

Neurological Examination

This is a complex system to examine and a systematic approach is vital. It is best to think of this system as follows:

- General cerebral functions.
- Cranial nerves.
- Motor system.
- Sensory.
- Reflexes.

History

This may give you clues to possible neurological disease. Current problems – Dizziness, memory loss, nervousness, depression, weakness, loss of hearing etc.

General function, posture and gait

1. Ability to perform normal functions such as sitting, standing.
2. Gait.
3. Use of walking aids.

General Cerebral Functions

1. General behaviour.
2. Conscious level.
3. Intellectual performance.
4. Emotional status.
5. Thought content.
6. Cerebral integration.
 - Reorganise objects by hearing and touch.
 - Carry out skilled purposeful movements.
 - Understand and communicate written speech and writing.

Cranial Nerves

1. **Olfactory.** (1) Patency of nasal passages. Occlude each respective nostril with index finger. Test using common odours such as tea, coffee or cloves.
2. **Optic nerve.** (11) Test visual acuity using Snellen chart. Test visual fields. Bring hand in slowly from all quadrants. Ask patient to look at the examiner's eyes. Also use colored pins (four quadrants).
Blind spot (Define). Check optic fundus using ophthalmoscope. Right eye to right eye. Left eye to left eye.

Examine pupils check direct response and consensual response.
Swing light for afferent. Conveyance response-pupils should constrict.
Check pupil size – 20% of the population have unequal pupils

3. **Oculomotor (111), Trochlear (1V), and abducens (V1)** these are the nerves responsible for eye movements.
- Check for ptosis – drooping of the upper eyelid with inability to elevate it completely.
 - Check for a squint or strabismus i.e. when the eyes are not parallel
 - Voluntary gaze. Check eye movements.
 - Nystagmus is a rhythmical oscillation of eye position. It may be horizontal, vertical or rotatory in nature. To test for nystagmus the examiners finger must be 10 inches in front of and level with the patients eyes and should be moved to about 30 degrees to the right and to the left of the midline. Normal people have a transient mild nystagmus on extremes of lateral gaze. Nystagmus on upward or downward gaze is highly suggestive of a brain stem lesion.
 - Check for diplopia.

Summary of lesions:

- a) A Complete **third nerve lesion** causes ptosis and a dilated pupil which looks downwards and outwards.
- b) A **fourth nerve lesion** causes problems looking downwards and inwards.
- c) A **sixth nerve lesion** causes problems looking laterally

4. **Trigeminal (V)** ask the patient to clench his teeth.

Protrude jaw to the right and to the left. Check sensory nerve distribution. Ophthalmic, maxillary, and mandibular. First use cotton bud then pin-prick. Ask patient to say yes.

Check corneal reflex with a sterile cotton bud.

The jaw jerk reflex like all routinely tested reflexes is a muscle stretch reflex. If the response is brisker than normal then this implies upper neurone damage.

5. **Facial Nerve (V11)** The facial nerve is mostly motor, although for part of its course it carries along with it taste sensation from the anterior two-thirds of the tongue and some fibres which stimulate salivary secretion.

Wrinkle forehead. May be uni-lateral if a uni-lateral lower motor neurone lesion is present.

Close eyes tightly.

Grimace.

Blow a trumpet

Taste response, bitter or sweet.

Smile.

6. **Acoustic Nerve (V111)** –auditory nerve has two components, the cochlear (responsible for hearing) and the vestibular(labyrinthine) responsible for balance and appreciation of movement.

Check ears with an auroscope first.

Use whispering to test the hearing. Traditionally a ticking watch was used. If a patient is deaf, and if the tympanic membrane is normal and unobstructed by wax, then tuning fork tests are useful.

The **Rinne test** is performed to compare air conduction with bone conduction. Place tuning fork on mastoid process and set vibrating. The patient is asked to say when the tuning fork vibrations cease. The distal end of the tuning fork is then held at the external auditory meatus to test air conduction. Normally air conduction is better than bone.

Weber test- The tuning fork base is placed on the vertex of the skull and the patient asked in which ear the sound is best heard. Normally the sound is heard in the centre.

Testing for positional vertigo. Nystagmus which appears within about 15 seconds of this manoeuvre and which subsides spontaneously indicates a problem in the lower-most ear.

7. **Glossopharyngeal (IX) and vagus (X) nerves** . Test these two nerves together

Check gag response.

Ask the patient to say AAARRGGH / EEEEE.

Cough normally.

If applicable swallowing response mouthful of water.

8. **Accessory nerve (XI)** Ask patient to turn head against resistance. Elevate shoulders against resistance.

9. **Hypoglossal nerve (XII)** This is the motor nerve to the tongue. Unilateral lower motor neurone type damage causes weakness, wasting and often unilateral fasciculation of tongue muscle.

Check fibrillation. Side to side movement. Tongue protrusion.

Cerebral function

Assess client's ability to:

1. Touch finger to nose (eyes open), alternating hands. (Repeat with eyes closed).
2. Touch finger to nose and then examiners moving finger.
3. Run each heel down opposite shin (Lying and standing).
4. Rapidly pat knees, alternating back of hands and palms.
5. Stand erect with feet together, first with eyes open, then with eyes closed (Romberg test)
6. Tandem walk.

Motor system

1. Mass – looking for wasting, fasciculation's fine tremors.
2. Tone – note resistance to passive range of motion; look for spasticity, rigidity, flaccidity.
3. Involuntary movement.
4. Strength –test flexion, extension, and other movements through major joints, first without resistance and then with examiner offering resistance. Compare each side, grade as normal, decreased, or absent.

Sensory

Have client close eyes for these tests; compare reactions for both sides of the body.

1. Superficial tactile sensation- compare sensitivity to wisp of cotton on each side of body, check hands, forearms, upper arms, trunk, thighs, lower legs, feet.
2. Superficial pain – repeat procedure in 1, using sharp object.
3. Sensitivity to vibration – hold vibrating tuning fork to bony prominences: wrist, elbow, knee, and ankle.

Reflexes

Deep reflexes. Elicited by tapping briskly on a tendon or bony prominence, evoking sudden stretching of certain muscles and subsequent contraction.

Reflex	Site of stimulus	Normal response
Biceps	Biceps tendon	Contraction of biceps
Triceps	Triceps tendon above olecranon	Extension of elbow
Brachioradialis	Lower third of radius	Flexion, pronation of forearm; flexion of fingers, hand
Patellar	Patellar tendon	Extension of leg at knee
Achilles	Achilles tendon	Plantar flexion of foot
Plantar	Outer aspect of sole of foot	Plantar flexion of toes

Superficial reflexes. Rapid firm stroking of skin with moderately sharp object, such as split tongue blade.

Reflex	Site of stimulus	Normal response
Abdominal	Stroke abdomen from periphery to umbilicus in 4 quads	Umbilicus moves toward area being stroked

Abnormal Reflexes

Babinski – stroking of lateral aspect of sole of foot causes dorsiflexion of big toe and fanning of toes.