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# Comparative study between the outcomes of type 1 tympanoplasty with graft materials used by cartilage and temporal is fascia – a review report

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***Abstract :***
***Background and objectives :*** *According to the Wullstein classification type 1 tympanoplasty is the defect in the tympanic membrane in the forms perforation which is repaired with a graft. It is also called Myringoplasty.Various graft materials have been used to close ear drum (tympanic membrane) perforations. Study was tocompare the outcomes of type 1 tympanoplasty with graft materials used by temporalis fascia and cartilage.*
***Materials and Method****: A retrospective review was undertaken of primary type 1 tympanoplasties using pieces of cartilages from the tragus, concha and temporalis fascia from October 2015 to October 2017. The study was conducted in the department Otorhinolaryngology, IQCITY Medical College and Narayana Multispecialty Hospital, India.*
***Result:*** *The total numbers of cases were 48.Average operated patients age group were 15-52. The numbers of male patients were 25 and female 23. In total, 31cases were operated on using tragal and conchal cartilage graft a nd rest of the 17 cases using temporalis fascia.At the 6 months of followup, successful closure of the tympanic membrane was achieved in 100% of cases in cartilage group and 82.35% in the temporalis fascia group. The average air bone gap in the cartilages group was7±2.23 dB and 8.45±2.35 dB in the temporalis fascia group in the 6 months of follow-ups.*
***Conclusion****: The overall success rate for type 1 cartilage tympanoplasty is higher than the temporalis fascia tympanoplasty.*
***Keywords:*** *Tympanoplasty, Tragus, Concha, Temporalis fascia, Airbone gap.*

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## I. Introduction

Chronic suppurative otitis media (CSOM) is a disease which is a major cause of morbidity in our country.It is a long standing infection of a part or whole of the middle ear cleft characterized by ear discharge and permanent perforations. Incidence of CSOM is higher in developing countries because of poor nutrition and lack of health education.It affects both sexes and all age groups. In India, the overall prevalence rate is 46 and 16 persons per thousand in rural and urban population, respectively. It is also the single most important cause of hearing impairment in rural population[1]. A large proportion of these patients have safe (mucosal) chronic suppurative otitis media. Otolaryngologist plays an important role in its correction and amelioration by conservative or operative procedures. One such procedure is tympanoplasty[2].

The potential seriousness of ear suppuration was first appreciated by 'Hippocrates' but the idea of operating to relieve the condition was first given by the great medieval surgeon Ambrose Pars. Although the term myringoplasty was coined by Berthold in1878, first myringoplasty was performed by Marcus Bancer in 1640[3].

.According to the Wullstein (1952) type1 Tympanoplasty the defect is perforation of tympanic membrane which is repaired with a graft. It is also called myringoplasty[1]. Numerous graft materials have been used for the closure of the defective membrane: skin, fascia lata, temporalis fascia, vein, perichondrium, duramater [4, 5,6]. Temporalis fascia remains the most frequently used graft material with closure of the tympanic membrane in 70% to 90% of primary tympanoplasties in different hands.However, in some situations such as advanced middle ear Pathology, retraction pockets, and atelectatic ears, temporalisfascia tends to undergo atrophy in the subsequent postoperative period regardless of placement techniques[7]. Cartilage has shown to be a

