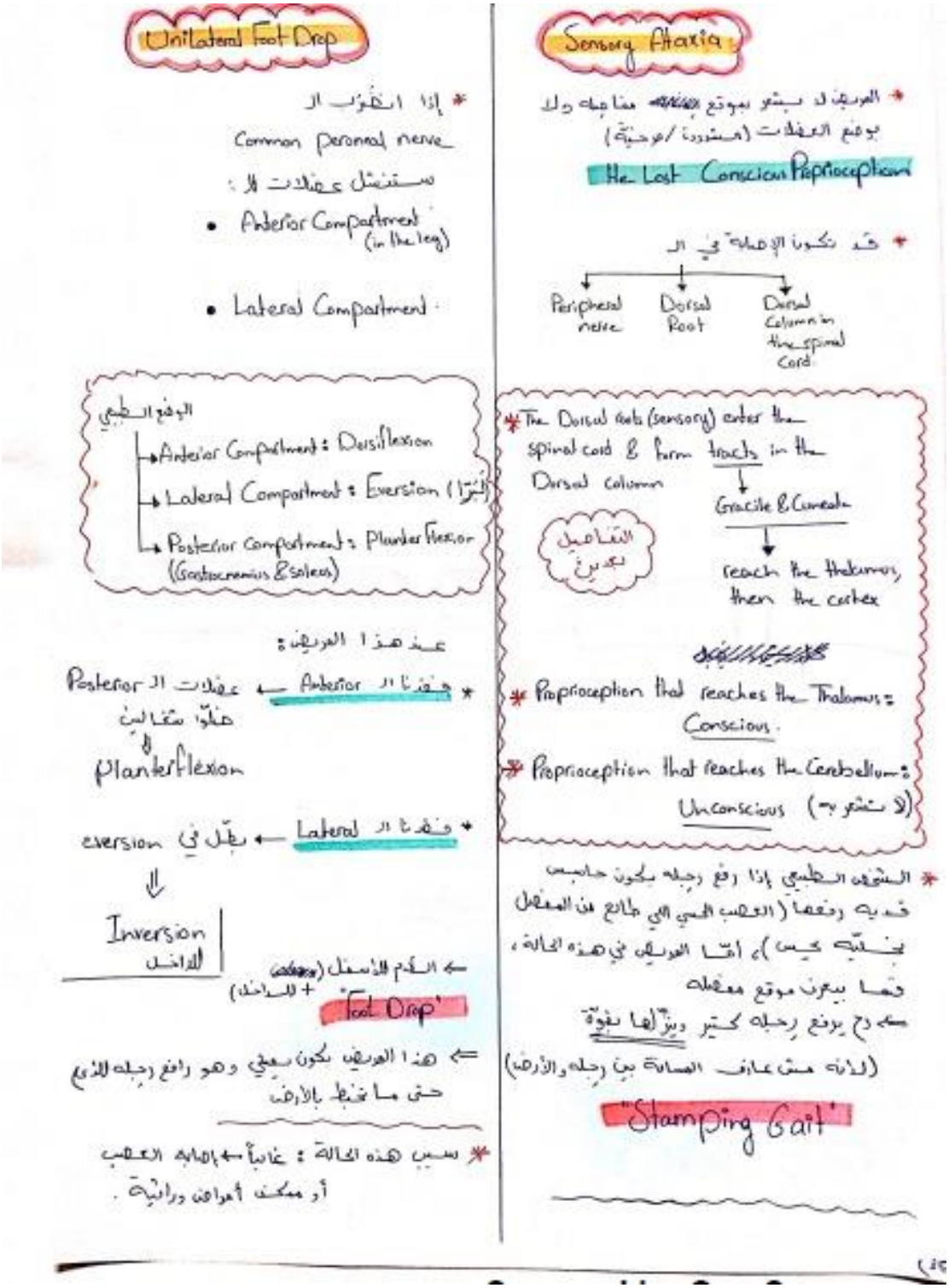
PHYSIOLOGY-LAB 1

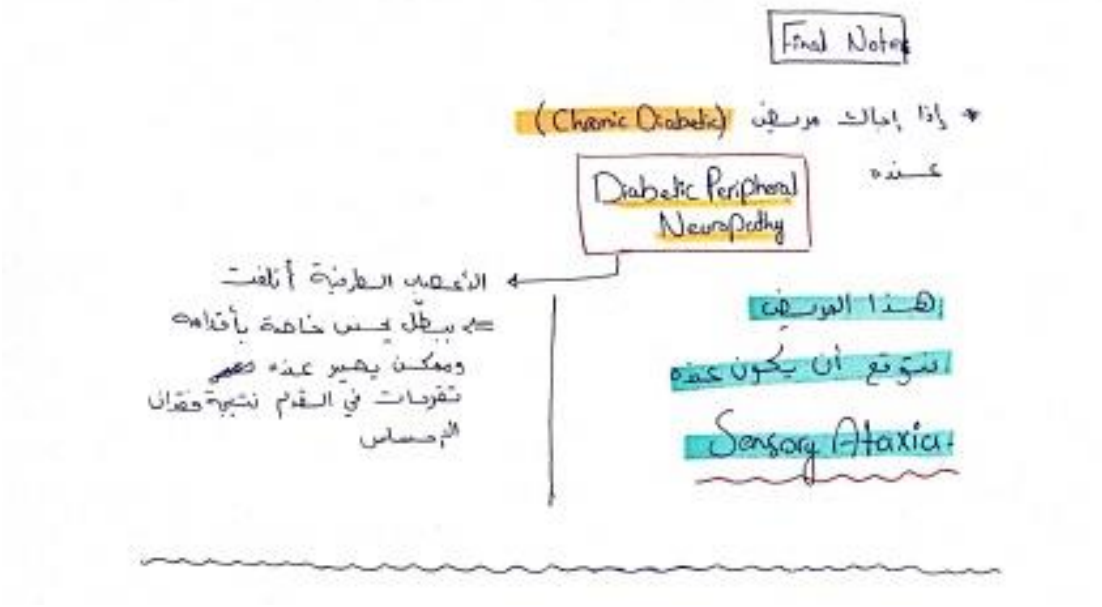
Gaits& Neurological Examination

Done by: Fekra team

- The following few figures are for the Gaits' part of the lab. They are taken directly from the edited Handout of Anatomy for lecture #10. They are more than enough for gaits' part!



