

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)

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The History and Development of Endoscopic Ear Surgery (EES)

Presenting Author: **Jean-Marc Thomassin**

Jean-Marc Thomassin

Hopital 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 at this stage of investigation of the eardrum, did it remain to take a decisive step? The peroperative 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 through 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 Ootoscope.

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 peroperative 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 developed video-monitored endoscopic guided surgery for the retrotympanium and anterior epitympanium 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 retrotympanium 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 Otoplasty [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

DINE, TARABICHI, PRESUTTI, MARCHIONI, AYACHE, NOGUEIRA and KAKEHATA.

From 1996 to 1998 in Marseilles, we lectured two courses on Endoscopic Ear Surgery. Today, in the world, many congresses are organized.

One of the important benefits of an endoscope compared to the microscope is the wide field of view during ear surgery. Altogether there are numerous applications in the surgery of the middle ear.

The routine, which uses optical systems for all Tympanoplasties, familiarises the surgeon with the endoscopic anatomy and provides a training for him.

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Endoscopic Ear Surgery 1 (R674)

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Endoscopic exclusive transcanal approach to the tympanic cavity cholesteatoma in pediatric patients: our experience

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Learning Objectives: The aim of the present study is to describe our experience in the management of tympanic cavity cholesteatoma in pediatric patients, treated with endoscopic exclusive transcanal approach.

Objectives: Describe our experience in the management of tympanic cavity cholesteatoma in pediatric patients treated with endoscopic exclusive transcanal approach.

Methods: Review of surgical cases performed between January 2007 and December 2013. Patients presenting with cholesteatoma of the tympanic cavity with no mastoid involvement were included in the first group and underwent an exclusive transcanal endoscopic approach (TEA). Patients with mastoid extension of the pathology were included in the control group and underwent a canal wall up microscopic technique (CWU).

Results: 59 ears of 54 patients were reviewed. Median age was 9.6 years (range 4–16 years). 31 cholesteatomas underwent a TEA approach, while 28 underwent a CWU approach, based on inclusion criteria. No differences from congenital vs acquired form was made. The ossicular chain was preserved in 26.6% of patients (16 ears): 42% of patients (13 ears) undergoing a TEA and 10% of patients undergoing a CWU approach (3 ears) ($P = 0.006$). Second look surgery was executed in 41.6% of patients (25 ears). In partial ossicular prosthesis reconstructions, the mean preoperative pure-tone average (PTA) was 29.4 dB, while the mean postoperative PTA was 27.1 dB, with a mean increase of 2.3 dB.

In total ossicular prosthesis reconstructions, the mean preoperative PTA was 47.8 dB, while the mean postoperative PTA was 26.5 dB, with a mean increase of 21.3 dB. Recurrence rate was 12.9% (4 ears) for the TEA group and 17.2% (5 ears) for the CWU approach. Residual disease was present in 26.6%: 19.3% (6 ears) for the TEA and 34.4% (10 ears) for the CWU approach. The mean follow up was 36 months (range 8–88). Kaplan-Meier analysis at 36 months showed a lower recurrence risk for the TEA compared with the CWU approach, but this data was not statistically significant ($P = 0.58$).

Conclusion: TEA represents a feasible, minimally invasive and conservative technique for the management of pediatric middle ear cholesteatoma.

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Advances in Understanding of Eustachian Tube Dysfunction and Cholesteatoma (N675)

ID: 675.1

The effects of smoking on Eustachian tube function and chronic ear surgery

Presenting Author: **David Kaylie**

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Learning Objectives: After this presentation, the attendee will understand the effects of smoking on Eustachian tube dysfunction and its impact on chronic ear disease. They will understand how smoking increases the severity of cholesteatoma and how smoking leads to more extensive surgery.

Smoking is a known to be a risk factor for cardiac disease, chronic obstructive lung disease, head and neck cancer and lung cancer. Cessation of smoking will reduce a person's risk for cardiac and lung disease over time, but will not reduce it back to the risk level of life long non-smokers. Cigarette smoking is also known to worsen outcomes in plastic surgery and sinus surgery. Smoking has multiple deleterious effects on ciliary function, some of which are reversible and some of which are permanent. We will examine, in depth, the effects of cigarette smoking on the severity of chronic ear disease and its effects on surgical outcomes for chronic ear disease.

This talk will describe the effects of cigarette smoking on ciliary function and Eustachian tube function. We will then discuss a large series of patients who underwent surgery for tympanic membrane perforation with or without cholesteatoma and analyze their surgical outcomes with regards to their smoking status. We will show how short term and long-term abstinence from cigarettes smoking effects their surgical outcomes compared to life long non-smokers.