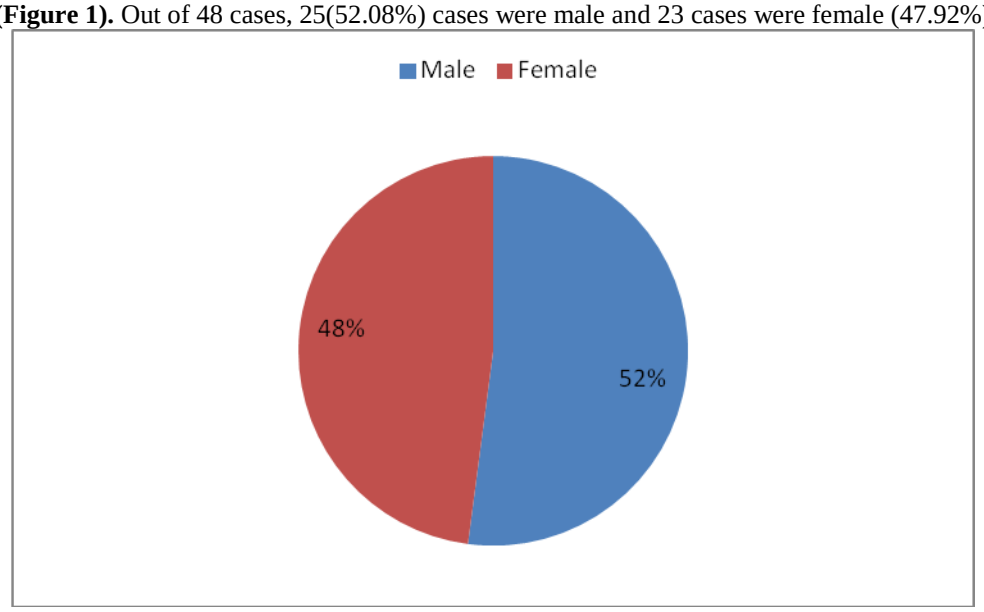
promising graft material to close perforations in the tympanic membrane. Although it is similar to temporalis fascia, its more rigid quality tends to resist resorption, retraction, and reperforation, even in the milieu of continuous Eustachian tube dysfunction[8]. The main problem of the temporalis fascia is the reperforation due to its thinness nature, although its sound conduction quality is good. Our study is to compare the outcomes of type 1 tympanoplasty with graft materials used by cartilage and temporalis fascia.

## II. Materials and Method

A retrospective review was undertaken of primary type 1 tympanoplasties using pieces of cartilages from the tragus, concha and temporalis fascia from October 2015 to October 2017. The study was conducted in the department Otorhinolaryngology, IQCITY Medical College and Narayana Multispecialty Hospital, India. The total numbers of cases were 48.Average operated patients age group were 15-52. The numbers of male patients were 25 and female 23. In total, 31cases were operated on using tragal and conchal cartilage graft and rest of the 17 cases using temporalis fascia. Inclusion criteria were age group between 15-55 years irrespective sexes with good general conditions, central perforation of the pars tensa of the tympanic membrane with dry ear with minimum 4 weeks, no evidence of active infection ear, nose, and throat or paranasal sinuses with good Eustachian tube functions. Exclusion criteria were blocked Eustachian tube with polyp, granulations, evidence of focal infection, and failed myringoplasty in the same ear and otogenic intracranial complications in the past. All patients were operated under local anaesthesia with adequate sedation or under general anaesthesia by Underlay technique - It is the technique of placing grafting material medial to the annulus. First postoperative visit is after 48 hours for meatal pack and mastoid bandage removal. Subsequent postoperative visits are at 1week, 1 month, 2 months, 3months and 6 months. At the end of 3 months, pure tone audiometry (average threshold at 500, 1000, 2000, and 3000 Hz) is done to evaluate air- bone gap (ABG) closure. Patients are evaluated functionally at the end of 6 months; Data were grouped and analyzed by standard statistical method.

## III. Result and Observations

**(Figure 1).** Out of 48 cases, 25(52.08%) cases were male and 23 cases were female (47.92%)




At the 6 months of followup, successful closure of the tympanic membrane was achieved in 31 (100%) in case of cartilage group and 14 out of 17 cases (82.35%) in the temporalis fascia group (Figure-2). Where 3 patients came with reperforations in the tympanic membrane. The average air bone gap in the cartilages group was7±2.23 dB and 8.45±2.35 dB in the temporalis fascia group in the 6 months of follow-ups.

