



**A COMPARATIVE STUDY OF MYRINGOPLASTY UNDERLAY TECHNIQUE WITH AND WITHOUT ANTERIOR ANCHORING OF GRAFT**

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**ABSTRACT**

**Introduction:** Tympanoplasty refers to reconstruction of tympanic membrane and/or ossicular chain. Myringoplasty is tympanoplasty without ossicular reconstruction. The most widely used and accepted method is underlay grafting of temporalis fascia. Residual perforations do occur and frustrate the surgeon and patient. There is marked diversity in the reported success rates for achieving an intact tympanic membrane following Myringoplasty.

**Material and methods:** A comparative study was conducted for an year,during which 90 cases were studied. Detailed preoperative and postoperative clinical and audiometric findings were assessed.

**Results :**Two groups of 45 patients each were taken for the study.It was found that anterior anchoring technique of myringoplasty had a better success rate (95.55%) than without anchoring technique(86.67%).

**Conclusion :** We were able to demonstrate that the graft uptake and functional results following underlay myringoplasty with anterior anchoring technique was better than underlay myringoplasty without anterior anchoring technique.

**KEYWORDS :** Myringoplasty, Underlay tympanoplasty ,Anterior Anchoring, Kerr Flap.

**INTRODUCTION:**

Myringoplasty is, tympanoplasty without reconstruction of ossicles. The success rate in achieving an intact tympanic membrane in experts hand is often quoted at around 95%. However, when results of large number of operations in hands of many surgeons are reported,the success rate is much lower.Numerous authours have reported the failure rate to be higher in anterior or large or subtotal perforations<sup>1</sup>. However, it is said that the failure rate can be reduced by anchoring the anterior margin of graft beneath the annulus or Kerr flap<sup>2,3</sup>.

Hence,we undertook this study to assess the clinical and functional results following underlay myringoplasty with and without anterior anchoring technique.

**MATERIALS AND METHODS:**

The study was conducted for an year,during which 90 cases were studied. Patients with unhealthy middle ear mucosa,ossicular discontinuity,cholesteatoma, allergic rhinitis, adenotonsillar hypertrophy were excluded.

Statistical analysis were done using mean,standard deviation,paired t test and z test.p value of <0.05 was taken as significant.

**RESULTS:**

In our study of 90 ears, primarily we have observed and analyzed rate of graft success, hearing gain and mean residual air bone gap. However, during the study we have also observed age and sex distribution and its relation to graft success rate.

**AGE AND SEX DISTRIBUTION:**

In our study, the age group ranged from 0 to 60 years. Sex distribution were also observed. Our observations are as follows:

**Table 1:**

Age group	Number of patients	Percentage
0 to 20	15	16.66
21 to 30	40	44.44
31 to 40	27	30
41 to 60	8	8.88
	90	100

Number	Male	Female
90	65	25

**DISTRIBUTION OF SITE OF PERFORATION IN THE TWO GROUPS**

Of the 32 subtotal perforations, 13 belonged to Group A and 19 to Group B. 19 of the central perforations were in Group A and 11 in Group B, while there were 4 posterior perforations in Group A and 6 in Group B and 9 anterior perforations in Group A and 9 in Group B.

**Table 2:Distribution of perforation site in the two groups**

Site of perforation	Total	Group A	Group B
Anterior	18	9	9
Posterior	10	4	6
Central	30	19	11
Subtotal	32	13	19
	90	45	45

**GRAFT SUCCESS RATE**

In our study, 45 cases underwent myringoplasty with anterior anchoring (Group A) and the remaining 45 myringoplasty without anterior anchoring (Group B). The results of the surgical procedures are tabulated below .

