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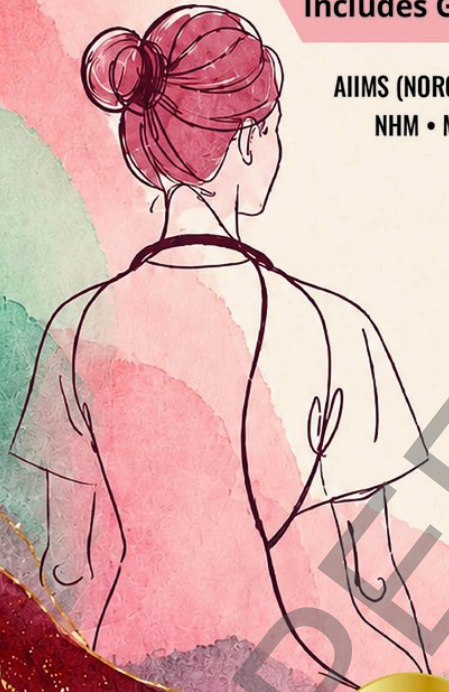
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VOLUME 2

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ADULT HEALTH NURSING



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INFLAMMATION

INTRODUCTION

A protective response of body tissues to injury, irritation, or infection.

Eliminates the initial cause of cell injury, clears out damaged cells, and initiates tissue repair.

Cardinal Signs (from Latin):

- **Rubor** (Redness)
- **Calor** (Heat)
- **Tumor** (Swelling)
- **Dolor** (Pain)
- **Functio laesa** (Loss of function)

TYPES OF INFLAMMATION

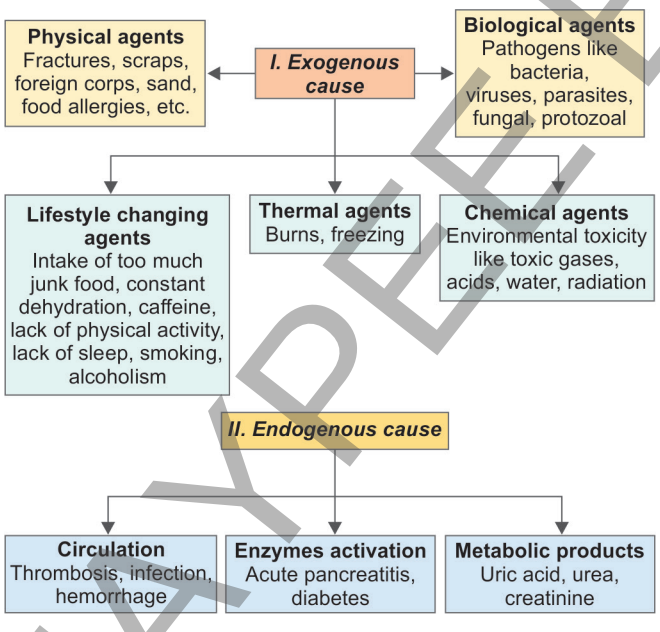
Acute Inflammation

A rapid, short-term response to injury or infection aiming to eliminate the cause and begin healing.

Duration: Minutes to a few days

Onset: Sudden and rapid

Causes



Features

- Prominent vascular changes (vasodilation, increased permeability)
- Exudation of plasma and neutrophils
- **Cardinal signs:** Redness, heat, swelling, pain, loss of function

Main Immune Cells: **Neutrophils** (first responders)

Outcomes

- Resolution (healing)
- Suppuration (pus formation)
- Abscess formation
- Progression to chronic inflammation

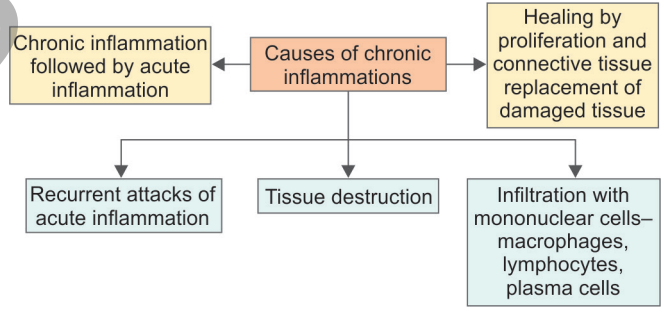
Chronic Inflammation

A prolonged inflammatory response that may follow acute inflammation or occur as a primary process.

Duration: Weeks to years

Onset: Slower, often subtle

Causes



Features

- Ongoing tissue destruction and repair
- Fibrosis and angiogenesis (new blood vessel formation)
- Less obvious cardinal signs

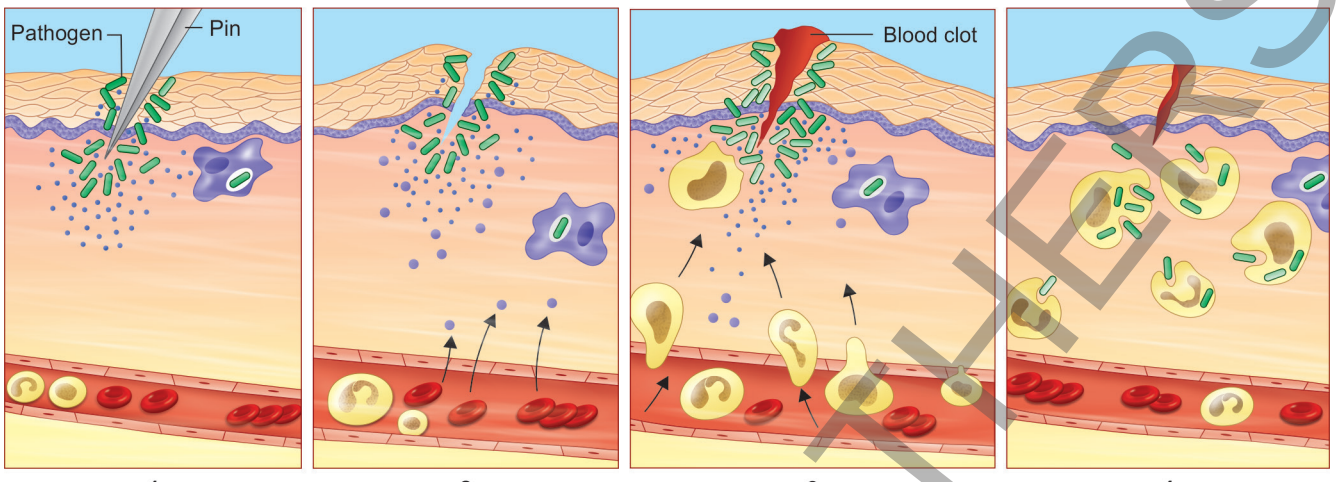
Main Immune Cells: **Macrophages**, **Lymphocytes**, **Plasma cells**

Outcomes

- Tissue damage and scarring
- Organ dysfunction
- Granuloma formation (in some diseases)

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STEPS OF INFLAMMATORY RESPONSE



1
At the injured site chemical signals released by activated macrophages and mast cells causes nearby capillaries to enlarge and become more permeable

2
Antimicrobial proteins, fluid, and clotting elements transfer from the blood to the site clotting begins

3
Chemokines released by several types of cells attract more phagocytic cells from blood to injury site

4
Macrophages, neutrophils, phagocytose pathogens and cell debris at the site and the tissue heals

STAGES OF WOUND HEALING

Wound healing occurs in four overlapping phases:

