



King Saud University

College of Nursing

Medical Surgical Department

Application of Health Assessment

NUR 225

Module Nine

Physical examination of Nervous System



Outline :

- I. Review anatomy and physiology of nervous system (NUR 224)
- II. Obtaining health history
- III. Preparing Neurologic Examination Equipment.
- IV. Neurologic Examination - five sections.
 1. Cerebral function(mental status, level of consciousness, pupil assessment)
 2. Testing Cranial Nerves
 3. Motor Examination (muscle strength, gait and coordination)
 4. Sensory Examination
 5. Reflexes Examination

II. Obtaining health history:

Chief complaint:

Headache, loss of consciousness ,Convulsion or seizure, Head injury, Dizziness Tremors , Muscle weakness or paralysis ,Incoordination Numbness or tingling loss of memory , Speech impairment ,Disorientation, Mood swings ,Nervousness Anxiety ,Depression , Change in vision, hearing, smell, test, or touch.

Past history: e.g. major illness, injury and accident ,surgical procedure

Family history: e.g. migraine headache , brain tumor

Current health problem: Diabetic, hypertensive, renal failure

Medication: Hypoglycemic drugs, anticoagulant therapy

Habits: Alcohol, abuse drug

III. Preparing Neurologic Examination Equipment :

General: Examination Gloves

Cranial Nerve Examination: Cotton tipped Applicators; Newsprint to read; Ophthalmoscope; Paperclip penlight Snellen Chart, Sterile Cotton Balls; Substances to smell or taste (soap , coffee, vanilla, salt, sugar, lemon juice) ; Tongue Depressor; Tuning Fork

Motor and Cerebellar Examination: Tape measure;

Sensory Examination: Cottonballs/ objects to feel (key) ; paperclip; testubes containing hot and cold water; Tuning fork

Reflex Examination : Cotton tipped applicator; Percussion Hammer

IV. Five sections of Neurologic Examination

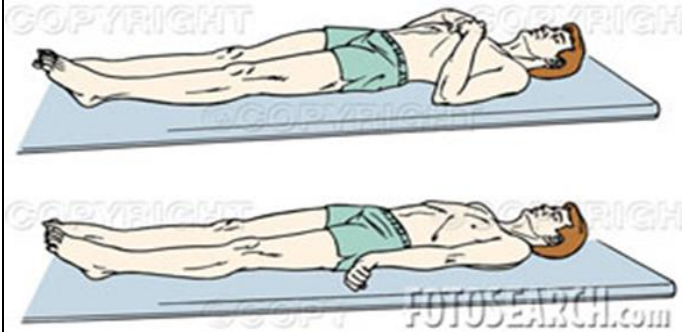
1. Cerebral function(mental status, level of consciousness, pupil assessment)
2. Testing Cranial Nerves
3. Motor Examination (muscle strength, gait and coordination)
4. Sensation Examination
5. Reflexes Examination

Technique examination	Normal finding	Abnormal finding
<p>1. Cerebral function: A. mental status examination:</p> <p><u>Speech & language</u> (note quantity, rate, loudness, clarity and fluency of speech)</p> <p><u>Orientation</u> (time, place, personal) Ask the client about his name, his family member name ,time during examiantion ,date day ,hospital Name ,duration of his illness.</p> <p><u>Memory</u> (immediate recall, recent memory, remote memory) <u>Immediate recall:</u> *Ask the client to repeat number ex: 2345.Spoken slowly *Ask the client to repeat them backward. <u>Recent memory:</u> *Ask the client to recall the recent event of the day. *Ask the client to recall information given early in the interview.</p> <p><u>Remote memory:</u> Ask the clients about his birthdays, school, and jobs .</p> <p>Attention and calculation: To test the client ability to concentrate or attention span. *Ask client to count back ward from 10-0. *Assess calculation ability such as addition, subtraction and multiplication.</p>	<p>Client will speak clearly without any difficulty.</p> <p>Client is alert and oriented to time ,place ,persons.</p> <p>Client will repeat the number without difficulty.</p> <p>Recent and remote memory intact.</p> <p>Client count backward from 10-0.</p>	<p>Client will have aphasia, dysarthria (difficulty in forming words).</p> <p>Disorientation and does not recognnize family.</p> <p>Client will have difficulty to repeat the number. Impaired memory.</p> <p>Client will has difficult to count backward.</p>

B. Level of consciousness:

The single most valuable indicator of neurological function is the individual's level of consciousness

- **Alert:** Follow commands and responds completely and appropriately to stimuli .
- **Lethargic:** The patient is drowsy has delayed responses to verbal stimuli .
- **Stuporous:** Requires vigorous stimulation for a response
- **Comatose:** The patient is completely unresponsive.



