

Part 1: Neurological Disorders

Parkinson's Disease

- **Pathophysiology:** Chronic, progressive neurodegenerative disorder caused by the destruction of dopamine-producing neurons in the substantia nigra. Result: **Dopamine depletion** (inhibitory) and relative **Acetylcholine excess** (excitatory).
- **Classic Tetrad (TRAP):**
 - Tremor (pill-rolling, occurs at rest)
 - Rigidity (cogwheel resistance to passive movement)
 - Akinesia / Bradykinesia (slowness of movement, masked facies)
 - Postural instability (shuffling gait, propulsive gait)
- **Key Interventions:**
 - Administer **Carbidopa-Levodopa** on time (Carbidopa prevents peripheral breakdown of Levodopa). Avoid high-protein meals at the time of dose (competes for absorption).
 - Implement fall precautions; encourage a wide-based gait and rocking side-to-side to initiate walking.

Multiple Sclerosis (MS)

- **Pathophysiology:** Autoimmune, progressive **demyelination of the central nervous system** (brain and spinal cord), leading to interrupted nerve impulses. Characterized by remissions and exacerbations.
- **Key Symptoms:**
 - Visual disturbances (diplopia, blurred vision, optic neuritis).
 - Fatigue, muscle weakness, ataxia, and intention tremors.
 - **Lhermitte's sign:** Electric shock-like sensation running down the spine with neck flexion.
- **Key Interventions:**
 - During acute exacerbations, administer high-dose **Corticosteroids**.
 - **Patient Education:** Avoid triggers that cause exacerbations (stress, fatigue, infection, and **increased body temperature/hot baths**—known as Uhthoff's phenomenon).

Myasthenia Gravis (MG)

- **Pathophysiology:** Autoimmune disease where antibodies destroy **Acetylcholine (ACh) receptors** at the neuromuscular junction, leading to severe muscle weakness.
- **Key Symptoms:**
 - Fluctuating muscle weakness that **worsens with activity and improves with rest**.
 - Ptosis (drooping eyelids), diplopia, dysphagia, and risk of respiratory compromise.
- **Diagnostics: Tensilon (Edrophonium) Test.** If muscle strength temporarily improves, it is positive for MG.
 - *Antidote for Edrophonium: Atropine sulfate.*
- **Key Interventions:**
 - Administer anticholinesterase medications (e.g., **Pyridostigmine**) strictly on time, usually 30–45 minutes before meals to facilitate safer swallowing.

Guillain-Barré Syndrome (GBS)

- **Pathophysiology:** Acute, rapidly progressive inflammatory polyneuropathy causing demyelination of the **peripheral nerves**. Often preceded by a mild gastrointestinal or respiratory infection (e.g.,

Campylobacter jejuni).

- **Key Symptoms: Ascending symmetrical paralysis** (starts in the feet and moves upward).
- **Priority Risk:** Respiratory failure if demyelination reaches the diaphragm and intercostal muscles.
- **Key Interventions:**
 - Monitor Vital Capacity and respiratory status constantly.
 - Treatments include Plasmapheresis or IV Immunoglobulin (IVIG) administered early in the disease course.

Huntington's Disease

- **Pathophysiology:** Autosomal dominant genetic disorder causing progressive breakdown of nerve cells in the brain (basal ganglia).
- **Key Symptoms:**
 - **Chorea:** Involuntary, jerky, dancelike movements.
 - Progressive dementia and severe cognitive decline.
 - Cachexia (severe weight loss due to constant caloric burn from chorea).
- **Key Interventions:**
 - Provide a high-calorie diet (up to 4,000–5,000 calories/day).
 - Genetic counseling for family members (50% chance of inheritance per child).

