

## Study of Influence of Factors on Graft Uptake in Tympanoplasty Surgery

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**Abstract:** Myringoplasty is the operation specifically designed to close tympanic membrane defects. The main aim of surgery of chronic ear disease is to eliminate disease process and reconstruct middle ear to give the patient a dry safe and functioning ear. In this study a clinical study of myringoplasty underlay technique in the management of central perforations done. Main emphasis is laid on evaluation of factors like Eustachian tube function, middle ear mucosa at operation, size of perforation, duration of otorrhoea, duration of deafness, sex distribution, age distribution in graft uptake after tympanoplasty. A series of patients treated in the Department of ENT, Government General Hospital, Kurnool during the period of two years is taken for the study.

**Keywords:** Tympanoplasty, Graft uptake, Eustachian tube function, middle ear mucosa, Sex distribution, Otorrhoea duration

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### I. Introduction

Myringoplasty is the operation specifically designed to close tympanic membrane defects. A perforation in the tympanic membrane can result from physical injury, scalds, burns, pressure effects, head injuries or infection process; out of this suppurative process is the most common cause. Most of these perforations usually heal spontaneously. But this spontaneous healing is hampered by chronicity of infection and certain pathophysiological changes at the perforated margin, leading to a non healing permanent perforation. The main aim of surgery of chronic ear disease is to eliminate disease process and reconstruct middle ear to give the patient a dry safe and functioning ear. Current tympanoplasty techniques primarily involves grafting with temporalis fascia(ref). Temporalis fascia contain collagen and mucopolysaccharides. These two components provide it with tensile strength and for this reason it does not get easily autolysed even in the presence of infection. In this journey towards the aim, the first milestone is reconstruction of tympanic membrane. In this study a clinical study of myringoplasty underlay technique in the management of central perforations done. Main emphasis is laid on evaluation of prognostic factors like Eustachian tube function, middle ear mucosa at operation and audiometric evaluation. A series of patients treated in the Department of ENT, Government General Hospital, Kurnool during the period of two years is taken for the study. Relevant literature regarding anatomy, physiology, pathophysiology, clinical features and various methods of medical and surgical management are reviewed.

### II. Materials And Methods

A prospective study was carried out at Dept. of ENT and HN Surgery KMC, Kurnool, as part of thesis submission, during period 2006-08. Fifty cases of CSOM with deafness aged between 15-45yrs age group and all cases with Middle ear risk index between 1to3, were taken up for type I Tympanoplasty, with temporalis fascia as graft material. Simple Mastoidectomy was done in cases where mucosa was found abnormal.

Exclusion criteria

1. Infection in nose sinuses, nasopharynx and oropharynx.
2. Deviated nasal septum enlarged inferior turbinate, polyp in the nose.
3. Sensori neural hearing loss.
4. Atticoantral disease cholesteatoma.,

Preoperative evaluation

Duration of Otorrhea, duration of deafness, size of perforation, Eustatian tube mucociliary clearance by dye test, status of middle ear mucosa pathology at operation, were assessed. Pre and post operative pure tone audiograms were taken to assess pure tone average hearing gain air bone gap closure.

Postoperative follow up

Graft uptake was assessed by otoscopy at eight weeks postoperatively. Postoperative audio –grams were taken to assess the improvement in hearing. Patients are categorized for each variable, to be assessed and the base line data thus obtained is analyzed. The analyses of results obtained are represented in a tabular form.

**Tympanoplasty reporting protocol**

Deafness grading Mild = 21 to 40db loss, Moderate = 41 to 55db loss, Severe = More than 55db loss,

1. Size of perforation :Large = More than 50% of T.M surface area, Small = Small than 50% of T.M surface area
2. Mucociliary clearance of Eustachian tube : Abnormal = dye not seen within 10min Normal= dye seen within 10min
3. Postoperatively graft uptake was assessed at 8 weeks postoperative period  
Assessment of Eustachian tube function

Just prior to operation, Eustachian tubal function was tested by nasal endoscopy following instillation of 15 drops of fluorecein sodium dye (one in five dilution of 20% solution – sterile) into external auditory canal of the ear with perforated tympanic membrane. Cases in which, the dye was seen at nasopharyngeal end of tube within 10 min of its instillation into the ear were classified as having normal patent Eustachian tubes and others as having abnormal blocked eustachian tubes.

