



King Saud University

College of Nursing

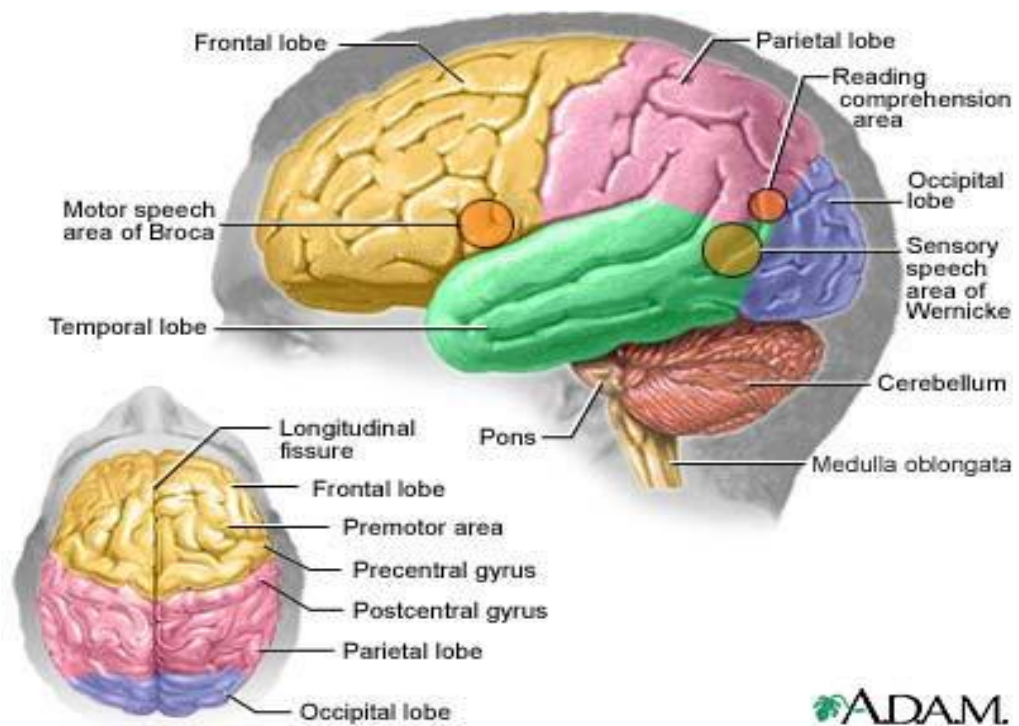
Medical Surgical Department

Application of Health Assessment

NUR 225

Module Nine

Physical examination of Nervous System



The outline :

- review anatomy and physiology of nervous system (224)
- Obtain health history
- Prepare Neurologic Examination Equipment.
- The Neurologic Examination has five sections.

Obtain 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

Prepare Neurologic Examination Equipment :

- *Safety pin*
- *Cotton*
- *Reflex hammer*
- *Flashlight*
- *Tongue blade*
- *Vision screener*
- *Coffee , sugar*
- *Tuning fork*

The Neurologic Examination has five sections:

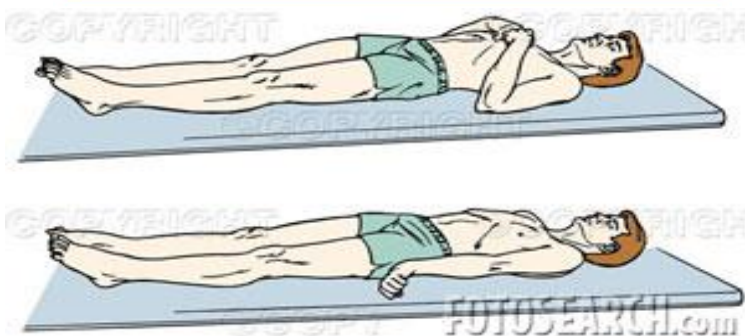
1. Cerebral function(mental status, level of consciousness, pupil assessment)
2. Testing Cranial Nerves
3. Motor Examination (muscle strength, gait and coordination)
4. Sensation Examination
5. Reflexes Examination

