



21

Neurologic System

LEARNING OBJECTIVES

After studying Chapter 21 in the textbook and completing this section of the workbook, students should be able to:

1. Conduct a history related to the neurologic system.
2. Discuss examination techniques for the neurologic system.
3. Identify normal age and condition variations of the neurologic system.
4. Recognize findings that deviate from expected findings.
5. Relate symptoms or clinical findings to common pathologic conditions.

TEXTBOOK REVIEW

Chapter 21 Neurologic System (pages 766–816)

CONTENT REVIEW QUESTIONS

Multiple Choice

Circle the correct answer for each of the following questions.

1. Which of the following disorders is known to be hereditary?
 - a. Creutzfeldt-Jakob disease
 - b. meningitis
 - c. Huntington's chorea
 - d. seizure disorder

2. Unless a problem is suspected, which cranial nerve is not routinely tested?
 - a. I
 - b. II
 - c. V
 - d. XI

3. The patient is able to rapidly touch each finger to his thumb in rapid sequence. What does this finding mean? The patient has:
 - a. intact trochlear and abducens cranial nerves.
 - b. appropriate cerebellar function.
 - c. an intact spinal accessory nerve.
 - d. appropriate kinesthetic sensation.
4. Which question asked by the examiner may help to determine prevention strategies for seizures that a patient is experiencing?
 - a. "Where do your seizures typically begin?"
 - b. "How do you feel after the seizure?"
 - c. "What goes through your mind during the seizure?"
 - d. "Are there any factors or activities that seem to start the seizures?"
5. The patient makes the following statement: "I sometimes feel as if the whole room is spinning." What type of neurologic dysfunction should the examiner suspect?
 - a. peripheral neuropathy dysfunction
 - b. increased intracranial pressure from a brain tumor
 - c. inner ear dysfunction affecting the acoustic nerve
 - d. lesion affecting the frontal lobe
6. The examiner asks the patient to close her eyes, then places a vibrating tuning fork on the patient's ankle and asks her to indicate what is felt. What is being assessed?
 - a. peripheral nerve sensory function
 - b. cranial nerve sensory function
 - c. cortical sensory function
 - d. level of consciousness
7. Which of the following findings should an examiner consider a normal finding if associated with pregnancy?
 - a. decreased gag reflex
 - b. mild seizures
 - c. change in balance
 - d. 4+ deep tendon reflexes
8. Sensory neurologic testing is not usually done with children until they are:
 - a. preschool age.
 - b. kindergarten age.
 - c. middle school age.
 - d. high school age.
9. Jack is a 52-year-old obese man with a history of poorly controlled diabetes. He also smokes. Based on this data, the examiner should recognize that Jack has several risk factors for:
 - a. seizures.
 - b. cerebral vascular accident.
 - c. multiple sclerosis.
 - d. Guillain-Barré syndrome.

10. Which of the following assessment findings should not be surprising to an examiner given Jack's history as described in question 9?
 - a. inability to discern superficial touch or two-point discrimination on the legs
 - b. reduced muscle tone on left side of face
 - c. asymmetry of the face when asked to smile and puff out his cheeks
 - d. slow and uncoordinated movement with finger-nose test
11. A woman complains of weakness in the lower extremities. She is 2 days postpartum. Which of the following problems should the examiner consider?
 - a. depression
 - b. obstetric palsy
 - c. encephalitis
 - d. postpartum stroke
12. The examiner is assessing deep tendon reflex response on a 12-year-old boy. The response is an expected reflex response. Which of the following scores should be documented?
 - a. 1+
 - b. 2+
 - c. 3+
 - d. 4+
13. An older patient tells the examiner, "I have a hard time finding the right words when I am talking." This symptom may be:
 - a. a precursor to a seizure disorder.
 - b. an early symptom of Parkinson's disease.
 - c. an indication of a dysfunction of the temporal lobe.
 - d. associated with a problem of the vestibular apparatus.
14. What response should occur when a patient's field of gaze moves from a distant object to one close to his or her face?
 - a. rapid eye movement
 - b. ptosis of the eye
 - c. constriction of the pupil
 - d. dilation of the iris
15. How can an examiner best gain the cooperation of a child to perform a neurologic examination?
 - a. Ask a parent to perform the exam while the examiner observes the response.
 - b. Ask the mother or father to step out of the room.
 - c. Promise the child a toy or treat if they do what you ask.
 - d. Make various aspects of the neurologic examination a game.
16. Which of the following infant reflex responses is considered normal?
 - a. A 13-month-old baby's toes fan in response to stroking the lateral surface of the infant's sole.
 - b. An 8-month-old infant demonstrates a positive Moro reflex when startled.
 - c. A 3-month-old infant's fingers fan when the examiner's finger is placed in the infant's hand.
 - d. A 2-month-old infant's legs flex up against the body when the infant is held in an upright position, and the dorsal side of the foot touches the table.

