

# Comparative Analysis of Per-meatal and Post-Aural Approaches in Tympanoplasty: Patient Perspectives and Quality of Life

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## Abstract

**Objectives:** This study aimed to compare patient perspectives and experiences between per-meatal and post-aural tympanoplasty techniques, focusing on scar perception, postoperative symptoms, return to work, and quality of life (QOL). **Design:** Retrospective comparative study. **Setting:** Secondary care hospital. **Participants:** Fifty-four patients who underwent tympanoplasty via either per-meatal or post-aural methods. **Main Outcome Measures:** Patient-reported scar perception, postoperative symptoms and quality of life reported using validated patient reported outcome measure- The Chronic Otitis Media Benefit Inventory (COMBI) score, patient reported return time off work. **Results:** Scar perception was favourable in both groups. Most patients in the post-aural group (96%) were content with their scar, while 83% of the per-meatal group patients were not bothered by the possibility of a scar behind the ear. Long term postoperative symptoms, return to work, and quality of life (QOL) measures were comparable between the two groups. The Chronic Otitis Media Benefit Inventory (COMBI) scores showed no statistically significant difference between the two surgical techniques. **Conclusion:** Patient experiences and outcomes were similar between per-meatal and post-aural tympanoplasty techniques. Clinicians should consider individual patient factors and expectations when choosing a surgical approach.

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*Design :* Retrospective comparative study.

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*Main Outcome Measures :* Patient-reported scar perception, postoperative symptoms and quality of life reported using validated patient reported outcome measure- The Chronic Otitis Media Benefit Inventory (COMBI) score, patient reported return time off work.

*Results :* Scar perception was favourable in both groups. Most patients in the post-aural group (96%) were content with their scar, while 83% of the per-meatal group patients were not bothered by the possibility of a scar behind the ear. Long term postoperative symptoms, return to work, and quality of life (QOL)

measures were comparable between the two groups. The Chronic Otitis Media Benefit Inventory (COMBI) scores showed no statistically significant difference between the two surgical techniques.

*Conclusion* : Patient experiences and outcomes were similar between per-meatal and post-aural tympanoplasty techniques. Clinicians should consider individual patient factors and expectations when choosing a surgical approach.

Key words: Tympanoplasty, per-meatal, post-aural, scar perception, postoperative symptoms, return to work, quality of life (QOL), patient perspectives.

### Key Points:

1. Having a post aural scar did not seem to be a big concern among patients undergoing tympanoplasty surgery.
2. Comparable time off work, long term postoperative symptoms and quality of life measures were observed between the two surgical approaches i.e., per-meatal approach and post aural approach.
3. The Chronic Otitis Media Benefit Inventory (COMBI) scores revealed no statistically significant difference in patient-reported outcomes between the two groups.
4. Clinicians can use the findings of this study within its limitations in future decision making for patients for tympanoplasty surgery.
5. This study could serve as the initial groundwork for future large scale studies seeking patient's perspectives and quality of life (QOL) for tympanoplasty surgery.

### Introduction:

*Background:* Tympanoplasties have conventionally been performed through three primary techniques, namely post-aural, endaural, and per-meatal approaches<sup>1</sup>. Although research has scrutinized auditory outcomes and closure rates of perforations, limited information is available about patient preferences and experiences specific to each distinct surgical approach<sup>2</sup>. This study offers insight into the patient viewpoints concerning the prevalent tympanoplasty approaches—per-meatal versus post-aural methods.

*Objectives* : Our study primarily seeks to capture patient's experiential perspectives and opinions in relation to the contrasting per-meatal and post-aural techniques. This study encompasses patient perceptions of scar Vs scar-less surgical procedures, as well as any associated scar-related complications. Furthermore, we explore potential dissimilarities observed by patients in postoperative symptoms, particularly related to ear discharge and auditory function. Lastly, we examine variations in patients' recovery times and their ability to resume work after undergoing each distinct surgical approach.

### Methodology:

*Reporting Guideline* : This study followed the Strobe guidelines for reporting the study findings.

*Study design* : A retrospective study was undertaken concerning patients who underwent either post-aural or per-meatal tympanoplasty surgery. Patients were contacted via telephonic consultation to gather insights into their experiences with the respective approaches.

