CNS checklist

General (usually skip)

تعريف بنفسك، أخذ الإذن، تعقيم اليدين، مُرافق، الغرفة مضوية ودافية وبرايفت، المعدات.

Comment on exposure and position (nothing in particular).
Vital signs (pulse, blood pressure, respiratory rate and oxygen saturations, temperature).
Comment on the general look of patient: comfortable, neutral facial expressions.
Ask the patient to stand and walk, comment: normal posture, normal gait.
Ask the patient to say any thing (his full name for ex): normal speech.
No Involuntary movements.
Level of consciousness (Glasgow coma scale):

18.5 Glasgow Coma Scale (GCS)

Eye opening (E)	
4	Spontaneously
3	To speech
2	To pain
1	No response
Best verbal response (V)	
5	Orientated
4	Confused
3	Inappropriate words
2	Incomprehensible sounds
1	No verbal response
Best motor response (M)	
6	Obeys commands
5	Localises painful stimulus
4	Normal flexion
3	Abnormal flexion
2	Extends to painful stimulus
1	No response

Speech:
Comment: normal volume, normal rhythm, clear, fluent, and appropriate.
Ask the patient to say:

- ✓ ب ب ب ب
- ✓ ت ت ت ت
- ✓ ك ك ك ك

Ask the patient to count to 30 (assess fatigue as in gravis or claudication in temporal arteritis).
Ask the patient to cough and say 'Ah' see the soft palate rising bilaterally and the uvula in central (normal CN IX & CN X).
Ask the patient to repeat a simple sentence and read something and write, comment: no dysarthria, No dysphonia, no dysphasia.

Stance and Gait:
To examine stance: feet together eyes open and then closed with hands stretched out (no cerebellar or sensory ataxia).
Ask the patient to set up and down without using hands.

To examine gait: walk and turn towards you, then walk on tiptoes and on the heels (look for foot drop), then tandemly خط مستقيم (for gait ataxia in cerebellar diseases), and comment normal stride length, arm swings, no tremors.

MOTOR SYSTEM

In the exam the station can be upper or lower motor exam separately.
DON'T FORGET THE OTHER LIMB IN EACH STEP.

1-Inspection & palpation:

Comments: normal symmetrical limbs, no deformities, no abnormal movement, no Fasiculations, no visible muscle wasting or hypertrophy.
Palpation: (Ask about pain, warm your hand, and keep eye contact) comment on bulk, hypertrophy, wasting, tenderness, and masses.

2-Tone & clonus:

Patient should be relaxed and in supine position (نام ورخي حالك)
Warm your hands

Upper limbs: (Bilateral)
Hold as if shaking hand & support the elbow with the other hand, flex and extend at the elbow and wrest and rotate the hand in pronation & supination.
Reinforcement: ask the patient to draw circles in the air in one hand while assessing the other, you should feel increase in resistance that goes away after a little.
(There is no test for clonus in the upper limbs).

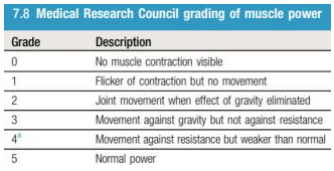
Lower limbs: (Bilateral)
Roll the leg from one side to the other then briskly lift the knee in flexed position.

Ankle clonus: partially flex the knee and the ankle, then do a brisk dorsiflexion and eversion of the foot and hold it in place for alittle while.
Repeated dorsiflexion of the ankle >6 movements = sustained clonus.

Comment: No hypertonia or hypotonia, No spasticity, No rigidity No Ankle clonus.

3-Power:

Ask about pain
Get up from a chair (without using hands) and walk, sit up from a lying position without using hands (for truncal strength).
Assess power against gravity then resistance, compare both sides in each step (DON'T do all the tests on one side and then the other).



7.8 Medical Research Council grading of muscle power

Grade	Description
0	No muscle contraction visible
1	Flicker of contraction but no movement
2	Joint movement when effect of gravity eliminated
3	Movement against gravity but not against resistance
4[a]	Movement against resistance but weaker than normal
5	Normal power

Upper limbs: (Bilateral)
Pronator drift: Ask the patient to hold hands outstretched forward, palms up and fingers straight and close eyes, wait 10+ seconds, comment: no pronator drift (extrapyramidal disease).