17. The examiner is conducting an interview with the mother of an infant as part of the neurologic system examination. Which of the following responses made by the mother may indicate a need for further evaluation?
 - a. "My baby sometimes falls asleep when I am feeding her."
 - b. "My baby seems to jump when there is a loud noise in the room."
 - c. "I drank a glass of wine about once a week while I was pregnant."
 - d. "I had problems with hypertension the entire time I was pregnant."

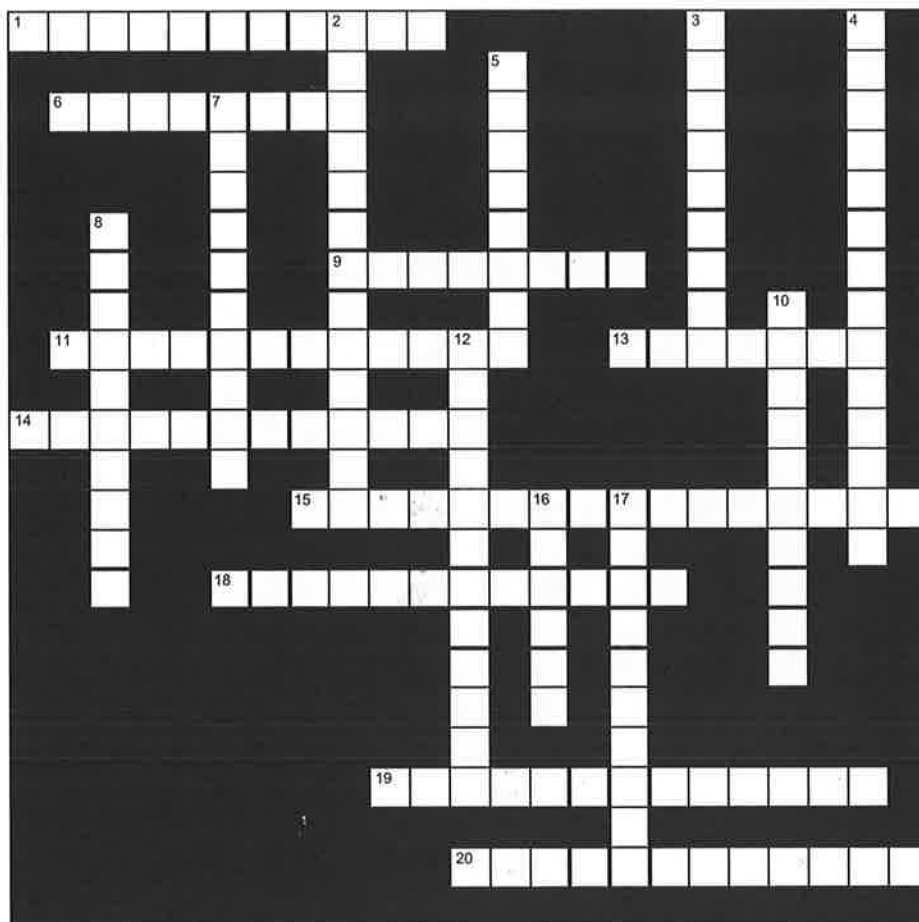
18. A patient demonstrates impaired pain sensation. Which additional test is appropriate to further evaluate this finding?
 - a. heat and cold sensation
 - b. ultrasonic perception
 - c. deep tendon reflex
 - d. transillumination of the involved area

19. The examiner squeezes the patient's bicep muscle as part of an examination. Which of the following responses verbalized by the patient is considered normal?
 - a. "That makes my arm tingle."
 - b. "That makes a burning sensation go up my arm."
 - c. "That is uncomfortable."
 - d. "My arm is twitching."

