# CLINICAL APPROACH

## A) History taking:

A good history taking leads to 70% of the diagnosis, epilepsy and headache are mainly diagnosed by history.

**From whom we should take the history**? The best one is the patient himself, but in certain situations (a child, speech disorder, disturbed level of consciousness, mental disorders) history could be taken from a family member, friends, schoolteacher or relatives.

### I) Personal history:

1. **Name**:For the familiarity with the patient.
2. **Age**: Certain diseases are more common in certain age groups e.g.:
   1st decade; Duchenne muscular dystrophy (DMD).
   2nd decade: Limb-Girdle Myopathy.
   3rd decade: MS.
   4th decade: Motor neuron disease.
   5th decade: Cerebro-vascular diseases.
   6th decade: Malignancy, Cerebral Atherosclerosis.
3. **Sex**: DMD occurs exclusively in boys.
   - Myasthenia is common in females.
4. **Occupation**: Certain occupations are more susceptible to certain diseases e.g.
   - Painters: Lead neuropathy
   - Manganese Miners: Parkinsonian syndrome.
5. **Residence**: Certain diseases are endemic in certain areas e.g.
   - Migraine: in urban areas.
   - Nutritional Diseases: in rural areas.
6. **Marital Status**:
   - Single, married, divorced, widow or widower.
   - Sometimes Number of children with the age of the youngest and oldest is Important to diagnose infertility, impotence or still-births.
7. **Special Habits**:
   - Smokers → Cerebro-vascular diseases.
   - Alcohol → Peripheral neuritis
8. **Handedness**:
   -To know the dominant cerebral hemisphere for speech centre localization.

**Example of personal history:**
Male patient named…… 25 years old farmer from …….married with 2 living offspring (2and5 years old), Rt. Handed with no special habit.

## II)Complaint:

- In patient's own words
- Arranged chronologically with the duration of each complaint

| **Example of the Complaint** |
|---|
| Heaviness then numbness of lower limbs → Intra- medullary lesion (motor then sensory) |
| Numbness then Heaviness of lower limbs → Extra-medullary (sensory then motor) |

## III) Family history:

1- **Consanguinity**.

1st degree → ....ابن, ابنة, أب, أم

2nd degree →....أخ, أخت

3rd degree →....جد, جدة, حفيد,حفيدة,عم, عمة, خال, خالة

4th degree →....ابن العم, ابن العمة, ابن الخال, ابن الخالة

5th degree →....ابن ابن العم, ابن ابن العمة, ابن ابن الخال, ابن ابن الخالة

Far consanguinity →....أي شئ آخر

So say; negative consanguinity or (3rd...) degree consanguinity

**2- Similar condition.**

Some diseases are heredofamilial e.g. Friedrich's ataxia, run in familles e.g. hypertension D.M.

**3- Other neurological disorders**

## IV) Past history:

1. Similar condition
2. Trauma related to neurological condition
3. Fever related to neurological condition
4. History of T.B.
5. History of syphilis.
6. D.M. Hypertension.
7. History of Rheumatic fever.
8. History of otitis media,
9. Drugs intake or toxin exposure

## V) Present history:

**1- Onset, course and duration:**

Onset:

-Sudden (in seconds) as traumatic and embolic hemiplegia and subarachnoid hge

-Acute (in hours ) as inflammatory and infections lesions

-Rapid (in days)

-Gradual (in weeks) as space occupying lesions

-Insidious (unknown) as most of degenerative

Course:

-Progressive: degenerative and neoplastic disorders

-Regressive: vascular and inflammatory disorders

-Stationary: post-traumatic conditions.

-Intermittent: the condition occurs in attacks in-between which the patient is completely free e.g. epilepsy and migraine.

-Remittent: remissions and exacerbations: The condition occurs in attacks in-between which the patient shows incomplete recovery i.e. there is increasing residual disability: as M.S.

Duration.

**2- Analysis of the complaint:**

The story of the patient`s illness in sequence of events.

