

Sesamoid Bones

- Bone formed in tendon and joint capsules
- No periosteum, no haversian system, no medullary cavity
- Ossify after birth

Sesamoid bone	Formed in tendon of
Patella	Quadriceps femoris
Pisiform	Flexor carpi ulnaris
Fabella	Lateral head of gastronemius
Riders bone	Adductor longus
Os perineum	Peroneus longus
Os vesalis	Peroneus brevis

Fibrous and Cartilaginous Joints

Fibrous Joints			Cartilaginous Joints	
Sutures	Syndesmosis	Gomphosis	Primary	Secondary
SERRATE: Sagittal				
DENTICULATE: Lambdoid			First chondrosternal joint	Symphysis menti
SQUAMOUS: Temporoparietal	Inferior tibio-fibular joint	Tooth fit in the socket	Between epiphysis and diaphysis	Symphysis pubis
PLANE: Between palatine process of maxillae	Middle radio ulnar joint		Between basiocciput and basisphenoid	Manubriosternal
SCHINDYLESIS: Between rostrum of sphenoid and upper margin of vomer				Intervertebral joint

Types of Synovial Joints

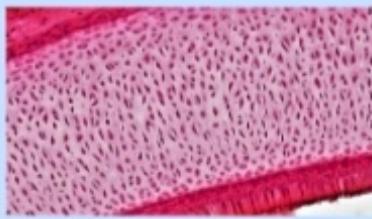
Type	Examples
Hinge/ginglymus	1. Interphalangeal 2. Elbow 3. Ankle
Pivot	1. Atlanto-axial 2. Sup and inf. Radioulnar
Condylar	1. Knee 2. Temporomandibular
Ellipsoid	1. Wrist 2. MCP 3. Atlanto-occipital
Saddle	1. Carpo-metacarpal joint of thumb 2. Sternoclavicular 3. Calcaneocuboid 4. Between malleus and incus
Plane	1. Intercarpal 2. Intertarsal 3. Facet joint
Ball and socket	1. Shoulder 2. Hip 3. Talocalcaneonavicular ,between incus and stapes

Fascicular Architecture of Muscles

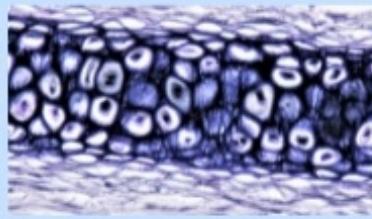
Type of Muscles	Examples
Strap Like	Infrahyoid muscles, sartorius
Strap Like With Digitations(washboard stomach)	Rectus abdominis
Fusiform	Digastric and biceps
Quadrilateral	Thyrohyoid, pronator quadratus
Fan Shaped	Temporalis
Sphincter Type	Orbicularis oculi Orbicularis oris
Spiral/ Twisted Type	Pectoralis major, Latissimus dorsi
Multipennate	Middle part of deltoid Subscapularis
Circumpennate	Tibialis anterior
	Sternocleidomastoid
Cruciate	Masseter Adductor magnus

Types of Cartilage

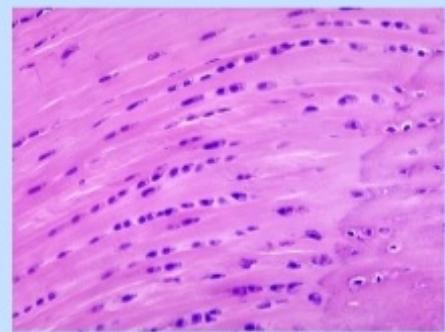
Hyaline Cartilage



Elastic Cartilage



Fibrous Cartilage

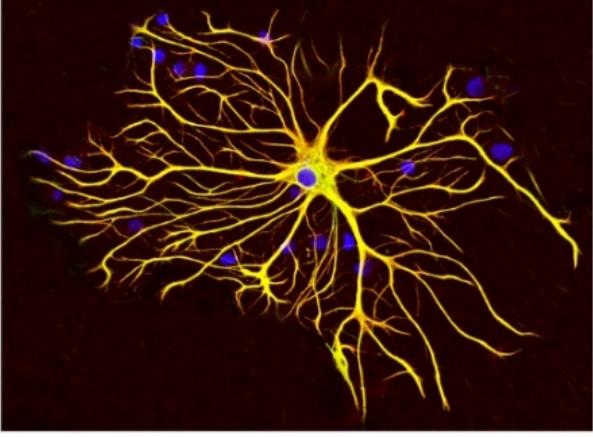
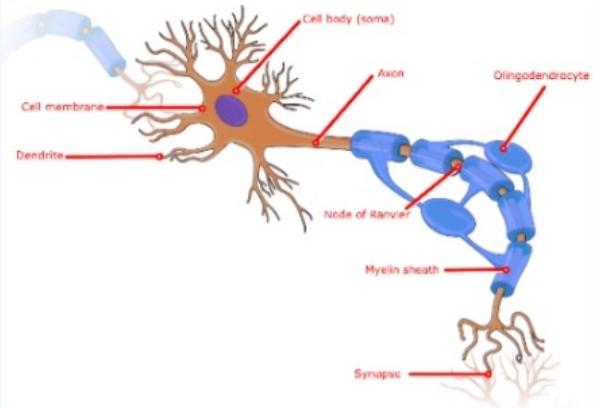
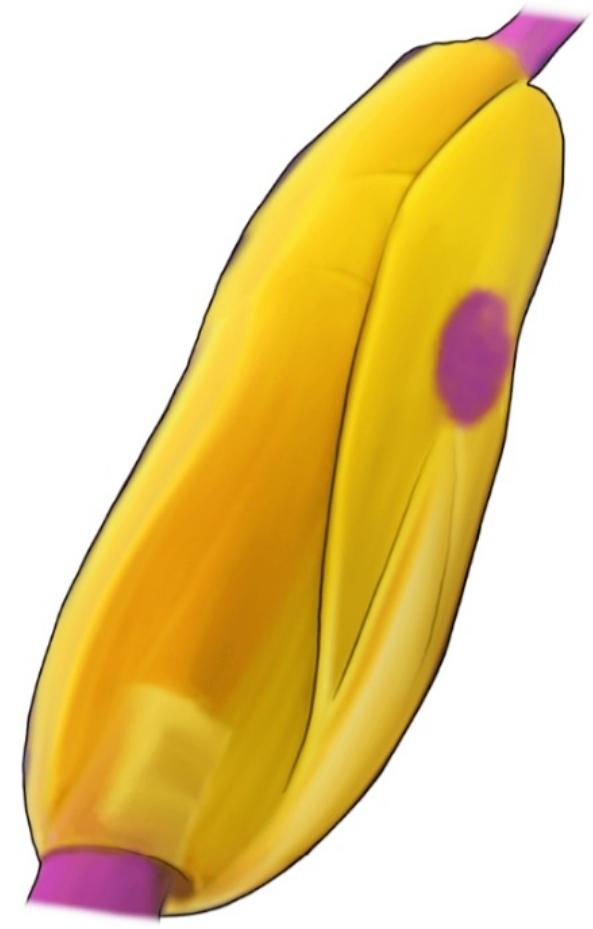


1. Articular cartilage
2. Costal cartilage
3. Embryonic cartilage
4. Trachea and bronchi
5. Thyroid cartilage
6. Cricoid cartilage
7. Arytenoids except apex
8. Epiphyseal plate

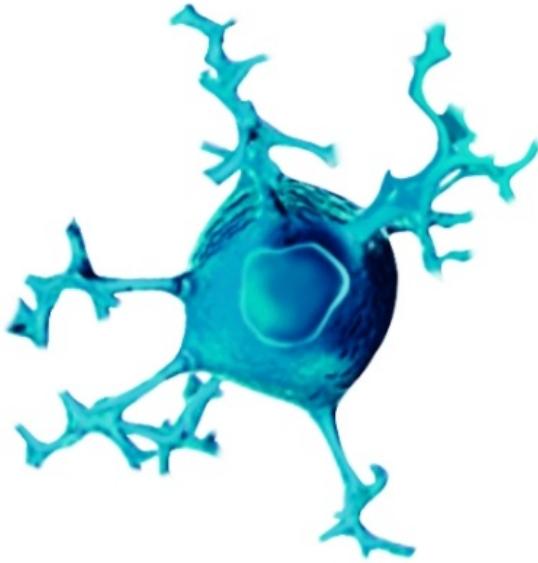
1. Eustachian tube
2. External ear
3. Epiglottis
4. Corniculate
5. Cuneiform
6. Apex of arytenoid

1. Menisci of knee joint
2. Intervertebral discs
3. Articular disc of TMJ and SCJ

Types of Supporting Cells in CN

Cells	Functions
Astrocyte (CNS) 	Blood brain barrier
Oligodendrocyte (CNS) 	Myelination in central nervous system
Schwann cells (PNS) 	Myelination in peripheral nervous system

Microglial cells (CNS)



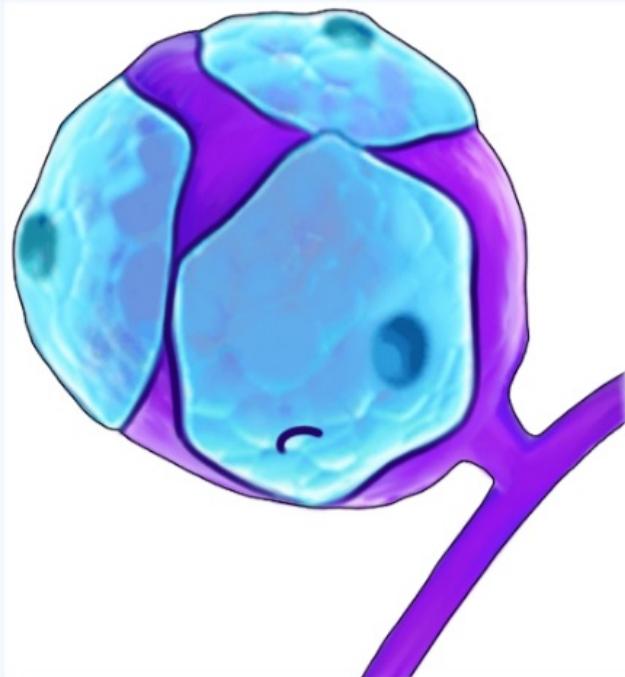
Phagocytic function in CNS

Ependymal cells (CNS)



Lines the ventricles

Satellite cells (PNS)



Surrounds the cell bodies of neurons
Pathway for metabolic exchange

Neural Crest Cell Derivatives

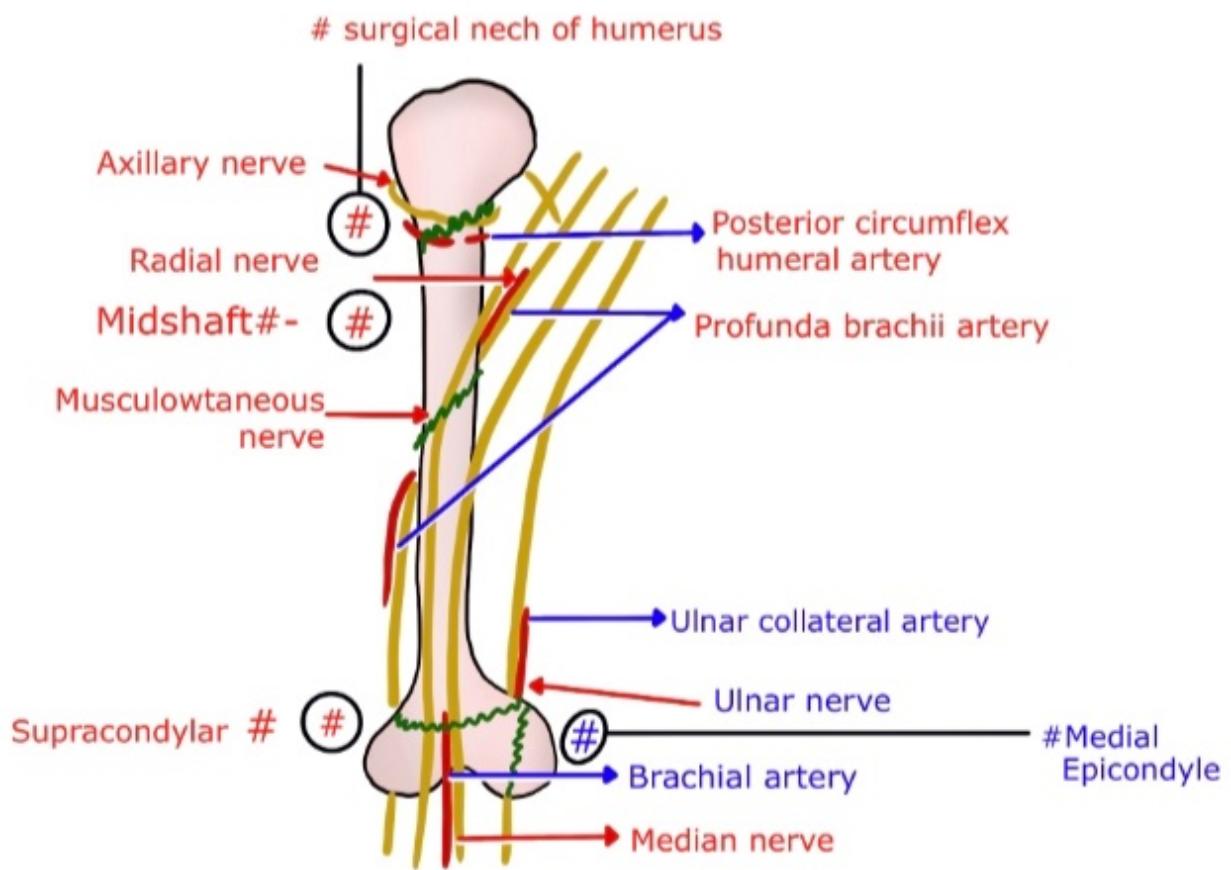
- Cranial nerve ganglia
- Dorsal root ganglia
- Sympathetic ganglia
- Parasympathetic ganglia
- Schwann cells
- Adrenal medulla
- Melanoblast
- Pia and arachnoid
- Pharyngeal arch derivatives
- Most of skull bones
- Most of eyeball derivatives
- Odontoblast (dentine of teeth)
- Parafollicular 'C' cells of thyroid
- Conotruncal (aorta - pulmonary) septum

Critical Periods in Prenatal Period

Body System	Especially Sensitive Development
Brain/ CNS	4-8 weeks
Heart	5-9 weeks
Upper limbs	6-10 weeks
Eyes	6-10 weeks
Lower limbs	6-10 weeks
External genitalia	9-11 weeks

Nerves Related to Humerus

Nerve	Related To Humerus
Axillary nerve	Surgical neck
Radial nerve	Mid shaft and spiral groove
Median nerve	Distal end of humerus
Ulnar nerve	Groove behind medial epicondyle



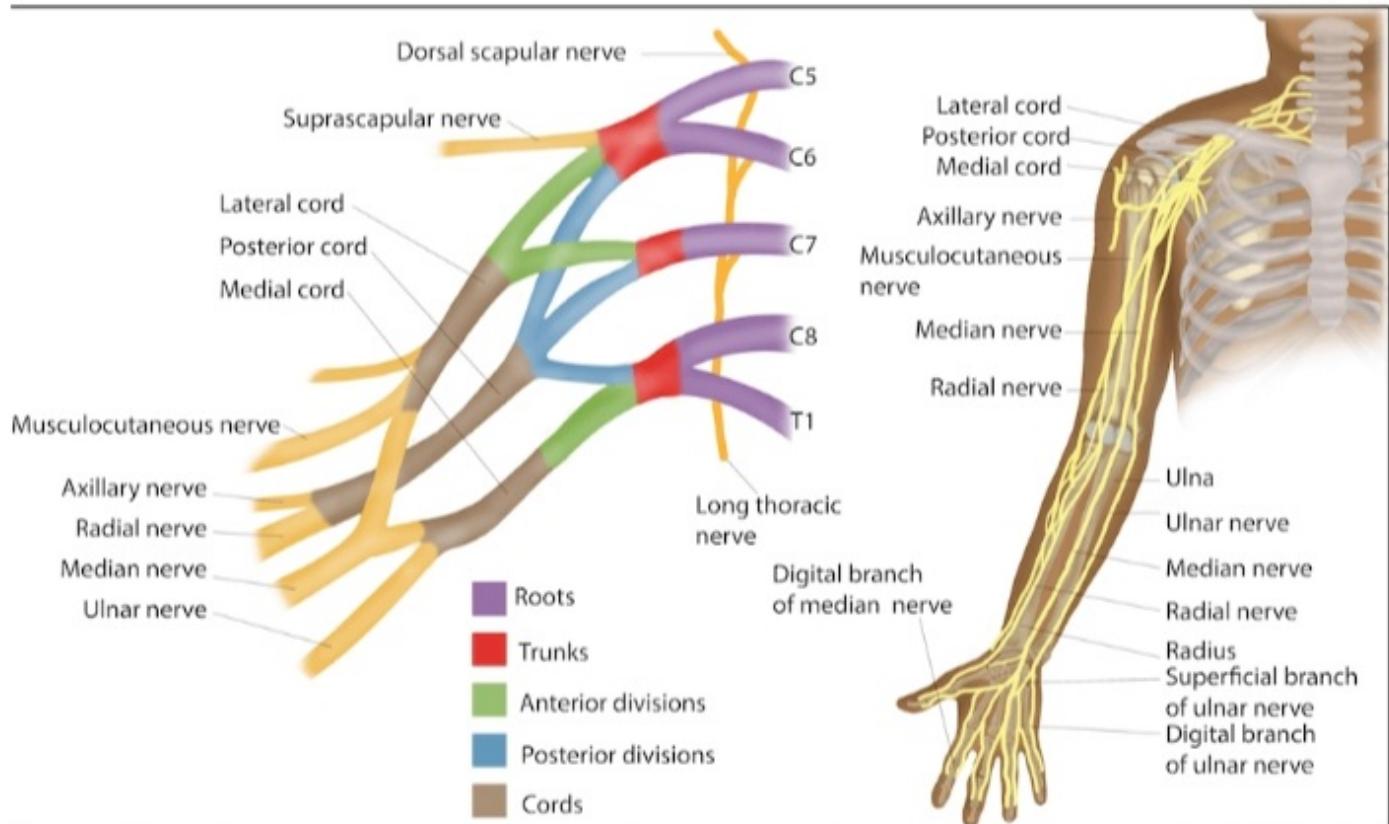
Important Points About Upper Limb Muscles

Characteristic	Muscles
Most common muscle absent in congenital anomalies	Pectoralis major
Boxers muscle	Serratus anterior
Climbers muscle	Latissimus dorsi
Winging of scapula	Serratus anterior > rhomboids > trapezius
Forgotten muscle of rotator cuff	Subscapularis
Painful arc syndrome	Supraspinatus
Popeye sign	Proximal tendon of biceps rupture
Key muscle of upper limb	Anconeus

Movements at the Shoulder Joint

Movement	Muscles Responsible
Abduction	0-15° = supraspinatus 15-90° = middle fibres of deltoid Overhead abduction= serratus anterior & trapezius
Adduction	Pectoralis major Latissimus dorsi
Flexion	Anterior fibres of deltoid Coracobrachialis Pectoralis major
Extension	Posterior fibres of deltoid Teres major Latissimus dorsi Long head of triceps
Medial rotation	Pectoralis major Deltoid anterior fibres Teres major Latissimus dorsi
Lateral rotation	Posterior fibres of deltoid Teres minor Infraspinatus

Brachial Plexus



ERB'S vs KLUMPKE'S Palsy

	ERB'S Palsy	KLUMPKE'S Palsy
Injury to	Upper trunk (C5 C6)	Lower trunk (C8 T1)
Cause	Undue separation of head from shoulder Eg. Birth injury, fall, blow to shoulder	Hyperabduction of arm Pancoast tumor CA breast Cervical rib
Nerves And Muscles Affected	Musculocutaneous Axillary Nerve to subclavius Suprascapular Radial (partial injury)	Ulnar Median (partial injury) Horner's syndrome Anesthesia of ulnar border of arm
Deformity	Policeman/ waiter's tip deformity	Ape thumb deformity Claw hand deformity
Position Of Arm	Adducted and medially rotated	Vasomotor/ trophic changes mainly

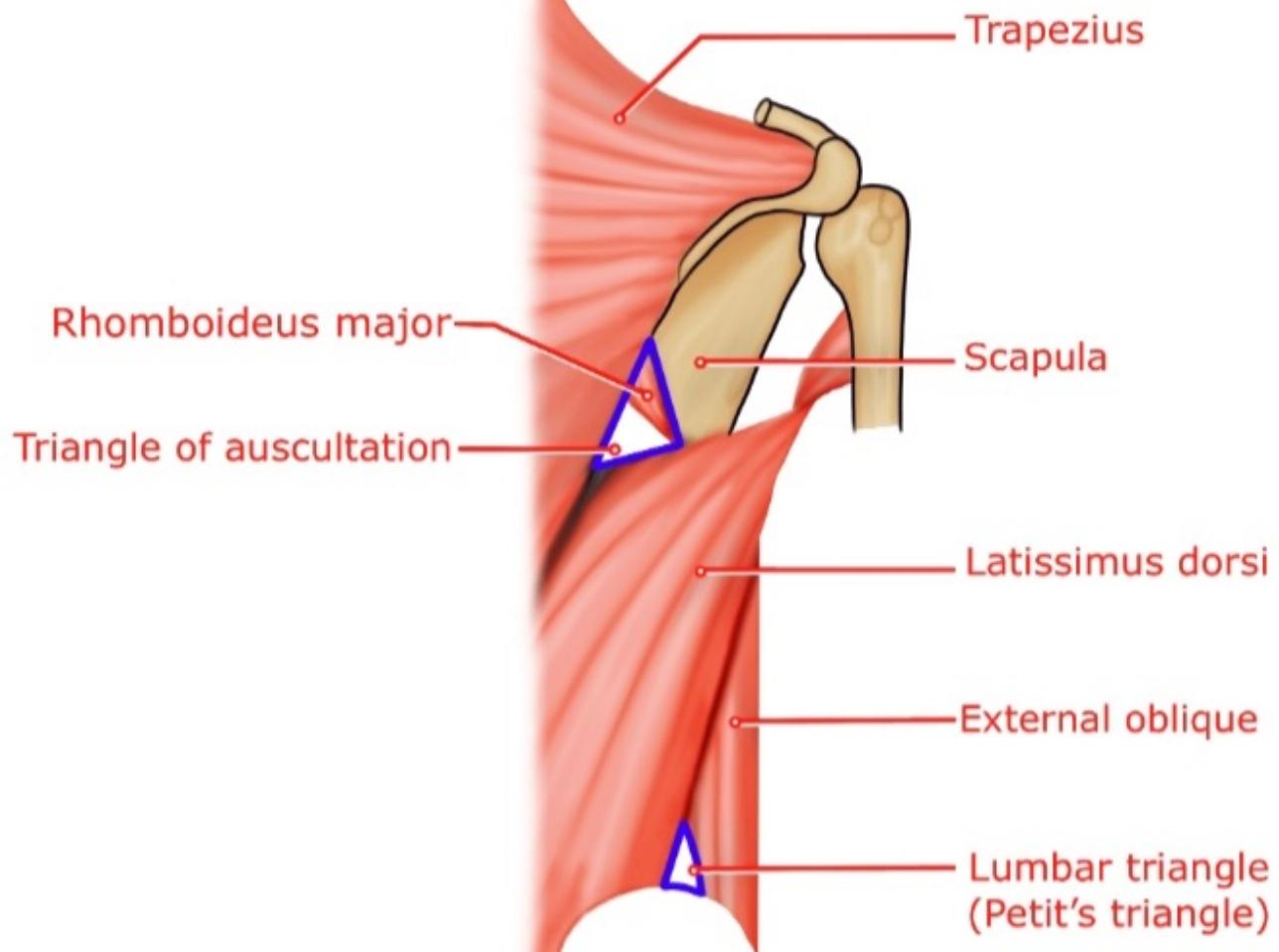
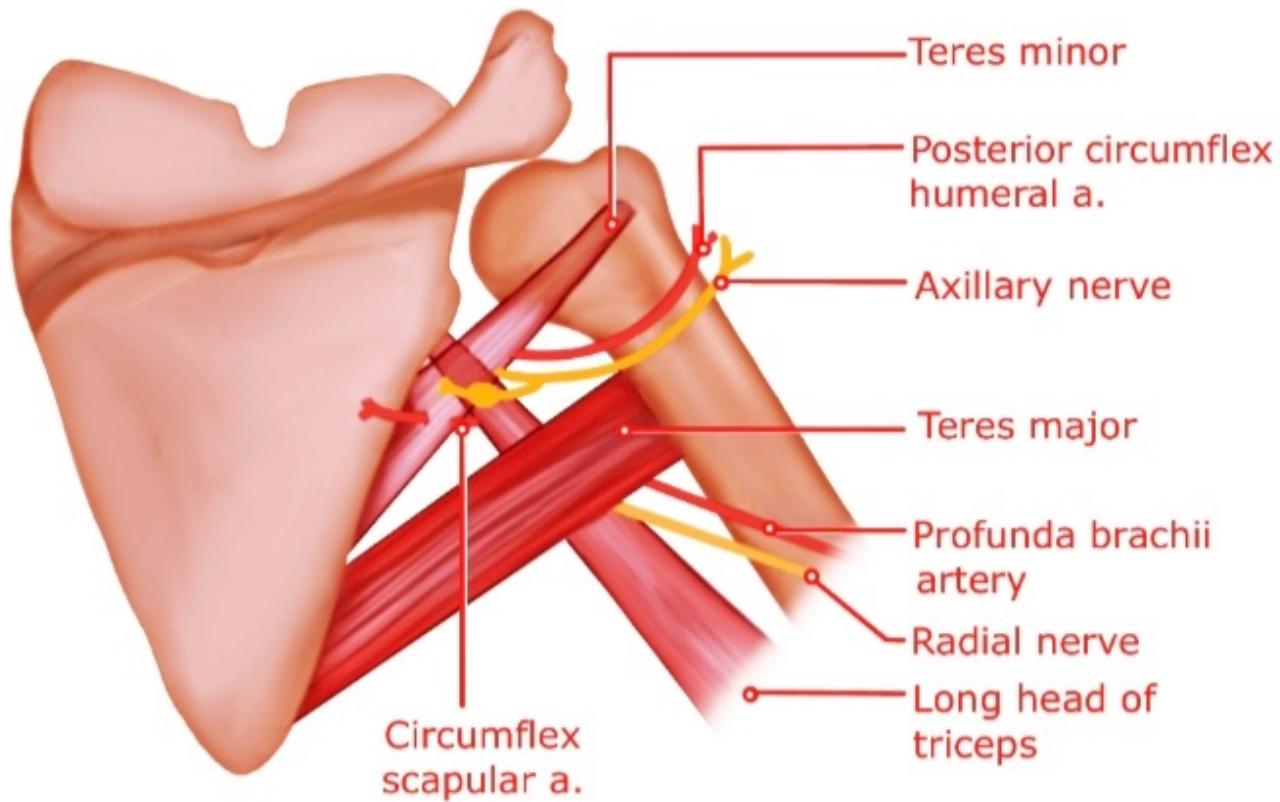
Cutaneous Innervation of Upper Limb