20. Which of the following findings is associated with an increased risk of skin breakdown and injury?
 - a. inability to feel pressure applied by a monofilament
 - b. inability to identify a familiar object by touch
 - c. inability to identify a letter drawn in the palm of the hand
 - d. 3+ deep tendon reflexes

Terminology Review

Crossword Puzzle



Across

1. Contains the motor cortex; associated with voluntary skeletal movement
6. Behavior used to limit pain, as limping reduces the time of weight bearing on an affected leg
9. Conveys sensory impulses to and from the cerebrum and integrates the impulses between the motor cortex and the cerebrum
11. Responsible for perception and interpretation of sounds, taste, smell, and balance
13. Patient standing with eyes closed is unable to maintain balance when pushed slightly
14. Ability to identify an object by touch
15. Acts as the respiratory center and relay center for major ascending and descending spinal tracts
18. Maintains temperature control, water metabolism, and neuro-endocrine activity
19. Tactual ability to recognize writing on the skin
20. Mediates primitive behaviors that determine survival

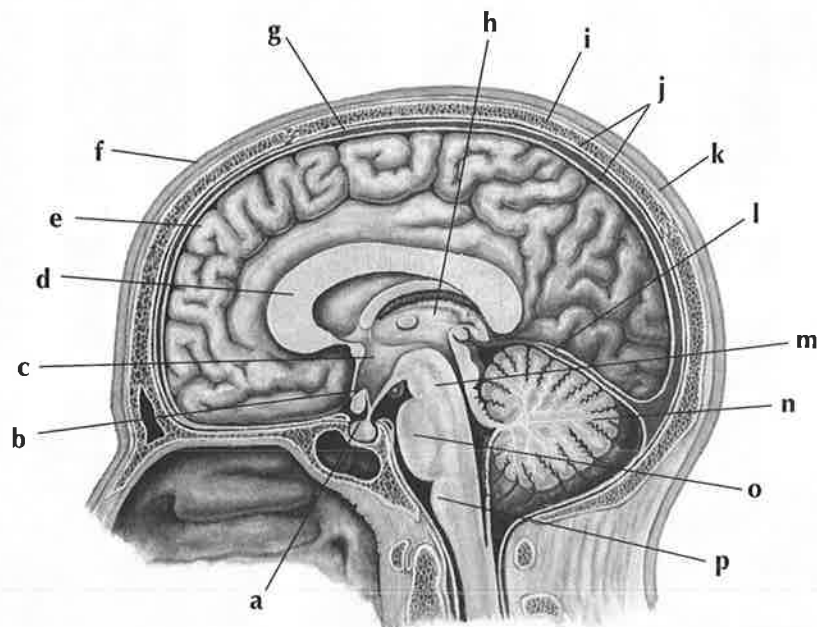
Down

2. Contains the primary visual center and interpretation of visual data
3. Acts as the pathway between the cerebral cortex and spinal cord
4. Stiff neck; associated with meningitis
5. Unexpected gait pattern manifested by an excessive lift of the hip and knee and an inability to walk on the heels
7. Absence of deep tendon reflexes may be an indication of this type of neuron disorder or of peripheral neuropathy
8. Works with the motor cortex of the cerebrum; involved in voluntary movement; processes information from eyes, ears, and touch
10. Attempt to straighten a leg of a supine patient with leg flexion at the knee and hip
12. Pathway and processing station between the cerebral motor cortex and the upper brain stem
16. Inability to coordinate muscle activity during voluntary movement
17. Sign characterized by involuntary flexion of the hips and knees when the neck is flexed

Anatomy Review

Activity 1

On the following illustration, identify the structures of the skull and brain by writing the correct term in the corresponding lettered answer space.



cerebellum
 cerebrum
 corpus callosum
 dura mater (two layers)
 galea aponeurotica
 hypothalamus
 medulla oblongata
 midbrain

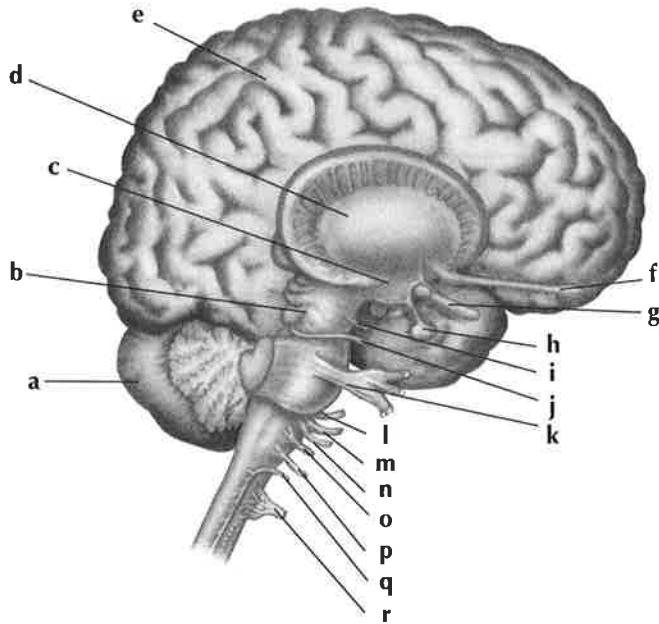
optic chiasma
 pituitary gland
 pons
 skin
 skull
 superior sagittal sinus
 tentorium cerebelli
 thalamus

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____
- h. _____

- i. _____
- j. _____
- k. _____
- l. _____
- m. _____
- n. _____
- o. _____
- p. _____

Activity 2

On the following illustration, identify the structures of the skull and brain by writing the correct term in the corresponding lettered answer space.



