Chapter 3. Regions of Body, Cavities and Systems

1 . Learning Objectives

After completing this chapter, the learner will be able to ...

1. **List the nine classical anatomical regions** (and their practical extensions) and describe their surface boundaries.
2. **Identify the major body cavities, their serous membranes and subdivisions**, explaining how they protect and support the viscera.
3. **Name the eleven principal organ-systems**, summarise their key functions and state at least *two* ways each system is relevant to physiotherapy assessment or intervention.
4. **Apply regional and systems knowledge to clinical reasoning**, e.g., selecting postural drainage positions, core-stability exercises or cardiorespiratory rehabilitation strategies.

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2 . Regions of the Body

Regional Group	Typical Surface Boundaries	Key Structures	Physiotherapy Significance
Head & Neck	Hairline → C7 SP	Cranial bones, facial muscles, cervical spine, carotid sheath	Cervical mobilisation, vestibular rehab, TMJ therapy
Thorax	C7 → Diaphragm	Ribs, sternum, heart, lungs, mediastinum	Postural drainage, breathing retraining, rib mobilisation
Back	C7 → Sacrum (posterior)	Vertebrae, paraspinals, thoracolumbar fascia	Core stabilisation, spinal manipulation, EMG-guided re-ed
Abdomen	Diaphragm → Pelvic brim (anterior/lateral)	Abdominal wall, viscera, lumbar plexus	Abdominal bracing, visceral referral mapping, posture
Pelvis & Perineum	Pelvic brim → Pelvic floor	Pelvic organs, sacrum/coccyx, pelvic floor muscles	Pelvic floor rehab, SIJ dysfunction management
Upper Limb	Shoulder girdle → Digits	Scapular complex, brachial plexus, UE joints	Shoulder impingement protocols, dexterity retraining
Lower Limb	Pelvic girdle → Digits	Hip/knee/ankle joints, sciatic nerve, LE musculature	Gait analysis, proprioceptive training, orthosis fitting
Axilla	Cervico-axillary canal	Neurovascular bundle, lymph nodes	Axillary clearance post-mastectomy, crutch education
Inguinal region	ASIS → Pubic tubercle	Inguinal canal, femoral neurovasculature	Hernia precautions, hip-flexor stretch localisation

Mnemonic: *"H-T-B-A-P-U-L-A-I" → Head, Thorax, Back, Abdomen, Pelvis, Upper, Lower, Axilla, Inguinal.*

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3 . Body Cavities

Major Cavity	Sub-cavities / Membranes	Contents	Clinical PT Relevance
Dorsal Cavity	• **Cranial** – meninges • **Vertebral** – meninges	Brain; spinal cord	Neurological PT, ICP considerations, spinal precautions
Ventral Cavity	**Thoracic** *(pleural ×2, pericardial, mediastinum)*	Lungs; heart; great vessels	Breathing techniques, post-CABG mobilisation
	Abdominopelvic – peritoneum • **Abdominal** • **Pelvic**	Digestive organs; kidneys; bladder; reproductive organs	Core-stability training, pelvic floor rehab, visceral mobilisation

Major Cavity	Sub-cavities / Membranes	Contents	Clinical PT Relevance
Diaphragm (musculotendinous divider)	—	Central tendon, openings for aorta, oesophagus	Diaphragmatic breathing training, hiatal hernia precautions

Serous membranes (pleura, pericardium, peritoneum) reduce friction ➜ rationale for early mobilisation after thoraco-abdominal surgery.

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4 . Overview of Organ Systems & PT Interfaces

System	Principal Functions	Selected Physiotherapy Touch-points
Integumentary	Protection, thermoregulation	Scar management, pressure-injury prevention
Skeletal	Support, calcium store, RBC formation	Fracture rehab, osteoporosis exercise dosing
Muscular	Movement, heat production	Strengthening, EMG biofeedback, spasticity mgmt
Nervous	Control, coordination, cognition	Neuro-plasticity training, PNF, balance therapy
Endocrine	Hormonal regulation, metabolism	Diabetes exercise prescription, osteoporosis risk
Cardiovascular	Transport, BP regulation	Cardiac rehab phases I-III, endurance testing
Lymphatic/Immune	Fluid balance, defence	Lymph-oedema drainage, post-node-dissection care
Respiratory	Gas exchange, acid-base balance	Airway clearance, incentive spirometry, IMT
Digestive	Nutrient absorption, waste elimination	Post-abdominal surgery mobilisation, nutrition advice synergy
Urinary	Filtration, osmoregulation	Pelvic floor training, fluid management counselling
Reproductive	Gamete production, hormones	Prenatal/postnatal PT, men’s health physio

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5 . Systems-Across-Regions: Integrated Clinical Example

Case: A 52-year-old with COPD and chronic low-back pain.
– *Thoracic cavity* compromise ➜ ↓ lung volumes → relies on accessory neck muscles (cervical region) → cervical postural overload.
– Weak abdominal wall (abdominal region) ➜ poor diaphragmatic excursion ➜ exacerbates low-back strain (lumbar region).
PT Plan:

1. **Thoracic expansion** exercises in high-sitting to unload abdominal cavity.
2. **Diaphragmatic breathing** supine hook-lying to isolate diaphragm.
3. **Core stabilisation** targeting transversus abdominis to support lumbar spine.
4. **Pursed-lip breathing** combined with gradual ambulation to improve O_2 saturation.

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6 . Quick-Revision Flash Cards

Prompt	Answer
Name the serous membrane lining the abdominal cavity.	**Parietal peritoneum**
Which cavity houses the pituitary gland?	**Cranial cavity – sella turcica**
Give two reasons physios study the inguinal region.	Groin strain rehab; femoral nerve mobilisation

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7 . Self-Assessment Quiz

1. **Which plane separates the abdominal from the pelvic cavity, and what landmark corresponds externally?**
2. List **three physiotherapy techniques** that exploit gravity in relation to body cavities.
3. Match the following systems with a common PT modality:
   a) Respiratory — ___ ; b) Lymphatic — ___ ; c) Nervous — ___
4. True/False: The mediastinum contains both lungs.
5. A patient complains of numbness in the *anterolateral leg*. Which body region and likely nerve root are involved?

Answers

1. None (they are continuous); approximate external landmark = **pelvic brim**.
2. Postural drainage, Trendelenburg for venous return, prone press-ups for disc re-centralisation.
3. a) Active cycle of breathing / IMT; b) Manual lymph drainage / compression; c) Neurodynamic sliding / PNF.
4. False – it lies **between** the pleural cavities.
5. **Lower-limb region**, L5 nerve root via common fibular → superficial fibular nerve.

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8 . Suggested Practical / Lab Activities

Activity	Brief Description	Outcome
Palpation Map-Out	Students tape the nine abdominal regions on a peer and palpate underlying organs	Enhances surface anatomy localisation
Cavity-Posture Lab	Use spirometry to compare lung volumes in Fowler's vs. Trendelenburg	Relates cavity orientation to respiratory function
Systems Relay	Teams match clinical cases to the primary and secondary systems involved	Builds integrative clinical reasoning

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9 . Key Take-Home Points

- Regions, cavities and systems provide a **three-tiered organisational map** of the human body.
- **Physiotherapists continually navigate across these tiers**: e.g., cueing pelvic tilts (region) to influence intra-abdominal pressure (cavity) and ultimately spinal load (system interplay).
- Mastery of this map enhances **safety, specificity and interdisciplinary communication**.