**III. Observations**

Postoperatively graft uptake was assessed at 8 weeks and found that in 78% of the cases it is successful . 64% of the patients presented with duration of Otorrhea for more than 5yrs which shows graft uptake of 66%, 86% of the patients presented with duration of otorrhoea for less than 5yrs with graft uptake of 100%. 54% of the patients presented with age more than 25yrs with graft uptake 74%, 46% of patients are with age less than 25 years with graft uptake 83%. 64% of the patients are females with graft uptake 87%, 36% patients are males with graft uptake78%. 58% of the patients are mildly deaf 34% moderately deaf 8% were severely deaf. Duration of deafness more than 5 years in 14% with graft uptake 100%, duration of deafness less than 5 years in 86% patients with graft uptake 51%. 58% of the patients presented with small tympanic membrane perforation with graft uptake 93% and 42% presented with large perforation with 61% graft uptake. Eustachian tube mucociliary clearance assessed by dye test showed that the test is abnormal in 54% with graft uptake 59%, test is normal in 46% patients with graft uptake 100%. Middle Ear mucosa Pathology was assessed at operation and in 58% of the cases it was found normal with 100% graft uptake, in 42% cases it is abnormal with graft uptake 48%. 4 types of middle ear mucosa pathology encountered a) Polypoidal b) Granulations c) Tympanosclerosis . Simple Mastoidectomy was done in cases showing abnormal middle Ear mucosa Pathology. When. The average hearing gain in db observed in the study population is 7.7db.The average air bone gap closure achieved in the study population is 9.75db.

**Table. 1** Graft uptake in different variables

S.No.	Variable	Graft uptake %	No. of cases/ Total cases
1.	Age more than 25 years	74%	20/27
2.	Age less than 25 years	82.6%	19/23
3.	Males	78%	14/18
4.	Females	87%	28/32
5.	Duration of otorrhoea more than 5 years	65.6	21/32
6.	Duration of otorrhoea less than 5 years	100%	18/18
7.	Duration of deafness more than 5 years	100%	7/7
8.	Duration of deafness less than 5 years	51%	22/43
9.	Small perforation	93%	27/29
10.	large perforation	61%	13/21
11.	Normal eustachian tube function by Dye test	100%	23/23
12.	Abnormal eustachian tube function by Dye test	59.2%	16/27
13.	Normal Middle ear mucosa	100%	29/29
14.	Abnormal Middle ear mucosa	48%	11/21

**IV. Discussion**

The present study was undertaken, 1) to evaluate patients undergoing type –I tympanoplasty for Chronic Suppurative Otitis Media with Deafness in terms of Graft uptake and , 2) to evaluate the relative incidence of the following factors viz., a) Age distribution b) Gender distribution c) Duration of otorrhea d) Duration of deafness e) size of perforation f) Eustachian Tube mucocilliary clearance function, g) Middle ear mucosa pathology at operation in patients undergoing Type –I Tympanoplasty 3)The surgical outcome measures and relative incidence of these factors will be compared with that of similar studies .The final objective in myringoplasty is to achieve a safe, dry ear, with an intact tympanic membrane. Most authors agree

that preoperative abnormalities indicative of severity of underlying Eustachian tube dysfunction and Infection have a significant influence on prognosis .

In the present study 54% of the patients are of more than 25yrs of age. 46% of them were in the age group of less than 25yrs. The graft uptake rate in patients of more than 25 years of age is 74% and in age group less than 25 years is 82.6%. As compared with the values of Jain k et al<sup>1</sup> graft uptake in age more than 26 years patients is 90% and patients with age less than 26 years is 84% which is differing with present values . As described by many studies graft take up may be more in younger age groups but if the cochlear reserve is good then same outcome can be achieved The age distribution in graft uptake is an insignificant factor.