Stage	*Hemostasis*	*Inflammation*	*Proliferation*	*Maturation/Remodeling*
Span	Immediately after injury	0–3 days	3–10 days	Weeks to months
Purpose	Stop bleeding	Prevent infection and prepare wound for healing	Build new tissue	Strengthen and organize tissue
Process	• Vasoconstriction • Platelet aggregation → clot formation • Release of clotting factors (e.g., thrombin, fibrin)	• Vasodilation → allows immune cells to enter tissue • Neutrophils remove debris and bacteria • Macrophages release growth factors (e.g., VEGF, TGF-β)	• Fibroblasts synthesize collagen • Formation of granulation tissue • Angiogenesis (new blood vessels) • Re-epithelialization (skin regeneration)	• Collagen type III → type I conversion • Scar formation • Blood vessel regression • Tensile strength increases (but rarely reaches 100% of original)

FACTORS INFLUENCING WOUND HEALING

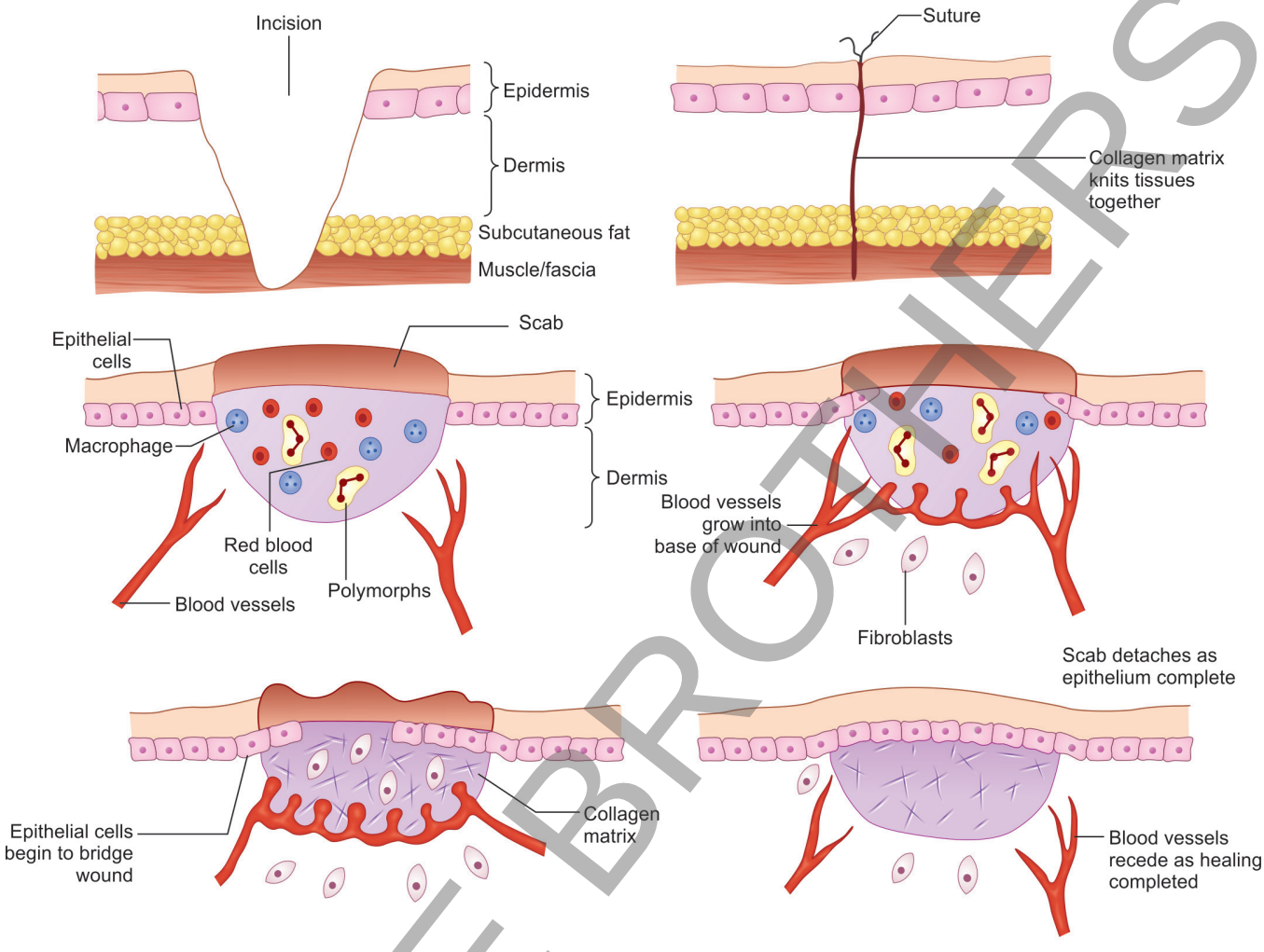
Intrinsic (Patient-related)

Factor	*Effect on Healing*
Age	Slower healing in elderly
Nutrition	Protein, vitamin C, zinc are essential
Chronic diseases	Diabetes impairs circulation and immunity
Immune status	Immunosuppression delays healing
Oxygenation	Poor perfusion impairs tissue repair

Extrinsic (Environmental/External)

Factor	*Effect on Healing*
Infection	Prolongs inflammation phase
Foreign bodies	Impede closure, promote infection
Medications	Steroids, NSAIDs delay healing
Radiation	Damages cells, impairs repair
Smoking	Reduces oxygen supply, delays healing
Wound care	Poor hygiene or dressing can delay healing

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Stages of wound healing: (A1) Inflammatory stage; (A2) Destructive stage; (A3) Proliferative stage; (A4) Maturation stage; (B) Complete epithelization

Nursing Mnemonics & Tips

Phases

"HIPM" – Hemostasis, Inflammation, Proliferation, Maturation

PERIOPERATIVE NURSING

POSITION AND DRAPING FOR COMMON SURGICAL PROCEDURES

Surgical Procedure	*Position*	*Draping Technique*
Abdominal surgery (e.g., laparotomy, appendectomy)	Supine	Four-towel drape with laparotomy sheet; expose abdomen
Perineal procedures (e.g., hemorrhoidectomy)	Lithotomy	Leg holders; perineal drape exposing anus/genitals
Gynecologic surgery (e.g., D&C, hysterectomy)	Lithotomy	U-drape or leggings drape; expose perineum
Orthopedic hip surgery	Lateral or supine	Hip drape or fenestrated drape; entire leg prepped
Spinal surgery (e.g., laminectomy)	Prone	Longitudinal midline drape; back fully exposed

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Surgical Procedure	Position	Draping Technique
Neurosurgery (cranial)	Supine or sitting	Head draped with turban or craniotomy drape
ENT procedures (e.g. tonsillectomy, thyroidectomy)	Supine with neck extended	Head and neck drape; face may be partially exposed
Breast surgery (e.g. mastectomy)	Supine with arm extended	Breast drape with arm board; upper chest and axilla exposed
Urologic procedures (e.g. TURP, cystoscopy)	Lithotomy	Leggings drape; access to perineum and genitalia
Shoulder surgery	Beach chair or lateral	Arm drape or full body with extremity isolated
Knee arthroscopy	Supine with knee flexed	Extremity drape with tourniquet; entire leg prepped
Thoracic surgery (e.g. lobectomy)	Lateral decubitus	Wide chest draping; arm supported or suspended
Vascular surgery (e.g. femoral bypass)	Supine	Fenestrated drape; groin/limb exposure

