REVIEW ARTICLE

Nursing Tools and Strategies to assess Neurological Function

Anitha S Sundaram

Abstract

It is highly required to know about appropriate neurological assessment in bedside nursing. Neurological examination is one of the basic and common procedure for all Nursing students as per the syllabus. This neurological examination format will assist all the undergraduate student nurses to complete the neurological assessment and to find the abnormalities in an accurate manner.

Keywords: Neurological examination, CNS assessment, Reflexes.

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Introduction

How often have nurses used the following expression to describe a patient's mental status.

- Patient appears to be a bit confused today.
- Patient looks more aggressive.

What about the accuracy of those above mentioned statements? Objectively, what does that statement mean and how often does it actually serve to cause confusion among staff involved with caring for the patient? Accurate observational skills are necessary for nurses working with patients experiencing neurological dysfunction, in order to detect discrete and ever changing problems experienced by patients. Actually terminologies like a little bit confused/more aggressive to be avoided. It should be replaced with well defined terms, which in turn helps the health professionals to provide holistic care to the patients.[1–3]

Neurological Examination

It consists of six steps:

1. Mini mental status examination /assessment of cerebral function.
2. Cranial nerve assessment.
3. Assessment of motor (cerebellar) function.
4. Assessment of sensory function.
5. Assessment of Reflexes.
6. Screening tests

This paper presents the *Mental Status Examination* and the *Cranial Nerve Assessment*.

Sridevi College of Nursing, Krishnapuram, Ponneri, Tamil Nadu, India

Corresponding Author: Anitha S Sundaram, Sridevi College of Nursing, Krishnapuram, Ponneri, Tamil Nadu, India, Phone: +91 9445208620, e-mail: ranitha79@yahoo.com

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Mental Status Examination

S.No.	*Features/functions*	*Test*	*Findings*
I.		**I. General appearance**	
a.	Appearance/grooming	• Observe physical appearance, grooming and body image, appropriateness of dressing and hygiene	
b.	Posture	• Calculate the patient's ability to ambulate. • Watch the patient's gait and posture.	
II.		**Behavior**	
a.	Level of consciousness	• Use stimuli, such as verbal, visual, and tactile. • Observe for the ability to follow commands. Touch the patient gently, shake his/her hands/shoulders.	
b.	Mood or affect	• Note any agitation, anger or depression. Use suitable questions to bring out patient's feelings.	
c.	Characteristics of thought	• Watch for clarity and relevancy of thought. • Watch for illusion, delusion, hallucination, and paranoia.	

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S.No.	*Features/functions*	*Test*	*Findings*
III.		**Cognitive function**	
a.	Orientation to place, person, and time	• Note orientation to place, person, and time. • Ask questions like What is your name? Where are you now?	
b.	Immediate memory	• Ask about the events that occurred within one hour.	
c.	Recent memory	• Ask about recent incidents, e.g., What was your breakfast in the morning?	
d.	Remote memory	• Ask about past events, e.g., Do you remember your wedding day/birthday?	
IV.		**Intellectual function**	
a.	Abstract thinking	• Ask the client to explain a proverb.	
b.	Computation	• Ask the client to solve simple to complex problems.	
c.	Ability to read	• Provide a newspaper/magazine to the patient and watch for their comprehension ability.	
d.	General knowledge	• Ask any general knowledge question and find the relevancy of answer.	
e.	Insight	• Ask the client to give an opinion on what may be the cause of a particular problem?	
f.	Judgment	• Present any situation/problem to the patient and ask him/her to find a solution for that problem	
g.	Thought process	• Watch whether the patient's thought process is spontaneous, natural, clear or relevant?	
h.	Language	• Assess the content fluency articulation of speech. • Does the patient answer appropriately? • Check for aphasia	
i.	Reasoning	• Ask the client to explain/justify his/her own decision in certain matters.	
		Impression:	
		II. Cranial nerve assessment	
	Cranial nerves and function	*Test*	*Findings*
1.	I. Olfactory (sensory) smell	• Ask the patient to close one nostril, close both eyes, and sniff from a bottle with coffee, spice, soap, or some other readily recognized odors. The same is done for the other nostril.	
2.	II. Optic (sensory) vision	• Ask the patient to close one eye, look directly at the examiner's nose, and indicate when an object (finger, pencil tip or head of pin) is presented from the periphery of each of the four visual field quadrants. The same test is repeated for the other eye. • Visual acuity is tested with a Snellen chart.	
3.	III. Oculomotor (motor) upward, downward, and medial eye movements	• The oculomotor (CN III), trochlear (CN IV), and abducens (CN VI) nerves are tested together. • Ask the patient to follow the examiner's finger as it moves horizontally, vertically (making a cross), and diagonally (making an X).	
4.	IV. Trochlear nerve (motor) upward, downward, and medial eye movements	• To test pupillary constriction, shine a light into the pupil of one eye and look for ipsilateral constriction of the same pupil and contralateral (consensual) constriction of the opposite eye. • The size and shape of the pupils are also noted. Watch PERRLA—Pupil are Equal in size, Round, and Reactive to Light and Accommodation.	
5.	V. Trigeminal (mixed) sensory—facial sensation and motor—mastication	• The sensory component of the trigeminal nerve (CN V) is tested by having the patient identify light touch (cotton) and pinprick in each of the three divisions (ophthalmic, maxillary, and mandibular) of the nerve on both sides of the face. • The motor component is tested by asking the patient to clench the teeth and palpate the masseter muscles just above the mandibular angle.	
6.	VI. Abducens (motor) lateral eye movement	CN VI is tested along with CN III and IV.	
7.	VII. Facial (mixed) sensory—taste and motor—facial movement	• Its function is tested by asking the patient to raise the eyebrows, close the eyes tightly, purse the lips, draw back the corners of the mouth in an exaggerated smile, and frown and to make a whistle sound.	

