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Updated Edition
2025



ONE Touch **Anatomy**



For NEET PG/NEXT/FMGE/INI-CET/Undergraduates

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- Enriched with latest updates up to **March 2025**
- Previous years' papers coverage (for the last 5 years) up to **Jan 2025 (FMGE Jan 2025, INI-CET Nov 2024 and NEET PG 2024)**
- Complete subject is covered in the form of Tables, Figures, last-minute revision in just 325+ pages
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Shrikant Verma

ONE Touch **Anatomy**



For NEET PG/NEXT/FMGE/INI-CET/Undergraduates

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ONE Touch Anatomy

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Preface

Dear students,

Welcome to the **One Touch Anatomy**, a concise, comprehensive, and meticulously designed resource for NEET PG, INI-CET, FMGE, and MBBS students. Anatomy is perceived as a complex, boring and volatile subject by most of the students; and the journey of mastering this subject is both a challenging and deeply rewarding experience. As you embark on this important phase of your medical education, this book has been crafted to serve as your companion, providing you with all the essential tools to strengthen your understanding and retention of Anatomy, and to excel in your exams.

Anatomy is the foundation of all other medical subjects, where each structure has its purpose, each system plays its role, and every detail connects to clinical practice. This book has been designed to integrate these foundational concepts with clinical relevance, offering a unique approach to understanding how Anatomy fits into the larger picture of medical science. Whether you are revising for exams or seeking to reinforce your clinical knowledge, **One Touch Anatomy** aims to help you grasp the core concepts efficiently, with a focus on practical application.

In **One Touch Anatomy**, we have carefully structured each chapter to include:

- **Concepts and Principles:** Clear, straightforward explanations that highlight key anatomical principles and their relationships with other medical subjects.
- **Clinical Anatomy:** Real-world applications of anatomy in clinical scenarios to help you connect theory with practice.
- **Integration with Medical Subjects:** Anatomy is not learned in isolation. We have integrated it with every medical subject, providing you with a holistic understanding.
- **Previous Year Questions:** Real exam question pattern from NEET PG, INI-CET and FMGE to familiarize you with the format and give you a competitive edge.
- **Tricks and Mnemonics:** Memory aids and helpful tricks that make complex anatomical structures and concepts easier to recall under pressure.
- **Flowcharts and Tables:** Visual aids to simplify complicated anatomical processes, making it easier for you to internalize and retrieve critical information.
- **Hollywood, Bollywood, Tollywood Integrated (HBTI) Anatomy:** This is totally new concept started in this book which I brought from popular face-to-face classes of CBI Anatomy, where lots of concepts are learnt with movies, songs and dialogues. This helps to retain the Anatomy facts in limbic system and hippocampus for long term in an entertaining way.
- **Magics in Anatomy:** In this book, I have introduced another new pattern “Magics in Anatomy” to remember the difficult things like Magic of 2 (for stomach), Magic of 3 (for gallbladder), Magic of 4 (for urinary bladder), Magic of 5 (for liver), etc.

Beyond the content, **One Touch Anatomy** embodies my passion for teaching since 2005. As an educator, I understand the challenges and stress that come with preparing for high-stakes exams. But I also know that this phase of your education is crucial in shaping your future as a medical professional. My goal in writing this book is to make your learning experience more structured, effective, and enjoyable. Teaching is not just a profession; it is a deep passion, and through this book, I hope to guide you toward mastering anatomy in a way that sparks curiosity and excitement, rather than causing dread.

As you work through the chapters, remember that anatomy is not just about memorizing structures or reciting facts. It is about understanding the human body in all its complexity and beauty. Keep a growth mindset, and allow the knowledge you gain here to serve as a stepping stone to becoming a compassionate, well-rounded doctor.

This book is a culmination of my 20 years of teaching, countless hours of research, and an unwavering commitment to your success. I hope you find it both helpful and motivating as you navigate your studies. Good luck on your journey, and remember—the knowledge you gain here will not only prepare you for exams, but will also lay the foundation for the exceptional care you will provide to your patients in future.

Wishing you all the best on your path to becoming a brilliant doctor.

While I have worked hard to ensure its accuracy, mistakes may still have slipped through. If you happen to notice any errors, whether in the text, formatting or anything else, I would be truly grateful if you could let me know. You can inform me at my Instagram or Telegram groups (drshrikantvermaclasses) or directly WhatsApp me at 9131783495. Your feedback is invaluable to improve future editions and ensure the highest quality of work. I will give my best to correct the mistakes and will rectify them in the next edition.

Thank you for your understanding and support.

Shrikant Verma



From the Publisher's Desk

Dear Students,

Let us begin with a power-packed and inspiring quote:

Arise, awake, and stop not until the goal is achieved.

—Swami Vivekananda

Healthcare is undoubtedly one of the most noble and sacred professions. We are truly fortunate to be a part of this field, which stands as a beacon of selfless service to humanity. Healthcare professionals work tirelessly, transcending boundaries of caste, creed, religion, community, nationality, and preferences. Their service is a testament to the divine nature of this profession.

We extend our deepest gratitude to all healthcare professionals for their unwavering commitment, particularly during the pandemic. When the world retreated behind closed doors, these brave individuals stood on the frontlines, leaving no stone unturned in saving the lives of people.

At CBS Publishers, we take great pride in supporting the healthcare community by offering resources that empower future professionals. Ten years ago, we laid the foundation of the PGMEET segment with titles such as the **Conceptual Review Series**, **SARP Series**, **AIIMS MedEasy**, **NIMHANS**, **PGI Chandigarh**, **My PGMEET Notes**, **ROAMS**, **PRIMES**, **FMGE Solutions** and many more.

What makes our PGMEET books stand out is the updated, simple, clear, and easy-to-understand language, making study sessions feel less like a challenge and more like an enjoyable learning experience. A team of our esteemed medical educators brings their expertise to create these comprehensive yet compact books, ensuring that all the critical topics are covered.

A special feature of our books is the use of illustrations that simplify complex concepts, making them easier to grasp. We have also included previous years' questions, complete with detailed explanations, which are invaluable for exam preparation. Image-Based Questions (IBQs) further enhance the learning experience. The combination of concise theory and multiple choice questions makes these books the ultimate tool to ease exam-related worries.

FMGE Solutions is one of our best-selling titles, meticulously designed to meet the specific needs of FMGE aspirants. This comprehensive guide is an all-in-one resource for FMGE preparation, offering in-depth coverage of essential topics, detailed explanations, and a wide array of questions that reflect the latest exam patterns. Its reputation as a bestseller speaks of its effectiveness and reliability as a trusted resource for future medical professionals.

One Touch Series has been tailored specifically for aspirants of NEET PG, NExT, FMGE, and INI-CET. Conceptualized with a focus on last-minute revision, the **One Touch Series** covers a complete range of preclinical, paraclinical, and clinical subjects. These concise, expertly curated books have been designed to help students efficiently review key concepts, ensuring they are well-prepared and confident as they approach their exams.

This year, we have introduced a new addition to the CBS Exam Book Series: **Ten into Ten** (Part A and B). According to market research, at present no book is available for practice and this new addition to our exam book series will fill this gap for sure. Although there are multiple apps from where students can attempt test series online, not a single updated book is available in the market for offline practice, and this book now in your hand will fill this vacuum. The motto of this book is Practice: Practice: Practice as this book offers a decent amount of MCQs which will meet the evolving needs of students. **Ten into Ten** is



a comprehensive question bank covering 19 medical subjects. It offers over 10,000 meticulously curated questions across 10 key subjects, crafted by 10 renowned medical scholars.

Following this, we will soon release the next part, **Nine into Nine**, further expanding our collection of practice material for the PGME Examination, with the latest and most effective study approaches.

At CBS, we are committed to revolutionize the medical education; and your support and encouragement can make our task easier. So, keep extending your support by sending feedback to us. We will be highly pleased to serve you and make you victorious in your career. You can share your feedback at feedback@cbspd.com

Wishing you all the best in your endeavors.



A handwritten signature in black ink, appearing to read 'Bhupesh Aarora'.

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Abbreviations

CBI: Conceptual Brainstorming Integration

O: Origin

I: Insertion

Q: PYQ

MC: Most Common

MCS: Most Common Site

Mn: Mnemonic

Ms: Muscle

#: Damage/fracture/lesion

⊕: Joint

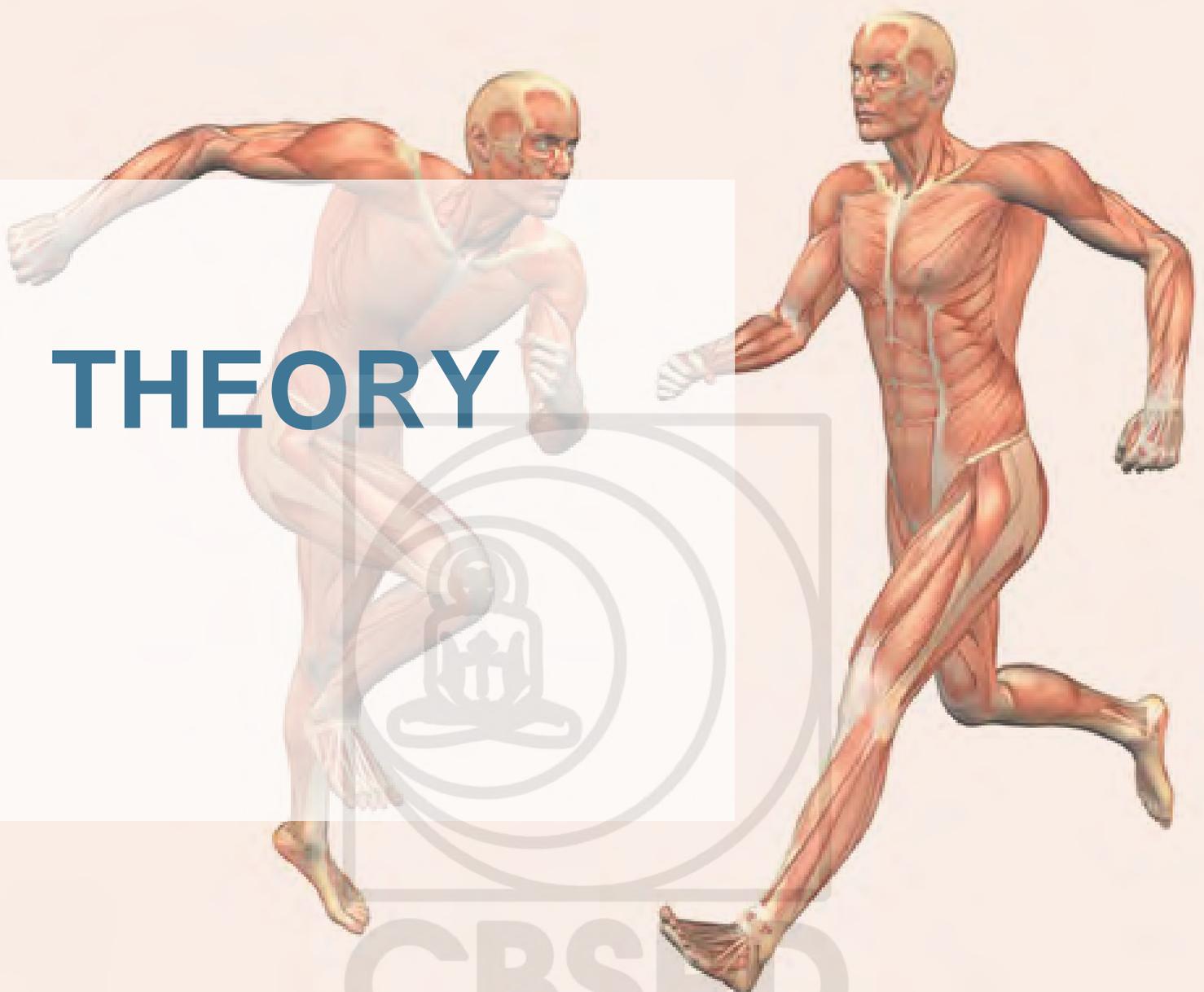
Note: To make learning interesting and interactive a new feature in this book:

HBTI Anatomy: Hollywood Bollywood Tollywood Integration with Anatomy



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THEORY

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Basics and General Anatomy

1. BASIC CONCEPTS, TRICKS AND MAGIC IN ANATOMY

"I don't fear the man who has practiced 10,000 kicks once, but I fear the man who has practiced one kick 10,000 times." —Bruce Lee

WHAT IS ANATOMY?

- Anatomy word is formed by two words:
 - "ANA" = To see
 - "TOME" = Cutting
- In simple words, verbal meaning of anatomy is "cutting and observation" or "dissection".
- Human anatomy is the branch of medical science in which we dissect (cut) the human body and study the body structures scientifically.



Figure 1: Dissection: A scientific and artistic practice since ancient times

Herophilus is considered "Father of Anatomy" while "Vesalius" is considered "Father of Modern Anatomy".

THREE MAGICS IN ANATOMY

1. 1st Magic

- For all intermuscular spaces (like axilla, cubital fossa, femoral triangle, etc.):
 - Different layers of body during dissection
 - Skin (ANAT-SURGERY-FMT)^{CBI*}
 - Superficial fascia
 - Deep fascia
 - Muscles
 - Bones
- In anatomy, we learn about many spaces or fossa. To understand their boundaries, here is a simplified example. Suppose we do transverse section (TS) of arm at given level.

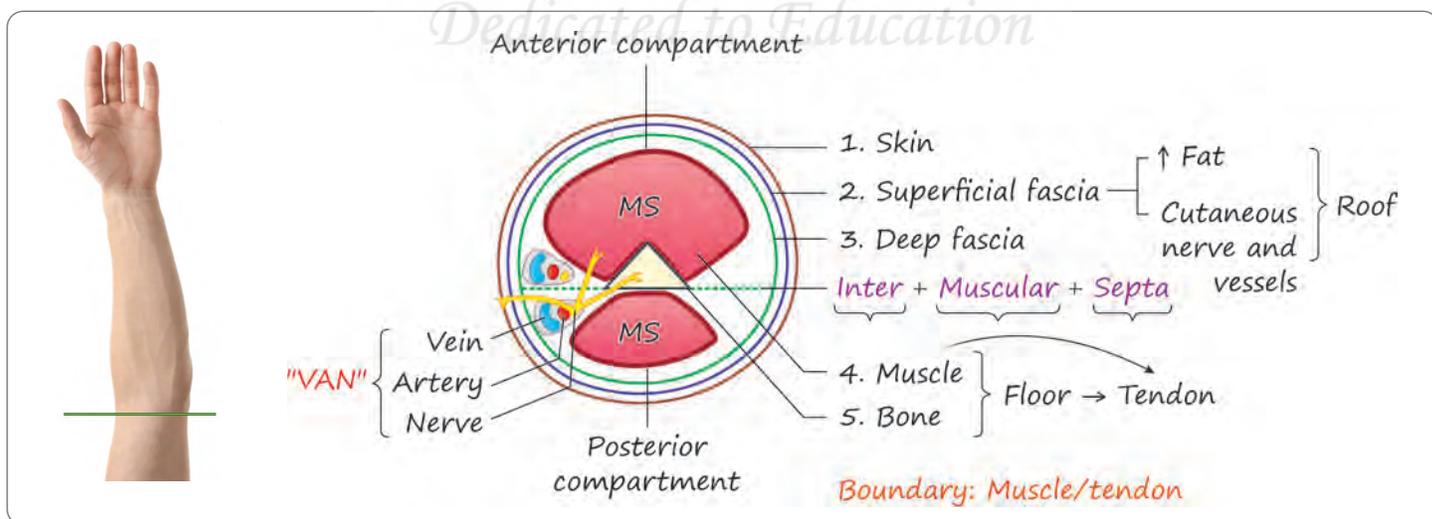


Figure 2: Transverse section of arm (schematic presentation for general organization of body)

*CBI, conceptual brainstorming integration

- General concept for Boundaries of any intermuscular space:

Roof	<ul style="list-style-type: none"> • Skin^Q • Superficial fascia^Q <ul style="list-style-type: none"> ○ Fat ○ Cutaneous nerve and vessels • Deep fascia^Q
Floor	<ul style="list-style-type: none"> • Muscles/Tendons • Bones
Boundary	Muscles/tendons
Contents	Neurovascular bundle ^Q : Mnemonic: "VAN" ^Q <ul style="list-style-type: none"> • Vein • Artery • Nerve

2. 2nd Magic for All Muscles and Nerves

- **Hilton's law:** Hilton observed that the nerves which supply the muscle extending directly across and acting at a given joint also innervates the joint and the skin overlying that muscle.
- In a simpler way, the nerve of particular compartment will supply:
 - Muscle
 - Skin and
 - Joint related to that compartment.

