

Tikrit University

College of Nursing

Basic Nursing Sciences



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Health assessment and physical examination

(Neurological Assessment)

by:

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❑ The Nervous System consists of two division:

1- The Central Nervous System (CNS):

- Brain
- Spinal Cord

2- The Peripheral Nervous System

- Cranial Nerve: 12 pairs
- Spinal Nerve: 31 pairs
- The function of the Nervous System is to control all motor, sensory, autonomic, cognitive & behavioral activities.

Subjective Data

- Headache
- Head Injury
- Dizziness (Lightheadedness), Vertigo (room is spinning)
- Tremors
- Seizures
- Weakness
- Incoordination; Balance when walking
- Numbness / Tingling in an extremity
- Difficulty of Speaking
- Difficulty of Swallowing
- Patient-centered care
- Environmental/ Occupational hazards

Equipment

- Penlight
- Tongue Blade
- Cotton Swab
- Cotton Ball
- Tuning Fork (128 Hz and 256 Hz)
- Percussion Hammer

- Possibly familial aromatic substances (e.g., peppermint, coffee, etc.)
- Position the person sitting up with the head at your eye level.

Examination Sequence

- Perform a **Screening Neurologic Examination** on seemingly well persons with no significant subjective findings from Hx.
- Perform a **Complete Neurologic Examination** on persons with neurologic concerns (e.g., headache, weakness, or loss of coordination) or those who showed signs of neurologic dysfunction.
- **Perform Neurologic Recheck Examination** on persons with neurologic deficit who require periodic assessments (e.g; hospitalized persons).
- Integrate the steps of the Neurologic Examination with the examination of each particular part of the body.
- **Use the Following Sequence for the Complete Neurologic Assessment:**
 - **I:** Mental Status
 - **II:** Cranial Nerves
 - **III:** Motor System
 - **IV:** Sensory System
 - **V:** Reflexes

I. Mental Status Examination

- Reflects Emotional and Cognitive Functions
- **Components of the Mental Status Examination: A, B, C, T**
 1. A: Appearance
 2. B: Behavior
 3. C: Cognitive Functions
 4. T: Thought Processes
- You can assess Mental Status through the context of the health history interview.

Assessment of Mental Status/ Objective Data

1. Appearance

- **Posture:** Erect and position is relaxed.

- **Abnormal Findings:** Sitting on edge of chair, tense muscle, frowning, watchful eyes, & restless occur with Anxiety & Hyperthyroidism.
- **Body Movements:** Voluntary, deliberate, coordinated, smooth and even.
- **Abnormal Findings:** Apathy & psychomotor slowing occur with depression.
- **Dress:** Appropriate for setting, season, age, and gender. Clothing fits & is put on appropriately.
- **Grooming & Hygiene:** Clean & well groomed; hair & nails clean

2. Behavior:

- **Level of Consciousness:** Awake, alert, aware of stimuli from the environment & responds appropriately to stimuli.
- **Facial Expressions:** Look is appropriate to the situation, change appropriately with the topic.
- **Abnormal Findings:** Flat, masklike expression occurs with Parkinsonism & Depression.
- **Speech & Articulation:** Laryngeal sounds effortlessly & shares conversation appropriately. Talking is fluent, articulation (ability to form words) is clear & understandable.
- **Mood & Affect:** Appropriate to place & condition, cooperate

Level of Consciousness

- **Consciousness:** Being aware of one's own existence, feelings, & thoughts & aware of the environment.
- ☐ **Levels of Consciousness:**
 - (1) **Alert:** Awake, oriented to time, place, & person, aware and respond appropriately to surroundings, conducts meaningful conversation.
 - (2) **Lethargic:** Not fully alert, sleep when not stimulated but can be aroused when called in normal voice but looks drowsy, responds appropriately to questions, slow in thinking and movement.
 - (3) **Obtunded:** Sleeps most time, requires loud sound or vigorous shaking to arouse, speech is incoherent, confused when aroused.
 - (4) **Stupor or Semi-Coma:** Spontaneously unconscious, responds only to persistent vigorous shaking or pain, only groans or move restlessly, reflexes are present.

