BIO 3330

Advanced Human Cadaver Anatomy

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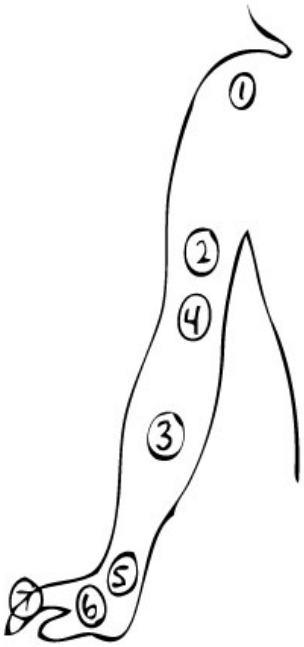
PARTS OF THE BODY

1) HEAD – CAPUT, CAPITUS
2) SKULL- CRANIUM
    CEPHALIC- TOWARD THE SKULL
    CAUDAL- TOWARD THE TAIL
    ROSTRAL- TOWARD THE NOSE
3) COLLUM (PL. COLLI), CERVIX
4) TRUNK- THORAX, CHEST
5) ABDOMEN- AREA BETWEEN THE DIAPHRAGM AND THE HIP BONES
6) PELVIS- AREA BETWEEN OS COXAS

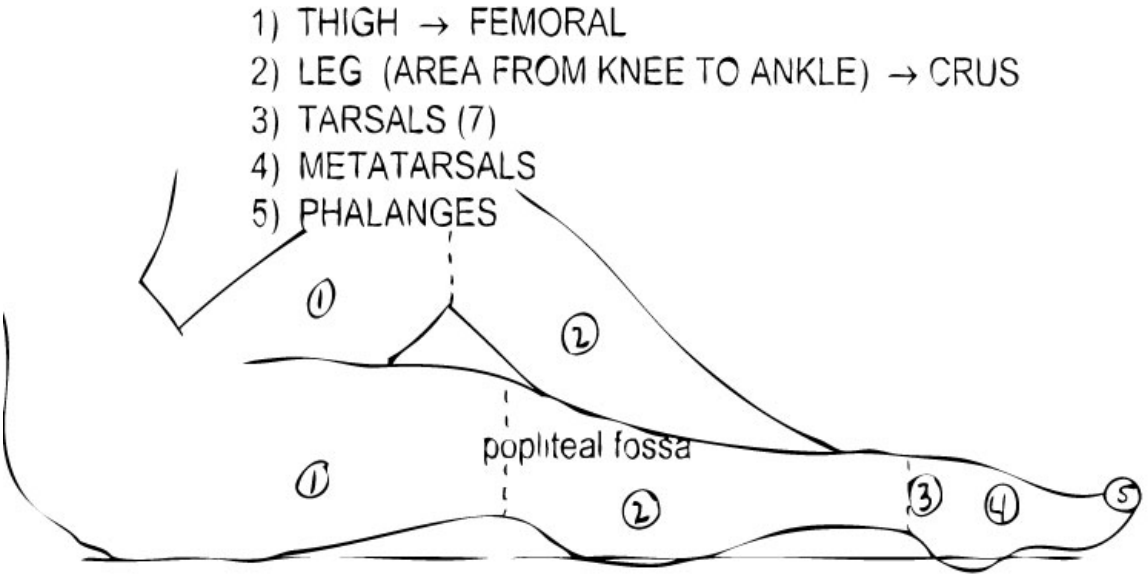
EXTREMITIES -UPPER

1) SHOULDER GIRDLE - SCAPULA, CLAVICLE
2) BRACHIUM - ARM
3) ANTEBRACHIUM -FOREARM
4) CUBITAL FOSSA
6) METACARPALS
7) PHALANGES



Lower Extremities

Pelvis
- Os Coxae (2) Inominant Bones
- Sacrum
- Coccyx



Terms of Position and Direction
Anatomical Position
Body Erect, head, eyes and toes facing forward. Limbs at side, palms facing forward
Anterior-ventral
Posterior-dorsal
Superficial
Deep
Internal/external
Vertical & horizontal- refer to the body in the standing position

Lateral/ medial
Superior/inferior
Ipsilateral
Contralateral

Planes of the Body
Median-cuts the body into left and right halves
Sagittal- parallel to median
Frontal (Coronal)- divides the body into front and back halves

Horizontal(transverse)- cuts the body into upper and lower portions

Positions of the Body
Proximal
Distal

Limbs
Radial
Ulnar
Tibial
Fibular

Foot
Dorsum
Plantar
Hallicus

HAND
Dorsum- back of hand
Palmar (volar)- palm side
Pollex-1
Index finger-2
Middle finger-3
Ring finger-4
Pinky finger-5

TERMS OF MOVEMENT

1) FLEXION:	DECREASE ANGLE BETWEEN TWO BONES OF A JOINT
2) EXTENSION:	INCREASE ANGLE BETWEEN TWO BONES OF A JOINT
3) ADDUCTION:	TOWARDS MIDLINE
4) ABDUCTION:	AWAY FROM MIDLINE
5) CIRCUMDUCTION:	CIRCULAR MOVEMENT DESCRIBING A CONE
6) ROTATION:	MOVEMENT ABOUT A LONG AXIS
7) SUPINATION:	PALMS UP WITH FOREARM FLEXED
8) PRONATION:	PALMS DOWN
9) ROTATION:	
10) PROTRACTION:	
11) RETRACTION:	
12) INVERSION:	MOST COMMON ANKLE SPRAIN
13) EVERSION:	MOST SERIOUS ANKLE SPRAIN

INVERSION & EVERSION OCCUR AT THE TALOCALCANEONAVICULAR JOINT

14) DORSIFLEXION: EXTENSION OF FOOT AT ANKLE JOINT
15) PLANTAR FLEXION: FLEXION OF FOOT AT ANKLE JOINT
14) & 15) OCCUR AT THE TALOCRURAL JOINT
16) SUPINATION OF FOOT (3 ACTIONS):
PLANTAR FLEXION -ADDUCTION - INVERSION

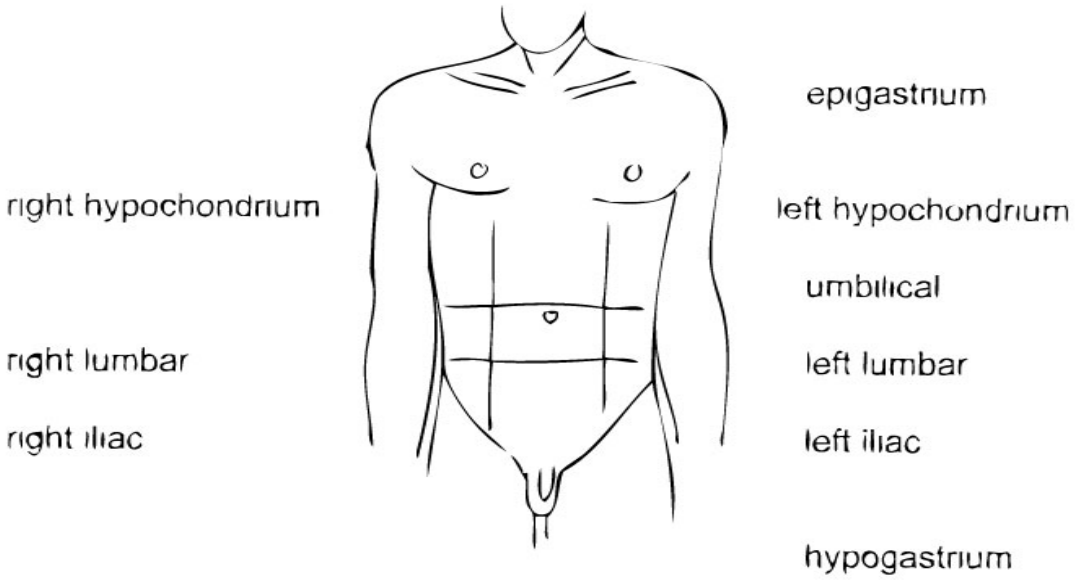
17) PRONATION OF FOOT (AS IN A BEGINNER ICE SKATER):
DORSIFLEXION - ABDUCTION - EVERSION

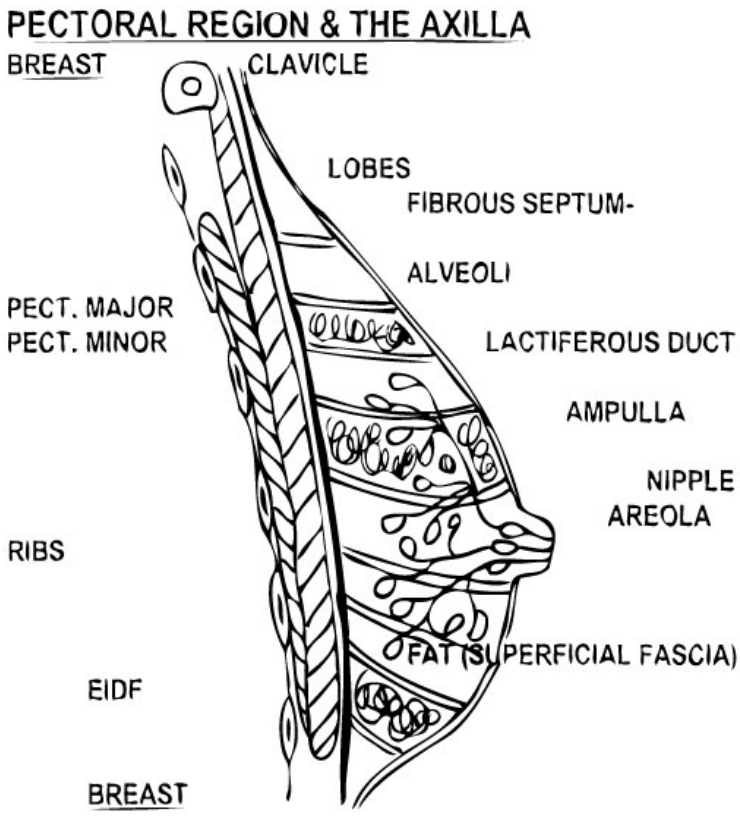
REGIONS OF THE BODY

ANTERIOR
- SUPRACLAVICULAR
- INFRACLAVICULAR
- MAMMARY
- AXILLARY

POSTERIOR
- SUPRASCAPULAR
- INFRASCAPULAR
- INTERSCAPULAR
- LUMBAR
- SACRAL

ABDOMINAL REGIONS





BREAST

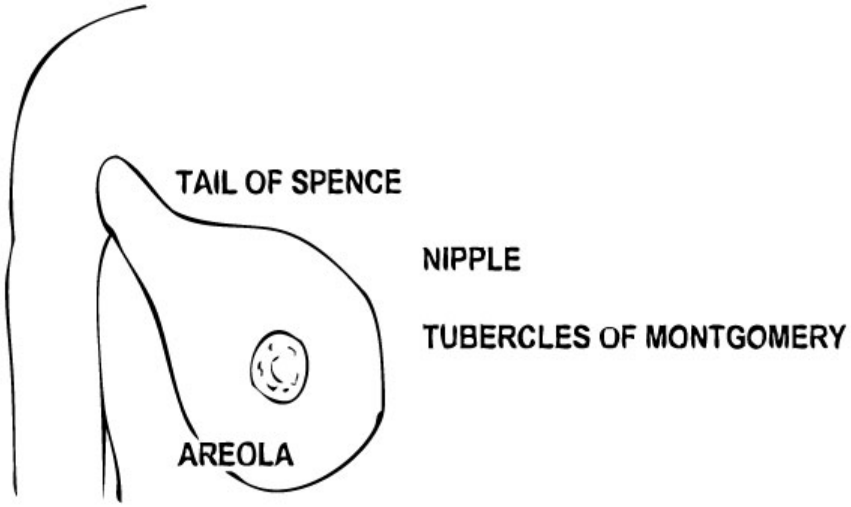
1) EACH BREAST CONTAINS 15-20 LOBES CONTAINING SPECIALIZED SWEAT GLANDS. THESE GLANDS ARE SURROUNDED BY SUPERFICIAL FASCIA.

2) WALLS OF EACH LOBE IS COMPOSED OF EIDF & SUSPENSORY LIGAMENTS OF COOPER.

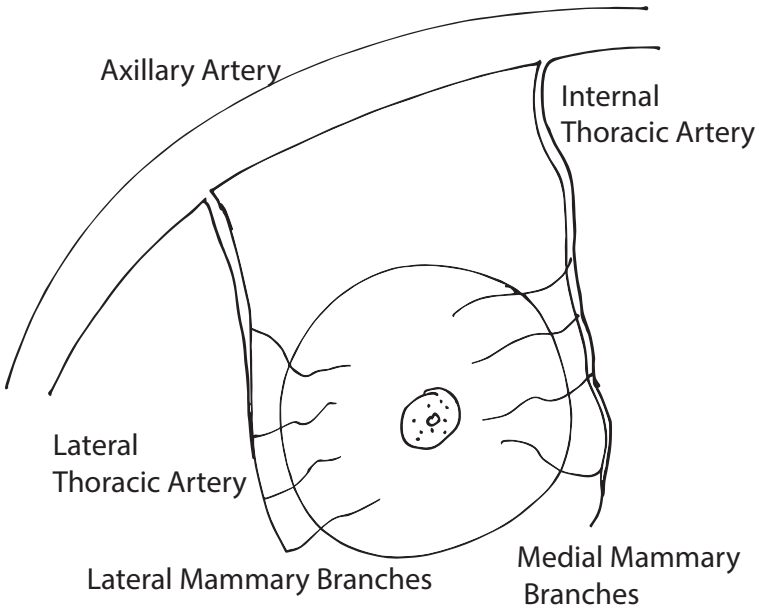
3) BREAST LIES WITHIN SUPERFICIAL FASCIA.

4) PREGNANCY
ALVEOLI - LACTIFEROUS DUCTS - LACTIFEROUS SINUS (AMPULLA) - NIPPLE

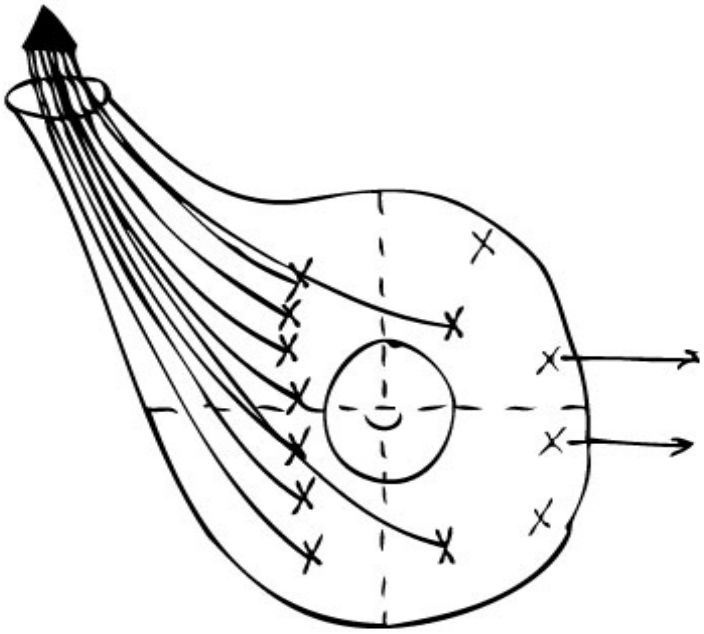
5) AREOLA HAS AREOLAR GLANDS THAT SECRETE OILS TO PROTECT Areola and Nipple



ARTERIAL SUPPLY TO BREAST
INTERNAL THORACIC ARTERIES
INTERCOSTAL ARTERIES



LYMPHATIC DRAINAGE OF BREAST
INTO SUBCLAVIAN VEIN



AXILLA
70-80% of Lymph Drainage Enters here

THORAX AND OPPOSITE BREAST
These lymphatic ducts are the ones that transmit cancer from one breast to another.

THORACIC CAGE
BOUNDARIES

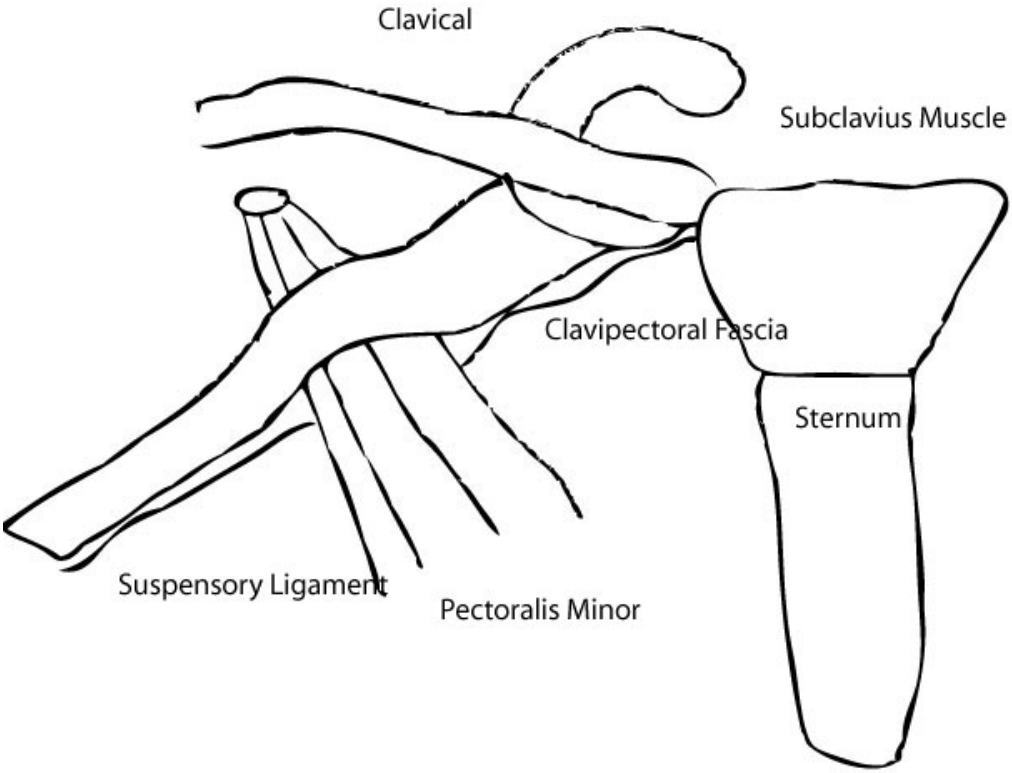
ANTERIOR	STERNUM, MANUBRIUM, XIPHOID PROCESS
POSTERIOR	VERTEBRA
LATERAL	RIBS
SUPERIOR	SUPERIOR THORACIC APERATURE
INFERIOR	INFERIOR THORACIC APERATURE

AXILLA (ARMPIT)

BOUNDARIES

ANTERIOR AXILLARY FOLD

PECT. MAJOR
PECT. MINOR
SUBCLAVIUS MUSCLE
CLAVIPECTORAL FASCIA
SUSPENSORY LIGAMENT



MUSCLES OF THE AXILLA

ANTERIOR (PECTORAL REGION)
- PECTORALIS MAJOR
- PECT. MINOR
- SUBCLAVIUS
- SERRATUS ANTERIOR

POSTERIOR
- SUBSCAPULARIS
- LATISSIMUS DORSI
- TERES MAJOR

PECTORALIS MAJOR MUSCLE

ORIGIN	APONEURIOSIS OF EXTERNAL OBLIQUE M. UPPER 6 COSTAL CARTILAGES STERNUM MEDIAL 1/2 OF CLAVICLE
INSERTION	LATERAL LIP OF BICIPITAL GROOVE
NERVE SUPPLY	MEDIAL & LATERAL PECTORAL NERVES
ACTION	ADDUCTION HORIZONTAL FLEXION MEDIAL ROTATION
BLOOD SUPPLY	PECTORAL BRANCH OF THE THORACOACROMIAL ARTERY PERFORATING BRANCHES OF INTERNAL THORACIC A.

PECTORALIS MINOR

ORIGIN	3,4,5 RIBS
INSERTION	COROCOID PROCESS OF THE SCAPULA
NERVE SUPPLY	MEDIAL PECTORAL NERVE
ACTION	PULLS SHOULDER ANTERIOR AND INFERIOR
BLOOD SUPPLY	SAME AS PECT. MAJOR

SUBCLAVIUS M.

ORIGIN	1st RIB
INSERTION	CLAVICLE
NERVE SUPPLY	THE NERVE TO THE SUBCLAVIUS
ACTION	DEPRESSES & STEADIES THE CLAVICLE
BLOOD SUPPLY	THORACOACROMIAL ARTERY

SERRATUS ANTERIOR M.

ORGIN	UPPER 8-9 RIBS
INSERTION	MEDIAL BORDER OF SCAPULA
NERVE SUPPLY	LONG THORACIC NERVE
ACTION	HOLDS SCAPULA TO RIB CAGE ABDUCTS SCAPULA WITH ARM MOVEMENTS
BLOOD SUPPLY	LATERAL THORACIC ARTERY

SUBSCAPULARIS M.

ORIGIN	COSTAL SURFACE OF SCAPULA
INSERTION	LESSER TUBERCLE OF HUMERUS
NERVE SUPPLY	UPPER & LOWER SUBSCAPULAR NERVES
ACTION	MEDIALLY ROTATES THE ARM STABILIZES THE SHOULDER JOINTS
BLOOD SUPPLY	LATERAL THORACIC ARTERY, SUBSCAPULAR ARTERY

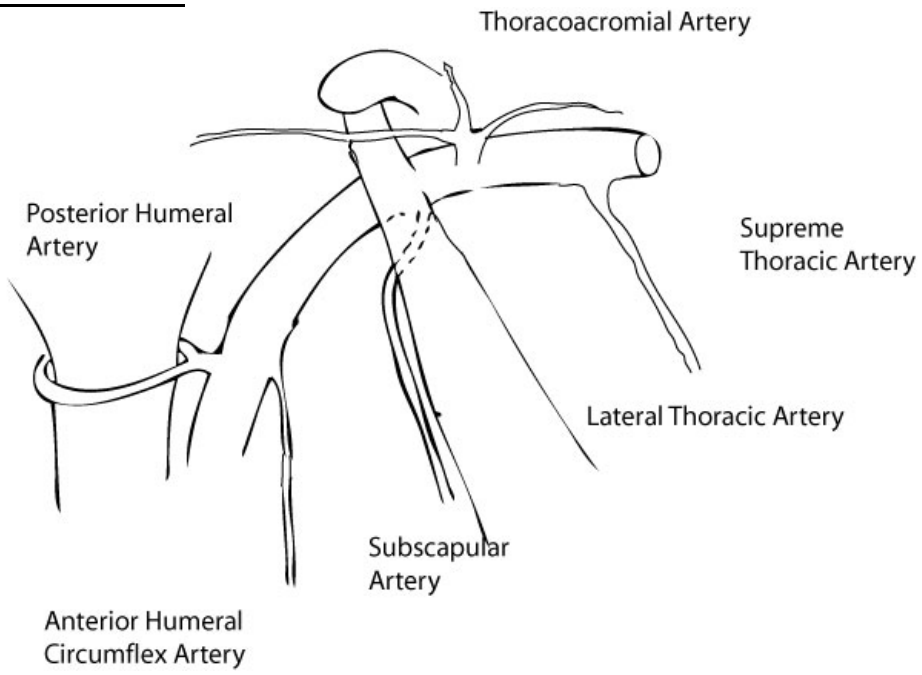
LATISSIMUS DORSI M.

ORIGIN	SP'S OF T7 -T12 & L1- L5, ILIAC CREST, LOWER 3 OR 4 RIBS INFERIOR ANGLE OF SCAPULA
INSERTION	MEDIAL LIP OF BICIPITAL GROOVE OF HUMERUS
NERVE SUPPLY	THORACODORSAL NERVE
ACTION	EXTENDS, ADDUCTS & MEDIALLY ROTATES ARM
BLOOD SUPPLY	DESCENDING SCAPULAR A.

TERES MAJOR M.

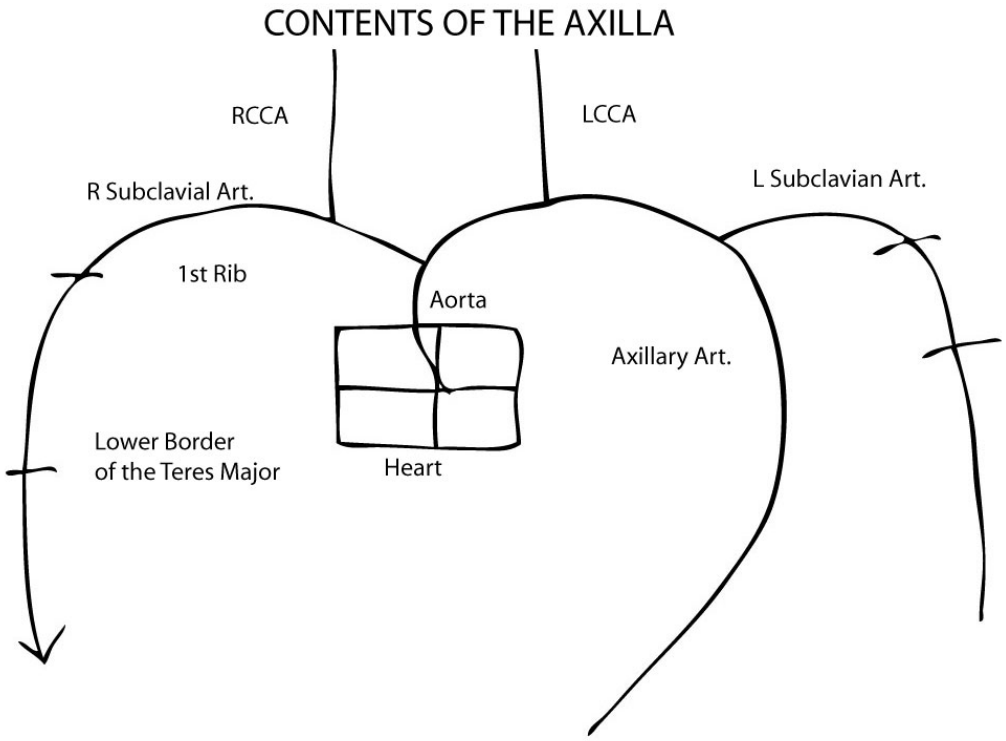
ORIGIN	LOWER 1/3 OF LATERAL SURFACE OF SCAPULA
INSERTION	MEDIAL LIP OF BICIPITAL GROOVE OF HUMERUS
NERVE SUPPLY	LOWER SUBSCAPULAR NERVE
ACTION	MEDIALLY ROTATES & ADDUCTS THE HUMERUS
BLOOD SUPPLY	SCAPULAR CIRCUMFLEX ARTERY

AXILLARY ARTERY



Axillary Artery

Enclosed within a sheath, and lies within the cords of the brachial plexus



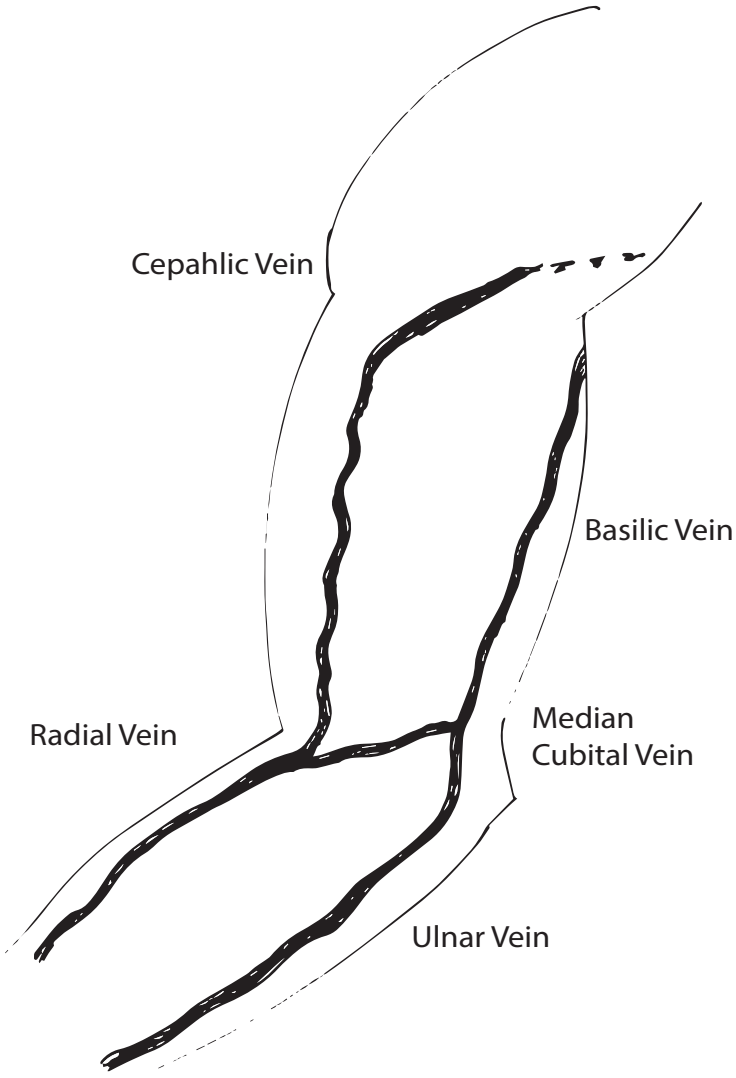
BRANCHES OF AXILLARY ARTERY

1- HIGHEST THORACIC ARTERY (SUPREME THORACIC ARTERY)- 1 ST ICS
2- THORACOACROMIAL ARTERY- PECTORALIS MM.
DELTOID M.
SUBCLAVIUS M.
3- LATERAL THORACIC ARTERY- ANTERIOR SERRATUS (LONG THORACIC) M.
SUBSCAPULARIS M.

4- SUBSCAPULAR ARTERY
-scapular circumflex artery - scapular mm.

5 & 6- ANTERIOR & POSTERIOR HUMERAL CIRCUMFLEX ARTERIES
(POSTERIOR IS USUALLY 2-3 TIMES LARGER IN DIAM.)

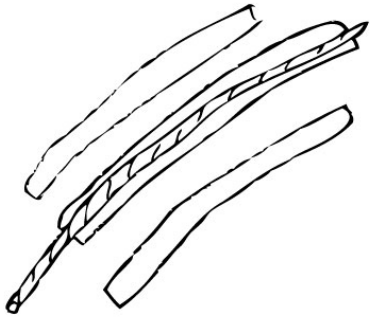
CEPHALIC VEIN --> AXILLARY VEIN -->(DRAINS SUPERFICIAL
BASILIC VEIN- AREAS OF BODY)



BRACHIAL PLEXUS

COMES FROM POSTERIOR TRIANGLE OF NECK

C5, C6, C7,C, T, -> ROOTS (SOMETIMES C 4 - T2) COMES FROM VPR



BRACHIAL PLEXUS OUTLINE

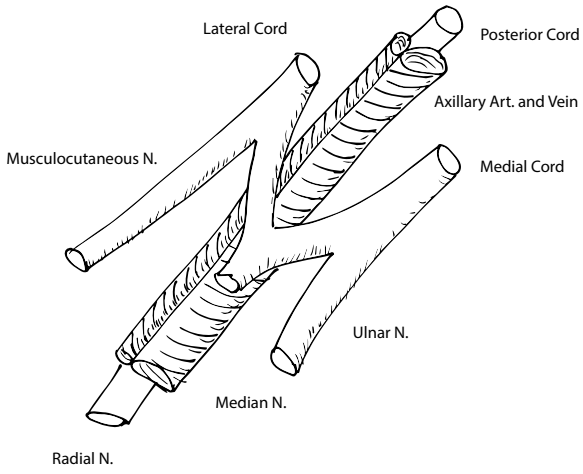
5 ROOTS EXIT THE SPINAL CORD THROUGH IVF

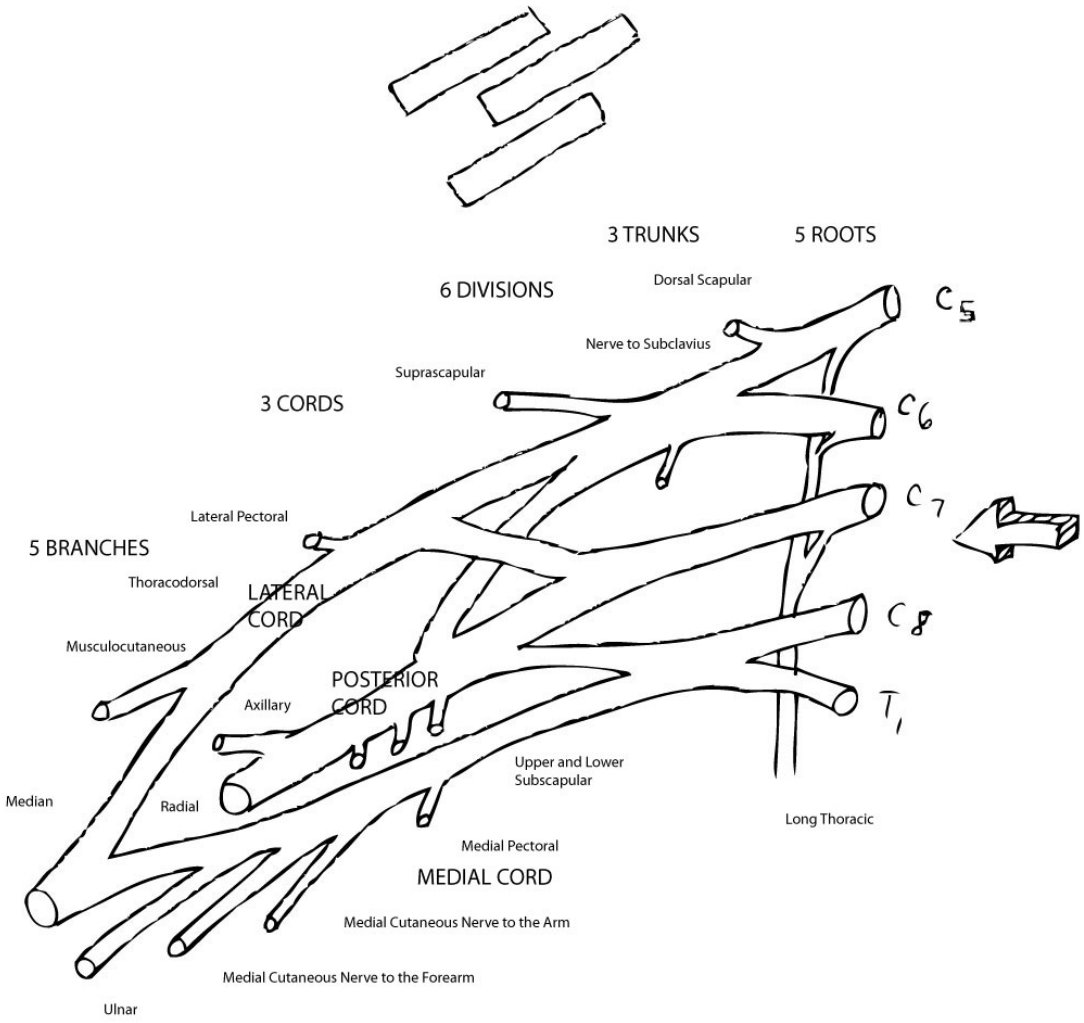
3TRUNKS BY UNITING, DIVIDING & UNITING AGAIN, THE ROOTS MIX WITHIN THE TRUNKS.

6 DIVISIONS (3 ANTERIOR, 3 POSTERIOR)

3 CORDS

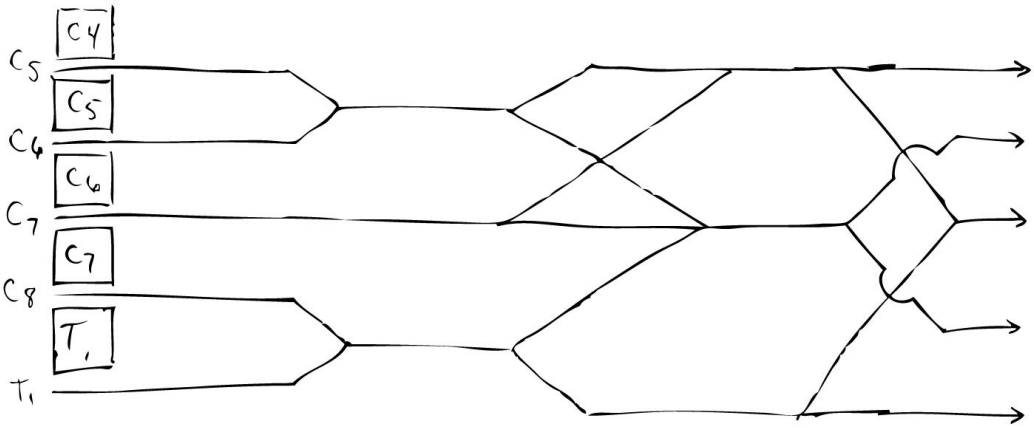
5 BRANCHES





BRACHIAL PLEXUS

5 Roots 3 Trunks 6 Divisions 3 Cords 5 Branches



BRACHIAL PLEXUS

Roots

Long Thoracic N.- C5,C6,C7
Dorsal Scapular N.- C5
Phrenic N.- C3,C4,C5

Trunks

Nerve to the Subclavius- C5,C6
Suprascapular N.- C4,C5,C6
Supraspinatus and Infraspinatus mm.

Cords

Lateral	Lateral Pectoral Nerve C5,C6, C& Pectoralis Major
	Musculocutaneous Nerve C4, C5, C6, C7
	Median Nerve C5-T1 (both lateral and Medial)
Medial	Ulnar Nerve (C7), C8, T1
	Medial Pectoral Nerve – Pectoralis Minor
	Medial Cutaneous Nerve to the Arm
	Medial Cutaneous Nerve to the Forearm
Posterior	Axillary Nerve C5, C6
	Upper and Lower Subscapular Nerves (C4), C5, C6 (C7) Subscapularis and Teres Major
	Thoracodorsal Nerve C5-C8 Latissimus Dorsi

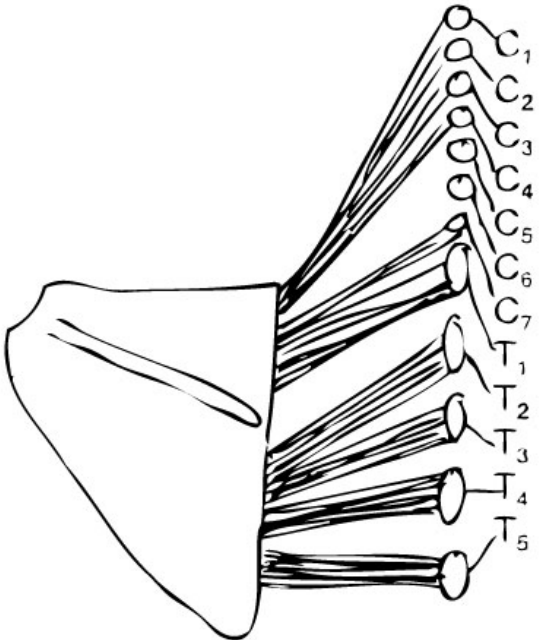
SUPERFICIAL BACK, SCAPULAR AND SHOULDER REGION

TRAPEZIUS MUSCLE

ORIGIN	OCCIPITAL BONE, EOP (INION)
	SUPERIOR NUCHAL LINE,17 BONY ATTACHMENTS
	LIGAMENTUM NUCHAE
	SP'S- C7 T1-T12
INSERTION	LATERAL 1/3 OF CLAVICLE
	ACROMION
	SPINE OF SCAPULA
NERVE SUPPLY	SPINAL ACCESSORY n. C3, C4
ACTION	ADDUCTS SCAPULA
	CRANIALLY ROTATES SCAPULA (PULLS SHOULDERS BACK)
BLOOD SUPPLY	DESCENDING SCAPULAR A.

LEVATOR SCAPULA M.

ORIGIN	TP'S OF ATLAS, AXIS,C3, C4
INSERTION	VERTEBRAL BORDER OF SCAPULA BETWEEN MEDIAL ANGLE & ROOT OF SPINE
NERVE SUPPLY	C3, C4, DORSAL SCAPULAR N. (C5)
ACTION	ELEVATES SCAPULA
BLOOD SUPPLY	DESCENDING SCAPULAR A.



RHOMBOIDS MAJOR M

ORIGIN	SP's OF T2 -T5
INSERTION	MEDIAL BORDER OF SCAPULA
NERVE SUPPLY	DORSAL SCAPULAR N
ACTION	ADDUCTS & ROTATES THE SCAPULA
BLOOD SUPPLY	DESCENDING SCAPULAR A.

RHOMBOIDS MINOR M.

ORIGIN	LIGAMENTUM NUCHAE, SP's C7,T1,
INSERTION	ROOT OF SPINE OF SCAPULA
NERVE SUPPLY	DORSAL SCAPULAR N.
ACTION	ADDUCTS & CAUDALLY ROTATES SCAPULA
BLOOD SUPPLY	DESCENDING SCAPULAR A.

DELTOID M

ORIGIN	ANT. FIBERS - LATERAL 1/3 CLAVICLE MIDDLE FIBERS- ACROMION POST. FIBERS - SPINE OF SCAPULA
INSERTION	DELTOID TUBEROSITY OF HUMERUS
NERVE SUPPLY	AXILLARY N.
ACTION	ABDUCT SHOULDER IN ADDITION: ANT. FIBERS- POST. FIBERS-
BLOOD SUPPLY	POSTERIOR HUMORAL CIRCUMFLEX A. THORACOACROMIAL A. (ACROMIAL DIVISION)

SUPRASPINATUS M.

ORIGIN	SUPRASPINOUS FOSSA OF SCAPULA
INSERTION	GREATER TUBEROSITY OF HUMERUS - SUPERIOR FACET
NERVE SUPPLY	SUPRASCAPULAR N. C5, C6
ACTION	ABDUCTION OF SHOULDER
BLOOD SUPPLY	SUPRASCAPULAR A.

INFRASPINATUS M.

ORIGIN	INFRASPINOUS FOSSA
INSERTION	GREATER TUBEROSITY OF HUMERUS - MIDDLE FACET
NERVE SUPPLY	SUPRASCAPULAR N.
ACTION	LATERAL ROTATION OF ARM
BLOOD SUPPLY	SUPRASCAPULAR A. SCAPULAR CIRCUMFLEX A.

TERES MINOR M.

ORIGIN	MIDDLE 1/3 OF LATERAL BORDER OF SCAPULA
INSERTION	GREATER TUBEROSITY OF HUMERUS - LOWER FACET
NERVE SUPPLY	AXILLARY N.
ACTION	LATERAL ROTATION OF ARM
BLOOD SUPPLY	SCAPULAR CIRCUMFLEX A.

MUSCULAR SPACES OF THE SHOULDER REGION

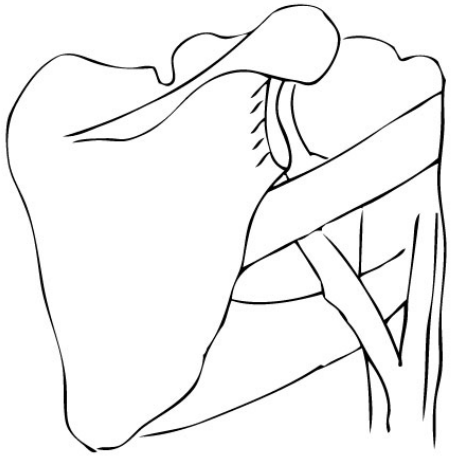
1) QUANDRANGULAR SPACE
   AXILLARY N

   POSTERIOR HUMERAL CIRCUMFLEX A.

2) TRIANGULAR INTERVAL
   RADIAL N.

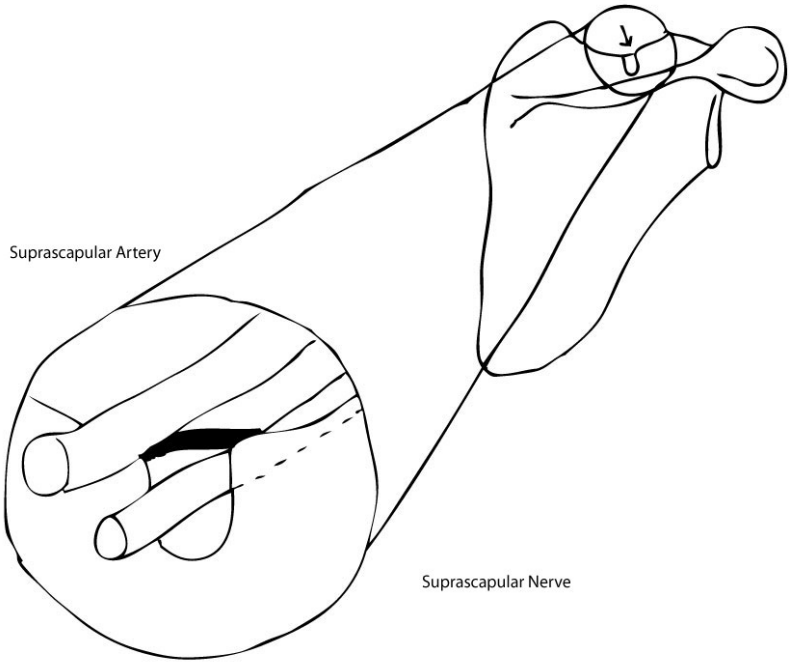
   PROFUNDA BRACHII A.

3) TRIANGULAR SPACE
   SCAPULAR CIRCUMFLEX A.



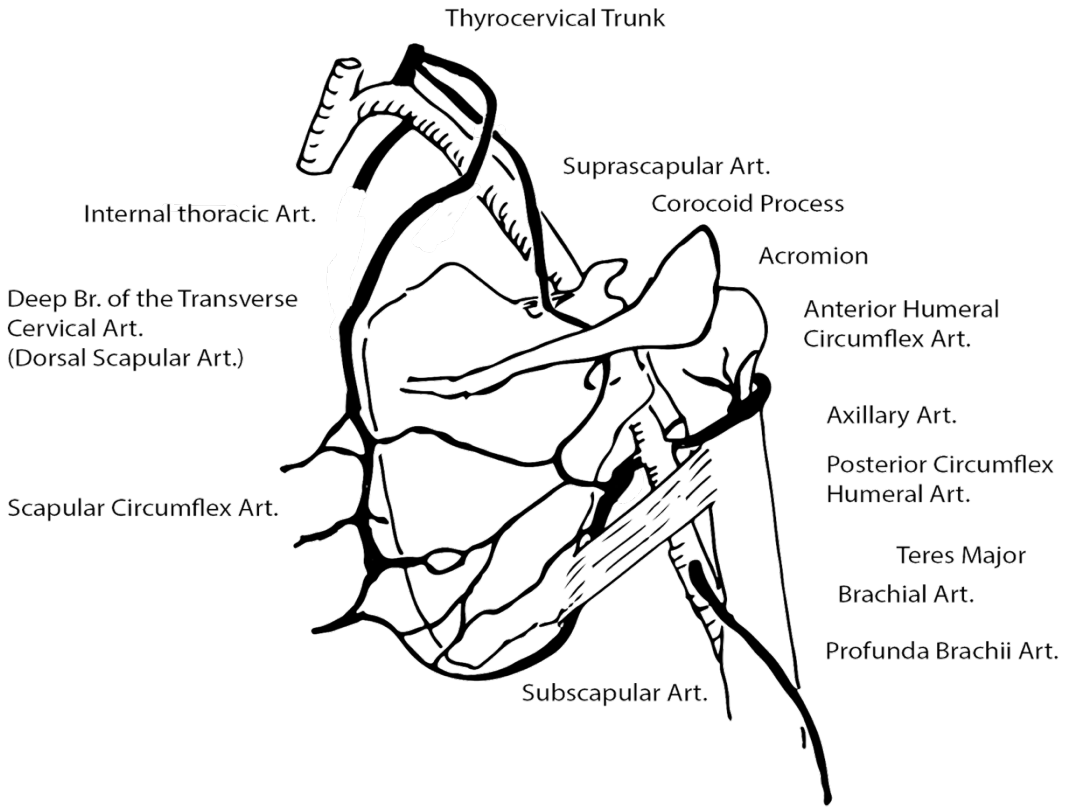
SUPRASCAPULAR NOTCH

- COVERED BY SUPRASCAPULAR LIG.
  - SUPRASCAPULAR ARTERY RUNS OVER LIGAMENT
  - SUPRASCAPULAR NERVE RUNS UNDER LIGAMENT



SUPRASCAPULAR A.
& NERVE

VESSELS OF THE AXILLARY REGION



SUBCLAVIAN ARTERY

Thyrocervical Trunk
- Superficial Cervical Artery
  - Deep Branch – Descending Scapular Artery
    - Anastomosis with Subscapular Artery

Suprascapular Artery
- Anastomosis with Scapular Circumflex Artery

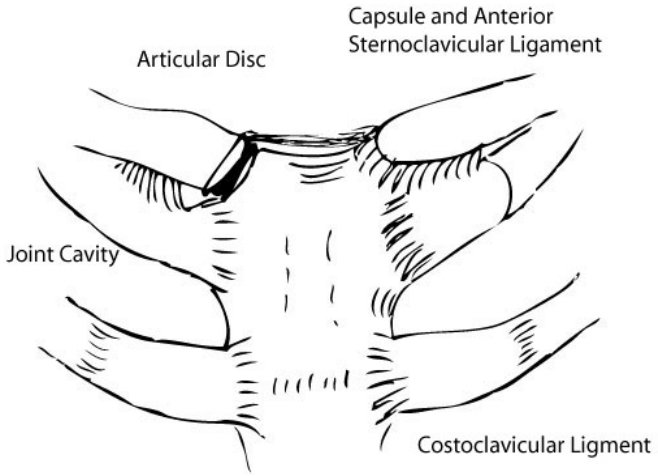
SHOULDER JOINT

STERNOCLAVICULAR JT. & ACROMIOCLAVICULAR JT.
- SYNOVIAL JOINTS
- CAPSULE REINFORCED BY LIGAMENTS
- SYNOVIAL FLUID
- SYNOVIAL MEMBRANE

STERNOCLAVICULAR JOINT (SC)

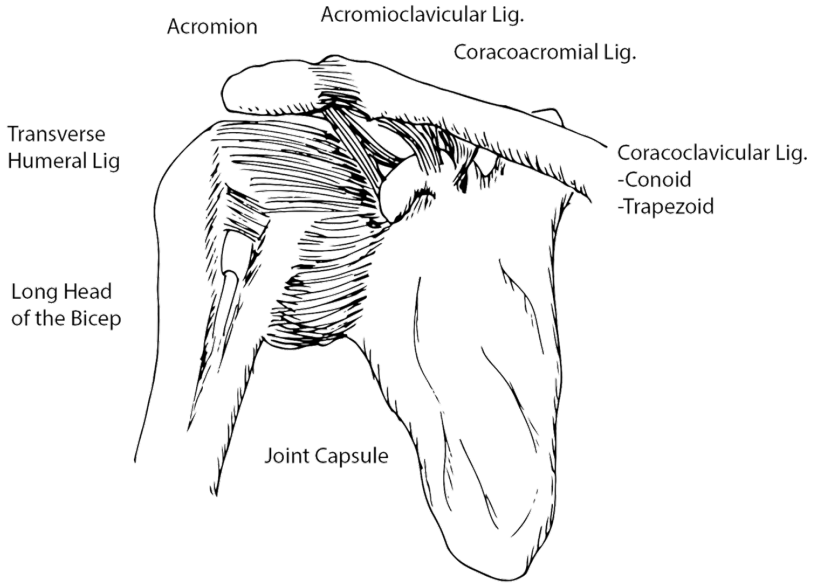
ARTICULATION STERNAL END OF CLAVICLE - MANUBRIUM
AND 1st COSTAL CART.
STERNOCLAVICULAR LIG
COSTOCLAVICULAR LIG

MOVEMENT IS ANT., POST., CEPHALAD, CAUDAL
ARTICULAR DISC IS PRESENT
INNERVATED BY THE SUPRACLAVICULAR NERVE AND THE NERVE TO THE SUBCLAVIUS



ACROMIOCLAVICULAR JOINT (AC)
LIGAMENTS

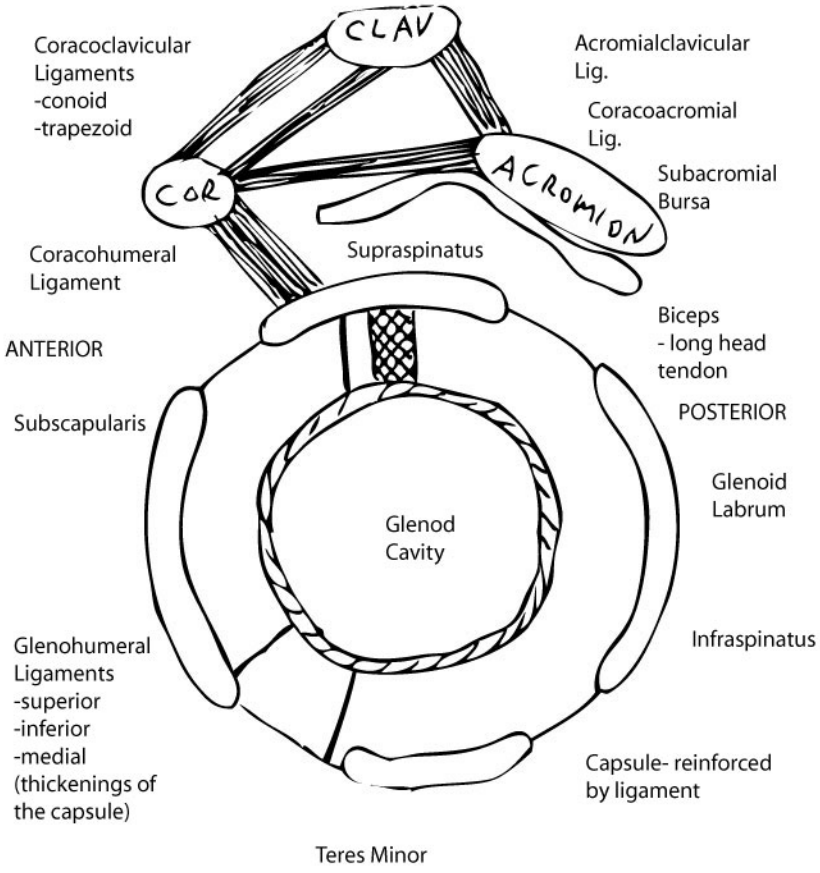
SUPERIOR & INFERIOR ACROMIOCLAVICULAR LIGAMENTS
FIBROCARTILAGE DISC
CORACOCLAVICULAR LIGAMENTS
GLIDING MOVEMENT
JOINT INNERVATED BY SUPRASCAPULAR NERVE



SHOULDER JOINT

GLENOHUMERAL JOINT
IT IS A SYNOVIAL JOINT
A POLYAXIAL JOINT

PARASAGITAL VIEW OF LEFT SHOULDER



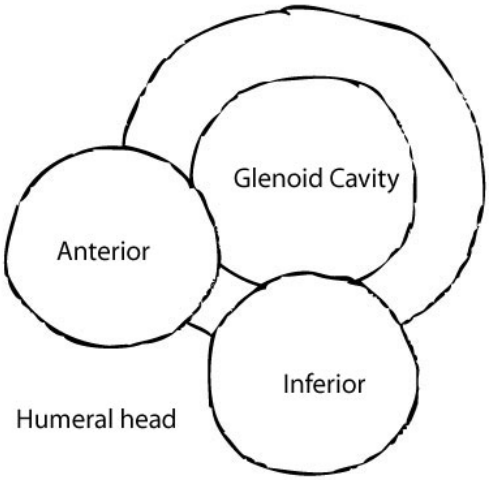
SHOULDER COMPLICATION

SUPRASPINATUS TENDINITIS
PERICAPSULITIS
SUBACROMIAL BURSITIS

DISLOCATIONS

ANTERIOR DISLOCATION
EVENTUALLY, HEAD OF HUMERUS IS PULLED FORWARD & INFERIOR BECAUSE OF THE ATTACHED MUSCLES
(SUPSCAPULAR M)

INFERIOR DISLOCATION



MOVEMENTS OF THE SHOULDER

FLEXION
- ANTERIOR DELTOID
- CORACOBRACHIALIS
- PECTORALIS MAJOR
- BICEPS (TO SOME EXTENT)

EXTENSION
- TERES MAJOR
- LATISSIMUS DORSI
- POSTERIOR DELTOID
- TRICEPS

ABDUCTION
- DELTOIDS
- SUPRASPINATUS
- TRAPEZIUS
- SERRATUS ANTERIOR

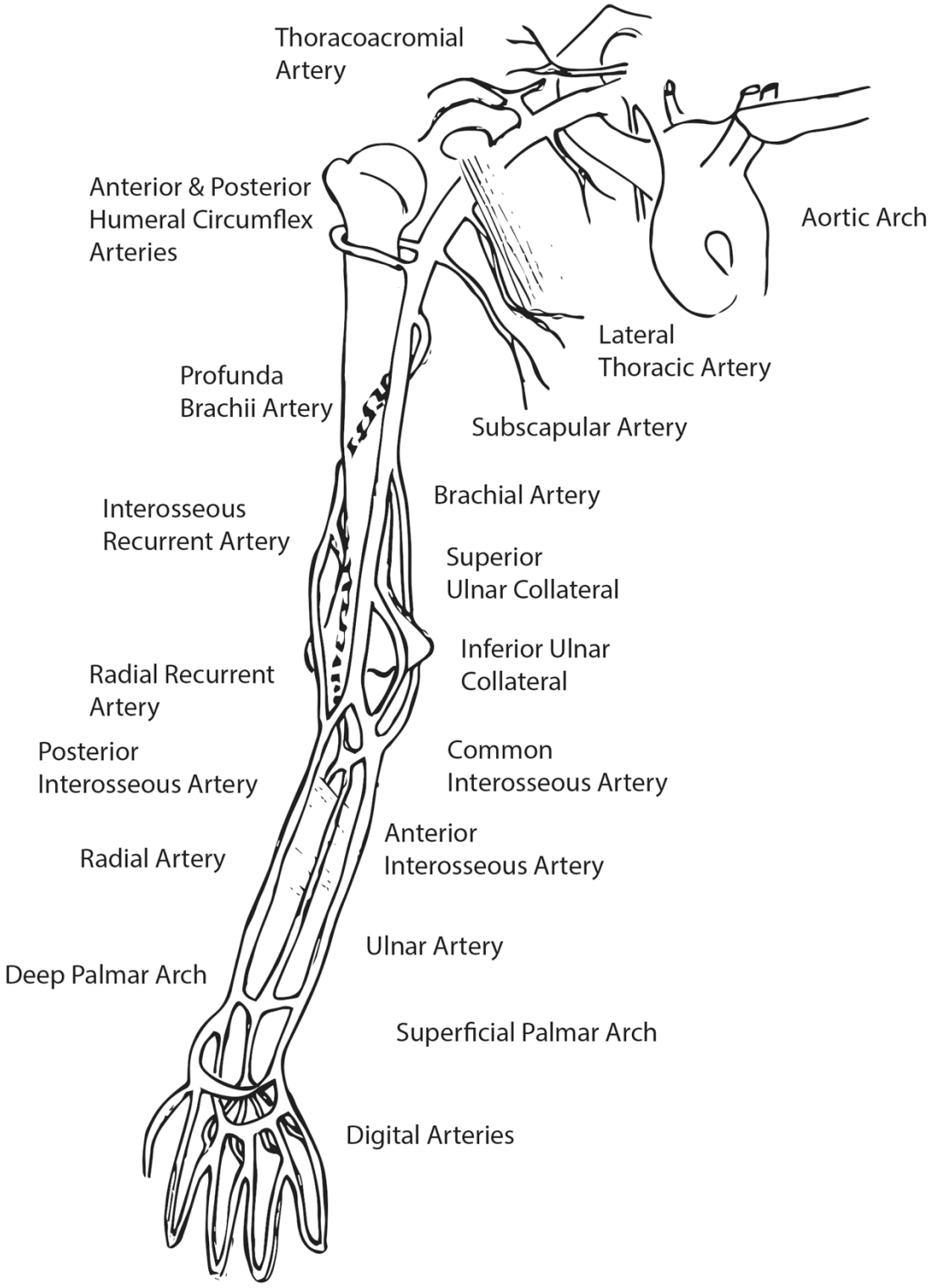
ADDUCTION
- PECTORALIS MAJOR
- LATISSIMUS DORSI
- TERES MAJOR
- TERES MINOR

LATERAL ROTATION
- INFRASPINATUS
- TERES MINOR
- POSTERIOR DELTOID

MEDIAL ROTATION
- SUBSCAPULARIS
- LATISSIMUS DORSI
- PECTORALIS MAJOR
- TERES MAJOR
- ANTERIOR DELTOID

CIRCUMDUCTION
- COMBINATION OF ALL OF THE ABOVE

VASCULARIZATION OF THE UPPER LIMB



UPPER EXTREMITY

BRACHIUM (ARM)

ANTERIOR COMPARTMENT

BICEPS BRACHII M.
CORACOBRACHIALIS M., BRACHIALIS M.

NERVE SUPPLY

MUSCULOCUTANEOUS NERVE

BLOOD SUPPLY

BRACHIAL A.

GROUP ACTION

ELBOW FLEXION
SUPINATION

POSTERIOR COMPARTMENT

TRICEPS BRACHII M.
ANCONEUS M.

NERVE SUPPLY

RADIAL NERVE

BLOOD SUPPLY

PASS THROUGH TRIANGULAR INTERVAL
PROFUNDA BRACHII A.

ANTERIOR COMPARTMENT

BICEPS BRACHII M.

ORIGIN	LONG HEAD SUPRAGLENOID TUBERCLE SHORT HEAD TIP OF CORACOID PROCESS OF SCAPULA
INSERTION	TUBEROSITY OF THE RADIUS BONE; ATTACHED VIA THE BICIPTAL APONEUROSIS
NERVE SUPPLY	MUSCULOCUTANEOUS N.
ACTION	FLEXION & SUPINATION OF ELBOW
BLOOD SUPPLY	BRACHIAL A.

CORACOBRACHIALIS M.

ORIGIN	CORACOID PROCESS
INSERTION	SHAFT OF HUMERUS
NERVE SUPPLY	MUSCULOCUTANEOUS N.
ACTION	FLEXES ARM
BLOOD SUPPLY	BRACHIAL A.

BRACHIALIS M.

ORIGIN	SHAFT OF HUMERUS
INSERTION	CORONOID PROCESS OF ULNA
NERVE SUPPLY	MUSCULOCUTANEOUS, N.,
ACTION	STRONG ELBOW FLEXOR
BLOOD SUPPLY	BRACHIAL A.

POSTERIOR COMPARTMENT

TRICEPS BRACHII M.

ORIGIN	LONG HEAD
	INFRAGLENOID TUBERCLE OF SCAPULA
	LATERAL HEAD
	POSTEROLATERAL HUMERUS
	MEDIAL HEAD
	LOWER POSTERIOR HUMERUS
INSERTION	OLECRENON OF UNLA
	FOREARM FASCIA
NERVE SUPPLY	RADIAL NERVE
ACTION	EXTENDS FOREARM
BLOOD SUPPLY	PROFUNDA BRACHII A.

ANCONEUS

ORIGIN	LATERAL EPICONDYLE OF THE HUMERUS
INSERTION	LATERAL SIDE OF THE OLECRENON
ACTION	ASSIST IN EXTENDING THE FOREARM
NERVE SUPPLY	RADIAL N.
BLOOD SUPPLY	BRANCH OF THE PROFUNDA ARTERY

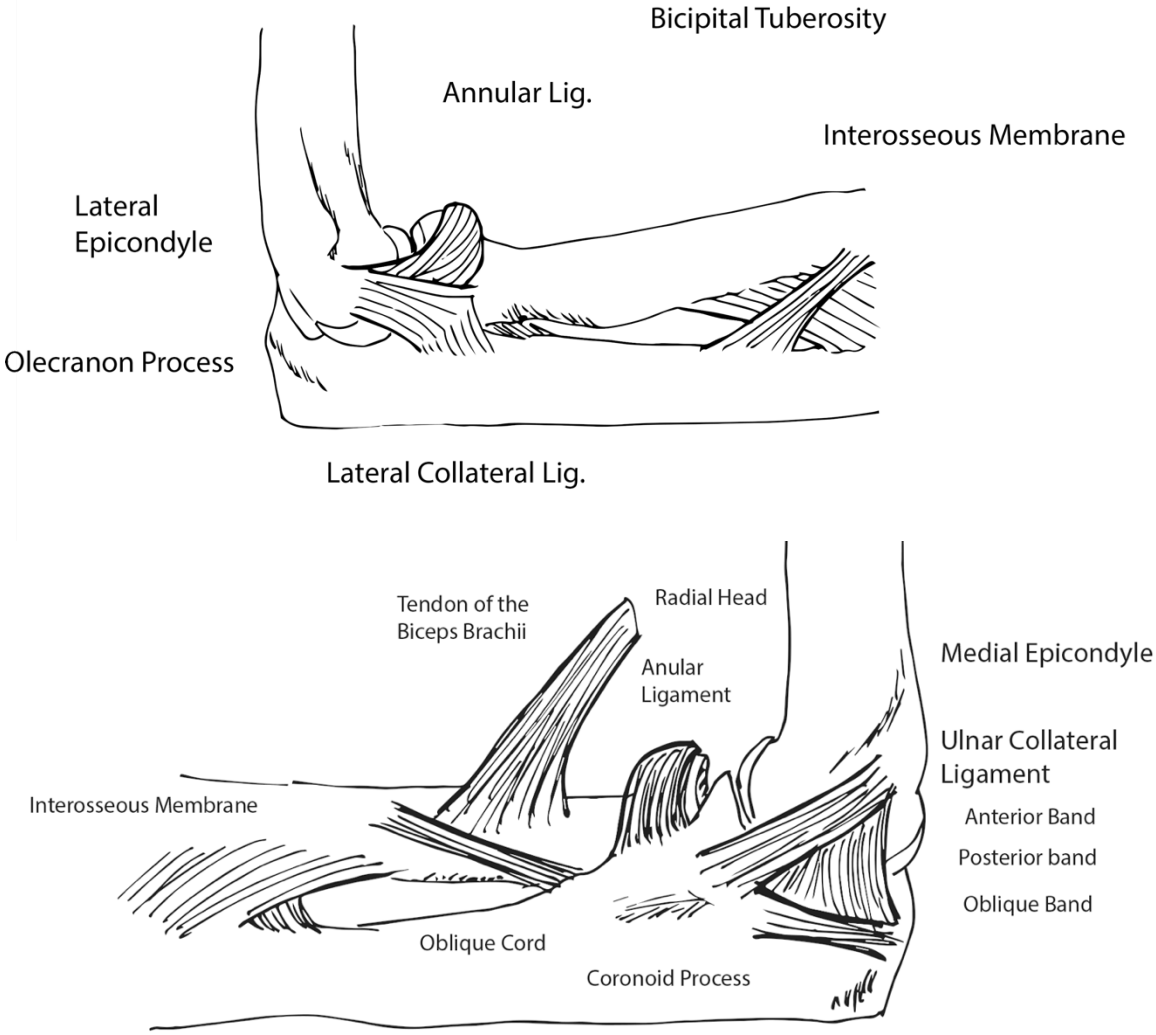
ELBOW JOINT

CAPABLE OF FLEXION & EXTENSION
UNIAXIAL, SYNOVIAL HINGE JOINT

HUMEROULNAR JOINT
ARTICULATION BETWEEN TROCHLEA OF HUMERUS AND TROCHLEAR NOTCH OF ULNA.