SKVian's Rule

Hence, remember the SKVian's Rule: A River's Flow So Wide and Bright, Feeds Cities Near Day and Night (Jo Nadi Jaha Rahti Hai, Jaha Bahti Hai; Us Area Ko Supply Karti Hai)

- Two exceptions of Hilton's law:
 1. **Buccinator muscle:** Pierced by buccal branch of mandibular nerve but supplied by facial nerve.
 2. **Piriformis muscle:** Occasionally pierced by a branch from sciatic nerve but supplied by nerve to piriformis (branch from sacral plexus).

HBTI ANATOMY: Bollywood song "Kaliyon ka chaman jab banta hai" can be compared to "ANATOMY me badan tab banta hai....Thoda bone lagta hai... Thoda muscle lagta hai... fascia lagte hain...fir skin lagta hai"

3. 3rd Magic for All Joints and Movements

If a muscle crosses a joint anteriorly, then the movement of the bones occurs anteriorly. Similarly, if a muscle crosses the joint posteriorly, the movement occurs posteriorly; if it crosses medially, the movement is medial; and if it crosses laterally, the movement is lateral.

SKVian's Rule

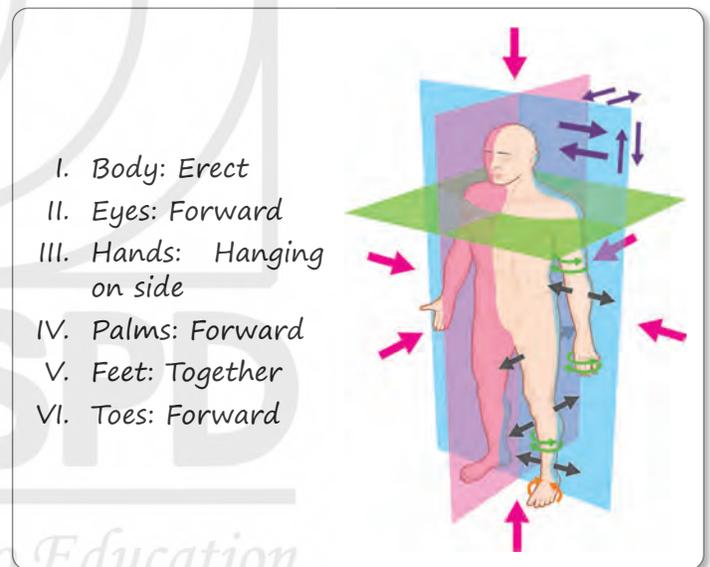
Hence, remember the SKVian's RULE: Where Muscle Goes, There Movement Flows (Jidhar Muscle Udhar Movement).

ANATOMICAL AND OT POSITIONS

(SURGERY-OBG-ORTHO-ENT-EYE- ANAT CBI)

Different Positions

- Anatomical position



- I. Body: Erect
- II. Eyes: Forward
- III. Hands: Hanging on side
- IV. Palms: Forward
- V. Feet: Together
- VI. Toes: Forward

Figure 3: Anatomical position

- **Supine position:**
 - Lying on back
 - Use: For most of the abdominal and chest surgery
- **Prone position:**
 - Lying on chest and abdomen
 - Use: For back spinal surgery and pilonidal sinus surgery
- **Lithotomy position:**
 - Lying on back
 - Both thighs separated
 - Perineum exposed
 - Foot rest on support

1. BONES OF UPPER LIMB

“Everyone has a plan until they get punched in the mouth.”

CLAVICLE

- It is also known as collar bone^o/beauty bone^o/key bone^o.
- Two parts of clavicle^o: Medial 2/3rd and lateral 1/3rd
- Clavicle is one of the most common bones to get fractured in adult^o.

Seven Peculiarities of Clavicle

1. Only long bone which lies horizontally^o.
2. Only long bone which ossifies by two primary centers^o.
3. Only long bone which ossifies in membrane^o, except for its medial end.
4. Only bone which may be pierced by cutaneous nerve (intermediate supraclavicular nerve^o).
5. No medullary cavity^o.
6. Subcutaneous^o throughout (known as beauty bone^o).
7. 1st bone to start ossifying^o and the last bone to complete its ossification^o.

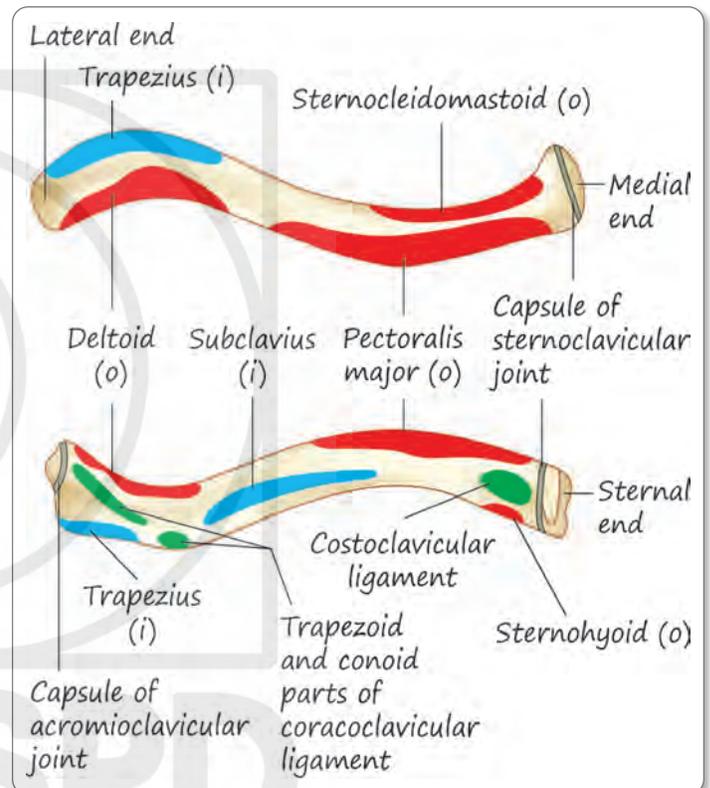
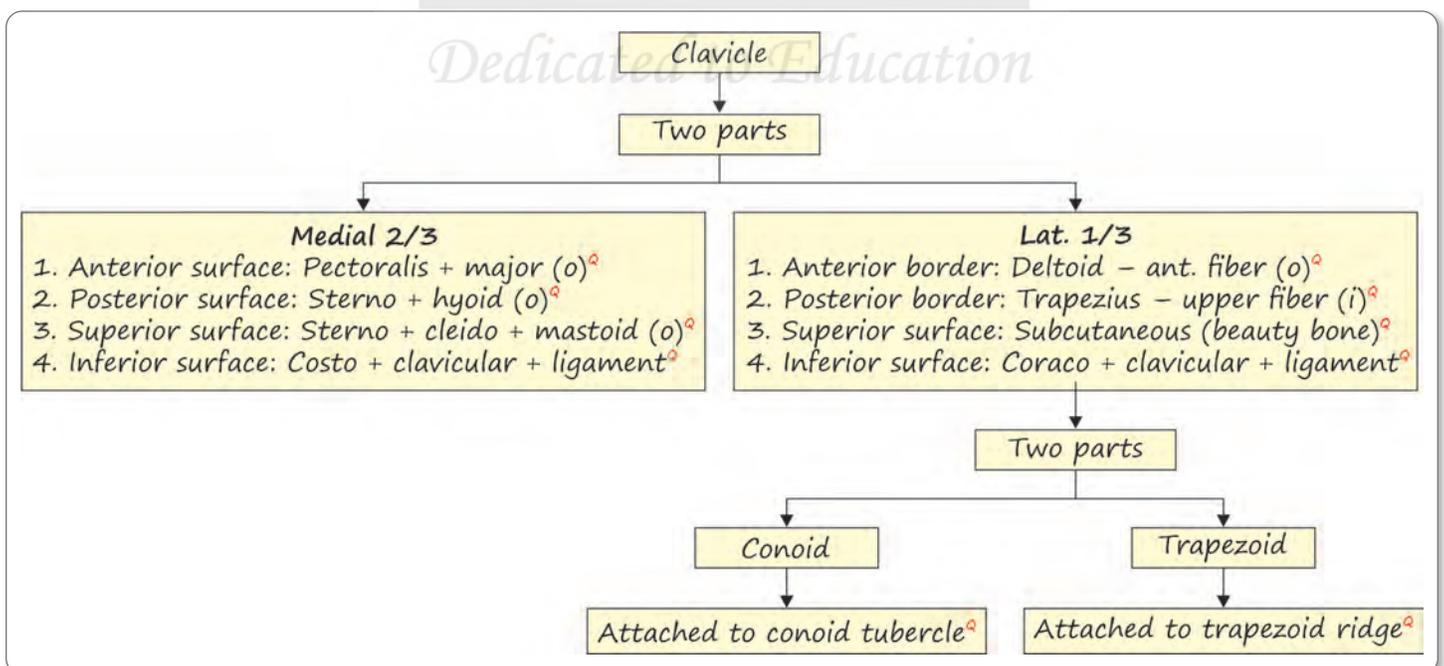


Figure 1: Attachments of clavicle



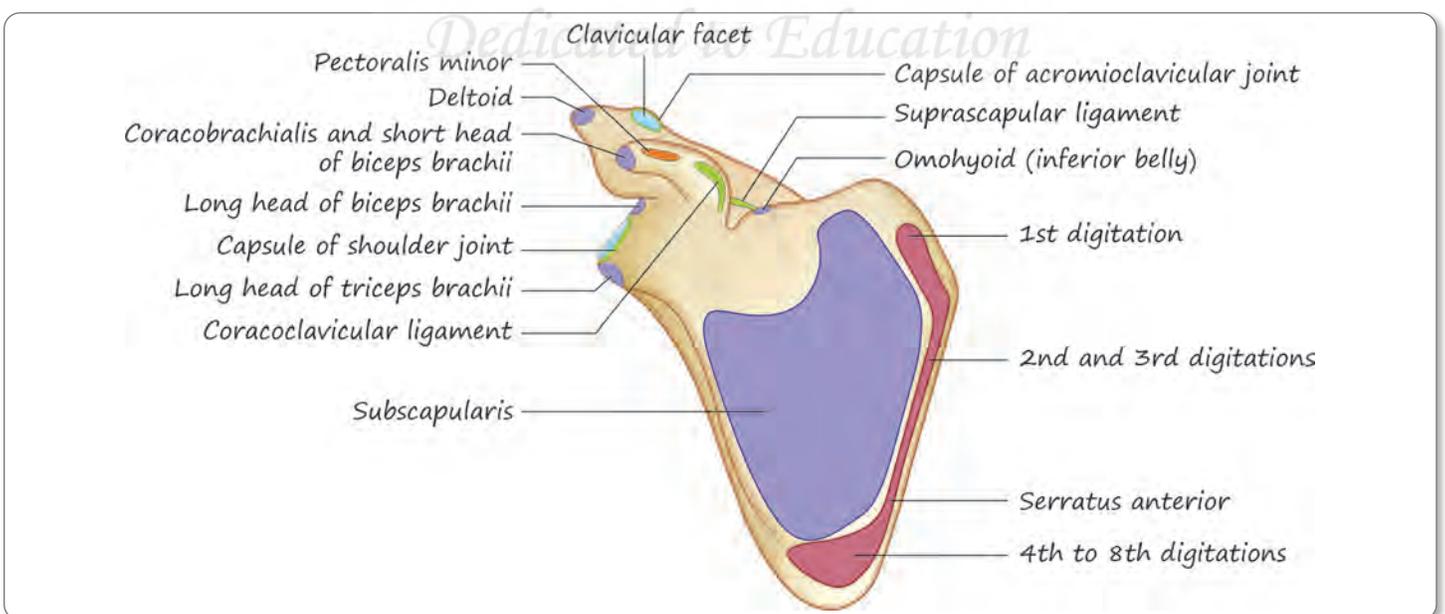
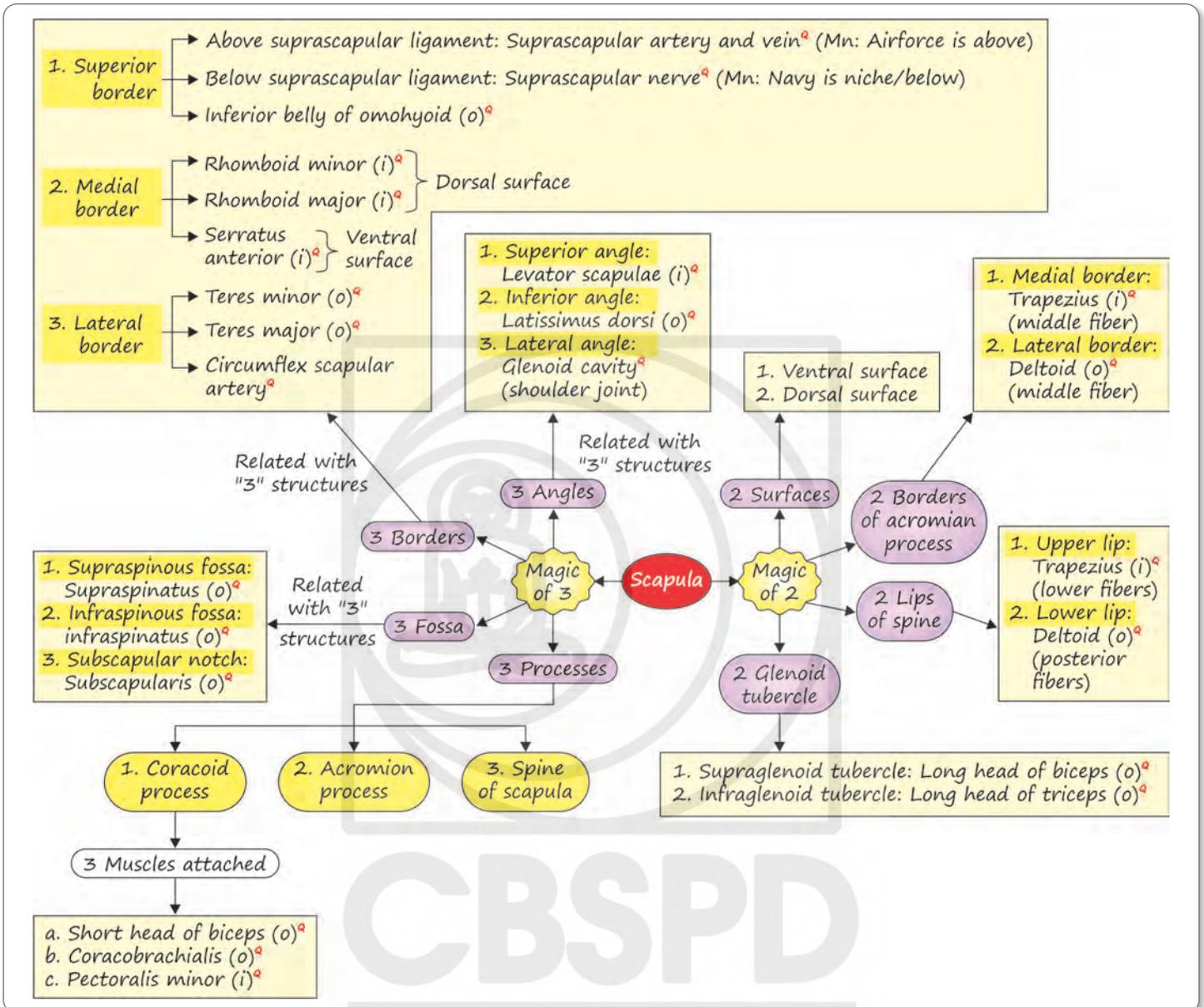


Figure 6: Scapular attachments (ventral view)

Clinical CBI Anatomy

ANAT-RADIO CBI

- **Winging of scapula^o:**
 - It occurs due to loss of support of medial border of scapula.
 - It is seen in case of paralysis of serratus anterior^o (SA) > Trapezius > Rhomboid muscles.