The sex distribution in the present study showed 36% of males and 64%. Females. In our study, females were predominant over males. In present study graft uptake in males is 78% and in females is 87%. As compared with the values of Jain K et al<sup>1</sup> in males graft uptake is 83.33%, in females it is 90.4% which is coinciding with the present study with a little increase in graft uptake in females. According to Masour Naderpour et al<sup>2</sup> there was no statistically significant correlation between sex and success rate, which was similar in other studies

In patients with Duration of deafness more than 5 years the graft uptake rate is 100% as compared to patients with duration of deafness less than 5 years which is 51%. This is statistically insignificant.

In patients with Duration of otorrhoea for more than 5 years the graft uptake is 65.6%, and patients with duration of otorrhoea less than 5 years which is 100%. According to Yojana Sharma et al<sup>3</sup> Total 103 patients were studied, group A (wet ear) had 67 and group B (dry ear) had 36 patients. Graft take up rate was 94% in wet ear and 100% in dry ear and p value was 0.2. There was no statistically significant difference found between the two groups. Nagle et al<sup>4</sup>. which showed the success rate for myringoplasty in dry ear was 88% and for the wet ear was 74%. Shankar et al.<sup>5</sup>, showed that the success rate of tympanoplasty in dry ear was 88% and in wet ear was 80% .Pinar et al.<sup>6</sup> found a significant association between dry ear and success of tympanoplasty. Their graft take up rate was 79% for dry ear versus 64% for wet ear. Takahashi et al.<sup>7</sup> have studied 74 non cholesteatomatous chronic otitis media cases undergoing type I tympanoplasty which is similar to our current research. They found that the presence of granulation tissue or oedematous mucosa in the middle ear impairs the function of transmucosal gas exchange and increases the distance between the middle ear cavity and the capillaries. This may result in surgical failure of tympanoplasty in wet ears. Caylan et al.<sup>8</sup> have reported better healing of the tympanic membrane after myringoplasty in a discharging ear with 100% of success rate, while it was 75% in dry ear. They attributed such better results to the probable increase in the vascularity of the middle ear, which could have favoured better healing in wet ear. Vijayendra et al.<sup>9</sup> did a histopathological study of the remnant tympanic membrane of 20 dry and 20 wet central perforation, however they have concluded that a draining central perforation was not a contraindication for tympanoplasty as these anatomical conditions promote the graft take up

In the present study Eustachian tube mucocilliary function as assessed by fluorecein dye test showed abnormal patency in 54% and normal in 46%. Graft uptake in normal Eustachian tube function is 100% and in abnormal Eustachian tube function is 59.2% which correlates with below studies. according to Vishal dave et al<sup>10</sup> found 87% success rate in patients with normal Eustachian tube function, 80% in partially impaired Eustachian tube function, and 70% in totally impaired Eustachian tube. So, pre-operative planning in tympanoplasty surgery eustachian tube function assessment is must to increase graft uptake rate by preoperative utilization of decongestant. It is also important to comment outcome of surgery. El-Guindy et al.<sup>11</sup> stated that success rate of graft taken up in patients with normal tubal function was 95% and success rate in patients with tubal dysfunction present but could be corrected was 90% and success rate in patients with poor tubal function was 68% . Sen et al.<sup>12</sup> in 1998 assessed ETF by using impedance audiometry Those with normal Eustachian tube function a graft uptake of 80%, 80% graft uptake in partially impaired Eustachian tube function, and 66% graft uptake in totally impaired Eustachian tube function. SATO et al.<sup>13</sup> stated that the percentage of unsuccessful outcomes increased with the grade of tubal dysfunction, indicating that tubal function is closely associated with the outcome of ear surgery

The present study showed abnormal middle ear mucosal pathology such as polypoidal mucosa, granulations, tympanosclerosis in 42% of patients and normal mucosa in 58%. Graft uptake in normal middle ear mucosa is 100% and in abnormal middle ear mucosa is 48%