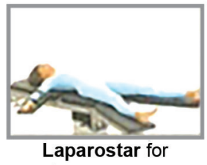
REMOTE CONTROL OT TABLES


Multistar for Multiprocedure

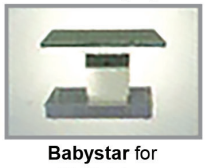

NeuroStar 3S for Neurosurgery


NeuroStar 4S for Neurosurgery


Cardiomatic for Cardiothoracic


Laparostar for Laparoscopy


Olympian 2000 for Ortho Specialist


Babystar for Pediatrics


Float-o-matic for Angiography/ERCP

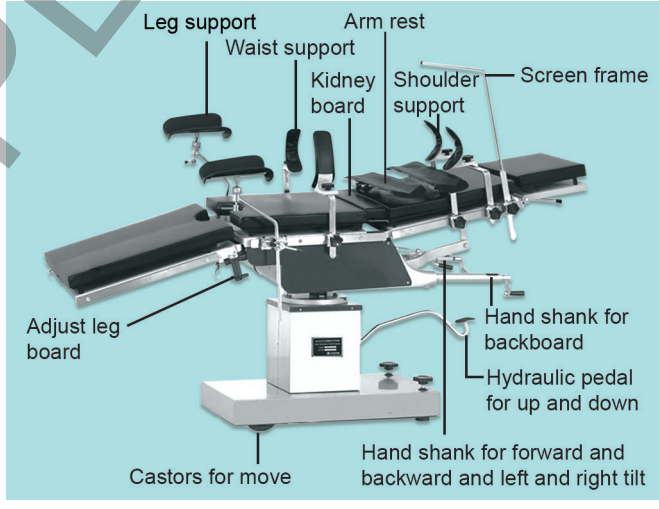

Obes-o-matic for Bariatric procedures


Laparo/Urology/ Gynecology

Key Points

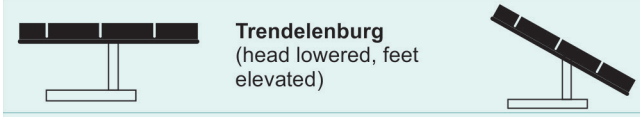
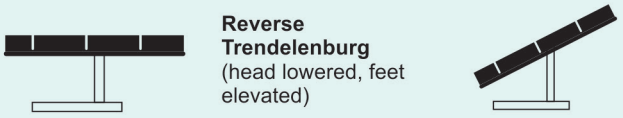
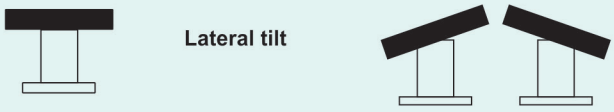
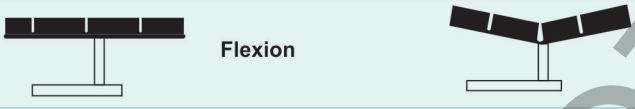
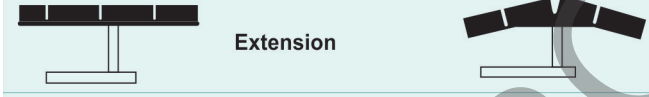
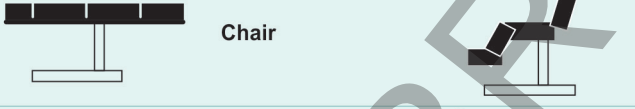
- **Supine:** Most common; flat on back.
- **Prone:** On stomach; used for spinal and posterior access.
- **Lithotomy:** Legs elevated and flexed in stirrups; used for perineal, urologic, gynecologic access.
- **Lateral:** Side-lying; used for thoracic, kidney, or hip surgeries.
- **Beach chair:** Semi-sitting; commonly for shoulder surgery.

Multifunctional Manual Hydraulic Surgical Operation Table

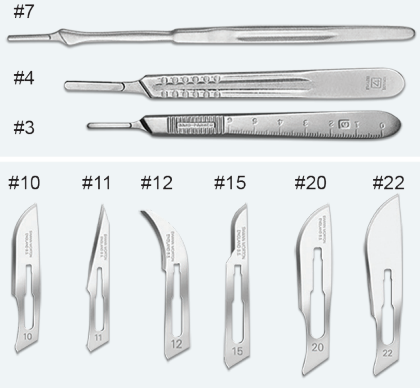


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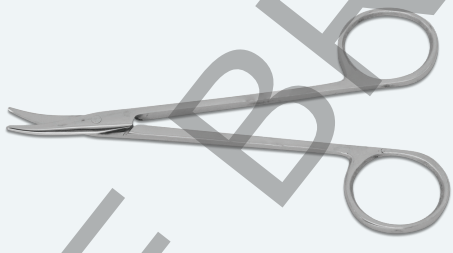
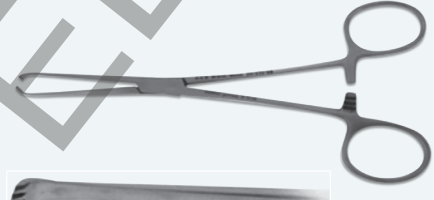
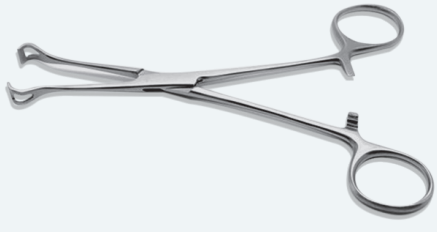
OT Table and Positions

	**Trendelenburg** (head lowered, feet elevated)	• Used to reduce risk of shock • Improves access to pelvis as bowel moves proximally
	**Reverse Trendelenburg** (head lowered, feet elevated)	• Can be used to prevent or relieve patient choking • Reduces venous oozing during head and neck surgery
	**Lateral tilt**	• Allows surgeons better access to anatomy • Used in obstetrics to prevent the baby from pressing on the mother's abdomen, causing her to faint
	**Flexion**	• Flexion and extension can be of individual segments • Back surgery • Kidney surgery • Gallbladder surgery • Abdominal surgery
	**Extension**	
	**Chair**	• Ophthalmic surgery • Neurosurgery • Shoulder surgery
	**Lithotomy** (split leg)	• Obstetrics • Gynecological surgery • Perineal surgery • Urology

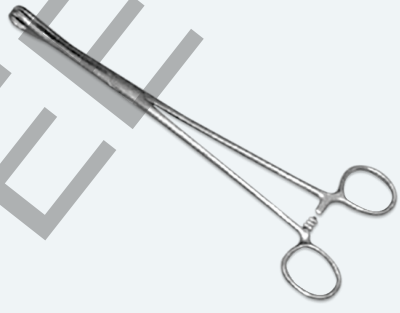
Common OT Instruments

Category	*Instrument Name*	*Use/Description*
Cutting and Dissecting	**Scalpel/BP handle with blade** 	Precise skin/tissue incision (handle + disposable blade)

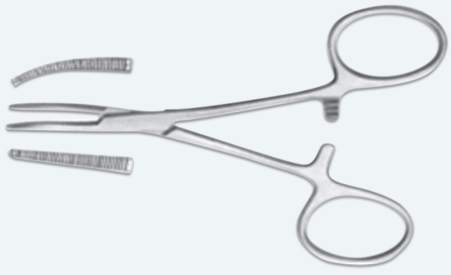
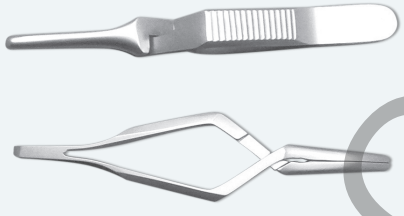
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Category	Instrument Name	Use/Description
	Metzenbaum scissors 	Fine dissection of delicate tissue
	Mayo scissors 	Cutting tougher tissue like fascia
	Tenotomy scissors 	Fine, curved scissors for small surgical dissection
Grasping and Holding	**Allis forceps**  	Grasping soft tissue (traumatic teeth)
	Babcock forceps 	Holding delicate structures (e.g. bowel, fallopian tubes)

