

Learning Objectives:

Introduction: Visualization of endolymphatic hydrops (EH) has recently become possible using MRI with contrast agents. EH could be found in cases of candidates for middle ear surgery, such as otosclerosis or ossicular anomaly. Preoperative EH could be a risk factor for inner ear disturbances following surgery. We investigated the presence of EH on MRI in ears with clinical otosclerosis or ossicular anomaly, and evaluate the efficacy of such MRI evaluation for the management of middle ear surgery.

Subjects and methods: Subjects diagnosed as having otosclerosis and agreed to MRI examination were randomly recruited in the study. Ears were evaluated by MRI performed 4 h after intravenous injection of gadolinium. The degree of EH in the vestibule and cochlea was classified into three grades (none, mild, and significant). Imaging data were compared with clinical findings. In ears operated, imaging data concerning the degree of EH were compared with postoperative clinical findings.

Results: Varying degrees of cochlear EH and vestibular EH were observed. Episodes of acute sensorineural hearing loss with rotatory vertigo occurred in some ears that showed severe EH in the cochleae and vestibules. Severe EH, however, was also observed in ears without such symptoms. The postoperative course in all ears with no EH in the vestibule was uneventful, with successful improvement of hearing levels, but a case with severe EH in the vestibule had postoperative nystagmus and long period of dizziness.

Conclusions: The presence of EH in ears with otosclerosis was clearly visualized in the present patient series. Moreover, the presence of EH in the vestibule on MRI might be a high risk factor in ears that are candidates for stapes surgery. Such MRI evaluation could provide useful information for managing symptoms related to EH.

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Free Papers (F832)**ID: 832.5****A New Postoperative Adjustable Middle Ear Prosthesis**Presenting Author: **Ismail Kuru**Ismail Kuru¹, Hannes Maier², Thomas Lenarz², Tim C. Lueth¹¹Technische Universität München, ²Hannover Medical School

Learning Objectives: • A new concept of a self-adapting middle ear implant for ossicular chain reconstruction in Tympanoplasty • The prosthesis has a spring-damper-element, that conducts the sound and adapts the length of the prosthesis • The spring-damper-element is made of implantable silicone material.

Introduction: The Tympanoplastic-III is a common method to treat conductive hearing loss by reconstructing the ossicular chain with a passive prosthesis. However, the state-of-art prostheses can only be adjusted intraoperatively and cannot adapt to the postoperative changes. Hence, suboptimal tensions on the tissues and hearing may result. Furthermore, these changes may cause prosthesis luxation, if the prosthesis is too short, or extrusion, if it is too long. Both complications require revision surgery.

Methods: We propose a new postoperative adjustable prosthesis for ossicular chain reconstruction with a spring-damper-element (SDE). The SDE conducts the sound waves from the prosthesis head to the prosthesis foot, while it can adapt the distance between them. The SDE consists of a closed elastic cover (spring) and a fluid fill (damper), both made of implantable silicone material. Under dynamic loads (e.g. sound waves) the damper stiffens and conducts. Under static loads (e.g. ambient pressure variations), the damper yields to a constant force when the spring contracts or extends the prosthesis.

Results: We have built a prototype as total ossicular replacement prosthesis (TORP). We have tested our prototype in our custom middle ear model. The prototype was built too long for the model, so that we could simulate a suboptimal reconstruction. Our preliminary measurements on the stapes footplate response to sound showed that the sound conduction of our prototype was approx. 4.5 dB higher compared to a commercial TORP of the same length. In a second experiment, we could show that the prototype could reduce the tension on the stapes footplate under varying ambient pressure compared to the commercial TORP.

Conclusion: Our results show, that an implantable SDE can be manufactured and it is a promising way to limit the preload, to prevent extrusion, stabilize the prosthesis against luxation and maximize sound conduction, so that the complications can be reduced to a minimum.

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Free Papers (F832)**ID: 832.6****Tissue engineered mastoid air cells' regeneration for intractable otitis media**Presenting Author: **Shin-ichi Kanemaru**Shin-ichi Kanemaru¹, Rie Kanai¹¹Medical research institute, Kitano Hospital**Learning Objectives:** How to regenerate middle ear gas exchange function.

Aim: Most chronic otitis media(OMC) are observed poor development of mastoid air cells(MACs) and poor function of Eustachian tube. In order to a complete recovery from intractable otitis media, regeneration of the MACs' gas exchange functions is thought to be need. In this study, we implanted autologous bone fragments as a scaffold and gelatin sponge soaked in basic-fibroblast growth factor (b-