Amyotrophic Lateral Sclerosis (ALS / Lou Gehrig's Disease)

- **Pathophysiology:** Progressive, fatal neurodegenerative disease targeting **both upper and lower motor neurons**. Cognitive function remains entirely intact.
- **Key Symptoms:**
 - Progressive muscle weakness, wasting, and fasciculations (twitching).
 - Eventually leads to dysarthria, dysphagia, and respiratory failure.
- **Key Interventions:**
 - Focus on palliative care, respiratory support (BiPAP, ventilator discussions), and communication alternative devices.
 - **Riluzole** may extend life by a few months by reducing glutamate levels.

Part 2: Musculoskeletal Disorders & Trauma

Fractures & Sprains

Condition	Description	Classic Interventions
Fracture	A break in the continuity of the bone.	Immobilize immediately before moving the patient. Assess Neurovascular Status (The 6 Ps: Pain, Pallor, Pulselessness, Paresthesia, Paralysis, Poikilothermia). Watch for Fat Embolism Syndrome in long bone fractures (characterized by dyspnea, confusion, and petechiae on chest).

Sprain	Injury to ligaments surrounding a joint (twisting/wrenching).	Implement PRICE : P rotect, R est, I ce (for first 24–48 hours to vasoconstrict), C ompression, E levation.
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Knee Injury

- **Common Pathology:** Meniscus tears (rotational injury) or Anterior Cruciate Ligament (ACL) tears (rapid deceleration/hyperextension).
- **Assessment Tests:** **Lachman test** or **Anterior Drawer test** for ACL laxity; **McMurray’s test** for meniscus tears.
- **Intervention:** RICE protocol initially; standard pre- and post-op care for arthroscopic repair.

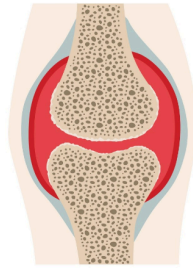
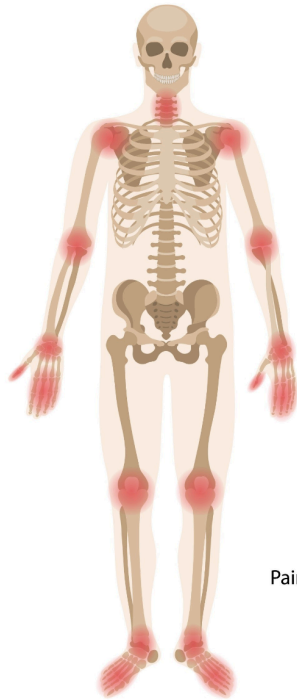
Bone Marrow Biopsy

- **Purpose:** Evaluation of hematologic malignancies or severe anemias; usually taken from the **posterior superior iliac crest**.
- **Nursing Responsibilities:**
 - *Pre-procedure:* Obtain informed consent; position patient prone or lateral decubitus.
 - *Post-procedure:* Apply **direct pressure** over the site for several minutes to prevent bleeding. Apply a sterile pressure dressing.
 - *Positioning:* Have the patient lie flat or on the affected side for 30–60 minutes to maintain pressure on the site. Monitor closely for bleeding and infection.

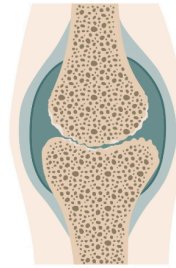
Arthritis & Connective Tissue Disorders

ARTHRITIS COMPARISON	
OSTEOPHYTES (SPURS)	SYNOVIAL INFLAMMATION
=====	=====
[Osteoarthritis (OA)]	[Rheumatoid Arthritis (RA)]
• Degenerative (Wear/Tear)	• Autoimmune / Systemic
• Asymmetric joint pain	• Symmetric, inflamed joints
• Worse with activity	• Morning stiffness > 1 hour
• Heberden's/Bouchard's nodes	• Swan-neck, Boutonniere deformities