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S.No.	Features/functions	Test	Findings
8.	VIII. Acoustic nerve (sensory) hearing and equilibrium	• Ask the patient to close the eyes and indicate when a ticking clock is heard as the stimulus is brought closer to the ear and the distance from the patient's ear to the sound source when first heard is recorded. Each ear is tested individually. • Check hearing acuity using a tuning fork. Do Rinne and Weber tests.	
9.	IX. Glasso pharngeal Glossopharyngeal nerve (mixed) sensory—taste and motor—swallowing	• The glossopharyngeal and the vagus nerves are tested together. • Elicit gag reflex (bilateral contraction of the palatal muscles initiated by stroking or touching either side of the posterior pharynx or soft palate with a tongue blade). • Ask the patient to phonate by saying "ah" and note the bilateral symmetry of elevation of the soft palate. Apply a small amount of salt or sugar to the anterior two-thirds of the tongue. Ask the client to identify the taste.[4,5]	
10.	X. Vagus (mixed) sensory—muscles of the pharynx, larynx, and soft palate and motor—swallowing	• Tested along with CN IX.	
11.	XI. Spinal accessory nerve (motor) turning of head and elevation of shoulder	• Ask the patient to shrug the shoulders against resistance and turn the head to either side against resistance.	
12.	XII. Hypoglossal (motor) movement of tongue	• Ask the patient to protrude the tongue. It should protrude in the midline. The patient should also be able to push the tongue to either side against the resistance of a tongue blade.	

Impression:

III. Motor assessment/assessment of cerebellar function

S.No.	Test	Response
1.	Finger to nose movements (point to point test)	It involves having the patient alternately touch the nose with the index finger, then touch the examiner's finger. The examiner repositions the finger so that the patient can adjust to a new distance each time the examiner's finger is touched.
2.	Rapid alternating movements	First, the patient is instructed to pat his or her thigh as fast as possible with each hand separately. Then the patient is instructed to alternately pronate and supinate the hand as rapidly as possible. Lastly, the patient is asked to touch each of the fingers with the thumb in a consecutive motion. Speed, symmetry, and degree of difficulty are noted.
3.	Romberg test	The patient is asked to stand with the feet together and arms at the side, first with eyes open and then with eyes closed for 20–30 seconds. Slight swaying is normal, loss of balance is abnormal.
4.	Heel-to-shin test	The heel-to-shin test involves having the patient place one heel on the opposite shin below the knee and moving the heel down the shin to the ankle. This is repeated for the other leg. These movements should flow smoothly without jerking or hesitation.
5.	Heel-to-toe walk	Ask the patient to walk heel-to-toe in a straight line. Observe for normal coordination and balance.
6.	Muscle strength	Muscle strength score.
	Assessing the patient's ability to flex or extend the extremities against resistance tests muscle strength.	5—Indicates full power of contraction against gravity and resistance or normal muscle strength. 4—Indicates fair but not full strength against gravity and a moderate amount of resistance or slight weakness. 3—Indicates just sufficient strength to overcome the force of gravity or moderate weakness. 2—Able to move but not to overcome gravity. 1—Flickering movements 0—No muscular contraction.
7.	Muscle tone	Assess the tension present in the muscle at rest by palpating various muscles at rest and during passive movement. Watch for spasticity and rigidity.

