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Experimentally induced neuromuscular changes during and after nasal airway obstruction.

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Neuromuscular changes were studied by electromyography in rhesus monkeys which adapted to nasal obstruction for 2 years and then in the succeeding year recovered to nasal respiration. Obstructing the nasal passage with silicone plugs induced specific behavioral responses which remained for the duration of nasal obstruction and were lost within 8 days after removal of the plugs. Animals demonstrated individual variations, but more than 80% consistently maintained a lower mandibular posture for the entire 2-year period. Rhythmic mandibular, tongue, and upper lip movements were evident in fewer than 60% of the animals. Certain craniofacial and tongue muscles (the genioglossus, dorsal tongue fibers, digastric, geniohyoid, dilator naris, and vertically oriented fibers of the superior orbicularis oris, that is, lip-elevator fibers) were recruited rhythmically and remained rhythmically active throughout the entire 2-year period of nasal obstruction. This rhythmic activity ceased within 1 week after removal of the nose plugs. A tonic or consistent discharge was also induced in the genioglossus, dorsal tongue fibers, the geniohyoid, superior orbicularis oris, and lip-elevator fibers over the entire 2 years of nasal obstruction. Not all muscles lost their tonic discharge after removal of the nasal plugs. The genioglossus, geniohyoid, inferior orbicularis oris, and lip-elevator fibers discharged tonically during the recovery period. These data suggest that nasal obstruction can induce neuromuscular changes which extend beyond the period of obstruction and remain after the original stimulus for neuromuscular change has been removed.

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