Figure 9: Winging of scapula



Figure 10: Sprengel's deformity



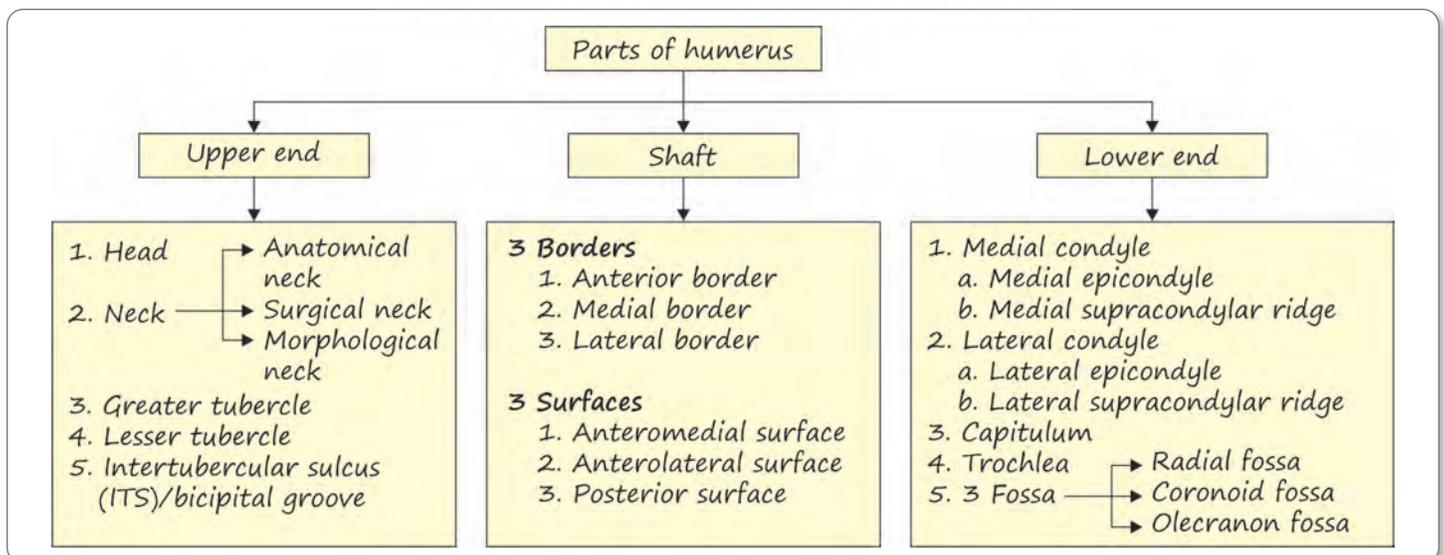
Figure 11: Radiological appearance of sprengel's deformity

- **Scapula fractures:**
 - MC site^o: Body of scapula
 - 2nd MC site^o: Neck of scapula
- **Sprengel's deformity^o:** Congenital high scapula due to failure of normal descent of scapula.

HBTI ANATOMY: "Pushpa" had High Scapula

HUMERUS

- Humerus is bone of arm.
- It is also known as "Funny bone"^o due to course of ulnar nerve^o behind medial epicondyle^o which gives funny tingling sensation on strike over it.



6. BACK REGION

“Anger is a fuel, use it to drive your success.”

MUSCLES OF BACK REGION

Name of muscles	1. Trapezius	2. Latissimus + dorsi	3. Levator + scapulae	4. Rhomboid + minor	5. Rhomboid + major
Origin	<ul style="list-style-type: none"> Medial 1/3rd of superior nuchal line^Q External occipital protuberance^Q Ligamentum nuchae^Q C7 spine^Q T1–T12 spines^Q Corresponding supraspinous ligaments 	<ul style="list-style-type: none"> Posterior 1/3rd of the outer lip of iliac crest^Q Posterior layer of lumbar fascia^Q Spines of T7–T12, lower four ribs^Q Inferior angle of the scapula^Q 	Transverse processes of C1, C2, C3, C4 ^Q	<ul style="list-style-type: none"> Lower part of ligamentum nuchae C7 and T1 spines 	T2–T5 spines
Insertion	<ul style="list-style-type: none"> Upper fibers: Posterior border of lateral 1/3rd of clavicle^Q Middle fibers: Medial border of acromion process^Q Lower fibers: Apex of triangular area at the medial end of the spine^Q 	Floor of the intertubercular sulcus ^Q	Area near Superior angle of scapula ^Q	Root of the spine of the scapula	Medial border of scapula below the root of the spine
Action	<ul style="list-style-type: none"> Upper fibers: Shrugging of shoulder^Q Middle fibers: Retraction of scapula^Q Lower fibers: It acts with upper fiber and serratus anterior and causes overhead abduction^Q 	<ul style="list-style-type: none"> Adduction^Q Extension^Q It is chief climber's muscle^Q Medial rotation^Q Hence, it helps in “stand at ease” position 	Elevation of scapula ^Q	Retraction of scapula ^Q	Retraction of scapula ^Q
Nerve	<ul style="list-style-type: none"> Spinal part of XI^Q Branches from C3, C4 (proprioceptive) (Few authorities consider this muscle as hybrid muscle due to dual nerve supply) 	Thoracodorsal nerve ^Q (C6–C8) (nerve to latissimus dorsi) ^Q	Dorsal scapular nerve (C5) ^Q	Dorsal scapular nerve (C5) ^Q	Dorsal scapular nerve (C5) ^Q

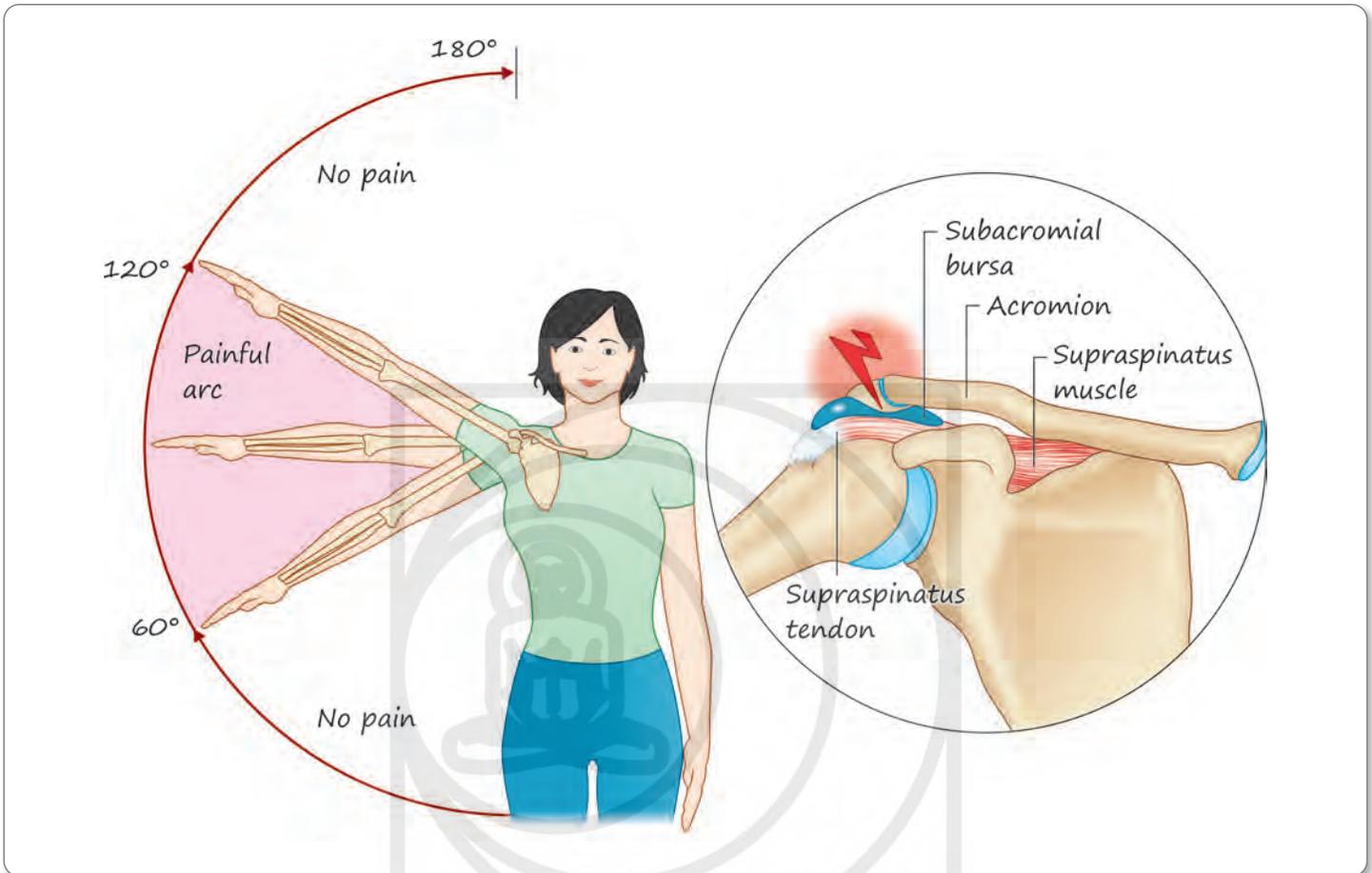


Figure 70: Shoulder impingement syndrome

- **Shoulder dislocation:** CBI ORTHO and RADIO
 - Shoulder joint is MC joint in body to dislocate^Q.
 - Types of shoulder dislocations are seen:
 1. **Anterior shoulder dislocation^Q:** Head of humerus lies in front the glenoid cavity.
 2. **Posterior shoulder dislocation^Q:** Head of humerus lies behind the glenoid cavity.
 3. **Luxatio erecta (rare type)^Q:** Head comes to lie in the subglenoid position.
- **Subacromial bursitis:** Inflammation of subacromial bursa leads to pain in shoulder and problem in shoulder movement known as subacromial bursitis. It is characterized by positive Dawbarn sign^Q. CBI ORTHO

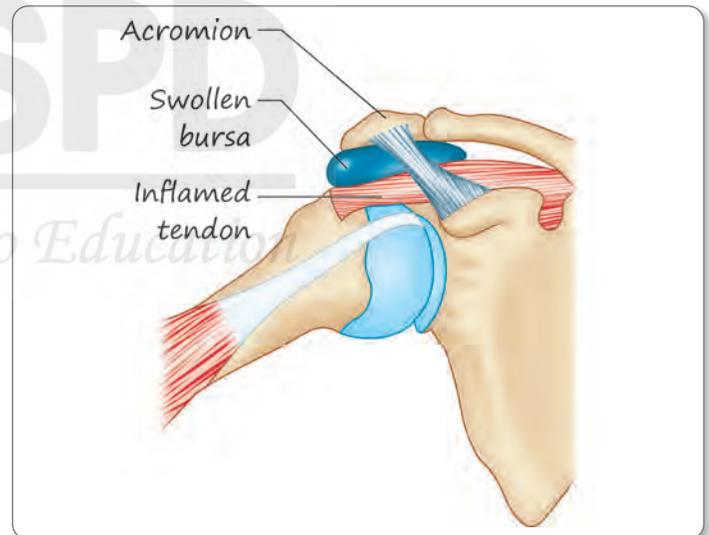


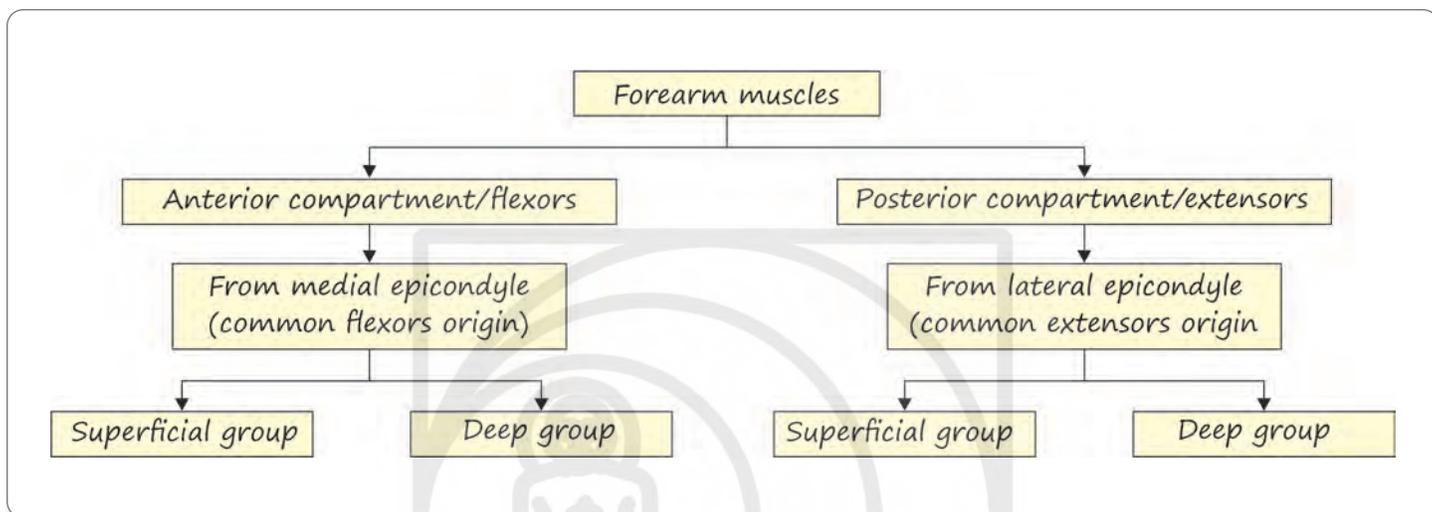
Figure 71: Subacromian bursa

HBTI ANATOMY: Many bollywood songs are dedicated to "Bursa" like- Tip Tip "Bursa" Pani and Mohabbat "Bursa" Dena Tum....

- **Dawbarn sign:** Clinical test when pain appears on adduction of shoulder and pain disappears on abduction of shoulder^Q is known as positive Dawbarn sign. CBI ORTHO

10. FOREARM

“Don't let yesterday take up too much of today. You are not the same person you were yesterday, so why let yesterday's mistakes define you?”



ANTERIOR COMPARTMENT SUPERFICIAL MUSCLES

Table 2: Attachments of the superficial muscles

Muscles	Origin	Insertion
Pronator teres	Medial epicondyle of humerus and medial margin of coronoid process	Middle of lateral aspect of shaft of radius
Flexor carpi radialis	Medial epicondyle of humerus	Bases of second and third metacarpal bones
Palmaris longus	Medial epicondyle of humerus	Flexor retinaculum and palmar aponeurosis
<ul style="list-style-type: none"> • Flexor digitorum superficialis <ul style="list-style-type: none"> ▪ Humeroulnar head ▪ Radial head 	<ul style="list-style-type: none"> • Medial epicondyle of humerus; medial border of coronoid process of ulna • Anterior oblique line of shaft of radius 	Muscle divides into 4 tendons. Each tendon divides into 2 slips which are inserted on sides of middle phalanx of 2nd to 5th digits
<ul style="list-style-type: none"> • Flexor carpi ulnaris <ul style="list-style-type: none"> ▪ Humeral head ▪ Ulnar head 	<ul style="list-style-type: none"> • Medial epicondyle of humerus • Medial aspect of olecranon process and posterior border of ulna 	Pisiform bone; insertion prolonged to hook of the hamate and base of fifth metacarpal bone



Figure 88: Chauffeur fracture

- **Nightstick fracture^Q:** CBI ORTHO and RADIO
 - Nightstick fractures are isolated fractures of the ulna^Q
 - Typically transverse and located in the mid-diaphysis and usually resulting from a direct blow^Q.



Figure 89: Nightstick fracture

EXTRA EDGE WITH MCQs

- All superficial muscles of anterior compartment of forearm are supplied by the Median nerve,^Q except for flexor carpi ulnaris^Q, which is supplied by ulnar nerve^Q (Hilton's law).
- All deep muscles of anterior compartment of forearm are supplied by deep branch of median nerve^Q (anterior interosseous nerve) except medial ½ of FDP^Q which is supplied by ulnar nerve^Q.
- All muscles of posterior compartment of forearm are supplied by the posterior interosseous nerve^Q (PIN) except "ABE":
 - a. Anconeus^Q
 - b. Brachioradialis^Q
 - c. Extensor carpi radialis longus^Q
 Above muscles are supplied by radial nerve directly^Q.
- Palmaris longus has long tendon^Q. That is why it is used for tendon grafting operation^Q in upper limb. It is homologous to plantaris^Q of lower limb, which is used for tendon grafting operation in lower limb^Q.

CBI ORTHO and SURGERY

HBTI ANATOMY: You can remember this mnemonic with help of famous Pakistani funny television show called Loose Talk. "ABE sale...maaf karna kabhi kabhi main idhar udhar nikal jata hu..."

Dedicated to Education

11. HAND

"The only way to do great work is to love what you do, and the only way to love what you do is to do what sets your soul on fire."

