



Voice Source and Subglottal Pressure in Persian and Kurdish Singing

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Subglottal pressure (P_{sub}) and voice source were analysed in singers representing traditional Persian and Kurdish singing styles, thereby complementing a previous study of stylistic formant-to-harmonics relationships as well as melodic ornaments in these traditions.

Audio and EGG signals were simultaneously recorded while the subjects sang excerpts from their traditional repertoires. The subjects either repeated the song, replacing each syllable of the lyrics with [pæ], or they sang diminuendo sequences of [pæ] on different pitches (with constant pitch in each sequence). P_{sub} was recorded as the oral pressure during the occlusion for the consonant /p/.

Fundamental frequency F_0 was measured from the EGG signal, and voice source parameters from inverse filtering of the audio signal by means of the custom made DeCap and S-naq software (Svante Granqvist). The relationships between P_{sub} and voice source parameters, e.g., NAQ, MFDR, Closed Quotient and H1-H2 are compared between the two singing traditions and with some Western classical as well as non-classical singing styles (Zannger Borch & Sundberg 2011; Sundberg, Thalén & Popeil 2010; Björkner, Sundberg & Alku 2006; Björkner 2008).

The data indicate high adduction and high P_{sub} as being characteristic for Persian and Kurdish singing; both styles use pressed phonation. This in combination with the strong second harmonic achieved by the formant tuning (as found in the previous study) seems to serve the purpose of producing a jelly sound in both styles.