The Glasgow coma scale (GCS)

TABLE 38-2		
Glasgow Coma Scale		
BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	Best response	15
	Comatose client	8 or less
	Totally unresponsive	3

C. Pupil assessment:

- Size of the pupils
- Shape of pupils
- Equality of pupils
- Observe reaction to light

Pupils are normally equal in size (3 to 5 mm). An inequality in pupil size of less than 0.5 mm occurs in 20% of clients. This condition, called anisocoria, is normal

Unilateral dilation and non-reactive is sign of increased intracranial pressure
 Irregularly shaped irises, miosis, mydriasis, and anisocoria
 If the difference in pupil size changes throughout pupillary response tests, the inequality of size is abnormal

2. Testing Cranial Nerves:

Cranial nerve I : The olfactory nerves

- For all assessments of the cranial nerves, have client sit in a comfortable position at your eye level.
- Ask the client to clear the nose to remove any mucus, then to close eyes, occlude one nostril, and identify a scented object that you are holding such as soap, coffee, or vanilla
- Repeat procedure for the other nostril.

CN II (optic)

- Use a Snellen chart to assess vision in each eye
- Ask the client to read a newspaper or magazine paragraph to assess near vision.
- Assess visual fields of each eye by confrontation.
- Use an ophthalmoscope to view the retina and optic disc of each eye.

CN III (oculomotor), IV (trochlear), and VI (abducens).

- Inspect margins of the eyelids of each eye.
- Assess extraocular movements. If nystagmus is noted, determine the direction of the fast and slow phases of movement

Client correctly identifies scent presented to each nostril.

OLDER ADULT CONSIDERATIONS : Some older clients' sense of smell may be decreased.

Client has 20/20 vision OD (right eye) and OS (left eye). Client reads print at 14 inches without difficulty

Full visual fields

Retina is pink Round red reflex is present, optic disc is 1.5 mm, round or slightly oval, well-defined margins, creamy pink with paler physiologic cup.

Eyelid covers about 2 mm of the iris.

Eyes move in a smooth, coordinated motion in all directions (the six cardinal fields).

Inability to smell (neurogenic anosmia) or identify the correct scent may indicate **olfactory tract lesion or tumor or lesion of the frontal lobe.** **Loss of smell** may also be **congenital** or due to other causes such as **nasal or sinus problems; injury of nerve tissue** at the top of the nose or the higher smell pathways in the brain due to **viral upper respiratory infection; Smoking and use of cocaine**

- Difficulty reading Snellen chart, missing letters, and squinting.
- Client reads print by holding closer than 14 inches or holds print farther away as in presbyopia, which occurs with aging.
- Loss of visual fields may be seen in retinal damage or detachment, with lesions of the optic nerve, or with lesions of the parietal cortex
- Papilledema (swelling of the optic nerve) results in blurred optic disc margins and dilated, pulsating veins. Papilledema occurs with increased intracranial pressure from intracranial hemorrhage or a brain tumor. Optic atrophy occurs with brain tumors

Ptosis (drooping of the eyelid) is seen with weak eye muscles such as in myasthenia gravis

Nystagmus (Rhythmic Oscillation of the eyes): indicates cerebellar disorders.

- Assess pupillary response to light (direct and indirect) and accommodation in both eyes

Cranial nerve V: the trigeminal nerve

Test motor function. Ask the client to clench the teeth while you palpate the temporal and masseter muscles for contraction.

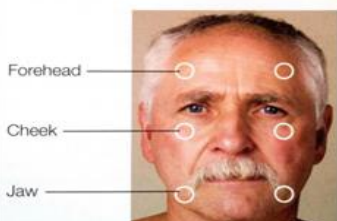
CLINICAL TIP This test may be difficult to perform and evaluate in the client without teeth.

