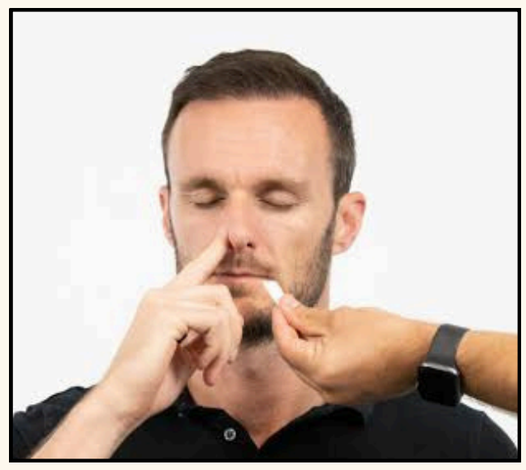
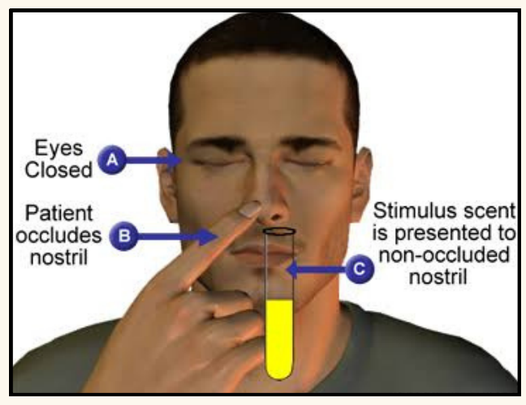
ECE Practical

Examination of cranial nerves





I) Olfactory Nerve (CN I)

- **Function:** Smell
- **Test:**

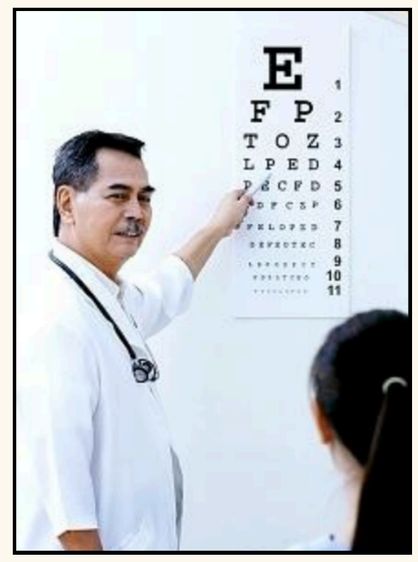
1. Coffee / almond / peppermint
2. Each nostril alone
3. Eyes closed

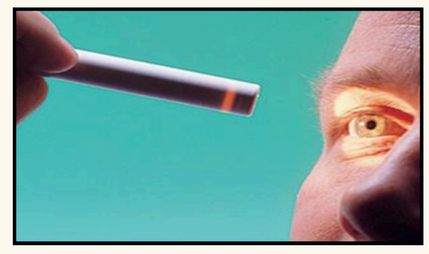
- **Abnormal:** Anosmia / parosmia

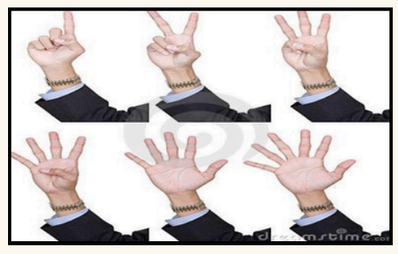
II) Optic Nerve (CN II)

- **Function:** Vision
- **1. Visual Acuity + Color:**

Use Snellen chart or finger counting at 6 m.
If unable → test hand movements at 30 cm.
If absent → test light perception (torch).
If no P.L. → complete blindness.
Test each eye separately.



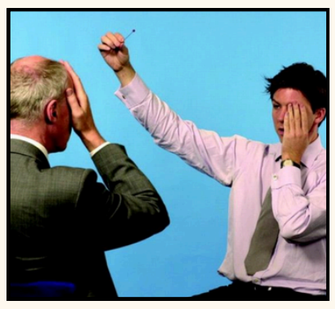


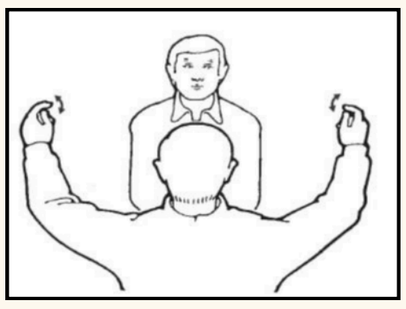


- **2. Visual Field:**

By confrontation method (if no equipment):

1. Sit 60–100 cm in front of patient.
2. Close opposite eye, patient closes one eye.
3. Patient looks at your eye.
4. Move finger from periphery inward (up/down/left/right).
5. Compare your vision to theirs.
6. Repeat with other eye.





- **3. Fundus Exam:**

Use ophthalmoscope → Check for:
Papilledema, Optic atrophy

- **Abnormal:** vision and field affection.

Examination of cranial nerves

III) Ocular Nerves (CN III, IV, VI)

- **Function:** Eye movement, pupil reflexes.
- **1. Ptosis causes:**

- CN III lesion → complete ptosis + mydriasis + divergent squint.
- Horner's → partial ptosis + miosis + enophthalmos + anhidrosis.

- **2. Pupil Reflexes:**

a. Light Reflex:

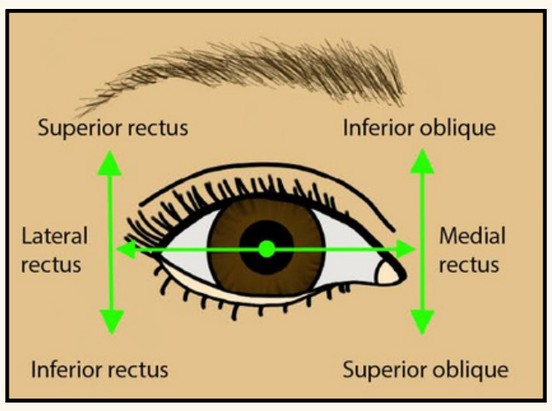
1. Cover one eye.
2. Shine light in uncovered eye.
3. Observe constriction:
   - Same eye = direct.
   - Other eye = consensual.

b. Accommodation Reflex:

1. Ask patient to follow finger from far to near.
2. Observe: convergence – miosis – accommodation.

- **3. Extraocular Movements:**

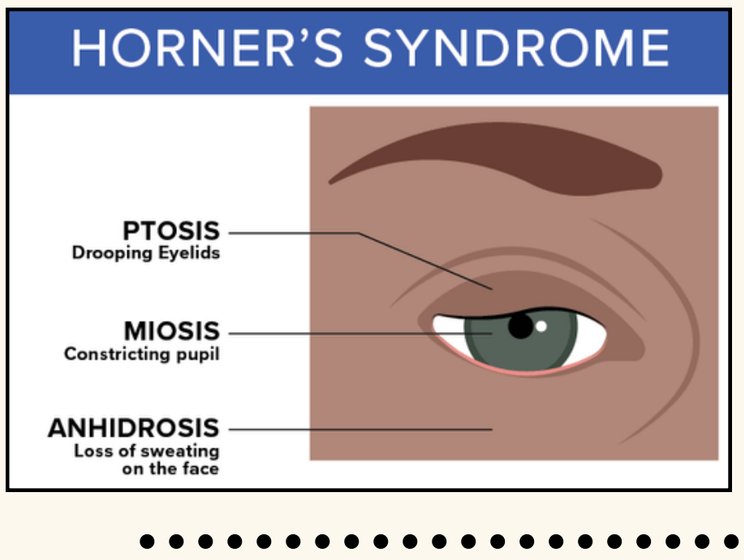
CN VI → look laterally > Lateral rectus
CN IV → look down & in > Sup. oblique
CN III → all other directions > Rest of muscles
Test each eye, then both together (conjugate).