Ask the patient to set on the end of the bed, ask the patient to copy your movements:
1. Shoulder abduction
2. Elbow flexion and extension
3. Wrest extension
4. Fingers flexion and extension

5. Thumb abduction

Then ask the patient to do the same movements and resist his movements.

Lower limbs: (Bilateral)
Ask the patient to lay on the bed and do the following movements:
1. Hip flexion and extension (ارفع رجلك كاملة لفوق ونزلها)
2. Knee flexion and extension (اثني رجلك وافردها)
3. Ankle dorsiflexion, plantar flexion, eversion, and inversion (ارفع مشط رجلك لفوق، ادعس بنزين، لف رجلك لجوا وبرا)
4. Big toe extension

Ask the patient to do the same thing but resist the movements (this can be alittle tricky, make sure you practice it before the exam.

Comment: Power is 5/5 all over four limbs, No pronator drift.

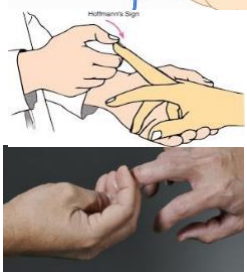
4-Reflexes

Patient should be **relaxed** and in supine position and ask about pain.
Compare each reflex with the other side, check for symmetry of response.
Flex your wrist and allow the weight of the tendon hammer head to determine the strength of the blow.
Strike the tendon, not the muscle or bone.
Record as: increased, normal, diminished, present only with reinforcement, or absent.
Memories the nerve root responsible for the jerk.

Upper limbs: (Bilateral)

1. Biceps jerk (C5) tap with your finger on tendon
2. Supinator (C6) tap with your finger on tendon
3. Triceps jerk (C7) tap directly on triceps tendon

4. Finger jerk (C8) place your middle and index fingers on the palmar surface of the patient's proximal phalanges, tap your fingers with the hammer.
5. Hoffmann's jerk (UMN lesion): put your index finger under the DIP of the middle finger of the patient then flick the patient's finger with your index. Or hold the patient's middle finger with your index and middle finger زي السيجارة and flick the patient's finger with your thumb, look for thumb flexion (abnormal, positive Hoffman's)



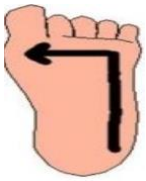
Reinforcement after each strike: make a strong fist with the other hand.

Lower limbs: (Bilateral)

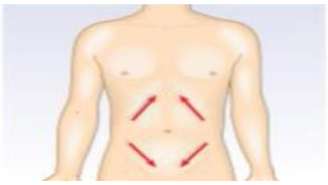
1. Knee jerk (L3, 4) ask the patient to set on the edge of the bed, make sure that the back of his knees touch the bed, tap directly on patellar tendon under the patella.

2. Ankle jerk (S1) ask the patient to lay on the bed, hold the patient's foot and put it just below the other knee and dorsiflex it and hold it (see the pic), tap directly on Achilles tendon.

3. Planter response: use a blunt object (tip of the hammer) and run it from the heel laterally towards the little finger and medially. The normal response is plantar flexion of the great toe (downward movement) or no response, the abnormal response is up going big toe= +ve babinski (UMN lesion).



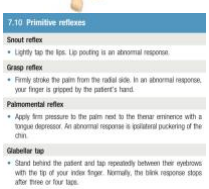
4. Abdominal reflexes (T8-T12) ask the patient to lay on the bed and expose his abdomen, use the tip of the hammer briskly but lightly stroke the upper and lower quadrants away from the midline of the relaxed abdomen, watching for a contraction (normal response).



Reinforcement after each strike: ask the patient to interlock the fingers and pull one hand against the other, do the movement and tell him to copy you.

Mention:

- Cremasteric reflex (only in males) L1, L2. stroke the upper medial aspect of the thigh with the tip of the hammer, the testis on the side stimulated will rise briskly.
- Primitive reflexes: Snout, Grasp, Palm omental, Glabellar tap.


7.10 Primitive reflexes

Snout reflex
- Lightly tap the lips. Lip pouting is an abnormal response.

Grasp reflex
- Firmly stroke the palm from the radial side. In an abnormal response, your finger is gripped by the patient's hand.