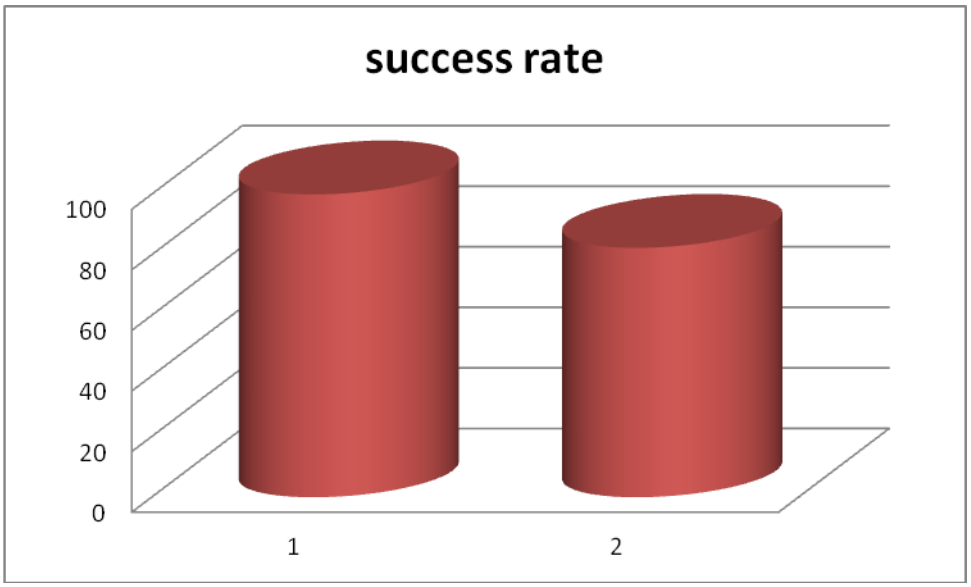



**Figure-2 Showing success rate 1.C**artilage 2. Temporalis fascia group

## IV. Discussion

In both experimental and clinical studies it has been shown that cartilage is well tolerated by middle ear and long term is its norm[9, 10, 11].

In our study group, a successful closure of the tympanic membrane was achieved in 31 (100%) in case of cartilage group and 14 out of 17 cases (82.35%) in the temporalis fascia group , where 3 patients came with reperforations in the tympanic membrane . The average air bone gap in the cartilages group was7±2.23 dB and 8.45±2.35 dB in the temporalis fascia group in the 6 months of follow-ups.

M. M. Khan et al in their study shown that cartilage graft is good in type 1 tympanoplasty with satisfactory result both in anatomical and audio logical results. Overall success rate of 98.20% in terms of perforation closure and air bone closure 7.06±3.39 dB[12].

Guneri et al showed by using cartilage no cases of graft loss and reperforations with 100% success rate with a mean post operative hearing gain of 20 dB(range 10-40 dB)[13].

Dornhoffer JLet al said comparing perichondrium and cartilage in revision type I tympanoplasty, showed, in both the groups, an improvement in ABG of less than 10 dB. Assuming that replacing a large portion of the tympanic membrane with cartilage would add stiffness and mass[14].

Gerber et al compared the cartilage to fascia in a frequency-specific manner and again no significant difference was observed[15].

M. Cavaliere et al shown in their study (Tragal cartilage in tympanoplasty:

Anatomic and functional results in 306 cases) Graft take was achieved in 304 patients (99.35%) and there were no immediate post-operative complications. The overall average pre-operative pure-tone average air-bone gap was 43.79 ± 7.07 dB, whereas the post-operative (1 year after surgery) pure-tone average air-bone gap was 10.43 ± 5.25 dB ($p < 0.0001$). Statistically significant improvement was observed up to 5 years after surgery[16].

The overall graft take rate of 99.35% (100% in primary tympanoplasties suggests that cartilage shield tympanoplasty is a reliable technique, which is in agreement with the results of other Authors.[17,18,19]

## V. Conclusion

Usage of cartilage has resulted in a significant improvement in the tympanic membrane reconstruction procedure. However, the indications for routine use of this more rigid material in tympanoplasty remain somewhat controversial, and the impact on hearing remains to be fully elucidated. In our study, the overall success rate for type 1 cartilage tympanoplasty is higher than the temporalis fascia tympanoplasty.

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