In The Name Of God

Neurological Exam

Shiraz University Of Medical Sciences

What are the components?

Neuro:

- Mental Status
- Language, Speech
- Cranial Nerves
- Motor
- Reflexes
- Sensory
- Cerebellar
- Gait

Mental status

- MMSE
- MoCA

MMSE

آگاهي به زمان و مكان (يك نمره براي هر پاسخ صحيح)

از بيمار سوال كنيد: چه سالي، چه فصلي، كدام ماه، چندم ماه، و چه روزي از هفته است؟ ( ) 5
از بيمار سوال كنيد: كجا هستيم؟ (كشور) ، (شهر)، (استان)، (بيمارستان / درمانگاه)، (طبقه) ( ) 5

حافظه فوري (بسته به تعداد اسم هايي كه تكرار مي كند نمره 1، 2، و يا 3 بدهيد)
اسامي سه شيء نامربوط مثل " سيب " ، " ميز " و " ريال " را بطور روشن و آهسته بيان كنيد. ( ) 3
هركلمه را به آهستگي و در حدود يك ثانيه بگوييد، و در پايان از **بيمار بخواهيد** هر سه را بگويد.
اگر بيمار نتواند هر سه اسم را بطور صحيح تكرار كند، 6 بار هر سه كلمه را تكرار كنيد تا بيمار بتواند هر سه آنها را بگويد.

تمركز و محاسبه (يك نمره براي هر تفريق صحيح) 5
از بيمار بخواهيد: از عدد 100 ، 7 تا 7 تا كم كرده و حاصل را بگويد (بعد از 5 پاسخ).
65 ، 79.72 ، 86 ، 93 به عاشيه خانه دهيد)، يا به جاي آن از 100 بر عكس بشمارد (تا 5 عدد). ( ) 5

يادآوري (يك نمره براي هر پاسخ صحيح)

از بيمار بخواهيد: اسامي اشيائي كه در بالا به او گفته شد را مجددا تمام ببرد. ( ) 3

زبان

از بيمار بخواهيد: نام اشيائي را كه به او نشان مي دهيد بگويد (مداد و ساعت مچي). (2 نمره) ( ) 9
از بيمار بخواهيد: عبارت " بدون اگر، و ، يا اما " را تكرار كند. (1 نمره) ( )
از بيمار بخواهيد: برگه اي كه به او مي دهيد، با دست راست گرفته ، آن را از وسط تا كند ، و سپس روي زمين بگذارد (1 نمره براي اجراي صحيح هريك از اين فعاليت ها) (3 نمره) ( ) ( )

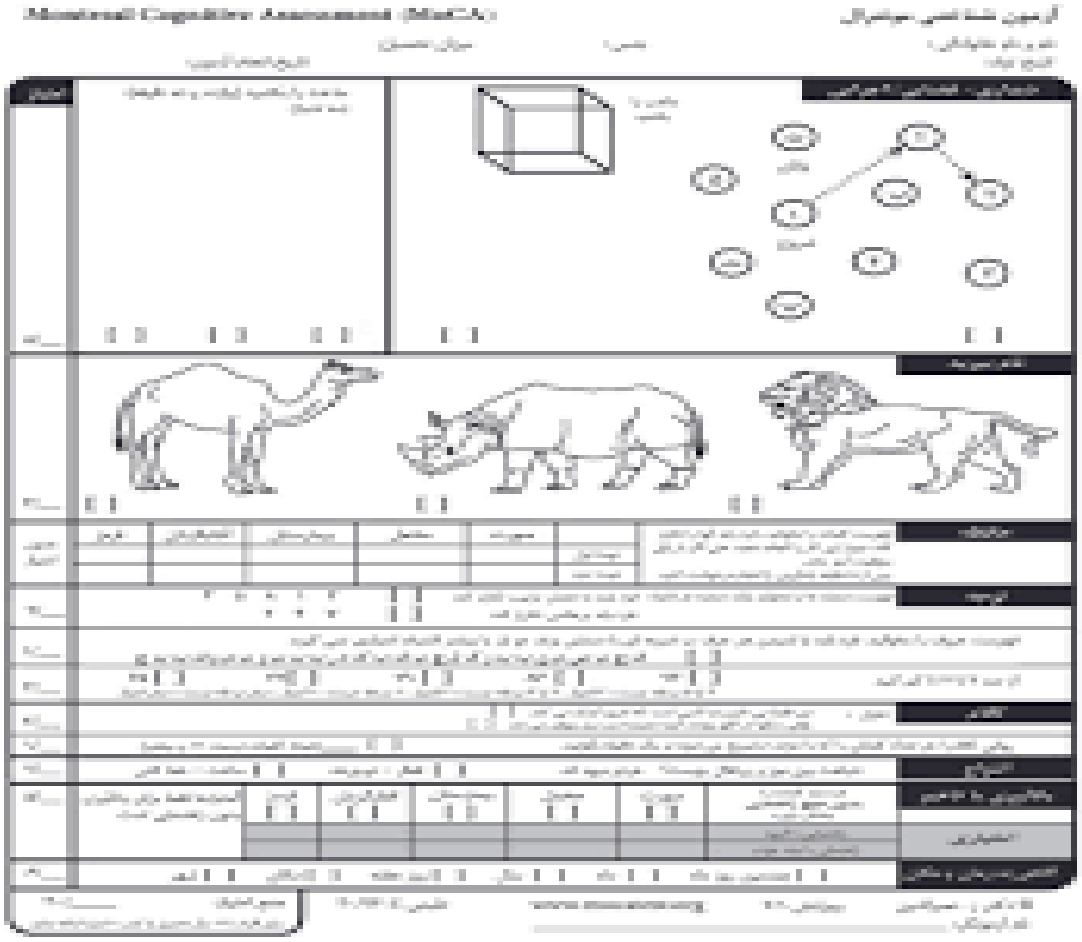
از بيمار بخواهيد: جمله " چشم هايت را ببند " را كه روي يك برگه نايپ كرده ايد و به او نشان مي دهيد خوانده و آن را انجام دهد. (1 نمره) ( )