- One extra gait is associated with Huntington disease. The patient shows **bizarre movements**.(Basal Ganglia disorder)

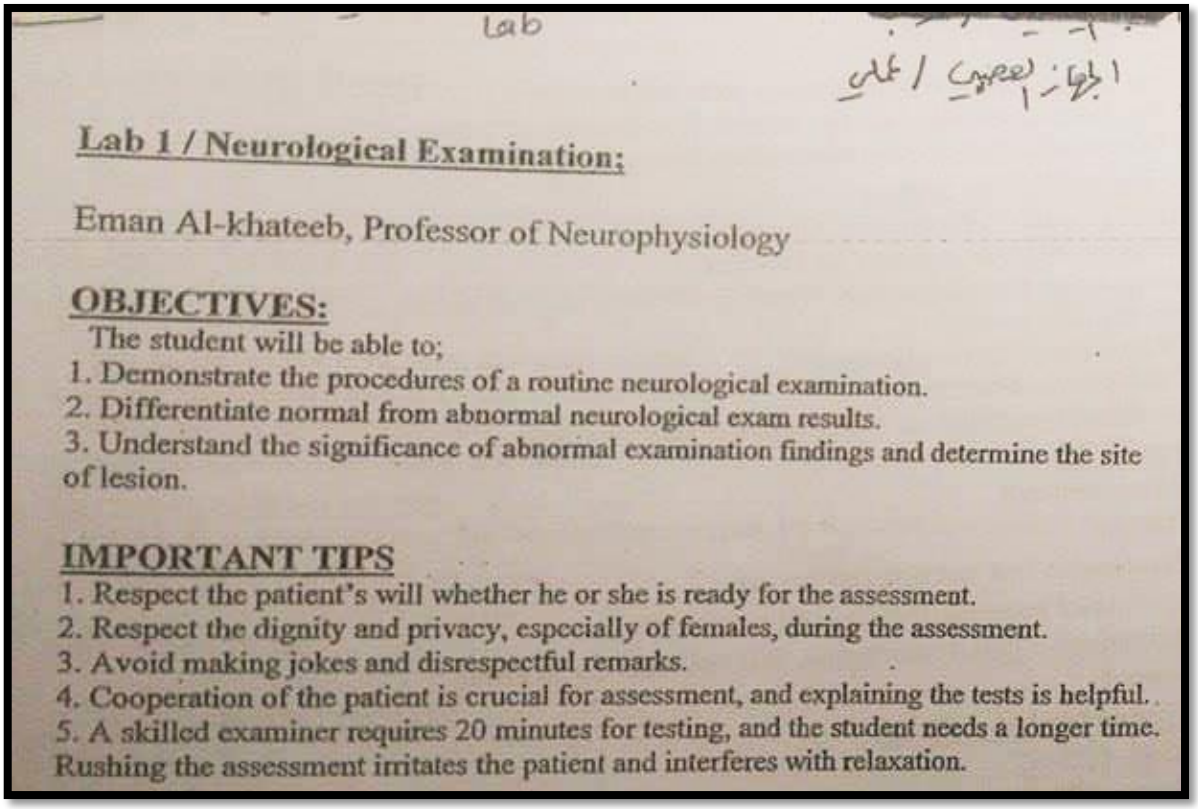


- That's it for the Gaits. Now moving on to the neurological examination:

* Notes :

- Both doctors of the lab assured that the paper that was given for us is enough for the exam, in addition to the gaits of-course !