Palmomental reflex
- Apply firm pressure to the palm next to the thenar eminence with a tongue depressor. An abnormal response is ipsilateral puckering of the chin.

Glabellar tap
- Stand behind the patient and tap repeatedly between their eyebrows with the tip of your index finger. Normally, the blink response stops after three or four taps.

Comment: No hyperreflexia or hyperreflexia, Negative plantar response, or if present positive Babinski sign, Positive or Negative Hoffmann's and finger jerks.

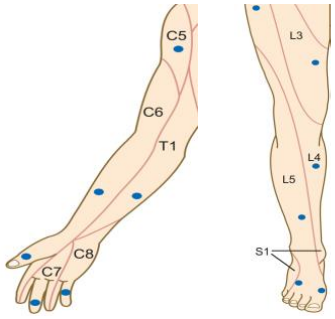
If the station was just motor mention at the end that you need to examine the coordination.

Sensory examination

Before testing any modality in the sensory examination always ask the patient to close his eyes.

1. Light touch

Patient should close his eyes
Use a cotton wool and dab irregularly compare the two sides
Distal to proximal on the blue dots as in the photo, memories the nerve root.



2. Superficial pain:

Patient should close his eyes, explain and show on the sternum.
Use the tip of the hammer, move from reduced to higher sensibility.
On the same spots as the previous point.

3. Temperature

Use tuning fork for cold sensation. Ideally it should be examined using cold tubes and hot tubes.

4. Vibration

First show on the sternum.
Ask the patient to close their eyes and to report when you stop the fork vibrating with your fingers.

Upper limbs:
DIP Joint of index, if not felt go proximally to PIP, MCP, wrist, elbow, shoulder, clavicle.

Lower limb:
Tip of big toe, if not felt go proximally to the medial malleolus, patella, ASIS, lower chest wall.

5. Joint position sensation

Demonstrate on great toe or middle finger (move it up and down while saying what is the movement) with eyes opened then ask the patient to close eyes.
Start the examination with the big toe, DIP of the middle finger and continue proximally if not felt right.

6. Stereognosis and graphesthesia

Ask the patient to close his eyes?
Stereognosis: Place a familiar object in his hand and ask him to name it (ex. Pen, coin)
Graphaesthesia: Use the tip of the hammer or with your finger trace a litter or digits on the patient's palm and ask him to name it (يفضل بالعربي).

7. Point localization and sensory inattention (done only if all previous tests were normal)

Ask the patient to close his eyes?
Point localization: touch his rt. and lt. arms or legs in turn and ask which side has been touched, touch different fingers and ask the patient which is touched.
Sensory inattention: touch both sides arms or legs simultaneously and ask whether the left, right or both sides were touched.

Coordination (for cerebellum)

Can be a station alone.

1. **Speech and language**

Dysarthria & scanned speech.

2. **Stance**

Look for cerebellar ataxia or sensory ataxia.
Ask the patient to stand up, feet together (preferably bare) and putting your hands around him with eyes open for 30 seconds (cerebellar ataxia), Then with closed eyes (Romberg test) stretched out hands & closed eyes for 30 seconds (sensory ataxia).

Rebound phenomenon

Ask the patient to stretch his arms out and keep this position.
Push the patient's wrist quickly downward and see the returning movement, if it were higher than the normal position it would be +ve.

3. **Gait**

Ask the patient to walk heel to toe (tandem gate), & to walk normally for cerebellar ataxia.

4. **Eye movements**

Ask the Pt patient to follow your fingers in a wide H shape and after you finish ask him if he had double vision (ازدواج بالرؤية) for horizontal nystagmus.

****Before you do the following tests you should mention that you need to assess the tone and power, as cerebellar disease causes hypotonia, and if the patient did not have cerebellar disease and had reduced power it would give a false positive.**

5. **Finger-to-nose test**

Ask the patient to touch his nose with the tip of his index and then touch your index as quickly as possible., keep your finger in a distance that makes the patient's arm fully stretched
Change the position of your index each time & move it when patient's finger is about to leave his nose
Some patients are so ataxic that they may injure their eye/face with this test. If so, use your two hands as
the targets and ask patients to touch their chin instead of nose.

6. **Rapid alternating movements test**

Demonstrate repeatedly patting the palm of your hand with the palm and back of your opposite hand as quickly and regularly as possible.
Ask the patient to copy your actions. Repeat with the opposite hand.

