

Cranial Nerves

The brain is in continuous communication with almost all the cranial nerves (CN) through the spinal cord. The cranial nerves arise directly from the brain – the first two nerves arising from the cerebrum and the remaining ten emerging from the brain stem. They are responsible for carrying information and connecting the brain to different parts of the body.

There are 12 pairs of cranial nerves, which are assigned Roman numerals I through XII. The numbering is based on the order in which they emerge from the brain and the function they perform. Each cranial nerve is paired and is present on both sides of the brain hemisphere.

Remembering the order and function of the cranial nerves

Many nursing mnemonics have been developed to help remember the order and function of the cranial nerves. For example, to remember the order of the cranial nerves, think, “On Old Olympus Towering Tops, A Finn And German Viewed Some Hops.” To remember the sensory and/or motor function of the cranial nerves, think, “Some Say Marry Money, But My Brother Says Bad Business Marry Money.”

Cranial Nerve	Order	Function	
I	Olfactory	On	Some (sensory: sense of smell)
II	Optic	Old	Say (sensory: vision)
III	Oculomotor	Olympus	Marry (motor: movement of the eyelids, dilation of the pupil, and coordinated movement of the eyes)
IV	Trochlear	Towering	Money (motor: movement of the eyelids, dilation of the pupil, and coordinated movement of the eyes)
V	Trigeminal	Tops	But (both sensory and motor: sensation of the face, corneal reflexes, and jaw movements)
VI	Abducens	A	My (motor: movement of the eyelids, dilation of the pupil, and coordinated movement of the eyes)
VII	Facial	Finn	Brother (both sensory and motor: facial movement, taste and salivation)
VIII	Acoustic	And	Says (sensory: sense of hearing and balance)
IX	Glossopharyngeal	German	Bad (both sensory and motor: sense of taste, movement of tongue for swallowing/gag reflex and phonation)
X	Vagus	Viewed	Business (both sensory and motor: sense of taste, movement of tongue for swallowing/gag reflex and phonation)
XI	Spinal Accessory	Some	Marry (motor: movement of the shoulder and some neck muscles)
XII	Hypoglossal	Hops	Money (motor: movement of the tongue)

Assessment of the Cranial Nerves

The cranial nerve exam is part of the neurological examination. Proper assessment of these nerves provides insightful and vital information about a patient's nervous system. Examine patient while he or she is sitting over the edge of the bed or examination table.

CN I: Olfactory nerve

- Not always tested.
- Assess for a rash or deformity of the nose.
- An upper respiratory infection is the most frequent cause of dysfunction.
- To test, offer the patient something familiar to smell and identify, for example, an orange or lemon peel, coffee, or vinegar. You can also use essence bottles of vanilla or peppermint.

CN II: Optic nerve

- Acuity
 - Use a Snellen chart, or have patient read something in the room.
 - Assess with and without patient's vision aids.
 - Wiggle fingers and move hand medially, starting one-foot lateral from patient's ears; ask the patient to say when they see the examiner's fingers.
- Color
 - Use Ishihara plates to identify patients who are color blind.
- Visual Field
 - Ask the patient to look directly at examiner while examiner wiggles one of their fingers in each of the four quadrants. Then, ask the patient to identify which finger is moving.
- Visual Reflexes
 - Place one hand vertically along the patients nose to block any light from entering the eye which is not being tested and shine a light into each eye observing for pupillary reflexes.
- Fundoscopy
 - Use a fundoscope to examine the structures of each eye.

CN III, IV, VI: Oculomotor nerve, trochlear nerve, and abducens

- Test the 6 cardinal points in an H pattern by asking the patient to follow your finger with only his eyes without moving his head.
- Look for failure of movement, nystagmus, eyelid drooping, and ask the patient if he experiences any double vision.
- Inspect pupils for size, equality, and regularity. Observe pupil size with a shined light.

CN V: Trigeminal nerve

- Test sensory branches:
 - Lightly touch the face with a piece of cotton followed by a blunt pin in three places on each side of face: around jawline, on cheek, on forehead.
 - Assess corneal reflex by lightly touching each cornea with small piece of cotton. This should cause the patient to blink.
- Test motor branches:
 - Have patient open his mouth against your resistance, or simulate chewing gum
 - Perform the jaw jerk by placing left index finger across patient's chin and striking finger with a tendon hammer. This should normally cause slight protrusion of the jaw.

CN VII: Facial nerve

- Test by asking patient to crease up forehead (raise eyebrows), close eyes and keep closed against resistance, puff out cheeks and reveal teeth.
- Assess taste by touching both sides of patient's tongue with piece of gum or peppermint stick. Can they taste it?

CN VIII: Acoustic nerve (also known as vestibulocochlear nerve)

- Stand to the side or behind the patient and whisper to him. Ask him to repeat what you whispered.
- The Rinne and Weber tests can also be used to assess hearing and differentiate conductive and sensorineural hearing loss.
 - Rinne test:
 - Place sounding tuning fork on patient's mastoid process and then, next to the ear, ask which is louder (normal hearing patient will find the second position the loudest).
 - Weber test:
 - Place sounding tuning fork base down in the center of the patient's forehead and ask if it is louder in either ear (should be heard equally in both ears).

CN IX, X: Glossopharyngeal nerve and vagus nerve

- Ask the patient to swallow or attempt to elicit gag reflex with tongue depressor.
- Assess phonation by listening to vocal sounds as the patient speaks.
- Offer patient a piece of gum or peppermint stick to assess taste.

CN XI: Spinal Accessory

- Ask the patient to shrug his shoulders and turn his head against your resistance.

CN XII: Hypoglossal

- Have the patient stick out tongue and observe for deviations to either side.

References:

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