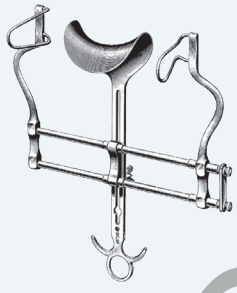
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Category	Instrument Name	Use/Description
	Kocher forceps 	Strong grip with teeth; used on tough tissue
	Towel clips (Backhaus) 	Securing drapes to skin
	Towel clips (Doyen's) 	Securing drapes to skin
	Sponge holder/Rampley's swab holding forceps 	Clean the operative field or hold the operative parts
Clamping and Occluding	**Artery forceps (Hemostats)** 	Clamping blood vessels to control bleeding

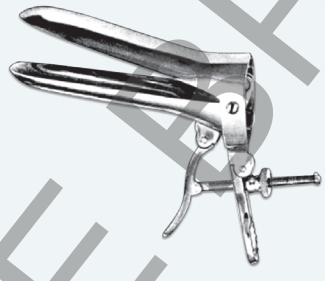
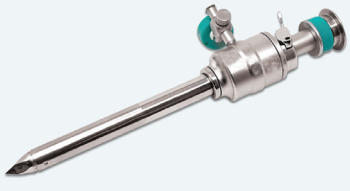
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Category	Instrument Name	Use/Description
	Mosquito forceps 	Small hemostat for fine bleeding points
	Bulldog clamp 	Temporary vascular occlusion
	Lister's sinus forceps 	Drain fluid from abscess or incision site
	Dissecting forceps (Non-toothed) 	Grasp soft tissues
	Dissecting forceps (toothed) 	Hold tough structures
Retracting and Exposing	**Langenbeck retractor** 	Hand-held; used to retract soft tissues

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Category	Instrument Name	Use/Description
	Deaver retractor 	Deep abdominal/chest wall retraction
	Self-retaining retractor (e.g., Balfour) 	Holds wound open without assistant
Suturing and Closing	**Needle holder (Mayo-Hegar)** 	Holding suture needle during stitching
	Skin stapler 	Rapid skin closure
	Adson forceps with teeth 	Holding skin edges during suturing

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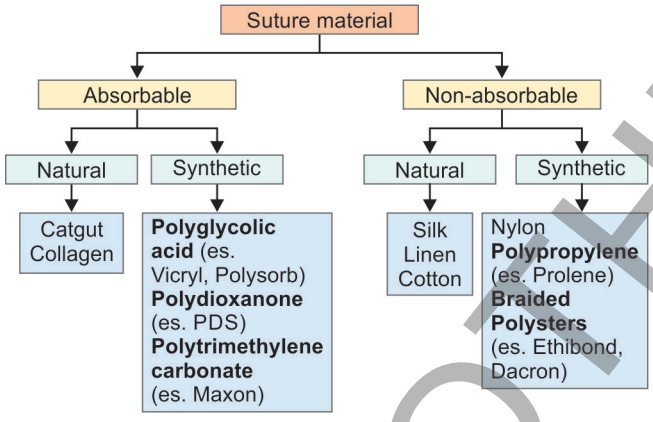
Category	Instrument Name	Use/Description
Suction and Irrigation	**Yankauer suction tip** 	General-purpose suction
	Poole suction tip 	Suctioning large volumes, especially in abdominal surgery
Miscellaneous	**Speculum (e.g., Cusco's)** 	Visualizing body cavities (vaginal exam)
	Probes 	Exploring wounds or sinus tracts
	Trocars 	Used in laparoscopic entry

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SUTURE

A suture is a strand of material used to approximate tissues and promote wound healing after surgery or injury.

Classification of Sutures



By Absorbability

Type	Description	Examples	Common use
Absorbable	Broken down and absorbed by the body over time	Vicryl, chromic catgut, PDS	Internal tissues, GI tract
Non-absorbable	Remain indefinitely or removed after healing	Silk, nylon, prolene, stainless steel	Skin closure, tendons, vessels

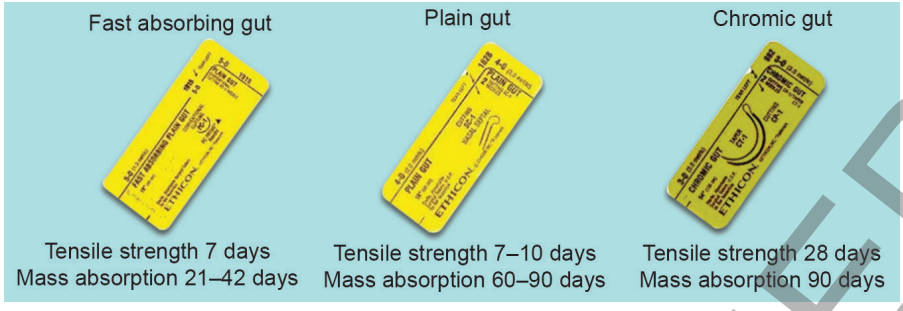
By Structure

Type	Description	Features
Monofilament	Single smooth strand	Less tissue drag, fewer infections (e.g., nylon, prolene)
Multifilament	Braided strands	Better knot security, more tissue drag (e.g., silk, vicryl)

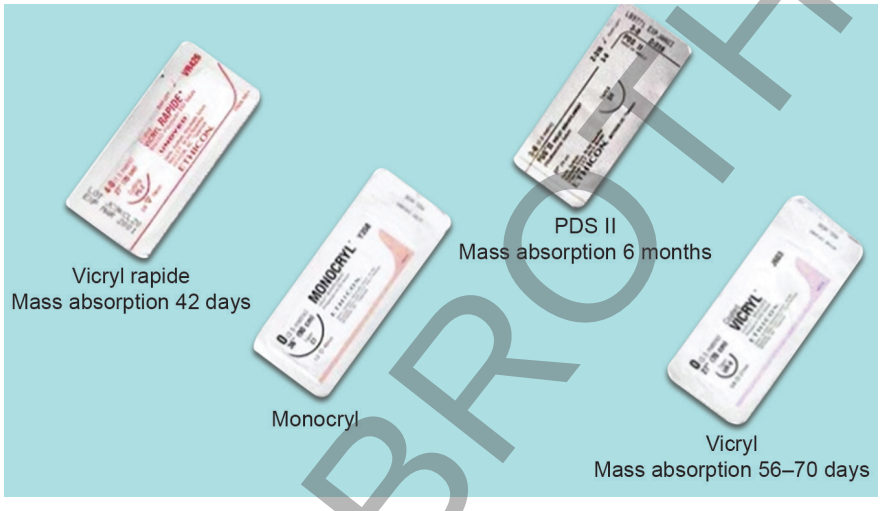
Common Suture Materials

Material	Absorbability	Structure	Notes
Catgut	Absorbable	Monofilament	Natural; unpredictable absorption
Vicryl (Polyglactin 910)	Absorbable	Braided	Synthetic; widely used; strong
PDS	Absorbable	Monofilament	Long-lasting; used in fascia
Silk	Non-absorbable	Braided	Natural; easy handling; inflammatory
Nylon	Non-absorbable	Monofilament	Minimal tissue reaction
Prolene (Polypropylene)	Non-absorbable	Monofilament	Inert; often used in cardiovascular surgery
Stainless steel	Non-absorbable	Monofilament	Strongest; used in orthopedic surgery

