

CNS EXAMINATION

Cranial Nerve Examination

Olfactory Nerve

- Asses smell with pungent, non irritative odours like clove oil, oil of peppermint, tincture of asafoetida.

Optic Nerve

- Visual Acuity : Using snellens chart.
- Visual Fields
- Colour vision
- Fundoscopy

Oculomotor, Abducent, Trochlear

- Diplopia
 - Trochlear nerve palsy : Patient will have vertical diplopia (Noticeable while going downstairs).
 - Abducent nerve palsy : Horizontal diplopia.
 - Myasthenia gravis
- Eye Movement
 - A complete third nerve palsy causes the eye to be in inferior & lateral position, ptosis and dilated pupil.
 - Sixth nerve palsy will cause failure of abduction on the ipsilateral side.
 - Fourth nerve palsy results in failure to intort the eye.
- Nystagmus
 - Peripheral vestibular nystagmus : Fast component is towards the opposite side.
 - Central vestibular nystagmus : Rotatory nystagmus
 - Cerebellar Nystagmus : Fast component is towards the side of lesion.
 - Pendular nystagmus: It is due to failure in ocular fixation due to long standing blindness.
- Pupils
 - Size & symmetry
 - Direct & Indirect light Reflex

Trigeminal Nerve

- Sensory : Trigeminal nerve has three sensory branches ophthalmic division, maxillary division & mandibular division.
 - Look for sensation

- Motor
 - Ask the patient to clench his teeth while you palpate both masseter muscles above the angles of the jaw & temporalis muscle over the temples.
 - Test the pterygoid muscle by forceful opening of the jaw against resistance: unilateral pterygoid weakness the jaw deviates to ipsilateral side as it opens.
- Corneal Reflex
- Jaw jerk

Facial Nerve

- Look for asymmetry by asking the patient to smile, bare their teeth & attempt to whistle.
- Frontalis : Ask the patient to raise their eyebrows while you look for asymmetry of the forehead creases.
- Orbicularis oculi : Ask the patient to screw their eyes shut while you try to prevent this with your finger and thumb.
- Orbicularis oris: Ask the patient to purse the lip shut and stop you from opening them.
- Taste sensation can be tested in the anterior 1/3rd.
- UMN Facial Weakness
 - Lesion can be anywhere from the contralateral cerebral hemisphere through the internal capsule, corticopontine tract and pontine decussation to the facial nerve nucleus.
 - It causes the weakness of the cheek, mouth, platysma but much less weakness of the upper face.
- LMN Facial Weakness
 - Nuclear & Infranuclear lesions causes flaccid paralysis and atrophy in the whole nerve distribution (Both upper & lower facial muscles).

Vestibulocochlear Nerve

- Tinnitus
- Hyperacusis
- Auditory hallucinations

Glossopharyngeal Nerve

- Taste on the posterior part of the tongue
- Gag reflex : Contraction after tickling the back of the pharynx with a small cotton covered stick.

Vagus Nerve

- Nasal regurgitation
- Palatal dysarthria

- Deviation of uvula to the normal side.

Accessory Nerve

- Trapezius : Ask the patient to shrug their shoulder while you press downward, the affected side will be weak.
- Sternocleidomastoid : Ask the patient to turn the head while you resist with the hand.

Hypoglossal Nerve

- Look for any wasting, fasciculation or tremor of tongue
- Unilateral hypoglossal lesion tongue deviates to the paralysed side.
- Test the power by asking the patient to press the tongue against the inside of each cheek in turn while you press from outside with your finger.

Motor System

Inspection

- Look for muscle wasting
- Posture & Abnormal movements like tremors, chorea, myoclonus, tics

Palpation

- Wasted or atrophied muscles are smaller, softer & flabby.
- When muscle wasting is accompanied by fibrosis as in muscular dystrophy, polymyositis or eosinophilic myositis, the muscle feels hard and inelastic.
- Tone
- Look for hypertonia or hypotonia ; spasticity & rigidity.

Power

- Medical Research council scale grading of muscle function
 - Grade 0 : Complete paralysis
 - Grade 1: A flicker of contraction only
 - Grade 2 : Power detectable only when gravity is excluded by appropriate postural adjustment.
 - Grade 3: Limb can be held against gravity and against the force of gravity, but not against examiners resistance.
 - Grade 4: Limb can be held against gravity and against some resistance.
 - Grade 5 : Normal power.
- If the weakness is
 - Proximal or axial : Indicates primarily muscle disease
 - Distal : Indicates polyneuropathy
 - Unilateral or bilateral : Stroke or focal CNS disease
 - Focal : In distribution of single peripheral nerve or nerve root.