Test sensory function.

Tell the client: “I am going to touch your forehead, cheeks, and chin with the sharp or dull side of this paper clip. Please close your eyes and tell me if you feel a sharp or dull sensation. Also tell me where you feel it” Vary the sharp and dull stimulus in the facial areas and compare sides. Repeat test for light touch with a wisp of cotton. To avoid transmitting infection, use a new object with each client. Avoid “stabbing” the client with the object’s sharp side.



Trigeminal nerve assessment sites



- Bilateral illuminated pupils constrict simultaneously.
- Pupil opposite the one illuminated constricts simultaneously.

Temporal and masseter muscles contract bilaterally.

The client correctly identifies sharp and dull stimuli and light touch to the forehead, cheeks, and chin.

Limited eye movement through the six cardinal fields of gaze: indicates increased intracranial pressure.

Paralytic Strabismus : indicates paralysis of the oculomotor, trochlear, or abducens nerves .

- Dilated Pupil: oculomotor nerve paralysis.
- Constricted Fixed pupil : narcotics abuse or damage to the pons.
- Unilaterally dilated pupil unresponsive_ to light or accommodation: damage to cranial nerve III (oculomotor)
- Constricted Pupil unresponsive_ to light or accommodation: lesions of the sympathetic nervous system.
- Bilateral muscle weakness with peripheral or central nervous system dysfunction.

- Unilateral muscle weakness may indicate a lesion of cranial nerve V (trigeminal).
- Decreased contraction in one of both sides. Asymmetric strength in moving the jaw may be seen with lesion or injury of the 5th cranial nerve.
- Pain occurs with clenching of the teeth

Inability to feel and correctly identify facial stimuli occurs with lesions of the trigeminal nerve or lesions in the spinothalamic tract or posterior columns

Test corneal reflex.

Ask the client to look away and up while you lightly touch the cornea with a fine wisp of cotton (Fig. 25-12). Repeat on the other side.

CLINICAL TIP: This reflex may be absent or reduced in clients who wear contact lenses.

Test CN VII (facial).

Test motor function.

Ask the client to: smile, frown and wrinkle forehead; show teeth; puff out cheeks; purse lips; raise eyebrows; close eyes lightly against resistance



Sensory function of CN VII is not routinely tested. If testing is indicated, however, touch the anterior two-thirds of the tongue with a moistened applicator dipped in salt, sugar, or lemon juice. Ask the client to identify the flavor. If the client is unsuccessful, repeat the test using one of the other solutions. If needed, repeat the test using the remaining solution.

CLINICAL TIP: Make sure that the client leaves the tongue protruded to identify the flavor. Otherwise, the substance may move to the posterior third of the tongue (vagus nerve innervation). The posterior portion is tested similarly to evaluate functioning of cranial nerves IX and X. **The client should rinse the mouth with water between each taste test.**

Eyelids blink bilaterally.


Client smiles, frowns, wrinkles forehead, shows teeth, puffs out cheeks, purses lips, raises eyebrows, and closes eyes against resistance. Movements are symmetric.

Client identifies correct flavor.
OLDER ADULT CONSIDERATIONS
In some older clients, the sense of taste may be decreased.

An absent corneal reflex may be noted with lesions of the trigeminal nerve or lesions of the motor part of cranial nerve VII (facial).

Inability to close eyes, wrinkle forehead, or raise forehead along with paralysis of the lower part of the face on the affected side is seen with Bell's palsy (a peripheral injury to cranial nerve VII [facial]). Paralysis of the lower part of the face on the opposite side affected may be seen with a central lesion that affects the upper motor neurons, such as from stroke.

Inability to identify correct flavor on anterior two-thirds of the tongue suggests impairment of cranial nerve VII (facial).