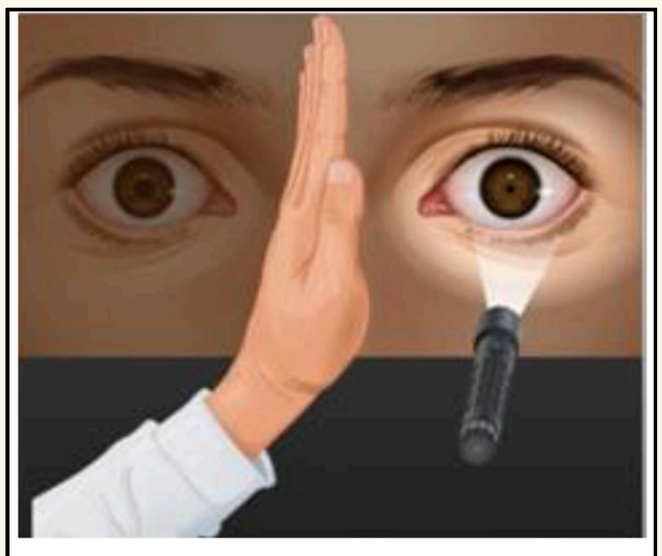


- **4. Nystagmus Test:**

Ask patient to look: lateral, up, down
Note: spontaneous or on fixation
Fast phase = direction of nystagmus

- **Abnormal:** diplopia





Pupillary Light reflex

Accommodation reflex

Examination of cranial nerves

V) Trigeminal Nerve (CN V)

- **Function:** Mastication (motor) + Facial sensation (sensory)
- **1. Motor:**

A. Muscles of mastication:

1. Temporalis: patient clenches → palpate temples
2. Masseter: patient clenches → palpate with thumb/index
3. Pterygoids: ask patient to open mouth against resistance

Unilateral lesion → jaw deviates to affected side
Bilateral lesion → no deviation, can't open against resistance

B. Jaw Reflex (Jaw Jerk):

Mouth slightly open → place finger on chin → tap downward
Normal: absent or minimal
Exaggerated: bilateral UMNL (e.g. pseudobulbar palsy)

- **2. Sensory:**

A. Facial Sensation:

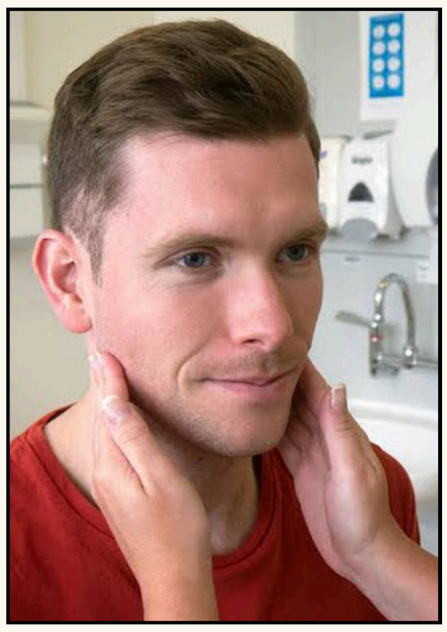
Use pin (pain) and cotton (touch)
Compare:

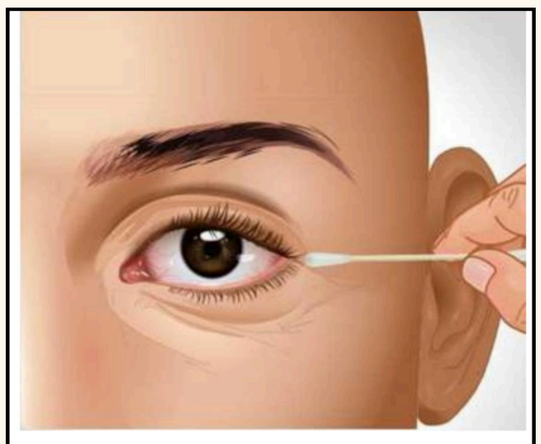
a. Both sides
b. 3 divisions: ophthalmic, maxillary, mandibular
c. Inner vs outer face

B. Corneal Reflex (Afferent: CN V, Efferent: CN VII):

Ask patient to look up & in
Touch lateral corneo-scleral junction (cotton)
Normal: blink both eyes
Absent blink on one side → facial nerve lesion
Absent both → trigeminal sensory loss or bilateral facial palsy

- **Abnormal:** Weak mastication, Facial Sensory loss





Corneal Reflex

Examination of cranial nerves

VII) Facial Nerve (CN VII)

- **Function:** facial expression, taste
- **1. Motor (Facial muscles):**

A. Upper face:

Frontalis → Ask: Raise eyebrows

Orbicularis oculi → Ask: Close eyes tightly

↳ Check for Bell's phenomenon

B. Lower face:

Orbicularis oris, Buccinator, Retractor anguli oris → Ask:

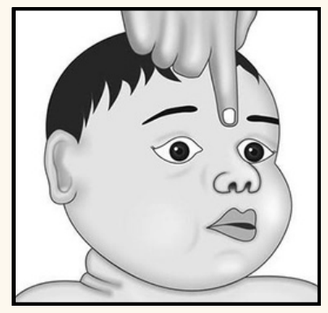
1. Whistle
2. Blow cheeks
3. Show teeth

↳ Observe nasolabial fold & angle of mouth

- **2. Sensory (Chorda tympani):**

Dry tongue, Test taste on anterior 2/3 (sweet / salty)

- **3. Reflex:**



Glabellar reflex → Tap glabella

↳ Normal: blinking stops after 2–3 taps

↳ Parkinsonism: blinking persists

- **Abnormal:** accumulation of food, ↓ Eye closure

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VIII) Vestibulocochlear Nerve (CN VIII)

- **Function:** Hearing + Balance
- **1. Cochlear Part (Hearing):**

1. Watch Test

2. Rinne Test

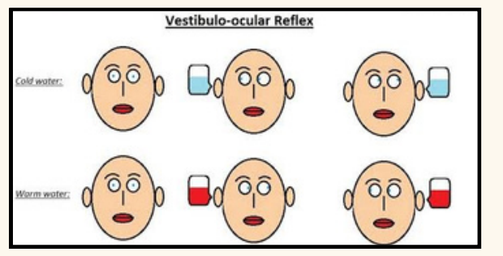
Place tuning fork on mastoid → then near ear.

