report of two new cases. *J Oral Maxillofac Surg* 72(9):1736–1743.
17. Cordero-Garcia T, Lozano-Rosado R, Fontillon-Alberdi M, Gutierrez-Perez JL, Infante-Cossio P. Surgical ciliated cyst of the maxilla after orthognathic surgery: A case report. *Exp Ther Med*. 2023 Jul;26(1):343.