

losses. However surgery should be individually tailored in majority of the cases.

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Middle ear implants in chronic ears (R774)

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Middle ear implants in chronic ears (R774)

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Learning Objectives: To learn how active middle ear implants can contribute to hearing restoration in reconstructive middle ear surgery, especially in chronic ears and mastoid cavities. The RT discusses the coupling strategies to deliver vibrations to the cochlea, compares different coupling methods and reports on the experience in different countries. Also experience with Revision Surgeries, and strategies how to avoid complications are discussed.

During the round table the panelists comment and discuss in a structured way with the audience, how active middle ear implants can contribute to hearing restoration in reconstructive middle ear surgery, especially in chronic ears and mastoid cavities. The RT discusses the coupling strategies to deliver vibrations to the cochlea, compares different coupling methods and reports on the experience in different countries. Also experience with Revision Surgeries, and strategies how to avoid complications are discussed.

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Basic research on the otological fields (N775)

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Regulation of osteoclasts is required to maintain morphology and function of ossicles in middle ear

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Little is known about how bone-resorbing osteoclasts play a role in the vibration of auditory ossicles. Osteoclasts are specialized multinuclear macrophages that resorb bone. Once bones develop through endochondral and intramembranous ossification (bone modeling), osteoclastic bone resorption in adults is usually followed and balanced by osteoblastic bone formation through “coupling” mechanisms, which maintain bone integrity (bone remodeling). Turnover of temporal bones including the otic capsule and ossicles is much slower than that of the long bones because the former contain high levels of osteoprotegerin (Opg), which inhibits osteoclast formation. We analyzed hearing function and morphology of ossicles in both osteoporotic and osteopetrotic mice. Ossicles in Opg deficient (*Opg*^{-/-}) mice are massively resorbed by abundant osteoclasts, resulting in impaired hearing function. In *Opg*^{-/-} mice, the ligament at the junction of the stapes and the otic capsule is lost by bony ankylosis. In addition, administration of the anti-resorptive drug bisphosphonate prevents not only erosion of auditory ossicles but also progression of hearing loss, suggesting that excessive bone resorption underlies impaired hearing in *Opg*^{-/-} mice. Conversely, osteopetrotic mice, which lack osteoclasts due to either c-Fos or RANKL deficiency, show a smaller volume of the tympanic cavity but larger ossicles compared to controls. The malleal process brevis thus touches the medial wall of the tympanic in osteopetrotic mice. These data demonstrate that regulation of osteoclastic bone resorption is required to maintain morphology of ossicles and normal hearing function.

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Basic research on the otological fields (N775)

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N775 (Basic Research on the Otological Fields), Middle Ear Mucosal Regeneration by Nasal Mucosal Epithelial Cell Sheets Transplantation

Presenting Author: **Hiromi Kojima**

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Learning Objectives: Postoperative regeneration of the middle ear mucosa and pneumatization of the middle ear cavity are of great importance after middle ear surgery. This study developed a new method to transplant autologous nasal mucosal epithelial cell-sheets into the damaged middle ear cavity. The aim of this study was to evaluate postoperative healing after the transplantation of the cell sheets in rabbits. Rabbit nasal mucosal epithelial cell-sheets were fabricated from a temperature-responsive culture dish and transplanted into the damaged middle ear of rabbit, which was surgically created. The healing of middle ears was evaluated with histological methods and computed tomography findings at 8 weeks after transplantation. Functional evaluation was performed by measuring the maximum middle ear total pressure reflecting a trans-mucosal gas exchange function. Two control groups were used: the normal control group and the mucosa-eliminated control group. Transplantation of nasal mucosal epithelial cell-sheets