از بيمار بخواهيد: يك جمله بنويسد . (1 نمره) ( )
تصوير دو پنج ضلعي متقاطع را بكشيد و از **بيمار بخواهيد** اين شكل را كپي كند (1 نمره) ( ) ( )

0

نمره كل : ( )

MoCA

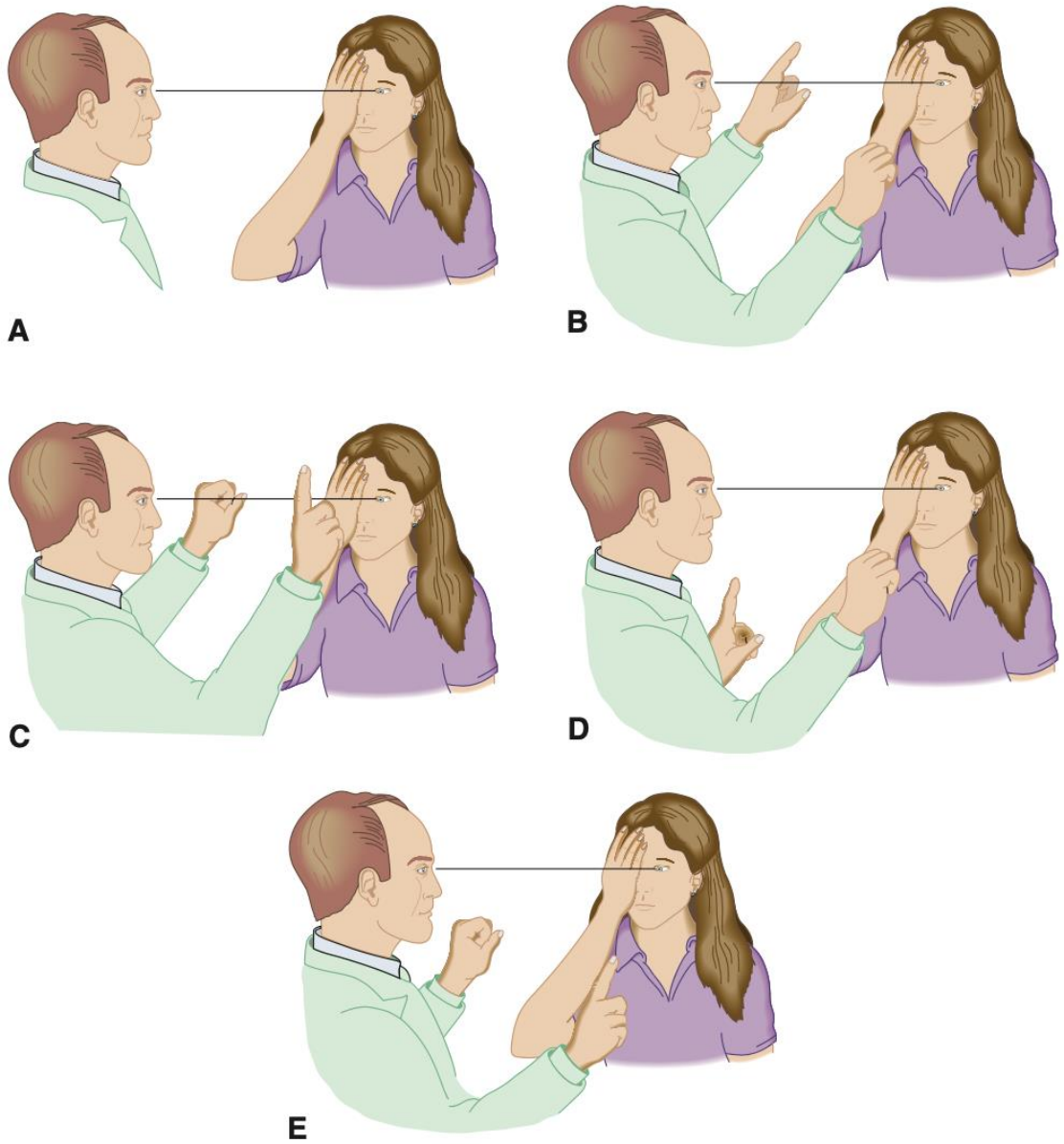