Nerve	Branch of
Medial cutaneous nerve of arm	Medial cord of brachial plexus
Upper lateral cutaneous nerve of arm	Axillary nerve
Lower lateral cutaneous nerve of arm	Radial nerve
Posterior cutaneous nerve of arm	Radial nerve
Posterior cutaneous nerve of forearm	Radial nerve
Lateral cutaneous nerve of forearm	Musculocutaneous nerve

Triplets in Upper Limb

Entity	Involved Structures
Attachments on intertubercular sulcus	<p>Medial lip = Teres major</p> <p>Floor = Latissimus dorsi</p> <p>Lateral lip = Pectoralis major</p>
Structures piercing clavipectoral fascia	<p>Cephalic vein</p> <p>Lateral pectoral nerve</p> <p>Thoracoacromial vessels</p>
Anatomical snuff box boundaries	<p>Lateral = Abductor pollicis longus,</p> <p>Extensor pollicis brevis</p> <p>Medial = Extensor pollicis longus</p>

Triangles and Spaces in Upper Limb



Triangles and Spaces in Upper Limb

Triangle / Space	Boundaries	Contents / Significance
Quadrangular space	S- Teres minor I - Teres major M- Long head triceps L- Neck of humerus	Axillary nerve Posterior circumflex humeral vessels
Upper triangular space	S – Teres minor I – Teres major L- Long head triceps	Circumflex scapular vessels Subscapular nerve
Lower triangular space	S – Teres major M – Long head triceps L – Shaft of humerus	Radial nerve Profunda brachii vessels
Triangle of auscultation	M – Lateral border trapezius L – Vertebral border of scapula I – Latissimus dorsi	Site for respiratory auscultation
Lumbar triangle of petit	L –Posterior border of external oblique M –Anterior border of latissimus dorsi I – Iliac crest	Potential Site of hernia

Nerve Involvement in Injuries of Upper Limb

Injury In Relation To	Nerve Involved
Surgical neck of humerus	Axillary nerve
Inferior dislocation of shoulder	Axillary nerve, Radial nerve
Spiral groove #	Radial nerve
Medial epicondyle humerus	Ulnar nerve
Supracondylar #	Anterior interosseous nerve > Median nerve
Radius neck #	Posterior interosseous nerve
Hook of hamate	Ulnar nerve
Lunate dislocation	Median nerve
Wrist slash injury	Median nerve

Nerves Piercing Muscles in Upper Limb

Between / Piercing	Nerve
Between two heads of pronator teres	Median nerve
Between two heads of flexor carpi ulnaris	Ulnar nerve
Piercing supinator muscle	Posterior interosseous nerve
Piercing coracobrachialis	Musculocutaneous nerve

Hybrid/Composite Muscles in Upper Limb

Muscle	Nerves Supply
Brachialis	Musculocutaneous nerve Radial nerve
Pectoralis major	Lateral pectoral nerve Medial pectoral nerve
Subscapularis	Upper subscapular nerve Lower subscapular nerve
Flexor digitorum profundus	Median nerve Ulnar nerve
Flexor pollicis brevis	Median nerve Ulnar nerve

Triplets in Lower Limb

Entity	Structures Involved
Structures passing through lesser sciatic notch	Nerve and tendon of obturator internus Internal pudendal artery Pudendal nerve
Guy ropes muscle	Sartorius Gracilis semitendinosus
Unhappy triad of O'DONOOGHUE	Medial collateral ligament Medial meniscus Anterior cruciate ligament

Nutrient Arteries

Bone	Nutrient Artery
Clavicle	Suprascapular artery
Humerus	Profunda brachii artery
Radius	Anterior interosseous artery
Ulna	Anterior interosseous artery
Femur	Profunda femoris artery
Tibia	Posterior tibial artery (largest nutrient artery)
Fibula	Peroneal artery

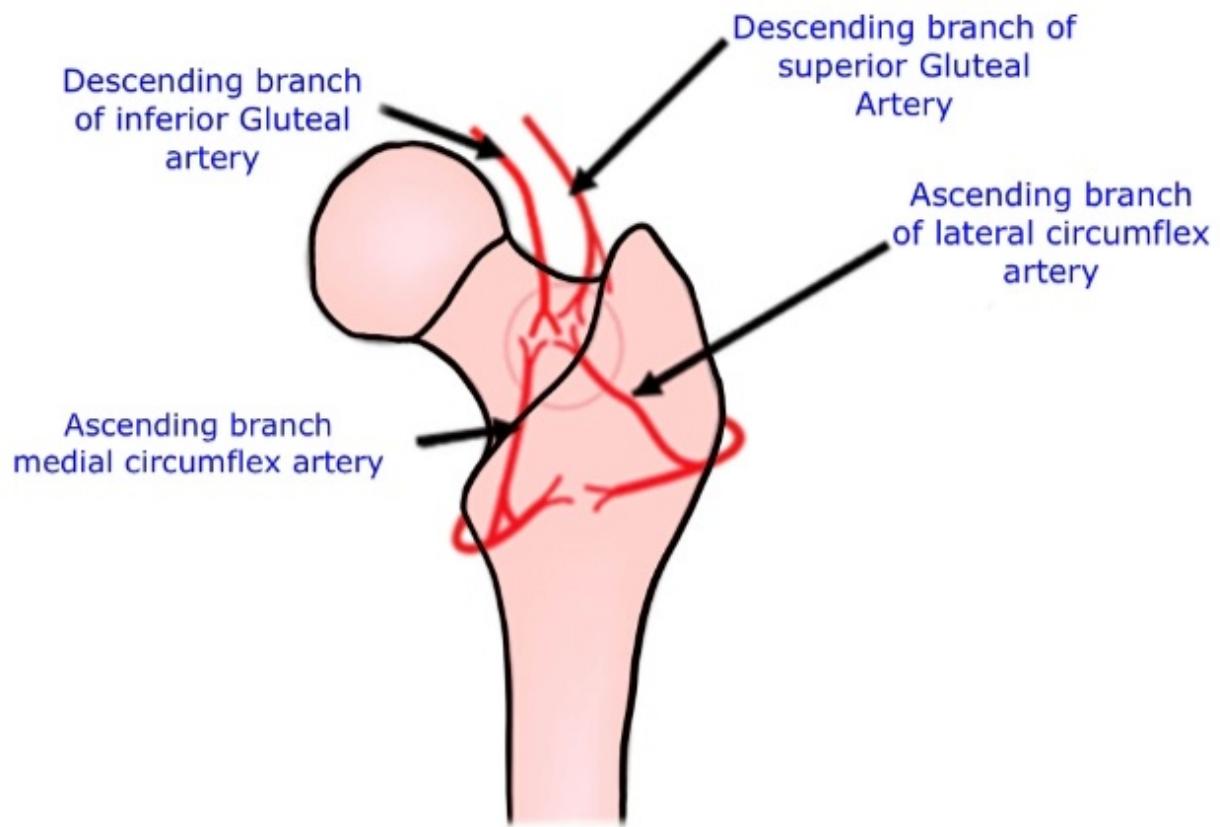
Drainage of Inguinal Lymph Nodes

Superficial	Deep
Afferents	
Medial Group:	
External genitalia including prepuce, excluding glans penis/clitoris	Glans penis/clitoris
Lower end of vagina	Lympahtics along deep vessels
Terminal male urethra	
Anal canal below pectinate line	From superficial inguinal nodes and popliteal nodes
Lymphatics of uterus following round ligament	
Anterior abdominal Wall below umbilicus	
Lateral Group:	
Posterior abdominal Wall below umbilicus	
Gluteal region	
Skin and fascia of lateral thigh	
Lower Vertical:	
Entire lower limb except small saphenous vein territory	
Efferents	
External iliac nodes	External iliac nodes
Some to deep inguinal nodes	

Lumbar Plexus

Nerve	Root value
Ilioinguinal nerve	L1
Iliohypogastric nerve	L1
Genitofemoral nerve	L 1,2
Femoral nerve	Dorsal branch of ventral rami of L2,3,4
Obturator nerve	Ventral branch of ventral rami of L2,3,4
Lateral femoral cutaneous nerve	Dorsal branch of ventral rami of L2,3
Accessory obturator nerve	ventral branch of ventral rami of L2,3

Anastomosis Around Femur



Trochanteric anastomosis

Arrangement of Structures (Medial to Lateral)

Superior Extensor Retinaculum T-HAND-P	Flexor Retinaculum Tom Dick And Harry
Tibialis anterior	Tibialis posterior
Extensor hallucis longus	Flexor digitorum longus
Anterior tibial artery	Posterior tibial artery
Deep peroneal nerve	Tibial nerve
Extensor digitorum longus	Flexor hallucis longus
Peroneus tertius	

Cruciate Ligaments

	Anterior	Posterior
Tibial Attachment	Anterior part of intercondylar area	Posterior part of intercondylar area
Direction	Upwards, backwards, laterally	Upwards, forwards, medially
Femoral Attachment	Posterior aspect of medial surface of lateral condyle	Anterior aspect of lateral surface of medial condyle
Prevents	Posterior dislocation of femur on tibia Forward dislocation of tibia on femur	Anterior dislocation of femur on tibia Posterior dislocation of tibia on femur
Limits	Hyperextension of knee	Hyperflexion of knee
Taut During	Extension	Flexion
Strength	Weaker	Stronger

Surface Landmarks of Thorax

Structure	Level
Suprasternal notch	T2
Sternal angle	2nd costal cartilage anteriorly T4-T5 posteriorly
Tenth rib	L3
Vertebra prominens	C7
Spine of scapula	T3
Inferior angle of scapula	T7
Nipple	4TH ICS
Apex beat	5TH ICS

Primitive Heart Tube Dilatations

Embryonic Dilatation	Adult Structure
Truncus arteriosus	Ascending aorta and pulmonary artery
Bulbus cordis	Smooth part of right and left ventricle
Primitive ventricle	Trabeculated part of right and left ventricle
Primitive atrium	Rough part of right and left atrium
Body of sinus venosus and right horn	Smooth part of right atrium
Left horn of sinus venosus	Coronary sinus and oblique vein of left atrium

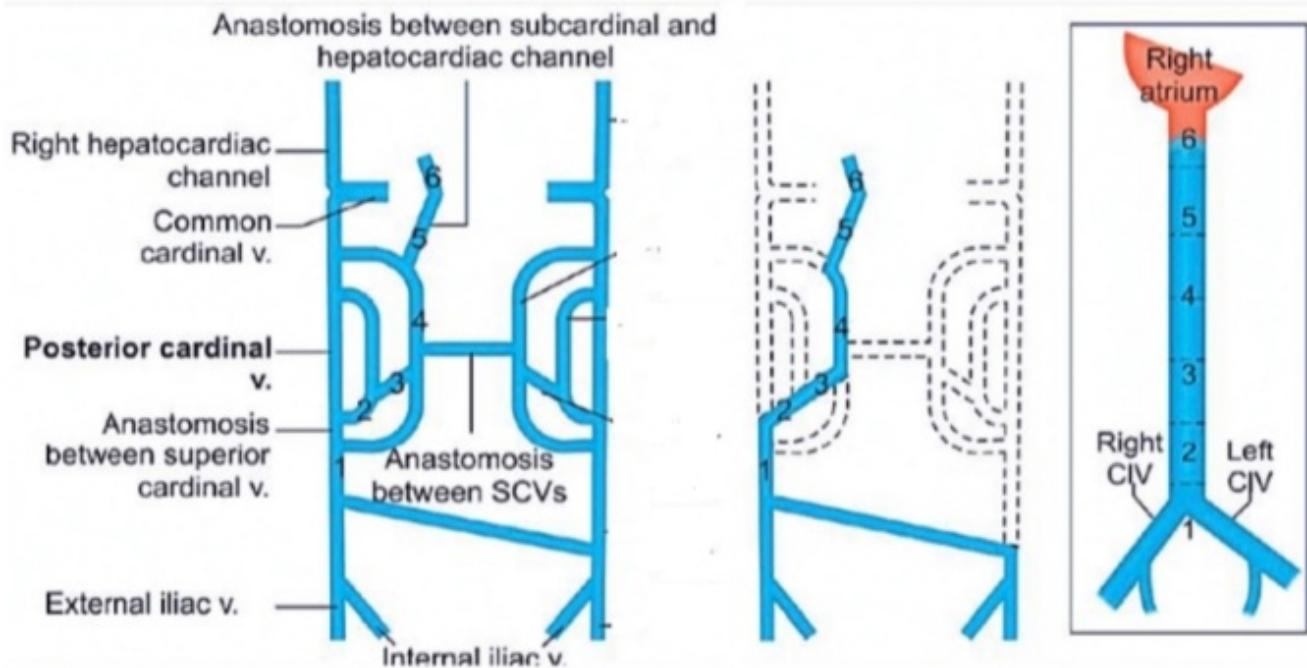
Aortic Arch and Its Derivatives

Aortic Arch	Derivatives
1st arch	Inferior alveolar artery (transitory)
2nd arch	Transitory hyloid and stapedial artery
3rd arch	Common carotid and 1st part of internal carotid
4 th arch	Left= arch of aorta Right + 7 th intersegmental artery= right subclavian artery
6 st arch	Left= left pulmonary artery and ductus arteriosus Right= right pulmonary artery

Embryonic Veins and Their Adult Derivatives

Embryonic Veins	Adult Derivatives
Vitelline veins (Mnemonic - SHIP)	Superior mesenteric vein Hepatic vein and sinusoids IVC Portal vein
Right umbilical vein	Regresses Site of gastroschisis
Left umbilical vein	Ligamentum teres
Anterior cardinal vein	SVC and internal jugular vein
Posterior cardinal vein	IVC and common iliac veins
Subcardinal vein	IVC, gonadal and renal veins
Supracardinal vein	IVC, azygous veins and intercostal veins

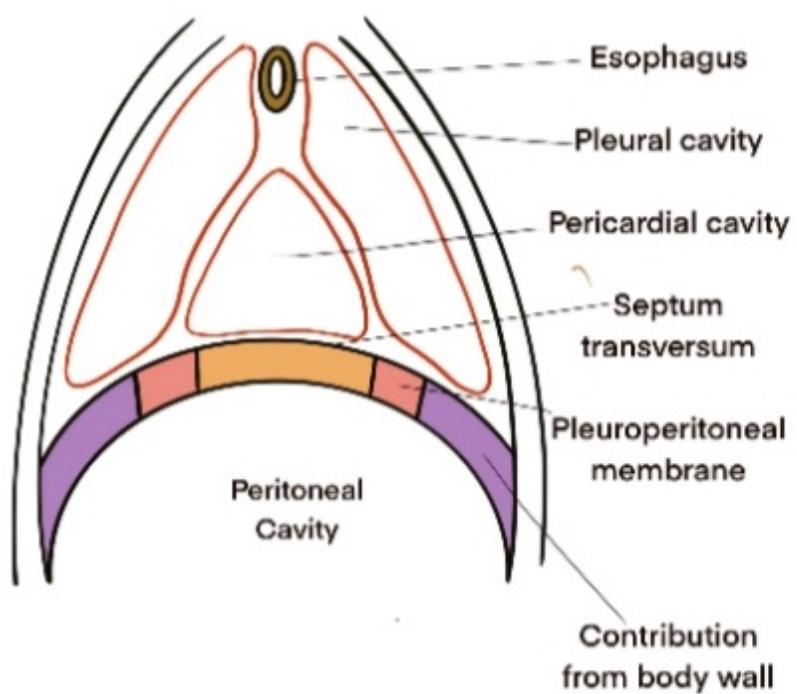
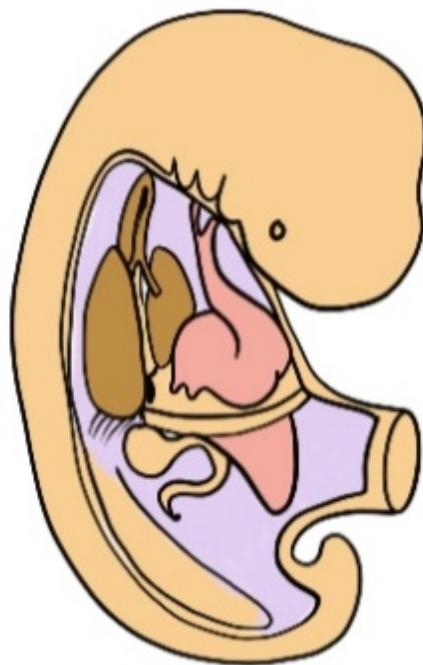
Development of IVC



Caudal to Cranial:

- Posterior intercardinal anastomosis
- Caudal portion of right supracardinal vein
- Right anastomosis between supracardinal and subcardinal veins
- A segment of right subcardinal vein
- Anastomosis between right subcardinal and right vitelline veins
- Terminal portion of right vitelline vein

Development of Diaphragm



Embryonic Structure	Adult Derivative In Diaphragm
Septum transversum	Central tendon
Pleuroperitoneal membrane	Posterolateral part Defective fusion leads to bochdalek's hernia
Dorsal mesentery of oesophagus	Crus
Cervical somites	Body wall

Importance of Angle of Louis

Sternal angle of Louis

- Vertebral level T4
- Helps in counting ribs, 2ndrib lies at this level
- Line of demarcation between dermatomes C4 and T2
- Junction between superior and inferior mediastinum
- Beginning and ending of arch of aorta
- Thoracic duct crosses from right to left
- SVC pierces the fibrous pericardium
- Termination of arch of azygous vein
- Tracheal bifurcation

Joints of Thorax

Joint	Type
Manubrio-sternal	Secondary cartilaginous (symphysis)
Xiphisternal	Primary cartilaginous (synchondrosis)
Sternoclavicular	Saddle type of synovial
1st sternocostal	Primary cartilaginous
Remaining sternocostal	Synovial
Costochondral	Synchondrosis
Interchondral	Synovial
Costovertebral and costotransverse	Plane type of synovial

Muscles of Respiration

Inspiration		Expiration	
Quiet Inspiration	Deep Inspiration	Quiet Expiration	Forced Expiration
Diaphragm External intercostals	Sternocleidomastoid		Abdominal muscles
	Serratus anterior and posterior		Latissimus dorsi
	Scaleni	Elastic recoil of alveoli and thoracic wall	Internal intercostals
	Erector spinae		Transversus thoracis
	Pectoralis major and minor		Quadratus lumborum
			Serratus posterior inferior

Intercostal Vessels

Arteries		Veins		
Anterior	Posterior	Anterior	Posterior	
2 in each ICS	1 in each ICS		Right	Left
1 to 6- internal mammary artery	1 & 2- superior intercostal artery	Follows the artery and drains into internal thoracic vein and musculophrenic vein	1 st - right brachiocephalic vein	1 st - left brachiocephalic vein
7 to 9- musculophrenic artery	3 to 11- descending thoracic aorta		2,3,4- arch of azygous vein	2,3,4- left superior intercostal vein
			5 to 11- azygous vein	5,6,7- superior hemiazygous vein
				8,9,10- inferior hemiazygous vein

Contents of Mediastinum

Superior			Inferior		
Retrosternal	Intermediate	Prevertebral	Anterior	Middle	Posterior
Sternohyoid	Arch of aorta and its branches	Trachea	Sternopericardial ligaments	Pericardium and heart	Descending aorta
Sternothyroid	Vagus n.	Oesophagus	Retrosternal lymph nodes	Ascending aorta	Azygous and hemiazygous veins
Thymus	Phrenic n.	Left RLN		Pulmonary trunk	Thoracic duct
Brachiocephalic veins		Thoracic duct		Lower half of SVC and arch of azygous	Oesophagus
SVC				Bifurcation of trachea and deep cardiac plexus	Splanchnic nerves
				Phrenic n. and pericardiophrenic vessels	Vagus nerve
					Posterior Intercostal vessels, termination of superior and inferior hemiazygos veins

External Heart

Part	Contributing Structures
Apex	LV
Base(posterior surface)	2/3 rd by LA 1/3 rd by RA
Surface	Sternocostal- RA, RV, LV, left auricle Diaphragmatic- 2/3 rd by LV, 1/3 rd by RV Left- LV, LA, left auricle
Borders	Right- RA Left- RV, LV

Coronaries of Heart

	Right Coronary Artery	Left Coronary Artery
Origin	Anterior Aortic Sinus	Left Posterior Aortic Sinus
Branches	Right conus artery Right anterior ventricular artery Atrial rami Posterior interventricular artery Right posterior atrial and ventricular rami SA nodal artery AV nodal artery	Anterior interventricular artery (left anterior descending) Anterior ventricular rami Circumflex artery SA nodal branch in 35% cases Left/obtuse marginal artery Atrial branch
Areas of Distribution	Whole of RA Most of RV except a strip along anterior IV groove Part of LV adjoining posterior IV groove	Most of LA Most of LV except a strip along posterior IV groove Part of RV adjoining anterior IV groove

Features of Anterior Rough Part of RA

Part	Description
Crista terminalis	Muscular ridge
Musculi pectinati	Parallel muscle fibres from crista terminalis
Fossa ovalis	Oval depression developed from septum primum
Limbus fossa ovalis	Sickle shaped margin around fossa ovalis. Developed from septum secundum
Triangle of Koch	Septal leaflet of TV Opening of coronary sinus Tendon of todaro Contains AV node
Torus aorticus	Elevation due to noncoronary sinus

