

Care of the Patient with a Neurological Disorder

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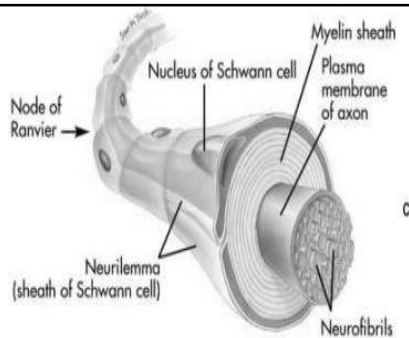
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Overview of Anatomy and Physiology

- Structural divisions
 - Central nervous system (CNS)
 - Brain and spinal cord
 - Peripheral nervous system
 - Somatic nervous system
 - Sends messages from the CNS to the skeletal muscles; **voluntary**
 - Autonomic nervous system
 - Sends messages from the CNS to the smooth muscle, cardiac muscle and certain glands; **involuntary**

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(A, C, from Thibodeau, G.A., Patton, K.T. [2003]. *Anatomy and physiology*. [5th ed.]. St. Louis: Mosby. B, Courtesy of Brenda Russell, PhD, University of Illinois at Chicago.)

A, Diagram of a typical neuron. B, Scanning electron micrograph of a neuron. C, Myelinated axon.

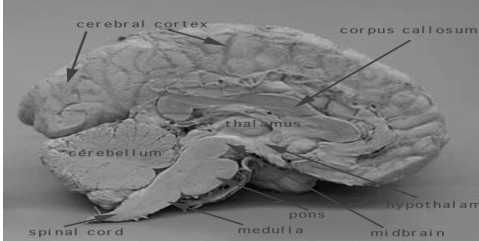
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Overview of Anatomy and Physiology

➤ Central nervous system

• Brain



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Common Disorders of the Neurological System

➤ Headaches

- High blood pressure headaches
- Migraine headaches
- Tension headaches
- Cluster headaches

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Common Disorders of the Neurological System

• Migraine headaches

- Early signs/symptoms
 - Visual field defects, unusual smells
- During headache
 - Nausea, vomiting, light sensitivity

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Internet

- Migraine headaches seem to be caused in part by changes in the level of a body chemical called serotonin. Serotonin plays many roles in the body, and it can have an effect on the blood vessels. When serotonin levels are high, blood vessels constrict (shrink). When serotonin levels fall, the blood vessels dilate (swell). This swelling can cause pain or other problems.

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- As a kid, I did miss a lot of school because I would periodically dehydrate myself — I would vomit a lot with each migraine and it would be really hard to stop. It would often continue that way for hours and hours — 12 hours sometimes.
- Migraine headaches are simply dreadful. A white hot ice pick of pain thrusting into your brain — over and over again. A pulsing, pounding, throbbing torture — sucking the very fiber of your being dry. Then the nausea kicks in ... with you throwing up — until there's nothing left to rid. Leaving you virtually entombed in your room - a curled up ball of misery.

Avoiding light, avoiding sound, avoiding movement — even avoiding your own husband and children.

➤

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Common Disorders of the Neurological System

- Medical management/nursing interventions
 - Diet: limit MSG, vinegar, chocolate, yogurt, alcohol, fermented or marinated foods, ripened cheese, cured sandwich meat, caffeine, and pork
 - Medications
 - Migraine headaches
 - Aspirin, acetaminophen, ibuprofen
 - Ergotamine tartrate
 - Codeine; Inderal

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Common Disorders of the Neurological System

- Tension headaches
 - Comfort measures
 - Non-narcotic analgesics
 - Cold packs to forehead or base of skull
 - Dark room; limit auditory stimulation

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Increased intracranial pressure

- Causes
 - Trauma, lesions, cerebral edema
- Signs and Symptoms
 - Double vision
 - Headache
 - Decreased level of consciousness
 - Pupillary signs (blown pupil)
 - Bradycardia
 - Respiratory problems
 - Seizures
 - Posturing
 - Vomiting

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Posturing

➤ Decorticate



➤ Decerebrate



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Other Disorders of the Neurological System

- **Epilepsy or seizures**
 - Pathophysiology
 - Sudden, violent, involuntary contraction of a group of muscles
 - Types: grand mal; petit mal; psychomotor; Jacksonian-focal; myoclonic; akinetic
 - Status epilepticus

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Epilepsy or seizures

- Medical management/nursing interventions
 - During seizure: Monitor ABC's
 - Anticonvulsant medications
- Nursing interventions
 - Medical alert tag
 - Adequate rest
 - Good nutrition
 - Avoid alcohol
 - Avoid driving, operating machinery, and swimming until seizures are controlled

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Degenerative Diseases

- **Multiple sclerosis**

Degenerative neurological disorder with demyelination of the brain stem, spinal cord, optic nerves, and cerebrum

