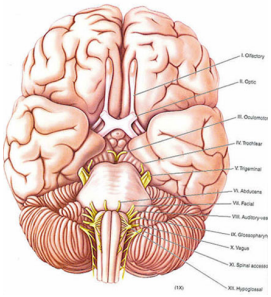
CRANIAL

NERVES



http://www.cbu.edu/~mcondren/IRM/Stop-Look-Listen-sign-IRM-7-7-07.jpg

You must do a minimum basic examination on every patient but you don't need to do every test

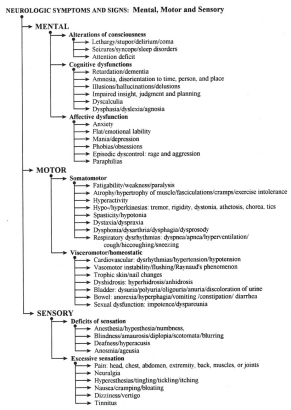
"You can see a lot just by observing."

Yogi Berra

The Neurologic Exam often can be completed during the clinical history

- **Assess:** the patient's articulation, content of speech, and overall mental status
- **Inspect**: the patient's facial features,facial movement,and and note any asymmetry. Note the patient's eye movements, blinking, and the relation of the palpebral fissures to the iris, look for en or exophthalmos.
- **Observe:** how the patient swallows saliva and breathes. Inspect the posture and look for tremors or involuntary movements

The Technique of the Neurologic Examination by William DeMyer Fifth Edition 2004 McGraw Hill Publisher



The Technique of the Neurologic Examination by William DeMyer McGraw Hill 2004

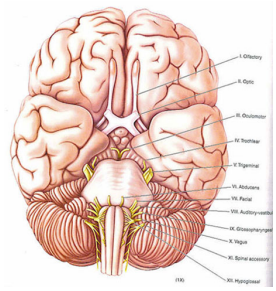
Tools of the trade

The Cranial Nerves

Cranial Nerve 1
Olfaction

- Not tested much unless a frontal lobe tumor is suspected
- May be damaged in patients with closed head injuries,nasal obstruction,viral infections, and can be abnormal in Parkinsons disease, Alzheimer's,and Multiple Sclerosis
- Test by asking if patients can smell,coffee,vanilla, or cinnamon in each nostril. Avoid noxious odors

http://www.neuroexam.com/



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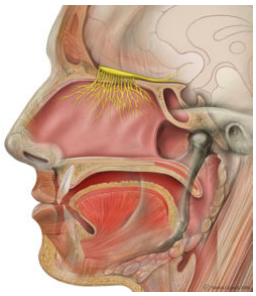

http://commons.wikimedia.org/wiki/Image:Head_olfactory_nerve.jpg

Cranial Nerve 2
Optic Nerve

- Visual Acuity (test with hand card)
- Color Vision (loss of color vision especially red is an important symptom of optic neuritis)
- Visual Fields (can be tested at the bedside by counting fingers in each quadrant)
- Visual Extinction (to detect visual neglect)
- Funduscopic Examination

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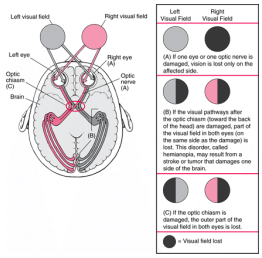

http://www.merck.com/media/mmhe2/figures/MMHE_20_235_01_eps.gif

http://arapaho.nsuok.edu/~fulk/Images/Ime0013.JPG

Cranial Nerve 2 and 3
Pupillary responses

•The size and shape of the pupil should be recorded at rest. Under normal conditions, the pupil constricts in response to light. Note the direct response, meaning constriction of the illuminated pupil, as well as the consensual response, meaning constriction of the opposite pupil.

•Test the pupillary response to accommodation. Normally, the pupils constrict while fixating on an object being moved from far away to near the eyes.