Language

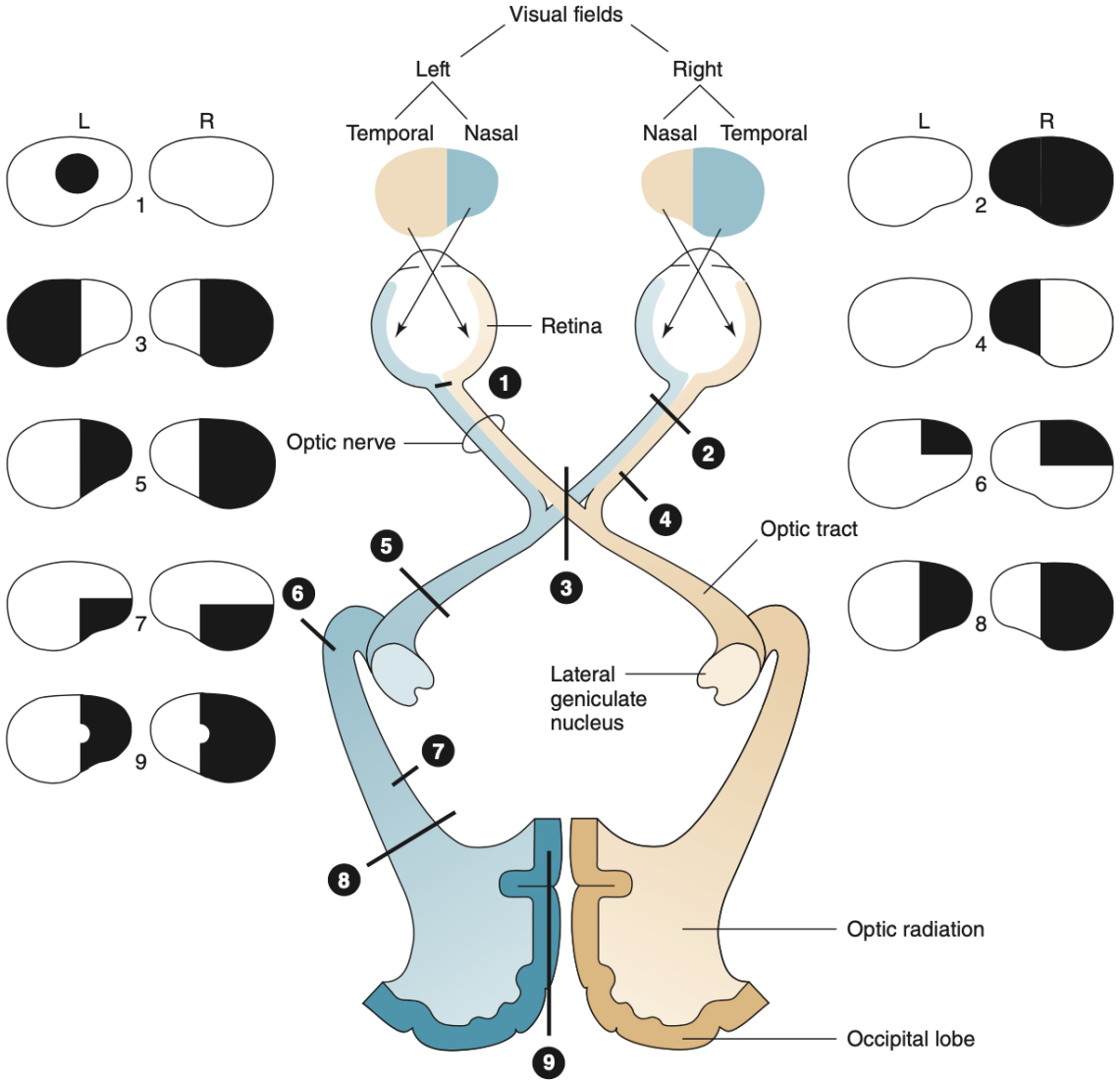
- Language
  - comprehension
  - spontaneous fluent
  - repetition,
  - naming objects,
  - reading,
  - writing,
  - prasody

