

Tikrit University

College of Nursing

Basic Nursing Sciences



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Adult Nursing

Introduction to Nervous System

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Cranial Nerves

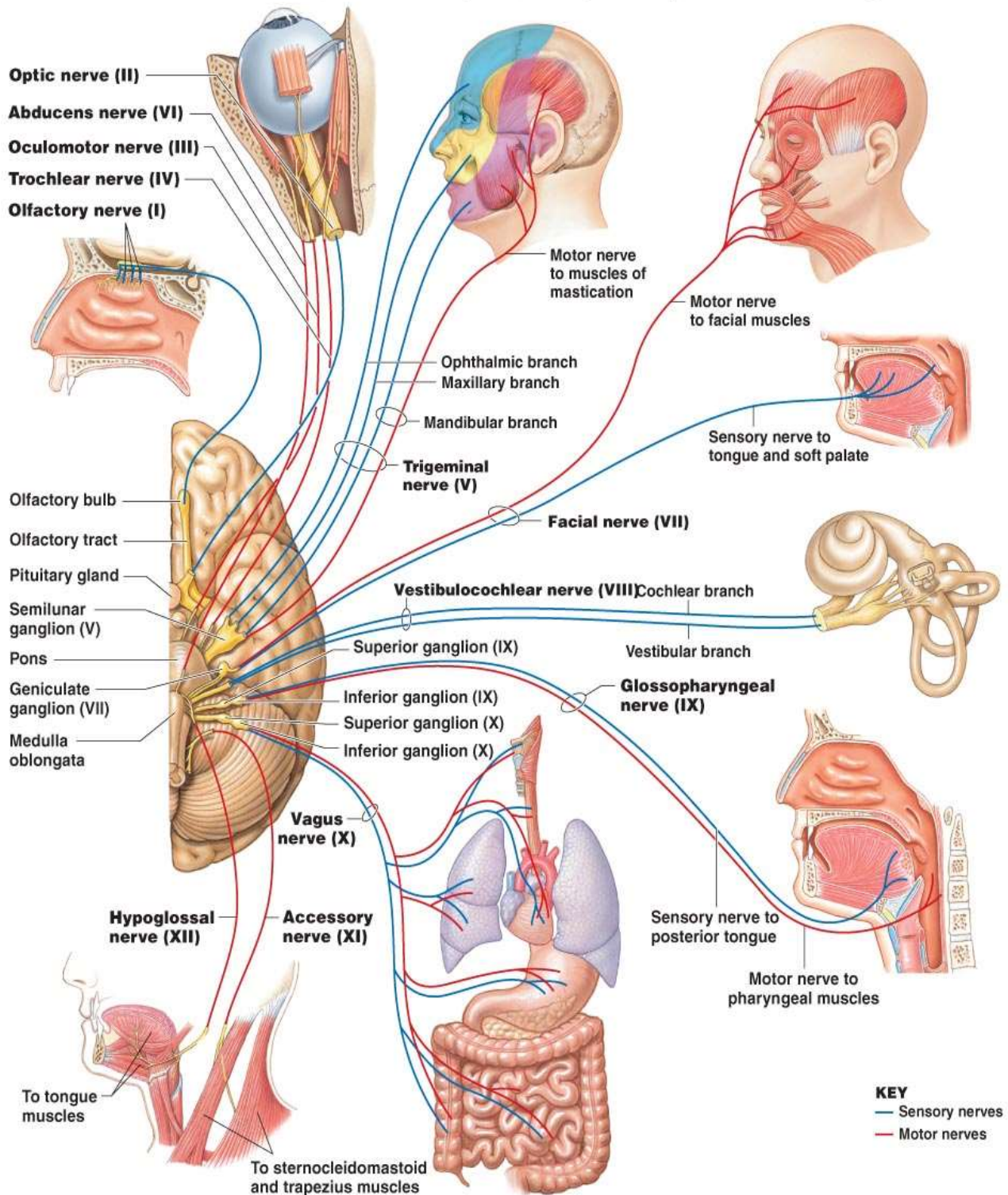
Twelve pairs. (Table 1: Distribution and Function of Cranial Nerve Pairs)

Cranial nerve	Function
I: Olfactory nerve	Smell
II: Optic nerve	Vision
III: Oculomotor nerve	Pupil constriction, accommodation, moves eye up, down and medially, opens eyelids
IV: Trochlear nerve	Supplies superior oblique muscle: moves eye down and inwards
V: Trigeminal nerve	Sensation to face, muscles of mastication
VI: Abducens nerve	Supplies lateral rectus, moves eye laterally
VII: Facial nerve	Supplies muscles of facial expression, taste (anterior two-thirds tongue), closes eyelids, lacrimal, nose, palate glands, submandibular and sublingual salivary glands
VIII: Vestibulocochlear nerve	Hearing, regulates balance
IX: Glossopharyngeal nerve	Sensation/taste to posterior one-third tongue, posterior pharynx, stylopharyngeus - swallowing, parotid gland - salivation
X: Vagus nerve	Parasympathetic supply to eye, heart, gut, lungs, larynx (sensation to airway, motor to vocal cords)
XI: Accessory nerve	Supplies sternocleidomastoid (rotates head) and trapezius (lifts shoulders)
XII: Hypoglossal nerve	Supplies tongue muscles