20 SHORT INTRINSIC MUSCLES OF HAND

A. 4 Thenar muscles

1. Abductor pollicis brevis
2. Flexor pollicis brevis
3. Opponens pollicis
4. Adductor pollicis

B. 4 Hypothenar muscles

1. Abductor digiti minimi

2. Flexor digiti minimi

3. Opponens digiti minimi

4. Palmaris brevis

C. 4 Lumbricals

D. 4 Palmar interossei

E. 4 Dorsal interossei

8. SOLE AND ARCHES OF FOOT

“You cannot expect different results if you are not willing to put in different efforts.”

SOLE OF FOOT

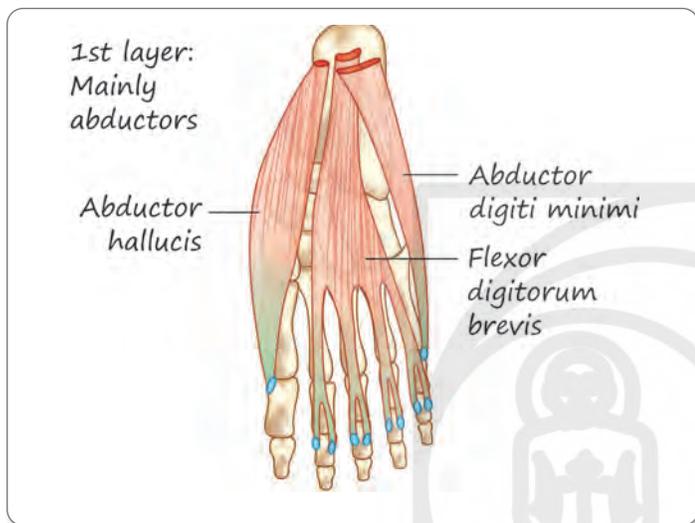


Figure 38: First layer of foot muscle

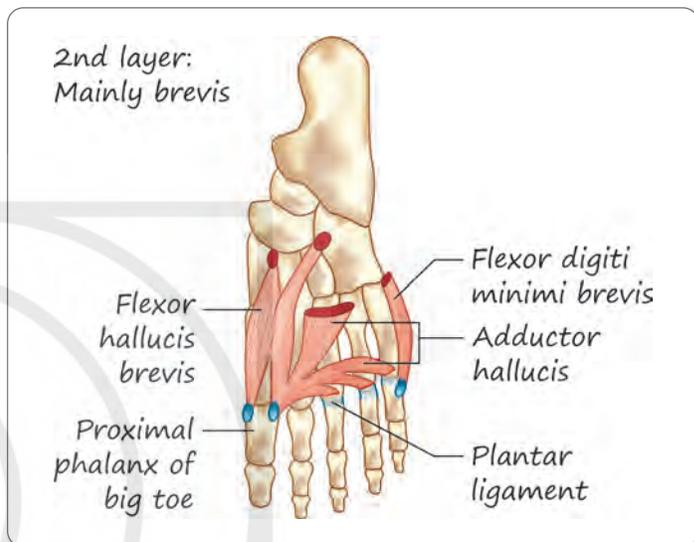


Figure 40: Second layer of foot muscle

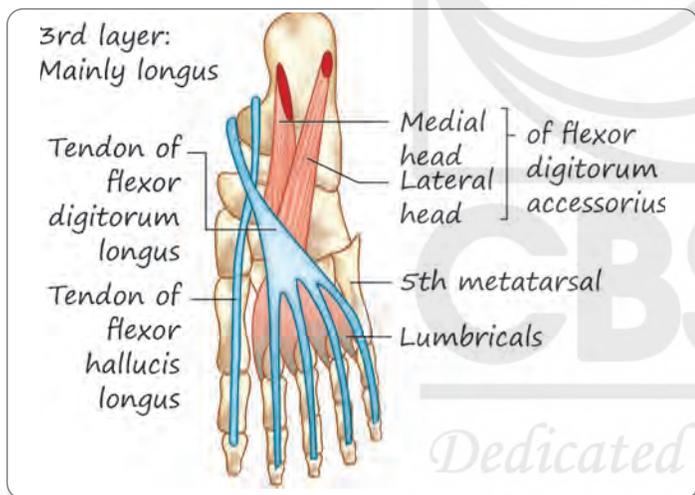


Figure 39: Third layer of foot muscle

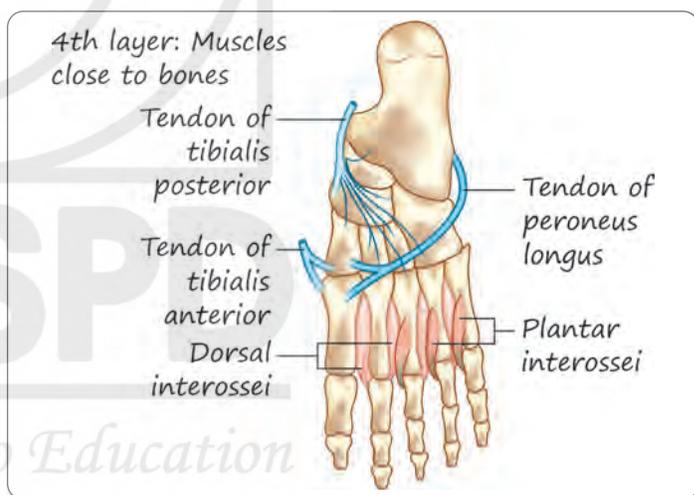


Figure 41: Fourth layer of foot muscle

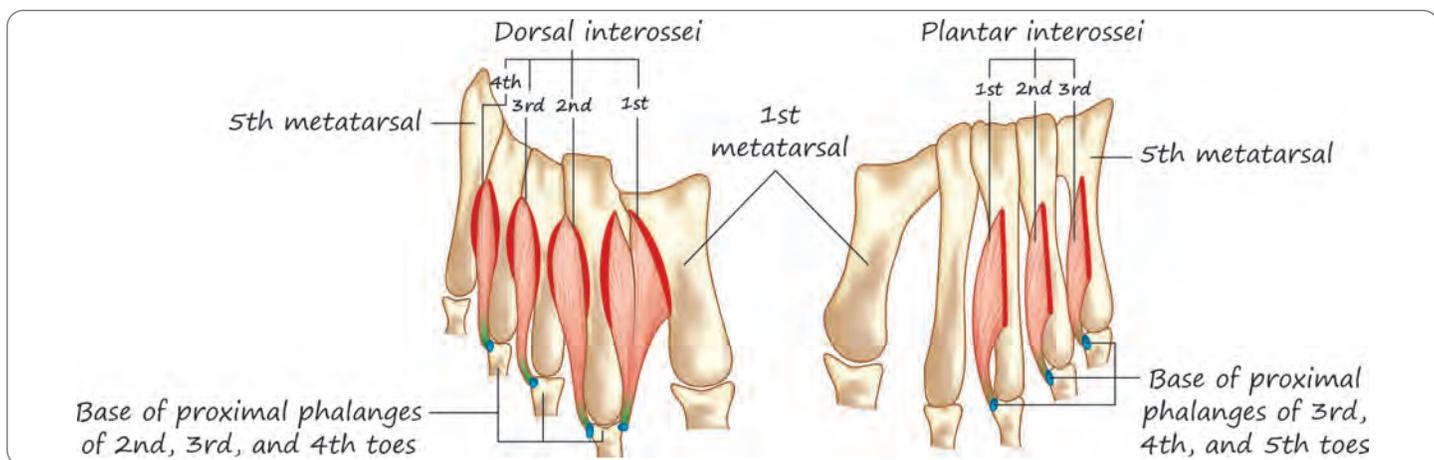


Figure 42: Plantar and dorsal interossei

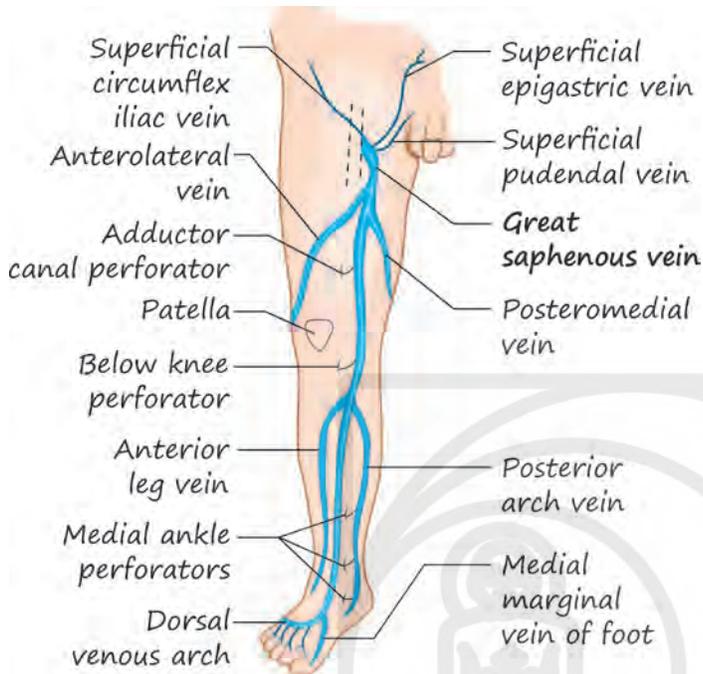


Figure 51: Great saphenous vein

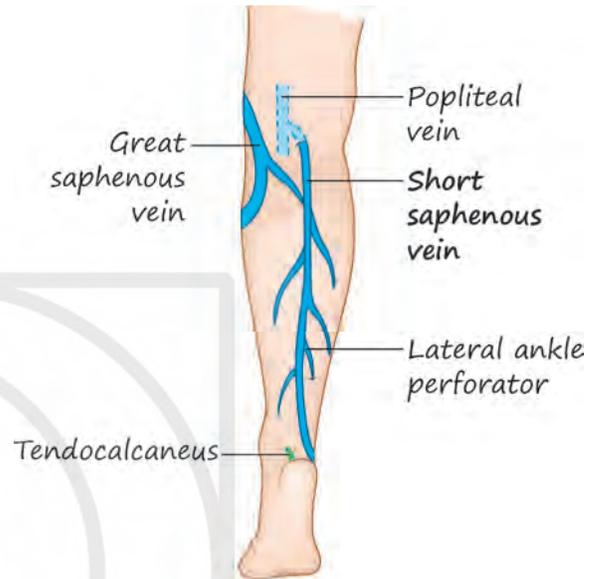


Figure 52: Small (short saphenous) vein

Perforators:

- **Direct perforators:** These perforators connect superficial and deep veins directly without piercing the muscles.
- **Indirect perforators:** These perforators connect superficial and deep veins by piercing the muscles.

- Most preferred site of **Phlebotomy^q**/venesection: Great saphenous vein in front of medial malleolus. **CBI SURGERY**
- Great saphenous vein is accompanied by saphenous nerve^q which may be injured during phlebotomy of it.
- Saphenous nerve injury^q leads to loss of sensation on medial side of foot. **CBI SURGERY**
- Another preferred site of **phlebotomy/venesection:** Small saphenous vein^q, which is accompanied by sural nerve^q.
- Sural nerve (S1)^q injury leads to loss of sensation on lateral aspect of sole. **CBI SURGERY**

Clinical CBI Anatomy

- **Varicose vein:** Abnormal dilated tortuous veins of lower limb are known as varicose vein. **CBI SURGERY**
- **Deep venous thrombosis (DVT):** Thrombus formation within veins of lower limb is known as DVT. **CBI SURGERY**
- **Phlebitis:** Inflammation of veins is known as phlebitis. **CBI MEDICINE and PATHO**
- **Phlebotomy/venipuncture:** A procedure in which a needle is used to take blood from a vein, usually for laboratory testing. **CBI SURGERY**

EXTRA EDGE

- **Calf pump:** Venous return from the lower limb depends largely on the contraction of calf muscles. Therefore, these muscles are termed calf pump^q. **CBI PHYSIO and MEDICINE**
- **Peripheral heart:** The soleus muscle^q helps in venous return mainly hence, it is known as peripheral heart^q. **CBI PHYSIO**

“Champions are made from something they have deep inside them—a desire, a dream, a vision.”

—Muhammad Ali

OSTEOLOGY

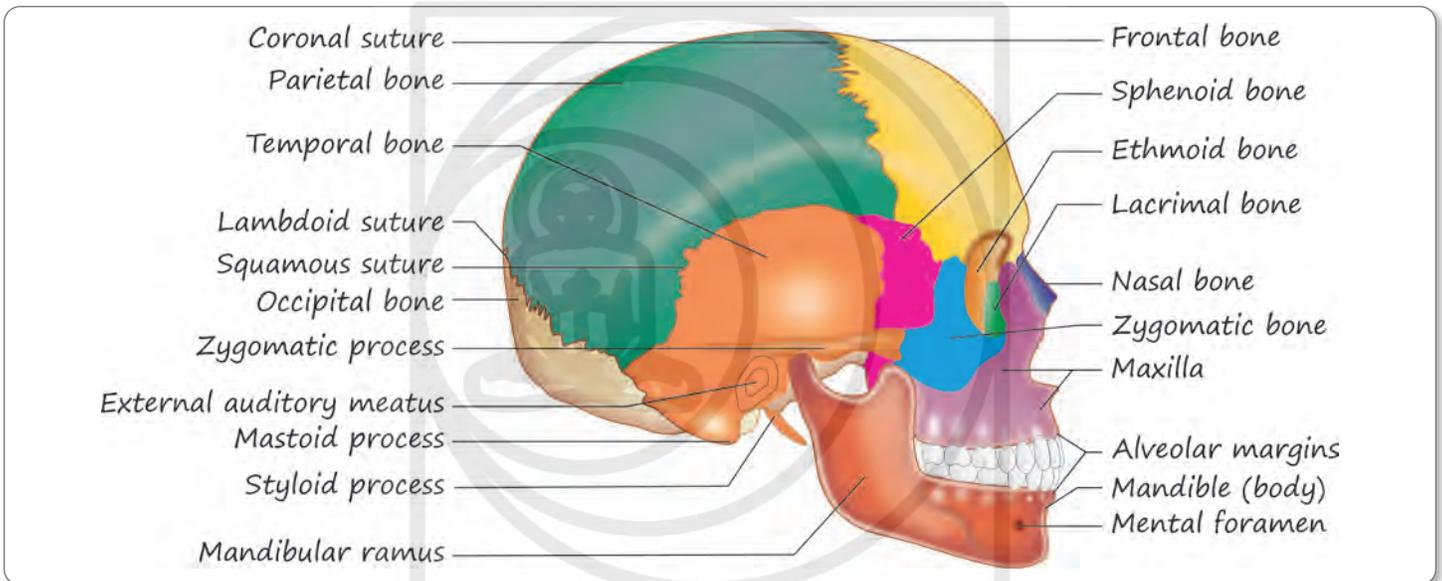


Figure 1: Skull bones

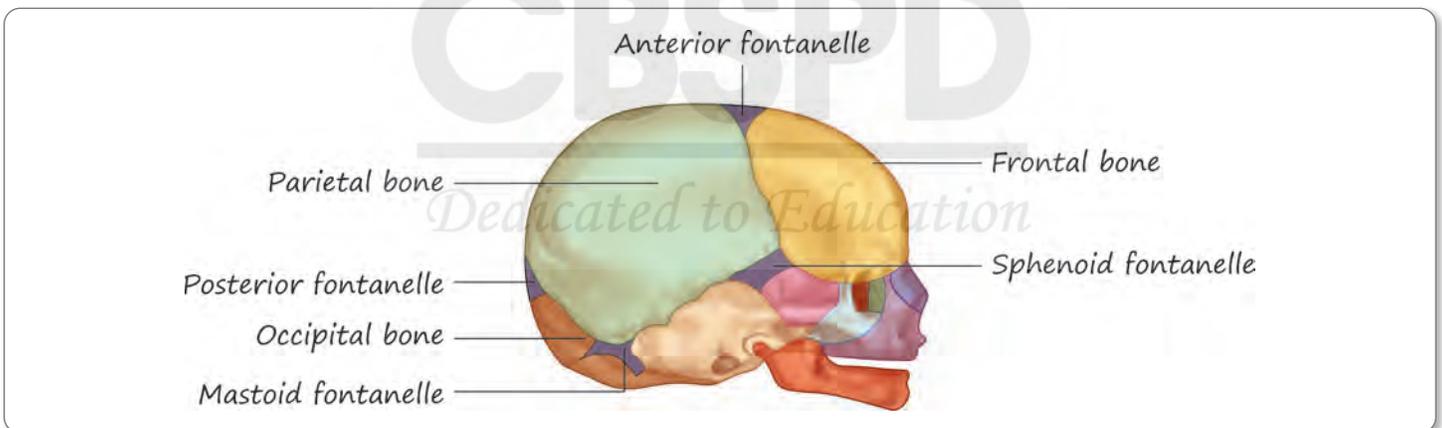


Figure 2: Fetal skull and fontanelles

Age of Closure of Fontanelles

Fontanelles	Age of closure
Anterior or bregmatic	24 months
Posterior or lambdoid	3 months
Anterolateral (sphenoid)	6–24 months
Posterolateral (mastoid)	6–24 months