Cranial Nerves

- CN 1: Olfactory, don't check routinely
- CN 2: Optic
  - Visual acuity
  - Visual fields
  - Fundus
  - Pupil light reflex

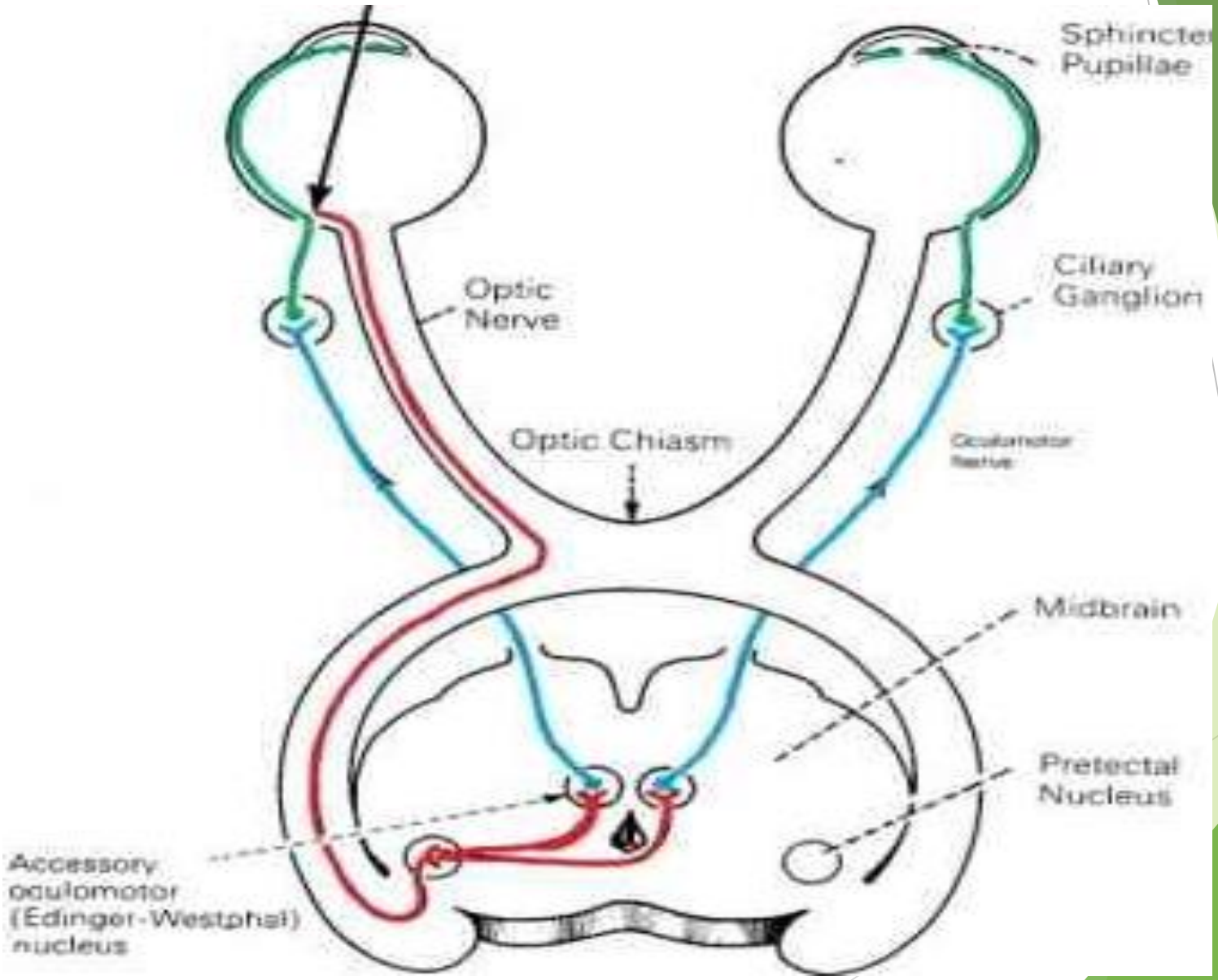


▲ **Figure 1-12.** Confrontation testing of the visual field. (**A**) The left eye of the patient and the right eye of the examiner are aligned. (**B**) Testing the superior nasal quadrant. (**C**) Testing the superior temporal quadrant. (**D**) Testing the inferior nasal quadrant. (**E**) Testing the inferior temporal quadrant. The procedure is then repeated for the patient's other eye.