Rheumatoid arthritis

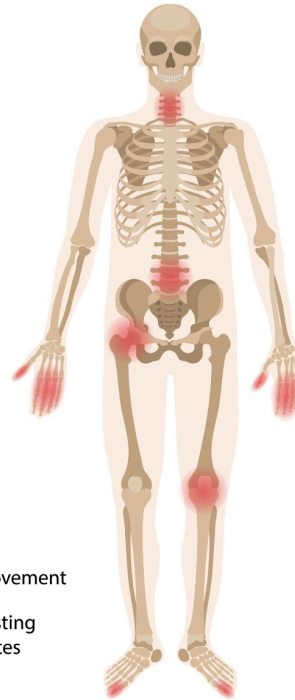


Swollen inflamed
synovial membrane
Erosion of bone
Autoimmune disease
Symmetrical



Loss of articular cartilage
Bone's ends rub together
Degenerative disease
Asymmetrical

Osteoarthritis



Symptoms

Pain, stiffness and inflammation

Pain and stiffness in movement

Morning stiffness lasting
more than 30 minutes

Morning stiffness lasting
less than 30 minutes

- **Gouty Arthritis (Gout):**

- *Pathophysiology:* Systemic disease where **uric acid crystals (uric acid)** deposit in joints due to hyperuricemia. Most commonly attacks the great toe (podagra).
- *Interventions:* Acute attack \rightarrow Colchicine, NSAIDs. Chronic management \rightarrow Allopurinol. **Diet:** Avoid high-purine foods (organ meats, sardines, alcohol/beer, seafood).

- **Systemic Lupus Erythematosus (SLE):**

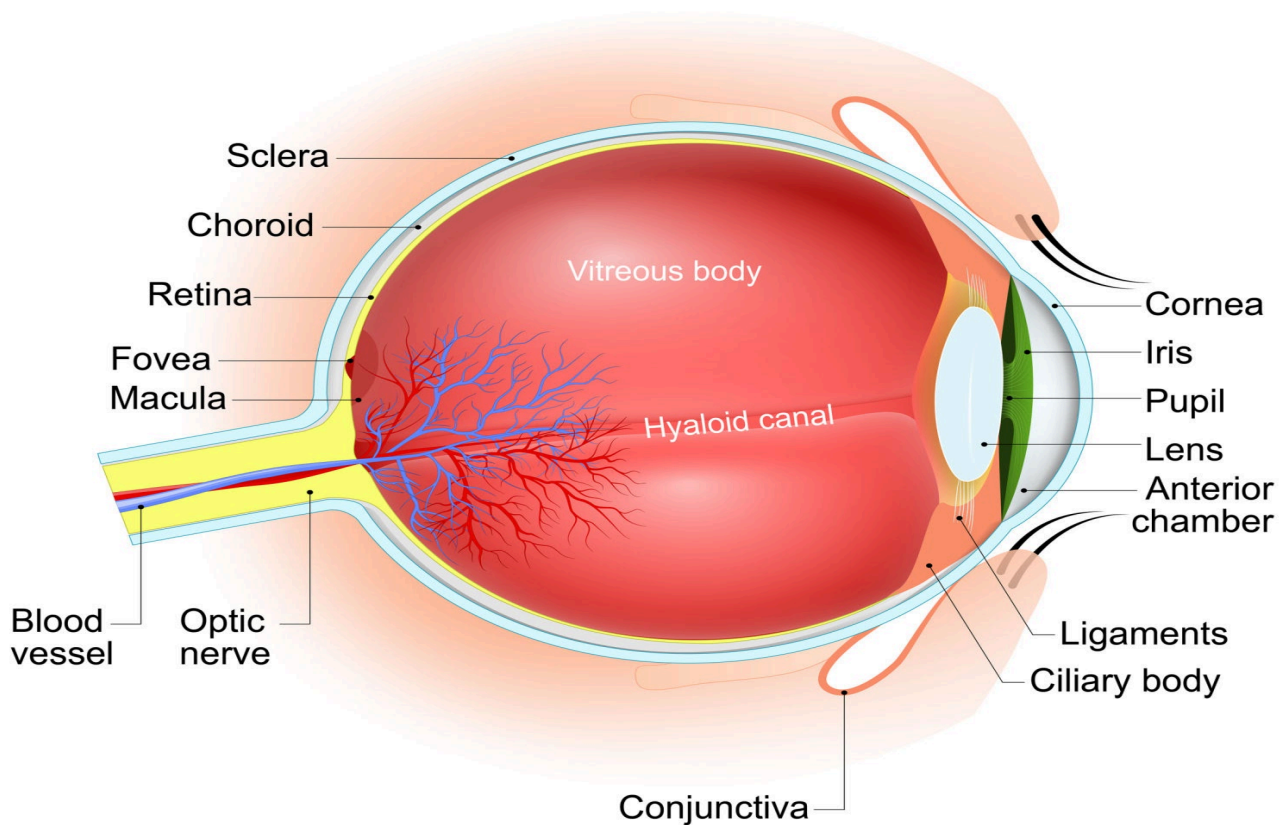
- *Pathophysiology:* Chronic, multi-system inflammatory autoimmune disease affecting connective tissue (kidneys, skin, joints, heart).
- *Key Sign:* **Butterfly rash (malar rash)** across the cheeks and bridge of the nose.
- *Interventions:* Protect skin from UV light (sunscreen, long sleeves). Monitor renal function (BUN/Creatinine) as lupus nephritis is a major complication.