<p>1. Cerebral function:</p> <p>A. mental status examination:</p> <p>Speech & language (note quantity, rate, loudness, clarity and fluency of speech) .</p> <p>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.</p> <p>Memory (immediate recall, recent memory, remote memory)</p> <p><u>Immediate recall:</u></p> <p>Ask the client to repeat number ex: 2345.Spoken slowly *Ask the client to repeat them backward.</p> <p><u>Recent memory:</u></p> <p>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></p> <p>Ask the client about his birthdays, school, and jobs .</p> <p>Attention and calculation:</p> <p>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>B. Level of consciousness:</p> <p>The single most valuable indicator of neurological function is the individual's level of consciousness</p>	<p>Client will speak <i>clearly</i> without any difficulty.</p> <p>Client <i>alert</i> and <i>oriented</i> to time ,place ,persons.</p> <p>Client will repeat the number without difficulty. Recent and remote memory intact.</p> <p>Client count back word from 10-0.</p>	<p>Client will have aphasia, dysarthria (difficulty in forming words).</p> <p>Disorientation and does not recognize family.</p> <p>Client will have difficulty to repeat the number. Impaired memory.</p> <p>Client will has difficult to count back word.</p>
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- **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:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3



C. Pupil assessment:

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

Unilateral dilation and non-reactive is sign of increased intracranial pressure

2. Testing Cranial Nerves:

THE OLFACTORY NERVES

Test this with odorous things, one nostril at a time. As most physicians don't carry odorants, the screening exam usually omits the first cranial nerve.

CRANIAL NERVE II: THE OPTIC NERVE

Test this with field of vision and visual acuity. To screen field of vision, test by confrontation (patient looks at your nose while you move fingers).

CRANIAL NERVE III, IV and VI: THE OCULOMOTOR, TROCHLEAR and ABDUCENS NERVES

Test these three nerves with extra ocular movements and pupil function (cranial nerve III). To detect subtle abnormalities, ask patient whether they have double vision (diplopia) during extra ocular movements.

Common causes of cranial nerve I dysfunction include:

-Frontal lobe mass or stroke

-Nasal problems (e.g. allergic or viral).

-Eye disease or injury. Diabetic retinopathy and glaucoma are major causes.

-Occipital lobe mass or stroke. This causes loss of visual field in both eyes. Patients can lose $\frac{1}{2}$ or $\frac{1}{4}$ of a visual field (hemianopia)

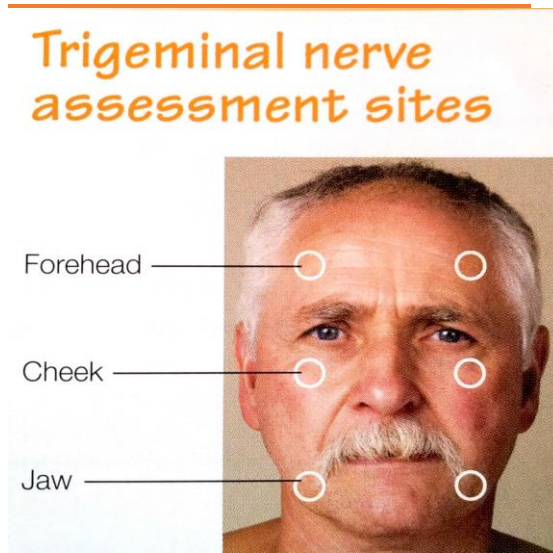
Some common causes for cranial nerve palsies are:

-Brainstem injury or compression (e.g. tumor, stroke, intracranial bleeding

-Diabetic neuropathy (can cause temporary palsies).

CRANIAL NERVE V: THE TRIGEMINAL NERVE

Screen this nerve with facial sensation (to light touch, e.g. q-tip) and strength of the masseter muscles.



CRANIAL NERVE VII: THE FACIAL NERVE

Test this with facial movements: ask the patient to raise eyebrows, show teeth, smile, puff out cheeks, whistle to assess the sensory component test taste by placing items with various tastes on the anterior portion of the tongue



Common cause for CN V abnormality is stroke in the contralateral sensory cortex.

-Injuries to facial strength central to the nucleus (in the cortex or corticospinal tracts) - often caused by a stroke - cause weakness of the lower face, with sparing of the forehead, due to cross-innervation of the forehead. We call this a central facial palsy.

-Injuries to the facial nerve itself (peripheral facial palsy) cause weakness of the entire side of the face, including the forehead. Common causes of peripheral facial palsy are Bell's palsy (idiopathic - cause is unknown) and Lyme disease (which may cause bilateral peripheral facial palsy)

-Sensorineural hearing loss due to age or noise exposure

-Tumors at cerebellopontine angle

-Acoustic neuroma

-Earwax or middle ear disease can cause temporary hearing loss.

