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journal: TMH-QPSR
volume: 40
number: 3-4
year: 1999
pages: 065-074

http://www.speech.kth.se/qpsr
Voice source differences between falsetto and modal registers in counter tenors, tenors and baritones

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Abstract
The voice source of professional singers is analyzed for four counter tenors, five tenors, and four baritones who sang the syllable [pæ:] in soft, middle and loud voice at certain pitches in modal and falsetto/counter tenor register. Subglottal pressure, closed quotient, relative glottal leakage, as well as the relative level of the fundamental are analyzed. The counter tenors all used comparatively low subglottal pressures, and showed a closed phase in their flow glottogram waveform, also in soft phonation. For a given value of the closed quotient the fundamental tended to show a higher relative level in falsetto than in modal register. The flow glottogram differences between the registers seem related to vocal fold thickness that is greater in modal than in falsetto register. The main characteristic of the counter tenors’ falsetto register seemed to be the presence of a closed phase.