<p><u>Test CN VIII (acoustic/vestibulocochlear).</u> Test the client’s hearing ability in each ear and perform the Weber and Rinne tests to assess the cochlear (auditory) component of cranial nerve VIII CLINICAL TIP The vestibular component, responsible for equilibrium, is not routinely tested. In comatose clients, the test is used to determine integrity of the vestibular system.</p> <p><u>Test CN IX (glossopharyngeal) and X (vagus).</u> Test motor function. Ask the client to open mouth wide and say “ah” while you use a tongue depressor on the client’s tongue</p> <p><u>Test the gag reflex</u> by touching the posterior pharynx with the tongue depressor. CLINICAL TIP Warn the client that you are going to do this and that the test may feel a little uncomfortable.</p> <p>Check the client’s ability to swallow by giving the client a drink of water. Also note the client’s voice quality.</p> <p><u>Test CN XI (spinal accessory).</u> Ask the client to shrug the shoulders against resistance to assess the trapezius muscle</p> <p>Ask the client to turn the head against resistance, first to the right then to the left, to assess the sternocleidomastoid muscle</p> 	<p>Client hears whispered words from 1–2 feet. Weber test: Vibration heard equally well in both ears. Rinne test: AC > BC (air conduction is twice as long as bone conduction).</p> <ul style="list-style-type: none"> • Uvula and soft palate rise bilaterally and symmetrically on phonation. • Gag reflex intact. Some normal clients may have a reduced or absent gag reflex. • Client swallows without difficulty. No hoarseness noted. <p>There is symmetric, strong contraction of the trapezius muscles.</p> <p>There is strong contraction of sternocleidomastoid muscle on the side opposite the turned face.</p>	<p>Vibratory sound lateralizes to good ear in sensorineural loss. Air conduction is longer than bone conduction, but not twice as long, in a sensorineural loss</p> <ul style="list-style-type: none"> • Soft palate does not rise with bilateral lesions of cranial nerve X (vagus). Unilateral rising of the soft palate and deviation of the uvula to the normal side are seen with a unilateral lesion of cranial nerve X (vagus). • An absent gag reflex may be seen with lesions of cranial nerve IX (glossopharyngeal) or X (vagus). • Dysphagia or hoarseness may indicate a lesion of cranial nerve IX (glossopharyngeal) or X (vagus) or other neurologic disorder. <p>Asymmetric muscle contraction or drooping of the shoulder may be seen with paralysis or muscle weakness due to neck injury or torticollis.</p> <p>Atrophy with fasciculations may be seen with peripheral nerve disease.</p>
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<p>B. Evaluate gait and balance. To assess gait and balance, ask the client to walk naturally across the room. Note posture, freedom of movement, symmetry, rhythm, and balance.</p> <p>CLINICAL TIP It is best to assess gait when the client is not aware that you are directly observing the gait.</p> <p>Ask the client to walk in heel-to-toe fashion (tandem walking; next on the heels, then on the toes. Demonstrate the walk first; then stand close by in case the client loses balance.</p> <p>OLDER ADULT CONSIDERATIONS For some older clients, this examination may be very difficult.</p>	<p>OLDER ADULT CONSIDERATIONS Some older clients may normally have hand or head tremors or dyskinesia (repetitive movements of the lips, jaw, or tongue).</p> <p>Gait is steady; opposite arm swings.</p> <p>OLDER ADULT CONSIDERATIONS : Some older clients may have a slow and uncertain gait. The base may become wider and shorter and the hips and knees may be flexed for a bent-forward appearance.</p> <p>Client maintains balance with tandem walking. Walks on heels and toes with little difficulty.</p>	<p>Tic (twitch of the face, head, or shoulder) from stress or neurologic disorder. Unusual, bizarre face, tongue, jaw, or lip movements from chronic psychosis or long-term use of psychotropic drugs. Tremors (rhythmic, oscillating movements) from Parkinson’s disease, cerebellar disease, multiple sclerosis (with movement), hyperthyroidism, or anxiety.</p> <p>Slow, twisting movements in the extremities and face from cerebral palsy.</p> <p>Brief, rapid, irregular, jerky movements (at rest) from Huntington’s chorea.</p> <p>Slower twisting movements associated with spasticity (athetosis) seen with cerebral palsy.</p> <p>Gait and balance can be affected by disorders of the motor, sensory, vestibular, and cerebellar systems. Therefore, a thorough examination of all systems is necessary when an uneven or unsteady gait is noted</p> <p>An uncoordinated or unsteady gait that did not appear with the client’s normal walking may become apparent with tandem walking or when walking on heels and toes.</p>
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<p><u>Perform the Romberg test. :</u></p> <p>Ask the client to stand erect with arms at side and feet together. Note any unsteadiness or swaying. Then with the client in the same body position, ask the client to close the eyes for 20 seconds. Again note any imbalance or swaying. Stand near the client to prevent a fall should the client lose balance.</p> <p>Now ask the client to stand on one foot and to bend the knee of the leg the client is standing on. Then ask the client to hop on that foot. Repeat on the other foot.</p> <p>OLDER ADULT CONSIDERATIONS This test is often impossible for the older adult to perform because of decreased flexibility and strength. Moreover, it is not usual to perform this test with the older adult because it puts the client at risk.</p> <p>C. Assess coordination.</p> <p>Demonstrate the finger-to-nose test to assess accuracy of movements, then ask the client to extend and hold arms out to the side with eyes open. Next, say, "Touch the tip of your nose first with your right index finger, then with your left index finger. Repeat this three times" Next, ask the client to repeat these movements with eyes closed.</p> <p>Assess rapid alternating movements. Have the client sit down. First, ask the client to touch each finger to the thumb and to increase the speed as the client progresses. Repeat with the other side.</p> <p>Next, ask the client to put the palms of both hands down on both legs, then turn the palms</p>	<p>Client stands erect with minimal swaying, with eyes both open and closed.</p> <p>Bends knee while standing on one foot; hops on each foot without losing balance.</p> <p>Client touches finger to nose with smooth, accurate movements, with little hesitation.</p> <p>CLINICAL TIP When assessing coordination of movements, bear in mind that normally the client's dominant side may be more coordinated than the nondominant side.</p> <p>Client touches each finger to the thumb rapidly.</p> <p>OLDER ADULT CONSIDERATIONS For some older clients, rapid</p>	<p>Positive Romberg test: Swaying and moving feet apart to prevent fall is seen with disease of the posterior columns, vestibular dysfunction, or cerebellar disorders.</p> <p>Inability to stand or hop on one foot is seen with muscle weakness or disease of the cerebellum.</p> <p>Uncoordinated, jerky movements and inability to touch the nose may be seen with cerebellar disease.</p> <p>Inability to perform rapid alternating movements may be seen with cerebellar disease, upper motor neuron weakness, or extrapyramidal disease.</p>
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up, then turn the palms down again Ask the client to increase the speed.

