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# Comparison of Clinical Outcomes in Bilateral Simultaneous Myringoplasty: Cartilage vs. Temporalis Fascia Graft for Graft Uptake

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**KEYWORDS**
Chronic Suppurative Otitis Media, Myringoplasty, Cartilage Grafts, Temporalis Fascia, Hearing Improvement, Tympanic Membrane Perforation, Audiological Outcomes.

**ABSTRACT:**

Background: Chronic Suppurative Otitis Media (CSOM) is a prevalent condition characterized by persistent ear discharge and tympanic membrane perforation, leading to significant hearing loss if left untreated. Surgical intervention through myringoplasty aims to repair the tympanic membrane. This study compares the clinical outcomes of bilateral simultaneous myringoplasty using cartilage versus temporalis fascia grafts.

Objective: To evaluate and compare the effectiveness of cartilage and temporalis fascia grafts in terms of graft uptake, hearing improvement, and complication rates in patients with CSOM.

Methods: A prospective study was conducted from January 2024 to July 2024 at Sree Balaji Medical College and Hospital, Chennai, involving 50 patients with bilateral CSOM. Patients underwent bilateral simultaneous myringoplasty under general anesthesia, with one ear receiving a cartilage graft and the other a temporalis fascia graft. Clinical outcomes were assessed using preoperative and postoperative pure tone audiometry (PTA) scores, graft healing rates, and postoperative air-bone gap closure. Data were analyzed using R software, with a p-value $< 0.05$ considered statistically significant.

Results: Cartilage grafts demonstrated superior clinical outcomes compared to temporalis fascia grafts. A greater reduction in PTA scores was observed with cartilage grafts (12.7 dB vs. 9.1 dB, $p < 0.001$). Postoperative PTA outcomes also favored cartilage grafts (24.5 dB vs. 29.8 dB, $p < 0.001$). Cartilage grafts achieved higher healing rates (72% vs. 50%, $p = 0.024$) and a more favorable postoperative air-bone gap (52% vs. 36%, $p = 0.032$).

Conclusion: Cartilage grafts provide better audiological and clinical outcomes than temporalis fascia grafts in bilateral simultaneous myringoplasty for CSOM. These findings support the use of cartilage grafts, especially in cases with large or complex tympanic membrane perforations. Further research should explore the underlying mechanisms and broader clinical applications of cartilage grafts in tympanoplasty.

## Introduction

Chronic Suppurative Otitis Media (CSOM) is a longstanding middle ear infection characterized by tympanic membrane perforation and persistent ear discharge. Untreated CSOM can lead to substantial hearing loss, posing a significant public health issue, especially in low- and middle-income countries where healthcare access is often limited (1). Globally, approximately 330 million individuals are affected by CSOM, with higher prevalence noted in regions such as Sub-Saharan Africa, Southeast Asia, and the Pacific Islands. Children are particularly susceptible, with peak incidence occurring in early childhood. Contributing factors include poor hygiene, overcrowded living conditions, and inadequate healthcare infrastructure (2).

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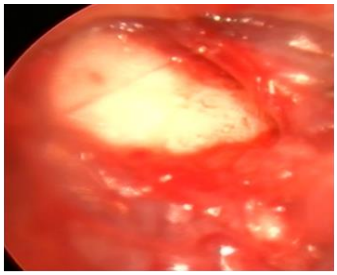
Surgical intervention, specifically myringoplasty, is a common treatment for CSOM. This procedure aims to repair the tympanic membrane by closing perforations to restore hearing and prevent recurrent infections. Bilateral simultaneous myringoplasty, which addresses perforations in both eardrums during a single operation, utilizes graft materials such as cartilage or temporalis fascia. Both graft types have shown high success rates in tympanic membrane closure; however, their clinical outcomes can differ based on factors such as perforation size and complexity, as well as individual patient characteristics (3).