 - Autoimmune disease
 - T- cells attack the myelin sheath

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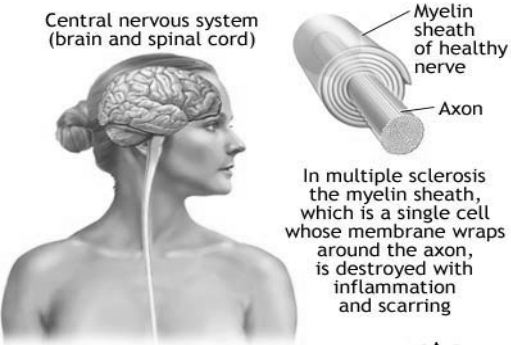
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➤ In addition to nerve damage, another part of MS is inflammation. Inflammation occurs when the body's own immune cells attack the nervous system. The inflammation destroys the myelin, leaving multiple areas of scar tissue (sclerosis). It also causes nerve impulses to slow down or become blocked, leading to the symptoms of MS. Repeated episodes, or flare ups, of inflammation can occur along any area of the brain and spinal cord.

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Central nervous system (brain and spinal cord)



Myelin sheath of healthy nerve

Axon

In multiple sclerosis the myelin sheath, which is a single cell whose membrane wraps around the axon, is destroyed with inflammation and scarring

ADAM.

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Degenerative Diseases

- Multiple sclerosis
- Clinical signs and symptoms
 - Visual problems
 - Urinary incontinence
 - Fatigue
 - Weakness
 - Incoordination
 - Sexual problems
 - Swallowing difficulties

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Degenerative Diseases

- Multiple sclerosis
- Medical management/nursing interventions
 - No specific treatment or cure
 - Anti-inflammatory drugs

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Degenerative Diseases

- Parkinson's disease
- Deficiency of dopamine
- Clinical manifestations/assessment
 - Muscular tremors
 - Rigidity; propulsive gait
 - Mask like face
 - "Pill-rolling" motions of fingers
 - Slowed speech

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➤ **Introduction**

- Parkinson's disease is a disorder that affects nerve cells in the part of the brain controlling muscle movement.
- People with Parkinson's disease often experience trembling, muscle rigidity, difficulty walking, problems with balance and slowed movements. These symptoms usually develop after age 60, although some people affected by Parkinson's disease are younger than age 50.

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➤ **pill-rolling** *n.* A circular movement or tremor of the tips of the thumb and the index finger when brought together, seen in Parkinson's disease.

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Degenerative Diseases

- Parkinson's disease
- Medical management/nursing interventions
 - Medications
 - Levodopa
 - Sinemet
 - Artane
 - Cogentin

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➤ **In 2007, the FDA approved the first skin patch drug for treatment of Parkinson's disease. Transdermal rotigotine (Neupro) is a dopamine agonist drug that may help improve symptoms of early-stage Parkinson's disease. The patch is applied daily.**

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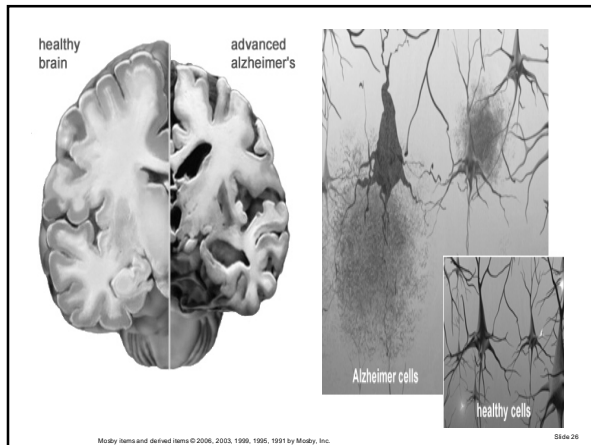
Degenerative Diseases

Alzheimer's disease

- Etiology/pathophysiology
 - Impaired intellectual functioning
 - Degeneration of the cells of the brain

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Alzheimer's disease

- Clinical manifestations/assessment
 - Early stage
 - Mild memory lapses; decreased attention span
 - Second stage
 - Obvious memory lapses
 - Third stage
 - Total disorientation to person, place, and time
 - wandering
 - Terminal stage
 - Severe mental and physical deterioration

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Degenerative Diseases

Alzheimer's disease

Medical management/nursing interventions

- Medications
 - Agitation: lorazepam; Haldol
 - Dementia: Cognex; Aricept
- Nutrition
- Safety
 - Double-lock all doors and windows
 - Constant supervision

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Degenerative Diseases

Myasthenia gravis

Pathophysiology

- Neuromuscular disorder; nerve impulses fail to pass at the myoneural junction; **causes muscular weakness**

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➤ **MG** is a neuromuscular disease leading to fluctuating muscle weakness and fatiguability. It is an autoimmune disorder, in which weakness is caused by circulating antibodies that block acetylcholine receptors at the post-synaptic neuromuscular junction.

