

Abstracts – MEMRO 2006, Zurich July 27–30, 2006

4th International Symposium on Middle Ear Mechanics in Research and Otology

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Tympanoplasty today – an analysis of 11000 cases of reconstructive middle ear surgery – the Würzburg experience

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Nowadays middle ear surgery is not only done to treat mastoiditis and to prevent its complications, which are highly dangerous. Middle ear surgery is also done to restore the hearing. Ojala summed up the situation in the seventies when he stated that „hearing after tympanoplasty usually does not improve (and in some cases even deteriorates)“.

Since Wullstein (Würzburg) described the basic principles of tympanoplasty in the early 50ties, many other otologists made additional contributions to our current knowledge of tympanoplasty. The aims of tympanoplasty have been and still are:

- the elimination of the pathological changes
- to create stable conditions and easy access for postoperative care
- to reconstruct the sound conduction mechanism.

Numerous grafting materials have been recommended for the closure of tympanic membrane perforations. This paper evaluates three different grafting materials for the reconstruction of the tympanic membrane:

- Perichondrium
- Cartilage
- Perichondrium-Cartilage Composite Graft

The study is based on a computerized documentation system called „Würzburger Ohrbogen“. This system includes now more than 11000 patient's records. The database comprises information on surgical details (324 items) and patients follow up. All patients included in the study had a minimum follow up of 6 months. The aim of the study was to analyse the audiological results of different grafting materials, which were combined with ossicular chain reconstruction.

In general, the audiological results achieved in ears which needed a tympanoplasty type I or III showed postoperatively for 80 % of the patients an improved hearing compared to preoperatively. The best hearing results were achieved in those ears in which primary tympanoplasty type I was performed without ossicular chain reconstruction (type I tympanoplasty). The grafting materials we used (perichondrium, cartilage palisades, perichondriumcartilage composit graft (PCCG)) showed 6 months postoperative a similar air bone gap. The audiograms were measured for the frequencies from 0.5 kHz to 8 kHz. Hearing results were best at 2 kHz.

As expected, those patients who required type III TORP tympanoplasty enjoyed less hearing recovery than those who required a type I tympanoplasty or a PORP.

Perichondrium and the cartilage techniques led to similar results.

It should not be unmentioned that re-perforations occurred. The perforation closure rate in type III tympanoplasties was 92.3%, the total re-perforation rate was 7.7 %.

Based on temporal bone studies using a laser doppler vibrometer also the influence and the audiological quality of different middle ear prostheses is discussed. The results of the temporal bone study as well as the initial clinical findings using a new light titanium (n=396) prostheses are discussed. Not surprisingly the combination of different graft materials and different prostheses led to similar clinical results except in type III TORP tympanoplasty. In these type of tympanoplasty with a reconstruction of the ossicular chain between stapes footplate and reconstructed eardrum significant better results were obtained when using cartilage. Based on our data we can conclude that tympanoplasty nowadays is able to improve the hearing.