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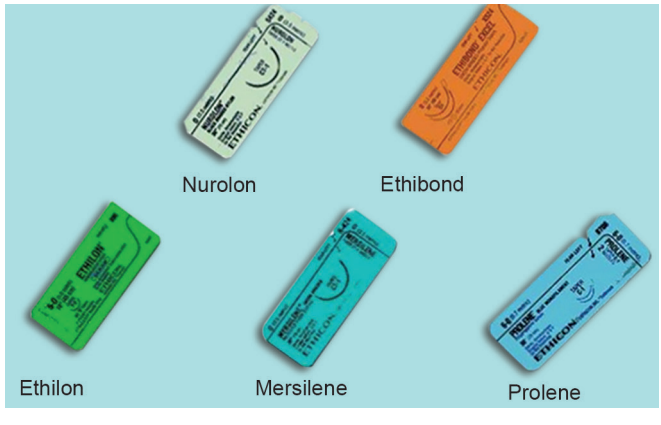
Absorbable (natural) suture



Absorbable (synthetic) suture



Nonabsorbable (natural) suture



Nonabsorbable (synthetic) suture

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Suture Sizes (USP System)

- Expressed as numbers: e.g., 0, 2-0 (00), 3-0 (000), 4-0
- Larger number of 0s = finer suture
  - 1, 0, 2-0: Used in deeper or stronger tissue (fascia)
  - 4-0, 5-0, 6-0: Used in delicate areas (face, vessels)

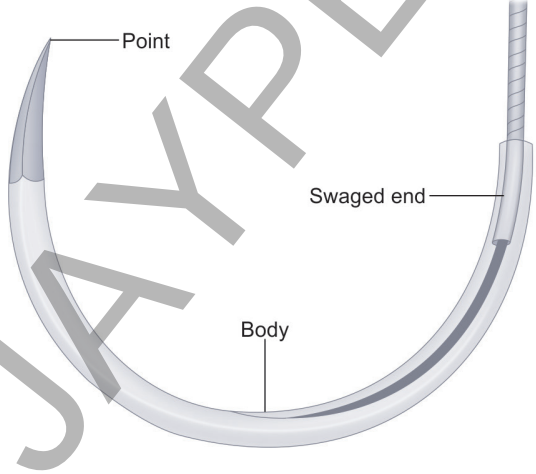
Needle Types

Needle type	*Use*
Taper	Soft tissue (GI, muscle, fascia)
Cutting	Skin (sharp edge)
Reverse cutting	Less traumatic to tissue, used in tougher areas
Blunt	Friable tissue like liver

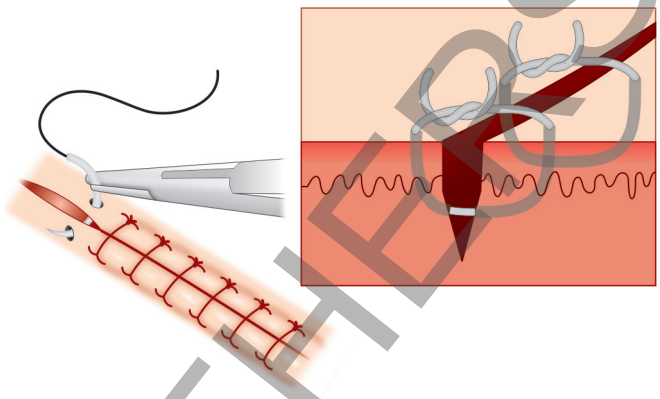
Suture Selection – Quick Guide

Tissue Type	*Recommended suture*
Skin	Nylon or prolene (non-absorbable)
Subcutaneous	Vicryl or monocryl (absorbable)
Fascia	PDS or vicryl (long-acting absorbable)
Muscle	Absorbable (Vicryl)
Bowel or bladder	Absorbable monofilament (PDS)
Blood vessels	Prolene (non-absorbable monofilament)
Tendon or ligament	Non-absorbable, strong (e.g., Ethibond, prolene)