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MS

- Clinical signs and symptoms
 - Ptosis (eyelid drooping)
 - Skeletal weakness may progress to respiratory distress
 - Dysphagia
 - Bowel and bladder incontinence

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Degenerative Diseases

Myasthenia gravis

Medical management/nursing interventions

- Anticholinesterase drugs
 - Prostigmin
 - Mestinon
- Corticosteroids

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Degenerative Diseases

Amyotrophic lateral sclerosis (ALS)

- Pathophysiology
 - **Motor neurons in the brain stem and spinal cord gradually degenerate and die**
 - Electrical and chemical messages originating in the brain do not reach the muscles to activate them
 - Lou Gehrig's disease
 - Leads to death in 2-6 years
 - Do not lose cognitive power

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➤ A-myo-trophic comes from the Greek language. "A" means no or negative. "Myo" refers to muscle, and "Trophic" means nourishment---"No muscle nourishment." When a muscle has no nourishment, it "atrophies" or wastes away. "Lateral" identifies the areas in a person's spinal cord where portions of the nerve cells that signal and control the muscles are located. As this area degenerates it leads to scarring or hardening ("sclerosis") in the region.

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How is ALS treated?

No cure has yet been found for ALS. However, the Food and Drug Administration (FDA) has approved the first drug treatment for the disease—riluzole (Rilutek).

Riluzole is believed to reduce damage to motor neurons by decreasing the release of glutamate. Clinical trials with ALS patients showed that riluzole prolongs survival by several months, mainly in those with difficulty swallowing. The drug also extends the time before a patient needs ventilation support. Riluzole does not reverse the damage already done to motor neurons, and patients taking the drug must be monitored for liver damage and other possible side effects. However, this first disease-specific therapy offers hope that the progression of ALS may one day be slowed by new medications or combinations of

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Amyotrophic lateral sclerosis (ALS)

➤ Clinical Signs and Symptoms

- Dysphagia
- Muscle wasting
- Compromised respiratory function
- Medical management/nursing interventions
 - No cure
 - Rilutek (Riluzole)

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Degenerative Diseases

Huntington's disease

- Pathophysiology
 - Overactivity of the dopamine pathways
 - Genetically transmitted
- Clinical manifestations/assessment
 - Abnormal and excessive involuntary movements (chorea)
 - Ataxia to immobility

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Huntington's disease

Medical management/nursing interventions

- No cure; palliative treatment
- Antidepressants
- Safe environment
- Emotional support
- High-calorie diet

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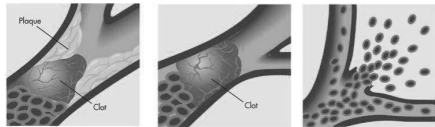
Vascular Problems

Stroke (Brain Attack)

- Pathophysiology
 - Thrombosis or hemorrhage of blood vessel or blood vessels
 - Results in death of the brain tissue
 - 700,000 people will suffer a stroke
 - 160,000 will die

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Figure 54-16



A Thrombotic stroke. Central thrombosis is a narrowing of the artery by fatty deposits called plaque. Plaque can cause a clot to form, which blocks the passage of blood through the artery.
B Embolic stroke. An embolus is a blood clot or other debris circulating in the blood. When it reaches an artery in the brain that is too narrow to pass through, it lodges there and blocks the flow of blood.
C Hemorrhagic stroke. A burst blood vessel may allow blood to seep into and damage brain tissue until clotting shuts off the leak.

(From Lewis, S.M., Heitkemper, M.M., Dirksen, S.R. [2004]. *Medical-surgical nursing: assessment and management of clinical problems*. [6th ed]. St. Louis: Mosby.)

Three types of stroke.

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Vascular Problems

- Stroke
- Medical management/nursing interventions
 - Thrombosis or embolism
 - Thrombolytics
 - Heparin and Coumadin
 - Neurological checks
 - Feeding tube
 - Physical, occupational, and/or speech therapy

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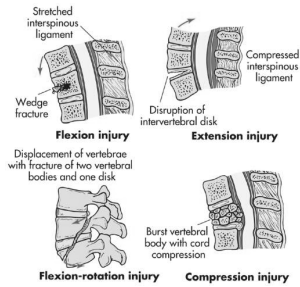
Trauma

- Spinal cord trauma
- Etiology/pathophysiology
 - Automobile, motorcycle, diving, surfing, other athletic accidents, and gunshot wounds
 - Fracture of vertebra
 - Complete cord injury

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Figure 54-22



(From Lewis, S.M., Heitkemper, M.M., Dirksen, S.R. [2004]. *Medical-surgical nursing: assessment and management of clinical problems*. [6th ed.]. St. Louis: Mosby.)

Mechanisms of spinal injury.

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Trauma

- Spinal cord trauma
- Signs and Symptoms
 - Loss of muscle function depends on level of injury
 - Spinal shock

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Autonomic Dysreflexia

- Abnormal response of the cardiovascular system to stimulation from bladder stimulation or fecal impaction
- Severe bradycardia
- Severe hypertension, up to 300 mm Hg
- or fecal impaction

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Trauma

Spinal cord trauma

➤ Medical management/nursing interventions

- Urinary function: Foley catheter; bladder training
 - Intermittent catheterization
- Bowel program

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➤ Any one have a headache?

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