Clinical Implications of Efference Copy and Laryngeal Mechanoreceptors in Speech Sensorimotor Control

Michael Hammer. Dept. of Surgery, Division of Otolaryngology, University of Wisconsin School of Medicine and Public Health, University of Wisconsin, Madison, WI

Laryngeal mechanoreceptors provide perceptual and proprioceptive afference for a variety of essential human functions including airway protection, breathing, deglutition, speech, and voice. It is interesting that mechanosensory information that yields a defensive airway response when a healthy individual breathes may go largely unnoticed when the individual voices. Modulation of laryngeal mechanosensory detection may be critical to maintain an uninterrupted speech/voice pattern in the presence of potentially distracting input. We used an endoscopic technique to measure laryngeal mechanosensory detection thresholds in healthy participants and in two groups of individuals with clinical speech/voice disorders including those with Parkinson’s Disease and those with Adductor Spasmodic Dysphonia. We will present recent findings from our work suggesting (a) an important role of efference copy and laryngeal mechanosensory modulation in healthy speech/voice sensorimotor control, (b) that speech/voice disorders associated with Parkinson’s Disease may be associated with generalized laryngeal mechanosensory deficits, and (c) that speech/voice disturbances in Adductor Spasmodic Dysphonia may be associated with task-specific deficits of efference copy. We will present these basic and clinical findings in the context of current models of speech/voice sensorimotor control.