

Christine E. Niekrash

Anatomy of the Perioral Region

The mouth and lips are important structures in our appearance and in facial expression.

Lips are movable, and the capacity and amount of opening of the mouth are important in the ability to eat, speak, and maintain the contents of the mouth within the oral cavity. The mouth allows the entrance of food and drink and air to the body. The process of digestion begins in the mouth with the mastication of food and the initiation of digestion by salivary enzymes.

Lips

The vermilion zone is the transition of skin to the nonkeratinized stratified squamous epithelium of the oral mucosa which lines the oral cavity (Fig. 11.1). The skin covering the lip is thin and without hair. It overlies extensive capillary beds, giving the lips their color. The vermilion border is the edge of the vermilion zone adjacent to the skin.

The labial commissure (cheilion) is the lateral location of the junction of the upper and lower lips. The oral fissure is the opening between the lips (entrance to the oral cavity).

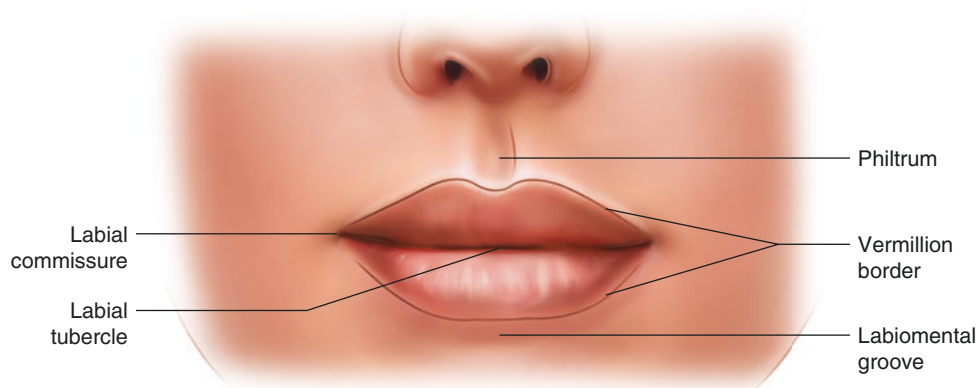


Fig. 11.1 Anterior view, mouth

C. E. Niekrash (✉)
 Frank H. Netter MD School of Medicine, Quinnipiac University,
 Hamden, CT, USA
 e-mail: christine.niekrash@quinnipiac.edu

The upper lip contains a midline protrusion in the vermilion border, the labial tubercle. Superior to the tubercle is the philtrum, a shallow vertical groove extending toward the nose in the midline. The nasolabial groove separates the upper lip and philtrum from the cheek. It extends at an angle from the alar surface of the nose to the angle of the mouth.

The labiomental groove separates the chin from the lower lip.

Musculature

The muscles controlling the mouth are complex, three-dimensional, bilateral, and interdigitated (Fig. 11.2). They are described in a general fashion in the Superficial Anatomy Chapter. More specific descriptions are below.

The orbicularis oris is a sphincter, a circular muscle surrounding the mouth. It gives support to the lips and allows for a tight seal of the oral cavity and protrusion of the lip. It also allows subtle movements essential for the generation of speech. Some intrinsic fibers originate from the alveolar bone housing the roots of the maxillary and mandibular incisors. Its fibers decussate with fibers from other facial mus-

cles that converge on the mouth, including the buccinator, levator labii superioris, levator anguli oris, depressor anguli oris, depressor labii inferioris, and zygomaticus major.

Elevators of the Upper Lip

Levator labii superioris arises from the lower margin of the orbit, superior to the infraorbital foramen and it inserts into the orbicularis oris and the skin of the upper lip. When contracted, it raises the upper lip and accentuates the nasolabial groove.

Levator labii superioris alaeque nasi arises from the superior aspect of the maxilla and courses inferiorly and laterally. Some fibers insert on the alar aspect of the nose and other fibers insert into the muscles of the upper lip. When it contracts, it will flare the nostril and elevate the upper lip.

