

Endoscopic Tympanomeatal versus Push Through Technique : A Prospective Study

<https://doi.org/10.47210/bjohns.2026.v34i2.340>

Ankita Yadav,¹ Ila B Upadhya,¹ Kinjal Damania¹

ABSTRACT

Introduction

Tympanoplasty is a procedure aimed at eradicating middle ear disease, repairing a perforated tympanic membrane, and restoring hearing. Endoscopic tympanoplasty offers advantages such as a magnified view and avoidance of larger incisions, but is limited by being a single-handed technique with no depth perception. The two techniques compared were: Conventional Method: Involves an extended Rosen's incision and raising a Tympanomeatal flap to reach the middle ear. Push Through Technique: Involves no Tympanomeatal flap elevation; a cartilage graft is pushed through the tympanic membrane perforation after filling middle ear with antibiotic soaked gelfoams.

The study's aim was to study the difference between the two techniques in terms of operative time, post-operative pain, post-operative complications (granulation formation and canal stenosis) graft take rate, and hearing improvements.

Materials and Methods

This was a prospective comparative study of 50 patients undergoing Type I Endoscopic Tympanoplasty. Inclusion Criteria included patients with moderate and small perforations, Type I Tympanoplasty, and tuning fork test/Pure Tone Audiometry results coherent with the tympanic membrane defect. Exclusion Criteria included patients with a discharging ear, tympanoplasty other than Type I, and patients less than 18 years of age.

Results and Conclusion

The two techniques yielded similar results in terms of graft uptake rate and post-operative audiometry changes. The push through technique demonstrated clear advantages with less post-operative pain, no incidence of granulation tissue formation, and less operative and recovery time.

Keywords

Tympanoplasty; Tympanic Membrane; Prospective Study; Pure Tone Audiometry; Operative Time; Post-operative Pain; Granulations

Tympanoplasty is a surgical procedure for the middle ear that encompasses the eradication of disease, the repair of the perforated tympanic membrane, and the restoration of hearing. It can be performed through post aural, endaural, or trans canal approaches. Endoscopic tympanoplasty, a trans canal approach, provides a wider, closer, and magnified view of the fine structures of the middle ear and better visualization even in a tortuous external ear anatomy. Furthermore, it avoids larger incisions, leading to lesser post-operative pain, neuralgia, and earlier recovery.^{1,2}

A key limitation of the endoscopic approach, however, is that it is a single-handed technique, and it lacks depth perception.³

This study focuses on comparing two techniques for

endoscopic tympanoplasty: the conventional Tympanomeatal flap elevation method and the push through technique.

Endoscopic Tympanoplasty Techniques

1. Conventional Tympanomeatal Flap Elevation Method

This is the conventional method, which involves giving an extended rosen's incision and raising a Tympanomeatal flap to reach the middle ear cavity. This technique addresses all types of perforations, including large and

1 - Department of ENT, B.J. Medical College, Ahmedabad Civil Hospital

Corresponding author:

Dr Ankita Yadav

email: dr.ankitarao@gmail.com

marginal perforations. Disadvantages of this method includes more post-operative pain, longer operative and recovery time, and occasional canal narrowing.

2. Push Through Technique

The push through technique is typically done for small and moderate dry perforations where the Pure Tone Audiometry (PTA) is coherent with the size of the perforation and Otoscopy findings. The distinguishing feature is that there is No Tympanomeatal flap elevation. Instead, middle ear space is filled with antibiotic soaked gelfoams and cartilage graft is pushed through the tympanic membrane perforation into the middle ear space. This is a minimally invasive technique that offers a relatively low risk of complications, a shorter operative time and faster recovery.⁴

The push through technique is disadvantaged when dealing with large or marginal perforations as one need to have a significant remnant tympanic membrane.

Preparation of graft: In both techniques tragal cartilage was harvested, the thicker perichondrium was lifted off carefully, the thinner perichondrium was kept as it was, the island cartilage was thinned and prepared as per the size of perforation keeping about 1 mm thin perichondrium all around the cartilage making an island composite graft.

The aim of the study was to compare the difference between these two techniques in terms of:

- Operative time
- Post-operative pain
- Post-operative complications (Granulation formation and canal stenosis)
- Graft take rate
- Hearing improvement

in patients with inactive mucosal type of chronic otitis media between two techniques of endoscopic tympanoplasty i.e; conventional tympanomeatal flap raising & push through technique.

Materials and Methods

This was a Prospective comparative analytical study of 14 months starting from January 2024 to February 2025 conducted in Department of ENT of Civil Hospital Ahmedabad. Patients attending E.N.T. OPD at tertiary care centre were included. The study was done after getting approval from our institutional scientific and ethical review board.