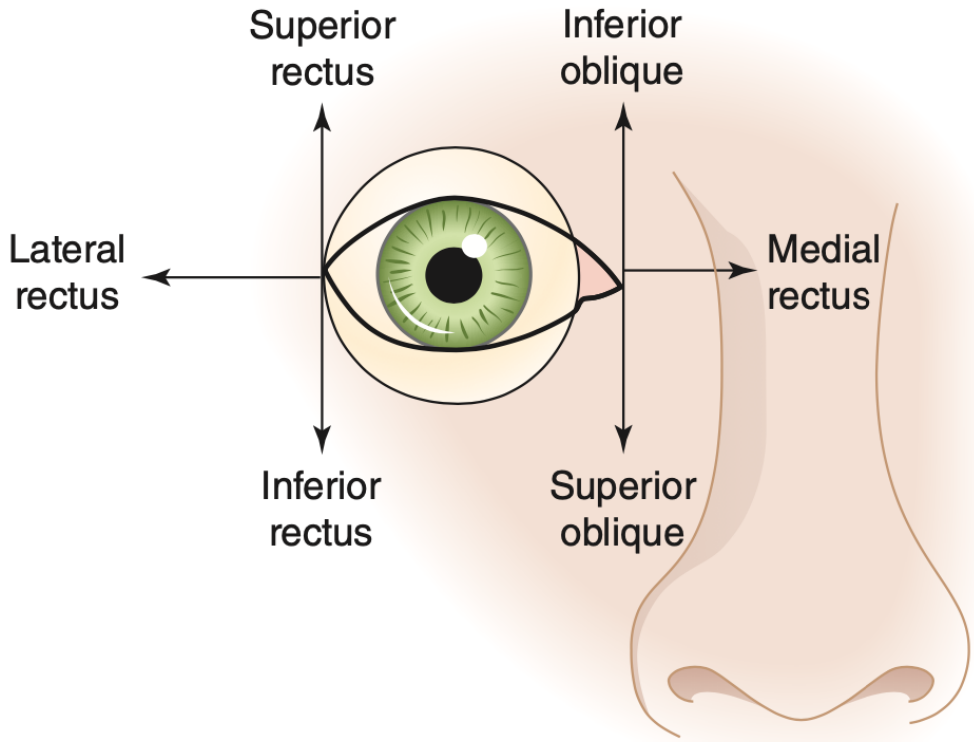
▲ **Figure 1-13.** Common visual field defects and their anatomic bases. 1. **Central scotoma** caused by inflammation of the optic disk (optic neuritis) or optic nerve (retrobulbar neuritis). 2. **Total blindness of the right eye** from a complete lesion of the right optic nerve. 3. **Bitemporal hemianopia** caused by pressure exerted on the optic chiasm by a pituitary tumor. 4. **Right nasal hemianopia** caused by a perichiasmal lesion (eg, calcified internal carotid artery). 5. **Right homonymous hemianopia** from a lesion of the left optic tract. 6. **Right homonymous superior quadrantanopia** caused by partial involvement of the optic radiation by a lesion in the left temporal lobe (Meyer loop). 7. Right homonymous inferior quadrantanopia caused by partial involvement of the optic radiation by a lesion in the left parietal lobe. 8. **Right homonymous hemianopia** from a complete lesion of the left optic radiation. (A similar defect may also result from lesion 9.) 9. **Right homonymous hemianopia (with macular sparing)** resulting from posterior cerebral artery occlusion. Defects are shown in black.

Optic nerve


Sphincter Pupillae
Optic Nerve
Ciliary Ganglion
Optic Chiasm
Midbrain
Pretectal Nucleus
Accessory oculomotor (Edinger-Westphal) nucleus

Cranial Nerves

- CN 3: Oculomotor
  - Pupil reactivity to light (direct and consensual) and accomadation
  - Extraocular eye movements (superior, medial and inferior recti; inferior oblique)
- CN 4: Trochlear
  - Extraocular eye movements (superior oblique)
- CN 6: Abducens
  - Extraocular eye movements (lateral rectus)



▲ **Figure 1-14.** The six cardinal positions of gaze for testing eye movement. The eye is adducted by the medial rectus and abducted by the lateral rectus. The adducted eye is elevated by the inferior oblique and depressed by the superior oblique; the abducted eye is elevated by the superior rectus and depressed by the inferior rectus. All extraocular muscles are innervated by the oculomotor (III) nerve except the superior oblique, which is innervated by the trochlear (IV) nerve, and the lateral rectus, which is innervated by the abducens (VI) nerve.