- One thing that needs to be corrected in the paper; is that we do the reflexes test **before** the power! So make sure you got this in mind.



lab

Lab 1 / Neurological Examination:

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OBJECTIVES:

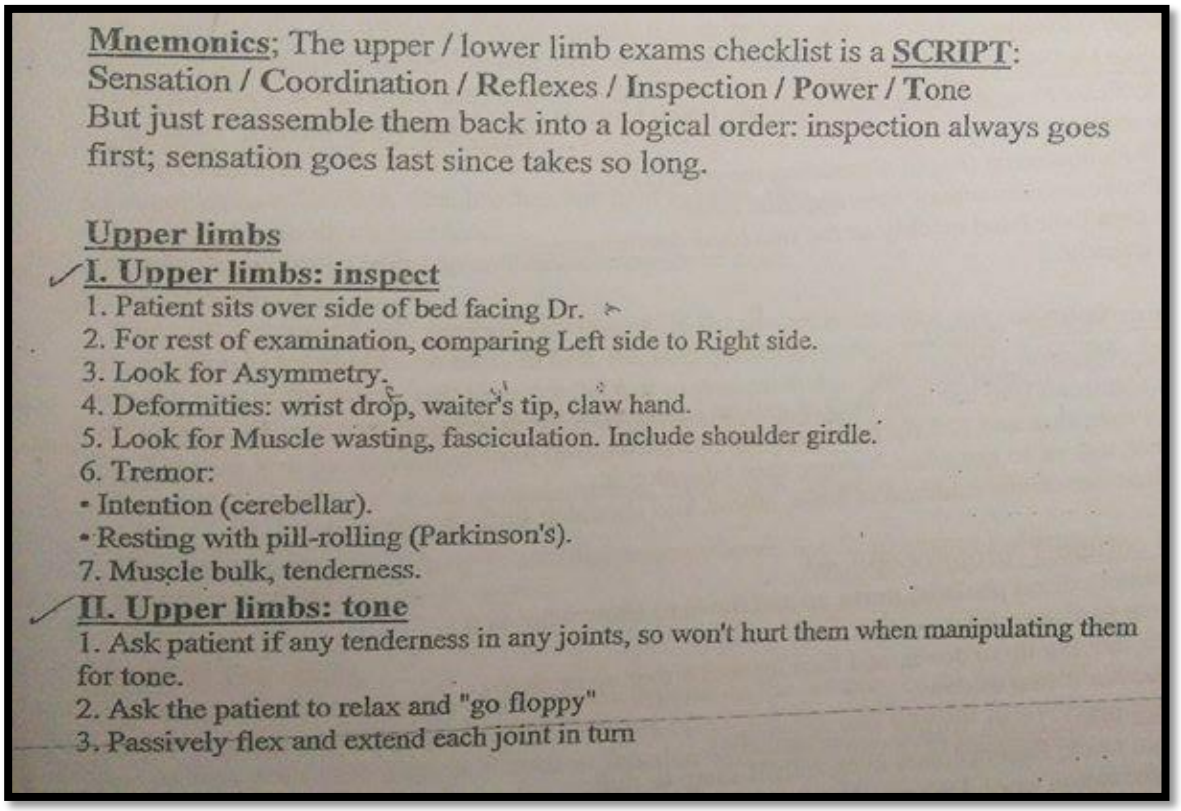
The student will be able to;

1. Demonstrate the procedures of a routine neurological examination.
2. Differentiate normal from abnormal neurological exam results.
3. Understand the significance of abnormal examination findings and determine the site of lesion.

IMPORTANT TIPS

1. Respect the patient's will whether he or she is ready for the assessment.
2. Respect the dignity and privacy, especially of females, during the assessment.
3. Avoid making jokes and disrespectful remarks.
4. Cooperation of the patient is crucial for assessment, and explaining the tests is helpful.
5. A skilled examiner requires 20 minutes for testing, and the student needs a longer time. Rushing the assessment irritates the patient and interferes with relaxation.

* It is important to introduce yourself& to ask for the permission from the patient!



