

Neurological examination

Today we are going to talk about clinical neurological examinations, in this lab we will focus on motor receptor.

- When do we start the neurological examination?

The first time we see the patient, before taking his history, we notice the clues that will help us indicating that there is something wrong, for example the way he walks, his posture, the way he talks when we ask him questions, if there was tremor, etc.

- Now if a patient came to us for the first time, we should introduce our self to him and explain to him what we would like to do, so he won't be confused, then we take his permission to examine him, close the door or draw curtains for privacy before starting the examination, and we should always keep a chaperone around us, especially for female pts.

Stand and Gait examination:

- After taking the patient approval, first thing we want to examine is the stands and gaits. If we want to examine the stand, we ask the patient to put his legs next to each other, stand straight, we put our hands in front and behind him for support. If the patient stand still, with his eyes open, and he starts swaying, this will indicate that the patient has a **cerebellar ataxia**, and if he had start swaying after closing his eyes, then he has a **sensory/proprioceptive ataxia** (the problem is in the spinal cord). This test is called **Romberg test**, and positive Romberg test indicate a sensory ataxia.
- After that we examine the coordination of gait:
Ask the patient to walk toward you and away from you in an open area in the room and observe his gait. Examples for gait abnormalities:
 1. Parkinsonian gait (also known as *festinant gait*): basal ganglia disorder characterized by short shuffling steps, absent arm swing and stooped posture. Remember it is a basal ganglia disorder.
 2. Hemiplegic gait: unilateral UMN lesion, characterized by straight leg and it is dragged in a semicircular movement.

Tandem gait: a type of physical exam in which we ask the patient to walk a straight line while touching the heel of one foot to the toe of the other with each step and don't forget to support the patient. Patient with a cerebellar problem will not be able to perform this task.



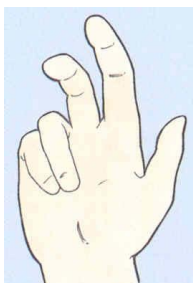
Upper Limb Examination

One of the most important things in the examination is proper exposure; we want to expose his upper limb with the shoulder girdle.

I. Inspection:

- Compare between the right and the left limb. Look for asymmetry, like hypertrophy or atrophy/wasting in one side.
- There are some deformities that we can see which will tell us something, like waiters tip, or other hands deformity that can tell us which nerve was damage.

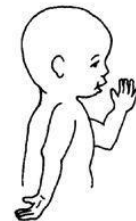
Examples:



1. Claw hand: ulnar nerve injury



2. Wrist drop: radial nerve injury



3. Waiter's tip: upper brachial plexus injury

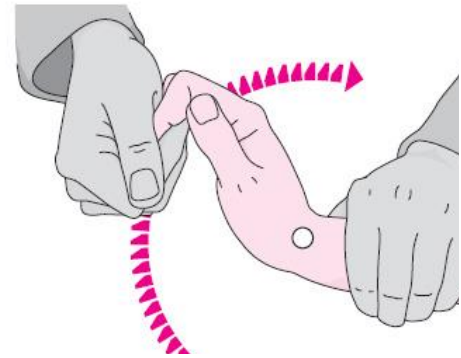
- we might see fasciculation (twitches under the skin overlying the muscle at rest) especially if there is muscle wasting.
- Also we should notice if the patient has a tremor (oscillatory movement around the joint) or not, and what kind of tremor, if it was a:
 1. Resting tremor with pill-rolling in Parkinson's disease, it is minimal during movement.
 2. Intention tremor, absent at rest and indicates cerebellar lesion.
- Also we need to examine the skin and look for scars or other skin changes.

II. Tone

- The tone is the resistant felt by the examiner upon passive movement, to examine the tone we need the patient to be relax and "go floppy" so we can tell how much resistant there is, so we can be able to see whether it was normal, hyper or hypotonic. Before we examine we should ask the patient if he feels any pain, because if there was a pain and we start stretching he might resist. And we will think that there is spasticity.
- Easiest way to examine the tone of the upper limb is to hold the patient's hand as if you are shaking his hand and start moving the joints (shoulder, elbow and wrist joints: flexion and extension, and circular movement to the shoulder), try to move them slowly then move them faster (because spasticity is velocity dependent).
- If there was hypotonia/ flaccidity → cerebellar or LMN lesion.

- If there was a hypertonia, it could be spasticity or rigidity. Spasticity is velocity depends; it will increase by moving the joint in a fast way, while rigidity is increasing the tone over all the movement. In Parkinson disease there are typical types of rigidity, lead-pipe rigidity (stiffness remains uniform throughout the range of passive movement) or cogwheel rigidity (عجلة مسننة). The cogwheel rigidity happens because the tremor interrupts the movement.

