implementation of standardized program of training. It seems crucial to develop alternative methods for surgical training, such as virtual reality (VR) and simulator. The aim of our study was to assess face, content, construct validity of the Voxel-Man® TempoSurg VR simulator.

Were included in the study 74 ENT surgeons, splitted in 2 groups according to their level of expertise: the expert group ($n = 16$) and the novice group ($n = 58$). The 2 groups benefited from a simple drilling task to familiarize them with the simulator and then performed four temporal bone dissection tasks. The performance of both groups were assessed by a global score and compared to assess the construct validity of the simulator. Finally, face and content validity were assessed using a five-point Likert-type scale. Experienced surgeons performed better ($p < .01$) and faster ($p < .001$) than novices. However, no differences in the bone volume removed and the number of injury to structures were found between the two groups. All experienced surgeons, except one would recommend the Voxel-Man simulator for anatomy learning (mean score 4.7). Most of them (87.5%) also thought that this simulator could be integrated in surgical training (mean score 4.1).

The Voxel-Man TempoSurg Virtual Reality Simulator constitutes an interesting complementary tool to traditional teaching methods for training in otologic surgery. Although some features require improvements, it allows trainees to acquire a good three-dimensional visualization of ear structures and to learn complex surgical skills. By its ability to distinguish different level of expertise, this simulator could be used as a certification tool, constituting a prior condition for performing real-life surgery.

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Tympanoplasty (R836)

ID: 836.1

Canal wall up surgery for cholesteatoma patients. When and how to perform ossicular reconstruction

Presenting Author: **Jean-Yves Sichel**

Jean-Yves Sichel

Shaare Zedek Medical Center

Learning Objectives: TBC

The main goal of cholesteatoma surgery is complete removal of the disease. The secondary goal is to preserve or restore hearing, mostly by ossicular reconstruction. There is no consensus on the best technique and timing (immediate or sequential) for the reconstruction.

The presentation will focus on the factors which influence the decision making: age, extent and location of the cholesteatoma (and need for a second look); status of the ossicular chain and especially the presence or absence of the superstructures of the stapes; inflammatory status of the middle ear during surgery (dry or an active purulent ear); the status of the contralateral ear and others.

According to the literature and the experience of our department we will propose recommendations which may aid in the decision for immediate or staged reconstruction and discuss the different possible technics.

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Tympanoplasty (R836)

ID: 836.2

The natural history of Tympanic membrane perforations in a large cohort of children and the implications of when to operate

Presenting Author: **Philip Robinson**

Philip Robinson[1], Matthew Rollin[2]

[1]*University Hospitals Bristol NHS Foundation Trust,* [2]*Imperial Healthcare NHS Trust*

Learning Objectives: 2703 tympanic membrane perforations were studied in 1761 children. Data was obtained from a 20 year database containing over 147500 consultations of children seen by the Bristol Paediatric Audiology service. All children who underwent surgical repair of the perforation were excluded from the study. 45% of perforations were related to prior ventilation tube placement. 38% of perforations closed spontaneously within 12 months, 57% by 18 months and 66% by 2 years. 90% of all closures happen within 2.5 years. There is a significant age effect with perforations more likely to close spontaneously in younger children. 90% closure at 2.5 years in children diagnosed <7 years old vs. 75% in children diagnosed aged 7–12 years old. When faced with the clinical question of what period of watchful waiting would be appropriate in monitoring a perforated tympanic membrane, before intervention may reasonably be recommended; there seems to be little advantage in waiting longer than 2.5 years.

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38% of perforations closed spontaneously within 12 months, 57% by 18 months and 66% by 2 years. 90% of all closures that will happen occur within 2.5 years.

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When faced with the clinical question of what period of watchful waiting would be appropriate in monitoring a tympanic membrane perforation before surgical intervention may be reasonably recommended; there seems to be little advantage in waiting longer than 2.5 years.