Mnemonics; The upper / lower limb exams checklist is a **SCRIPT**:
Sensation / Coordination / Reflexes / Inspection / Power / Tone
But just reassemble them back into a logical order: inspection always goes first; sensation goes last since takes so long.

Upper limbs

I. Upper limbs: inspect

1. Patient sits over side of bed facing Dr.
2. For rest of examination, comparing Left side to Right side.
3. Look for Asymmetry.
4. Deformities: wrist drop, waiter's tip, claw hand.
5. Look for Muscle wasting, fasciculation. Include shoulder girdle.
6. Tremor:
   - Intention (cerebellar).
   - Resting with pill-rolling (Parkinson's).
7. Muscle bulk, tenderness.

II. Upper limbs: tone

1. Ask patient if any tenderness in any joints, so won't hurt them when manipulating them for tone.
2. Ask the patient to relax and "go floppy"
3. Passively flex and extend each joint in turn

* The best reference for comparing the symmetry of a limb, is the other limb of the patient.

* The common deformities:

- Waiter's tip(Erb's palsy); adduction+ extension+ pronation of the limb; due to injury in C5 & C6 of the brachial plexus!

- Wrist drop; due to I jury in the radial nerve!

- Claw hand; due to injury in the ulnar nerve!

* Muscle Wasting vs Atrophy :

- Wasting is an immediate sign of a Lower Motor Neuron lesion.

- Atrophy is a sign of a Upper Motor Neuron lesion and it needs time to take place.

* Fasciculation is a sign of a Lower Motor Neuron lesion.

* Muscle hypertrophy is a sign of excessive exercising.

* Tenderness is the pain upon touching !

* Tremors:

- Intention, cerebellum. Absent at rest!

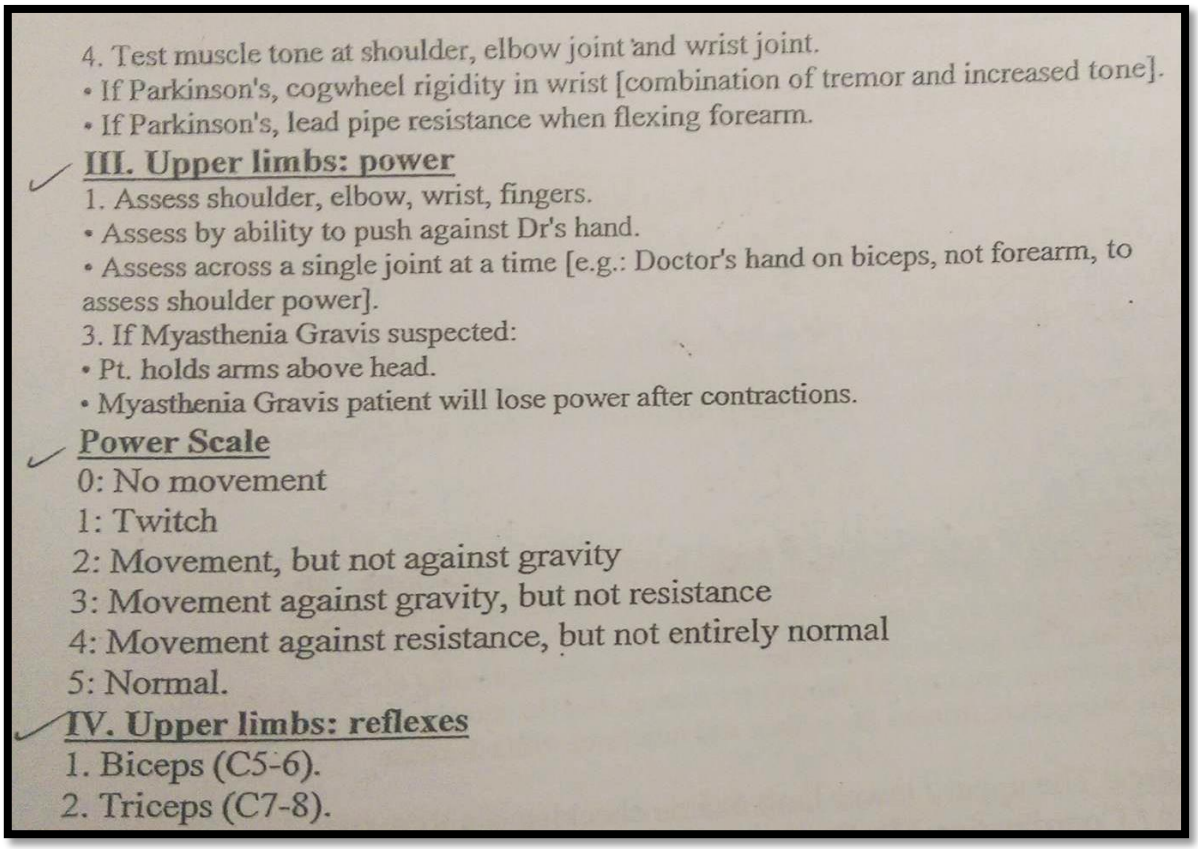
- Resting, basal ganglia. Usually uni-lateral & absent upon movement!

