Early Practice

External Sinus Surgery and Procedures and Complications

John S. Schneider, MD, MA[a,*], Andrew Day, MD[a],
Matthew Clavenna, MD[b], Paul T. Russell III, MD[b], James Duncavage, MD[b]

KEYWORDS

• Caldwell-Luc approach • External ethmoidectomy • Frontal trephine
• Osteoplastic flap

KEY POINTS

- The anterior, inferior portion of the maxillary sinus may harbor diseased tissue that cannot be addressed medically and may be difficult to access endoscopically. In this situation, a Caldwell-Luc approach may be necessary.
- External ethmoidectomy, while rarely used, can be useful when pathology inhibits proper visualization from the endoscopic approach. One MUST be mindful of orbital injury in this procedure.
- External approaches to the frontal sinus require identification of the most superior aspect of the sinus and the relative position of the posterior table in the anterior-posterior dimension (including relative changes in that dimension from superior to inferior).

INTRODUCTION

External approaches to the paranasal sinuses are rarely performed in the endoscopic era. However, they remain important surgical options in some cases. In this article, the indications, techniques, and complications of 4 techniques are described: Caldwell-Luc, external ethmoidectomy, frontal sinus trephine, and osteoplastic flap (OPF).

MAXILLARY SINUS

The maxillary sinus can be the most difficult sinus to manage medically and surgically in select patients. Endoscopic access to all regions of the maxillary sinus, including the most anterior, inferior, and lateral portions of the sinus, requires that endoscopes and

[a] Department of Otolaryngology, Washington University in St. Louis, 660 South Euclid Avenue, Campus Box 8115, St. Louis, MO 63110, USA; [b] Department of Otolaryngology, Vanderbilt University, 2201, West End Avenue, Nashville, TN 37235, USA
* Corresponding author.
E-mail address: SchneiderJ@ent.wustl.edu

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instruments are able to pivot and reach around the pyriform aperture and nasolacrimal duct. However, this may not be possible in all cases. The external approach to the maxillary sinus can provide the sinus surgeon the ability to surgically remove diseased tissue or neoplastic processes that cannot be reached even by extended endoscopic approaches. The open surgical approach to the maxillary sinus is described in classic Caldwell-Luc articles.[1]

The authors approach for the Caldwell-Luc procedure is as follows. A gingivolabial incision is made through the mucosa and periosteum of the canine fossa (**Figs. 1** and **2**). Careful periosteal elevation is performed over the anterior maxilla up to the level of the infraorbital nerve. The first assistant uses the maxillary retractors to hold the mucoperiosteum off the maxilla as the surgeon elevates it. The maxillary sinus is entered with a sinus trocar, rotating the trocar; direct force, such as a mallet, is not used.[2] A 3-mm Kerrison punch is used to widen the opening created by the trocar. Care is taken to maintain the lateral maxillary buttress. The anterior wall opening is widened as necessary for the particular procedure as required (**Fig. 3**). This opening ranges from an opening just wide enough to accommodate an endoscope for resections of pterygopalatine fossa lesions to a wide opening to accommodate endoscopes and instruments for maxillary sinus tissue removal in inverted papilloma cases. Closure consists of deep sutures of the soft tissue directly overlying the maxillary sinus wall defect, typically with Vicryl suture. The gingivolabial mucosa is then closed with absorbable suture, such as chromic or Vicryl.

Complications can be divided into intraoperative and postoperative complications. The most troublesome intraoperative complication of note is bleeding from the pterygopalatine or infratemporal fossa, including branches of the sphenopalatine artery (SPA). This bleeding can occur when too much force is used to initiate the anterior wall defect with the trocar. If the trocar penetrates the infratemporal fossa, the artery is at risk. Thus, it is stressed that one must use the twisting technique to enter the sinus instead of the mallet use technique. If bleeding is minor, bipolar or suction cautery may be used for control. In the authors' experience, SPA ligation has never been required; however, it must be considered for bleeding that cannot be controlled.

Postoperatively, the most concerning complication to the patient is poor wound healing. Poor wound healing must be managed expectantly; however, one must account for possible infection arising in the maxillary sinus itself. Long-term poor wound healing can result in an oroantral fistula through the anterior maxillary wall defect requiring additional procedures to close. Numbness of the infraorbital nerve can also occur. If careful attention is not paid to the position of the nerve preoperatively, injury can occur without intraoperative awareness. It is typically managed by watchful expectancy, assuming that the surgeon has not transected the nerve. Of note, in

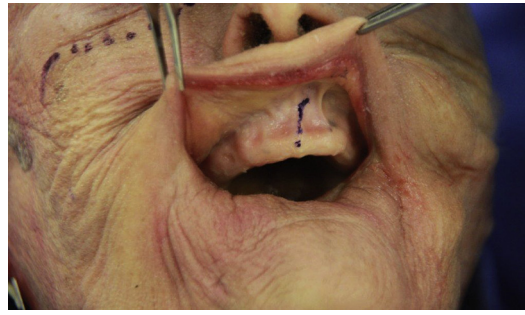

Fig. 1. Caldwell-Luc: sublabial approach.