CRANIAL CAVITY

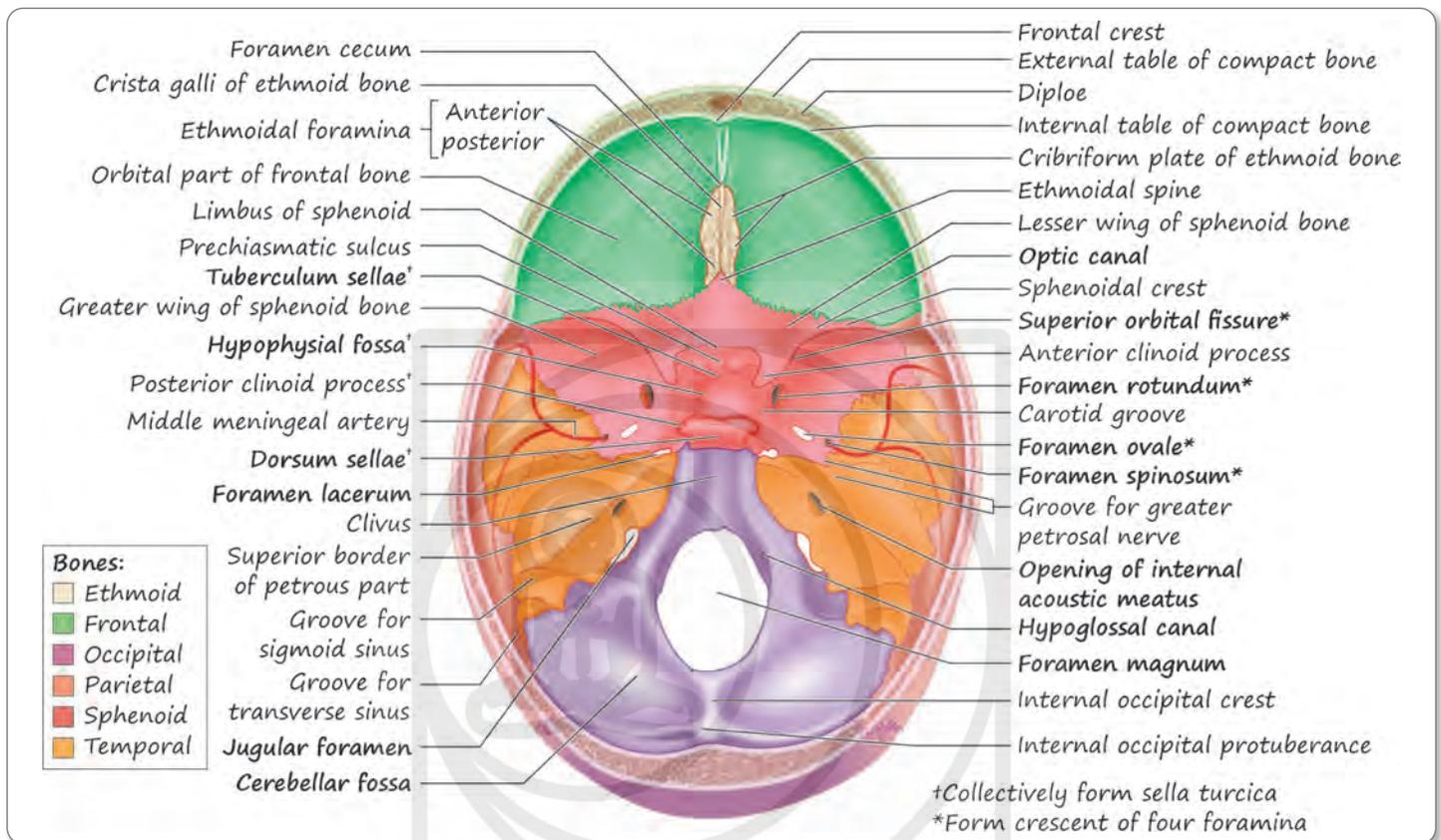


Figure 3: Cranial Cavity with Various Foramens

Mnemonic

Important structures and foramens from midline to lateral can be remembered by funny mnemonic:
KING → QUEENS → ROSE → IV

King: Pituitary gland sitting in "Turkish saddle"^Q/sella turcica

Queens: Foramen lacerum [LE SHARAM/Shy in nature/so consider queens]

R: Foramen Rotundum [Passes V₂^Q]

O: Foramen Ovale [Passes "MALE"^Q]

S: Spinosum [Passes "MEN"^Q]

E: Emissary vein [Sometimes may pass through foramen spinosum]

I: Innominatus canaliculus

V: Vesalius foramen [EMISSARY SPHENOIDAL FORAMEN]

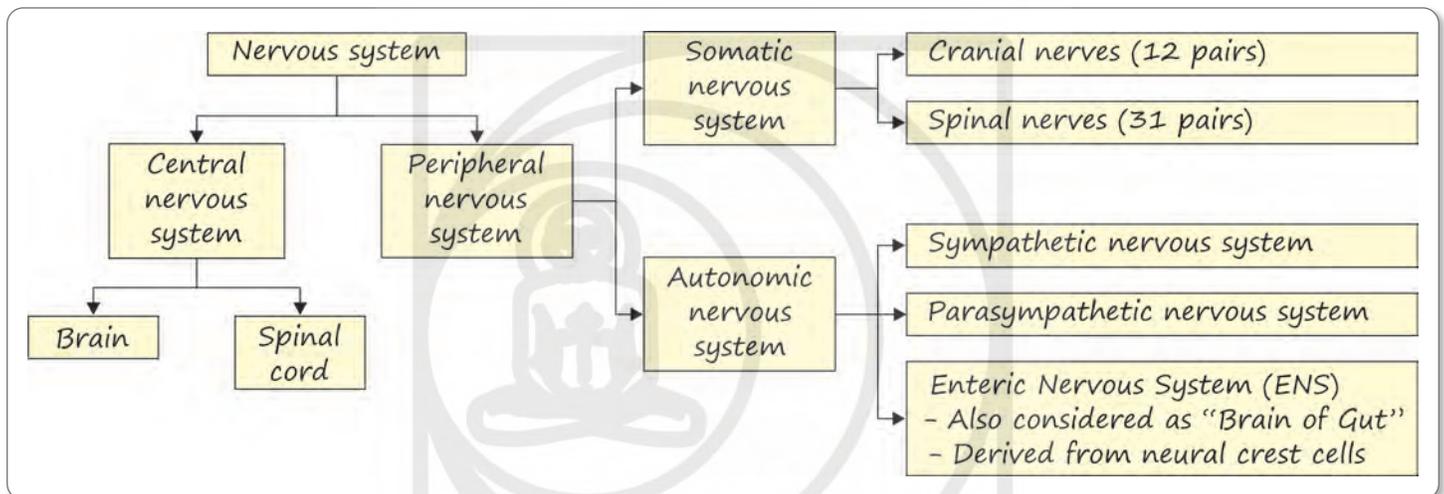
Structures Passing Through Foramens

Foramen	Structures passing through foramen
Foramen ovale	(Mnemonic: MALE) M: Mandibular nerve ^Q A: Accessory meningeal artery ^Q L: Lesser petrosal nerve ^Q E: Emissary vein ^Q [connecting vein between cavernous sinus and pterygoid venous plexus]

Contd...

“You don’t lose, you learn. and when you learn, you grow.”

DIVISIONS OF NERVOUS SYSTEM



Note: Enteric nervous system is considered 3rd part of ANS by few authorities. It is responsible for GIT peristalsis and was earlier included in parasympathetic nervous system. It is also known as “Brain of gut”.

SPINAL CORD

- It is the long cylindrical lower part of CNS.
- It is the main pathway for information connecting the brain and peripheral nervous system.

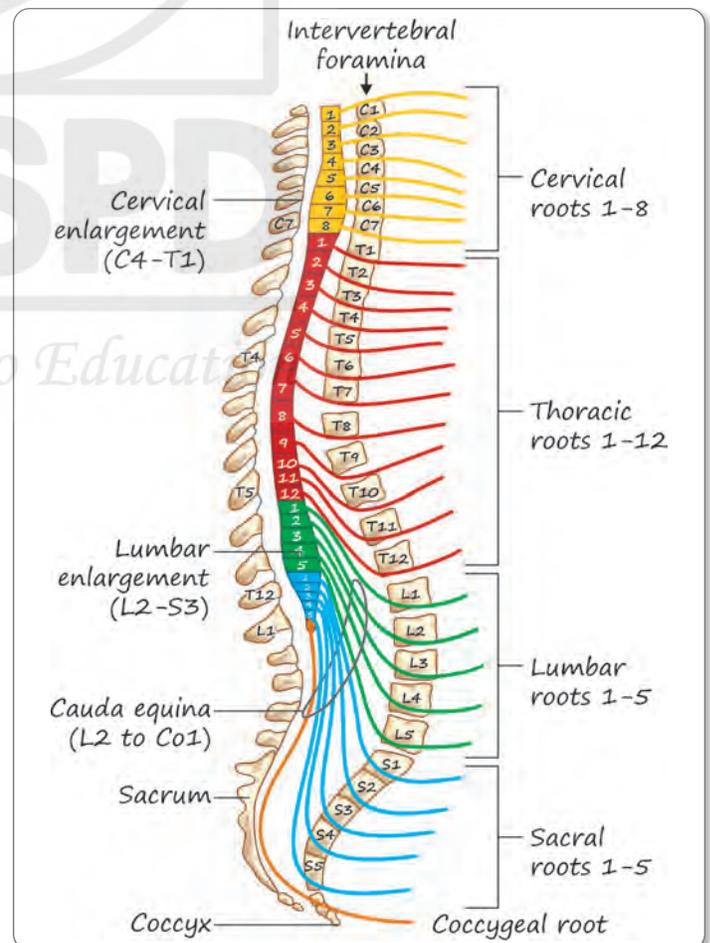


Figure 1: Spinal cord with spinal nerves

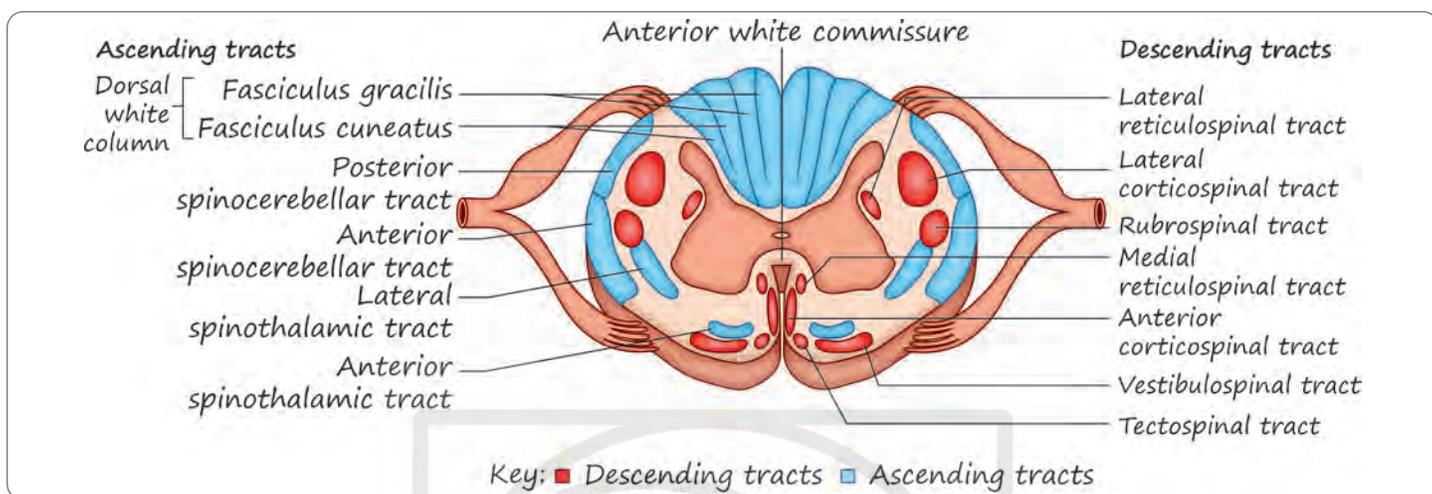


Figure 4: Tracts location in spinal cord

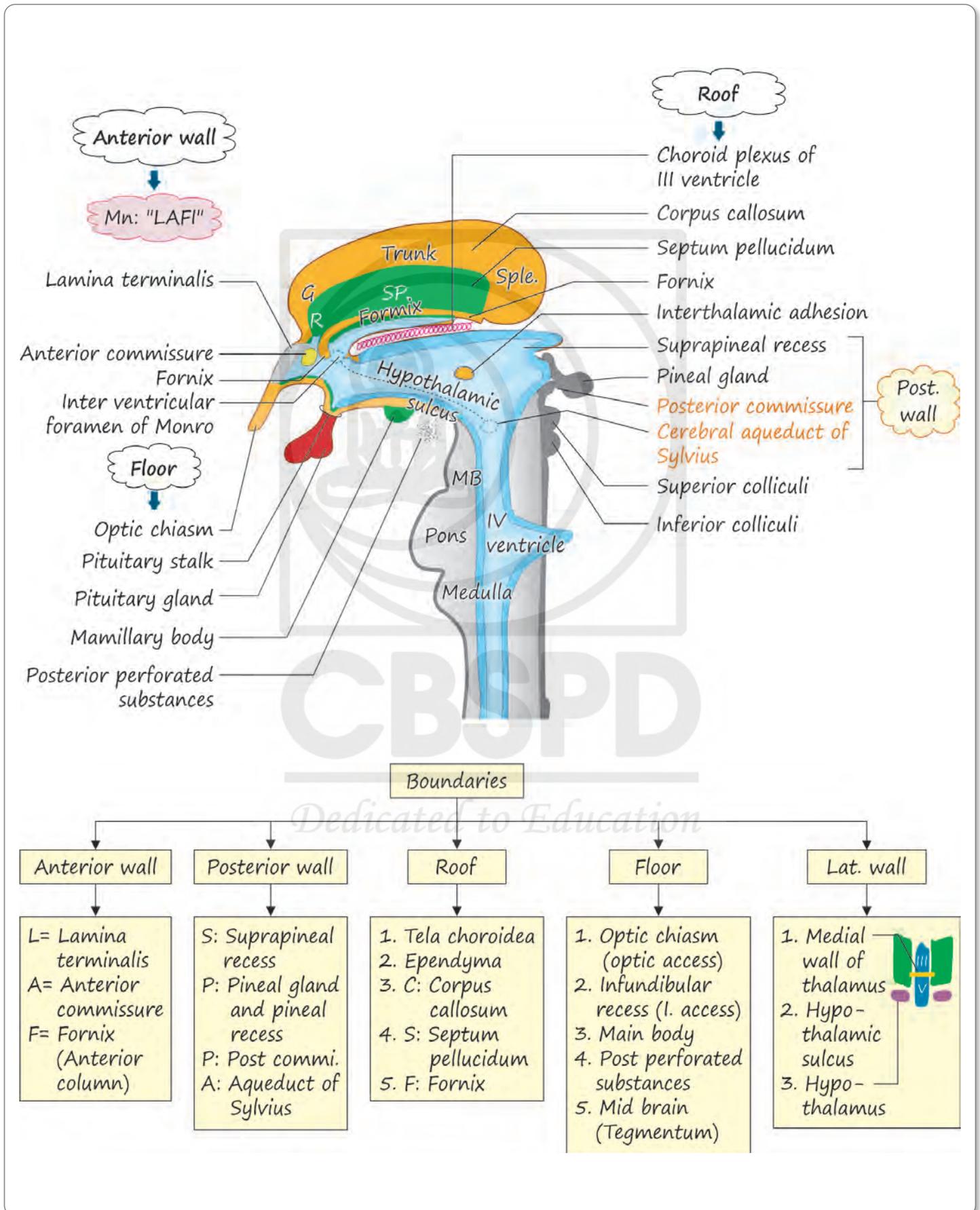
Summary of Important Motor Tracts

Table 1: The descending tracts

Name	Function	Crossed and uncrossed	Beginning	Termination
Pyramidal tracts				
<ul style="list-style-type: none"> Lateral corticospinal Anterior 	<ul style="list-style-type: none"> Main motor tract for skillful voluntary movements Facilitates flexors 	<ul style="list-style-type: none"> Crossed in medulla Crossed in corresponding spinal segment 	Motor area of cortex (areas 4, 6) Motor area of cortex (areas 4, 6)	Anterior gray column cells (alpha motor neurons) Anterior gray column cells (alpha motor neurons)
Extrapyramidal tracts				
Rubrospinal	Efferent pathway for cerebellum and corpus striatum	Crossed	Red nucleus of midbrain	Alpha and gamma motor neurons of anterior gray column cells
Medial reticulospinal	Extrapyramidal tract facilitates extensors	Uncrossed	Reticular formation of gray matter of pons	Alpha and gamma motor neurons of anterior gray column cells
Lateral reticulospinal	Extrapyramidal tract facilitates flexors	Uncrossed and crossed	Reticular formation of gray matter of medulla oblongata	Alpha and gamma motor neurons of anterior gray column cells
Olivospinal	Extrapyramidal tract	Uncrossed	Inferior olivary nucleus	Alpha and gamma motor neurons of anterior gray column cells
Lateral vestibulospinal	Efferent pathway for equilibratory control	Uncrossed	Lateral vestibular nucleus	Alpha and gamma motor neurons of anterior gray column cells

Contd...

