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Respiratory-related control of extrinsic tongue muscle activity.

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The purpose of this brief report is to introduce new evidence showing that the protrudor and retractor muscles of the tongue are co-activated during inspiration in eupnea and hyperpnea in an anesthetized, tracheotomized rat model. We also review previous work on the respiratory related control of the tongue musculature, and briefly consider the clinical significance of this work. The important new findings are that: (1) Both hypoxia and hypercapnia cause parallel increases in drive to the tongue protrudor and retractor muscles (the genioglossus and hyoglossus muscles, respectively); (2) phasic volume feedback inhibits the peak inspiratory activity of both muscles; and (3) the tongue muscles consistently produce a retraction force when the genioglossus and hyoglossus are co-activated, in both animal and human subjects. This latter observation is consistent with previous work showing that the retractor muscles (hyoglossus and styloglossus) develop up to ten times more force than the genioglossus muscle. The possible mechanical consequences of tongue muscle co-activation are briefly considered.

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