



Oral and pharyngeal reflexes in the mammalian nervous system: their diverse range in complexity and the pivotal role of the tongue.

[Miller AJ.](#)

Department of Growth and Development, School of Dentistry, School of Medicine,
University of California at San Francisco, San Francisco, CA 94143-0438, USA.
amiller@itsa.uscf.edu

The oral cavity and pharynx are anatomically separate but functionally integrated regions of the head. The two regions are involved in complex motor responses that include feeding, chewing, swallowing, speech, and respiration. The multiple sensory receptors that innervate these two regions provide the first link in reflexes that control muscles of the entire head, upper gastrointestinal tract, and airway. Most of the reflexes affect the diversity of muscles that compose the tongue, which is vital to all stages of feeding and which continually affects the patency of the airway. Oral-pharyngeal reflexes are evident in the mammalian fetus and continually emerge as the animal or human matures. Some of the first reflexes in the oral region are geared toward nourishment. As the central nervous system matures and the oral and pharyngeal regions develop morphologically, new reflexes develop. Many of these reflexes are protective both of the tissue in the oral cavity, such as the tongue, and of the upper airway in preventing aspiration. While simple reflexes can be evoked in isolation, most reflexes combine with more complex oral and pharyngeal responses such as chewing and vocalization. Oral-pharyngeal reflexes demonstrate a range in complexity. Some sensory stimuli will evoke a series of responses, as is often evident in the infant, and other stimuli will evoke a complex multiple-level recruitment of muscles in a sequence, as in pharyngeal swallowing. Certain sensory inputs evoke an entire motor behavior pattern, such as taste avoidance or facial expression. The oral-pharyngeal reflexes are critical to maintaining life and ultimately serve functions that the oral and pharyngeal regions have in common, such as communication, feeding, and breathing.

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