



Incus-Footplate Assembly: Surgical Outcome and Prognostic Factor



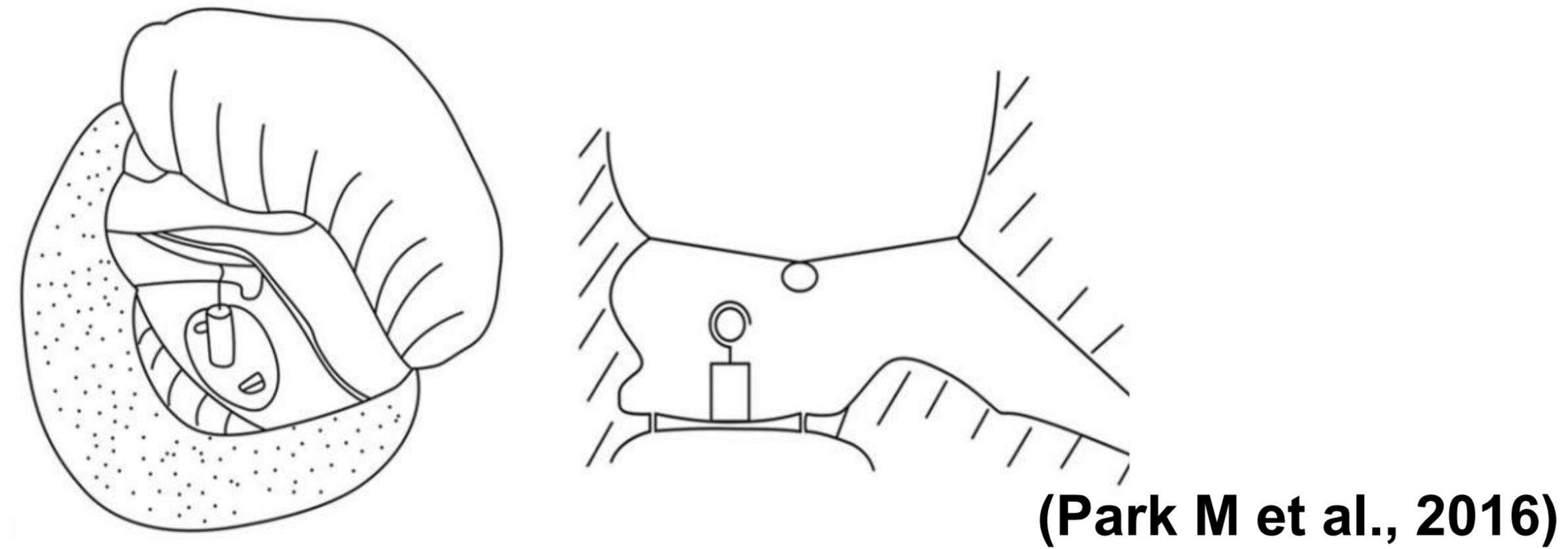
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Introduction

- Incus-footplate assembly (IFA) is a type of ossiculoplasty indicated when the stapes superstructure is absent but the footplate remains mobile.
- This study aimed to review long-term hearing outcomes after IFA and to identify prognostic factors associated with surgical success



Methods

- We retrospectively analyzed 18 ears that underwent primary IFA at Seoul National University Hospital and Seoul National University Bundang Hospital between 2003 and 2022.
- Inclusion criteria: pre- and postoperative audiology, ≥ 6 weeks follow-up.
- Exclusion criteria: inner ear pathology or concomitant procedures preventing reliable hearing evaluation.
- Outcomes: postoperative ABG, ABG closure, high-frequency bone conduction (HF-BC) shift, time-to-failure (reoperation or persistent ABG >20 dB).
- Statistics: Kaplan-Meier survival analysis, Cox proportional hazards with Firth correction, and linear mixed models (LMM)

Table 1. Patient demographics and surgical findings

Variables	Male N = 10	Female N = 8	p-value	Overall N = 18
Age at surgery	30.0 ± 17.7	38.1 ± 17.1	0.460	33.6 ± 17.4
Follow-up duration (yr)	2.4 ± 2.7	3.6 ± 3.3	0.213	3.1 ± 3.2
Congenital	9 (90%)	6 (75%)	0.576	15 (83%)
Stapes fixation	2 (20%)	4 (50%)	0.321	6 (33%)
Incus anomaly	3 (30%)	0 (0%)	0.216	3 (17%)
Stapes anomaly	9 (90%)	5 (63%)	0.275	14 (78%)