HUMERORADIAL JOINT
ARTICULATION BETWEEN CAPITULUM OF HUMERUS AND HEAD OF RADIUS.

ELBOW LIGAMENTS



NERVE SUPPLY

MEDIAN, ULNAR, RADIAL and MUSCULOCUTANEOUS NERVES

ACTION

FLEXION

BRACHIALIS M.
BICEPS BRACHII M.
BRACHIORADIALIS M.
PRONATOR TERES M.

EXTENSION

TRICEPS BRACHII M.

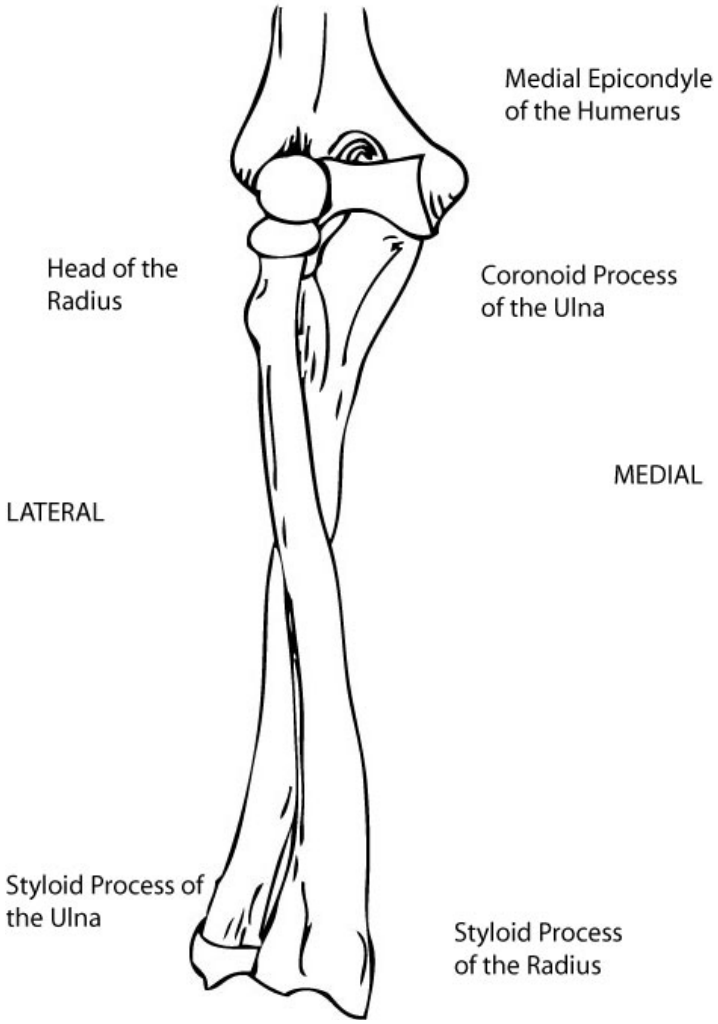
ANCONEUS M.

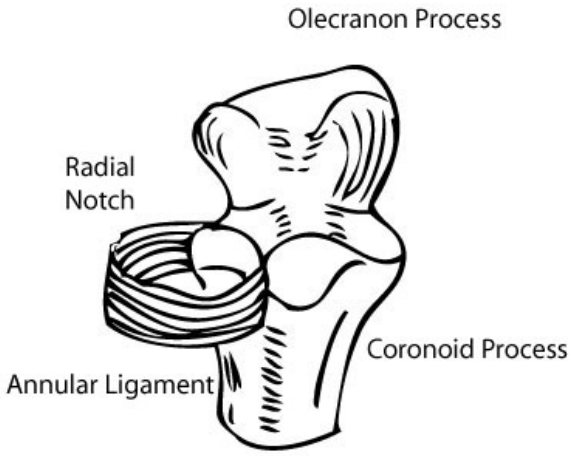
SUPINATION & PRONATION

RADIOULNAR JOINT

PROXIMAL

DISTAL





FOREARM (ANTEBRACHIUM)

CUTANEOUS NERVES
- PTTP

SUPERFICIAL VEINS
- BASILIC VEIN - ULNAR SIDE
- CEPHALIC VEIN - RADIAL SIDE
- MEDIAL CUBITAL VEIN - DRAW BLOOD FROM THIS VEIN

LYMPHATIC VESSELS

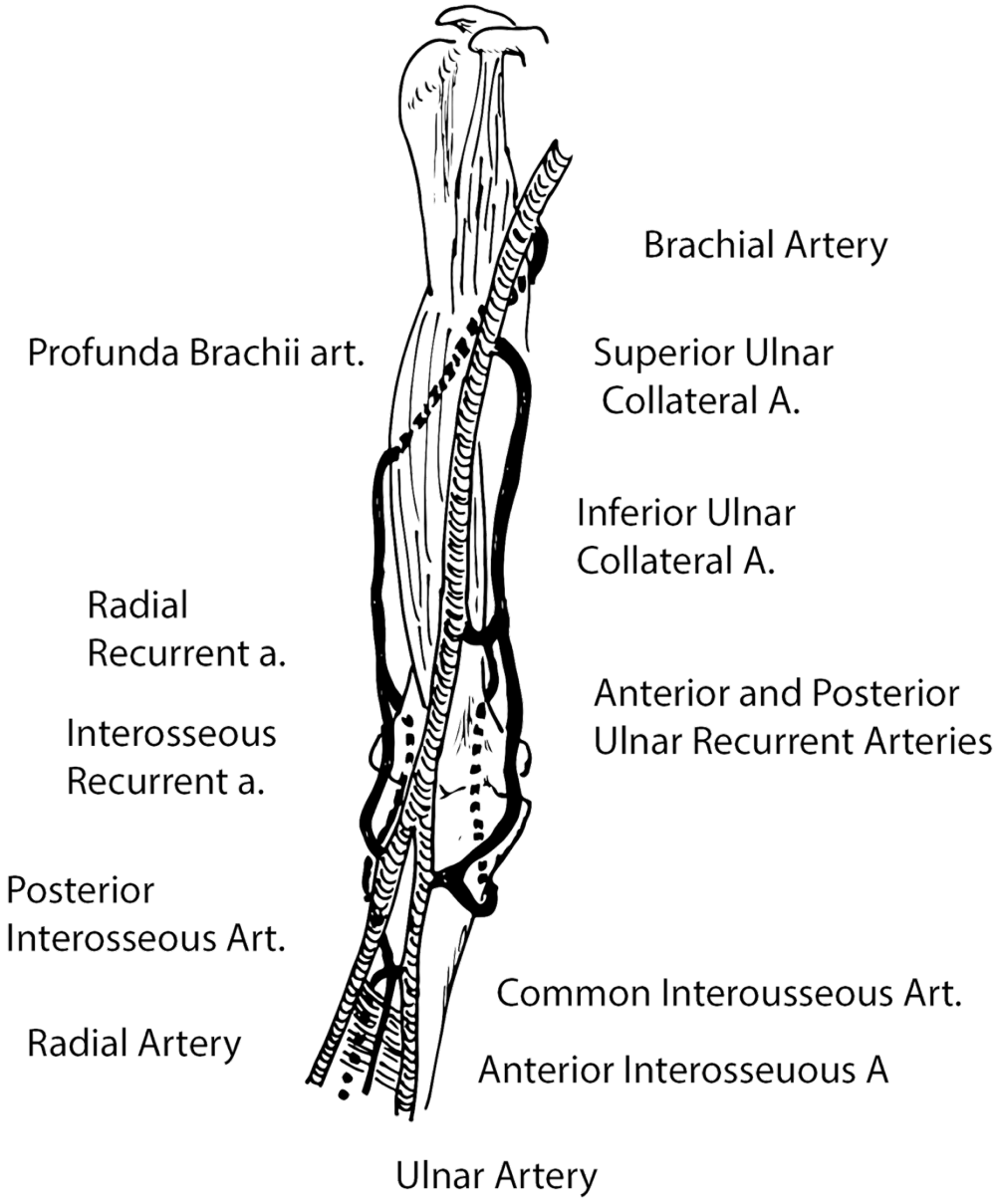
ANTERIOR FOREARM COMPARTMENT

GENERAL CHARACTERISTICS EIDF

1) MOST ORIGINATE FROM COMMON TENDON
   - ORIGIN THAT ATTACHES TO THE MEDIAL EPICONDYLE OF HUMERUS & THE ULNA.

2) BLOOD SUPPLY FROM ULNAR & RADIAL ARTERIES

3) MEDIAN NERVE SUPPLIES ALL OF THE FOREARM EXCEPT:
   - FLEXOR CARPI ULNARIS M. - (ULNAR NERVE)
   - 1/2 OF FLEXOR DIGITORM PROFUNDIS M. - (ULNAR NERVE)



MUSCLES OF ANTERIOR FOREARM
SUPERFICIAL MM.

PRONATOR TERES M.
FLEXOR CARPI RADIALIS M.
PALMARIS LONGUS M.
FLEXOR CARPI ULNARIS M.

INTERMEDIATE MM.
FLEXOR DIGITORUM SUPERFICIALIS

DEEP MM.
PRONATOR QUADRATUS M.
FLEXOR POLLICIS LONGUS M.
FLEXOR DIGITORUM PROFUNDUS M.

SUPERFICIAL ANTERIOR FOREARM COMPARTMENT

PALMARIS LONGUS M.

FREQUENTLY ABSENT
FOUND MORE OFTEN ON RIGHT SIDE THAN LEFT

ORIGIN	COMMON TENDON ORIGIN ATTACHED TO MEDIAL EPICONDYLE OF HUMERUS
INSERTION	FLEXOR RETINACULUM OF WRIST PALMAR APONEUROSIS OF HAND EIDF- TOUGH
NERVE SUPPLY	MEDIAN N.
ACTION	FLEXES THE HAND
BLOOD SUPPLY	PROBABLY POSTERIOR RECURRENT, ULNAR ARTERY & ½ FROM RADIAL ARTERY

FLEXOR CARPI ULNARIS M.

ORIGIN	COMMON TENDON ULNA
INSERTION	PISIFORM BONE HOOK OF THE HAMATE 5TH METACARPAL BONE
NERVE SUPPLY	ULNAR NERVE
ACTION	FLEXION OF WRIST ULNAR DEVIATION
BLOOD SUPPLY	ULNAR ARTERY

PRONATOR TERES M.

ORIGIN	COMMON TENDON ULNA
INSERTION	PRONATOR TUBEROSITY ON SHAFT OF RADIUS
NERVE SUPPLY	MEDIAN NERVE
ACTION	PRONATION, SOME FLEXION OF FOREARM
BLOOD SUPPLY	ULNAR A. (ANT. RECURRENT A.)

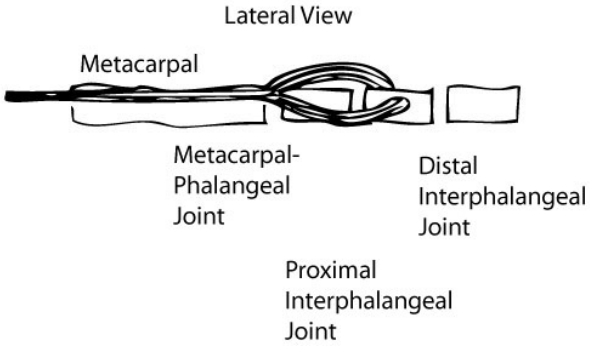
FLEXOR CARPI RADIALIS

ORIGIN	COMMON TENDON
INSERTION	2ND AND 3RD METACARPAL BONES
NERVE SUPPLY	MEDIAN NERVE
ACTION	RADIAL FLEXION OF WRIST
BLOOD SUPPLY	RADIAL AA.

INTERMEDIATE ANTERIOR FOREARM MUSCLES

FLEXOR DIGITORUM SUPERFICIALIS

ORIGIN	COMMON TENDON
INSERTION	SIDE OF 2ND PHALANX



NERVE SUPPLY	MEDIAN NERVE
ACTION	FLEXES FOREARM WRIST METACARPAL-PHALANGEAL JOINT PIP JOINT
BLOOD SUPPLY	RADIAL , ULNAR AA.

DEEP ANTERIOR FOREARM MUSCLES

FLEXOR DIGITORUM FROFUNDUS M.

ORIGIN	ULNA, INTEROSSEOUS MEMBRANE
INSERTION	BASE OF DISTAL PHALANX

NERVE SUPPLY	MEDIAL PORTION	ULNAR NERVE
	LATERAL PART	ANTERIOR INTEROSSEOUS BRANCH OF MEDIAN NERVE
ACTION	FLEX	WRIST METACARPAL - PHALANGEAL JOINT PIP JOINT DIP JOINT
BLOOD SUPPLY	ANTERIOR INTEROSSEOUS ARTERY	

FLEXOR POLLICIS LONGUS M.

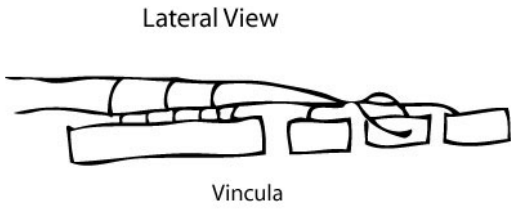
ORIGIN	ANTERIOR SHAFT OF RADIUS INTEROSSEOUS MEMBRANE
INSERTION	BASE OF DISTAL PHALANX OF THUMB
NERVE SUPPLY	ANT. INTEROSSEUS BR. OF THE MEDIAN N.
ACTION-	FLEX WRIST 1ST MP JOINT IP JOINT OF THUMB
BLOOD SUPPLY	ANT. INTEROSSEOUS BR.OF ULNAR A.

PRONATOR QUADRATUS M.

ORIGIN	LOWER ¼ 0F ULNA
INSERTION	LOWER ¼ 0F RADIUS
NERVE SUPPLY	ANT. INTEROSSEOUS NERVE
ACTION	PRONATION OF FOREARM
BLOOD SUPPLY	ANT. INTEROSSEOUS ARTERY

VINCULA

LITTLE TENDONACEOUS BRANCHES THAT HOLD FLEXOR TENDONS NEAR BONES



LATERAL FOREARM COMPARTMENT MUSCLES

BRACHIORADIALIS M.
FLEXOR OF FOREARM

EXTENSOR CARPI RADIALIS LONGUS M.

BRACHIORADIALIS M.

ORIGIN	UPPER 2/3 OF LATERAL SUPRACONDYLAR RIDGE OF THE HUMERUS
INSERTION	STYLOID PROCESS OF RADIUS
NERVE SUPPLY	RADIAL NERVE
ACTION	FLEXION OF FOREARM
BLOOD SUPPLY	RADIAL AND BRACHIAL AA.

EXTENSOR CARPI RADIALIS LONGUS M.

ORIGIN	LATERAL SUPRACONDYLAR RIDGE OF HUMERUS
INSERTION	POSTERIOR SURFACE OF BASE OF SECOND METACARPAL BONE
NERVE SUPPLY	RADIAL NERVE
ACTION	FLEX/EXTENDS FOREARM-depending on position, EXTENSION AND RADIAL FLEXION OF THE HAND
BLOOD SUPPLY	RADIAL ARTERY

POSTERIOR FOREARM COMPARTMENT
GENERAL CHARACTERISTICS

Superficial muscles all originate from common tendon of origin that attaches to the lateral epicondyle of the humerus.
Blood supply to muscles from posterior and anterior interosseous arteries.
Deep branch of the radial nerve (posterior interosseous n.) supplies most of the posterior forearm.

MUSCLES OF THE POSTERIOR FOREARM
SUPERFICIAL MM.

EXTENSOR CARPI RADIALIS BREVIS M.
EXTENSOR DIGITORUM M.
EXTENSOR DIGITI MINIMI M.
ANCONEUS M.

DEEP MM.

SUPINATOR M
ABDUCTOR POLLICIS LONGUS M.
EXTENSOR POLLICIS BREVIS M.
EXTENSOR POLLICIS LONGUS M.
EXTENSOR INDICIS M.

SUPERFICIAL POSTERIOR FOREARM MUSCLES

EXTENSOR CARPI RADIALIS BREVIS M.

ORIGIN	COMMON TENDON ATTACHED TO LATERAL EPICONDYLE OF HUMERUS
INSERTION	POSTERIOR SURFACE OF BASE OF THIRD METACARPAL BONE
NERVE SUPPLY	POSTERIOR INTEROSSEOUS N.
ACTION	EXTENDS FOREARM EXTENSION & RADIAL FLEXION OF HAND
BLOOD SUPPLY	RADIAL A.

EXTENSOR DIGITORUM M.

ORIGIN	COMMON TENDON
INSERTION	ON POSTERIOR SURFACE OF EACH FINGER, THE TENDON BECOMES INCORPORATED INTO THE EXTENSOR EXPANSION. THIS EXPANSION SPLITS INTO 3 PARTS AT THE M.P. JOINT
EXT. INDICES	A CENTRAL PART WHICH INSERTS INTO BASE OF THE 2nd PHALANX.
EXT. DIGITI MINIMI	SAME AS ABOVE
LUMBRICALS	TWO LATERAL PARTS WHICH CONVERGE & INSERT INTO BASE OF DISTAL PHALANX
NERVE SUPPLY	POSTERIOR INTEROSSEOUS NERVE
ACTION	EXTENSION OF FOREARM, WRIST, METACARPOPHALANGEAL JOINT, PIP & DIP JOINTS
BLOOD SUPPLY	POSTERIOR INTEROSSEOUS ARTERY

EXTENSOR DIGITI MINIMI M.

ORIGIN	COMMON TENDON ATTACHED TO LATERAL EPICONDYLE OF HUMERUS
INSERTION	EXTENSOR (DORSAL) EXPANSION FOR LITTLE FINGER
NERVE SUPPLY	POSTERIOR INTEROSSEOUS NERVE
ACTION	EXTEND METACARPAL - PHALANGEAL JOINT OF LITTLE FINGER
BLOOD SUPPLY	POSTERIOR INTEOSSEOUS A.

EXTENSOR CARPI ULNARIS M.

ORIGIN	COMMON TENDON
INSERTION	5th METACARPAL BONE
NERVE SUPPLY	POSTERIOR INTEROSSEOUS N.
ACTION	EXTEND & ULNAR FLEXION OF HAND
BLOOD SUPPLY	POSTERIOR INTEROSSEOUS A.

ANCONEUS

ORIGN	LATERAL EPICONDYLE OF THE HUMERUS
INSERTION	OLECRANON PROCESS
NERVE SUPPLY	RADIAL NERVE
ACTION	EXTEND ELBOW LAST 5 DEGREES
BLOOD SUPPLY	PROFUNDA BRACHII A.

DEEP POSTERIOR FOREARM MUSCLES

SUPINATOR M.

ORIGIN	LAT. LIGAMENTS OF ELBOW ANNULAR LIGAMENT, ULNA
INSERTION	ABOVE OBLIQUE LINE OF RADIUS
NERVE SUPPLY	POSTERIOR INTEROSSEOUS N.
ACTION	SUPINATION
BLOOD SUPPLY	POSTERIOR INTEROSSEOUS A., RADIAL RECURRENT A.

ABDUCTOR POLLICIS LONGUS M.

ORIGIN	UNLA RADIUS INTEROSSEOUS MEMBRANE
INSERTION	1st METACARPAL BONE OF THUMB
NERVE SUPPLY	POSTERIOR INTEROSSEOUS N.
ACTION	ABDUCTS/EXTENDS THUMB
BLOOD SUPPLY	POSTERIOR INTEROSSEOUS A.

EXTENSOR POLLCIS BREVIS M.

ORIGIN	RADIUS INTEROSSEOUS MEMBRANE
INSERTION	PROXIMAL PHALANX OF THUMB
NERVE SUPPLY	POST. INTEROSSEOUS N.
ACTION	EXTENDS METACARPAL-PHALANGEAL JOINT OF THE THUMB
BLOOD SUPPLY	POSTERIOR INTEROSSEOUS A.

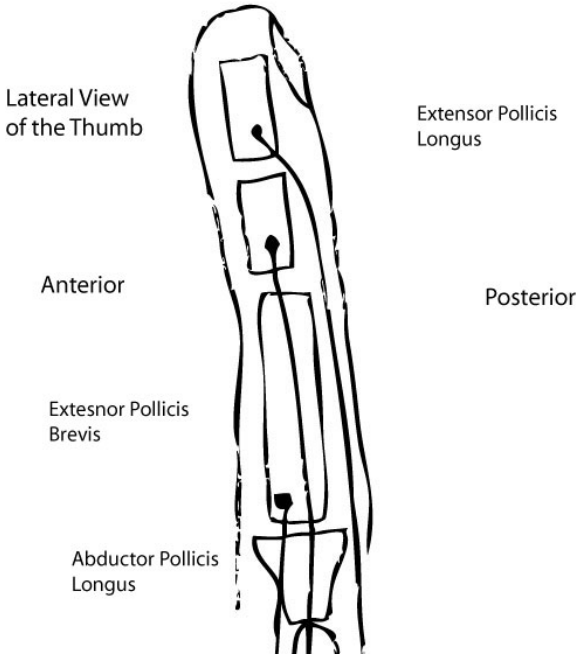
EXTENSOR POLLICIS LONGUS M.

ORIGIN	ULNA INTEROSSEOUS MEMBRANE
INSERTION	DISTAL PHALANX OF THUMB
NERVE SUPPLY	POST INTEROSSEOUS N.
ACTION	EXTENDS DISTAL PHALANX OF THUMB
BLOOD SUPPLY	POSTERIOR INTEROSSEOUS A.

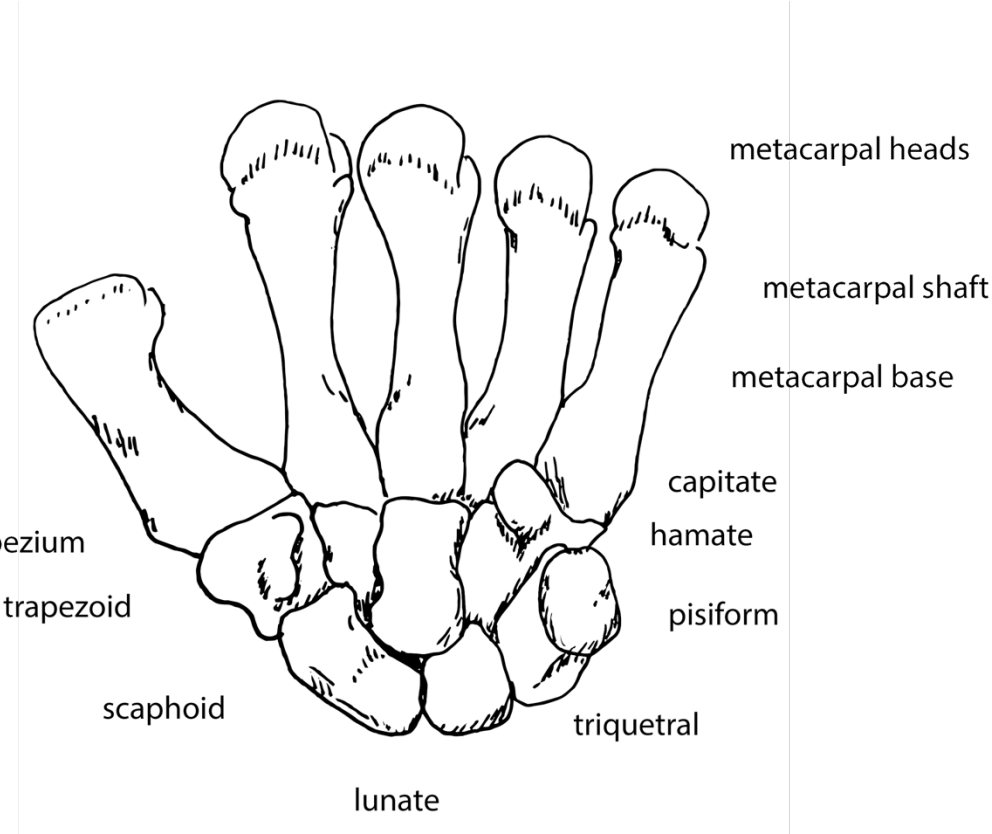
EXTENSOR INDICIS M.

ORIGIN	ULNA INTEROSSEUS MEMBRANE
INSERTION	EXTENSOR EXPANSION OF THE INDEX FINGER
NERVE SUPPLY	POST. INTEROSSEOUS NERVE
ACTION	EXTENDS METACARPAL-PHALANGEAL JOINT OF INDEX FINGER
BLOOD SUPPLY	POSTERIOR INTEROSSEOUS A.

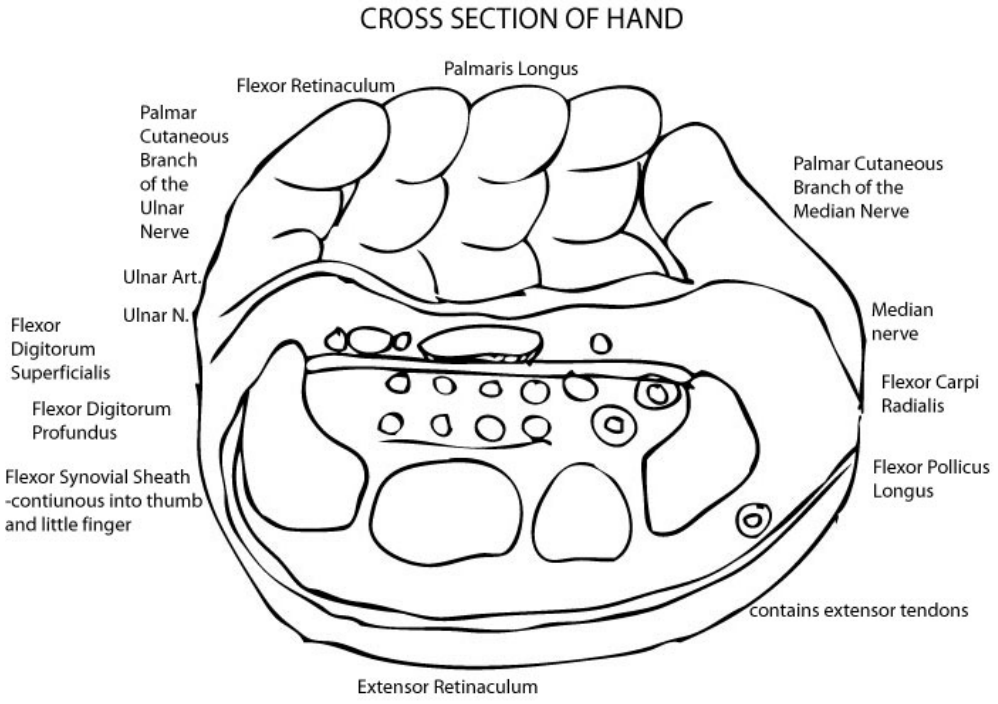
ANATOMICAL SNUFF BOX



CARPAL BONES



Tunnel of Guyon- pisohamate ligament



Carpal Tunnel Syndrome- infection or irritation of the hand- compresses median nerve.

Lunate bone-
Scaphoid bone-

PALM OF HAND
THENAR REGION
HYPOTHENAR REGION

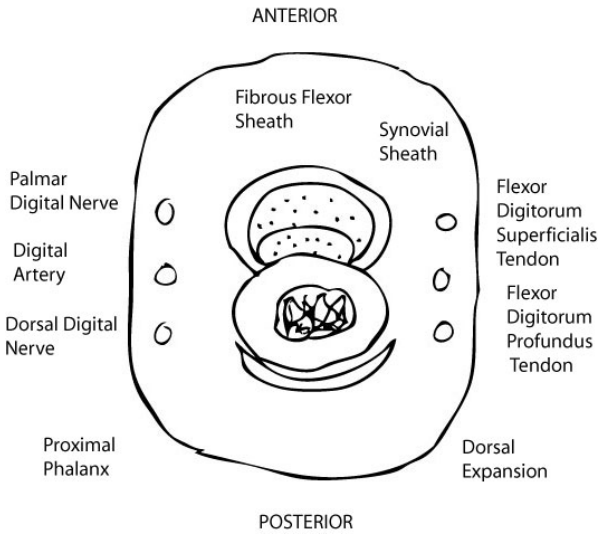
SKIN
ATTACHED BY FIBROUS BANDS TO THE DEEP FASCIA BELOW FLEXOR RETINACULUM PALMAR APONEUROSIS.

ATTACHMENT FOR PALMARIS LONGUS & BREVIS

SYNOVIAL SHEATH

FIBROUS FLEXOR SHEATH

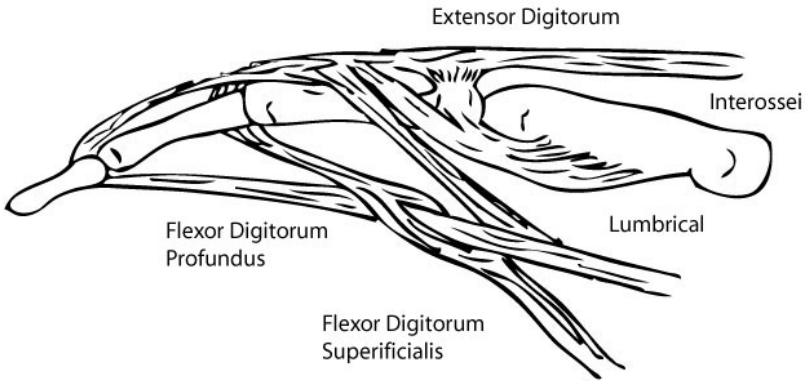
FINGER ANATOMY
PROXIMAL PHALANX

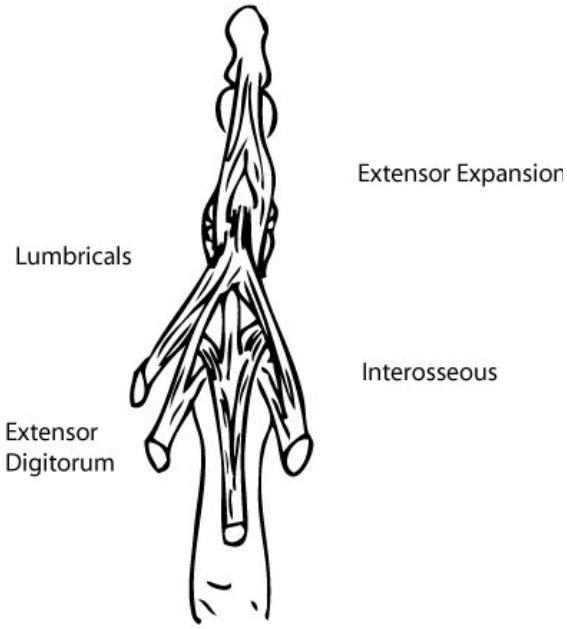


SMALL MUSCLES OF THE HAND

LUMBRICALS (4)

ORIGIN	FLEXOR DIGITORUM PROFUNDUS TENDON
INSERTION	DORSAL EXTENSOR EXPANSION
NERVE SUPPLY	1st & 2nd LUMBRICAL-MEDIAN N.
	3rd & 4th LUMBRICAL-ULNAR N.
ACTION	FLEX METACARPOPHALANGEAL JOINT
	EXTEND INTERPHALANGEAL JOINT
BLOOD SUPPLY	SUPERFICIAL PALMAR/VOLAR ARCH



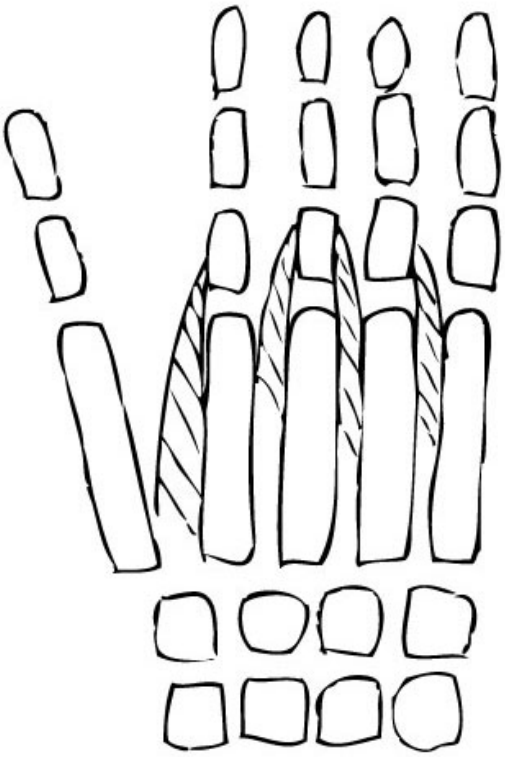


<u>INTEROSSEI MM</u> (4 DORSAL, 3 PALMAR)

ORIGIN	METACARPAL BONES	
INSERTION	PROXIMAL PHALANGES	
NERVE SUPPLY	ULNAR NERVE	
ACTION	DORSAL	ABDUCTION OF FINGERS
	PALMAR	ADDUCTION OF FINGERS

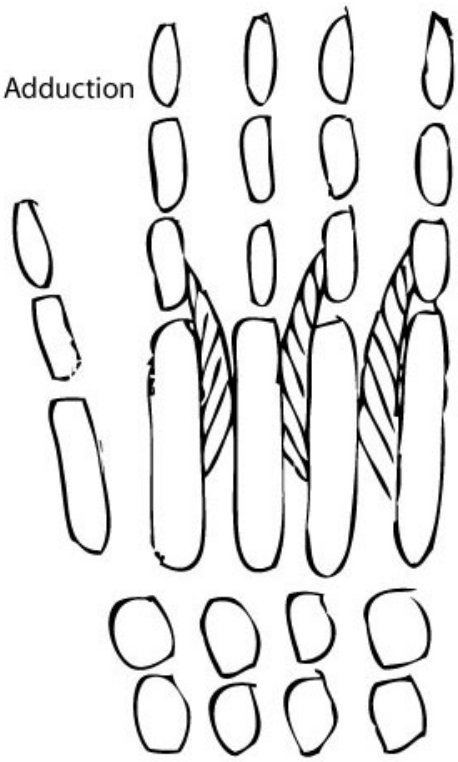
BLOOD SUPPLY- DEEP PALMAR ARCH

DORSAL INTEROSSEI

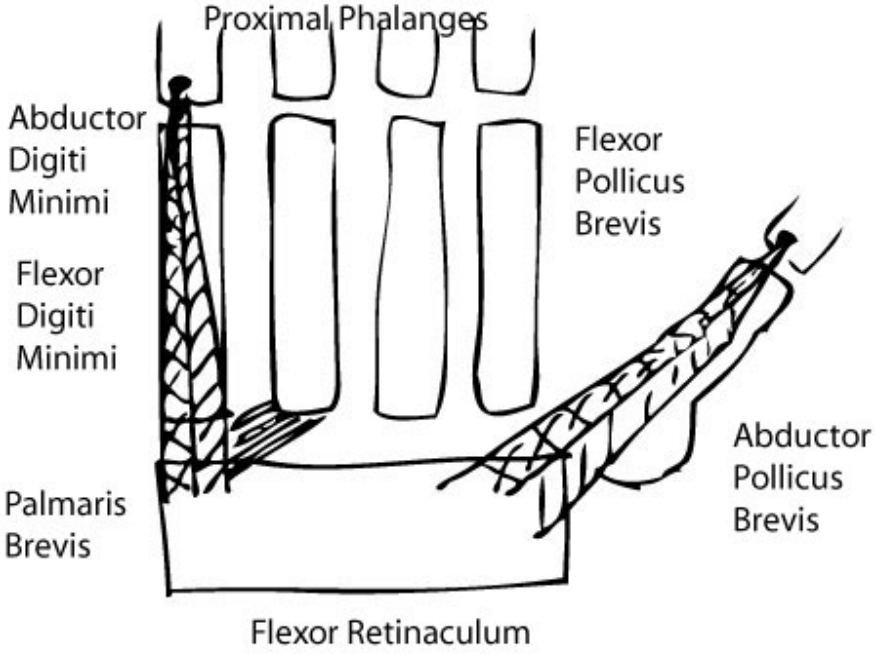


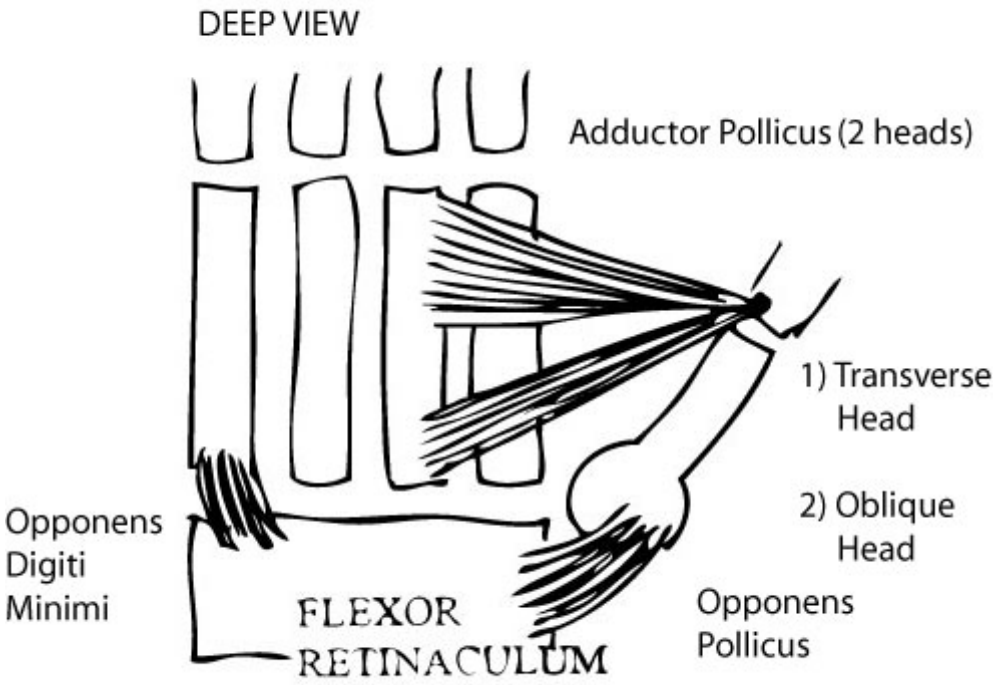
ABDUCTION

Palmar Interossei



SUPERFICIAL VIEW





THENAR SIDE OF THE HAND

ABDUCTOR POLLICIS BREVIS M.

ORIGIN	FLEXOR RETINACULUM
	SCAPHOID
	TRAPEZIUM
INSERTION	PROXIMAL PHALANX OF THUMB
NERVE SUPPLY	MEDIAN NERVE BUTCHER'S NERVE)
ACTION	ABDUCTION OF THUMB
BLOOD SUPPLY	SUPERFICIAL VOLAR ARCH

FLEXOR POLLICIS BREVIS M.

ORIGIN	FLEXOR RETINACULUM
INSERTION	PROXIMAL PHALANX OF THUMB
NERVE SUPPLY	MEDIAN NERVE
ACTION	FLEXION OF THUMB
BLOOD SUPPLY	SUPERFICIAL VOLAR ARCH

OPPONENS POLLICIS M.

ORIGIN	FLEXOR RETINACULUM
INSERTION	1 ST METACARPAL
NERVE SUPPLY	MEDIAN N.
ACTION	PULLS THUMB MEDIALLY & ACROSS PALM
BLOOD SUPPLY	SUPERFICIAL PALMAR (VOLAR) ARCH

ADDUCTOR POLLICIS M.

ORIGIN	OBLIQUE HEAD: BASE OF 2nd + 3rd METACARPALS & ADJOINING CARPAL BONES TRANSVERSE HEAD: SHAFT OF 3rd METACARPAL BONE
INSERTION	1st PHALANX OF THUMB
NERVE SUPPLY	ULNAR NERVE
ACTION	ADDUCT THUMB
BLOOD SUPPLY	DEEP VOLAR ARCH

HYPOTHENAR SIDE OF HAND

ABDUCTOR DIGITI MINIMI M.

ORIGIN	PISIFORM BONE
INSERTION	PROXIMAL PHALANX OF LITTLE FINGER
NERVE SUPPLY	ULNAR NERVE
ACTION	ABDUCTION OF LITTLE FINGER
BLOOD SUPPLY	DEEP VOLAR ARCH

FLEXOR DIGITI MINIM M. (BREVIS)

ORIGIN	FLEXOR RETINACULUM
INSERTION	PROXIMAL PHALANX OF LITTLE FINGER
NERVE SUPPLY	ULNAR NERVE
ACTION	FLEXION OF LITTLE FINGER
BLOOD SUPPLY	DEEP VOLAR ARCH

OPPONENS DIGITI MINIMI M.

ORIGIN	FLEXOR RETINACULUM
INSERTION	5th METACARPAL BONE
NERVE SUPPLY	ULNAR NERVE C8, T1
ACTION	FLEXION OF LITTLE FINGER TO CUP THE PALM
BLOOD SUPPLY	DEEP VOLAR ARCH

PALMARIS BREVIS M.

ORIGIN	MEDIAL FLEXOR RETINACULUM
INSERTION	FASCIA CONNECTING TO SKIN
NERVE	ULNAR N.
ARTERY	SUPERFICIAL PALMAR ARCH

THE BACK

Surface Anatomy

Vertebral Column

Joints
Curves
Movements

MUSCLES OF THE BACK

Superficial Layer (Innervated by VPR)

1. Trapezius m.
   Latissimus Dorsi m.
II. Levator Scapulae m.
   Rhomboidii m.

Intermediate Layer (VPR)

III. Posterior Serratus mm.
   Superior
   Inferior
Levator Costarum mm.

Deep Layers (DPR)

IV. Erector Spinae Group
- Iliocostals (Lateral)
  - -Lumborum
  - -Thoracis
  - -Cervicis

- Longissimus
  - -Thoracis
  - -Cervicis
  - -Capitis

- Spinalis (Medial)
  - -Thoracis
  - -Cervicis
  - -Capitis

V. Transversospinalis Group
- Semispinalis (prominent in cervicals)
  - -Thoracis
  - - Cervicis
  - - Capitis
- Multifidi (prominent in lumbars)
- - In lumbar, thoracic, and cervical regions)

• Rotatores (prominent in thoracic region) –Long/Short

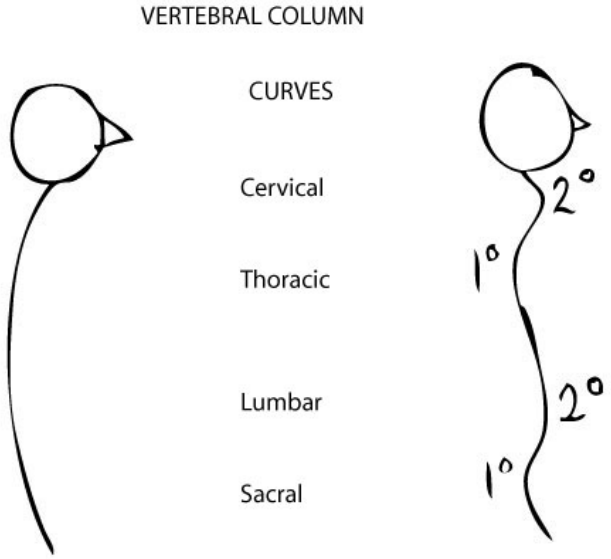
VI. Intersegmental group
- Interspinous mm.
- Intertransversari mm.

SKELETON

Function
1) Gives shape to the body
2) Attachment for muscles (movement)
3) Protects vital organs
4) Storehouse for Ca & P04
5) Production of blood cells

AXIAL SKELETON
Skull (cranium and facial bones)
Vertebral Column
7 cervical
12 thoracic
5 lumbar
1 sacrum (5 fused vertebra)
1 coccyx (3-5 fused or unfused vertebra)

Intervertebral Disks (IVD's)
- Lie between bodies of vertebra except between:
1) Occipital bone - C1
2) C1 - C2
3) Sacrum - Coccyx
4) Within coccyx



Typical Vertebra

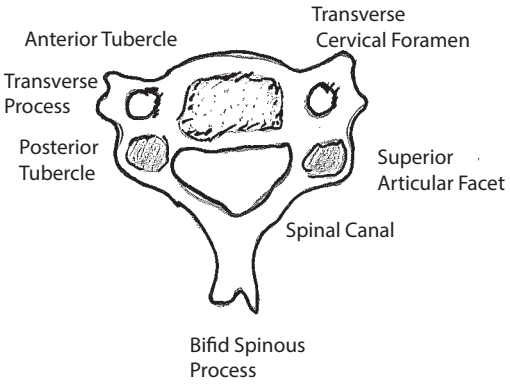
Has 1) Body
2) Vertebral Arch
a) Encloses vertebral canal
b) 2 Pedicles
2 Lamina
c) Processes
1 Spinous Process (SP)
2 Transverse Processes (TP)
4 Articular Processes (AP)

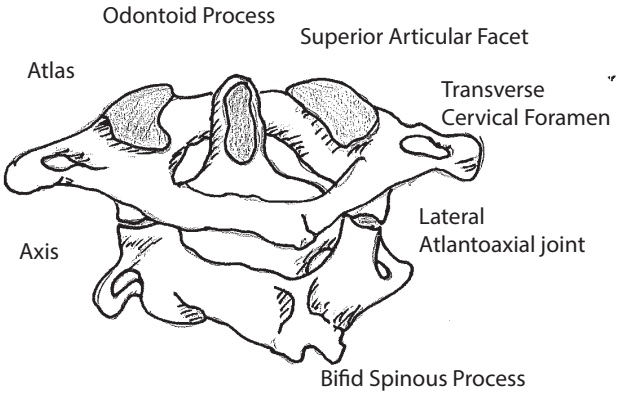
Vertebra

Cervicals (7)
1, 2, 7 Atypical
3, 4, 5, 6 Typical
Thoracics (12)
1, 9, 10, 11, 12 Atypical
2 - 8 Typical
Lumbars (5)
5 Atypical
1 - 4 Typical

Cervical Vertebrae

Typical C4
Rounded Body
Bifid SP
Transverse Foramina
- Conducts vertebral arteries
- Conducts NN.


Transverse
Cervical Foramen
Anterior Tubercle
Transverse
Process
Posterior
Tubercle
Superior
Articular Facet
Spinal Canal
Bifid Spinous
Process

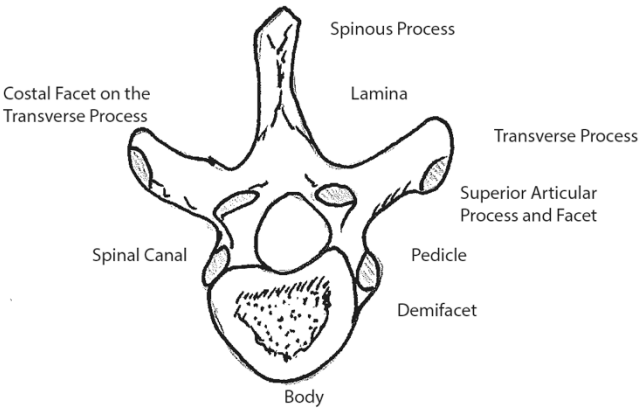

Odontoid Process
Superior Articular Facet
Atlas
Transverse
Cervical Foramen
Lateral
Atlantoaxial joint
Axis
Bifid Spinous Process

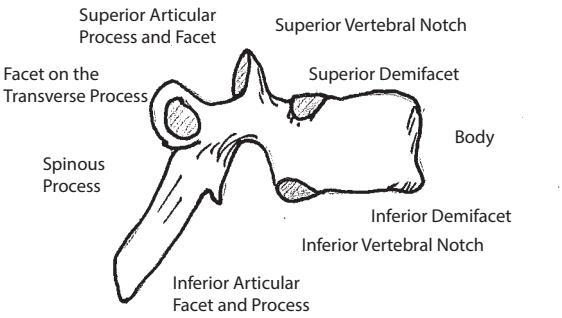
Thoracic Vertebrae

Typical T6

Heart-shaped body

2 Rib Demifacets

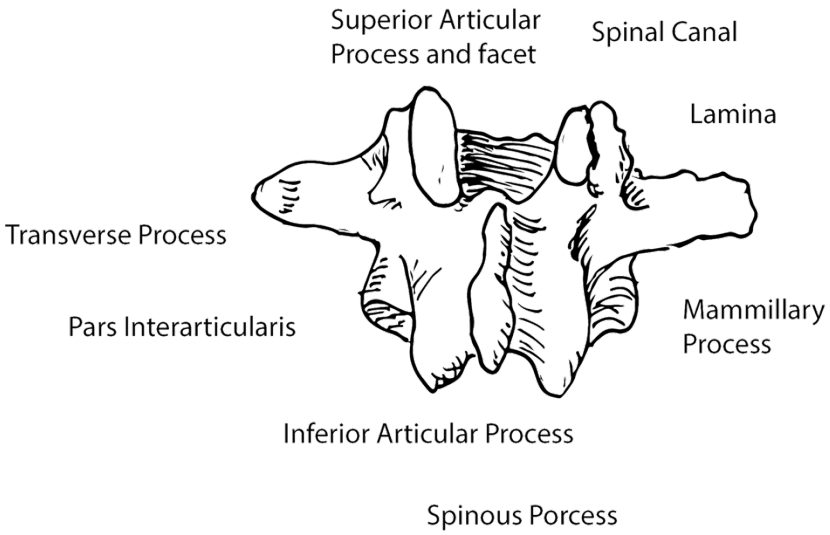


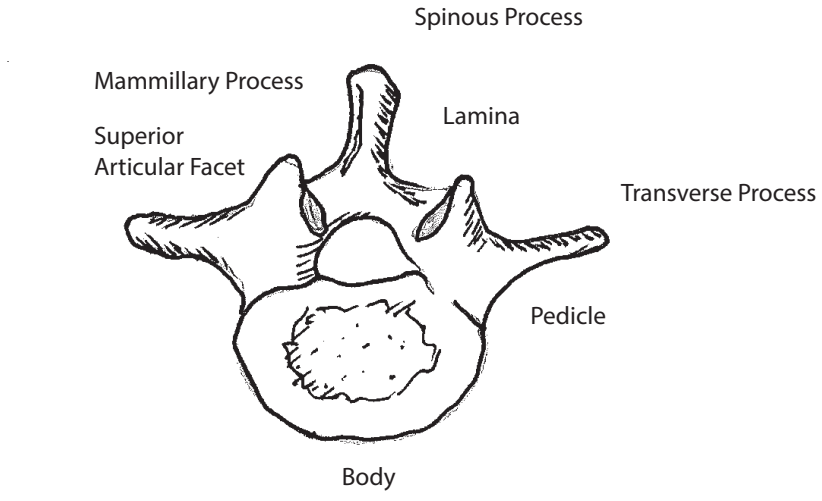


Lumbar Vertebrae

Typical L2

- Kidney-shaped body
- Thick body
- Weight bearing
- 2 Mamillary processes
  - Attachment for Multifidi mm.
- 2 Accessory processes
- *11 Processes





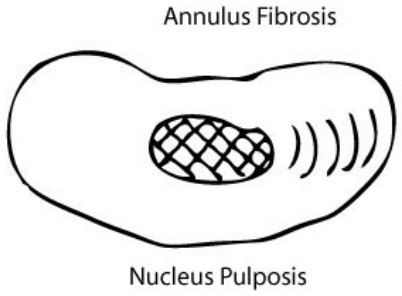
Vertebral Column

Intervertebral Foramen (IVF)

1) Transmits: Spinal Nerve
   Arteries
   Veins
   Lymphatics
2) Bounded By: Two vertebra
   Intervening disc
   Superior & Inferior vertebral notches
3) There is little change in size of IVF in cervicals and thoracics, but largest in lumbar vertebra
4) Spinal nerve occupies 4/5 of IVF

Inter-vertebral Disc (IVD)

- Responsible for 1/5th of length of vertebral column OR 1/4th excluding sacrum and coccyx
- Function: 1) Absorbs Shock
  2) Disperses weight radially
  3) Allows limited motion between vertebra in cervical & lumbar region (where motion is greatest)
- Attached to vertebrae by Sharpey's Fibers
- Structure: Kidney-shaped



Nucleus Pulposus
Annulus Fibrosus

Annulus Fibrosis

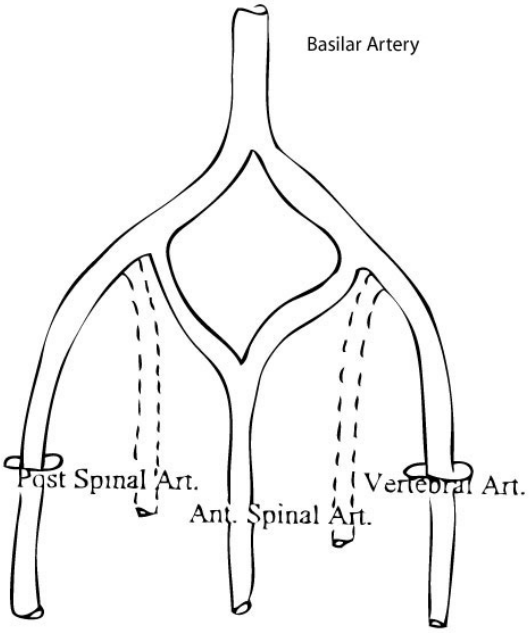
1) Layers of concentric lamellae
2) Made of dense, connective tissue (cartilagenous)
3) Fibers of lamella run at right angles to each other in adjacent lamella
4) Function: Increase resistance of disc

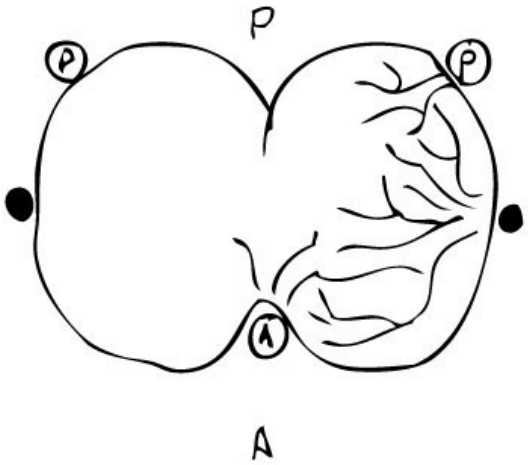
Nucleus Pulposus

1) Wet, glistening, semi-gelatinous substance
2) Transmits stress to annulus fibrosus

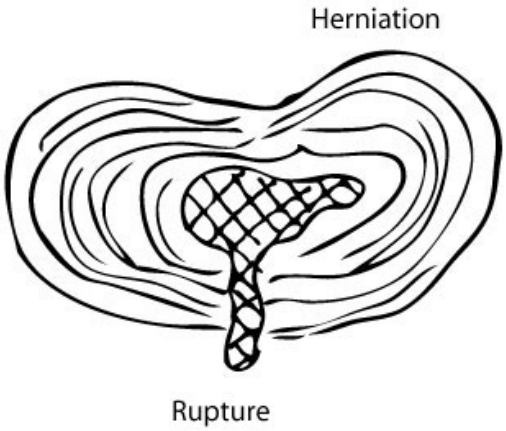
Blood Supply to Disc (which is avascular)
Comes from blood supply to vertebra

-Anterior spinal a.
-2 Posterior spinal aa.
-Radicular aa.





DISC PATHOLOGIES
Most Commonly Herniated – L5/S1



JOINTS OF THE VERTEBRAL COLUMN

Cartilagenous Joints - Between the vertebral bodies
Synovial Joints - Between the articular processes
Joints of Luschka - Lateral posterior boundaries of cervical vertebra
Uncovertebral joints

Atlanto-Occipital Joint
- Between Occiput & Atlas
- Anterior atlanto-occipital membrane
  - Continuation of anterior longitudinal ligament
- Posterior atlanto-occipital membrane
  - Continuation of ligamentum flava

Atlanto-Axial Joint

3 Joints between:
2 Lateral masses
Dens / Fovea Dentalis

LIGAMENTS OF THE VERTEBRAL COLUMN

Anterior Longitudinal Ligament

1) Extends along anterior surfaces of vertebral bodies and discs, attaching firmly to both

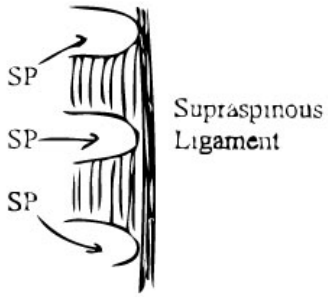
2) C1- Coccyx

Ant. Atlanto-occipital Membrane
C1
Ant. Long. Ligament

3) Thick band increasing in width from cervicals to lumbars

Posterior Longitudinal Ligament

1) Lies within vertebral canal on posterior surface of vertebral bodies and discs, attaching firmly only to the discs.
2) C2 – Sacrum

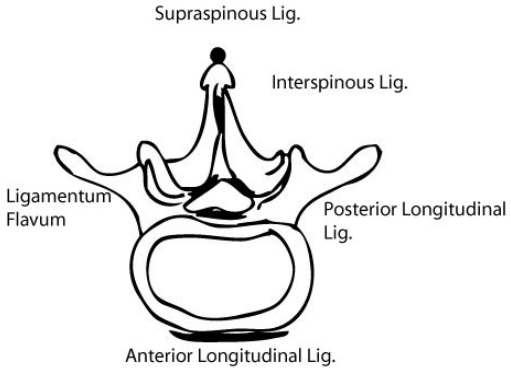


Ligamentum Nuchae

1) C7 –occiput (Inion) EOP

2) Combination of interspinous and supraspinous ligaments in the cervical region

Ligaments of the Spine



Ligaments of the Sacrum. OS Coxae & Coccyx

1) Anterior sacro-iliac ligament
   Sacrum. - Iliac Fossa
2) Interosseous ligament (Ille's ligament)
   Chief bond between sacrum and os coxae
3) Posterior sacro-iliac ligament
   Sarum - PSIS
   Erector spinae group partially originates from these ligaments
4) Sacrotuberous ligament
   Ischial. tuberosity - PSIS, sacrum, and coccyx Sacrospinous ligament
   Ischial spine - Sacrum and coccyx
5) Iliolumbar ligaments
   L4 & L5 TP's - Iliac crest and lateral sacrum
   Nerve supply - L1
6) Dorsal and Ventral sacro-coccygeal ligaments

Costo-Vertebral Ligaments (Ribs)

1) Radiate (stellate) ligament
   Head of rib - Bodies of corresponding 2 vertebra and intervening disc
2) Costotransverse ligament
   Neck of rib - TP vertebra

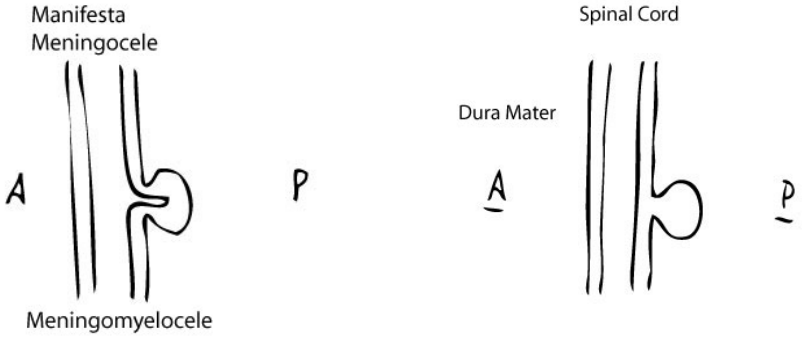
Spina Bifida

Failure of vertebral arch to properly fuse in the midline
Accompanied with paralysis, paresis, clubfoot

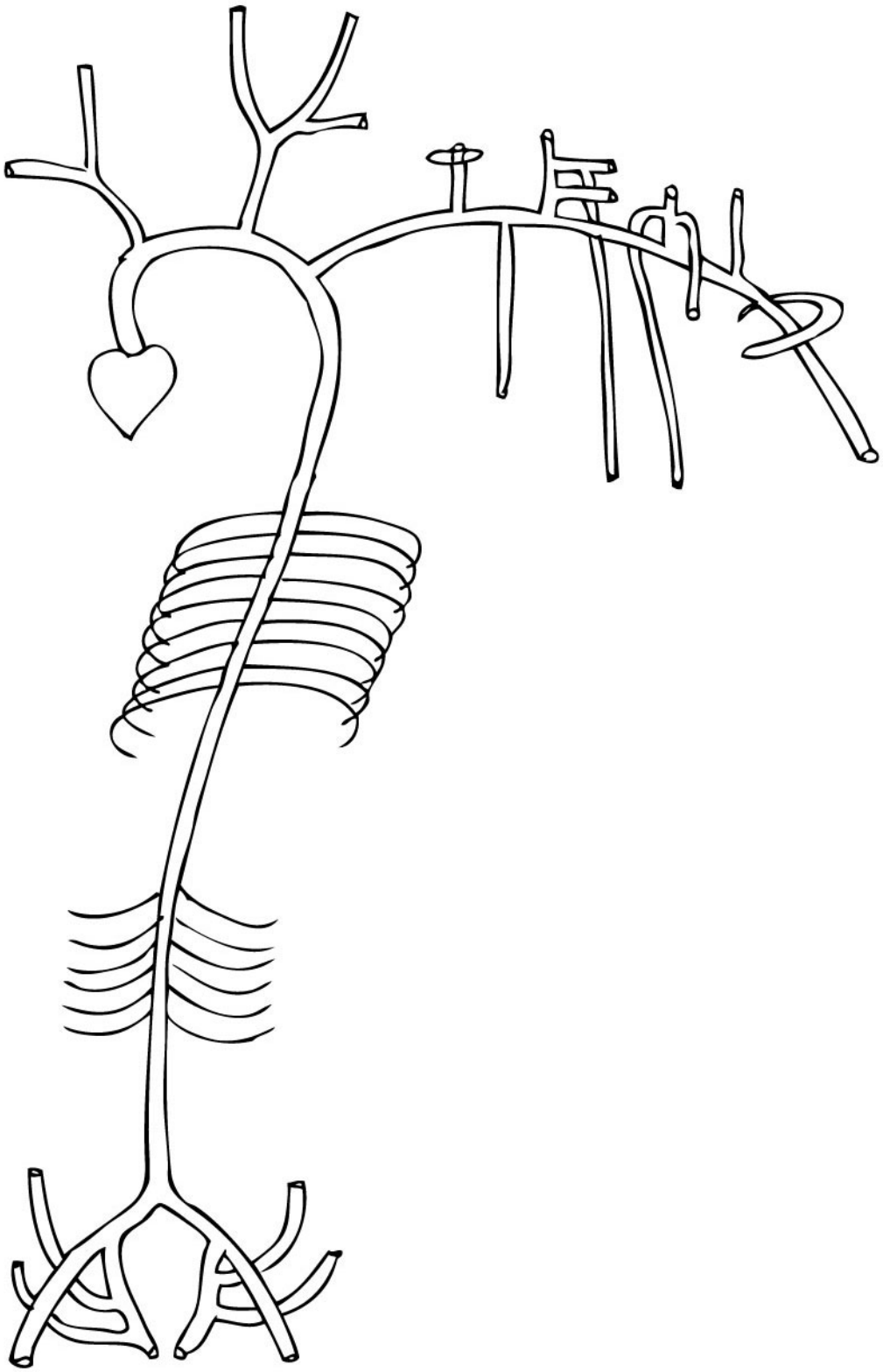
Occulta - Spina Bifida
• Typically not serious
• Characterized by dimple or tuft of hair along skin on spine
• Common at levels C 1, L5, S 1

Manifesta - Spina Bifida
Very Serious

Spinal Cord



VASCULARIZATION OF THE BACK



VASCULARIZATION OF THE BACK

Cervical Region
1) Common carotid artery (CCA)
    - Internal carotid artery (ICA)
    - External carotid artery (ECA)
    Occipital a.

2) Subclavian artery
• Vertebral a.
• Internal thoracic a.
• Thyrocervical. trunk
    Inferior thyroid a.
    *Transverse cervical a. (superficial cervical a.)
    Descending scapular a.
    Suprascapular a.
• Thyrocervical trunk
    Deep cervical a.
• Dorsal scapular a.

Thoracic Region
Posterior Intercostal aa.
- Branches off these supply deep muscles of the back

Lumbar Region
Subcostal. aa.
Lumbar aa.