Cog-wheel rigidity



III. Power

- The power is different from the tone, because it is an active movement, there must be some resistant from the patient. EX:

Shoulder joint: Ask the patient to move his arms away from his body and try to adduct them (test the abduction), now ask him to adduct his arms and try to abduct them (test the adduction).
 Elbow joint: ask the patient to bend and extend his elbow and try to move it against his movement each time .
 Wrist joint: ask him to form a fist, and fix his forearm, and then ask him to move his hand up and down.

Power Scale:

5. Normal power
4. There is some resistant but not like normal
3. There will be no resistant but he will be able to raise his hand against gravity
2. No resistant and he won't be able to rise his hands against gravity only he will rise it at the level of the belt
1. He will only be able to do some twitches
0. No movement at all

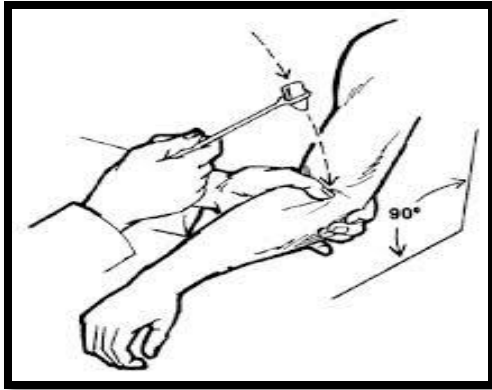
IV. Reflexes

-In the upper limb we examine two reflexes; the biceps and the triceps. Both are Deep Tendon Reflexes.

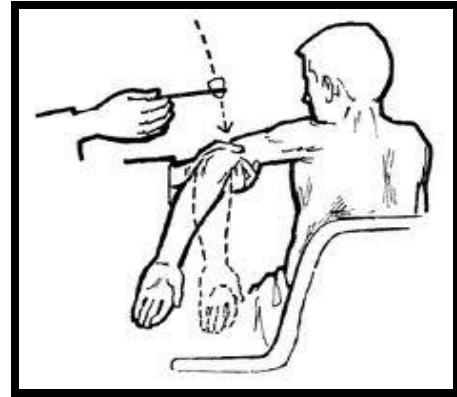
-In the biceps reflex we want to press on the biceps tendon, like what's showing in the picture below. In the triceps we will press on the tendon like what's showing in the picture

-Some time we don't get strong reflex so we should do reinforcement. This means we want to make the patient to focus on something else, we want to distract his mind away from the examination.

- And the reason we examine the reflexes because they are monosynaptic, the simplest, and they are the first one to recover.



Biceps Reflex (C5-6)

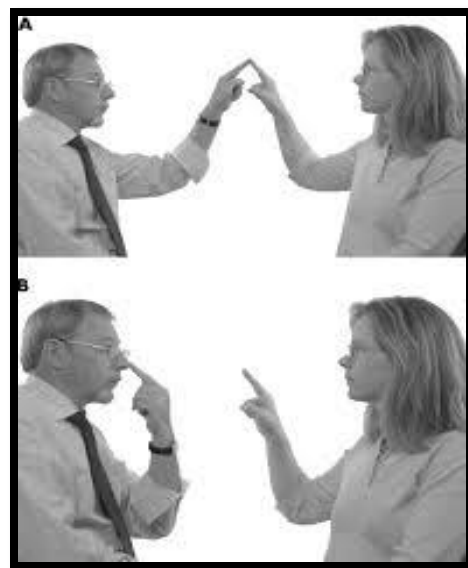


Triceps Reflex(C7-8)

V. Coordination

-To test the coordination in upper limb, we use the **finger nose test**, while doing the exam we should put our finger in the region where the patient can reach.

- To test for **Dysidiadochokinesia**, we ask the patient to perform two rapid alternating movements as demonstrated in the pictures below (A &B).