**3- Important symptoms:**

**Symptoms suggestive of intracranial hypertension:**

Headache, vomiting and blurring of vision …

Characters of headache:

Sufficient duration, dull-aching and bursting in nature.

More in the early morning, Increases by cough, straining and leaning forward

Not relieved by ordinary analgesics

May be associated with vomiting which relives some headache.

Frontal in supra-tentorial lesion and occipital in infra-tentorial lesions.

Characters of vomiting:

Not essentially projectile but usually is, not preceded by nausea

Not related by meal, more in the early morning.

May relieve some of the headache.

| To say positive manifestations of ↑I.C.T. at least two of the above should be present. |
|---|

**Symptoms suggestive of cranial nerve affection:**

1st Cr. n. → smells sensation → Anosmia parosmia.

2nd Cr. n. → vision and field affection.

3rd, 4th, 6th Cr. n. → diplopia

5th Cr. n. → mastication problem, face sensation.

7th Cr. n. → accumulation of food between teeth and check and inability to close the eye.

8th Cr. n. → hearing problem, vertigo.

9th 10th, 11th Cr. n. → bulbar manifestations (dysphagia, dysarthria, dysphonia)

12th→ tongue deviation, dysarthria

**Symptoms suggestive of loss of consciousness or fits.**

**Symptoms suggestive of motor or sensory System Affection:**

Motor System: Convulsions, abnormal movements, Paralysis, paresis.

Sensory System: Pain, paraesthesia, e.g. tingling, numbness.

**Symptoms suggestive of sphincteric disturbances;**

Ask about the control on micturation (Straining, hesitancy, precipitancy or incontinence).

**4- Menstrual disorders:**May suggest a lesion in the pituitary gland.

**5- Symptoms suggestive of other systems affection.**

**3) Speech and articulation**

- Speech is tested during interrogation with the patient.
- Articulation is tested by asking the patient to recite (Al-Fatihah).

**4) Examination of cranial nerves**

**I) Olfactory nerve:**

The sense of smell is examined by using a familiar non- irritant substance (coffee, almond, peppermints). Each nostril is tested separately with the patient's eyes closed.

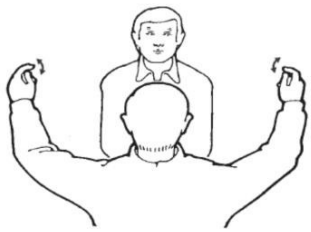
**II) Optic nerve:** Examine for:

**1) Acuity and color of vision:**

Using Snellen's chart or finger counting from a distance of 6 meters. If at a distance of 30 cm the patient still fails to count the fingers test for vision using hand movements.
If the patient does not see the movements, test for light perception using the torch.
If there is no P.L. then the patient is blind.Each eye should be examined separately.

**2) Field of vision:**

- It is examined using **Bjerrum's screen** (central vision) and the **perimeter** (peripheral vision).
- If these are not available use the **confrontation method**:
  - Sit in front of the patient at a distance of 60-100 cm. keep your eyes at the level of the patient's eyes.
  - Let the patient close one eye and you close the opposite eye. Insist that the patient looks into your eye and nowhere else.



  - Examine for the field of vision of the patient's open eye by bringing your finger slowly from the periphery inwards.
  - Test for the whole field by bringing your finger from above, below, left and right.

N.B: The patient's field of vision is normal when he notices the movement of your finger at the periphery of the field at the same time that you do, then test for the other eye in the same manner.

**3) The fundus:**

Ophthalmoscope examination for papilloedema and optic atrophy (See brain tumors).

**III, IV, VI) Ocular nerves:** Examined for:

1) Ptosis:which may be due to:

- Oculomotor nerve paralysis where the ptosis is complete and there is associated mydriasis and divergent squint.
- Sympathetic paralysis (Horner's syndrome) where the ptosis is partial and there is associated miosis, enophthalmos and anhydrosis. .