*Setting and Participant Cohort* : This study was performed in a secondary care hospital, catering to a population exceeding 900,000 individuals<sup>3</sup>. Study approval was obtained from the hospital's clinical audit department. The study encompassed 54 consecutive patients who provided consent and demonstrated the ability to be able to participate. Exclusions were attributed due to the factors such as non-consent, communication challenges, language barriers, and health-related impediments. Encompassed within this group were individuals who underwent tympanoplasty via either the post-aural or per-meatal method. Procedures spanned simple myringoplasty, ossiculoplasty (performed in cases where the ossicular chain was not in continuity), and limited atticotomy (4 cases of atticotomy out of total of 54 cases). Mastoid surgeries were excluded. Predominantly, the per-meatal subgroup underwent microscopic procedures, with a sole instance

of endoscopic tympanoplasty. General anaesthesia was administered, with a solitary exception of local anaesthesia. Primary and revision cases were included. The study spanned a 3 year window, commencing from November 2019 to April 2022, encapsulating patients who had undergone surgery within the prior 1 to 3 years. This temporal scope facilitated a comprehensive long-term assessment of the postoperative outcomes. Out of the 90 patients contacted for telephonic survey participation, 54 responded and were included in the analysis.

*Data collected* : Utilising the validated patient reported outcome measure, denoted as The Chronic Otitis Media Benefit Inventory (COMBI)<sup>4,5</sup> (Figure 1), data was collected from both cohorts. Additional inquiries encompassed work absence and return to work details. Post-aural patients underwent supplementary questioning concerning the post aural scar, which has been used in research articles before<sup>6,7</sup> (See figure 3 below).

The data collected included demographic specifics (age, gender). In the post-aural subset, scar related queries are shown in figure 3. Per-meatal patients were queried on post-aural scar inclination (See figure 3 below).

The validated COMBI patient reported scoring system (See Figure 1 below) facilitated a comparison between the two cohorts.

### Symptom severity:

Since your operation/intervention, has the discharge or drainage from your ear been better or worse?

5	4	3	2	1
<i>Much Better</i>	<i>A little or somewhat better</i>	<i>No Change</i>	<i>A little or somewhat worse</i>	<i>Mhuch worse</i>

2. Since your operation/intervention, how would you define the change the having a “smelly ear” Has this become better or worse?

5	4	3	2	1
<i>Much Better</i>	<i>A little or somewhat better</i>	<i>No Change</i>	<i>A little or somewhat worse</i>	<i>Mhuch worse</i>

3. Since your operation/intervention, has your hearing at home (e.g. requiring the volume of the TV or Radio to be turned up) got better or worse?

5	4	3	2	1
<i>Much Better</i>	<i>A little or somewhat better</i>	<i>No Change</i>	<i>A little or somewhat worse</i>	<i>Mhuch worse</i>

4. Since your operation/intervention, has your hearing when talking to people in groups (or when there are noisy surroundings) got better or worse?

5	4	3	2	1
<i>Much Better</i>	<i>A little or somewhat better</i>	<i>No Change</i>	<i>A little or somewhat worse</i>	<i>Mhuch worse</i>

5. Since your operation/intervention, has the discomfort and/or around the ear got better or worse?

5	4	3	2	1
<i>Much Better</i>	<i>A little or somewhat better</i>	<i>No Change</i>	<i>A little or somewhat worse</i>	<i>Much worse</i>

6. Since your operation/intervention, has your dizziness or feeling off balance got better or worse?

5	4	3	2	1
<i>Much Better</i>	<i>A little or somewhat better</i>	<i>No Change</i>	<i>A little or somewhat worse</i>	<i>Much worse</i>

7. Since your operation/intervention, has your tinnitus or noises in the ear got better or worse?

5	4	3	2	1
<i>Much Better</i>	<i>A little or somewhat better</i>	<i>No Change</i>	<i>A little or somewhat worse</i>	<i>Much worse</i>

### Lifestyle, work and health service impact:

8. Regarding your normal daily activities at home and at work, would you say that you have had more problems or less problems, since your operation/intervention?