(5) **Coma:** Completely unconscious, no response to pain or to any external or internal stimuli, no movement with deep coma.

Glasgow Coma Scale (GCS)

- GCS: Assess level of Consciousness.
- Maximum score is **15** and Minimum score is **3**
- A score of 7 or less indicates coma.
- **Composed of 3 Parts:**
 - Eye Opening
 - Verbal Response
 - Motor Response
- Total score is summation of individual scores.

Eye Opening	Verbal Response	Best Motor Response
4 = Spontaneous 3 = To Speech 2 = To Pain 1 = None	5 = Spontaneous 4 = Confused 3 = Inappropriate Words 2 = Incomprehensible Sounds 1 = None	6 = Obeys commands 5 = Localizes to Pain 4 = Withdraws from Pain 3 = Abnormal Flexion (<u>Decorticate Posture</u>) 2 = Abnormal Extension (<u>Decerebrate Posture</u>) 1 = None

Decorticate Posture

- Indicated by rigidity, **Flexion** of the arms, clenched fists, and extended legs. The arms are bent inward toward the body with the wrists and fingers bent and held on the chest. Presence of this type of posturing implies severe damage to the brain with immediate need for medical attention.
- Indicates damage to the corticospinal tract.
- Common Causes: Brain abscess, brain tumors, increased intracranial pressure from any cause, stroke, head injury

Decerebrate Posture

- Indicated by rigid **Extension** of the arms and legs, downward pointing of the toes, and backward arching of the head. A severe injury to the brain at the level of the brainstem is the usual cause.

- It usually indicates deterioration of the structures of the nervous system, particularly the upper brain stem.
- **Common Causes:** Hepatic encephalopathy, brain tumors, increased intracranial pressure from any cause, stroke, intracranial hemorrhage, and head injury.

3. Cognitive Functions:

- **Orientation:** To time, place, & person.
- **Abnormal Findings:** Disorientation, occurs with organic brain disorders, as delirium & dementia.
- **Attention Span:** Ability to concentrate (should be able to complete a thought without wandering), Or give a series of directions to follow “Please take this glass of water with your left hand, drink from it, shift it to your right hand, and set it on the table.”
- **Recent Memory** (e.g., 24-hr diet recall)
- **Remote Memory:** Ask the person verifiable past events (e.g., birthday, first job, etc.).
- **New Learning:** Tell the person 4 different words ask to memorize and ask to recall after 5 minutes, 10 & at 30 min

II. Cranial Nerves Assessment

- I Olfactory
- II Optic
- III Oculomotor
- IV Trochlear
- V Trigeminal
- VI Abducens
- VII Facial
- VIII Acoustic
- IX Glossopharyngeal
- X Vagus
- XI Spinal Accessory
- XII Hypoglossal
- **On Old Olympus's Towering Top, A Finn And German Viewed Some Hops**