Fig. 1. Harvesting Tragal cartilage



Fig.2. Island cartilage graft

Inclusion criteria:

- All Patients presenting to ENT OPD with small and moderate central perforation.
- Type 1 tympanoplasty
- Tuning fork test with pure tone audiometry in coherence with tympanic membrane defect.

Exclusion criteria:

- Patients with discharging ear.
- Patients not willing to participate in the study.
- Tympanoplasty other than Type I.
- Patients not willing for follow up visits.
- Patients <18 years of age.

Detailed history was obtained from all the patients. After obtaining history, a detailed clinical examination including General Examination, Systemic Examination and E.N.T. examination was done.

All procedures were done under general anaesthesia. Tragal cartilage graft was prepared as mentioned earlier. Both procedures were done by one hand endoscopic method by an experienced single surgeon.

For both techniques margins were freshened. For conventional technique, extended rosen's incision was kept. Tympanomeatal flap was elevated. Middle ear was checked for any disease, adhesions and round window reflex. Middle ear was packed with antibiotic soaked gelfoams. Cartilage composite island graft was kept by underlay with perichondrium towards the middle ear. The perichondrium was kept over cartilage by underlay, tympanomeatal flap was repositioned back and supported with antibiotic soaked gelfoams.

For push through technique the procedure was same as mentioned in conventional one with only difference that endomeatal incision was not kept. Tympanomeatal flap was not raised. Round window reflex, middle ear status was checked using straight and angled endoscopes.

Results

The study results comparing the two techniques are summarized below (refer to the Endoscopic Tympanoplasty via Tympanomeatal flap raising method

as "Conventional" and Endoscopic Tympanoplasty via Push through technique as "Push Through"):



Fig. 3. Post-op picture of graft placed by push through technique

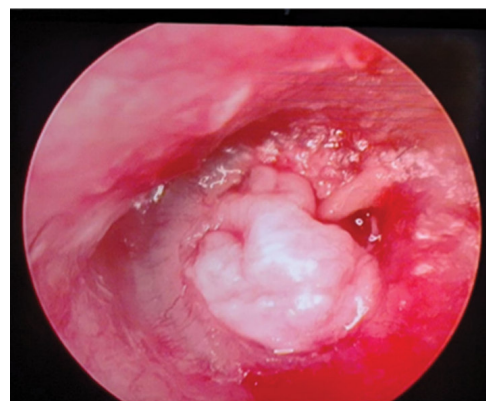


Fig. 4. Cartilage graft with second layer perichondrium as double breasting

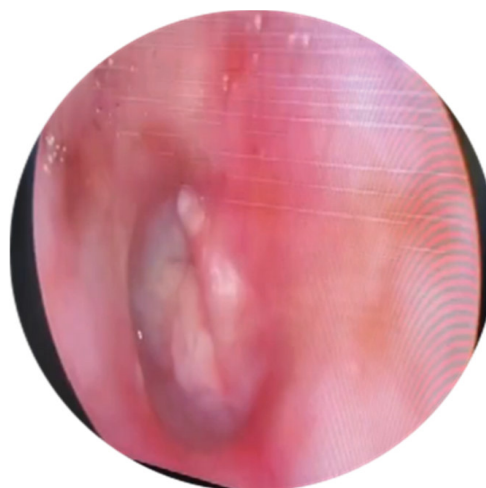


Fig. 5. Graft uptake at 6 months Post-op.