Major Opening in Diaphragm

Openings	Vertebral Level	Structures Passing
Vena caval	T ₈	IVC Right phrenic nerve
Esophageal	T ₁₀	Esophagus Anterior and posterior vagal trunks Esophageal branches of left gastric artery
Aortic	T ₁₂	Abdominal aorta Thoracic duct Azygos vein

Constrictions of Esophagus

Constriction of oesophagus	Vertebral Level	Distance From Incisors
Cricopharyngeal	C ₆	6"
Arch of aorta	T ₄	9"
Crossing of left bronchus	T ₆	11"
Esophageal opening in diaphragm	T ₁₀	15"

Osteology of Thorax

Entity	Enumeration
True ribs	1 to 7
False ribs	8 to 12
Typical ribs	3 to 9
Atypical ribs	1, 2, 10, 11, 12
Typical vertebra	2 to 8
Atypical vertebra	1,9,10,11,12
Typical ICS	3 to 6

Tributaries of Azygous Vein

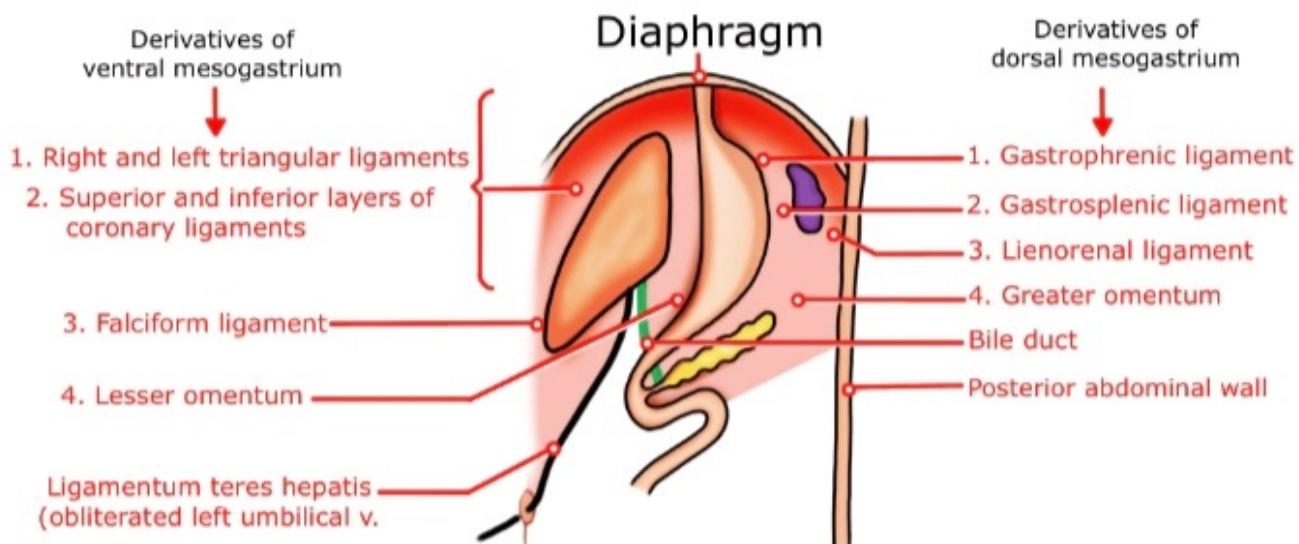
Tributaries of Azygous Vein:

- Right posterior intercostal veins except 1st.
- 2, 3, 4th intercostal vein united to form right superior intercostal vein
- Right subcostal vein
- Right ascending lumbar vein
- Terminal part of hemiazygous and accessory hemiazygous
- Right bronchial vein – last tributary
- Esophageal, pericardial and mediastinal veins

Primitive Gut Tube

	Foregut	Midgut	Hindgut
Extent	Upto ampulla of vater (2nd part of duodenum)	From ampulla of vater to right 2/3rd of transverse colon	Rest of gut
Artery	Celiac trunk	Superior mesenteric artery	Inferior mesenteric artery
Sympathetic Supply	Greater splanchnic nerves T5-T9	Lesser splanchnic nerves T10,T11	Least splanchnic nerve T12, and also from L1 L2
Parasympathetic Supply	Vagus	Vagus	S2,3,4
Pain Radiates To	epigastrium	Perumbilical region	Suprapubic area

Derivatives of Mesogastrum



Ventral Mesogastrium	Dorsal Mesogastrum
Lesser omentum	Greater omentum
Falciform ligament	Gastrosplenic ligament
Coronary ligament	Gastrophrenic ligament
Triangular ligament	Lienorenal ligament
	Spleen develops In dorsal mesogastrum

Omphalocele VS Gastrochisis

Omphalocele



Gastroschisis



Midline swelling	Not midline swelling
Umbilical cord normal in position	Umbilical cord not normal in position
Lined by amnion	Not lined by amnion
Associated with other congenital anomalies	Not associated with other congenital anomalies
Liver, intestine and other organs can be contents	Only intestine remains outside

Development of Genital System

	Male	Female
Genital Ridge	Testis	Ovaries
Gubernaculum	Gubernaculum testis	Ovarian ligament Round ligament of uterus
Mesonephros	Appendix of epididymis Efferent ductules Lobules of epididymis Paradidymis(organ of Giraldes)	Appendices vesiculosae Epoophoron (organ of Rosenmuller) Paroophoron
Mesonephric Duct	Duct of epididymis Vas deferens Seminal vesicle Ejaculatory duct Trigone of bladder Prostatic urethra	Duct of Epoophoron (gartner's duct) Trigone of bladder Prostatic urethra
Paramesonephric Duct	Appendix of testis Prostatic utricle	Uterine tubes Uterus Upper part of vagina
Dorsal Cloaca(Anorectal)	Rectum and upper part of anal canal	
Ventral Cloaca(Urogenital)	Most of bladder Part of prostatic urethra Bulbourethral glands	Most of bladder Urethra Greater vestibular glands Vestibule Lower portion of vagina
Genital Tubercl e	Glans penis	Clitoris
Labioscrotal Swellings	Scrotum	Labia majora

Fasciae of Anterior Abdominal Wall

Layer	Name Of Fascia
Superficial fatty layer of Anterior abdominal wall	Camper's fascia
Deep membranous layer of Anterior abdominal wall	Scarpa's fascia
Superficial fatty layer of perineum	-- No specific name --
Deep membranous layer of perineum	Colles fascia
Superficial fascia of penis	Buck's fascia
Anterior layer of perirenal fascia	Fascia of Gerota
Posterior layer of perirenal fascia	Fascia of Zuckerkandl
Condensation of endopelvic fascia	Hypogastric sheath
Inferior fascia of urogenital diaphragm	Perineal membrane
Rectovesical septum in females and rectoprostatic in males	Fascia of Denonvilliers

Inguinal Ligament & Associated Ligaments

Anterior superior iliac spine (ASIS)

Pubic tubercle



Lacunar ligament:

- Deeper fibers of external oblique aponeurosis pass posteriorly to attach LATERAL to the pubic tubercle to form an arch.

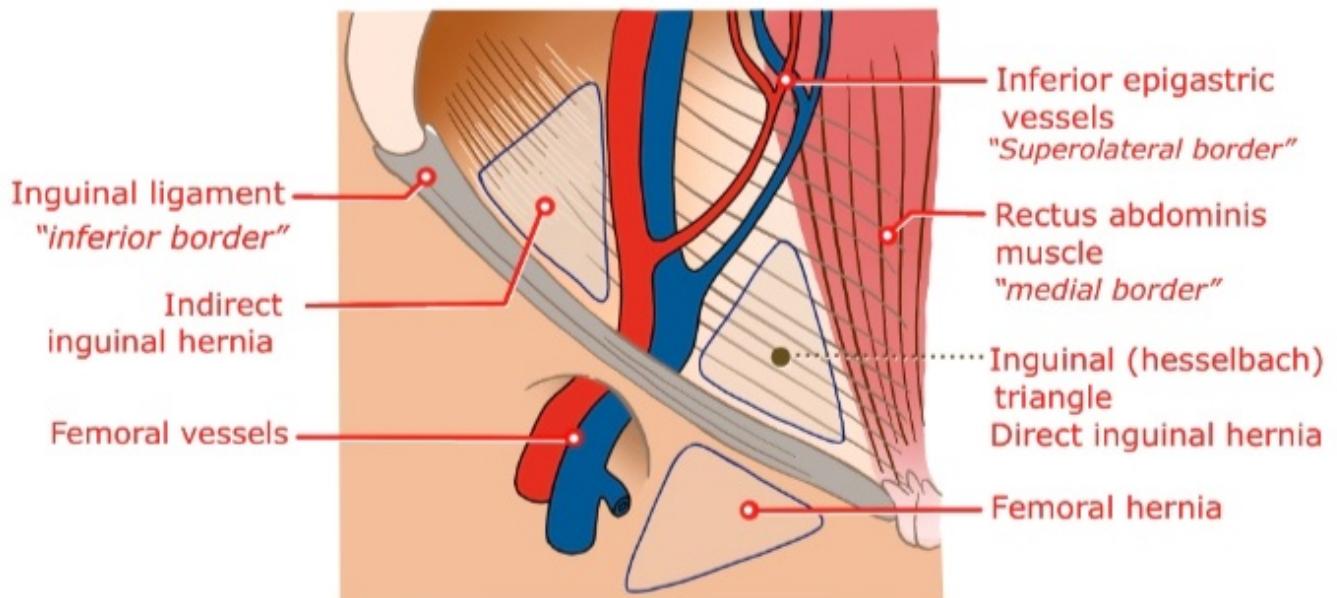
Pectenial ligament:

- Most lateral Lacunar ligament fibers continue to run along the pecten pubis
- MEDIAL to femoral canal

Reflected inguinal ligament:

- Superior fibers fan upwards crossing the linea alba instead of inserting into the pubic tubercle and ultimately blend with external oblique aponeurosis fibers

Important Triangles of Inguinal Region



HESSELBACH TRIANGLE

Medial border : Lateral border of Rectus Abdominis

Lateral border : Inferior epigastric vessels

Base : Inguinal ligament

Structures Crossing the Root of Mesentery (Left to Right)

- 3rdpart of duodenum
- Abdominal aorta
- Inferior vena cava
- Right gonadal vessels
- Right psoas major
- Right genitofemoral nerve
- Right ureter
- Right sacroiliac joint

Peritoneal Recesses

Recess	Important Points
Lesser sac	1. Largest recess, lies behind the stomach
Duodenal recesses	1. 6 recesses 2. Mesenteroparietal recess contains Superior mesenteric vessels 3. Paroduodenal recess contains inferior mesenteric vein 4. Retroduodenal is largest
Cecal recess	1. Superior ileocecal recess contains branch of iliocolic artery 2. Retrocecal recess contains appendix 3. Inferior ileocecal recess is avascular (bloodless fold of treves)
Intersigmoid recess	1. Left ureter present here

Structures Forming Stomach Bed

- Left crus of diaphragm
- Splenic artery
- Body of pancreas
- Transverse mesocolon
- Upper part of left kidney
- Left suprarenal gland
- Spleen
- Left colic flexure

Divisions of Anal Canal

	Upper Area	Intermediate Area (Area Of Pecten Or Transitional Zone)	Lower Area (Anal Verge)
Location	Above dentate line	Between dentate and hilton's line	Below hilton's line
Measurement	1.5 cm	1.5 cm	0.8 cm
Epithelium	Simple columnar	Non keratinized stratified squamous	Keratinized stratified squamous
Features	Anal columns of Morgagni Anal valves of Ball Anal papillae	Without sweat glands, sebaceous glands and hair follicles	With sweat glands, sebaceous glands and hair follicles
Nerve supply	Autonomic	Somatic	Somatic
Pain	Insensitive	Sensitive	Sensitive

Harris Dictum for Spleen

- 1 inch = thickness
- 3 inch = breath
- 5 inch = length
- 7 oz = weight
- 9-11 = ribs in contact

Contents of Splenic Ligaments

Ligament	Content
Gastrosplenic	Short gastric vessels Left gastroepiploic vessels
Lienorenal	Splenic vessels Tail of pancreas
Leinophrenic	Suspensory ligament of spleen
Phrenicocolic	Prevents downward displacement of spleen sustentaculum lienis

Branches of Abdominal Aorta

Branches of Abdominal aorta:

Segment	Branches
Ventral branches	Celiac trunk -T12 Superior mesenteric artery - L1 Inferior mesenteric artery - L3
Dorsal branches	4 pairs of lumbar artery Median sacral artery
Lateral branches	Inferior phrenic artery (1 st branch) Middle suprarenal artery Renal artery Gonadal artery
Terminal branches	Common iliac arteries

Sites of Portocaval Anastomosis

Sites	Portal	Systemic
Lower end of esophagus	Esophageal branches of left gastric vein	Esophageal branches of hemiazygous veins
Lower end of rectum and anal canal	Superior rectal vein	Middle and inferior rectal vein
Umbilicus	Paraumbilical vein	Veins of anterior abdominal Wall
Bare area of liver	Portal radicals of liver	Diaphragmatic veins
Posterior abdo. wall	Splenic and colic veins	Renal and lumbar veins
Falciform ligament	Paraumbilical vein	Diaphragmatic veins
Fissure for ligamentum venosum	Left branch of portal vein	Inferior vena cava

Contents of Superficial Perineal Pouch

Roots	Crus penis/clitoris Bulb of penis with spongy urethra in male
Muscles	Ischiocavernosus Bulbospongiosus Superficial transverse perinei
Nerves	Posterior scrotal nerve Perineal branch of posterior cutaneous nerve of thigh
Arteries	Two posterior scrotal arteries in male (labial in female) Transverse perineal vessels
Other	In female, urethra and vagina in middle Bulb of vestibule, greater vestibular glands on each side of vagina

Contents of Deep Perineal Pouch

Muscles	Sphincter urethrae Transverse perinei profundus
Vessels	Deep artery of penis Dorsal artery of penis Artery to bulb of penis
Nerves	Dorsal nerve of penis or clitoris
Others	Membranous urethra in female Bulbourethral glands in male

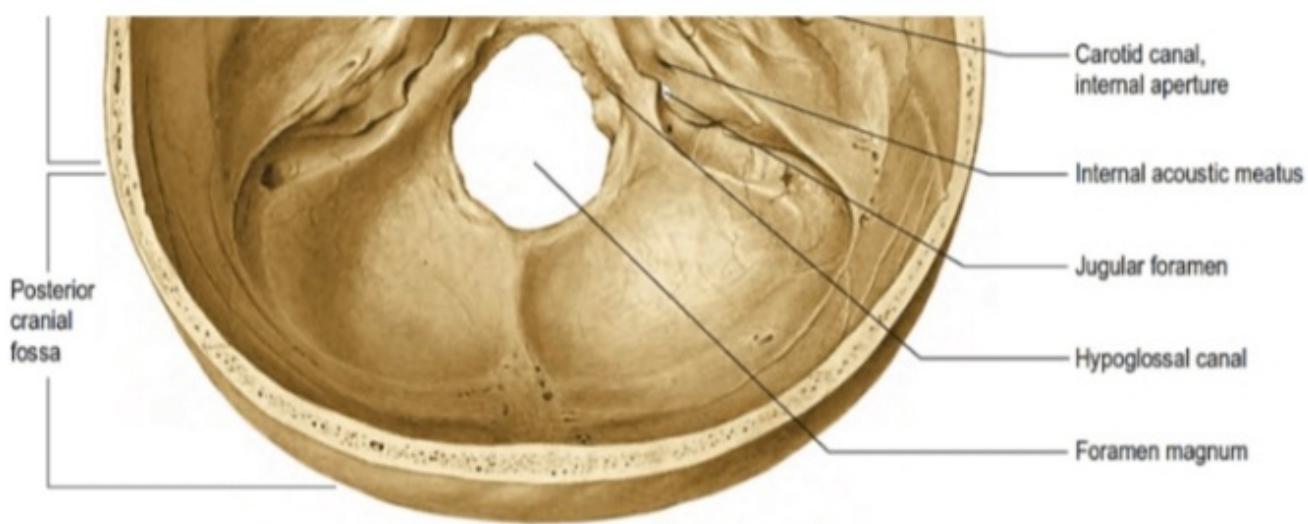
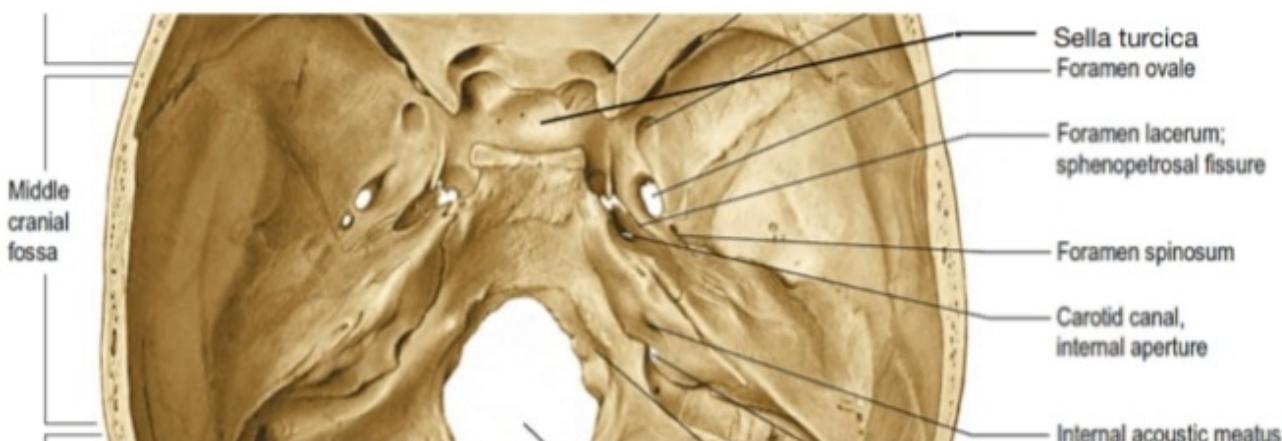
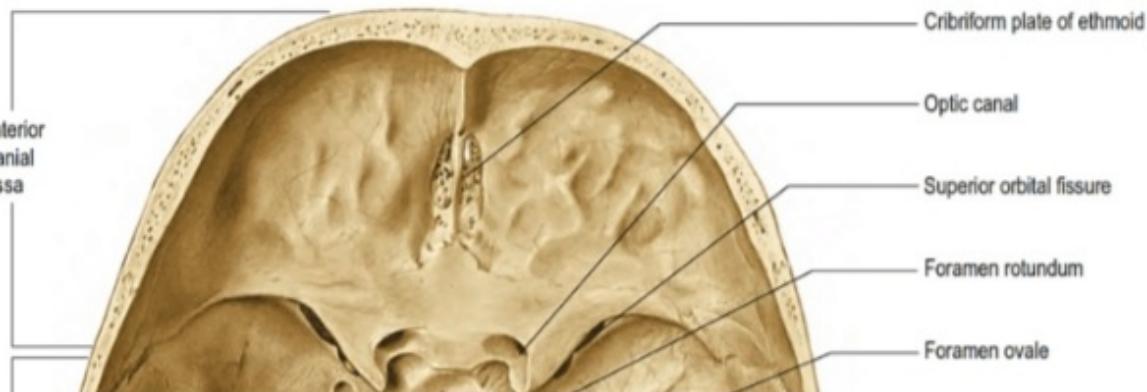
Derivatives From Pharyngeal Arches

Arch	Skeletal Derivatives	Muscle Derivatives	Nerve Of Arch	Artery Of Arch
First arch	1. Malleus, incus 2. Anterior ligament of malleus 3. Sphenomandibular ligament 4. Facial bones	1. Muscles of mastication 2. Tensor tympani 3. Tensor veli palatini 4. Mylohyoid 5. Anterior belly of digastric		
Meckel's cartilage			Mandibular nerve	Maxillary artery (transitory)
Quadrato mandibular ligament				
Second arch	1. Stapes 2. Styloid process 3. Stylohyoid ligament 4. Small horn of hyoid 5. Superior surface of hyoid	1. Muscles of facial expression 2. Posterior belly of digastric 3. Stylohyoid 4. stapedius		
Hyoid arch			Facial nerve	Stapedial artery (transitory)
Reichert's cartilage				
Third arch	1. Greater horn of hyoid 2. Inferior surface of hyoid	1. stylopharyngeus	Glossopharyngeal nerve	Common carotid and 1 st part of ICA
Fourth arch	1. Thyroid cartilage 2. epiglottis	1. Muscles of pharynx, palate and cricothyroid	Vagus- superior laryngeal nerve	Right subclavian artery Part of arch of aorta between left SCA and left CCA
Sixth arch	1. Cricoid 2. Arytenoid	1. Muscles of larynx except cricothyroid	Recurrent laryngeal nerve	Pulmonary artery, ductus arteriosus

Derivatives From Pharyngeal Pouches

Pouch	Derivatives
1st	Epithelial lining of auditory tube, middle ear, mastoid
2nd	Epithelial lining of tonsil and fossa
3rd	Ventral component: thymus Dorsal component: inferior parathyroids
4th	Ventral component: ultimobranchial body Dorsal component: superior parathyroids

Skull Foramina and Structures Passing Through Them

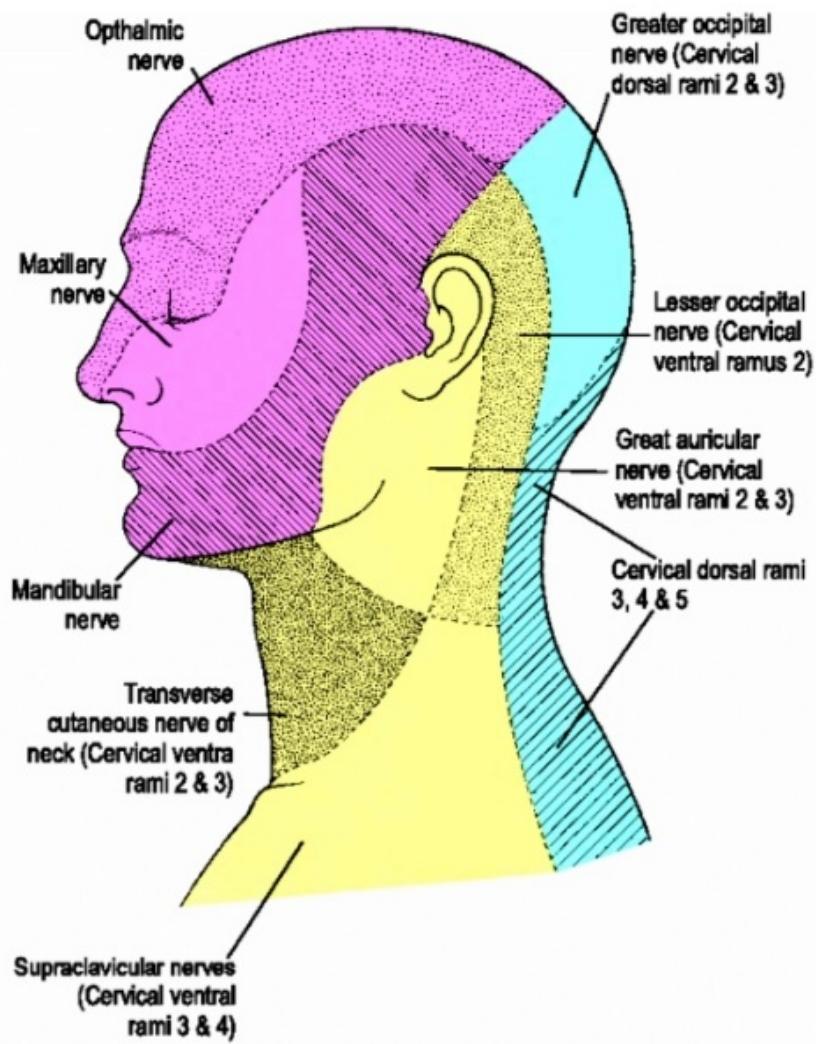


Foramina	Structures Passing
	Mandibular nerve
	Accessory meningeal artery
Foramen ovale	Lesser petrosal nerve
	Emissary vein