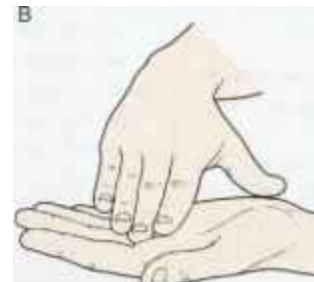


Finger-nose test

A. Dorsum of the hand of the patient on palm of his opposite hand.



B. Patient's flips their hand quickly so the two hand palms touch. Then repeat quickly



VI. Sensory

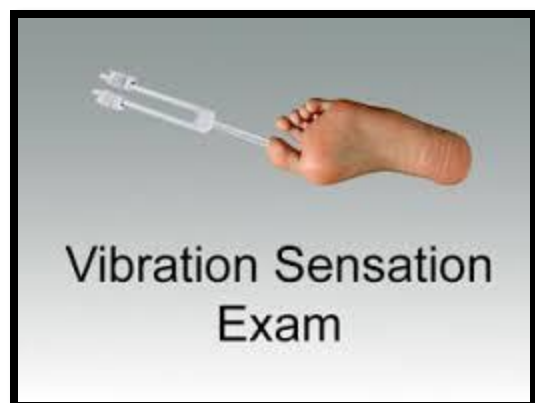
- We have 2 pathways for sensation: Spinothalamic and dorsal column.

- In the dorsal column we examine the vibration and proprioception, while in the spinothalamic we examine the superficial pain. There is temperature sensation but it's hard to examine it. Also there is light touch but it comes from two pathways so it's not clinically significant. In examining the sensation we always start from distal.



Example on testing proprioception from the thumb.

- In proprioception sensation :
 - Test at the (most distal joint) of his finger.
 - Hold the proximal joint. Move the distal phalanx up and down, showing the patient the movement first.
 - Then ask the patient to close his eyes and move the distal phalanx up and down randomly. Ask the patient to tell you the direction of movement each time. Do it for 3 times to make sure that he didn't guess the position by chance.
 - Test on both hands.
 - If there is an abnormality, move backwards to the proximal joint and so on until joint position sense is normal.
- In Vibration test we use a sounding tuning fork (128Hz). We must explain for the patient about the test and the sensation, and the best place to start with so that the patient can feel the sensation is the sternum because it takes bilateral innervations and it is the last part to lose sensation. (We must put the fork on a bony prominence because it won't work on fleshy one like muscles.) Then place it on one of the distal interphalangeal joints (most distal bony prominence) of one of the fingers. If no vibration is sensed, move backwards proximally to know where is the lesion. Asking the patient to tell you when the tuning fork stops vibrating can be helpful if



there is doubt that their vibration sense is intact. Repeat on the other hand.

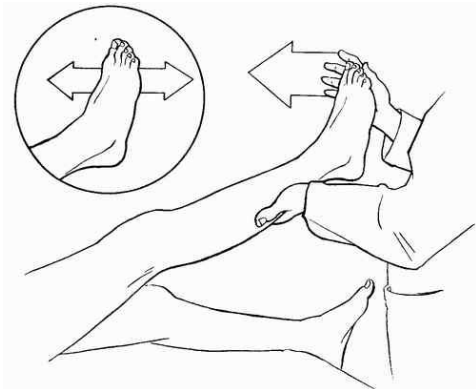


- We test the superficial pain sensation by inserting a needle in the patient skin (1mm deep) (first we test with his eyes opened , after that we ask him to close his eyes and tell as when he feels the pain again, and we should consider the dermatomes). Repeat on the other hand.

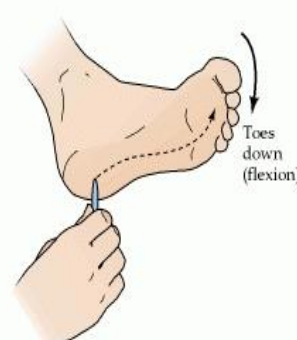
Lower Limb Examination

- By doing a proper exposure while the patient in the supine position, we do the exact same as the upper limb. By starting with inspection, then we examine the tone, power, reflections, coordination and sensations.
- The easiest way to examine the tone is by rolling his leg or moving joint by joint (hip, knee, and ankle).
- We do **Clonus** test for the ankle, which is rhythmic contractions after sudden stretch of the muscles. In ankle clonus: Place patients knee bent (90 degrees), thigh externally hand. Quickly dorsiflex patients ankle (sudden stretching) → Clonus if sustained rhythmic contraction (indicates UMN lesion).
- After that we do the power tests, then the reflexes (knee reflex)(planter reflex: which is polysynaptic a superficial reflex. we examine the patient by putting a blunt object on the dorsal side of his foot and then move the object upward and lateral, in the normal situation the big toe will plantar flex and the other digits will adduct. But in **positive babinski sign** the big toe will be dorsi flex while the other digits will be in fanning position, which is considered an early sign of UMNL).
- Then we do the coordination test by using **heel-shine test** (in elderly patient we do the finger-toe test). Finally we examine the pain sensations by the exact mechanisms as the upper limb.

Clonus test



(A) Normal plantar response



(B) Extensor plantar response (Babinski sign)