Metabolic & Infectious Bone Diseases

- **Osteomalacia:** Decalcification and softening of bones caused by **Vitamin D deficiency** (the adult equivalent of Rickets). *Intervention:* Vitamin D and Calcium supplementation; sunlight exposure.
- **Osteomyelitis:** Severe **infection of the bone** and marrow (often *Staphylococcus aureus*). *Intervention:* Requires long-term IV antibiotics (often 4–6 weeks via a PICC line). Surgical debridement may be necessary.
- **Pott's Disease: Tuberculosis of the spine.** Characterized by back pain, fever, and spinal deformities (kyphosis). *Intervention:* Standard multi-drug anti-TB regimen (Rifampin, Isoniazid, Pyrazinamide, Ethambutol) for an extended period.
- **Paget's Disease (Osteitis Deformans):** Chronic metabolic disorder characterized by **rapid, disorganized bone resorption and remodeling**, leading to large, deformed, but structurally weak bones. *Key Signs:* Increased skull size, bone pain, waddling gait, elevated serum **Alkaline Phosphatase (ALP)**.

Part 3: Ophthalmic (Eye) Disorders

Anatomy & Assessment of the Eyes



- **Key Structures:** Cornea (refraction), Iris (controls light entry), Crystalline Lens (focuses light), Retina (photoreceptors), Optic Nerve (CN II - transmits visual data).
- **Assessment Tools:**
 - **Snellen Chart:** Assesses **Distance Vision** (Cranial Nerve II). *Tip:* 20/40 vision means the patient can see at 20 feet what a normal eye sees at 40 feet.
 - **Jaeger Chart / Rosenbaum Card:** Assesses **Near Vision** (tests for presbyopia).
 - **Ishihara Plates:** Assesses color blindness.
 - **Tonometry:** Measures **Intraocular Pressure (IOP)**. Normal range: **10–21 mmHg**.

Eye Medications (Ophthalmic Instillation)