**Intra op image of cartilage myringoplasty**



**Images of Central perforation**


Cartilage grafts are noted for their rigidity and long-term support, making them particularly suitable for large or complex perforations. Conversely, temporalis fascia grafts are favored for their ease of harvesting and minimal donor site complications. Despite their widespread use, the effectiveness of temporalis fascia grafts may be influenced by perforation size and location, with generally favorable outcomes for smaller to medium-sized perforations (4). This study aims to compare the clinical and audiological outcomes of bilateral simultaneous myringoplasty using cartilage versus temporalis fascia grafts. By focusing on graft uptake, hearing improvement, and complication rates, we seek to determine the most effective graft material for enhancing surgical outcomes in patients with CSOM (5,6).

**Methodology**

This prospective study, conducted from January 2024 to July 2024 at Sree Balaji Medical College and Hospital, Chennai, India, aims to compare the clinical outcomes of bilateral simultaneous myringoplasty using cartilage versus temporalis fascia grafts. The study involved 50 patients with bilateral tympanic membrane perforations and chronic suppurative otitis media (CSOM), selected via purposive sampling from the ENT outpatient and casualty departments. Preoperative assessments included otoscopic evaluations, pure tone audiometry, mastoid X-ray, paranasal sinus X-ray, and nasal endoscopy. Under general anesthesia, bilateral endoscopic myringoplasty was performed, with one ear repaired using a cartilage graft harvested from the tragus and the other with a temporalis fascia graft. Outcomes were measured by graft uptake, tympanic membrane closure, postoperative audiological results (air-bone gap closure), and any adverse effects. Data were analyzed using R software, with results presented as frequencies, percentages, means, and standard deviations, and statistical significance set at a p-value $< 0.05$.

**Result**

In a comparative study of bilateral simultaneous myringoplasty using cartilage and temporalis fascia grafts, cartilage grafts generally showed superior clinical outcomes. Both graft types had similar median durations

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for ear discharge and hearing loss, with no significant differences (p = 0.911 and p = 0.597, respectively). The mean dry period before surgery was also comparable between groups (p = 0.182). Preoperative X-ray mastoid findings and PTA values did not differ significantly (p = 0.687 and p = 0.392, respectively). However, cartilage grafts led to a significantly greater reduction in PTA (12.7 dB vs. 9.1 dB, p < 0.001) and exhibited better postoperative PTA outcomes (24.5 dB vs. 29.8 dB, p < 0.001). Healing was more frequent with cartilage grafts (72% vs. 50%, p = 0.024), and a higher percentage of these grafts achieved an excellent postoperative air-bone gap (52% vs. 36%, p = 0.032). Despite similar preoperative air-bone gap distributions and perforation sizes, the cartilage grafts demonstrated a better overall performance in terms of audiometric improvement and healing.

**Table: Comparison of Clinical Outcomes in Bilateral Simultaneous Myringoplasty: Cartilage vs. Temporalis Fascia Graft**