The present study showed that in 58% of patients there was small central perforation and in 42% large perforation was present. Graft uptake rate is 93% in small perforations and 61% in large perforations. According to Onal K et al<sup>14</sup> a relatively smaller perforation found to be significant prognostic factors positively influencing the success rate of myringoplasty which correlates the present study. According to Masoud Naderpour et al.<sup>2</sup> did not find any factors to be statistically significant to affect surgical outcome. According to Sarker MZ et al.<sup>15</sup> .The graft take rate was small, medium and large perforations were 100%, 80% and 72.73% respectively. Karela and et al.<sup>16</sup> examined the outcome of myringoplasty and hearing improvement and stated that the size and location of the perforation has no effect on the tympanic membrane closure rate. Yung MW et al.<sup>17</sup> study shows

the success rate of subtotal perforation closure (92.5%) is as good as the closure rate for smaller perforations (94.1%). Perkins R et al.<sup>18</sup> studied on large perforations in patients with intact ossicular chains. All perforations were successfully closed by this technique. Thus uniform data may not be obtained in all of the variables studied because of observer variation in various studies. The variables are analyzed separately by various authors but in clinical practice all these factors are interconnected and act concomitantly in disease morbidity.

## V. Conclusions

The condition of the middle ear mucosa determines the outcome of the surgery. It also helps in predicting post-operative hearing gain. Patent Eustachian tube is required in tympanoplasty. Patency test like flurecin dye instillation is a simple and effective method of assessing the mucociliary clearance function of the E.T. tube. Cortical Mastoidectomy in those patients who have a middle ear disease in the form of hypertrophy, mucosal edema and granulations helps in clearing the auditus and disease from the mastoid air cells, which is a pre-requisite of a successful Tympanoplasty. preoperative abnormalities indicative of severity of underlying Eustachian tube dysfunction and Infection have a significant influence on prognosis Post-operative audiological evaluation after 8 weeks showed hearing gain of 7.7dB on the average. We did not find any factors like Age, gender, duration of otorrhoea, size of perforation statistically significant to affect surgical outcome, but if the above factors are concomitant with middle ear pathology and eustachian tube dysfunction, they may affect the outcome of surgery. A healthy middle ear and functioning Eustachian is mandatory for maximal success of graft uptake after tympanoplasty. The study has made an attempt to show that careful selection of patients might play a role in obtaining better results, in terms of graft uptake or closure rate and also in interpreting hearing gain results after Tympanoplasty, as well as good technical expertise.

