

Neurological: Part 2

Mental Status, Coordination, and Cranial Nerve Evaluation

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Mental Status

To evaluate the patient's cerebral function, the practitioner should test the patient's mannerisms and orientation for person, place, time, and situation. If there are inappropriate answers, or the patient is unsure about the year, his/her location, or the day of the week, this may indicate a cerebral abnormality.

Questions to test the cerebral function may include:

1. What day of the week is it?
2. What year is it?
3. Who is president of the United States?
4. How old are you?
5. What is your name?
6. Where are you right now?
7. Why are you here?
8. How did you get here?
9. These generally can be brought up in conversation and flows with the conversation created by the history.

If a more detailed evaluation is needed, the following information is obtained:

Appearance:	Gestures, mannerisms, etc.
Speech:	Coherence, flight of ideas, etc.
Mood and Affect:	Depression, elation, anger, etc.
Thought Process:	Blocking, evasion, etc.
Thought Content:	Worries, hyperchondraisis, lack of self confidence, delusions, hallucinations, etc.
Motor Activity:	Slow, rapid, purposeful, etc.
Cognitive Functions:	Attention and concentration Memory (immediate recall, recent, remote) Calculations Abstractions Judgement

If the patient is not responding correctly to person, place, time, situation or any of the above questions, consider asking the patient or their caregiver further questions about it and any neurologist involved with the care of these findings. If this is a recent onset or a neurologist is not involved with this finding, contact your neurological consult for a discussion and case management choices.

Cerebellar Testing

To test cerebellum function, do any of the following tests:

Ask the patient to perform the following:

1. place the heel to shin and slide the heel down the shin to the foot,
2. stands up, closes their eyes, and move their finger to nose alternating left then right,
3. heel to toe walking,
4. rapid alternating movements of the hand on the thigh, flipping palm and dorsum.

Equipment for a Neurological Evaluation

When performing that portion of the examination concerning the nervous system, the equipment needed include:

Penlight
Tongue blade
Sterile needles
Tuning forks, 128 Hz and 512 Hz
Familiar objects – coins, keys, paper clip
Cotton wisp
Reflex Hammer
Vials of aromatic substances – coffee, orange, peppermint extract, oil of cloves
Vials of solutions – glucose, salt, lemon or vinegar, or quinine – with applicators
Test tubes of hot and cold water fro temperature sensation testing
Tape measure
J-mar Grip Strength Hand Dynamometer

Cranial Nerve Evaluation

Cranial nerve function is determined by testing brain stem activity. Neurological screening examination includes cranial nerves II through XII which are routinely tested; however, taste and smell (CN I) are not tested unless some aberration is found.

Acronym for Cranial Nerves

One acronym used to recall the 12 cranial nerves is

"On Old Olympus' Towering Tops A Finn And German Viewed Some Hops."
(See below.)

O	Olfactory	I
O	Optic	II
O	Oculomotor	III
T	Trochlear	IV
T	Trigeminal	V
A	Abducens	VI
F	Facial	VII
A	Acoustic	VIII
G	Glossopharyngeal	IX
V	Vagus	X
S	Spinal Accessory	XI
H	Hypoglossal	XII

An Abbreviated Version of the Cranial Nerve Exam is below. Consider performing only one or two of these maneuvers to test that specific cranial nerve. When one is proficient at performing the cranial nerve examination, the entire examination can be done in under two minutes.

Cranial Nerve	How Tested
I	Smell
II	Vision, fields and fundi
III, IV, VI	Pupillary response to light , ptosis, volitional eye movements, pursuit eye movement
V	Corneal reflex, facial sensation , open jaw against resistance
VII	Close eyes tight, show teeth, smile or whistle
VIII	Watch tick, finger rub, Weber-Rinne . (Air conduction lasts longer than bone conduction in the normal person.)
IX, X	Palate moves in midline, speech (Note: taste sensation is not tested here)
XI	Shoulder shrug, push head against resistance
XII	Stick out tongue

The following are a list of the cranial nerves with the type of nerve tested (motor or sensory or both motor and sensory). These testing procedures list what is considered normal and abnormal response. If there is an abnormal response, ask the patient if they were aware of this and if they have seen any other practitioner for it. If not consider contacting your neurological consultant for a case discussion and how to proceed with the finding.

