Response of genioglossus muscle activity to nasal airway occlusion in normal sleeping adults.

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To determine the combined effect of increased subatmospheric upper airway pressure and withdrawal of phasic volume feedback from the lung on genioglossus muscle activity, the response of this muscle to intermittent nasal airway occlusion was studied in 12 normal adult males during sleep. Nasal occlusion at end expiration was achieved by inflating balloon-tipped catheters located within the portals of a nose mask. No seal was placed over the mouth. During nose breathing in non-rapid-eye-movement (NREM) sleep, nasal airway occlusion resulted in multiple respiratory efforts before arousal. Mouth breathing was not initiated until arousal. Phasic inspiratory genioglossus activity was present in eight subjects during NREM sleep. In these subjects, comparison of peak genioglossus inspiratory activity on the first three occluded efforts to the value just before occlusion showed an increase of 4.7, 16.1, and 28.0%, respectively. The relative increases in peak genioglossus activity were very similar to respective increases in peak diaphragm activity. Arousal was associated with a large burst in genioglossus activity. During airway occlusion in rapid-eye-movement (REM) sleep, mouth breathing could occur without a change in sleep state. In general, genioglossus responses to airway occlusion in REM sleep were similar in pattern to those in NREM sleep. A relatively small reflex activation of upper airway muscles associated with a sudden increase in subatmospheric pressure in the potentially collapsible segment of the upper airway may help compromise upper airway patency during sleep.

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