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Can extended high frequency hearing thresholds be used to detect auditory processing difficulties in an aging population?

Liddell, A. (1, 2), Campbell, P.E. (1), Owens, D. (1, 2), DePlacido, C. (1), Wolters, M. (2)

(1) Audiology Division, Speech and Hearing Science Department, Queen Margaret University, Edinburgh, UK

(2) Centre for Speech Technology Research, University of Edinburgh, Edinburgh, UK

OBJECTIVE: Age-associated hearing loss and the subsequent masking of any speech information carried above 8 kHz may result in older adults' difficulties in understanding speech in adverse listening conditions. However the use of extended high frequency (EHF) audiometry is still limited and additional studies are required to establish its use, particularly among older adults. In this study, we sought to determine the clinical usefulness of EHF audiometry in detecting increases in pure-tone hearing thresholds in adults who complained of discrimination difficulties in background noise despite normal hearing in conventionally tested frequencies.

DESIGN: We measured hearing thresholds from 0.25 kHz to 20 kHz in 18 subjects (aged 50-65 years) using a GSI-61 high frequency audiometer with Sennheiser HDA-200 earphones. EHF audiometry thresholds were established at intermediate frequencies between 9 and 20 kHz (9, 10, 11.2, 12.5, 14, 16, 18 and 20 kHz) using a modified Hughson-Westlake procedure [1]. Subjects were divided into two groups: group 1 reported difficulties with their hearing in background noise (n=7) and group 2 reported no concerns (n=11).

RESULTS: All participants had normal peripheral hearing across 0.5 kHz to 4 kHz. However, significant differences were observed between the two groups for the extended high frequencies (9-20 kHz). In adults who complained of noise (group 1), there were statistically significant elevations only in frequencies higher than 9 kHz.

CONCLUSIONS: Although our sample size are small, our data lead us to conclude that EHF audiometry is an important instrument to distinguish auditory sensitivity, even for those considered as audiologically normal. Extended high frequency audiometry may serve as a useful measure of elevation in pure-tone hearing thresholds that precede noticeable loss of auditory acuity.

References:

[1] Stelmacowicz PG, Beauchaine KA, Kalberer A, Jesteadt W. Normative thresholds in the 8-to 20-kHz range as a function of age. Journal of the Acoustical Society of America 1989; 86: 1384-1391