Sacral Region
Internal iliac artery
- Iliolumbar a.
- Lateral sacral aa.

Venous Drainage
- Venous drainage of back parallels arteries
- Venous drainage of spinal column and cord Portal system

Venous Drainage of Vertebrae
    Two sets of Plexus
        1) External vertebral venous plexus
            - External to vertebral column
        2) Internal vertebral venous plexus
            -Within vertebral canal

Internal plexus receives blood from:
    1) Basivertebral veins

2) Meninges
3) Spinal cord
IVF - External plexus - Vertebral vv.
Intercostal vv.
Lumbar vv.
Lateral Sacral v.
Portal system

The internal and external venous plexes from the occiput to the sacrum are continuous with each other.

- There are no valves separating one from the other
- Therefore, problems from one area can easily affect another area.

MUSCLES OF THE BACK

Layer 1. (Shoulder girdle)

Trapezius m.

Origin	Occipital bone, EOP (inion)
	Superior nuchal line
	Ligamentum nuchae
	SP's C7, Tl-T12
Insertion	Lateral 1/3 of clavicle
	Acromion
	Spine of scapula
Nerve Supply	Spinal Accessory nerve C3,C4
Action	Retracts shoulders
Blood Supply	Descending scapular a.
	A descending branch of either the superficial cervical artery or the suprascapular artery.

Latissimus Dorsi m.

Origin	SP's of T7-T12 & L I -L5
	Sacral tubercles
	Iliac crest
	Lower 3 or 4 ribs
	Inferior angle of scapula
Insertion	Medial lip of bicipital groove of humerus
Nerve Supply	Thoracodorsal n.
Action	Extends, adducts, and medially rotates arm
Blood Supply	Descending scapular a.

Layer II.

Levator Scapulae m.

Origin	TP's C1 -C4 posterior tubercle
Insertion	Vertebral border of scapula between medial angle and root of spine
Nerve Supply	Dorsal Scapular n.
Action	Elevates scapula
Blood Supply	Descending Scapular A.

Rhomboid Minor m.

Origin	Ligamentum nuchae SP's C7, T1
Insertion	Root of spine of scapula
Nerve Supply	Dorsal Scapular n.
Action	Adducts, and medially rotates scapula
Blood Supply	Descending Scapular A.

Rhomboid Major in.

Origin	SP's of T2-T5
Insertion	Vertebral border of scapula between root of spine and inferior angle
Nerve Supply	Dorsal Scapular n.
Action	Adducts and medially rotates scapula
Blood Supply	Descending scapular a.

Layer III.

Posterior Serratus Superior m.

Origin	Ligamentum Nuchae between ribs SP's of C7, T1, T2
Insertion	2nd, 3rd, and 4th rib just posterior to the angle of the rib
Nerve Supply	T1-3 VPR, C8-T3 VPR.
Action	Elevates ribs - (Inspiration)
Blood Supply	Posterior intercostal aa.

Posterior Serratus Inferior m.

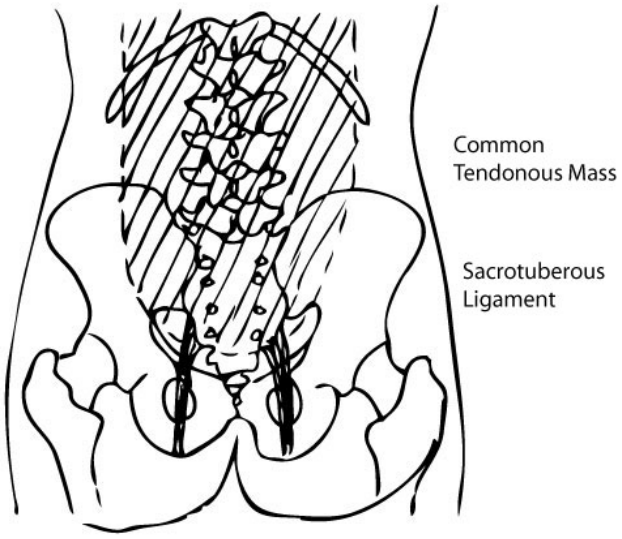
Origin	SP's of T11, T12, L1, L2 Lumbar Fascia
Insertion	Lower 4 ribs
Nerve Supply	VPR T9-T11
Action	Depresses ribs (Expiration)
Blood Supply	Posterior intercostal aa.

Levatores Costarum m. (12 Pairs)

Origin	TP's C7,T1-T11
Insertion	On rib below origin - between tubercle and angle of rib
Nerve Supply	C8-T11 DPR
Action	Rotates and laterally flexes vertebral column, elevates ribs - (Inspiration)
Blood Supply	Posterior intercostal aa.

Layer IV. - Erector Spinae Group

Origin	Common origin (common tendon mass) Thoracolumbar Fascia 1. Posterior surface of sacrum and iliac bones 2. Sacrotuberous and posterior sacro-iliac ligaments 3. SP'sT11,T12,L1-5



Nerve Supply	DPR
Action	Bilaterally - Extension of spine Unilaterally - Rotation and lateral flexion of spine
Blood Supply	Subcostal aa. Lumbar aa.

Iliocostalis Lumborum m.

Origin	Common tendon mass
Insertion	Lower 6 or 7 ribs
Nerve Supply	DPR
Action	Bilaterally - Extension of spine Unilaterally - Rotation and lateral flexion of spine
Blood Supply	Subcostal aa Lumbar aa.

Iliocostalis Thoracis in.

Origin	Lower 6 or 7 ribs
Insertion	Upper 6 ribs
Nerve Supply	DPR
Action	Bilaterally - Extension of spine Unilaterally - Rotation and lateral flexion of spine
Blood Supply	Subcostal, lumbar, and post. Intercostal aa.

Iliocostalis Cervicis m.

Origin	Angle of the upper 3-6 ribs
Insertion	TP's C4,5,6
Nerve	DPR
Action	Extension of spine
Blood Supply	Branches of subclavian artery

Longissimus Thoracis M.

Origin	Common tendon mass
Insertion	Lower 9 or 10 ribs and their corresponding vertebrae (TP) (Double attachment)
Nerve Supply	DPR
Action	Bilaterally - Extension of spine Unilaterally - Rotation and lateral flexion of spine
Blood Supply	Post. Intercostal aa.

Longissimus Cervicis m.

Origin	TP's Tl-T4(5)
Insertion	TP's C2-C6
Nerve Supply	DPR
Action	Bilaterally - Extends the spine Unilaterally - Rotation and lateral flexion of spine
Blood Supply	branches of the subclavian art.

Longissimus Capitis m.

Origin	TP's T1 -T4(5)
Insertion	Mastoid process
Nerve Supply	DPR
Action	Bilaterally - Extension of spine Unilaterally - Rotation and lateral flexion of spine
Blood Supply	branches of the subclavian art.

Spinalis Thoracis m.

Origin	SP's T11, T12, L1, L2
Insertion	SP's T1- T4-8
Nerve Supply	DPR
Action	Bilaterally - Extension of spine
	Unilaterally - Rotation and lateral flexion of spine
Blood Supply	Post intercostal aa.

Spinalis Cervicis m.

Origin	SP's C7, TI, T2
	Lower part of ligamentum nuchae
Insertion	SP's C2 (C3, C4)
Nerve Supply	DPR
Action	Bilaterally - Extension of spine
	Unilaterally - Rotation and lateral flexion of spine Blood
Supply	Branches of the subclavian art.

Spinalis Capitus m.

Origin	TP's C7,T1-T6(7)
	AP's C4, C5, C6
Insertion	Occiptal Bone
Nerve Supply	DPR
Action	Bilaterally – Extension of the spine
	Unilaterally – Rotation and lateral flexion of the spine
Blood Supply	branches of the subclavian artery

Layer V Transversospinalis Group

R – Rotatores
M – Multifidi
S - Semispinalis

Semispinalis Thoracis m.

Origin	TP's T6-T12
Insertion	SP's C6, C7, T1-T4
Nerve Supply	DPR
Action	Lateral flexion of spine, Extension of head, Elevation of ribs
Blood Supply	Post intercostal aa.

Semispinalis Cervicis m.

Origin	TP's T1 -T6
Insertion	SP's C2-C5
Nerve Supply	DPR
Action	Lateral flexion of spine, Extension of head, Elevation of ribs
Blood Supply	Branches of the Subclavian art.

Semispinalis Capitis m. - (Strongest muscle in back of neck)

Origin	SP's C4, C5, C6 TP's C7, T1-T6
Insertion	Occipital bone
Nerve Supply	DPR
Action	Lateral flexion of spine, Extension of head, Extension of ribs
Blood Supply	Branches of the subclavian art.

Multifidi mm. (Prominent in L/S area)

Origin	Posterior sacrum Posterior sacro-iliac ligament Mammillary processes in lumbar spine TP's in thoracic spine SP's C4-C7
Insertion	SP of vertebra above origin
Nerve Supply	DPR
Action	Aids in extension, rotation, and lateral flexion of vertebral column
Blood Supply	See earlier blood supplies for each region

Rotatores mm. (11 small prs. - Deep to the multifidi mm.)

Origin	TP's of thoracic vertebrae
Insertion	Lamina of vertebra above origin (short rotators) OR lamina of 2 vertebra above (long rotators)
Nerve Supply	DPR
Action	Rotation of spinal column
Blood Supply	See earlier blood supply (Prominent in thoracic area)

Layer VI. - Intersegmental mm.

Interspinalis mm.
Cervical - 6 pairs
Lumbar - 4 pairs SP - SP

Origin	SP of vertebra
Insertion	SP of adjacent vertebra
Nerve Supply	DPR or VPR or both
Action	Extension of spine
Blood Supply	See earlier blood supplies

Intertransversarii mm. TP - TP

Origin	TP of vertebrae
Insertion	Ipsilateral TP of adjacent vertebrae
Nerve Supply	DPR or VPR or both
Action	Lateral flexion of spine
Blood Supply	See earlier blood supplies

**Longissimus represents of the bulk of the erector spinae

THE LOWER EXTREMITY

LUMBAR PLEXUS
T12, L1 -L4
VENTRAL PRIMARY RAMI ONLY
L2 IS ALSO INCLUDED IN SACRAL PLEXUS

SUPPLIES
- ANTERIOR & MEDIAL THIGH
- POSTERIOR ABDOMINAL WALL MM.
- PSOAS
- ILIACUS
- QUADRATUS LUMBORUM

(1) SUBCOSTAL NERVE
- MOTOR: TO ABDOMINAL MUSCLES ESPECIALLY TRANSVERSUS ABDOMINIS M.
- SENSORY: FROM T12 DERMATOME (DIRECTLY ABOVE INGUINAL LIGAMENT)

(2) ILIOHYPOGASTRIC NERVE
- MOTOR: INTERNAL OBLIQUE M.
- SENSORY: L1 DERMATOME

(3) ILIOINGUINAL NERVE

SENSORY: FROM INGUINAL CANAL WITHIN SPERMATIC CORD
L1 DERMATOME

(4) GENITOFEMORAL NERVE

PIERCES PSOAS MUSCLE & RUNS ON TOP OF IT

A) FEMORAL PART: SENSORY TO ANT. THIGH

B) GENITO PART (FOUND WITHIN THE SPERMATIC CORD) TO THE CREMASTERIC MUSCLE - THIS IS THE MIDDLE COVERING OF THE SPERMATIC CORD.

THIS NERVE IS RESPONSIBLE FOR THE CREMASTERIC REFLEX IN THE MALE.
-STIMULATION OF SKIN OF THIGH (NAVEL) CAUSES CONTRACTION OF CREMATERIC MUSCLE WHICH MAKES THE TESTES ASCEND.

-IN FEMALES THERE IS A HOMOLOGOUS REFLEX CALLED THE GEIGLE'S REFLEX (SCRATCH THIGH)

(5) LATERAL FEMORAL CUTANEOUS N. -

SENSORY: LATERAL THIGH
SUPERIOR GLUTEAL REGION

(6) FEMORAL NERVE -

(LARGEST NERVE IN LUMBAR PLEXUS)

MOTOR: ANTERIOR THIGH
POSTERIOR ABDOMINAL MM.

SENSORY: ANTERIOR THIGH
MEDIAL & ANT. LEG (SAPHENOUS NERVE)

((7) OBTURATOR NERVE -

(PASSES THROUGH OBTURATOR FORAMEN)

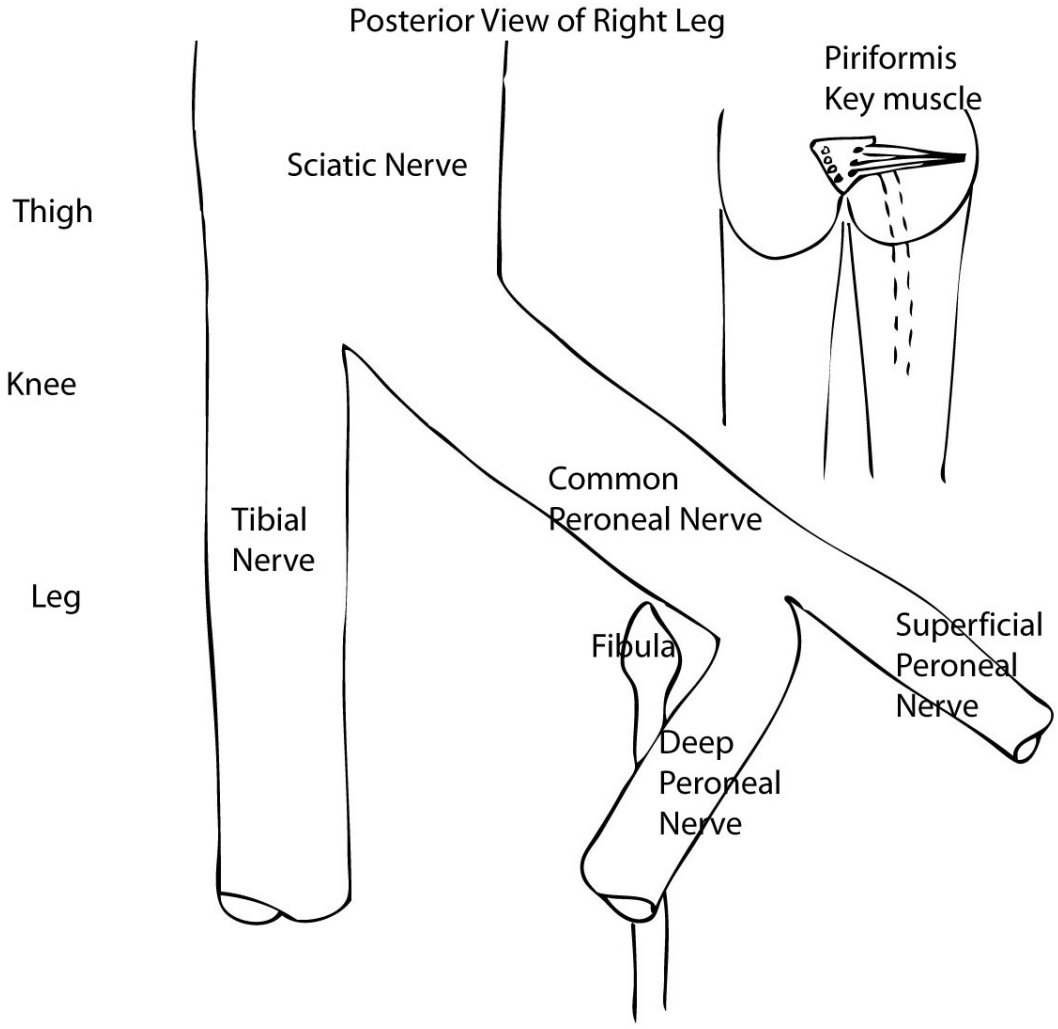
MOTOR: ADDUCTORS OF HIP
SENSORY: MEDIAL THIGH

(8) ACCESSORY OBURATOR NERVE - (OFTEN ABSENT)

MOTOR: ADDUCTORS OF HIP
SENSORY: MEDIAL THIGH

SACRAL PLEXUS

LARGEST PLEXUS OF ALL THE PLEXI
VENTRAL PRIMARY RAMI (VPR)
L4 - S4
INNERVATES PELVIS & LOWER EXTREMITIES
PS (S234)



(1) SCIATIC NERVE
MOTOR: TO HAMSTRINGS
SENSORY: TO POSTERIOR THIGH

NERVE DIVIDES INTO:
A) TIBIAL NERVE (MOST MEDIAL)
MOTOR: POSTERIOR LEG MUSCLES
PLANTAR MM OF THE FOOT
SENSORY: POSTERIOR LEG
PLANTAR SURFACE OF THE FOOT

B) COMMON PERONEAL NERVE (NORE LATERAL)
SUPERFICIAL PERONEAL NERVE (SUPERFICIAL BRANCH)
MOTOR: LATERAL LEG MM.
SENSORY: LATERAL LEG

DEEP PERONEAL NERVE
MOTOR: ANTERIOR LEG MM.
SENSORY: ANTERIOR LEG

(2) SUPERIOR GLUTEAL NERVE -
MOTOR: GLUTEUS MEDIUS
GLUTEUS MINIMUS
TENSOR FASCIA LATA
(ABDUCTION OF LEG & THIGH)

(3) INFERIOR GLUTEAL NERVE -
MOTOR: GLUTEUS MAXIMUS M.

(4) POSTERIOR FEMORAL CUTANEOUS NERVE -
SENSORY: SKIN OF BUTTOCKS &
POSTERIOR THIGH

(5) NERVE TO THE OBTURATOR INTERNUS & SUPERIOR GEMELLUS MM.

(6) NERVE TO THE INFERIOR GEMELLUS & QUADRATUS FEMORIS MM.

(7) NERVE TO THE PIRIFORMIS M.

PUDENDAL NERVE – INNERVATES SKELETAL MUSCLE
A) INFERIOR RECTAL NERVE (INFERIOR HEMORROIDAL NERVE)
MOTOR: ANAL SPHINCTER, LINING OF ANAL CANAL
SENSORY: SKIN AROUND ANUS

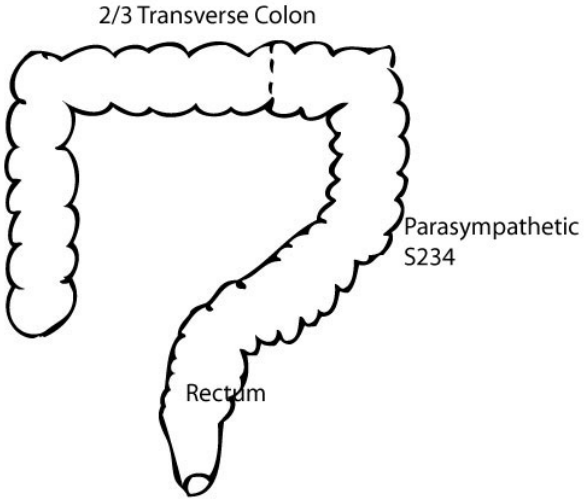
B) PERINEAL NERVE
MOTOR: TO SUPERFICIAL PERINEAL SPACE
(UROGENITAL DIAPHRAGM)
CONTROLS MICTURITION
(PELVIC DIAPHRAGM)
CONTROLS DEFECATION
SENSORY: POSTERIOR SCROTUM, LABIA MAJORA

C) DORSAL NERVE OF THE PENIS (CLITORIS)

- INNERVATES GLANS PENIS & GLANS CLITORIS
- RESPONDS TO MECHANICAL STIMULATION

DORSAL NERVE OF PENIS - MECH. STIMULATION

PS= S 234 ERECTION
S=L1, L2 ORGASM



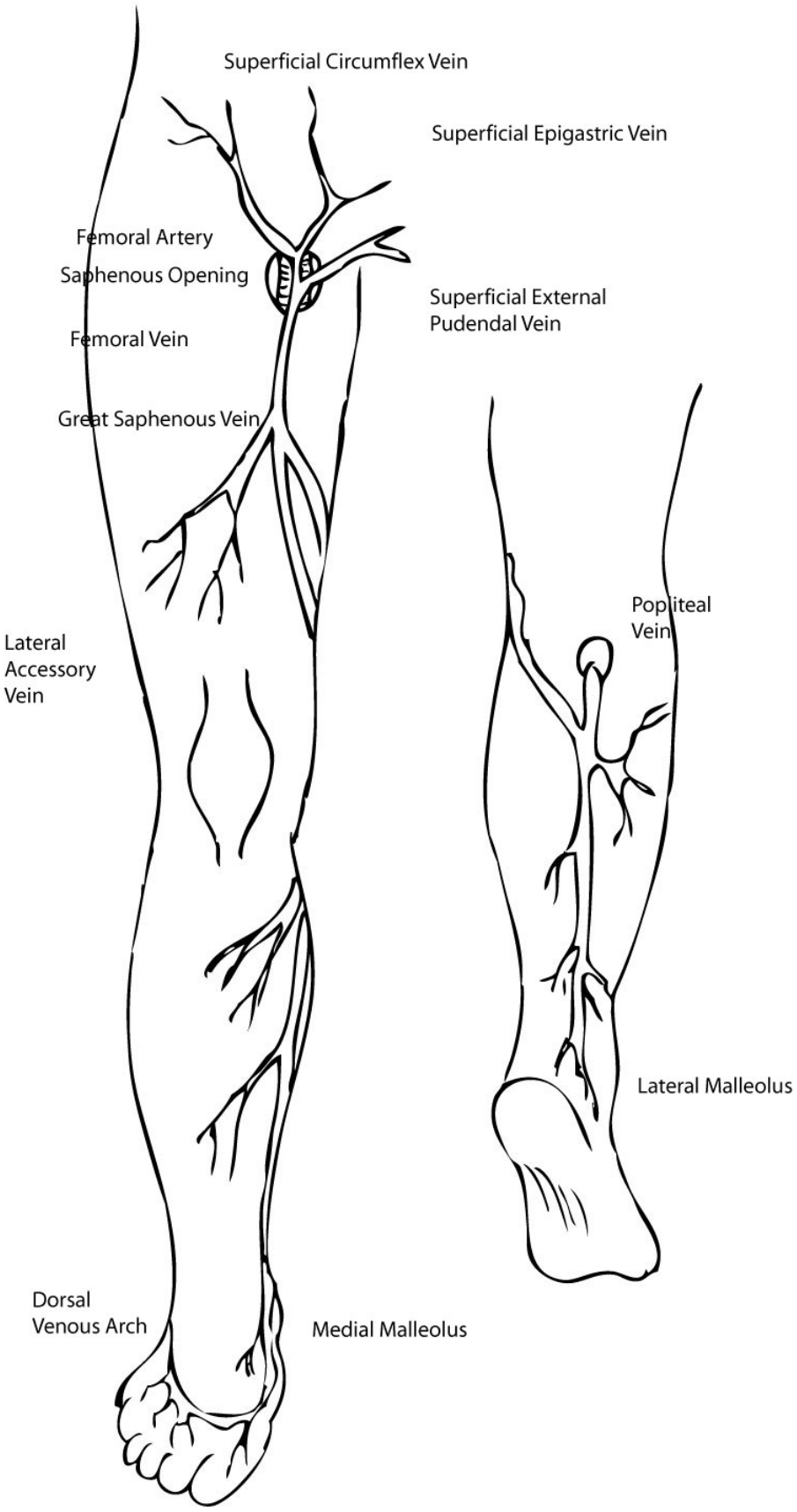
Pelvic Splanchnic Nerve
(Nervi Erigentes)
PS S234

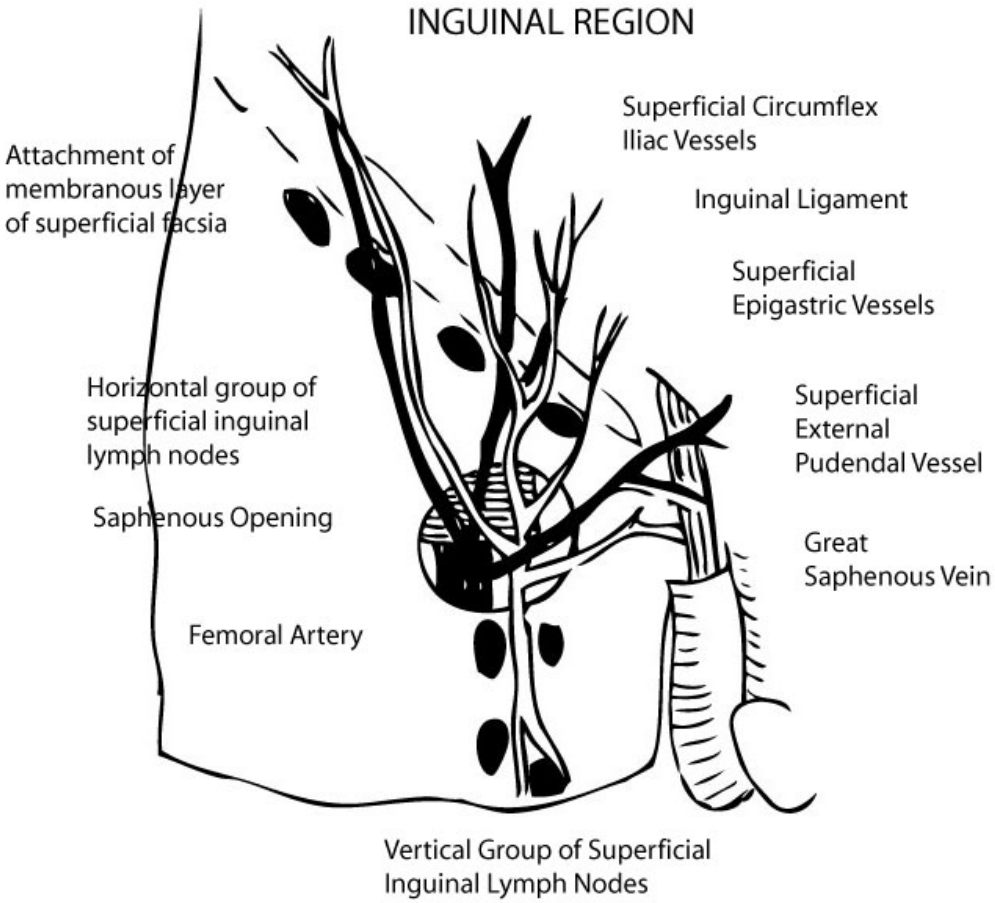
Controls Bladder
Rectum
Ext. Genitalia
Rectum

THE LOWER EXTREMITY

ANTERIOR & MEDIAL THIGH

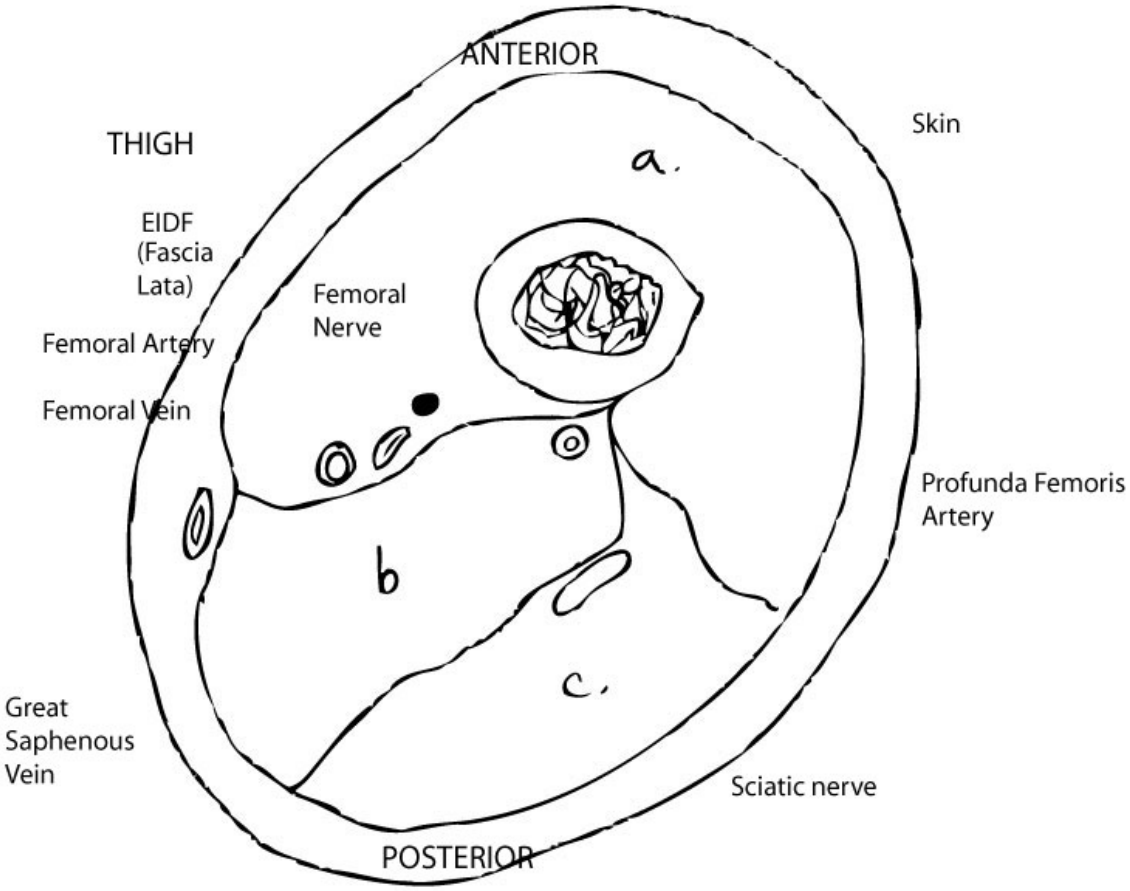
- CUTANEOUS NERVES
- SUPERFICIAL VEINS
- GREAT SAPHENOUS VEIN
  SAPHENOUS OPENING IN FASCIA LATA
- FEMORAL VEIN
- SMALL SAPHENOUS VEIN
- POPLITEAL VEIN


Superficial Circumflex Vein
Superficial Epigastric Vein
Femoral Artery
Saphenous Opening
Femoral Vein
Great Saphenous Vein
Superficial External
Pudendal Vein
Lateral
Accessory
Vein
Popliteal
Vein
Lateral Malleolus
Dorsal
Venous Arch
Medial Malleolus



- SUPERFICIAL FASCIA OF THE THIGH
- DEEP FASCIA OF THE THIGH (FASCIA LATA)
  EIDF
  SHEATH ABOUT THE THIGH

ILIOTIBIAL TRACT (BAND)
• ATTACHES TO ANTEROLATERAL TIBIA
• CONTAINS INSERTIONS OF TENSOR FASCIA LATA & GREATER PART OF GLUTEUS MAXIMUS



A) ANTERIOR GROUP

ACTION	HIP FLEXION
NERVE SUPPLY	FEMORAL N.
BLOOD SUPPLY	FEMORAL A.

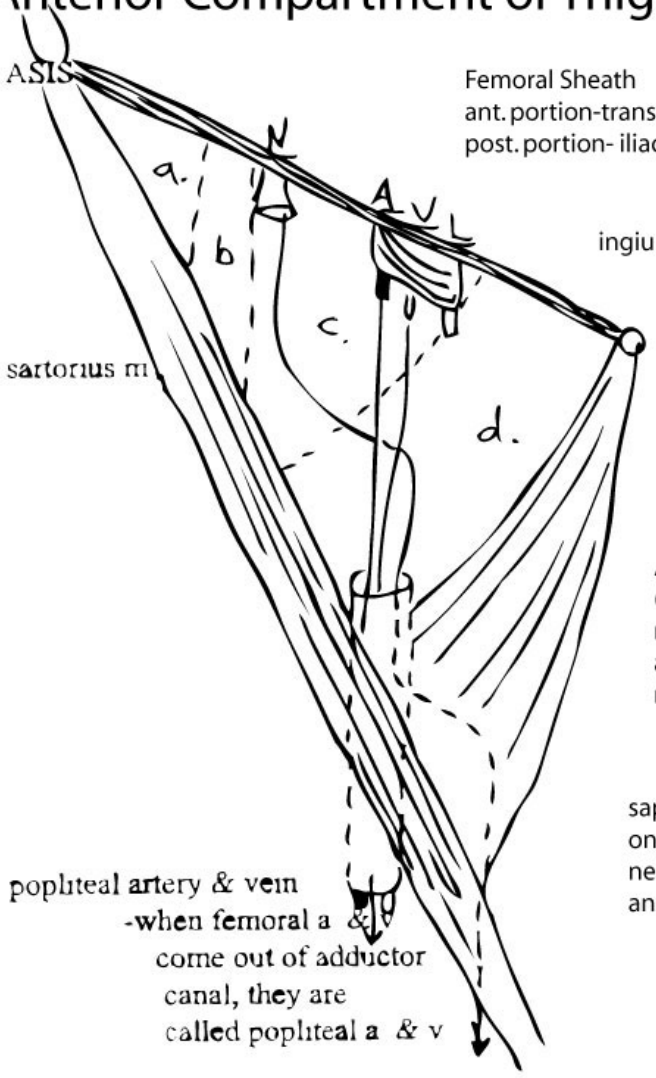
B) MEDIAL GROUP

ACTION	ADDUCTION OF HIP
NERVE SUPPLY	OBTURATOR N. - L234
BLOOD SUPPLY	PROFUNDA FEMORIS A. OBTURATOR A. MEDIAL FEMORAL CIRCUMFLEX A.

C) POSTERIOR GROUP

ACTION	EXTENSION OF THIGH FLEXION OF KNEE
NERVE SUPPLY	SCIATIC N.
BLOOD SUPPLY	PROFUNDA FEMORIS A. (Four Horsemen of Farabeouf)

Anterior Compartment of Thigh



Femoral Sheath
ant. portion-transverse fascia
post. portion- iliacus fascia

ingiunal ligament

pubic tubercle

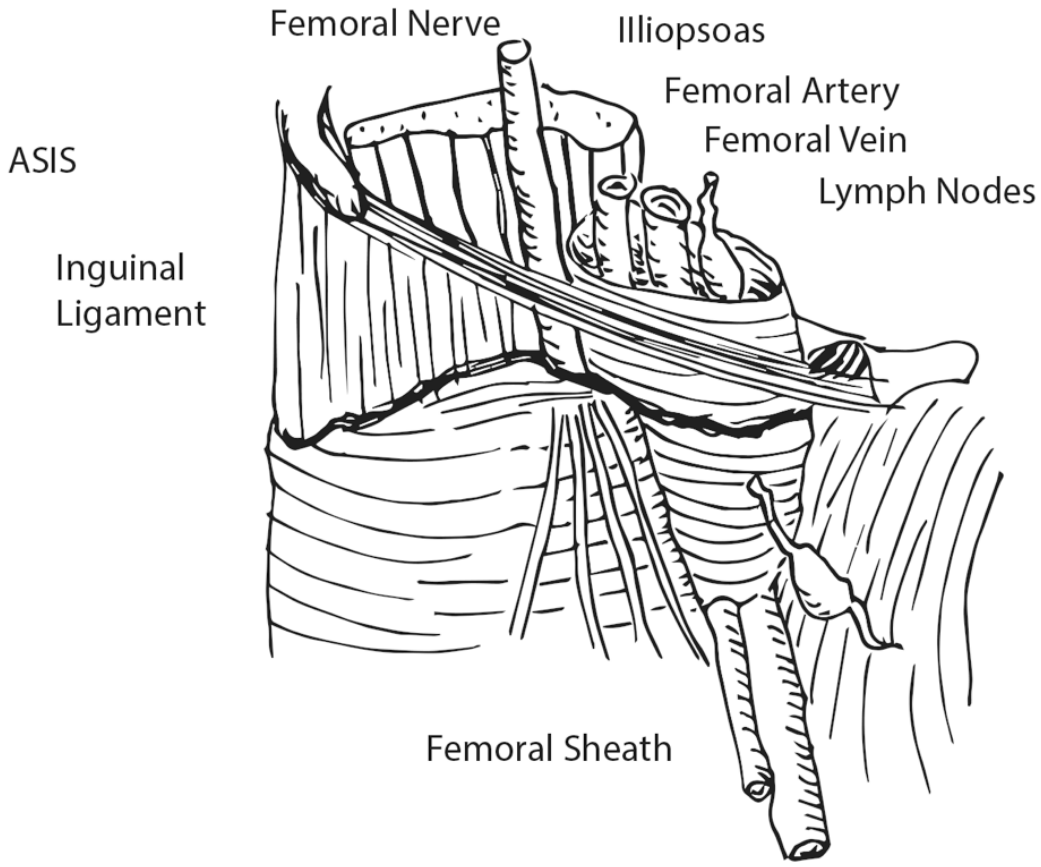
femoral canal-
common site for female
hernias

Adductor Canal
(Hunter's Canal)
made from sheath of sartorius,
adductor longus, adductor
magnus and vastus medalis

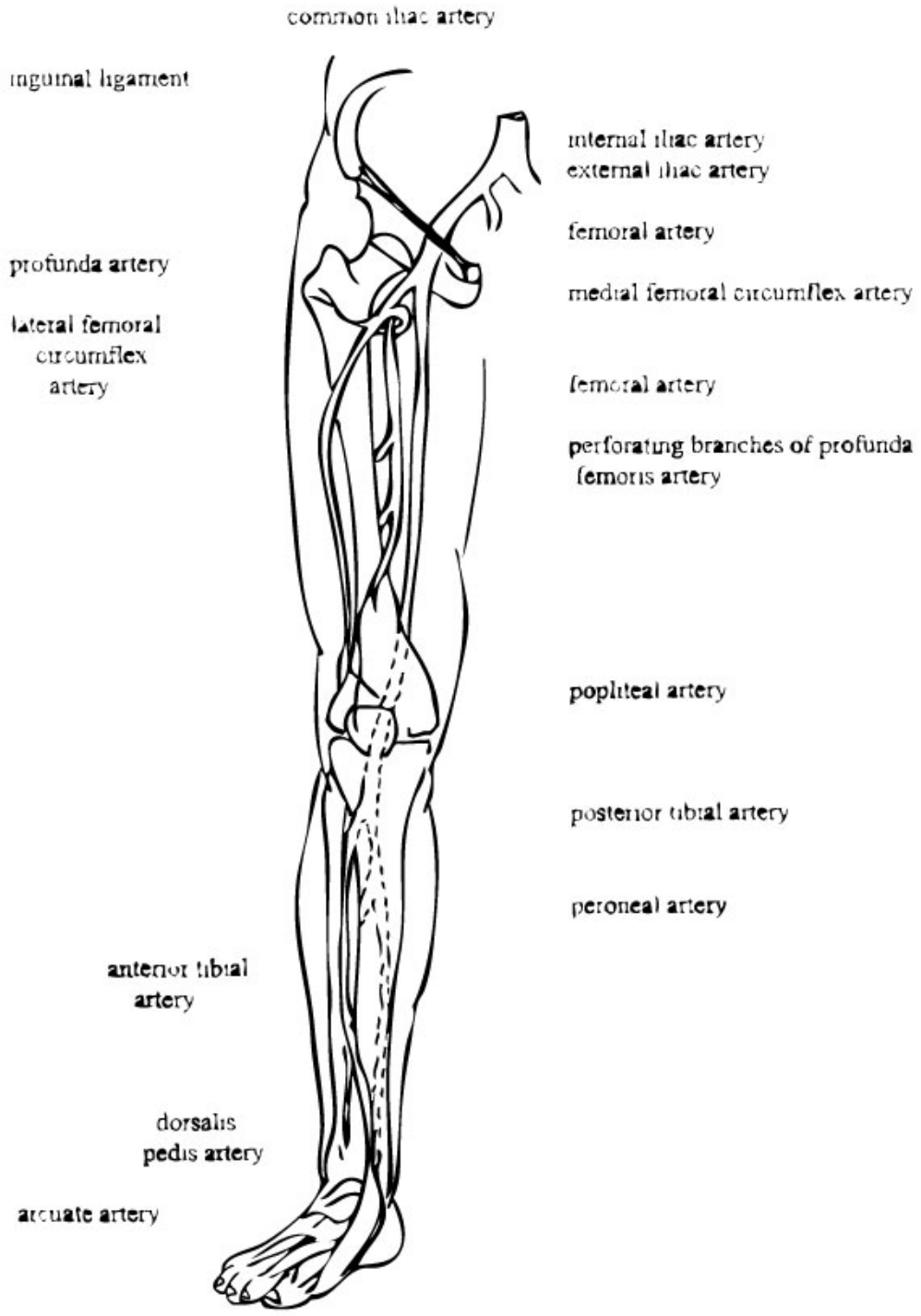
saphenous nerve-
only branch of the femoral
nerve to pass knee (sensory to medial
and anterior leg)

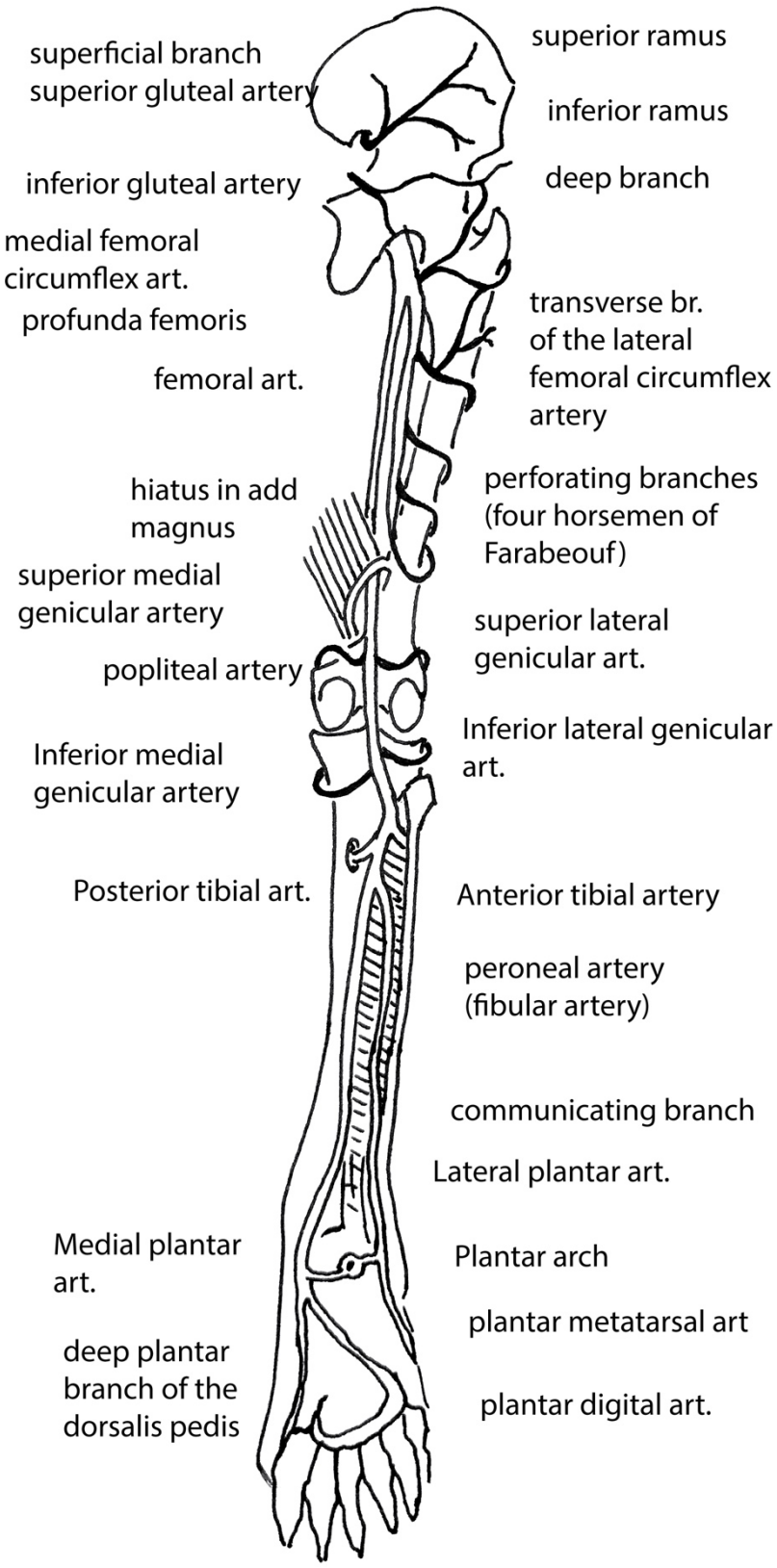
FLOOR OF FEMORAL TRIANGLE

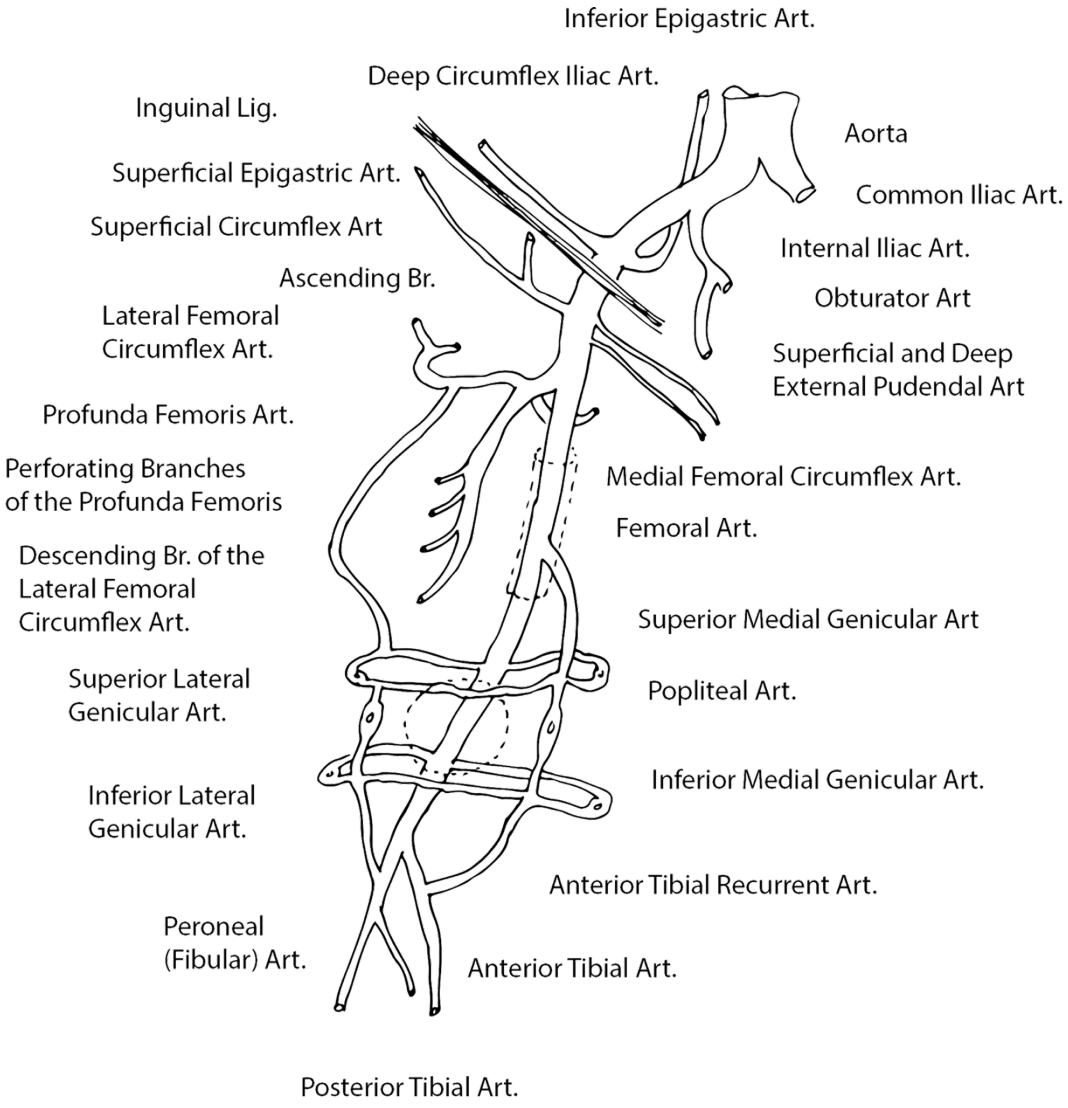
A) ILIACUS M.
B) PSOAS MAJOR M.
C) PECTINEUS M.
D) ADDUCTOR BREVIS M.
ADDUCTOR MAGNUS M.



VASCULARIZATION OF LOWER LIMB




superficial branch superior gluteal artery
superior ramus
inferior ramus
deep branch
inferior gluteal artery
medial femoral circumflex art. profunda femoris
femoral art.
transverse br. of the lateral femoral circumflex artery
hiatus in add magnus
perforating branches (four horsemen of Farabeouf)
superior medial genicular artery
superior lateral genicular art.
popliteal artery
Inferior lateral genicular art.
Inferior medial genicular artery
Posterior tibial art.
Anterior tibial artery
peroneal artery (fibular artery)
communicating branch
Lateral plantar art.
Medial plantar art.
Plantar arch
plantar metatarsal art
deep plantar branch of the dorsalis pedis
plantar digital art.



ANTERIOR THIGH

MUSCLES OF ANTERIOR THIGH
SARTORIUS M.
ILIACUS M.
PSOAS MAJOR M.
PSOAS MINOR M.
PECTINEUS M.
QUADRACEPS FEMORIS MM.
- RECTUS FEMORIS M.
- VASTI
  - LATERAL
  - INTERMEDIUS
  - MEDIAL

ARTICULARIS GENU
ATTACHES TO CAPSULE OF KNEE & PULLS IT UP ON EXTENSION OF KNEE
MAY BE CONSIDERED PART OF VASTUS INTERMEDIUS

BLOOD SUPPLY - FEMORAL ARTERY
NERVE SUPPLY - FEMORAL NERVE
ACTION - FLEX THIGH, EXTEND KNEE

ANTERIOR THIGH MUSCLES

SARTORIUS M.

ORIGIN	ASIS ANTERIOR SUPERIOR ILIAC SPINE
INSERTION	PES ANSERINUS MEDIAL SIDE OF TIBIA BELOW KNEE
NERVE SUPPLY	FEMORAL N.
ACTION	FLEX HIP, ABDUCT AND LATERAL ROTATION OF THIGH FLEX KNEE

BLOOD SUPPLY FEMORAL ARTERY

ILIACUS M.

ORIGIN	ILIAC FOSSA SACRUM
INSERTION	COMBINE WITH PSOAS M. TO BECOME ILIOPSOAS ATTACHES TO LESSER TROCHANTER OF FEMUR
NERVE SUPPLY	FEMORAL N.
ACTION	FLEX THIGH ON TRUNK LATERAL ROTATION OF THIGH
BLOOD SUPPLY	BRANCH OF INTERNAL ILIAC A. (ILIOLUMBAR ARTERY)

PSOAS MAJOR M.

ORIGIN	OFF TP'S, BODIES, & IVD'S T12 - L5
INSERTION	WITH ILIACUS INTO LESSER TROCHANTER OF FEMUR
NERVE SUPPLY	BRANCHES FROM LUMBAR PLEXUS -
ACTION	FLEXES & LATERALLY ROTATES THIGH
BLOOD SUPPLY	ILIOLUMBAR AA. FROM INTERNAL ILIAC A.

PECTINEUS M.

ORIGIN	SUPERIOR RAMUS OF PUBIS
INSERTION	ATTACHED TO LINE EXTENDING FROM LESSER TROCHANTER TO LINEA ASPERA (PECTINEAL LINE).
NERVE SUPPLY	FEMORAL N. (SOMETIMES BOTH) OBTURATOR N.
ACTION	FLEXES & ADDUCTS THIGH
BLOOD SUPPLY	OBTURATOR A MEDIAL FEMORAL CIRCUMFLEX A.

QUADRICEPS

RECTUS FEMORIS M.

ORIGIN	STRAIGHT HEAD -AIIS (ANTERIOR INFERIOR ILIAC SPINE) REFLECTED HEAD -ABOVE THE ACETABULUM
INSERTION	COMMON QUADRICEPS TENDON Quads-tendon-patella-patellar ligament-tibial tuberosity
NERVE SUPPLY	FEMORAL NERVE
ACTION	1) EXTENDS KNEE (ACTING WITH 3 VASTI MM.) 2) FLEXES HIP (ONLY QUAD TO CROSS HIP JOINT)
BLOOD SUPPLY	FEMORAL A.

VASTUS LATERALIS M.

ORIGIN	LATERAL & POSTERIOR FEMUR
INSERTION	QUADRICEPS TENDON
NERVE SUPPLY	FEMORAL NERVE
ACTION	EXTENDS KNEE
BLOOD SUPPLY	DESCENDING BRANCH OF LATERAL FEMORAL CIRCUMFLEX A.

VASTUS MEDIALIS M. (VMO)

ORIGIN	MEDIAL and POSTERIOR FEMUR
INSERTION	QUADRICEPS TENDON
NERVE SUPPLY	FEMORAL NERVE
ACTION	EXTENDS KNEE
BLOOD SUPPLY	FEMORAL A., PROFUNDA FEMORIS A., GENICULAR A.

VASTUS INTERMEDIUS M.

ORIGIN	ANTERIOR & LATERAL FEMUR SHAFT
INSERTION	QUADRICEPS TENDON
NERVE SUPPLY	FEMORAL NERVE
ACTION	EXTENDS KNEE
BLOOD SUPPLY	DESCENDING BRANCH OF LATERAL FEMORAL CIRCUMFLEX A.

ARTICULARIS GENU M.

ORIGIN	LOWER PORTION OF SHAFT OF FEMUR
INSERTION	CAPSULE OF KNEEE JOINT
NERVE SUPPLY	FEMORAL NERVE
ACTION	TENSES CAPSULE DURING KNEE EXTENSION
BLOOD SUPPLY	GENICULAR AA

MEDIAL THIGH

MUSCLES OF MEDIAL THIGH
GRACILIS M.
ADDUCTOR LONGUS M.
ADDUCTOR BREVIS M.
ADDUCTOR MAGNUS M.
OBTURATOR EXTERNUS M.

BLOOD SUPPLY- PROFUNDA FEMORIS A.
OBTURATOR A.
MEDIAL FEMORAL CIRCUMFLEX A.

NERVE SUPPLY- OBTURATOR NERVE

MEDIAL THIGH MUSCLES

GRACILIS M.

ORIGIN	LOWER 1/2 PUBIC SYMPHYSIS
	UPPER 1/2 PUBIC ARCH
	INFERIOR RAMUS
	RAMUS OF ISCHIUM
INSERTION	PES ANSERINUS
NERVE SUPPLY	OBTURATOR N.
ACTION	ADDUCT THIGH
	FLEX KNEE
BLOOD SUPPLY	PROFUNDA FEMORIS A.
	OBTURATOR A.
	MEDIAL FEMORAL CIRCUMFLEX A.

ADDUCTOR LONGUS M.

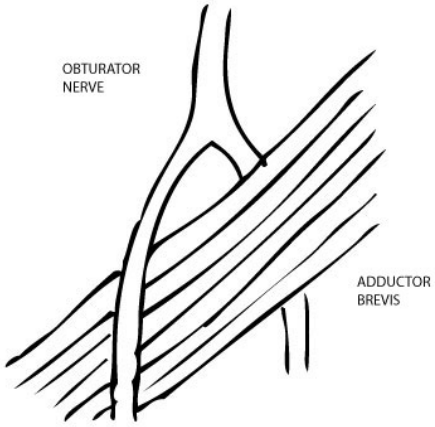
ORIGIN	INF. RAMUS OF PUBIS
INSERTION	MEDIAL LIP OF LINEA ASPERA
NERVE SUPPLY	OBTURATOR NERVE
ACTION	ADDUCT THIGH
BLOOD SUPPLY	PROFUNDA FEMORIS A.
	OBTURATOR A.
	MEDIAL FEMORAL CIRCUMFLEX A.

ADDUCTOR BREVIS M.

ORIGIN	INFERIOR RAMUS OF PUBIS
INSERTION	LINEA ASPERA
NERVE SUPPLY	OBTURATOR NERVE
ACTION	ADDUCTS THIGH
	SOME THIGH FLEXION DURING WALKING
BLOOD SUPPLY	PROFUNDA FEMORIS A.
	OBTURATOR A.
	MEDIAL FEMORAL CIRCUMFLEX A.

ANTERIOR PORTION
GRACILIS
ADDUCTOR LONGUS
ADDUCTOR BREVIS
PECTINEUS
HIP JOINT

POSTERIOR PORTION
ADDUCTOR MAGNUS
OBTURATOR EXTERNUS
KNEE JOINT



ADDUCTOR MAGNUS M.

ORIGIN	ISCHIAL TUBEROSITY INF. RAMUS OF PUBIS
INSERTION-	ATTACHES ALONG LINE EXTENDING FROM GREATER TROCHANTER TO LINEA ASPERA. LINEA ASPERA MEDIAL SUPRACONDYLAR LINE ADDUCTOR TUBERCLE
NERVE SUPPLY	UPPER PART - OBTURATOR N.
LOWER PART	SCIATIC N.
ACTION	ADDUCTION OF THIGH; UPPER PORTION FLEXES LITTLE EXTENSION OF THIGH (LOWER PORTION)
BLOOD SUPPLY	PROFUNDA FEMORIS A. OBTURATOR A. MEDIAL FEMORAL CIRCUMFLEX A. POPLITEAL A.

- LOWER PART OF ADDUCTOR MAGNUS IS CONSIDERED TO BE A HAMSTRING.
- MOST POSTERIOR OF ALL ADDUCTORS

OBTURATOR EXTERNUS M.

ORIGIN	OBTURATOR MEMBRANE & SURROUNDING BONE
INSERTION	TROCHANTERIC FOSSA
NERVE SUPPLY	OBTURATOR NERVE (POSTERIOR PORTION)
ACTION	LATERAL ROTATOR OF THIGH
BLOOD SUPPLY	MEDIAL FEMORAL CIRCUMFLEX A. OBTURATOR A.

MUSCLES OF POSTERIOR THIGH

BICEPS FEMORIS M.
SEMITENDINOSUS M.
SEMIMEMBRANOSUS M.
SMALL PART OF ADDUCTOR MAGNUS M

BLOOD SUPPLY - PERFORATING BRANCHES OF PROFUNDA FEMORIS A.

ACTION - EXTEND HIP
FLEX & ROTATE LEG

BICEPS FEMORIS M.

ORIGIN	LONG HEAD (CONSIDERED A HAMSTRING)- ISCHIAL TUBEROSITY COMMON TENDON WITH THE SEMITENDINOSUS
	SHORT HEAD- LINEA ASPERA LATERAL SUPRACONDYLAR RIDGE OF FEMUR.
INSERTION	HEAD OF FIBULA
NERVE SUPPLY	LONG HEAD SCIATIC NERVE
	SHORT HEAD COMMON PERONEAL NERVE
ACTION	FLEX & LATERALLY ROTATES LEG EXTENDS HIP
BLOOD SUPPLY	PERFORATING BRANCHES OF PROFUNDA FEMORIS

SEMITENDINOSUS M.

ORIGIN	ISCHIAL TUBEROSITY ON COMMON TENDON WITH BICEPS FEMORIS M.
INSERTION	PES ANSERINUS
NERVE SUPPLY	SCIATIC NERVE
ACTION	FLEX & MEDIALLY ROTATES LEG EXTENDS HIP
BLOOD SUPPLY	PERFORATING BRANCHES OF PROFUNDA FEMORIS A.

SEMIMEMBRANOSUS M.

ORIGIN	ISCHIAL TUBEROSITY
INSERTION	POSTERIOR MEDIAL SURFACE OF MEDIAL CONDYLE OF TIBIA.
NERVE SUPPLY	SCIATIC NERVE
ACTION	FLEX KNEE & MEDIALLY ROTATE LEG EXTEND HIP
BLOOD SUPPLY	PERFORATING BRANCHES OF PROFUNDA FEMORIS

3 MM ATTACH ON PES ANSERINUS
-
-
-

GLUTEAL REGION

MUSCLES OF GLUTEAL REGION
- GLUTEUS MAXIMUS
- GLUTEUS MEDIUS
- GLUTEUS MINIMUS
- TENSOR FASCIA LATA (TFL)
- PIRIFORMIS (KEY MUSCLE)
- GEMELLUS SUPERIOR
- GEMELLUS INFERIOR
- OBTURATOR INTERNUS
- QUADRATUS FEMORIS

GLUTEUS MAXIMUS M.

ORIGIN	ILIUM SACRUM COCCYX SACROTUBEROUS LIGAMENT
INSERTION	ILIOTIBIAL BAND OF TENSOR FASCIA LATA GLUTEAL TUBEROSITY OF FEMUR
NERVE SUPPLY	INFERIOR GLUTEAL NERVE
ACTION	EXTENSION OF HIP SOME LATERAL ROTATION OF HIP
BLOOD SUPPLY	SUPERIOR & INFERIOR GLUTEAL AA. (COME FROM INTERNAL ILIAC A.)

GLUTEUS MEDIUS M.

ORIGIN	EXTERNAL ILIAC FOSSA
INSERTION	GREATER TROCHANTER OF FEMUR
NERVE SUPPLY	SUPERIOR GLUTEAL NERVE
ACTION	ABDUCT HIP
	-ANTERIOR FIBERS MEDIALLY ROTATE THIGH
	-RAISES AND STEADIES HIP ON OPPOSITE SIDE IF STANDING ON ONE LEG
BLOOD SUPPLY	SUPERIOR GLUTEAL A.

GLUTEUS MINIMUS A.

ORIGIN	EXTERNAL ILIAC FOSSA
INSERTION	GREATER TROCHANTER
NERVE SUPPLY	SUPERIOR GLUTEAL N.
ACTION	ABDUCT HIP
	ANTERIOR FIBERS MEDIALLY ROTATE THIGH
BLOOD SUPPLY	SUPERIOR GLUTEAL A.

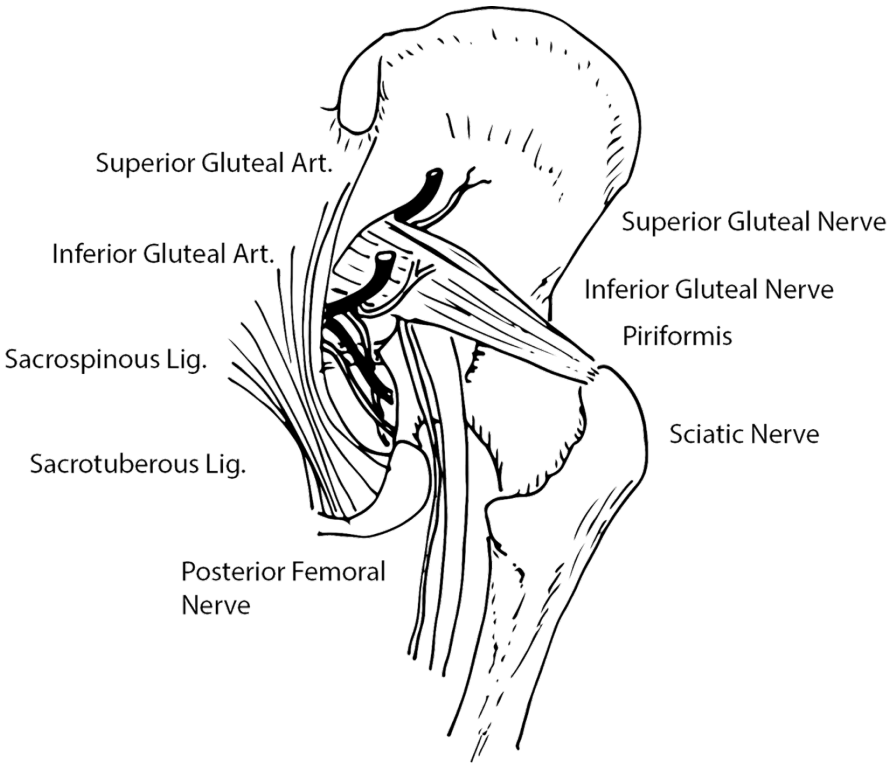
TENSOR FASCIA LATA (TFL)

ORIGIN	ASIS, ILIAC CREST
INSERTION	ILIOTIBIAL BAND TO ANTERIOR LATERAL PROXIMAL SURFACE OF TIBIA.
NERVE SUPPLY	SUPERIOR GLUTEAL N.
ACTION	TENSES THIGH
	EXTENDS KNEE
	FLEX & ABDUCT HIP
BLOOD SUPPLY	ASCENDING BRANCH OF LATERAL FEMORAL CIRCUMFLEX A.