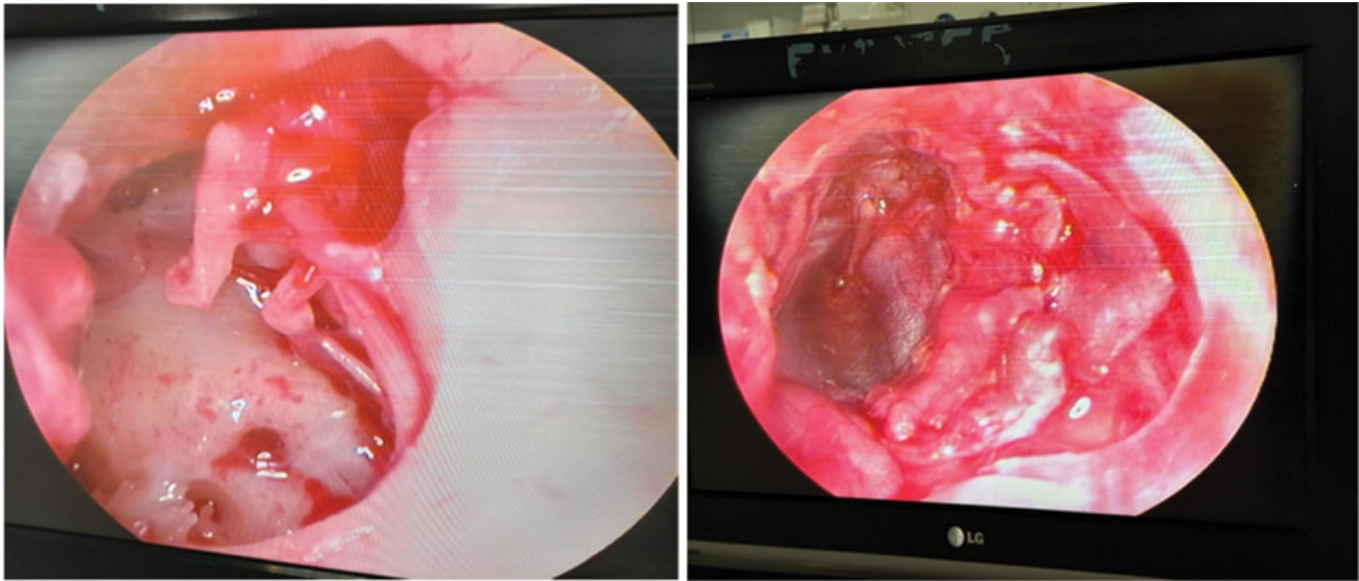


Fig. 6. TM Flap raising technique, before and after Graft placement.

Table I : Comparison of Endoscopic Conventional and Push through technique

PARAMETER	CONVENTIONAL (n = 24)	PUSH THROUGH (n = 26)	p-VALUE
Post-operative pain	22/24 (91.7%)	16/26 (61.5%)	0.0195
Granulations at 3 weeks	7/24 (29.2%)	1/26 (3.8%)	0.0106
Graft uptake at 3 weeks	19/24 (79.2%)	24/26 (92.3%)	0.0423
Hearing improvement at 3 months	20/24 (83.3%)	24/26 (92.3%)	0.0423
Graft uptake at 6 months	20/24 (83.3%)	24/26 (92.3%)	0.0423
EAC stenosis	5/24 (20.8%)	0/26 (0%)	0.0163
Operative time	45-60 minutes	30-40 mintues	

Discussion

In the context of Endoscopic Tympanoplasty for inactive mucosal chronic otitis media, the comparative data reveals key distinctions between the conventional tympanomeatal flap raising method and the push-through technique.

● Operative Time:

The operative time was notably shorter for the push-through technique (approximately 30–40 minutes) compared to the conventional method (approximately 45–60 minutes).

● Post-operative Pain and Granulations:

The push-through technique showed a favourable profile regarding post-operative discomfort and complications. Specifically, the incidence of post-operative pain was lower (91.7% vs. 61.5%), and the incidence of granulation formation at 3 weeks was significantly lower (29.2% vs. 3.8%). Endoscopic cartilage graft myringoplasty without tympanomeatal flap elevation offers high short- and long-term graft success rate, and the hearing results are satisfactory; the technique is minimally invasive. Findings are in coherence with Lou Z et al.(5)

- Graft uptake and Hearing Improvement

Crucially, in terms of primary outcomes, the two techniques demonstrated similar efficacy:

- Graft uptake rates were better in push through technique at both the 3-week (79.2% vs. 92.3%) and 6-month follow-ups.
- Hearing improvements at 3 months were also comparable (83.3% vs. 92.3%).

Conclusion

Endoscopic Tympanoplasty via the conventional Tympanomeatal flap raising method and the Push-through technique yield similar results concerning graft uptake rate and post-operative audiometry changes.

However, the Push through technique presents several distinct advantages:

- Less complaints of post-operative pain.

- Reduced incidence of granulation tissue formation.
- Less operative and recovery time.

References

1. Kawale M, Landge S, Garg D, Kanani K. Endoscopic Versus Microscopic Type 1 Tympanoplasty (Myringoplasty) in a Rural Tertiary Care Hospital in India: A Retrospective Comparative Study. *Cureus*. 2023 Mar;15(3):e36109
2. Lee SY, Lee DY, Seo Y, Kim YH. Can Endoscopic Tympanoplasty Be a Good Alternative to Microscopic Tympanoplasty? A Systematic Review and Meta-Analysis. *Clin Exp Otorhinolaryngol*. 2019 May;12(2):145–55
3. Kozin ED, Gulati S, Kaplan AB, Lehmann AE, Remenschneider AK, Landegger LD, et al. Systematic review of outcomes following observational and operative endoscopic middle ear surgery. *Laryngoscope*. 2015 May;125(5):1205–14
4. Tarabichi M. Endoscopic transcanal middle ear surgery. *Indian J Otolaryngol Head Neck Surg*. 2010 Jan;62(1):6–24
5. Lou Z. Use of Endoscopic Cartilage Graft Myringoplasty Without Tympanomeatal Flap Elevation to Repair Posterior Marginal Perforations. *Ear Nose Throat J*. 2021 Dec;100 (10_suppl):953S-957S.