Deep Tendon Reflex

- It is graded into
 - Hyperactive (+++)
 - Normal (++)
 - Diminished (+)
 - Absent (-)
- Biceps jerk(C5,C6): Contraction of biceps.
- Supinator jerk (C5,C6) : Contraction of supinator with supination of forearm.
- Triceps jerk (C6,C7): Contraction of the triceps.
- Knee jerk (L2,L3,L4) : Contraction of quadriceps
- Ankle jerk (S1,S2) : Contraction of calf muscle

Superficial Reflex

- Plantar reflex(L5, S1)
- Cremasteric reflex(L1,L2) : Testicles will move upwards when the skin at the upper inner part of the thigh is struck.
- Abdominal reflex (T7 - T12): Stroking abdominal wall below costal margin and in iliac fossa results in contraction of abdominal muscle.
- Anal reflex : Stroking or scratching skin near anus results in contraction of anal sphincter.

Coordination

- Finger nose test
- Heel-shin test
- Dysdiadochokinesia
- Rombergs test : If positive patient may sway or even fall. It is seen in tabes dorsalis, subacute combined degeneration, sensory polyneuropathies and posterior cord compression at high level.
- Tandem Walking : In unilateral cerebellar disease patient deviates towards the side of lesion. In sensory ataxia patient walks fairly well with eyes open, but tends to sway and stagger on shutting the eyes.

Gait

- Stance
 - Ask the patient to stand up straight, with the feet close together and eyes open.
 - Swaying with eyes open suggests cerebellar ataxia.
 - Ask the patient to close his eyes (Romberg's test). Indicates sensory ataxia.

Clinical signs of cerebellar lesions
● Cerebellar ataxia ● Intention tremor ● Nystagmus

- Past pointing
- Rebound phenomenon
- Impaired ability to generate alternate rhythmic movements.

	Bulbar Palsy	Pseudobulbar palsy
Motor lesion	LMN	UMN
Speech	Dysarthria	Dysarthria & dysphonia
Swallowing	Dysphagia	Dysphagia
Tongue	Weakness, wasting, fasciculation	Conical, spastic
Jaw jerk	Absent	Brisk
Emotional lability	Absent	Present

What is spasticity & Rigidity ?

- Spasticity is velocity dependent resistance to passive movements: that is detected with quick movements. It is associated with UMN lesion. It is often accompanied with hyperreflexia, weakness, extensor plantar response.
- Rigidity is a sustained resistance throughout the range of movement and is most easily detected when a limb is moved slowly.

• Clinical Sign	• UMN Lesion	• LMN Lesion
• Power	• Upper limbs : Extensors weaker • Lower Limb: Flexors are weaker	• Weak
• Wasting	• No	• Yes
• Fasciculation	• None	• Yes
• Tone	• Spastic	• Flaccid
• Reflex	• Increased	• Reduced
• Plantar response	• Extensor	• Flexor
• Coordination	• Reduced by weakness	• Reduced by weakness

Aphasia

- Aphasia is an acquired language disorder resulting from damage to the brain's language centres in the dominant hemisphere.
- It is characterised by difficulties in verbal or written expression, comprehension or both.

Fluent Aphasia

- Wernicke Aphasia
- Transcortical Sensory Aphasia (fluent, repetition preserved but comprehension is affected)
- Conduction Aphasia
- Anomic Aphasia

Nonfluent Aphasia

- Broca Aphasia
- Transcortical Motor Aphasia (non fluent, comprehension is preserved. repetition is possible)
- Mixed transcortical Aphasia
- Global Aphasia

- Broca's Aphasia (Expressive Aphasia):
 - Broca's area - anterior part of peri sylvian region of inferior frontal gyrus
 - Non fluent, telegraphic speech, without grammar (conjunctions, prepositions, adjectives, adverb)
 - Comprehension will be normal (reading and writing skills will be preserved).
- Wernicke Aphasia (Receptive Aphasia)
 - Broadmann area (Posteriorly in the superior temporal gyrus)
 - Fluent aphasia, but uses made up words, meaningless speech
 - Comprehension is affected (reading and writing skills also).
- Global Aphasia
 - perisylvian region supplied by dominant Left MCA.
 - Produces only a few recognisable words.
 - Comprehension is affected (Unable to read or write).