Introduction

External approaches to the sinuses were refined in the preantibiotic era when intervention was focused primarily on saving lives rather than improving quality of life. As our knowledge and ability has improved, so has our preference for endonasal techniques. Revising open surgical approaches presents some unique challenges. Many surgeons today have limited experience with open procedures and many open procedures have been significantly refined to reduce morbidity and complement endoscopic techniques rather than supplant them. The role of the open procedure after failed endoscopic techniques has been addressed in Chap. 31. The present chapter will focus on some of the challenges and consequences associated with failure of the open sinus approach. We will focus on the open procedures, which most commonly remain in the armamentarium of the modern-day rhinologist [29], and discuss the implications of their failures for the endoscopic approach (Table 38.1).

Revision endoscopic sinus surgery is often substantially more complex than primary surgery because essential landmarks are drastically altered [6]. This is especially true following open surgery. The surgeon should be intimately familiar with concepts involved in external sinus surgery in order to facilitate a safe approach during revision surgery [6, 17, 38, 39].

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Indications

Indications for endoscopic revision after open surgery of the:

1. Maxilla:
   a. Persistent inflammatory mucosal disease after failed medical management.
   b. Recurrent benign neoplasms including inverted papilloma, juvenile nasopharyngeal angiofibroma (JNA).
   c. Oroantral fistulae aggravated by maxillary pathology.
   d. Orbital decompression.
   e. Access to the pterygomaxillary fissure and/or infra-temporal fossa.

2. Ethmoids:
   a. Persistent inflammatory mucosal disease after failed medical management.
   b. Recurrent benign neoplasms including inverted papilloma and JNA.
   c. Mucocele of an ethmoid sinus cell.
   d. Access to orbital pathology.

3. Frontal:
   a. Persistent inflammatory mucosal disease after failed medical management.
   b. Frontal mucocele – recurrent or complication of a frontal sinus obliteration procedure.
   c. Recurrent benign neoplasms including osteoma and inverted papilloma.

Contraindications

1. A surgically unfit patient.
2. Unrealistic expectations.
3. Appropriate instrumentation and/or imaging not available.
4. Surgical inexperience.
5. Extensive osteoneogenesis.

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Preoperative Workup

This is an essential component of successful revision surgery.

Patient Factors

The patient’s principal concern and a symptom profile, both current and initial need to be established [26]. Undiagnosed medical conditions may have contributed to failure of the initial procedures and need to be addressed prior to further management [45].

Anatomical Considerations

- The Caldwell-Luc (C-L) procedure will result in distorted maxillary anatomy, but this is obscured by a normal uncinate, especially if no inferior antrostomy was performed.
- Similarly, after external ethmoidectomy physical findings on rhinoscopy and nasendoscopy may be deceptively normal.

Computed tomography (CT) is the diagnostic modality of choice [31]. Bony window (wide window 4000 setting) fine cuts in coronal, axial, and parasagittal planes are obtained ideally with soft-tissue views (narrow window 150–250 setting) with intravenous contrast.

Magnetic resonance imaging (MRI) is particularly important when CT reveals opacification adjacent to a dehiscent skull base. In this situation, MRI identifies whether the erosion is secondary to sinus disease or secondary to a prior skull-base erosion or trauma with resultant meningoencephalocele (Fig. 38.1) [6]. T1- and T2-weighted MRI images with intravenous gadolinium in axial, coronal, and parasagittal planes are obtained.

The surgeon should have an appreciation of the three-dimensional nature of the sinuses and pay particular attention to areas of maximal risk. These include:

1. The skull base, with attention to erosions or thinning, slope, symmetry, and height of the lateral lamella as per the Keros classification [18].
2. The medial orbital wall with attention to overall shape, dehiscence, and possible orbital prolapse obstructing the frontal recess, the relation to the uncinate process, and adjacent Haller cells.
3. The maxillary sinus and the presence of accessory ostia, previous inferior antrostomy, anterior and lateral wall neo-osteogenesis, and synechiae following open surgery, integrity of the orbital floor and bone surrounding the nasolacrimal duct.