**Table 3:Graft Success rate**

Type of Surgery	Success	%	Failure	%	Total
Group A	43	95.55	2	4.45	45
Group B	39	86.66	6	13.34	45

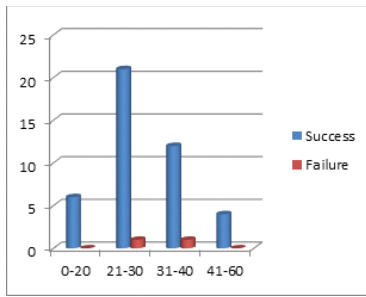
The success rate of graft uptake for the two surgical procedures employed have been summarized. In Group A, where patients underwent myringoplasty with anterior anchoring, 43 of the 45 ears (95.55%) showed successful graft uptake, while 2 ear (4.45%) showed residual perforation. In Group B, where patients underwent myringoplasty without anterior anchoring 39 ears (86.66%) showed successful graft uptake. And 6 ears (13.34%) had residual perforations. The difference of graft success rate between the two groups was statistically not significant with P value 0.266 by fisher exact test.

**GRAFT SUCCESS IN RELATION TO AGE**

The results of the surgical procedures were studied in relation to the age of patients. The results are tabulated below:

Figure 1 :

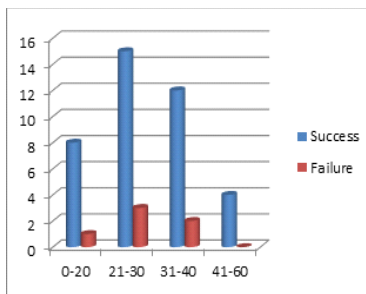
Graft success in relation to age - Group A



In Group A, where patients underwent Myringoplasty with anterior anchoring, no failures were seen in age group 0-20 yrs and 41-60 yrs. In age groups 21-30 yrs and 31-40 yrs, one failure was seen in each group.

Figure 2:

Graft success in relation to age - Group B



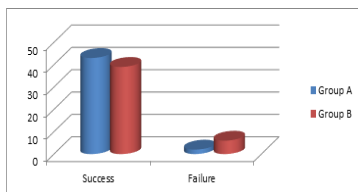
In Group B, where patients underwent Myringoplasty without anterior anchoring, 1 failure was seen in age group 0-20 yrs, 3 failures in age group 21-30, 2 failures in 31-40yrs and 0 failures in 41-60yrs of age.

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**HEARING GAIN IN RESPONSE TO THE TWO PROCEDURES**

The hearing gains following the two surgical procedures were studied in the patients with successful outcome. The 8 patients, in both the groups, who had residual perforations, were excluded .Our observations of Group A and Group B is as follows:(table 4 & fig 4)

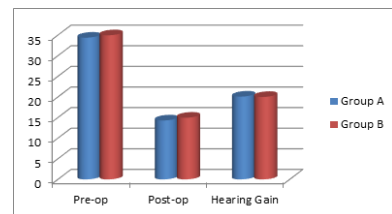
Table 4:Hearing gain in response to the two procedures

	Group A AB Gap	Group B AB Gap
Pre op	34.38	34.96
Post op	14.30	14.96
Hearing gain	20.08	20

	Pre Operative A-B Gap(SD)	Post Operative A-B Gap(SD)	Z value	P value
Group A	34.41(7.39)	14.25(5.32)	26.78	< 0.001
Group B	32.96(8.58)	14.97(4.31)	21.78	< 0.001

(Paired t test)

Figure 4:



For the 43 successful cases of Group A mean air bone gap, pre and post operatively was 34.38 dB and 14.30 dB. And for the 39 successful cases of Group B mean air bone gap, pre and post operatively was 34.96 dB and 14.96 dB

There was no change in bone conduction thresholds post operatively. The difference between the two surgical groups in hearing gain was not statistically significant (P=0.050). Although, AB closure post-operatively in both surgical groups was statically significant (p<0.001).

**DISCUSSION AND ANALYSIS**

**Graft Success In Relation To Age Of Patients**

In our study group of 90 patients undergoing surgery myringoplasty with and without anterior tucking of graft, 15 patients were in age group 0-20yrs, 40 patients belonged to age group 21-30 yrs, 27 patients in age group 31-40 yrs and 8 patients were in age group 41-60yrs.

