SWEEP FREQUENCY IMPEDANCE (SFI) MEASURES OF MIDDLE EARS WITH OSSICULAR-CHAIN DYSFINCTIONS

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Introduction

Tympanometry is known as a popular measure to diagnose the conductive hearing loss due to middle-ear lesions. However, this measure still has poor performance to diagnose the separation and fixation of the ossicular chain due to similar results between those different types of ossicular chain dysfunctions.

The authors have shown that an alternative impedance meter based on sweep frequency impedance (SFI) is available for diagnosis of such dysfunctions [1], even only with a sound pressure stimulus without static pressure [2, 3]. We then aim to further investigate the diagnosability of separation/fixation using SFI measure.

Our previous measurement [4] still did not clarify the effect of the detail middle-ear conditions on the SFI measure. Here we conducted SFI measures for multiple middle-ear lesions to carefully explore the dynamic characteristics.

Methods

We conducted the SFI measurement to obtain the resonance frequency (RF) of the middle ear and the change in the ear canal sound pressure (ΔSPL) using the same equipment (Fig. 1) and the manner as the previous measurement [4].

Total of 28 patients participated in this measurement. The number of ears diagnosed as separation was 11. The number of ears diagnosed as fixation was 20 (17 for the stapes and 3 for the malleus/incus).

Results and Discussion

Figure 2 shows the distribution of measured data plotted on RF-ΔSPL plane. Although the ears with separation/fixation were found to have lower/higher RF and higher/lower ΔSPL, respectively, no specific tendency was found depending on the extent of separation/fixation or the fixation positions. Addition of another quantitative parameter (e.g., mobility of the fixation positions) might be useful for further exploring the dynamic characteristics.

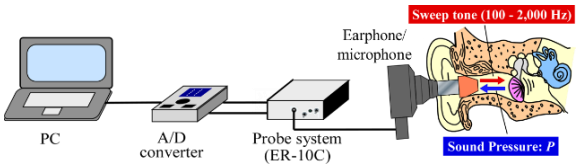

Figure 1: Overview of SFI meter for measurements

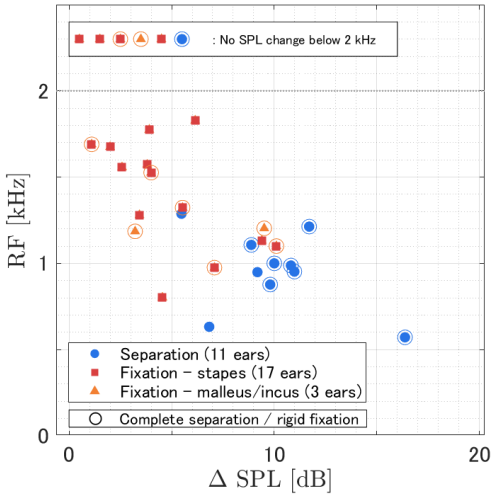

Figure 2: Distribution of measured data plotted on RF-ΔSPL plane.

Conclusion

We conducted the SFI measures for multiple middle ear lesions, finding that the middle ear with separation/fixation have different tendency in SFI.

References

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Acknowledgments

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