

Assessment of Cranial Nerves I-XII

Below you will find descriptions of how to perform a neurological exam for cranial nerves.

All tests are performed bilaterally:

Cranial Nerve I (Olfactory Nerve): Sensory for Smell

Always begin by asking patient if he/she has had any decrease in ability to smell. Ask patient to close his/her eyes and pinch one nostril shut. Put a familiar scent, such as coffee or cinnamon underneath their nose and ask them to identify the scent. Repeat for the opposite nostril with another scent. Positive test is inability to identify scent.

Cranial Nerve II (Optic Nerve): Sensory for Vision

Receives sensory stimuli to the retina. When enough light strikes the retina, Shine a light in the patient's eye (while blocking the other eye) and observe for pupil constriction on same side. Repeat the same pupil for accommodation reflex (pupil constriction on opposite side). Positive test for optic nerve lesion is loss of pupil constriction bilaterally.

Snellen Eye Chart: Have patient stand 20 feet from eye chart and read the smallest line they can read easily. Progress down the chart until they reach a line where at least two errors are made. Compare the number on that line with the 20 feet where they stand. "20/30" means they stood twenty feet but could only read a line that a normal eye can read from 30 feet.

Visual field: use your hand to see where the patient can begin to see in all fields (peripheral vision)

Cranial Nerve III (Oculomotor Nerve): Motor to pupil constriction and eyeball movement.

Shine light in one eye while blocking the other and observe for bilateral pupil constriction. If both pupils constrict, oculomotor nerve is ok. If ipsilateral pupil constricts, but not contralateral, positive for contralateral CN III lesion. If contralateral pupil constricts, but not ipsilateral, positive for ipsilateral CN III lesion. If neither constricts, positive for CN II lesion.

Cranial Nerves III (oculomotor), IV (trochlear), and VI (abducens): Motor to eyeball movement

Ask patient to watch the tip of your finger with his/her eyes only while you trace an H-pattern in the air. CN IV innervates the superior oblique muscle, which moves the eyeball infero-medially, CN VI innervates the lateral rectus, which moves the eyeball laterally. CN III innervates the rest of the intrinsic muscles that move the eyeball in all other directions. Inability to move in any of these directions is positive for ipsilateral lesion of that CN.

Neumonic for intrinsic eye muscle innervation: S04LR6

Cranial Nerve V (Trigeminal Nerve): Sensory to lower 2/3 of face, motor to muscles of mastication

Sensory: Ask patient to close eyes and distinguish between sharp and soft touch on the maxilla and mandible. Inability to distinguish or feel is positive for CN V lesion.

Motor: Put fingers on bilateral masseters and temporalis muscles and ask patient to bite down. Unequal tension bilaterally in muscles is positive for CN V lesion.

Cranial Nerve VII (Facial Nerve): Sensory to cornea & taste, motor to muscles of facial expression

Sensory: Ask patient to open eye, touch cornea with a cotton wisp for *corneal reflex*. Not blinking in response is positive for CN VII lesion (patients who wear contacts may have lost this reflex). There is too much overlap of CN's to use taste as an assessment technique.

Motor: Ask patient to frown, smile, and wrinkle brow. Inability or asymmetrical facial expression is positive for CN VII lesion.

Cranial Nerve VIII (Vestibulocochlear Nerve): Sensory for hearing, motor for balance

Vestibular branch (balance): Ask patient to march in place (Mittlemeyer Marching) with eyes closed. Inability to do so is positive for Vestibular branch lesion. Ask patient to focus on your nose while you passively rotate their head from left to right. Inability to remain focused on your nose is positive for Vestibular branch lesion.

Cochlear branch: Part 1: Tap a tuning fork and place it on the vertex of the patient's skull. Ask patient if he/she hears it louder in one ear over the other. Part 2: If so, tap tuning fork and place it on the mastoid process of the ear that is louder and ask them to tell you when they can no longer hear it. Then, place the tines of the fork next to the ear without tapping it again, patient should continue to be able to hear it for at least as long as they heard it through the mastoid. Then, do the same in the ear that was quieter than that other. This is called the **Webber/Rinne test**.

Results: If equal in part 1, test is considered negative and over.

If patient can't hear at all in Part 2 when the fork is on the quieter side, then it is a Cochlear lesion on the same side.

Cranial Nerve IX (Glossopharyngeal Nerve): Motor to muscles of the pharynx and larynx, Sensory to taste.

Motor portion of Gag reflex: Touch the back of Patient's throat with tongue depressor. Not gagging is positive for CN IX lesion.

Cranial Nerve X (Vagus Nerve): Sensory to taste, Motor to muscles of soft palate and vocal cords.

Observe for hoarseness of voice. Shine light in patients' mouth, ask patient to say "Ahhhh". Check to see if uvula is deviating to one side. Uvula will deviate away from the side of a CN X lesion.

Cranial Nerve XI (Accessory Nerve): Motor to upper trapezius and SCM muscles

Ask patient to shrug shoulders against your resistance. Weakness is positive for ipsilateral CN XI lesion.

Cranial Nerve XII (hypoglossal nerve): Motor to tongue muscles

Observe patient for slurred speech. Ask patient to stick tongue straight out. Tongue will deviate toward the side of a CN XII lesion.