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Tympanoplasty (R836)

ID: 836.3

Modified overlay tympanoplasty & autologous Bone-Cartilage Composite Graft Ossiculoplasty

Presenting Author: **Shi Nae Park**

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Learning Objectives:

Overlay tympanoplasty is one of the well-known techniques of middle ear surgery applied for all types of perforated tympanic membrane. However, classic overlay tympanoplasty has several disadvantages of technical difficulty, lateralization, and anterior wall blunting and long healing time. Modified overlay tympanoplasty was developed to overcome these disadvantages and has been performed for more than 15 years at our university. Overall success rate of this technique was 98%. Precise technique and surgical tips of modified overlay tympanoplasty to achieve a promising surgical result as well as early hearing restoration will be introduced.

Another novel surgical technique of ossiculoplasty, named autologous bone-cartilage composite graft (BCCG) ossiculoplasty will be mentioned. Analytic data of ossiculoplasty of BCCG showed satisfactory hearing outcome and the lowest complication rate among different materials of ossiculoplasty including Polycel® and titanium. Especially extrusion rate of BCCG ossiculoplasty appeared 0%. Therefore, we propose our BCCG ossiculoplasty be considered as a useful alternative method especially in patients with Eustachian tube dysfunction. Designing procedure and its application to different cases will be demonstrated.

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Surgery on windows of inner ear (V837)

ID: 837.1

Cholesteatoma surgery with labyrinthine fistula

Presenting Author: **Tommaso Sorrentino**
Tommaso Sorrentino[1], Nader Nassif[2], Francesco Mancini[2], Luca Redaelli DeZinis[2]
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Learning Objectives: To give suggestions on the treatment of labyrinthine fistula in cholesteatoma surgery and the risk of hearing loss.

Introduction: Labyrinthine fistula is one of the most common complications of chronic otitis media with cholesteatoma. The aim of this study is to identify factors that may foresee evolution of hearing in case of cholesteatoma surgery with labyrinthine fistula.

Methods: We did a retrospective study on patients undergone tympanoplasty for cholesteatoma with labyrinth fistula. For each case were noted localization/s and the features of the fistula, treatment of the cholesteatoma and the fistula, and air and bone conduction thresholds before and after surgery.

Results: 75 ears has been evaluated. Only for 26.7% of the patients complained about hearing loss at diagnosis, while all but 3 patients presented hearing loss at audiometric testing. The fistula interested the lateral semicircular canal in 81.3%, while interest multiple canals in 18.7% of the cases. The fistula was membranous in 22.7 % cases, while bony in 77.3 % of cases. The size of the fistula was inferior to 2 mm in 60% of the patients, and superior to 2 mm in 40%. Only 21.3% patients underwent canal wall up , while 78.7% underwent canal wall down tympanoplasty. In 33.3% of the cases the matrix of the cholesteatoma was left in place on the fistula. In the other cases it was remouved and the fistula was covered. In 17.3% of cases we don't have details. The mean preoperative bone conduction thresholds was 30.8 dB. The mean postoperative bone conduction thresholds was 35.3 dB. Hearing loss was more significant at 1 and 2 Khz. The risk of hearing loss was statistically correlated to the presence of multiple, membranous fistulae and if the size of the fistula was superior to 2 mm.

Conclusions: In case of labyrinthine fistula the risk of hearing loss is not correlated to the surgical procedure, but mainly on the feature of the fistula. Probably in case of large, multiple fistulae the membranous labyrinth may be damaged not only by surgery but also by inflammatory and infective process.

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Surgery on windows of inner ear (V837)

ID: 837.2

Removal of cholesteatoma matrix from inner ear fistula

Presenting Author: **Harukazu Hiraumi**

Harukazu Hiraumi, Hiroaki Sato
Iwate Medical University

Learning Objectives:

The inner ear fistula is a frequently encountered complication of a cholesteatoma. During the removal of cholesteatoma matrix covering the inner ear fistula, meticulous care should be taken not to insult the inner ear. To minimize the inner ear damage, we preserve the periosteum around the inner ear fistula during the removal of cholesteatoma matrix. With this technique, the damage to the endosteum is minimized. This is very important, especially in case with cochlear fistula. In this video workshop, we present our technique in the removal of cholesteatoma matrix from inner ear fistula.

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Surgery on windows of inner ear (V837)

ID: 837.3

Hearing preservation techniques in semicircular canal surgery

Presenting Author: **Vincent Van Rompaey**