Levator anguli oris is a deep muscle that originates from the canine fossa of the maxilla, inferior to the infraorbital foramen. It inserts into the decussation of muscles near the commissure of the mouth. It acts together with the other lip elevators to dilate the mouth and deepen the nasolabial groove. The infraorbital nerve and vessels lie infe-

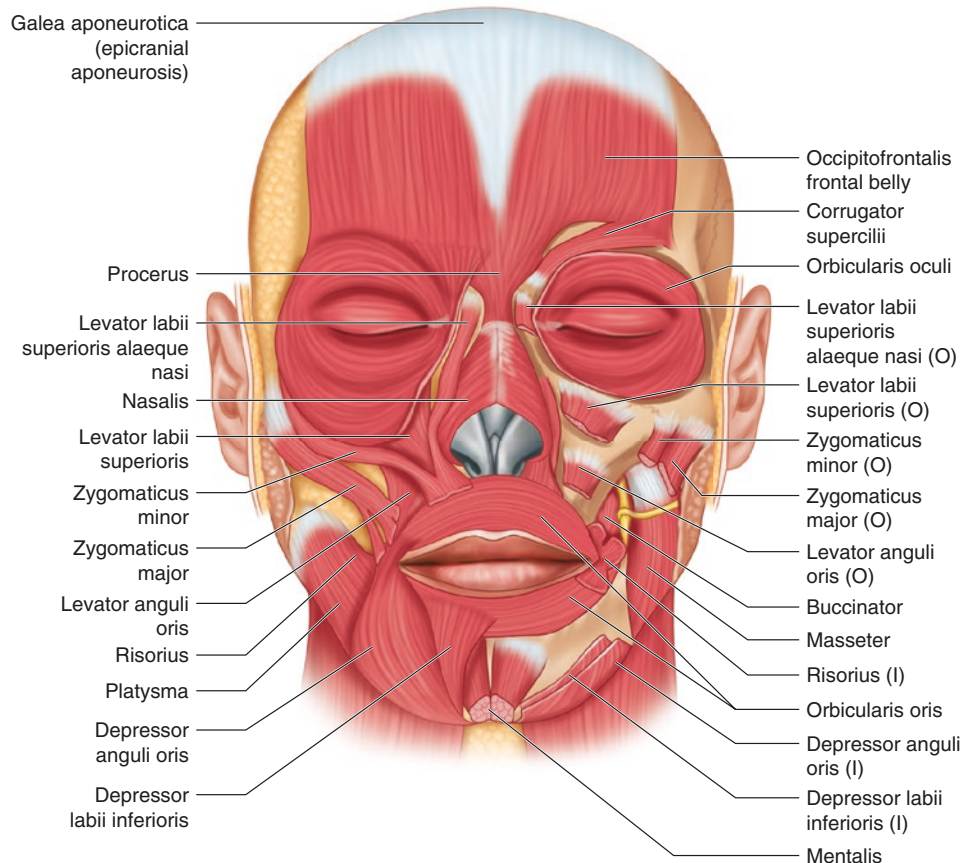


Fig. 11.2 Anterior view, muscles of facial expression

rior to the levator labii superioris and on top of the levator anguli oris.

Zygomaticus major originates on the lateral part of the zygomatic bone and travels medially and inferiorly to insert at the corner of the mouth, decussating with other perioral muscles. Its contraction results in a smiling action by moving the commissure of the mouth in a posterior, superior direction.

Zygomaticus minor also originates from the zygomatic bone medial to the origin of zygomaticus major. It inserts into the upper lip between the levator labii superioris and the zygomaticus major.

The risorius muscle is a thin, narrow muscle that arises from fascia covering the masseter muscle and buccal skin and also inserts at the angle of the mouth. When contracting, it pulls the commissure of the mouth in a lateral and downward direction.

Depressors of the Lower Lip

Depressor anguli oris is a superficial muscle with a triangular shape. It arises from the oblique line of the mandible interdigitating with the platysma and inserts into the corner of the mouth. It acts to depress the angle of the mouth.

Depressor labii oris arises from the oblique line of the mandible between the symphysis and the mental foramen and inserts into the lower lip and the orbicularis oris. Some fibers interdigitate with the depressor labii oris arising from the opposite side of the mouth. It functions to depress the lower lip.