Boundaries and Relations of III Ventricle



“The mind is everything; what you think, you become.”

—Lord Buddha

RIB CAGE

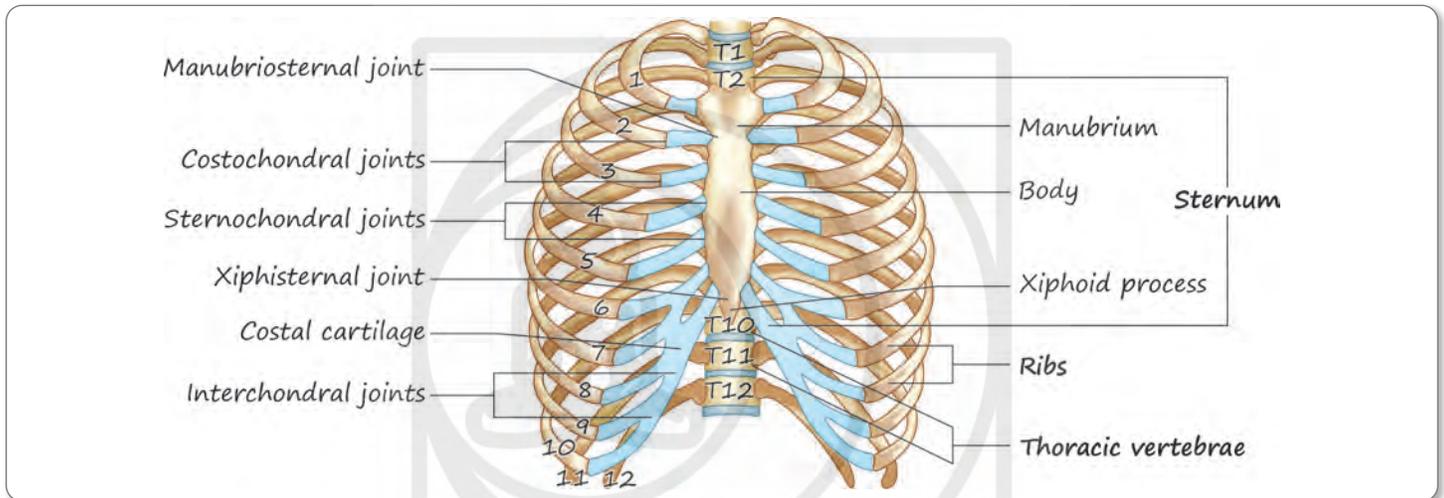
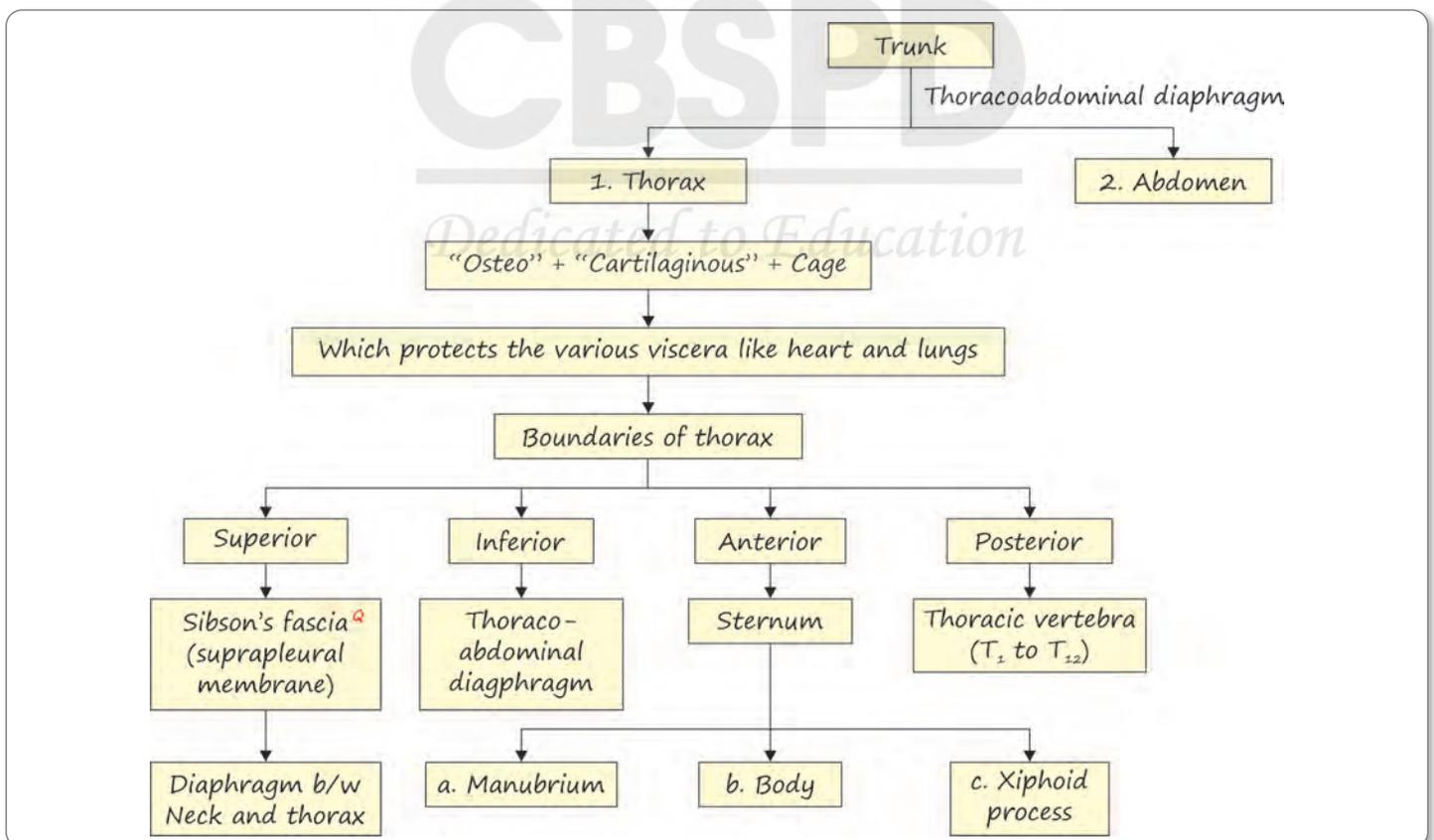


Figure 1: Structure of rib cage

BOUNDARIES OF THORAX



Clinical CBI Anatomy

Thoracentesis: It is done at 8th ICS^Q along the upper border of lower rib^Q to protect the neurovascular bundle in costal groove.^Q

CBI MEDICINE

INTERCOSTAL NERVES (ICN)

The anterior primary rami of upper 11 thoracic spinal nerves (T1–T11)^Q are called **intercostal nerves**.

Types: Two types:

1. Typical ICN—3rd–6th ICN^Q
2. Atypical ICN—remaining other ICN

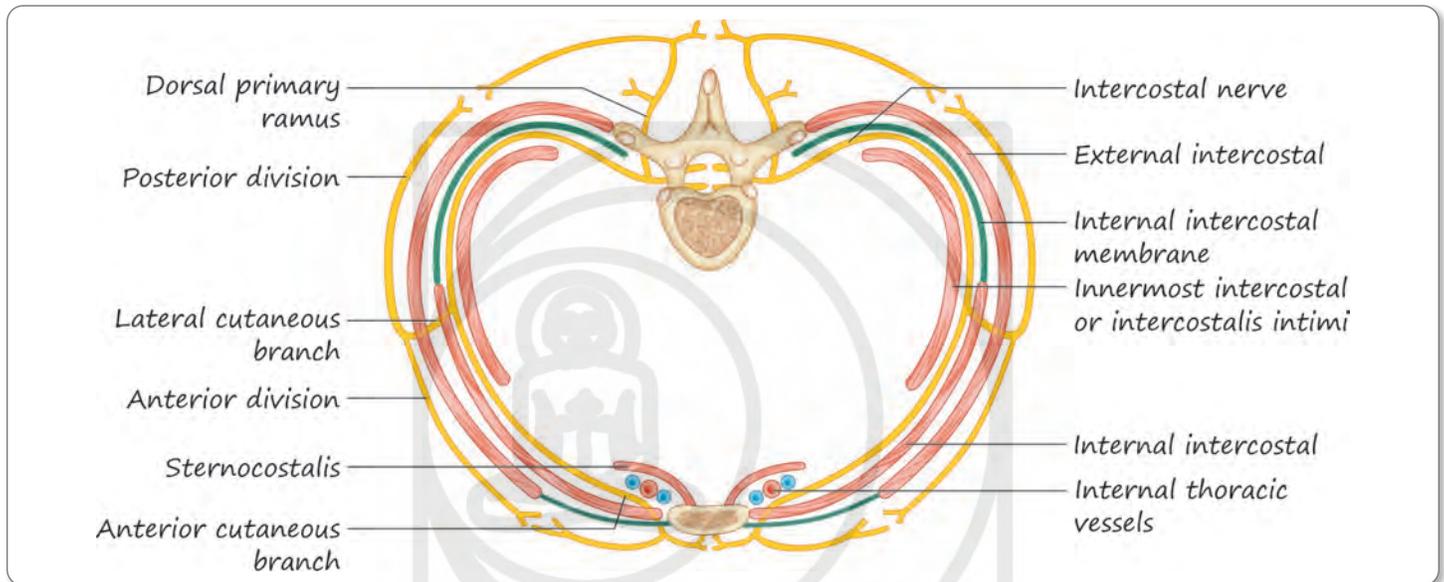


Figure 9: Typical intercostal nerve

Clinical CBI Anatomy

- **Intercostal neuralgia:** Sharp, lancinating pain along the intercostal nerves,^Q often due to trauma or inflammation. CBI MEDICINE

- **Herpes zoster (shingles):** Viral infection causing painful rash^Q and blistering along the distribution of intercostal nerves^Q.

CBI MEDICINE, SKIN and MICROBIOLOGY

- **Intercostal nerve entrapment:** Compression of intercostal nerves leading to localized pain, numbness or tingling. CBI MEDICINE

- **Post-thoracotomy pain syndrome:** Chronic pain along the chest wall following thoracic surgery, involving intercostal nerve damage or irritation. CBI SURGERY

- **Intercostal neuroma:** Benign tumor or growth on an intercostal nerve causing localized pain and discomfort. CBI PATHOLOGY

- **Intercostal nerve block:** Therapeutic injection of local anesthetic to block pain signals from intercostal nerves, used in pain management. It is done along the lower margin of rib^Q to approach the intercostal nerve. CBI ANESTHESIA

INTERCOSTAL ARTERIES (ICA)

- ICS are supplied by Intercostal arteries which are two types:

1. **Posterior ICA:** There are 11 pairs^Q of intercostal arteries, one in each space. They supply the greater part of the intercostal spaces.

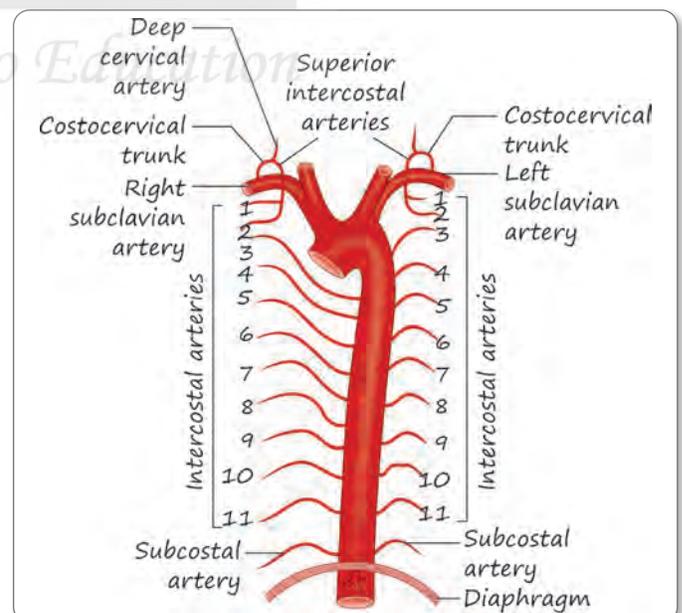


Figure 10: Posterior intercostal artery

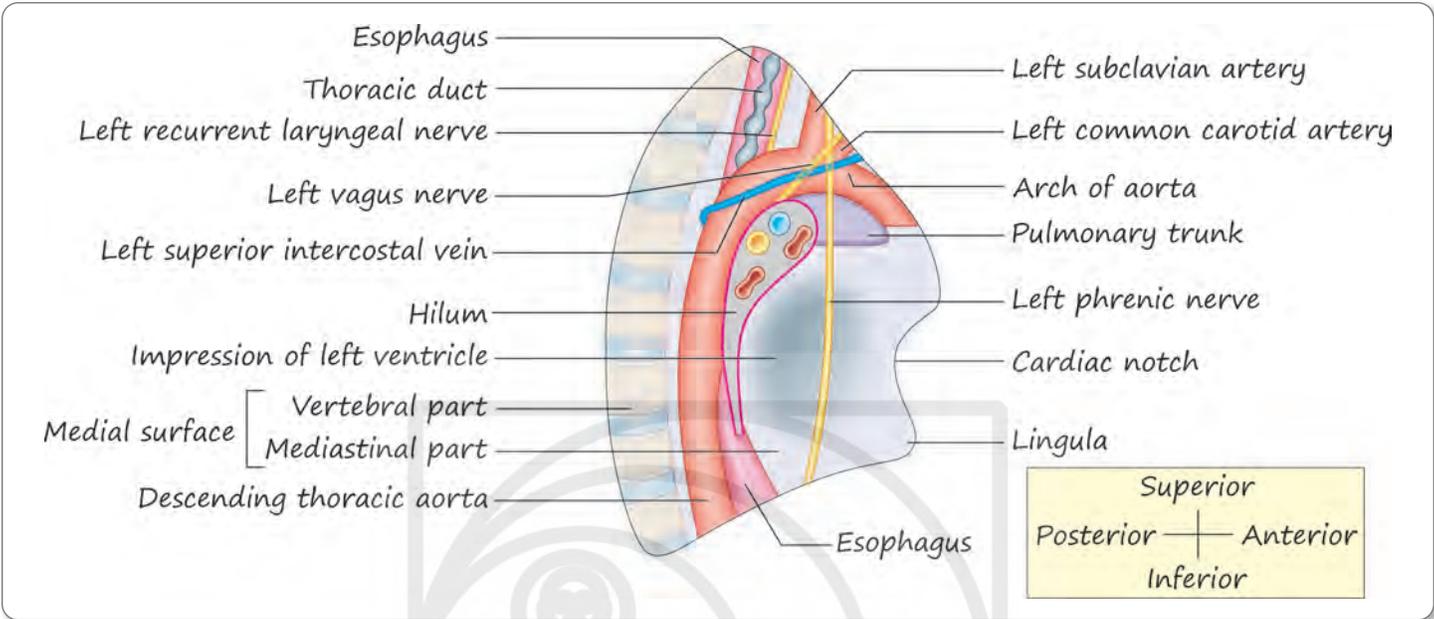


Figure 19: Impressions on medial surface of left lung

Structures Related to the Mediastinal Surfaces of the Right and Left Lungs

Structures at Root of Lung

Mnemonic

- From anterior to posterior (in both lungs):
“VAB”
V - Vein (pulmonary vein)
A - Artery (pulmonary artery)
B - Bronchus
- From superior to inferior:
 - A. In right lung:
 Bhai - Bronchus (eparterial bronchus)
 - B. In left lung:
 Atal - Artery (pulmonary artery)
 Bihari - Bronchus
 Vajpeyi - Vein (pulmonary vein)

