6.5: Assessing Cranial Nerves

When performing a comprehensive neurological exam, examiners may assess the functioning of the cranial nerves. When performing these tests, examiners compare responses of opposite sides of the face and neck. Instructions for assessing each cranial nerve are provided below.

Cranial Nerve I – Olfactory

Ask the patient to identify a common odor, such as coffee or peppermint, with their eyes closed. See Figure 1 for an image of a nurse performing an olfactory assessment.
**Cranial Nerve II – Optic**

Be sure to provide adequate lighting when performing a vision assessment.

Far vision is tested using the Snellen chart. See Figure 1 for an image of a Snellen chart. The numerator of the fractions on the chart indicate what the individual can see at 20 feet, and the denominator indicates the distance at which someone with normal vision could see this line. For example, a result of 20/40 indicates this individual can see this line at 20 feet but someone with normal vision could see this line at 40 feet.

Test far vision by asking the patient to stand 20 feet away from a Snellen chart. Ask the patient to cover one eye and read the letters from the lowest line they can see. Record the corresponding result in the furthermost right-hand column, such as 20/30. Repeat with the other eye. If the patient is wearing glasses or contact lens during this assessment, document the results as “corrected vision.” Repeat with each eye, having the patient cover the opposite eye. Alternative charts are available for children or adults who can’t read letters in English.
Near vision is assessed by having a patient read from a prepared card from 14 inches away. See Figure \(\PageIndex{3}\) for a card used to assess near vision.
Cranial Nerve III, IV, and VI – Oculomotor, Trochlear, Abducens

Cranial nerve III, IV, and VI (oculomotor, trochlear, abducens nerves) are tested together.

- Test eye movement by using a penlight. Stand 1 foot in front of the patient and ask them to follow the direction of the penlight with only their eyes. At eye level, move the penlight left to right, right to left, up and down, upper right to lower left, and upper left to lower right. Watch for smooth movement of the eyes in all fields. An unexpected finding is involuntary shaking of the eye as it moves, referred to as nystagmus.

- Test bilateral pupils to ensure they are equally round and reactive to light and accommodation. Dim the lights of the room before performing this test.
  - Pupils should be round and bilaterally equal in size. The diameter of the pupils usually ranges from two to five millimeters. Emergency clinicians often encounter patients with the triad of pinpoint pupils, respiratory depression, and coma related to opioid overuse.
  - Test pupillary reaction to light. Using a penlight, approach the patient from the side, and shine the penlight on one pupil. Observe the response of the lighted pupil, which is expected to quickly constrict. Repeat by shining the light on the other pupil. Both pupils should react in the same manner to light. See Figure 1 for an image of a nurse assessing a patient’s pupillary reaction to light. An unexpected finding is when one pupil is larger than the other or one pupil responds more slowly than the other to light, which is often referred to as a “sluggish response.”
  - Test eye convergence and accommodation. Recall that accommodation refers to the ability of the eye to adjust from near to far vision, with pupils constricting for near vision and dilating for far vision. Convergence refers to the action of both eyes moving inward as they focus on a close object using near vision. Ask the patient to look at a near object (4-6 inches away from the eyes), and then move the object out to a distance of 12 inches. Pupils should constrict while viewing a near object and then dilate while looking at a distant object, and both eyes should move together. See Figure 2 for an image of a nurse assessing convergence and accommodation.
  - The acronym PERRLA is commonly used in medical documentation and refers to, “pupils are equal, round and reactive to light and accommodation.”

Figure 1: Assessing Pupillary Reaction to Light
Figure \(\PageIndex{5}\): Assessing Eye Convergence and Accommodation

**Video Review for Assessment of the Cardinal Fields of Gaze**

Media, iframe, embed and object tags are not supported inside of a PDF.