Results

Hearing Outcomes

- Mean preoperative ABG: 32.9 ± 9.3 dB.
- Postoperative 12-month ABG: 16.7 ± 8.6 dB, with mean closure of 16.5 dB (range -3.8 to 32.5).
- Distribution of ABG closure: 0–10 dB (14%), 11–20 dB (50%), 21–30 dB (21%), >30 dB (14%)

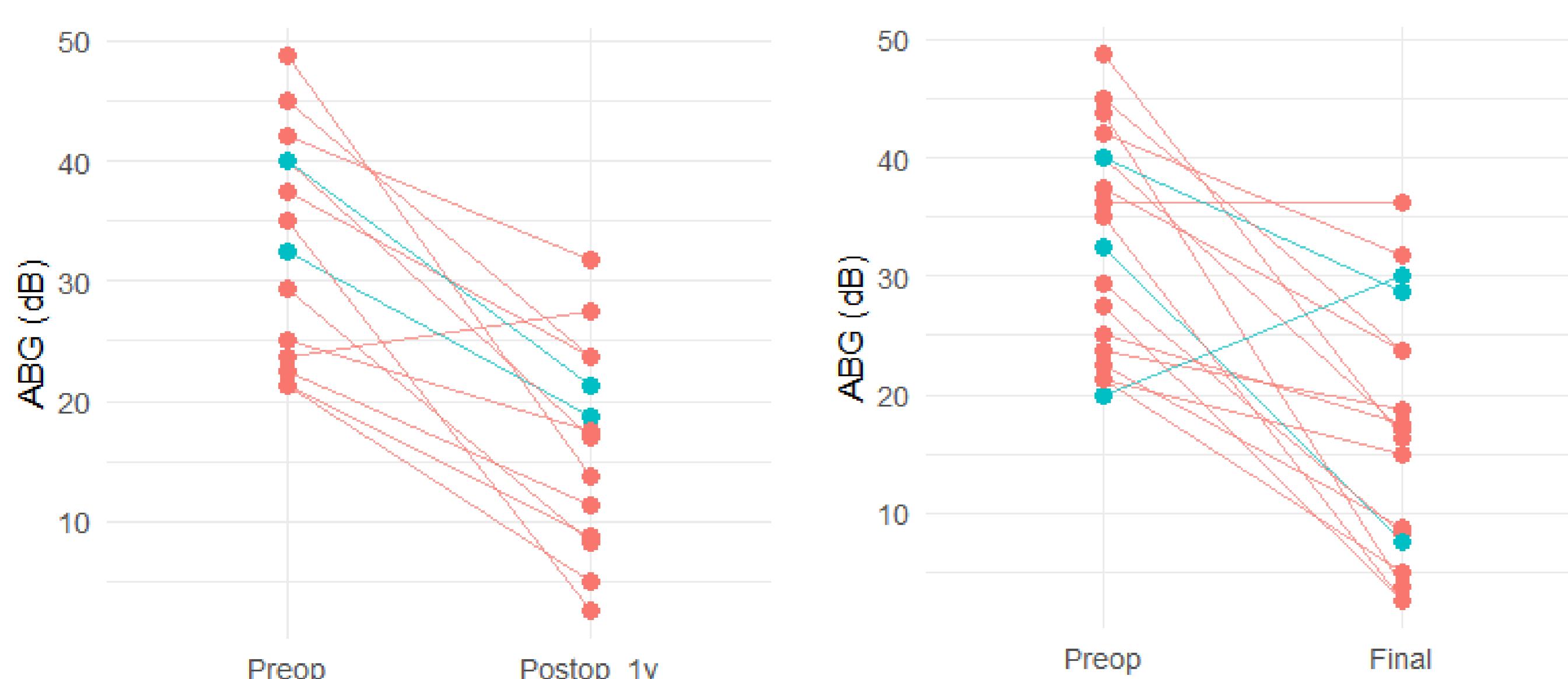


Figure 1. Preop vs Postop ABG (paired line chart)
Aqua lines/points indicate cases that later required revision surgery.