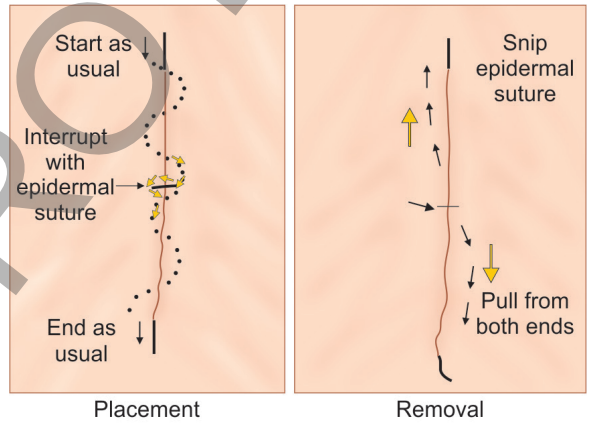
Parts of Suture Needle



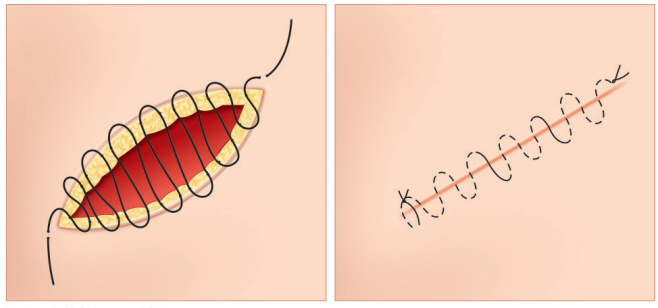
Suture Technique



Simple interrupted

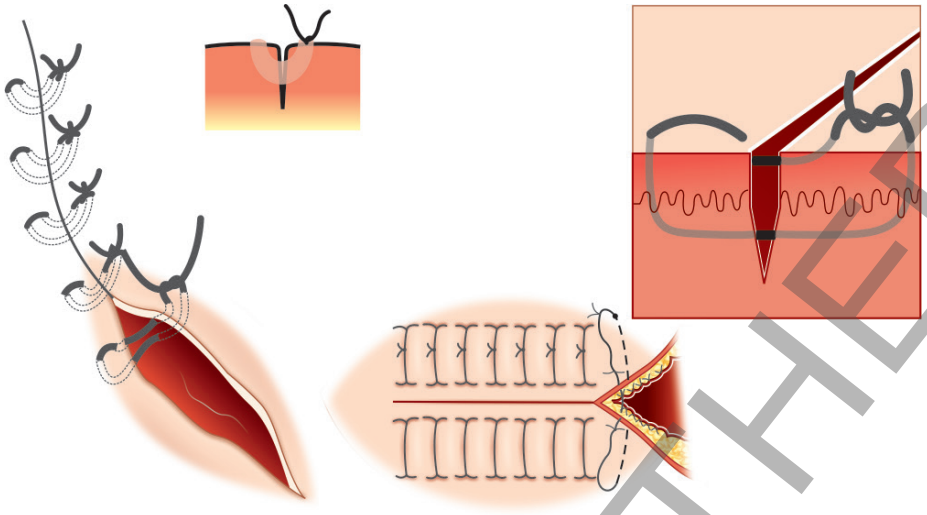


Modified interrupted subcuticular

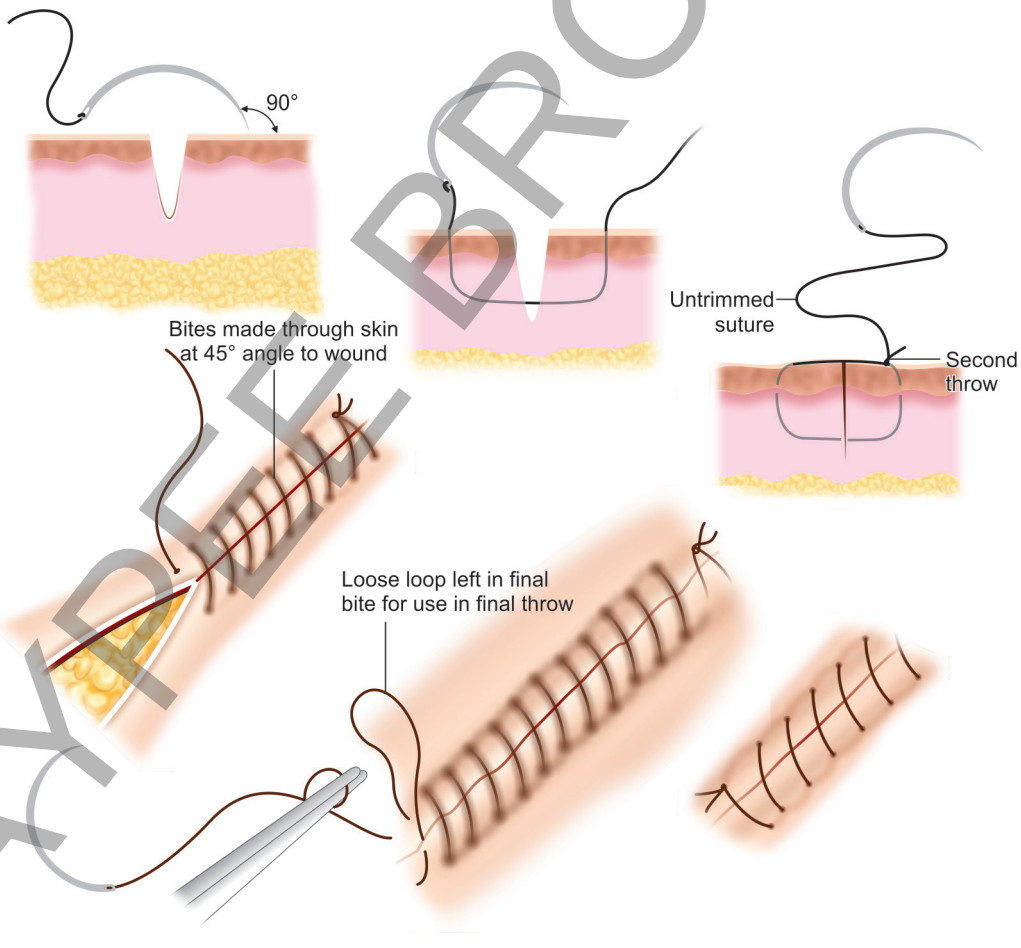


Running subcuticular suture

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Mattress suture



Continuous suture

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ANESTHESIA

Anesthesia is the loss of sensation (with or without consciousness) induced by drugs, allowing painless surgical or diagnostic procedures.

Types of Anesthesia

Type	Description	Examples/Use
General anesthesia	Induces unconsciousness + loss of sensation and reflexes	Major surgeries (e.g., laparotomy)
Regional anesthesia	Blocks nerve impulses in a large area while patient stays awake	Spinal, epidural, nerve blocks
Local anesthesia	Numbs a small, specific area; patient is fully conscious	Minor procedures (e.g., suturing, dental)
Sedation	Reduces anxiety and consciousness but not complete unconsciousness	Endoscopy, minor procedures

Routes of Administration

Route	Use	Examples
Inhalational	Mainly for general anesthesia	Isoflurane, sevoflurane, nitrous oxide
Intravenous (IV)	Induction and maintenance	Propofol, ketamine, thiopental
Topical	Local anesthesia	Lidocaine gel, EMLA cream
Subcutaneous/ infiltration	Local anesthesia	Lidocaine injection
Intrathecal (spinal)	Regional (below L2)	Bupivacaine
Epidural	Regional (e.g., labor)	Ropivacaine, with/ without opioids

Components of General Anesthesia

Component	Purpose	Drugs used
Induction	To put patient to sleep	Propofol, thiopental, etomidate
Maintenance	Keep patient unconscious	Sevoflurane, isoflurane
Analgesia	Pain control	Fentanyl, morphine
Muscle relaxation	Facilitate surgery/ intubation	Rocuronium, succinylcholine
Reversal	Wake up patient, reverse relaxants	Neostigmine, sugammadex

Monitoring During Anesthesia

- ECG (Heart rhythm)
- Pulse oximetry (O_2 saturation)
- Blood pressure
- End-tidal CO_2 ($ETCO_2$)
- Temperature
- Neuromuscular function (if muscle relaxants used)

Complications

Type	Examples
General	Nausea, vomiting, sore throat
Serious	Malignant hyperthermia, aspiration, hypotension, cardiac arrest
Regional	Headache (spinal), nerve damage, hypotension
Local	Allergic reaction, toxicity if overdose (CNS/cardiac symptoms)

Nursing Mnemonics & Tips

"AIMS" for General Anesthesia

- A – Analgesia
- I – Induction
- M – Muscle relaxation
- S – Sedation/Maintenance

FLUID AND ELECTROLYTE IMBALANCES

ELECTROLYTES TO KNOW

- **Sodium (Na^+):** 135–145 mEq/L
- **Potassium (K^+):** 3.5–5.0 mEq/L
- **Calcium (Ca^{2+}):** 8.5–10.5 mg/dL
- **Magnesium (Mg^{2+}):** 1.5–2.5 mEq/L
- **Phosphate (PO_4^{3-}):** 2.5–4.5 mg/dL
- **Chloride (Cl^-):** 96–106 mEq/L

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FLUID IMBALANCES

Condition	Cause	Signs and symptoms	Management
Hypovolemia (fluid loss)	Bleeding, vomiting, diarrhea, burns	Dry mucosa, hypotension, tachycardia, low urine output	IV fluids (NS, LR), treat cause
Hypervolemia (fluid overload)	Heart failure, kidney failure, excess IV fluids	Edema, hypertension, crackles in lungs	Diuretics, fluid restriction, treat cause

ELECTROLYTE IMBALANCES

Imbalance	Cause	Symptoms	Treatment
Hyponatremia ($\downarrow Na^+$)	Vomiting, SIADH, heart failure	Confusion, seizures, headache	Fluid restriction, hypertonic saline (if severe)
Hypernatremia ($\uparrow Na^+$)	Dehydration, diabetes insipidus	Thirst, agitation, dry mouth, seizures	Hypotonic fluids (e.g., D5W), oral water
Hypokalemia ($\downarrow K^+$)	Diuretics, vomiting, diarrhea	Muscle weakness, arrhythmias, cramps	Oral/IV K^+ replacement, monitor ECG
Hyperkalemia ($\uparrow K^+$)	Renal failure, cell lysis (e.g. burns)	Peaked T waves, muscle paralysis, cardiac arrest	Calcium gluconate, insulin + glucose, dialysis
Hypocalcemia ($\downarrow Ca^{2+}$)	Hypoparathyroidism, pancreatitis	Tetany, Chvostek/Trousseau signs, seizures	IV/Oral calcium, vitamin D
Hypercalcemia ($\uparrow Ca^{2+}$)	Hyperparathyroidism, malignancy	Lethargy, stones, abdominal pain, bone pain	IV fluids, bisphosphonates, loop diuretics
Hypomagnesemia ($\downarrow Mg^{2+}$)	Alcoholism, malnutrition	Tremors, seizures, arrhythmias	Magnesium sulfate IV/IM
Hypermagnesemia ($\uparrow Mg^{2+}$)	Renal failure, excess Mg^{2+} intake	Hyporeflexia, hypotension, bradycardia	IV calcium gluconate, dialysis
Hypophosphatemia ($\downarrow PO_4^{3-}$)	Refeeding syndrome, DKA recovery	Weakness, confusion, respiratory failure	Oral/IV phosphate
Hyperphosphatemia ($\uparrow PO_4^{3-}$)	Renal failure, cell destruction	Muscle cramps, soft-tissue calcification	Phosphate binders, dialysis