•Direct response (pupil illuminated). The direct response is impaired in lesions of the ipsilateral optic nerve, the pretectal area, the ipsilateral parasympathetics traveling in CN III, or the pupillary constrictor muscle of the iris.

•Consensual response (contralateral pupil illuminated). The consensual response is impaired in lesions of the contralateral optic nerve, the pretectal area, the ipsilateral parasympathetics traveling in CN III, or the pupillary constrictor muscle.

•Accommodation (response to looking at something moving toward the eye). Accommodation is impaired in lesions of the ipsilateral optic nerve, the ipsilateral parasympathetics traveling in CN III, or the pupillary constrictor muscle, or in bilateral lesions of the pathways from the optic tracts to the visual cortex. Accommodation is spared in lesions of the pretectal area.

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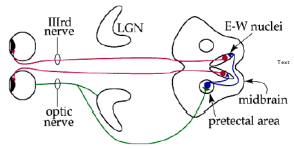
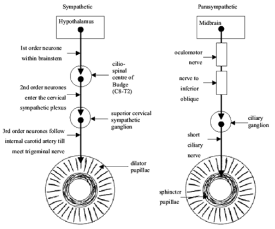
Pupillary Size is determined by the light input, sympathetic and parasympathetic tone



http://www.psych.ndsu.nodak.edu/mccourt/Psy460/Central%20visual%20pathways/pupillary%20light%20reflex.gif



http://www.abdn.ac.uk/~opt065/Web%20pages%20only/drh-p085.gif

Cranial Nerve 3,4,6
Extraocular Movements

•Observe the eyes at rest to see if there are any abnormalities such as spontaneous nystagmus (see below)or dysconjugate gaze (eyes not both fixated on the same point) resulting in diplopia (double vision)

•Test smooth pursuit by having the patient follow an object moved across their full range of horizontal and vertical eye movements. Test convergence movements by having the patient fixate on an object as it is moved slowly towards a point right between the patient's eyes

•In comatose or severely lethargic patients, the vestibulo-ocular reflex can be used to test whether brainstem eye movement pathways are intact. The oculocephalic reflex, a form of the vestibulo-ocular reflex, is tested by holding the eyes open and rotating the head from side to side or up and down

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Cranial Nerve 5

Facial Sensation and Muscles of Mastication

•Test facial sensation using a cotton wisp and a sharp object. Also test for tactile extinction using double simultaneous stimulation.

•The corneal reflex, which involves both CN 5 and CN 7, is tested by touching each cornea gently with a cotton wisp and observing any asymmetries in the blink response

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•Feel the masseter muscles during jaw clench. Test for a jaw jerk reflex by gently tapping on the jaw with the mouth slightly open.

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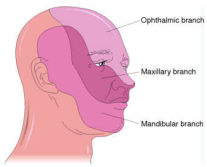

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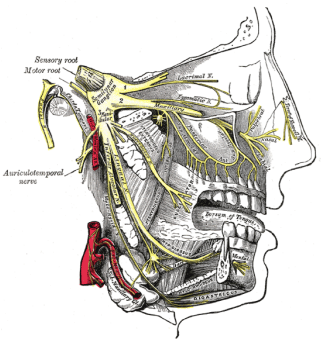

http://www.dalcross.com/staging/_images/trigeminal.JPG

Cranial Nerve 7

Muscles of Facial Expression and Taste

•Look for asymmetry in facial shape or in depth of furrows such as the nasolabial fold. Also look for asymmetries in spontaneous facial expressions and blinking. Ask patient to smile, puff out their cheeks, clench their eyes tight, wrinkle their brow, and so on. Old photographs of the patient can often aid your recognition of subtle changes

•Check taste with sugar, salt, or lemon juice on cotton swabs applied to the lateral aspect of each side of the tongue. Like olfaction, taste is often tested only when specific pathology is suspected, such as in lesions of the facial nerve, or in lesions of the gustatory nucleus

