

**Learning Objectives:** Obliteration of radical cavities in canal-wall down (CWD) operations due to cholesteatoma with autologous cortical bone chips, bone pate and meatally-based musculoperiosteal (Palva) flap technique is safe and considerably stable in terms of cavitation and hearing outcome. In our material, no intracranial complications due to hidden residual cholesteatoma have been observed.

In Helsinki University Hospital we are used to obliterate radical cavities in canal-wall down (CWD) operations due to cholesteatoma with autologous cortical bone chips, bone pate and meatally-based musculoperiosteal (Palva) flap technique. In this study we retrospectively evaluated 70 patients operated in our institution during 1986–1991 with a mean follow-up of 18 years. Outer ear canal configuration was evaluated with a modified Likert scale (1–4) and outer ear canal physical volume assessed by tympanometry. The posterior wall of the ear canal and the attic region were analyzed separately. The posterior wall results were 1.8 ( $\pm$  0.9 SD) in Likert scale and the attic region 1.8 ( $\pm$  0.9 SD) indicating no cavity formation or minor formation of a cavity. The functional result was usually good. The mean volume of the operated ear canal was 1.7 ( $\pm$  0.5 SD) ml. The volume of the contralateral ear canal was 1.2 ( $\pm$  0.3 SD) ml. One tympanic membrane perforation was seen. An aerated tympanum was found in 52 patients and an adhesive tympanum was found in 18 patients. In audiometry a comparison of the current mean ABG to the preoperative mean ABG and to the ABG at one-year postoperatively, 5-years postoperatively or 10-years postoperatively showed no statistical significance. 36% of the patients had an excellent or good air-bone gap closure in the operated ear after follow-up. The need for debridement generally diminished over time and 50% of the patients had no need for debridement of the cavity after 18 years' of follow-up. To date no intracranial complications due to hidden residual cholesteatoma have been observed. In summary, our obliteration method is considerably stable in terms of cavitation and hearing outcome.

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## Long-term results of chronic ear surgery (R711)

### ID: 711.2

#### Our long-term outcomes of tympanoplasty and mastoidectomy in patients with cholesteatoma and chronic otitis media (COM)

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**Learning Objectives:** How to report on term results of tympanoplasty and mastoidectomy.

**Introduction:** (1) Exact etiology of middle ear cholesteatoma remains unknown and its recurrence is unavoidable during the long-term follow up. We showed recurrence rate using Kaplan-Meier analysis because follow-up patients decreased with the time. (2) We analyzed the long-term outcomes of perforated COM using multivariate analysis to examine the prognostic factors and to determine whether mastoidectomy is useful for tympanoplasty in patients with perforated COM.

**Subjects:** (1) Between 1987 and 2002, 345 patients with cholesteatoma were operated on by the same surgeon. They were 140 attic cholesteatomas (40.6%) and 90 pars tensa cholesteatoma, and 115 other types (33.3%). Canal wall down tympanoplasty (CWDT) was performed in 113 patients (32.8%), canal wall reconstruction (CWR) after CWDT in 70 patients (20.3%) and intact canal wall up tympanoplasty (ICWT) in 162 patients (47.0%). (2) Between 1989 and 2002, 213 patients with perforated COM underwent tympanoplasty with mastoidectomy (34 ears, 16.0%) and without mastoidectomy (179 ears, 84.0%), and were followed up for more than 5 years.

**Results:** (1) The mean follow-up period was 6.3 years. Using the standard calculation method, the 5-year recurrence rate in patients with CWDT and with ICWT/CWR were 3.5% and 12.1%, respectively. Using Kaplan-Meier analysis, they were 3.9 and 16.7%, respectively. (2) Successful hearing outcomes (A-B gap: 20 dB or smaller) was 174/213 (81.7%). Using multivariate logistic regression analysis, normal ossicular chain was the only factor to long-term successful hearing outcomes. Graft success rate was 204/213 (95.8%). There were no significant predictors of long-term successful graft outcomes.

**Conclusion:** (1) Because the follow-up rate decreased with year, Kaplan-Meier analysis shows more correct recurrence rate than the standard calculation method. (2) Mastoidectomy was not a significant factor predicting long-term outcomes.

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## Long-term results of chronic ear surgery (R711)

### ID: 711.3

#### Long-Term Hearing and Functional Outcomes and Complications after Ossiculoplasty

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**Learning Objectives:** To study intermediate-term and long-term hearing results after ossiculoplasty and long-term goodness-of-fit for the ossiculoplasty outcomes parameter staging (OOPS) index.

**Objective:** To study intermediate-term and long-term hearing results after ossiculoplasty and long-term goodness-of-fit for the ossiculoplasty outcomes parameter staging (OOPS) index.

