ZENITH EDUCATION

AIIMS NORCET 2026 • Nursing Officer • Stage I Prelims & Stage II Mains

A-Series • A01 — Syllabus Unit 1

Anatomy and Physiology

Anatomy & Physiology — all body systems

Notes-only edition (practice questions are in the B-Series MCQ Book) • Print-ready • English Medium

NORCET syllabus coverage	1.1 Foundations • 1.2 Cardiovascular & blood • 1.3 Respiratory • 1.4 Digestive & hepatobiliary • 1.5 Renal • 1.6 Nervous, endocrine, reproductive, musculoskeletal, integumentary, lymphatic & immunity	
Volumes in this unit	A01 Anatomy & Physiology — all body systems	
Stage focus	Stage I — recall and application of facts, values, classifications; Stage II — case vignettes: priority action, deterioration, safety, delegation, evaluation	

TOPPER'S EDGE (9.5 level) — what NORCET asks most from this unit

- Normal values are the most-asked A&P items: cardiac output 4–8 L/min, GFR ~125 mL/min, tidal volume ~500 mL, Hb, platelets, pH 7.35–7.45.
- Know the conduction pathway order (SA → AV → bundle of His → bundle branches → Purkinje) and which coronary artery supplies which wall.
- Hormone source–action pairs (ADH, aldosterone, PTH, calcitonin, oxytocin, prolactin) and feedback loops are frequent recall questions.
- Cranial nerves, reflex arcs and spinal levels (C3–5 phrenic, S2–4 micturition) link directly to clinical questions.
- Apply physiology to nursing: oxyhaemoglobin curve shifts, RAAS and fluid balance, preload/afterload — these appear inside Stage II vignettes.

Unit 1 — Anatomy & Physiology Foundations

This unit builds the structural and functional base for every later nursing subject. Each chapter follows the same sequence: definition, structure or mechanism, classification, normal values, clinical and nursing significance, and exam traps. Practice MCQs for this unit are in the companion B-Series Practice Set.

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1.21 150 High-Yield Facts

1.1 Introduction to Anatomy and Physiology

1.1.1 Definitions and Scope

Anatomy is the study of the structure of the body and the relationships of its parts. The word comes from the Greek ana (up) and tom ē (cutting), because early anatomy was learned by dissection. **Physiology** is the study of how the body and its parts function — the physical and chemical processes that keep a person alive (Greek physis, nature; logos, study).

Term	Meaning
Morphology	The visible shape and arrangement of body parts
Mechanism	The step-by-step process that produces a function
Homeostasis	The body's ability to keep internal conditions stable despite external change

The two subjects cannot be separated. The shape of a structure explains what it can do, and its function explains why it is built that way. Nursing assessment depends on both: a nurse palpates a radial pulse because of where the artery lies (anatomy) and interprets its rate and rhythm because of how the heart conducts impulses (physiology).

Branch	What it studies	Example
Gross (macroscopic) anatomy	Structures visible to the naked eye	Chambers of the heart
Microscopic anatomy	Cells (cytology) and tissues (histology)	Epithelium of the trachea
Developmental anatomy	Structural change from conception to old age	Embryology, fetal circulation
Surface anatomy	Internal structures located from the skin surface	Apex beat, IM injection sites
Radiological anatomy	Structures seen by X-ray, CT, MRI, ultrasound	Chest X-ray landmarks
Systemic physiology	Function of an organ system	Renal physiology
Pathophysiology	Disordered function in disease	Heart failure, diabetes

1.1.2 Landmarks in the History of Anatomy and Physiology

Period	Contributor	Contribution
c. 1600 BCE	Edwin Smith Papyrus (Egypt)	Earliest surviving surgical text with anatomical observations
Ancient India (date debated)	Sushruta	Sushruta Samhita; surgery and anatomical description
c. 460–370 BCE	Hippocrates	"Father of Medicine"; separated medicine from superstition
4th century BCE	Aristotle	Comparative animal anatomy; early speculation on function
c. 300 BCE	Herophilus (Alexandria)	"Father of Anatomy"; early systematic human dissection
2nd century CE	Galen of Pergamon	On the Usefulness of the Parts of the Body; animal-based anatomy that dominated for about 1,300 years