CN I: Olfactory Nerve

Type: Sensory
Procedure: Test ability to identify familiar aromatic odors, one naris at a time with eyes closed.
Expected: Able to perceive and usually identify the odor on each side.
Unexpected: Anosmia. (an inability to perceive smells)

CN II: Optic Nerve

Type: Sensory
Procedure: Test vision with Snellen chart and Rosenbaum near vision chart.
Expected: Vision 20/20 with or without lenses with near and far vision in each eye.
In children:

Age (Years)	Acuity
3	20/50
4	20/40
5	20/30
6	20/20

Infants: Focus on and track a face or light through 60 degrees.

Unexpected: Myopia, amblyopia, or presbyopia.

Procedure: Perform ophthalmoscopic examination of fundi. With patient looking at distant object, direct light at pupil from about 30 cm (12 in):

Expected: • Red reflex

Unexpected: Opacities.

• Fundus

Expected: Yellow or pink background, depending on race. Possible crescents or dots at disc margin, usually temporally.

Unexpected: Discrete areas of pigmentation away from the disk. Lesion. Drusen bodies. Hemorrhages.

• Blood vessel characteristics - follow blood

vessels distally in each quadrant noting crossings of arterioles and venules.

Expected: Possible venous pulsations (should be documented). A:V ratio 3:5 or 2:3.

Unexpected: Glaucomatous cupping, nicking, crossing, tortuosity.

- Disc characteristics

Expected: Yellow to creamy pink varying by race. Sharp, well-defined margin, especially in temporal region 1.5 mm diameter.

Unexpected: Myelinated nerve fibers. Papilledema. Glaucomatous cupping.

- Macula densa characteristics - ask patient to look directly at light.

Expected: Yellow dot surrounded by deep pink.

- Test visual fields by confrontation and extinction of vision. Test nasal, temporal, superior, and inferior fields by moving your finger into field from outside.

Unexpected: Fields of vision more limited than 60 degrees nasally, 90 degrees temporally, 50 degrees superiorly, and 70 degrees inferiorly.



CN III: Oculomotor Nerve; CN IV - Trochlear Nerve, CN VI Abducens Nerve

Type: Motor

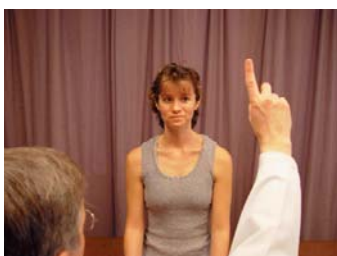
Procedure: Test six cardinal fields of gaze - hold patient's chin and ask patient to watch your finger or penlight.



Expected: • Pupillary size/shape
Round, regular, and equal in size.



Expected: • Pupillary response to light
Constricting with consensual response of the opposite pupil.



Expected: • Pupillary accommodation
Constricting when pupils focus on near object or dilating when focus changes from near to distant.



Expected: A few, horizontal nystagmic beats. Smooth, full, coordinated movement of eyes.



Unexpected: Sustained or jerking nystagmus. Exposure of sclera from lid lag.



CN V: Trigeminal Nerve

Type: Mixed

Procedure: Test facial characteristics - inspect face for muscle atrophy and tremors.

1. Ask patient to clench teeth tightly as you palpate muscles over jaw.

Unexpected: Muscle atrophy, deviation of jaw to one side, or fasciculations.



- Muscle tone

Expected: Symmetric tone

Unexpected: Fasciculations



- Touch sensation

2. Ask patient to close eyes and report if sensation to touch is present or is sharp or dull as you touch each side of face at scalp, cheek and chin areas, alternately using sharp and rounded edges of tongue blades or paper clip, in an unpredictable pattern. Ask patient to report when the stimulus is felt as you stroke the same six areas with cotton wisp or brush. Lastly, test sensation over buccal mucosa with wooden applicator.

Expected: Symmetric sensory discrimination over face to all stimuli.

Unexpected: Impaired sensation. If impaired, use test tubes of hot and cold water to evaluate temperature sensation.

- Corneal reflex

3. Touch wisp of cotton to cornea.

Expected: A bilateral blink reflex.

Unexpected: Failure to blink.

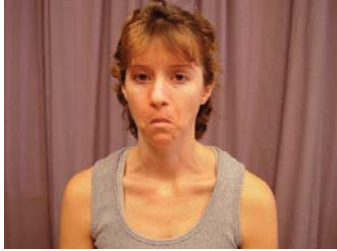


CN VII: Facial Nerve

Type: Motor

Procedure: Test: facial expressions - ask patient to - raise eyebrows and wrinkle forehead, smile, frown, puff out cheeks, purse lips and blow out, show teeth, and squeeze eyes shut.