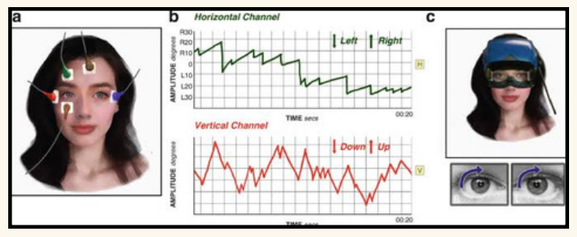
Normal: Air > Bone

3. Weber Test

Place tuning fork on mid-forehead.

Normal: Sound heard in middle.





- **2. Vestibular Part (Balance):**

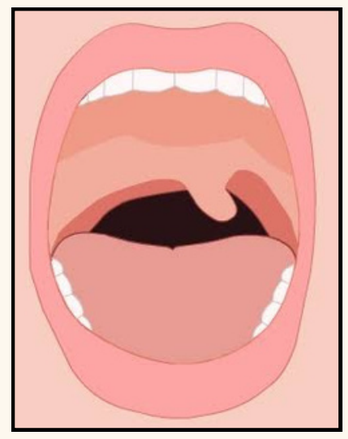
Caloric test

Rotating chair test

Electronystagmography (ENG)

- **Abnormal:** hearing problem, vertigo.

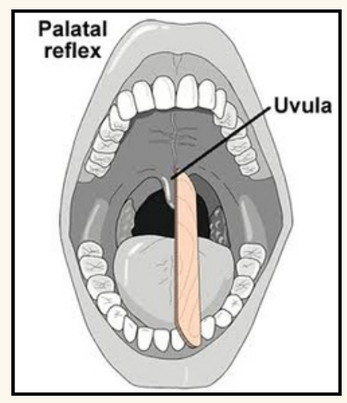
Examination of cranial nerves



IX & X) Glossopharyngeal, Vagus Nerves (CN IX, X)

- **Function:**

CN IX: Taste (posterior 1/3), pharynx sensation
CN X: Palate, pharynx & larynx motor

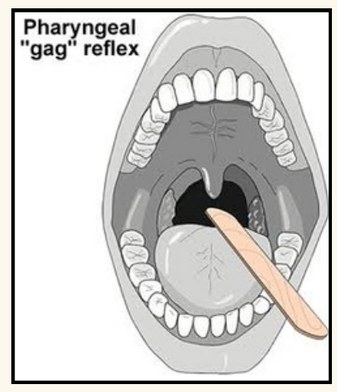


- **1. Inspect Uvula**

Normally central
Deviation → towards healthy side

- **2. Palatal Reflex (Afferent CN V, Efferent CN X)**

Touch soft palate → elevation



- **3. Pharyngeal Reflex (Afferent CN IX, Efferent CN X)**

Use 2 tongue depressors → stimulate pharynx → gag reflex

- **Abnormal:** bulbar manifestations

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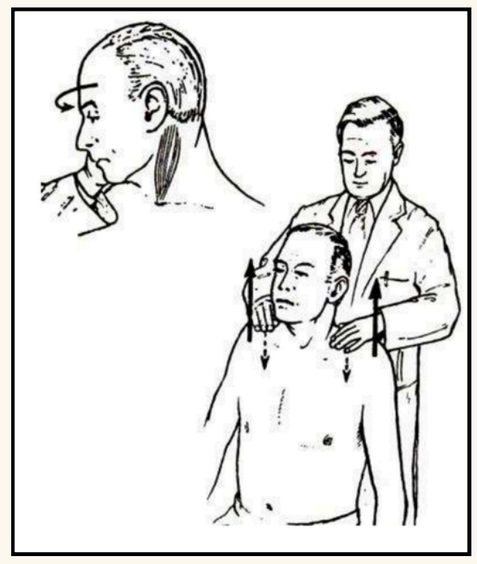
XI) Accessory Nerve (Spinal part)

- **Function:** Motor to sternomastoid & trapezius
- **Examination:**

1. **Sternomastoid:** Turn chin against resistance
2. **Trapezius:** Shrug shoulders against resistance

- **Abnormal:** Weak shoulder elevation or head turn



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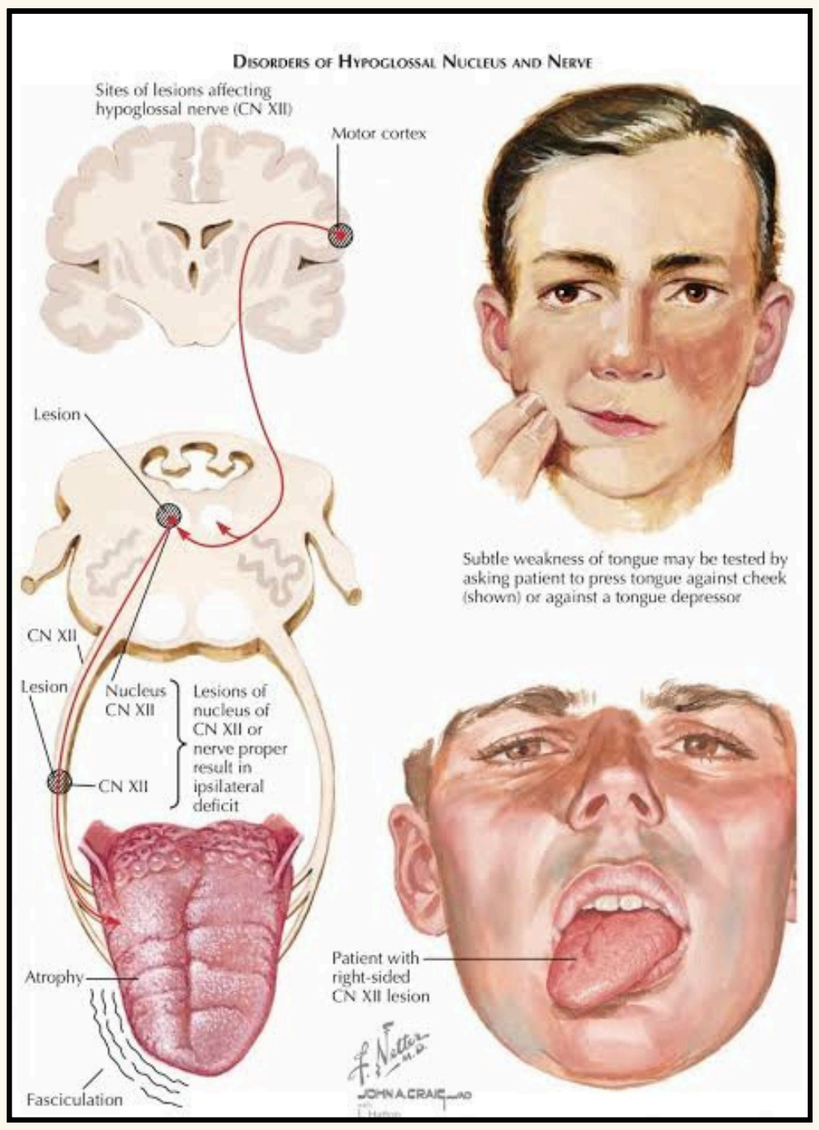
XII) Hypoglossal Nerve (CN XII)