Period	Contributor	Contribution
1543	Andreas Vesalius	De Humani Corporis Fabrica; corrected Galen; “Father of Modern Anatomy”
1628	William Harvey	Described the circulation of blood
17th century	Marcello Malpighi	Discovered capillaries using the microscope
1865 (approx.)	Claude Bernard	Concept of the milieu intérieur (internal environment)
1895	Wilhelm Röntgen	Discovered X-rays; birth of radiological anatomy
1926–1932	Walter B. Cannon	Coined the term **homeostasis**
20th century	CT, MRI, ultrasound, PET	Non-invasive imaging of structure and function

> **Exam Trap:** Harvey (1628) described circulation; Malpighi later found the capillaries that completed the circuit. Vesalius is the father of modern anatomy; Herophilus is often called the father of anatomy.

1.1.3 Levels of Structural Organisation

The body is organised in a hierarchy, each level built from the one below it (Figure 1.1).

> ⚠ **DIAGRAM NEEDS REGENERATING**
> The body is organised in a hierarchy, each level built from the one below it (Figure 1.1).
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***Figure 1.1**: Levels of structural organisation, from chemical to organism*

1. **Chemical level** — atoms (C, H, O, N) combine into molecules such as water, glucose, proteins, DNA and ATP.
2. **Cellular level** — molecules form organelles, and organelles form the cell, the smallest unit of life.
3. **Tissue level** — groups of similar cells with a common function. There are four basic tissues: epithelial, connective, muscle and nervous.
4. **Organ level** — two or more tissue types forming a structure with a specific function (stomach, heart).
5. **System level** — organs working together (the digestive system: mouth to anus plus liver and pancreas).
6. **Organismal level** — all systems working together as a living person.

> **Mnemonic:** “**C**an **C**ells **T**ake **O**ver **S**ome **O**rgans?” — Chemical → Cellular → Tissue → Organ → System → Organism.

Level	Nursing relevance
Chemical	Electrolyte balance, drug metabolism
Cellular	Tissue integrity, wound healing
Tissue	Skin breakdown, pressure injuries
Organ	Heart failure, kidney disease
System	Respiratory failure, circulatory shock
Organism	Holistic, patient-centred care

Disease is visible at several levels at once. In diabetes mellitus, glucose metabolism is disturbed at the chemical level, β-cell insulin secretion at the cellular level, islet structure at the tissue level, and energy balance of the whole person at the organismal level.

> **Exam Trap:** Organelles belong to the **cellular** level, not the chemical level. The nephron is a functional unit of an organ, not a “level” of organisation.

1.1.4 Organ Systems at a Glance

System	Main organs	Principal function
Integumentary	Skin, hair, nails, glands	Protection, temperature control, vitamin D
Skeletal	Bones, cartilage, joints	Support, movement, haematopoiesis, mineral store
Muscular	Skeletal muscles, tendons	Movement, posture, heat production
Nervous	Brain, spinal cord, nerves	Rapid control and integration
Endocrine	Pituitary, thyroid, adrenals, pancreas	Hormonal (slower, longer) control
Cardiovascular	Heart, blood vessels	Transport of blood, O_2, nutrients
Lymphatic/immune	Lymph nodes, spleen, thymus	Fluid return, defence
Respiratory	Nose to alveoli	Gas exchange, acid–base control
Digestive	GI tract, liver, pancreas	Digestion and absorption
Urinary	Kidneys, ureters, bladder, urethra	Excretion, fluid–electrolyte and acid–base balance
Reproductive	Gonads, ducts, accessory glands	Gamete and hormone production, reproduction

1.1.5 Core Principles

Complementarity of structure and function

Structure and function are interdependent: what a structure can do depends on its form. Examples: the thin, flat alveolar wall permits rapid diffusion; the biconcave, nucleus-free red blood cell maximises surface area for gas carriage; the thick left ventricular wall generates systemic pressure. The **trachea** has C-shaped cartilage rings that keep the airway open while the open posterior part lets the oesophagus expand during swallowing. The alveolar–capillary barrier is only about 0.2–0.6 µm thick; when fibrosis thickens it, diffusion slows and hypoxaemia follows — form constrains function. Conversely, a narrowed (stenotic) mitral valve limits flow from the left atrium to the left ventricle and produces a murmur. Structure also adapts to demand — skeletal muscle hypertrophies with resistance training, and bone remodels along lines of stress (**Wolff's law**).