**Patients:** 417 patients (3-88 years of age; 258 adults and 159 children) undergoing ossiculoplasty with tympanoplasty or tympanomastoidectomy using cartilage tympanic membrane grafts, retrograde mastoidectomy with canal wall reconstruction or mastoid obliteration techniques between July 1998 and July 2012. All patients had at least 1 year of clinical follow-up. All patients had a minimum of 1 year of post-operative audiometric data and 185 (44.4%) patients (111 adults and 74 children) had  $\geq$  5 years of post-operative audiometric data.

**Outcome Measures:** Early (<1 year after surgery), intermediate-term (1–5 years after surgery) and long-term (>5 years after surgery) post-operative audiometric data.

**Results:** Hearing results were assessed in all patients with 1 year of longer of audiometric follow-up. Despite worse pre-operative hearing (average intermediate PTA-ABG was 30.2 dB vs. 32.3 dB, respectively;  $p = 0.0421$ ), there was no significant difference between adults and children for early post-operative (average early post-op PTA-ABG [pure tone average air-bone gap] was 18.2 dB vs. 19.6 dB, respectively;  $p = 0.306$ ), intermediate (average intermediate PTA-ABG was 18.4 dB vs. 19.7 dB, respectively;  $p = 0.235$ ), or long-term hearing result (average final PTA-ABG was 18.6 dB vs. 19.4 dB, respectively;  $p = 0.439$ ). There was a significant improvement from pre-op to post-op and long-term PTA-ABG for all comparisons ( $p < < < 0.01$ ). Additionally, the rate of air-bone gap closure to less than 20 dB was not significantly different (63.1% vs. 58.0% for adults vs. children, respectively;  $p = 0.282$ ).

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### Long-term results of chronic ear surgery (R711)

**ID: 711.4**

#### Surgical treatment of adult and paediatric cholesteatoma – a comparison of 6 years follow-up

Presenting Author: **Lennart Edfeldt**

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**Learning Objectives:** The consistent performed and longterm follow-up after cholesteatoma surgery is essential for the evaluation and a prerequisite for a comparison of the surgical results.

**Introduction:** The aim with the study was to present and compare data from two separate studies of a 6-years follow-up after cholesteatoma surgery in adults and children.

**Material and methods:** 301 adult- (330 ears) and 57 paediatric patients were operated for cholesteatoma. In all cases an identical one-stage canal-wall down-technique with reconstruction of the middle ear and mastoid obliteration using autologous bone was used. In the adult group 47% had previous surgery, in the paediatric group 7%.

After surgery a standardized protocol for documentation of the intra- and postoperative findings and surgical steps including a sketch and the preoperative audiometric data -pure tone average (PTA) for air- and bone conduction threshold levels (0.5–3kHz) - were registered in the data based follow-up-program. All patients were examined annually after surgery and the surgical and the audiometric data fed into the program 1, 3 and 6 years after surgery.

**Results:** In the adult group residual disease was found in 3%, in the paediatric group in 5%. The recurrence rate was 10% and 12%. Chain revisions were performed in 19% and

14%. The rate of the postoperative water resistance was 5% and 7%, the postoperative infection rate 3% and 0%.

Long lasting improvement and/or preservation of hearing were obtained in both groups. The pre-and post-operative air conduction hearing levels were 45.8 dB and 35.8 dB in the adult group, in the paediatric group 33 dB and 25.5 dB.

**Conclusions:** Independent of preoperative middle ear condition, cholesteatoma extent and localization, the used surgical technique provided a long-term improvement of hearing with a low incidence of residual and recurrent disease. No differences in outcome between adult and children were found.

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### Free Papers (F712)

**ID: 712.1**

#### Effects of intensive microscopic work on neck and back strain and the benefits of a prototype ergonomic chair

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**Learning Objectives:**

**Introduction:** Musculoskeletal pain is a common occupational hazard experienced by surgeons. Within the ENT community, Otolologists have been noted to experience the most neck and back pain, possibly related to prolonged microscopic work.

**Aims:**

1. To investigate the effects of sustained microscopic work on the neck and back and its correlation to surgical experience
2. To assess the benefits of a prototype ergonomic chair during prolonged microscopic work

**Methods:** A crossover study was performed on 10 male ENT clinicians using a standard operating chair and a prototype ergonomic support chair. We used a subjective measure of time to fatigue and pain for the neck and back as well as objective readings from a surface electromyogram (sEMG).

**Results:** Surgeon experience (years) was correlated with the time (sec) to fatigue at the neck ( $R = 0.91$ ,  $p < 0.001$ ) and back ( $R = 0.76$ ,  $p = 0.01$ ) as well as time to pain at the neck ( $R = 0.74$ ,  $p = 0.01$ ) and back ( $R = 0.78$ ,  $p < 0.01$ ) when the standard chair was used. Group mean time to onset of neck fatigue was 348s, neck pain was 846s, back fatigue was around 502s and back pain was 821s. The prototype ergonomic support chair significantly delayed the sensation of neck fatigue ( $+672 \pm 520s$ ,  $p < 0.01$ ) and neck pain ( $+427 \pm 467s$ ,  $p = 0.017$ ) and also eliminated the