LATERAL ROTATORS OF THE THIGH

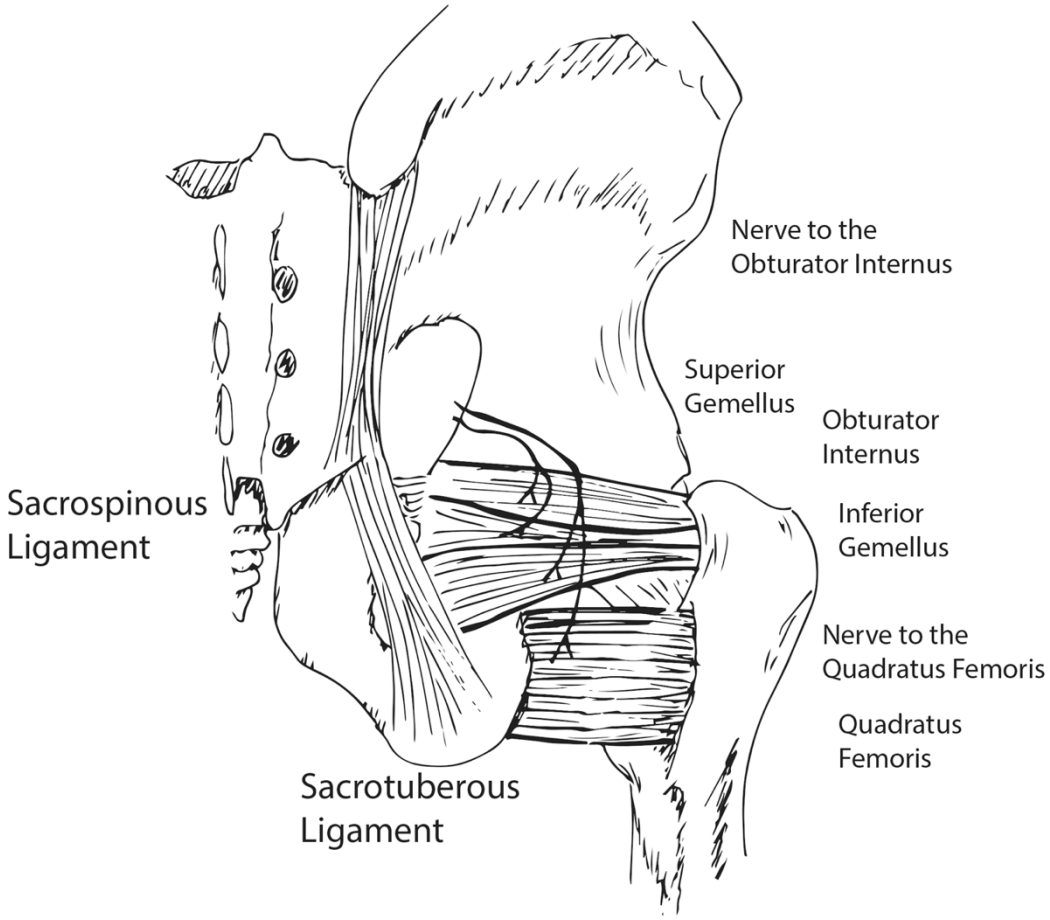
PIRIFORMIS M.

ORIGIN	SACRUM
INSERTION	FIBERS PASS THRU GREATER SCIATIC FORAMEN AND GO TO GREATER TROCHANTER.
NERVE SUPPLY	
ACTION	LATERALLY ROTATES THIGH
BLOOD SUPPLY	INFERIOR GLUTEAL A.



OBTURATOR INTERNUS M.

ORIGIN-	OBTURATOR MEMBRANE BONE SURROUNDING OBTURATOR FORAMEN
INSERTION-	THROUGH LESSER SCIATIC FORAMEN BY COMMON TENDON TO GREATER TROCHANTER
NERVE SUPPLY-	NERVE TO OBTURATOR INTERNUS
ACTON –	LATERAL ROTATION OF HIP
BLOOD SUPPLY-	INFERIOR GLUTEAL A.



GEMELLUS INFERIOR M.

ORIGIN	ISCHIAL TUBEROSITY
INSERTION	COMMON TENDON TO GREATER TROCHANTER
NERVE SUPPLY	NERVE TO QUADRATUS FEMORIS ACTION -LATERALLY ROTATES HIP
BLOOD SUPPLY	INFERIOR GLUTEAL A.

QUADRATUS FEMORIS M.

ORIGIN	ISCHIAL TUBEROSITY
INSERTION	QUADRATE TUBERCLE OF THE INTERTROCHANTERIC CREST OF FEMUR
NERVE SUPPLY	NERVE TO QUADRATUS FEMORIS
ACTION	LATERALLY ROTATES HIP
BLOOD SUPPLY	INFERIOR GLUTEAL A.

GEMELLUS SUPERIOR M.
ORIGIN- SPINE OF THE ISCHIUM
INSERTION- COMMON TENDON W/ OBTURATOR INTERNUS TO GREATER TROCHANTER
NERVE- NERVE TO THE OBTURATOR INTERNUS
ACTION- LATERAL ROTATION OF THE HIP AND THIGH
BLOOD SUPPLY- INFERIOR GLUTEAL ART.

ACTIONS OF THE THIGH

EXTENSION
- GLUTEUS MAXIMUS
- HAMSTRINGS

FLEXION
- ANTERIOR THIGH MM.
- POSTERIOR ABDOMINAL WALL MM. -ILIACUS –PSOAS

ABDUCTION
- GLUTEUS MEDIUS
- GLUTEUS MINIMUS

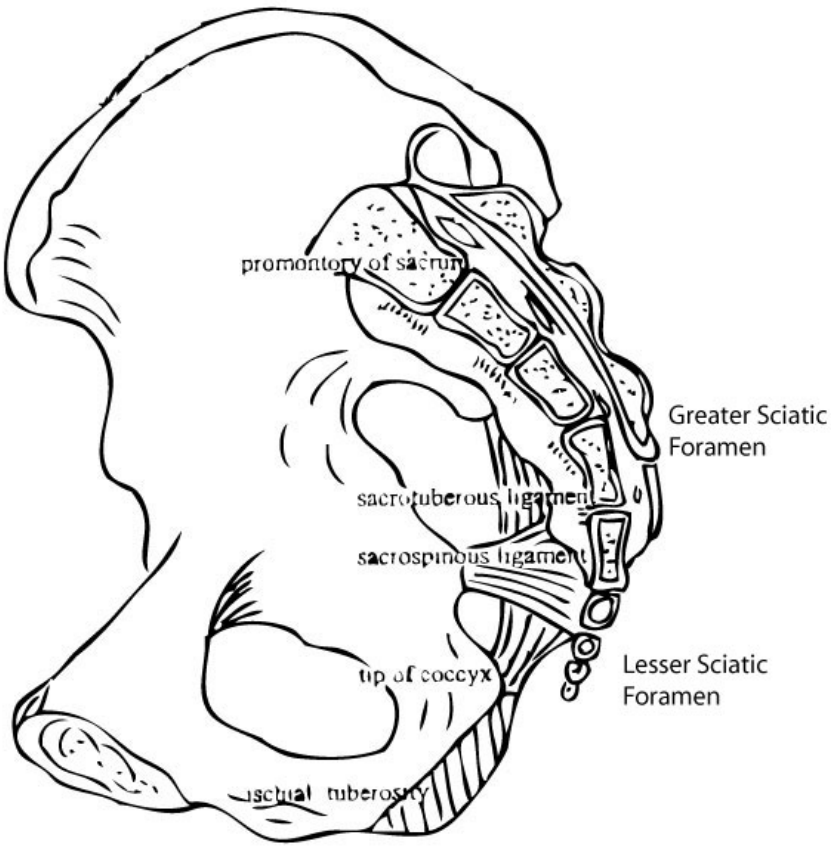
ADDUCTION
- ADDUCTORS

MEDIAL ROTATION
- ANTERIOR FIBERS OF GLUTEUS MEDIUS

LATERAL ROTATION
1. PIRIFORMIS
2. QUADRATUS FEMORIS
3. GEMELLUS SUPERIOR
4. GEMELLUS INFERIOR
5. OBTURATOR INTERNUS
6. OBTURATOR EXTERNUS

LESSER SCIATIC FORAMEN
- OBTURATOR INTERNUS M.
- INTERNAL PUDENDAL ARTERY & VEIN
- PUDENDAL NERVE

GREATER SCIATIC FORAMEN
- PIRIFORMIS
- SACRAL PLEXUS
- SUPERIOR AND INFERIOR GLUTEAL AA AND VV.
- INTERNAL PUDENDAL A & V



THE SACROSPINOUS &SACROTUBEROUS LIGAMENTS CONVERT THE GREATER AND LESSER SCIATIC NOTCHES INTO THE GREATER AND LESSER SCIATIC FORAMEN

ARTERIES OF GLUTEAL REGION
- SUPERIOR & INFERIOR GLUTEAL AA.
- LATERAL & MEDIAL FEMORAL CIRCUMFLEX AA.

HIP JOINT

- DIARTHROSIS
  SYNOVIAL
  POLYAXIAL
  BALL & SOCKET

- ARTICULATION OCCURS BETWEEN OS COXAE & HEAD OF FEMUR

STABILIZING FACTORS OF JOINT
A) ILIOFEMORAL LIGAMENT

ANT. (Y LIGAMENTOF BIGELOW)
- STRONGEST LIGAMENT IN BODY

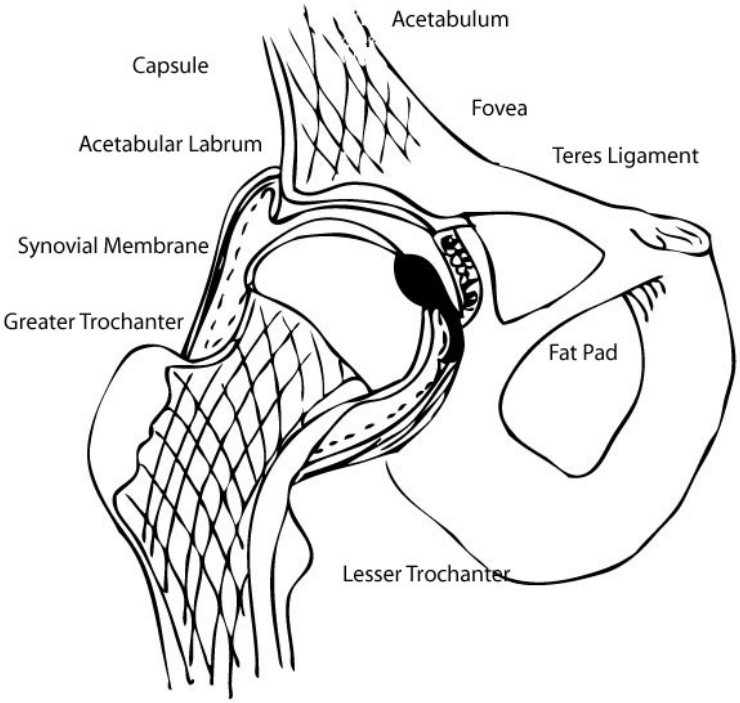
B) ISCHIOFEMORAL LIGAMENT (POSTERIOR)

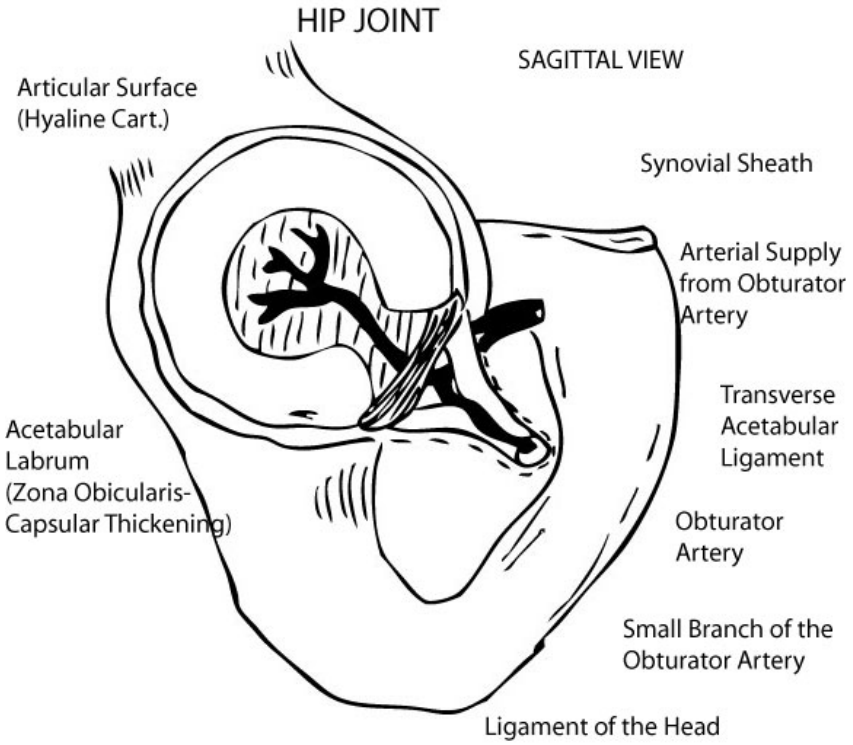
C) PUBOFEMORAL LIGAMENT (ANTERIOR)

D) MUSCLE TENDONS THAT CROSS HIP JOINT
- RECTUS FEMORIS
- SARTORIUS
- GRACILIS
- PECTINEUS ADDUCTORS
- GLUTEAL MM.
- HAMSTRINGS
- SACROTUBEROUS LIGAMENT

-VASCULARIZED BY:
LATERAL & MEDIAL FEMORAL CIRCUMFLEX AA.
INFERIOR GLUTEAL A.
OBTURATOR A.

HIP JOINT





Avascular Necrosis

Lack of blood supply causing tissue death
Occurs usually in pre-teens and teenagers

Osteochondrosis

- Hip Leggs-Calves Perthes Disease
  - Caused by lack of blood to the head of the femur
  - Appearance on x ray
- Knee Osgood-Schlater's Disease, not an AN, but commonly grouped with the AN conditions
- Spine Schaurmann's Disease

Clinical Applications

- Dislocations
  - Anterior- head of the femur is forced forward
  - Posterior- head of the femur is forced backward

Hip dislocations often produce multiple fracture of the head and neck of the femur because of the strong ligaments surrounding the region.

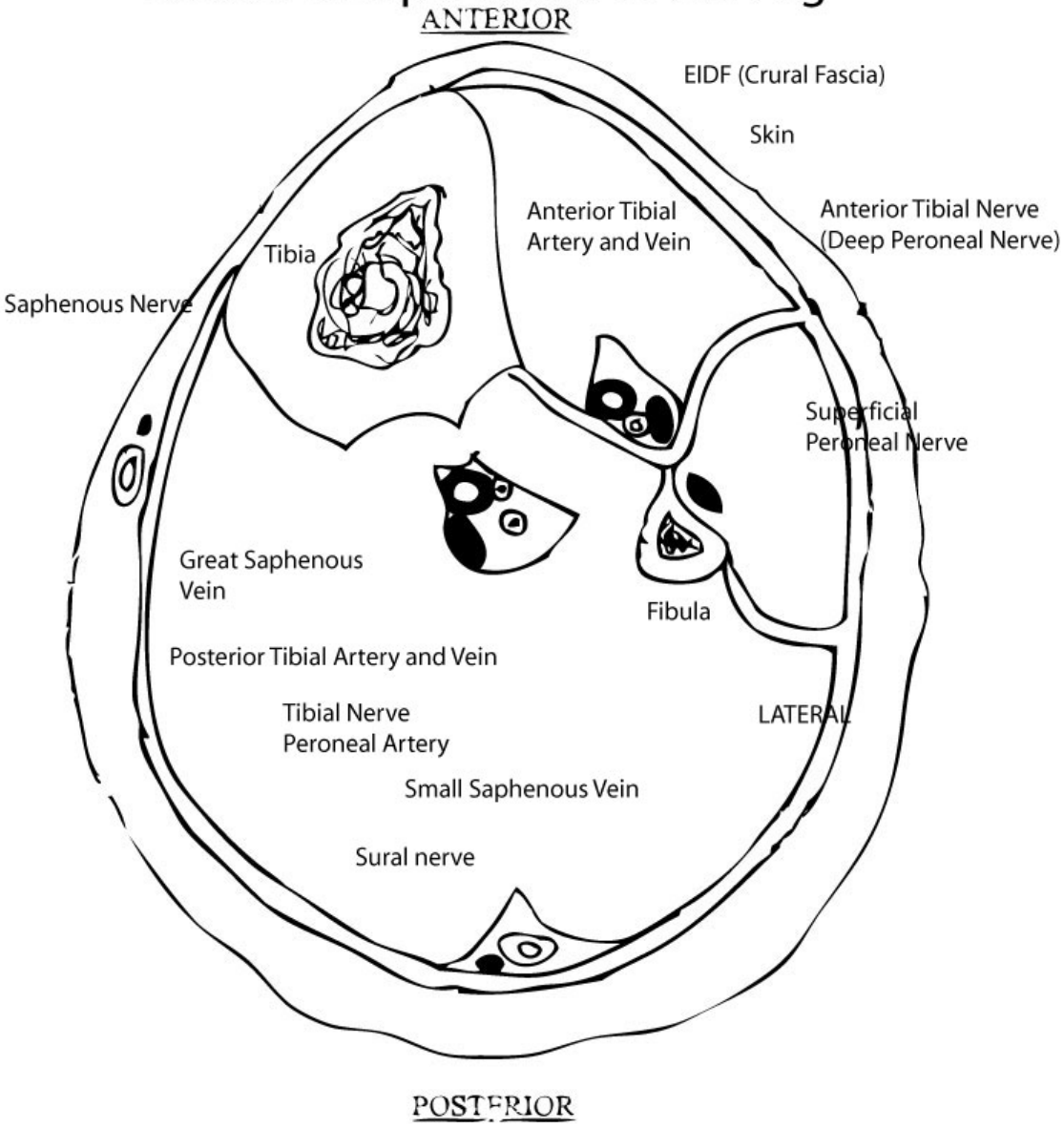
- Newborns
- Barlow's Test-

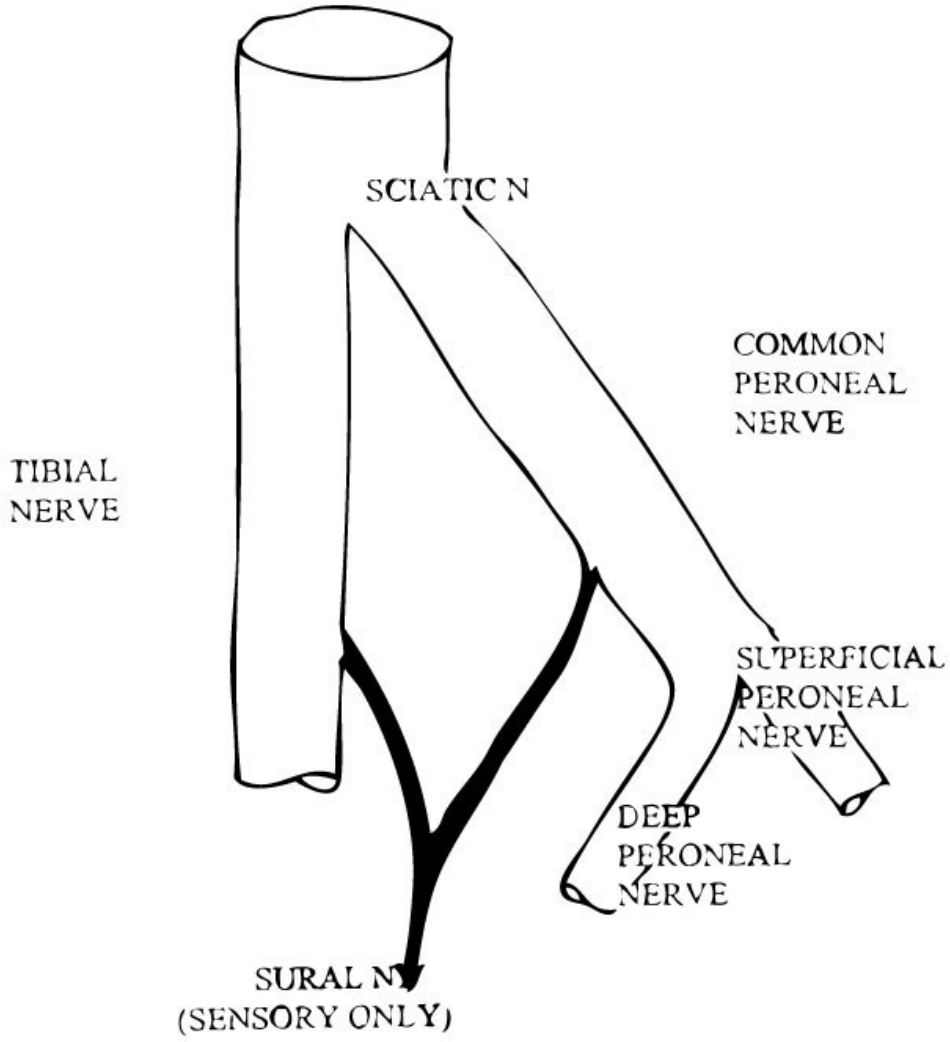
LEG

POPLITEAL FOSSA

- LATERAL BOUNDARY
  - BICEPS FEMORIS M.
  - LATERAL HEAD OF GASTROCNEMIUS
- MEDIAL BOUNDARY
  - SEMITENDINOSUS M.
  - SEMIMEMBRANOSUS M.
  - MEDIAL HEAD OF GASTROCNEMIUS
- CONTAINS
  - POPLITEAL ARTERY & VEIN
  - SCIATIC NERVE

Fascial Compartment of the Leg





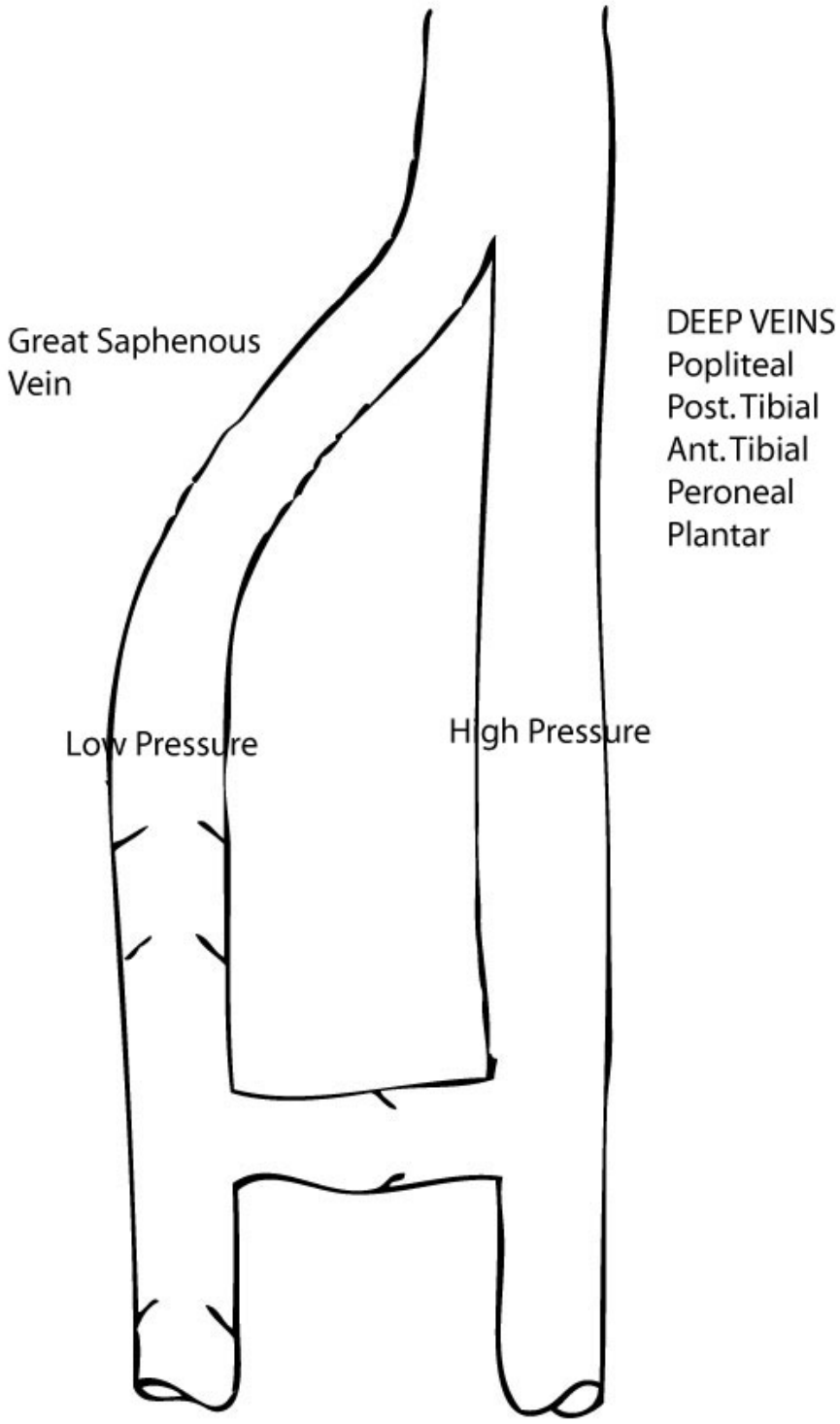
VARICOSE VEINS

DILATED & TORTUOUS

CAUSES

- HEREDITARY WEAKNESS IN VEIN WALLS
- INCOMPETENT VALVES
- INCREASED INTRA - ABDOMINAL PRESSURE
  - (PREGNANCIES OR ABDOMINAL TUMORS)
- THROMBOPHLEBITIS OF DEEP VEINS

CONSTIPATION - 10 % OF U.S.
HEMORRHOIDS VARICOSITIES


Great Saphenous
Vein
DEEP VEINS
Popliteal
Post. Tibial
Ant. Tibial
Peroneal
Plantar
Low Pressure
High Pressure

KNEE JOINT

SYNOVIAL
DIARTHROSIS
BIAXIAL CONDYLAR
CAPSULE
PRESENT LATERALLY & POSTERIORLY
ABSENT ANTERIORLY
BURSAE
SUPRAPATELLAR
PREPATELLAR
INFRAPATELLAR
SUPERFICIAL
DEEP

ONE UNDER EACH OF THE FOLLOWING MUSCLE ATTACHMENTS
POPLITEAL
SEMIMEMBRANOSUS
BICEPS FEMORIS
MEDIAL HEAD OF GASTROCNEMIUS
PES A.

CAPSULE AND RELATED STRUCTURES
1) OBLIQUE POPLITEAL LIGAMENT
(SEMIMEMBRANOSUS)
2) LATERAL COLLATERAL LIGAMENT
FUSED TO CAPSULE BUT NO ATTACHMENT
TO MENISCUS

3) MEDIAL COLLATERAL LIGAMENT
FUSED TO CAPSULE & MENISCUS

4) PATELLAR LIGAMENT
NOTE FAT PAD UNDERNEATH

5) INTRACAPSULAR (INTERCONDYLAR) LIGAMENTS (NAMED BY TIBIAL ATTACHMTS.)
A) ANTERIOR CRUCIATE LIGAMENT
ATTACHES FROM ANTERIOR TIBIA TO
LATERAL FEMORAL CONDYLE
(POSTERIOR, MED. SURFACE)

- TRAVELS SUPERIOR, POSTERIOR, LATERAL
- PREVENTS TIBIA FROM MOVING ANTERIOR DURING KNEE EXTENSION

B) POSTERIOR CRUCIATE LIGAMENT
- TRAVELS SUPERIOR ANTERIOR, & MEDIAL
- PREVENTS TIBIA FROM GOING POSTERIOR ON KNEE FLEXION

6) TRANSVERSE LIGAMENT
- ATTACHED TO MENISCUS ANT.

ARCUATE LIGAMENT

CORONARY LIGAMENT

MENISCI

LATERAL & MEDIAL MENISCI

MEDIAL - "C" SHAPED

LATERAL - "0" SHAPED

MADE OF FIBROCARTILAGE

RELATIVELY AVASCULAR

KNEE JOINT

NERVE SUPPLY

FEMORAL N.

TIBIAL N.

OBTURATOR N.

COMMON PERONEAL N.

MOVEMENTS

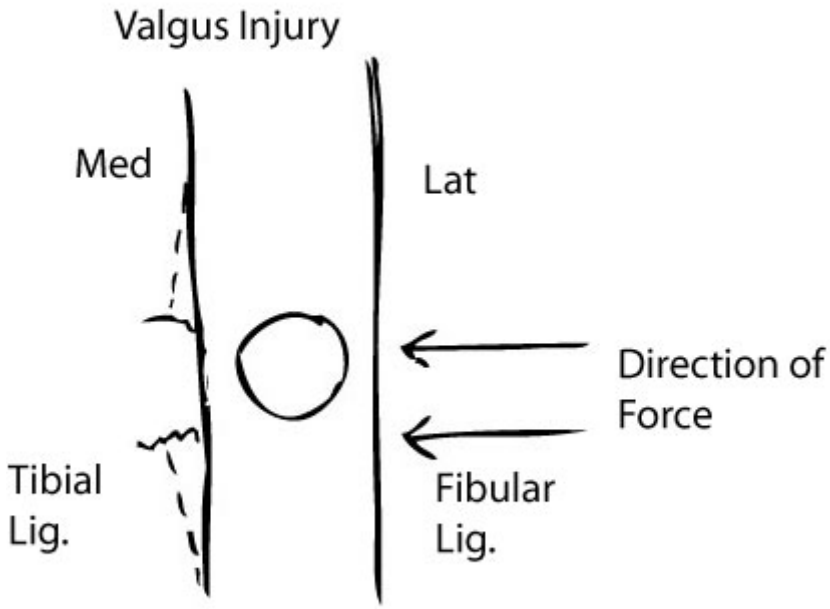
FLEXION - EXTENSION

LATERAL ROTATION UPON EXTENSION

MEDIAL ROTATION UPON FLEXION

MEDIAL LIGAMENT TIGHTLY FUSED TO MENISCUS

TERRIBLE TRIAD/UNHAPPY TRIAD



INJURY TO PERONEAL NN. OFTEN OCCURS.
CAPSULE EASILY INFECTED BECAUSE OF GOOD BLOOD SUPPLY.

HOUSEMAID'S KNEE & SWOLLEN FROM TRAUMA;
INFLAMMATION OF PREPATELLAR BURSA

RETINACULA OF THE ANKLE
THICKENING OF THE CRURAL FASCIA
FUNCTION: SUPPORT
GIVES LEVERAGE TO TENDONS OF LEG

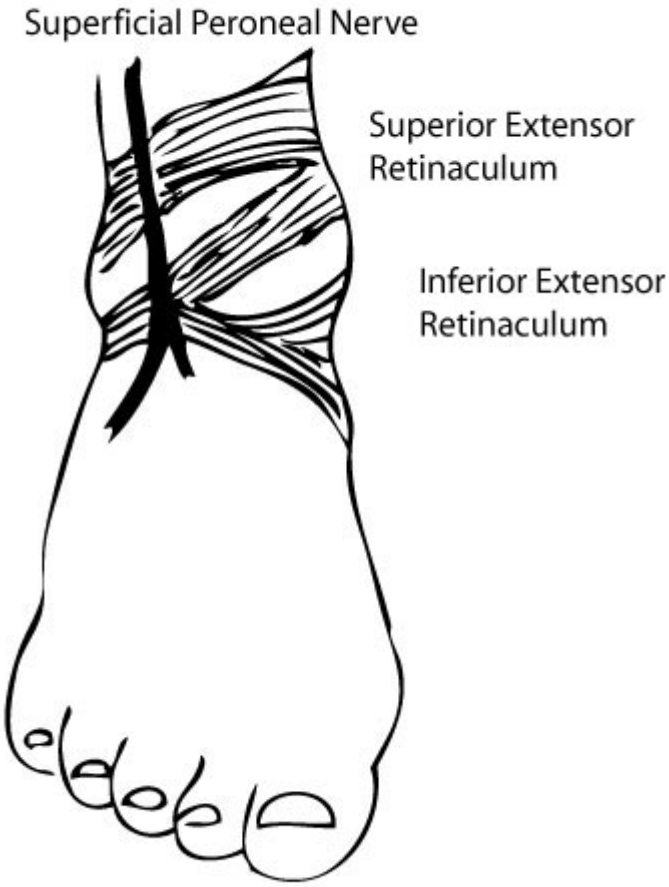
RETINACULA:
1) SUPERIOR EXTENSOR RETINACULUM
(TRANSVERSE CRURAL FASCIA)

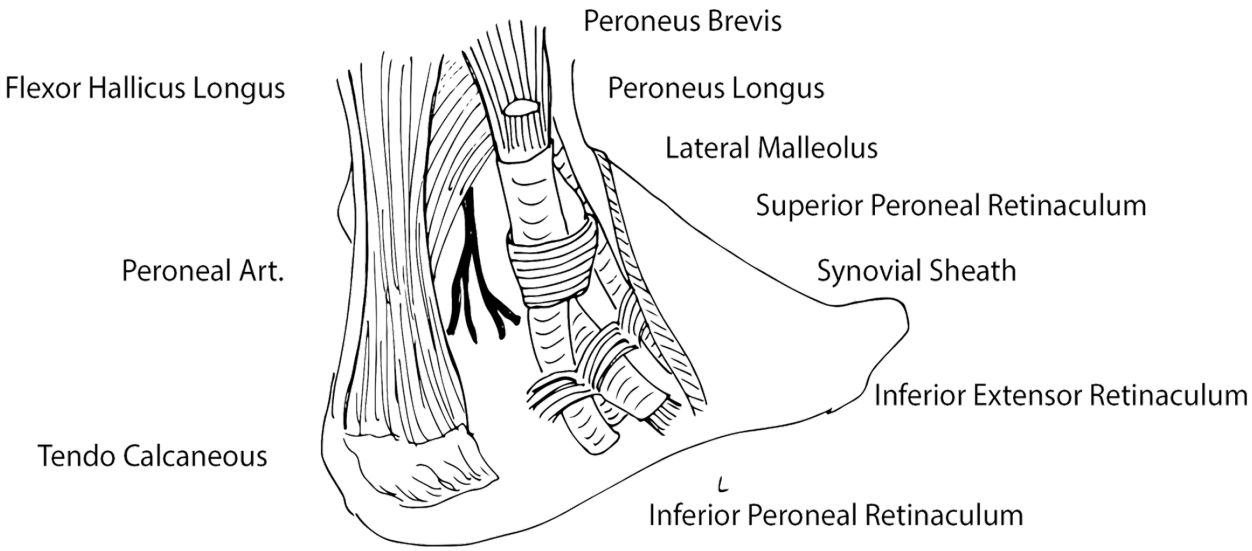
2) INFERIOR EXTENSOR RETINACULUM
(CRUCIATE CRURAL LIGAMENT)

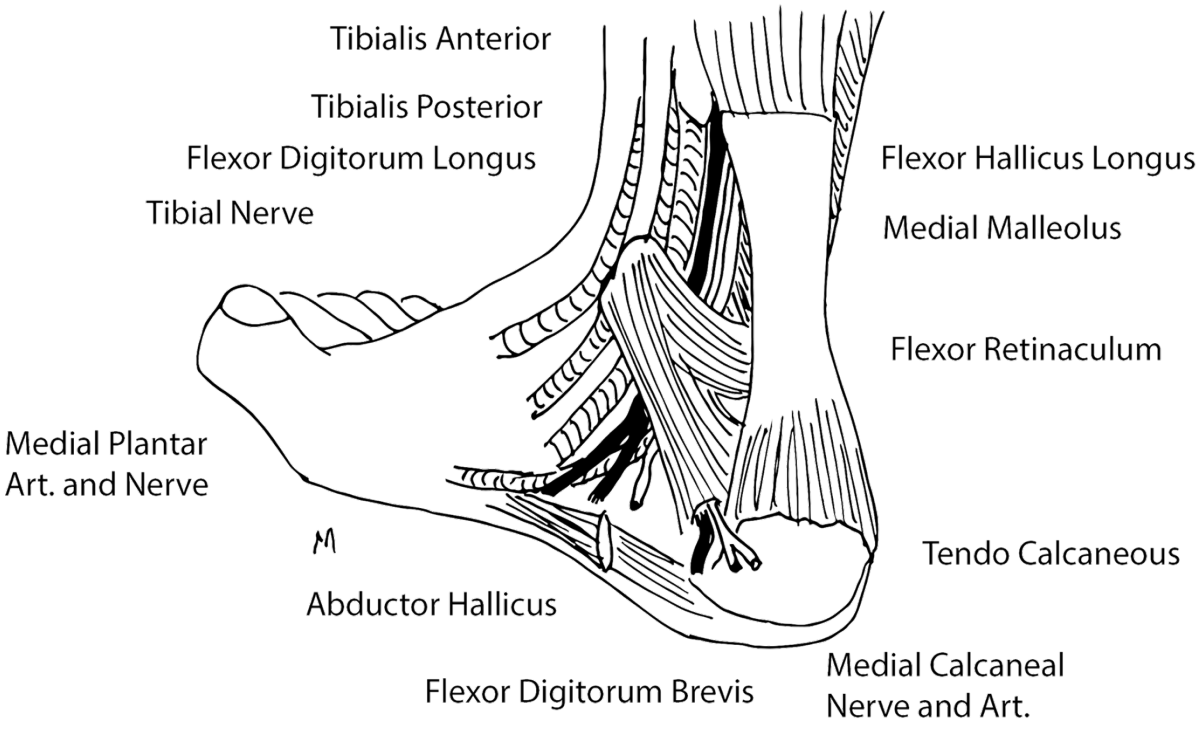
3) FLEXOR RETINACULUM

4) PERONEAL RETINACULA
(LATERAL ANKLE)

A) SUPERIOR PERONEAL RETINACULUM-PERONEUS LONGUS BREVIS PASS
B) INFERIOR PERONEAL RETINACULUM-UNDERNEATH BOTH OF THESE
Peroneus brevis passes underneath both of these




Peroneus Brevis
Flexor Hallicus Longus
Peroneus Longus
Lateral Malleolus
Superior Peroneal Retinaculum
Peroneal Art.
Synovial Sheath
Inferior Extensor Retinaculum
Tendo Calcaneous
Inferior Peroneal Retinaculum


Tibialis Anterior
Tibialis Posterior
Flexor Digitorum Longus
Flexor Hallicus Longus
Tibial Nerve
Medial Malleolus
Flexor Retinaculum
Medial Plantar
Art. and Nerve
Tendo Calcaneous
Abductor Hallicus
Medial Calcaneal
Nerve and Art.
Flexor Digitorum Brevis

WHAT RUNS UNDER FLEXOR RETINACULUM?

1) TENDON OF POSTERIOR TIBIALIS M.

2) TENDON OF FLEXOR DIGITORUM LONGUS M.

3) TIBIAL NERVE
POSTERIOR TIBAL ARTERY & VEIN

4) TENDON OF FLEXOR HALLUCIS LONGUS M.

ANTERIOR FORELEG

MUSCLES OF ANTERIOR LEG
- ANTERIOR TIBIALIS M.
- EXTENSOR DIGITORUM LONGUS M.
- PERONEUS TERTIUS M.
- EXTENSOR HALLUCIS LONGUS M.

BLOOD SUPPLY
- ANTERIOR TIBIAL A.

NERVE SUPPLY
- DEEP PERONEAL N.

ANTERIOR FORELEG MUSCLES

ANTERIOR TIBIALIS M. (L3, 4)

ORIGIN	UPPER PART OF TIBIA INTEROSSEOUS MEMBRANE
INSERTION	MEDIAL CUNEIFORM BONE 1 ST METATARSAL
NERVE SUPPLY	DEEP PERONEAL N.
ACTION	DORSIFLEXION INVERSION
BLOOD SUPPLY	ANTERIOR TIBIAL A.

EXTENSOR DIGITORUM LONGUS M.

ORIGIN	FIBULA
	TIBIA
	INTEROSSEOUS MEMBRANE
INSERTION	4 LATERAL TOES ON THE BASE OF MIDDLE
	PHALANX AND THE BASE OF THE DISTAL PHALANX
NERVE SUPPLY	DEEP PERONEAL N.
ACTION	EXTENDS TOES
	DORSIFLEXION OF ANKLE
BLOOD SUPPLY	ANTERIOR TIBIAL ARTERY

PERONEUS TERTIUS M.

ORIGIN	LOWER 1/3 FIBULA
	INTEROSSEOUS MEMBRANE
INSERTION	RUNS WITH EXTENSOR DIGITORUM LONGUS
	TENDON AND GOES TO 4TH & 5TH METATARSAL
NERVE SUPPPLY	DEEP PERONEAL N.
ACTION	DORSIFLEXION
	EVERSION
BLOOD SUPPLY	ANTERIOR TIBIAL A.

EXTENSOR HALLUCIS LONGUS M.

ORIGIN	ANTERIOR SURFACE OF FIBULA
	INTEROSSEOUS MEMBRANE
INSERTION	DISTAL PHALANX OF BIG TOE
NERVE SUPPLY	DEEP PERONEAL NERVE
ACTION	EXTENDS BIG TOE
BLOOD SUPPLY	ANTERIOR TIBIAL A.

SHIN SPLINTS

TRAUMA OR WEAKENING OF THE MUSCLES ATTACHING TO THE INTEROSSEOUS MEMBRANE

LATERAL FASCIAL COMPARTMENT OF FORELEG

MUSCLES
PERONEUS LONGUS M.
PERONEUS BREVIS M.

BLOOD SUPPLY
PERONEAL ARTERY

NERVE SUPPLY
SUPERFICIAL PERONEAL N.

MUSCLES OF LATERAL FORELEG

PERONEUS LONGUS M.

ORIGIN	UPPER FIBULA
INSERTION	BASE OF I ST METATARSAL
NERVE SUPPLY	SUPERFICIAL PERONEAL N.
ACTION	EVERSION OF FOOT
	PLANTAR FLEXION
BLOOD SUPPLY	PERONEAL A.

*SUPPORTS LATERAL LONGITUDINAL ARCH

PERONEUS BREVIS M.

ORIGIN	LOWER 2/3 OF FIBULA
INSERTION	TUBERCLE ON BASE OF 5TH METATARSAL
NERVE SUPPLY	SUPERFICIAL PERONEAL N.
ACTION	EVERSION OF FOOT
	PLANTAR FLEXION
BLOOD SUPPLY	PERONEAL A.

*SUPPORTS LATERAL LONGITUDINAL ARCH

POSTERIOR FASCIAL COMPARTMENT OF FORELEG

MUSCLES

SUPERFICIAL GROUP
- TRICEPS SURAE
  - GASTROCNEMIUS (2 HEADS)
  - SOLEUS (1 HEAD)
  - (TENDO CALCANEUS)
  - PLANTARIS
  - (SMALLEST MUSCLE OF THIGH & LEG)

DEEP GROUP
- POPLITEUS M.
- FLEXOR DIGITORUM LONGUS M.
- FLEXOR HALLUCIS LONGUS M.
- POSTERIOR TIBIALIS M.

BLOOD SUPPLY
- POSTERIOR TIBIAL A.
- PERONEAL A.

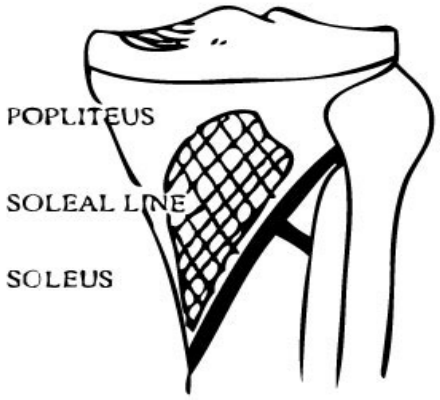
NERVE SUPPLY
TIBIAL N.
(SURAL N.)

MUSCLES OF POSTERIOR FORELEG

SUPERFICIAL GROUP

GASTROCNEMIUS

ORIGIN	LATERAL HEAD LATERAL CONDYLE OF FEMUR MEDIAL HEAD MEDIAL CONDYLE OF FEMUR (MED. HEAD COMMON KNEE PROBLEMS)
INSERTION	COMMON TENDON (TENDO CALCANEUS) ATTACHED TO CALCANEUS
NERVE SUPPLY	TIBIAL NERVE
ACTION	PLANTAR FLEXION OF FOOT (ANKLE) WEAK FLEXOR OF KNEE
BLOOD SUPPLY	POSTERIOR TIBIAL A. PERONEAL A.
*FABELLA	LATERAL HEAD 3-22%, depending on text



SOLEUS M.

ORIGIN	SOLEAL LINE OF THE TIBIA
INSERTION	COMMON TENDON (TENDO CALCANEUS) ATTACHED TO CALCANEUS
NERVE SUPPLY	TIBIAL NERVE
ACTION	PLANTAR FLEXION OF FOOT (ANKLE)
BLOOD SUPPLY	POSTERIOR TIBIAL A. PERONEAL A.

PLANTARIS M.

ORIGIN	LATERAL SUPRACONDYLAR RIDGE OF FEMUR
INSERTION	MEDIAL SIDE OF CALCANEUS
NERVE SUPPLY	TIBIAL NERVE
ACTION	FEEBLE FLEXION OF FOOT
BLOOD SUPPLY	POSTERIOR TIBIAL A.

DEEP GROUP

POPLITEUS M.

ORIGIN	LATERAL CONDYLE OF FEMUR A FEW FIBERS ATTACH TO LATERAL MENISCUS OF KNEE
INSERTION	POSTERIOR TIBIA ABOVE SOLEAL LINE
NERVE SUPPLY	TIBIAL N.
ACTION	MEDIAL ROTATION OF THE TIBIA ON THE FEMUR (INITIATION OF FLEXION - UNLOCKING THE KNEE JOINT)
BLOOD SUPPLY	POSTERIOR TIBAL A PERONEAL A.

FLEXOR DIGITORUM LONGUS M.

ORIGIN	POSTERIOR SURFACE OF TIBIA
INSERTION	SPLITS INTO 4 SLIPS WHICH ATTACH TO THE DISTAL PHALANGES OF 4 LATERAL TOES. FLEXOR HALLUCIS LONGUS TENDON

LAYER II FOOT	QUADRATUS PLANTAE 4 LUMBRICALS (BOTH ATTACH TO TENDON OF FLEXOR DIGITORUM LONGUS)

NERVE SUPPLY	TIBIAL N.
ACTION	FLEX DISTAL PHALANGES OF 4 LATERAL TOES FLEX ANKLE
BLOOD SUPPLY	POSTERIOR TIBIAL A. PERONEAL A.

*SUPPORTS MEDIAL & LATERAL LONGITUDINAL ARCHES OF FOOT.

FLEXOR HALLUCIS LONGUS.

ORIGIN	LOWER 2/3 OF FIBULA
INSERTION	BASE OF DISTAL PHALANX OF BIG TOE
	PASSES THROUGH A GROOVE IN THE CALCANEUS
	CALLED THE SUSTENTACULUM TALI
NERVE SUPPLY	TIBIAL N.
ACTION	FLEXES DISTAL PHALANX OF BIG TOE
	FLEXES FOOT
BLOOD SUPPLY	POSTERIOR TIBIAL A.
	PERONEAL A.

*SUPPORTS MEDIAL LONGITUDINAL ARCH OR FOOT

POSTERIOR TIBIALIS M.

ORIGIN	TIBIA
	FIBULA
	INTEROSSEOUS MEMBRANE
INSERTION	9 INSERTIONS ON BOTTOM OF FOOT)
	NAVICULAR
	CUBOID
	3 CUNEIFORMS
	2ND, 3RD, 4TH METATARSALS
	CALCANEUS
NERVE SUPPLY	TIBIAL N.
ACTION	PLANTAR FLEXION OF FOOT
	INVERSION
BLOOD SUPPLY	POSTERIOR TIBIAL A.
	PERONEAL A.

*SUPPORTS MEDIAL LONGITUDINAL ARCH

Anterior View

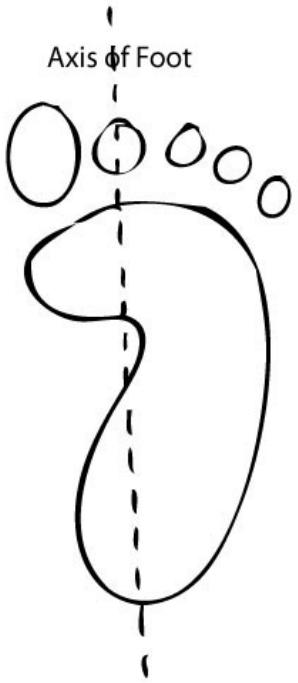
SOLE OF THE FOOT

THICK SKIN
MUCH COMPACTED, SUPERFICIAL FASCIA
SENSORY: MEDIAL & LATERAL PLANTAR NN.
EIDF: RETINACULA
PLANTAR APONEUROSIS

PLANTAR APONEUROSIS ATTACHES TO:
CALCANEUS & 5 TOES
GIVES OFF 5 SLIPS WHICH GOES TO
SKIN
EACH TOE

COVERS FLEXOR TENDONS & FUSES WITH A FIBROUS SHEATH ABOUT EACH TOE.

FUNCTION OF PLANTAR APONEUROSIS
-GIVES A FIRM ATTACHMENT TO THE SKIN
-PROTECTS TENDONS, NERVES, SYNOVIAL SHEATHS
-MAINTAINS ARCHES OF THE FOOT



MUSCLES OF THE SOLE OF THE FOOT

LAYER I - SUPERFICIAL
- ABDUCTOR HALLUCIS
- FLEXOR DIGITORUM BREVIS
- ABDUCTOR DIGITI MINIMI

*INNERVATED BY MEDIAL PLANTAR N.

LAYER II - 2 TENDONS
- FLEXOR DIGITORUM LONGUS TENDON
- QUADRATUS PLANTAE
- 4 LUMBRICALS

LAYER III
- FLEXOR HALLUCIS BREVIS
- FLEXOR DIGITI MINIMI BREVIS
- ADDUCTOR HALLUCIS

LAYER IV
- INTEROSSEI
  - 3PLANTAR
  - 4 DORSAL
- PERONEUS LONGUS TENDON
- POSTERIOR TIBIALIS TENDON

LAYER I

ABDUCTOR HALLUCIS M.

ORIGIN	CALCANEUS
INSERTION	PROXIMAL PHALANX OF BIG TOE
NERVE SUPPLY	MEDIAL PLANTAR N.
ACTION	ABDUCTION OF BIG TOE FLEXES BIG TOE
BLOOD SUPPLY	MEDIAL PLANTAR A.

*SUPPORTS MEDIAL LONGITUDINAL ARCH

FLEXOR DIGITORUM BREVIS M.

ORIGIN	CALCANEUS
INSERTION	4 TENDON SLIPS INSERT ON MIDDLE PHALANX OF EACH TOE.
NERVE SUPPLY	MEDIAL PLANTAR N.
ACTION	FLEXES 4 LATERAL TOES SUPPORTS LATERAL LONGITUDINAL ARCH
BLOOD SUPPLY	MEDIAL PLANTAR A.

ABDUCTOR DIGITI MINIMI

ORIGIN	CALCANEUS
INSERTION	PROXIMAL PHALANX OF LITTLE TOE
NERVE SUPPLY	LATERAL PLANTAR N.
ACTION	ABDUCTS LITTLE TOE
BLOOD SUPPLY	LATERAL PLANTAR A.

LAYER II

TENDONS OF POSTERIOR FORELEG

QUADRATUS PLANTAE (FLEXOR ACCESSORIUS)

ORIGIN	MEDIAL & LATERAL HEADS FROM THE CALCANEUS
INSERTION	FLEXOR DIGITORUM LONGUS TENDON
NERVE SUPPLY	LATERAL PLANTAR N.
ACTION	FLEXION OF 4 LATERAL TOES
BLOOD SUPPLY	LATERAL PLANTAR A.

LUMBRICALES (4)

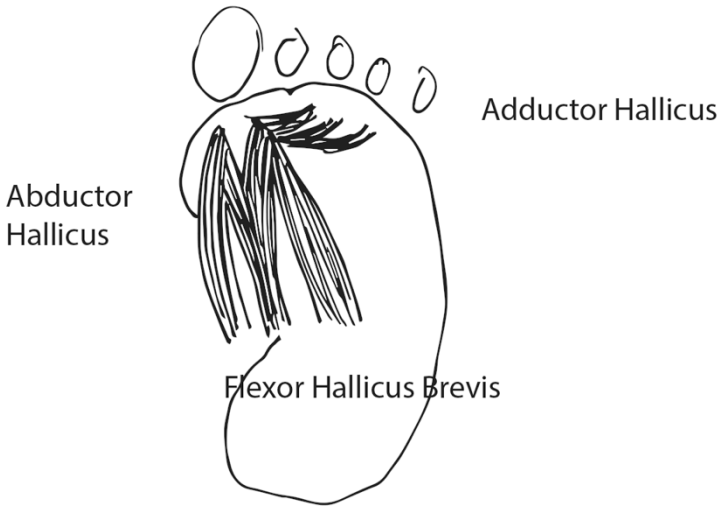
ORIGIN	FLEXOR DIGITORUM LONGUS TENDON
INSERTION	DORSAL EXPANSION OF EXTENSOR DIGITORUM LONGUS MUSCLE
NERVE SUPPLY	1 ST LUMBRICAL - MEDIAL PLANTAR N. REMAINDER - LATERAL PLANTAR N.
ACTION	PREVENTS TOES FROM BUCKLING BY KEEPING THEM EXTENDED.
BLOOD SUPPLY	LATERAL PLANTAR A. PLANTAR METATARSAL AA.

LAYER III

FLEXOR HALLUCIS BREVIS M.

ORIGIN	CUBOID LATERAL CUNEIFORM
INSERTION	2 TENDONS OF INSERTION (SESMOIDS UNDER EACH) MEDIAL BELLY JOINS TENDON OF ABDUCTOR HALLUCIS LATERAL BELLY JOINS TENDON OF ADDUCTOR HALLUCIS
NERVE SUPPLY	MEDIAL PLANTAR N.
ACTION	FLEX BIG TOE
BLOOD SUPPLY	1st PLANTAR METATARSAL A. LATERAL PLANTAR A MEDIAL PLANTAR A.

*SUPPORT MEDIAL LONGITUDINAL ARCH



ADDUCTOR HALLUCIS M.

ORIGIN	OBLIQUE HEAD 2ND, 3RD, 4TH METATARSALS TRANSVERSE HEAD BASE OF THE LONG PLANTAR LIGAMENT
INSERTION	LATERAL SIDE OF THE PROXIMAL PHALANX OF THE BIG TOE
NERVE SUPPLY	LATERAL PLANTAR N.
ACTION	FLEXION OF MP JOINT OF THE BIG TOE SUPORTS TRANSVERSE ARCH FOF THE FOOT, ADDUCTION
BLOOD SUPPLY	1ST PLANTAR METATARSAL A. LATERAL PLANTAR A.

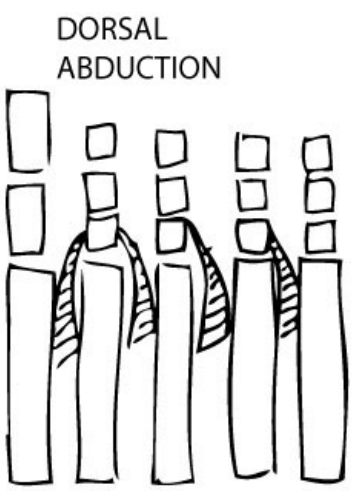
FLEXOR DIGITI MINIMI

ORIGIN	BASE OF 5TH METATARSAL
INSERTION	PROXIMAL PHALANX OF LITTLE TOE
NERVE SUPPLY	LATERAL PLANTAR N.
ACTION	FLEX MP JOINT OF LITTLE TOE
BLOOD SUPPLY	LATERAL PLANTAR A.

LAYER IV

INTEROSSEI MM.

ORIGIN	DORSAL (4)- SIDES OF THE METATARSALS VENTRAL (3)- SIDES OF 3RD, 4TH, 5TH METATARSALS
INSERTION	SEE PICTURE IN NOTES
NERVE SUPPLY	LATERAL PLANTAR N.
ACTION	DORSAL ABDUCTION OF TOES PLANTAR ADDUCTION OF TOES
BLOOD SUPPLY	DORSAL DORSAL METATARSAL AA. PLANTAR PLANTAR METATARSAL AA.



DORSUM OF THE FOOT

THIN SKIN
NO SUPERFICIAL FASCIA
CUTANEOUS NERVES
- LATERAL PERONEAL N.
- DEEP PERONEAL N.
- SAPHENOUS N.
- SURAL N.

MUSCLES
- EXTENSOR DIGITORUM BREVIS
- EXTENSOR HALLUCIS BREVIS

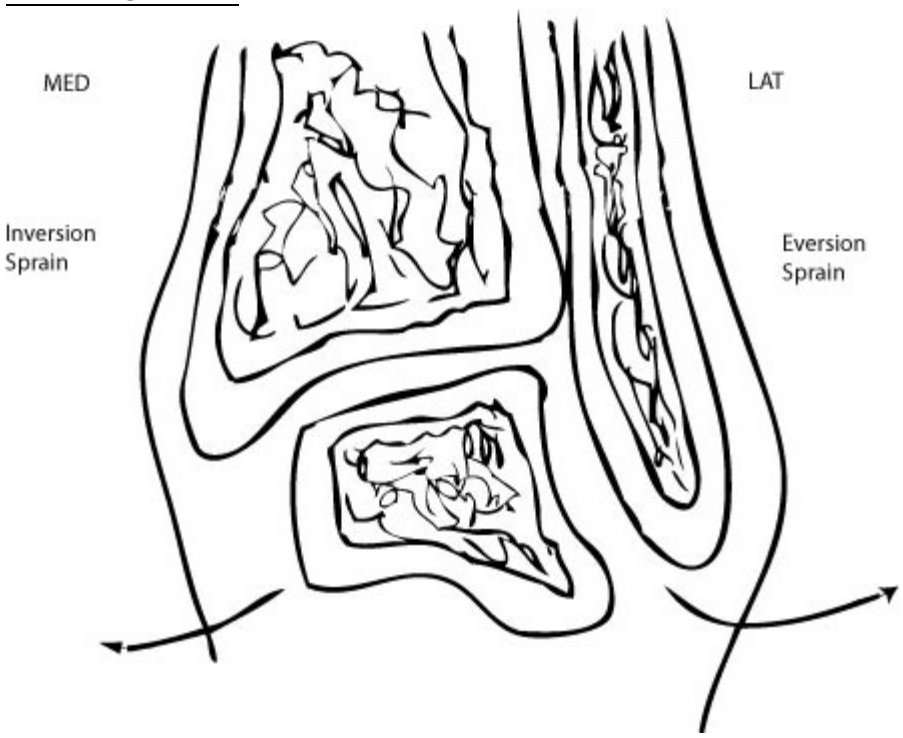
EXTENSOR DIGITORUM BREVIS M.

ORIGIN	CALCANEUS INFERIOR EXTENSOR RETINACULUM
INSERTION	3 TENDONS - JOIN LONG EXTENSOR TENDONS PASSING TO THE 2ND, 3RD, & 4TH TOES.
NERVE SUPPLY	DEEP PERONEAL N.
ACTION	EXTENDS TOES
BLOOD SUPPLY	DORSALIS PEDIS A.

EXTENSOR HALLUCIS BREVIS M.

ORIGIN	1ST TENDON OF EXTENSOR DIGITORUM BREVIS M.
INSERTION	WITH TENDON OF EXTENSOR HALLUCIS LONGUS
NERVE SUPPLY	DEEP PERONEAL N.
ACTION	EXTEND BIG TOE SLIGHTLY
BLOOD SUPPLY	DORSALIS PEDIS A.

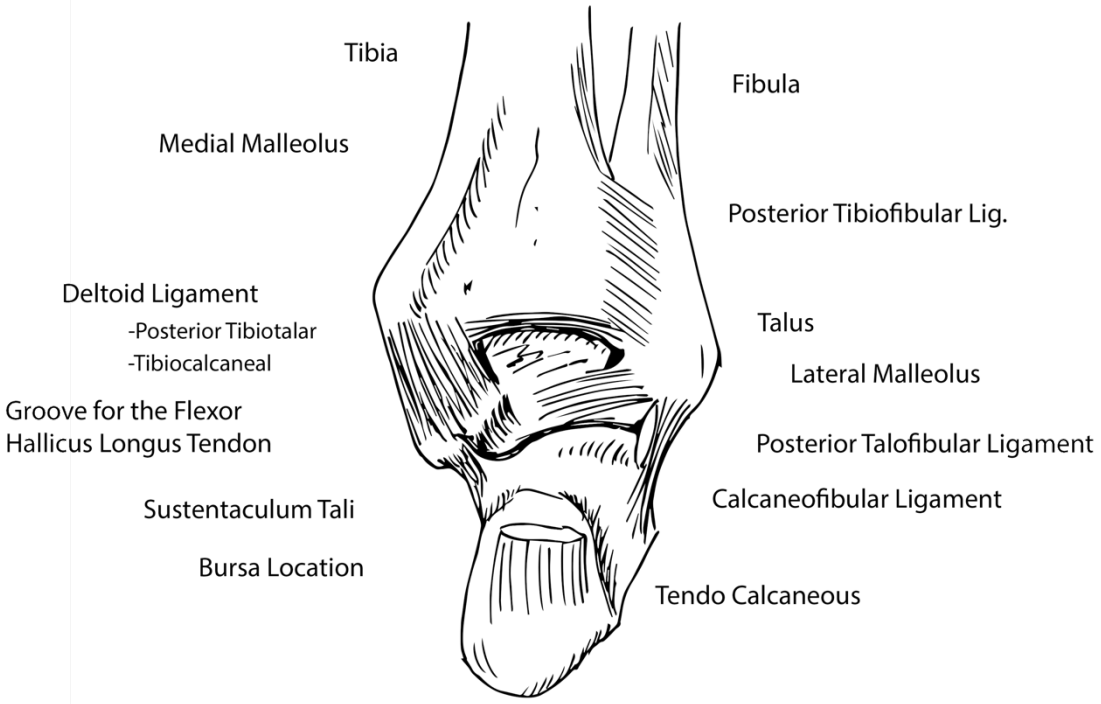
ANKLE SPRAIN



INVERSION SPRAIN ERVERSION SPRAIN

SUPPORTING LIGAMENTS

- INTEROSSEUS MEMBRANE
- TIBIOFIBULAR LIGAMENT
- MEDIAL LIGAMENTS
  - DELTOID LIGS.
- LATERAL LIGAMENTS
  - ANTERIOR/POSTERIOR TALOFIBULAR LIGAMENT
  - CALCANEOFIBULAR LIGAMENT



TARSAL JOINTS

SLIGHT GLIDING MOVEMENTS

1) SUBTALAR JOINT

JOINT BETWEEN TALUS & CALCANEUM

2) TALOCALCANEONAVICULAR JOINT

MOVEMENTS: INVERSION
EVERSION

LIGAMENT: PLANTAR CALCANEONAVICULAR LIGAMENT

3) CALCANEOCUBOID JOINT

LIGAMENTS: BIFURCATED LIGAMENT

LONG PLANTAR LIGAMENT

PIERCED BY PERONEUS LONGUS

SHORT PLANTAR LIGAMENT

(1) + (2) + (3) = MIDTARSAL JOINT
(TRANSVERSE TARSAL JOINT)

THE FOOT AS A FUNCTIONAL UNIT

FUNCTON

1) SUPPORT WEIGHT OF BODY
2) SERVE AS A LEVER TO PROPEL THE BODY FORWARD IN WALKING & RUNNING

PRESENCE OF MANY BONES ALLOWS IT TO ADAPT TO UNEVEN SURFACES.