Homeostasis

Homeostasis is the maintenance of a relatively stable internal environment despite external change. Most homeostatic control uses **negative feedback**; a few processes use positive feedback. The loop runs stimulus → receptor → control centre → effector → response. Example: after a meal blood glucose rises (stimulus); pancreatic β-cells detect it (receptor and control centre) and release insulin; liver and muscle take up glucose (effectors); glucose falls toward normal (response). In **diabetes mellitus** this negative feedback fails, and persistent hyperglycaemia damages vessels and nerves — nurses monitor capillary glucose, give insulin and teach lifestyle measures to restore control. The mechanisms, set points and clinical failures are covered in Chapter 1.7.

Gradients and flow

Blood, air, ions and heat all move down gradients (pressure, concentration, electrical or temperature), and flow is opposed by resistance. This single principle explains blood flow (flow = pressure difference ÷ resistance), ventilation, diffusion of gases and glomerular filtration.

Cardiac output example: CO = stroke volume × heart rate; with EDV 120 mL and ESV 50 mL, SV = 70 mL, and at 72 beats/min CO = 70 × 72 = 5,040 mL/min ≈ **5.0 L/min**. In heart failure SV falls, and the baroreceptor reflex raises heart rate to compensate; a narrow pulse pressure (below about 25 mmHg) suggests a low stroke volume.

> **Clinical Pearl:** Mean arterial pressure (MAP) ≈ cardiac output (CO) × total peripheral resistance (TPR). If CO is 5 L/min and TPR is 20 units, MAP ≈ 100 mmHg; if CO rises to 7 L/min while TPR falls to 15 units, MAP ≈ 105 mmHg — a rise of 5 mmHg in MAP. Such simple models explain why vasodilators lower BP and why fluid loss lowers CO.

1.1.6 Links with Other Disciplines

Discipline	Link with anatomy and physiology	Nursing application
Biochemistry	Metabolic pathways depend on structures such as mitochondrial cristae	Interpreting laboratory results; enzyme deficiencies (e.g. pyruvate kinase deficiency causing haemolysis of RBCs)

Discipline	Link with anatomy and physiology	Nursing application
Pharmacology	Absorption and distribution depend on barriers (blood–brain barrier) and pH gradients	Drug dosing, drip rates, recognising adverse reactions (e.g. warfarin and vitamin K–dependent clotting factors made in the liver)
Pathology	Disease alters structure (atherosclerotic plaque) and function (reduced flow)	Assessing perfusion by skin temperature and capillary refill
Immunology	Lymphatic organs and immune responses	Vaccination sites, allergy assessment
Genetics	DNA, protein synthesis	Genetic screening and counselling, family history

1.1.7 Relevance to Nursing Practice

- **Assessment:** vital signs, auscultation sites and pulse points are applied anatomy.
- **Procedures:** safe injection sites (ventrogluteal, deltoid, vastus lateralis), catheterisation and nasogastric tube insertion depend on anatomical relations.
- **Positioning:** turning schedules, the 30° lateral tilt and heel off-loading prevent pressure injuries over bony prominences (Chapter 1.16).
- **Pharmacology:** drug actions are explained through physiology (e.g. diuretics act on specific nephron segments).
- **Precision medicine** tailors prevention and treatment to a person's genes, environment and lifestyle. The Human Genome Project (completed 2003) mapped about 3 billion base pairs. Examples: warfarin dose requirements vary with CYP2C9 and VKORC1 gene variants (pharmacogenomics); ivacaftor targets the G551D mutation of the CFTR protein in cystic fibrosis. Nurses collect family history, give targeted therapies and monitor adverse effects.
- **Regenerative therapies** use stem cells (e.g. mesenchymal stem cells from marrow or fat, which can form bone, cartilage or fat), scaffolds and growth factors to repair tissue; nursing care centres on asepsis, graft-site monitoring and patient teaching.
- **Imaging-based 3D models and virtual dissection** reconstruct patient-specific anatomy from CT and MRI for surgical planning, patient education (e.g. a 3D-printed heart explaining a congenital defect) and training.

1.1.8 Quick Self-Test

1. Plane dividing the body into anterior and posterior parts — **coronal (frontal)**.
2. A patient lying face down is — **prone**.
3. Feedback that amplifies a change — **positive feedback**.
4. The radius is **lateral** to the ulna in anatomical position.
5. Levels of organisation from smallest — **chemical, cellular, tissue, organ, system, organism**.