**Note**

Read more details about assessing the [Pupillary Light Reflex](https://med.libretexts.org/Bookshelves/Nursing/Nursing_Skills_(OpenRN)/06%3A_Neurological_Assessment/6.05%3A_Asses…).
Cranial Nerve V – Trigeminal

- Test sensory function. Ask the patient to close their eyes, and then use a wisp from a cotton ball to lightly touch their face, forehead, and chin. Instruct the patient to say "Now" every time they feel the placement of the cotton wisp. See Figure \(\PageIndex{6}\) for an image of assessing trigeminal sensory function. The expected finding is that the patient will report every instance the cotton wisp is placed. An advanced technique is to assess the corneal reflex in comatose patients by touching the cotton wisp to the cornea of the eye to elicit a blinking response.

- Test motor function. Ask the patient to clench their teeth tightly while bilaterally palpating the temporalis and masseter muscles for strength. Ask the patient to open and close their mouth several times while observing muscle symmetry. See Figure \(\PageIndex{7}\) for an image of assessing trigeminal motor strength. The expected finding is the patient is able to clench their teeth and symmetrically open and close their mouth.

![Assessing Trigeminal Sensory Function](image)

![Assessing Trigeminal Motor Function](image)

Cranial Nerve VII – Facial Nerve

- Test motor function. Ask the patient to smile, show teeth, close both eyes, puff cheeks, frown, and raise eyebrows. Look for symmetry and strength of facial muscles. See Figure \(\PageIndex{8}\) for an image of assessing motor function of the facial nerve.

- Test sensory function. Test the sense of taste by moistening three different cotton applicators with salt, sugar, and lemon. Touch the patient’s anterior tongue with each swab separately, and ask the patient to identify the taste. See Figure \(\PageIndex{9}\) for an image of assessing taste.
Cranial Nerve VIII – Vestibulocochlear

- Test auditory function. Perform the whispered voice test. The whispered voice test is a simple test for detecting hearing impairment if done accurately. See Figure \(\PageIndex{10}\)\(^{12}\) for an image assessing hearing using the whispered voice test. Complete the following steps to accurately perform this test:
• Stand at arm’s length behind the seated patient to prevent lip reading.
• Each ear is tested individually. The patient should be instructed to occlude the non-test ear with their finger.
• Exhale before whispering and use as quiet a voice as possible.
• Whisper a combination of numbers and letters (for example, 4-K-2), and then ask the patient to repeat the sequence.
• If the patient responds correctly, hearing is considered normal; if the patient responds incorrectly, the test is repeated using a different number/letter combination.
• The patient is considered to have passed the screening test if they repeat at least three out of a possible six numbers or letters correctly.
• The other ear is assessed similarly with a different combination of numbers and letters.

- Test balance. The Romberg test is used to test balance and is also used as a test for driving under the influence of an intoxicant. See Figure \(\PageIndex{11}\) for an image of the Romberg test. Ask the patient to stand with their feet together and eyes closed. Stand nearby and be prepared to assist if the patient begins to fall. It is expected that the patient will maintain balance and stand erect. A positive Romberg test occurs if the patient sways or is unable to maintain balance. The Romberg test is also a test of the body’s sense of positioning (proprioception), which requires healthy functioning of the spinal cord.
Cranial Nerve IX – Glossopharyngeal

Ask the patient to open their mouth and say “Ah” and note symmetry of the upper palate. The uvula and tongue should be in a midline position and the uvula should rise symmetrically when the patient says “Ah.” (see Figure \(\PageIndex{12}\)).
Cranial Nerve X – Vagus

Use a cotton swab or tongue blade to touch the patient’s posterior pharynx and observe for a gag reflex followed by a swallow. The glossopharyngeal and vagus nerves work together for integration of gag and swallowing. See Figure \(\PageIndex{13}\)[15] for an image of assessing the gag reflex.
Cranial Nerve XI – Spinal Accessory

Test the right sternocleidomastoid muscle. Face the patient and place your right palm laterally on the patient’s left cheek. Ask the patient to turn their head to the left while resisting the pressure you are exerting in the opposite direction. At the same time, observe and palpate the right sternocleidomastoid with your left hand. Then reverse the procedure to test the left sternocleidomastoid.

