“In clear contrast to the impact of the introduction of endoscope in most surgical disciplines, the practice of ear surgery has changed little and it continues to be the domain for the microscope. Depending on the task at hand, there are many distinctions that would make the endoscope a better instrument than the microscope and vice-versa. We all need to master working with both instruments to better understand and treat pathologies of the ear. The objective of the IWGEES is to neutralize these longstanding biases toward the microscope and to get all of us to use the best instrument in the best way possible to help our patients.”

Muaaz Tarabichi – American Hospital of Dubai

- 1921 – Microscope in otology
  - Carl Nylen
- 1950 - Drills


- Post-auricular incisions
  - Easy access
  - Direct route to middle ear
  - Limitations of the microscope and instruments

INTRODUCTION

- Endoscopes in otology
  - Documentation
  - Ambulatory exams


WHY ENDOSCOPES?

- **Total visualization** of the TM (no need for repositioning)
- Anterior vision
- Attic vision
- “Hidden” recesses
- Use of a natural access (external auditory canal)
- Economics


LEFT EAR: The skin of the canal has been removed along with the epithelial layer of the TM. The ear canal has been enlarged. Note the limits of the fibrous annulus: red circles; CT: Corda Tympani; PML: Posterior Mallear Ligament.

RIGHT EAR: Fibrous layer of the TM is pulled down off the handle of Malleus revealing the Posterior Mallear Ligament (PML) and the Corda Tympani (CT).
Left ear: The fibrous layer of the TM along with the fibrous annulus is removed and separated from the handle of malleus. TT: The tendon of the tensor tympani.

Left ear:using transcanal endoscopic access and after removal of some bone, the facial recess (FR) appears less of a recess and more of a slight depression just superficial to the pyramidal eminence (PE) and the vertical segment of facial nerve (FN).

Left ear: View of the retrotympanum. IS: incudostapedial joint; PE: Pyramidal eminence; PO: Ponticulus; ST: Sinus tympani; SU: Subiculum; RW: Round Window.


Left ear: Note the entry points of the sub pyramidal space in this specimen is type A, connecting to both the sinus tympani and the posterior tympanic sinus. Arrow: Sub pyramidal space; ST: sinus tympani; PE: Pyramidal eminence; PTS: Posterior tympanic sinus.

Different morphology of the ponticulus. A, Ridge ponticulus; B, incomplete ponticulus; C, bridge ponticulus. FN: facial nerve; IN: incus; P: ponticulus; PE: pyramidal process; PS: posterior sinus; S: stapedial tendon; ST: stapes; SU: subiculum.
Right ear round window niche. TE: Tegmen; AP: Anterior Pillar; PP: Posterior Pillar; Arrows: Round window membrane.

Left ear: Overview picture of the tympanic cavity with special attention to the retrotympanum. FN: Facial nerve; SU: Subiculum; SS: Sinus subtympanicus; SE: Styloid eminence; RW: Round window; FN: Finiculus; CA: Crotid artery; HC: Hypotympanic air cell.

Left ear: PR: Prussak Space; PML: Posterior mallear ligament

Left ear: The relatively straight insertion line of the Lateral Incudo-Mallear ligament (LIML) and the downward sloping-insertion line of the Lateral Mallear Ligament (LML).

Left ear close up examination of the anterior epitympanic space. AES: Anterior epitympanic space; COG: Sheehy's Cog, separating the supratubal recess from the anterior epitympanic space; TF: tensor folds, partially seen and closing off the attic from direct ventilation into the supratubal recess and the Eustachian tube.
Left ear: the ossicles are fully exposed within the attic and the incus-malleal articulation line is visible. IM: Incudomalleal joint; AES: Anterior epitympanic space; COG: Sheehy’s cog, separating the supratubal recess from the anterior epitympanic space; TF: Tensor folds, partially see and closing off the attic from direct ventilation into the supratubal recess and the Eustachian tube.