CRANIAL NERVE VIII: THE ACOUSTIC NERVE

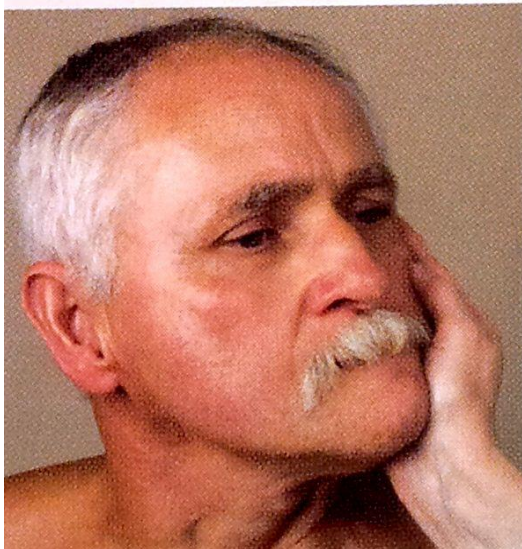
Test the acoustic nerve with hearing test (Weber and rinnes tests).

CRANIAL NERVE IX and X: THE GLOSSOPHARYNGEAL and VAGUS NERVES

- The glossopharyngeal and vagus nerves are tested together because their innervation overlaps in the pharynx. listen to the patient voice then check his gag reflex by touching the tip of tongue blade against his posterior pharynx and asking him to say (aaah) and watching for uvula movement.
- **CRANIAL NERVE XI: THE ACCESSORY NERVE**
 - Test this nerve by asking patient to shrug shoulders or turn head against resistance.

CRANIAL NERVE XII: THE HYPOGLOSSAL NERVE

- Test this nerve by asking patient to protrude tongue and move it from side to side.



A common cause of CN IX and X abnormality is a large stroke. The uvula retracts to the normal

A common cause of CN XI abnormality is neck injury.

CN XII function abnormalities are often caused by stroke. The tongue points toward its weak side.

3- Motor examination:

A-Assess bilateral muscle strength and muscle tone
(see musculoskeletal module)

B- Posture and gait:

Ask client to walk forward and then backward in a straight line, walk heel to toe, walk on toes then on heels, and hop in place on each foot .

C. Test for COORDINATION:

- **Finger to nose:**

Patient touches nose, then examiner's finger, then goes back and forth rapidly



- **Heel to ankle:**

In supine position ask the patient to place the heel on the opposite knee and run it down the skin from the knee to the ankle



- **Rapid alternating movements :**

Ask patient to rapidly pronate and supinate hands

ABNORMAL GAITS

- **SPASTIC HEMIPLEGIA**

Foot is held inverted, leg too straight and swung out, arm flexed and held close to chest - a sign of old stroke or other cortical injury.

- **PARKINSONIAN GAIT**

Shuffling gait, rapid small steps, little arm swing, turning "en bloc".

- **ANTALGIC GAIT**

(pain-avoiding) gait is not due to neurologic illness. In this gait, patient spends minimal time on the painful leg or side.

- **ATAXIC GAIT**

wide-based, irregular gait, a sign of cerebellar disease.

Here is a patient with abnormal finger to nose testing (intention) due to cerebellar disease



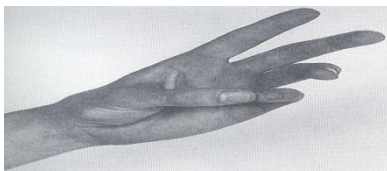
Abnormal jerky motion in cerebellar disease.

Abnormal (dysdiadochokinesia) in patients with cerebellar disease

Abnormal with cortical lesions (tumor or stroke).

- **Fine motor :**

Patient rapidly touches thumb to each finger of same hand.



- **Romberg's sign**

Patient stands with feet together and closes eyes. Patient sways and can't hold position with eyes closed. This is abnormal in posterior column disease (with cerebellar disease, patient can't stand with feet together even with eyes open). Here is a patient with an abnormal Romberg test.

4. SENSORY EXAMINATION:



- **(Pain)**

*Ask client to close eyes touch skin with safety pin, alternating blunt end and sharp

end of pin. Ask the patient with eyes closed to distinguish sharp from dull. Proceed in this order finger, shoulders, toes, thighs and trunk.

