

Dynamic characteristic changing of the external ear canal wall with an increase in neonatal chronological age

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Abstract

A sweep frequency impedance (SFI) meter, which evaluates the dynamic behavior of the middle ear, allows the diagnosis of middle ear dysfunctions in adults and children. Recently, we have applied this method to neonates and found that the SFI data is affected by the oscillatory behavior of the external ear canal wall, rendering the diagnosis in this period of life difficult. In this study, SFI tests were regularly performed in two healthy neonates for several months, who were a full-term baby with normal perinatal history and passed the automated auditory brainstem response test. An attempt was made to clarify how long the external ear canal wall impacts on the SFI data. The measurement results suggest that the rigidity of the external ear canal wall increases with chronological age, resulting in an increase and decrease in the first variation of frequency in the sound pressure level (SPL) curve and the changes in SPL, respectively. Additionally, the oscillatory behavior of the external ear canal wall tends to be disappeared by such months of age.

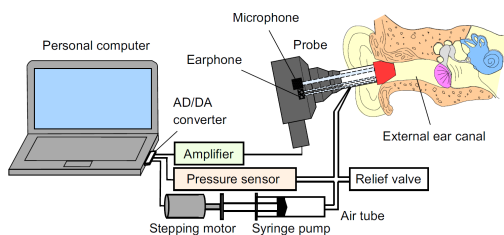


Figure 1. A schema of the SFI meter.

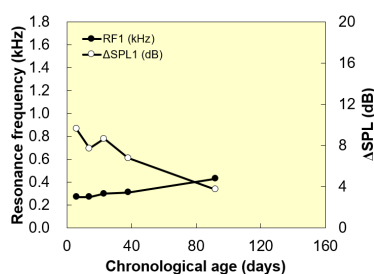


Figure 2. Chronological changes of the external ear, RF₁ and ΔSPL₁, derived from a healthy neonates.

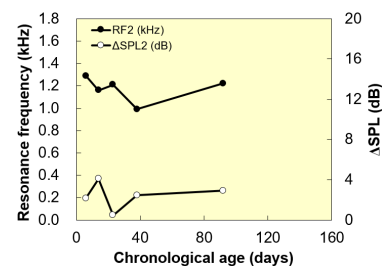


Figure 3. Chronological changes of the middle ear, RF₂ and ΔSPL₂, derived from a healthy neonates.

References

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