ARCHES OF FOOT

MEDIAL LONGITUDINAL ARCH
FULL ARCHES
LATERAL LONGITUDINAL ARCH
TRANSVERSE ARCH 1/2 ARCH

MECHANISM OF ARCH SUPPORT

(1) BY USING KEYSTONES
MEDIAL LONG. ARCH TALUS/NAVICULAR (KEYSTONE)
LATERAL LONG ARCH CUBOID
TRANSVERSE ARCH - NO KEYSTONE
BONES INCLUDED ARE CUNEIFORMS
METATARSAL BASES

(2) BY USING SMALL TIES TO TIE BONE TOGETHER (LIGAMENTS)
MEDIAL LONG ARCH - PLANTAR CALCANEONAVICULAR LIG.
LATERAL LONG ARCH - LONG & SHORT PLANTAR LIGS.
TRANSVERSE ARCH - DEEP TRANSVERSE LIGAMENTS

(3) USE OF THE BEAMS

MEDIAL LONG. ARCH	PLANTAR APONEUROSIS
	FLEXOR HALLUCIS LONGUS M.
LATERAL LONG ARCH	PLANTAR APONEUROSIS
	FLEXOR DIGITORUM LONGUS M.
	PERONEUS BREVIS M.
TRANSVERSE ARCH	PERONEUS LONGUS TENDON

(4) BY USE OF A SUSPENDING BRIDGE

MEDIAL LONG. ARCH	ANTERIOR TIBIALIS M.
	POSTERIOR & MEDIAL LIGAMENTS
	OF ANKLE JOINT

LATERAL LONG ARCH	PERONEUS LONGUS PERONEUS BREVIS
TRANSVERSE ARCH	PERONEUS LONGUS PERONEUS BREVIS SUSPENDING CONNECTION

OVERALL, ARCHES ARE MAINTAINED BY:

1) SHAPE OF BONES (KEYSTONES)
2) LIGAMENTS
3) MUSCLES & MUSCLE TONE

HEAD AND NECK

NECK

Superior border
Line extending from mandible to superior nuchal line
Inferior border
Clavicle

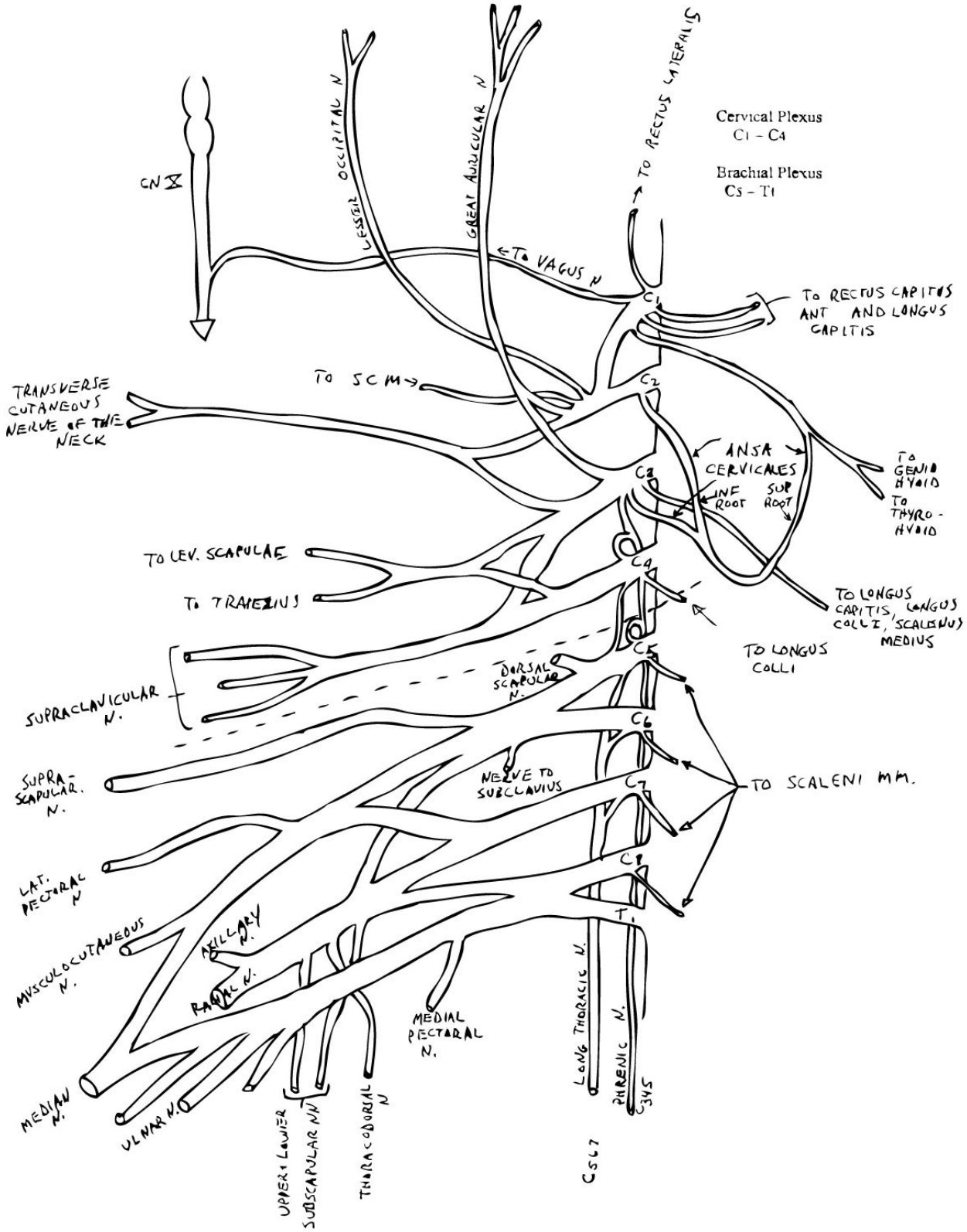
Dermatomes: C2 - C4

Nerve supply

Cervical plexus C1 - C4
- -superficial nerves (cutaneous)
- -deep nerves (innervate muscle of neck)

Superficial Nerves

1. Lesser occipital nerve C2
2. Greater auricular nerve C2 C3
3. Transverse cervical nerve C2 C3
4. Supraclavicular nerve C3 C4

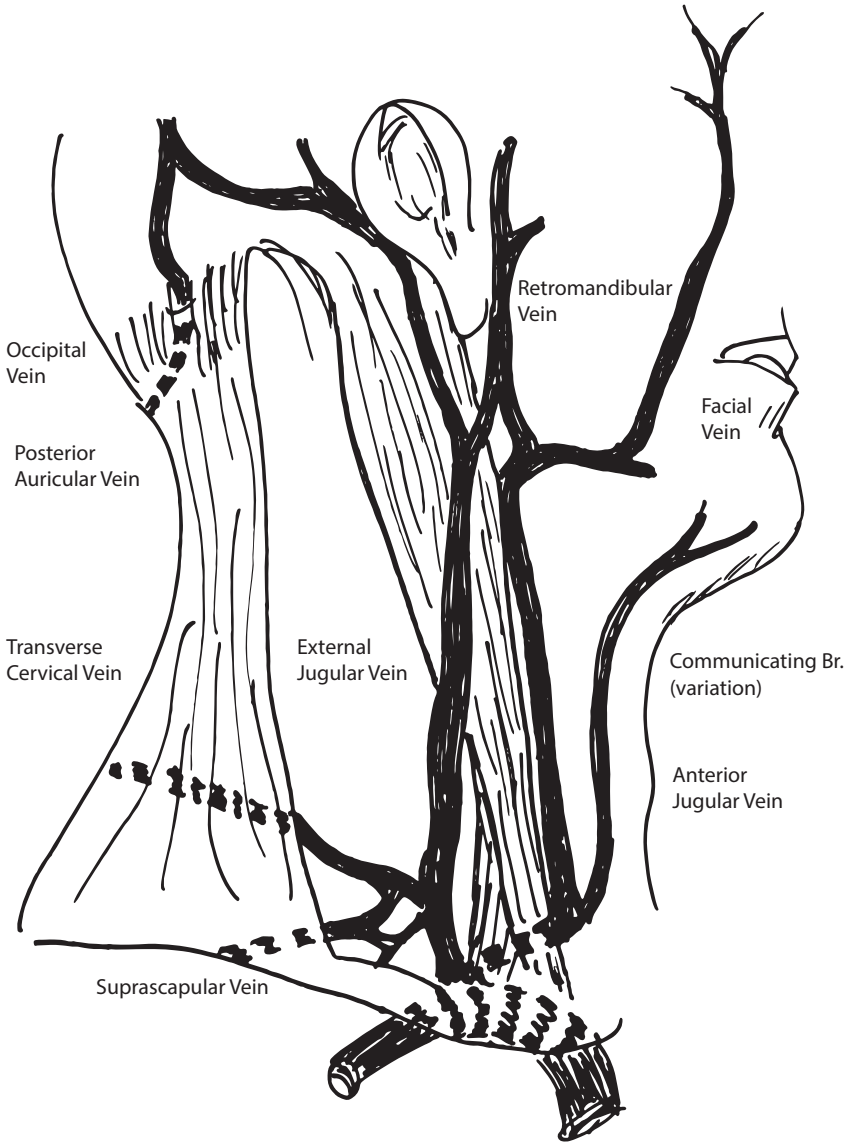

Cervical Plexus
C1 – C4
Brachial Plexus
C5 – T1
CN XI
LESSER OCCIPITAL N
GREAT AURICULAR N
TO RECTUS LATERALIS
TO VAGUS N
C1
TO RECTUS CAPITIS ANT AND LONGUS CAPITIS
TO SCM
C2
TRANSVERSE CUTANEOUS NERVE OF THE NECK
ANSA CERVICALES
INF ROOT
SUP ROOT
C3
TO GENIO HYOID
TO THYRO-HYOID
TO LEV. SCAPULAE
TO TRAPEZIUS
C4
TO LONGUS CAPITIS, LONGUS COLLI, SCALENUS MEDIUS
TO LONGUS COLLI
C5
DORSAL SCAPULAR N.
SUPRACLAVICULAR N.
C6
SUPRA-SCAPULAR N.
NERVE TO SUBCLAVIUS
TO SCALENI MM.
C7
LAT. PECTORAL N
C8
T1
MUSCULOCUTANEOUS N.
AXILLARY N.
RADIAL N.
MEDIAN N.
ULNAR N.
UPPER & LOWER SUBSCAPULAR NN
THORACODORSAL N
MEDIAL PECTORAL N.
LONG THORACIC N.
PHRENIC N.
C345
C567

SUPERFICIAL VEINS OF THE NECK

External Jugular Vein - important because superficial cervical lymph nodes lie along it.

1. Posterior external jugular vein
2. Posterior auricular vein
3. Retromandibular vein
4. Facial vein
5. Anterior jugular vein
6. Transverse cervical vein
7. Suprascapular vein

External Jugular Vein
retromandibular vein
posterior auricular vein
facial vein
posterior external jugular vein
external jugular vein
anterior jugular vein
transverse cervical vein
jugular arch
suprascapular vein



LYMPHATIC DRAINAGE OF HEAD AND NECK

Superficial Nodes:

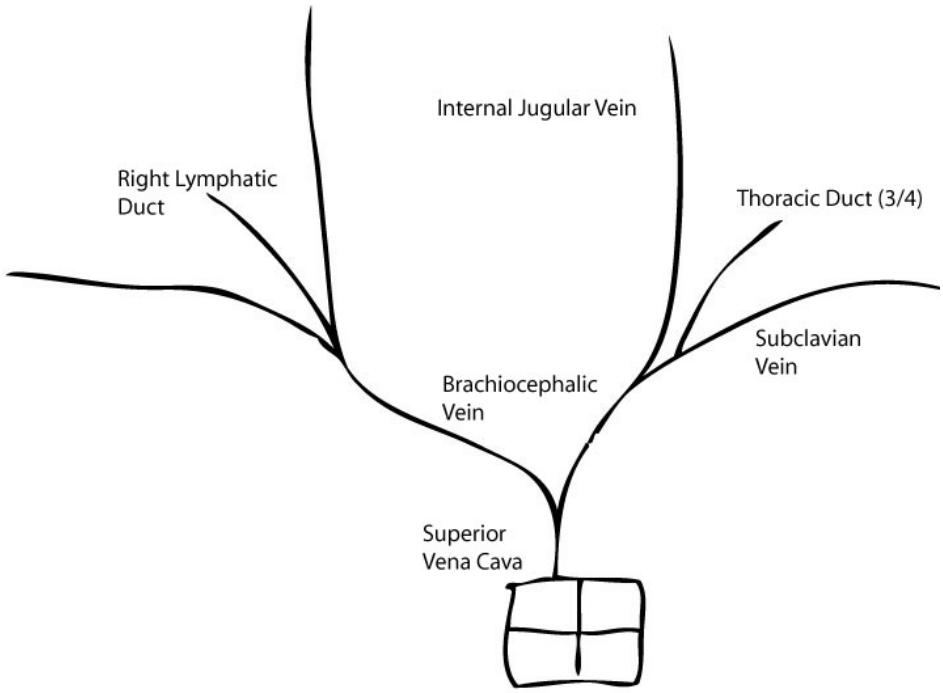
occipital
Retroauricular
Parotid
Buccal
submandibular
submental
anterior cervical
superficial cervical
retropharyngeal
laryngeal

drain into deep cervical nodes (which lie along internal jugular vein within carotid sheath area)

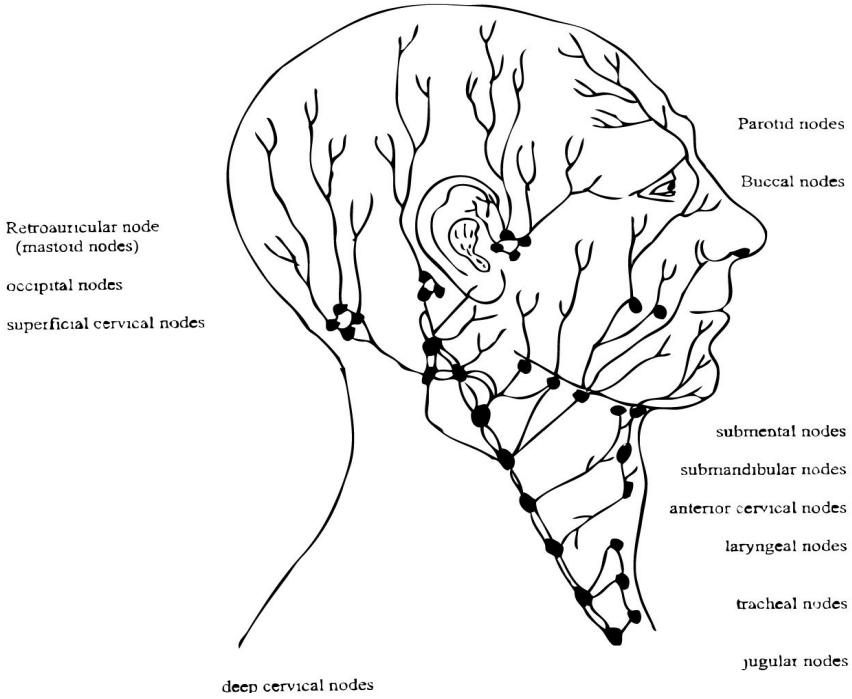
tracheal
jugular lymph trunks

(head & neck) right lymphatic duct or
(body)

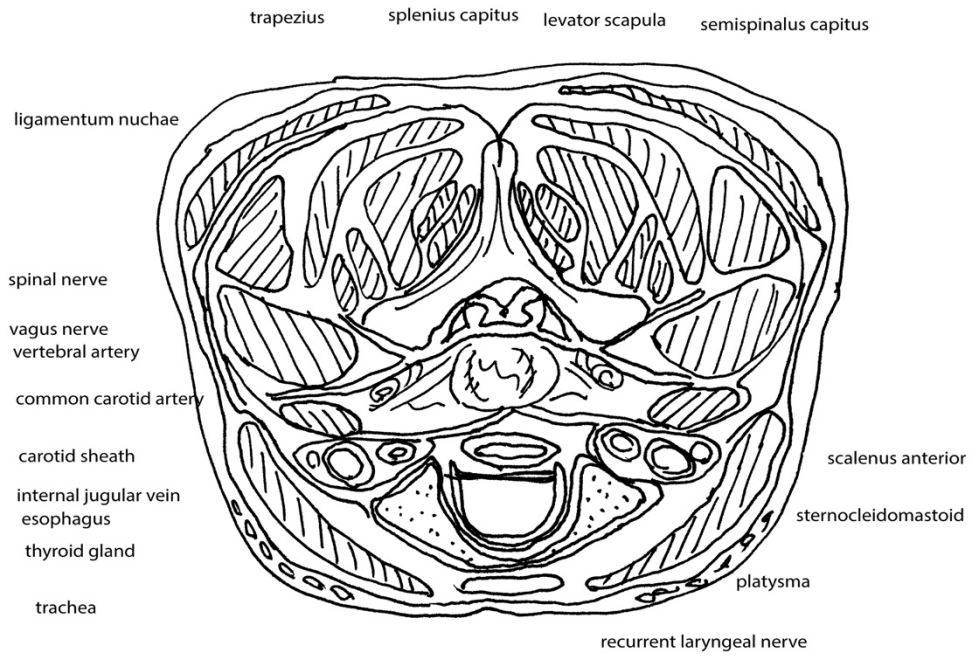
(3/4) thoracic duct
~brachiocephalic vein

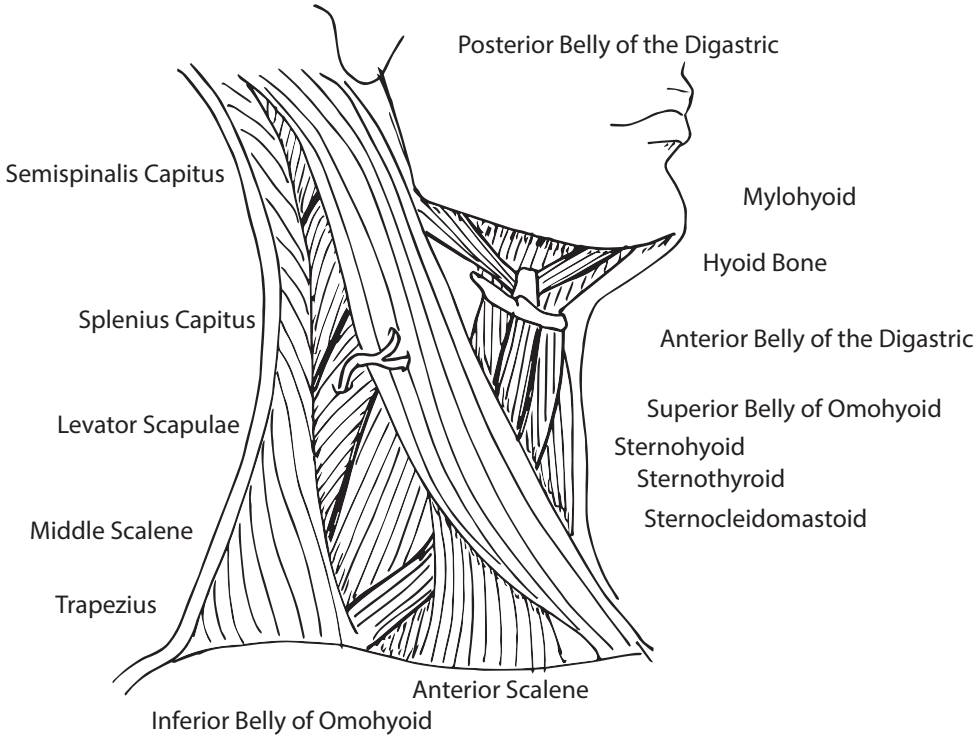


LYMPHATIC DRAINAGE
OF HEAD AND NECK



DEEP CERVICAL FASCIA





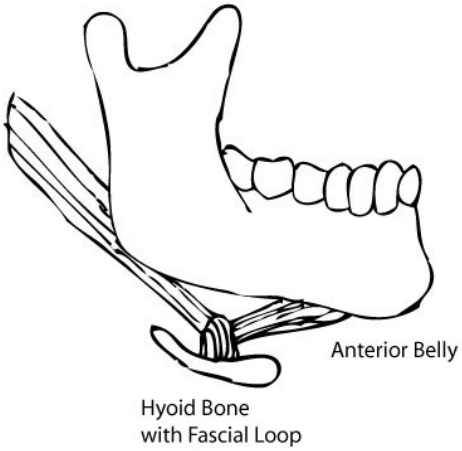
MUSCLES OF THE NECK

Sternocleidomastoid m.

Origin	manubrium of sternum	
	clavicle	
Insertion	mastoid process of temporal bone	
	occipital bone	
Nerve supply	11th nerve - accessory nerve	
	C2, (C3) VPR	
Action	bilaterally -	extends atlanto-occipital joint
		flexes whole cervical region
	unilaterally -	rotation
		lateral flexion
		(pulls mastoid process of same side toward sternum)
Blood supply	superior thyroid artery	
	occipital artery	
	posterior auricular artery	
	supraclavicular artery	

Digastric m.

Origin	mastoid notch (posterior belly) posterior belly- intermediate tendon, which passes through fascial loop of hyoid bone to - anterior belly
Insertion	mandible
Nerve supply	anterior belly- V3 posterior belly- VII
Action	depresses mandible or elevates hyoid bone
Blood supply	posterior auricular art. occipital art. submental art.



Stylohyoid m.

Origin	styloid process of temporal bone
Insertion	greater cornu of hyoid bone
Nerve supply	VII - facial nerve
Action	elevates hyoid bone
Blood supply	facial artery occipital artery

Posterior Triangle of the Neck

Contents:
Arterial vessels
- subclavian artery
- superficial cervical artery
- suprascapular artery
- occipital artery

external jugular vein
subclavian vein
brachial plexus nerve roots
- dorsal scapular nerve
- long thoracic nerve

spinal accessory nerve
superficial cervical plexus
scalenus muscle

NECK MUSCLES

Splenis Capitis M.

Origin	Lower 1/2 ligamentum nuchae SP's C7, TI, T2, T3, (T4)
Insertion	Mastoid process Occipital bone
Nerve Supply	DPR
Action	Bilaterally - Extension of neck Unilaterally - Lateral flexion and rotation of neck
Blood Supply	See previous blood supplies

Action of Suboccipital Muscles

Bilaterally

Rectus mm. (major and minor)	- Extension of occipital bone/C 1 - NO extension of CI/C2 because of configuration of the odontoid process
Oblique mm.	Superior - Extension of occiput
Inferior mm.	No extension at all

Unilateral

Rectus mm.	Extension, rotation, and lateral flexion to ipsilateral side of muscle
Minor	Very little action

Oblique mm. Superior - Extension and lateral rotation
Inferior Rotation

Anterior Triangle of the Neck

1)Submental triangle
2) Digastric triangle
    Submandibular gland (produces 75% of saliva)
    Facial artery and vein
    XII cranial nerve
3) Carotid triangle
    Ansa cervicales (C1, C2, C3)
        Forms a loop around carotid sheath.
    Branches go to infrahyoid mm.
    Common carotid artery
        ICA - brain
        ECA - facial and neck
    Internal jugular vein
    Vagus nerve
    Deep cervical lymph nodes
    Superior thyroid artery- accompanied by external laryngeal nerve
    Lingual artery and vein
    XII cranial nerve
    Facial artery

ARTERIES OF THE HEAD, NECK AND FACE

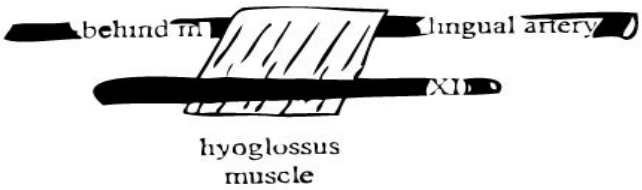
EXTERNAL CAROTID

1) Superior Thyroid Artery
    Supplies thyroid gland
    Accompanied by external laryngeal nerve (which innervates the cricothyroid muscle)

Superior Laryngeal Artery- accompanied by the Internal Laryngeal Nerve (sensory only to mucosa below larynx)

2) Ascending Pharyngeal Artery- supplies pharyngeal structures

3) Lingual Artery
    Dorsal Lingual Artery
    Sublingual Artery
        Supplies the tongue



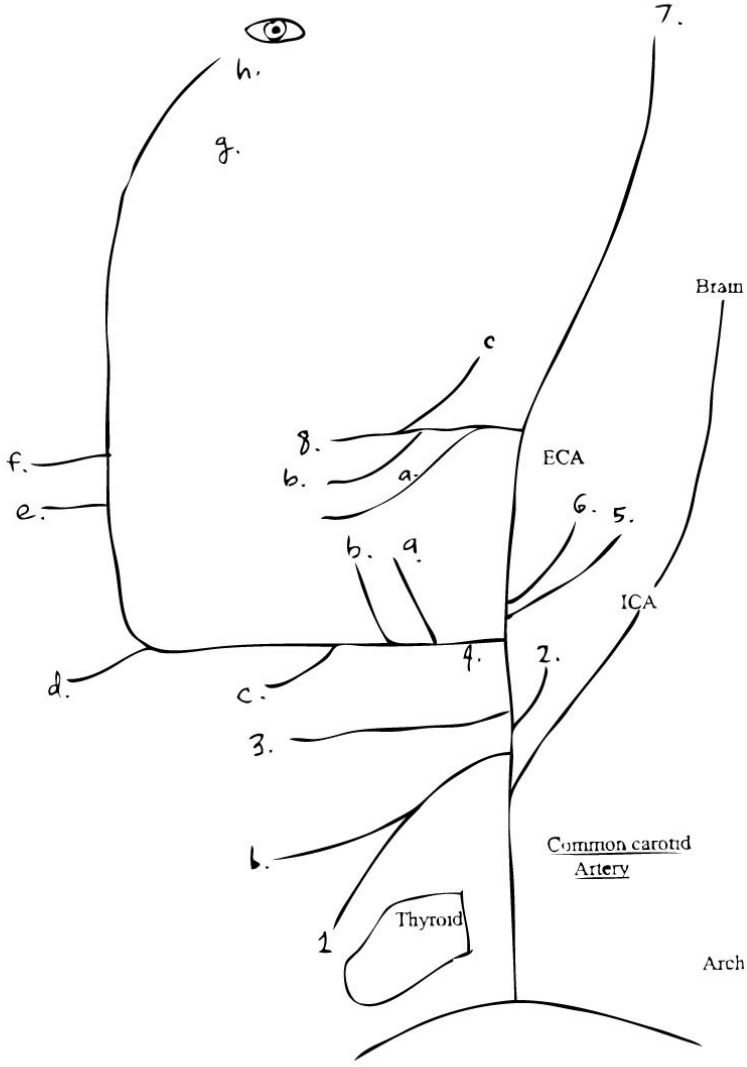
4) Facial Artery: branches
   - tonsillar artery
   - ascending palatine artery
   - submandibular artery
   - submental artery
   - inferior labial artery
   - superior labial artery
   - lateral nasal artery
   - angular artery

5) Occipital Artery- accompanies the greater occiptal nerve (C2)
6) Posterior Auricular Artery- supplies ear and middle ear cavity
7) Superficial Temporal Artery- supplies frontal and temporal regions
8) Maxillary Artery
   - 23 Branches
   - inferior alveolar artery- lower teeth
   - middle meningeal artery
   - anterior and posterior alveolar artery- upper teeth
   - also supplies: muscles of mastication
     palate
     nasal region

9) Transverse Facial Artery

ARTERIES OF THE FACE AND NECK

Arteies of the Face and Neck



Branches of the External Carotid Artery

1) Superior Thyroid Artery
   - b Superior Laryngeal Artery

2) Ascending Pharyngeal Artery

3) Lingual Artery

4) Facial Artery
   - a Tonsillar artery
   - b Ascending palatine artery
   - c Submandibular artery
   - d Submental artery
   - e Inferior Labial artery
   - f Superior Labial artery
   - g Lateral Nasal artery
   - h Angular artery

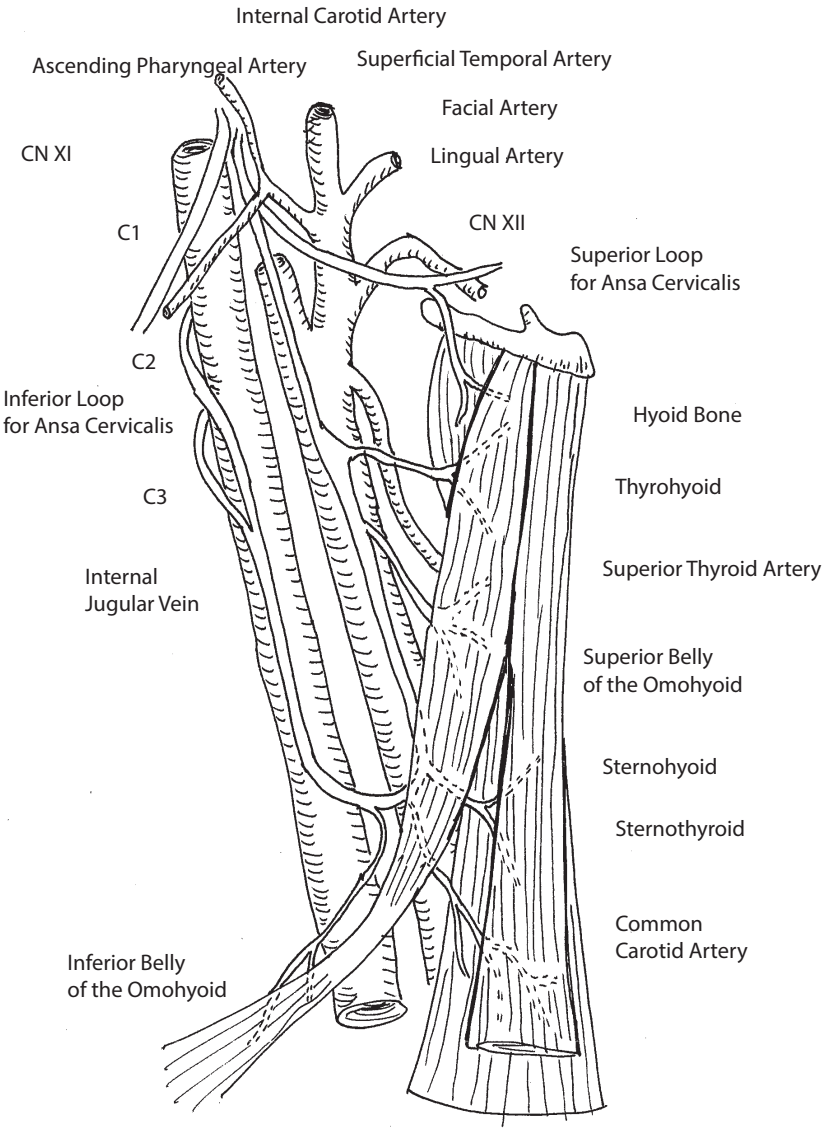
5) Occipital Artery

6) Posterior Auricular Artery

7) Superficial Temporal Artery

8) Maxillary Artery (23 branches)
   - a. Inferior Alveolar artery
   - b Anterior & Posterior Superior Alveolar aa
   - c Middle Meningeal artery

9) Transverse Facial Artery



Infrahyoid Muscles

Action	depress hyoid in swallowing
Nerve supply	ansa cervicales
Ansa Cervicales	C1 - C3 (innervates infrahyoid mm)

Internal Jugular Vein

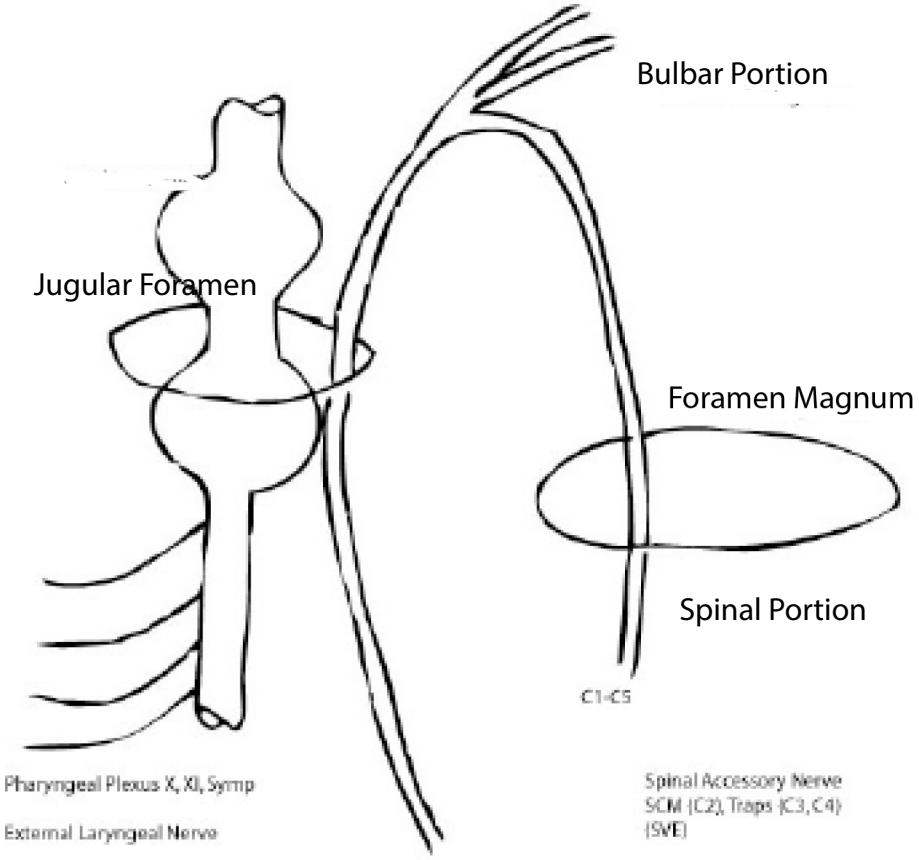
Receives blood from the brain, face, and neck

Begins at jugular foramen as a continuation of the sigmoid sinus

Accompanied by deep cervical lymph nodes

NERVES OF THE NECK

X VAGUS NERVE IX,X,XI, IJV RUN THROUGH THE JUGULAR FORAMEN



Pharyngeal Plexus X, XI, Symp

External Laryngeal Nerve

Internal Laryngeal Nerve

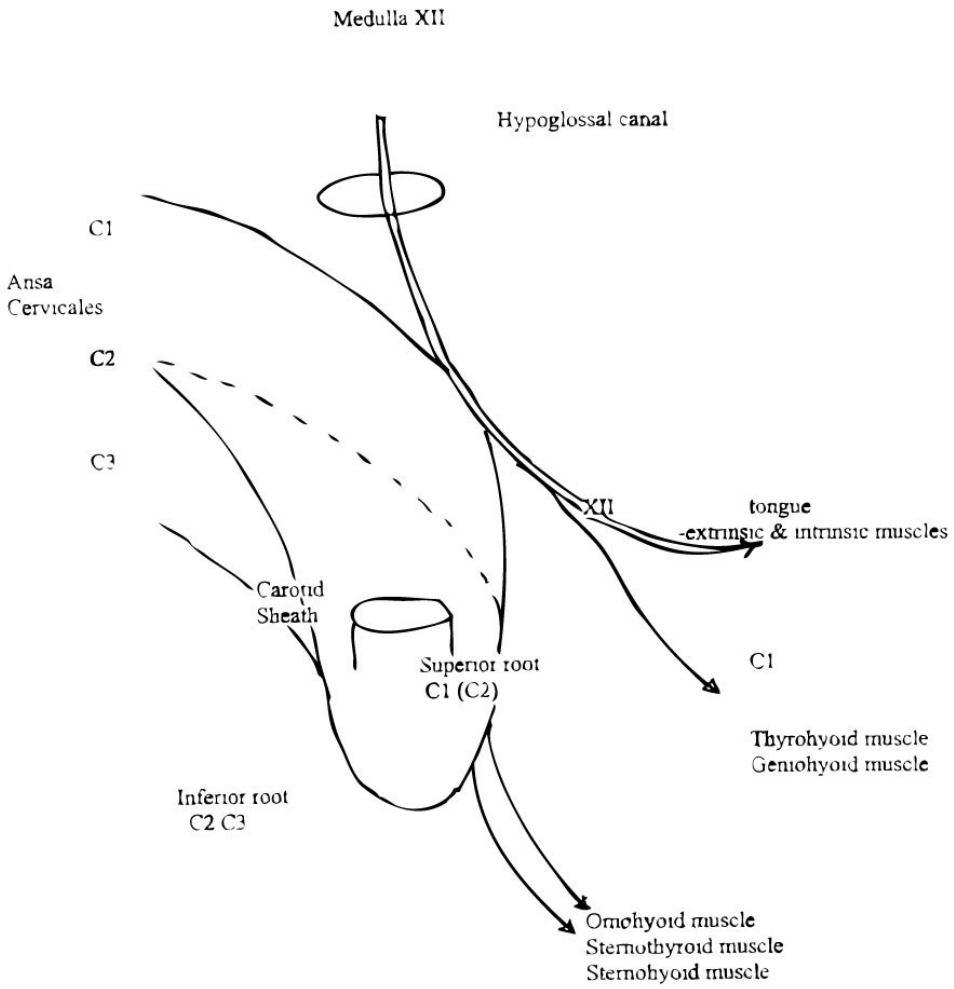
Recurrent Laryngeal Nerve

Left- loop around the aorta

Right-loops around the right subclavian artery

Spinal Accessory Nerve
SCM (C2), Traps (C3, C4)
(SVE)

XII Hypoglossal nerve



C1 gives a branch to contribute to the ansa cervicales. Also gives a branch that runs along with the XII nerve and supplies the thyrohyoid and geniohyoid mm.

Cervical Plexus deep to SCM
VPR C1 - C4

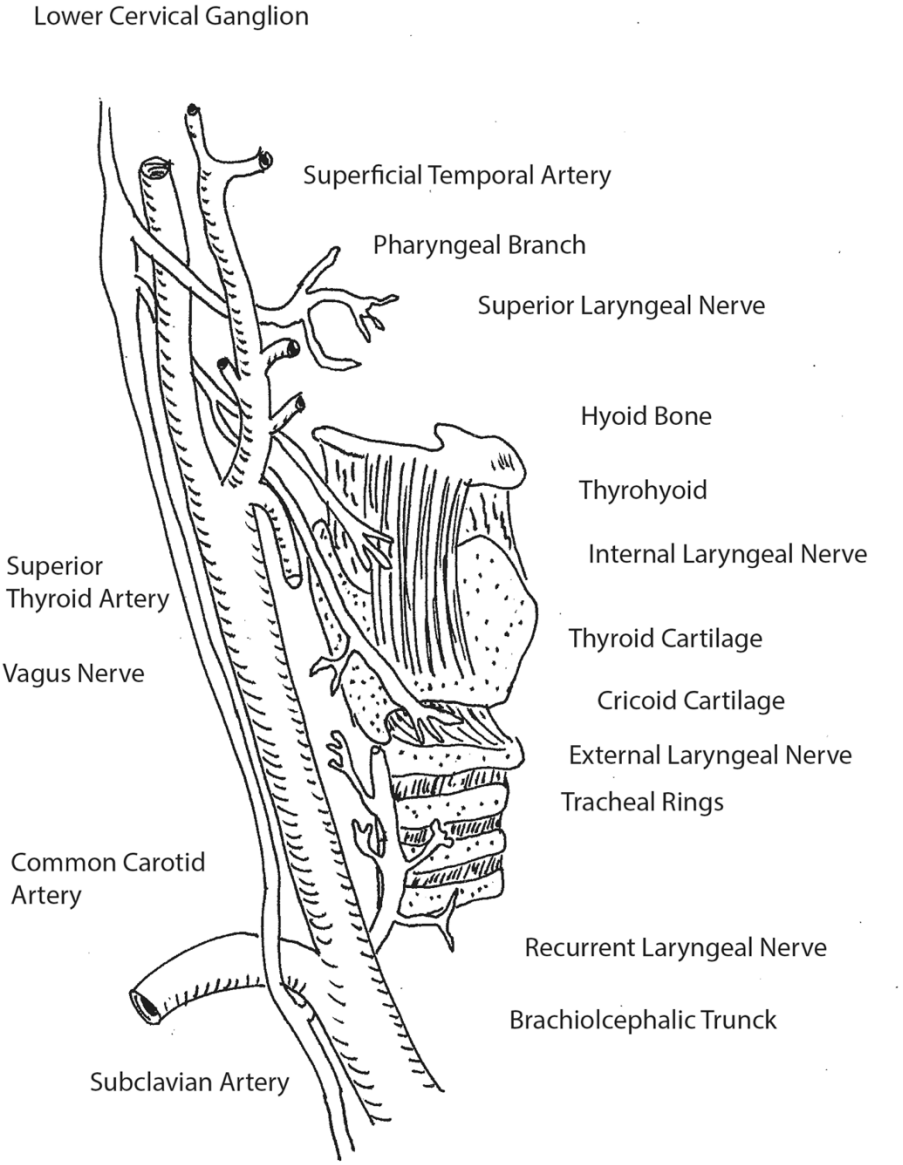
Cutaneous nn. (PTTP)
- Lesser occipital nerve C2
- Greater auricular nerve C2 C3
- Transverse cervical nerve C2 C3
- Supraclavicular nerve C3 C4

Muscular (Deep)mm.

SCM C2

TRAPS C3 C4

Phrenic Nerve C3 C4 C5



VISCERA OF THE NECK

Thyroid Gland

-consists of right and left lobes connected by a narrow isthmus.
-Surrounded by pre-tracheal fascia which attaches the thyroid to the larynx and trachea.
-Develops from root of tongue (thyroglossal duct)
-Pyramidal lobe is often present as an embryonic remnant. This lobe projects up from the isthmus.

Vascularization of Thyroid Gland

1) Superior Thyroid Artery (branch off of ECA)
   accompanied by external laryngeal nerve
2) Inferior Thyroid Artery
   a branch of the thyrocervical trunk off the subclavian artery
3)Thyroidea IMA (found in 3% of population)
   a branch directly off arch of aorta

Innervation of Thyroid Gland

PS - Vagus Nerve
S - T1 - T4 Middle Cervical Ganglion

Parathyroid Gland

2 Superior
2 Inferior
Located on the posterior surface of the thyroid gland

Trachea

Extends from cricoid cartilage - level of Angle of Louis (sternal angle)
C6 - T4 (bifurcation)

Blood supply	Inferior Thyroid Artery
Nerve supply	Vagus Nerve Recurrernt Laryngeal nn. Sympathetic Trunks

Esophagus
Extends from pharynx to stomach
25cm (10") long

Has both skeletal (beginning) and smooth muscle (lower part) in it.

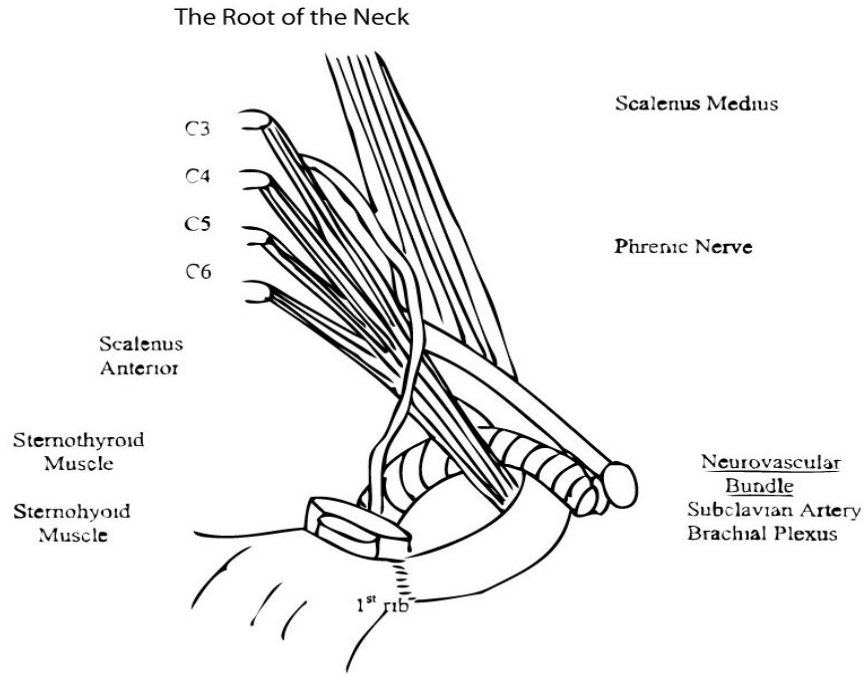
Blood supply	Inferior thyroid artery
Nerve supply	Vagus Nerve (esophageal plexus) Sympathetic Trunks

The Root of the Neck

Muscles
- Scalenus Anterior
- Scalenus Medius
- Scalenus Posterior

Scalenus Anterior Muscle important neck landmark

Origin	TPs of C3-C6
Insertion	Scalene tubercle on the inner border of the 1st rib
Nerve Supply	VPR C4,C5,C6
Action	depending on which is origin and insertion flex or rotate cervical column or raise first rib
Blood Supply	Inferior Thyroid Artery



Scalenus Medius Muscle

Origin	TP's of C 1 - C7
Insertion	1st rib
Nerve supply	VPR C3 C4
Action	elevates 1" rib or laterally flexes & rotates cervical column
blood supply	Inferior thyroid artery

Scalenus Posterior Muscle

Origin	TP's of C4 C5 C6
Insertion	2nd rib
Nerve supply	VPR C5 C6 C7 C8
Action	elevates 2nd rib or Lateral flexion of cervical column
Blood supply	Ascending cervical artery

Deep Neck Flexor MM.

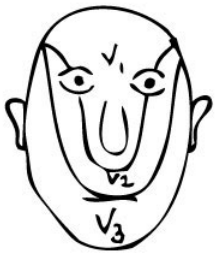
- Longus Colli muscle
- Longus Capitis muscle
- Rectus Capitis Anterior muscle
- Rectus Capitus Lateralis muscle

Longus Colli Muscle

Origin	bodies of vertebra C4, C5, C6, T1, T2, T3 TP's C3, C4, C5
Insertion	bodies of C2, C3, C4 anterior tubercle of C5, C6
Nerve supply	VPR C1 - C8
Action	flexes and assists in cervical rotation

Face and Scalp

- Skin
- Facial muscles
  - Attached to skull bones and superficial fascia
- Sensory nerves of the face



Area of Ear
VII, IX, X
C1 C2

V Trigeminal Nerve

V_1 (sensory only)	ophthalmic branch runs through superior orbital fissure (III, IV, V, VI, ophthalmic vein)
V_2 (sensory only)	maxillary branch runs through foramen rotundum
V_3 (sensory, motor)	mandibular branch runs through foramen ovale

V_1 Ophthalmic branch (sensory only)
- Lacrimal nerve
- Supraorbital nerve
- Supratrochlear nerve
- Infratrochlear nerve
- External Nasal nerve

V_2 Maxillary Branch (sensory only)
- Infraorbital nerve
- Zygomaticotemporal nerve

V_3 Mandibular branch
- Sensory
  - Mental nerve
  - Buccal nerve
  - Auriculotemporal nerve
- Motor
  - Muscles of Mastication
  - Anterior Belly of Digastric muscle
  - Tensor Tympani
  - Mylohyoid muscle
  - Tensor Veli Palatine (palatini)

SCALP

Five Layers (first three move together as a unit)

1) **S**kin with hair
2) Superficial Fascia
   Connects to skin & aponeurosis (actually a tendon; EIDF)

3) Epicranial **A**poneurosis (Gala Aponeurotica)
   unites frontal and occipital bellies of occipitofrontalis muscle

4) Subaponeurotic Space
   Contains: **L**oose connective tissue
   Arteries
   Emissary veins (veins that travel through bones)

5) **P**ericranium

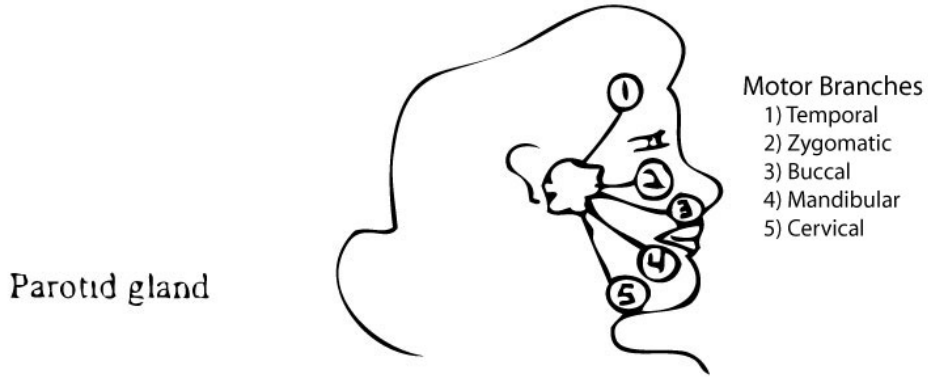
Occipitofrontalis Muscle
4 Bellies (2 frontal, 2 occipital) joined by aponeurotica

Action	moves first three layers of scalp back and forth raises eyebrows in expressions of surprise or horror
Nerve supply	VII
Blood supply	Occipital artery Superficial temporal artery Transverse cervical artery ECA (External Carotid Artery)

Sensory to the Scalp

V_1	Supratrochlear nerve Supraorbital nerve
V_2	zygomaticotemporal nerve
V_3	Auriculotemporal nerve
C_2	Greater Occipital nerve Lesser Occipital nerve
C_1	Suboccipital nerve

CRANIAL NERVE VII
MN VII – TO MUSCLES OF FACIAL EXPRESSION



MUSCLES OF FACIAL EXPRESSION

Origin	skull bones
Insertion	skin
Action	sphincters and dilators emotional expression
Nerve supply	facial nerve VII

Salivary Glands
Parotid
Submandibular
Sublingual

Parotid Gland

Largest of all salivary glands
Only produces 25% of total amount of saliva
Secretion is totally serous
Controlled mainly by PS of IX
Inferior salvatory nucleus (otic ganglion)

Parotid Duct (Stenson's Duct)	enters mouth above 2nd upper molar Pierces Buccinator Muscle Susceptible to infection
Blood supply	External Carotid Artery Superficial Temporal Artery drain into Retromandibular vein Maxillary artery

Submandibular Gland

Wharton's Duct — enters mouth on either side of Frenulum of tongue

Produces 75% of the total amount of saliva
- 75% serous
- 25% mucus

Blood supply — Facial artery, Lingual artery

Sublingual Glands

8 - 20 (30) holes under tongue (Ruvinus Ducts)

Secretes 0.5% of total amount of saliva (mostly mucus)

S – dry mouth
PS – wet mouth

MUSCLES OF MASTICATION

Muscles
- Temporalis muscle
- Masseter muscle
- Lateral Pterygoid muscle
- Medial Pterygoid muscle

Nerve supply — Mandibular branch of Trigeminal nerve (V_3)

Temporalis Muscle

Origin	Temporalis fossa and nearby fascia
Insertion	Coronoid process of mandible, anterior ramus of mandible
Nerve supply	V_3 - nerve to Temporalis
Action	elevates jaw pulls jaw back (retraction) just before complete closure
Blood supply	branch of maxillary artery

Masseter

Origin	zygomatic arch
Insertion	lateral surface of the coronoid process of the mandible upper ½ of the ramus of the mandible lateral angle of the mandible
Nerve supply	V_3
Action	elevates mandible clenches teeth
Blood supply	branches of the maxillary artery

Lateral Pterygoid Muscle

Origin	2 heads; upper and lower originate from sphenoid bone, lateral surface of the lateral pterygoid plate
Insertion	condyle, capsule and articular disc of TMJ
Nerve supply	V3 anterior division
Action	assists in opening of the mouth by protracting jaw
Blood supply	branch of the maxillary artery

Medial Pterygoid Muscle

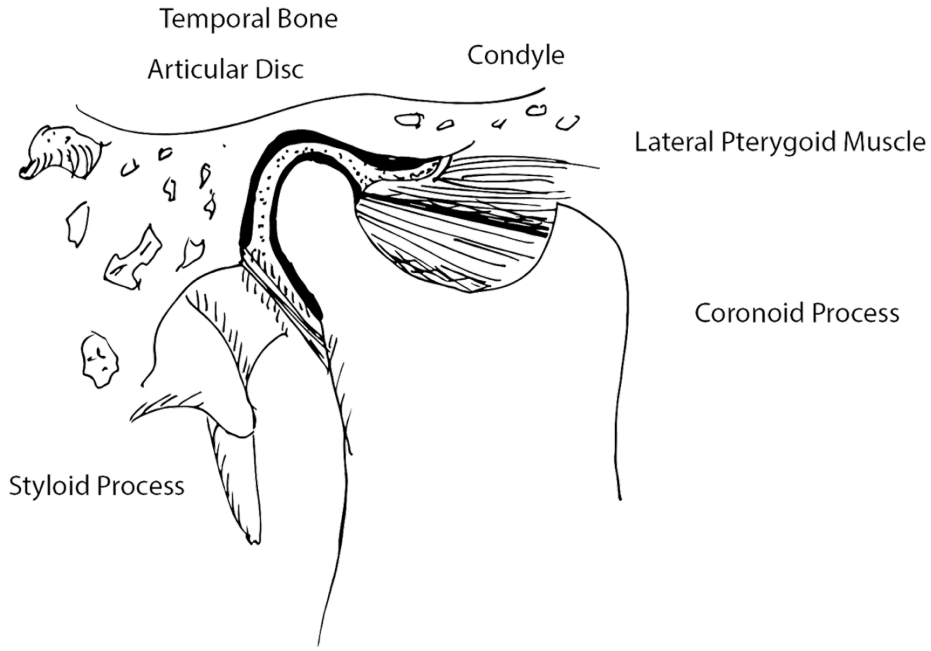
Origin	medial surface of the lateral pterygoid plate
Insertion	medial angle of the jaw
Nerve supply	V3
Action	elevates jaw
Blood supply	maxillary artery, facial artery

Temporomandibular Joint (TMJ)

Synovial joint with capsule
Articular disc involved (oval plate of fibrocartilage)
Strengthened by various ligaments
- Lateral ligament (TMJ ligament)
- Sphenomandibular ligament (medial)
- Stylomandibular ligament

Nerve supply	Auriculotemporal branch of V_3 Masseter branch of V_3
Action	depression of jaw, elevation, protraction, retraction

Mechanics of the TMJ



Trigeminal Nerve

Mandibular branch V_3 (sensory and motor)

Branches from Main Trunk

Meningeal branch

Nerves to: Medial Pterygoid muscle
Tensor Tympani muscle
Tensor Veli Palatini

Branches from Anterior Division

Nerves to:

- Masseter muscle
- Temporalis muscle
- Lateral Pterygoid muscle
- Buccal nerve (sensory only)
  - does not supply the buccinator muscle, which is supplied by the buccal branch of the facial nerve

Branches from the Posterior Division

Auriculotemporal Nerve
Sensory to: Temporomandibular joint
Auricle
External Auditory Meatus
Tympanic Membrane
Parotid Gland
Scalp

Lingual Nerve

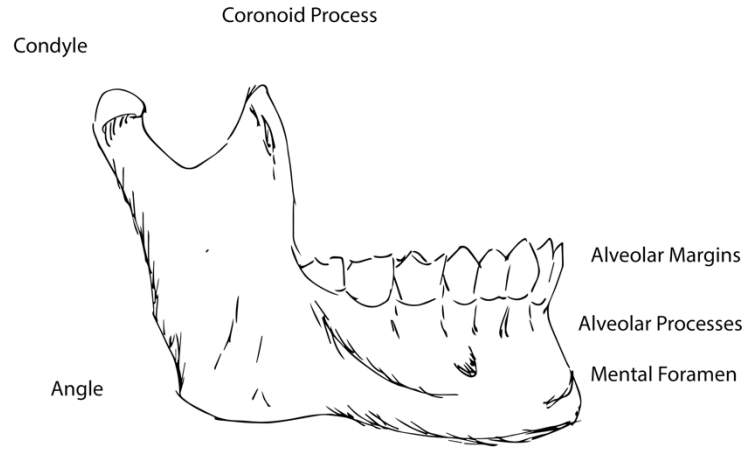
PTTP
Joins with chorda tympani of VII SVA

Inferior Alveolar Nerve

lower teeth
sensory and motor
sensory to lower teeth
mandibular foramen–mental foramen-mental nerve

motor (not through mandibular foramen)
along mylohyioid groove-mylohyoid muscle and anterior belly of the digastric m.

Mandible



Lateral Side

Ramus
Condyle Process (posterior)
Capitulum(head) articulates with disc
Neck
Coronoid Process (anterior)
attachment of temporalis muscle

Medial Side

Mandibular foramen

Inferior alveolar nerve & vessels

Lingula (lip)

attachment of sphenomandibular ligament

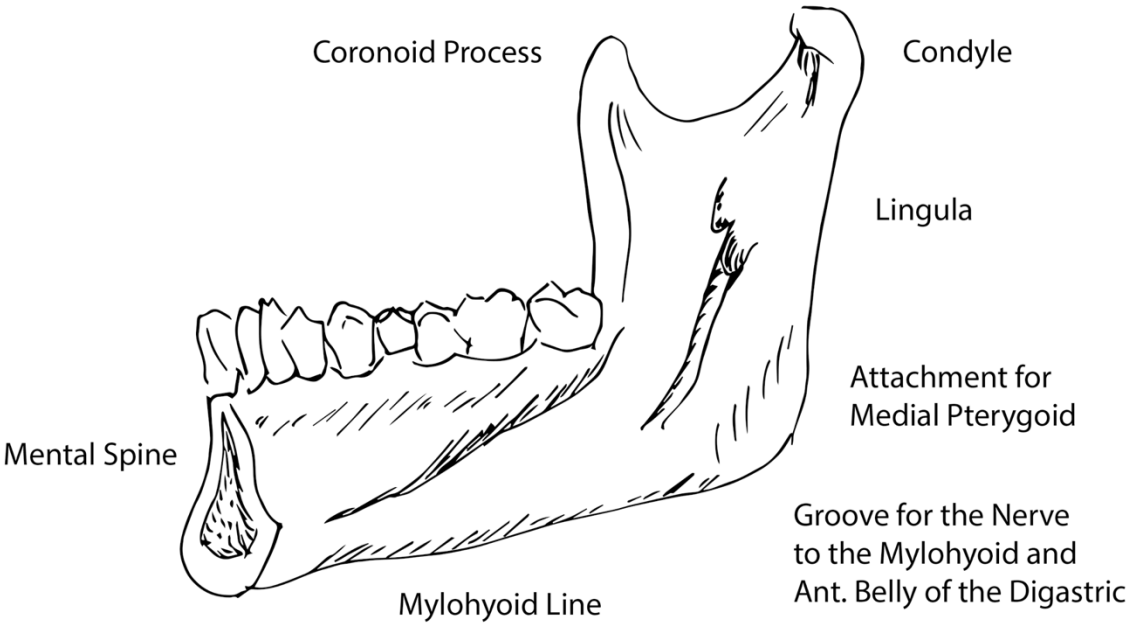
Body

Medial Side

Mylohyoid Line

Genial Tubercles (mental spines)

Attachment of Genioglossus muscle and Geniohyoid muscle



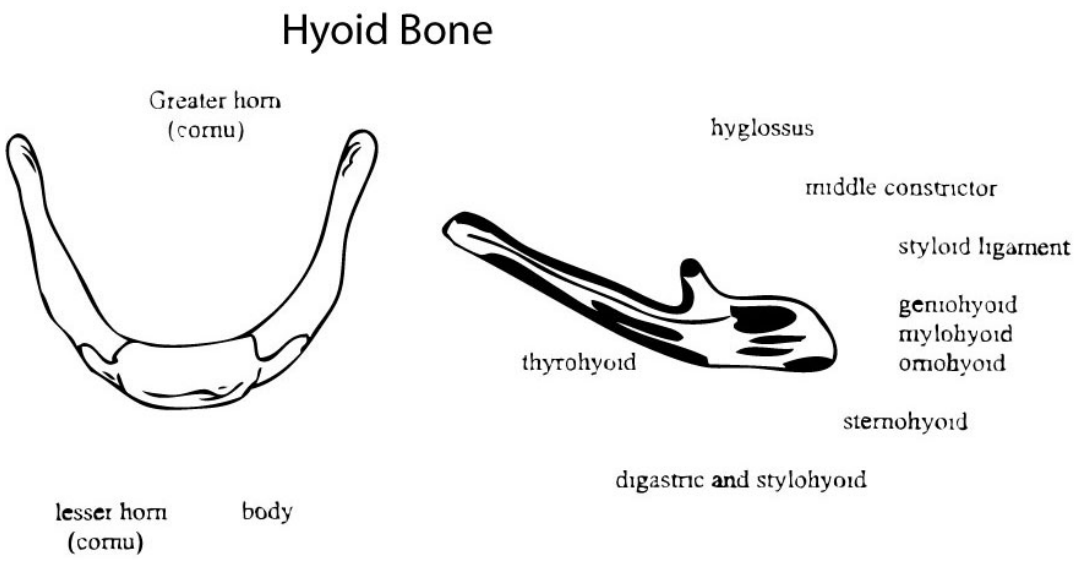
Lateral Side

Symphysis Menti

Ridge indicating line of fusion of 2 halves of mandible during development

Mental Foramen

Transmits terminal branches of Inferior alveolar nerve (mental nerve)



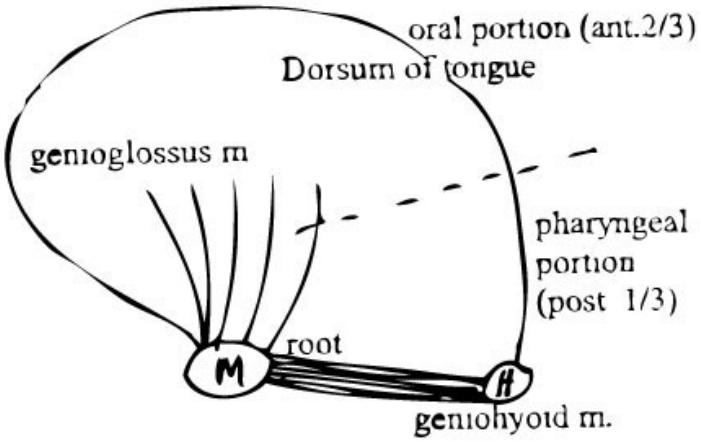
Suprahyoid Muscles

Digastric muscle
Stylohyoid muscle
Mylohyoid muscle
Geniohyoid muscle

Digastric muscle
previously presented

Stylohyoid Muscle

Origin	styloid process of the temporal bone
Insertion	greater cornu of the hyoid bone
Nerve supply	VII, facial nerve
Action	elevates hyoid bone
Blood supply	facial artery
	occipital artery



Mylohyoid

Origin	mylohyoid line of mandible
Insertion	median raphe of the mylohyoid, hyoid bone
Nerve supply	mylohyoid branch of inferior alveolar nerve (also supplies anterior belly of the digastric
Action	elvates hyoid or depresses mandible
Blood supply	lingual artery

Geniohyoid Muscle

Origin	inferior genial tubercle
Insertion	body of hyoid
Nerve supply	C1
Action	elevates hyoid during swallowing
Blood supply	lingual artery

Styloid Process of Temporal Bone

has 3 muscles and 2 ligaments attached to it.

Muscles
- Stylopharyngeus
- Styloglossus
- Stylohyoid

Ligaments
- Stylohyoid
- Stylomandibular

Glossopharyngeal Nerve IX

Branches
1) Tympanic: nerve (Jacobsen's Nerve)
   - Parotid gland (Otic ganglion)
2) Carotid nerve

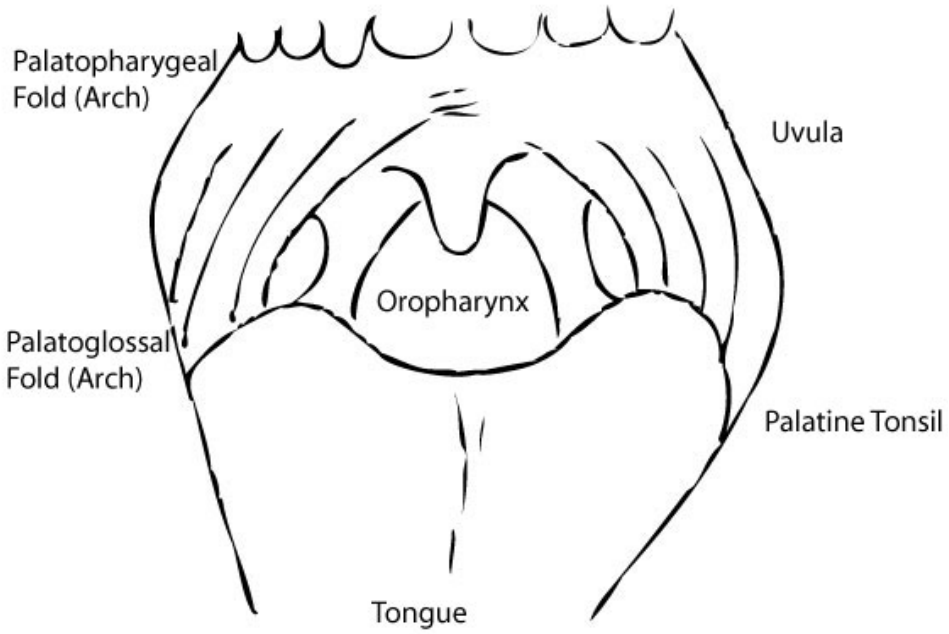
Carotid body and carotid sinus

3) Pharyngeal branches
   Unite with pharyngeal branches of Vagus nerve to form pharyngeal plexus
   (IX, X, S)
4) Muscular branches
   Stylopharyngeus muscle
   Superior constrictors
5) Lingual branches
   Post 1/3 of tongue - PTTP GSA
   Taste - post 1/3 tongue SVA

6) Tonsillar branch

Mouth

Vestibule	between lips and teeth
Mouth cavity proper	within the alveolar arches, gums and teeth

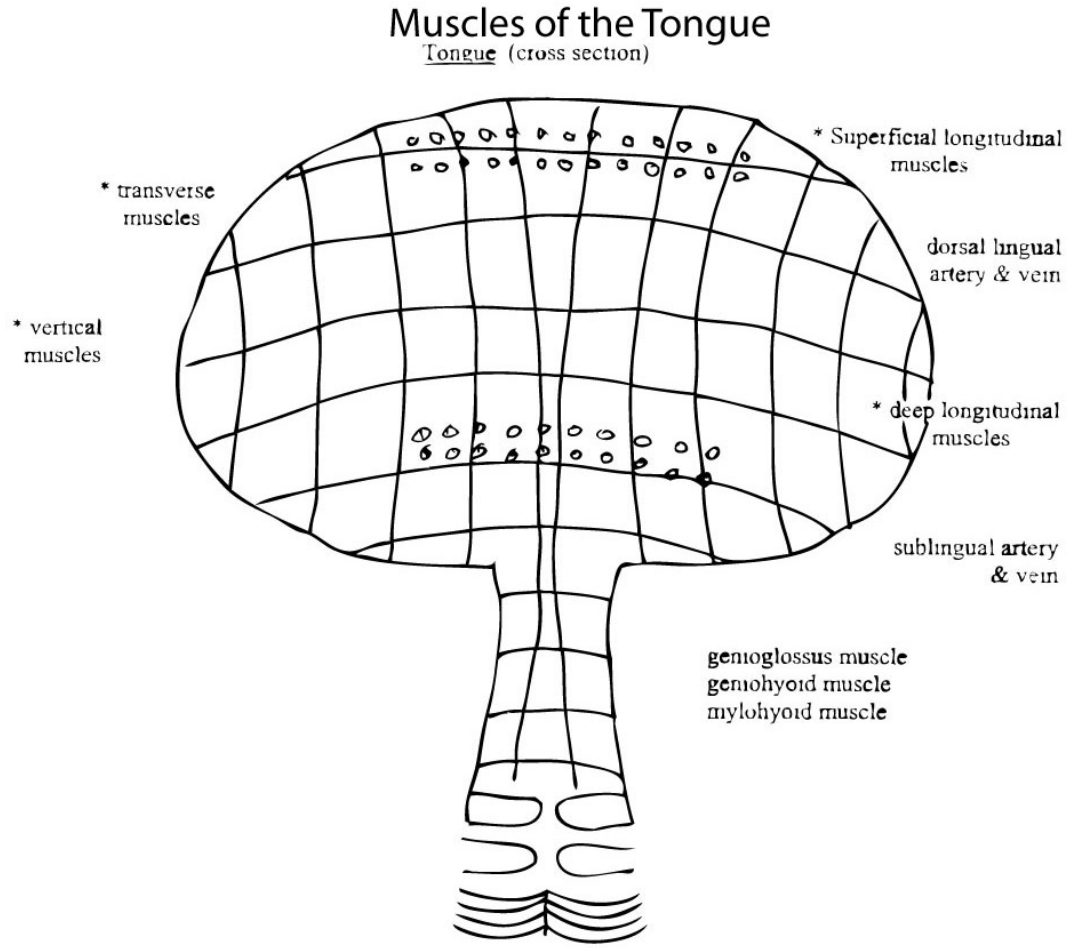


Teeth (52 total)

Deciduous teeth – 20
   baby teeth come in 6 mo. to 2 yrs.
Permenant teeth – 32
   52 total

Periodontal Ligament

hold tooth to socket
Proprioceptive fibers run in various directions



Styloglossus muscle

Origin	styloid process
Insertion	side of the tongue
Nerve supply	hypoglossal nerve XII
Action	draws tongue upward and backward
Blood supply	sublingual artery

Hyoglossus muscle

Origin	body and greater cornu of hyoid
Insertion	side of the tongue
Nerve supply	Hypoglossal nerve (XII)
Action	depresses the tongue
Blood supply	sublingual artery off the lingual artery submental artery off the facial artery

Genioglossus muscle

Origin	superior genial tubercules behind symphysis menti of mandible
Insertion	fans out to enter tongue
Nerve supply	Hypoglossal nerve XII
Action	draws tongue forward and protrudes tip to opposite side depress the tongue
Blood supply	sublingual artery

Pharynx

Situated behind nasal cavities, mouth, and larynx.
Becomes continuous with esophagus (C6)
Wall of pharynx has 3 layers

1) Mucous membrane

2) Fibrous layer - lies between mucous membrane and muscle layer.
Becomes continuous with submucous coat of esophgus.