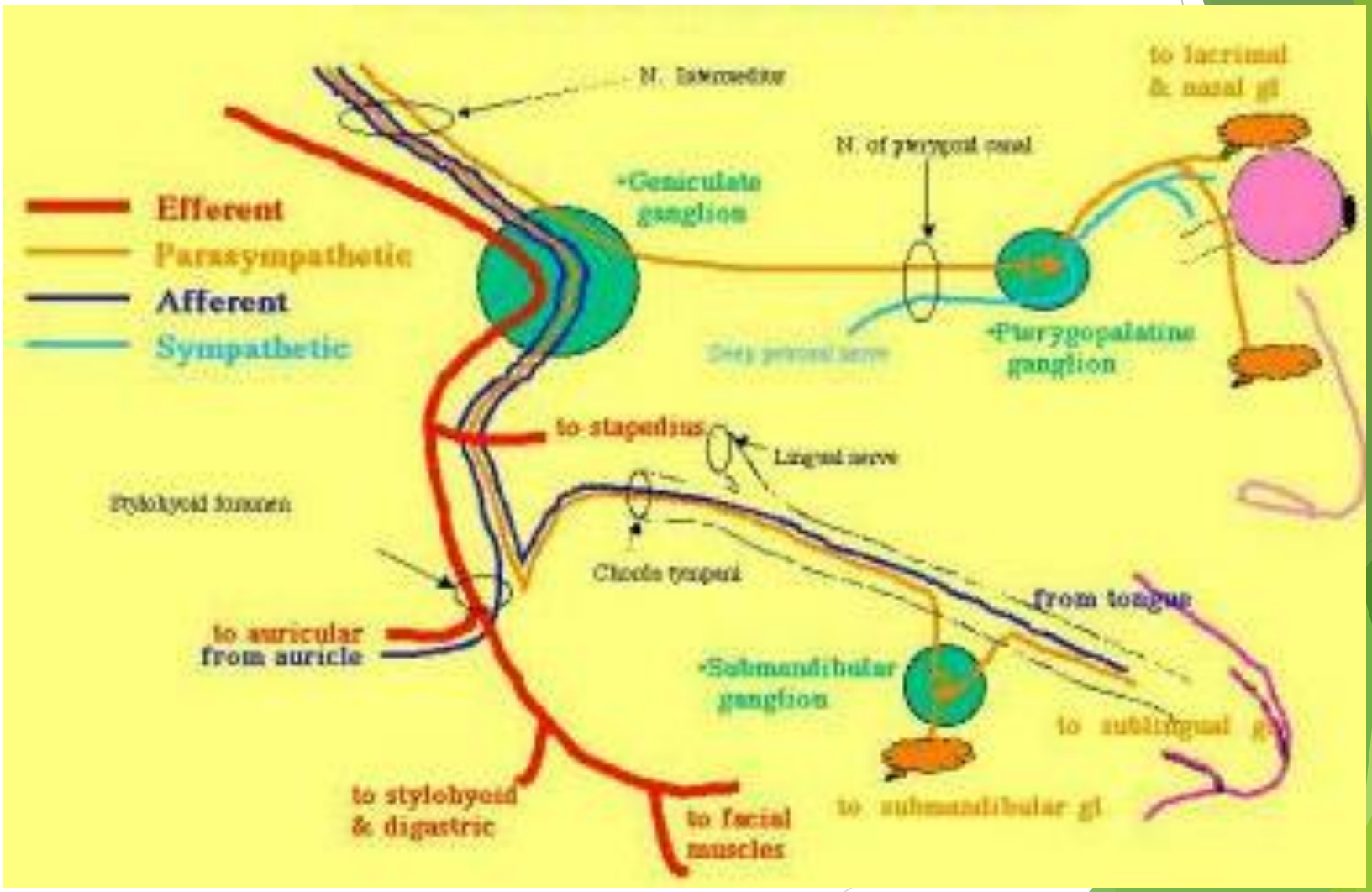
Cranial Nerves

- CN 5: Trigeminal
  - Muscles of mastication
  - Facial sensation (V1, 2, 3 divisions)

