Frontal Sinus: Anatomy and Endoscopic Approach

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The Frontal Sinus
FS Mucociliary Clearance (Messerklinger)
Frontal cell - Type I

Frontal cell - Type II
Frontal cell - Type III  Frontal cell - Type IV
Frontal Cell type I
Uncinate Process
Uncinate to Lamina

Recessus Terminalis
Uncinate to Lamina

Recessus Terminalis
Uncinate to Lamina
Uncinate to Lamina

Left side

Uncinate

FS

Left side
Uncinate to Lamina
Uncinate to Skull base

Uncinate to Middle Turbinate
Uncinate to Skull base
Uncinate to Middle Turbinate
Uncinate to Lateral Lamella of Cribriform
Supraorbital Ethmoid Air Cell
Supraorbital Ethmoid Air Cell
Frontal Sinus Septations and SOE cells

<table>
<thead>
<tr>
<th>p=10^-7</th>
<th>Frontal Septations</th>
<th>SOECCells</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>61</td>
<td>43 (70%)</td>
</tr>
<tr>
<td>NO</td>
<td>59</td>
<td>13 (22%)</td>
</tr>
</tbody>
</table>

Kountakis, SE et al, Triological-COSM, San Diego, CA May 2012
Supraorbital ethmoid cell as a landmark for the anterior ethmoidal artery
SOE and Anterior Ethmoidal Artery
SOE cells and orbital proptosis

<table>
<thead>
<tr>
<th>p=0.006</th>
<th>Proptosis</th>
<th>SOE</th>
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<tbody>
<tr>
<td>YES</td>
<td>16</td>
<td>15 (94%)</td>
</tr>
<tr>
<td>NO</td>
<td>50</td>
<td>13 (26%)</td>
</tr>
</tbody>
</table>

14 of 15 SOEC were the cause of proptosis

Comer B, Kountakis, SE.
In Press, International Forum of Allergy and Rhinology
Draf procedures of the frontal sinus

I  Anterior ethmoidectomy with drainage of the frontal recess without touching the frontal ostium

II A Removal of ethmoidal cells protruding into the frontal sinus ("uncapping the egg") creating an opening between the middle turbinate medially and the lamina papyracea laterally

II B Removal of the frontal sinus floor between the nasal septum and the lamina papyracea laterally

III Endoscopic modified Lorthrop procedure (Frontal Drill out): removal of the frontal sinus floor bilaterally and the upper part of the nasal septum
Surgical Techniques - “uncapping the egg”
• Agger Nasi vs Frontal Cell
  obstructing frontal recess
• One year post-op
• **Advanced frontal techniques**

• Revision cases - scarring in the frontal recess
• Frontal stents
• **Combination approaches** - Mini-trephination + endoscopic
• Endoscopic modified Lothrop: the last step before frontal sinus obliteration
• FS obliteration: last resort
Draf IIB Video
1 year post-op
• Revision FESS - frontal

• Mini-trephination
Frontal Cell Type IV
Combination approach
Video
2 years post-op
Lothrop

-intersinus septum, superior nasal septum and anterior ethmoid removed.
Modified Lothrop

- Intersinus septum, superior nasal septum and anterior ethmoid removed.
Endoscopic Modified Lothrop
Endoscopic Modified Lothrop

Septum

Septum
• **Indications**

  • Persistent chronic frontal sinusitis with failure of appropriate medical therapy and after unsuccessful primary endoscopic frontal sinusotomy
  
  • Inverted papilloma
  
  • Osteoma – other benign tumors
  
  • Trauma
  
  • Last resort procedure prior to osteoplastic frontal sinus obliteration
Contraindications

- Hypoplastic frontal sinus and frontal recess
- Lack of experience by the surgeon
- Lack of proper instrumentation
- Sinus disease located in a supra-orbital ethmoid air cell and not in the frontal sinus
• EMLP - 1 year post-op
Draf III, Endoscopic Modified Lothrop for Inverted Papilloma

2 weeks post-op
3 months post-op
1 year Post-op