- Physiological, is a fast action tremor that is evident upon moving and could be due to; high caffeine, excessive sympathetic, bronchodilators, anxiety ..!

- Essential, is autosomal dominant in family & evident at rest!

* Tone(physiologically) is the minimal contraction found in the muscle.

* Tone(upon examination) is the resistance felt by the examiner upon moving a joint passively through its range of motion.



4. Test muscle tone at shoulder, elbow joint and wrist joint.
• If Parkinson's, cogwheel rigidity in wrist [combination of tremor and increased tone].
• If Parkinson's, lead pipe resistance when flexing forearm.

III. Upper limbs: power

1. Assess shoulder, elbow, wrist, fingers.
• Assess by ability to push against Dr's hand.
• Assess across a single joint at a time [e.g.: Doctor's hand on biceps, not forearm, to assess shoulder power].
3. If Myasthenia Gravis suspected:
• Pt. holds arms above head.
• Myasthenia Gravis patient will lose power after contractions.

Power Scale

0: No movement
1: Twitch
2: Movement, but not against gravity
3: Movement against gravity, but not resistance
4: Movement against resistance, but not entirely normal
5: Normal.

IV. Upper limbs: reflexes

1. Biceps (C5-6).
2. Triceps (C7-8).

* Don't forget to compare with the other side.

* Two types of abnormalities:

- Hypertonia linked to UMN lesion.

- Hypotonia linked to LMN lesion.

* Spasticity vs Rigidity

- Spasticity is linked to UMN lesion. It's uni-directional & felt upon fast movement and at the beginning of the movement. Example is Clasp knife. (most obvious upon trying the extension on a flexed arm)

- Rigidity is linked to the basal ganglia. It's bi-directional & felt upon slow movement and throughout the whole movement. Example is lead pipe & Cogwheel.

* Remember that the reflexes are tested before the power !

* When testing the reflexes you might need reinforcement; in which you distract the patient from the test by asking him to pull his hands apart or put some pressure on the teeth so that he/she won't interfere with the test.

* Power is tested actively; you ask the patient to the do the movement and you will be the resistance.

* Power scale is required.

V. Upper limbs: coordination

1. Finger-Nose/ Finger-Finger tests; Patient's finger touches Doctor's fingers, then to patient's nose
2. Dysdiadochokinesia (Rapid alternating movements):
- Patient's palm on dorsum of their opposite hand.
- Patient flips their hand quickly so the two hand dorsums touch.
- Repeat quickly.

VI. Upper limbs: sensory

1. Dorsal columns (vibration):
a. Place on sternum [the last area lost] so patient knows how the buzzing feels.
b. Patient's eyes shut and 128 Hz fork on distal interphalangeal joint: ask if felt.
c. If can feel, ask pt. to say when it stops, then later stop it.
d. If deficient: assess dermatomes at wrist, elbow, and shoulder, both anterior and posterior.

2. Dorsal columns (proprioception):
a. Grasp patient's distal phalanx, move up and down to show what to do.
b. Tell patient to close eyes.
c. Repeat the moving up or down, and then leave it either up or down. Ask pt is whether it's up or down.

3. Spinothalamic (pain, forget temperature):
a. Sensory pin prick, Patient closes eyes, tells if sharp or dull.
b. Light touch: cotton wool. Dab skin lightly, don't stroke.

