Sensory Mechanisms of Voice Control S. Gonzales Flagmeier, D. Robin, W. Rogers, A. Ramage, P. Fox, S. Narayana, C. Larson

Introduction. Voice disorders are among the most serious disabilities that cause speech and communication handicaps; however, neural mechanisms controlling voice are poorly understood. This study aims to further understanding of these networks by defining the functions of cortical vocal areas involved in audio-vocal reflexes (Brown et al., 2008) using image guided robotic transcranial magnetic stimulation (irTMS). irTMS creates a virtual lesion in the brain by delivering a high-energy pulse of a focalized magnetic field. Hypothesis. The neural network controlling voice responses to pitch-shifted voice feedback involves the cerebral cortex. Method. During reflex testing, TMS is applied to the primary motor cortex at specific time intervals following pitch-shift stimuli. The functional significance of each region in the cortical network will be quantified by measuring the amplitude of F0 responses to TMS as a function of the time interval between the pitch-shift stimulus and the TMS. Results. Data shows that when irTMS was paired with upward pitch-shift stimuli, the magnitude of the voice F0 response to irTMS showed substantial decrease in magnitude with a delay time of 30-40 ms. When irTMS was paired with a downward pitch-shift stimulus, an increase in the F0 at 30-40 ms delay time was observed.