- **Function:** Motor to tongue muscles
- **Examination:**

1. **Inspection (at rest + protrusion):**
   - Deviation → to same (affected) side
   - Wasting
   - Fasciculations
   - Abnormal movements (e.g. chorea, myotonia dimpling)
   - Ulcers, fissures, or glazed appearance
2. **Power Test:**

Push tongue against inner cheek → apply resistance from outside

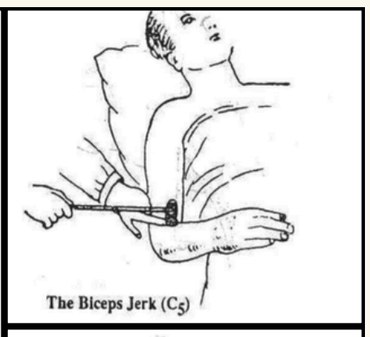
- **Abnormal:** tongue deviation, dysarthria

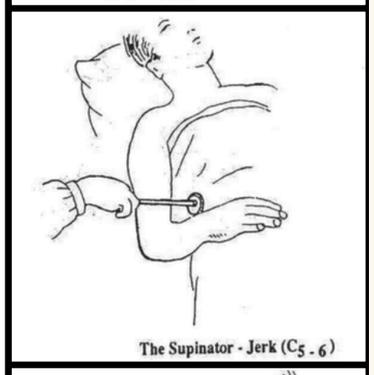


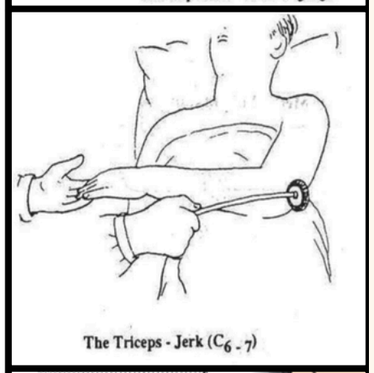
ECE Practical

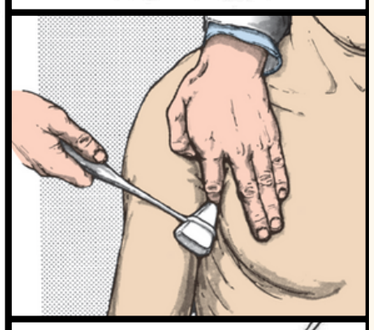
Deep tendon reflexes

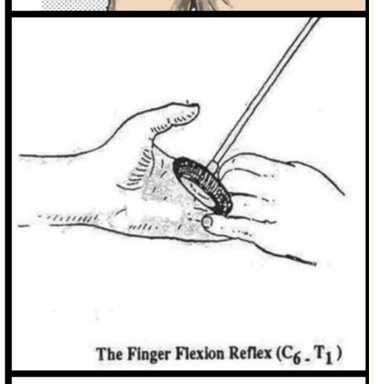
Reflex	Segment	Nerve	Technique	Normal response
Biceps	**C5**	**Musculo-cutaneous**	Press the forefinger gently on the biceps tendon in the antecubital fossa, strike the forefinger with the hammer	Flexion of the elbow Visible contraction of the biceps
Supinator	**C5-6**	**Radial**	Strike the lower end of the radius 2 inches above the wrist Watch the movement of the forearm and the fingers	Contraction of the brachio-radialis Flexion of the elbow, Biceps may contract as well and slight flexion of the fingers may occur
Triceps	**C6-7**	**Radial**	By holding the patient's hand, draw the arm across the trunk and allow it to lie loosely in the new position Strike the triceps tendon 2 inches above the elbow	Extension of the elbow Visible contraction of the triceps
Pectorals	**C5-T1**	**Lateral and Medial pectoral**	Place the tips of the fingers on the pectoral muscle as it forms the anterior margin of the axilla and strike the fingers	Adduction of the arm Visible contraction of the pect. major
Finger flexion	**C6-T1**	**Median**	Allow the patient's hand to rest palm upwards, the fingers slightly flexed. Then gently interlocks his fingers with the patient's and strikes them with the hammer	Slight flexion of all fingers and of the interphalangeal joint of the thumb
Knee	**L3-4**	**Femoral**	The left arm is placed under both knees; strike the patella tendon lightly on each side, increase strength if no response.	Extension of the knee visible contraction of quadriceps
Ankle	**S1**	**Medial popliteal**	The patient's leg should be externally rotated and slightly flexed at the knee. The back of the examiner's left hand should then be placed along the sole of the patient's foot, slightly dorsi-flexing the foot. The Achilles tendon is then struck and both movements of the foot and of calf muscles are watched.	Plantar flexion of the foot Contraction of the gastrocnemius

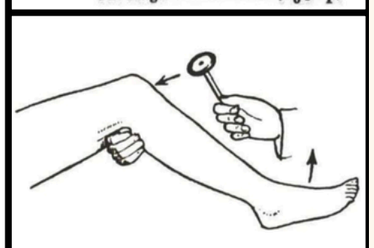

The Biceps Jerk (C_5)

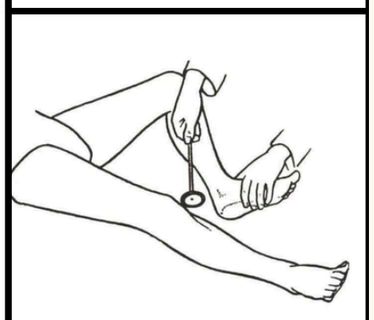

The Supinator - Jerk (C_{5-6})


The Triceps - Jerk (C_{6-7})