2) Pupils:

- They should be rounded, central, equal, reactive to light, and accommodation.
- The light reflex: If you expose one eye to light, while shading the other, normally there is constriction of the pupil of the exposed eye (direct reaction) as well as of the other eye (consensual reaction).
- The accommodation (near) reflex: When the patient is asked to follow your finger with both his eyes from a far to a near point, the following triad normally occurs:a) Convergence. b) Miosis. c) Accommodation

3) Extra ocular movements:

- Test for the abducent nerve (supplying the lateral rectus muscle) by asking the patient to look laterally.
- Test for the trochlear nerve (supplying the superior oblique muscle) by asking the patient to look inwards and downwards.
- Test for the Oculomotor nerve (supplying the superior, medial and inferior rectus and the inferior oblique muscles) by asking the patient to look in all other directions.
- These tests are done for each eye alone, if their results are normal this indicates that the ocular nerves are intact.
- Then repeat the same tests on both eyes simultaneously for conjugate movement; if normal, then the centers for conjugate movements present in the brainstem, and in the frontal and occipital lobe cortex is intact.

4) Nystagmus:

Ask the patient to look at your finger placed laterally, upwards then downwards at some distance from his eyes. If nystagmus is present comment:

- If it is spontaneous or on fixation.
- If it has rapid and slow phases; the direction of the nystagmus is that of the rapid phase.

**V) Trigeminal nerve:**Examine for:

**1) Motor Part:**

1. **Test for the power of the muscles of mastication:**

- Temporalis: Ask the patient to masticate while you put your hands over the temples to palpate the muscles.
- Masseters: The patient clenches his jaws while you palpate the contracted muscle between the index finger over its posterior border and the thumb over its anterior border.
- Pterygoids: Ask the patient to open his mouth against resistance.
- Unilateral paralysis: Deviation of the jaw to the diseased side.
- Bilateral paralysis: No deviation, but inability to open the mouth against resistance.

2. **Jaw reflex:** (afferent Cr. 5 efferent Cr. 5)

- While the mouth is slightly open, place your index finger on the lower jaw, and then tap it from above downwards.
- Normally the reflex is absent or minimal.
- An exaggerated reflex, shown by closure of the jaws, denotes a bilateral U.M.N.L. above the motor nucleus of the 5th cranial nerve i.e., above the pons as in pseudobulbar palsy.

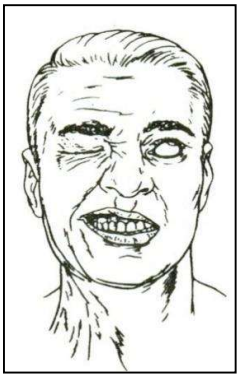
**Jaw Jerk maneuver**

**2) Sensory Part:**

1- Test for sensations including pain (using a pin) and touch (using a piece of cotton) over the face and compare between:
   b) Both sides of the face.
   c) The ophthalmic, maxillary and mandibular division on each side.
   d) The inner and outer part of the face

2- **Corneal reflexes** (afferent Cr 5; efferent Cr 7 bilaterally ):
   Ask the patient to look upwards and inwards. Touch the corneo-scleral junction from the lateral side using a thin piece of cotton.
   - Normally stimulation of one eye results in blinking of both eyes.
   - Absence of blinking on one side denotes facial paralysis of that side.
   - Absence of blinking on both sides denotes:
     - Sensory trigeminal affection of the stimulated side
     - Bilateral facial paralysis.
     - Organic type of coma.

**VII) Facial nerve:** Examine for:



1) Motor Part: Examine for the muscles of expression of the face:

1. Upper faces (Frontalis and orbicularis oculi):
   - Test for rising of the eyebrows.
   - Test for firm closure of the eye lids (Bell's phenomenon may be seen)
2. Lower face (orbicularis oris, buccinator and retractor anguli)
   - Look for absent nasolabial fold and dropping of the angle of the mouth.
   - Test for whistling, blowing checks, and showing the teeth.

**Left LMN Facial palsy**

2) Sensory part: (Chorda tympani)

Examine for the taste sensation over the anterior two-thirds of the tongue by drying the patient's tongue and then applying a drop of sweet, bitter or salty solution on its tip. See if the patient can properly recognize the taste.