Table 1 The cranial nerves and their corresponding functions

Figure 2: Cranial nerves

The branches of the 12 cranial nerves, their functions (motor, sensory, or mixed), and the structures they innervate



Spinal Cord

A Structure

1. Inner core of gray matter shaped like a three-dimensional H
2. Long columns of white matter surround cord's inner core of gray matter; namely, right and left anterior, lateral, and posterior columns; composed of numerous sensory and motor tracts

B Functions

1. Sensory tracts conduct impulses up cord to brain (e.g., spinothalamic tracts, two of the six ascending tracts, conduct sensations of pain, temperature, vibration, and proprioception)
2. Motor tracts (pyramidal and extrapyramidal tracts) conduct impulses down cord from brain (e.g., the two corticospinal tracts decussate, controlling voluntary movement on side of body opposite the cerebral cortex from which the impulse initiated; three vestibulospinal tracts are involved with some autonomic functions)
3. Gray matter of cord contains reflex centers for all spinal cord reflexes

Spinal Nerves

A Thirty-one pairs, each containing a dorsal root and a ventral root

B Branches of spinal nerves form intricate networks of fibers (e.g., brachial plexus), from which nerves emerge to supply various parts of skin, mucosa, and skeletal muscles

C All spinal nerves are composed of both sensory dendrites (dorsal root) and motor axons (ventral root)

Autonomic Nervous System

A Conducts impulses from brainstem or cord out to visceral effectors (e.g., cardiac muscle, smooth muscle, and glands)

B Consists of two divisions

1. Sympathetic (adrenergic fibers) secretes norepinephrine: influences heart, smooth muscle of blood vessels and bronchioles, and glandular secretion
2. Parasympathetic (cholinergic fibers) secretes acetylcholine: influences digestive tract and smooth muscle to promote digestive gland secretion, peristalsis, and defecation; influences heart to decrease rate and contractility

Neurologic Assessment (Including Glasgow Coma Scale)

A- Definition

1. Systematic evaluation of cranial nerves, motor and sensory functioning, and mental status to detect neurologic abnormalities
2. Screening tools assess critical aspects of a complete neurologic evaluation

B Nursing care

1. Assess cranial nerves
 - a. Olfactory (I): ability to identify familiar odors such as mint or alcohol with eyes closed and one nostril occluded at a time
 - b. Optic (II): visual acuity measured by use of Snellen chart or by gross estimation with reading material; gross comparison of visual fields with those of examiner; color perception
 - c. Oculomotor (III), trochlear (IV), and abducent (VI): ability of pupils to react equally to light and to accommodate to varying distances; range

of extraocular movement (EOM) evaluated by asking client to follow a finger or object with eyes; also assess for nystagmus (jerking motion of eyes), particularly when eyes are directed laterally

d. Trigeminal (V): sensations of face evaluated by lightly stroking cotton across forehead, chin, and cheeks while client's eyes are closed; ability to clench teeth (jaw closure)

e. Facial (VII): symmetry of facial muscles as client speaks or is asked to make faces

f. Acoustic or vestibulocochlear (VIII): hearing acuity determined by a watch tick or whispered numbers; Weber test may be performed by holding the stem of a vibrating tuning fork at midline of skull (should be heard equally in both ears)

g. Glossopharyngeal (IX) and vagus (X): uvula should hang in midline; swallow and gag reflexes should be intact

h. Spinal accessory (XI): symmetric ability to turn head or shrug shoulders against counterforce of examiner's hands

i. Hypoglossal (XII): ability to protrude tongue without deviation, to left or right, and without tremors

2. Assess motor function (including cerebellar function)

a. Balance

(1) Observation of gait

(2) Romberg test: positive if client fails to maintain an upright position with feet together with closed eyes

b. Coordination: ability to touch finger to nose when arms are extended or to perform similar tasks smoothly

c. Muscle strength: evaluated by having client move symmetrical muscle groups against opposition supplied by examiner

3. Assess sensory function: bilateral testing of response to light touch with

cotton, sharp versus dull stimuli, vibration of a tuning fork

4. Assess mental status (cerebral functioning)

a. Level of consciousness: determined by response to stimuli (verbal, tactile, or painful)

b. Orientation to person, place, and time: determined by general conversation and direct questioning

c. Judgment, memory, and ability to perform simple calculations

d. Appropriateness of behavior and mood

5. Assess reflexes

a. Deep tendon reflexes (biceps, triceps, patellar, Achilles) with a reflex hammer; classification from 0 (absent) to 4+ (hyperactive); 2+ is expected

b. Plantar: plantar flexion of foot when sole is stroked firmly with a hard object such as a tongue blade; abnormal adult response (dorsiflexion of foot and fanning of toes) is reported as a positive Babinski reflex and is indicative of corticospinal tract disease

7. Document findings; report any deviations

8. Explain to and reassure client and family when assessments must be repeated frequently

9. Coordinate other care with frequent neurologic assessments to promote rest between assessments