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Correlation between schroeder-phase effect and electrocochleography findings

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Introduction: In Schroeder-phase masking test, different auditory perception ability towards different phases of Schroeder masker is known as 'phase effect'. Previously, the phase effect mechanism was proposed to be dominantly contributed by peripheral auditory function, mainly by outer hair cells. This study aims to investigate the possible involvement of central auditory function (i.e. auditory nerve) in the phase effect mechanism. **Methods:** Four normal hearing and four sensorineural hearing loss subjects were recruited. Schroeder-phase masking test was conducted at 500 Hz, 1 kHz, and 2 kHz (75 dB A), and phase effect was recorded. Electrocochleography (ECoChG) test via tip-trode recording using 90 dBnHL tone burst at 500 Hz, 1 kHz, and 2 kHz was also conducted on the same subjects. The amplitude of three ECoChG components; i) cochlear microphonic (CM) - arises from outer hair cells, ii) summing potential (SP) - arises from inner hair cells, and iii) action potential (AP)- arises from auditory nerve; were recorded. Pearson and Spearman analysis were performed to find correlation between phase effect and individual ECoChG components' amplitude. **Results:** Result showed no significant correlation between phase effect and all ECoChG components' amplitude at all tested frequencies with exception at 2 kHz. A significant strong correlation ($p: 0.02$; $r: 0.81$) between phase effect and action potential's amplitude at 2 kHz was observed. **Conclusions:** This finding suggests that central auditory function (i.e. auditory nerve) is possibly involved in the phase effect mechanism. This finding gives new insight towards better understanding of auditory perception.

KEYWORDS: Schroeder-phase masking; phase effect mechanism; Electrocochleography