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Perspective

Morphology of facial nerve and its branches

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ABOUT THE STUDY

The facial nerve, often referred to as the seventh cranial nerve, cranial nerve VII, or simply CN VII, is a cranial nerve that arises from the brainstem's pons and regulates the muscles of face expression. It also helps carry taste sensations from the tongue's anterior two-thirds. The nerve normally leaves the skull at the stylomastoid foramen after passing from the pons through the facial canal in the temporal bone. It emerges from the brainstem in a region that is anterior to cranial nerve VIII and posterior to cranial nerve VI (the abducens nerve) (vestibulocochlear nerve). Moreover, some head and neck ganglia get preganglionic parasympathetic fibres from the facial nerve. The nervus intermediofacialis is the name for the group of face and intermediate nerves.

Structure

The facial nerve's course can be broken down into six sections such as intracranial segment, meatal segment, labyrinthine segment, tympanic segment, mastoid segment and extratemporal segment.

The intermediate nerve gives rise to the sensory and parasympathetic portions of the facial nerve, whereas the motor portion of the facial nerve originates from the facial nerve nucleus in the pons. The motor and sensory components of the facial nerve branch off from the brain stem, travel through the posterior cranial fossa, and then enter the petrous temporal bone through the internal auditory meatus. The nerve travels a complex path through the facial canal, which is separated into the labyrinthine, tympanic, and mastoid segments, after leaving the internal auditory meatus.

The labyrinthine segment is relatively short and terminates at the geniculum of the facial nerve, which houses the geniculate ganglion for sensory nerve bodies. Genu is Latin for knee. Here, the geniculate ganglion gives rise to the larger petrosal nerve, the first branch of the facial nerve. The larger petrosal nerve connects at the pterygopalatine ganglion after passing through the pterygoid canal. The lacrimal gland is innervated by post-synaptic fibres of the larger petrosal nerve. The facial nerve travels *via* the tympanic cavity in the tympanic segment, medial to the incus.

The facial nerve makes its second bend at the pyramidal eminence, where it curves downward as the mastoid segment. The nerve that supplies the chorda tympani and stapedius muscle with its signals originates in the temporal region of the facial canal. The submandibular ganglion and the anterior two thirds of the tongue both get taste fibres from the chorda tympani, which also synapses with it. Submandibular ganglion post-synaptic fibres nourish the sublingual and submandibular glands.

The facial nerve sprouts the posterior auricular branch as it leaves the stylomastoid foramen. The parotid plexus, which divides into five branches to innervate the facial muscles, is created by the facial nerve passing through the parotid gland, which it does not innervate.

Intracranial branches: The larger petrosal nerve originates at the superior salivatory nucleus of the pons and innervates various glands with parasympathetic nerves, including the lacrimal, nasal, palatine, and pharyngeal glands. Additionally, it gives the sphenoid sinus, frontal sinus, maxillary sinus, ethmoid sinus, and nasal cavity parasympathetic innervation. Through the lesser and greater palatine nerves, this nerve also carries taste fibres for the palate. The inferior petrosal nerve and the connecting branch, which travels to the otic ganglion, are connected by the geniculate ganglion. The middle ear's stapedius muscle receives motor innervation from the nerve to stapedius. The sublingual and submandibular glands get parasympathetic innervation from the chorda tympani, and the anterior two thirds of the tongue receive unique sensitive taste fibres.

Extracranial branches: The facial nerve branches off into the following nerves distal to the stylomastoid foramen;

- A nerve located behind the ear that regulates some of the ear-related scalp muscles.
- Branch to the stylohyoid muscle and the digastric muscle's posterior belly.

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