Clinical Relevance

- Always monitor ECG in potassium and magnesium imbalances.
- Correct magnesium first in hypokalemia that is resistant to treatment.
- Sodium imbalances should be corrected slowly to avoid cerebral edema or demyelination.

DEHYDRATION

Dehydration is a deficiency of body water that occurs when fluid loss exceeds intake, affecting both intracellular and extracellular compartments.

Types of Dehydration

Type	Features	Example causes
Isotonic (most common)	Equal loss of water and electrolytes	Diarrhea, vomiting, burns, bleeding
Hypertonic (Water loss > N^+ loss)	Increased serum sodium; water shifts out of cells	Fever, diabetes insipidus, excessive sweating
Hypotonic (Na^+ loss > Water loss)	Decreased serum sodium; water moves into cells	Diuretics, Addison's disease, kidney failure

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Clinical Signs and Symptoms

- Thirst, dry mucous membranes
- Hypotension, tachycardia
- Weakness, dizziness
- Decreased skin turgor
- Oliguria, concentrated urine
- Confusion (especially in elderly)

Clinical Assessment – Signs by Severity

Severity	Signs
Mild	Thirst, dry mouth, ↓ urine output
Moderate	Sunken eyes, tachycardia, poor skin turgor
Severe	Hypotension, confusion, cold extremities, shock

Diagnosis

- **Clinical exam:** Vital signs, mucous membranes, turgor
- **Lab tests:**
  - ↑ Hematocrit, ↑ serum osmolality
  - ↑ BUN/Creatinine ratio
  - Electrolytes (Na^+, K^+)
  - Urine specific gravity (>1.030 = concentrated)

Management

Severity	Treatment
Mild	Oral Rehydration Solution (ORS)
Moderate	ORS or IV fluids (Normal saline, Ringer's lactate)
Severe	Rapid IV fluid resuscitation + monitor vitals
Children	WHO ORS; if shock – rapid IV bolus (20 mL/kg NS)

Oral Rehydration Solution (WHO Formula)

- NaCl—2.6 g
- Glucose—13.5 g
- KCl—1.5 g
- Trisodium citrate—2.9 g
- Water—1 liter

Prevention

- Encourage fluid intake during illness or heat
- Use ORS during diarrhea or vomiting
- Avoid overuse of diuretics and alcohol
- Monitor fluid status in elderly and infants

SHOCK

INTRODUCTION

Shock is a life-threatening condition where there is inadequate tissue perfusion, leading to cellular hypoxia, impaired metabolism, and ultimately organ failure if not corrected.

Types of Shock

Type	Mechanism	Common Causes
Hypovolemic	↓ Blood/fluid volume → ↓ preload	Hemorrhage, dehydration, burns, diarrhea
Cardiogenic	Pump failure → ↓ cardiac output	MI, heart failure, arrhythmias
Distributive	Vasodilation → ↓ systemic vascular resistance	Sepsis, anaphylaxis, neurogenic shock
Obstructive	Physical blockage of circulation	Pulmonary embolism, tamponade, tension pneumothorax

Stages of Shock

Stage	Features
Initial	Subclinical ↓ perfusion; ↑ anaerobic metabolism
Compensated	Tachycardia, vasoconstriction, oliguria
Decompensated	Hypotension, acidosis, altered mental status
Irreversible	Multiorgan failure, death

GENERAL CLINICAL SIGNS

- **Vital signs:** Tachycardia, hypotension, rapid shallow breathing
- **Skin:** Cold/clammy (except in septic/anaphylactic → warm/flushed early)
- **CNS:** Confusion, restlessness, drowsiness
- **Renal:** Oliguria (<0.5 mL/kg/hr)
- **Metabolic:** Lactic acidosis

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Diagnosis

- CBC, electrolytes, ABG, lactate
- Blood cultures (if sepsis suspected)
- ECG, chest X-ray, echocardiogram
- Urine output monitoring
- CVP or arterial line for fluid status and BP monitoring (ICU)

Management – "ABC + VIP" Approach

A – Airway

Ensure patency, give oxygen (consider intubation if needed)

B – Breathing

Oxygen supplementation, mechanical ventilation if necessary

C – Circulation

- IV access → Start fluid resuscitation (e.g., 1–2 L NS bolus)
- **Vasopressors:** If fluids fail (e.g., norepinephrine, dopamine)
- **Blood products:** In hemorrhagic shock

VIP: Ventilation, Infusion, Pump support

Specific Treatments by Type

Shock Type	*Specific treatment*
Hypovolemic	IV fluids + blood transfusion (if hemorrhagic)
Cardiogenic	Inotropes (dobutamine), revascularization (MI), diuretics
Septic	Broad-spectrum antibiotics + fluids + norepinephrine
Anaphylactic	IM epinephrine + antihistamines + steroids
Neurogenic	Fluids + vasopressors, treat spinal injury
Obstructive	Relieve obstruction (e.g., chest tube for pneumothorax)

Key Points

- Early recognition and treatment is critical
- Monitor urine output, lactate, mental status, and perfusion
- Use vasopressors only after adequate fluid resuscitation
- In sepsis, give antibiotics within 1 hour

Types of Shock

Feature	*Hypovolemic*	*Cardiogenic*	*Distributive*	*Obstructive*
Cause	↓ Volume (bleeding, diarrhea)	↓ Pump function (MI, arrhythmia)	Vasodilation (sepsis, anaphylaxis)	Mechanical obstruction (PE, tamponade)
CO (Cardiac output)	↓	↓	↓ or normal/high (early sepsis)	↓
SVR (Systemic vascular resistance)	↑	↑	↓	↑
Preload	↓	↑ or ↓	↓	↑ or ↓
Skin	Cold, clammy	Cold, clammy	Warm (early), cold (late)	Cold, clammy
Pulse	Tachycardia	Tachycardia or bradycardia	Tachycardia	Tachycardia
Treatment	Fluids, stop bleeding	Inotropes, fix heart	Fluids + vasopressors + treat cause	Relieve obstruction + fluids

Nursing Mnemonics & Tips

Types of Shock

"SHOCKED"

Letter	*Meaning*	*Example*
S	**S**eptic	Infection → vasodilation
H	**H**ypovolemic	Blood/fluid loss
O	**O**bstructive	PE, tamponade
C	**C**ardiogenic	MI, heart failure
K	**K** (Anaphylactic shock - "K" for allergic "Krisis")	Allergy reaction
E	**E**ndocrine (Neurogenic shock)	Spinal injury, adrenal insufficiency
D	**D**istributive (includes septic, anaphylactic, neurogenic)	Vasodilation and pooling