1	2	3	4	5
<i>Much more problems performing activities</i>	<i>More problems performing activities</i>	<i>No Change</i>	<i>Less problems performing activities</i>	<i>Much less problems performing activities</i>

9. Regarding your ability to wash or shower or bathe as you would like to since your operation/intervention have you been more fearful or less fearful of these activities causing an ear infection?

1	2	3	4	5
<i>Much more problems performing activities</i>	<i>More problems performing activities</i>	<i>No Change</i>	<i>Less problems performing activities</i>	<i>Much less problems performing activities</i>

10. Since your operation/ intervention, have you seen your family doctor more often or less often about your ear problems?

1	2	3	4	5
<i>Much more often</i>	<i>More often</i>	<i>No Change</i>	<i>Less often</i>	<i>Much less often</i>

Since your operation/Intervention, have you needed to take medicines (including ear drops) for your ear

problem more often or less often?

1	2	3	4	5
<i>Much more often</i>	<i>More often</i>	<i>No change</i>	<i>Less often</i>	<i>Much less often</i>

### General:

12. Since your operation/intervention have your ear problems got you down more or less than before?

1	2	3	4	5
<i>Much more than before</i>	<i>More then before</i>	<i>No change</i>	<i>Less than before</i>	<i>Much less than before</i>

Figure 1: Showing Validated COMBI scoring system

The principal author gathered data and made phone contact. Verbal consent was obtained, and responses were documented in an Excel spreadsheet.

### Statistical analysis :

Data was assessed for normality of data distribution with Shapiro Wilk test. Continuous variables were reported as mean and standard deviation whereas, categorical variables were reported as frequencies and percentages. Independent sample t-test was used to compare means between the two groups, whereas chi-square test was used to compare categorical variables. Type I error of <0.05 was taken as significant. All individual COMBI questions were compared between the two groups. The responses to each question were reported with mean and standard deviation.

### Results:

Among the 90 contacted patients, 54 were included - 30 in the post-aural group and 24 in the per-meatal group (See Figure 2 below).

	Per-meatal Group	Post-aural group
Number of patients included	24	30
Mean age in years	42.23	53.79
Male: Female ratio	11:13	19:11

Figure 2: Participant Characteristics.

*Patient's Scar Perception* : In the per-meatal group 20 out of 24 (83%) were not bothered about scars if there was one behind the ear but 4 patients (mostly females 3 out of 4 i.e., 75%), were more happy on not having any scar (See figure 3 below).

### Patient response in numbers

Permeatal group scar perception	Yes	No	Don't Care/Don't Know
1. Would it matter to you if there was a scar behind the ear?			
Yes, No, don't care	4	0	20
Postaural group scar perception			

Permeatal group scar perception	Yes	No	Don't Care/Don't Know
1. Are you satisfied with the scar behind the ear?			
Yes, No, don't care	29	0	1
2. Would you prefer no scar if you had a choice?			
Yes, No, don't care	7	0	23
3. Hairstyle needed changing after surgery?			
Yes, No	0	30	0
4. Do other people remark or ask about the scar?			
Yes, No, don't know	0	30	0
Does it bother you?			
Yes, No, don't know	NA	NA	NA
5. Scar causes discomfort?			
Yes, No, don't care	2	28	0
6. Is ear/scar numb?			
Yes, No, don't care	5	24	1
Numbness causes problems?			
Yes, No, don't care	0	5	0
7. Ear position has changed since ear surgery?			
Yes, No, don't know, don't care	3	25	2
8. Any problems wearing eye glasses since ear surgery?			
Yes, No, don't know	1	24	0
9. Any problems wearing hearing aids since surgery?			
Yes, No, don't know	1	10	0
10. Voluntary pinna movements effected since ear surgery?			
Yes, No, don't know	3	3	0

Figure 3: Showing patient's responses to Scar perception questions (NA- Not applicable)