## References

- [1]. Jain K, Pandey A, Gupta S, Rahul. A Clinical Study of Hearing Outcome after Type I Tympanoplasty. IAIM, 2016; 3(10): 48-54. Page 48 Original Research Article A Clinical Study of Hearing Outcome after Type I Tympanoplasty
- [2]. Masoud Naderpour,<sup>1</sup> Yalda Jabbari Moghadam,<sup>2,1</sup> Ensieh Ghanbarpour,<sup>1</sup> and Nikzad Shahidi<sup>1</sup> Evaluation of Factors Affecting the Surgical Outcome in Tympanoplasty Iran J Otorhinolaryngol. 2016 Mar; 28(85): 99–10 PMID: 27280095
- [3]. Yojana Sharma, corresponding author Girish Mishra, and Jaykumar V. Patel Comparative Study of Outcome of Type I Tympanoplasty in Chronic Otitis Media Active Mucosal Disease (Wet Ear) Versus Chronic Otitis Media Inactive Mucosal Disease (Dry Ear) ndian J Otolaryngol Head Neck Surg. 2017 Dec; 69(4): 500–503. Published online 2017 Oct 22. doi: 10.1007/s12070-017-1233-z PMID: 29238681
- [4]. Nagle SK, Jagade MV, Gandhi SR, Pawar PV. Comparative study of outcome of type I tympanoplasty in dry and wet ear. Indian J Otolaryngol Head Neck Surg. 2009;61:138–140. doi: 10.1007/s12070-009-0053-1.
- [5]. Shankar R, Virk RS, Gupta K, Gupta AK, Bal A, Bansal S. Evaluation and comparison of type I tympanoplasty efficacy and histopathological changes to the tympanic membrane in dry and wet ear: a prospective study. J Laryngol Otol. 2015;129(10):945–949. doi: 10.1017/S0022215115002091.
- [6]. Pinar E, Sadullahoglu K, Calli C, Oncel S. Evaluation of prognosis factors and middle ear risk index in tympanoplasty. Otolaryngol Head Neck Surg. 2008;139(3):386–390. doi: 10.1016/j.otohns.2008.05.623.
- [8]. Takahashi H, Sato H, Nakamura H, Naito Y, Umeki H. Correlation between middle ear pressure regulation and outcome of type I tympanoplasty. Auris Nasus Larynx. 2007;34(2):173–176. doi: 10.1016/j.anl.2006.09.007.
- [9]. Caylan R, Titiz A, Falcioni M, De Donato G, Russo A, Taibah A, et al. Myringoplasty in children: factors influencing surgical outcome. Otolaryngol Head Neck Surg. 1998;118(5):709–713.
- [10]. Vijayendra H, Rangam Chetty K, Sangeeta R. Comparative study of tympanoplasty in wet perforation v/s totally dry perforation in tubotympanic disease. Indian J Otolaryngol Head Neck Surg. 2006;58(2):165–167.
- [11]. Vishal Dave and Mohit Ruparel corresponding author Correlation of Eustachian Tube Dysfunction with Results of Tympanoplasty in Mucosal Type of Chronic Suppurative Otitis Media Indian J Otolaryngol Head Neck Surg. 2019 Mar; 71(1): 10–13. Published online 2018 Nov 2. doi: 10.1007/s12070-018-1525-y PMID: 30906705
- [12]. El-Guindy A. Manometric and endoscopic study of tubal function in drum perforation. Am J Otol. 1993;14(6):580–584.
- [13]. Sen S, Guha S, Biswas A, Ghosh LM. A comparative study of methods of evaluation of Eustachian tube functions in chronic otitis media. Indian J Otol. 1998;4:147–149.
- [14]. Sato H, Nakamura H, Honjo I, Hayashi M. Eustachian tube function in tympanoplasty. Acta Otolaryngol Suppl. 1990;471:9–12. doi: 10.3109/00016489009124803.
- [15]. Onal K, Uguz MZ, Kazikdas KC, Gursoy ST, Gokce H. A multivariate analysis of otological, surgical and patient-related factors in determining success in myringoplasty. Clinical Otolaryngology. 2005;30(2):115–20.
- [16]. Sarker MZ, Ahmed M, Patwary K, Islam R, Joarder AH. Factors affecting surgical outcome of myringoplasty. Bangladesh Journal of Otorhinolaryngology. 2011;17(2):82–7.
- [17]. Karela M, Berry S, Watkins A, Phillipps JJ. Myringoplasty: surgical outcomes and hearing improvement: is it worth performing to improve hearing? European Archives of Oto-Rhino-Laryngology. 2008;265(9):1039–42. hearing improvement (6).
- [18]. Yung MW. Myringoplasty for subtotal perforation. Clinical Otolaryngology and Allied Sciences. 1995;20(3):241–5.
- [19]. Perkins R, Bui HT. Tympanic membrane reconstruction using formaldehyde-formed autogenous temporalis fascia: twenty years' experience. Otolaryngology-Head and Neck Surgery. 1996;114(3):366–79.

