Learning Objectives:

Introduction: Despite the routine use of endoscopes for various operations in the fields of rhinology and later laryngology, endoscopic ear surgery (EES) has gained widespread popularity only over the last ten years. Although EES has some disadvantages such as the inherent feature of being a one handed technique and necessity of frequent cleaning of the instruments it also offers some major advantages like direct illumination and wide field wiew through ear canal.
In this study we aimed to present our experience in EES procedures.

Materials: Charts of 33 patients who underwent various EES in our department were retrospectively reviewed. Patient demographic characteristics, surgery types, hearing results and complications were evaluated

Results: Mean follow up time was 8,2 (6–24) months. Endoscopic stapedotomy was performed in 13, endoscopic tympanoplasty and/or ossiculoplasty was performed in 9 patients. Hydroxyapatite bone cement was used to rebridge the defects between incus and stapes in 4 patients and a PORP was used for ossiculoplasty in one case. Inside out mastoidectomy with manibriostapediopexy using hydroxyapatite bone cement was performed in one case. In 10 patients endoscope assisted cochlear implantation was performed due to the difficult access to the round window under direct microscopic vision. Mean pre and postoperative air bone gaps (ABG) for stepedotomy operations were 29,1 ± 9,1 and 9,4 ± 6,8 dB respectively. Mean pre and post operative ABG for endoscopic tympanoplasty and/or ossiculoplasty operations 27,8 ± 10,7 and 11,3 ± 7,6 dB. No graft perforation or detoriation in hearing thresolds were seen in any of the cases.

Conclusion: Our results show that EES can safely be performed in the majority of the middle ear procedures with similar or better outcomes to conventional microscopic approach.

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Update in ossicular reconstruction: Ossicular Replacement Prostheses (ORP), bone cement and new assembly techniques (N673)

ID: 673.4

Manubriostapedioplasty

Presenting Author: **Levent Sennaroglu**

Levent Sennaroglu
Hacettepe University School of Medicine

Learning Objectives: The author developed a technique called manubrio-stapedioplasty using glass ionomer cement for malleus and incus fixation due to tympanosclerosis and congenital fixation. Method: this method can be used in situations where malleus and incus are fixed but stapes is mobile. Head of the malleus and incus are removed and manubrium is connected to the head of the stapes with glass ionomer cement. In a group of five patients with conductive hearing loss mean pre-operative air-bone gap of 42.75 dB, and mean post-operative air-bone gap was 5.25 dB. This method can also be used in situations with fixation of all ossicles. Here the stapes is mobilized after removing of all tympanosclerotic plaques but the postoperative hearing results are not as good as situations where stapes is mobile. During this presentation videos of different patients will be provided showing the technique.

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Endoscopic Ear Surgery 1 (R674)

ID: 674.1

Transitioning to Endoscopic Ear Surgery and Training the Next Generation

Presenting Author: **Manuela Fina**

Manuela Fina
Assistant Professor, University of Minnesota

Objective: The objective of this presentation is to illustrate the learning curve of a surgeon who transitioned to Endoscopic Ear Surgery and the surgeon's creation of a teaching program in a U.S. residency program.

Methods: A 5 minutes educational video with 3 power point slides illustrating learning curve, tips, take home points and conclusions.

Results: The surgeon will illustrate the initial difficulties and challenges that can delay the transition and adoption of the primary endoscopic approach, how many cases does it take to fully transition to Endoscopic Ear Surgery, the modifications in OR set up and surgeon's position with time and skill acquisition, utilization of endoscopy in the office setting for chart documentation and patients' education.

The surgeon will present a personal experience in teaching the residents a new surgical technique and creating a structured educational program with goals and skills to achieve according to resident's level of training.

To evaluate the surgeon's initial results in Endoscopic Ear Surgery two cohort of consecutive patients who underwent tympanoplasty with microscopic approach and endoscopic approach were evaluated for closure rate and duration of surgery. All surgeries were performed with residents' participation. The comparison shows that in the surgeon's personal experience the endoscopic approach provided similar rate of closure and duration of surgery than the microscopic approach.

Conclusions: Transitioning to Endoscopic Ear Surgery requires an initial investment of time in attending training courses and observing live surgery performed by experienced surgeons. The surgeon's learning curve is steeper than for a resident that has familiarity with endoscopic sinus surgery. A comparison of 30 consecutive microscopic and 30 consecutive endoscopic tympanoplasty showed no difference in duration of surgery and closure rate, with a trend indicating that duration of surgery may shorten with surgeon's experience.