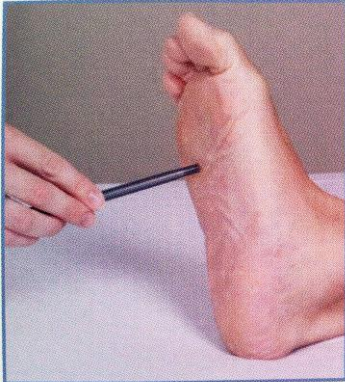
- **(Light Touch) :**

Ask client to close eyes stroke cotton wisp over client's skin

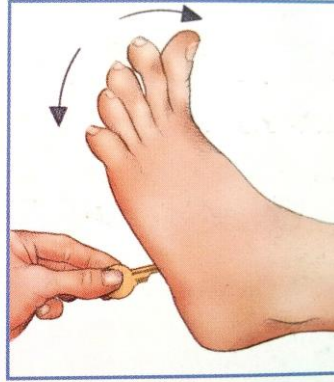
<ul style="list-style-type: none"> ▪ (Vibration): Apply a vibrating tuning fork over bony prominences while his eyes are closed. ▪ (position): proprioception To be tested for position sense , the patient needs intact vestibular and cerebellar function. ▪ (Two point Discrimination): Assess the ability of the cerebral cortex to interpret and integrate information .  <p><u>5-REFLEXES EXAMINATION:</u></p> <p><u>A. Light reflexes:</u></p> <p><u>Corneal reflex :</u></p> <p>Hold client eye unexpectedly from side of the head or brush client cornea with cotton swap.</p> <p><u>Gag and swallow reflex :</u></p> <p>Open client mouth and touching the tip of tongue blade against his posterior pharynx and ask the patient to say "aah"</p> 	<p>Eye blinking immediately</p> <p>great toe goes down(dorsiflexion)</p>	<p>No blinking</p> <p>Absences of gag and swallow reflex are due to impaired cranial nerve IX& X.</p> <p>great toe goes up, other toes fan up occur in paralyzed side in CVA and bilaterally spinal cord injury.</p>
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BABINSKI's SIGN:

Stroke the sole of the foot with the back of your reflex hammer (Babinski used a key), from lateral heel to lateral ball of foot, then medially to medial ball of foot



Plantar response



Babinski's reflex

elbow flexion
(bending)and
contraction of
biceps

B. DEEP TENDON REFLEXES:

Biceps reflex tests:

Place your thumb on biceps tendon and strike your thumb with the reflex hammer.



Brachioradialis reflex:

Strike tendon with flat side of hammer



Triceps: Tap proximal to olecranon.



knee Reflex:



Achilles Reflexes :



