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# COMPARISON BETWEEN TRAGAL CARTILAGE AND TEMPORALIS FASCIA IN TYPE 1 TYMPANOPLASTY: A PROSPECTIVE COMPARATIVE STUDY

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ABSTRACT

INTRODUCTION

Chronic otitis media is a mucoperiosteal chronic inflammation in the middle ear cleft which is associated with perforation of the tympanic membrane, ear discharge and hearing impairment. The main goal of tympanoplasty is the reconstruction of the tympanic membrane and closure of a perforation that has been impaired by chronic ear diseases with or without trying to improve the hearing mechanism.

MATERIALS AND METHODS

A randomized prospective study has been done with a sample size of 100 patients in order to compare the results of temporalis fascia and tragal cartilage for the closure of tympanic membrane undergoing type I tympanoplasty. 50 patients in Group A underwent surgery with Tragal Cartilage and 50 in Group B with Temporalis Fascia. All cases were performed by the same surgeon to avoid bias. All of the cases were performed under Local Anaesthesia with 2% Lignocaine and 1:100000.

OBSERVATIONS AND RESULTS

The graft uptake was 80% in Group A and 73% in Group B making it statistically significant. Hearing improvement 4 weeks after surgery was 20% in Group A and 17% in Group B. Failure rates were almost the same in both groups.

DISCUSSION

It has been mentioned in older literature that the use of Tragal Cartilage can

cause poor hearing results in the post-operative period. This, however, has also ben proved to be unclear in other studies. In our study, the hearing and success rates were both found to be better in Group A.

## CONCLUSION

The use of Tragal Cartilage can be done on a regular basis for Tubotympanic type of CSOM because it gives better results with respect to hearing and is also scarless which gives better patient compliance.

## KEYWORDS

Tubotympanic disease; Chronic Suppurative Otitis Media; Tympanoplasty; Myringoplasty; Tragal cartilage; Temporalis Fascia

# MAIN MANUSCRIPT

## INTRODUCTION

Chronic otitis media is a mucoperiosteal chronic inflammation in the middle ear cleft which is associated with perforation of the tympanic membrane, ear discharge and hearing impairment [1]. The main goal of tympanoplasty is the reconstruction of the tympanic membrane that has been impaired by chronic ear diseases and the sound conducting mechanism which is a common procedure for otolaryngologists [2]. It was introduced in 1950 by Wullstein and Zoellner and many grafting materials also have been proposed by them [3,4]. Temporalis muscle fascia is the commonly used grafting material. Temporalis fascia was first used by Heerman for myringoplasty. Salen and Jansen in 1963 introduces a cartilage graft for the reconstruction of tympanic membrane [5].

Chronic otitis media is a common ear disease in the developing countries which cause major infective deafness in India [6,7]. Temporalis fascia, fat, dura, tragal cartilage with perichondrium, periostea, skin are the autologous grafting materials used for the tympanic membrane reconstruction [8,9]. Allo Derm (a cellular homograft) which is a xemografting material derived from Bovine pericardium are also used for reconstructing tympanic membrane.

Goodhill in 1967, used tragal perichondrium which is similar to the temporal fascia, but this material was not used widely [10]. The need for the rigid grafting materials encouraged the use of cartilage grafting. It also overcomes the problems or complications that has been seen in patients who were treated with

fascia. Usage of rigid cartilage materials resulted in hearing loss in some patients.

The aim of this review is to analyse the usefulness of the tragal cartilage and the temporal fascia for tympanic membrane closure in tympanoplasty.

## MATERIALS AND METHODS

**Study Design:**

A randomized prospective study has been done in order to compare the post operative results of temporalis fascia and tragal cartilage for the closure of tympanic membrane undergoing type I tympanoplasty.

**Sample Size:**

A total of 100 patients were included in this study out of which 50 patients underwent tympanoplasties with tragal cartilage and the remaining 50 underwent temporal fascia. All the patients are between 18 to 50 year of age and the detailed history of patients were recorded. The effect of tympanoplasty is measured using pure-tone audiometry. Air conduction and Air Bone Gap was recorded.