3) Glabellar Reflex:

In the normal adult, tapping the glabella (root of the nose) results in blinking (contraction of orbicularis oculi muscles); this blinking stops after 2-3 taps (due to habituation). In Parkinsonism the blinking continues with the taps as long as the stimulus is applied.

**VIII) Cochleo-vestibular nerve:**Examine for:

1) Cochlear Part:

Test for the acuity of hearing using:

1. The Watch test: If there is diminution of the patient's hearing do the following:
2. Rinne's test: Using the vibrating tuning fork, compare air conduction (fork placed in front of patient's ear) with bone conduction (fork placed on patient's mastoid process).
3. Weber's test: Place the tuning fork in the middle of the forehead.

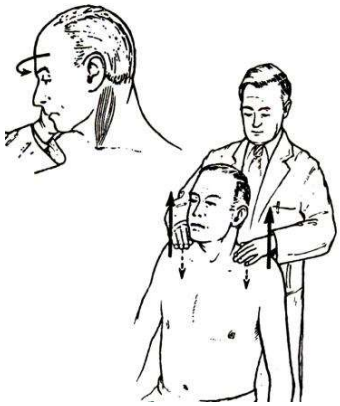
2) Vestibular part:Caloric test, rotating chair tests and electronystagmography (E.N.G)

**IX, X) Glossopharyngeal and vagus nerves:**How to examine:

1) Open the patient's mouth and inspect the uvula. Normally it is central. If it is deviated, it is towards the healthy side.
2) **Palatal Reflex** (afferent Cr 5, efferent Cr 10). Normally stimulation of the soft palate leads to its elevation.
3) **Pharyngeal Reflex** (afferent Cr 9, efferent Cr 10) Use 2 tongue depressors, one to depress the tongue and the other to stimulate the pharynx, these results in local contraction and gag reflex.

**N.B:**

- Palatal and pharyngeal reflexes are lost in true bulbar palsy and exaggerated in pseudobulbar palsy.
- Isolated lesions of the glossopharyngeal nerve are unknown; it is usually damaged with the vagus and accessory nerves at the jugular foramen.
- The only specific test for isolated vagal lesion is indirect laryngoscopy to observe the position and movements of the vocal cords.



**XI) Accessory nerve:**The spinal part is tested by:

- Examination of **sternomastoid**
  (Ask the patient to turn his chin against resistance).
- Examination of **trapezius**
- (Ask the patient to raise shoulders against resistance).

**XII) Hypoglossal nerve:**How to examine:

**a) Inspect the tongue for:**

1. Deviation: when it is deviated, it is towards the diseased side.
2. Wasting: which indicates an L.M.N.L.
3. Fasciculations indicate a nuclear lesion as in M.N.D. and syringobulbia.
   The tongue should be inspected for fasciculations while inside the mouth.
4. Abnormal movements as in Chorea.
5. Dimpling of the tongue on tapping it, in cases of myotonia.
6. Inspection may also reveal:
   - Glazed tongue as in deficiency diseases.
   - Fissured tongue as in mongolism.
   - Ulcers as in Behcet's disease, Herpes simplex.

**b)Test for the power of the muscles of the tongue** by asking the patient to push the inner side of his cheek with the tip of his tongue.

## 5) Examination of the motor system:

- **Muscle state (Inspection and Palpation)**
  The muscles are inspected for bulk (wasting, hypertrophy= true or pseudo) and fasciculations and, when indicated, palpated for tenderness, consistency and contractures

- **Muscle tone**
  Muscle tone is assessed by putting selected muscle groups through passive range of motion. The most commonly used maneuvers are flexion and extension at the joints, besides shaking method at wrist and ankle joints and Gower method at shoulder joints.

- **Muscle power**
  Muscles work in combination with other muscles, testing movements may mean testing several muscles
  1. What muscle or muscle group to be tested?
  2. Position of the limb for that muscle
  3. Segmental supply.
  4. Peripheral nerve supplies it.

  Patient must be told clearly the movement he is to make (Illustrating it for him first).

