

NEUROLOGY

NURSING STUDY NOTES

Neurology nursing bundle



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NERVOUS SYSTEM OVERVIEW

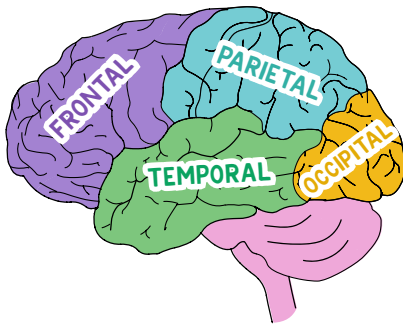
THE NERVOUS SYSTEM IS BROKEN DOWN INTO TWO PARTS:

CNS

CENTRAL NERVOUS SYSTEM

Brain & Spinal Cord

THE CNS FUNCTIONS LIE IN THE DIFFERENT PARTS OF THE BRAIN:



PARIENTAL

- Sensation
- Spatial and visual perception

FRONTAL

- Motor control
- Problem solving
- Expressive speech **BROCA'S AREA**

OCCIPITAL

- Sight
- Visual perception & interpretation

TEMPORAL

- Auditory processing
- Language comprehension **WERNICKE'S AREA**
- Memory retrieval

SPINAL CORD

Made up of nerve cells that carry messages between the brain and the rest of the body

PNS

PERIPHERAL NERVOUS SYSTEM

Nerves outside the brain and spinal cord

SOMATIC NERVOUS SYSTEM

Controls all 5 senses & movement

THINK **S** FOR **SENSES**

SENSORY NEURONS

REST OF BODY → CNS

- Afferent neurons
- Receives info from body to brain
- Contain dorsal root ganglion
 - ▶ Carry sensory information from periphery to spinal cord

EXAMPLE: Moving hand away after touching hot stove

MOTOR NEURONS

CNS → REST OF BODY

- Efferent neurons
- Send info from brain to body
- Contain ventral root ganglion
 - ▶ Carry instructions from brain/SC to muscular contraction

EXAMPLES:

- ▶ Walking
- ▶ Speaking
- ▶ Swallowing

MEMORY TRICKS

SAME

Sensory Afferent Motor Efferent

DAVE

Dorsal Afferent Ventral Efferent

AFFERENT = ARRIVES

Signals arrive at CNS

EFFERENT = EXITS

Signals exit CNS to body

AUTONOMIC NERVOUS SYSTEM

Controls **involuntary** physiological processes

THINK THINGS THAT **AUTOMATICALLY OCCUR**:

- ▶ Heart rate
- ▶ Respirations
- ▶ Digestion

SYMPATHETIC NERVOUS SYSTEM

FIGHT OR FLIGHT RESPONSE

- ▶ ↑ HR ↑ BP
- ▶ Dilates pupils
- ▶ Stops salivation
- ▶ ↑ blood sugar
- ▶ Relaxes bladder
- ▶ Inhibits digestion



REMEMBER **S** FOR **STRESS**

PARASYMPATHETIC NERVOUS SYSTEM

REST & DIGEST SYSTEM

- ▶ ↓ HR ↓ BP
- ▶ Constricts pupils
- ▶ Promotes salivation
- ▶ Bronchoconstriction
- ▶ Contracts bladder
- ▶ Stimulates GI motility



REMEMBER **R** IN **PARA** FOR **RELAX**

NEURO ASSESSMENT

GLASGOW COMA SCALE

Assesses level of consciousness (LOC)

EYE-OPENING

- 4 Eye spontaneous
- 3 to Sound
- 2 to Pressure
- 1 No response

REMEMBER **ESPN** (LIKE THE SPORTS CHANNEL)

VERBAL-RESPONSE

- 5 Oriented
- 4 Confused
- 3 Inappropriate Words
- 2 Incomprehensible speech
- 1 No response

REMEMBER **OUR COUNTRY WIN**

MOTOR-RESPONSE

- 6 Obeys commands
- 5 Localizes pain
- 4 Draws away from pain
- 3 Bend/ abnormal flexion
- 2 Extension abnormality
- 1 No response

REMEMBER **OLD BEN**

SCORE INTERPRETATION

- 13-15 Mild brain injury
- 9-12 Moderate brain injury
- 3-8 Severe brain injury
- ≤3 Deep coma or brain dead

LOWER SCORE = WORSE LOC

Obtain **BASELINE** upon admission & **REASSESS** per facility protocol

ORIENTATION

Assesses awareness

EXAMPLE QUESTIONS:

PERSON: "What is your name?"

PLACE: "Where are you now?"

TIME: "What month are we in?"

EVENTS: "Do you remember what happened to you?"

AAOX4 MEANS:

Awake, Alert & Oriented to:

- (1) PERSON
- (2) PLACE
- (3) TIME
- (4) EVENTS/ SITUATION

POSTURING

WORSE OUTCOME

DECORTICATE

Flexed posturing

- Arms flexed towards midline
- Feet internally rotated & flexed

Problem in **CERVICAL SPINE** or **CEREBRAL CORTEX**



Remember **CORE** for **DECORTICATE**

DECEREBRATE

Extended posturing

- Arms & legs extended outwards
- Legs extended + plantar flexion of feet

Problem in **MIDBRAIN** or **PONS**



Look at **E's** to remember **DECEREBRATE**

LOC — LEVEL OF CONSCIOUSNESS

Assesses wakefulness

AWAKE

Alert & awake, eyes open

SOMNOLENT

Sleeping/ sleepy, awake easily with stimuli

LETHARGIC

Very drowsy, falls asleep between care

OBTUNDED

Difficult to arouse, needs repeated mild/ moderate stimuli to stay awake

STUPOROUS

Very difficult to arouse, needs repeated vigorous stimuli to stay awake

COMATOSE

No response to any type of stimuli

PUPIL ASSESSMENT

Assesses **PERRLA**

PUPILS EQUAL

Both pupils are the same size upon inspection



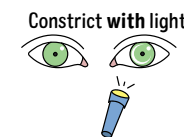
ROUND

Both pupils are round in shape



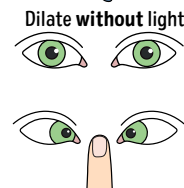
REACTIVE TO LIGHT

Both pupils constrict when one eye is exposed to light



AND ACCOMODATION

Both pupils constrict & equally move to follow finger towards nose



DTR — DEEP TENDON REFLEXES

Assesses motor response

- 4+ Very brisk; hyperactive; with clonus
- 3+ Brisker than average; hyperreflexic
- 2+ Expected response; normal
- 1+ Somewhat diminished
- 0 Absent

BABINSKI REFLEX

Assesses integrity of the **Corticospinal Tract (CST)**

Sole of foot is stroked in J curve from heel upward



Positive results are **normal** in newborns-2 years
Positive results are **abnormal** in adults

CRANIAL NERVES

CRANIAL NERVES are nerves that originate in the brain and control various functions in the head, neck, & other parts of the body



MEMORY TRICK

Olfactory ON	Optic OCCASION	Oculomotor OUR	Trochlear TRUSTY	Trigeminal TRUCK	Abducens ACTS	Facial FUNNY	Vestibulocochlear VERY	Glossopharyngeal GOOD	Vagus VEHICLE	Accessory ANY	Hypoglossal HOW
SOME SENSORY	SAY SENSORY	MARRY MOTOR	MONEY MOTOR	BUT BOTH	MY MOTOR	BROTHER BOTH	SAYS SENSORY	BIG BOTH	BRAINS BOTH	MATTER MOTOR	MOST MOTOR

CN I OLFACTORY

Sense of smell
Think you only have
ONE nose= CN 1

TEST

Have patient identify smell of substance with eyes closed

NORMAL RESPONSE

Can correctly identify smell

SENSORY

CN II OPTIC

Vision ability
Think you have
TWO eyes= CN 2

TEST

Snellen chart standing 20 feet away, covering one eye at a time

NORMAL RESPONSE

Able to read with each eye & both eyes together

SENSORY

CN III OCULOMOTOR

Upward eye movement and pupillary reflex

TEST

Use penlight to check light reaction & finger to check accommodation

NORMAL RESPONSE

Pupils constrict equally when brought towards nose & when exposed to light

MOTOR

OFTEN TESTED TOGETHER:

- CN III
- CN IV
- CN VI

CN IV TROCHLEAR

Downward & medial eye movements

TEST

Use a penlight & move it medially & downwards

NORMAL RESPONSE

Able to move eyes down & medially

MOTOR

CN V TRIGEMINAL

Facial sensation and chewing

TEST

SENSORY: Use sharp & dull side of object to check for sensation with eyes closed

MOTOR: Ask patient to clench teeth with resistance

NORMAL RESPONSE

SENSORY: Can distinguish between sharp & dull

MOTOR: Can open mouth against resistance & bite

BOTH

CN VI ABDUCENS

Lateral or sideward eye movements

Think of abducens as **ABDUSIDES**

TEST

Use a penlight & move it sideways

NORMAL RESPONSE

Able to move eyes laterally

MOTOR

CN VII FACIAL

Facial movement & taste

TEST

SENSORY: Taste test on the anterior tongue (**SWEET & SALTY**)

MOTOR: Ask patient to smile, raise eyebrows, close eyes, puff out cheeks

NORMAL RESPONSE

SENSORY: Able to distinguish taste

MOTOR: Able to perform facial expressions without difficulty

BOTH

CN VIII VESTIBULOCOCHLEAR

Hearing & sense of balance

TEST

HEARING: Whisper near patient's ear

BALANCE: Ask patient to walk across the room & back

NORMAL RESPONSE

HEARING: Can hear clearly in both ears

BALANCE: Able to stand & walk upright while maintaining balance

SENSORY

CN IX GLOSSOPHARYNGEAL

Throat sensation, swallowing, salivation

TEST

SENSORY: Taste test on the posterior tongue (**SOUR & BITTER**)

MOTOR: Have patient say "ahhhh"

NORMAL RESPONSE

SENSORY: Able to distinguish taste

MOTOR: Uvula rises symmetrically upon saying "ahhhh"

BOTH

CN X VAGUS

Digestion, HR, RR, immune system, swallowing

TEST

Use tongue blade to touch posterior pharynx to test gag reflex

NORMAL RESPONSE

Gag reflex should be assessed followed by swallow

BOTH

CN XI ACCESSORY

Shoulder & neck movement

TEST

Shrug shoulders & turn head side to side with hand's resistance

NORMAL RESPONSE

Able to shrug shoulders & turn head to each side without difficulty

MOTOR

CN XII HYPOGLOSSAL

Tongue movement

TEST

Ask the patient to protrude tongue and move it in different directions

NORMAL RESPONSE

Able to move tongue without difficulty

MOTOR

★
CN IX & CN X
work together
for gag &
swallow