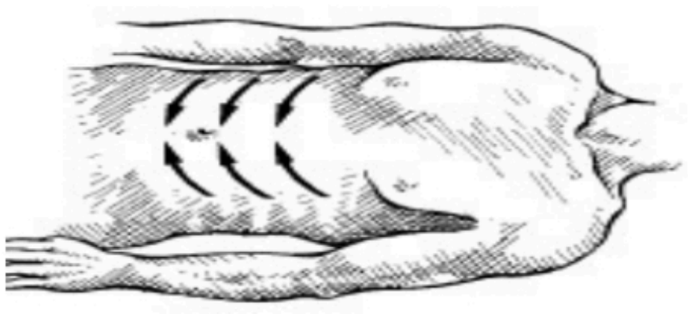
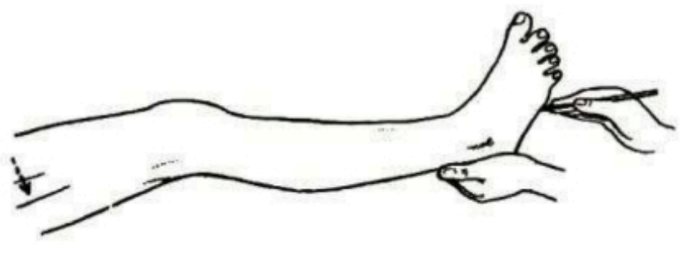
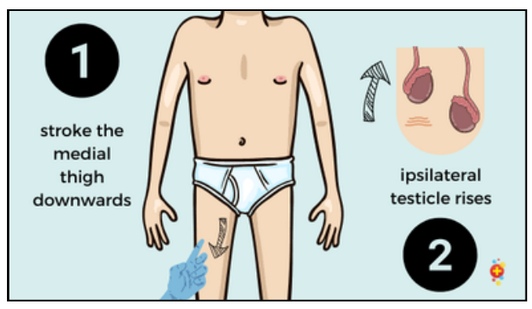

The Finger Flexion Reflex (C_6 - T_1)




Ankle Reflex (S1)

ECE Practical

Superficial reflexes

Reflex	Technique	Results
Abdominal reflexes (T8,9,10) (T10,11,12) 	Stroke lightly, briskly from the midaxillary line toward the midline. A key, wooden end of applicator, or tongue blade can be used. One should inform the patient of the technique to be used.	Normal –Ipsilateral contraction of the abdominal muscles and deviation of the umbilicus towards the stimulus. Lost in: Pyramidal lesion above it Obese, ascetic, operation scars, pregnancy, LMNL
Plantar (L5, S1) 	A key or wooden end of applicator can be used to stroke the lateral aspect of the sole from the heel forwards and then across the ball of the foot.	Normal – Plantar flexion of the toes Abnormal – Dorsal flexion of the big toe often accompanied by fanning of the other toes = Babinski Response
Cremasteric reflex in the male (L1, L2) 	Stroke the inner thigh from the pubis distally.	Normal - contraction of the Cremaster with prompt elevation of the testes on the ipsilateral side. Note: a slow irregular rise of the testes results from muscular contraction in the Dartos and is not the reflex.
Superficial anal (L1, L2)	Stroke the skin of the perianal region.	Normal - external anal sphincter contraction.

Other methods to elicit plantar reflex:

Method	Technique
Babinski	Stimulation of the plantar surface of the foot with a blunt point from the heel forward, crossing the metatarsal pad from the small to the big toe
Chaddock	Stimulation of the lateral aspect of the foot with a blunt point from the heel forward to the small toe
Oppenheim	Application of heavy pressure with the thumb and index finger to the anterior surface of the tibia with downward stroking from the infrapatellar region to the ankle
Gordon	Squeezing or applying deep pressure to the calf muscles
Gonda-Allen	Downward snapping of the distal phalanx of the second or fourth toe

ECE Practical

Examination of sensory system:

Superficial sensations:

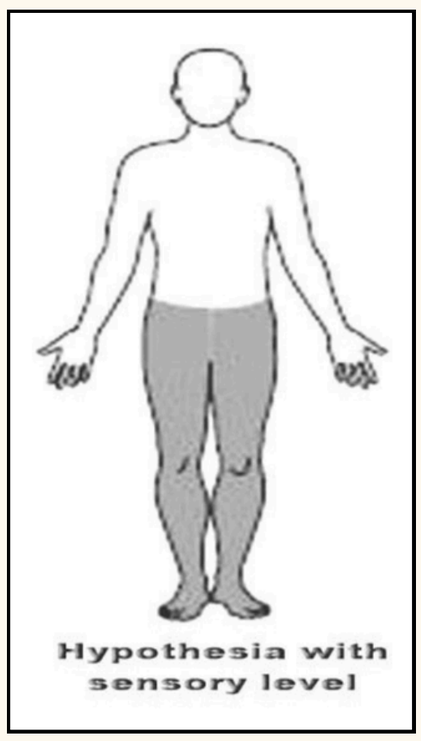
Types:
1. Pain
2. Temperature
3. Touch (crude & fine)

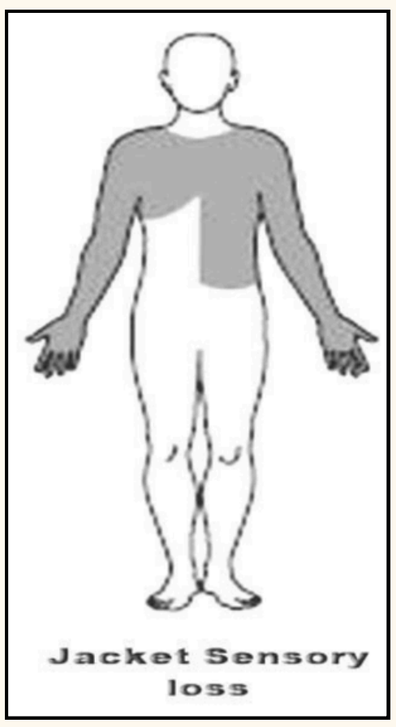
- **Examination of Pain (using a pin):**

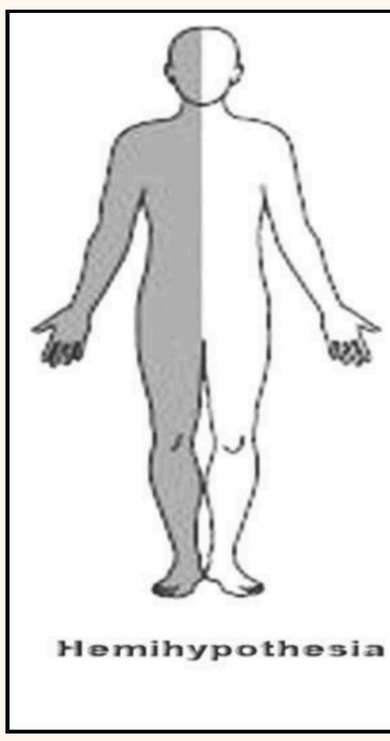
1. Search for a sensory level
Move the pin from below upward
Compare: lower limbs → trunk → upper limbs → face
Ask patient if sensation ↑↓
2. Compare both sides
Right vs left
3. Test dermatomes
Examine each dermatome separately