Cranial Nerves

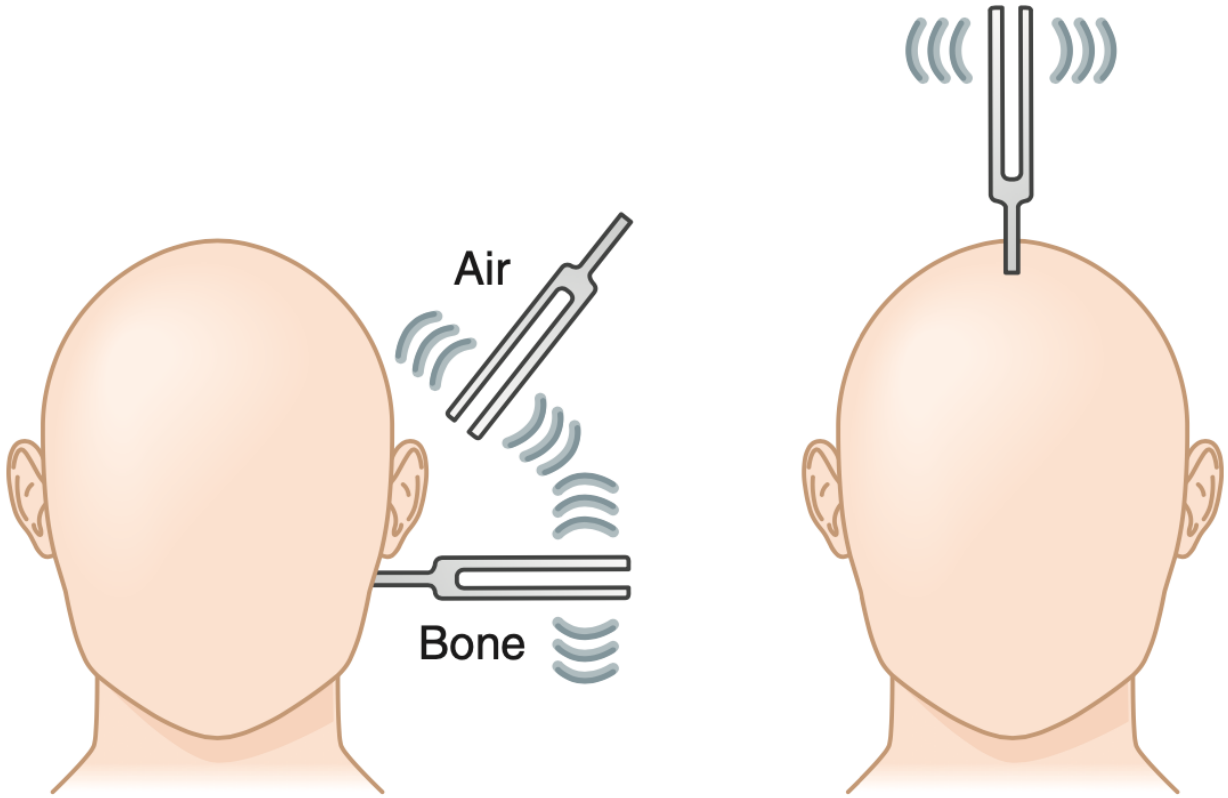
- CN 7: Facial
  - Facial muscles
  - Taste (anterior 2/3)