3) Muscular layer
Superior, middle, and inferior constrictor muscles
Stylopharyngeus muscle

• Pharynx divided into three parts:
- Nasal
- Oral
- Laryngeal

Palate (forms the roof of the mouth)

Hard Palate (anterior)

Soft Palate (posterior) -uvula

Soft Palate composed of:
- Mucous membrane
- Palatine aponeurosis

Muscles:
- Tensor veli palatini
- Levator veli palatini
- Palatoglossus
- Palatopharyngeus
- Musculus uvulae (muscularis uvulae)

Cleft Palate

caused by failure of palatal processes of the maxilla to fuse with each other in the midline

The Nose

Consists of:

External nose
Nasal cavity

Bones of the septum - vomer, ethmoid

Posterior nasal cavity contains superior, middle, and inferior concha

Between concha are the:

Middle meatus-	frontal, maxillary sinus
Inferior meatus-	lacrimal ducts

Paranasal Sinuses

Found in the interior of the maxilla, frontal, sphenoid, and ethmoid bones
Function - acts as resonators for vocal production

Sinuses:

Maxillary - (2)
Frontal - (2)
Sphenoidal - (2)
Ethmoidal – (4)

Skull

Bony framework of the head
Made up of 22 bones

21 joined together by sutures

I mandible-joined to skull by TMJ

Face bones - 14

Paired	Unpaired
Maxilla	mandible
Zygoma	vomer
Palatine	
Lacrimal	
Nasal	
Inferior nasal conchae	

Cranium- that portion of the skull that houses the brain.

Cranial Bones - 8

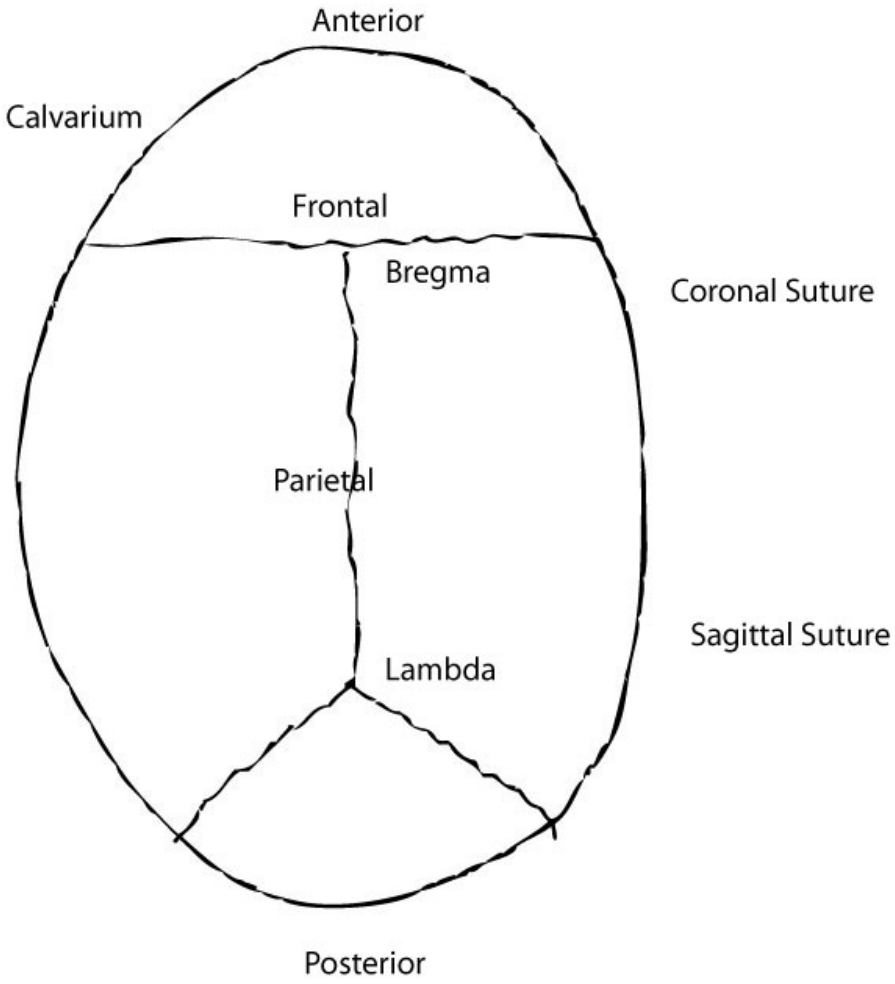
Paired	Unpaired
Temporal	Frontal
Parietal	Occipital
	Sphenoid

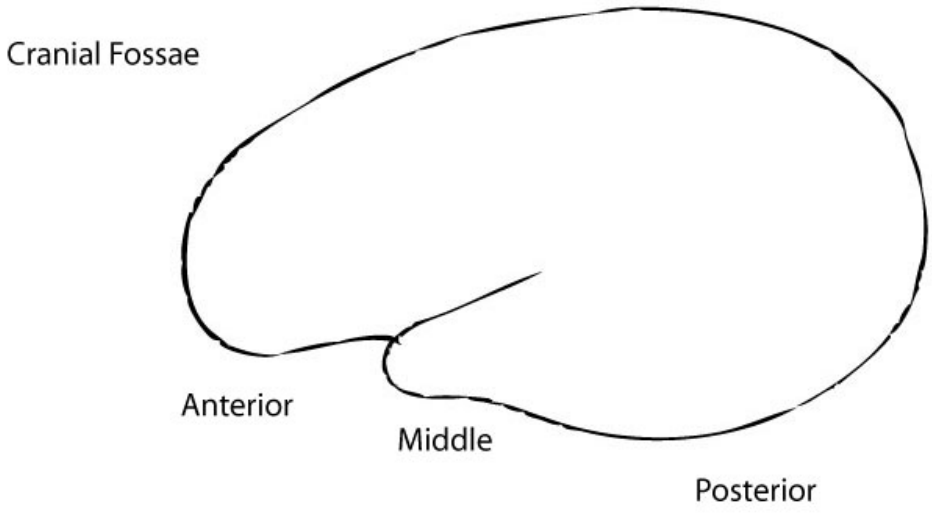
Orbital Cavity
- Frontal
- Sphenoid
- Zygoma
- Maxilla

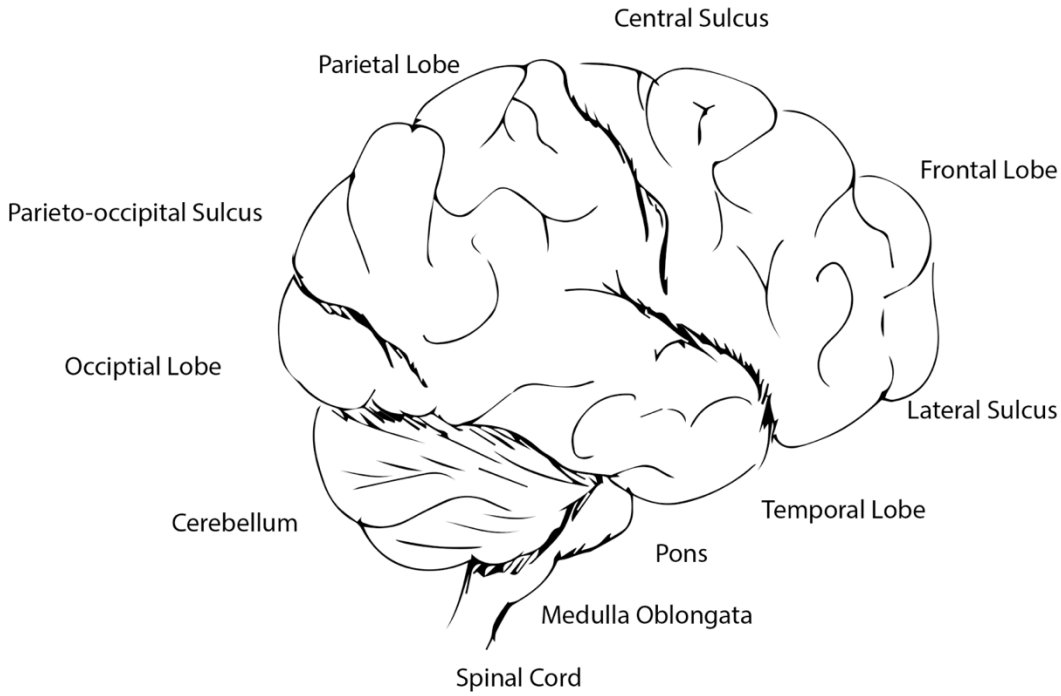
Lacrimal
Ethmoid
Palatine

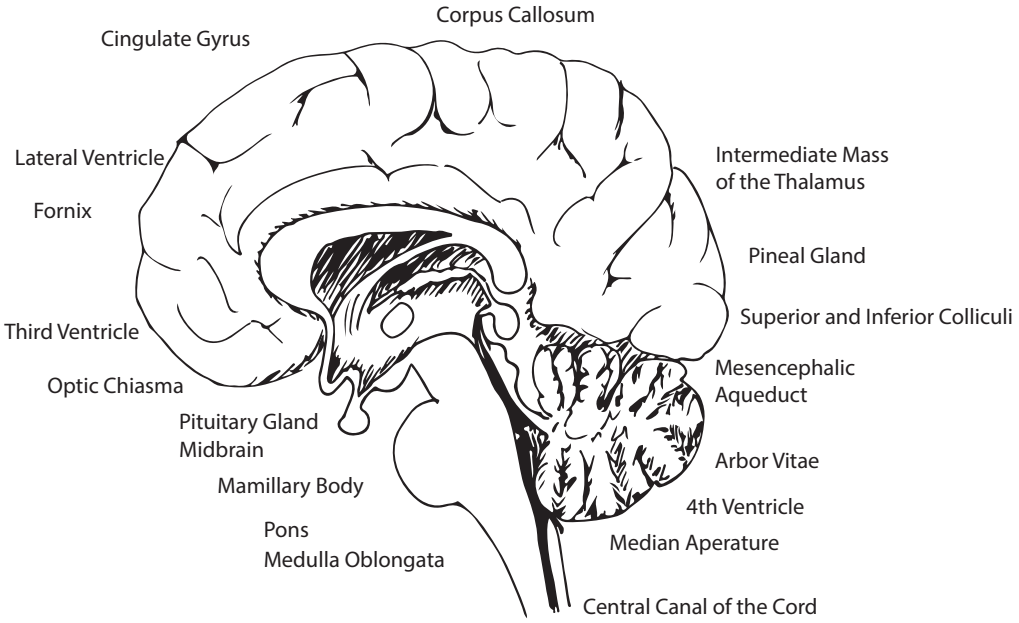
Nasal Cavity
- Maxilla
- Vomer
- Palatine
- Ethmoid
- Lacrimal

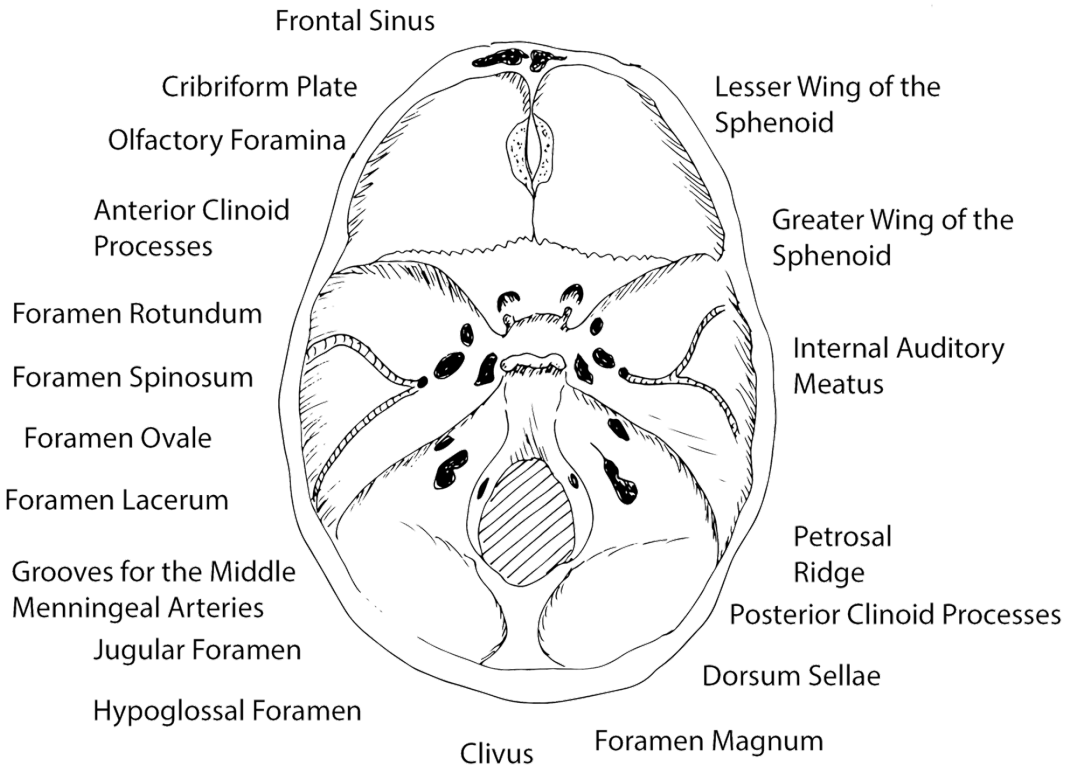
*These together from the bony part of the nasal septum.


Anterior
Calvarium
Frontal
Bregma
Coronal Suture
Parietal
Sagittal Suture
Lambda
Posterior


Cranial Fossae
Anterior
Middle
Posterior


Central Sulcus
Parietal Lobe
Frontal Lobe
Parieto-occipital Sulcus
Occiptial Lobe
Lateral Sulcus
Temporal Lobe
Cerebellum
Pons
Medulla Oblongata
Spinal Cord


Corpus Callosum
Cingulate Gyrus
Lateral Ventricle
Intermediate Mass
of the Thalamus
Fornix
Pineal Gland
Superior and Inferior Colliculi
Third Ventricle
Mesencephalic
Aqueduct
Optic Chiasma
Pituitary Gland
Midbrain
Arbor Vitae
Mamillary Body
4th Ventricle
Pons
Median Aperature
Medulla Oblongata
Central Canal of the Cord

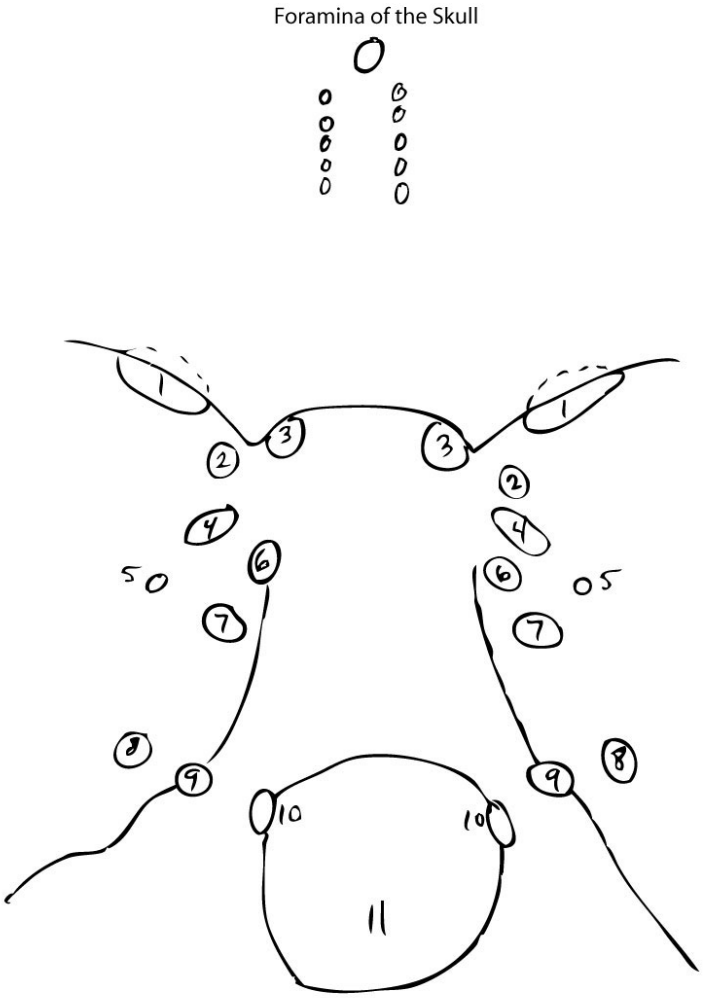


Cranial Fossa

Anterior
- frontal
- ethmoid
- sphenoid

Middle
- sphenoid
- temporal
- parietal

Posterior
- occipital
- temporal
- parietal



Foramen and Canals of the Skull

1. superior orbital fissure	III, IV, V1. VI
2. foramina rotundurn	V2
3. optic canal	II
4. foramen ovale	V3
5. foramen spinosum	
6. foramen lacerum	
7. trigeminal impression	
8. internal acoustic meatus	VII, VIII
9. jugular foramen	IX, X, XI
10. hypoglossal canal	XII
11. foramen magnum	

Foramina of the Cranial Fossae

Foramen Cecum (frontal bone)
- Attachment of falx cerebri
- Emissary veins

Olfactory Foramina (ethmoid)
- CN I

Optic Canal (sphenoid)
- CNII - optic nerve
- Ophthalmic artery

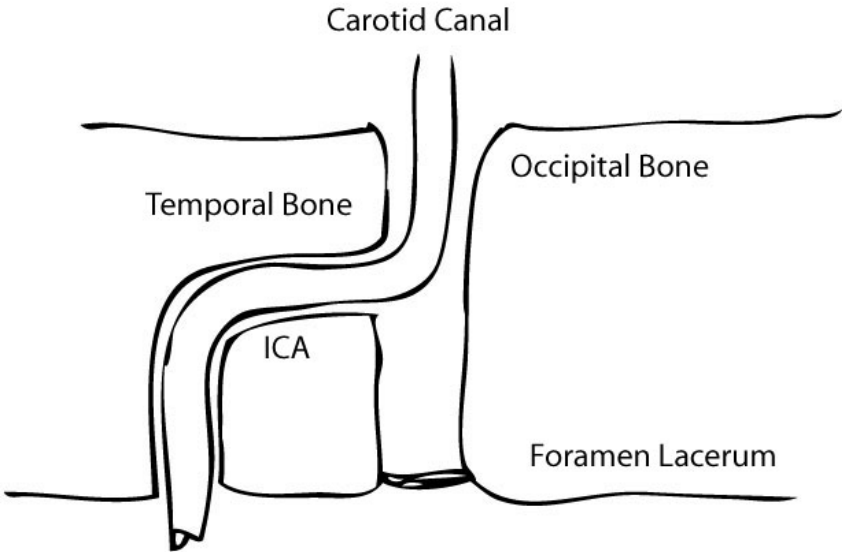
Superior Orbital Fissure (sphenoid)
- CN III
- CN IV
- CN V - V1 - ophthalmic
- CN VI
- Opthalmic vein

Foramen rotundum (sphenoid)
- V_2 maxillary nerve

Foramen ovale (sphenoid)
- V_3 mandibular branch of trigeminal nerve

Foramen spinosum (sphenoid, temporal)
- Middle meningeal arteries

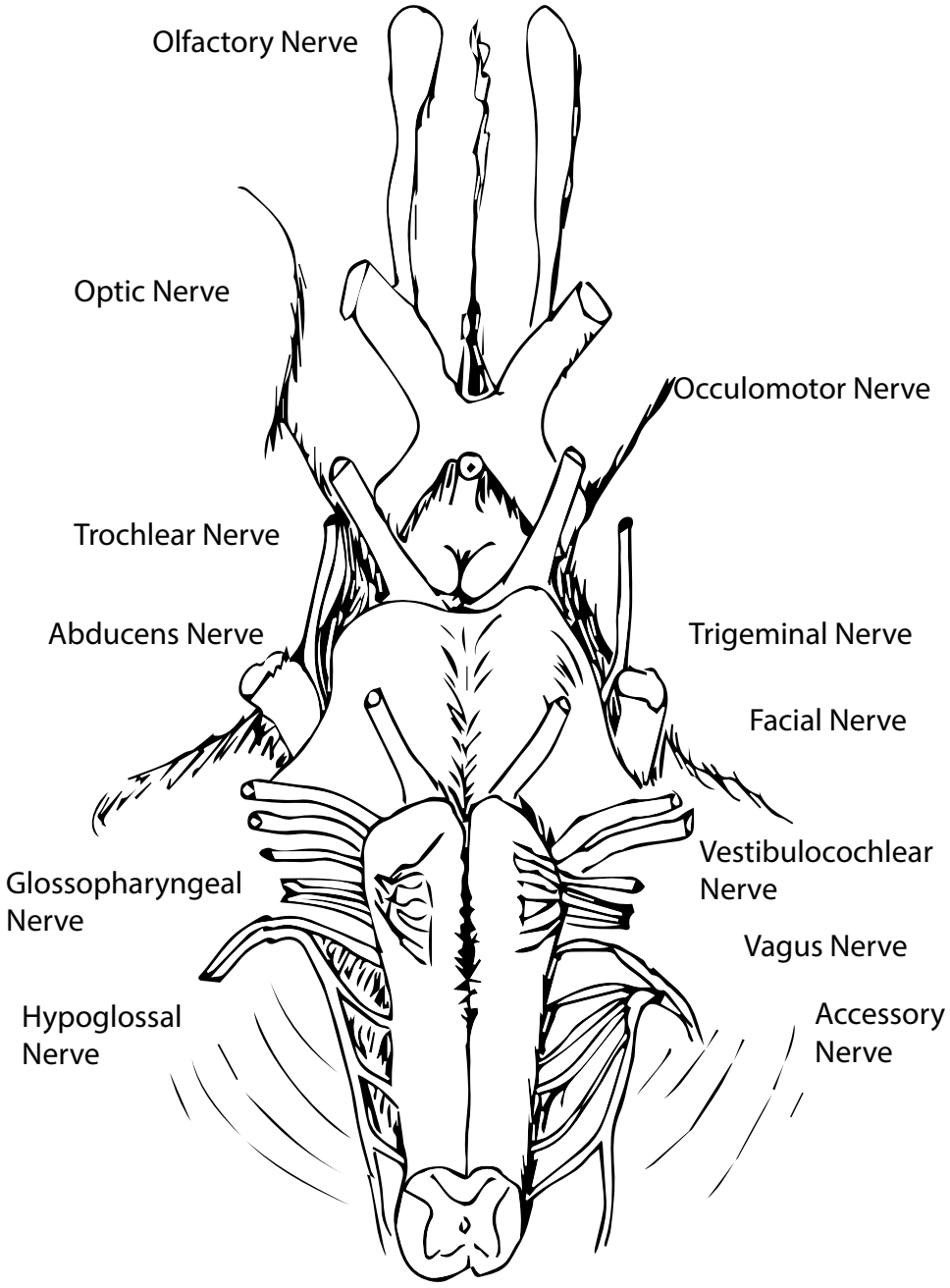
Foramen lacerum (sphenoid, temporal, occipital)
- In a living body, fibrocartilage covers the opening and nothing travels through it.
- In the dead body, this fibrocartilage degenerates thus uncovering the foramen.
- Lesser petrosal nerve



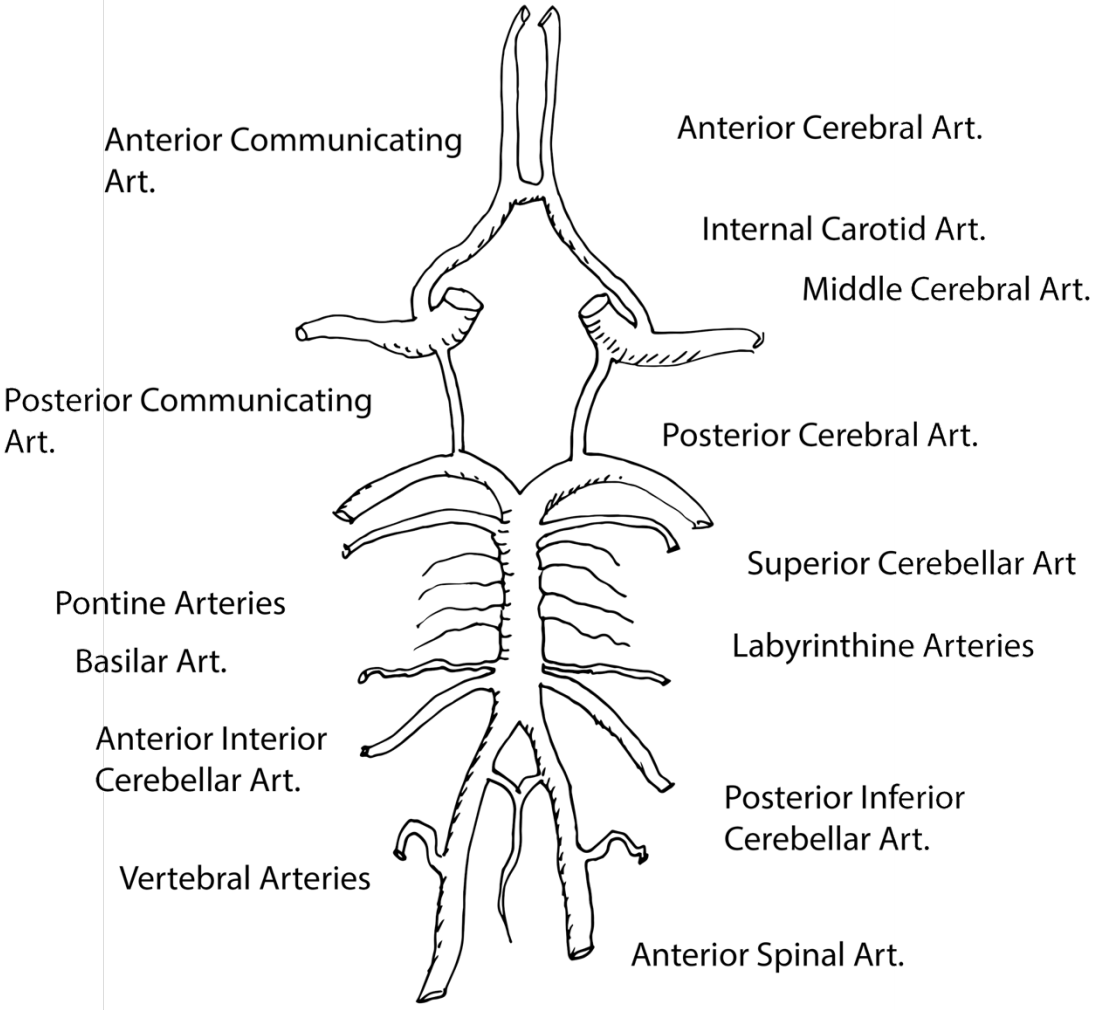
Internal Auditory Meatus (temporal, petrosal portion)
- Internal auditory artery and vein
(off of basilar artery)
- CN VIII
- CN VII-stylomastoid foramen

Jugular Foramen (temporal, Occipital)
- CN IX
- CN X
- CN XI
- Internal jugular vein
- C1-C5 of cervical plexus

Cranial Nerves



Circle of Willis



Vascularization of the Brain and Spinal Cord

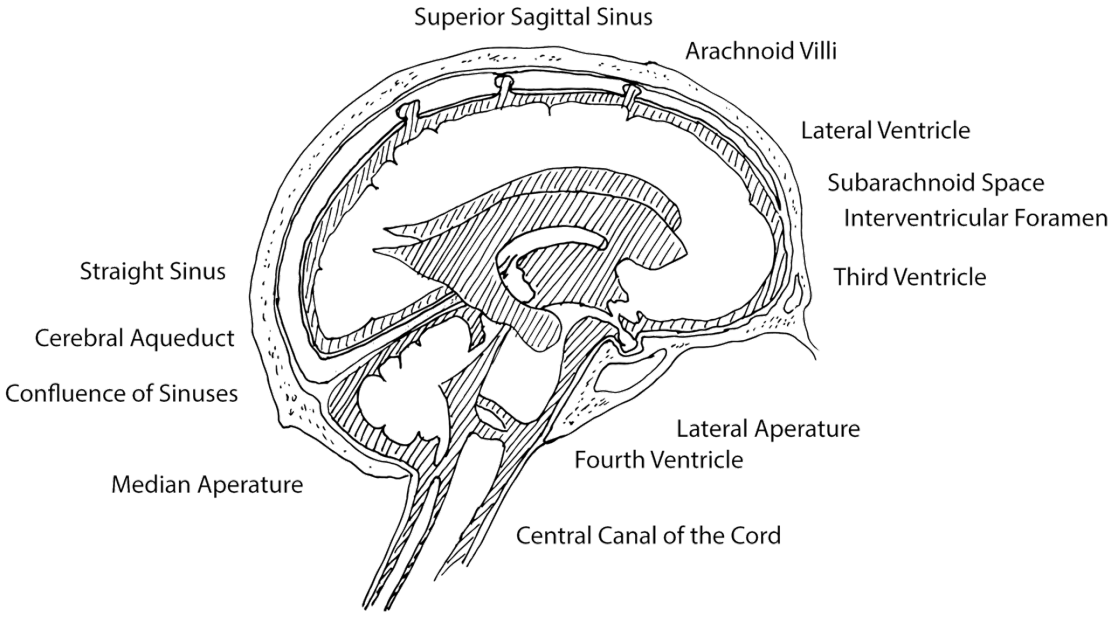
1) Vertebral artery
2) Basilar artery
3) Anterior Spinal artery
4) Posterior Spinal arteries
5) Radicular arteries (anastomosis with 3&4)
6) Posterior Inferior Cerebellar artery (only cerebellar artery to arise off of vertebral artery
7) Anterior Inferor Cerebellary artery
8) Superior Cerebellary artery
9) Internal Auditory artery
10) 5-12 pairs of Pontine arteries
11) Posterior Cerebral arteries

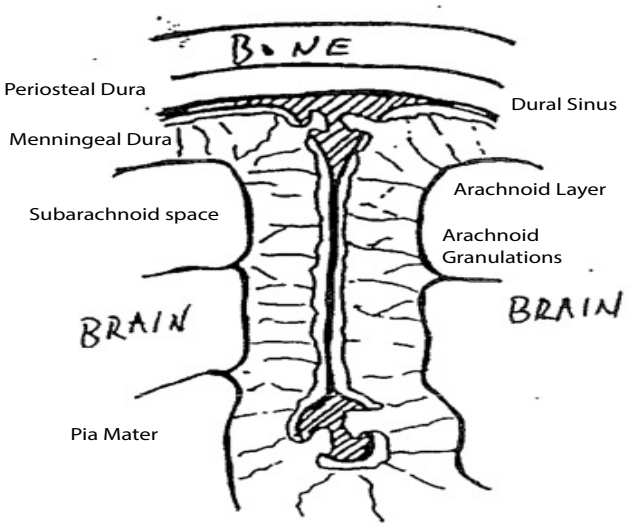
12) Middle Cerebral artery
13) Anterior Cerebral artery
14) Striate Artery

Internal Carotid Artery branches anastomose with all ECA except the Central Retinal Artery

Blood-Brain Barrier

Central nervous capillaries are impermeable to large molecules.
Cerebral arterial capillaries are the least permeable capillaries in the body.





THORAX

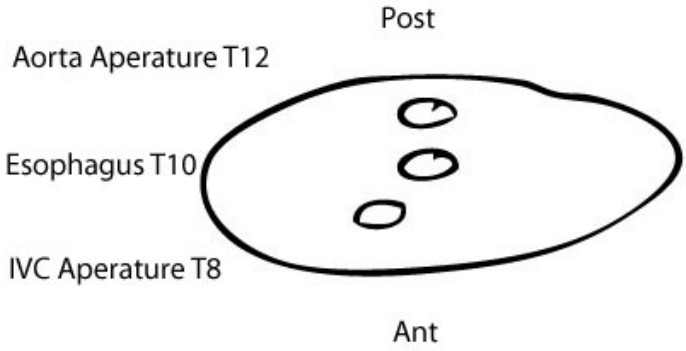
Houses: a) Lungs, and entire pulmonary circulation

b) Heart
Beginnings of the great systemic arteries
Aorta
Left Common Carotid Artery
Brachiocephalic Trunk
Right Common Carotid Artery

Endings of great systemic veins
Superior Vena Cava
Inferior Vena Cava

Borders of the Chest

a)	Lateral	ribs and deep muscles
b)	Anterior	sternum
c)	Posterior	12 thoracic vertebra
d)	To the neck	superior thoracic aperature transmits esophagus, trachea, blood vessels, nerves, and lymphatics
e)	Inferior	inferior thoracic aperature diaphragm



Muscles of the Chest

Superficial Muscles
Pectoralis Major Muscle
Pectoralis Minor Muscle
Subclavius Muscle
Anterior Serratus Muscles

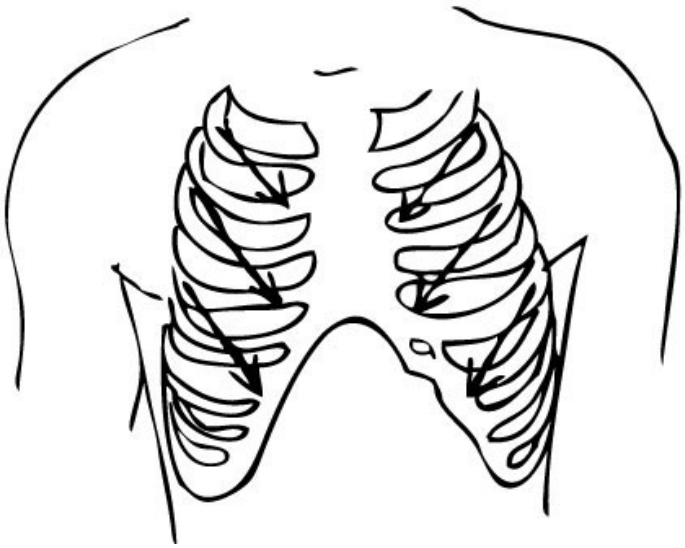
Deep Muscles

External Intercostal Muscles (I I pairs)
Internal Intercostal Muscles (I I pairs)
Innermost Intercostal Muscles
Subcostal Muscles
found on the anterior side of the posterior thorax
Sternocostalis Muscles (Transversus Thoracis Muscle)
found on the anterior thorax

Deep Muscles of the Chest

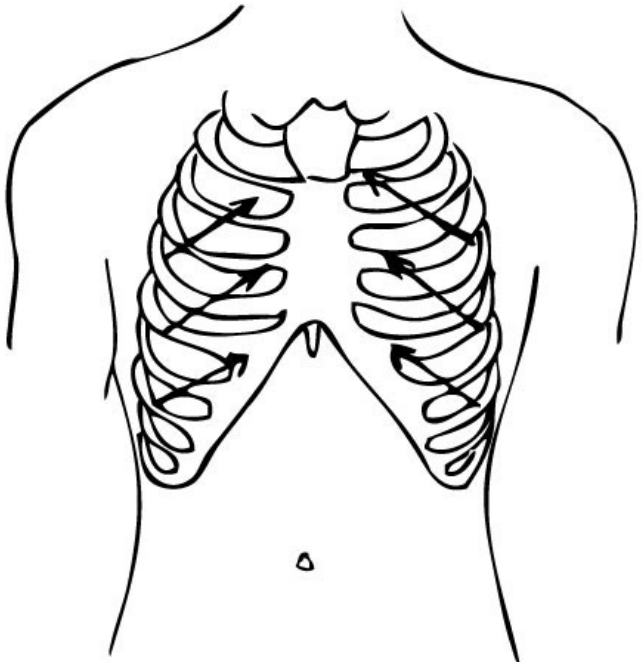
External Intercostal muscles (11 pairs)

Origin	rib above	
	~ fiber run	superior - inferior
		lateral - medial
Insertion	rib below	
Nerve supply	intercostal nerves	
Action	elevates the ribs	
Blood supply	posterior intercostal arteries	
	anterior intercostal arteries	



Internal Intercostal muscles (11 pairs)

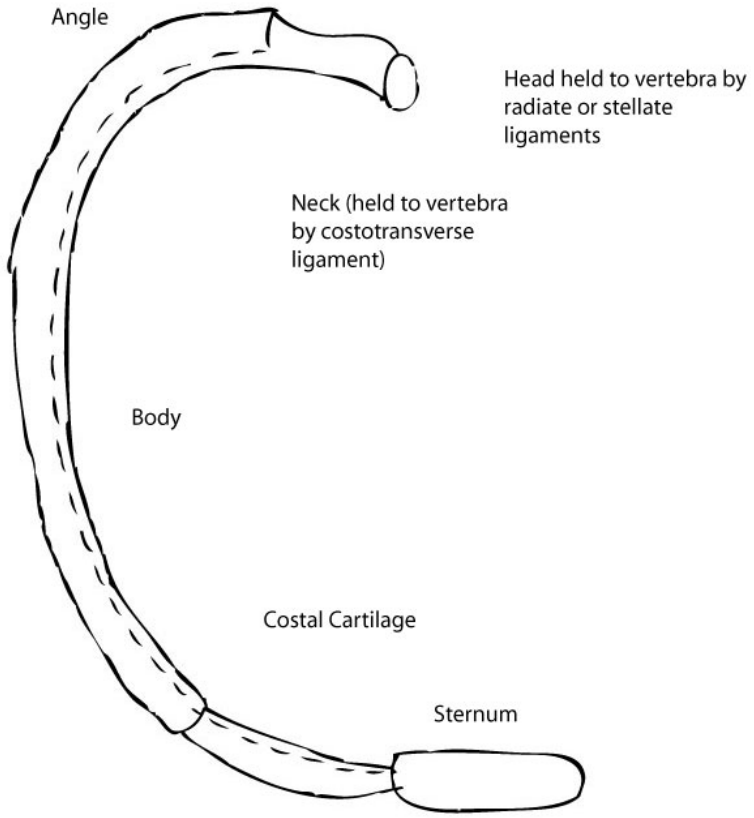
Origin	lower rib	
	~ fibers run	inferior-superior
		lateral-medial
Insertion	rib above	
Nerve supply	intercostal nerves	
Action	forced expiration	
Blood supply	posterior intercostal arteries,	
	anterior intercostal arteries	



Innermost Intercostal muscles

origin	rib below
	~ fibers run same as above
Insertion	rib above
Nerve supply	intercostal nerves
Action	forced expiration
Blood Supply	posterior intercostal arteries
	anterior intercostal arteries

Rib Anatomy

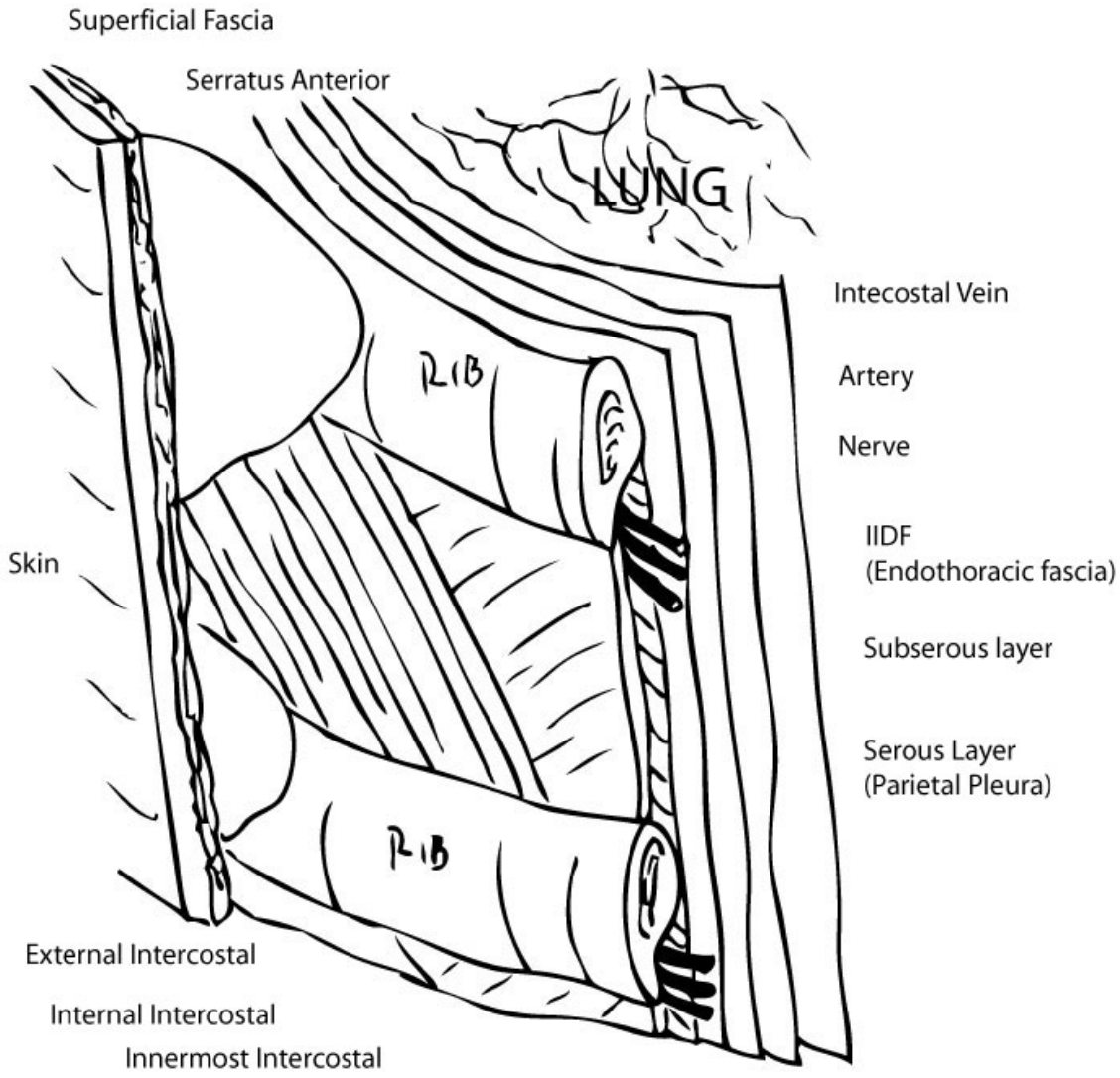


Sternocostalis Muscle (Transversus thoracis)

Origin	posterior aspect of thoracic shield at level of costal cartilage
Insertion	sternum
	xyphoid process
Nerve supply	VPR T_1 - T_3
Action	forced expiration
Blood supply	internal thoracic artery

Subcostal Muscles

Origin	posterior thorax, rib above
Insertion	rib below
Nerve supply	intercostal nerves
Action	aids in depressing ribs
Blood Supply	posterior intercostal arteries



VASCULARIZATION OF THORACIC WALL

Posterior

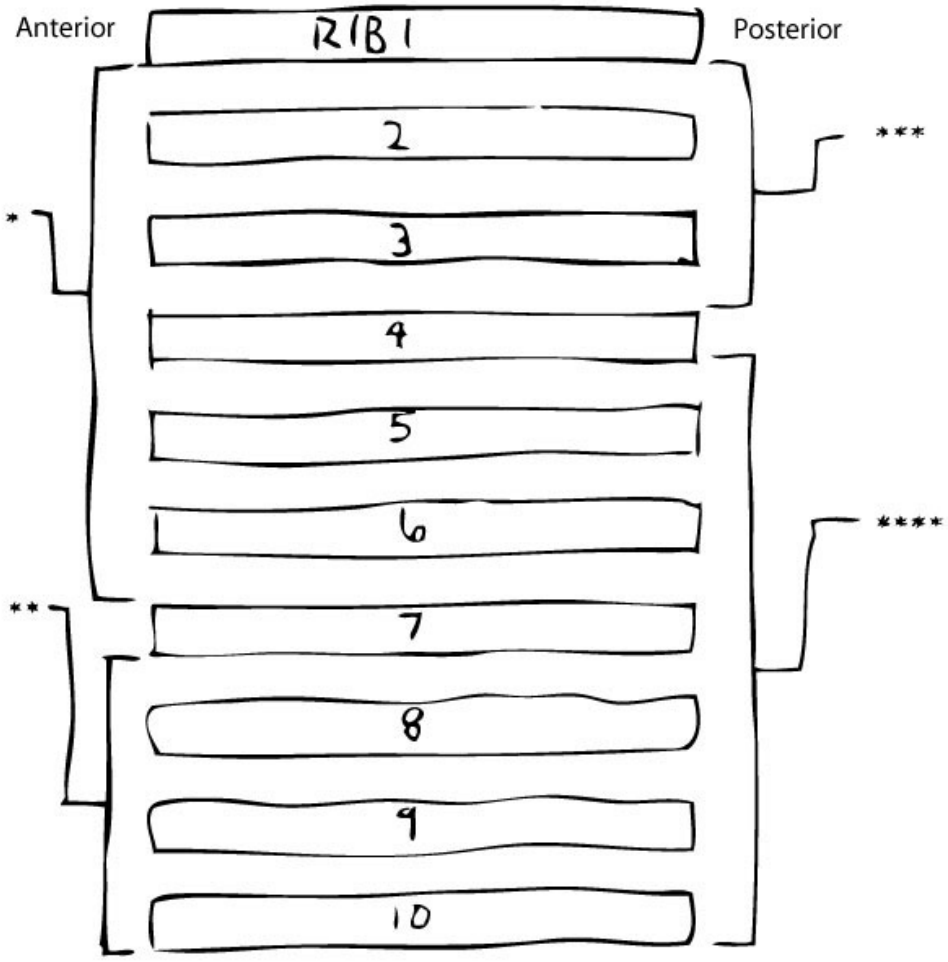
*** Intercostal Space (ICS) 1 - 3
Superior Intercostal Arteries (off costocervical trunk)

**** ICS Lower 9
Posterior Intercostal Arteries (off thoracic aorta)

Anterior

* ICS I - 6
Anterior Intercostal Arteries (off internal thoracic artery)

** ICS 7,8, 9
Anterior Intercostal Artery (off musculophrenic artery)



Branches of the Thoracic Aorta

- Pericardial Artery
  - Posterior surface of Pericardium
- Bronchial Artery
  - Lungs
- Esophageal Artery
  - Esophagus
- Mediastinal Artery
  - Posterior Mediastinum (space between lungs)
- Phrenic Artery
  - Diaphragm
- Posterior Intercostal Arteries

Branches of the Subclavian Artery

1) Vertebral Artery
   - Supplies brain and spinal cord
2) Internal Thoracic Artery

Pericardiacophrenic Artery
Parietal pleura, Pericardium. and Diaphragm

Mediastinal Artery
Anterior Mediastinum, Thymus

Pericardial Artery
Upper part of Anterior Pericadium.

Sternal Artery

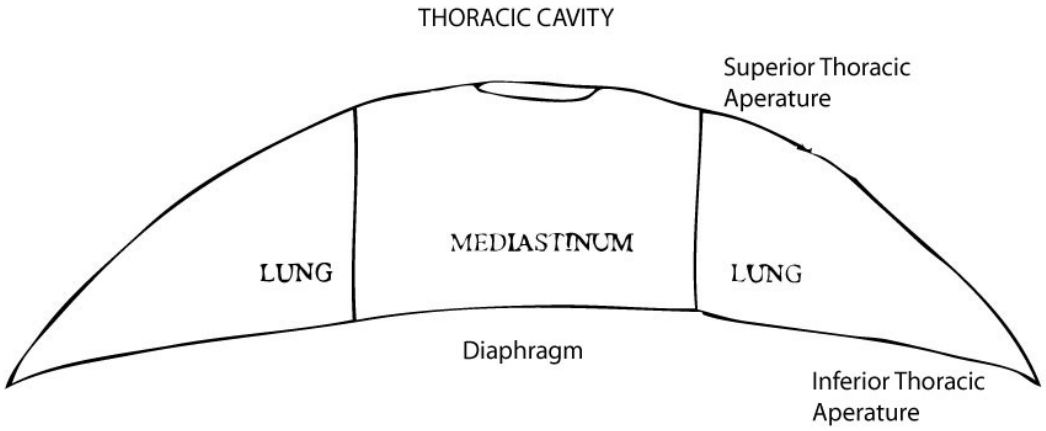
Anterior Intercostal Arteries
ICS 1-6 then anastomose with Posterior Intercostal Arteries

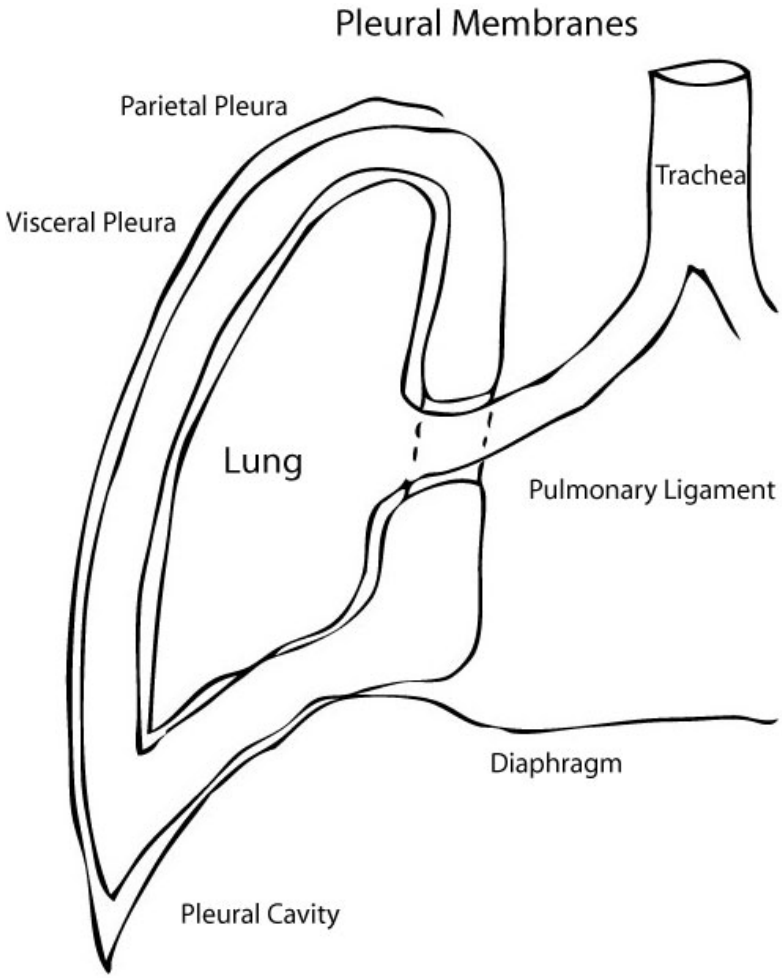
Musculophrenic Artery
ICS 7,8,9 then gives off Inferior Phrenic Artery

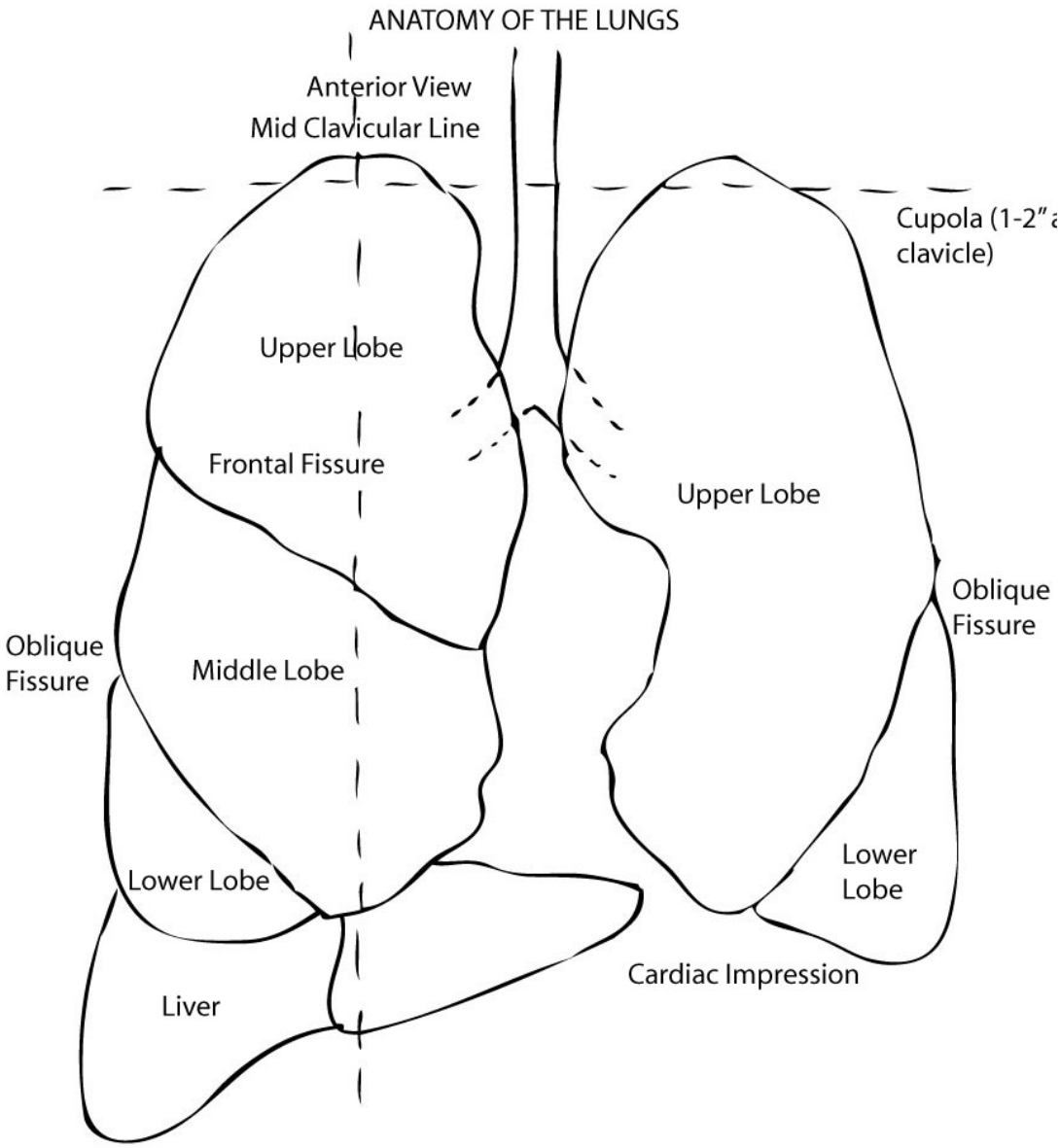
3) Thyrocervical Trunk
Inferior Thyroid Artery
Suprascapular Artery
Superior (superficial) Cervical

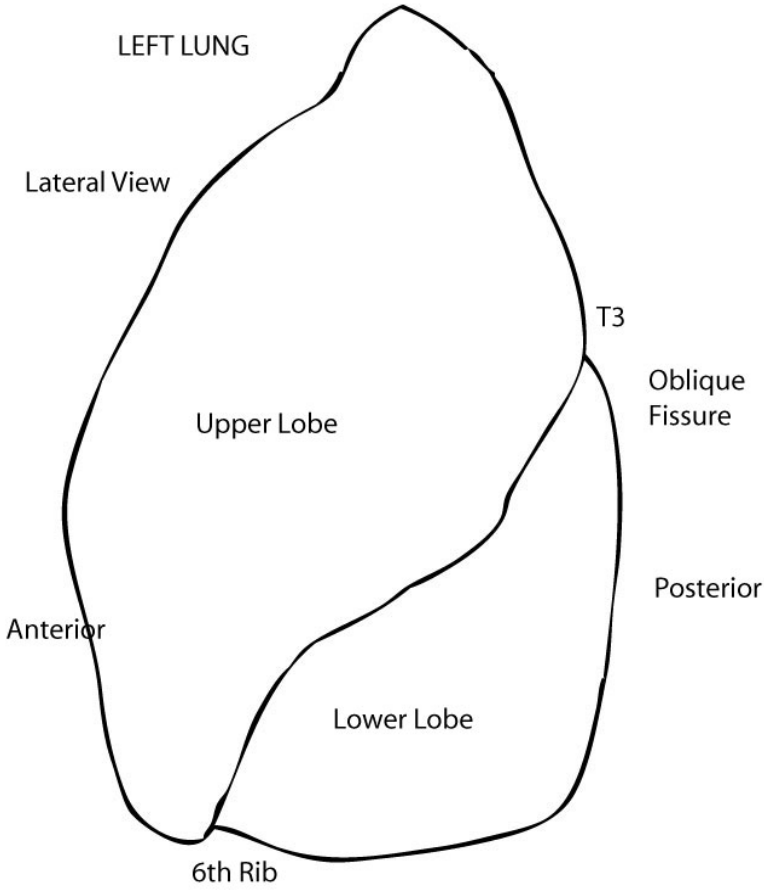
4) Costocervical Trunk
Superior Intercostal Artery
Posterior ICS 1, 2, 3
Deep Cervical Artery

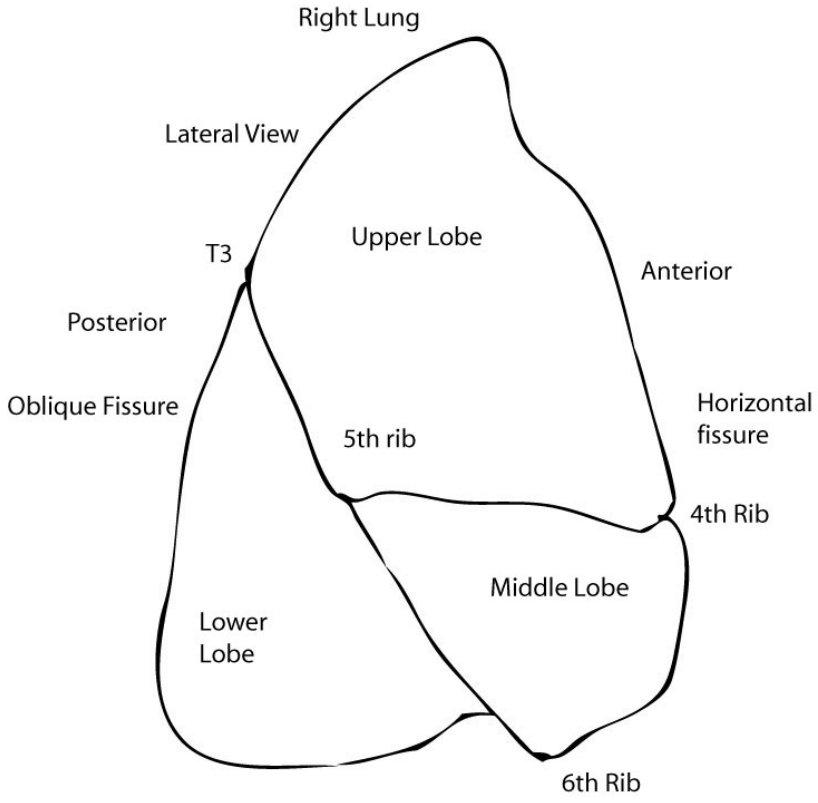
5) Dorsal Scapular Artery

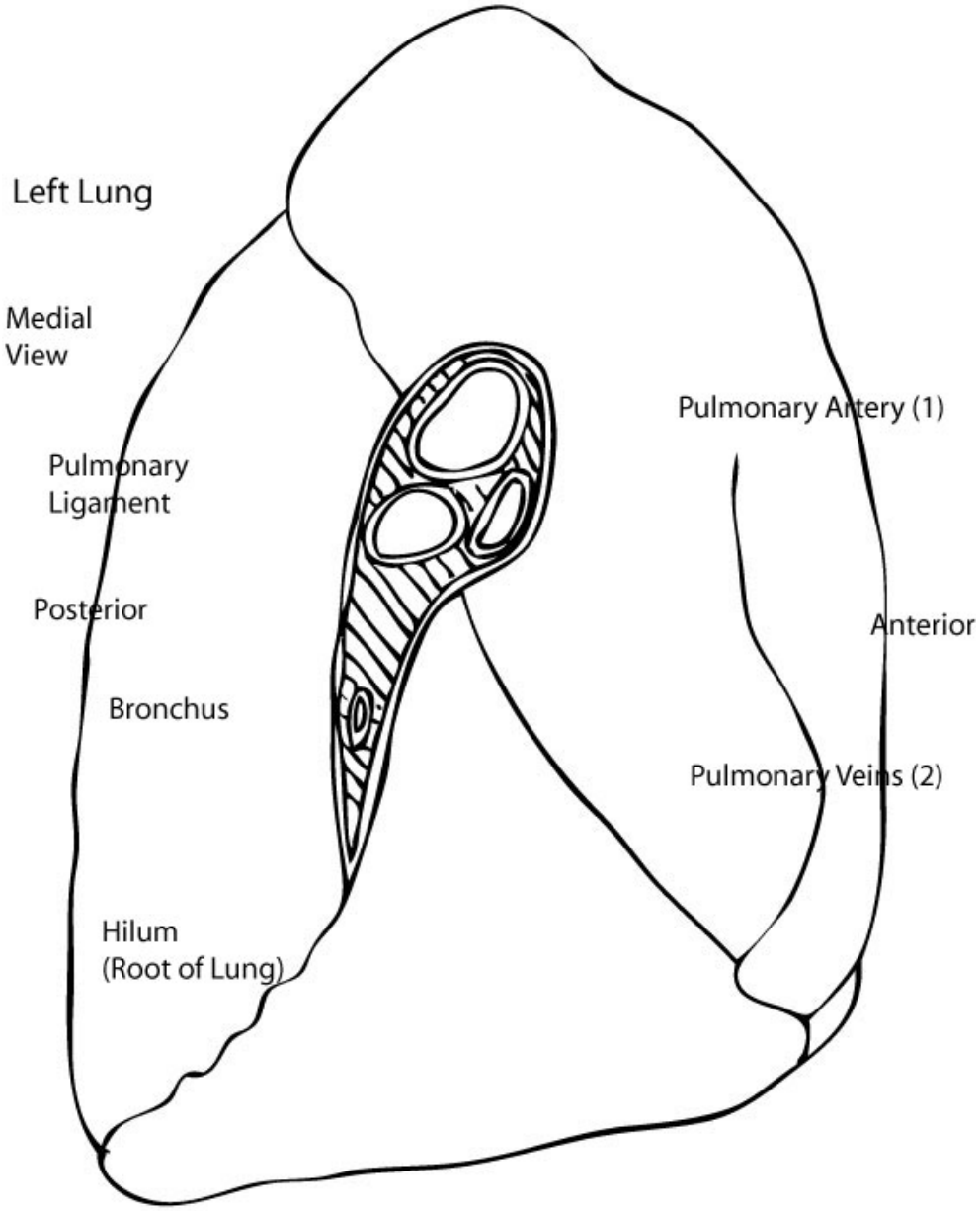


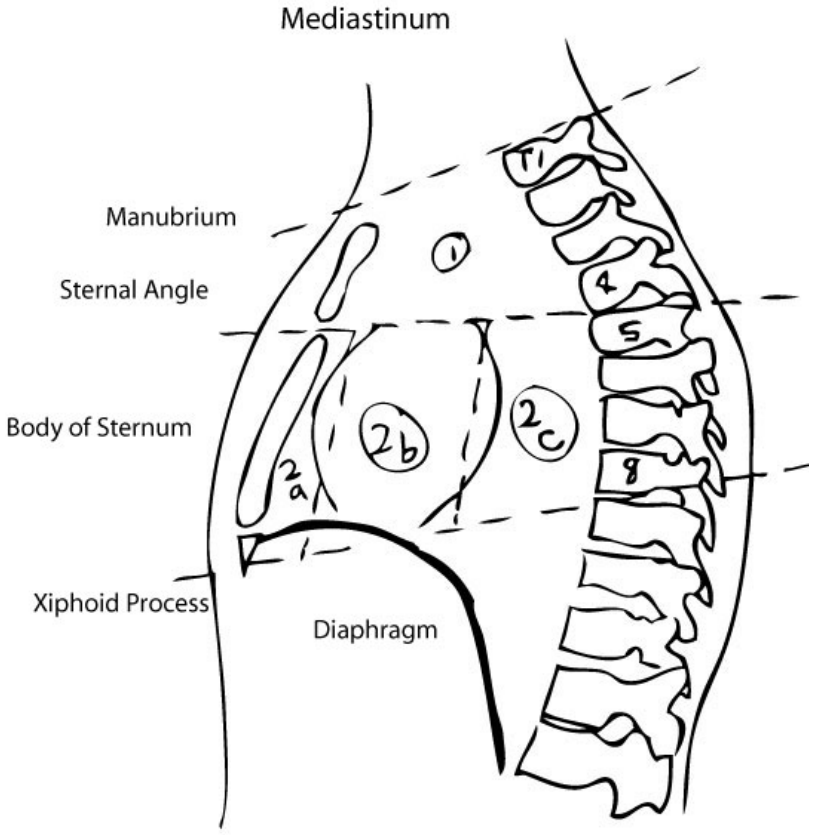

Pleural Membranes
Parietal Pleura
Visceral Pleura
Trachea
Lung
Pulmonary Ligament
Diaphragm
Pleural Cavity


ANATOMY OF THE LUNGS
Anterior View
Mid Clavicular Line
Cupola (1-2" a
clavicle)
Upper Lobe
Frontal Fissure
Upper Lobe
Oblique
Fissure
Oblique
Fissure
Middle Lobe
Lower
Lobe
Lower Lobe
Cardiac Impression
Liver


LEFT LUNG
Lateral View
T3
Oblique
Fissure
Upper Lobe
Posterior
Anterior
Lower Lobe
6th Rib


Right Lung
Lateral View
Upper Lobe
T3
Anterior
Posterior
Oblique Fissure
Horizontal
fissure
5th rib
4th Rib
Middle Lobe
Lower
Lobe
6th Rib


Left Lung
Medial
View
Pulmonary
Ligament
Posterior
Bronchus
Hilum
(Root of Lung)
Pulmonary Artery (1)
Anterior
Pulmonary Veins (2)



1) Superior Mediastinum

2) Inferior Mediastinum

(a) Anterior

(b) Middle

(c) Posterior

Superior Mediastinum (above Pericardial Sac)

Contents: some of Thymus Gland
Brachiocephalic Veins
Superior Vena Cava
Arch of Aorta
Trachea
Esophagus
Phrenic Nerves
Vagus Nerves
Cardiac Nerves
Sympathetic Chain
Thoracic Duct
Pulmonary Vessels

Inferior Mediastinum

Anterior Mediastinum
Thymus Gland

Middle Mediastinum
Heart
Great vessels within Pericardial Sac

Posterior Mediastinum
Descending Aorta
Esophagus
Vagus nerves
Thoracic Duct
Azygous & Hemiazygous veins
Splanchnic nerves
Sympathetic chain

Mediastinal compartments are not symmetrical.