Perform the heel-to-shin test. Perform the heel-to-shin test. Ask the client to lie down (supine position) and to slide the heel of the right foot down the left shin . Repeat with the other heel and shin.



Sensory System

Assess light touch, pain, and temperature sensations. For each test, ask clients to close both eyes and tell you what they feel and where they feel it. Scatter stimuli over the distal and proximal parts of all extremities and the trunk to cover most of the dermatomes. It is not necessary to cover the entire body surface unless you identify abnormal symptoms such as pain, numbness, or tingling.

To test light touch sensation, use a wisp of cotton to touch the client

To test pain sensation, use the blunt and sharp ends of a safety pin or paper clip.

To test temperature sensation, use test tubes filled with hot and cold water.

CLINICAL TIP Test temperature sensation only if abnormalities are found in the client’s ability to perceive light touch and pain sensations. Temperature and pain sensations travel in the lateral spinothalamic tract, **thus temperature need not be tested if pain sensation is intact.**

alternating movements are difficult because of decreased reaction time and flexibility. Client rapidly turns palms up and down.

Client is able to run each heel smoothly down each shin.

Client correctly identifies light touch.

OLDER ADULT CONSIDERATIONS

In some older clients, light touch and pain sensations may be decreased.

Client correctly differentiates between dull and sharp sensations and hot and cold temperatures over various body parts.

Uncoordinated movements or tremors are abnormal findings. They are seen with cerebellar disease (dysdiadochokinesia). Deviation of heel to one side or the other may be seen in cerebellar disease.

Many disorders can alter a person’s ability to perceive sensations correctly. These include peripheral neuropathies (due to diabetes mellitus, folic acid deficiencies, and alcoholism) and lesions of the ascending spinal cord, brain stem, cranial nerves, and cerebral cortex.