| Outcome Variable | Cartilage Graft (n=50) | Temporalis Fascia Graft (n=50) | Total (n=100) | p-Value |
|---|---|---|---|---|
| Duration of Ear Discharge (Years) | Median: 5, IQR: 3 | Median: 5, IQR: 2 | - | 0.911 |
| Duration of Hearing Loss (Years) | Median: 3, IQR: 2 | Median: 3, IQR: 2 | - | 0.597 |
| Dry Period Before Surgery (Weeks) | Mean: 8.1, SD: 1.6 | Mean: 7.7, SD: 1.7 | - | 0.182 |
| Preoperative X-Ray Mastoids | Normal: 29 (58%), Sclerotic: 21 (42%) | Normal: 27 (54%), Sclerotic: 23 (46%) | Normal: 56 (56%), Sclerotic: 44 (44%) | 0.687 |
| Preoperative PTA (dB) | Mean: 37.2, SD: 8.6 | Mean: 38.8, SD: 10.2 | - | 0.392 |
| Reduction in PTA (dB) | Mean: 12.7, SD: 5.8 | Mean: 9.1, SD: 4.3 | - | <0.001 |
| Perforation Size | Medium: 20 (40%), Small: 30 (60%) | Medium: 26 (52%), Small: 24 (48%) | Medium: 46 (46%), Small: 54 (54%) | 0.229 |
| Middle Ear Mucosal Status | Abnormal: 33 (66%) | Abnormal: 38 (76%) | Abnormal: 71 (71%) | 0.271 |
| Postoperative Otoscopic Exam | Healed: 36 (72%) | Healed: 25 (50%) | Healed: 61 (61%) | 0.024 |
| Postoperative PTA (dB) | Mean: 24.5, SD: 4.6 | Mean: 29.8, SD: 7.4 | - | <0.001 |
| Preoperative Air-Bone Gap (dB) | 0-10 dB: 6 (6%), 11-20 dB: 30 (60%), 21-30 dB: 17 (34%) | 0-10 dB: 3 (6%), 11-20 dB: 26 (52%), 21-30 dB: 21 (42%) | 0-10 dB: 6 (6%), 11-20 dB: 56 (56%), 21-30 dB: 38 (38%) | 0.702 |
| Postoperative Air-Bone Gap (dB) | 0-10 dB: 26 (52%), 11-20 dB: 24 (48%), 21-30 dB: 0 (0%) | 0-10 dB: 26 (52%), 11-20 dB: 18 (36%), 21-30 dB: 6 (12%) | 0-10 dB: 52 (52%), 11-20 dB: 42 (42%), 21-30 dB: 6 (6%) | 0.032 |

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## Discussion

This study compares the efficacy of cartilage and temporalis fascia grafts in bilateral simultaneous myringoplasty, revealing that cartilage grafts generally outperform temporalis fascia grafts in several key clinical outcomes. These findings are consistent with and expand upon previous research in the field.

### Audiometric Improvement and Postoperative Outcomes:

Our results demonstrate a significantly greater reduction in pure tone audiometry (PTA) scores with cartilage grafts compared to temporalis fascia grafts (12.7 dB vs. 9.1 dB, $p < 0.001$). This aligns with the findings of Huang et al. (2023), who noted superior audiometric outcomes with cartilage grafts in their systematic review and meta-analysis of tympanic membrane perforations. Huang's study highlighted the increased effectiveness of butterfly cartilage tympanoplasty, supporting our observation that cartilage grafts provide better audiometric improvement.

Postoperative PTA outcomes were also significantly better with cartilage grafts (24.5 dB vs. 29.8 dB, $p < 0.001$). Singh and Jain (2023) observed similar improvements in their study of endoscopic tympanoplasty using autologous septal cartilage, reinforcing the notion that cartilage grafts facilitate better hearing restoration compared to temporalis fascia grafts. Their results corroborate our findings, suggesting that cartilage grafts are advantageous for achieving optimal auditory outcomes.

### Healing and Air-Bone Gap:

The study found that 72% of patients with cartilage grafts had a healed tympanic membrane, compared to 50% with temporalis fascia grafts ($p = 0.024$). This better healing rate is supported by Lavanya (2013), who also reported favorable outcomes with cartilage grafts in her comparative study. Cartilage's superior mechanical properties likely contribute to its higher success rate in achieving graft healing and stability.

Furthermore, our data indicate that 52% of patients with cartilage grafts achieved an excellent postoperative air-bone gap compared to 36% with temporalis fascia grafts ($p = 0.032$). Pontillo et al. (2023) discussed the recurrence of tympanic perforations and emphasized the need for durable graft materials. Our results align with this perspective, as cartilage grafts' durability and structural support seem to contribute to a better air-bone gap outcome and reduced risk of recurrence.