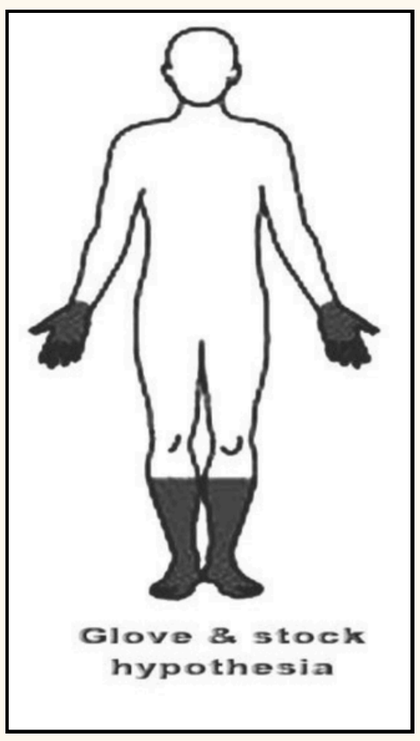
- **Common Patterns of Sensory Loss:**

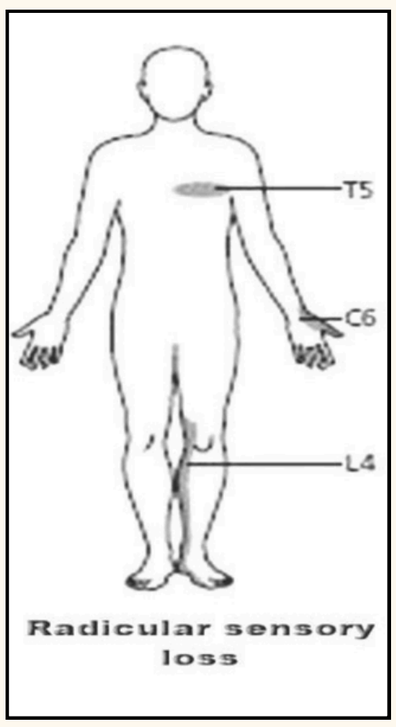
a. Sensory level → e.g. paraplegia: complete loss below a line
b. Jacket pattern → loss in a specific area with sensation above & below
c. Hemihypoesthesia → one side of body
d. Stock & glove → peripheral neuropathy (ends at same level in limbs)
e. Radicular → specific root area (e.g. cauda equina)
f. Maculo-anesthetic patch → seen in leprosy


Hypothesia with sensory level


Jacket Sensory loss


Hemihypothesia


Glove & stock hypothesia



Radicular sensory loss

ECE Practical

Deep sensations:

- **1. Vibration Sense**

Most sensitive and earliest affected.
Tested by:
1. Use 128 Hz tuning fork.
2. Place the stem on bony prominence.
3. Ask: “Do you feel vibration?”
4. Compare both sides and different sites.

- **2. Joint Position Sense**

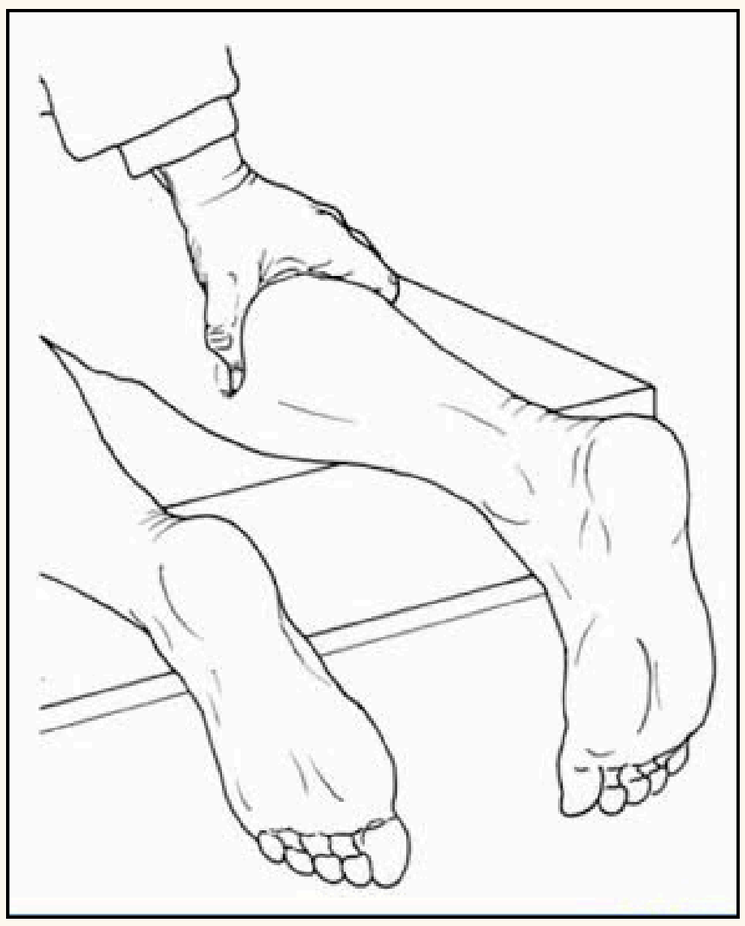
Tested on big toe.
Two types:
a. Position sense → Ask for up/down position.
b. Movement sense → Move the toe and ask direction.

- **3. Nerve Sense**

Press on ulnar nerve (behind medial epicondyle).
Patient feels electric-like tingling.

- **4. Muscle Sense**

Squeeze the calf muscle.
Normal → discomfort.
Absent → Abadie’s sign (e.g. neurosyphilis).
Exaggerated → DVT, myositis, psychogenic pain.