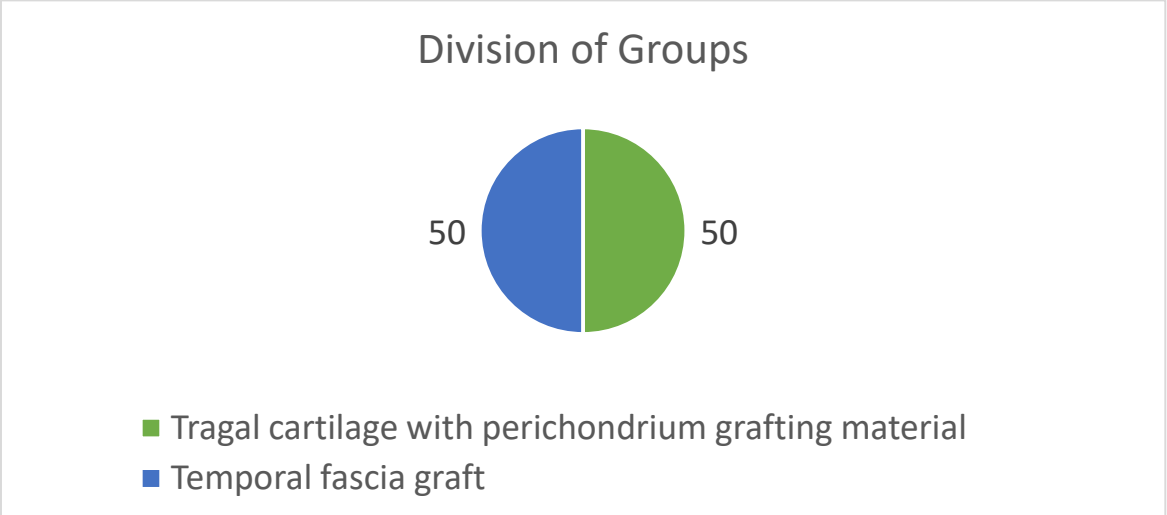


**Fig 1: Number of cases in study.**

**Inclusion Criteria:**

- Central Perforation.
- Safe type of CSOM – Tubotympanic disease.
- Patent Eustachian Tube.
- No infective focus in the Nose or Nasopharynx.
- Age group 18-60.
- Air Bone Gap of a minimum of 20 dB.

**Exclusion Criteria:**

- Atticoantral type of CSOM
- Active discharging ear.
- Congential hearing loss
- Diabetes, uncontrolled hypertension and severe anaemia.

Steps of Surgery:

All cases were performed by the same surgeon to avoid bias. All of the cases were performed under Local Anaesthesia with 2% Lignocaine and 1:100000. Local infiltration was given at the harvest site and in the 4 quadrants of the External Auditory Canal.

In Group A, Tragal Cartilage was harvested and in Group B, Supra Aural incision was given and Fascia was harvested. Both the wounds were closed with 3-0 Silk.

Rosen's incision was given and Tympanomeatal Flap was elevated, graft was then placed underlay and canal was packed with gel foam.

Sutures were removed on the $7^{th}$ day and Audiometry was done after 4 weeks and 8 weeks.

## OBSERVATION AND RESULTS

50 patients in the tragal cartilage group and 50 in the temporal fascia group who underwent type I tympanoplasty were keenly monitored and followed up post surgery. The average age of the cartilage group and the fascia group was 30 and the follow up period was 12 months. Out of 100 patients, 32 were male and 18 were female in temporal fascia group and 37 were male and 13 were female in cartilage group.

On doing the post-operative examination using otoscopy, the result showed that the graft uptake was better for cartilage with perichondrium compared to temporalis fascia. Graft uptake in cartilage shows 80% but for fascia it shows 73% which is statistically significant. The results were also similar with some studies published earlier. The success rate of the graft uptake for the cartilage group was 92.1% and 65% for fascia group in the study conducted by Yakub Yagin and his team [11]. Dabholkar and his team showed 84% for fascia group and 80% for cartilage group which is contrast to the study conducted by Yakub [12]. The graft success rate was 92.5% for temporal fascia group which was lower than the cartilage group which was 95.18% in the study conducted by Hodzic et al [13].