Left ear: HM: Handle of malleus; STS: Supratubal recess; COG: The anterior surface of Sheehy’s cogs which separates the attic from the supratubal recess; TFA: The vertical segment of the tensor fold which when complete, will close off the attic from the Eustachian tube; TFB: the horizontal segment of the tensor fold which forms a partial floor of the supratubal recess anteriorly; TT: Tensor tympani muscle’s bony encasement; BA: Bony annulus; CA Carotid artery.

Left ear: Looking down the Eustachian tube. ET: Eustachian tube; TTM: tensor tympani muscle’s bony encasement; BA: Bony annulus; CA Carotid artery.

Left ear: IM: Isthmus forms the only pathway for attic ventilation in the presence of a complete tensor folds. TT: Tensor tympani tendon; ISJ: Incudostapedial joint.

Left ear: The anatomy of the tensor fold in a specimen with a well developed supratubal recess. The tensor fold is composed of two segments, a vertical part that attaches to the COG and a horizontal part that forms a partial floor of the supratubal recess. TFA: The vertical segment of the tensor fold which when complete, will close off the attic from the Eustachian tube; TFB: the horizontal segment of the tensor fold which forms a partial floor of the supratubal recess anteriorly; TTM: Tensor tympani muscle’s bony encasement.

Left ear: The incus has been removed. AS: Articular surface of the head of malleus; FN: Horizontal segment of the facial nerve; SC: Lateral semicircular canal; AA: Additus antrum; CD: Corda Tympani; TT: Tensor tympani tendon.
Left ear attic after removal of the incus. AS: Articular surface of the head of malleus. SI: remnant of the superior ligament of the incus attaching to the tegmen.

Left ear: The tensor tendon is transected and the handle of the malleus is removed, so was the anterior spine, anterior mallear ligament and the corda tympani. ODG: Dorello’s ODG. Single arrows: insertion point of the partially removed vertical segment of the tensor fold. Double arrows: insertion point of the completely removed horizontal segment of the tensor fold. STR: Supratubal recess; ET: Eustachian tube; CF: Cochleariform process; 1G: First genu of the facial nerve and neighboring geniculate ganglion; LC: Lateral semicircular canal.

Left ear: The horizontal segment of the facial nerve and its relationship to the lateral semicircular canal. 1G: First genu; 2G: second genu; LC: Lateral canal; CF: Cochleariform process.

WHERE CAN WE GO?

VENTILATION ROUTES


VENTILATION ROUTES


- Endoscopes (4 mm, 0m 30 and 45-degrees)
- Video
- Instruments
WHAT DO WE USE?

POSITIONING

PROCEDURES

- Ventilation tubes
- Myringoplasty
- Tympanoplasty
- Tympanoplasty + atticotomy
- Cholesteatoma surgery
- Otosclerosis surgery
- Other (acoustic neuromas, etc)

CHOLESTEATOMA

- Less invasive access


Tarabichi M. Endoscopic management of limited attic cholesteatoma. Laryngoscope 2004;114;1157-62.
Endoscope-assisted myringoplasty

Advantages of Endoscopically Assisted Surgery for Attic Cholesteatoma

Comparison Between Transtympanic and Elevation of Tympanomeatal Flap Approaches in Tympanoplasty

Conclusion: Transtympanic tympanoplasty is a simple technique with comparable success rate to the tympanomeatal flap technique in tympanic membrane closure and hearing results.
14/07/2011

**VIRTUAL OTOSCOPY**

**MEASUREMENT**

**STAPES SURGERY I**

**STAPES SURGERY II**
Female, 32 Y/O

Pre-operative

Post-operative

SRT: 30 dB

SRT: 55 dB

• One hand work
• No stereoscopic vision
• Adaptations

"The best way to predict the future is to create it"

Peter F. Drucker

Female, 57 Y/O – Left side

Female, 39 Y/O – Right side

Automated Tube Delivery

Bench Model
Endoscopes are very interesting tools

- Excellent visualization
- Learning curve
- Potential for future
  - Choclear implants, etc
- Indication of surgery
- Explain to your patient