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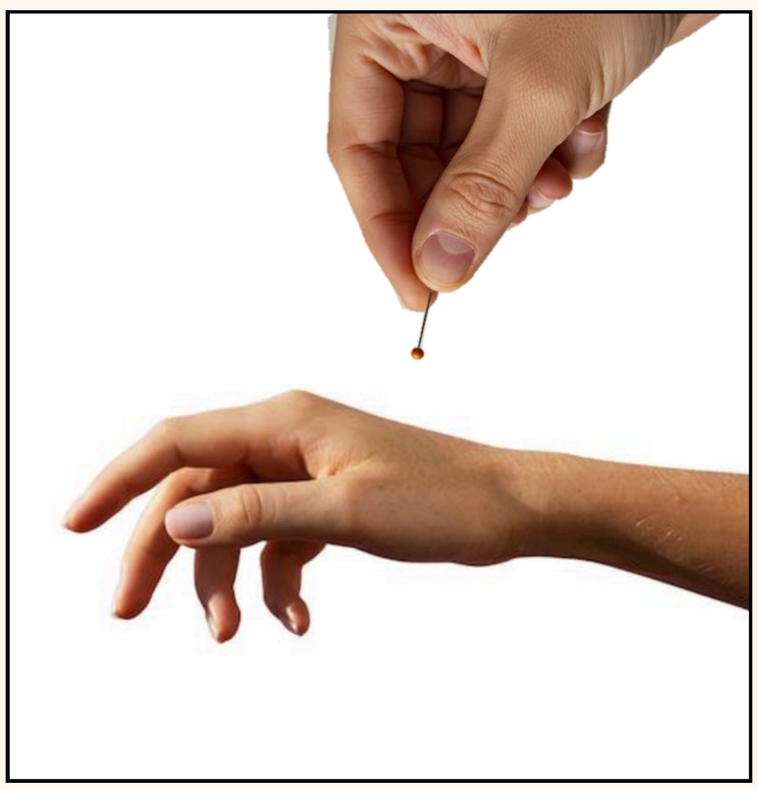
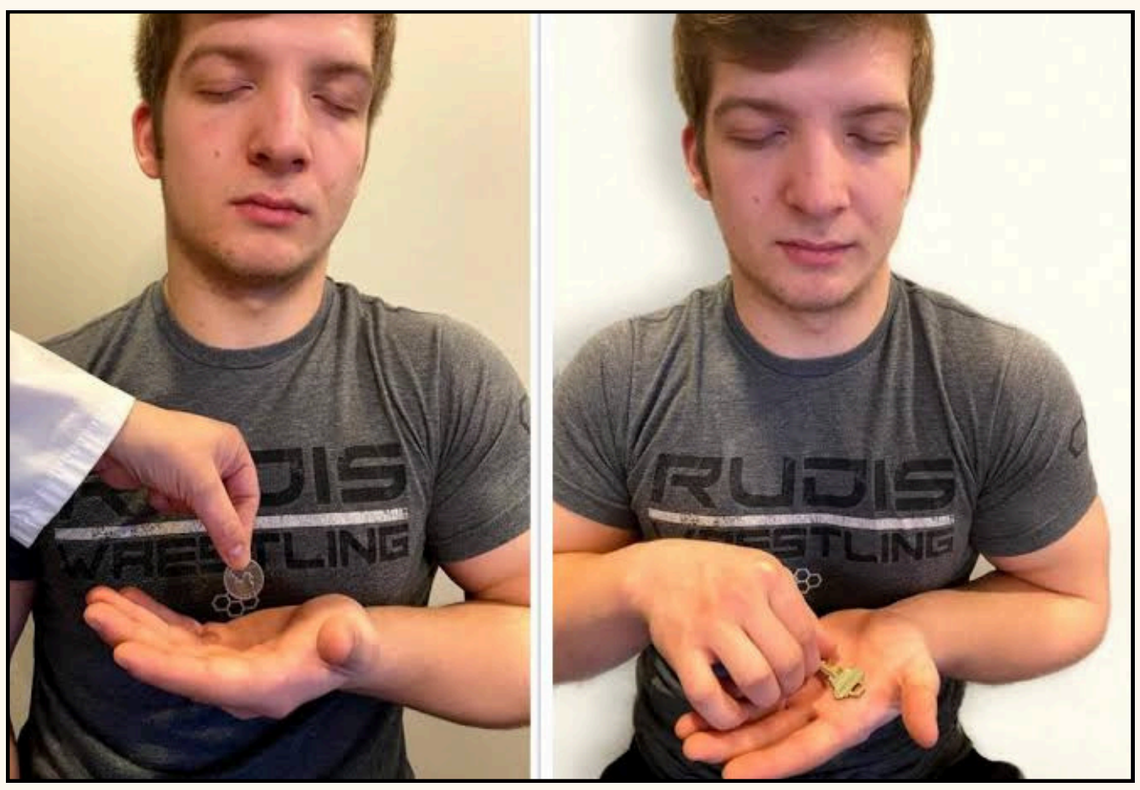
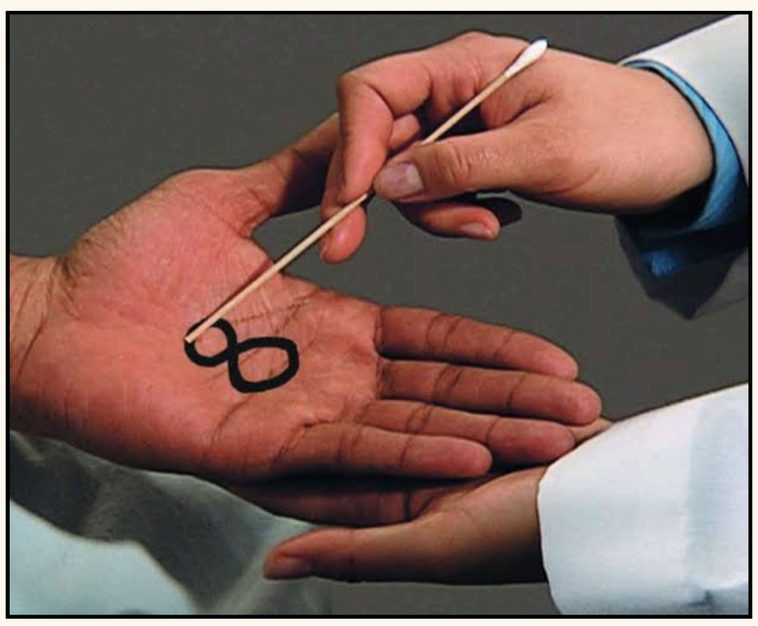
Cortical sensations:

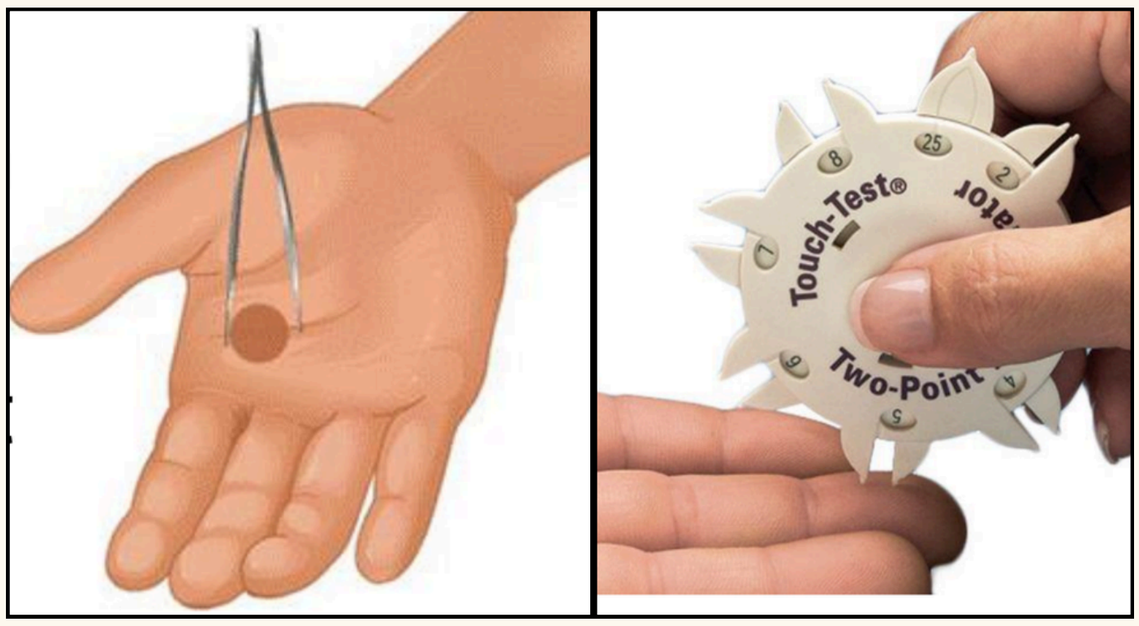
Note: Tested only if superficial & deep sensations are intact.