- abducens (VI)
- acoustic (VIII)
- cerebellum
- cerebral peduncle
- cerebrum
- facial (VII)
- glossopharyngeal (IX)
- hypoglossal (XII)
- hypothalamus

- oculomotor (III)
- olfactory (I)
- optic (II)
- pituitary gland
- spinal accessory (XI)
- thalamus
- trigeminal (V)
- trochlear (IV)
- vagus (X)

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____
- h. _____
- i. _____

- j. _____
- k. _____
- l. _____
- m. _____
- n. _____
- o. _____
- p. _____
- q. _____
- r. _____

CONCEPTS APPLICATION

Activity 1

Complete the following table by writing in the cranial nerve(s) tested by each examination procedure. More than one cranial nerve may be tested with each procedure.

<i>Examination Procedure</i>	<i>Cranial Nerve Tested</i>
Whisper test	
Patient sticking out tongue and moving it from side to side	
Taste test with sugar, salt, and lemon	
Visual acuity	
Patient puffing out cheeks and showing teeth	
Patient shrugging shoulders against examiner's hands	
Smell test with coffee, orange, and cloves	
Eyes constricting and dilating in response to light	
Patient clenching teeth (temporal muscles contracted)	

Activity 2

In the table below, write the name of the reflex based on the observed response; then indicate whether this is expected or unexpected, based on the age of the infant and/or the nature of the response.

<i>Age of Infant</i>	<i>Observed Response</i>	<i>Name of Reflex</i>	<i>Expected/Unexpected</i>
8 months	The infant abducts and extends arms and legs in response to sudden movement of head and trunk backward. The arms then adduct in an embracing motion followed by relaxation.		
2 months	The infant demonstrates a strong grasp of the examiner's finger when it is placed in the infant's palm.		
4 months	When held in an upright position with soles of the feet touching the surface of a table, the infant flexes legs upward in a curled position and holds them there.		
6 months	In a suspended head-first prone position, the infant extends arms and legs.		

CASE STUDY

Melvin Thomas is a 64-year-old male admitted to the hospital with a diagnosis of acute cerebral vascular accident (CVA). Listed below are data collected by the examiner during an interview and examination.

Interview Data

Mr. Thomas's wife tells the examiner that her husband was fine until this morning when he suddenly had a headache, fell to the floor, and could not get up. Mrs. Thomas adds that when she tried to get her husband to speak, he made only mumbling noises, and she could not understand him.

Examination Data

Mental status: Awake, alert male. Unable to talk, but able to follow commands. Very distraught over this incident. Patient cries and avoids eye contact with the wife and examiner.

Neurologic examination: Cranial nerves I, II, III, IV, V, VI, VIII all intact. Patient has asymmetry and unequal movements of face, with a drooping of the left side of face. Has asymmetry of shoulder shrug, with deficiency noted on left side. Patient has left-sided paralysis. Demonstrates expected muscle tone and sensation on right side. Unable to assess balance. Unable to get up or move around in bed unassisted at this time.

1. What data deviate from normal findings, suggesting a need for further investigation?
2. What additional questions could the examiner ask to clarify symptoms?
3. What additional physical examination, if any, should the examiner complete?
4. What primary problems does the patient have?

CRITICAL THINKING

1. Kevin, an ambitious novice examiner, uses an unfolded paper clip to test peripheral two-point discrimination. He adjusts the paper clip so that the points are 1 inch apart. With this instrument, he tests the patient's palm, toe, back, upper arm, and upper leg, and he notes that the patient fails to discriminate between one and two points in each of these areas. Kevin concludes that the patient has some sort of peripheral sensory deficit. What is incorrect in Kevin's methods and/or conclusion?
2. The CT scan of a patient demonstrates an infarction of the frontal lobe toward the left side. What brain functions occur in the frontal lobe? What type of symptoms would you anticipate this patient to have?