



## Audiometric and Operative Results in Type I Tympanoplasty Resident Training at the M.P. Shah Medical College (Saurashtra University), Jamnagar, India

**Authors:** Keyur Mehta\*, Vikas Sinha\*\*, Viral A. Chhaya\*\*\*, Dilavar A. Barot\*\*\*\*, Parin Patel\*\*\*\*\*, Swapna Patil\*\*\*\*\*, Vishal A. Parmar\*\*\*\*\*, Prashanth C. D\*\*\*\*\*, Hiten Maniyar\*\*\*\*\*

\* Registrar, \*\* Dean & Professor ENT, \*\*\* Professor & Head, \*\*\*\* Assistant Professor, \*\*\*\*\* Resident, \*\*\*\*\*Former Registrar

**Institution:** Department of Otorhinolaryngology and Head and Neck Surgery, M.P.Shah Medical College, Jamnagar, India.

**Corresponding Author:** Dr. Vikas Sinha, Dean Prof. E.N.T., M.P.Shah Medical College, Jamnagar, India  
[dr\\_sinhavikas@yahoo.co.in](mailto:dr_sinhavikas@yahoo.co.in)

**Abstract:** A prospective study was performed to evaluate audiometric and surgical outcomes of 50 patients operated on by ENT residents in the ENT Department of the M P Shah Medical College Jamnagar, India. The success rate of the graft taking was 94% and the average hearing gain was 13dB in 62% of the cases irrespective of their preoperative degree of hearing loss or size of perforation.

All patients underwent audiological assessment (pre and postoperatively) for a Type I Tympanoplasty (myringoplasty) operation using a post auricular approach and an underlay technique. All 50 patients had a history of chronic suppurative otitis media. Patients having a cholesteatoma were excluded from this study. All the patients were evaluated with a detailed history and clinical examination including audiological assessment (tuning fork tests and pure tone audiometry). The degree of closure of their air-bone gap was recorded postoperatively at one and three month intervals.

The factors affecting the outcome of hearing improvements were analyzed. The majority of the patients, 92% (n = 46), presented with an infectious etiology, with 68% (n = 34) of the patients having a past history of recurrent upper respiratory tract infection. Eight percent (n=4 cases) of the patients presented with a traumatic etiology for their perforation.

Hearing improvement was seen in 84% patients. Thirty-eight percent (n = 19) of these patients presented with a moderate sized perforation (greater than 25% to 75% of the tympanic membrane) and 46% (n=23) presented with a large perforations (greater than 75% of the tympanic membrane). Sixty percent (n=30) of these patients had a moderate degree of hearing loss preoperatively.

**Introduction:** Hearing loss is a global problem with 275 million of the worlds population suffering from moderate or greater degrees of decreased hearing acuity according to the WHO survey in 2001.<sup>1</sup> The disease is more commonly seen in developing countries. The aim of this study is to identify the prevalence of various degrees of hearing loss in patients with tympanic membrane perforations and to report the success rate and hearing improvement after the patients undergo a Type I Tympanoplasty using an underlay technique. The patch test has a direct relation on the final outcome of hearing improvement in the post treatment patient. Comparison of the average air-bone gap in pre and postoperative successful cases was performed and the average gain in air-bone gap and factors affecting it, were identified.

**Material and Methods:** Fifty patients with a history of chronic suppurative otitis media (without cholesteatoma) underwent a Type I Tympanoplasty (myringoplasty) by ENT residents in the ENT department of M P Shah Medical College Jamnagar, India. Only patients with a tubo-tympanic variety of chronic suppurative otitis media with a dry ear for at least four weeks prior to surgery were entered into the study. All the patients underwent a detailed history, clinical examination, ENT examination and detailed audiological assessment.

Fifty percent of the patients presented with a history of ear discharge as a chief complaint and 20% presented with hearing loss as the only chief complaint. The remaining patients had both ear discharge as well as decreased hearing. Fifty-two percent were male and 48% were female (n=50). There was no significant male female ratio. The mean age was 40 years with a range of 15 years to 60 years. Sixty-eight percent (n=34) of the cases presented with a late history of disease process for more than twelve months.

