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Modern training of otologic surgery (N835)

ID: 835.2

Development and validation of a temporal bone prototype

Presenting Author: **David Bakhos**

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Learning Objectives:

Background: Inexperienced otologists require training on the temporal bone drilling process, prior to any surgical activity. The shortage of cadaveric temporal bones exerts pressure to create realistic physical prototypes. We described the devlioppement and validation of an artificial temporal bone (TB) model devoted to surgical training and education.

Material and Methods: A helical computed tomographic (CT) scan was used to acquire high-resolution data of cadaveric TB. Digital imaging and communications in medicine data were converted into .stl files after data processing. Cadaveric TBs were prototyped using stereolithography. Validation of the prototype needed several steps.

First, we validated the TB prototype using on CT scan and visualization of anatomic landmarks during TB drilling of the cadaveric TBs and prototyped bones. The second step was the validation of the prototype with otologist experts. Twenty-five prototypes were sent to 25 otologists, accompanied by a 20-item questionnaire in order to have their satisfaction rate and feeling about the prototype. At last, we investigated with a sclae the use of temporal bone prototype for drilling performance during residency.

Results: Concerning the validation of the prototype using CT scan and drilling, measurements of volume and distance showed no significant difference between prototypes and cadaver TBs. Concerning the otologist experts, satisfaction rate was 92 per cent. The overall prototype score was 48.87 out of 60. Limitations of the model included an excessively vivid facial nerve colour and difficulty in identifying the posterior semicircular canal. At last, the use of an artificial TB showed a significant improvement about drilling performance in residency.

Conclusion: The prototype appears to provide an attractive solution to the shortage of cadaveric TBs and interest in the model for drilling technique training for inexperienced otologists ans show an improvement in term of performance.

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Modern training of otologic surgery (N835)

ID: 835.3

Dissection as a teaching tool in otologic surgery

Presenting Author: **Valérie Franco-Vidal**

Valérie Franco-Vidal, Damien Bonnard, Vincent Darrouzet
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Learning Objectives:

Ear surgical techniques require progressive training. Cadaveric temporal bone drilling practice constitutes an essential stage in training for the surgical approach to these complex anatomic structures. The resident in training must master the use of the surgical microscope, the burr, and fine drilling instruments used in otological dissection. This kind of practice is also necessary to learn anatomy of the temporal bone in surgical position which is different from the imaging and the classical anatomical representation. Since a few years, due to economical reasons, the operating duration has to be more and more limited, and time spent for teaching in the operating room is dramatically reduced. Cadaveric temporal bone dissection is a good alternative teaching method. Finally, learning from its mistakes is necessary in surgical practice and it is of course safer on cadaveric specimen than on living beings. The pedagogic interest of this kind of teaching has been largely demonstrated, and is an additional tool, with virtual surgery and simulators increasing surgical practice acquisitions safely.

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Modern training of otologic surgery (N835)

ID: 835.4

Interest and validity of 3D simulator in otologic surgical training program

Presenting Author: **Cécile Parietti-Winkler**

Cécile Parietti-Winkler
University Hospital of Nancy

Learning Objectives:

Middle ear surgery requires thorough knowledge of middle-ear anatomy and great surgical precision. However, training tools remain limited: absence of animal model and lack of access to cadaveric temporal bone hampers the

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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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**