

# Predicting Outcome Following Stapedectomy

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## Objective

To Assess whether intra-operative findings at stapedectomy can be used to predict post-operative outcome

## Method

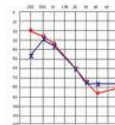
Retrospective review of 188 consecutive stapedectomies (teflon piston + vein graft) performed by the senior author between 1994 and 2005

Intra operative findings noted:

- Anatomical abnormalities
- Surgical complications
- Type of anaesthetic (GA/ LA)
- Whether 1<sup>st</sup> or 2<sup>nd</sup> side surgery

Outcome Measures:

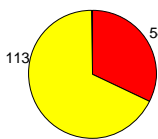
- Change in air conduction (AC)
- Closure of air bone (AB) gap (post operative AC – pre operative BC)
- Average of 0.5, 1, 2, 4 KHz
- Comparison using Mann Whitney U test for non normally distributed data



## Results

n = 167 excluding patients with a dead-ear outcome (n=5), revision surgery (n=9), or missing audiogram data (n=7)

### Anatomical Abnormalities



Includes:

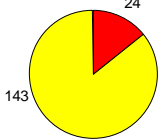
- Overhanging/ dehiscent VII n.
- Adhesions at oval window
- Persistent stapedial artery
- Narrow meatus

■ Yes Vs ■ No

Comparing change in AC;  $p=0.689$

Comparing change in AB gap;  $p=0.186$

### Surgical Complications



Includes:

- Perilymph leak
- TM perforation
- Fractured footplate
- Intra-operative bleeding

■ Yes Vs ■ No

Comparing change in AC;  $p=0.377$

Comparing change in AB gap;  $p=0.092$

### Type of Anaesthetic

GA (n= 159) Vs LA (n=8)

Comparing change in AC;  $p=0.949$

Comparing change in AB gap;  $p=0.118$

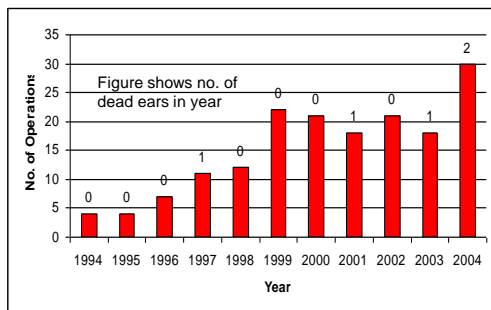
### 1<sup>st</sup> or 2<sup>nd</sup> Side Surgery

1<sup>st</sup> side (n= 124) Vs 2<sup>nd</sup> side (n= 43)

Comparing change in AC;  $p=0.705$

Comparing change in AB gap;  $p=0.543$

Looking at individual frequencies, only the presence of surgical complications had a significant effect on outcome at lower frequencies (0.5KHz,  $p=0.014$ , 1KHz,  $p=0.037$ )



- To look for change in outcome over time, i.e. 'learning effect', data split into 2 groups: 1994 – 1999 and 2000 – 2005

- 2 groups compared:

1994 - 1999 Vs 2000 - 2005

Comparing change in AC;  $p=0.47$

Comparing change in AB gap;  $p=0.70$

- No  $\uparrow$  dead ear rate in early years

### Dead Ears

- Overall dead ears n = 5 (2.7%)

- 2 had anatomical abnormalities

- 1 had surgical complication

(Though all had post operative dizziness)

- 4 had GA

- All were first side surgery

- Numbers too small for statistics

## Discussion

- Reviewing 1681 stapedectomies performed by Jean Marquet, Somers et al. found that excessive bleeding, accidental perilymph aspiration, and anatomical abnormalities may affect results at some frequencies.<sup>1</sup>

- It is accepted that there is a learning curve when performing stapedectomy<sup>2,3</sup>. Poor technique leads to complications including dead ear. However, experienced surgeons also encounter dead ears, due to other factors such as infection, post-operative perilymph leak and granulomatous reactions.<sup>4,5</sup>

- In our series, the senior author did not show evidence of a learning curve. This may be a result of a high level of training in middle ear surgery (over 150 cases) before commencing stapes surgery. It is arguable that experience of *all* middle ear procedures should be taken into account when considering which trainees (and consultants) should perform stapes surgery.<sup>6</sup>

## Conclusion

In our study, intra-operative stapedectomy findings were not a reliable indicator of outcome or predictor for dead ear

## References

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2. Leighton SEJ, Robson AK, Freeland AP. Audit of Stapedectomy in a Teaching Hospital. *Clin Otolaryngol* 1991;16:488-492
3. Yung MW, Oates J, Vowler SL. The Learning Curve in Stapes Surgery and its Implication to Training. *Laryngoscope* 2006;116(1):67-71.
4. Harkness P, Brown P, Fowler S, Grant H, Topham J. A Confidential Comparative Audit of stapedectomies: results of the Royal College of Surgeons of England Comparative Audit of ENT Surgery 1994. *JLO* 1995;109:317-319.
5. Wiet RJ, Harvey SA, Bauer GP. Complications in Stapes Surgery. *Otolaryngologic Clinics of North America* 1993;26(3):471-6.
6. Moriarty BG. Stapes Surgery: implications for training. *JLO* 1990;104:203-5.