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TABLE No. 1: MASTER CHART

Sl. No	Sex/ Age	I.P.No.	DOA	DOS	Otorhea duration	Deafness Duration	Size of perforation		Webers Lateralisation	Eustation tube function Dyttest	Middle Ear Mucosa	Graft uptake	Heari ng Gain in decib els	Air bone gap in db	Air bone gap closure achieved db	Pre-op pure tone average in db	Post-op pure tone average db	Belfast rule of thumb Air threshold db
							Large/ Small	Side										
1	M-30	39404	10/3/2007	10/4/2007	5 Years	3 Years	Small	Right Ear	Left Ear	Abnormal	Normal	Good	6.7	Pre OP: 20 Post OP:10	10.0	40.0	33.3	>30
2	F-26	39462	10/3/2007	10/9/2007	5 Years	2 Years	Small	Right Ear	Right Ear	Abnormal	Polypoidal	Good	8.4	Pre OP: 20 Post OP:10	10.0	40.0	31.6	>30
3	F-27	40183	10/8/2007	10/11/2007	7 Years	5 Years	Small	Right Ear	Right Ear	Abnormal	Normal	Good	10.0	Pre OP: 20 Post OP:10	10.0	33.3	25.0	<30
4	F-27	41211	10/15/2007	10/16/2004	5 Years	2 Years	Small	Left Ear	Left Ear	Normal	Normal	Good	8.5	Pre OP: 20 Post OP:10	10.0	33.3	25.0	<30
5	F-20	42217	10/22/2007	10/23/2007	10 Years	10 Years	Large	Left Ear	Left Ear	Abnormal	Normal	Good	8.3	Pre OP: 20 Post OP:10	10.0	36.6	28.3	<30
6	F-21	42223	10/22/2007	10/26/2007	5 Years	2 Years	Small	Left Ear	Left Ear	Normal	Normal	Good	8.3	Pre OP: 20 Post OP:10	10.0	31.6	23.3	<30
7	F-30	42266	10/22/2007	10/26/2007	10 Years	5 Years	Large & Bilateral	Left Ear	Left Ear	Abnormal	Granulations	Failure	0.0	Pre OP: 20 Post OP:20	0.0	40.0	40.0	>30
8	F-14	42621	10/24/2007	10/30/2007	5 Years	2 Years	Large & Bilateral	Left Ear	Left Ear	Abnormal	Polypoidal	Good	1.7	Pre OP: 20 Post OP:20	0.0	43.3	41.6	>30
9	F-32	42252	10/22/2007	10/30/2007	10 Years	5 Years	Small	Right Ear	Right Ear	Abnormal	Normal	Good	6.7	Pre OP: 20 Post OP:10	10.0	33.3	26.6	<30
10	F-20	42236	10/22/2007	11/1/2007	3 Years	3 Years	Small	Right Ear	Right Ear	Normal	Normal	Good	5.0	Pre OP: 20 Post OP:10	10.0	30.0	25.0	<30
11	F-30	43316	10/29/2007	11/1/2007	11 yr	5yr	Large	left Ear	Left Ear	Abnormal	Granulations	Failure	0.0	Pre OP:20 Post OP :20	0.0	43.3	43.3	>30
12	M-29	43676	10/30/2007	11/8/2007	10 yr	5yr	Large	Right Ear	Right Ear	Abnormal	Granulations	Failure	0.0	Pre OP:20 Post OP :20	0.0	50.0	50.0	>30
13	F-46	43679	10/31/2007	11/8/2007	3yr	1yr	Large	Left Ear	Left Ear	Normal	Granulations	Good	8.4	Pre OP:20 Post OP :10	10.0	40.0	31.6	>30
14	F-40	43323	10/31/2007	11/6/2007	10yr	5yr	Large	Right Ear	Right Ear	Abnormal	Granulations	Failure	0.0	Pre OP:20 Post OP:20	0.0	46.6	46.6	>30