1.1.9 High-Yield Summary

Point	Key fact
Smallest living unit	Cell
Four basic tissues	Epithelial, connective, muscle, nervous
Levels (6)	Chemical → cellular → tissue → organ → system → organism
Term "homeostasis"	Walter B. Cannon
Milieu intérieur	Claude Bernard
Circulation of blood	William Harvey, 1628
Father of modern anatomy	Andreas Vesalius (1543)

1.2 Anatomical Position, Planes, Axes and Directional Terms

1.2.1 Standard Anatomical Position

Definition. The standard anatomical position is the reference posture in which all anatomical descriptions are made: the body **erect**, facing forward, eyes looking to the horizon, **upper limbs at the sides with palms facing forward** (thumbs pointing laterally), and lower limbs together with **feet flat and toes pointing forward**.

Every directional term describes the body as if it were in this position, whatever the patient's actual posture. A lesion "medial to the knee" remains medial whether the patient is lying supine, prone or sitting. Right and left always mean the **patient's** right and left, not the examiner's.

The anatomical position is **not** the same as the supine position on an operating table: it is a standing reference posture, and a supine patient is simply described "as if" standing. In anatomical position the radius lies lateral to the ulna; if the palm faces medially or backward, the forearm has been rotated (pronated).

Related position	Description	Nursing use
Supine	Lying on the back, face up	Examination, most surgery
Prone	Lying face down	Posterior surgery, proning in ARDS
Lateral (side-lying)	On the right or left side	Pressure relief, recovery
Fowler's	Head of bed raised 45–60° (semi-Fowler's 30–45°; high Fowler's 60–90°)	Dyspnoea, feeding, aspiration prevention
Trendelenburg	Supine, head lower than feet	Specific surgery; no longer advised routinely for shock
Lithotomy	Supine, hips and knees flexed, legs in stirrups	Delivery, pelvic procedures
Sims' (semi-prone)	Left side, right knee flexed up	Enema, rectal examination

> **Exam Trap:** In anatomical position the palms face **forward** (supinated), not upward or backward; the thumb is lateral. The radius (thumb side) is therefore the lateral bone of the forearm.

1.2.2 Anatomical Planes

A **plane** is an imaginary flat surface that divides the body into parts (Figure 1.2).

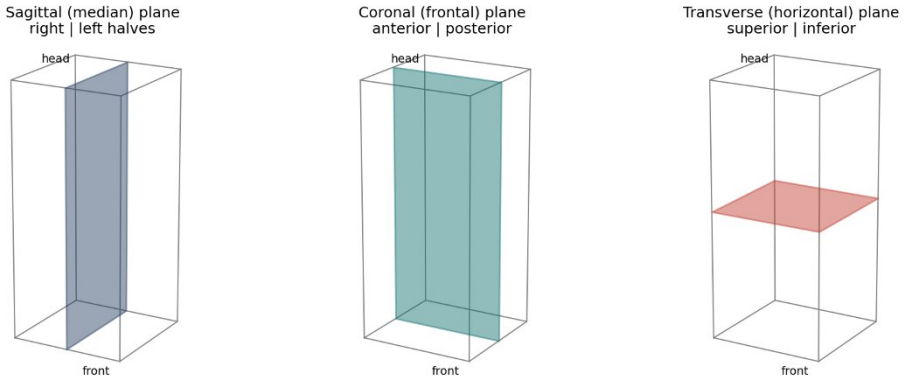


***Figure 1.2**: The three cardinal planes shown on a schematic body block*

Plane	Orientation	Divides the body into	Imaging example
Sagittal	Vertical, front to back	Right and left parts	Sagittal MRI of the spine
Median (midsagittal)	Sagittal plane exactly in the midline	Equal right and left halves	Midsagittal MRI of the brain
Parasagittal	Sagittal plane off the midline	Unequal right and left parts	—
Coronal (frontal)	Vertical, side to side	Anterior (front) and posterior (back) parts	Coronal CT of the sinuses; PA chest X-ray is a coronal projection
Transverse (horizontal, axial)	Parallel to the floor	Superior (upper) and inferior (lower) parts	Axial CT slices
Oblique	At an angle between the others	Variable	—

Clinical and imaging uses: midsagittal MRI shows midline brain structures (corpus callosum, falx cerebri, septum pellucidum); coronal CT is used for facial and orbital (blow-out) fractures and the sinuses; axial (transverse) CT shows lung nodules, liver segments and spinal levels. By radiological convention, axial CT and MRI images are viewed **as if looking up from the patient's feet**, so the patient's right appears on the viewer's left. An oblique plane is any plane not

parallel to the three cardinal planes.

