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A longitudinal study on vocal aging - Changes in F0, jitter, shimmer and glottal noise

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A longitudinal study on vocal aging was conducted for voicing source parameters: fundamental frequency (F0), jitter (period perturbation quotient, PPQ), shimmer (amplitude perturbation quotient, APQ) and glottal noise (normalized noise energy in a high frequency band, NNEb). Acoustic analyses were made on the sustained phonations of the Japanese vowel /a/ of 20 males and 38 females with no laryngeal disease, which were recorded once every year over periods ranging from 11 to 19 years. The acoustic parameters measured were subjected to statistical regression analysis, where the longitudinal change of the parameters was evaluated by the t-test. Two males (10%) and 12 females (32%) showed significant falling in F0 ($P<0.05$) but no significant rising was observed. Five males (25%) and 12 females (32%) displayed a significant increase in APQ ($P<0.05$), whereas only six females (16%) and no male revealed significant changes in PPQ ($P<0.05$). Increase in NNEb was significant for seven males (35%) and 14 females (37%) ($P<0.05$). We conclude that 1) F0 falling is a more emblematic tendency of female vocal aging than male, 2) shimmer is a more observable indication of vocal aging than jitter, and 3) glottal noise in a high frequency region tends to increase with age.