

Cranial Nerves (also see tables and figures in text for details)

#	Name	Origin & Course	Functions	Clinical Applications
I	Olfactory	Sensory fibers in olfactory epithelium project through olfactory foramina of ethmoid bone to synapse in olfactory bulb; olfactory tract enters cerebral hemispheres and terminates in primary olfactory cortex on medial temporal lobe	Purely sensory; afferent impulses for sense of smell	Lesions of fibers or fracture of ethmoid can lead to anosmia (loss of sense of smell)
II	Optic	Fibers from retina form optic nerve, through optic canal; partial crossover of fibers at optic chiasma, continue as optic tracts to thalamus where they synapse with fibers heading to occipital visual cortex	Purely sensory; afferent impulses for vision	Damage to optic nerve results in blindness to that eye, damage past optic chiasma leads to partial loss of vision
III	Oculomotor	Ventral midbrain through superior orbital fissures to eyes	Primarily motor with a few proprioceptive afferents; somatic motor fibers to some of the extrinsic eye muscles and to levator palpebrae superioris; parasympathetic fibers to smooth muscle of iris and lens	Oculomotor nerve paralysis results in drooping lid (ptosis), double vision, trouble focusing on close objects due to inability to move eye inward
IV	Trochlear	Dorsal midbrain through superior orbital fissures to eyes	Primarily motor with a few proprioceptive afferents; somatic motor fibers to one extrinsic eye muscle	Damage leads to double vision and inability to rotate eye inferiorly and laterally
V	Trigeminal	Pons to face (3 branches)	Mixed; sensory impulses for face (touch, temperature, pain); motor and proprioceptive fibers for chewing muscles	Local anesthetic to alveolar branches of maxillary and mandibular divisions blocks pain during dental work
VI	Abducens	Inferior pons through superior orbital fissures to eyes	Primarily motor with a few proprioceptive afferents; somatic motor fibers to one extrinsic eye muscle	Abducens paralysis results in inability to move eye laterally

VII	Facial	Pons through internal acoustic meatus of temporal bone, through stylomastoid foramen to face	Mixed; 5 major branches (temporal, zygomatic, buccal, mandibular, cervical), chief somatic motor nerves of face, parasympathetic fibers to glands (lacrimal, nasal, salivary); afferent fibers from anterior tongue	Herpes simplex viral infection may cause inflammation of nerve and Bell's palsy: paralysis of facial muscles on one side, partial loss of taste, lower eyelid droops, mouth sags
VIII	Vestibulocochlear	Hearing and equilibrium apparatus within temporal bone through internal acoustic meatus to pons-medulla border	Purely sensory; afferent impulses for equilibrium and hearing	Damage to cochlear portion causes deafness, damage to vestibular portion causes dizziness, involuntary eye movements, loss of balance and nausea
IX	Glossopharyngeal	Medulla to throat via jugular foramen	Mixed; somatic motor fibers to pharynx, parasympathetic fibers to salivary glands; afferent fibers for taste (posterior tongue), touch (pharynx and tongue), from carotid bodies for regulation of respiration and blood pressure	Damage to nerve leads to difficulty swallowing and loss of taste on affected portion of tongue
X	Vagus	Medulla through jugular foramen and neck to thorax and abdomen	Mixed; somatic motor fibers for swallowing muscles, parasympathetic fibers for heart, lungs and abdominal viscera; afferent fibers from viscera, carotid sinus/bodies aortic bodies for regulation of blood pressure and respiration	Damage causes hoarseness or loss of voice, difficulty swallowing, decreased digestive system motility; with total loss of vagus nerve on both sides body cannot survive due to unopposed sympathetic activity
XI	Accessory	Medulla and spinal cord through jugular foramen; cranial root fibers join vagus, spinal root to sternocleidomastoid and trapezius	Strictly motor; cranial division carries fibers to larynx, pharynx and soft palate; spinal division carries fibers to muscles	Damage to spinal root causes paralysis of affected muscles
XII	Hypoglossal	Medulla through hypoglossal canal to tongue	Strictly motor; somatic motor fibers to intrinsic and extrinsic muscles of tongue	Damage causes problems with speech and swallowing