•The upper motor neurons for the upper face project to the facial nuclei bilaterally. Therefore, upper motor neuron lesions, such as a stroke, cause contralateral face weakness sparing the forehead, while lower motor neuron lesions, such as a facial nerve injury, typically cause weakness involving the whole ipsilateral face. http://www.neuroexam.com/

Cranial Nerve 8
Hearing and Balance

•Test to see can the patient hear fingers rubbed together or words whispered just outside of the auditory canal and identify which ear hears the sound? A tuning fork can be used to perform the Weber and Rhinne test to evaluate sensori-neural and conductive hearing loss respectively

•Hearing loss can be caused by lesions in the acoustic and mechanical elements of the ear, the neural elements of the cochlea, or the acoustic nerve (CN VIII). After the hearing pathways enter the brainstem, they cross over at multiple levels and ascend bilaterally to the thalamus and auditory cortex. Therefore, clinically significant unilateral hearing loss is invariably caused by peripheral neural or mechanical lesions.

•Vestibular testing is not done routinely.

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Cranial Nerve 9 and 10
Palatal Elevation and Gag Reflex

•Does the palate elevate symmetrically when the patient says, "Aah"? Does the patient gag when the posterior pharynx is brushed? The gag reflex needs to be tested only in patients with suspected brainstem pathology, impaired consciousness, or impaired swallowing.

•Palate elevation and the gag reflex are impaired in lesions involving CN 9, CN 10, the neuromuscular junction, or the pharyngeal muscles.

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Cranial Nerves 5,7,9,10,12
Muscles of Articulation

•Is the patient's speech hoarse, slurred, quiet, breathy, nasal, low or high pitched, and so on? Note that dysarthria, or abnormal pronunciation of speech, is not the same as aphasia, which is an abnormality in language production or comprehension.

•Abnormal articulation of speech can occur in lesions involving the muscles of articulation, the neuromuscular junction, or the peripheral or central portions of CN 5,7,9,10,and 12. Furthermore, speech production can be abnormal as a result of lesions in the motor cortex, cerebellum, basal ganglia, or descending pathways to the brainstem.

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Cranial Nerve11
Sternocleidomastoid and Trapezius Muscles

•Ask the patient to shrug their shoulders, turn their head in both directions, and raise their head from the bed, flexing forward against the force of your hands.

•Weakness in the sternocleidomastoid or trapezius muscles can be caused by lesions in the muscles, neuromuscular junction, or lower motor neurons of the accessory spinal nerve (CN XI).

•Unilateral upper motor neuron lesions in the cortex or descending pathways cause contralateral weakness of the trapezius, with relative sparing of sternocleidomastoid strength

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Cranial Nerve12

•Note any atrophy or fasciculations (spontaneous quivering movements caused by firing of muscle motor units) of the tongue while it is resting on the floor of the mouth. Ask the patient to stick their tongue straight out and note whether it curves to one side or the other. Ask the patient to move their tongue from side to side and push it forcefully against the inside of each cheek

•Fasciculations and atrophy are signs of lower motor neuron lesions. Unilateral tongue weakness causes the tongue to deviate toward the weak side. Tongue weakness can result from lesions of the tongue muscles, the neuromuscular junction, the lower motor neurons of the hypoglossal nerve (CN XII), or the upper motor neurons originating in the motor cortex. Lesions of the motor cortex cause contralateral tongue weakness.

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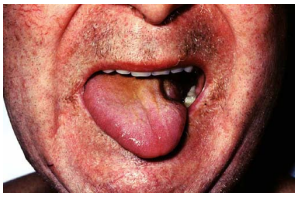
Hypoglossal Nerve Injury



Cranial nerve song

- https://www.youtube.com/watch?v=sAFaTaavmO8

Note the parkinsonian stare,masked facies,flexed posture,hypokinesia typical of extrapyramidal disorders
http://www.ananova.com/news/story/sm_1417224.html


THE
END