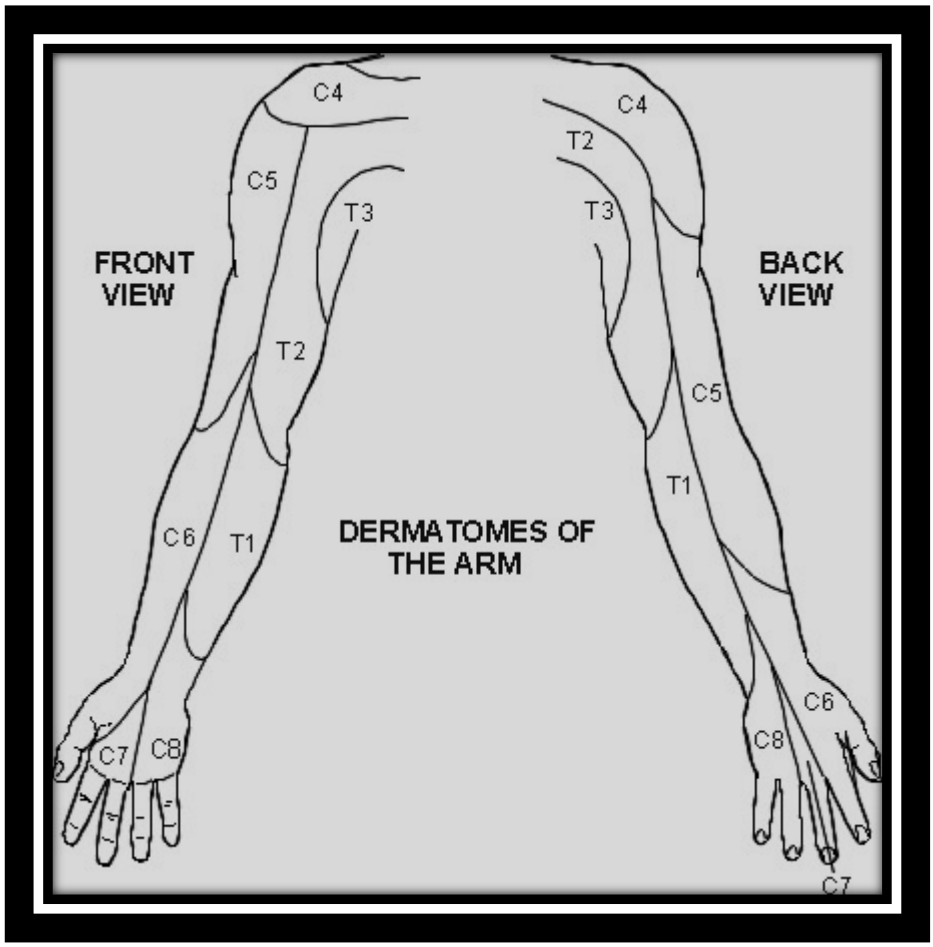
* When the patient is asked to do the finger-nose test, we can check for Dysmetria and intention tremors which both are signs of cerebellar disease.

* Decussation occurs at:

- Lower part of the medulla for the Dorsal column.
- 1 or 2 segments above in the spinal cord for the spinothalamic tract

* When we are testing the sensory pathways; preferably we follow the dermatomal distribution, as shown in the figure next page.

- Ask him if the feeling is still the same while you move from one area to the next and if the feeling is dull or sharp.



* Proprioception test could be something not familiar to the patent, so you should explain it before doing it!

• Moving on the lower limb .. Just like the upper limb with very few differences.

* You test the Tone in the lower limb by rolling the leg of your patient.

* One sign for an UMN lesion is the positive clonus sign seen as rhythmic repetitive contraction in the leg.

* The planter reflex is done by a blunt object; moving it on the lateral edge on the planter side of the foot to the medial center. The pathological response of this reflex is the Babinski sign; fanning of the toes& abduction of them. Babinski sign is linked to an UMN lesion.

* Check the extra figure in the next page for the dermatomal distribution of the lower limb.

Lower limbs: inspect

1. Asymmetry.
2. Muscle wasting, fasciculation, tremor.
3. Muscle bulk
4. Foot bruising, infections from peripheral neuropathy.

II. Lower limbs: tone

1. May roll legs internally and externally for a quick preliminary inspection of tone.
2. Test Ankle clonus:

- Place patient's knee bent, thigh externally rotated.
- Doctor lifts patient's heel in Doctor's cupped hand.
- Doctor quickly dorsiflexes patient's ankle and holds it flexed for 3 seconds.
- Clonus if sustained movement afterwards.