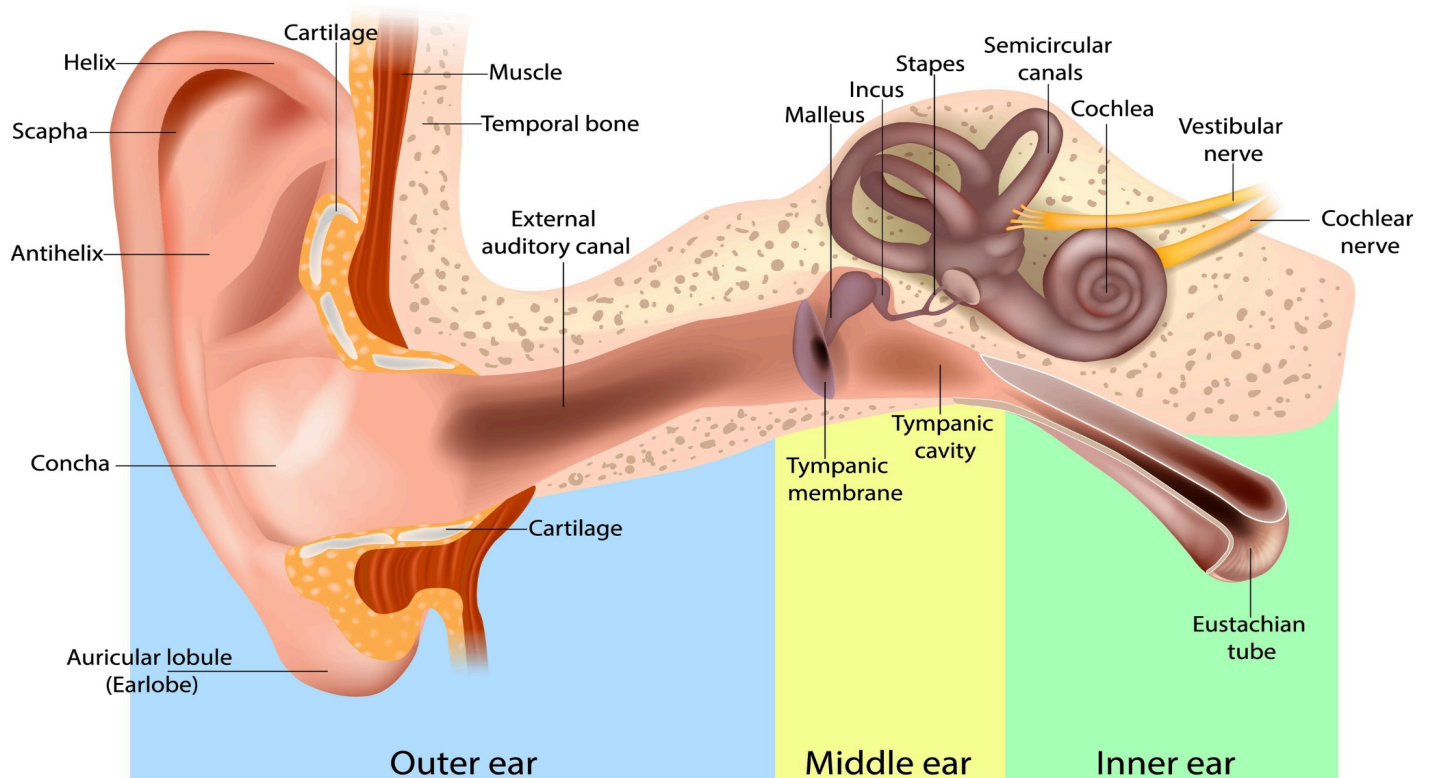
- **Administration Technique:** Pull down the lower eyelid to form a conjunctival sac. Drop medication into the **sac**, never directly onto the cornea.
- **Crucial Step:** Apply pressure to the **nasolacrimal duct (inner canthus)** for 1–2 minutes post-instillation to prevent systemic absorption of the drug.
- **Miotics vs. Mydriatics:**
 - **Miotics (e.g., Pilocarpine):** **Constrict** the pupil (used in glaucoma to improve aqueous humor outflow).
 - **Mydriatics (e.g., Atropine):** **Dilate** the pupil (Contraindicated in narrow-angle glaucoma).