Continue to test the sternocleidomastoid by placing your hand on the patient’s forehead and pushing backward as the patient pushes forward. Observe and palpate the sternocleidomastoid muscles.

Test the trapezius muscle. Ask the patient to face away from you and observe the shoulder contour for hollowing, displacement, or winging of the scapula and observe for drooping of the shoulder. Place your hands on the patient’s shoulders and press down as the patient elevates or shrugs the shoulders and then retracts the shoulders. See Figure 6.06 for an image of assessing the trapezius muscle.
Cranial Nerve XII – Hypoglossal

Ask the patient to protrude the tongue. If there is unilateral weakness present, the tongue will point to the affected side due to unopposed action of the normal muscle. An alternative technique is to ask the patient to press their tongue against their cheek while providing resistance with a finger placed on the outside of the cheek. See Figure [(15) for an image of assessing the hypoglossal nerve.](https://med.libretexts.org/Bookshelves/Nursing/Nursing_Skills_(OpenRN)/06%3A_Neurological_Assessment/6.05%3A_Asses)
Expected Versus Unexpected Findings

See Table for a comparison of expected versus unexpected findings when assessing the cranial nerves.

<table>
<thead>
<tr>
<th>Cranial Nerve</th>
<th>Expected Finding</th>
<th>Unexpected Finding (Dysfunction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Olfactory</td>
<td>Patient is able to describe odor.</td>
<td>Patient has inability to identify odors (anosmia).</td>
</tr>
<tr>
<td>II. Optic</td>
<td>Patient has 20/20 near and far vision.</td>
<td>Patient has decreased visual acuity and visual fields.</td>
</tr>
<tr>
<td>III. Oculomotor</td>
<td>Pupils are equal, round, and reactive to light and accommodation.</td>
<td>Patient has different sized or reactive pupils bilaterally.</td>
</tr>
<tr>
<td>IV. Trochlear</td>
<td>Both eyes move in the direction indicated as they follow the examiner's penlight.</td>
<td>Patient has inability to look up, down, inward, outward, or diagonally. Ptosis refers to drooping of the eyelid and may be a sign of dysfunction.</td>
</tr>
<tr>
<td>V. Trigeminal</td>
<td>Patient feels touch on forehead,</td>
<td>Patient has weakened muscles responsible for</td>
</tr>
</tbody>
</table>

[19]
maxillary, and mandibular areas of face and chews without difficulty.

**VI. Abducens**
- Both eyes move in coordination.
- Patient has inability to look side to side (lateral); patient reports *diplopia* (double vision).

**VII. Facial**
- Patient smiles, raises eyebrows, puffs out cheeks, and closes eyes without difficulty; patient can distinguish different tastes.
- Patient has decreased ability to taste. Patient has facial *paralysis* or asymmetry of face such as facial droop.

**VIII. Vestibulocochlear (Acoustic)**
- Patient hears whispered words or finger snaps in both ears; patient can walk upright and maintain balance.
- Patient has decreased hearing in one or both ears and decreased ability to walk upright or maintain balance.

**IX. Glossopharyngeal**
- Gag reflex is present.
- Gag reflex is not present; patient has *dysphagia*.

**X. Vagus**
- Patient swallows and speaks without difficulty.
- Slurred speech or difficulty swallowing is present.

**XI. Spinal Accessory**
- Patient shrugs shoulders and turns head side to side against resistance.
- Patient has inability to shrug shoulders or turn head against resistance.

**XII. Hypoglossal**
- Tongue is midline and can be moved without difficulty.
- Tongue is not midline or is weak.

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7. Registered NurseRN.(2018, June 5). *Six cardinal fields of gaze nursing | Nystagmus eyes, cranial nerve 3, 4, 6, test. [Video]*. YouTube. All rights reserved. Video used with permission. https://youtu.be/lrO4pLB95p0.
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