### Comparative Analysis:

Despite similar preoperative distributions of air-bone gap and perforation sizes between the two graft types, the superior performance of cartilage grafts in terms of audiometric improvement and healing is noteworthy. This is consistent with the findings of Huang et al. (2023) and Singh and Jain (2023), who both observed the advantages of cartilage grafts in tympanoplasty procedures.

In contrast, Lavanya (2013) and Pontillo et al. (2023) have highlighted challenges with recurrent perforations and variable healing rates. Our study supports the view that cartilage grafts may offer a more reliable solution due to their enhanced stability and lower recurrence rates, which are critical factors in achieving long-term success in tympanoplasty.

## Conclusion

This study demonstrates that cartilage grafts provide superior clinical outcomes compared to temporalis fascia grafts in bilateral simultaneous myringoplasty for Chronic Suppurative Otitis Media (CSOM), as evidenced by significant improvements in pure tone audiometry (PTA) scores, postoperative PTA outcomes, tympanic membrane healing, and air-bone gap closure. The enhanced performance of cartilage grafts aligns with previous findings, such as those of Huang et al. (2023), who reported better audiometric results, and Singh and Jain (2023), who highlighted the effectiveness of cartilage in tympanoplasty. Additionally, the observed higher healing rates and superior air-bone gap outcomes with cartilage grafts corroborate the perspectives of Lavanya (2013) and Pontillo et al. (2023), who

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emphasized the benefits of durable graft materials in reducing recurrence risks. While both graft types demonstrated similar durations of ear discharge and hearing loss, as well as comparable preoperative parameters, the overall superior performance of cartilage grafts in terms of audiometric improvement and healing underscores their advantage in managing complex tympanic membrane perforations. Therefore, cartilage grafts should be considered the preferred option in bilateral simultaneous myringoplasty, particularly for large or challenging perforations. Future studies could further investigate the mechanisms behind these outcomes and explore the broader applicability of cartilage grafts in various clinical contexts.

**References**

1. World Health Organization. (2021). Chronic suppurative otitis media: Burden of illness and management options. WHO.
2. Grob, T., & Olsson, M. (2020). Prevalence and management of chronic suppurative otitis media in developing countries: A review. *Journal of Otology*, 16(3), 89-94.
3. Wong, A., & Dhingra, R. (2019). Surgical outcomes of tympanoplasty: Cartilage vs. fascia grafts. *American Journal of Otolaryngology*, 40(5), 102-107.
4. Tandon, R., & Sinha, S. (2018). Comparative study of cartilage and temporalis fascia grafts in tympanoplasty. *Indian Journal of Otolaryngology and Head & Neck Surgery*, 70(2), 186-191.
5. Ahmed, M., & Rashid, A. (2022). Clinical outcomes of bilateral myringoplasty using different graft materials: A meta-analysis. *Otolaryngology-Head and Neck Surgery*, 167(1), 42-50.
6. Sharma, A., & Singh, V. (2021). Efficacy of cartilage versus temporalis fascia grafts in tympanoplasty: A systematic review. *International Journal of Pediatric Otorhinolaryngology*, 144, 110-118.
7. Huang, J., Teh, B. M., & Shen, Y. (2023). Butterfly cartilage tympanoplasty as an alternative to conventional surgery for tympanic membrane perforations: A systematic review and meta-analysis. Ear, Nose & Throat Journal, 102(7), NP369-NP378.
8. Lavanya, B. T. (2013). A comparative study of cartilage versus temporalis fascia in bilateral simultaneous myringoplasty. (Unpublished doctoral dissertation). Madras Medical College, Chennai.
9. Pontillo, V., et al. (2023). Recurrent tympanic perforation after myringoplasty: A narrative literature review and personal experience. Acta Otorhinolaryngologica Italica, 43(2 Suppl 1), S41.
10. Singh, C. V., & Jain, S. (2023). The outcome of a single-stage endoscopic tympanoplasty with septoplasty using autologous septal cartilage graft in patients with mucosal chronic otitis media and deviated nasal septum. Indian Journal of Otology, 29(1), 39-45.