Pediatric ossiculoplasty: Choosing the right technique, ossiculoplasty and patient

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Introduction

- pediatric CHL
  - incidence /impact

- specific entities
  - tympanoplasty
  - ossiculoplasty

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Pediatric Ossiculoplasty:

- pediatric ossiculoplasty differs from adult:
  - etiology
  - growth
  - importance of audition

- surgical results are variable

- experiential data

Failures

- poor technical results
- hearing deterioration
- complications
  - disease recurrence
  - extrusion
Top Ten Tips for Ossiculoplasty

1. clean/stable middle ear
2. intact tympanic membrane
3. autologous>prosthetic
4. bank incus functionally
5. stapes key to success
6. cartilage grafts
7. titanium>others
8. cartilage shoe
9. trauma does best
10. caution with stapes surgery

1. Clean and Stable Ear

- avoid prosthetic reconstruction
  - 1° cholesteatoma resection
  - incus*
**Approach to Ossiculoplasty in Children After Cholesteatoma**

- **Clean, Aerated Middle Ear Space**
  - 2nd look after 1.5 years
  - CT scan after 1.5 years
  - Surgical revision

- **Clean but not through puberty**
  - Wait until puberty
  - Through puberty

- **Not clean through puberty**
  - Surgical revision
  - Ossiculoplasty

**2. Intact Tympanic Membrane**

- Best results require tension
  - Extrusion

- Exceptions
  - Distant TM repair
  - In-line malleus

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2. Intact Tympanic Membrane

- best results require tension
  - extrusion

- exceptions
  - distant TM repair
  - in-line malleus

3. “Functionally” Bank Incus

- put it where you’ll find it
  - sometimes it works!
  - can find it with minimal exposure
4. Autologous > Prosthetic

- obvious
  - cost
  - incorporation
  - growth
- downside
  - can harbour disease
  - too short

5. Stapes = Success

- intact stapes
  - good hearing result
    - PORP
    - myringostapediopexy
6. Cartilage Grafts

- tragal or conchal
  - reduce/eliminate extrusion
  - prevent atelectasis?

7. Titanium > Others

- lighter
- fitted length
- inert
- robust
- tiny
Kurz Ossiculoplasty

Table 1: Patient Demographics

<table>
<thead>
<tr>
<th>Number of Patients</th>
<th>43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at time of surgery</td>
<td>13 yrs. (7-17 yrs.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Etiology of Ossicular Chain Damage</th>
<th>Cholesteatoma</th>
<th>Congenital Ossicular Fusion</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37 (86.0%)</td>
<td>3 (7.0%)</td>
<td>3 (7.0%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cholesteatoma Type</th>
<th>Attic</th>
<th>Congenital</th>
<th>Tensa</th>
<th>Implantation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26 (70.3%)</td>
<td>8 (21.6%)</td>
<td>2 (5.4%)</td>
<td>1 (2.7%)</td>
</tr>
</tbody>
</table>

Kurz Ossiculoplasty

Table 2: Ossiculoplasty characteristics

<table>
<thead>
<tr>
<th>Ossiculoplasty</th>
<th>TORP</th>
<th>PORP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>39 (88.6%)</td>
<td>5 (11.4%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Operations Prior to Ossiculoplasty</th>
<th>None</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 (11.6%)</td>
<td>20 (46.5%)</td>
<td>17 (39.5%)</td>
<td>1 (2.3%)</td>
</tr>
</tbody>
</table>
Ossiculoplasty Results

- Long term audiometric results

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8. Cartilage Shoe

- stabilizes the ossicle in position
- works with autologous bone!
- designed for titanium implant

9. Trauma Does Best

- wait for resolution of transient CHL
- explore within 6 months
- don’t fear removing and repositioning incus (see # 5 Stapes = Success)
10. Careful With the Stapes

- fixed footplate
  - congenital
  - middle ear sclerosis

basal turn of cochlea
vestibule
oval window

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Conclusions

- consider the top ten points in decisions making about pediatric ossiculoplasty

- results are operator dependent
  - variable
  - possibly not durable
  - difficult to predict

Conclusion

- conductive hearing loss in children
  - breadth of pediatric otology
  - rapidly changing field
  - decision making central to obtaining successful outcomes
Conclusions

- understand patient’s:
  - needs
  - expectations
  - anatomy
  - physiology

- each ear is different