

**Conclusion:** Removal of cholesteatoma matrix and sealing should be performed in one-stage procedure in LF, because its disease progression and additional infection may cause. We think that the multi-layered reconstruction of LF is desirable to prevent postoperative perilymph leakage and deterioration of BC hearing level.

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#### ID: IP088

### Review on external auditory canal cholesteatoma and proposal of more clinical classification

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#### Learning Objectives:

**Introduction:** External auditory canal cholesteatoma (EACC) is a relatively rare disease and its etiology is uncertain. There seem no guidelines of its management throughout the world.

**Methods:** Eighteen ears of 17 cases with EACC, which we operated during the past 6 years, were reviewed on its extension and management.

**Results:** The median age was 58 years old (16–80). There are 4 males (1 with bilateral EACC) and 13 females. Preoperative CT showed the lesion localized in the EAC in 18 ears; only bony erosion in 5 ears and bony destruction in 13 ears. Out of 13 ears, extension to the middle ear was found in 2 ears, to the mastoid in 2 ears, and to the both in 2 ears. Canaloplasty alone was performed in 8 ears. Canaloplasty with mastoidectomy was performed in 1 ear. Tympanoplasty was performed in 9 ears; type I in 6, type IIIc in 2, and type W0 (without ossiculoplasty) in 1.

**Discussion:** Although Naim et al reported a classification of EACC based on macroscopic and histological criteria, we here propose alternative, more simple classification based on its extension and treatment modalities; Stage 0 : only surface lesion without bony lesion, Stage I: only bony erosion, Stage II: bony deficit localized in the external auditory canal, Stage III: invasion into the tympanic cavity (T), mastoid (M) or combined (T + M), Stage IV: the adjacent anatomical structure complications (e.g. facial palsy (FP), labyrinthine fistula (LF), petrous bone/skull base destruction (PB), and temporo-mandibular joint destruction (TJ)) Following our classification, there are 5 ears in Stage I, 7 in Stage II, 6 in Stage III (2 in T, 2 in M, and 2 in T + M), 0 in Stage IV. Conservative treatment is recommended in cases of Stage I EACC. For Stage II cases with severe otorrhea, canaloplasty may be needed. Cases of Stage III need tympanoplasty, mastoidectomy, or the both. Treatment for Stage IV cases needs more argument.

**Conclusion:** More clinically applicable classification of EACC is proposed.

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### Regenerative treatment for tympanic membrane perforation with cholesteatoma, tumor, or severe calcification

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**Learning Objectives:** How to regenerate the TM with cholesteatoma, tumor, or severe calcification.

**Background:** We developed a new regenerative treatment for large tympanic membrane (TM) perforations without the need for conventional surgical therapy. This treatment was performed on patients with cholesteatoma, tumor, or severe calcification of the TM.

**Methods:** Twenty-five patients (Age: 9–85; M = 10, F = 15) were selected from patients with or without TM perforation. Ten patients had cholesteatomas, 3 had tumors and 12 had severe TM calcification. They were classified into three groups based on TM perforation size: less than 1/3 of the TM as Grade I (n = 4), 1/3 to 2/3 as Grade II (n = 13) and over 2/3 as Grade III (n = 8). Materials for the TM repair included gelatin sponge with b-FGF and fibrin glue. After lesions were removed through the TM perforation, gelatin sponge immersed in b-FGF was placed over the perforation. Fibrin glue was then dripped onto the sponge. Treatment efficacy was evaluated 6 months post-treatment. Treatment was repeated up to 4 times if complete closure of the TM perforation was not achieved after the first treatment.

**Results:** Complete closure of the TM perforation was achieved in 92% (n = 23/25) of the cases. The average hearing level in all patients with successful TM repair was improved or maintained. No serious sequelae were observed in any patient.

**Conclusions:** This new regenerative therapy is useful not only for patients with simple TM perforations but also for those with cholesteatoma, tumor, or severe calcification without requiring conventional surgical procedures. This innovative regenerative therapy is an easy, safe, cost-effective and minimally-invasive treatment.

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### Cholesteatoma recurrence after endoscopy assisted tympanoplasty

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**Learning Objectives:** The endoscopically assisted surgery of the middle ear is widely used in the world for over 20 years. The aim of the study was to assess the application of this method in comparison to the standard microscopic tympanoplasty in terms of the tendency to recurrence of cholesteatoma.