> **Exam Trap:** The **median plane and the midsagittal plane are the same plane**. Any other sagittal plane is parasagittal. A plane perpendicular to the sagittal plane and vertical is the **coronal** plane.
> **Clinical Pearl:** Scoliosis (a lateral curve) is best seen in the coronal view (AP/PA spine X-ray, Cobb angle); kyphosis and lordosis are seen in the sagittal (lateral) view. A midline laparotomy runs along the median plane.

1.2.3 Anatomical Axes and Movements

An **axis** is an imaginary line around which a movement (rotation) occurs. A plane divides; an axis is a line of rotation. Movement always occurs **in** a plane and **around** an axis perpendicular to that plane.

Axis	Direction of the line	Movement occurs in plane	Movements
Transverse (coronal / frontal) axis	Side to side	Sagittal	Flexion, extension of elbow, knee, hip; nodding “yes”
Anteroposterior (sagittal) axis	Front to back	Coronal	Abduction, adduction at shoulder and hip; lateral flexion of trunk
Vertical (longitudinal) axis	Top to bottom	Transverse	Medial and lateral rotation; pronation, supination; shaking the head “no”

Movement	Definition
Flexion / extension	Bending that decreases / increases the angle between parts (sagittal plane)
Abduction / adduction	Movement away from / toward the midline
Medial / lateral rotation	Turning anterior surface toward / away from the midline
Pronation / supination	Palm turned backward (down) / forward (up)
Dorsiflexion / plantar flexion	Foot up toward shin / toes pointed down
Inversion / eversion	Sole turned inward / outward
Circumduction	Circular movement combining flexion, abduction, extension and adduction

To name any movement: (1) picture the axis as a rod through the joint, (2) identify the plane in which the part moves, (3) name the movement. Knee flexion is rotation around a **transverse** axis — not the anteroposterior axis. Range-of-motion documentation names the joint, the movement and the degrees achieved.

> **Exam Trap:** “Flexion decreases the joint angle” is true for most joints. Flexion is defined by the sagittal-plane movement, so at the shoulder the arm moves forward and upward (angle with the trunk increases), and at the ankle the equivalent movement is called dorsiflexion.

1.2.4 Directional Terms

Term	Meaning	Opposite	Example
Superior (cranial, cephalic)	Toward the head	Inferior (caudal)	The heart is superior to the diaphragm
Anterior (ventral)	Toward the front	Posterior (dorsal)	The sternum is anterior to the heart
Medial	Toward the midline	Lateral	The little finger is medial to the thumb

Term	Meaning	Opposite	Example
Proximal	Nearer the trunk or point of origin (limbs)	Distal	The elbow is proximal to the wrist
Superficial	Nearer the body surface	Deep	Skin is superficial to muscle; muscle is superficial to bone
Ipsilateral	Same side	Contralateral (opposite side)	Right motor cortex controls left (contralateral) limbs
Intermediate	Between a medial and a lateral structure	—	The ring finger lies between the middle and little fingers
Central / peripheral	Toward / away from the centre	—	CNS vs PNS

Applied pairs to remember: in the forearm the **ulna is medial** and the **radius lateral** (so the ulnar side = little-finger side); in the leg the **tibia is medial** and the **fibula lateral**; the medial malleolus belongs to the tibia and the lateral malleolus to the fibula. The layers of skin run epidermis (superficial) → dermis → hypodermis (deep). A **deep vein thrombosis** is in a deep vein (femoral, popliteal, calf veins); superficial thrombophlebitis affects superficial veins (e.g. long saphenous).

Proximal and distal in practice: "proximal control" of haemorrhage means compressing the artery nearer the heart; a proximal nerve lesion involves the trunk near the spinal cord, a distal lesion a branch in the limb; a "proximal humerus fracture" is near the shoulder, a "distal radius fracture" near the wrist.