An infectious etiology was seen in 92% of patients out of which 68% had a past history of recurrent upper respiratory tract infection. Only 8% of the patients presented with a traumatic etiology. The most common presentation was a moderate-sized perforation in 38% of the patients (n=19) and a large perforation in 46% (n=23) of the patients. (Small perforations are less than or equal to 25% of the area of the tympanic membrane, moderate sized perforations are greater than 25% to 75% of the area of the tympanic membrane and larger perforations are greater than 75% of the area of the tympanic membrane<sup>8</sup>)

All patients were operated using an underlay myringoplasty technique with a temporalis fascia graft.

Audiological evaluation included a patch test preoperatively, and at the first and third month's postoperative visit. The patch test was performed using cigarette silver paper. The paper was cut slightly bigger than the size of perforation and applied over the perforated drum by the use of liquid paraffin under the microscope. Pure tone audiometry was then performed and the gain in air-bone gap was assessed.

**Results:** The study group was divided according to degree of deafness into mild, moderate and severe as per Table I. A moderate degree of hearing loss was present in 60% (n=30) of the cases and a mild degree of hearing loss was present in 32% (n=16) of cases. A severe degree of hearing loss was seen in only 8% (n=4) of cases. The average air-bone gap which was 27 dB preoperatively and improved to 14 dB postoperatively. A successful graft take produced a reduction in the air-bone gap of between 11 to 30 dB.

From this study it was evident that in 50% of the patients, the presenting complaint was ear discharge having a duration of more than twelve months. Hearing loss was present as a sole complaint in only 20% of

cases. Patients were most commonly in their middle age and had an infectious etiology. A history of recurrent upper respiratory tract infection was present in 68% cases, which is similar to rates reported in other studies.<sup>2</sup>

Large to moderate size perforations with a moderate degree of hearing loss was present in the majority of cases. All patients (N = 42) in Table III that had an improvement in hearing also had a hearing improvement post operatively and are included in Table IV. 66.6% of the patients who underwent patch testing had a 11-30 dB gain in hearing.

65% of the total cases that under went tympanoplasty also showed a gain in their air-bone gap (Table IV). The average air-bone gap in successful cases of Type I Tympanoplasty was 27 dB as compared to 22 dB reported by P Packer, et al.<sup>3</sup> and 40 dB in M Tos.<sup>4,5</sup> The postoperative average air-bone gap at the third month post operative visit was 14 dB as compared to 10 dB reported by P Packer, et al.<sup>3</sup> and 2 and 27 dB reported by M Tos.<sup>4,5</sup> Sixty-eight percent of the patient showed an average gain in the air bone gap of approximately 11 to 30 dB which was not related to the size of the pre operative air-bone gap, size of the perforation or duration of the disease. These results are comparable to that reported by P Packer, et al.<sup>4,5</sup> where 12 dB postoperative hearing improvement was seen in 60% of cases.

**Table I Grading of Deafness<sup>6</sup>**

- Normal 0-25 dB
- Mild 26-40 dB
- Moderate 41-55 dB
- Severe 56-70 dB
- Very Severe 71-90 dB
- Profound > 90 dB

**Table II Size of perforation and degree of deafness**

	No of Cases	Mild deafness	Moderate deafness	Severe deafness
<b>Small Perforation</b>	8	3	5	-
<b>Moderate Perforation</b>	19	7	11	1
<b>Large Perforation</b>	23	6	14	3
<b>Total</b>	50	16	30	4

**Table III Air bone gap gain between patch test.**

Gain in dB	Patch Test (% n = 42)
<b>0-10 dB</b>	10 (23.8%)
<b>11-30dB</b>	28 (66.6%)
<b>&gt; 30 dB</b>	4 (9.5%)
<b>Total</b>	42

**Table IV Gain in hearing in successful postoperative cases (Includes all of the 42 patients who had improvement in hearing).**

Gain in dB	Successful Postoperative Patients (% n = 47)
0-10 dB	13 (27.6%)
11-30dB	31 (65.9%)
> 30 dB	3 (6.3%)
Total	47

**Conclusion:** Hearing loss is the most common presenting complaint in the chronic suppurative otitis media patient. There is no significant male female ratio. The most common etiology was an infectious etiology caused by an upper respiratory tract infection. The majority of patients presented during the late course of their disease process and had a moderate hearing loss which affected their routine day to day life. A pre operative positive patch test was found to have a direct correlation with the final hearing outcome of the post operative patient. A Type I Tympanoplasty gave good post operative air bone gap closure, with a gain of over 10 dB in over 72% of cases. The gain in hearing could not be predicted by the preoperative size of perforation or preoperative air bone gap.

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