Client reports:

ANESTHESIA: absence of touch sensation

HYPESTHESIA: decreased sensitivity to touch

HYPERESTHESIA: increased sensitivity to touch

ANALGESIA : absence of Pain sensation

HYPALGESIA: decreased sensitivity to Pain

<p><u>Test vibratory sensation.</u> Strike a low pitched tuning fork on the heel of your hand and hold the base on the distal radius , forefinger tip, medial malleolus and, last, the tip of the great toe Ask the client to indicate what he or she feels. Repeat on the other side. CLINICAL TIP If vibratory sensation is intact distally, then it is intact proximally.</p>	<p>Client correctly identifies sensation. OLDER ADULT CONSIDERATIONS: Vibratory sensation at the ankles may decrease after age 70 (Willacy, 2011), but vibration sense is more likely to be absent at the great toe and preserved at the ankle bones (Gilman, 2002).</p>	<p>Inability to sense vibrations may be seen in posterior column disease or peripheral neuropathy (e.g., as seen with diabetes or chronic alcohol abuse).</p>
<p><u>Test sensitivity to position.</u> Ask the client to close both eyes. Then hold the client’s toe or a finger on the lateral sides and move it up or down . Ask the client to tell you the direction it is moved. Repeat on the other side. CLINICAL TIP: If position sense is intact distally, then it is intact proximally.</p>	<p>Client correctly identifies directions of movements. OLDER ADULT CONSIDERATIONS In some older clients, the sense of position of great toe may be reduced.</p>	<p>Inability to identify the directions of the movements may be seen in posterior column disease or peripheral neuropathy (e.g., as seen with diabetes or chronic alcohol abuse).</p>
<p><u>Assess tactile discrimination (fine touch).</u> Remember that the client should have eyes closed. To test stereognosis, place a familiar object such as a quarter, paper clip, or key in the client’s hand and ask the client to identify it. Repeat with another object in the other hand.</p>	<p>Client correctly identifies object.</p>	<p>Inability to correctly identify objects (astereognosis), area touched, number written in hand; to discriminate between two points; or identify areas simultaneously touched may be seen in lesions of the sensory cortex.</p>
<p><u>To test point localization,</u> briefly touch the client and ask the client to identify the points touched.</p>	<p>Client correctly identifies area touched. Same as above.</p>	<p>Same as above</p>
<p><u>To test graphesthesia,</u> use a blunt instrument to write a number, such as 2, 3, or 5, on the palm of the client’s . Ask the client to identify the number. Repeat with another number on the other hand.</p>	<p>Client correctly identifies number written..</p>	<p>Same as above.</p>

V – Reflexes

A. Test deep tendon reflexes.

Position client in a comfortable sitting position.

Use the reflex hammer to elicit reflexes

CLINICAL TIP: If deep tendon reflexes are diminished or absent, two reinforcement techniques may be used to enhance their response. **When testing the arm reflexes, have the client clench the teeth. When testing the leg reflexes, have the client interlock the hands.**

OLDER ADULT CONSIDERATIONS

Reinforcement techniques may also help the older client who has difficulty relaxing.

Test biceps reflex.

Ask the client to partially bend arm at elbow with palm up. Place your thumb over the biceps tendon and strike your thumb with the pointed side of the reflex hammer. Repeat on the other side. (This evaluates the function of spinal levels C5 and C6.)



Assess brachioradialis reflex.

Ask the client to flex elbow with palm down and hand resting on the abdomen or lap. Use the flat side of the reflex hammer to tap the tendon at the radius about 2 inches above the wrist. Repeat on other side. (This evaluates the function of spinal levels C5 and C6.)



Normal reflex scores range from:

1+ (present but decreased)

2+ (normal)

3+ (increased or brisk, but not pathologic).

OLDER ADULT CONSIDERATIONS

Older clients usually have deep tendon reflexes intact, although a decrease in reaction time may slow the response

Elbow flexes and contraction of the biceps muscle is seen or felt. Ranges from 1+ to 3+.

Forearm flexes and supinates. Ranges from 1+ to 3+.

Absent or markedly decreased (**hyporeflexia**) deep tendon reflexes (**rated 0**) occur when a component of the lower motor neurons or reflex arc is impaired; this may be seen with spinal cord injuries.

Markedly hyperactive (hyperreflexia) deep tendon reflexes (**rated 4+**) may be seen with lesions of the upper motor neurons and when the higher cortical levels are impaired.