In the post-aural group, 29 out of 30 (96%) patients were satisfied with the scar they have. Concerning scar preference in the post-aural group, 23 patients (77%) were not bothered about the scar while 7 patients (23%) preferred no scar. No patient (0%) altered hairstyle due to post aural scar. Scar visibility to others was reported as nil (0%). Merely 2 patients (7%) reported mild scar discomfort. 5 patients (17%) noted slight scar numbness which was non-intrusive. 3 patients indicated a slight change in ear position post-surgery, 2 patients were uncertain about post-surgery ear re-positioning, and 25 patients noted no change in ear position. Hearing aids were used by 11 out of 30 patients in the post-aural group; 1 patient reported minor issues wearing hearing aid and 10 out of 11 patients (91%) reported no issues with hearing aids. 6 out of 30 patients could move their ears prior to surgery using auricular muscles; where 3 out of 6 of those patients (50%) lost that ability post-surgery (See figure 3).

*Time off work post-ear surgery* : Standard hospital advice suggests approximately 2 weeks of work leave after ear surgery. For some patients, work leave was not reported due to memory lapse or either it was insignificant due to their roles (e.g., housewives, retirees, remote workers).

In the per-meatal group, 14 of 24 individuals had relevant work leave, averaging 13.7 days (1 day to 6 weeks). Among them, 5 followed the advice with 2 full weeks off, 5 returned sooner, and 4 needed more than 2 weeks off.

In the post-aural group, 23 of 30 were relevant, with an average leave of 13.4 days. 8 returned early, 7 took full 2 weeks, and 8 needed over 2 weeks off.

*Comparison of Permeatal vs. Post-aural approaches using the COMBI questionnaire :*

Overall, the statistical analysis indicates that there are variations in patient perceptions and experiences between the per-meatal (PA) and post-aural (PM) tympanoplasty techniques across different dimensions assessed by the Chronic Otitis Media Benefit Inventory (COMBI) questionnaire. However, these variations appear to be relatively subtle, and in all cases (12 questions), the differences between the two groups are not statistically significant.

## Discussion:

*Key findings* : In line with our research, no notable contrast emerged between the per-meatal and post-aural groups based on patient responses after tympanoplasty surgery. The scar behind the ear posed a minimal concern for the majority of patients in both groups. The post-aural approach was well-tolerated, with negligible scar-related problems. Work absence and resumption were akin between groups. The COMBI questionnaire revealed no statistically significant difference in postoperative quality of life or symptoms. To the best of our knowledge, this is the first study comparing patient viewpoints, symptomatology, and quality of life tied to these two surgical techniques.

*Limitations* : Some patients underwent meatoplasty alongside the post aural approach, theoretically impacting post-operative results, particularly with hearing aid use. However, our study found no supporting evidence of this based on patient responses. Graft materials included cartilage, temporalis fascia, and fat graft, each could potentially yield different success rates and subsequent ongoing symptoms. Yet, as most patients received cartilage grafts (occasionally composite cartilage and fascia), and in only one case used a fat plug, generally high success rates of these graft materials mitigate significant result disparities. Procedures were performed or supervised by two experienced otologists. Selection criteria for choosing a surgical approach encompassed perforation size, site, ear canal diameter and curvature which could be a source of selection bias. While age displayed a statistically significant difference between per-meatal and post aural approach, this disparity would have less likely impacted the overall conclusions of the study.

*Comparison with Prior Literature* : The three recognized methods for tympanoplasty are post-aural, endaural, and per-meatal approaches<sup>1</sup>. Literature extensively covers these approaches, discussing indications, techniques, outcomes, and complications<sup>2</sup>. Studies compare per-meatal and post-aural approaches, examining graft success, hearing, surgery duration, recovery, and complications<sup>2,8</sup>. Perhaps our study is unique since it offers a patient perspective on experiences with these two surgical methods.

*Clinical and Research Implications* : This study provides preliminary data, potentially paving the way for a more extensive investigation with robust methodology and larger sample size. Clinicians can utilise our study findings within the study's limitations.

## Conclusion:

Our study suggests comparable long-term outcomes in quality of life between per-meatal and post-aural approaches. No significant disparity was observed in ongoing ear symptoms, impact on quality of life, scar perception, or return to work. Clinicians should consider individual patient factors and preferences when selecting a surgical approach.

*Conflict of interest statement*: The authors declare no conflicts of interest.

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