The endoscopically assisted surgery of the middle ear is widely used in the world for over 20 years. The aim of the study was to compare the use of this method compared to the standard microscopic tympanoplasty in terms of the tendency to recurrence of cholesteatoma.

The study included 45 patients operated in the years 2009 to 2010 due to cholesteatoma. All patients had made canal wall up tympanoplasty with posterior tympanotomy and removing the cholesteatoma from the middle ear. Reconstruction of the tympanic membrane and ossicular chain were performed as needed. Additionally application of endoscope in study group allowed to visualize and removing of the matrix of cholesteatoma from the recesses of the tympanic cavity. We compared the results of treatment of patients five years after the first operation.

To the study group were enrolled twenty-five patients and twenty to the control group. During five years after surgery, again we operated on sixteen subjects in the study group (66%) and ten from control group (50%). The reason of second-look procedure was uncontrollable retraction pocket or apparent recurrence in the pocket in six patients from the study group (24%) and in one case from the control group (5%). The further persons had carried out second-look tympanoplasty to check the tympanic cavity and to perform ossiculoplasty.

The presence of cholesteatoma during reoperation were found in nine individuals in the study group (37.5%) – six recurrences from the retraction pockets (24%) and three residual cholesteatoma in the recesses of tympanic cavity (12%). In the control group the cholesteatoma was found in only two cases (10%). The recurrence from the retraction pocket in one patient (5%) and the residual of cholesteatoma in one person (5%).

We conclude that developed otosurgical technique is the basis of the satisfactory results of treatment. Additional tool is not affected a in crucial way for improving results in terms of score of residual cholesteatoma.

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## ID: IP091

### The development of a new 3D printed temporal bone model and it's comparison to other training models

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**Learning Objectives:** To develop a 3D printed temporal bone that can be used as a training model and to compare it against the Pettigrew bone model, the Voxel-Man virtual reality model and a cadaveric temporal bone.

**Introduction:** There is a need for realistic temporal bone (TB) models for dissection by trainees in otolaryngology. Three

dimensional (3D) printers provide a method of replicating realistic models. We have developed the first UK 3D TB model (3D model) to our knowledge and compared it to a Pettigrew model (PM), Voxel-Man virtual reality model (VMM) and a cadaveric TB model (CM).

**Methods:** The production of the 3D model will be discussed using an Object 3D printer. Different colours and materials were used to enhance realism. A senior ENT trainee and post CCT fellow separately dissected and rated the 4 models assessing their realism to a live TB dissection using a 5 point rating system.

**Results:** The cadaveric model was the closest to a living TB in all category ratings. Amongst the other models, the 3D model rated excellently for “anatomical feel” but due to technical difficulties in the manufacturing process anatomical accuracy was poor. Pros and cons of each of the models are discussed including how the 3D model will be improved to an acceptable standard for ENT trainees to dissect.

**Conclusions:** With improved manufacturing of the 3D model, trainees will have access to relatively cheap, high quality models to dissect. All models evaluated have varying benefits to the trainee dependant on the stage of their training. The 3D model will be utilised in the region's training programme in the future.

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## ID: IP092

### How to achieve a dry care free mastoidectomy cavity

Presenting Author: **Udi Katzenell**

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**Learning Objectives:**

**Objectives:** This study investigates the clinical results of canal wall down mastoidectomy (CWDM).

**Methods:** The clinical records of patients who had primary or revision canal wall down mastoidectomy between 9/2011 and 12/2015 in Kaplan Medical Center were reviewed. All surgeries were performed in a uniform technique by two experienced surgeons.

**Results:** 39 patients had CWDM with the average age of 34 years (5–87). 72% (28) were male and 11 (28%) were female. For 51% (20) it was a revision surgery. 46% (18) had a contralateral pathology and 7(18%) had contralateral surgery. 7% (2) had recurrence of the cholesteatoma after surgery. The Nadol cavity grading after surgery was grade 0 (No discharge events and no granulations) in 71% (22) of the patients, grade 1 (one event of discharge which is shorter than two weeks in the past three months or no discharge with a sensation of a wet ear) in 13% (4) and grade 2 (persistent