Skull Foramina and Structures Passing Through Them

Foramen spinosum	Middle meningeal artery and vein Emissary vein Nervus spinosum
Foramen lacerum	Greater petrosal nerve
Foramen rotundum	Maxillary nerve
Optic Canal	Optic Nerve and Ophthalmic Artery(associated with sympathetic fibres)
Stylomastoid foramen	Facial nerve Posterior auricular artery
Petrotympanic fissure	Chorda tympani nerve
Internal acoustic meatus	Facial nerve Nervus intermedius Labyrinthine vessels 8 th nerve
Jugular foramen	Anterior part: inferior petrosal sinus Intermediate part: glossopharyngeal n. Vagus nerve Accessory n. Meningeal branch of accessory pharyngeal a. Posterior part: IJV

Nerve Supply of Scalp



In Front Of Auricle		Behind The Auricle	
4 sensory	1 motor	4 sensory	1 motor
Supraorbital	Temporal branch of facial nerve	Greater auricular nerve	Posterior auricular branch of facial nerve
Supratrochlear		Lesser occipital nerve	
Zygomaticotemporal		Greater occipital nerve	
Auriculotemporal		Third occipital nerve	

Head & Neck Muscles Exceptions

Part	Supplies
C1 through hypoglossal nerve	Geniohyoid Thyrohyoid
Superior root of ansa	Superior belly of omohyoid
Ansa cervicalis	Inferior belly of omohyoid Sternohyoid Sternothyroid

Head & Neck Muscles Exceptions

All Muscles Of	Supplied By	Except	Which Is Supplied By
Tongue	Hypoglossal nerve	Palatoglossus	Pharyngeal plexus
Infrahyoid region	Ansa cervicalis	Thyrohyoid	C1 fibres via 12th nerve
Pharynx	Pharyngeal plexus	Stylopharyngeus	9th cranial nerve
Larynx	Recurrent laryngeal nerve	Cricothyroid	External laryngeal nerve
Palate	Pharyngeal plexus	Tensor veli palatini	Mandibular nerve

Parasympathetic Pathway for Salivary Glands

Parotid Gland	Submandibular Gland Sublingual	Lacrimal Gland
		Lacrimal nucleus
		↓
		Nervus intermedius
From Inferior salivatory nucleus	Superior salivatory nucleus	↓
↓	↓	Trunk of facial nerve
Tympanic branch of Glossopharyngeal	Facial nerve	↓
↓	↓	Geniculate ganglion
Tympanic plexus	Chorda tympani	↓
↓	↓	Greater petrosal nerve
Lessor petrosal nerve	Lingual nerve	↓
↓	↓	Nerve of pterygoid canal
Otic ganglion	Submandibular ganglion	↓
↓	↓	Pterygopalatine ganglion
Auriculotemporal nerve	Direct branch from ganglion	↓
↓	↓	Maxillary nerve
Parotid gland	Submandibular gland	↓
		Zygomatic nerve
		↓
		Lacrimal nerve
		↓
		Lacrimal gland

High Yield Points About Cranial Nerves

Facts	Cranial Nerve
Enters the cerebrum directly	Olfactory nerve
Surrounded by meninges	Optic nerve
Longest intracranial course	Trochlear nerve
Smallest/thinnest/slimmest cranial nerve	Trochlear nerve
Emerges from posterior aspect	Trochlear nerve
Dorsal exit	Trochlear nerve
Decussates before reaching the target	Trochlear nerve
Largest	Trigeminal nerve
Longest extracranial course	Vagus nerve
Longest interosseous course	Facial nerve
Longest intradural course	Abducent nerve
Involved in raised ICT	Abducent nerve
Passing through cavernous sinus	Abducent nerve
Related to lateral wall of cavernous sinus	Oculomotor nerve

Parasympathetic Ganglia

Ganglion	Topographically Related To	Functionally Related To	Supplies
Otic	Mandibular nerve	Glossopharyngeal nerve	Parotid gland
Pterygopalatine	Maxillary nerve	Greater petrosal nerve	Lacrimal, nasal, palatine, pharyngeal glands
Submandibular	Lingual nerve	Chorda tympani nerve	Submandibular and sublingual glands
Ciliary	Nasociliary nerve	Oculomotor nerve	Ciliaris Sphincter and dilator pupillae

Diaphragms Across Body

Name Of The Diaphragm	Formed By
Diaphragma sellae	Dura mater
Oral diaphragm	Mylohyoid muscle
Cervical diaphragm	Sibson's fascia
Thoracoabdominal diaphragm	Diaphragm
Urogenital diaphragm	Musclofascial diaphragm situated in anterior part of perineum
Pelvic diaphragm	Levator ani

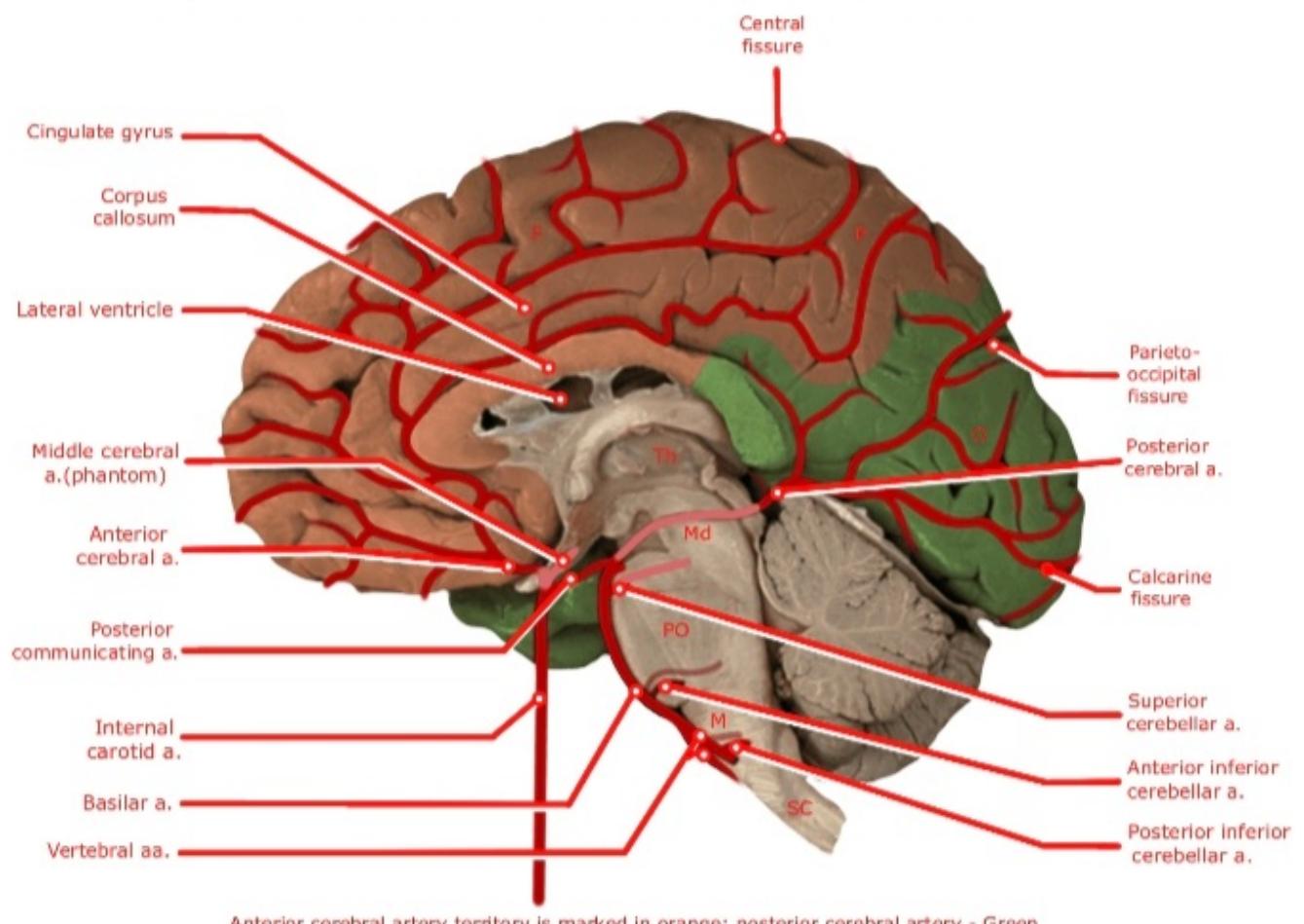
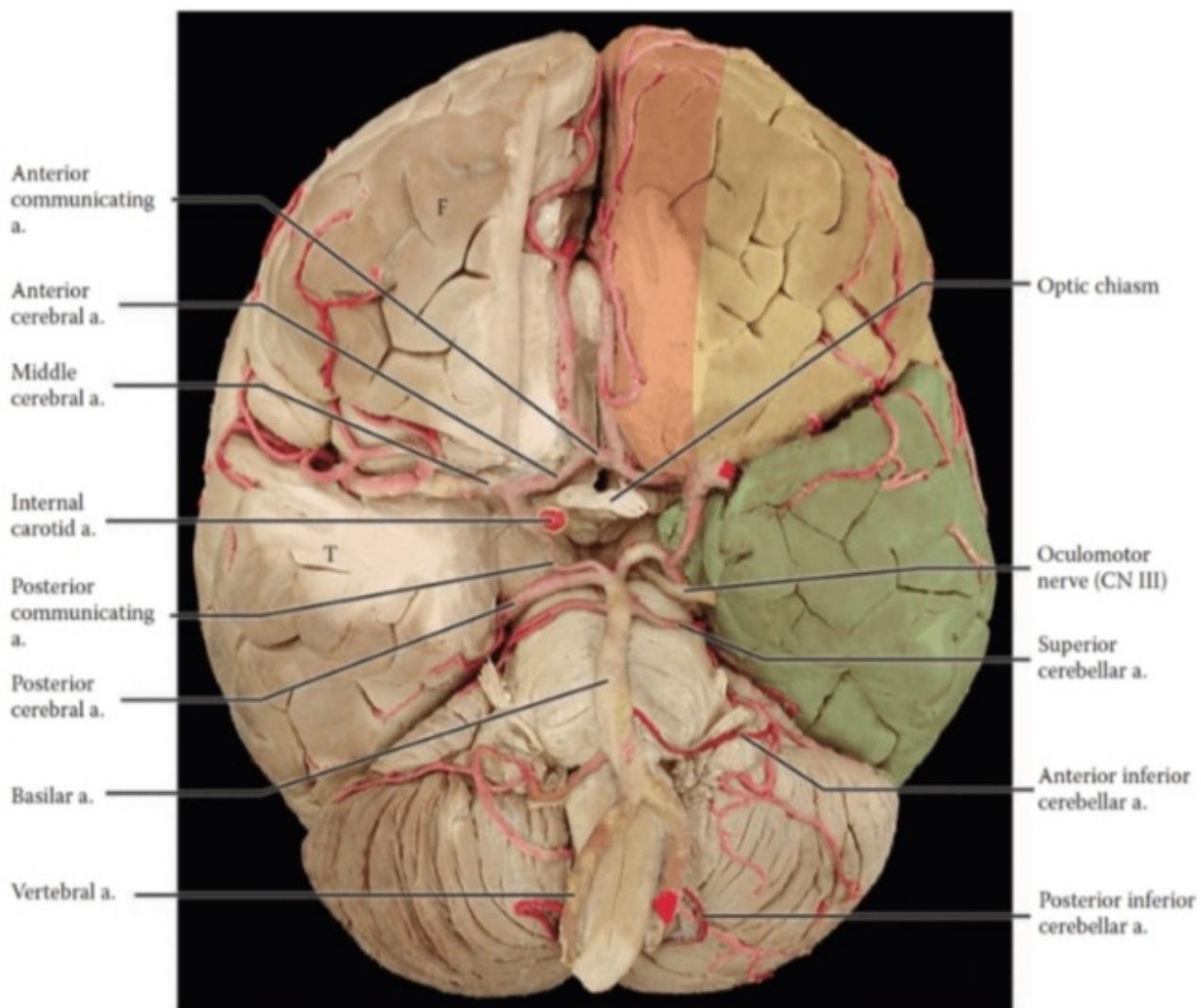
Derivatives From Dilatations of Neural Tube

Part	Derivatives	Cavity Forms
Telencephalon	Cerebrum Corpus striatum	Lateral ventricle
Diencephalon	Thalamus, hypothalamus, epithalamus, metathalamus, subthalamus, pars nervosa, retina, optic nerve	3rd ventricle
Mesencephalon	Midbrain	Aqueduct of sylvius
Metencephalon	Pons and Cerebellum	4th ventricle
Myelencephalon	Medulla oblongata	4th ventricle

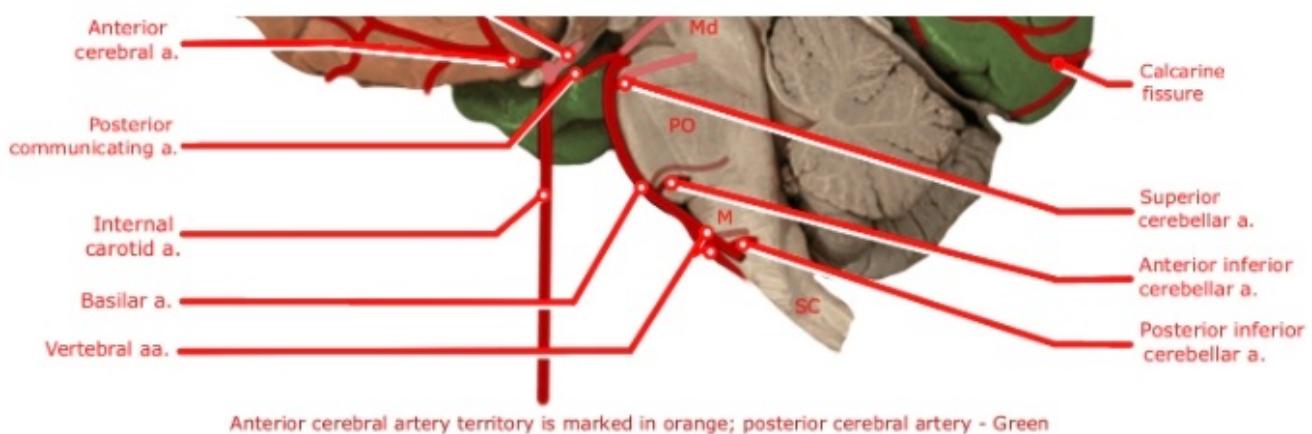
Functional Components of Cranial Nerves(Medial to Lateral)

Component	Function	Cranial Nerves
Efferents		
General somatic efferent	Supplies striated muscles	3,4,6,12
Special visceral efferent	Supplies Pharyngeal arch muscles	5,7,9,10,11
General visceral efferent	Supplies glands and smooth muscles	3,7,9,10
Afferents		
General visceral afferent	General sensation from viscera	9,10
Special visceral afferent	Special sensation from viscera	Smell (CN -1) and taste (CN- 7,9,10)
General somatic afferent	General sensation	5,7,10
Special somatic afferent	Special sensation	Vision (CN -2) and Hearing & Balance (CN - 8)

Blood Supply of Various Parts of Brain

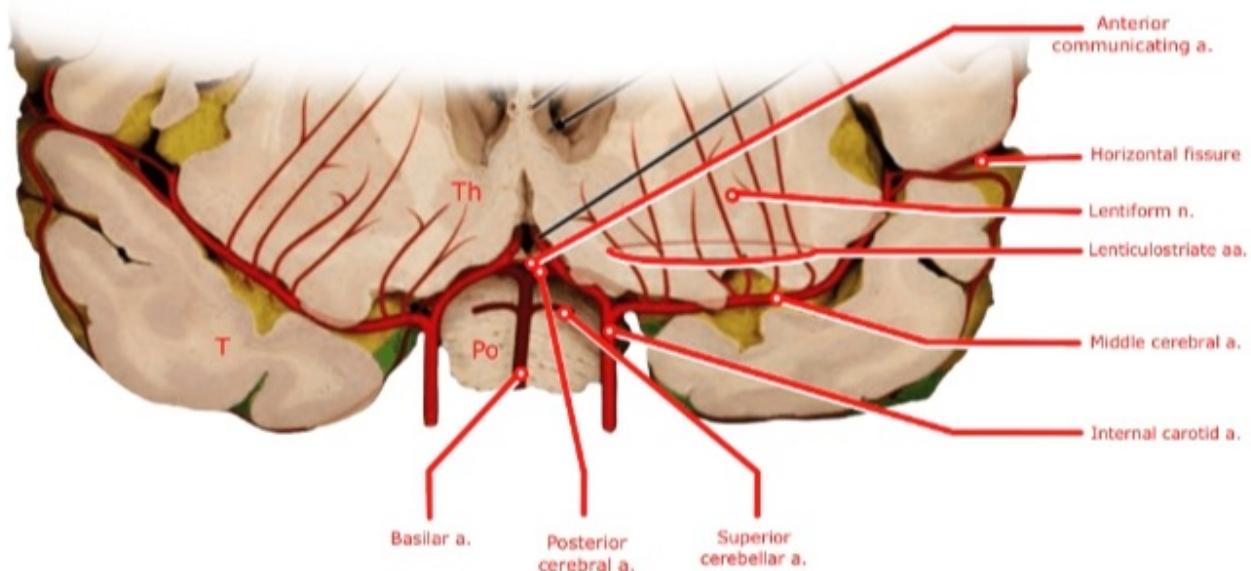


Blood Supply of Various Parts of Brain



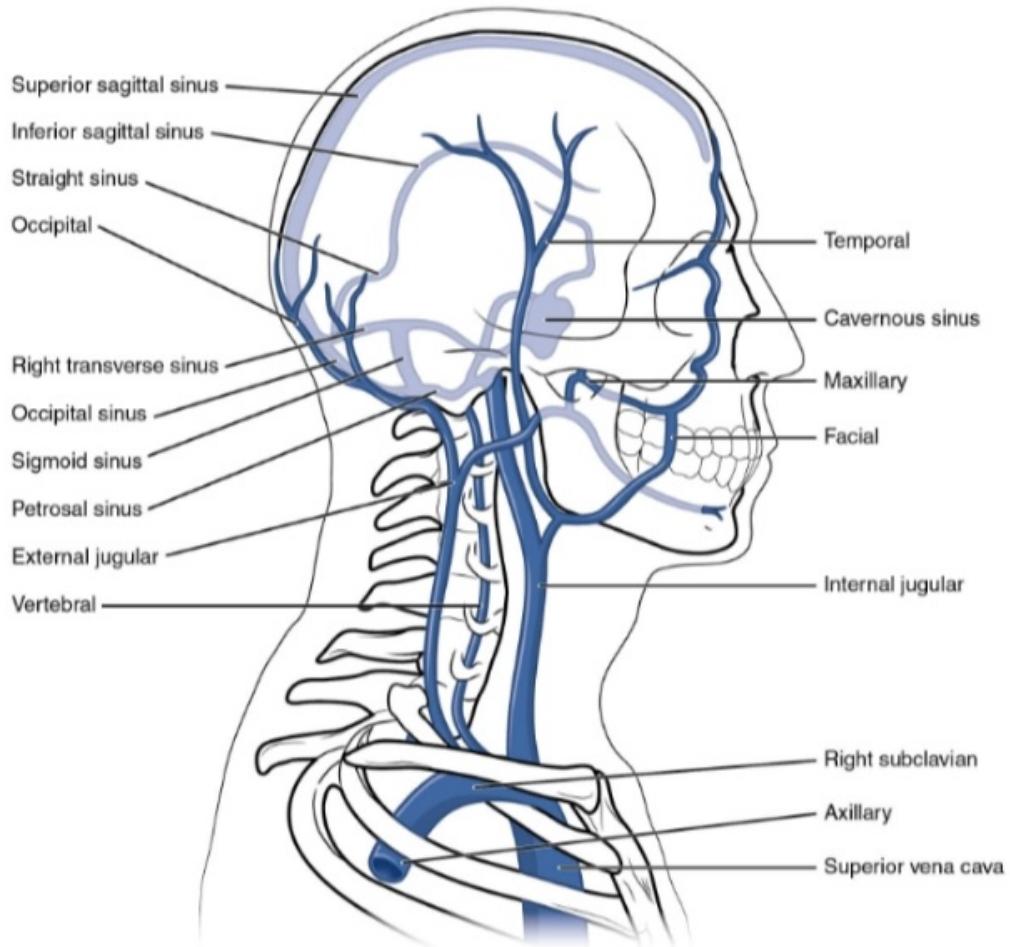
Part	Blood Supply
Medulla	PICA
	Anterior and posterior spinal artery
	Medullary branches of basilar, vertebral artery
Pons	Pontine branches of basilar artery
	AICA
	Superior cerebellar artery
Midbrain	Posterior cerebral artery
	Superior cerebellar artery
Thalamus	Posterior communicating artery
	Posterior cerebral artery
Cerebellum	PICA
	AICA
	Superior cerebellar artery

Blood Supply of Internal Capsule



Part Of Internal Capsule	Blood Supply
Dorsal part of anterior limb, genu and posterior limb	Medial and lateral striate branches of middle cerebral artery
Ventral part of anterior limb	Recurrent artery of Heubner (Anterior cerebral artery)
Ventral part of genu	Internal carotid artery
Ventral part of posterior limb, retrolentiform and subtentorial	Branches from anterior choroidal artery

Deep Veins of Brain



	Basal Vein	Internal Cerebral Vein	Great Cerebral Vein Of Galen
Formation	Anterior cerebral + Deep middle cerebral + Striate veins	Thalamostriate + Septal + Choroidal veins	Union of 2 internal cerebral veins
Drainage	Great cerebral vein of galen	Great cerebral vein of galen	Joins with inferior sagittal sinus to form straight sinus

Vertebral Levels of Spinal Cord Structures

Structure	Vertebral Level
Spinal cord in adults	C1 to L1
Spinal cord in children	C1 to L3
Filum terminale	L1 to coccyx tip
Pia Mater	Upto coccyx
Arachnoid mater	Upto S2
Dura mater	Converge at S2 Extend upto coccyx

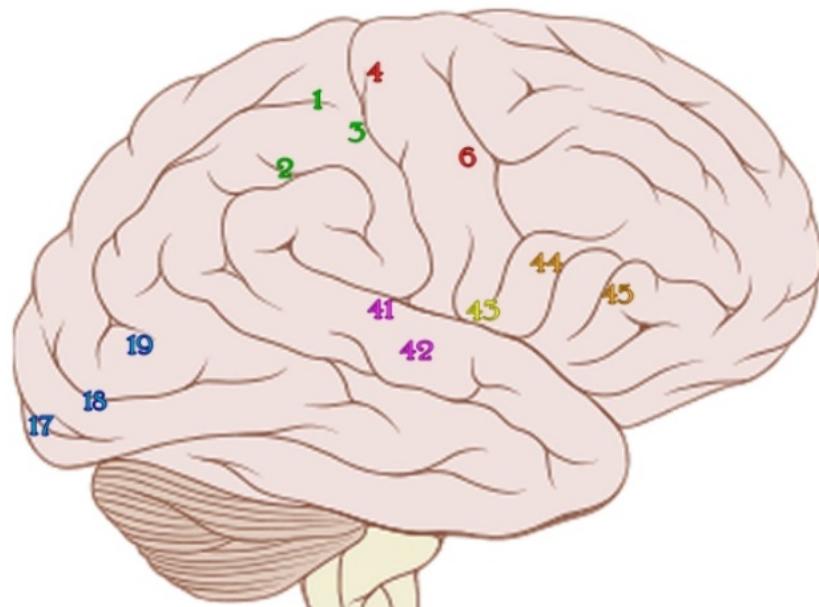
Contents of Interpeduncular Fossa

- Tuber cinereum
- Mamillary bodies
- Infundibulum
- Posterior perforated substance
- Oculomotor nerve
- Optic chiasma
- Posterior cerebral and superior cerebellar artery