- **CN I (Olfactory, S):** Test the sense of Smell (anosmia)
- **CN II (Optic, S):** Test Visual Acuity (Snellen eye chart), & Visual Fields (by Confrontation Test).
- **CN III (Oculomotor, PS + M):**
 - **Sensory Function:** Pupillary reactions to light and Near response.
 - **Motor Function:** Opening eye lids, mostly innervates EOM
- **CN IV & VI (Trochlear, M & Abducens, M):** EOM
- ✚ **S:** sensory; **M:** motor; **PS:** parasympathetic, **EOM:** extraocular muscles
- **CN V (Trigeminal, S+M):**
 - **Sensory Function:** With person eyes closed, test light touch sensations by touching a cotton wisp to (forehead, checks, chin), Corneal reflex: blink bilaterally.
 - **Motor Function:** Palpate masseter & temporal muscles for strength of contraction when patient clenches teeth, then try to push down the chin, normally you cannot.
- **CN VII (Facial, M+ S + PS):**
 - **Motor Function:** Inspect face during conversation for any asymmetry, tics, or abnormal movements, ask patient to close eyes tightly, smile, frown, show upper and lower teeth, & puff out both cheeks.
- **CN VIII (Acoustic- Vestibulocochlear, S):** Assess hearing: hearing acuity (conversation and whispering) **CN IX & X (Glossopharyngeal M + S + PS & Vagus M + S + PS):**
 - **Motor Function:** Listen to patient's voice, assess swallowing, depress the tongue with tongue depressor and ask person to say "ahh" then note movements of the soft palate & uvula , check the gag reflex.
- **CN XI (Spinal Accessory, M):** Look for equal size & strength of the trapezius and sternomastoid muscle.
- Check equal strength by asking person to rotate the head against resistance, then ask person to shrug shoulders against resistance.
- **CN XII (Hypoglossal, M):** Listen for articulation of words. Inspect patient's tongue as it lies in the mouth floor (look for symmetry, atrophy), ask patient to protrude his/her tongue and look for abnormal deviation from medial line.

III. Assessment of the Motor System

□ Assessment of

▪ A: Muscles

- A1) Size
- A2) Strength
- A3) Tone
- A4) Involuntary Movement

▪ B: Cerebellar Functions

- **B1) Balance Tests:** Gait, the Romberg test
- **B2) Coordination & Skilled Movements:** Rapid alternating movements (RAM), finger to finger test, finger to nose test, & heel to shin test.

A) Muscles

▪ A1) Size

- Should be within the normal size for age and be symmetrical bilaterally.
- Difference less than 1 cm is not significant.
- Abnormal Findings: **Atrophy:** Abnormally small muscle. **Hypertrophy:** Increased size & strength.

▪ A2) Strength

- By applying opposing resistance against active ROM.
- Abnormal Findings:
- **Paralysis or Plegia:** Absence of Strength.
- **Paresis:** Weakness, diminished Strength.

▪ A3) Tone

- Is the normal degree of tension (Contraction) in voluntary relaxed muscle.
- Assessed by applying passive range of motion after asking person to relax.
- Normally: Feel mild resistance.
- Abnormal Findings:
- Flaccid (decrease resistance), Spastic (increase resistance).

▪ A4) Involuntary Movements: Normally: No involuntary movements occur.

B) Cerebellar Function

▪ **B1) Balance Tests**

✚ **B1-1) Gait:**

- Observe as the person walks **10 to 20** feet, turns, & returns to the starting point.
- Normal Findings: Gait is smooth, effortless, coordinated arm swing, suitable step length (**15** inches from heel to heel)
- Abnormal: Ataxia (unsteady), stiff, wide step for support
- **Tandem Walking** (heel to toe fashion)
- Walk on his/her toes or heels for a few steps to test balance.

B1-2) Romberg Test:

- Ask person to stand up with feet together & arms at sides, then close the eyes & to hold the position. observe for **20** seconds- observe balance
 - Normal: Maintain position
 - Abnormal: (+) Romberg test Includes sway, falls or widened step

C) Ask person to perform shallow knee bend or to **hop in place**, first on one leg then the other.

B2) Coordination and skilled movement

▪ **B2-1) Rapid Alternating Movements (RAM) of the Arms**

- Patting knees with palms and dorsa of the hands alternatively → Observe speed, rhythm, & smoothness of movement.
- Or ask the person to touch the thumb to each finger starting with the index then reverse the direction.

▪ **B2-2) Finger-to-Nose Test:**

- With closed eyes, ask person to touch his nose by alternating his index fingers and increasing the speed.

▪ **B2-3) Finger-to-Finger Test:**

- With open eyes ask the person to touch the examiner finger then his/her own nose. After few times the examiner moves his finger to a different spot.

▪ **B2-4) Heel-to-Shin Test:**

- In supine position, slide one leg over the other from knee down to ankle.