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Videofiberoptic Laryngeal Data and Acoustic Analysis of the Ornamentations used in Mongolian Long Song

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Objective. The paper presents the results of a multiparametrical analysis of "Mongolian Long song", a long and slow versified melody with multiple ornamentations.

Method. The study includes: (1) a physiological analysis (videofiberoptic laryngeal data of the 61 ornamentations of a song produced by a famous Mongolian singer, Narantuya, and video recordings of the singer); (2) an acoustical analysis (fundamental frequency and intensity curves of the ornamentations).

Results. The fiberoptic analysis showed two main laryngeal behaviour in producing ornamentations, with a leitmotiv: (1) "lyrical" vibratos mobilizing the entire laryngeal block; (2) "Mongolian" trills with essentially supraglottic movements, the arytenoids being mobilized independently of the rest of the laryngeal block. These movements contrasted with the absence of cervico-scapular movement of the singer.
The acoustic analysis showed: (1) for the "lyrical" vibrato: the fundamental frequency and the intensity were in-phase, with a moderate amplitude (1 to 3 semitones for the fundamental frequency, 4 to 6 dB for the intensity; 5 to 6 modulations/s); (2) for the "Mongolian" trill: the fundamental frequency and the intensity were in opposite phase, with an important amplitude (3.5 to 4.5 semitones for the fundamental frequency, 6 to 10 dB for the intensity; and 6 to 7 modulations/s) and acoustical indications of changes of laryngeal vibratory mechanisms.

Conclusion. In this multiparametrical study of Mongolian Long song with previously unpublished physiological data, we defined two ornamentations used by the singer in the same melody, corresponding to different laryngeal movements and different acoustic characteristics: "lyrical" vibrato and "Mongolian arytenoidian" trill.

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