Types of Brain Sulci

Sulci	Description	Examples
Axial Sulcus	Formed in long axis of homogenous area	Post Calcarine sulcus
Limiting Sulcus	Separates functionally different areas	Central sulcus of Rolando
Operculated Sulcus	Separates functionally different areas but the lip contains a third area	Lunate sulcus
Complete Sulcus	Produce elevation in lateral ventricle	Collateral sulcus Calcarine sulcus

Broadmann Areas



Functional Areas	Brodmann Number	Location
Primary motor area	4	Precentral gyrus
Premotor area	6	Superior, middle and inferior frontal gyri
Frontal eye field	8	Middle frontal gyrus
Broca speech area	44,45	Inferior frontal gyrus
Primary sensory area	3,1,2	Postcentral gyrus
Sensory association area	5,7	Superior parietal lobe
Primary auditory area	41,42	Anterior part of superior temporal gyrus
Secondary auditory area	22	Lateral surface of superior temporal gyrus
Wernicke's speech area	22, 39,40	Posterior part of superior temporal gyrus
Primary visual area	17	Posterior part of calcarine sulcus
Secondary visual area	18,19	Surrounds primary visual area
Taste area	43	Inferior part of parietal lobe
Olfactory area	28	Parahippocampal gyrus and uncus

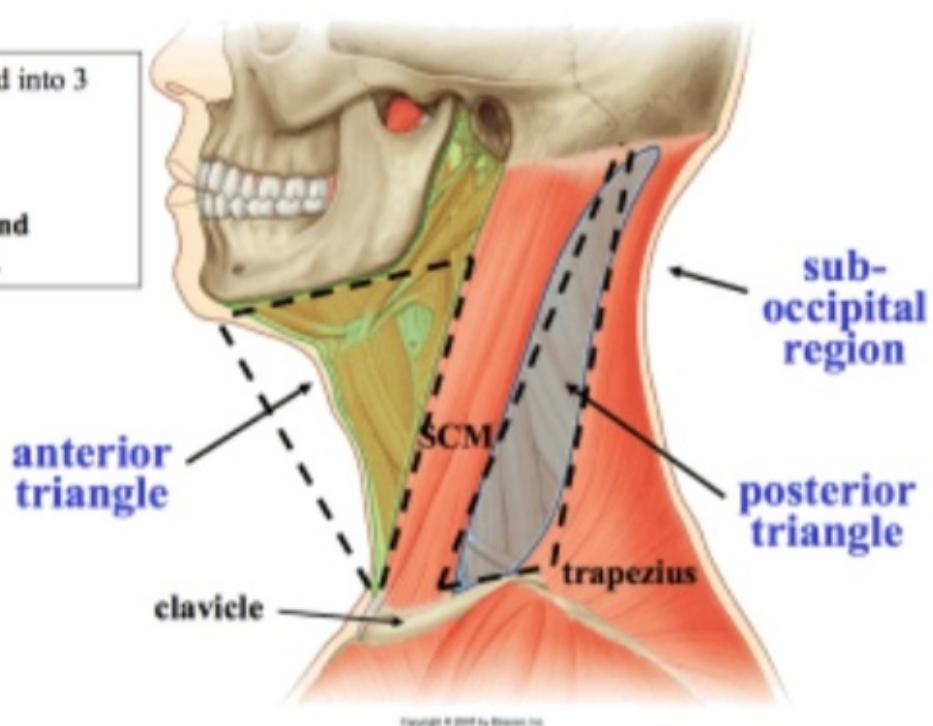
Aphasia

Aphasia	Comprehension	Repetition	Naming	Fluency
Broca's aphasia	Preserved	Affected	Affected	Decreased
Wernick's aphasia	Affected	Affected	Affected	Preserved/increased
Global aphasia	Affected	Affected	Affected	Decreased
Conduction aphasia	Preserved	Affected	Affected	Preserved
Anomic aphasia	Preserved	Preserved	Affected	Preserved
Alexia	Affected only for reading	Preserved	Preserved	Preserved

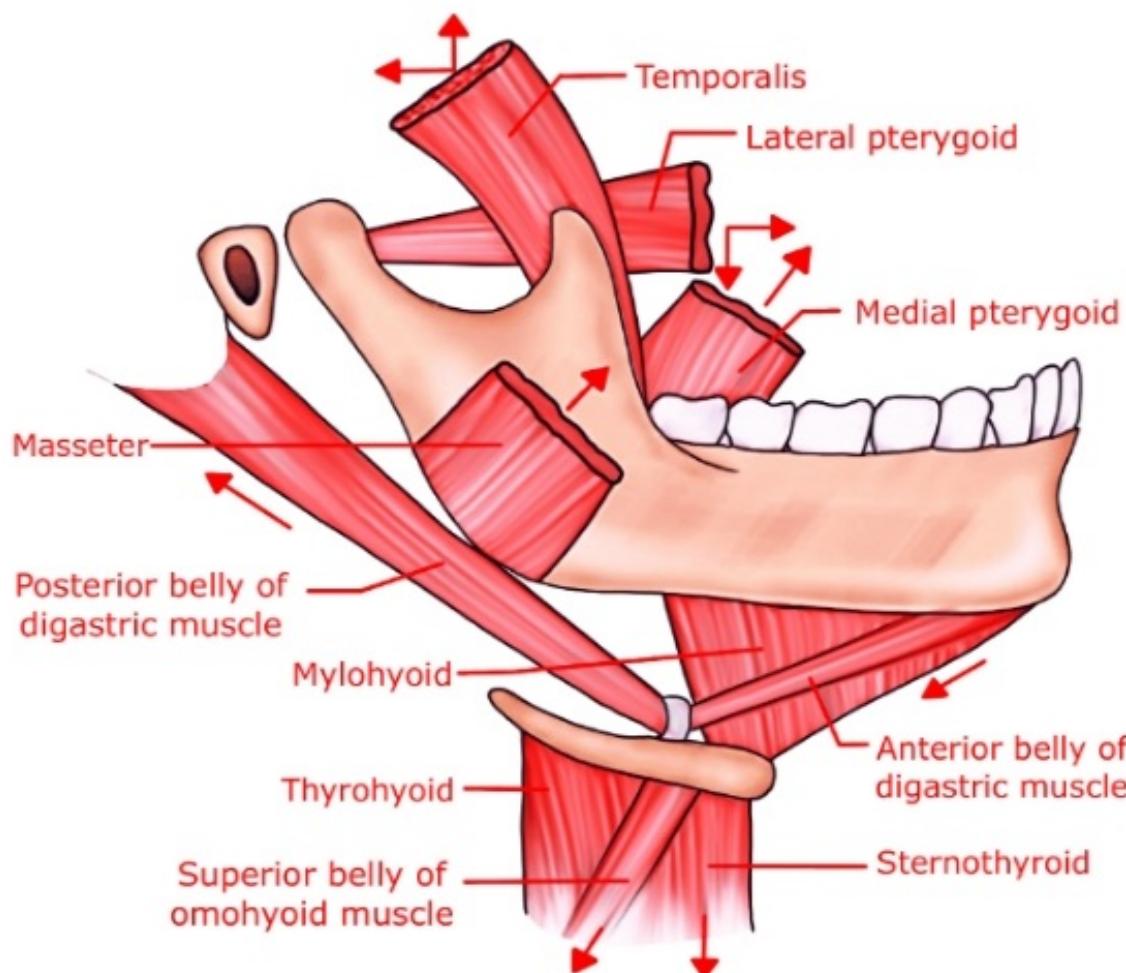
Triangles of Neck

The neck can be divided into 3 regions:

- the anterior triangle,
- the posterior triangle, and
- the sub-occipital region.

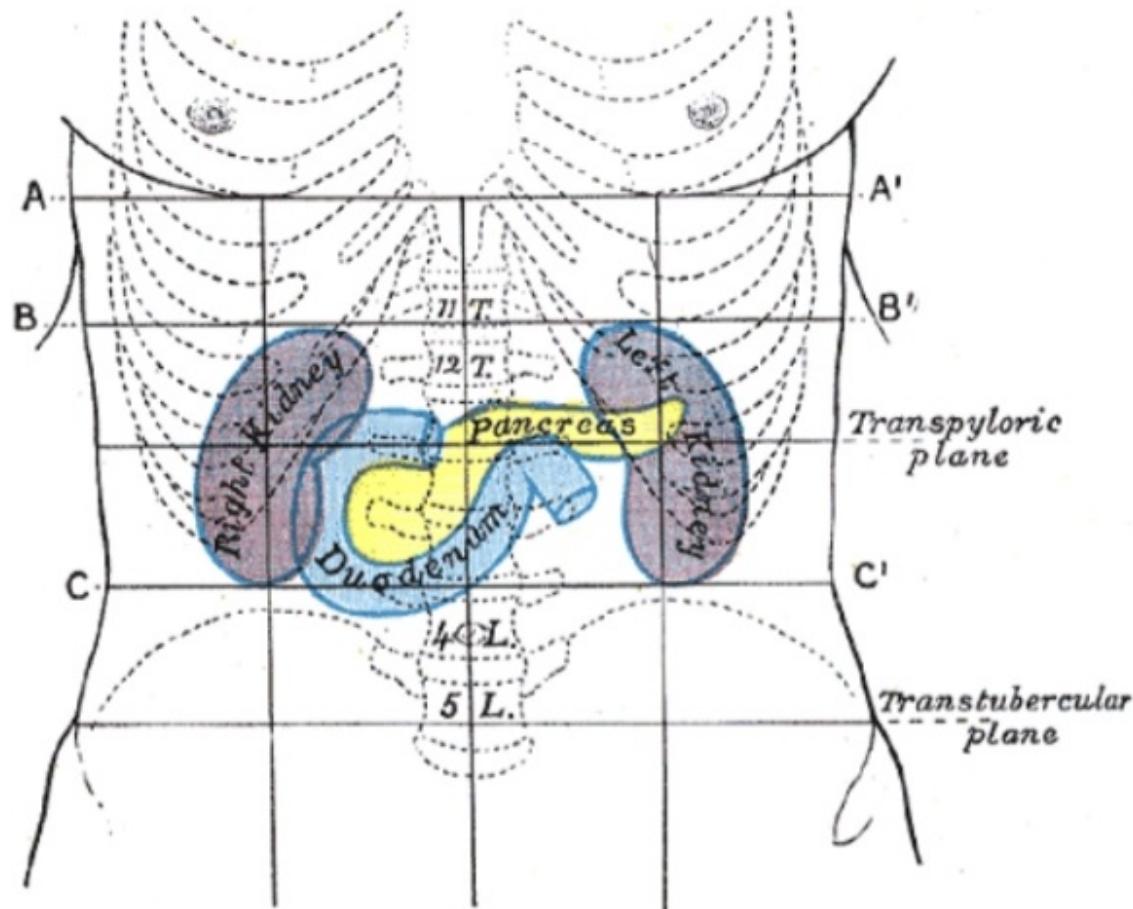


Movements at TM Joint



Movement	Muscles Responsible
Depression of mandible	Lateral pterygoid Assisted by mylohyoid, geniohyoid, digastric
Elevation of mandible	Masseter Temporalis Medial pterygoid
Protrusion of mandible	Medial and lateral pterygoids
Retraction of mandible	Posterior fibres of temporalis
Side to side movement	Medial and lateral pterygoids

Transpyloric Plane and Transtubercular Plane



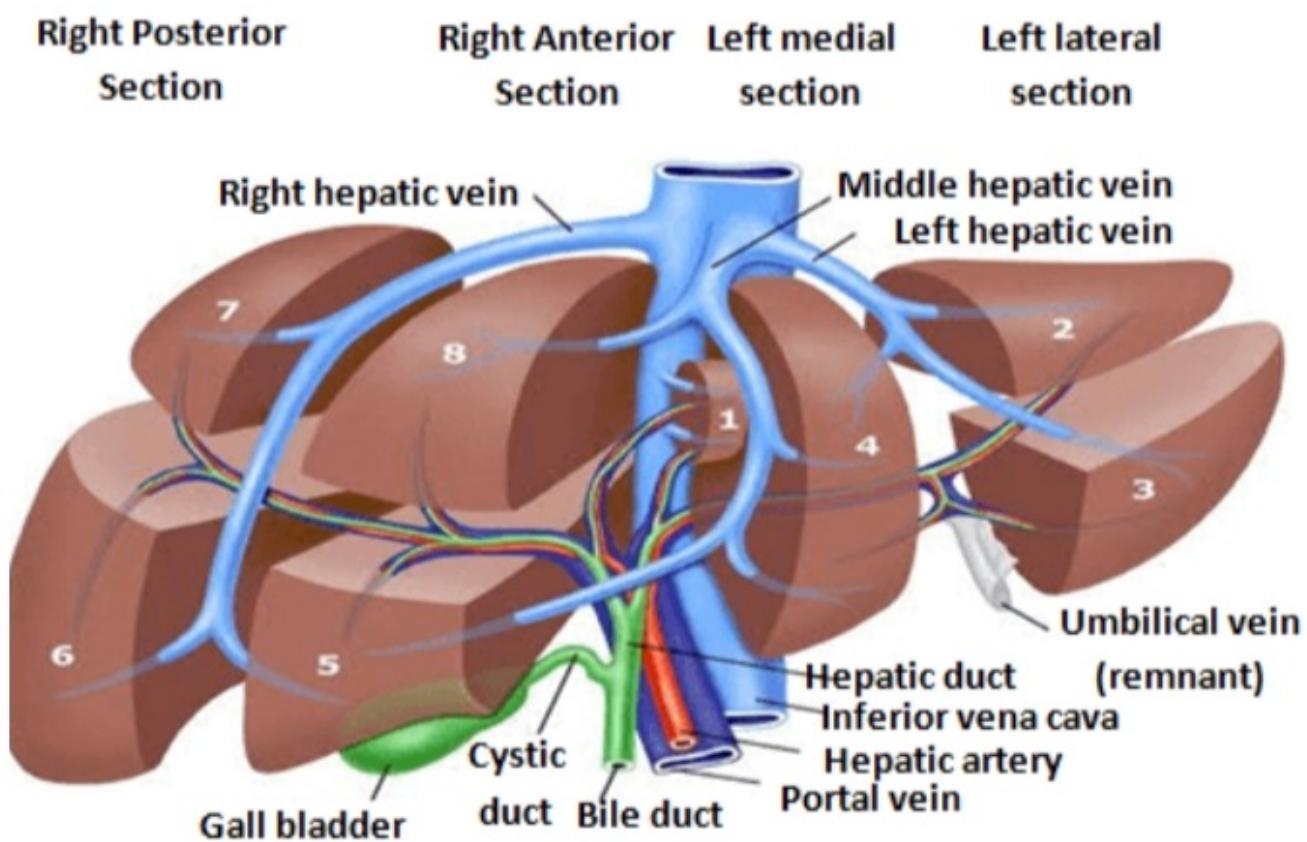
Structure Crossed By Transpyloric Plane:

- L1 vertebra
- Pylorus
- Pancreatic neck
- Duodenojejunal flexure
- Fundus of gall bladder
- 9th costal cartilage
- Hila of kidneys
- Origin of portal vein
- Transverse mesocolon
- 2nd part of duodenum
- Superior mesenteric artery origin
- Hilum of spleen
- Termination of spinal cord

Areas Above and Below Dentate Line

	Above Dentate Line	Below Dentate Line
Developed From	Endodermal cloaca	Ectodermal proctodeum
Arterial Supply	Superior rectal artery	Inferior rectal artery
Venous Drainage	Portal system	Systemic veins
Lymphatic Drainage	Internal iliac nodes	Superficial inguinal nodes
Nerve Supply	Autonomic	Somatic
Epithelium	Simple columnar	Stratified squamous nonkeratinized

Segmental Anatomy of Liver



Autonomic Nerve Supply to Heart

Sympathetic chain
Ganglia

Superior cervical

Middle cervical

Inferior cervical

Thoracic

T1-5

Superficial plexus

Lies on aortic arch between
phrenic vagus nerves

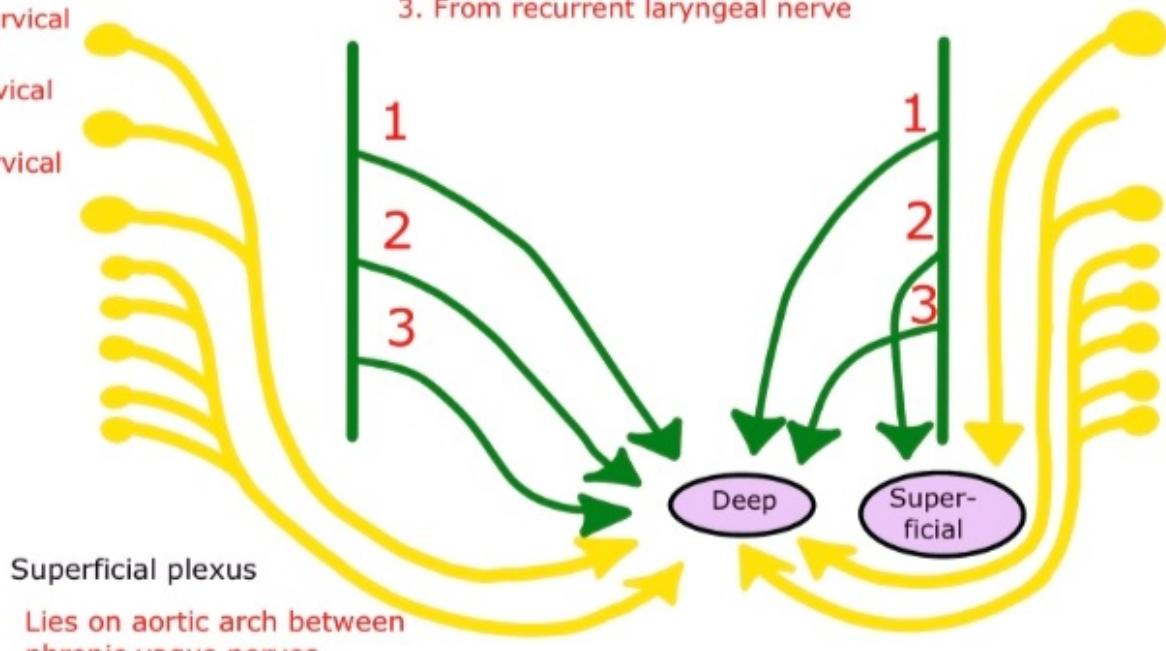
Vagus cardiac branches

1. Superior from cervical region
2. Inferior from cervical. Region
3. From recurrent laryngeal nerve

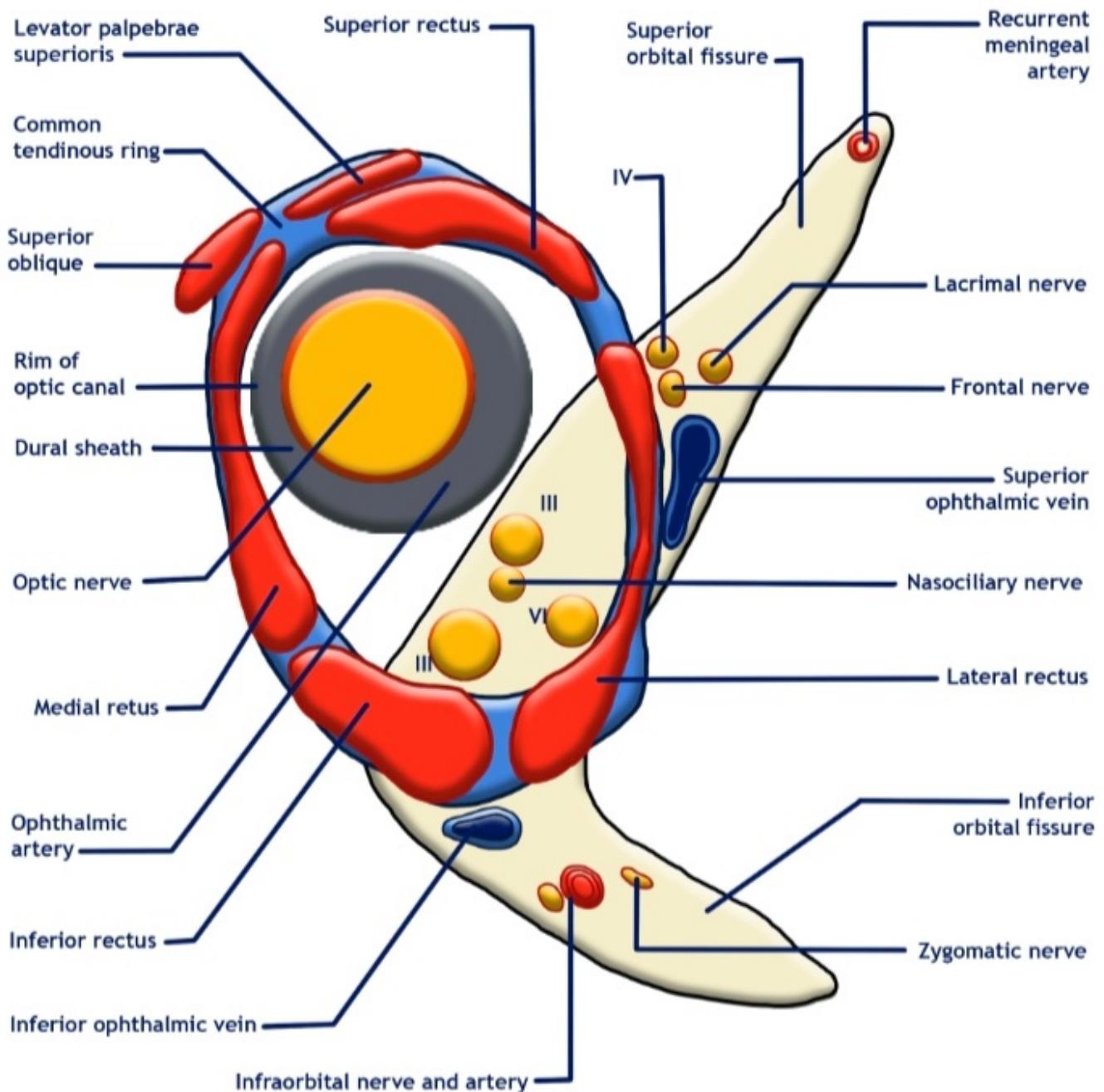
CARDIAC PLEXUSES

Deep plexus

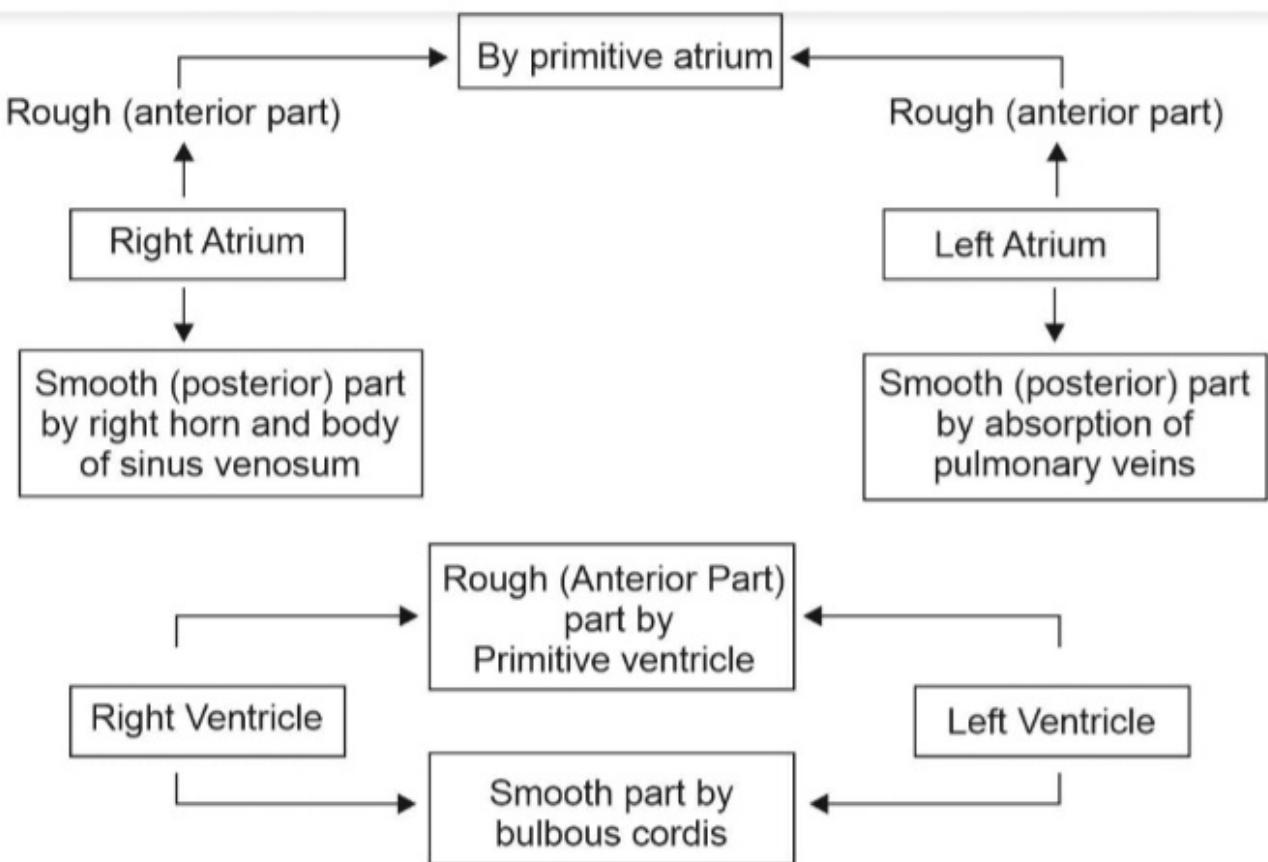
Lies to right of ligamentum
arteriosum, inferior & medial



Superior orbital fissure



Development of heart



Rough part = trabeculated part forming anterior wall

Specialized cells according to organ

SPECIALIZED CELLS	ORGAN IN WHICH THEY ARE LOCATED
1. CORDS OF BILROTH	SPLEEN
2.HASSAL CORPUSCLE	THYMUS
3.ROCKITANKSY ASCHOFF SINUS	GALL BLADDER
4.PORES OF KOHN	ALVEOLI
5.HOFFBAUER CELLS	PLACENTA
6.REINKE CRYSATLS	TESTES
7.ITO CELLS	LIVER
8.DUST CELLS	LUNGS

CIRCUMVENTIRULAR ORGANS

CIRCUMVENTRICULAR ORGANS are areas devoid of blood brain barrier.

