THE NERVOUS SYSTEM

HEALTH ASSESSMENT

CEREBRAL CORTEX

• Each half of the cerebrum is a hemisphere; the left hemisphere is dominant in most (95%) people, including those who are left handed.
• Cerebral Cortex: The cerebral cortex is the center for humans’ highest functions, governing thought, memory, reasoning, sensation, and voluntary movement.

COMPONENTS OF THE CNS

Cerebral Cortex
Each Hemisphere is divided into four lobes:
Frontal: Concerned with personality, behavior, emotions, and intellectual function
Parietal: Primary center for sensation
Occipital: Primary visual receptor center
Temporal: Primary auditory reception center

CNS COMPONENTS CONT…

• Thalamus: The thalamus is the main relay station for the nervous system.

• Hypothalamus: The hypothalamus is a major control center with many vital functions: temperature, heart rate, and blood pressure control, sleep center, anterior and posterior pituitary gland regulator, and coordinator of autonomic nervous system activity and emotional status.
**CNS COMPONENTS CONT...**

- **Cerebellum**: The cerebellum is a coiled structure located under the occipital lobe that is concerned with motor coordination of voluntary movements, equilibrium, and muscle tone.

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**BRAIN STEM**

- Midbrain
- Pons
- Medulla
- Spinal Cord
SPINAL NERVES

• The 31 pairs of spinal nerves arise from the length of the spinal cord and supply the rest of the body. 8 cervical, 12 thoracic, 5 lumbar, 5 sacral, and 1 coccygeal.

CRANIAL NERVES

• I: Olfactory  Sensory  Smell
  - Testing smell
• II: Optic  Sensory  Vision
  - Testing visual acuity – Snellen Chart
  - Peripheral vision – Confrontation Test
• III: Oculomotor  Mixed (CNIII,IV,VI)
  Motor - most EOM movements, raise eyelids
  Parasympathetic - pupil constriction, lens shape
  -EOM
  -PERRLA

CRANIAL NERVES CONT...

• IV: Trochlear  Motor
  Down and inward movement of eye
  -EOM
• V: Trigeminal  Mixed
  Motor - muscles of mastication
  Sensory - sensation of face and scalp, cornea, mucous membranes of mouth and nose
  -teeth clench
  -temporal muscles
  -sensory function – forehead, cheek, chin

CRANIAL NERVES CONT.

• VI: Abducens  Motor
  Lateral movement of eye
  -EOM
• VII: Facial  Mixed
  Motor - facial muscles, close eyes, labial speech
  Sensory - taste (sweet, salty, sour, bitter) on anterior two-thirds of tongue
  Parasympathetic - saliva and tear secretion
  -smile, frown, close eyes tightly, lift eyebrows, show teeth, puff cheeks,
CRANIAL NERVES CONT..

- **VIII: Acoustic**  
  Sensory  
  Hearing and equilibrium  
  - Whispered voice test  
  - Weber  
  - Rinne

- **IX: Glossopharyngeal**  
  Mixed (CNIX,X)  
  Motor – pharynx  
  Sensory - taste on posterior one-third of tongue, pharynx (gag reflex)

- **X: Vagus**  
  Mixed  
  Motor - pharynx and larynx  
  Sensory - general sensation from carotid body, carotid sinus, pharynx, viscera  
  -” ahhh” reflex  
  - gag reflex

CRANIAL NERVES CONT.

- **XI: Spinal**  
  Motor  
  Movement of trapezius and sternomastoid muscles  
  - Shrug shoulders against resistance  
  - Rotate head against resistance

- **XII: Hypoglossal**  
  Motor  
  Movement of tongue  
  - Protrude tongue
Subjective Data

- Headache
- Head injury
- Dizziness/vertigo
- Seizures
- Tremors
- Weakness
- Coordination problems
- Numbness or tingling
- Difficulty swallowing
- Difficulty speaking
- Numbness/tingling anywhere in the body
- Fainting/syncope/falls
- Significant past medical history
- Environmental/occupational hazards

Additional history for the aging adult:

- Any problem with dizziness? If so, does it occur when you first sit or stand up? When you move your head, when you get up and walk after eating?
- How does dizziness affect your activities?
- Are you able to drive safely? Can you maneuver in your house safely?
- What safety modifications have you applied in your home?
- Any changes in your memory? Confusion? Change in mental function?

Neuro Exam (Objective):

Mental Status

- Appearance/behavior
- Level of consciousness, posture/motor behavior, dress/grooming/hygiene, facial expression, manner and affect
- Speech/Language
  - quantity, rate, articulation, fluency
- Mood
- Thought/Perception
  - thought processes/content, perceptions, insight, judgment

Cognitive functions

- orientation
- attention (serial 7’s, spelling backward)
- memory (recent, remote)

Higher Cognitive function

- information/vocabulary (who’s president, etc)
- calculating ability (make change)
- abstract thinking
- constructional ability
NEUROLOGIC EXAM CONT..

Cranial Nerves
- CN1 - CNXII

Motor Functioning and Coordination
- Upper extremities
  - Touch nose with alternating fingers
  - Rapidly move index finger between nose and examiner’s finger
  - Rapidly alternate fingers to thumb
  - Rapidly turn palms up and down on lap

COORDINATION

Gait and balance
- Walk straight line
- Tandem walking
- Toe walk-heel walk
- Romberg Test
- Knee flexion-hop or shallow knee bend

Spine
- With patient standing, inspect and palpate spine as patient bends over at waist
- ROM – flexion, extension, lateral bending, rotation

OBJECTIVE INFORMATION CONT...

Sensory Function
- Superficial pain and light touch - Arms and Legs
- Vibration - Arms and Legs

Reflexes
- Triceps
- Biceps
- Brachioradialis
- Patellar
- Achilles

4+ very brisk
3+ brisker than average
2+ normal
1+ diminished
0 absent