Success rate of graft uptake including group A and group B was 93.33% for 0-20 yrs age group, 90% for age group 21-30 yrs, 88.88% for age group 31 -40 yrs and 100% for age group 41-60 yrs. Overall success rate of 90%.

A study done by Adkins WY 4, 30 type 1 tympanoplasty performed in age group 0-16 yrs and 41 surgeries with age group 16-67 with success rate of 87% and 90%, with an overall success rate of 89%.

Our study results are comparable to the above study results, and shows that age does not have any significance on the graft uptake. P value >0.99 for both groups.

**Graft success**

The present study was conducted for an year, during which 90 cases were studied. They were divided into two groups, comprising of 45 patients in group A and 45 patients in group B. Group A patients underwent Myringoplasty with anterior anchoring of the graft and group B patients underwent Myringoplasty without anterior anchoring of the graft. Of the 45 patients in Group A, 43 patients (95.55%) had successful graft uptake as seen in the follow up period, whereas 2 patients (4.45%) had a residual perforation. In Group B

consisting of 45 patients, 39 patients (86.67%) showed a successful graft uptake while 6 patients (13.33%) had residual perforations.

The results of standard underlay method and underlay with anterior anchoring method as obtained by various authors are compared and shown below.

Sl. No.	Name of the Author	No. of cases (n)	Method of Grafting		Graft uptake %
			Anterior anchoring	Standard Underlay Method	
1.	J. F. Sharp et al5(1992)	45	+	-	95.7
2.	Mangal Singh et al6(2003)	30	-	+	93.3
3.	F. M. Rizer7(1997)	427	-	+	87.6
4.	Gibb et al3(1982)	365	-	+	89.5
5.	Packer et al8 (1982)	106	-	+	82
6.	Chopra et al9 (2001)	20	-	+	85
7.	Riccardo D'eredita et al10(2004)	111	+ (93.2%) n=59	+ (84.6%) n=52	
8.	Our study	90	(95.55%) n=45	(86.67%) n=45	

Our results were comparable with the above studies. The results of Group A (95.55%) were better than Group B (86.67%). Though the difference between the results of the two groups was statistically not significant (p=2.66).

**Hearing Gain In Response To The Two Procedures**

The patients having residual perforations were excluded for the assessment of hearing in both the groups post-operatively

**Group A:** For the 43 successful cases, mean pre-operative air-bone gap was 34.38 dB, Post-operative mean air-bone gap was 14.30 dB. There was a mean hearing gain of 20.08 dB.

**Group B:** For the 39 successful cases, mean pre-operative air-bone gap was 34.96 dB, Post-operative mean air-bone gap was 14.96 dB. There was a mean hearing gain of 20 dB.

Though, the group A showed better hearing gain with mean air-bone gap closure of 20.08 dB than group B with mean air-bone gap closure of 20 dB, the difference in hearing gain between the two groups was not statistically significant (p>0.05).

**CONCLUSION**

- Underlay grafting for subtotal perforations is a surgical challenge because of its poor success rate<sup>11</sup>. In the present study, it appears that the graft uptake was better in patients undergoing Myringoplasty with anterior anchoring of the graft, especially in cases of anteriorly placed and subtotal perforations, but statistically the results were not significant (p>0.05).
- The hearing outcomes were similar in both the groups, with no statistical significance (p>0.05)
- As the graft uptake is better in patients undergoing Myringoplasty with anterior anchoring of the graft in cases of anteriorly placed and subtotal perforations, we recommend that this procedure to be performed in the cases, where the anterior rim of the remnant tympanic membrane is inadequate, in spite of no statistical significance in our study.

- In our study, even though the results of Myringoplasty with anterior anchoring were better than the Myringoplasty without anterior anchoring, no statistical significance could be found, hence a further larger study with longer follow-up period is proposed to assess the long term results.

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