



## model based investigation of activation patterns of the tongue muscles for vowel production

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Muscle activations in speech production are important for understanding speech control. To overcome the problems of previous methods, we proposed a physiological articulatory model based approach to explore the muscle activations in the production of the five sustained Japanese vowels through an optimization procedure which minimizes the morphological differences between the model simulations and MRI observations. The general findings were consistent with the observations obtained using EMG. In addition, we found that the Transversus and Verticalis actively participate in vowel production. This implies the proposed method is appropriate for estimating the muscle activation patterns during vowels production.

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