- Pineal body
- Neurohypophysis
- Median eminence of hypothalamus
- Organum Vasculosum of Lamina Terminalis(OVLT)
- Area Postrema
- Subfornical region

Brachial Plexus

AXILLARY NERVE

→ Supplies
Teres
minor &
deltoid

→
Sensation:
upper arm

→
**Regimental
Badge
area- Loss
of
sensation**

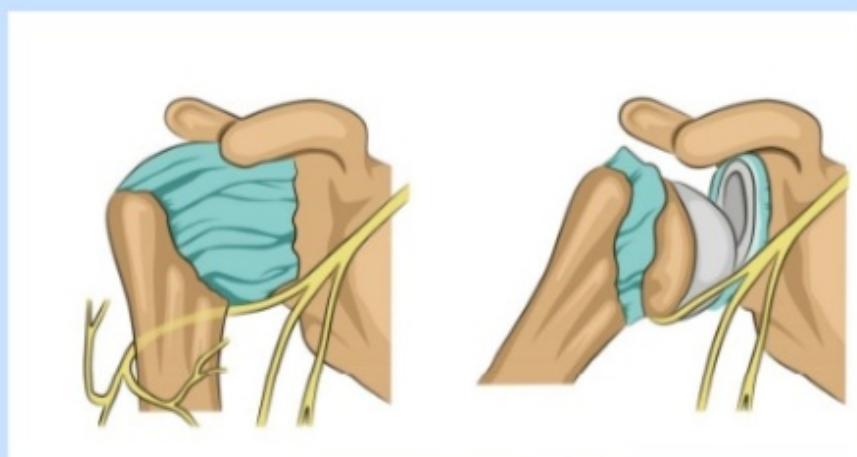
→ Known
as
Regimental
badge Sign

→
Damaged
due to:

1.
Shoulder
dislocation

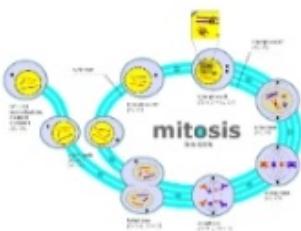
2. Fracture
of upper
end of
Humerus

3.
Injection
into deltoid
muscle



EMBRYOLOGY

MITOSIS & MEIOSIS

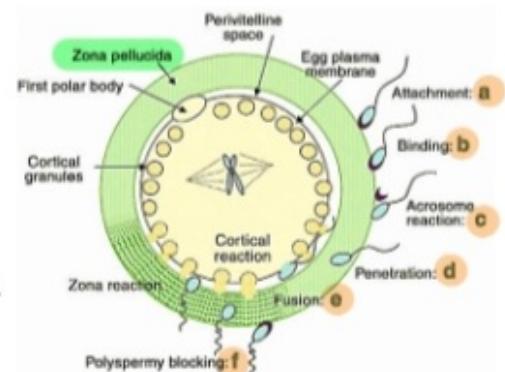
MITOSIS		MEIOSIS
<ul style="list-style-type: none"> Somatic cells 	OCCURS IN	<ul style="list-style-type: none"> Germ cells
<ul style="list-style-type: none"> Completes in one sequence 	SEQUENCES	<ul style="list-style-type: none"> Completes in two sequences <ul style="list-style-type: none"> - Meiosis I - Meiosis II
<ul style="list-style-type: none"> Doesn't take place 	CROSSING OVER	<ul style="list-style-type: none"> Takes place
<ul style="list-style-type: none"> Same as parent cell 	NUMBER OF CHROMOSOMES IN DAUGHTER CELLS	<ul style="list-style-type: none"> Half as parent cell
<ul style="list-style-type: none"> Identical to each other and to parent cell 	DAUGHTER CELLS : ? IDENTICAL?	<ul style="list-style-type: none"> NOT Identical to each other and to parent cell
<ul style="list-style-type: none"> Equational division 	OTHER NAME	<ul style="list-style-type: none"> Reductional division
 mitosis		MEIOSIS 
IMAGE		

EMBRYOLOGY

EMBRYOGENIC EVENTS & ITS SEQUENCE

SEQUENCE OF EMBRYOGENIC EVENTS

- a. Sperm attachment to zona pellucida
- b. Binding of Sperm to ZP
- c. ACROSMOME REACTION → release of enzymes
- d. Penetratⁿ of Sperm
- e. Fusion → Sperm membrane fuse to oocyte membrane & releases Ca^{2+}



CORTICAL REACTION

→ release of cortical granules

ZONA REACTION

→ permeability of ZP changes
Prevents polyspermy

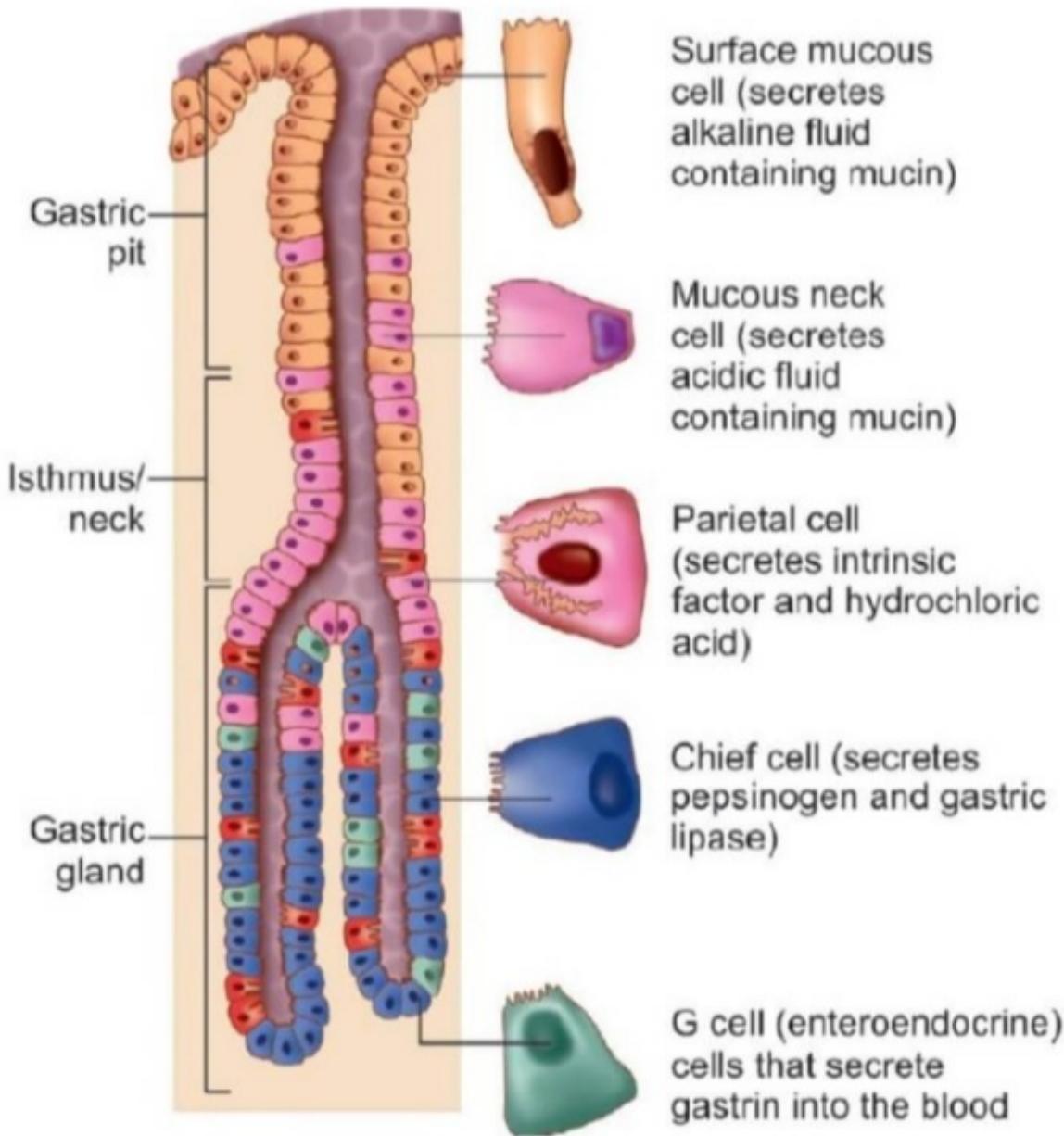
GENERAL ANATOMY

COLLAGEN FIBRES : TYPES

TYPE	LOCATION
Type I	<ul style="list-style-type: none">• Dermis• tendon• ligaments• bone• <i>Fibrocartilage [Atypical cartilage]</i>
Type II	<ul style="list-style-type: none">• Cartilage: Hyaline and elastic• vitreous body• nucleus pulposus
Type III	<ul style="list-style-type: none">• Skin• vessel wall• reticular fibre of most tissues (lungs, liver, spleen)• <i>Healing/ Granulation Tissue</i>
Type IV	<ul style="list-style-type: none">• Basement membrane

GENERAL ANATOMY

GASTRIC GLANDS & CELLS



NECK [Upper half]	<ul style="list-style-type: none">Mucous neck cellsParietal cells <i>[Fried egg appearance]</i>	Eosinophilic [pink]
FUNDUS/BASE [Lower half]	<ul style="list-style-type: none">Chief cellsG cells	Hematoxylin [blue]

GENERAL ANATOMY

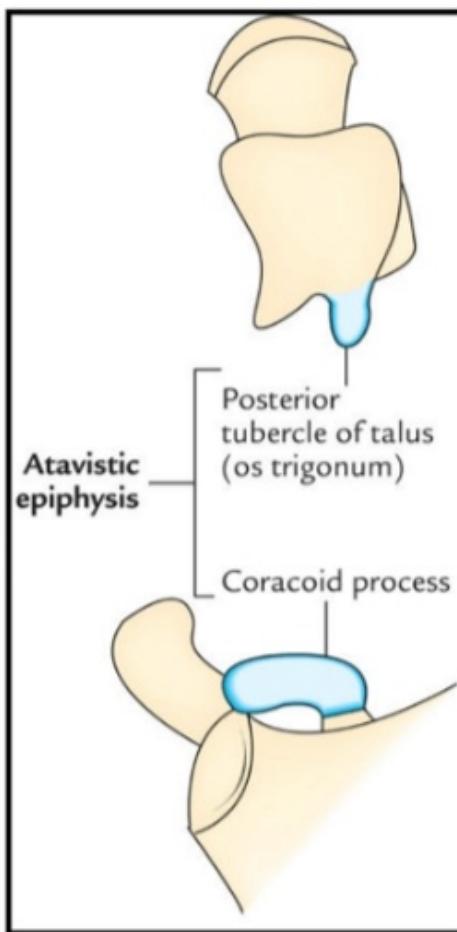
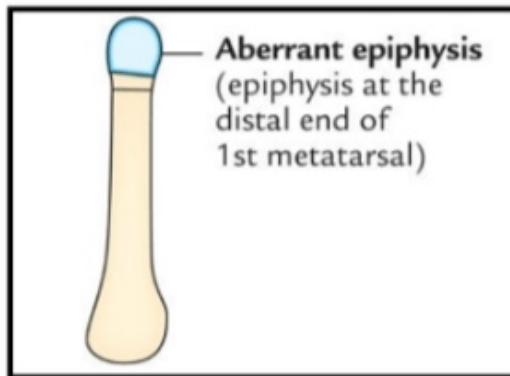
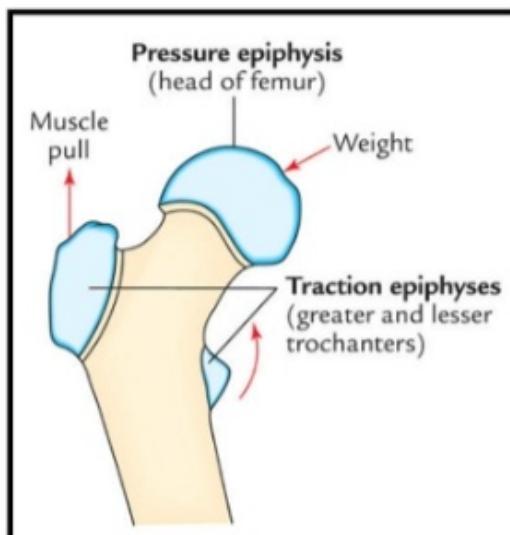
CARTILAGE vs BONE

CARTILAGE		BONE
<ul style="list-style-type: none"> Type 2 collagen 	COLLAGEN TYPE	<ul style="list-style-type: none"> Type 1 collagen
<ul style="list-style-type: none"> Chondrocytes in lacunae 	CELLS	<ul style="list-style-type: none"> Osteocytes in lacunae
<ul style="list-style-type: none"> Variable proportions of collagen, elastic and reticular fibres 	FIBERS	<ul style="list-style-type: none"> Predominantly collagen fibres
<ul style="list-style-type: none"> Chondroitin sulphates with proteins ; forming hydrated proteoglycans 	MATRIX	<ul style="list-style-type: none"> Insoluble crystals of calcium phosphate and carbonate
<ul style="list-style-type: none"> None 	VASCULARITY	<ul style="list-style-type: none"> Extensive
<ul style="list-style-type: none"> NON-NEURAL 	NERVE. SUPPLY	<ul style="list-style-type: none"> Present
<ul style="list-style-type: none"> Limited 	REPAIR ABILITY	<ul style="list-style-type: none"> Extensive
<ul style="list-style-type: none"> Two layered; perichondrium 	COVERING	<ul style="list-style-type: none"> Two layered; periosteum

GENERAL ANATOMY

EPIPHYSIS : TYPES

Pressure epiphysis	Traction epiphysis	Atavistic epiphysis	Aberrant epiphysis
-Articular ends(takes part in transmission of weight)	<ul style="list-style-type: none"> - Nonarticular(does not take part in transmission of weight) *Provides attachment to one or more tendons which exert traction on the epiphysis. 	<ul style="list-style-type: none"> - Phylogenetically an independent bone, which in humans is fused to another bone 	Is not always present
Example- Head of femur	Example- Tubercles of humerus, mastoid process.	Example- coracoid process of scapula	Example- Epiphysis of head of first metacarpal



NEUROANATOMY

CEREBRUM: WHITE MATTER TRACTS

	COMMISURAL FIBERS	ASSOCIATION FIBRES	PROJECTION FIBRES
Definition	collection of axons connecting right half to left half of brain by crossing the midline	do not cross the midline, connect same side of brain	projecting either from higher brain centre to lower brain centre or vice versa
Examples	<ul style="list-style-type: none"> Corpus callosum 	<ul style="list-style-type: none"> Arcuate fasciculus Uncinate Cingulum Longitudinal fasciculus 	<ul style="list-style-type: none"> Corona radiata Internal capsule

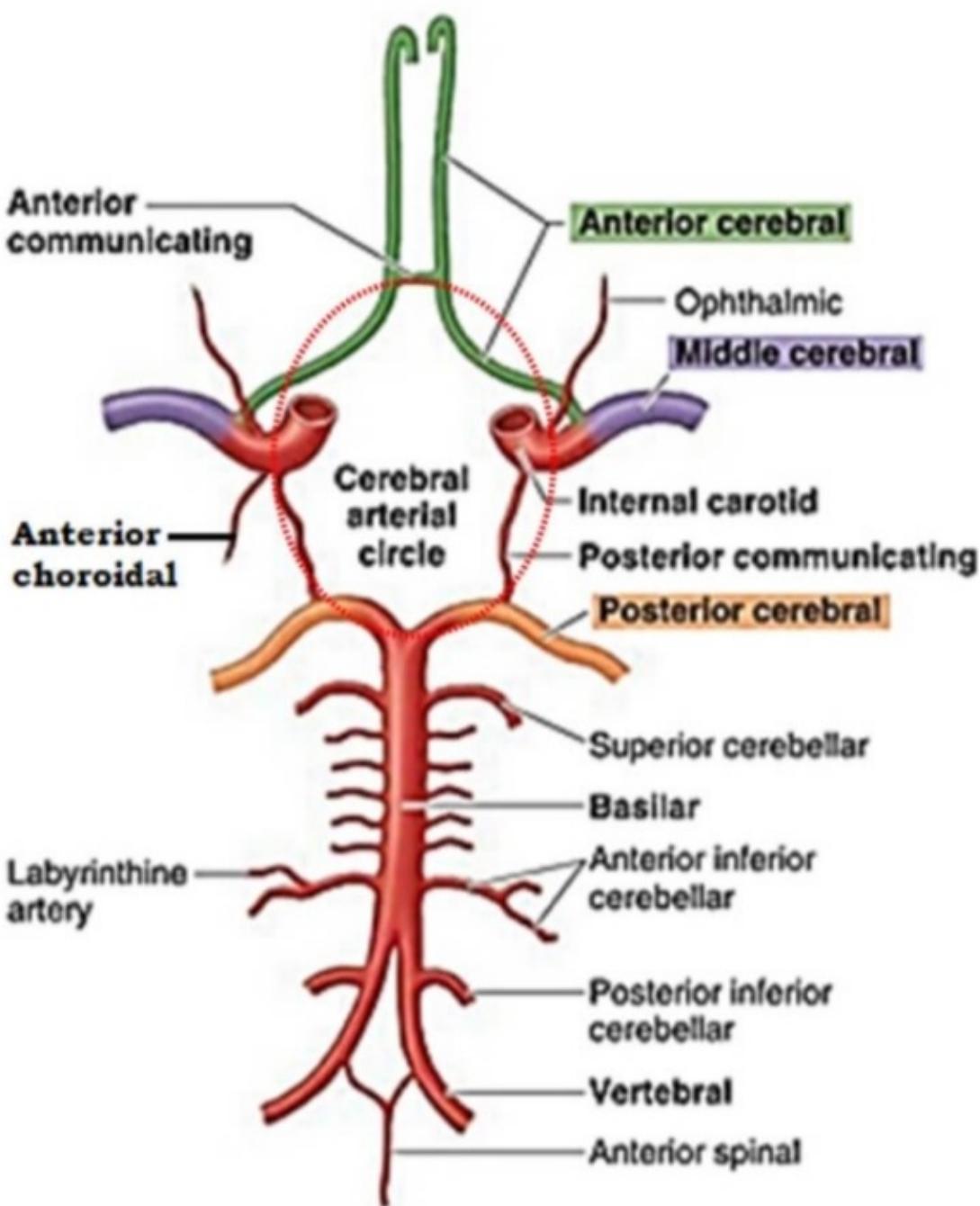
NEUROANATOMY

CEREBELLUM : AFFERENT TRACTS

Name	Tract	Enter Cerebellum Via	Target and Function
Climbing fibers	Olivocerebellar	Inferior cerebellar peduncle (decussate)	Excitatory terminals on Purkinje cells (glutamate)
Mossy fibers	Vestibulocerebellar	Inferior cerebellar peduncle	Excitatory terminals on granule cells (glutamate) which are excitatory to Purkinje cells
	Spinocerebellar	Inferior cerebellar peduncle and superior cerebellar peduncle	
	(Cortico) pontocerebellar	Middle cerebellar peduncle (decussate)	

NEUROANATOMY

CIRCLE OF WILLIS



Base of brain ;

LOCATION

in Interpeduncular area

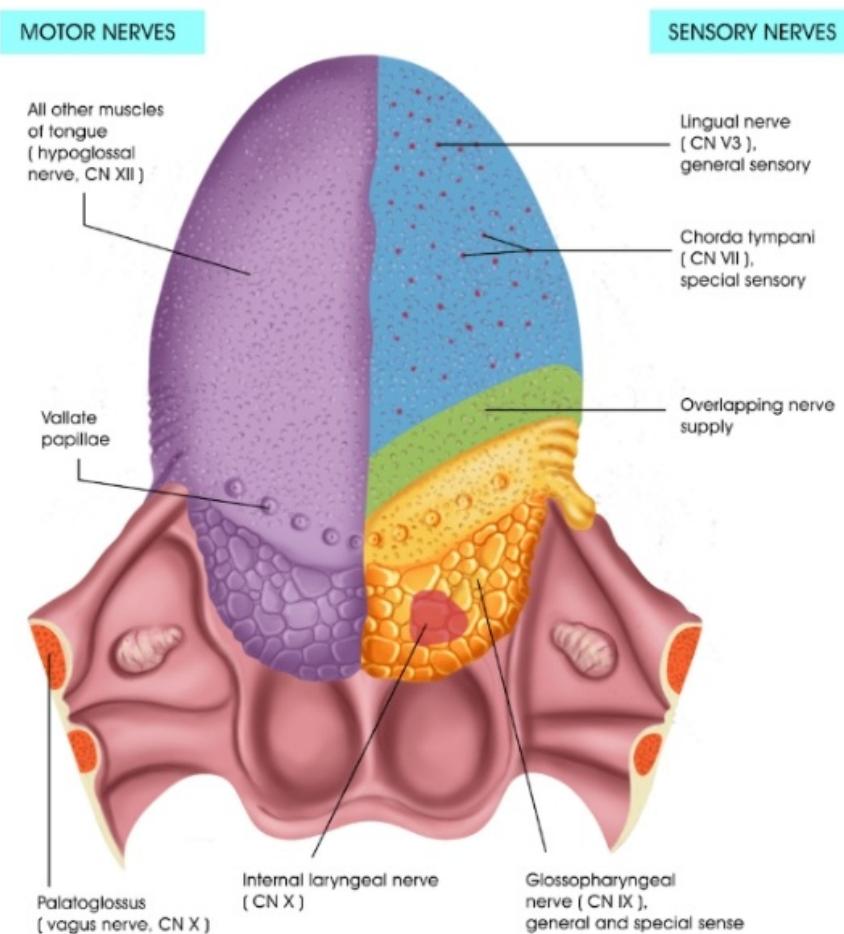
in the subarachnoid space

CONTRIBUTED BY

Anteriorly : Internal carotid artery

Posteriorly : Vertebral artery

TONGUE : SUPPLY



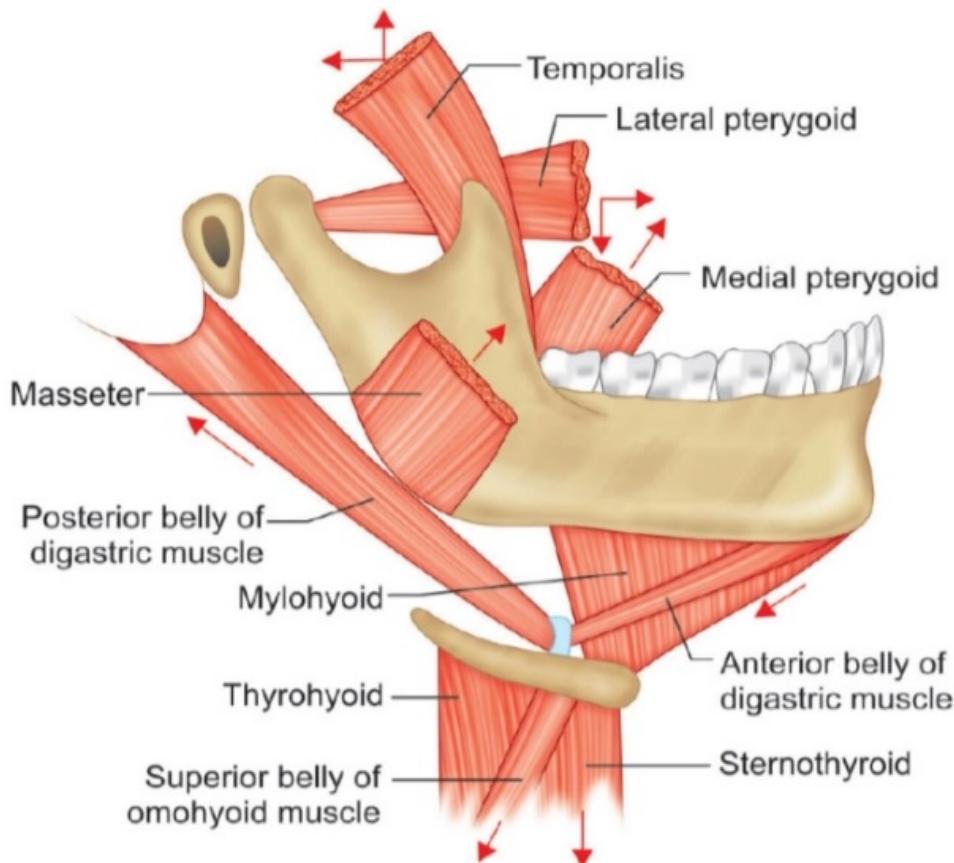
	Anterior 2/3rd	Posterior 1/3rd	From the vareculla
Derivative of	from 1st arch	from 3rd arch	from 4th arch
General sensations	Via Lingual nerve	Glossopharyngeal nerve	Internal laryngeal branch of superior laryngeal nerve (vagus)
Special sensations	Except circumvallate papillae via chorda tympani (facial nerve)	Including circumvallate papillae via glossopharyngeal nerve	Internal laryngeal branch of superior laryngeal nerve (vagus)

STRUCTURES WHICH ARE OF ADULT SIZE AT BIRTH

- Ear ossicles (malleus , incus,stapes)
- Tympanic membrane
- Tympanic cavity
- Tympanic mastoid and antrum
- Internal ear :Cochlea,vestibule and semicircular canal

MoM [MUSCLES OF MASTICATION]

- develop from 1st pharyngeal arch
- Nerve supply – mandibular branch of trigeminal.