**The power can then be carried out in 2 ways:**

1. The patient first completes the movement and then tries to maintain the muscles in full contraction while the examiner tries to over come it.
2. The examiner resists the movements through the whole of the patient's attempt to carry it out (difficult)

- Steady exertion is required both the examiner and the pt.
- Application of great force is unnecessary, painful in hypertonic muscle.

**During examination:**

- Muscle is Intact (as strong as expected) age and build of pt.
- Degree of weakness.
- Other side.
- Weaken is constant or variable.
- Painful conditions (injury, joint disorders, and contracture of antagonists).

**Quantitative assessment of weakness:-**

Power is recorded by numbers ranging from the normal (5) to complete paralysis represented by (0)

5 = normal power (intact).
4 = full normal movement overcome by resistance.
3 = normal movement against gravity. (Not against add. resist.).
2 = normal movement when limb is so positioned that gravity is eliminated.
1 = visible or palpable flicker of contraction but No movement of limb or Joint.
0 = total paralysis.

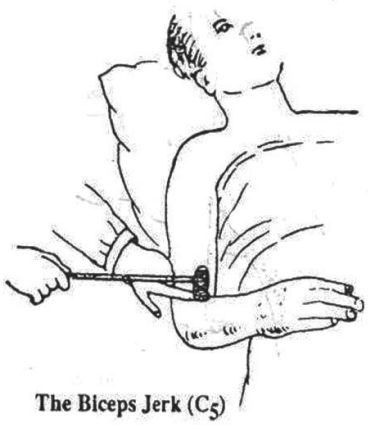
**Routine test of muscle groups**

**Neck**: flexion and extension.
**Shoulder**: Abduction, Adduction, Rotation.
**Elbow**: flexion and Extension.
**Wrist**: flexion and Extension.
**Fingers**: flexion and ExtensionGrip**.**
**Abd.ms**. **Spine**: ext.
**Hip**: flex. Ext, Abd. Add.
**Knee**: flex. ext.
**Foot**: dorsi, plantar flexion, eversion, and inversion
**Toes**: flex. Ext. (big toe)
Any weakness discovered is then more carefully analyzed by carrying out the appropriate test for individual muscle concerning this movement.

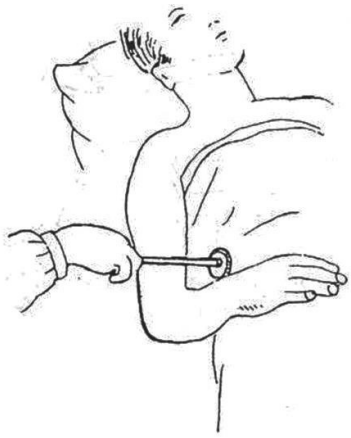
- **Reflexes:**

**1) Deep tendon reflexes**

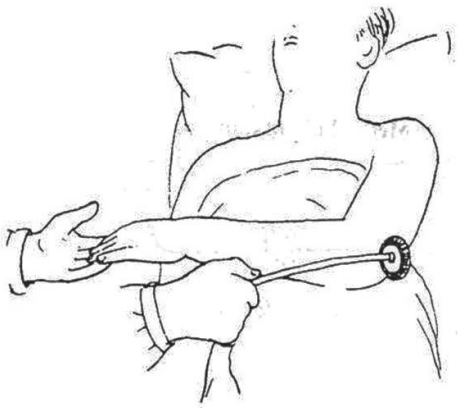
| Reflex | Segment | Nerve | Technique | Normal response |
|---|---|---|---|---|
| **Biceps** | **C5** | **Musculo-cutaneous** | Press the forefinger gently on the biceps tendon in the antecubital fossa, strike the forefinger with the hammer | Flexion of the elbow<br>Visible contraction of the biceps |
| **Supinator** | **C5-6** | **Radial** | Strike the lower end of the radius 2 inches above the wrist<br>Watch the movement of the forearm and the fingers | Contraction of the brachio-radialis<br>Flexion of the elbow,<br>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<br>Strike the triceps tendon 2 inches above the elbow | Extension of the elbow<br>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<br>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<br>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.<br>The Achilles tendon is then struck and both movements of the foot and of calf muscles are watched. | Plantar flexion of the foot<br>Contraction of the gastrocnemius |