15	F-20	43730	10/31/2007	11/6/2007	5yr	2yr	Large	Left Ear	Left Ear	Abnormal	Polypoidal	Good	5.0	Pre OP:20 Post OP :10	10.0	40.0	35.0	>30
16	F-15	43322	10/20/2007	11/8/2007	7yr	2yr	Large & Bilateral	Right Ear	Right Ear	Abnormal	Tympanos clerosis	Failure	0.0	Pre OP:20 Post OP:20	0.0	43.3	43.3	>30
17	F-25	44358	11/5/2007	11/6/2007	1yr	1 yr	Small	Left Ear	Left Ear	Normal	Normal	Good	8.4	Pre OP:20 Post OP:10	10.0	30.0	21.6	<30
18	M-30	44368	11/5/2007	11/6/2007	1Yr	1 Yr	Small	Right Ear	Right Ear	Normal	Normal	Good	8.4	Pre OP:10 Post OP:05	5.0	35.0	26.6	<30
19	M-23	45369	11/12/2007	11/13/2007	10 Yr	10 Yr	Large	Right Ear	Right Ear	Abnormal	Polypoidal	Good	8.3	Pre OP:20 Post OP:10	10.0	36.6	28.3	<30
20	M-30	45683	11/14/2007	11/15/2007	3 Yr	1 Yr	Small	Right Ear	Right Ear	Abnormal	Polypoidal	Good	8.4	Pre OP:20 Post OP:10	10.0	45.0	36.6	>30
21	F-27	47780	11/29/2007	11/29/2007	1 yr	1 yr	Small	Left Ear	Left Ear	Abnormal	Normal	Good	8.3	Pre OP:20 Post OP:10	10.0	43.3	35.0	>30
22	F-46	47727	12/3/2007	12/6/2007	15 Yr	5 Yr	Large	Right Ear	Right Ear	Abnormal	Tympanos clerosis	Failure	0.0	Pre OP:20 Post OP:20	0.0	53.3	53.3	>30
23	M-23	48472	12/3/2007	12/6/2007	10 yr	5 yr	Large	Left Ear	Left Ear	Abnormal	Polypoidal	Good	8.4	Pre OP:20 Post OP:10	10.0	45.0	36.6	>30
24	M-28	72376	12/10/2007	12/11/2007	6 yr	2 yr	Large	Right Ear	Right Ear	Normal	Normal	Good	10.0	Pre OP:40 Post OP:30	10.0	60.0	50.0	>30
25	F-17	6437	12/10/2007	12/11/2007	3 Yr	1 Yr	Small	Right Ear	Right Ear	Normal	Normal	Good	8.3	Pre OP:10 Post OP:05	5.0	43.3	35.0	>30
26	F-27	49494	12/10/2007	12/11/2007	5yr	1 Yr	Small	Right Ear	Right Ear	Abnormal	Normal	Good	10.0	Pre OP:25 Post OP:10	15.0	43.3	33.3	>30
27	F-34	48777	12/5/2007	12/6/2007	7 yr	1 yr	Small	Left Ear	Left Ear	Abnormal	Normal	Good	11.7	Pre OP:20 Post OP:10	10.0	48.3	36.6	>30
28	F-22	49776	12/12/2007	12/13/2007	5 Yr	3 Yr	Small	Left Ear	Left Ear	Abnormal	Normal	Good	6.7	Pre OP:15Post OP:05	10.0	38.3	31.6	>30
29	F-30	49784	12/12/2007	1/22/2008	10 Yr	2 Yr	Large	Right Ear	Right Ear	Normal	Normal	Good	6.7	Pre OP:20 Post OP:15	5.0	63.3	56.6	>30
30	F-31	49785	12/12/2007	12/20/2007	10 Yr	5 Yr	Large	Right Ear	Right Ear	Normal	Normal	Good	6.7	Pre OP:20 Post OP:10	10.0	53.3	46.6	>30
31	M-16	59585	12/26/2007	12/27/2007	10 Yr	5 Yr	Small	Right Ear	Right Ear	Abnormal	Polypoidal	Failure	0.0	Pre OP:10 Post OP:10	0.0	23.3	23.3	<30
32	M-35	2692	1/21/2008	1/24/2008	5 Yr	2 Yr	Small	Left Ear	Left Ear	Normal	Normal	Good	6.6	Pre OP:20 Post OP:10	10.0	36.6	30.0	>30