7. **Heel-to-shin test**

With the patient lying supine, ask him to place his heel on his opposite knee, and then slide his heel down the shin between knee and ankle, then left it up and start at the knee again.

8. **Apraxia**: (usually just mention)

Ask the patient to do or imitate common learned tasks (drinking a cup of tea, making a V sign, copy a geometric figure, ask them to dress up with one sleeve of the shirt inside out and to perform a cycling movement with their leg).

9. **Knee jerk reflex: Pendular.**

At the end comment: no dysarthria, no cerebellar or sensory ataxia, no nystagmus, no dysdiadochokinesis, no ataxia, negative cerebellar signs

Cranial nerves

Olfactory nerve CN I:

Check the nasal passage for any obstruction, ask the patient to close their eyes and close one nostril at a time, use “scratch and sniff” test cards, such as the University of Pennsylvania Smell Identification Test (UPSIT) (usually just mention).

Optic nerve CN II:

Inspection of the eye

1. Observe the head position, Face, and orbit for asymmetry, swelling, erythema, any abnormalities.
2. Lids: Look for the lids position (ptosis vs lid retraction), and
3. Lid lag: Examine the seated patient from the right. Hold your finger from a point 45° above the horizontal to point below this plane. Watch how the upper eyelid moves with the downward movement of the eye. In lid lag the sclera can be seen above the iris.
4. Proptosis; examine from the back by looking from above.

Palpation of the eye

Palpate around the orbital rim and orbit and look for any masses.

Comment: normal head and eyes position, no head tilting, no proptosis, no ptosis, no lid lag, no lid retraction, no periorbital masses or edema.

Special tests

1. **Visual acuity**: (Just mention)

   Use a backlit Snellen chart positioned at 6 meter and dim the room lighting. Cover one eye and ask the patient to read the chart from the top down until they cannot read any further. Repeat for the other eye.
   If the patient cannot see the largest font, reduce the test distance to 3 meters, then to 1 meter if necessary.
   If they still cannot see the largest font, document instead whether they can count fingers, see hand movement or just perceive the difference between light and dark. If the patient cannot read down to line (6/6), place a pinhole directly in front of the eye (with the patient keeping their usual spectacles on, if they wear them) to correct any residual refractive error.

   Assess near vision with a similar test using text of reducing font size held at a comfortable reading distance.

   Pupils' tests:

1. **Inspection** for shape and asymmetry in pupils. Comment: symmetrical regular pupils, no anisocoria.

2. **Direct and consensual light reflex**
   Ask the patient to look at a point in the distance, shine the torch from the

temporal side into one eye and look for constriction of the ipsilateral pupil (direct light reflex). Shine the light again at the same eye, but now look at the other eye and look for constriction in it too (consensual reflex). Repeat for the other pupil (so in total you use the torch 4 times 2 for each eye). Comment: Intact direct and consensual papillary reflex.

3. **Relative-afferent pupillary defect**
   Move the torch briskly from one eye to the other and place it on each eye for a minimum of 3 seconds, look for constriction in both eyes when the light is shining on them. Comment: No relative afferent papillary defect.

4. **Accommodation**
   Ask the patient to look at a distant point, then put your index in front of his eyes and ask him to look at it (do not use a light source). Look for pupillary constriction and convergence of eyes. comment: Normal convergence and accommodation reflex.

5. **<u>Visual field:</u>**
   First check if the patient has good vision (visual acuity).
   Sit directly facing the patient, 1 meter away.
   With your eyes and the patient's eyes open, ask the patient to look at your face and comment on whether they have any difficulty seeing parts of your face.
   (شايف وجهي؟ خليك متطلع عليه)

   Start while both eyes are opened to examine homonymous defects and sensory inattention.

   - **Homonymous defects:**
     Ask the patient to keep looking straight at your face with both eyes & you do the same. Hold your hands out and move your fingers up and down and bring them in from the periphery towards the center. Always keep your hands in the plane exactly halfway between you and the patient. Ask the patient to point to it when he first sees them. Test the upper quadrants then the lower. Comment: No homonymous defect.