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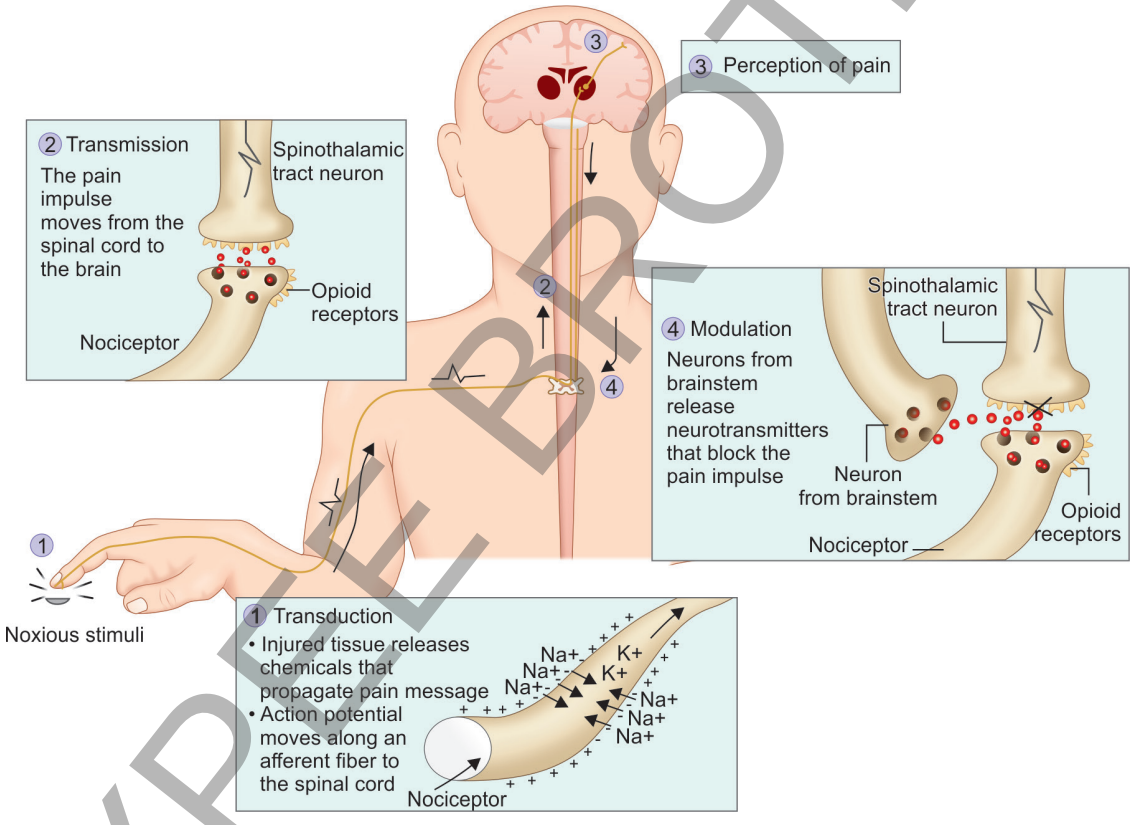
PAIN

An unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Types of Pain

Type	Characteristics	Examples
Acute pain	Sudden onset, short duration, protective	Surgical pain, injury
Chronic pain	Lasts >3 months, persists beyond healing	Arthritis, neuropathy
Nociceptive pain	From tissue damage, well localized	Burns, cuts, fractures
Neuropathic pain	From nerve damage, burning, shooting, tingling	Diabetic neuropathy, sciatica
Psychogenic pain	Emotional, psychological factors	Depression-related pain

Physiology of Pain



Theories of Pain

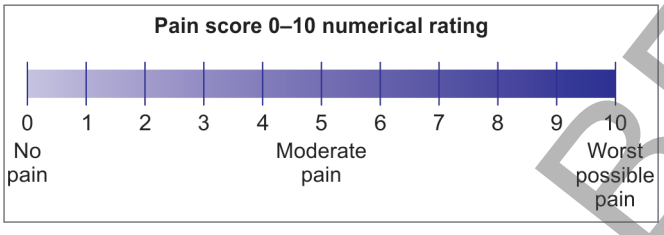
Theory	Key concept	Mechanism	Strengths	Limitations	Clinical relevance
Specificity Theory	Pain has specific receptors and pathways	Pain stimulus → specific receptor → spinal cord → brain	Simple, explains acute localized pain	Ignores emotional/ cognitive factors; cannot explain chronic pain	Supports use of localized analgesia, nerve blocks
Pattern Theory	Pattern and intensity of impulses determine pain	Strong stimulation → summation of impulses → pain perceived	Explains why touch can become painful under certain conditions	No clear differentiation between touch and pain	Suggests modulation of impulse patterns (e.g., massage)

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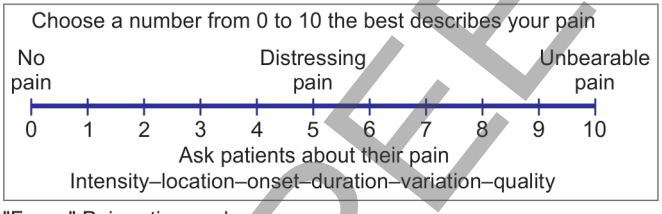
Theory	Key concept	Mechanism	Strengths	Limitations	Clinical relevance
Gate Control Theory	Spinal "gate" modulates pain signals	Small (pain) fibers open gate; large (touch) fibers close it; brain input matters	Explains emotional, cognitive, and sensory modulation of pain	Does not fully account for chronic or phantom pain	Basis for TENS, massage, distraction, emotional support
Neuromatrix Theory	Brain generates pain experience via network (neuromatrix)	Pain = interaction of sensory, emotional, and cognitive signals	Explains phantom limb pain, chronic pain, and mind-body connection	Abstract; difficult to measure neurologically	Supports holistic care: CBT, emotional care, mindfulness, education

Pain Assessment

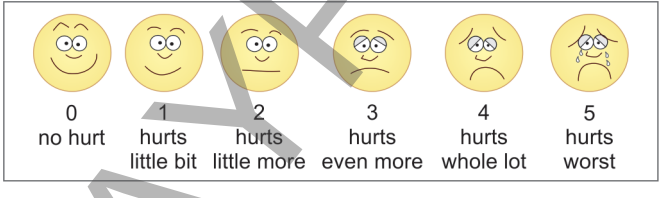
- **Use the PQRST method:**
  - Provokes/Palliates
  - Quality
  - Region/Radiation
  - Severity (use pain scales)
  - Timing/duration
- **Pain scales:**
  - Numeric Rating Scale (0–10)



  - Visual Analog Scale (VAS)
  - Wong-Baker Faces Scale (children)



"Faces" Pain rating scale



- **Observe non-verbal cues:** grimacing, restlessness, guarding.

Pain Management

Pharmacologic Methods

Drug Type	Examples	Use/Notes
Non-opioid analgesics	Paracetamol, NSAIDs	Mild-to-moderate pain
Opioids	Morphine, fentanyl	Moderate to severe pain
Adjuvants	Antidepressants, anticonvulsants (e.g., gabapentin)	Neuropathic pain
Topical agents	Lidocaine patches	Localized pain

Nonpharmacologic Methods

- Physical therapy (heat/cold therapy, massage)
- Relaxation techniques (deep breathing, guided imagery)
- Cognitive-behavioral therapy
- Acupuncture
- Transcutaneous electrical nerve stimulation (TENS)
- Distraction and education

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