(*Continued*)

		Impression	
		IV. Assessment of sensory function	
S.No.	*Features/functions*	*Test*	*Findings*
1.	Tactile sensation	Lightly touch with a cotton wisp to corresponding areas on each side of the body. The sensitivity of proximal parts of the extremities is compared with that of distal parts.	
2.	Localization of stimuli	The examiner gently strokes a cotton wisp over each of the four extremities and asks the patient to indicate when the stimulus is felt by saying "touch".	
3.	Test of pain sensation	Pain and temperature sensations are transmitted together in the lateral part of the spinal cord, so it is unnecessary to test for temperature sense in most circumstances. Determining the patient's sensitivity to a sharp object can assess superficial pain perception. The patient is asked to differentiate between the sharp and dull ends of a broken wooden tongue blade; using a safety pin is inadvisable because it breaks the integrity of the skin.	
4.	Test of temperature sensation	The sensation of temperature is tested by applying tubes of warm and cold water to the skin and asking the patient to identify the stimuli with the eyes closed.	
5.	Test of vibration sensation	Vibration and proprioception are transmitted together in the posterior part of the cord. Vibration may be evaluated through the use of a low-frequency (128- or 256-Hz) tuning fork. The handle of the vibrating fork is placed against a bony prominence, and the patient is asked whether he or she feels a sensation and is instructed to signal the examiner when the sensation ceases.	
6.	Tactile discrimination. Stereognosis	Steregnosis (ability to perceive the form and nature of objects) is tested by having the patient identify the size and shape of easily recognized objects (e.g., coins, keys, and a safety pin) placed in the hands again with the eyes closed.	
7.	Graphethesia	Graphesthesia (ability to feel writing on the skin) is tested by having the patient identification number traced on the palm of the hands or back with eyes closed.	
8.	Extinction/two-point discrimination	Sensory extinction or inattention is evaluated by touching both sides of the body simultaneously. An abnormal response occurs when the patient perceives the stimulus only on one side. The other stimulus is "extinguished".	
9.	Position sense	Position sense is assessed by placing the thumb and forefinger on either side of the patient's forefinger or great toe and gently moving the finger up or down. The patient, with his or her eyes closed, is asked to indicate the direction in which the digit is moved.	
		V. Reflexes	
		Deep tendon reflexes	
1.	Biceps Reflex	Place the thumb over the biceps tendon in the antecubital space and strike the thumb with a hammer. The patient should have the arms partially flexed at the elbow with the palms up. The normal response is flexion of the arm at the elbow or contraction of the biceps muscle that can be felt by the examiner's thumb.	
2.	Triceps reflex	Strike the triceps tendon above the elbow while the patient's arm is flexed. The normal response is an extension of the elbow or visible contraction of the triceps.	
3.	Brachioradialis reflex	Strike the radius 3–5 cm above the wrist while the patient's arm is relaxed. The normal response is flexion and supination of the forearm or visible contraction of the brachioradialis muscle.	
4.	Patellar reflex	Strike the patellar tendon just below the patella. The patient can be in a sitting or lying position. The normal response is an extension of the knee with contraction of the quadriceps.	
5.	Ankle (Achilles) reflex	Strike the Achilles tendon while the patient's leg is flexed at the knee and the foot is dorsiflexed at the ankle. The normal response is plantar flexion at the ankle.	
		Superficial Reflexes	
6.	Gag reflex	Gently touch the posterior pharynx with a cotton-tipped applicator; first on one side of the uvula and then the other. Positive response is an equal elevation of the uvula.	
7.	Plantar reflex	Stroking the lateral side of the foot with a tongue blade normally causes toe flexion.	
8.	Corneal reflex	Using a clean wisp of cotton lightly touch the outer corner of each eye on the sclera. The reflex is present if the action elicits a blink.	

(*Continued*)

S.No.	*Features/functions*	*Test*	*Findings*
9.	Babinski reflex	Stroke the lateral aspect of the sole of the foot, the toes contract and are drawn together. In patients with a defective motor system the toes fan out and are drawn back.	
		Impression:	
		VI. Screening test score	
	Pain rating scale score	Use any of the pain rating scales and find the score: simple descriptive pain intensity scale/0–10 numeric pain intensity scale/visual analog scale (VAS)	
	Glasgow coma scale score	Find the score for eyes open, best verbal response/best motor response	

References

1. Williams LS, Hopper PD. Understanding Medical Surgical Nursing, fifth edition. JAYPEE publications; 2017.
2. Kitchen ND. Clinical Neurology and Neurosurgery. Manson Publishing Ltd.; 2013.
3. Retrieved from www.nueroscience2019.com.
4. Sue Woodward (2009), Neuroscience nursing, CBS publication
5. TP Prema KF Graicy, Essentials of Neurological and Neurosurgical Nursing, Jaypee Publication