OLDER ADULT CONSIDERATIONS

Some older clients may have decreased deep tendon reflexes and unstable balance due to peripheral neuropathy, which also causes disturbed proprioception and ability to sense vibration (Burns & Mauermann, 2006).

No response or an exaggerated response is abnormal.

No response or an exaggerated response is abnormal.

Test triceps reflex.

Ask the client to hang the arm freely (“limp, like it is hanging from a clothesline to dry”) while you support it with your nondominant hand. With the elbow flexed, use the flat side of the reflex hammer to tap the tendon above the olecranon process . Repeat on the other side. This evaluates the function of spinal levels C6, C7, and C8.



Assess patellar reflex.

Ask the client to let both legs hang freely off the side of the examination table. Using the flat side of the reflex hammer, tap the patellar tendon, which is located just below the patella. Repeat on the other side. For the client who cannot sit up, gently flex the knee and strike the patella. This evaluates the function of spinal levels L2, L3, and L4.



Test Achilles reflex.

With the client’s leg still hanging freely, dorsiflex the foot. Tap the Achilles tendon with the flat side of the reflex hammer. Repeat on the other side.

For assessing the reflex in the client who cannot sit up, have the client flex one knee and support that leg against the other leg. Dorsiflex the foot and tap the tendon using the flat side of the reflex hammer. This evaluates the function of spinal levels S1 and S2.

Elbow extends, triceps contracts. Ranges from 1+ to 3+.

No response or exaggerated response.

Knee extends, quadriceps muscle contracts. Ranges from 1+ to 3+.

No response or an exaggerated response is abnormal.

OLDER ADULT CONSIDERATION :
In some older clients, the Achilles reflex may be absent or difficult to elicit.

Repeated rapid contractions or oscillations of the ankle and calf muscle are seen with lesions of the upper motor neurons.

<p><u>Test ankle clonus</u> when the other reflexes tested have been hyperactive. Place one hand under the knee to support the leg, then briskly dorsiflex the foot toward the client's head. Repeat on the other side.</p>  <p><u>B. Test superficial reflexes.</u> <u>Assess plantar reflex.</u> CLINICAL TIP Use the handle end of the reflex hammer to elicit superficial reflexes, whose receptors are in the skin rather than the muscles. With the end of the reflex hammer, stroke the lateral aspect of the sole from the heel to the ball of the foot, curving medially across the ball. Repeat on the other side. This evaluates the function of spinal levels L4, L5, S1, and S2. (Babinski response).</p>  <p>Plantar response Babinski's reflex</p>	<p>No rapid contractions or oscillations (clonus) of the ankle are elicited.</p> <p>Normal response is plantarflexion of the foot. Ranges from 1+ to 3+. Flexion of the toes occurs (plantar response) OLDER ADULT CONSIDERATIONS In some older adult clients, flexion of the toes may be difficult to elicit and may be absent.</p>	<p>No response or an exaggerated response is abnormal.</p> <p>The toes will fan out for abnormal (positive Babinski response). Except in infancy, extension (dorsiflexion) of the big toe and fanning of all toes (positive Babinski response) are seen with lesions of upper motor neurons. Unconscious states resulting from drug and alcohol intoxication, brain injury, or subsequent to an epileptic seizure may also cause it</p>
<p><u>Test abdominal reflex.</u> Lightly stroke the abdomen on each side, above and below the umbilicus. This evaluates the function of spinal levels T8, T9, and T10 with the upper abdominal reflex and spinal levels T10, T11, and T12 with the lower abdominal reflex.</p>	<p>Abdominal muscles contract; the umbilicus deviates toward the side being stimulated. CLINICAL TIP The abdominal reflex may be concealed because of obesity or muscular stretching from pregnancies. This is not an abnormality</p>	<p>Superficial reflexes may be absent with lower or upper motor neuron lesions.</p>