**ELEVATORS of mandible:
MTM**

• Masseter	Elevation, protraction
------------	------------------------

• Temporalis	Elevation retraction
--------------	----------------------

• Medial pterygoid	Elevation, protraction
--------------------	------------------------

DEPRESSORS of mandible

• Lateral pterygoid	Depression, protraction
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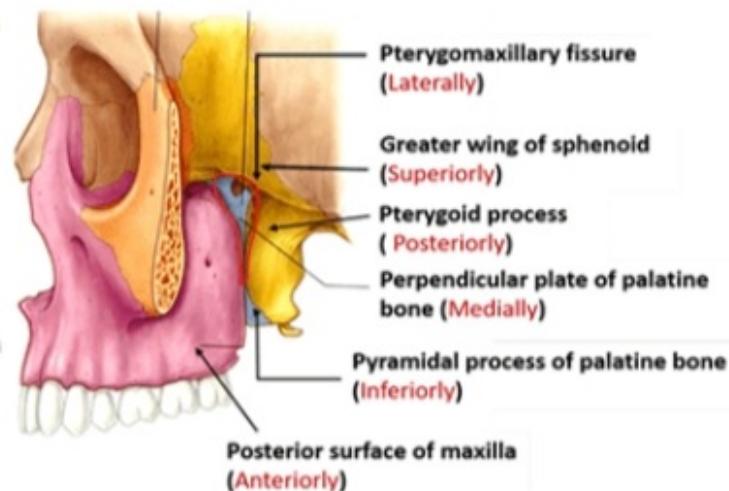
• Mylohyoid	Depression
-------------	------------

• Ant. belly of digastric	Depression
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PTERYGOPALATINE FOSSA

The pterygopalatine fossa is an inverted teardrop shaped space between bones on the lateral side of the skull immediately posterior to maxilla.

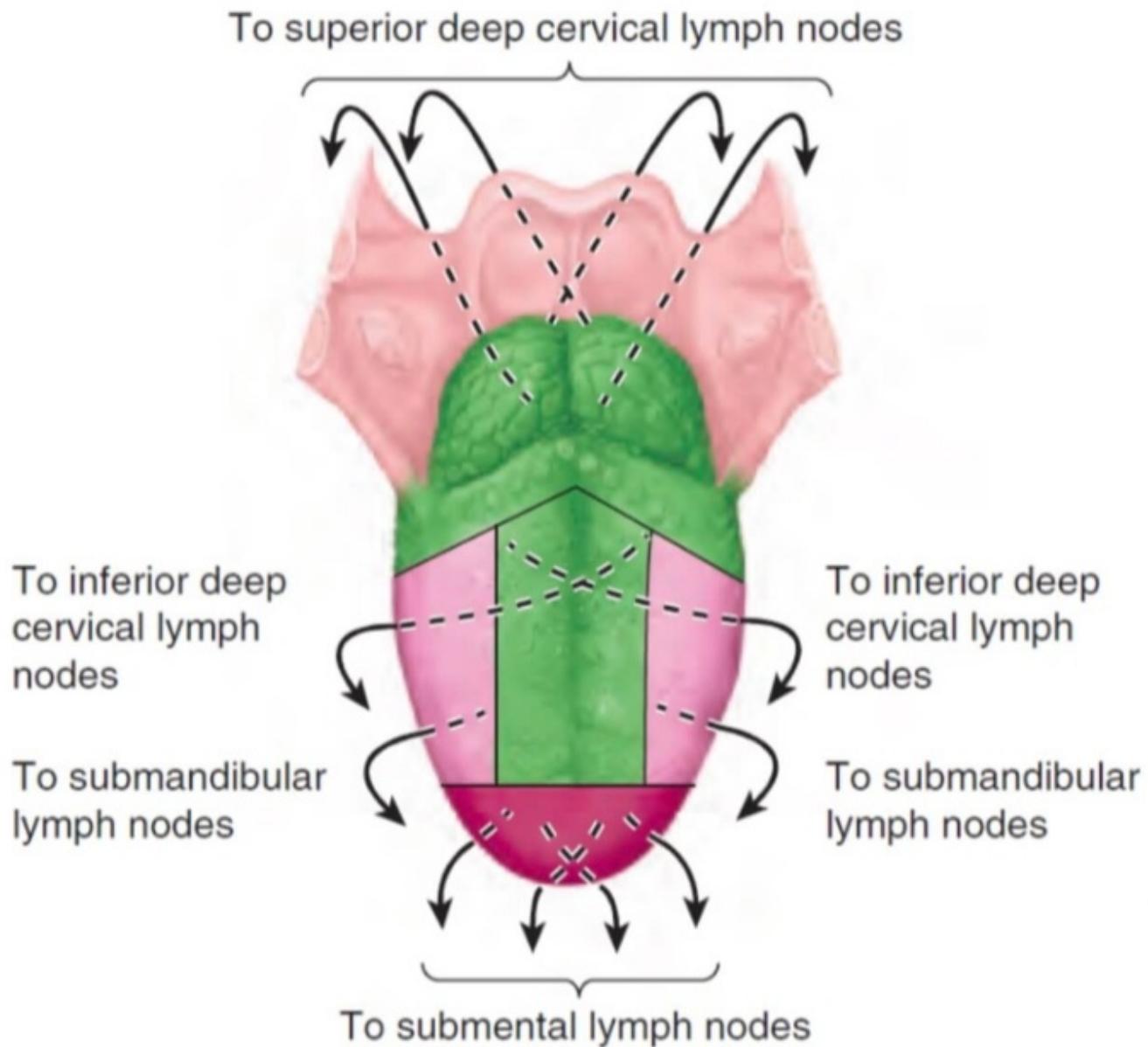
Direction	Passage	Connection
Anterior	Inferior orbital fissure	Orbit
Posterior	<ul style="list-style-type: none"> • Foramen rotundum • Pterygoid canal (vidian) • Palatovaginal canal (pharyngeal) 	Middle cranial fossa Middle cranial fossa foramen lacerum Nasal cavity, nasopharynx.
Medially	Sphenopalatine foreman	Nasal cavity
Laterally	Pterygomaxillary fissure	Infratemporal fossa
Inferiorly	Greater palatine canal (pterygopalatine)	Oral cavity, lesser palatine canals.



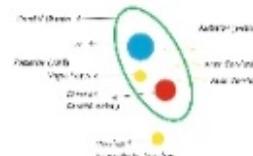
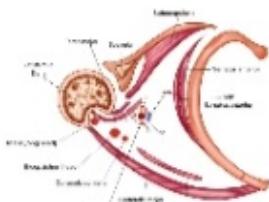
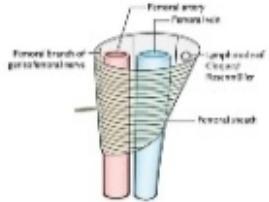
Contents of pterygopalatine fossa: -

1. Third part of maxillary artery and its branches which bear the same names as the branches of the pterygopalatine ganglia & accompany all of them.
2. Maxillary nerve and its two branches, zygomatic & posterior superior alveolar.
3. Pterygopalatine ganglion & its numerous branches containing fibers of the maxillary nerve mixed with autonomic nerve.

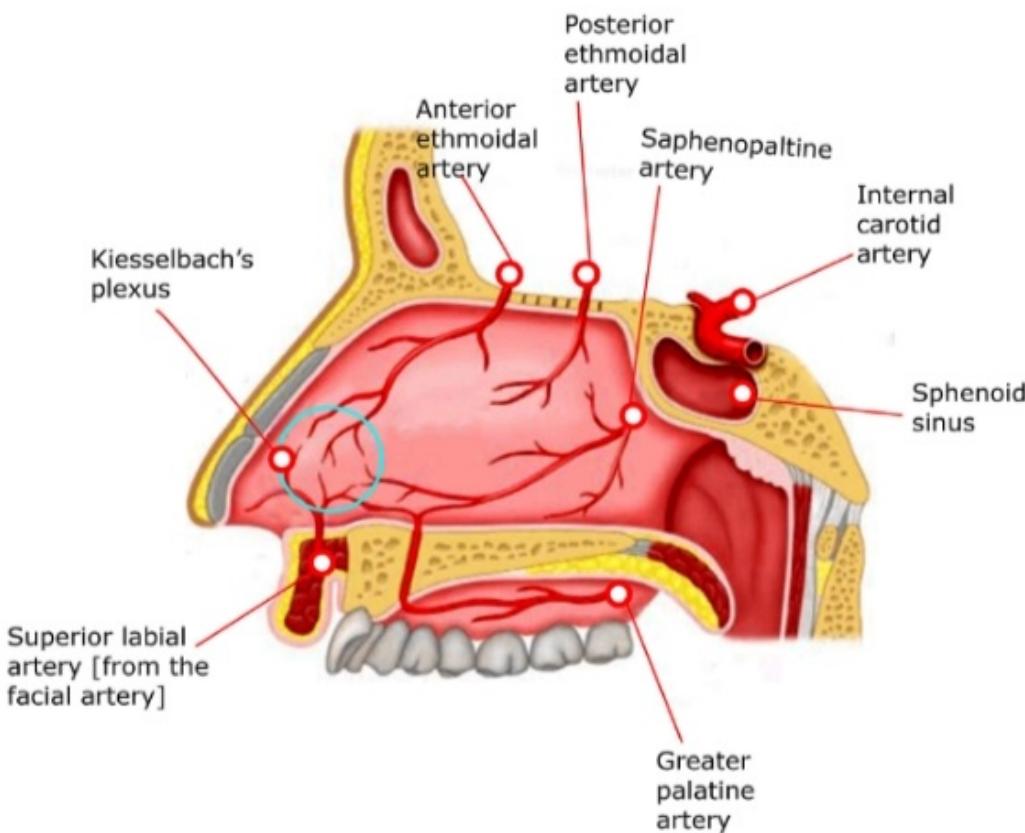
TONGUE : LYMPHATIC DRAINAGE



SHEATH's & IMPORTANT POINTS TO REMEMBER

	CAROTID SHEATH	AXILLARY SHEATH	FEMORAL SHEATH
DEVELOPS FROM	All layers of deep cervical fascia	Prevertebral layer	Transversalis fascia anteriorly and the fascia overlying psoas and iliacus posteriorly.
CONTENT OUTSIDE	External carotid artery Sympathetic chain	Axillary vein	Femoral nerve
	 <p>Detailed description: A schematic diagram of the carotid sheath. It shows a central blue circle labeled 'Vagus nerve' with a yellow arrow pointing to it. To its right is a red circle labeled 'Sympathetic chain' with a yellow arrow. Above the vagus nerve is a blue circle labeled 'Internal carotid artery' with a yellow arrow. Below the sympathetic chain is a yellow circle labeled 'External carotid artery' with a yellow arrow. The entire arrangement is enclosed within a green oval labeled 'Carotid Sheath' at both ends.</p>	 <p>Detailed description: A detailed anatomical diagram of the axillary sheath. It shows the axillary vein (blue) and artery (red) running parallel. Between them is the brachial plexus (yellow), which is shown branching into various nerves. The pectoralis major muscle is shown in pink, and the latissimus dorsi muscle is shown in orange. The trapezius muscle is also visible at the top.</p>	 <p>Detailed description: A schematic diagram of the femoral sheath. It shows the femoral artery (red) and vein (blue) running together. The femoral nerve (yellow) is shown passing around the artery. The femoral branch of the genitofemoral nerve is also indicated. The femoral artery is labeled 'Femoral artery' and the femoral vein is labeled 'Femoral vein'. The femoral nerve is labeled 'Femoral branch of genitofemoral nerve'.</p>

NASAL SEPTUM :LITTLE's AREA / KIESSELBACH's PLEXUS



An anastomosis of the following arteries:

INTERNAL. CAROTID ARTERY	EXTERNAL. CAROTID ARTERY
<ul style="list-style-type: none"> • Anterior Ethmoidal artery [branch of ophthalmic artery] 	<ul style="list-style-type: none"> • Sphenopalatine artery (branch of maxillary artery) gives Nasopalatine and posterior medial nasal branches. • Septal branch of greater palatine artery (branch of maxillary artery). • Septal branch of superior labial artery (branch of facial artery).

Posterior Ethmoidal Artery does not contribute to the plexus

CARDIOVASCULAR

CHANGES IN FETOPLACENTAL CIRCULATION AFTER BIRTH

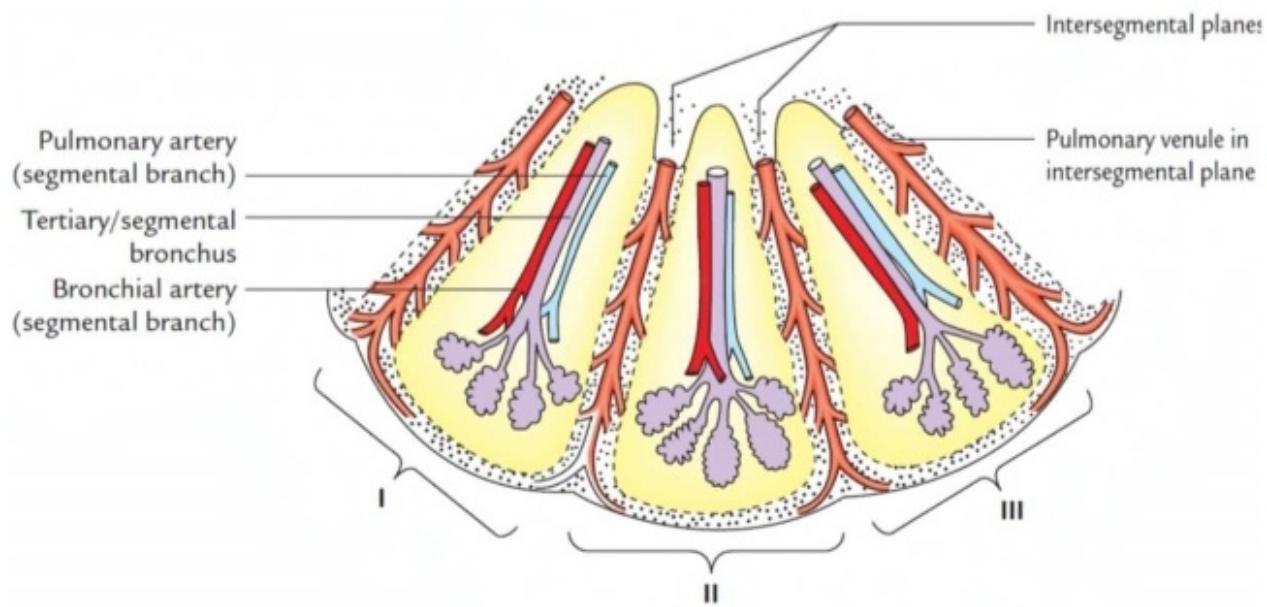
EMBRYONIC STRUCTURE	AFTER BIRTH
Left umbilical vein	Obliterates to form Ligamentum teres
Ductus venosus	Ligamentum venosum
Ductus arteriosus	<ul style="list-style-type: none">• Physiological closure : immediate• Anatomic : complete in 1-3 months
Foramen ovale	Fossa ovalis
Umbilical arteries	Medial umbilical ligaments

BRONCHOPULMONARY SEGMENTS

BRONCHOPULMONARY SEGMENTS

CONTENTS:

- Pulmonary artery
- Bronchial artery
- Tertiary bronchus



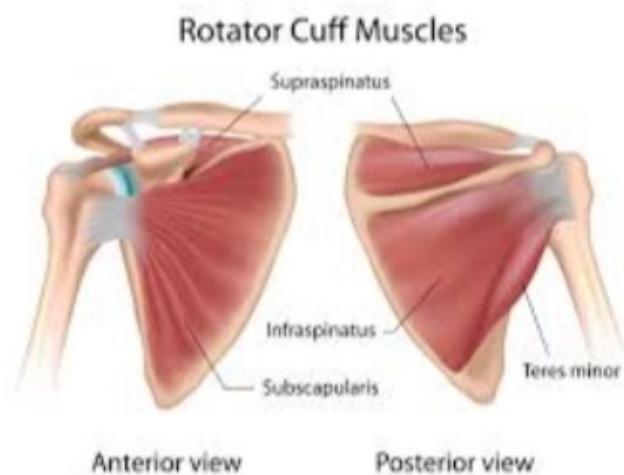
REMEMBER : Pulmonary vein is NOT a content

- It is intersegmental
- Guides surgical resections of segments

UPPER LIMB

ROTATOR CUFF

Four muscles of **rotator cuff** are



MUSCLE	ATTACHED TO
Supraspinatus	Greater tuberosity
Infraspinatus	Greater tuberosity
Teres minor	Greater tuberosity
Subscapularis	Lesser tuberosity

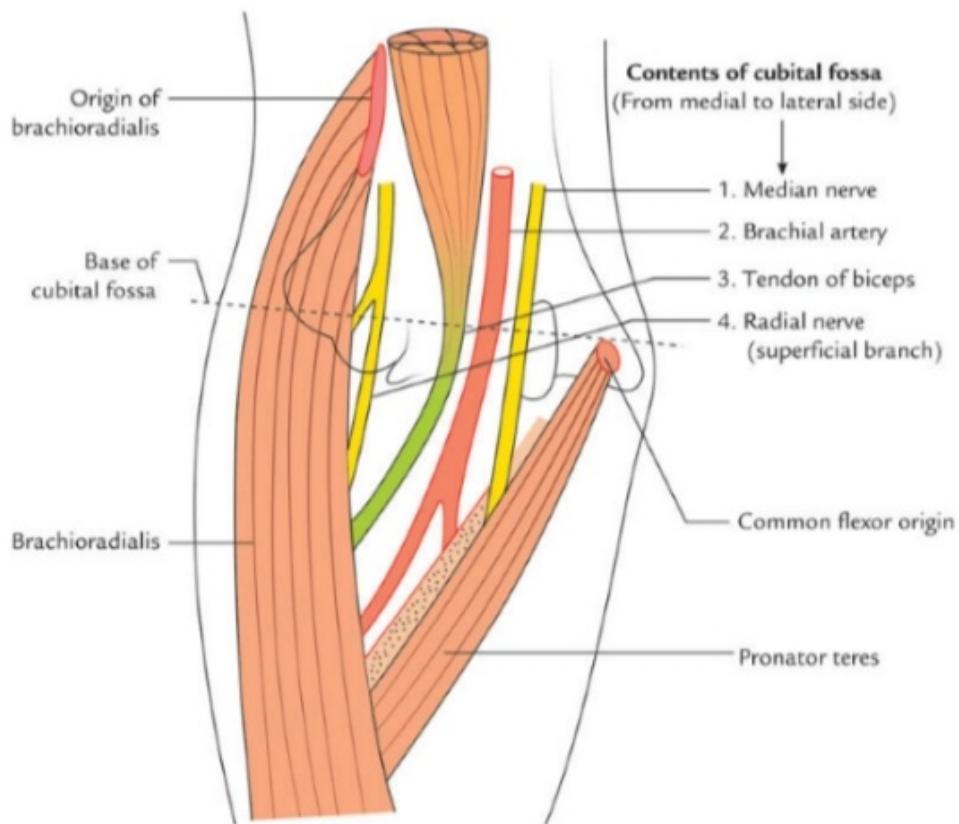
Arrangement of Structures (Medial to Lateral)

CUBITAL FOSSA

Cubital Fossa is a **triangular** fossa in front of elbow joint

Boundaries-

- **Lateral**-Brachioradialis muscle
- **Medial** - Pronator teres
- **Base** - Imaginary line connecting medial epicondyle with lateral epicondyle



Contents (medial to lateral) →

- **M**- Median nerve
- **B**- Brachial artery and it's branches
- **B**- Biceps brachi tendon
- **S**- Superficial branch of radial nerve

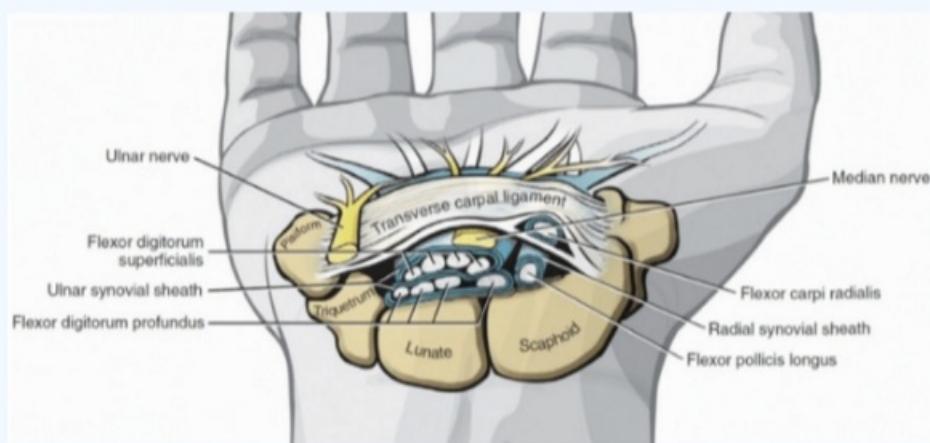
CARPAL TUNNEL

- 8 carpal bones covered by flexor retinaculum

CONTENTS : 9 flexor tendons + *median nerve*

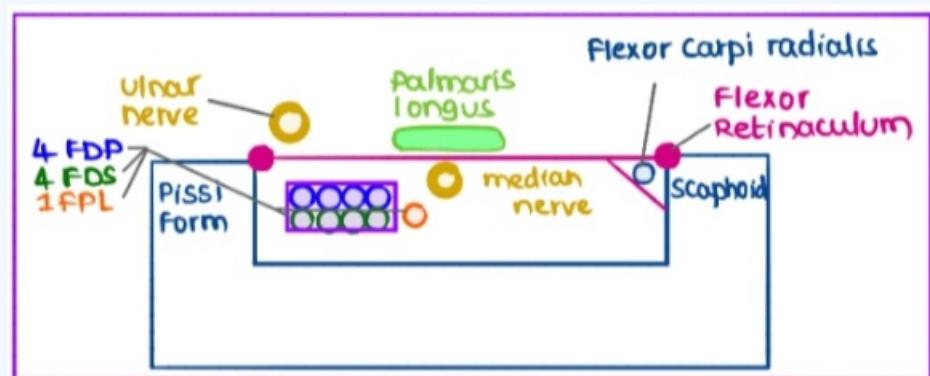
9 tendons:

- tendons of flexor digitorum superficialis
- 4 tendons of flexor digitorum profundus
- 1 tendon of flexor pollicis longus



REMEMBER :

- *Ulnar nerve passes is NOT a content of carpal tunnel*
- *It passes through guyon's canal.*



Carpal tunnel syndrome

- The overuse of these 9 tendons, causes the inflammation which compresses the Median nerve causing carpal tunnel syndrome, causing tingling sensation in 3 and ½ fingers, including nail beds.