Facial Nerve



Cranial Nerves

- CN 8: Vestibulocochlear
  - Hearing
  - Vestibular function

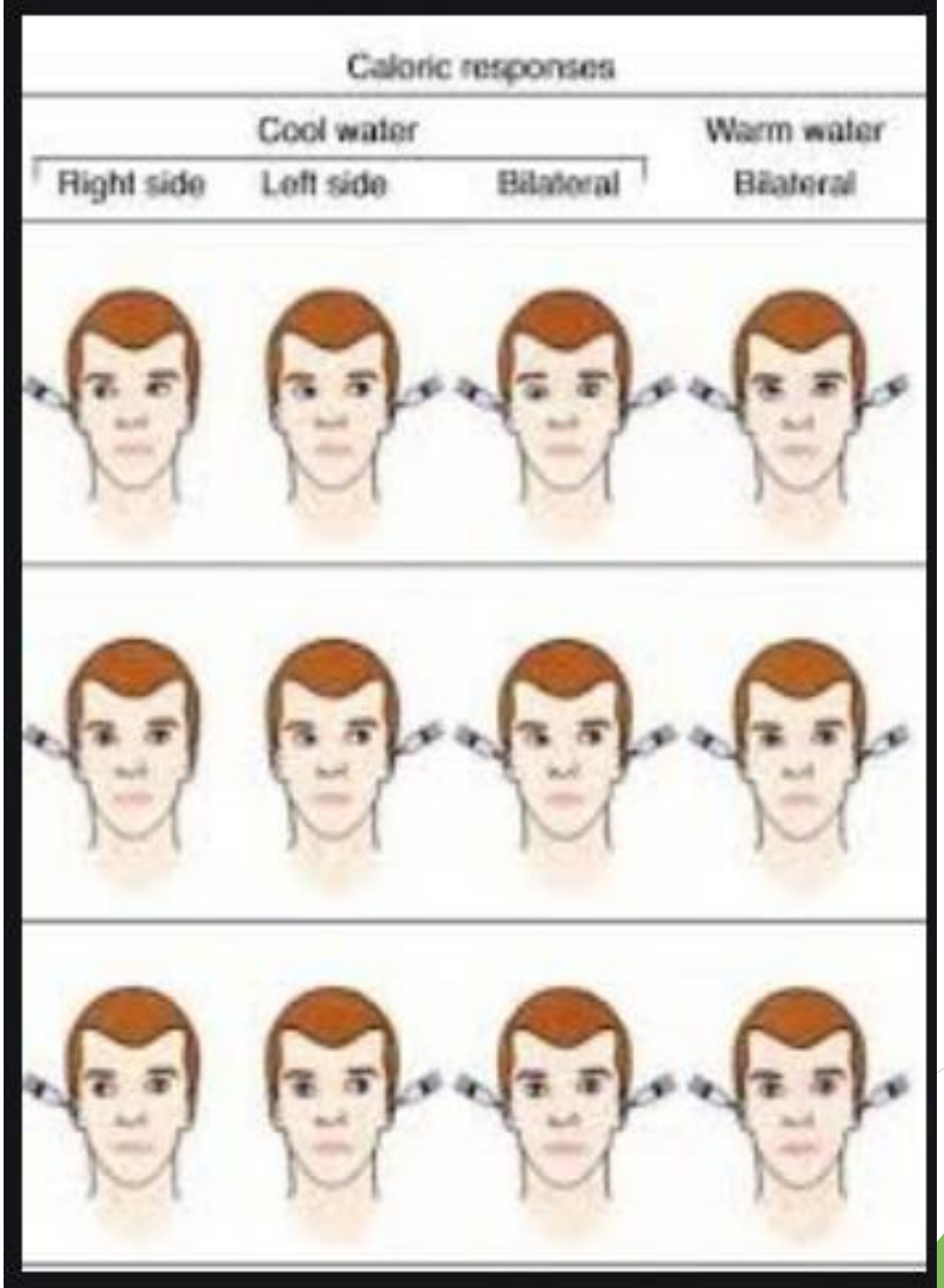


Rinne test

Weber test

Hearing loss	Rinne test (Conduction)	Weber test (Localization)
None	Air > bone	Midline
Sensorineural	Air > bone	Normal ear
Conductive	Bone > air	Affected ear

▲ **Figure 1-18.** Tests for hearing loss.


Caloric responses
Cool water
Warm water
Right side
Left side
Bilateral
Bilateral

Cranial Nerves

- CN 9: Glossopharyngeal
  - Taste (posterior 1/3)
  - Uvula
- CN 10: Vagus
  - Phonation
  - Palate elevation
- CN 11: Spinal accessory
  - Head turn
  - Shoulder shrug

Cranial Nerves

- CN 12: Hypoglossal
  - Tongue protrusion

Motor

- Muscle bulk
- Muscle Tone
- Strength
- Abnormal movements

inspection

- Atrophy
- Hypertrophy
- Pseudohypertrophy
- Scoliosis
- Scapular winging

palpation

- Scoliosis
- Scapular winging
- Muscle Tone

percussion

- Fasciclation
- Myotonia
- pseudomyotonia

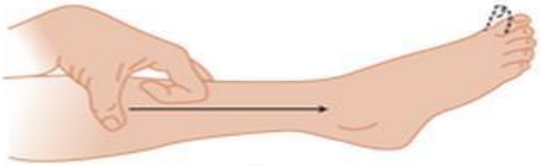
Strength:

- Grading system
  - 0: no movement
  - 1: can see muscle contraction but no movement
  - 2: can move with gravity eliminated
  - 3: can move against gravity
  - 4: can resist opposition to some extent, but not full (+, - also)
  - 5: full strength
- Pronator drift

Reflexes

- Suprficial reflex: abdominal reflex
- Deep tendon reflex: velocity or amplitude?
  - 0: absent
  - 1+: hyporeflexic
  - 2+: normal
  - 3+: brisk, without clonus or non sustained
  - 4+: brisk, with sustained clonus
- More pathologic descriptors: spreading

- Plantar response and equivalents

Descriptive Name	Eponym	Maneuver	
A. Plantar toe reflex	Babinski	Move an object along the lateral aspect of the sole.	
B. None	Chaddock	Move an object along the lateral side of the foot.	
C. Achilles-toe reflex	Schaeffer	Squeeze hard on the Achilles tendon.	
D. Shin-toe reflex	Oppenheim	Press your knuckles on the patient's shin and move them down.	
E. Calf-toe reflex	Gordon	Squeeze the calf muscles momentarily.	
F. Pinprick-toe reflex	Bing	Make multiple light pinpricks on the dorsolateral surface of the foot.	
G. Toe-pull reflex	Gonda, Stransky	Pull the fourth toe outward and downward for a brief time and release suddenly.	

Sensory

- How and what part of the nervous system are we checking?
  - Light touch
  - Pinprick
  - Vibration
  - Joint position sense
- Checking a level
- Romberg- correct positioning!

Cerebellar

- Ataxia
  - Axial
  - Appendicular
- Finger-nose-finger
- Heel-knee-shin
- Rapid alternating movements

Gait

- Ataxic: cerebellar and sensory ataxia
- Steppage
- Hemiparetic and scissor
- Waddling
- Shuffling/ Festinating