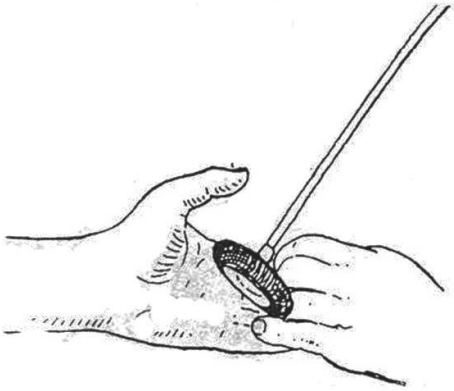
The Biceps Jerk ($C_5$)



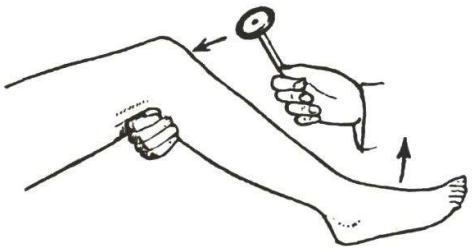
The Supinator - Jerk ($C_{5-6}$)



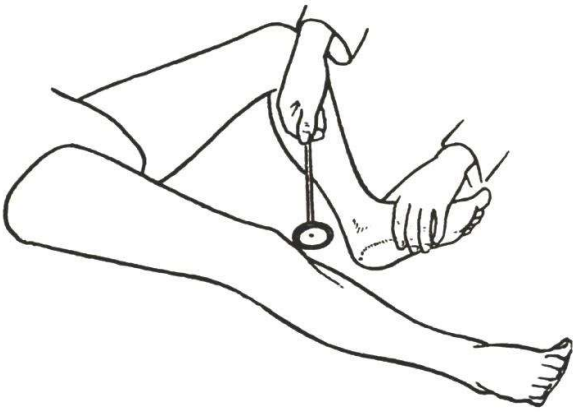
The Triceps - Jerk ($C_{6-7}$)



The Finger Flexion Reflex ($C_{6-T_1}$)

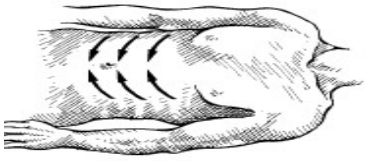
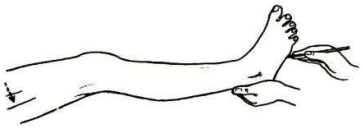


**Knee Reflex (L2, 3, 4)**



**Ankle Reflex (S1)**

## 2) 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.<br>Lost in:<br>Pyramidal lesion above it<br>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<br>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.<br>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 |

## 6) Examination of sensory system:

1- **Superficial sensations**
   a- Pain
   b- Temperature
   c- Touch (crude and fine)
2- **Deep sensations**
   a- Vibration sense
   b- Muscle sense
   c- Joint sense
   d- Nerve sense
3- **Cortical sensations**
   a- Tactile localization
   b- Two point discrimination
   c- Stereognosis
   d- Graphosthesia
   e- Perceptual rivalry