Survival Analysis

- Median follow-up: 22 months (IQR 12–77.5).
- Six failures observed.
- Failure-free survival: 69.3% at 5 years, 46.2% at 7 years.
- No significant differences by incus anomaly, stapes fixation, or etiology

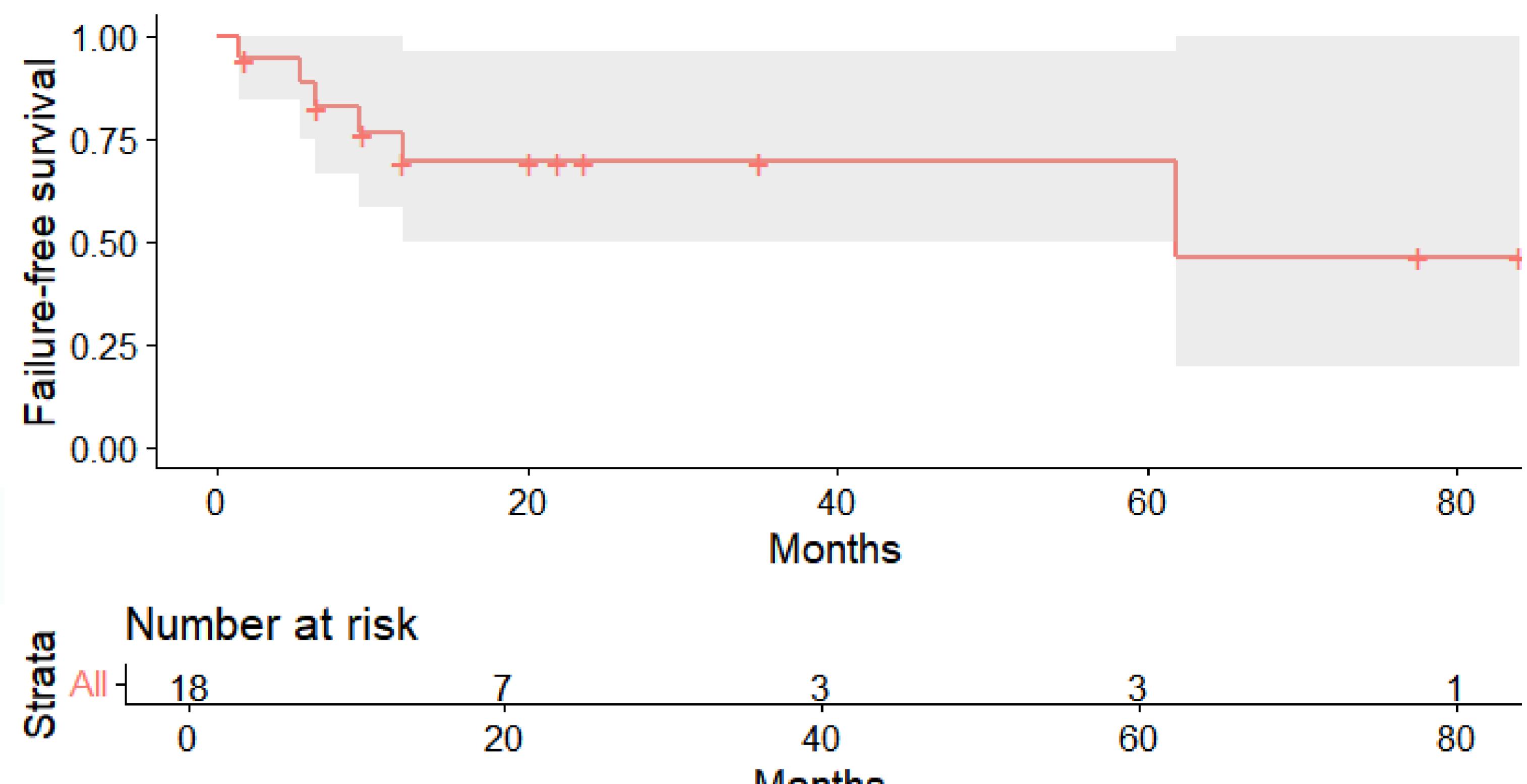


Figure 2. Kaplan-Meier survival curve.