Superior Mediastinum

Right Side
Brachiocephalic vein
Brachiocephalic trunk
Right Subclavian artery
Right Phrenic nerve
Right Recurrent Laryngeal nerve
Esophagus
Superior Vena Cava
Right Lymphatic duct

Left Side
Left Brachiocephalic vein
Left Common Carotid Artery
Left Subclavian Artery
Arch of Aorta
Posterior Intercostal Arteries and Veins
Left Phrenic nerve
Left Recurrent Laryngeal Nerve
(loop around Arch of Aorta just posterior to the Ligamenturn Arteriosa)
Thoracic Duct
Trachea

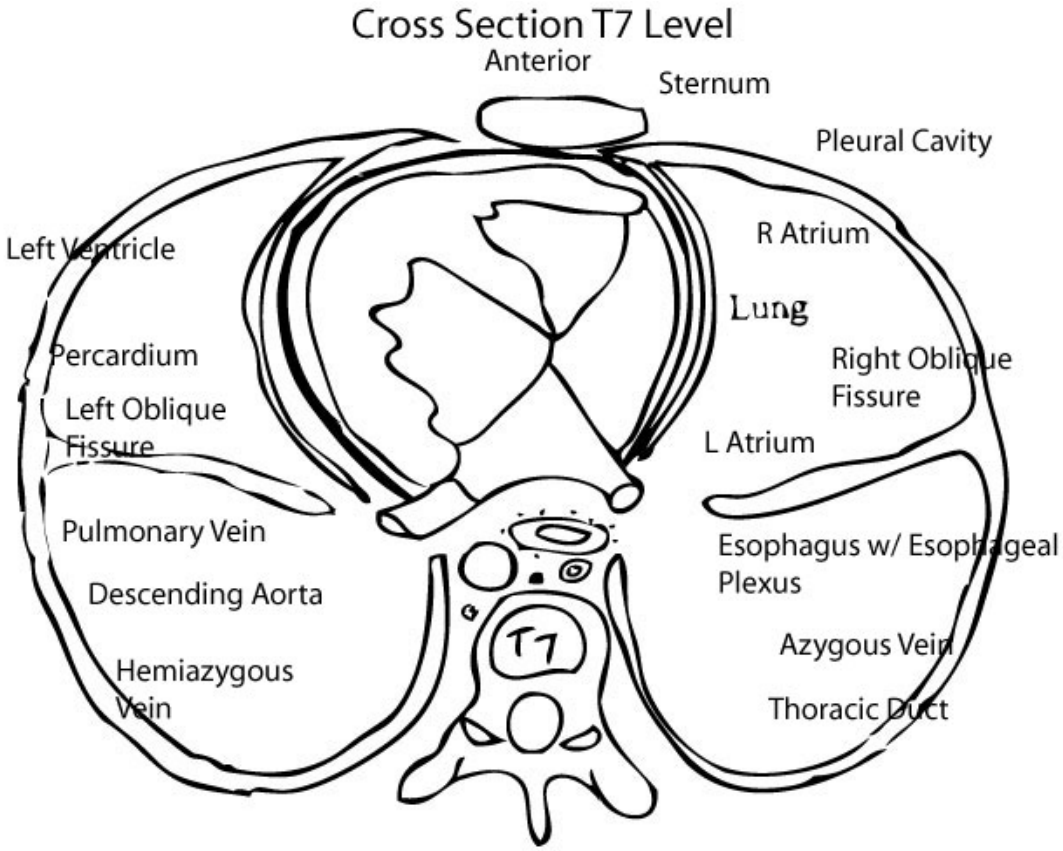
Inferior Mediastinum

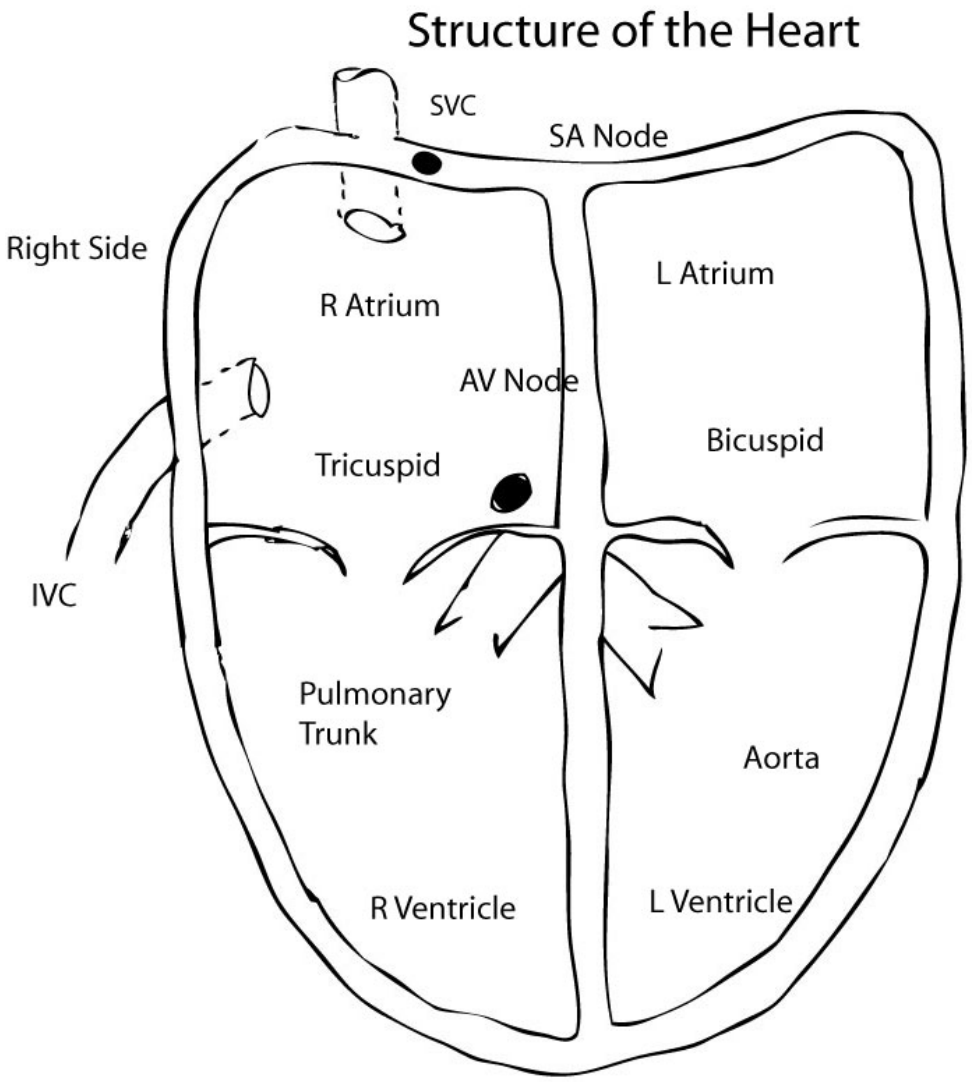
Right Side

- Anterior
  - Very little
- Middle
  - Superior Vena Cava
  - Right Phrenic nerve
  - Root of Lung
  - Azygous vein
- Posterior
  - Esophagus
  - Azygous vein
  - Posterior Intercostal arteries

Left Side

- Anterior
  - Very little
- Middle
  - Right and Left Ventricles of Heart
  - Pulmonary Trunk
  - Ascending Aorta
  - Left Phrenic nerve
  - Root of Lung
- Posterior
  - Posterior Intercostal arteries
  - Descending Aorta
  - Thoracic Duct
  - Esophagus
  - Hemiazygous Vein
  - Accessory Hemiazygous Veins


Cross Section T7 Level
Anterior
Sternum
Pleural Cavity
Left Ventricle
R Atrium
Lung
Percardium
Right Oblique Fissure
Left Oblique Fissure
L Atrium
Pulmonary Vein
Esophagus w/ Esophageal Plexus
Descending Aorta
T7
Azygous Vein
Hemiazygous Vein
Thoracic Duct



Structure of the Heart

Right Atrium

Openings

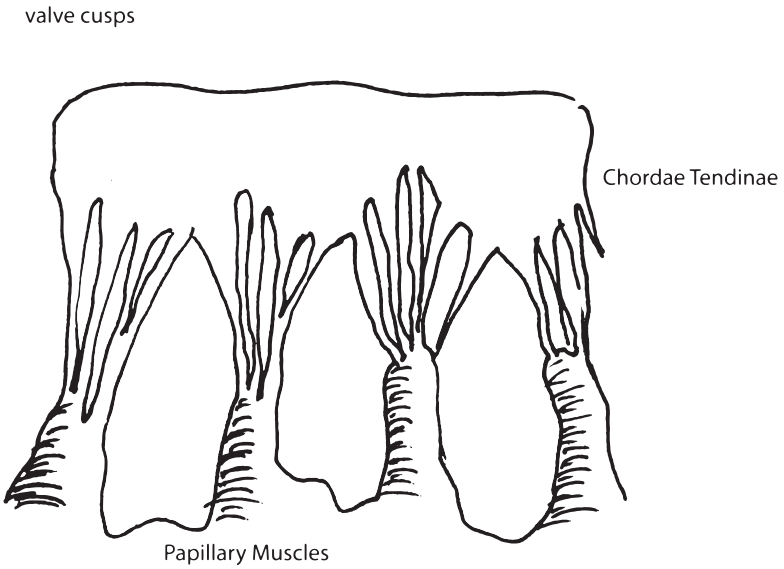
Superior Vena Cava
(collecting from the 2 Brachiocephalic veins)
Inferior Vena Cava (collecting from the Hepatic veins)
Tricuspid valve
Coronary Sinus
2 Anterior cardiac veins

Internal Surface

Pectinate muscles (anterior wall in front of crista terminalis)
Crista Terminalis (smooth surfaced ridge dividing the right atrium into 2 parts)
Auricle (smooth)
SVC (no valve)

IVC (valve of Eustachii)
Coronary Sinus Valve (Valve of Coronary Sinus or valve of Thesbesei
Fossa Ovalis
Depression in the interatrial septum (fetal circulation)
SA Node
Located where the SVC enters right atrium

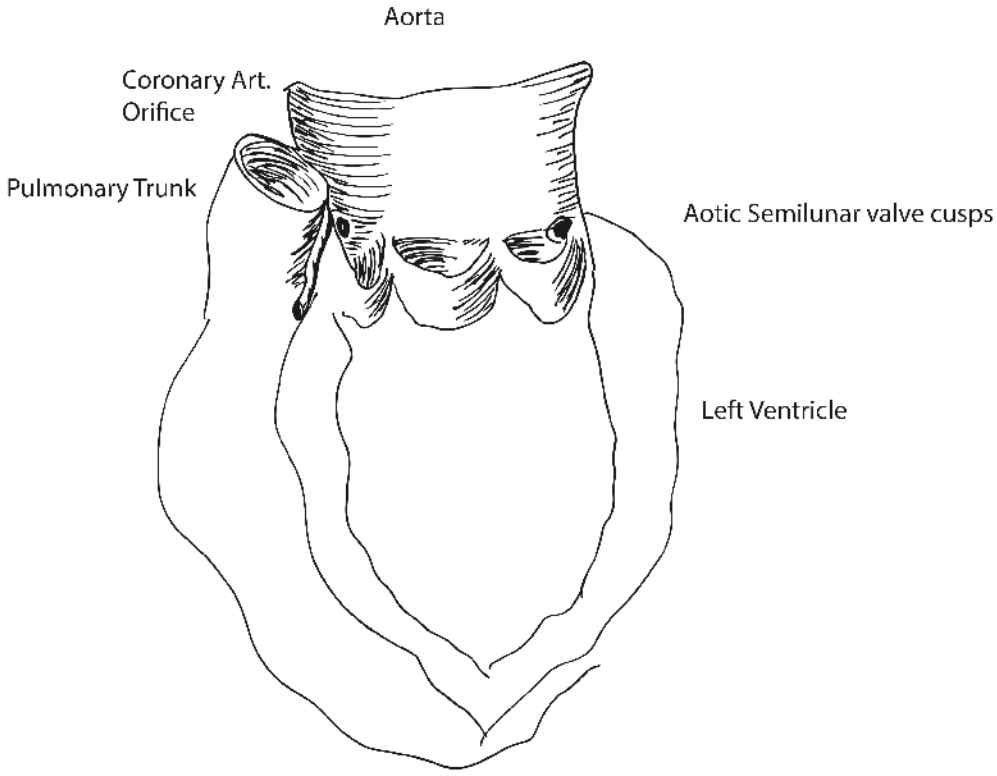
Right Ventricle
has 1/3 thinner wall than the left ventricle
rough walls
trabecula carnae
Papillary muscles
anterior- contains septomarginal band (moderator band)
middle
posterior
Chordae tendinae
keeps valves from inverting or everting



Left Atrium
Auricle is rough
Rest of Left Atrial walls are smooth
Fossa Ovalis is a bump on this side
Receives 4 Pulmonary veins

Left Ventricle

Trabeculae Carnae
Papillary Muscles
Chordae Tendinae



Coronary Circulation

Coronary arteries are located directly in heart muscle tissue and are closed when heart contracts (in time with heart).

- Blood flows through coronary circulation during diastole
- After systole, back pressure of blood that closed the valves also moves blood through coronary arteries

Ascending Aorta

Right Coronary Artery - supplies nodal tissue.

Left Coronary Artery - supplies Left Ventricle.

Right Coronary Artery

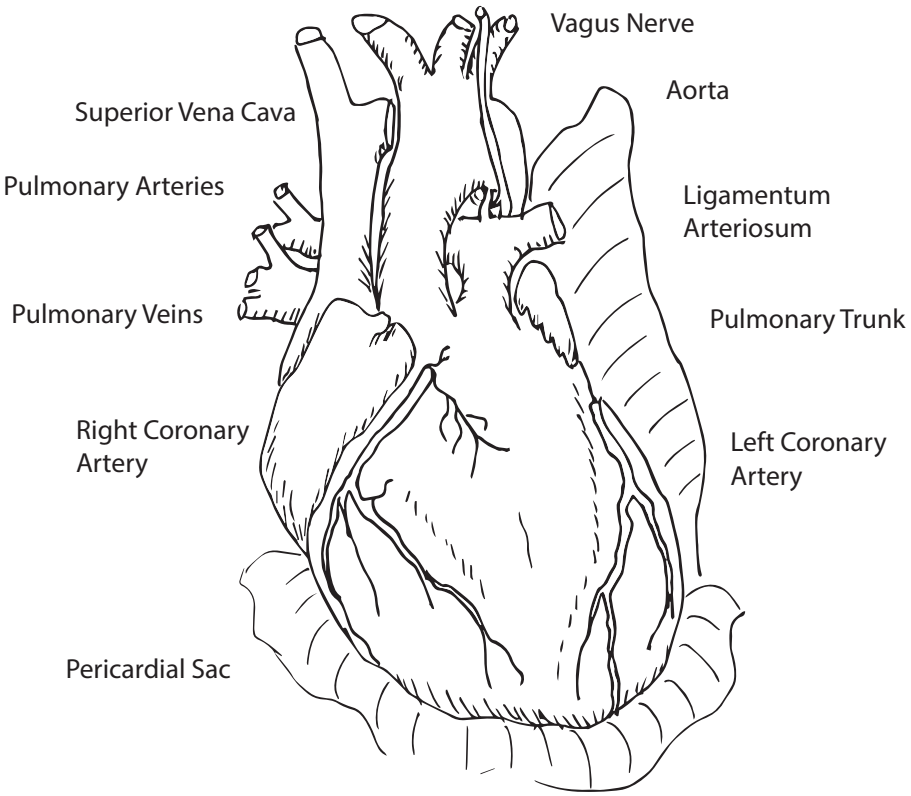
Smaller than left
Runs along Right AV Sulcus
Anastomoses with circumflex branch of Left Coronary Artery
Produces Marginal Artery

Produces Posterior Descending Branch which anastomoses with anterior descending branch from Left Coronary Artery

Supplies Nodal Tissue

Left Coronary Artery

Largest of Coronary circulation
Circumflex branch
Anterior Descending branch
supplies left ventricle



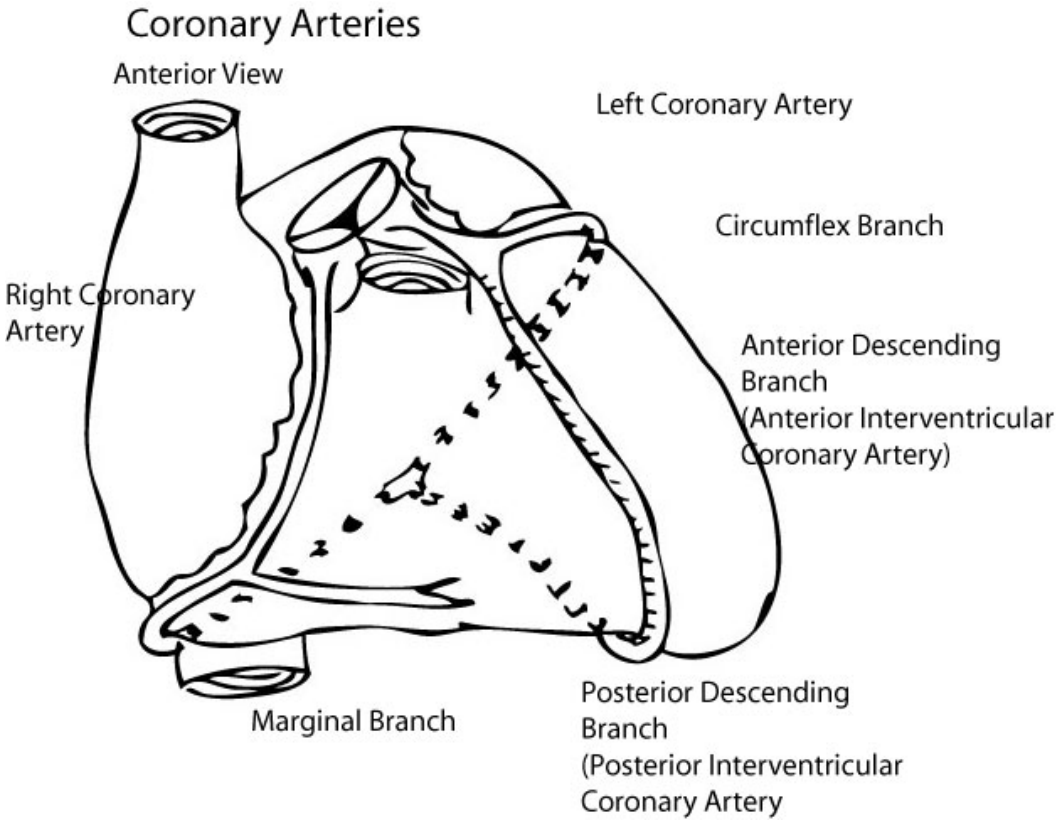
Cardiac Veins

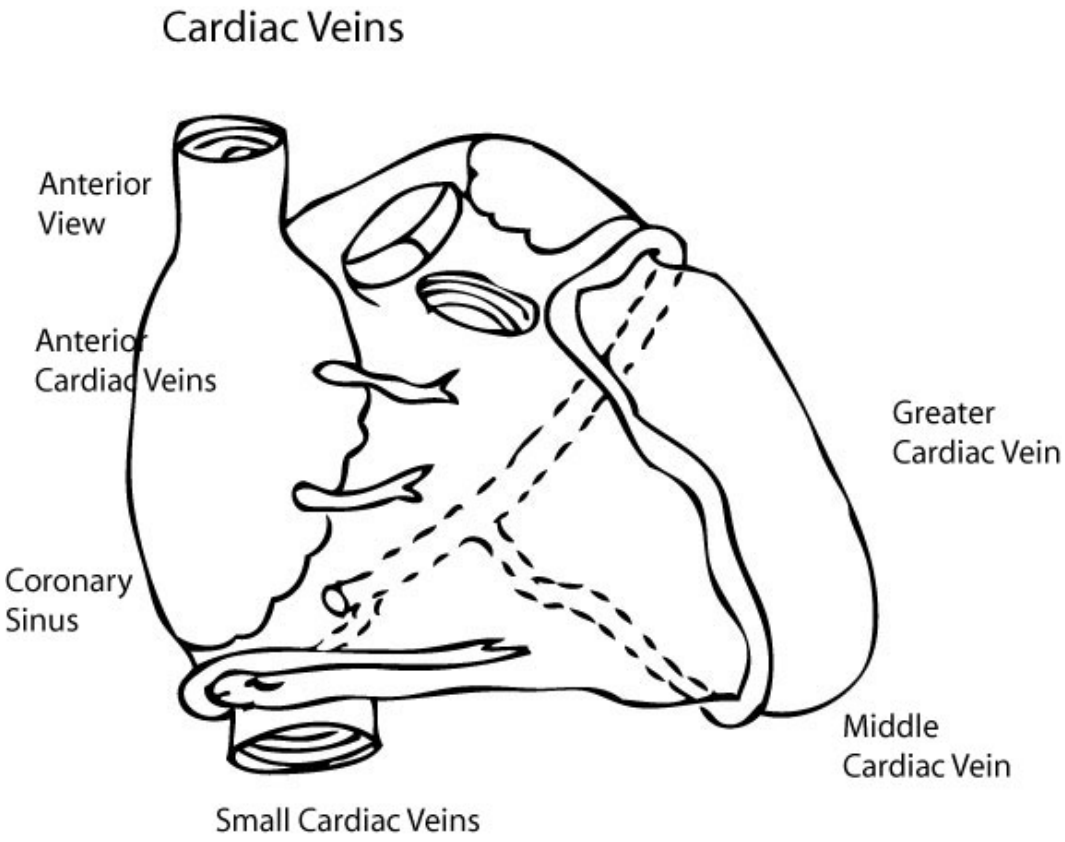
1) Anterior Cardiac Veins (2)
Drain into Right Atrium

2) Great Cardiac Vein
Travels with Anterior Descending branch of Left Coronary Artery
Drains from Left Ventricle

3) Middle Cardiac Vein
Accompanies Posterior Descending branch

4) Small Cardiac Vein
Accompanies marginal branch of Right Coronary Artery

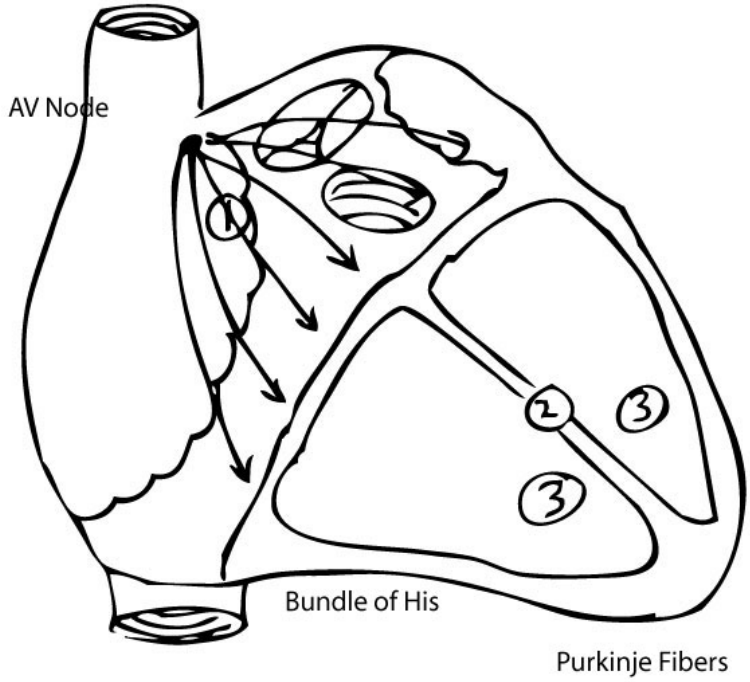




Innervation of the Heart

PS	Vagus -	Atria
S	T1 -T4 -	Ventricles

Electrical Conduction of the Heart



Diaphragm Muscle

- Dome shaped muscle with both striated and smooth muscle in it.
- Attaches to Pericardium, Parietal Pleura, and Parietal Peritoneum.

Origin	xyphoid process
	lower 6 ribs and their costal cartilages
	TP's of L1, L2
	Vertebral bodies of L1, L2, L3
insertion	central tendon
nerve supply	C3,4,5 phrenic nerve
action	inspiration
	abdominal straining
	weight lifting (valsalva maneuver)
blood supply	off internal thoracic artery
	musculophrenic artery
	pericardiacophrenic artery
	off thoracic aorta
	superior phrenic artery

openings in diaphragm

T_8 = IVC

T_{10} = esophagus

T_{12}= aortic hiatus

ABDOMEN

Musculature
Spermatic Cord
Testes
Scrotum
Viscera

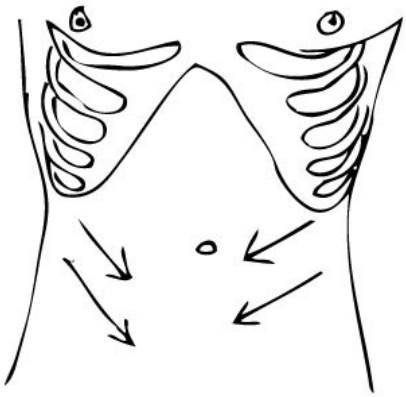
Muscles of the Anterior Abdominal Wall

- External Oblique muscles
- Internal Oblique muscles
- Transversus Abdominis muscle
- Rectus Abdominis muscle
- Pyramidalis muscle
  -small, variable in length,
  -often absent
  -lies anterior to rectus abdominus muscle

External Oblique Muscle

Origin	lower ribs by interdigitating slips from serratus anterior muscle
	fascia of superficial back
insertion	iliac crest
	linea alba
nerve supply	VPR T7 - T12, LI, L2
action	compresses abdomen
	supports viscera
	forced expiration
	rotation of trunk
	turn to left - right external oblique
blood supply	superior and inferior epigastric arteries

External Oblique Muscles



*the external oblique muscle has an aponuerosis that forms the external spermatic fascia.

Internal Oblique Muscle

origin	lumbar fascia
	iliac crest
	inguinal ligament
insertion	cartilages of lower 3 ribs
	linea alba
nerve supply	VPR T7 - T12, LI, L2
action	compresses abdomen
	supports viscera
	forced expiration
	rotation of trunk
blood supply	superior and inferior epigastric arteries

*forms the cremasteric muscle (layer)

Transversus Abdominis Muscle

runs horizontally

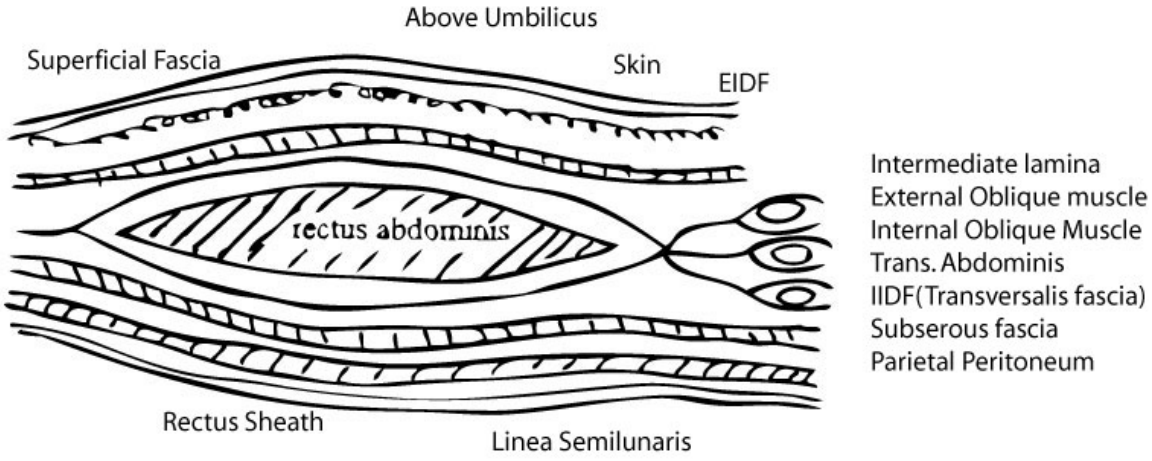
origin	inner surfaces of costal cartilages of lower 6 ribs.
	middle layer of lumbar fascia
	iliac crest
	inguinal ligament
insertion	inserts with obliques into linea alba
nerve supply	VPR T7 - T12, LI, L2
action	compresses abdomen
	supports viscera
	forced expiration
	rotation of trunk
blood supply	superior and inferior epigastric arteries

* Transversus abdominus muscle aponeurosis forms the internal spermatic fascia

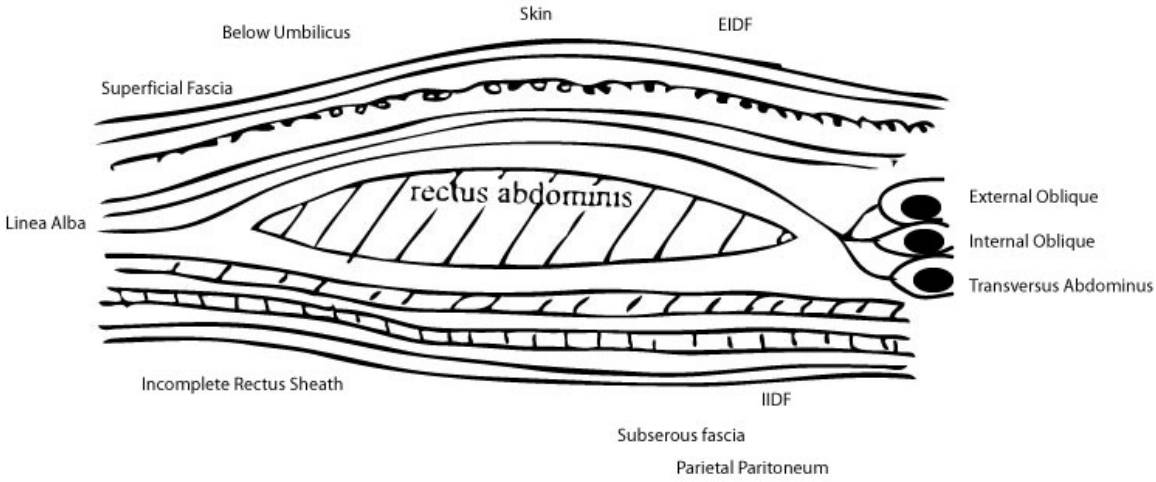
Rectus Abdominis Muscle

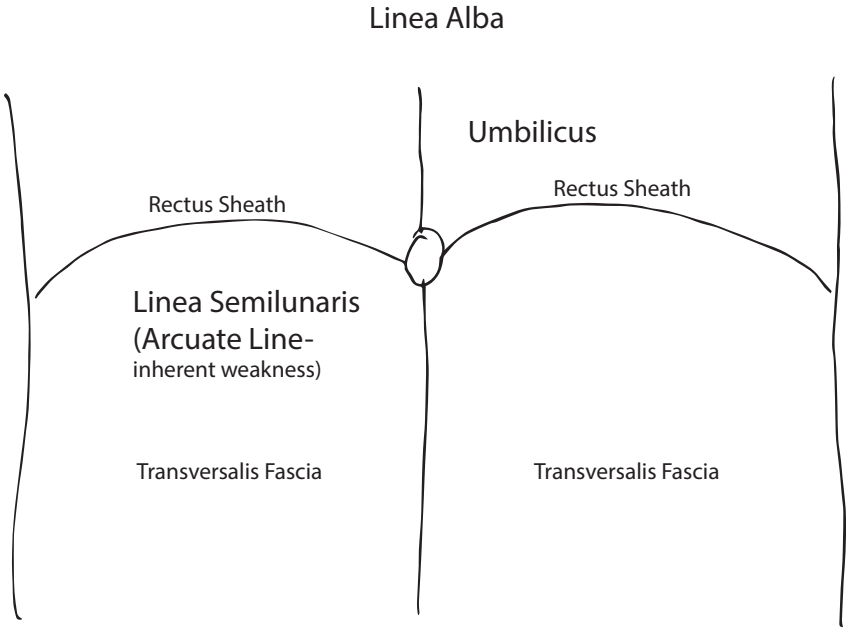
origin	pubic symphysis
	iliac crest
insertion	xyphoid process
	5th , 6th , 7th costal cartilages
nerve supply	VPR T7 - T12, LI, L2
action	flexes pelvis
	flexes vertebral column
	forced expiration
blood supply	superior and inferior epigastric arteries

Rectus Sheath



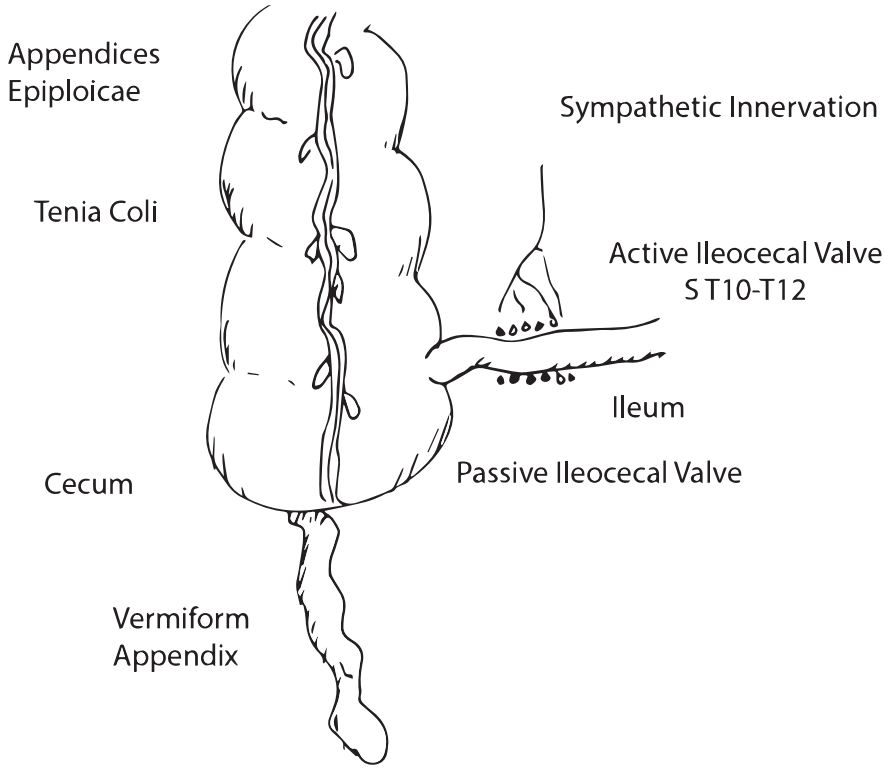
Rectus Sheath





Nerve Supply to GI Tract

Foregut
above diaphragm
S T1 - T4
PS Vagus Nerve
below diaphragm (foregut and midgut)
S - Splanchnic Nerves
Greater Splanchnic Nerve T5 - T9- primary foregut
PAIN
Lesser Splanchnic Nerve T10 - T11
Least Splanchific Nerve T12 (L1)



Other SENSATIONS
PS - Vagus
Hindgut
S- L1, L2 Lumbar Splanchnic Nerves
PS- S2, S3, S4 Pelvic Splanchnic Nerves

Esophagus

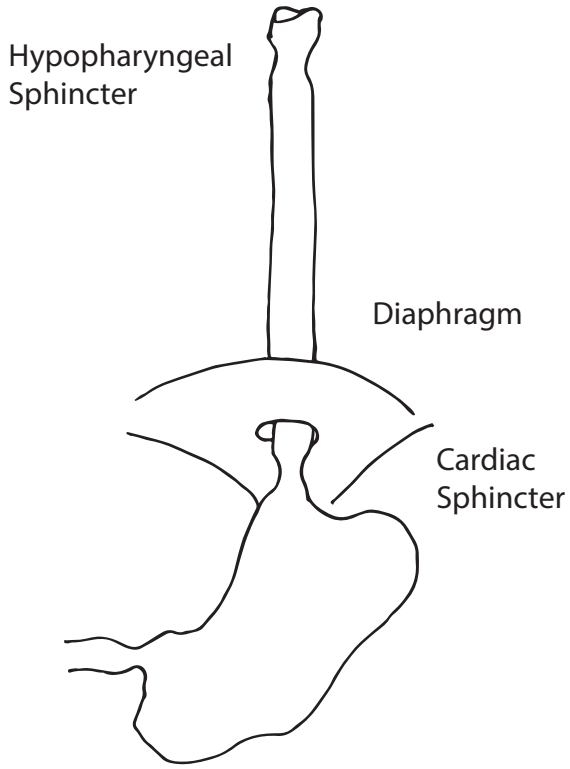
• Muscular collapsible tube that joins the pharynx to the stomach.

• Muscle content

Upper 1/3	Striated
Middle 1/3	Striated and Smooth
Lower 1/3	Smooth

•Approximately 10" long

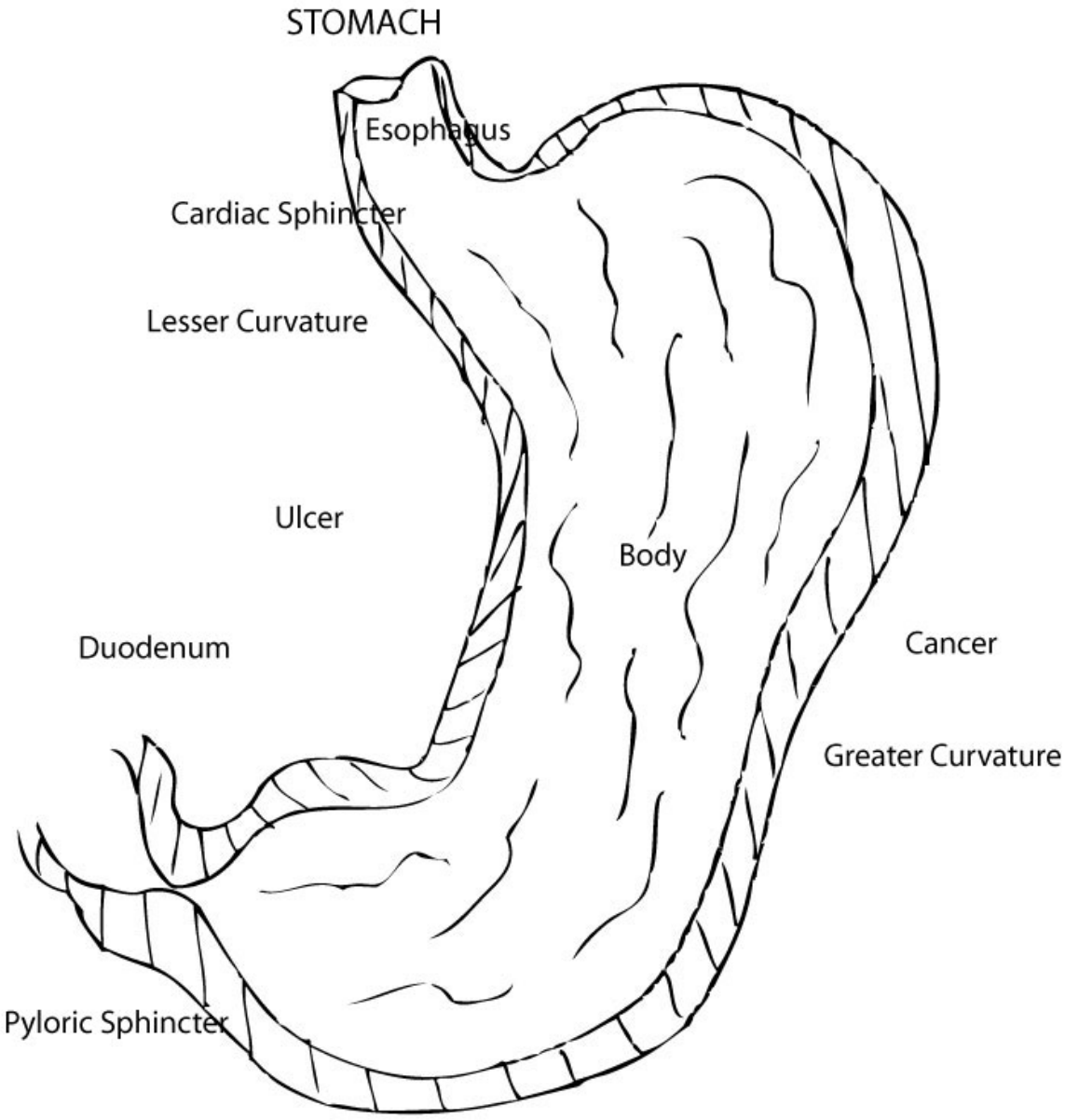
Smooth muscle of the Esophagus
Outer longitudinal muscle- autorhythmic
Inner circular muscle

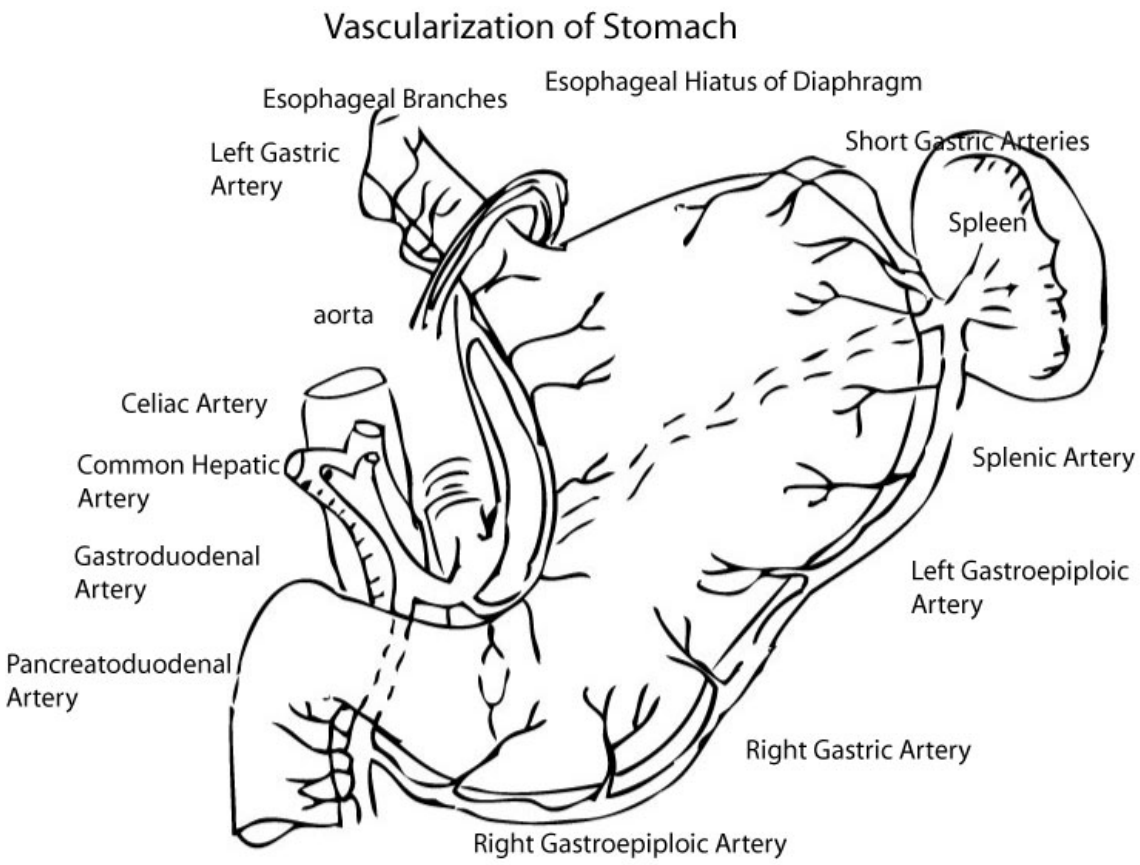


Sphincters

1) Hypopharyngeal Sphincter – just below pharynx at junction of esophagus and pharynx

2) Gastroesophageal (Cardiac) Sphincter


STOMACH
Esophagus
Cardiac Sphincter
Lesser Curvature
Ulcer
Body
Duodenum
Cancer
Greater Curvature
Pyloric Sphincter



Abdominal Arteries

Celiac Trunk
(first major blood vessel off thoracic aorta below diaphragm) (abdominal aorta)

1) Common Hepatic Artery
    Right and Left Hepatic Arteries

    Right Gastric Artery
        supplies lower right part of Lesser Curvature

    Gastroduodenal Artery
        Right Gastroepiploic Artery
            supplies lower part of Greater Curvature

    Posterior and Anterior Superior Pancreatoduodenal Arteries

2) Splenic Artery
    Short Gastric Arteries
        supply the fundus

Left Gastroepiploic Artery
-supplies upper part of Greater Curvature
-anastomoses with Right Gastroepiploic Artery

Dorsal Pancreatic Artery

Great Pancreatic Artery

Caudal Pancreatic Artery

3) Left Gastric Artery
-supplies lower 1/3 of Esophagus and the upper right portion of Lesser curvature

Innervation of the Stomach

S - Greater Splanchnic Nerve T5 - T9

Pregg Fibers - Celiac Ganglion - Postgg Fibers
-to Sphincters and Submucosal plexus

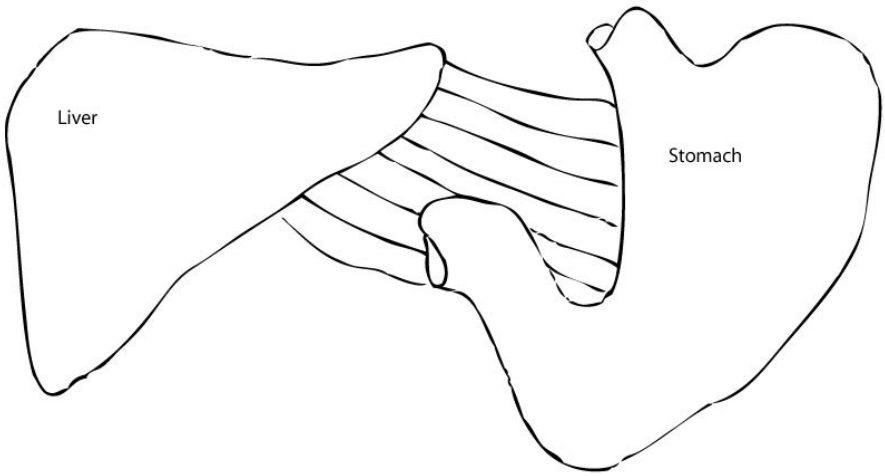
PS - Vagus Nerves
Left Vagus Nerve
- anterior aspect of stomach
Right Vagus Nerve
- posterior aspect of stomach

Vagus nerves go mainly to myenteric plexus
increase PS - increase motility
increase HCl secretion

Mesentaries of the Stomach

Mesentaries transport blood vessels and nerves.

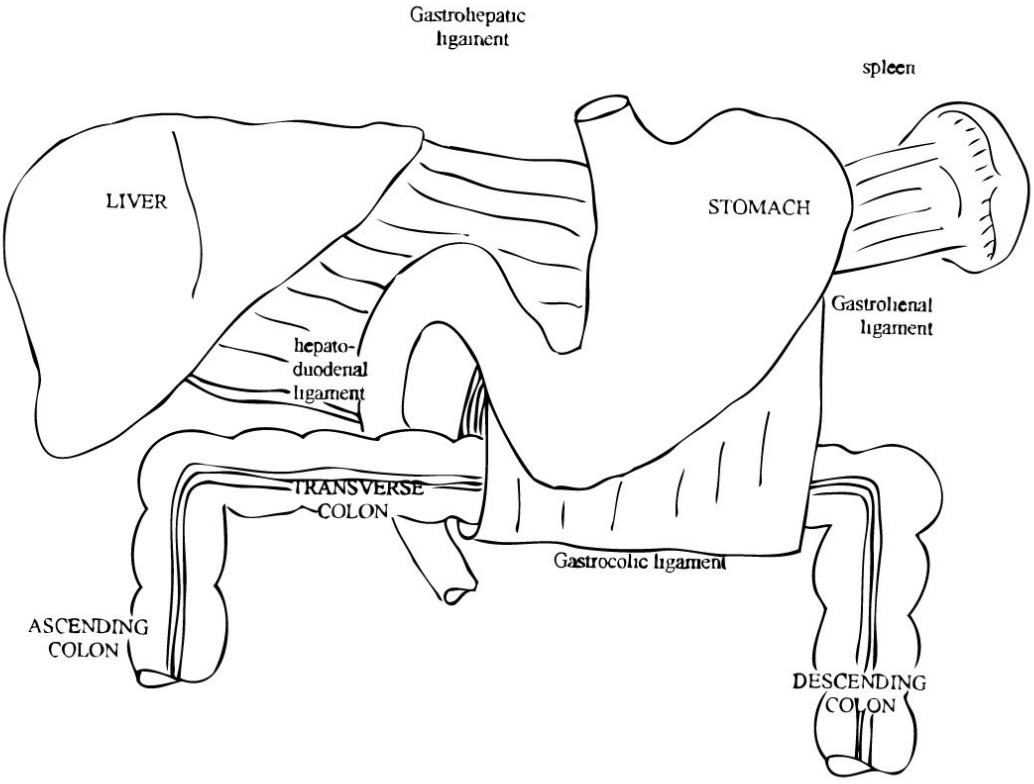
Greater Omentum
Gastrocolic Ligament
Gastrolineal Ligament



Lesser Omentum
- Gastrohepatic Ligament
- Hepatoduodenal Ligament

Mesentaries of the Spleen
- Lienogastric Ligament
- Lienorenal Ligament

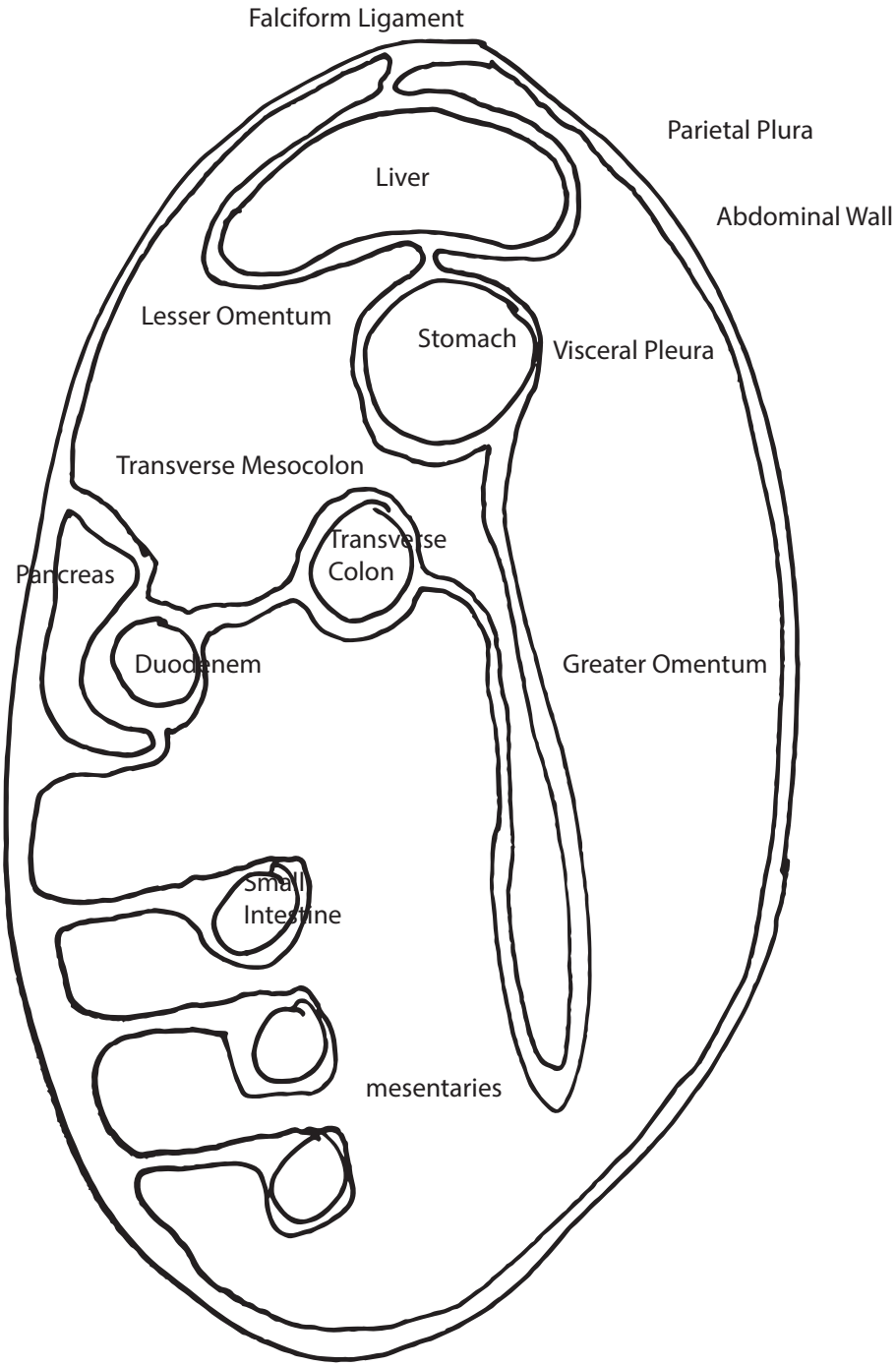
Mesentaries of Transverse Colon
- Gastrocolic Ligament
- Transverse Mesocolon



Intraperitoneal (freely movable)
- Liver
- Stomach
- Transverse Colon
- Spleen

Retroperitoneal (relatively immovable)
- Pancreas
- Kidney
- Duodenum (distal 11”)
- Ascending and Descending Colon

Peritoneum


Falciform Ligament
Parietal Plura
Liver
Abdominal Wall
Lesser Omentum
Stomach
Visceral Pleura
Transverse Mesocolon
Transverse Colon
Pancreas
Duodenem
Greater Omentum
Small Intestine
mesentaries

Small Intestine

Components (22' long)
1’ Duodenum

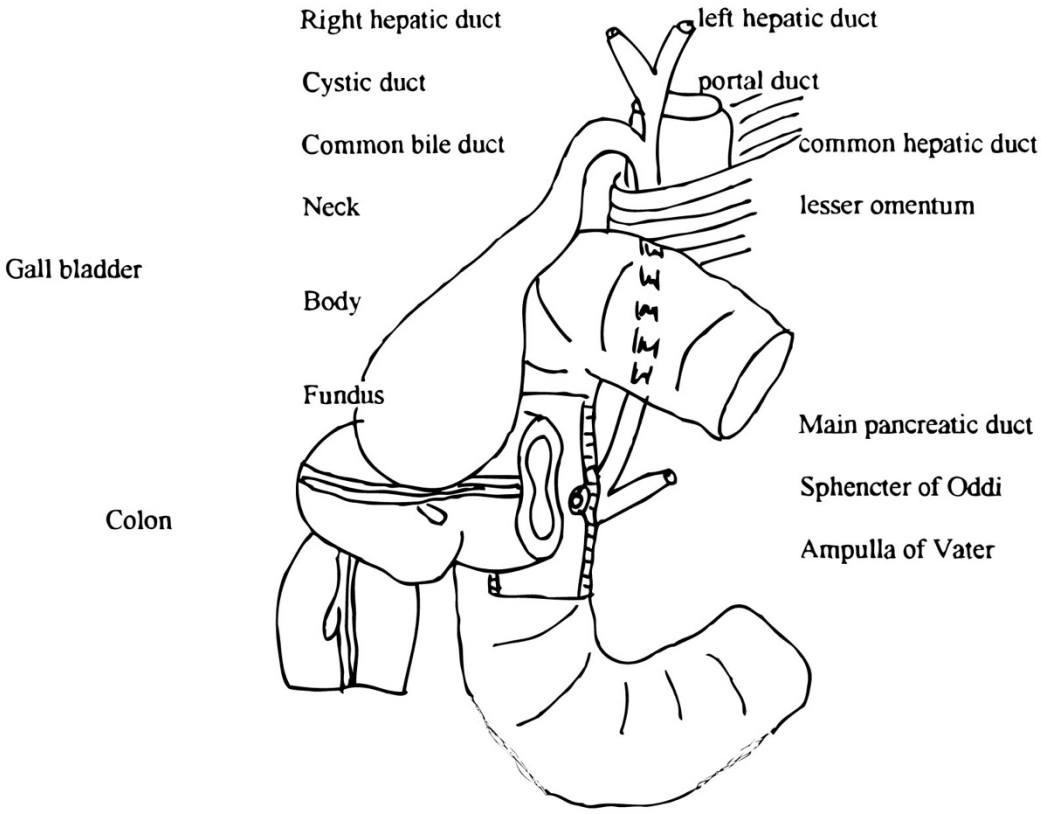
8 - 9' Jejunum (2/5 of remaining 21’)

12-13’ Ileum 3/5 of remaining 21’

Duodenum (12”)
1st inch Intraperitoneal
Hepatoduodenal Ligament (lesser omentum)

(11") Retroperitoneal

*curves around the head of the Pancreas

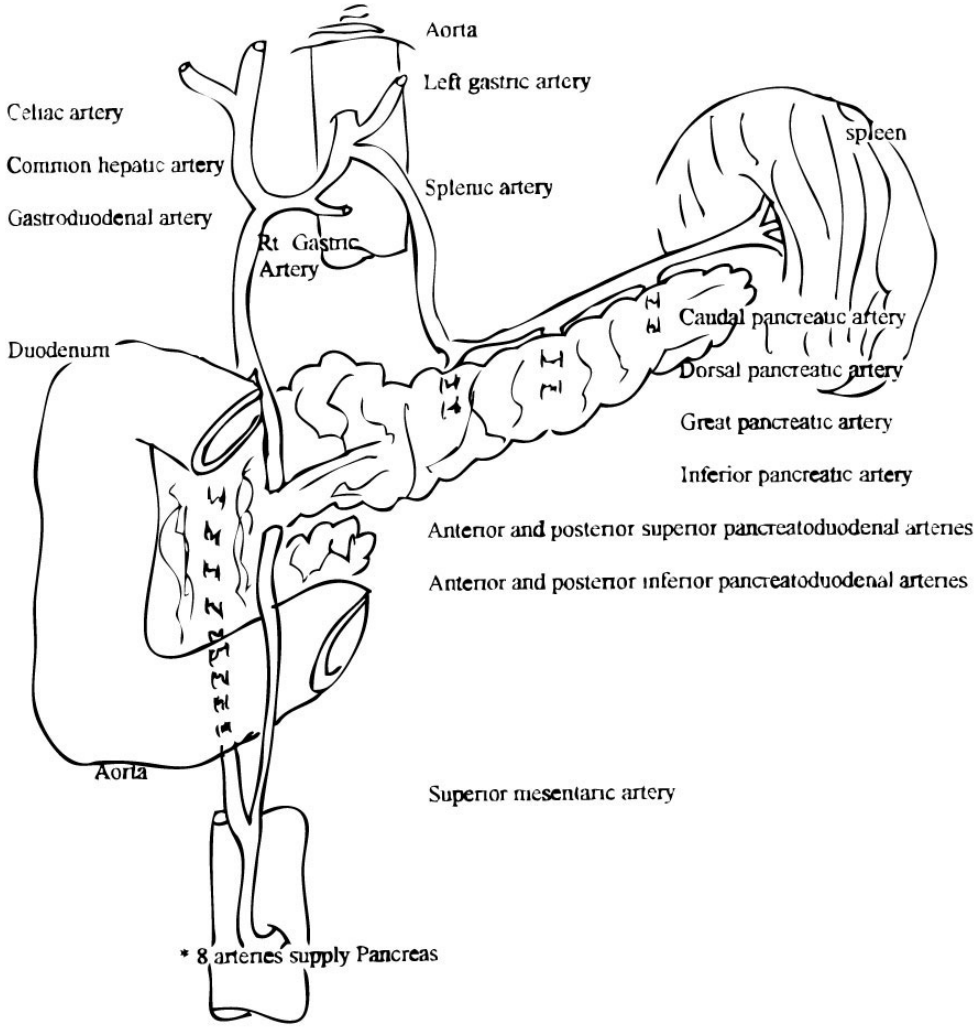


Blood Supply to the Duodenum

Gastroduodenal Artery (off of Common Hepatic Artery)
Anterior and Posterior Pancreatoduodenal Arteries

Superior Mesenteric Artery (off of Abdominal Aorta)
Anterior and Posterior Inferior Pancreatoduodenal Arteries

Blood Supply to the Duodenum and Pancreas



Small Intestine

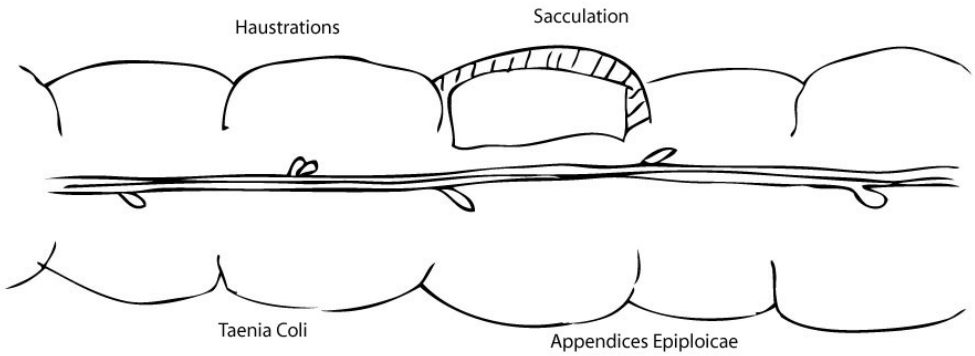
Innervation S T5-9
PS Vagus Nerve

Large Intestine

Approximately 6' long

Divided into many different parts
- Cecum (intraperitoneal)
- Vermiform Appendix (intraperitoneal)
  - Slung in the Mesoappendix
- Ascending Colon (Retroperitoneal)
- Transverse Colon (Intraperitoneal)
  - Slung in Greater Omenturn
  - Transverse Mesocolon

Descending Colon (Retroperitoneal)
Sigmoid Colon (intraperitoneal)
Slung in Mesosigmoid
Rectum (Retroperitoneal)
Anal Canal (Retroperitoneal)



Structures of the Large Intestine

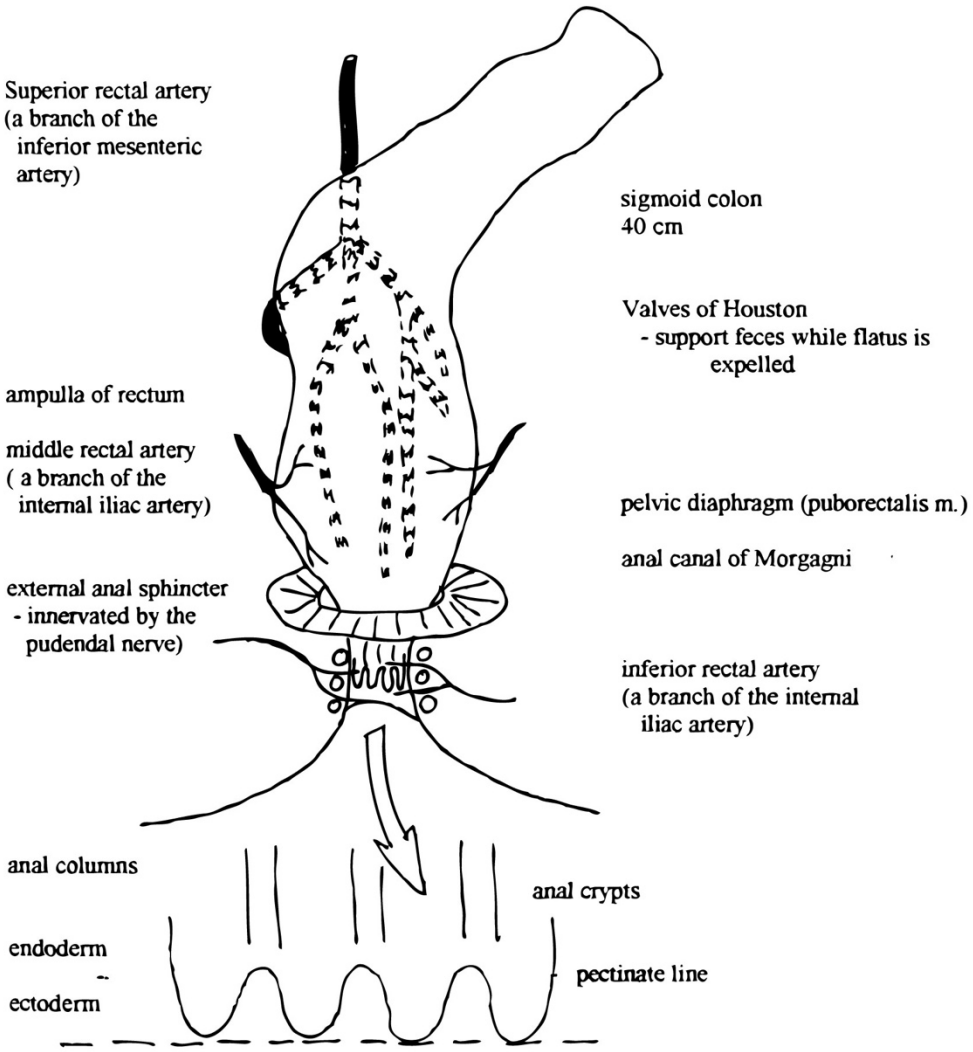
Serosa Layer
Appendices Epoploicae – finger-like fat pads
Taenia coli – 3 longitudinal bands of smooth muscle

