Functional divergence of human genioglossus motor units with respiratory-related activity.

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The genioglossus muscle has at least two types of motor unit with respiratory-related activity. Inspiratory motor units show phasic activity during inspiration, whereas inspiratory/expiratory motor units show phasic inspiratory activity superimposed on tonic activity. The purpose of this study was to investigate the physiological roles of these different genioglossus motor units. The unitary activities of 12 inspiratory and 12 inspiratory/expiratory motor units were recorded using fine-wire electrodes during quiet nasal breathing in eight normal adult males. The mean interspike interval and the SD of successive spikes were calculated for inspiratory and inspiratory/expiratory motor units, respectively. Scattergrams of the mean interspike interval versus SD were constructed for the two groups of motor units. The effects of changes in head position on the firing activity and the patterns of distribution of the mean interspike interval versus its SD were significantly different for inspiratory and inspiratory/expiratory motor units. These results suggest that the inspiratory and inspiratory/expiratory motor units have different functional roles in respiration; inspiratory motor units may be phasically active to counteract intraluminal negative pressure during inspiration, whereas inspiratory/expiratory motor units may be tonically active to maintain tongue posture.

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