Longitudinal Analysis

- LMM showed a trend toward deterioration over time ($\beta=0.067$, $p=0.058$).
- After adjusting for baseline ABG, the time effect was no longer significant ($\beta=0.075$, $p=0.036$).
- Suggests that long-term outcome is largely determined by preoperative hearing status rather than time since surgery

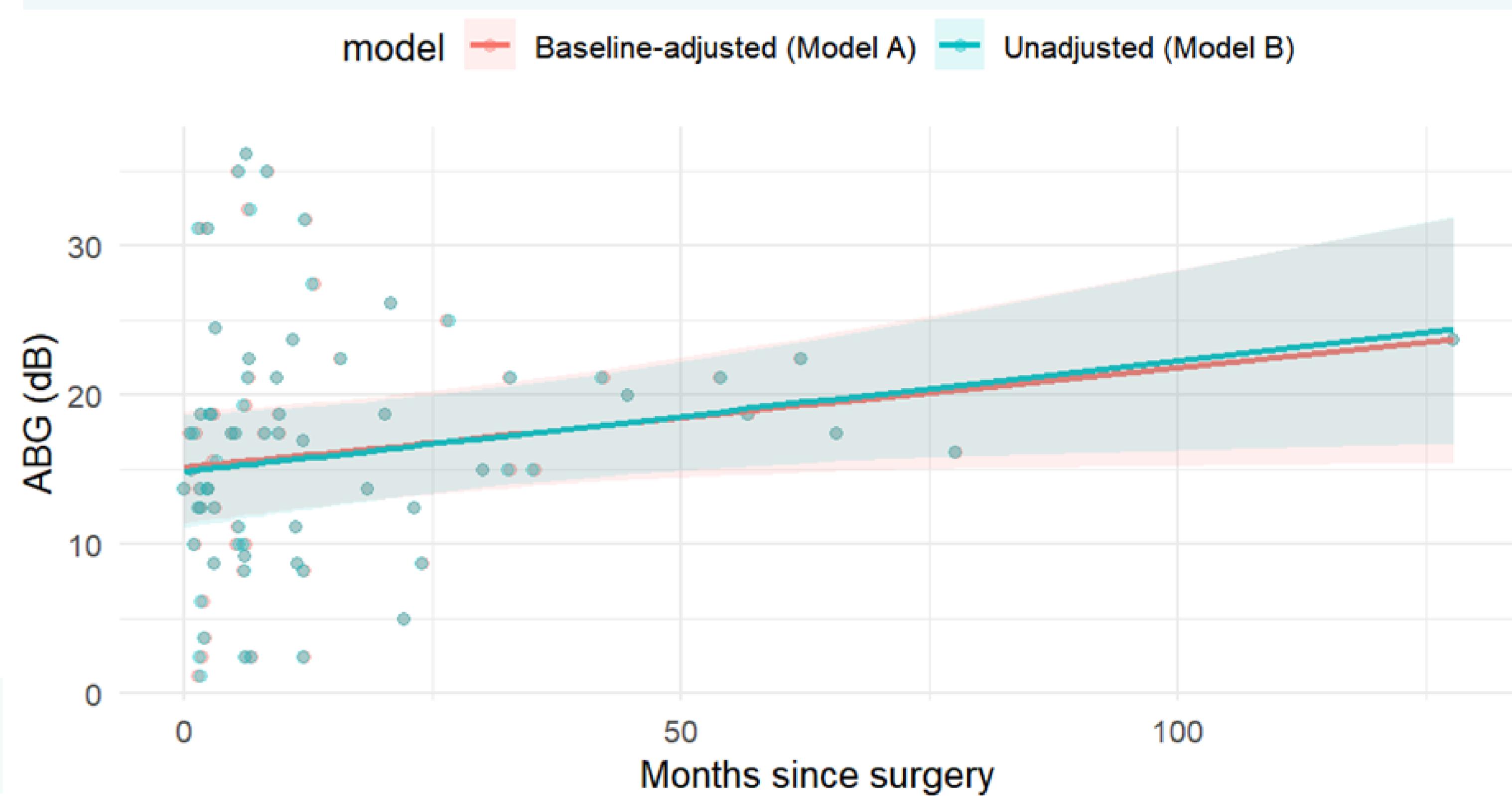


Figure 3. LMM trajectory of ABG over time.

Revision / Failed Cases

- Across cases, prosthesis instability (loose crimp, displacement) and progressive functional decline were the dominant mechanisms of failure.
- Revision surgery rarely restored hearing, except when conversion to an alternative technique (MFA using TORP) was feasible.

Conclusion

- IFA provides meaningful short-term hearing improvement in carefully selected cases.
- Prognosis is strongly influenced by baseline hearing, anatomical abnormalities, and prosthesis stability.
- Careful case selection and long-term follow-up are essential.