   - **Sensory inattention**
     Ask the patient to keep looking straight at your face with both eyes & you do the same. Both you and the patient should keep your eyes open.
     Hold your hands stretched in halfway between you and the patient, ask him to tell you which side is moving, move the fingers in the right then the left then both. Note if the patient saw only one side move and which quadrant or side is affected. comment: No sensory inattention.

   For the following tests each eye will be tested separately (they aren't both open).

   - **Peripheral visual field**

     Ask the patient to close or cover one eye and keep looking at your opposite eye; you also close your other eye. Test each eye separately for the four quadrants.
     Hold your other hand out and move your fingers, bring your hand in from the periphery towards the center and keep it halfway between you. Ask the patient to point when he first sees your finger.

If the patient does not notice your finger when it is clearly visible to you, their field is reduced in that area.

Then use a small white hatpin or a white Neurotip (just mention mostly). Comment: No peripheral visual field defect.

- **Central visual field:** Repeat the same test using a red hatpin, comment: No central visual field defect.

6. **Color desaturation**
   Show the patient the red target and ask them to say what color they see. A 'pale' or 'pink' response implies color desaturation, can be caused by optic nerve problems. comment: No color desaturation.

7. **Blind spot**
   Test one eye at a time, Ask the patient to cover one eye and look directly at you, cover your eye that is opposite the patient's covered eye, and tell the patient tell you when the target disappears.
   Hold a red-tipped target between the patient and yourself at the visual fixation point, move the target temporally until it disappears for you (usually at 15 degrees), then move the target slowly up and down, as well as from side to side. Test the other eye. Comment: Blind spot is same as mine.

8. **Ophthalmoscope**: look for optic disc swelling (Just mention).

9. **Color vision:** assess red green using Ishihara test plates (just mention).

Ocular movements (CN III, IV, XI)

- Sit you and the patient 1 meter away, both eyes are open, head not moving, draw a wide **H shape** with your finger (make sure that pupils reach the end of the eye in each movement).

  Ask the patient to say if he had **diplopia**. If diplopia is present, ask whether this is horizontal, vertical or a combination of the two.

  Look for **nystagmus** and see if the eye movement is smooth.

- Examine **direct and consensual light reflex.**

Comment: eyes have full range of motion, No nystagmus No diplopia.

Trigeminal nerve CN V:

- **Sensory exam:**
  Ask the patient to close their eyes and say 'yes' each time they feel a light touch

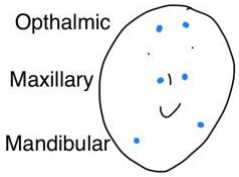
  (you use a cotton-wool tip for this test). Do this in the areas of V1, V2 and V3.

  Repeat using a fresh neurological pin, such as a Neurotip, to test superficial pain.

  Compare both sides.

  Normal sensation (not taste) in anterior two thirds of the tongue (mention).

  Nasal tickle test (mention).



- **Motor exam:**
  Inspect for wasting of the muscles of mastication at temples. Comment: No muscle wasting of temporalis.
  Ask the patient to clench their teeth; feel the masseters estimating bulk. Comment: Good bulk at masseter.

  Ask the patient to open their jaw and note any deviation, ask the patient to resist your movement and push his jaw up to close. Comment: good power of pterygoids, no jaw deviation.

- **Corneal reflex** (just mention mostly)
  Gently depress the lower eyelid while the patient looks up.

  Lightly touch the lateral edge of the cornea with a wisp of damp cotton wool

  Look for both direct and consensual blinking.

- **Jaw jerk**
  Ask the patient to let their mouth hang loosely open.

  Place your index in the midline between lower lip and chin.

  Percuss your finger gently with the tendon hammer in a downward direction. An absent, or just present, reflex is normal.

Facial nerve CN VII:

- **Motor function**
  Inspect the face for asymmetry.
  Ask the patient to blink, look for differences in blinking or eye closure on one side.
  Look for spontaneous or involuntary movement.
  Ask the patient to:
  - Raise their eyebrows and see symmetrical wrinkling of the forehead (frontalis muscle).
  - Screw their eyes tightly shut and resist you opening them (orbicularis oculi).
  - Bare their teeth يضحك ويبين سنانه(orbicularis oris).
  - Blow out their cheeks with their mouth closed (buccinators and orbicularis oris) with your hand's resistance.
  -Ask the patient to clinch his neck muscles to assess platysma (show him how)
  Comments: Symmetrical face, symmetrical wrinkles, no deviation in angle of mouth, no ptosis, no abnormal movement, mention the muscles and say that they are normal.

