

# Standard Endoscopic Approaches in Frontal Sinus Surgery

## Technical Pearls and Approach Selection



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### KEYWORDS

- Frontal recess • Draf • Endoscopic modified Lothrop procedure (EMLP)
- Posterior frontal sinus wall

### KEY POINTS

- Successful frontal sinus surgery relies on a complete frontal sinus surgery, and surgeons should approach management in a stepwise fashion from least invasive to advanced procedures depending on the case in hand and underlying pathophysiology.
- When performing a Draf III (EMLP), all intersinus septations need to be removed and a wide cavity created to facilitate postoperative medical therapy and improve symptoms.
- Maintaining dissection anterior to the coronal plane of the posterior frontal sinus wall prevents skull base injury.
- Before frontal sinus surgery, a complete anterior ethmoidectomy with identification of the fovea ethmoidalis and skeletonization of the medial orbital wall is necessary.
- Postoperative debridements and appropriate topical medical therapy are crucial in maintaining patency of the frontal drainage pathway.



Video content accompanies this article at <http://www.oto.theclinics.com>.

### INTRODUCTION

Frontal sinus surgery has always been considered a challenge. This is mainly attributed to its wide array of variable and complex anatomy, extent of disease, and associated scarring and osteoneogenesis that can ensue, either due to the primary disease process or previous incomplete surgery.<sup>1</sup> It is crucial to highlight that the mainstay of frontal sinus surgery for chronic rhinosinusitis, as it is with any of the sinuses, is to

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achieve and maintain an adequate frontal outflow tract (frontal recess and infundibulum) while preserving minimally diseased mucosal membranes where possible.<sup>2</sup> This has to be achieved by using a stepwise approach, identifying critical endoscopic anatomic landmarks, to minimize complications and obtain long-term good endoscopic surgical results.

In this article, we present the various endoscopic operative techniques and approaches to frontal sinus surgery in a systematized manner. We discuss the pertinence of useful anatomic landmarks to achieve safe frontal sinus surgery.

## TREATMENT GOALS AND OUTCOMES

The most common causes of surgical failure are polyp recurrence, stenosis, and consequent scarring and/or osteoneogenesis.<sup>3</sup> This can be attributed, in part, to inadequate surgery, failure to recognize contributing anatomic barriers, and/or surgeon inexperience.

The goal is to relieve the patient's symptoms, restore functional mucociliary flow, achieve a wide frontal sinus ostium, and prevent long-term scarring and stenosis.

Multiple factors contribute to failure, and selecting the appropriate procedure for patients represents a challenge.

### *Mucociliary Flow*

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Messerklinger<sup>4</sup> first described frontal sinus ciliary flow. Knowledge of the ciliary flow pattern aids in successful frontal recess surgery. The cilia sweep up mucus along the interfrontal septum, laterally across the roof, medially along the floor toward the natural ostium. Mucosal preservation is fundamental when conceivable, although there are select situations in which this is impossible. Meticulous dissection and appropriate use of instrumentation and techniques aids in preventing unnecessary damage to normal mucosa while achieving one's goal of an adequate surgical ostium.

### *Osteoneogenesis*

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Controversies exist regarding the management of new bone formation in the region of the frontal sinus ostium. Some investigators advocate minimally invasive surgery with placement of stents and administration of oral and topical steroids in the postoperative period to prevent restenosis. The objective should be removal of the new bone to achieve a wide and adequate anteroposterior (AP) and lateral diameter, culture-directed postoperative antibiotics, office debridement, and close follow-up so as to intervene early in the event of symptomatic restenosis or closure of the frontal outflow tract. It is therefore very important to have proper visualization and instrumentation in the office setting to maximize the chances of a successful outcome.

## PREOPERATIVE PLANNING

Before working in the region of the frontal sinus, it is imperative to have a robust conceptualization of the radiological anatomy and be conscious of the different anatomic relationships in this complex anatomic area. Being unfamiliar with the intricate anatomy of the inverted funnel, like frontal recess, predisposes to incomplete dissection and consequent failure with restenosis.<sup>5</sup>

The challenging location of the frontal sinus prompts anxiety for the surgeon because of the risk of injury to the anterior ethmoid artery, anterior cribriform plate, olfactory apparatus, and anterior skull base. Familiarizing oneself with a mental picture

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