33	M-22	50637	2/13/2007	2/14/2007	8 Yr	3 Yr	Small	Left Ear	Left Ear	Normal	Normal	Good	10.0	Pre OP:20 Post OP:10	10.0	33.3	23.3	<30
34	F-30	52234	12/31/2007	1/2/2008	10 Yr	5 Yr	Small	Right Ear	Right Ear	Abnormal	Polypoidal	Failure anterior perforation	0.0	Nil	Nil	35.0	35.0	>30
35	F-38	52342	1/1/2008	1/2/2008	15 Yr	5 Yr	Large	Right Ear	Right Ear	Abnormal	Polypoidal	Failure anterior dehiscence	11.7	Pre OP:20 Post OP:20	0.0	78.3	66.6	>30
36	F-33	14684	4/21/2008	4/22/2008	10 Yr	5 Yr	Small	Right Ear	Right Ear	Normal	Polypoidal	Good	0.0	Pre OP:30 Post OP:15	15.0	76.6	76.6	>30
37	M-55	3756	1/30/2008	1/31/2008	10 Yr	5 Yr	Small	Right Ear	Right Ear	Normal	Normal	Good	6.7	Pre OP:20 Post OP:10	10.0	35.0	28.3	<30
38	M-25	18268	5/7/2008	5/8/2008	5 Yr	4 Yr	Large	Left Ear	Left Ear	Normal	Normal	Good	8.3	Pre OP:20 Post OP:10	10.0	43.3	35.0	>30
39	M-23	18369	5/7/2008	5/8/2008	10 Yr	5 Yr	Small	Left Ear	Left Ear	Abnormal	Polypoidal	Failure anterior dehiscence	0.0	Pre OP:10 Post OP:10	0.0	25.0	25.0	<30
40	M-20	9694	3/17/2008	3/18/2008	7 Yr	3 Yr	Small	Right Ear	Right Ear	Normal	Normal	Good	6.6	Pre OP:20 Post OP:10	10.0	36.6	30.0	30
41	F-45	9928	5/7/2008	5/8/2008	10 Yr	5 Yr	Small	Left Ear	Left Ear	Normal	Normal	Good	1.7	Pre OP:10 Post OP:05	5.0	38.3	36.6	>30
42	F-19	16942	4/30/2008	5/1/2008	5 Yr	2 Yr	Small	Right Ear	Right Ear	Abnormal	Normal	Good	8.3	Pre OP:20 Post OP:05	15.0	31.6	23.3	<30
43	F-36	7716	3/3/2008	3/4/2008	8 Yr	2 Yr	Small	Left Ear	Left Ear	Normal	Normal	Good	8.4	Pre OP:20 Post OP:10	10.0	45.0	36.6	>30
44	M-20	23545	6/11/2008	6/12/2008	6 Yr	1 Yr	Large	Left Ear	Left Ear	Abnormal	Granulations	Failure	11.7	Pre OP:20 Post OP:10	10.0	45.0	33.3	>30
45	M-19	13639	4/16/2008	4/17/2008	10 Yr	5 Yr	Small	Right Ear	Right Ear	Normal	Normal	Good	10.0	Pre OP:25 Post OP:10	15.0	33.3	23.3	<30
46	F-25	3517	1/26/2008	1/28/2008	10 Yr	7Yr	Small	Right Ear	Right Ear	Normal	Normal	Good	16.1	Pre OP:25 Post OP:10	15.0	48.3	31.6	>30
47	M-20	21172	5/26/2008	6/3/2008	14 Yr	10 Yr	Large & Bilateral	Left Ear	Left Ear	Abnormal	Normal	Good	3.4	Pre OP:10 Post OP:05	5.0	35.0	31.6	>30
48	F-26	23523	6/11/2008	6/12/2008	20 Yr	7 Yr	Large & Bilateral	Left Ear	Left Ear	Normal	Polypoidal	Good	10.0	Pre OP:20 Post OP:10	10.0	38.3	28.3	<30
49	M-20	24656	6/19/2008	6/20/2008	15 Yr	5 Yr	Large	Left Ear	Left Ear	Normal	Polypoidal	Good	8.3	Pre OP:10 Post OP:05	5.0	28.3	20.0	<30
50	F-18	16310	4/24/2008	5/2/2008	7 Yr	6 Yr	Small	Left Ear	Left Ear	Normal	Normal	Good	8.4	Pre OP:25 Post OP:10	15.0	30.0	21.6	<30