Unexpected: Tics, unusual facial movements, or asymmetry of expression.



- Speech

Unexpected: Difficulties with enunciating b, m, and p (labial sounds).



- Muscle strength

Unexpected: One side of mouth drooping, flattened nasolabial fold, or lower eyelid sagging.



- Taste (CN VII and CN IX) - hold card listing tastes in patient's view. Ask patient to extend tongue and point to taste as perceived.

Apply one of four solutions to the lateral side of tongue in the appropriate taste-bud region. Offer patient a sip of water and repeat with a different solution and applicator, testing each side of the tongue with each solution.

Expected: Ability to identify each taste bilaterally when placed in appropriate taste-bud region.



CN VIII: Vestibulocochlear/Acoustic Nerve

Type: Sensory

Procedure: 1. Have patient mask hearing in one ear by moving a finger rapidly up and down in ear canal. Stand 1 to 2 feet from other ear and softly whisper 1 to 2 syllable words. Repeat with opposite ear.



Expected: Patient repeats words correctly at least 50% of the time. In children, patient should turn toward sound consistently.

Unexpected: Patient unable to hear whispered words.



Expected: Patient hears ticking at distance common for most people.

Unexpected: Patient unable to hear watch tick.

Expected: No lateralization. Sound heard equally in both ears (unoccluded). Sound heard better in occluded ear.

Unexpected: Conductive hearing loss - lateralization to deaf ear unless sensorineural loss.
Sensorineural loss - lateralization to better ear unless conductive loss.

Expected: Air conduction heard longer than bone conduction by 2:1 ratio (Rinne positive).

Unexpected: Conductive hearing loss - bone conduction heard longer than air

conduction in affected ear (Rinne negative)
Sensorineural hearing loss - air conduction heard longer than bone conduction in affected ear, but less than 2:1 ratio.

- Schwabach test

5. Alternately place vibrating tuning fork against patient's mastoid and your mastoid until one of you no longer hears the sound.

Expected: Examiner hears equally as long as the patient.

Unexpected: Conductive hearing loss - Patient hears longer than the examiner.

Sensorineural hearing loss - Examiner hears longer than the patient.

CN IX: Glossopharyngeal Nerve

Type: Mixed

Procedure: 1. Test ability to identify sour and bitter tastes.
2. Test gag reflex and ability to swallow.

Expected: Correctly identify sour and bitter tastes. Gags with stimulation of the gag reflex and can swallow.

Unexpected: Unable to detect sour and bitter taste. Does not gag and/or has difficulty swallowing.



CN X: Vagus Nerve

Type: Motor

Procedure: 1. Test the gag reflex (nasopharyngeal sensation) (CN IX and CN X) - tell patient that gag reflex will be tested before performing the test. Touch posterior wall of the pharynx with an applicator while observing the palate, pharyngeal muscles, and uvula.

Expected: Upward movement of the palate and contraction of the pharyngeal muscles, with the uvula in midline.

Unexpected: Drooping or absence of arch on either side of the soft palate.

2. Motor function - ask patient to say "ah" while observing the movement of the soft palate and uvula.

Unexpected: Failure of the soft palate to rise or deviation of the uvula from midline.



3. Swallowing (CN IX and CN X) - ask the patient to swallow water.

Expected: Water easily swallowed.

Unexpected: Retrograde passage of water through the nose.

4. Speech

Unexpected: Hoarseness, nasal quality, or difficulty with guttural sounds.



CN XI: Spinal Accessory Nerve

Type: Motor

Procedure: Test trapezius muscle strength (shrug shoulders against resistance).

Test sternocleidomastoid muscle strength (turn head to each side against resistance).

Expected: Bilaterally symmetric with full resistance to opposition.

Unexpected: Inability to produce full resistance.



CN XII: Hypoglossal Nerve

Type: Motor

Procedure: Test the tongue resting and protruded - inspect while at rest on the floor of the mouth and while protruded.

Unexpected: Fasciculations, asymmetry, atrophy, or deviation from midline.



Tongue movement - ask the patient to move the tongue in and out, side to side, curled up toward nose, and curled down toward the chin.

Expected: Able to perform most tongue movements.



Tongue strength - ask the patient to push tongue against the cheek while applying resistance with the index finger.

Expected: Steady, firm pressure.

Speech - evaluate quality of lingual speech sounds (l, t, d, n).

Unexpected: Problems with l, t, d, or n.