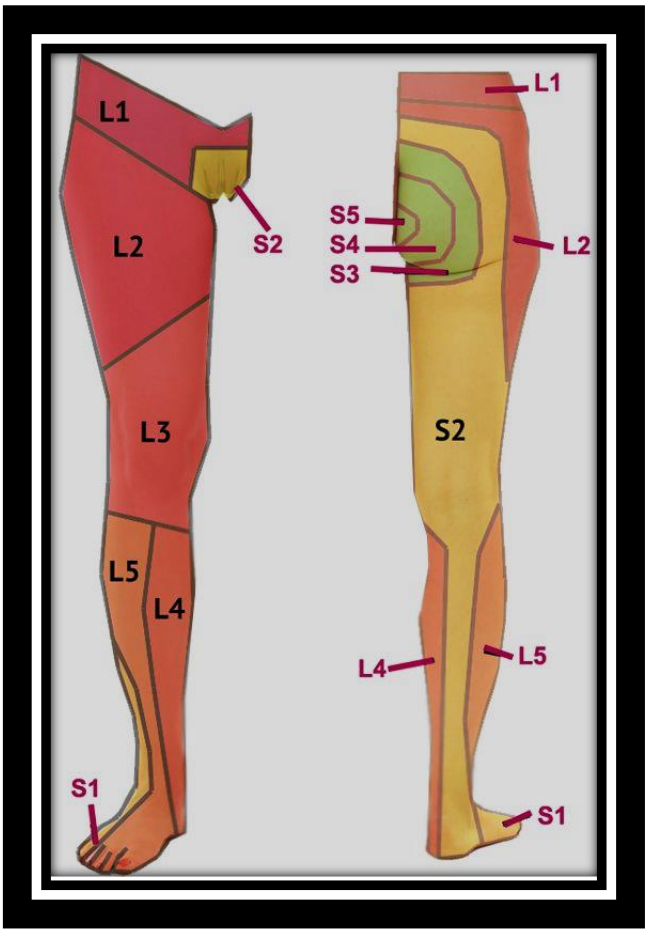
III. Lower limbs: power

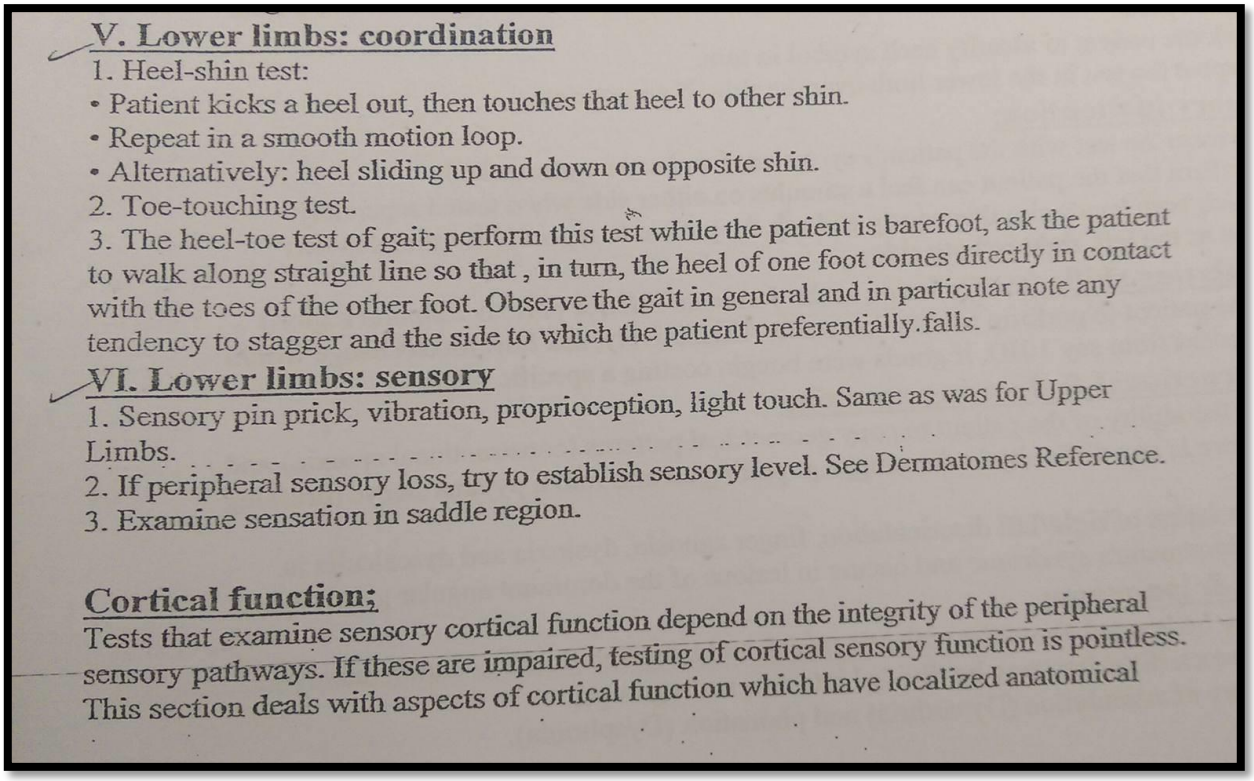
1. Power: hips, knees, ankles. "Lift leg, don't let me push it down". "Push leg down, don't let me push it up".