GRADING REFLEXES

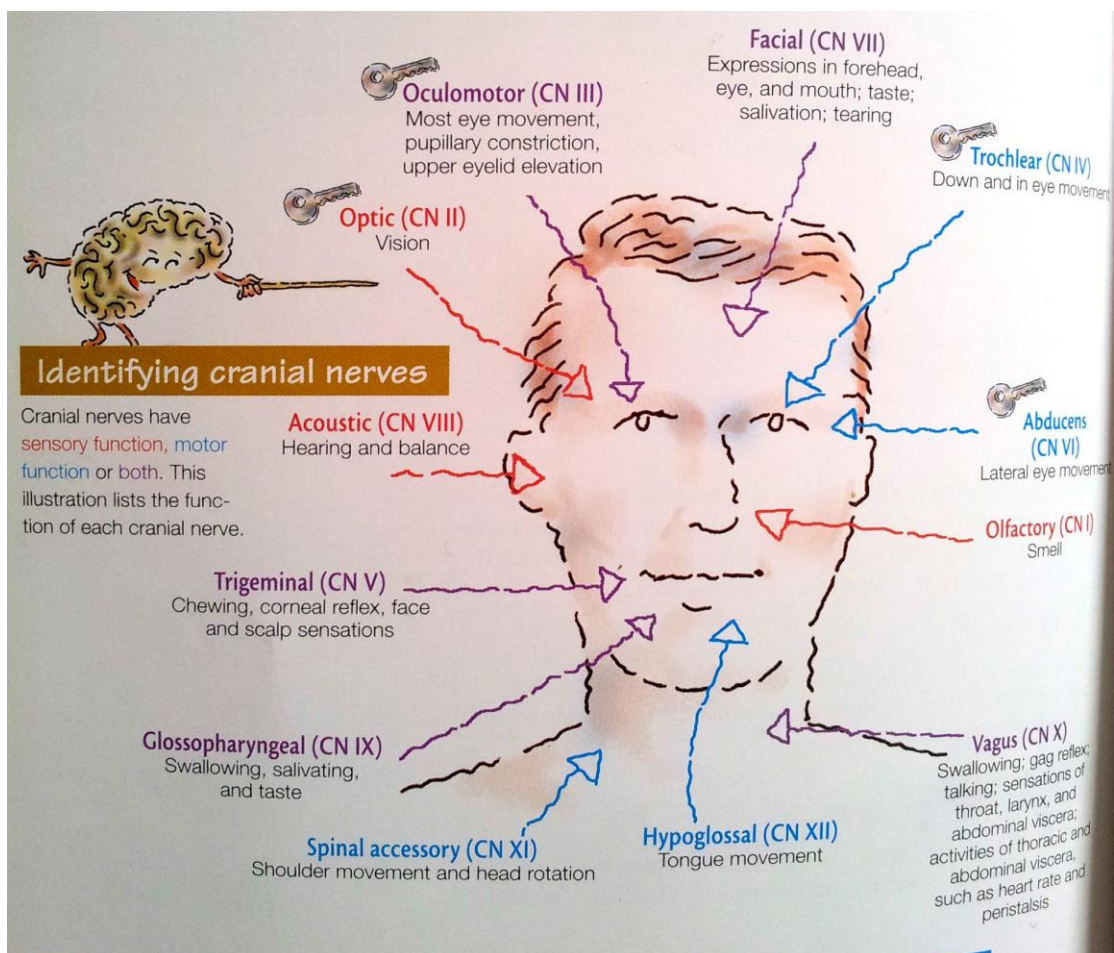
0= No response

1+= Slightly diminished

2+= Average or normal

3+= Increased but normal

4+= Hyperactive, or exaggerated



Abnormal gaits

Gait abnormalities may result from disorders of the cerebellum, posterior columns, corticospinal tract, basal ganglia, and lower motor neurons.

Spastic gait

- Stiff, foot-dragging walk caused by unilateral leg muscle hypertonicity



Scissors gait

- Adduction of thighs with each step, causing knees to hit or cross in a scissorslike movement
- Results from bilateral spastic paresis



Propulsive gait

- Stooped, rigid posture
- Cardinal sign of advanced Parkinson's disease



Steppage gait

- Results from foot-drop (usually caused by lower motor neuron disease), which causes outward rotation of hip and exaggerated flexion of knee
- Toes hit ground first, producing an audible slap



Waddling gait

- Distinctive ducklike walk
- Results from deterioration of the pelvic girdle muscles





Application of Health Assessment

NUR 225

Medical Surgical Nursing

Physical Examination of the Nervous System

Performance Checklist

Student's Number: _____ Students' Name: _____

The student should be able to:

Performance Criteria	Competency Level					Remarks
	Trial 1			Trial 2		
	Done Correctly	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.						
<u>1. Cerebral function:</u>						
A. mental status examination:						

Speech & language (note quantity, rate, loudness, clarity and fluency of speech)						
Orientation (time, place, personal) Ask the cleint about his name, his family member name ,time during examiantion ,date day ,hospital Name ,duration of his illiness						
Memory (immediate recall, recent memory, remote memory)						
Attention and calculation						
B. Level of consciousness:						
Alert, Lethargic, Semi coma, Coma						
C. Pupil assessment: <ul style="list-style-type: none"> • Size of the pupils • Shape of pupils • Equality of pupils • Observe reaction to light 						
2. Testing Cranial Nerves: <ol style="list-style-type: none"> 1. the olfactory nerves 2. cranial nerve ii: the optic nerve 3. cranial nerve iii, iv and vi: the oculomotor, trochlear and abducens nerves 4. cranial nerve v: the trigeminal nerve 5. cranial nerve vii: 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 bilateral muscle strength and muscle tone (see musculoskeletal module)						

B- Posture and gait: Ask client to walk forward and then backward in a straight line, walk heel to toe, walk on toes then on heels, and hop in place on each foot .						
C. Test for COORDINATION:						
1. Finger to nose 2. Heel to ankle 3. Rapid alternating movements 4. Fine motor 5. Romberg's sign						
<u>4. SENSORY EXAMINATION:</u>						
<ul style="list-style-type: none"> ▪ Pain ▪ Temperature ▪ Touch ▪ Proprioception 						
<u>5-REFLEXES EXAMINATION:</u>						
<u>A. Light reflexes:</u>						
<ul style="list-style-type: none"> • Corneal reflex • Gag and swallow reflex • BABINSKI's SIGN 						
<u>B. DEEP TENDON REFLEXES:</u>						
<ul style="list-style-type: none"> • Biceps reflex • Brachioradialis reflex • Triceps reflex • knee Reflex • Achilles Reflexes 						
Document Findings						