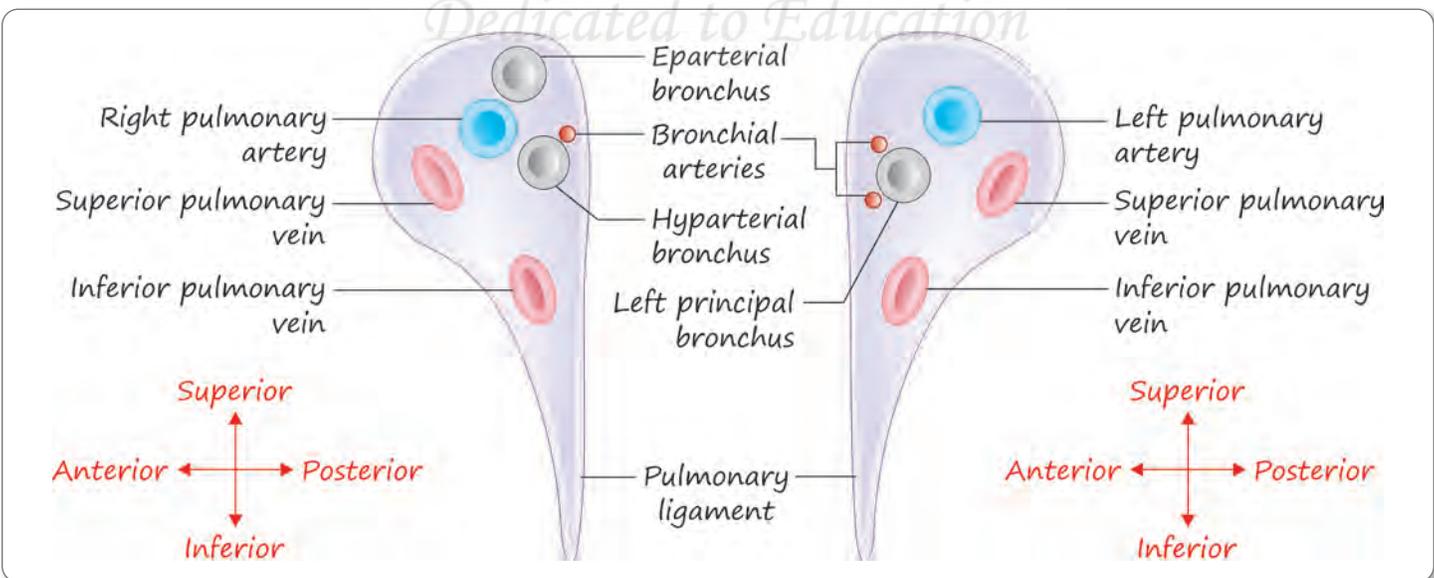


Figure 20: Important relations at pulmonary hilum

“Defeat is not the end, it’s a stepping stone to success.”

PHARYNGEAL APPARATUS

- During embryonic development near the pharynx^α/neck region, there is formation of very special structures known as **Pharyngeal apparatus** in human.
- In fishes, it forms **Gills/Branchial system** known as **Branchial apparatus^α**.

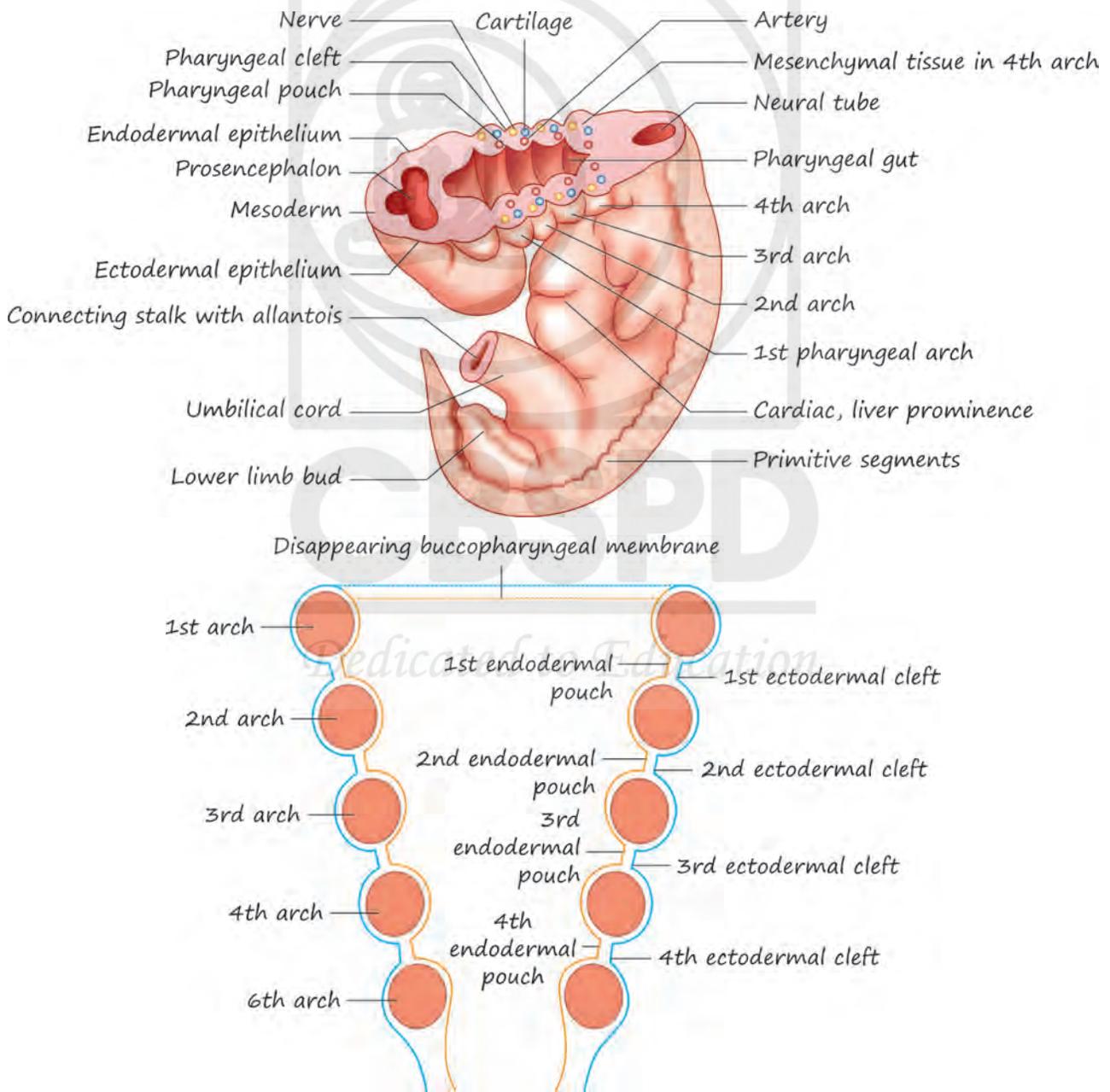
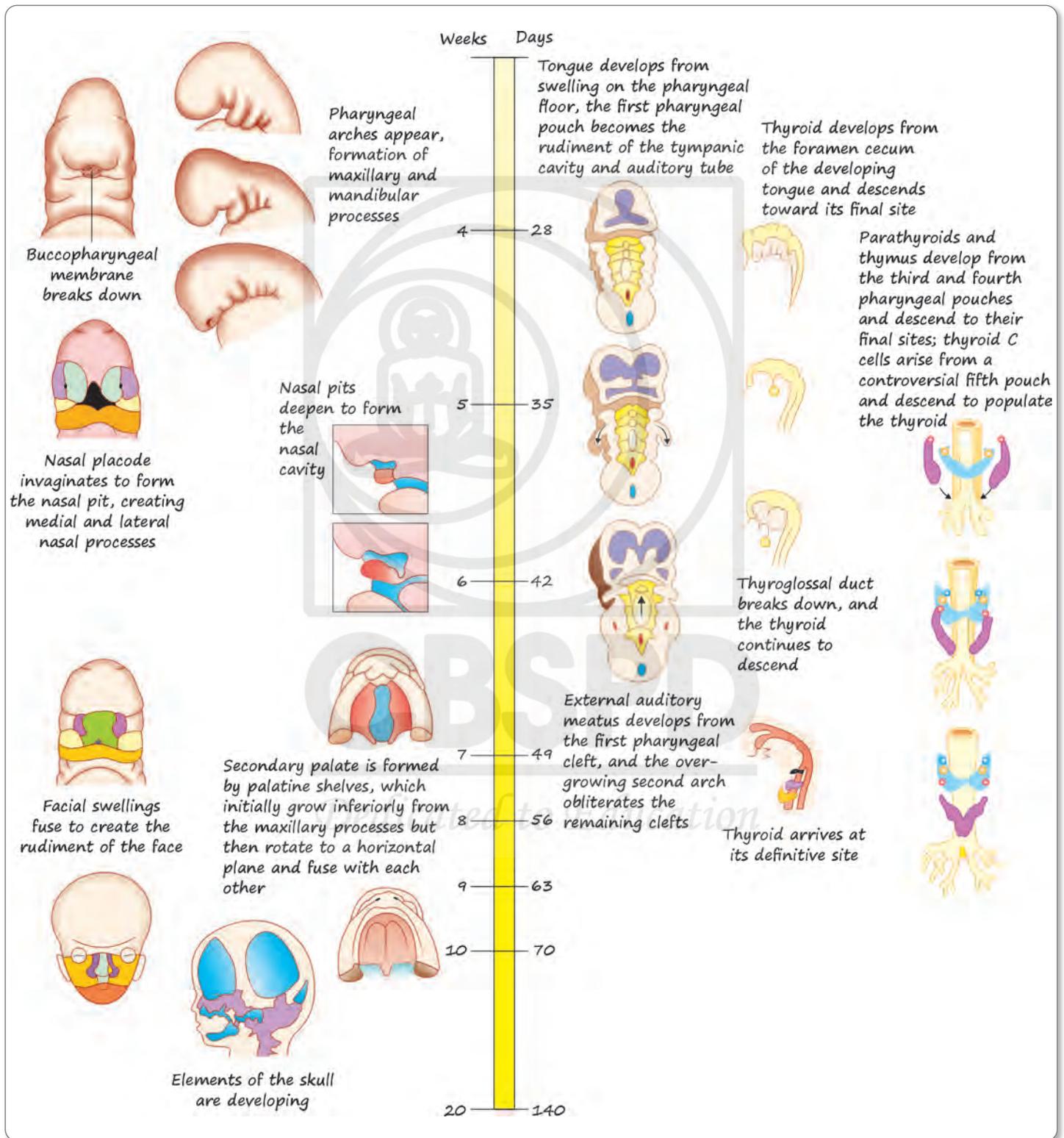


Figure 1: Pharyngeal apparatus (schematic view)

IMPORTANT EVENTS OF PHARYNGEAL APPARATUS, HEAD AND NECK STRUCTURES DEVELOPMENT

“The only way to get through the hard times is to keep moving forward.”



- Histology is the study of the microscopic structure of tissues.
- Tissue is a group of cells with similar structure and function.
- To see cells clearly, we need microscope and stains to highlight different parts of the cell.
- The two main stains are used in histology:
 1. **Hematoxylin (basic dye):** Blue in appearance → it loves and binds with acidic structures
 2. **Eosin (acidic dye):** Red/pink in appearance → it loves and binds with basic structures

Main Structures of a Cell and their Histological Appearance

Parts of cell	Chemical nature	Loving stain	Appearance in slide
Nucleus	Acidic (due to DNA)	Basic stain: Hematoxylin	Blue
Cytoplasm	Slight basic	Acidic stain: Eosin	Pink/red
Cell membrane	Same as cytoplasm	Acidic stain: Eosin	Pink/red line (around nucleus)
Basement membrane	Same as cytoplasm	Acidic stain: Eosin	Pink/red line (over which many cells are located)

- Due to microscopic structure, it is difficult to identify the shape of cells.
- Hence, the blue and red/pink color contrast helps to differentiate nucleus and cytoplasm.
- On background of red/pink color, blue color nucleus is easily identified. Hence, “Nucleus is friend” in histology to identify the cell.
- Following are helpful rules to identify the cell/epithelium

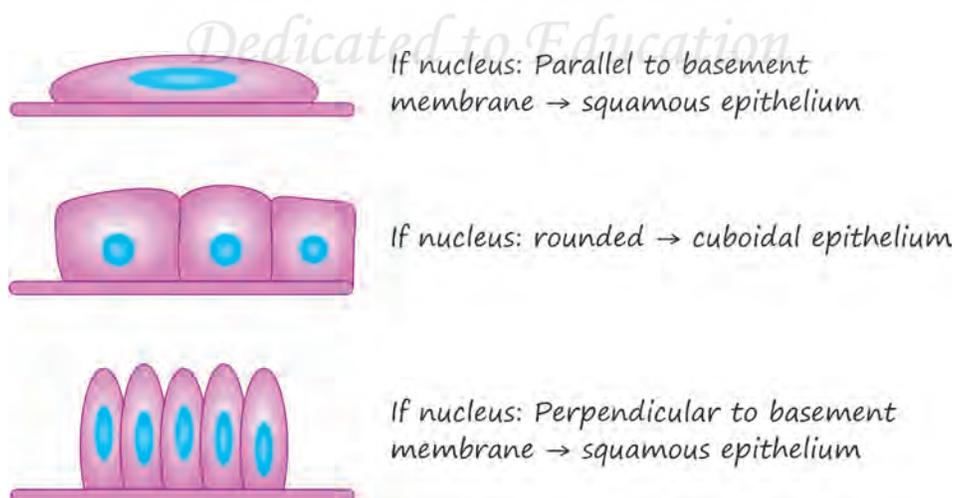
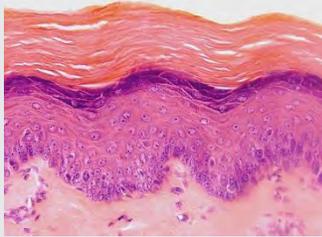
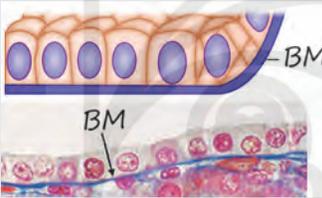
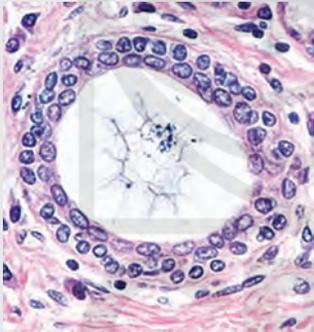
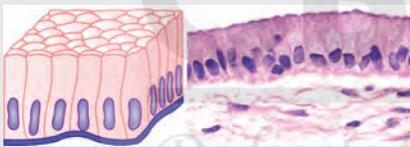
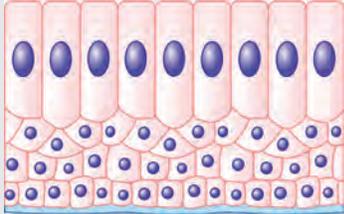
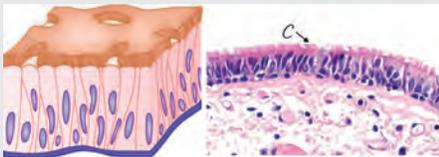


Figure 1: Identification of epithelium on basis of nucleus

Classifications	Images	Important locations	Major functions
	<p>b. Keratinized</p> 	<p>Dry friction area:</p> <ul style="list-style-type: none"> • Skin^Q • Mucocutaneous junctions of the lips, nostrils, distal anal canal^Q • Outer surface of the tympanic membrane^Q • Parts of the oral cavity (gingivae, hard palate and filiform papillae on the anterior part of the dorsal surface of the tongue)^Q. 	<p>Resist the friction^Q and generally keep dry the surface^Q</p>
Simple cuboidal		<ul style="list-style-type: none"> • Thyroid follicles^Q • Kidney tubules^Q • Small ducts of exocrine glands^Q • Surface of ovary (germinal epithelium)^Q 	<p>Synthesis and secretion^Q</p> <ul style="list-style-type: none"> • Absorption and conduit • Barrier • Absorption and secretion
Stratified cuboidal		<ul style="list-style-type: none"> • Sweat gland ducts^Q • Large ducts of exocrine glands^Q • Anorectal junction^Q 	<p>Barrier and drainage^Q</p>
Simple columnar		<ul style="list-style-type: none"> • Small intestine and colon^Q • Stomach lining and gastric glands^Q • Gallbladder^Q 	<p>Synthesis and storage^Q</p> <ul style="list-style-type: none"> • Absorption and secretion • Secretion • Absorption
Stratified columnar		<ul style="list-style-type: none"> • Largest ducts of exocrine glands^Q • Anorectal junction^Q 	<p>Barrier and drainage^Q</p>
Pseudostratified		<ul style="list-style-type: none"> • Trachea and bronchial tree^Q • Ductus deferens^Q • Efferent ductules of epididymis^Q 	<ul style="list-style-type: none"> • Secretion and drainage^Q • Absorption and drainage^Q

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LATEST QUESTION PAPERS

- NEET PG 2024 (MEMORY-BASED)
- NEET PG 2023 (MEMORY-BASED)
- NEET PG 2022 (MEMORY-BASED)
- NEET PG 2021 (MEMORY-BASED)
- INI-CET NOVEMBER 2024 (MEMORY-BASED)
- INI-CET MAY 2024 (MEMORY-BASED)
- INI-CET NOVEMBER 2023 (MEMORY-BASED)
- INI-CET MAY 2023 (MEMORY-BASED)
- INI-CET NOVEMBER 2022 (MEMORY-BASED)
- INI-CET MAY 2022 (MEMORY-BASED)
- INI-CET JULY 2021 (MEMORY-BASED)
- FMGE JANUARY 2025 (MEMORY-BASED)
- FMGE JULY 2024 (MEMORY-BASED)
- FMGE JANUARY 2024 (MEMORY-BASED)
- FMGE JULY 2023 (MEMORY-BASED)
- FMGE JANUARY 2023 (MEMORY-BASED)
- FMGE JUNE 2022 (MEMORY-BASED)
- FMGE DECEMBER 2021 (MEMORY-BASED)
- FMGE JUNE 2021 (MEMORY-BASED)

NEET PG 2024 (Memory-Based)

1. Fracture at which site affects the longitudinal growth of a bone?

- Epiphyseal plate
- Diaphysis
- Epiphysis
- Metaphysis

Ans. a. Epiphyseal plate

Explanation: The growth plate is a key site of chondrocyte proliferation, and injuries to this area can disrupt its blood supply. Epiphyseal blood vessels nourish the zones of active chondrocyte growth, and damage to these vessels may result in necrosis, leading to the arrest of longitudinal bone growth.