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Endoscopic Ear Surgery 1 (R674)

ID: 674.2

The History and Development of Endoscopic Ear Surgery (EES)

Presenting Author: **Jean-Marc Thomassin**

Jean-Marc Thomassin

Hopîtal de la Conception

Binocular otomicroscope in the 1950s, became a revolutionary machine. Yet, it gave a global vision of all cavities of the middle ear except for the retrotympanic region. JAKO (1966) and ZINI (1967) [1] conceived the use of stainless steel micro-mirrors to investigate the sinus tympani area. This system, reflecting the light of the operating microscope, was useful in experienced hands but was not reliable for the eradication of epidermal lesions at this site.

In 1966, Harrold HOPKINS [2] developed the Hopkins rod endoscope with KARL STORZ team. KARL STORZ, manufactured in Tuttlingen, creates a cold light source, tube endoscopes and loupes. The technical quality of the lenses, lit from cold light sources, allowed very simple rapid and precise otoendoscopic examination of the tympanic membrane.

Having arrived a this stage of investigation of the eardrum, did it remain to take a decisive step? The peroperatoire use the system to visualise the middle cavities.

MER (1967) [3] employed a flexible fiberscope to examine the ears of cadavers as well as ears of living animals throught an iatrogenic myringotomy.

MARQUET (1975) [4] introduced an endoscope 1.7 mm of diameter through a tympanic perforation to observe the tympanic cavity. He already foresaw the great possibilities of the technique and wrote: "The retrotympanic regions, such as the sinus tympani, can be observed in a precise manner".

NOMURA (1982)[5] developed a new system of rigid endoscopy used an angled rigid endoscope and called it the Needle Otoscope.

KANSAKI (1983)[6] was the first to anticipate the importance of endoscopy in postoperative surveillance of the posterior cavities of the middle ear in patients operated for cholesteatoma by a closed technique. Under local anaesthesia, he introduced an endoscope via a retro auricular incision and reported a series of 26 cases.

WULLSTEIN (1984) had a micrometric system manufactured by KARL STORZ company which call ototympanoscope. Using two endoscopes and under a visual control, this allowed the passage through the perforation of an endoscope 2.7 mm of diameter with 30° and 70° angles of vision. Nevertheless, the disadvantage of this endoscope was that both hands of the surgeon were engaged, thus preventing any treatment procedure. Ultimately, it found a little general use.

In 1984, we began using a 2.7 mm optical system with 70° angle as used for Wullstein's ototympanoscope to practice peroperating monitoring of the posterior recesses of the tympanic cavity.

In 1985, with special instruments, we performed EES of the sinus tympani area in cases of cholesteatoma surgery.

From 1988, we developped video-monitored endoscopic guided surgery for the retrotympanum and anterior epitympanum by coupling the endoscope to a micro-camera [7] [8] [9].

Endoscopic Ear Surgery in the 1990's

In 1990 [10], we carried out a second monitoring stage for cholesteatoma operated by tympanoplasty using a closed technique with a minimal cutaneous approach in the retroauricular region. In over 85%, the surgical procedure was very often combined with survey of the tympanic cavity more especially of the retrotympanum via a limited transmeatal route.

POE and BOTTRIL (1992) [11] used transtympanic endoscopy to diagnose perilymphatic fistulae and to identify other middle ear pathologies.

In 1993, MC KENNAN [12] used endoscope in second look surgery. He called this procedure: "Transcutaneous Mastoidoscopy".

The same year, we published in Laryngoscope Endoscopic-guided Otosurgery [13] in the prevention of residual cholesteatoma. Between 1985 and 1991, 36 cases of cholesteatoma in closed technique were operated-on with a systematic control by otoendoscopy (70° angle). The residual rate was 5.5%.

Another early adopter of EES: TARABICHI, in 1997, published a series of the endoscopic management of cholesteatoma [14]. 36 cases underwent a transcanal endoscopic tympanotomy and extended atticotomy for removal of cholesteatoma.

Currently, EL GUINDY,(1992) in Egypt, investigated the utility of endoscope to perform a myringoplasty with fat graft material [15].

We started in 1993 to operate with transcanal approach for myringoplasty using abdominal fat graft with a laser fiber. The great majority of our cases were operated-on under local anaesthesia [16].

Endoscopic Ear Surgery in the 2000's

During this decade, more investigators and Otologic surgeons explored the potential benefits of endoscopic techniques in middle ear cavities and in CPA angle.

An international working group on Endoscopic Ear Surgery (IWGEES) with many surgeons was developed: BADR EL