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Use of a Novel Device to Assess Intraoral and Intrapharyngeal Baropressure during Sound Production.

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Abstract

OBJECTIVE: We developed a novel device that simultaneously measures oral and intrapharyngeal baropressure. The transducer has the advantage that it can be placed in any region. We determined the effect of different speech samples on baropressure in these regions.

PATIENTS AND METHODS: Seven healthy individuals produced speech samples comprising vowels and consonants (e.g., /aka/, /apa/, and /ash/). Two transducers were installed into the experimental plate at the incisive papillae and center of the Ah-line; a third transducer was placed in the mid-pharyngeal cavity. During each task, 3 parameters were analyzed: peak pressure, mean pressure, and the temporal relationship between sound signals and pressure changes.

RESULTS: The mean pressure did not change during the production of a single vowel; however, the pressure transiently increased during the production of the speech samples, depending on the place of articulation. Moreover, the place of articulation affected the onset and peak timing of pressure changes.

CONCLUSIONS: These findings indicate that pressure changes during the production of speech samples reflect the functional aspects of speech production. In particular, simultaneous pressure recordings at multiple locations would provide precise information about speech production, compared to pressure studies that used a single pressure transducer.

KEYWORDS: Aerodynamic; Oral; Phonation; Pressure; Sound pressure level; Speech production; Velopharyngeal function

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