- **1. Tactile Localization**
  - Patient closes eyes.
  - Prick skin → ask to localize site.
- **2. Two-Point Discrimination**
  - Use compass on dorsum of hand/trunk.
  - Ask if feels 1 or 2 pricks.
- **3. Stereognosis**
  - Place familiar object (e.g. key) in hand.
  - Ask to identify it with eyes closed.
- **4. Graphesthesia**
  - Draw number on palm with finger.
  - Ask to recognize it.
- **5. Perceptual Rivalry (Extinction)**
  - Simultaneous pin pricks. on both sides.
  - Cortical loss: feels only healthy side.



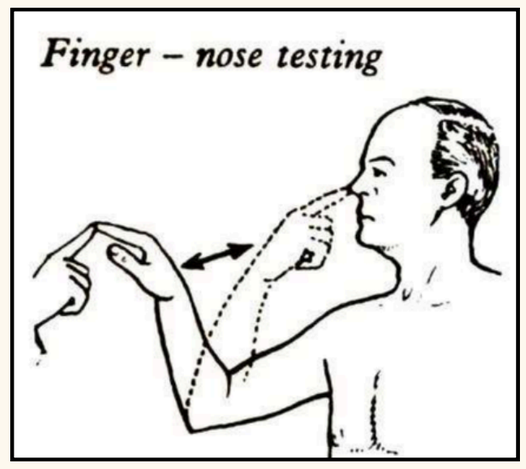






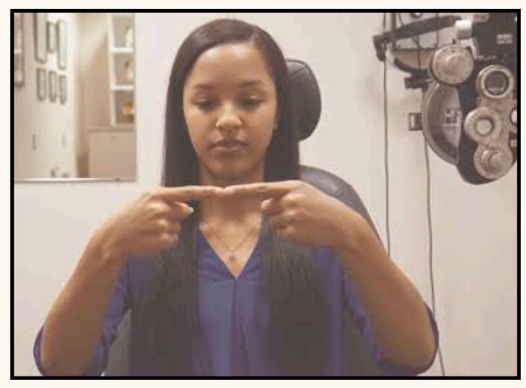
ECE Practical

Examination of coordination



- **1. Finger-to-Nose**

Touch nose with fingertip (eyes open → then closed).



- **2. Finger-to-Finger**

Touch both index fingertips together in midline.

- **3. Finger-to-Doctor's Finger**

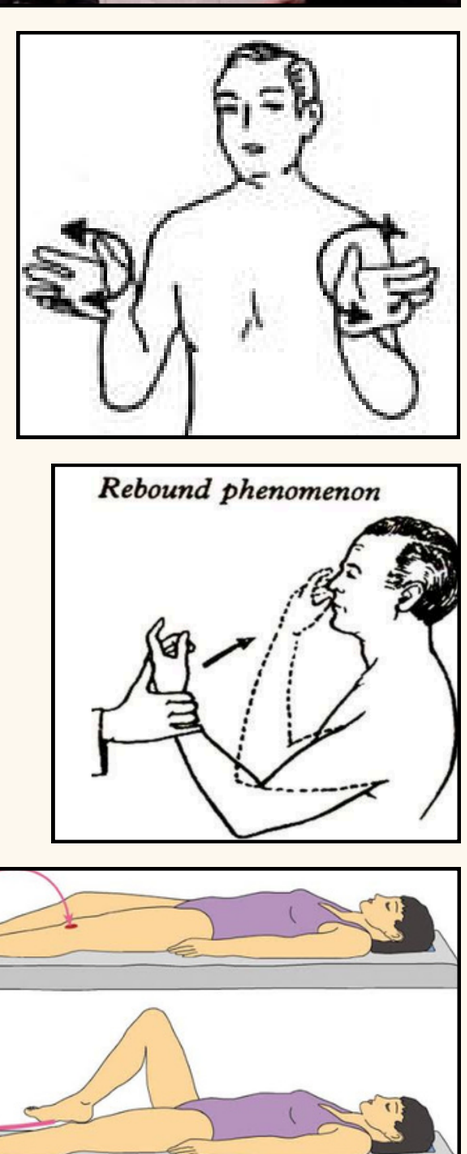
Touch doctor’s finger with own fingertip.

→ In any of the above tests you may find:

a- Decomposition of movement

b- Kinetic intention tremors

c- Dysmetria in the form of hypometria or hypermetria



- **4. Adiadokokinesia or dysdiadokokinesia test**

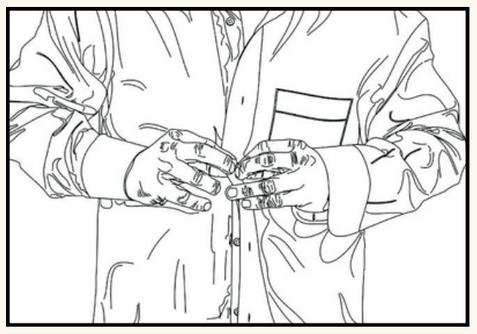
Rapid Alternating Movements

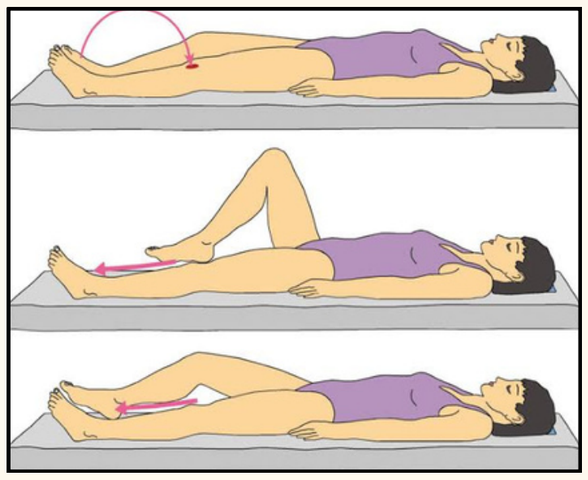
Pronation & supination.

- **5. Rebound Phenomenon**

Flex elbow against resistance → release suddenly.

→ Arm may rebound excessively.





- **6. Buttoning unbutton test.**

- **7. Heel-to-Knee Test**

Heel of one leg on knee of opposite leg → slide down.

- **8. Walking along a straight line, foot close to foot**

→ Deviation = cerebellar lesion (to same side).