<p><u>C.Tests for Meningeal Irritation or Inflammation</u></p> <p>If you suspect that the client has meningeal irritation or inflammation from infection or subarachnoid hemorrhage, assess the client’s neck mobility. First, make sure that there is no injury to the cervical vertebrae or cervical cord. Then, with the client supine, place your hands behind the patient’s head and flex the neck forward until the chin touches the chest if possible.</p> <p><u>Test for Brudzinski’s sign.</u></p> <p>As you flex the neck, watch the hips and knees in reaction to your maneuver.</p> <p><u>Test for Kernig’s sign.</u></p> <p>Flex the client’s leg at both the hip and the knee, then straighten the knee.</p>	<p>Neck is supple; client can easily bend head and neck forward.</p> <p>Hips and knees remain relaxed and motionless. No pain is felt.</p> <p>Discomfort behind the knee during full extension occurs in many normal people.</p>	<p>Pain in the neck and resistance to flexion can arise from meningeal inflammation, arthritis, or neck injury.</p> <p>Pain and flexion of the hips and knees are positive Brudzinski’s signs, suggesting meningeal inflammation.</p> <p>Pain and increased resistance to extending the knee are a positive Kernig’s sign. When Kernig’s sign is bilateral, the examiner suspects meningeal irritation.</p>
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Application of Health Assessment
NUR 225
Medical Surgical Nursing
Physical Examination of the Nervous System

Performance Checklist

Students' Name: _____ Number : _____

The student should be able to:

Performance Criteria	Trial 1			Trial 2	
	Done	Done with Assistance	Not Done	Competent	Not Competent
Preparation Guidelines: Gather pertinent data (subjective and objective data) related to general survey.					
Obtain health history					
Prepare Neurologic Examination Equipment					
Explain procedure.					
1. <u>Cerebral function:</u>					
A. Mental Status Examination:					
• Speech & language (note quantity, rate, loudness, clarity and fluency of speech)					
• Orientation (time, place, personal) Ask the client about his name, his family member name ,time during examination ,date day ,hospital Name ,duration of his illness					
• Memory (immediate recall, recent memory, remote memory)					
• Attention and calculation					
B. Level of consciousness:					
• Alert, Lethargic, Semi coma, Coma					
• Glasgow Coma scale					
C. Pupil assessment:					
• Size of the pupils					
• Shape of pupils					
• Equality of pupils					
• Observe reaction to light					
2. <u>Testing Cranial Nerves:</u>					
1. Cranial nerve I: The olfactory nerves					
2. Cranial nerve II: the optic nerve					
3. Cranial nerve III, IV and VI: the oculomotor, trochlear and abducens					
4. Cranial nerve V: the trigeminal nerve					
5. Cranial nerve VI: the facial nerve					
6. Cranial nerve VIII: the acoustic nerve					

7. Cranial nerve IX and X: the glossopharyngeal and vagus nerves						
8. Cranial nerve XI: the accessory nerve						
9. Cranial nerve XII: the hypoglossal nerve						

3- Motor examination:

A. Assess condition and movement of muscles. Assess the size and symmetry of all muscle groups <ul style="list-style-type: none"> • Assess the strength and tone of all muscle groups • Note any unusual involuntary movements such as fasciculations, tics, or tremors. 						
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B- Evaluate gait and balance.

<ul style="list-style-type: none"> • Ask the client to walk naturally across the room. Note posture, freedom of movement, symmetry, rhythm, and balance. • Ask the client to walk in heel-to-toe fashion (tandem walking; next on the heels, then on the toes. Demonstrate the walk first; then stand close by in case the client loses balance. • Perform the Romberg test. 						
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C. Test for coordination:

<ol style="list-style-type: none"> 1. Finger to nose Test 2. Rapid alternating movements 3. Perform the heel-to-shin test 						
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4. Sensory examination:

<ul style="list-style-type: none"> ▪ Light Touch ▪ Pain ▪ Temperature ▪ Test vibratory sensation. ▪ Test sensitivity to position. ▪ Assess tactile discrimination (fine touch) <ul style="list-style-type: none"> A. Stereognosis B. Test point localization C. Graphesthesia 						
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5- Reflexes examination:

A. Deep tendon reflexes: <ul style="list-style-type: none"> • Biceps reflex • Brachioradialis reflex • Triceps reflex • Patellar Reflex • Achilles Reflexes • Test ankle clonus 						
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B. Superficial reflexes: <ul style="list-style-type: none"> • plantar reflex. • abdominal reflex. 						
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C. Tests for Meningeal Irritation or Inflammation <ul style="list-style-type: none"> • Test for Brudzinski's sign. • Test for Kernig's sign. 						
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Document Findings						
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