

ABSTRACT Separate file Nagle\_SEMGProsody

Surface EMG control of fundamental frequency modulation using submental muscles:  
Enhancing alaryngeal prosody: Nagle, Donoso, Dorward & Heaton

This study describes Electrolaryngeal (EL) speech for which a prosodic pattern is derived from skin surface electromyographical (sEMG) signals recorded from under the chin (submental surface). As part of a larger project, twenty laryngectomees performed a series of speech tasks using an EL customized to modulate  $f_0$  using submental sEMG signals (EMG-EL). For comparison, they performed the same speech tasks using a commercially available EL with thumb-button  $f_0$  modulation. Minimal training was provided in the use of either device, although most participants owned the thumb-button device.

Ten laryngectomees produced spontaneous speech using submental sEMG-based  $f_0$  modulation. This study reports  $f_0$  variability within their spontaneous speech samples to examine whether residual non-laryngeal speech musculature can support speech prosody. Of these participants, five produced spontaneous speech using both the sEMG and thumb-button modes of EL speech. Measures of  $f_0$  variability were compared within speaker, providing evidence that submental sEMG-based  $f_0$  modulation generates greater variability than thumb-button  $f_0$  modulation for EL speech. Results have implications not only for EL design, but also for researchers interested in the contributions of non-laryngeal structures to prosody.