Major Eye Pathologies

Condition	Pathophysiology & Signs	Nursing Interventions & Teaching
Cataract	<p>Opacification (clouding) of the lens.</p> <ul style="list-style-type: none"> • Painless, gradual loss of vision • Blurred vision, glare, absent red reflex. 	<p>Post-Op Care: Avoid activities that increase IOP (bending at waist, coughing, lifting >10 lbs, straining for bowel movements). Sleep on the unaffected side.</p>
Glaucoma	<p>Increased IOP causing progressive damage to the optic nerve.</p> <ul style="list-style-type: none"> • Open-angle: Gradual loss of peripheral vision (tunnel vision). • Angle-closure: Medical emergency! Sudden, severe eye pain, halos around lights, fixed mid-dilated pupil. 	<p>Lifetime eye drops required for open-angle. Avoid mydriatics (atropine) in angle-closure. Use miotics to constrict pupil and lower pressure.</p>
Retinal Detachment	<p>Separation of the sensory retina from the underlying pigment epithelium.</p> <ul style="list-style-type: none"> • Painless sudden onset of flashes of light (photopsia), floaters, or a "curtain/veil falling" over the visual field. 	<p>Bedrest; restrict eye movements (bilateral eye patches may be used). Positioning post-op: Position patient as ordered by the surgeon (often prone or side-lying if a gas bubble was used to splint the retina).</p>
Errors of Refraction	<p>Myopia: Nearsightedness (eyeball too long).</p> <p>Hyperopia: Farsightedness (eyeball too short).</p> <p>Presbyopia: Loss of lens elasticity due to aging (hard to focus on close objects).</p>	<p>Corrected via corrective lenses (concave for myopia, convex for hyperopia/presbyopia) or refractive surgery (LASIK).</p>

Part 4: Otologic (Ear) Disorders

Otitis Media vs. Otitis Externa



- **Otitis Media:** Infection of the **middle ear** (behind the tympanic membrane), common in children due to short, horizontal Eustachian tubes.
 - *Signs:* Otolgia, fever, tugging at the ear. Otoscope shows a **bulging, red, or opaque tympanic membrane** with loss of light reflex.
 - *Interventions:* Antibiotics. Avoid feeding infants flat on their backs.
- **Otitis Externa (Swimmer's Ear):** Infection of the **external ear canal**.
 - *Signs:* Severe pain when pulling the **pinna or tragus**. Canal is edematous and erythematous.
 - *Interventions:* Topical antibiotic/corticosteroid drops. Keep ear dry during swimming using earplugs.

💡 Ear Drop Administration Tip:

- **Adults & Children > 3 years:** Pull the pinna **Up and Back**.
- **Infants & Children < 3 years:** Pull the pinna **Down and Back**.

Meniere's Disease

- **Pathophysiology:** Excess accumulation of endolymph fluid in the inner ear (endolymphatic hydrops), disrupting both vestibular and auditory function.
- **Classic Triad of Symptoms:**
 1. Episodic, incapacitating **Vertigo**
 2. **Tinnitus** (ringing in ears)
 3. Sensorineural **Hearing Loss** (fluctuating)
- **Key Interventions:**
 - *During an attack:* Strict bedrest in a quiet, darkened room. Provide fall precautions.
 - *Dietary modification:* **Low-sodium diet** to reduce endolymphatic fluid retention. Avoid caffeine,

nicotine, and alcohol.

Hearing Impairment

- **Conductive Hearing Loss:** Occurs in the outer or middle ear (e.g., cerumen impaction, otitis media, otosclerosis).
 - *Rinne Test:* Bone conduction is greater than air conduction ($BC > AC$).
 - *Weber Test:* Lateralizes to the **affected (deaf) ear**.
- **Sensorineural Hearing Loss:** Occurs in the inner ear, acoustic nerve (CN VIII), or brain (e.g., noise damage, ototoxic drugs like aminoglycosides/furosemide, presbycusis).
 - *Rinne Test:* Air conduction is greater than bone conduction ($AC > BC$), but overall time is reduced.
 - *Weber Test:* Lateralizes to the **unaffected (good) ear**.
- **Communication Techniques:** Face the client directly, speak clearly in a **normal or low-pitched tone** (do not shout, as high pitch is harder to hear), and minimize background noise.