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Correlation between vibratory and perceptual measurement in resonant voice

Chen, Fei; Lo, Gigi; Pang, Gary; Ma, Estella; Yiu, Edwin

The University of Hong Kong, Hong Kong, Hong Kong

Instrumentations and perceptual evaluation protocols have been used in studying the physiology and acoustics of resonant voice exercise used in voice therapy. However, the extent of vibratory resonance during resonant voice phonation is not well documented. The present study investigated the relationship between extent of skull resonance using quantitative measurement and the perceptual quantification of phonatory resonance. The study also examined the difference in skull vibration between the production of nasal and non-nasal voice stimuli after resonant voice training. 18 females and 18 males aged from 20 to 33 years with normal voice were given a session of resonant voice training. Vibration measurements using vibro-detector on the nasal bridge and forehead site during the production of voice stimuli were taken. The voice productions were also recorded and three speech pathologists with at least 2 years of experience in assessing and managing voice patients were asked to rate independently using an 11-point equal-appearing interval (EAI) scale to evaluate the amount of phonatory resonance. Results revealed that the correlation between skull vibration measurement and perceptual resonance rating was significant but low ($r = .389, p < .0001$). Furthermore, the increase in vibration after resonant voice training is comparable between the nasal and non-nasal stimuli ($p > 0.05$). Neither was the vibration in resonant voice significantly different ($p > 0.05$) from that in strained voice. These results suggested that either perceptual voice evaluation or the vibratory measurement on the nasal bridge and forehead site is not a good indicator of resonant voice.