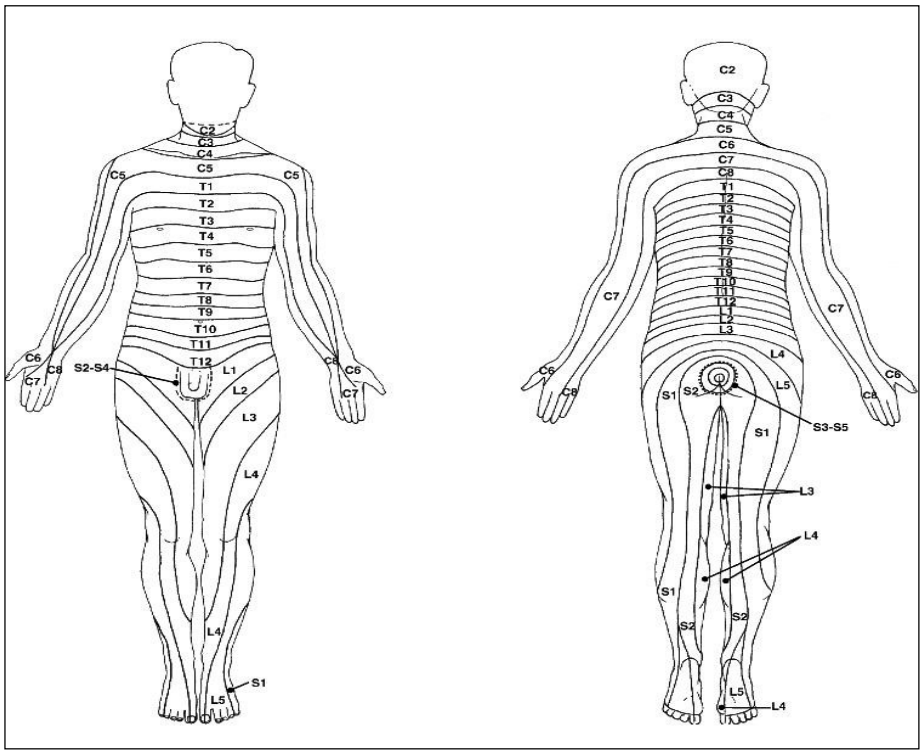
**Superficial sensations:**

Examination for pain sensation using a pin

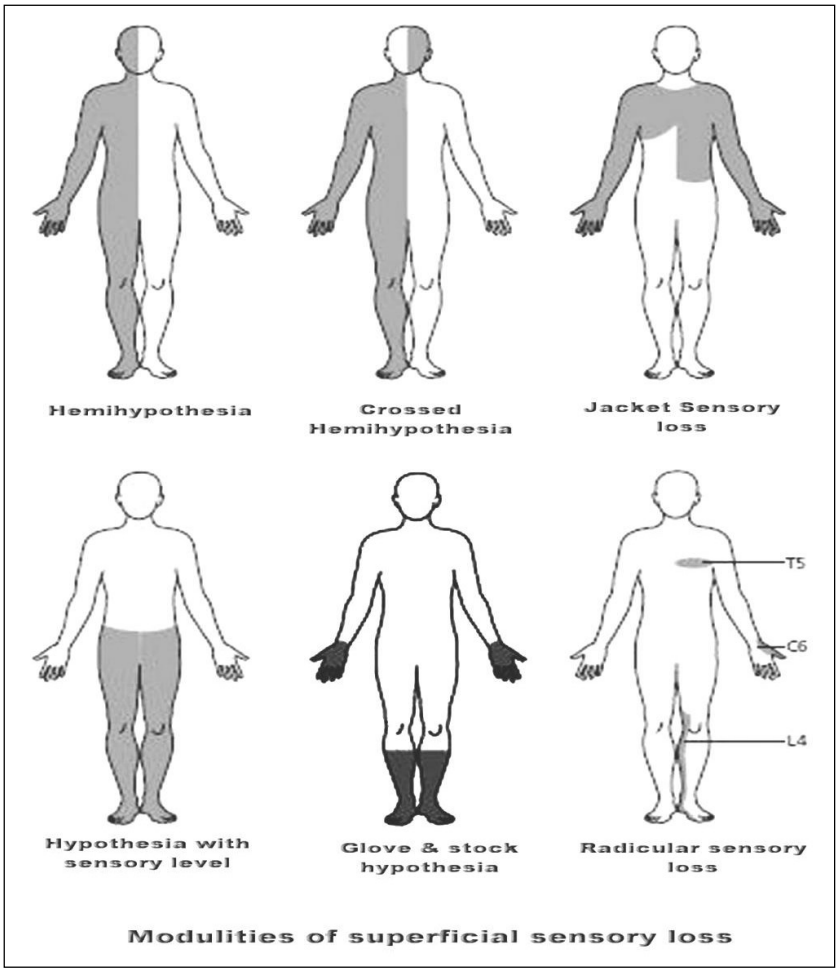
1- Search for a level: Compare lower limbs, trunk, upper limbs, and face. Using a pin from below upward with the same force and ask the patient to tell if there is increase or decrease sensation.
2- Compare both sides: leg to leg , arm to arm
3- Examine each dermatome separately (in arms and legs).