- **Taste sensation** over the anterior two thirds of the tongue

- **Corneal reflex**

Vestibulocochlear (VIII) nerve

1- **Whispered voice test**

- Stand behind the patient. Start testing with your mouth about 15 cm from the ear you are assessing. Mask hearing in the patient's other ear by rubbing the tragus.

- Ask the patient to repeat a combination of multisyllable numbers and words. Start with a normal speaking voice to confirm that the patient understands the test. Lower your voice to a clear whisper. (C4m, T2G)

- Repeat the test but this time at arm's length from the patient's ear. People with normal hearing can repeat words whispered at 60 cm.

2- **Weber's test**
Strike the tuning fork against a solid surface to make it vibrate. Place the base of the vibrating tuning fork in the middle of the patient's forehead (make sure that you don't let any thing touch the fork in the way). Ask the patient, 'Where do you hear the sound?', normally it should be central.

3- **Rinne's test**

- Strike the prongs of the tuning fork against a solid surface to make it vibrate. Place the vibrating tuning fork on the mastoid process.

- Now place the still-vibrating base at the external auditory meatus and ask, 'Is it louder in front of your ear or behind. Or keep the vibrating fork at the mastoid process until the patient says that he can't hear it anymore, the place the still vibrating fork in front of his ear and he should hear it. Normally conduction through air is better.

9.5 Tuning fork tests

	Weber's test	Rinne's test
Bilateral normal hearing	Central	AC>BC, bilateral
Bilateral symmetrical sensorineural loss	Central	AC>BC, bilateral
Unilateral or asymmetrical sensorineural loss LEFT	Louder right	AC>BC, bilateral[a]
Unilateral conductive loss LEFT	Louder left	BC>AC, left AC>BC, right
Bilateral conductive loss (worse on LEFT)	Louder left	BC>AC, bilateral

[a]Patients with a severe sensorineural loss may have BC > AC due to BC crossing to the other better-hearing cochlea that is not being tested (false-negative Rinne's test).
AC, Air conduction; *BC*, bone conduction.

Glossopharyngeal (IX) and vagus (X) nerves

- Assess the patient's speech for dysarthria or dysphonia, Ask the patient to say any thing, his full name and job.
- Ask them to say 'Ah'. Look at the movements of the palate and uvula using a torch, Comment: symmetrical palate elevation, no uvular deviation.
- Ask the patient to puff out their cheeks with their lips tightly closed. Listen for air escaping from the nose or put your finger under their nose to feel for escaping air. (Don't do resistance here, only in facial to assess the muscles).
- Ask the patient to cough; assess the strength of the cough, (not bovine).
- Testing pharyngeal sensation and the gag reflex is unpleasant (mention). Instead, and in fully conscious patients only, use the swallow test. Administer 3 teaspoons of water and see for absent swallow, cough, or delayed cough, or change in voice quality after each teaspoon. If there are no problems, see again while the patient swallows a glass of water.

Accessory (XI) nerve

- Face the patient and inspect the sternomastoid muscles for wasting or hypertrophy; palpate them to assess their bulk.
- Stand behind the patient to inspect and palpate the trapezius muscle for wasting or asymmetry.
- Ask the patient to shrug their shoulders, then apply downward pressure with your hands to assess the power.
- Test power in the left sternomastoid by asking the patient to turn their head to the right while you provide resistance with your hand placed on the right side of the patient's chin. Reverse the procedure to check the right sternomastoid.
- Test both sternocleidomastoid muscles simultaneously by asking the patient to flex their neck and apply your palm to the forehead as resistance.

Hypoglossal (XII) nerve

- Ask the patient to open his mouth (don't tell him that you want to see his tongue). Look at the tongue at rest for wasting, fasciculation or involuntary movement using the torch.
- Ask the patient to put out his tongue. Look for deviation or involuntary movement.
- Ask the patient to move his tongue quickly from side to side, in and out.
- Test power by asking the patient to press his tongue against the inside of each cheek in turn while you press from the outside with your finger.
- Assess speech by asking the patient to say 'ע ע ע ע'.
- Assess swallowing with a water swallow test.