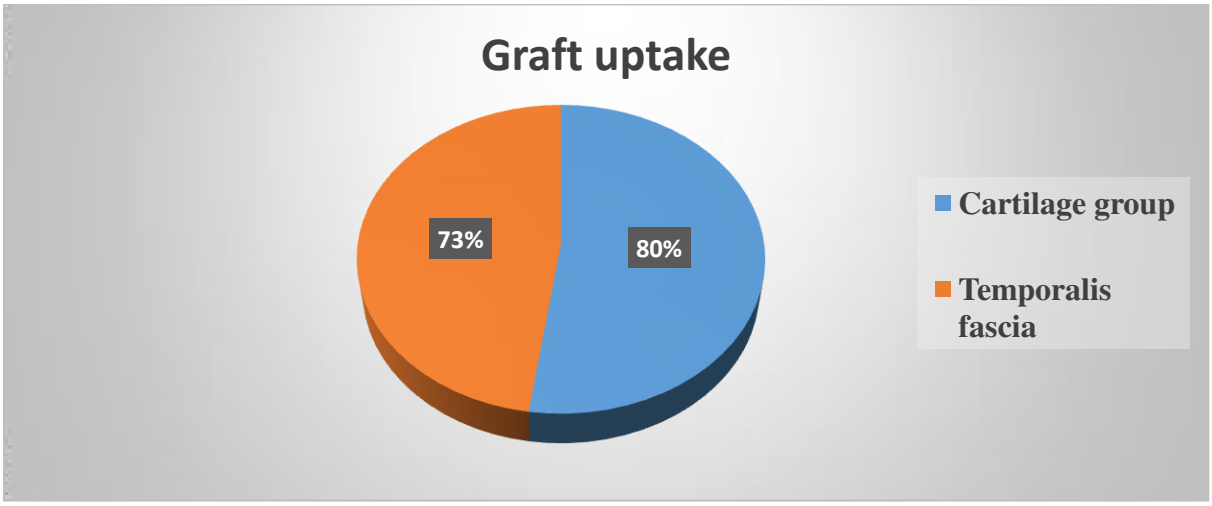


**Figure 2: Post-operative Graft Uptake Result**

| Graft Type | Uptake Result |
|---|---|
| Tragal Cartilage Group | 80% |
| Temporalis Fascia Group | 73% |

**Table 1: Graft Uptake Results**

Pure tone audiogram after 4 weeks of surgery showed that in the cartilage group hearing improved by 20% whereas for the fascia group it was 17%. The mean difference between the two group are not significant. The Air Bone Gap closed better in Group A.