In humans, cranial/cephalic are synonyms of superior, and ventral/dorsal are synonyms of anterior/posterior. In four-legged animals these pairs differ (dorsal means "toward the back", which is superior in a quadruped).

> **Exam Trap:** The little finger is **medial** (not lateral) to the thumb; a muscle is **superficial** (not deep) to the bone it covers; the femoral artery in the femoral triangle is **superficial** to the femur. "Proximal/distal" is used for limbs and tubes (e.g. proximal duodenum), not for the trunk (use superior/inferior).

1.2.5 Body Regions, Abdominal Regions and Quadrants

The body is divided into the axial part (head, neck, trunk) and the appendicular part (limbs). For clinical localisation, the abdomen is divided in two ways.

Four quadrants — formed by the median plane and a transverse plane through the umbilicus (at about the **L3–L4** intervertebral disc): right upper (RUQ), left upper (LUQ), right lower (RLQ) and left lower (LLQ).

Nine regions — formed by two vertical **midclavicular lines** and two horizontal planes: the **subcostal plane** (lower margin of the 10th costal cartilage) and the **transtubercular plane** (tubercles of the iliac crests, about L5). Figure 1.3 shows the regions with their principal contents.

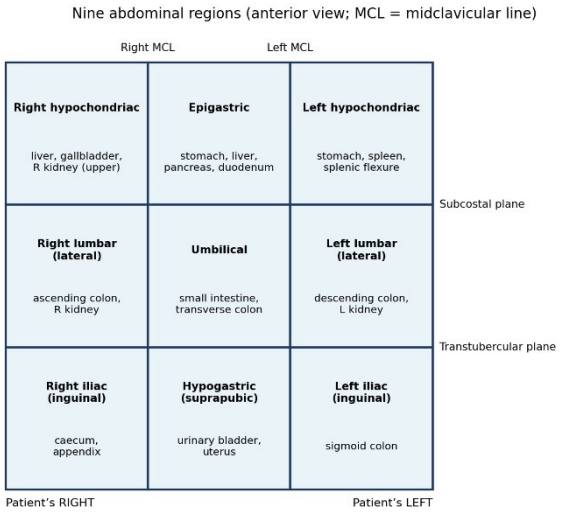


Figure 1.3: The nine abdominal regions with principal contents (anterior view)

Clinical finding	Usual region / quadrant
Acute appendicitis (late)	Right iliac fossa (RLQ); McBurney's point lies one-third of the way from the right ASIS to the umbilicus
Acute cholecystitis (Murphy's sign)	Right hypochondrium (RUQ)

Clinical finding	Usual region / quadrant
Peptic ulcer pain	Epigastric region
Splenic enlargement	Left hypochondrium (LUQ), extends toward umbilicus
Urinary retention (full bladder)	Hypogastric (suprapubic) region

1.2.6 Clinical Application: Documentation and Positioning

Steps for documenting a finding: (1) refer to anatomical position (or state the patient's actual position if it cannot be assumed, e.g. trauma, ICU); (2) name the region and plane; (3) choose a fixed reference point — midline, joint line or bony landmark (ASIS, PSIS, olecranon, medial malleolus); (4) give distance in cm and direction; (5) record it clearly. For round structures (breast, stoma, wound margins) use the **clock-face method** ("12 o'clock position").

Finding	Correct documentation	Poor documentation
Sacral pressure injury	"Stage 2 pressure injury over the sacrum, 2 cm right of the midline, 3 × 2 cm"	"Bed sore on the back"
Appendicectomy scar	"Oblique scar in the right iliac fossa crossing McBurney's point"	"Cut on the right side of the belly"
Wrist fracture	"Distal radius fracture, about 3 cm proximal to the radial styloid"	"Broken wrist"
Thigh lesion	"2 cm lesion on the posterior aspect of the left thigh, 5 cm lateral to the midline"	"On the back of the left leg"

Anatomical terms make documentation unambiguous: "a 3 cm laceration on the anterior aspect of the left forearm, 5 cm proximal to the wrist crease." Surgical site marking under the WHO Surgical Safety Checklist is confirmed at the **Sign-In** stage, with the patient involved where possible.

