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Title: Compensatory movement of the tongue when the jaw is blocked: spatio-temporal adjustments of the articulatory gesture.

Speech production is characterized by a highly complex spatio-temporal organization of the articulators. Lots of work is still being done in order to understand better how the articulatory system is governed. One of the methods consists in artificially perturbing articulatory movements during the production of speech. Studies based on this paradigm proved that the articulatory system presents a noteworthy plasticity functional to reinstate a rapid adapted response. We are particularly interested in the articulatory compensation in the production of consonants.

We focus on the realization of linguo-palatal stop consonants in French, produced with static perturbations like bite blocks. We neutralized the jaw activity by means of bite blocks in order to observe the movements of the tongue (with Reading's EPG system). We know, according to different studies on bite blocks, that it is possible to preserve the intelligibility of the consonants by producing unusual configurations of the vocal tract in order to overcome the removal of the activity of an articulator. A corpus of twelve repetitions of CVC sequences, of /t/ and /d/ with /a/ or /i/ vowels was recorded with the EPG system by two French native speakers, with and without bite blocks. Measures were taken on the basis of a manual segmentation of articulatory events, allowing a spatial and temporal analysis of the tongue movements.

Therefore, spatial and temporal changes of the tongue configurations palliate the immobilization of the mandible: duration and amplitude of the articulatory gesture are modified by the bite blocks to compensate the jaw immobility. The nature of the compensation seems to strongly depend on interspeaker variability. Compensations are immediate and selective. A hierarchy of compensation could exist on the same paradigm as for the production of Hyper-Hypo Speech: strong constraints involve incomplete compensation, weak constraints allow complete compensation. Indeed, some involvements for studies on motor control in speech production can be envisaged. Also, results confirm that the articulatory variability is an inherent characteristic of the speech production system.