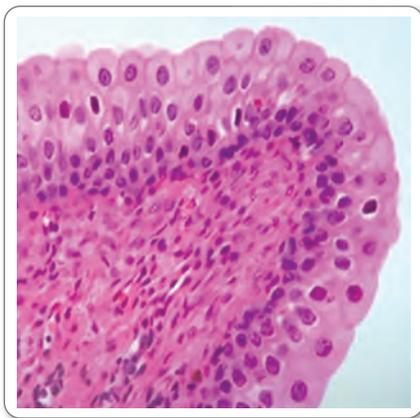
2. Chronic tobacco consumer went to dental clinic with bleeding lesions on tongue and was diagnosed with tongue carcinoma. Which of the following papillae do not have taste buds?

- Circumvallate
- Filiform
- Fungiform
- Foliate

Ans. b. Filiform

Explanation: Unlike the other kinds of papillae, filiform papillae do not contain taste buds. They cover most of the front two-thirds of the tongue's surface. They appear as very small, conical or cylindrical surface projections and covered by keratinized stratified squamous epithelium.

3. Where will you find the epithelium shown in the image?



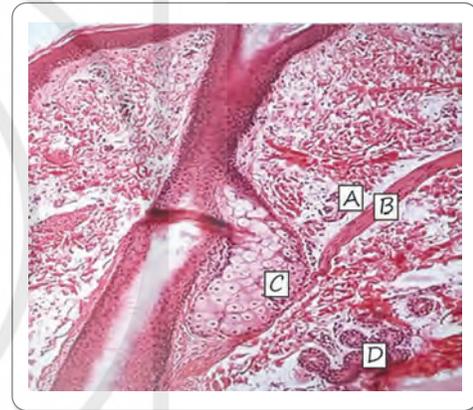
- Ureter
- Gallbladder
- Duodenum
- Trachea

Ans. a. Ureter

Explanation:

- The given image is transitional epithelium, also known as urothelium.
- Transitional epithelium allows distension of the urinary organs (calyces, pelvis, ureters, bladder) during urine accumulation and contraction of these organs, while the emptying process without breaking the cell contacts in the epithelium.

4. Identify the markers in the given slide.



- A – Apocrine sweat gland, B – Arrector pilorum, C – Eccrine sweat gland, D – Sebaceous gland
- A – Arrector pilorum, B – Apocrine sweat gland, C – Eccrine sweat gland, D – Sebaceous gland
- A – Sebaceous gland, B – Eccrine sweat gland, C – Arrector pilorum, D – Apocrine sweat gland
- A – Eccrine sweat gland, B – Arrector pilorum, C – Sebaceous gland, D – Apocrine sweat gland

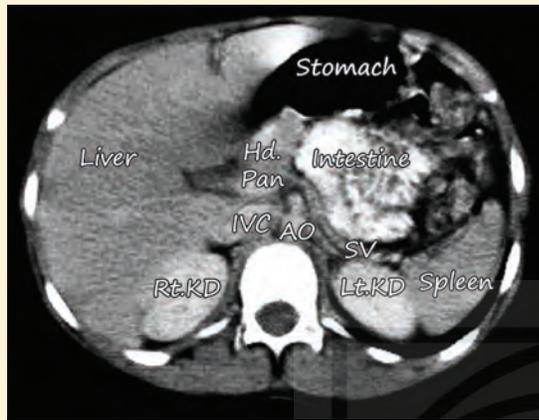
Ans. d. A – Eccrine sweat gland, B – Arrector pilorum, C – Sebaceous gland, D – Apocrine sweat gland

Explanation:

A – Eccrine sweat gland: These are sweat glands found throughout the skin, responsible for regulating body temperature by producing watery sweat.

B – Arrector pili: A small muscle attached to hair follicles, which causes hair to stand upright (goosebumps) in response to cold or emotional stimuli.

Contd...

Explanation:**FMGE JULY 2023 (Memory-Based)**

191. A patient with a recent MI underwent coronary angiography, which revealed a block in the anterior interventricular artery. The infarction is likely to be present in which of the following regions of the heart?

- Posterior part of interventricular septum
- Anterior wall of the left ventricle
- Lateral part of the heart
- Inferior surface of the right ventricle

Ans. b. Anterior wall of the left ventricle

Explanation: The occlusion of the left anterior descending artery (LAD) will lead to the infarction of the anterior wall of the left ventricle.

The left anterior descending artery also called the anterior interventricular artery supplies the anterior 2/3rd of the interventricular septum and the adjacent anterior wall of the left ventricle.

192. Which of the following cranial nerves does not carry parasympathetic fibers?

- Trochlear
- Facial
- Oculomotor
- Glossopharyngeal

Ans. a. Trochlear

Explanation: The trochlear nerve does not carry parasympathetic fibers.

The cranial nerves carrying parasympathetic fibers are listed below:

Cranial nerve	Associated Ganglion
Oculomotor (III)	Ciliary ganglion
Facial (VII)	Pterygopalatine submandibular ganglion
Glossopharyngeal (IX)	Otic ganglion
Vagus (X)	Visceral ganglions

193. A patient had his molar teeth extracted following which, he developed loss of general sensation in the anterior two-thirds of the tongue. Which of the following nerves is likely to be injured?

- Glossopharyngeal nerve
- Hypoglossal nerve
- Inferior alveolar nerve
- Lingual nerve

Ans. d. Lingual nerve

Explanation: The lingual nerve is a branch of the mandibular nerve (V3) that provides sensory innervation to the anterior two-thirds of the tongue, as well as the floor of the mouth and the lingual gums.

194. From which structures do the alae of the nose develop?

- Frontonasal process
- Medial nasal process
- Lateral nasal process
- Bucconasal membrane

Ans. c. Lateral nasal process

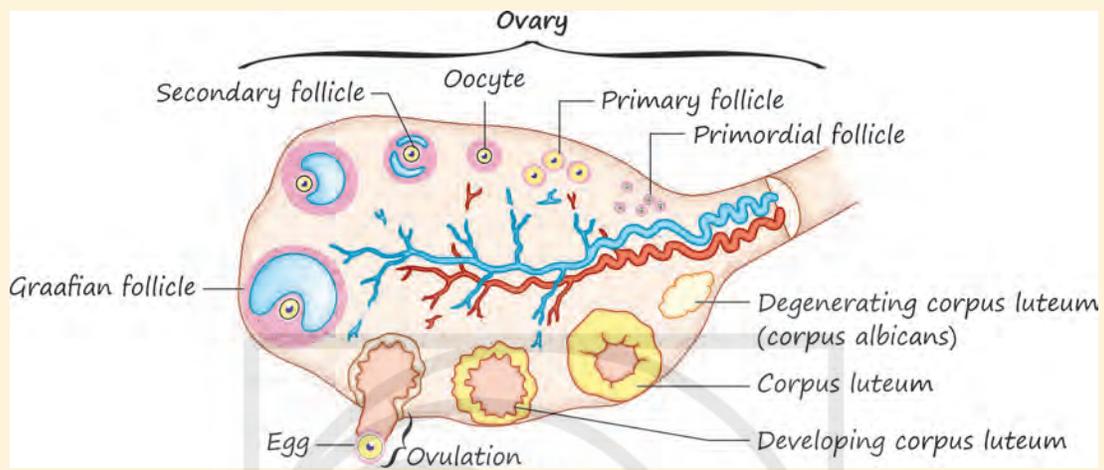
Explanation: The alae of the nose develop from the lateral nasal processes.

The development of various components of the nose can be summarized as follows:

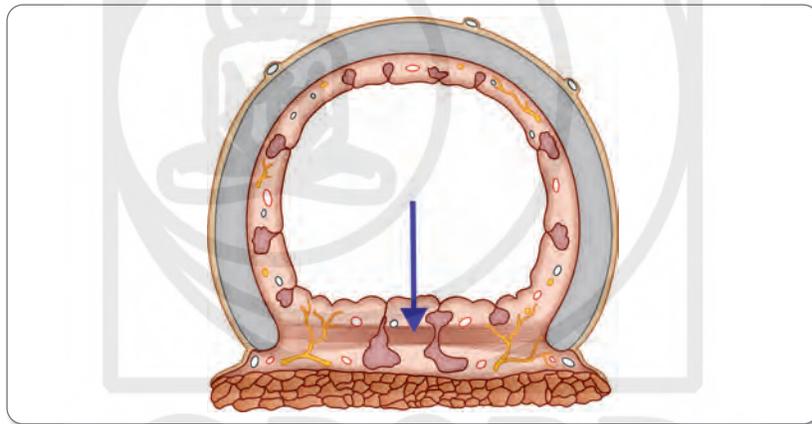
- Bridge - The frontonasal process
- Dorsum and tip - Fused medial nasal processes
- Alae - The lateral nasal processes
- Anterior nares (nostrils) - The original site of the nasal pit
- Nasal cavity - The nasal sacs formed by the elongation of nasal pits
- Posterior nares (choanae) - Ruptured bucconasal membrane

Contd...

Explanation:



233. Identify the structure marked given in the following image.

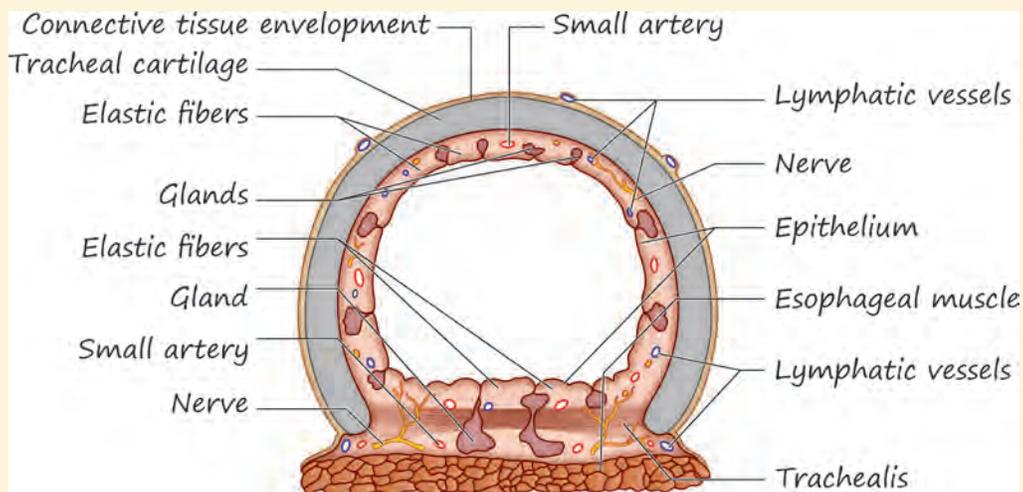


- a. Circular muscle layer of esophagus
- b. Longitudinal muscle layer of esophagus
- c. Trachealis
- d. Hyoid bone

Ans. c. Trachealis

Dedicated to Education

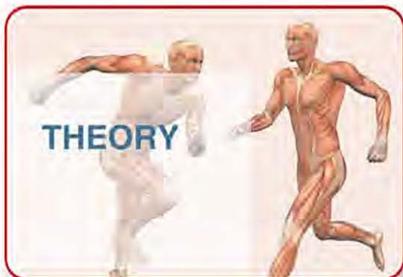
Explanation:





ONE Touch Anatomy

For NEET/NEXT/FMGE/INI-CET/Undergraduates



THEORY

Theory—A concise form of text covered in just 268 pages. Most important points to remember have been given for last-minute revision. Text of entire book has been presented in the form of Tables, Boxes, Flowcharts, and Illustrations for easy recalling.

Differences between Small and Large Intestines

CBI SURGERY and MEDICINE

Features	Small intestine	Large intestine
Length	6 m	1.5 m
Lumen	Narrower	Wider
Mobility	More	Less
Transverse mucous folds	Permanent and not obliterated by distension of the gut	Temporary and obliterated by distension of the gut
Villi	Present	Absent

Integrated approach—Subject-wise integration has been highlighted with the respective topics for better understanding through a dual approach.

Mnemonic

“Medical College Lucknow, Lucknow Medical College”

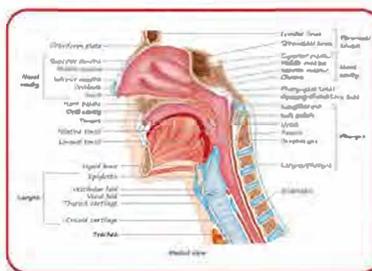
- Anterior horn of Medial meniscus.
- Anterior Cruciate ligament.
- Anterior horn of Lateral meniscus.
- Posterior horn of Lateral meniscus.
- Posterior horn of Medial meniscus.
- Posterior Cruciate ligament.

Mnemonic—Text has been supplemented with easy to recall Mnemonic boxes for quick memorization of the concepts.

Clinical CBI Anatomy

- **Rotator cuff injury:** CBI ORTHO and RADIO
 - **Cause:** Rotator cuff muscles (SITS) may be injured due to trauma, sports activities, age related degeneration → which may cause Tendonitis, partial tears or complete tears of the tendons.
 - **Symptoms:** Pain at shoulder, weakness and limited movement.
 - **MC muscle injured^o** among rotator cuff muscles: Supraspinatus^o. It is thinnest muscle

Clinical CBI Anatomy—Clinical Conceptual Brainstorming Integration has been covered with all the topics to enhance understanding with clinical correlations and facts.



Important Images/Illustrations—The book has been enriched with essential anatomical images and illustrations for better comprehension and retention of key concepts, making learning more effective.



LATEST QUESTION PAPERS

Last 5 years' Exam Questions—240+ Qs of Last 5 years' exam question papers up to Jan 2025 (FMGE Jan 2025, INI-CET Nov 2024 and NEET PG 2024) have been provided to develop an idea about the pattern of questions and also to know about the recently asked topics.

About the Author



Shrikant Verma, MBBS, MD Anatomy is a renowned Anatomy faculty, teaching in over 34 countries. With 19 years of experience, he is known for his unique, engaging, and integrated teaching style. He is a faculty at Cerebellum Academy and Nursing Next Live and teaches all 19 MBBS subjects on his own platform. A life member of the Anatomical Society of India, he has made significant contributions to forensic anatomy, earning recognition as a Chairperson at NATCON 68 in 2021. His passion for teaching has earned him numerous accolades, including the title of Top Educator in 2022. His interactive approach makes Anatomy fascinating and easy for students worldwide.



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