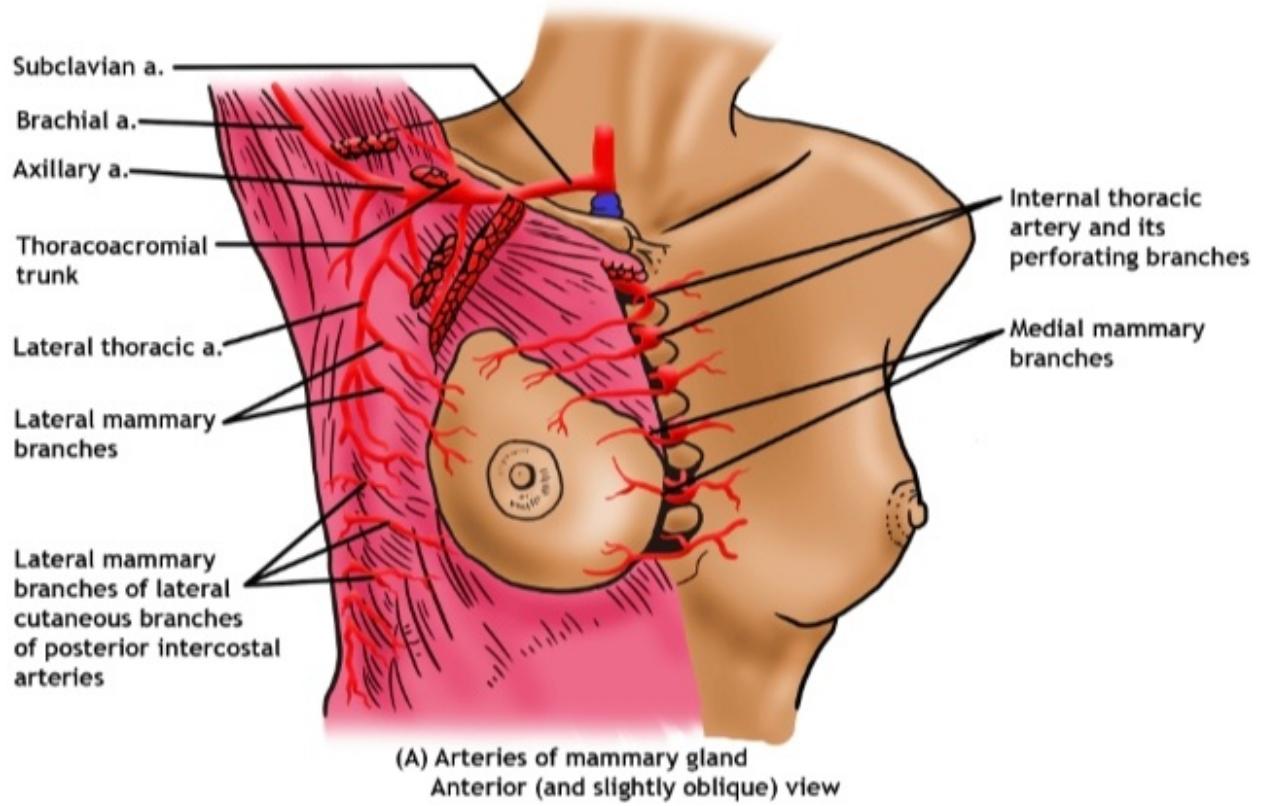
#CLINICAL

NERVES & THEIR TESTS

	CLINICAL TEST/FINDING		MUSCLE TESTED
MEDIAN NERVE			
	<ul style="list-style-type: none"> Pen test 		Abductor pollicis brevis
	<ul style="list-style-type: none"> Pointing index [Benediction hand deformity] 		FDS & FDP
	<ul style="list-style-type: none"> Ape thumb 		Thenar muscles
	<ul style="list-style-type: none"> Kiloh Nevin sign 		FDP & FPL
ULNAR NERVE			
	<ul style="list-style-type: none"> Book test 		Adductor pollicis
	<ul style="list-style-type: none"> Card test 		Palmar interossei
	<ul style="list-style-type: none"> Egawa test 		Dorsal interossei
	<ul style="list-style-type: none"> Froment's test/sign 		Flexor pollicis muscles comes into action to compensate for Adductor pollicis
RADIAL NERVE			
	<ul style="list-style-type: none"> Wrist drop 		Loss of wrist extensors

BREAST

BREAST : ARTERIAL SUPPLY

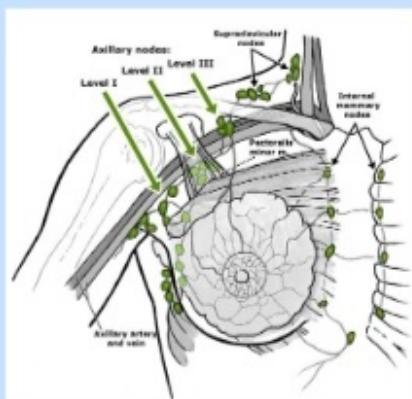


- **Axillary artery** via its branches:
 - Superior thoracic artery,
 - Thoracoacromial artery,
 - Lateral thoracic artery and
 - **Subscapular artery**
- **Internal thoracic (mammary) artery** via the medial mammary arteries
- Perforating branches of second, third and fourth **posterior intercostal arteries**

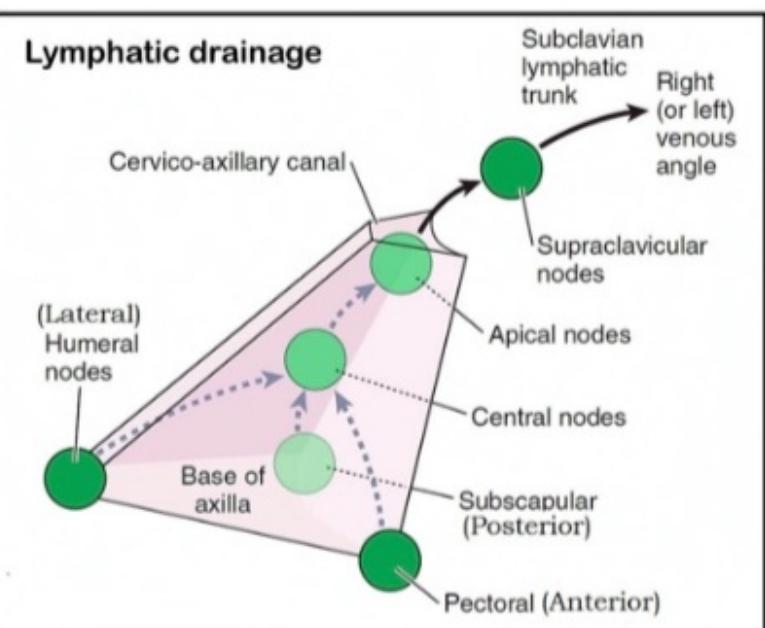
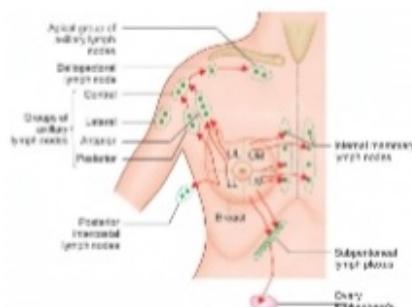
BREAST

BREAST : LYMPHATIC DRAINAGE

Axillary LN Levels in relation with Pectoralis minor

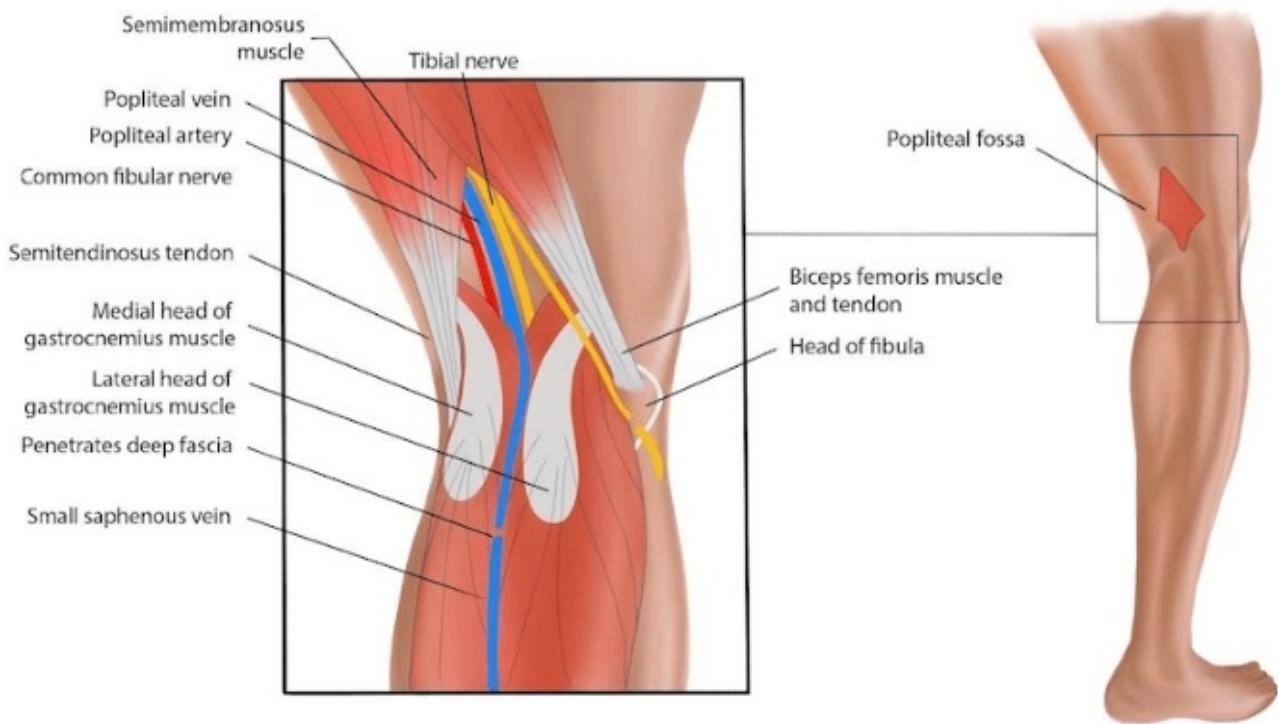


Level	Relation with Pectoralis minor	Axillary LNs Included
I	Below or lateral	Anterior, posterior, lateral
II	Posterior (behind)	Central, Interpectoral (Rotter's nodes)
III	Medial or above	Apical



LOWER LIMB

POPLITEAL FOSSA : BOUNDARIES



Superior and medial:

- Semimembranosus
- Semitendinosus muscles

Superior and lateral:

- Biceps femoris muscle

Inferior and medial:

- Medial head of the gastrocnemius muscle

Inferior and lateral:

- Lateral head of the gastrocnemius muscle
- plantaris muscle

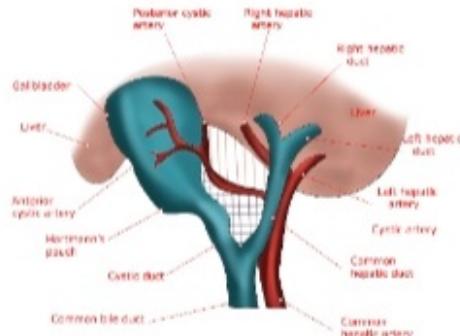
#BOUNDARIES

EPIPLOIC FORAMEN

	<p>Above (superiorly)</p> <ul style="list-style-type: none">• Caudate lobe of liver	
Anteriorly	<ul style="list-style-type: none">• Hepatic triad structures including Bile duct anteriorly, within the free margin of lesser omentum	 <p>Posteriorly</p> <ul style="list-style-type: none">• Inferior Vena Cava
	<p>Below (inferiorly)</p> <ul style="list-style-type: none">• First part of duodenum	

#BOUNDARIES

CALOT's TRIANGLE

	<h3>Superior</h3> <ul style="list-style-type: none">Inferior surface of the liver.
<h3>Medial</h3> <ul style="list-style-type: none">Common hepatic duct.	 <p>The diagram illustrates the anatomical structures within the Calot's triangle. The gallbladder is shown in blue, with the cystic duct (blue) and common bile duct (red) emerging from its fundus. The hepatic arterial system is depicted in red, with the common hepatic artery bifurcating into right and left hepatic arteries. The cystic artery, a branch of the right hepatic artery, runs posterior to the cystic duct. The anterior and posterior hepatic veins are also labeled. The liver is shown in pink at the top right.</p>
	<h3>Inferior</h3> <ul style="list-style-type: none">Cystic duct.

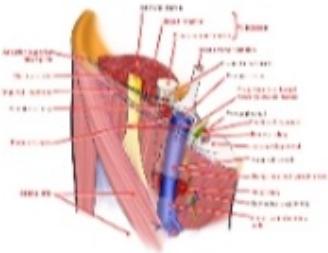
CONTENTS

The contents of the Calot's triangle include:

- Right hepatic artery**– formed by the bifurcation of the proper hepatic artery into right and left branches.
- Cystic artery**– typically arises from the right hepatic artery and traverses the triangle to supply the gall bladder.
- Lymph node of Lund**– the first lymph node of the gallbladder.
- Lymphatics**

#BOUNDARIES

FEMORAL TRIANGLE

	<p>Base or superior border</p> <ul style="list-style-type: none">• Inguinal ligament	
	 An anatomical diagram of the femoral triangle. The triangle is bounded by the inguinal ligament (superior), the medial border of the sartorius muscle (lateral), and the medial border of the adductor longus muscle (medial). The femoral artery and vein are shown passing deep to the femoral triangle. The femoral nerve is also depicted. The triangle contains the deep inguinal lymph nodes.	
Medial border	<ul style="list-style-type: none">• Medial border of adductor longus muscle	Lateral border <ul style="list-style-type: none">• Medial border of sartorius muscle

CONTENT

- Femoral nerve,
- Femoral artery
- Femoral vein
- Femoral canal (empty space)
- Lymphatics (**Deep Inguinal Lymph Nodes**)

REMEMBER

- **Femoral Triangle** is a sub-fascial space (fascia lata being the roof), it contains **ONLY** the **Deep Inguinal Lymph Nodes**

Superficial Inguinal Lymph Nodes are found deep to Camper's fascia

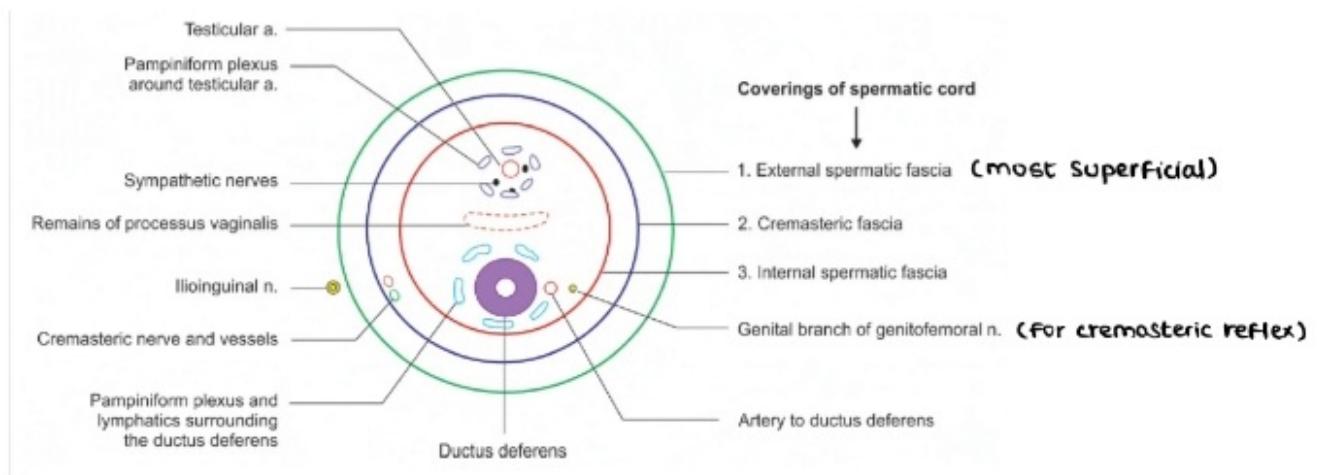
and

Superficial to **Fascia Lata**.

#CONTENTS

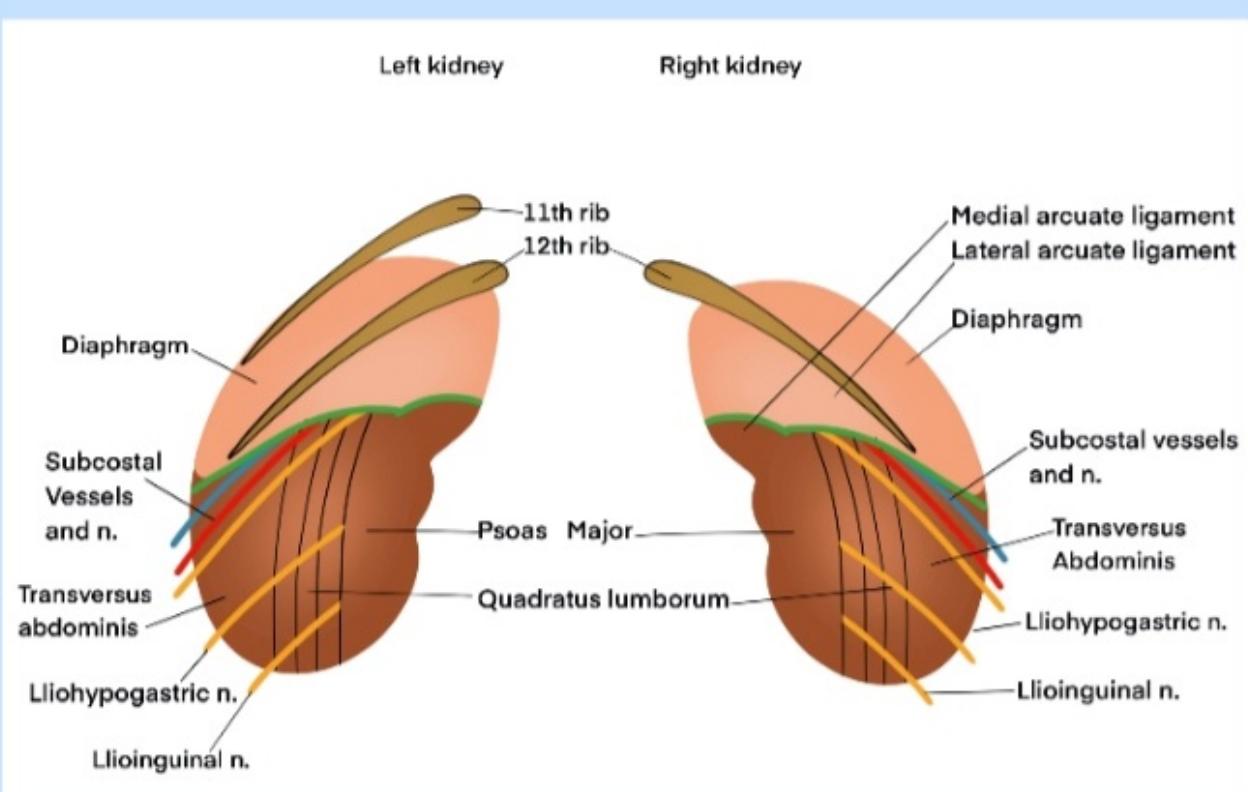
SPERMATIC CORD

3 ARTERIES	3 NERVES	3 OTHERS
<ul style="list-style-type: none">• Cremastric artery• Artery to Ductus deferens• Testicular artery	<ul style="list-style-type: none">• Genitofemoral Nerve• Autonomic and• Visceral Afferent Nerves <p>REMEMBER</p> <ul style="list-style-type: none">• Ilioinguinal nerve is outside the spermatic cord	<ul style="list-style-type: none">• Pampiniform Plexus• Vas Deferens• Lymphatics



#RELATIONS

KIDNEY : POSTERIOR RELATIONS



3 NERVES

- Subcostal (T12)
- Iliohypogastric (L1)
- Ilioinguinal (L1)

4 MUSCLES

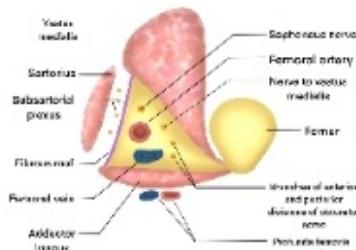
- Diaphragm
- Quadratus lumborum
- Psoas major
- Transversus abdominis.

#BOUNDARIES

ADDUCTOR CANAL

Anteromedial wall

- Sartorius.



Laterally

- Vastus medialis.

Posterior wall

- Adductor longus
- Adductor magnus.

CONTENTS

- Femoral Vessels
- Saphenous Nerve,
- Nerve to the Vastus Medialis.

REMEMBER

- **Femoral nerve** is NOT a content of **adductor canal**.

LEG & IT's COMPARTMENTS

LEG & IT's COMPARTMENTS

Compartment	Muscles	Nerve	Artery
• Lateral	<ul style="list-style-type: none"> • Peroneus longus • Peroneus brevis 	Superficial peroneal nerve	-----
• Anterior	<ul style="list-style-type: none"> • Tibialis anterior • extensor hallucis longus • Extensor digitorum longus 	Deep peroneal nerve	Anterior tibial artery
• Posterior(Superficial group)	<ul style="list-style-type: none"> • Gastrocnemius • Soleus • Plantaris 	<i>Supplied by nerve from deep group</i>	<i>Supplied by artery from deep group</i>
• Posterior (Deep group)	<ul style="list-style-type: none"> • Flexor hallucis longus • Flexor digitorum longus • Tibialis posterior 	Posterior tibial nerve	Posterior tibial artery fibular artery

#CLINICAL

COMMON PERONEAL NERVE & IT's INJURY

- Common peroneal nerve is commonest nerve to be paralysed .

CAUSE OF INJURY

- Fracture neck of fibula
- Lathi injury on lateral side of knee joint
- Due to **plaster** on leg.



EFFECT OF INJURY

1. Motor loss i.e. **Foot drop** (loss of dorsiflexion or extension)
2. **Sensory loss** at back and lateral side of leg, most of dorsum of foot.
3. Paralysis of **anterior compartment muscles of leg**
4. **Loss of foot eversion**