The mentalis muscle is a deep muscle that arises from the incisive fossa of the mandible. It inserts into the skin of the chin lateral to the lip frenum. It holds the lower lip against the incisor teeth, elevates the lower lip, and causes dimpling of the chin when it is contracted.

Buccinator

The lateral surface of the buccinator muscle underlies the fascia and skin of the cheek and the medial surface supports the lateral mucosa of the oral cavity. It is a deep muscle underlying the other facial muscles. It is located between the maxilla and mandible and arises from the posterior alveolar process of both of these bones and the pterygomandibular raphe which connects the buccinator to the superior constrictor muscle. The buccinator inserts through decussating fibers in the upper and lower lips. The duct of the parotid gland passes through the buccinator to empty saliva into the oral cavity opposite to the maxillary second molar. The action of the buccinator keeps the bolus of food on the masticatory

surfaces of the teeth. It also tenses the cheek to allow forceful exhalation of air from the mouth, as in blowing a trumpet.

Modiolus

The modiolus is a fibromuscular, multiplanar structure where as many as nine perioral muscles (described above) interlace. It is located at the lateral border of the labial commissure and is highly variable in appearance. It is important in the formation of facial expressions and dimples. The facial artery is located approximately 1 mm lateral to the modiolus.

Motor Innervation

All of the muscles of the perioral region are innervated by the facial nerve (CN VII), the more superior muscles from the buccal division and more inferior muscles from the mandibular division. Please see Appendix 6 and the chapter on the Superficial Anatomy of the face for the details of this cranial nerve. In the perioral area, the buccal branch of the facial nerve innervates the muscles around both the upper and lower lips. The mandibular branch innervates the muscles of the lower lip, and it courses over the margin of the mandible just anterior to the masseter muscle. The cervical branch innervates platysma.

Sensory Innervation

Sensory innervation of the perioral region is by the trigeminal nerve (Appendix 5) and cervical nerves (Appendix 7).

The infraorbital nerve, a branch of the maxillary division of the trigeminal, emerges onto the face through the infraorbital foramen of the maxilla located between the origins of levator labii superioris and levator anguli oris. The infraorbital nerve provides sensation to the medial surface of the lower nose, the lower eyelid, and the cheek all the way to the upper lip.

The buccal nerve, a branch of the mandibular division of the trigeminal, courses either beneath or through the inferior part of the temporalis muscle, enters the buccal fat pad, and terminates in the cheek at approximately the occlusal plane. It provides sensation to the cheek.

The mental nerve is the terminal branch of the inferior alveolar nerve of the mandibular division of the trigeminal. It leaves the mandible through the mental foramen beneath the depressor labii inferioris between the roots of the mandibular premolars. The mental nerve provides sensation to the lower lip and the chin.

Sensation to the skin along the inferior border of the mandible and the angle of the mandible is provided by the transverse cutaneous and great auricular nerves of the cervical plexus.

Arterial Blood Supply

The blood supply to the face has a rich collateral circulation with many anastomoses occurring among vessels. This is wonderful for perfusion, but makes bleeding sometimes difficult to control.

The facial artery, a branch of the external carotid artery (Appendix 2), travels deep to the stylohyoid muscle and posterior belly of the digastric muscle, superior or through the submandibular gland, and over the margin of the mandible onto its external surface at the anterior border of the masseter muscle. It then takes a tortuous, oblique course deep to the platysma, risorius, zygomaticus major and minor muscles, but superficial to the buccinator muscle and continues along the lateral surface of the nose as the angular artery.

In the perioral region, the facial artery gives off superior and inferior labial arteries within or close to the orbicularis oris.

Venous Drainage

The facial vein (Appendix 2) courses parallel to the facial artery inferiorly and obliquely across the face. It is deep to the zygomaticus muscles and runs between the mandible and the submandibular gland to empty into the retromandibular vein. It anastomoses with many veins, including those draining the orbits and the pterygoid plexus. Because these veins do not have valves, infections in this area may cause retrograde flow through these veins to the cavernous sinus. Infections along the path of this vein are in the danger zone of the face because of the potential rapid spread of infection to the cavernous sinus within the cranium.