Contribution of cutaneous afferent information to speech

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Abstract
Cutaneous mechanoreceptors provide kinesthetic information that may contribute to human movement. In the orofacial region, these cutaneous inputs may be particularly important for the control of articulatory motion because several orofacial muscles lack muscle spindles and tendons (for example, perioral muscles and anterior digastric). However, there has been limited research assessing the role of cutaneous inputs in movement planning and control in either the orofacial system or the limbs. To investigate the hypothesis that cutaneous afferent information provides kinesthetic information in speech motor system, we have developed a new system that modulates cutaneous sensations by stretching the facial skin in a specific orofacial area. In a first study, we have examined whether altered cutaneous afferent information induces a cortical reflex that is associated with articulatory adjustment. In a second study we assess whether cutaneous afferent information is utilized in jaw articulatory motion control. Our results to date indicate that cutaneous mechanoreceptors are narrowly tuned to deformation of the facial skin and provide kinesthetic information involved in sensorimotor processing in speech motor control.