Ref: Power Scale

IV. Lower limbs: reflexes

1. Knee (L3-4).
2. Ankles (S1-2).
3. Plantar (L5, S1-2), When non-pathological, it is called the **plantar reflex** (planter flexion of the hallux with flexion and adduction of the other toes), while the term **Babinski's sign** refers to its pathological form.





V. Lower limbs: coordination

1. Heel-shin test:
   - Patient kicks a heel out, then touches that heel to other shin.
   - Repeat in a smooth motion loop.
   - Alternatively: heel sliding up and down on opposite shin.
2. Toe-touching test.
3. The heel-toe test of gait; perform this test while the patient is barefoot, ask the patient to walk along straight line so that , in turn, the heel of one foot comes directly in contact with the toes of the other foot. Observe the gait in general and in particular note any tendency to stagger and the side to which the patient preferentially.falls.

VI. Lower limbs: sensory

1. Sensory pin prick, vibration, proprioception, light touch. Same as was for Upper Limbs.
2. If peripheral sensory loss, try to establish sensory level. See Dermatomes Reference.
3. Examine sensation in saddle region.

Cortical function;

Tests that examine sensory cortical function depend on the integrity of the peripheral sensory pathways. If these are impaired, testing of cortical sensory function is pointless. This section deals with aspects of cortical function which have localized anatomical

- The rest of the lab sheet starting from (**Cortical function**) is <u>not</u> required for the exam!

THE END ..

substrates. When damaged these give rise to discrete patterns of clinical abnormalities.
The range of skills which can be tested include;
1. Calculation ability, body awareness, Right-Left orientation and integrative perception of sensory information (stereognosis)
2. Cortical vision.
3. Speech and other language functions (e.g. reading, writing, verbal comprehension)
4. Ability to carry out skilled movements. Apraxia is the inability to carry out skilled movements despite satisfactory understanding of the task and normal motor power, cerebellar and sensory functions.
If language functions are impaired many of these tests cannot be performed.

Examination sequence

Point localization; (test for lesion in posterior inferior parietal cortex).
-Ask the patient with the eyes closed to localize tactile stimuli applied to various parts of the body, e.g. hands, fingers, different parts of the face
- In addition, ask the patient to discriminate the right side from left, and to name individual fingers, when these are touched by the examiner (Finger agnosia).

Stereognosis
1. Ensure that the patient's eyes are closed
2. Place various identifiable objects in the palm of the patient's hands (e.g. pen top, coin, key, matchstick, piece of cotton wool).
3. Ask the patient to identify the object by feel alone.

Graphaesthesia;
1. Perform the test with the patient's eyes closed.
2. Using a suitable object, such as the blunt end of a pencil, trace digits or letters on the patient's palm.
3. Ask the patient to identify each symbol in turn.
4. Repeat the test in the lower limb over the shin, if appropriate.

Sensory inattention;
1. Perform the test with the patient's eyes closed and arms outstretched.
2. Confirm that the patient can feel a stimulus on either side when tested separately.
3. Touch both hands simultaneously and ask the patient to report if the stimulus was applied to the left, right or both sides.

Calculating skills (test for lesion in the dominant inferior parieto-temporal region)
Ask the patient to perform subtraction sums. Alternatively, ask how much change would be expected from say 10JD, if goods were bought costing a specific price.

Constructional & dressing apraxia;
Assess the ability of the patient to copy geometrical patterns (constructional apraxia) and see if there is any difficulty in dressing, e.g. putting an arm into a pyjama sleeve (dressing apraxia)
The association of right/left disorientation, finger agnosia, dyslexia and dyscalculia is termed Gerstmann's syndrome and occurs in lesions of the dominant angular gyral region.

Speech & language;
Much may be learned about the patient's speech and language function during history-taking. Speech disorders may be divided into two main groups;
1. Disorders of articulation (Dysarthria) and phonation (Dysphonia).

Disorders of language areas in the dominant hemisphere (Dysphasia).
If a defect of speech is evident a more thorough examination should be undertaken. By careful examination of speech and language it is often possible to localize the causative lesion.

The mental State Examination;
1. Appearance; evidence of self-neglect, lack of cooperation, lack of eye contact, drowsiness….
2. Motor activity;
- Too much activity such as tremor or restlessness
- Too little activity such as retardation
- Involuntary activity such as tics or dystonia.
3. Speech;
- Too much talk is a feature of mania.
- Too little talk is a feature of depression.
- Talk abnormalities such as elective mutism or stuttering.
4. Mood
5. Thought
6. Attention / concentration
7. Orientation
8. Memory
9. Intelligence
10. Insight; patient's awareness of the nature of the illness particularly in disorders in which insight may be partially or totally lost. e.g. multiple sclerosis.