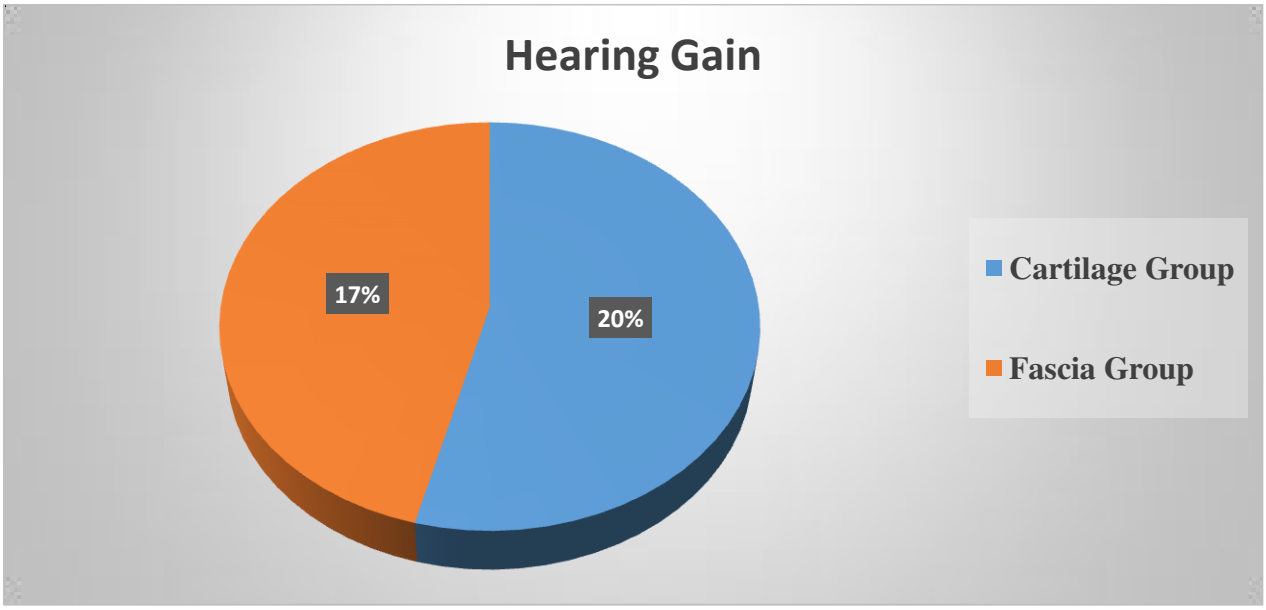


**Figure 3: Hearing Gain Improvement**

The failure rate of the operation for the tragal cartilage was 6% and 8% for fascia group. 3 perforations and 5 retractions were seen in the cartilage group patients post operatively. In temporal fascia group, 2 had persistent retracted drum.

## DISCUSSION

This article is a detailed study about the results of type I tympanoplasty, comparing the temporalis fascia technique with tragal cartilage method. Chronic otitis media is a cause of preventable hearing loss which is treated by Myringoplasty. It is done to improve or restore the patients hearing and to decrease the infections [14]. Commonly used grafting materials include vein, temporalis fascia and cartilage or by underlay technique. The underlay technique is a method which is achieved by using either post-aural approach or by trans-canal approach [15]. Failure rate for the pediatric age group were higher including Eustachian tube dysfunction and middle ear effusion. So they were excluded from the study. Patients were included irrespective of the quadrant involved and the size of perforation. Clinical examination was done for all the patients to ensure that the patients has para nasal sinuses and throat infection which affects the results of tympanoplasty.

Temporal fascia is composed of fibrous connective tissues and elastic fibres, therefore the dimensions of the fascia are unpredictable. On the other hand, Tragal cartilage is firmer than temporal fascia which also has constant shape and does not contain fibrous tissue so that the dimensions are predictable [16]. Inflammatory reactions, rejection and re-absorption are rare in tragal cartilage method [17]. It is also very easy to use cartilage method because it resists the deformation and pliable in nature.

The thickness of the tragal cartilage improves long-term integrity. Its thickness is about 1 mm, whereas a tympanic membrane is 0.1 mm thick [18]. Murbe and his team and Zahnert et al suggests that by thinning the cartilage to 0.5mm thickness, a slight acoustic benefits can be achieved [19,20].

Most of the studies suggests that tragal cartilage is a good grafting material. Cartilage is a stable grafting material which is resistant to negative middle ear pressure. It is easily accessible, tolerated and does not involve

additional costs. Graft opacity is the only drawback of the cartilage grafting material which limits the usage of otoscopy. Computed tomography should be done after surgery and detection of any recurrent cholesteatoma must be performed [21].

## CONCLUSION

- Temporal cartilage and temporal fascia are commonly used grafting materials for the closure of tympanic membrane.
- Usage of Tragal Cartilage is better when one intends to have a scarless surface, no need for parts preparation and lesser blood loss.
- Hearing gain is almost similar in both groups.
- Tragal cartilage is better tolerated than Temporalis fascia in our study.

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