Position	Pressure points at risk
Supine	Occiput, scapulae, elbows, sacrum and coccyx, heels
Lateral (side-lying)	Ear, acromion (shoulder), greater trochanter, medial and lateral condyles of knee, malleoli
Prone	Forehead, cheeks, chin, breasts (women), genitalia (men), anterior superior iliac spines, knees, toes
Sitting	Ischial tuberosities, sacrum, heels, scapulae

Case example — preventing pressure injury. A 72-year-old bedridden man after hip surgery has a Braden score of 14 (moderate risk). The nurse repositions him at least every 2 hours, uses a **30° lateral tilt** (instead of 90° side-lying, which loads the greater trochanter), keeps the head of the bed at or below 30° when possible to reduce sacral shear, and "floats" the heels. Knowledge of bony prominences — sacrum, heels, greater trochanters, ischial tuberosities, occiput — explains each step.

1.2.7 Quick Self-Test (True or False)

Statement	Answer
In anatomical position the palms face forward with the thumbs lateral	True
The coronal plane divides the body into right and left parts	False — anterior and posterior
The ulna is lateral to the radius	False — the ulna is medial
The scapula is anterior to the ribs	False — it is posterior
The transverse plane is also called the horizontal plane because it is parallel to the floor	True
The skin is deep to the subcutaneous fat	False — skin is superficial

Statement	Answer
A patient with right cerebral infarction has contralateral (left) limb weakness	True

1.2.8 High-Yield Summary

Concept	Remember
Anatomical position	Erect, palms forward, feet forward
Sagittal plane	Right/left; median = midsagittal
Coronal plane	Anterior/posterior
Transverse plane	Superior/inferior; axial CT
Flexion/extension	Sagittal plane, transverse axis
Abduction/adduction	Coronal plane, anteroposterior axis
Rotation	Transverse plane, vertical axis
Umbilicus level	About L3–L4 disc
Right/left	Always the patient's side

1.3 Body Cavities and Serous Membranes

1.3.1 Definition and Classification

A **body cavity** is an enclosed space that houses and protects internal organs (viscera) and allows them to move and change size. The body has two main cavities — **dorsal** and **ventral** — with further subdivisions (Figure 1.4).

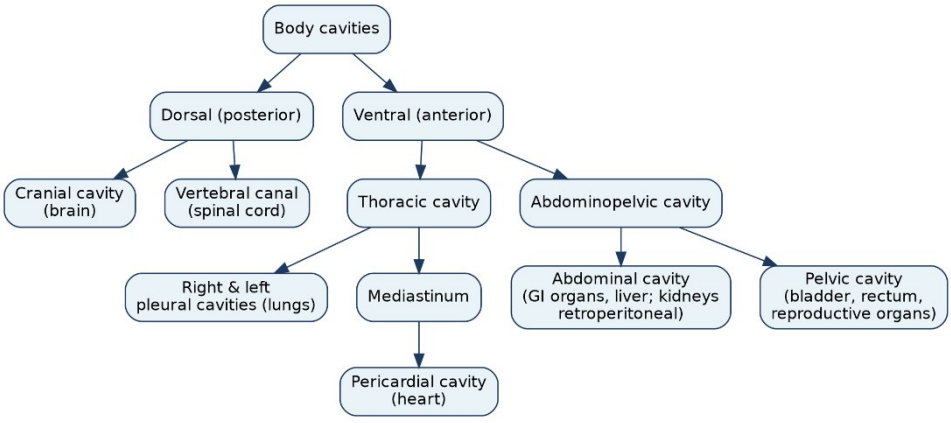


***Figure 1.4**: Classification of body cavities*

1.3.2 Dorsal Cavity

The dorsal cavity is enclosed by bone and protects the central nervous system.

Subdivision	Boundaries	Contents
Cranial cavity	Skull bones	Brain, meninges, CSF
Vertebral (spinal) canal	Vertebral foramina of the stacked vertebrae	Spinal cord, meninges, nerve roots, CSF

The cranial cavity is formed by the cranial bones (frontal, parietal, temporal, occipital, sphenoid, ethmoid) joined at sutures; its volume in adults is about 1.3–1.4 L. The vertebral canal is formed by the stacked vertebral foramina. The two parts are continuous through the **foramen magnum**. Both are lined by the **meninges** (dura, arachnoid, pia) rather than by serous membranes; CSF circulates in the subarachnoid space (Chapter 1.18).

Clinical point	Explanation
Extradural haematoma	Fracture of the thin temporal bone tears the middle meningeal artery