Common patterns of sensory loss:-

a- Sensory level, e.g. paraplegia there is a definite line below which all type of sensation are lost
b- Jacket sensory loss: loss of sensation in specific area with intact sensation below and above
c- Hemihypoesthesia takes one side of the body.
d- Stock and glove hypoesthesia, e.g. sensory peripheral neuropathy here hypothesis end at the same level all around the limbs
e- Radicular hypoesthesia, cauda equina lesion here there is affection of certain area supplied by certain root
f- Maculo anesthetic patch, e.g. leprosy




**Dermatomal supply of the body**



**Deep sensations**

**a- Vibration sense**

- The most sensitive and earliest affection
- Tested by:-

  Using tuning fork 128 placed from its stem on any bony prominence and asks the patient if he feel the vibration or not

  Compare both sides

  Compare the same side

**b- Joint sense**

- Tested on big toe
- 2 types: a- sense of position

  b- Sense of movement

**c- Nerve sense**

Pressure on ulnar nerve (behind medial epicondyl) the patient feels electric like sensation.

**d- Muscle sense**

Tested on call muscle by squeezing (pinching) it result

- Normally → discomfort (disagreeable)
- Lost disagreeable sensation (Abadie's sign)

  e.g. nerurosyphilis

  Peripheral neuropathy
- Exaggerated (tender call)e.g. DVT, myositis, psychogenic

**Cortical sensations:**

- Examined only of there is intact superficial and deep sensation

**a) Tactile localization:**

- Patient close his eyes
- Prick him
- Ask him to localize the site of pricking

**b) Two point discrimination:**

- Patient close his eyes
- Use the compass to deliver two simultaneous pricks on the dorsum of the hand or on the trunk.
- Ask him of he feel 2 point prick or one prick

**c) Stereognosis:**

- Patient close his eyes
- Ask him to recognize a familiar object placed in his hand e.g. key or pencil

**d)Graphosthesia**:

- Patient close his eyes
- Ask him to recognize a number drawn over his palm by your finger

**e) Perceptual rivalry:**

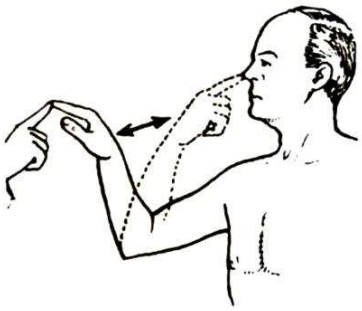
- If you deliver simultaneous pin pricks at 2 corresponding sites of body:
  - Normally the 2 prick are felt
  - Cortical sensory loss → only the prick on the healthy side will be left

## 7) Examination of coordination

**1- Finger- to- nose test**

- The patient brings the tip of his fore finger from a distance onto the tip of his nose.
- The test is conducted with the eyes open then closed

*Finger – nose testing*



**2- Finger-to-finger test**

The patient bring the tip of his fore fingers from the distance of his outstretched arm to meet each other in the midline

**3- Finger-to-doctor's finger test**

The patient brings the tip of his forefingers from distance to the doctor's forefinger.

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**

The patient is asked to do rapidly alternating movements e.g. pronation and supination of the forearm

**5- Rebound phenomenon**

The patient with his elbow fixed, flexes it against resistance and when the resistance is suddenly released the patients forearm flies upwards and may hit his face or shoulder.

*Rebound phenomenon*

**6- Buttoning and unbuttoning test**

**7- Heel – to- knee test**

The patient raises his leg, brings down its heel onto the knee of his other leg and slides it down along the shaft

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

In unilateral cerebellar lesions there is deviation to the diseased side.