Vascularization of Large Intestine
-Superior and Inferior Mesenteric Arteries

The motility of the Large Intestine is correlated with:
1) Heart attack
2) Cancer (of the colon and general cancer)
3) Diverticulitis
4) Hemorrhoids
* 70% of all Americans over 40 have hemorrhoids
* muscles of anal canal and sphincter
5) constipation
6) varicose veins
7) musculoskeletal problems
8) depression

Rectum
Retroperitoneal
Part of the Large Intestine between the Sigmoid Colon and the Anal Canal
= 5 inches (13cm) long

lowest level demarcated by the pelvic diaphragm (Puborectalis Muscle)
(supplied by the Pudendal Nerve S234)



Rectum is empty except during defecation

Hemorrhoids

External Hemorrhoids

Due to portal block or disturbance

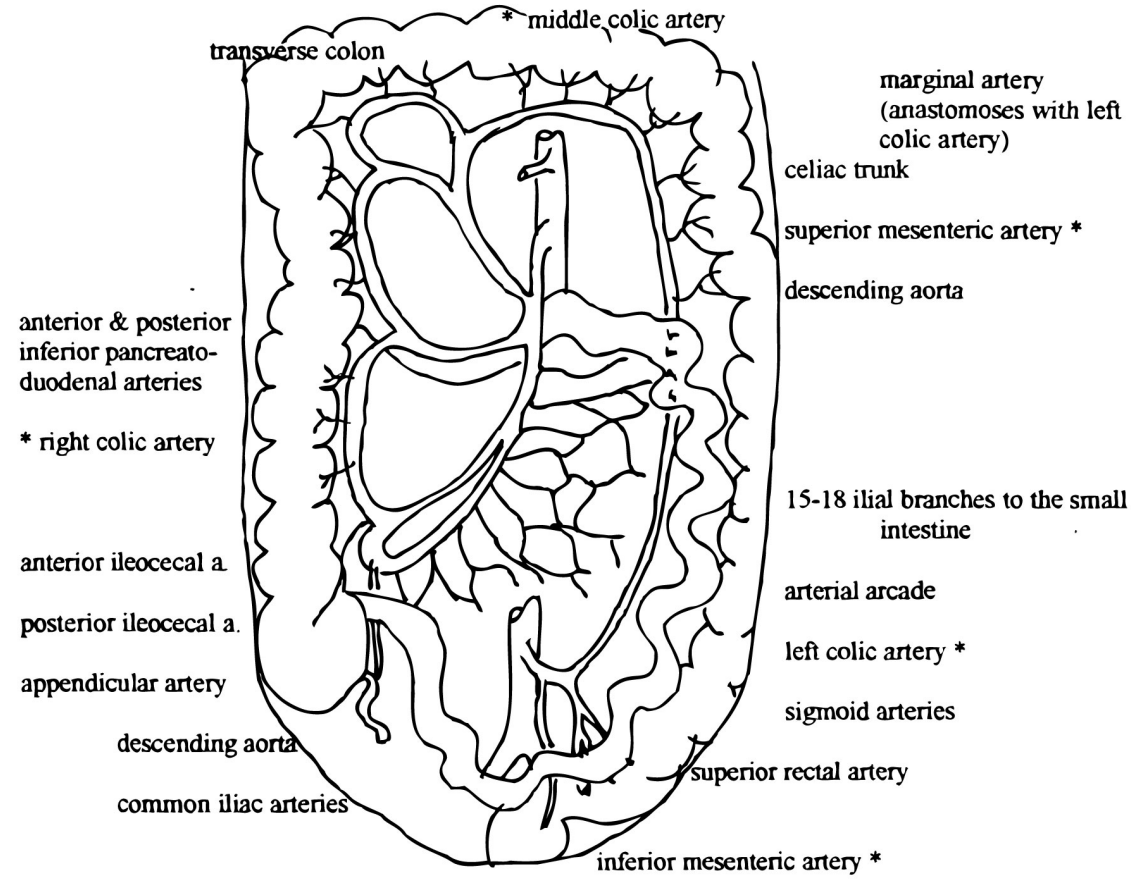
Dilation of Inferior Rectal Veins

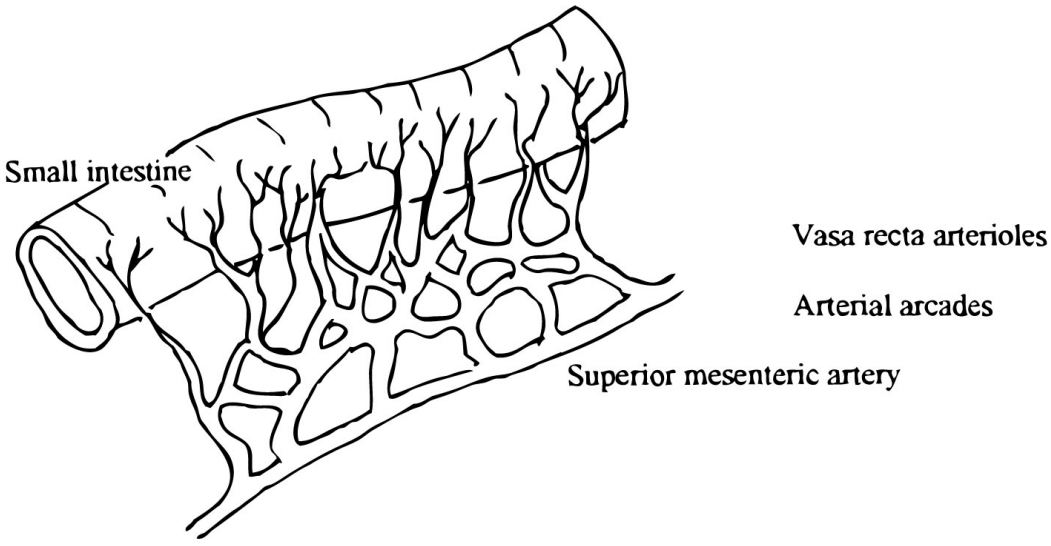
Internal Hemorrhoids

Due to a systemic block or disturbance

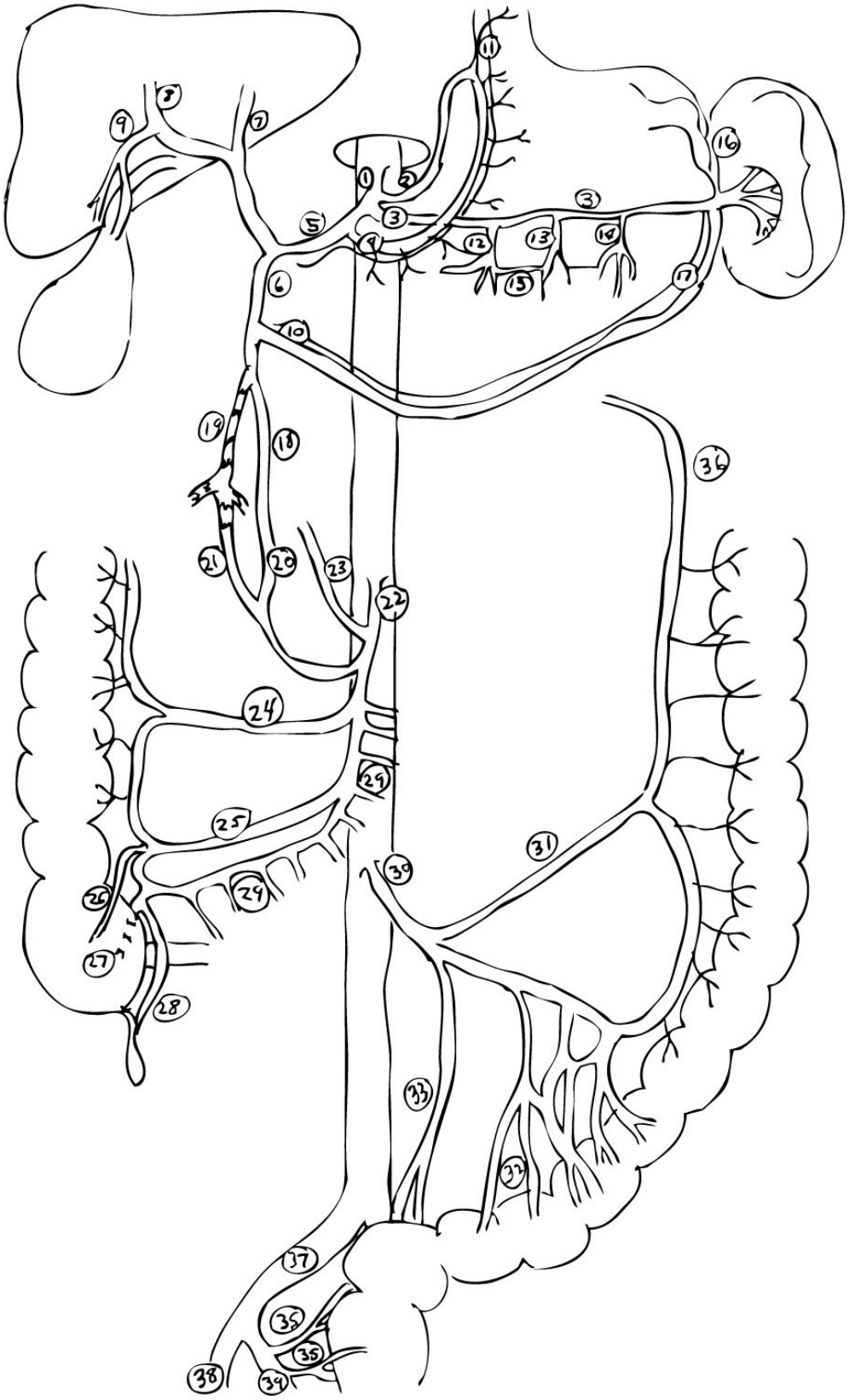
Dilation of Superior Rectal Veins

Vascularization of Small and Large Intestine





Arterial Supply of the Abdomen



Abdominal Arteries

1. celiac trunk
2. left gastric artery
3. splenic artery
4. right gastric artery
5. common hepatic artery
6. gastroduodenal artery
7. left hepatic artery
8. right hepatic artery
9. cystic artery
10. right gastroepiploic artery
11. esophageal branches
12. great pancreatic artery
13. dorsal pancreatic artery
14. caudal pancreatic artery
15. inferior pancreatic artery
16. short gastric arteries
17. left gastroepiploic artery
18. anterior superior pancreatoduodenal artery
19. posterior superior pancreatoduodenal artery
20. anterior inferior pancreatoduodenal artery
21. posterior inferior pancreatoduodenal artery
22. superior mesenteric artery
23. middle colic artery
24. right colic artery
25. ileocecal artery
26. anterior ileocecal artery
27. posterior ileocecal artery
28. appendicular artery
29. 8-18 intestinal arteries
30. Inferior mesenteric artery
31. left colic artery
32. sigmoid artery
33. superior rectal artery
34. middle rectal artery(35)
35. inferior rectal artery
36. marginal artery
37. common iliac artery
38. external iliac artery
39. internal iliac artery

Spleen

develops from Mesoderm
largest single mass of lymphoid tissue in the body
decreases in size with age
normal weight = 6 ounces

malaria can cause Splenomegaly where the spleen weighs 20 pound or more

Located between ribs 9, 10, 11 (left side)

Blood Flow to Spleen

celiac trunk - splenic artery - spleen - splenic vein- portal system- liver

Relationship to Stomach

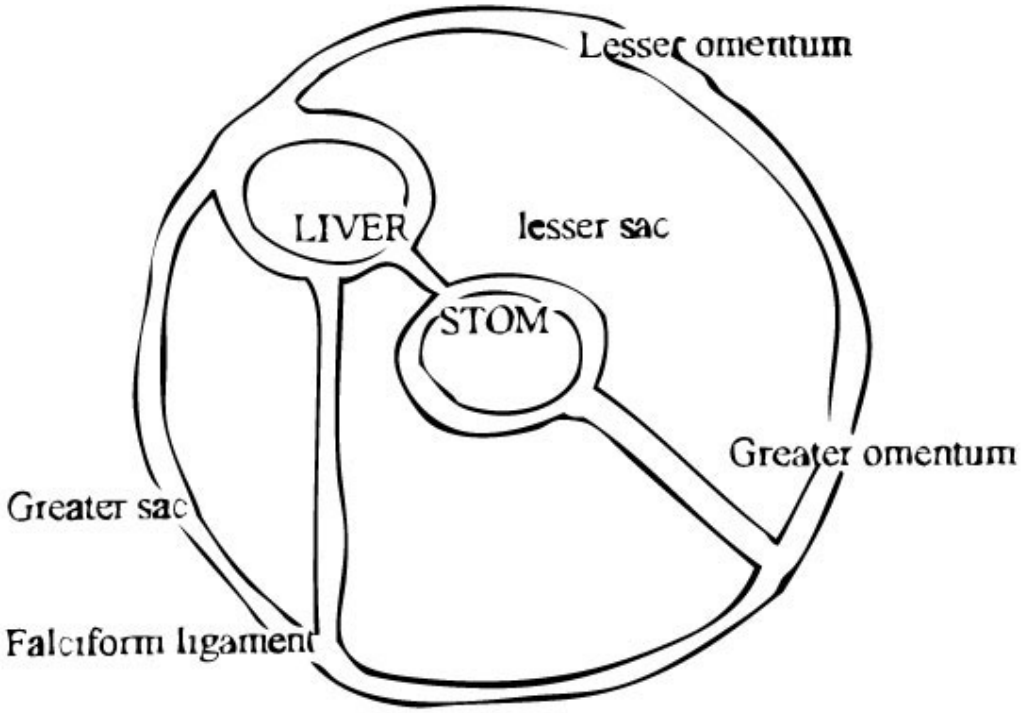
gastrolienic artery and ligament

vascular supply shared

Spleen is Intraperitoneal

lienogastric Ligament (Gastrosplenic Ligament)

lienorenal Ligament



Adult

LIVER

Liver is the largest and the heaviest organ in the body

Located in the right hypochondrium

Intraperitoneal.
Surrounded by a capsule
Capsule of Glisson
Blood supply to the liver
1) Hepatic artery (oxygenated blood)

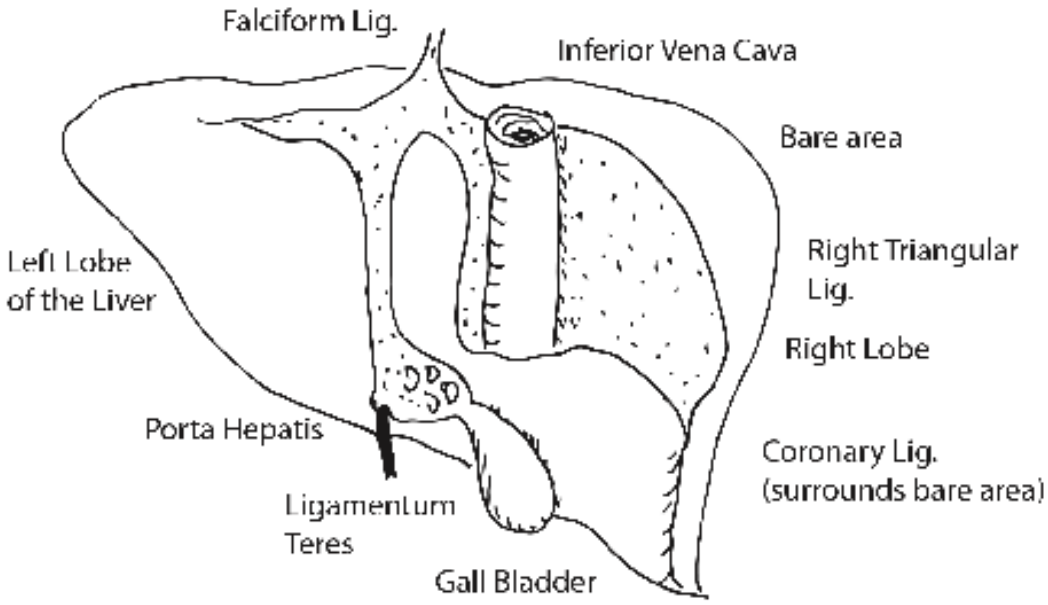
2) Portal vein (venous blood)
Portal blood - Sinusoids – Hepatocytes

Mesenteric Connections
Lesser Omentum
transmits vessels to Porta Hepatis

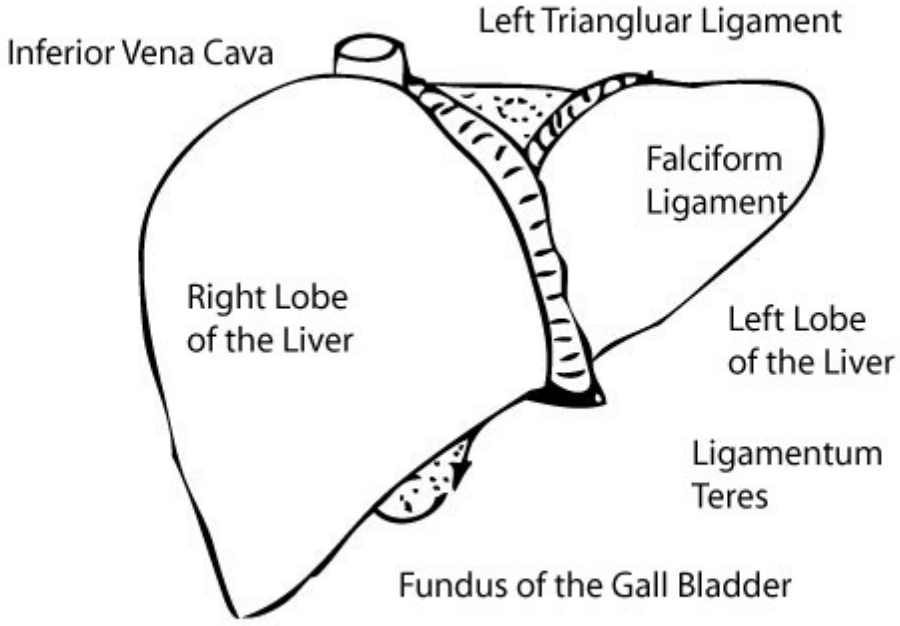
Porta Hepatis (gate of liver) transmits
1) Bile Duct

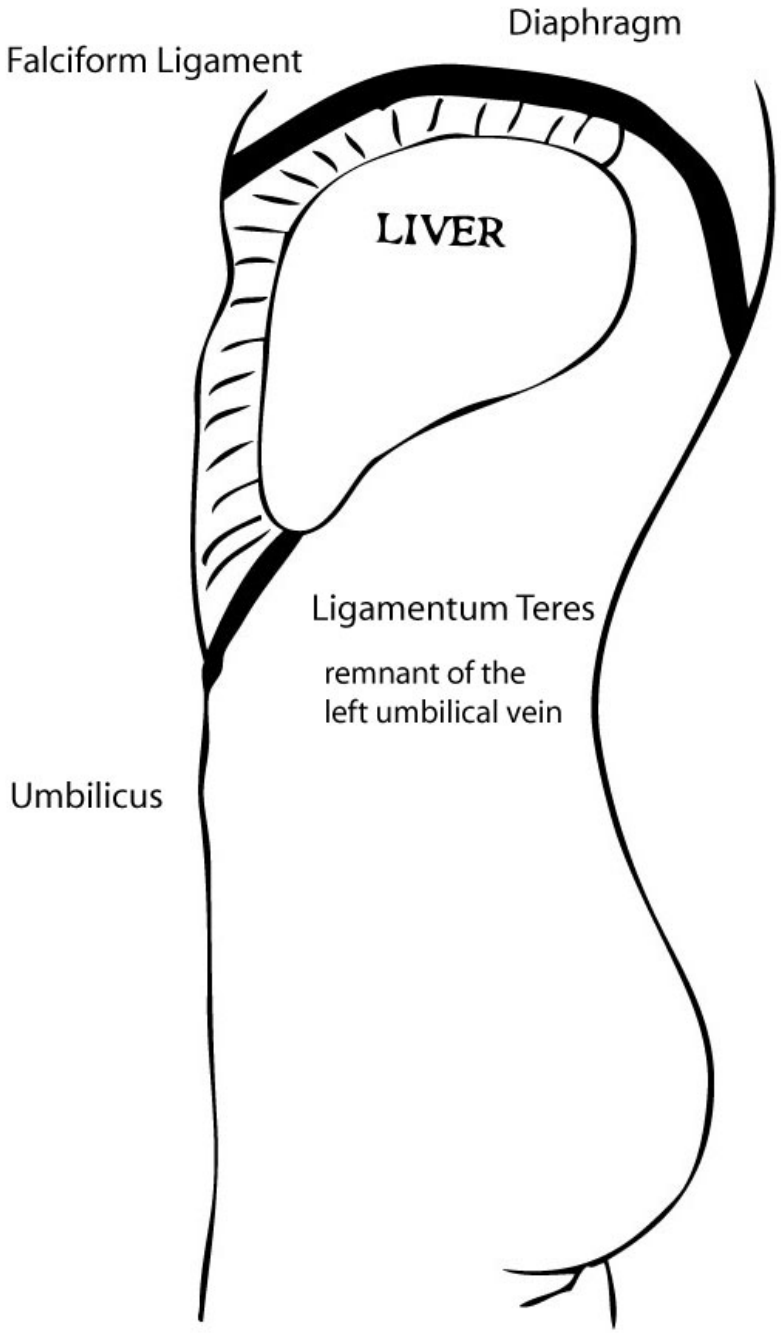
2) Hepatic Artery

3) Portal vein



Anterior View





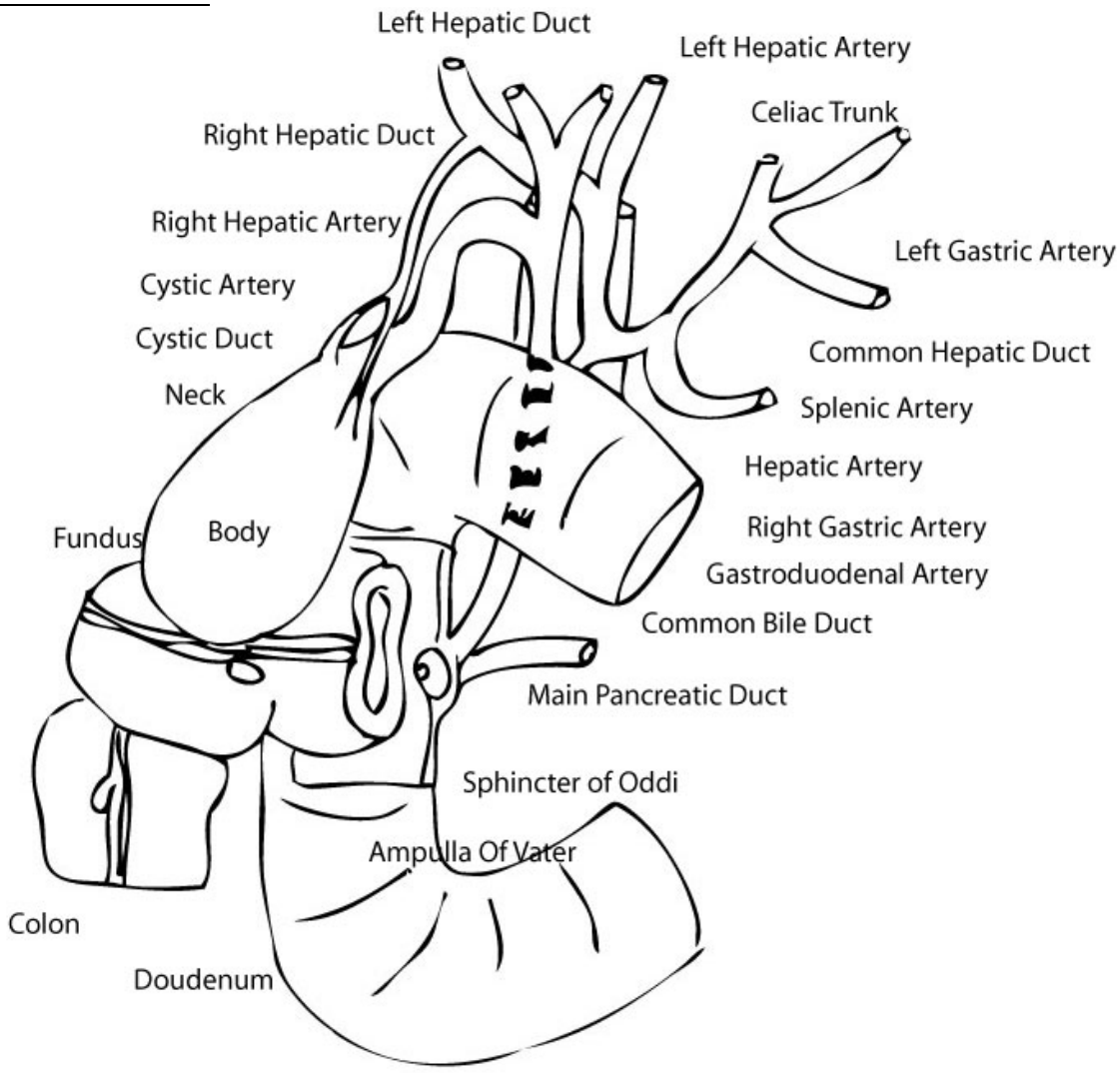
Falciform ascends and then splits into two layers

1) the right layer forms the upper layer of the coronary ligament
2) the left layer forms the upper layer of the left triangular ligament

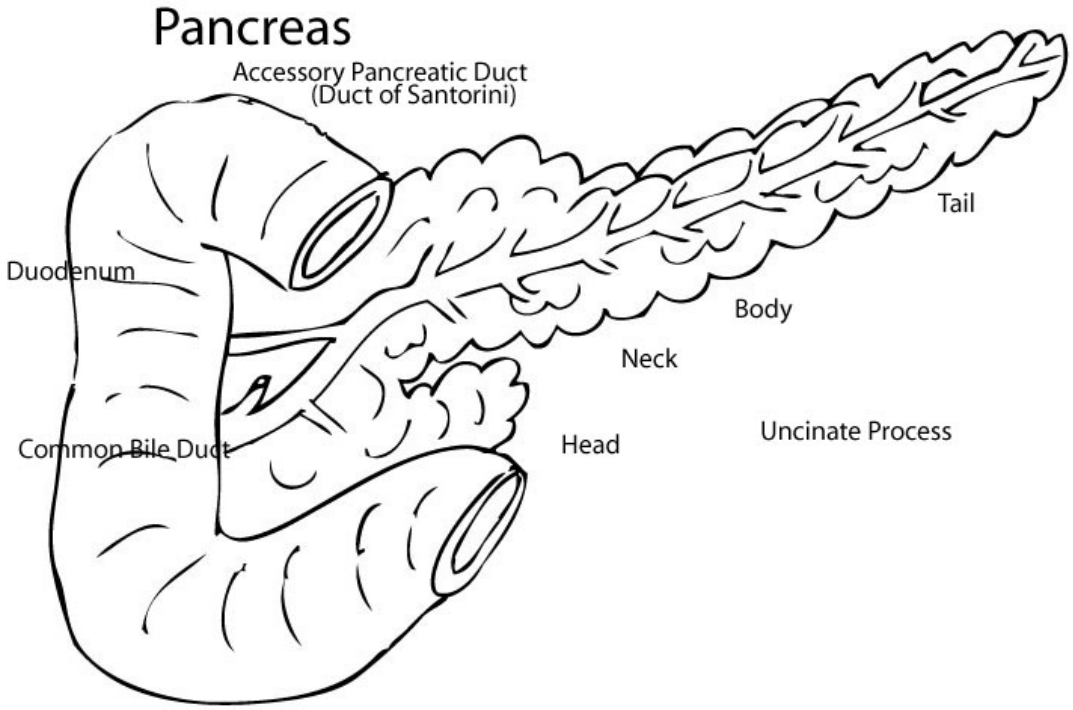
Nerve supply to liver

S	T5-T9
PS	Vagus

GALL BLADDER



PANCREAS
Retroperitoneal (relatively immovable)



PORTAL VEIN

has no valves so blood can flow both ways

a portal block causes more blood to flow through systemic system

Portal block of

a) Left Gastric Vein

- Drains into portal vein

- Drains into accessory and hemiazygous veins (systemic) -

  * blockage causes internal hemorrhage

b) Inferior Rectal Vein

- (systemic) - internal pudendal vein - internal iliac vein -common Iliac vein - IVC - heart

- (Portal) - superior rectal vein

-blockage causes inferior rectal vein to swell and lose tone thus causing external hemorrhoids

c) Veins surrounding Umbilicus

-(systemic) - epigastric veins

-(Portal) - portal veins around umbilicus

Portal Hypertension

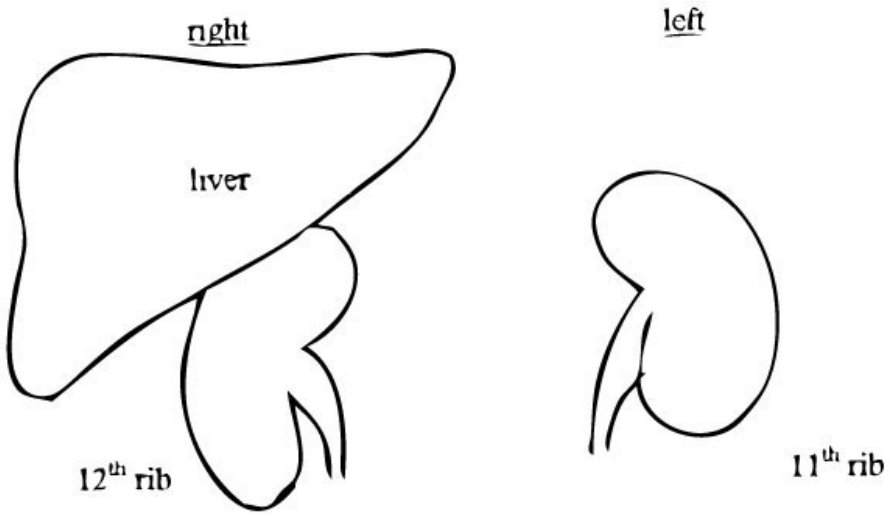
- Portal blood pressure goes up (normal BP = 10 mm Hg)

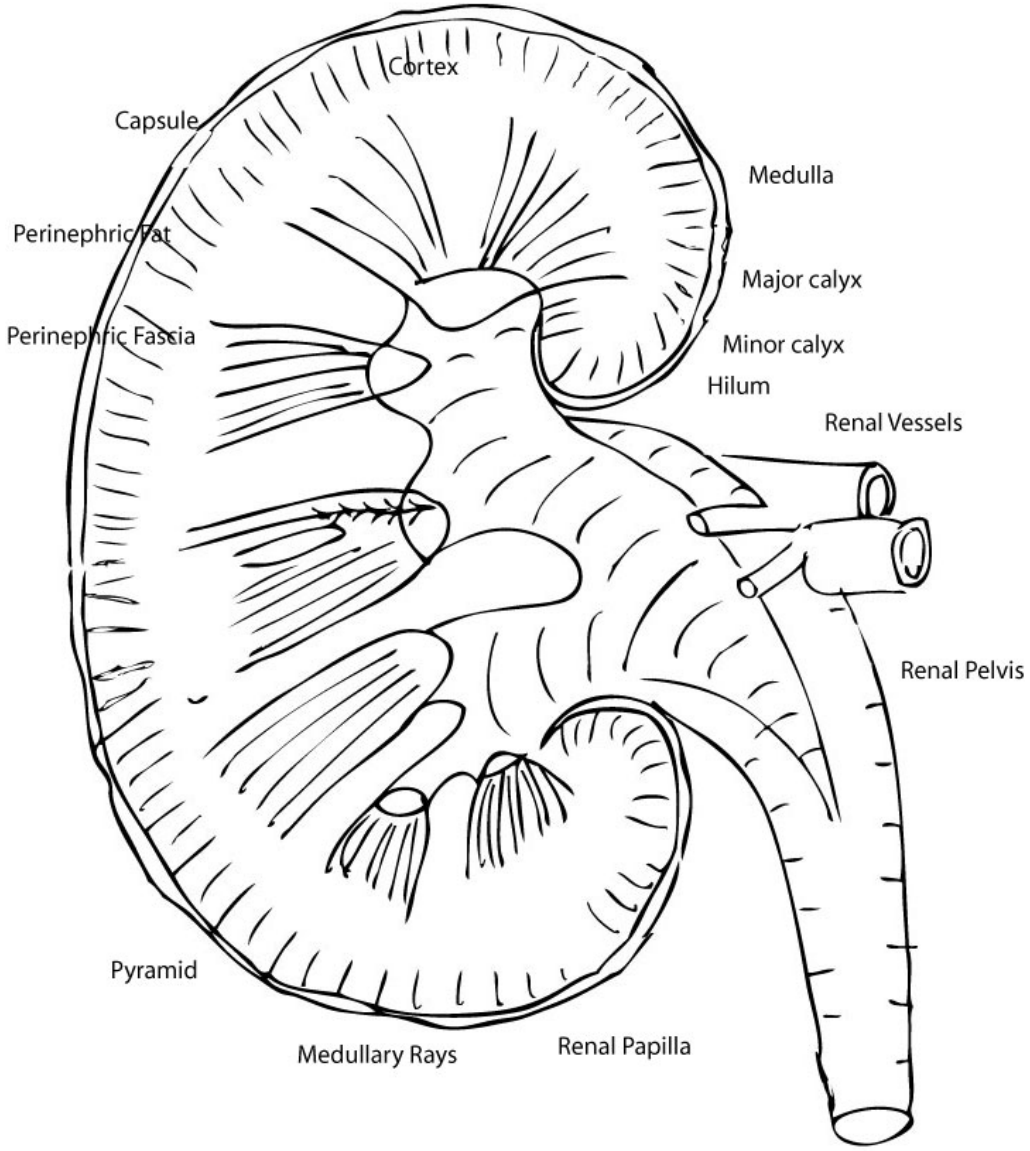
URINARY TRACT

Kidneys
Ureters
Bladder
Urethra

Kidneys

Retroperitoneal
Capped by the Adrenal glands
Enclosed in a capsule
Embryonic formation
3 paired kidneys appear in posterior of body
cervical
thoracic
pelvic
First two pair disappear and lower pair migrate upward





Cortex

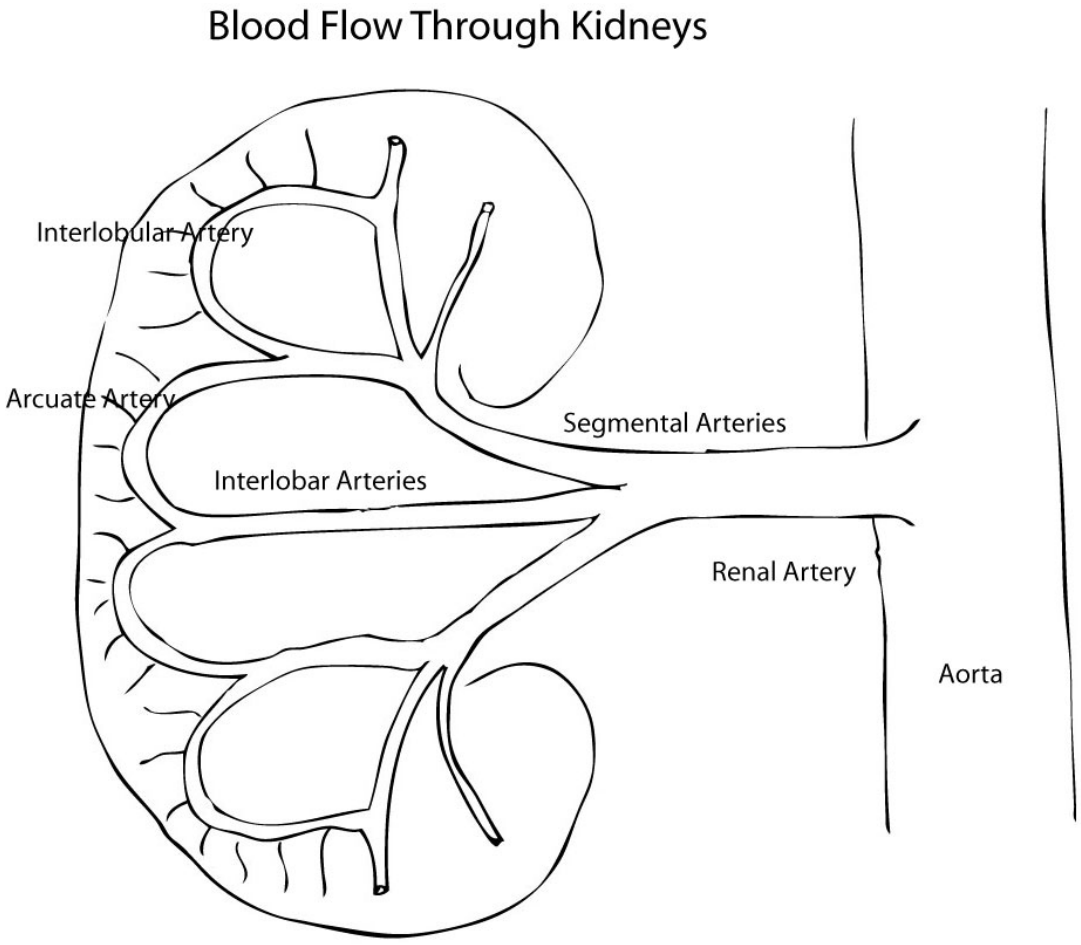
- Medullary rays
- Renal columns

Medulla

Pyramids	7 - 12 / kidney
Major calyces	3 - 5 / kidney
Minor calyces	3-5/ major calyces

Renal pelvis

Hilum
Renal Pelvis
Renal artery and vein
Ureter
- Retroperitoneal
-Composed of smooth muscle (peristalsis)
-Sensory nerves T9 - L3
-Bloods supply- testicular artery or ovarian artery



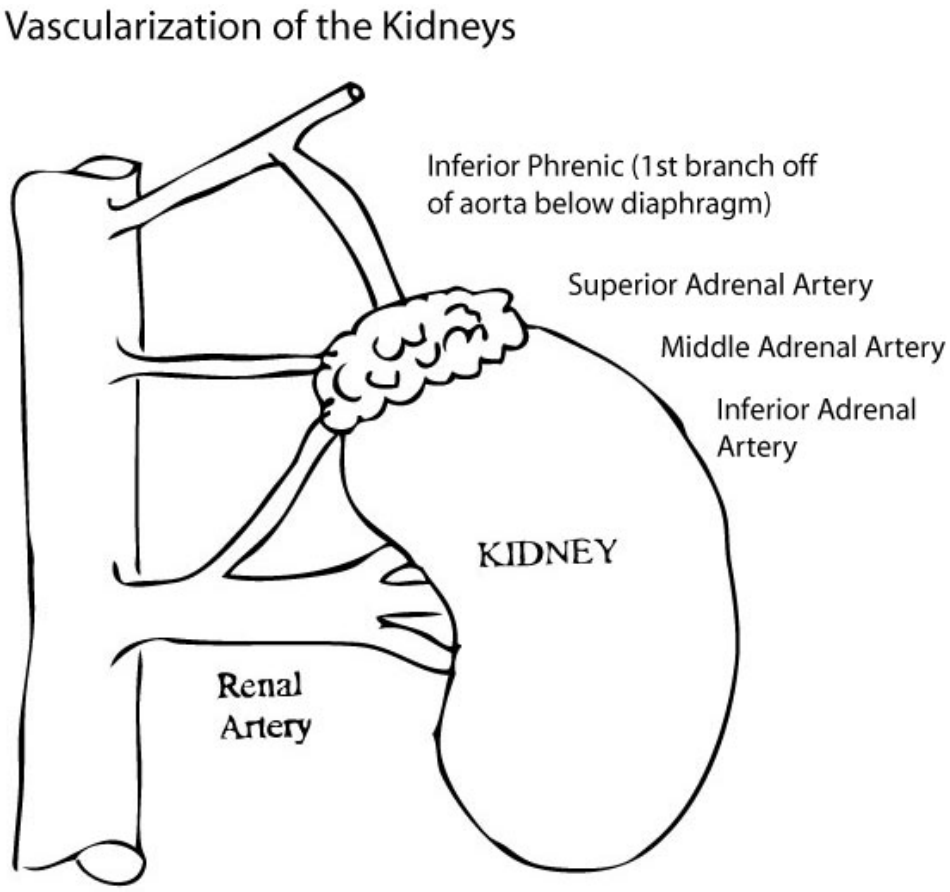
Medulla
S pregg fibers of lesser splanchnic, nerve T10, T11

Kidneys and Adrenal glands lie against posterior abdominal wall just below posterior aspect of diaphragm.

Innervation of Kidney

S	- T10, T11	Lesser Splanchnic Nerve
PS	- T12, L1	Least Splanchnic Nerve Vagus nerve

ADRENAL GLAND



Muscles of Posterior Abdominal Wall
- Quadratus Lumborum
- Psoas Major
- Psoas Minor
- Iliacus

Quadratus Lumborum Muscle

Origin	Iliolumbar ligament, Posterior Iliac crest
Insertion	12th rib, TP's L 1 - L4
Nerve supply	L2- L3
Action	depress 12th ribs, Aids in lateral flexion of trunk
Blood supply	iliolumbar artery

Psoas Major Muscle

Origin	TP's bodies, and IVD's L 1 -L5
Insertion	with iliacus into lesser trochanter of femur
Nerve	L2, L3
Action	Flexes thigh
	Flexes vertebral column
Blood supply	iliolumbar artery

Psoas Minor Muscle

absent in 50% of the population

Origin	bodies of T12 and L1 and the disc in between
Insertion	pectincal line of pelvis
Nerve	L1, L2
Action	Flex pelvis
Blood supply	iliolumbar artery

Iliacus muscle

Origin	iliac fossa, Iliac crest
	Anterior SI ligament
	Lumbosacral ligament
	Iliolumbar ligament
	Sacral attachment to the ala
Insertion	with psoas major muscle into lesser trochanter of femur
Nerve supply	L2, L3
Action	Flex thigh
Blood supply	iliolumbar artery

Pelvic Cavity

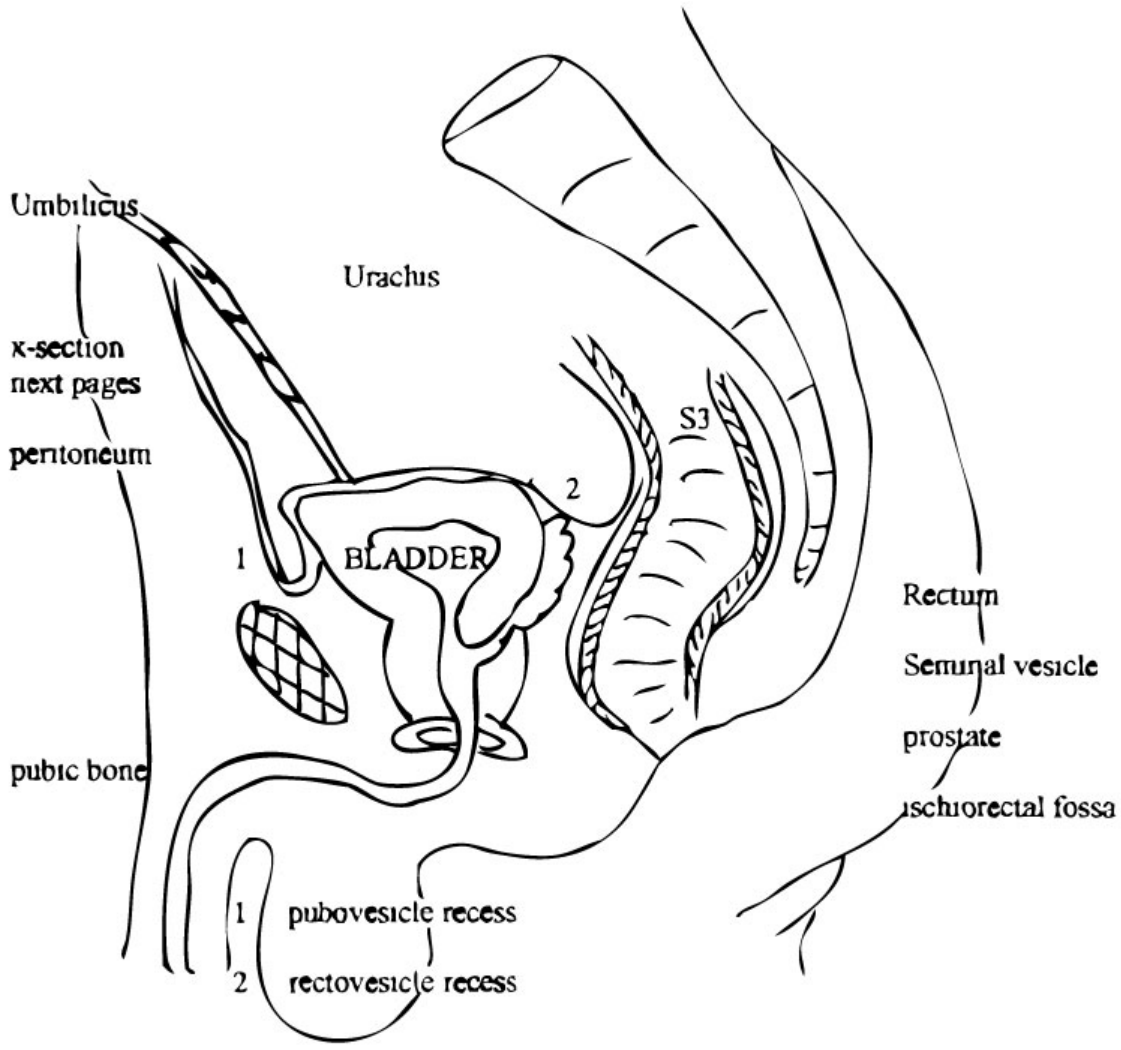
- True
- False

True pelvis in the female contains

- Rectum
- Bladder
- Uterus
- Vagina

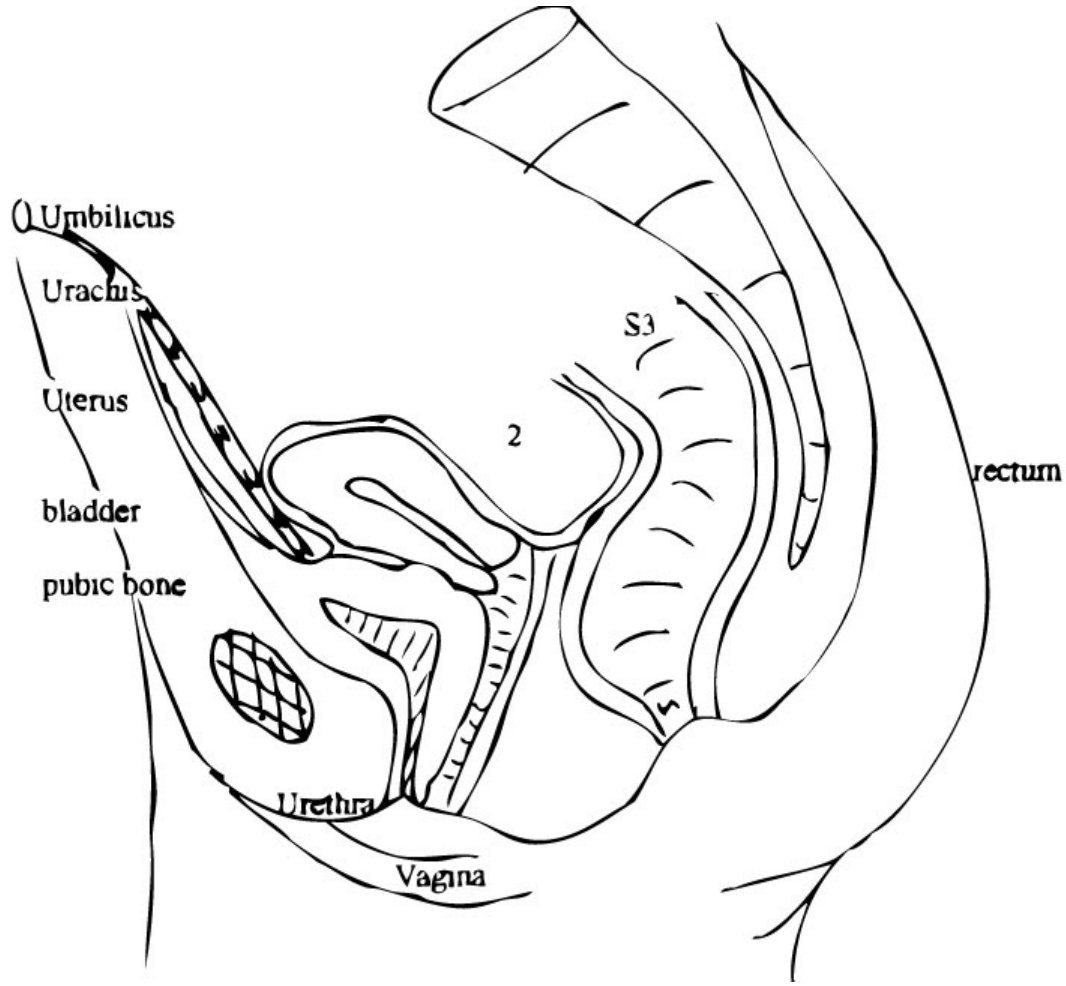
True pelvis in the male contains

- Rectum
- Bladder
- Seminal vesicle
- Prostate



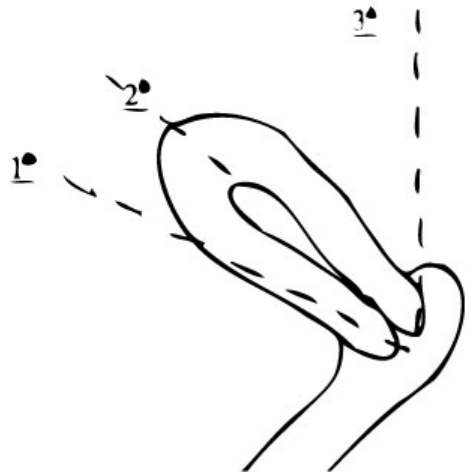
1. Anterior Recess (Vesicouterine recess, anterior cul-de-sac
   Lined by the anterior uterine ligament (vesicouterine ligament) which extends from the bladder to the uterus

2. Posterior Recess (rectouterine pouch, posterior cul-de-sac, Pouch of Douglas) lined by the posterior uterine ligament (rectouterine ligament) which runs between the rectum and the uterus.

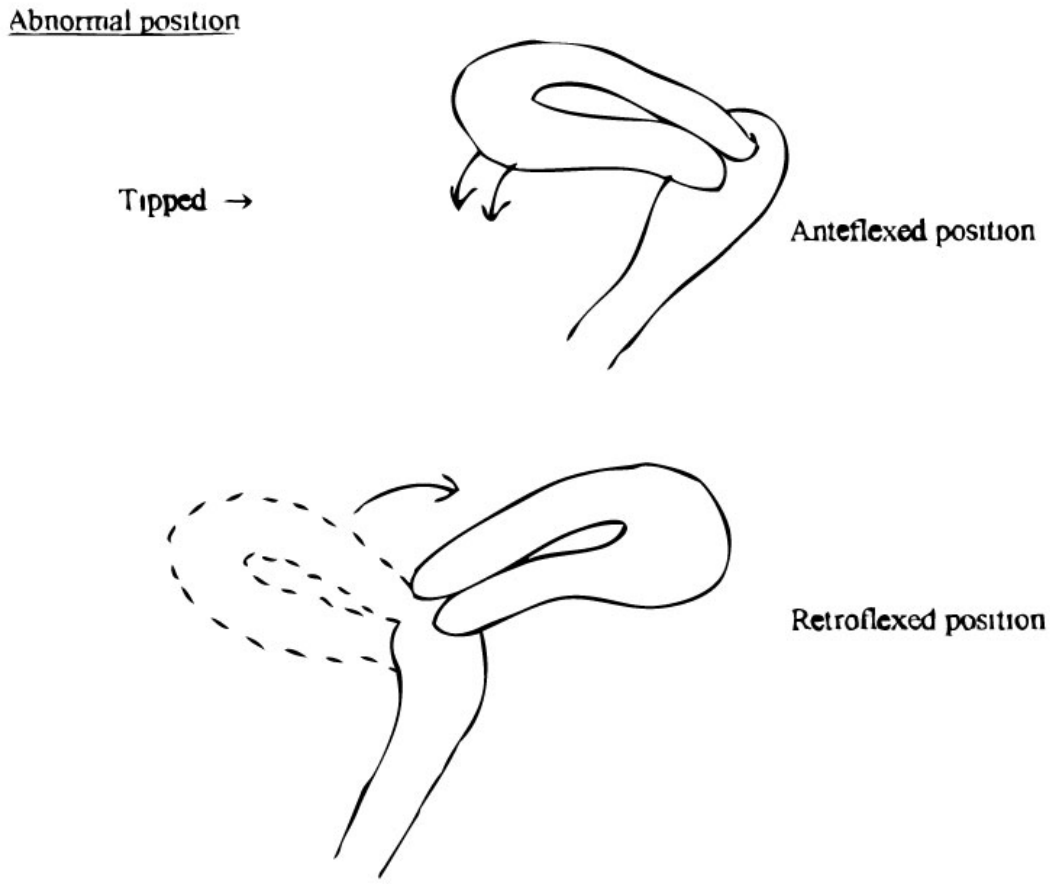


Uterus

Normal position



anteversion
retroversion



Muscles Lining the Pelvic Cavity

Posterior wall

piriformis muscle

coccygeus muscle

(Ishio) Coccygeus muscle

Origin	ischial spine
Insertion	sacrum, coccyx
Nerve	pudendal nerve
Action	abduction or flexion of coccyx
Blood supply	internal pudendal artery

Lateral wall

Obturator internus muscle

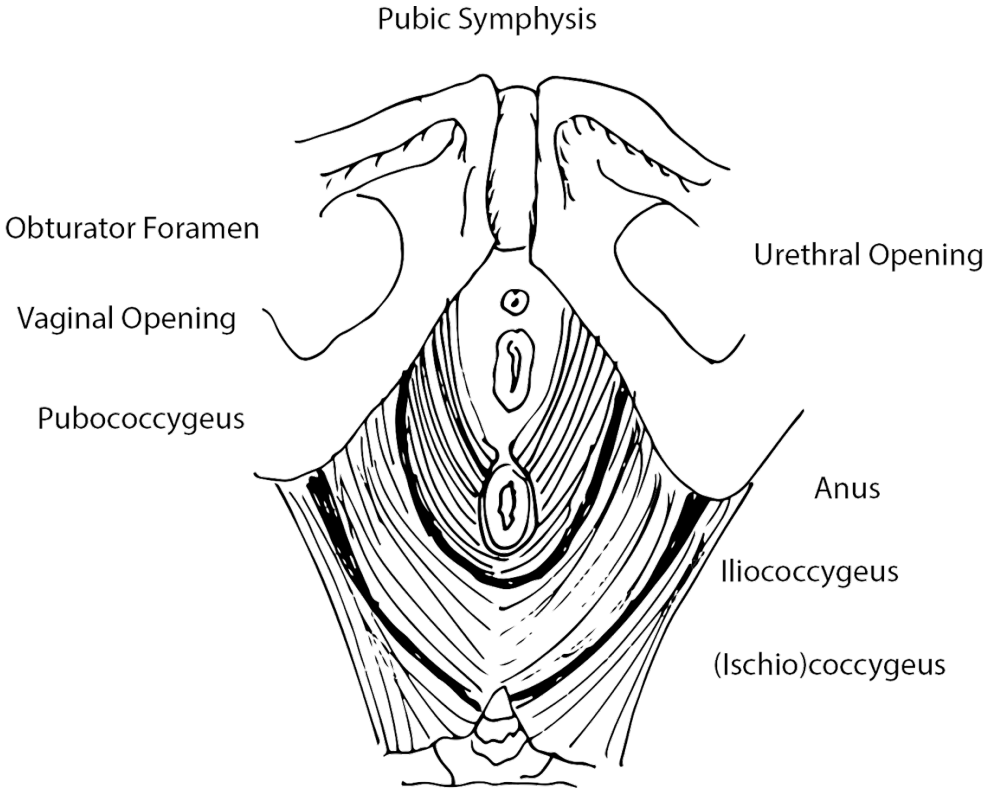
Floor

Pelvic diaphragm

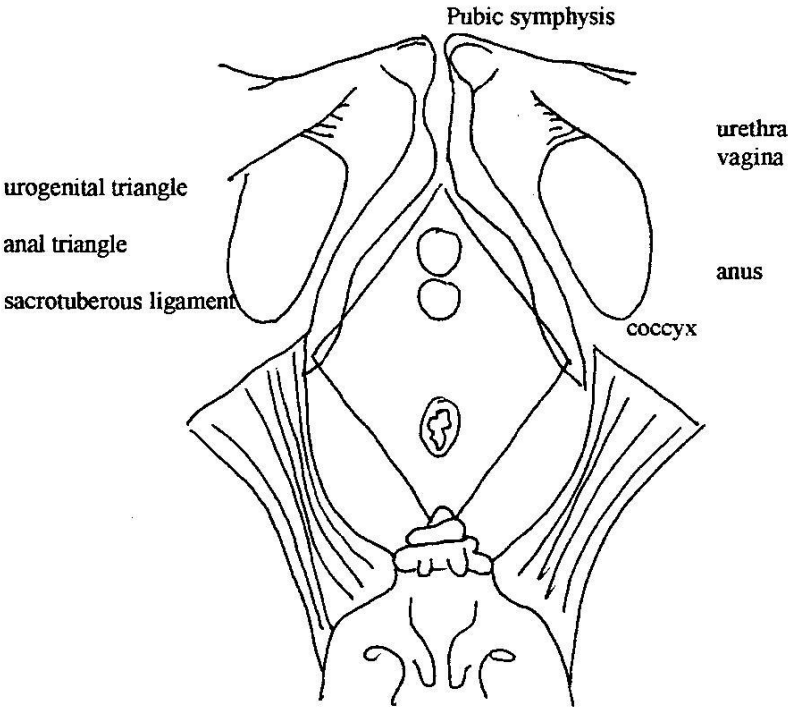
coccygeus muscle

levator ani muscle
*puborectalis muscle (sling muscle)
*pubococcygeus muscle
*iliococcygeus muscle

* All innervated by the perineal branch of the pudendal nerve

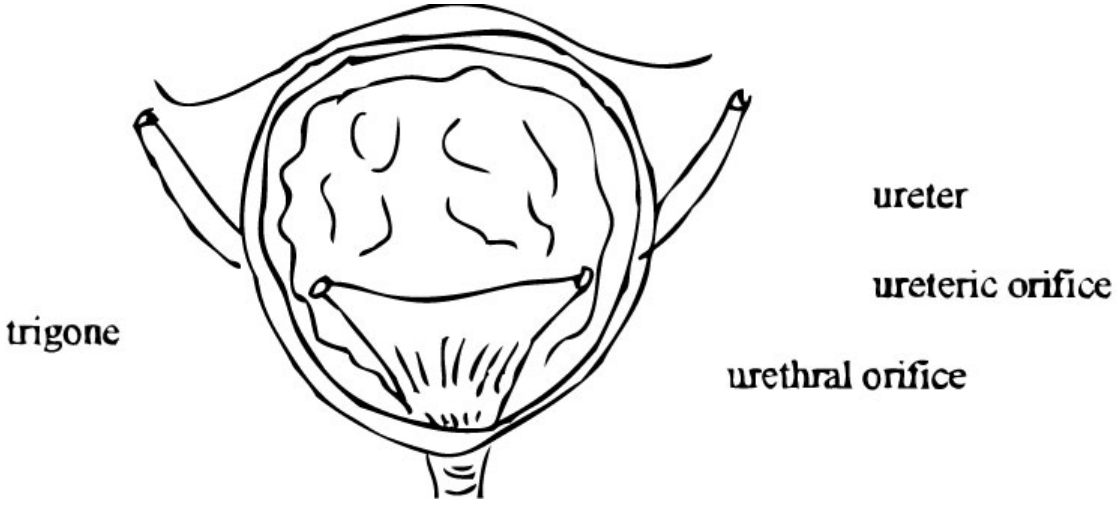


Pelvis Inferior to Pelvis Diaphragm Perineum



Bladder

- Function - store urine delivered from the kidneys
- Pyramid shaped
- Stretchable due to transitional epithelium
- Contains smooth muscle
- Retroperitoneal
- Mucous membrane of the empty bladder is thrown into folds except for one area that remains smooth all of the time.



• Urachus

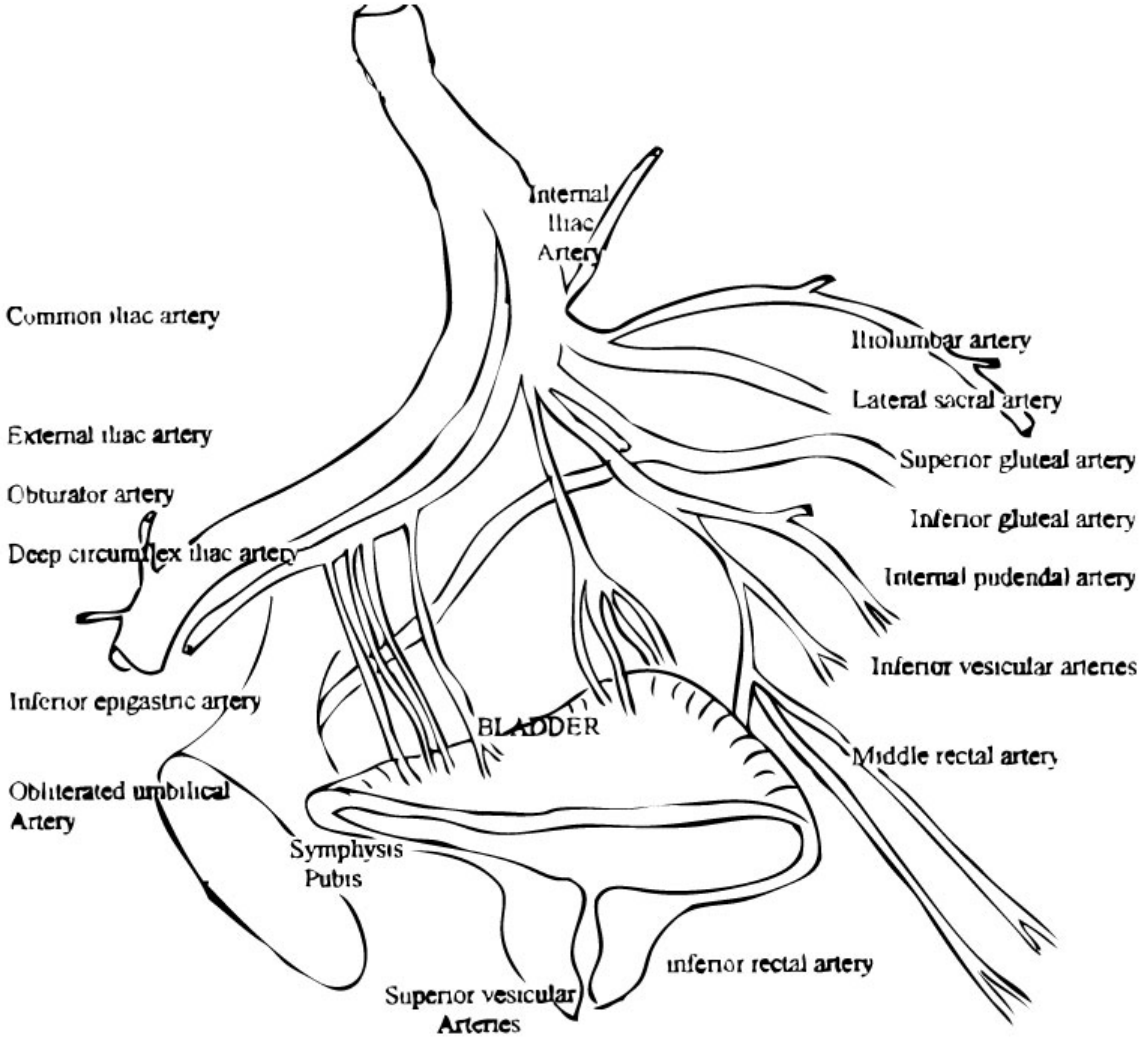
a fibrous cord (remains of the Allantois) which passes upward in the extraperitoneal fat to the umbilicus, forming the median umbilical ligament.

• Blood supply-Superior, middle, and inferior vesicular arteries (off of internal iliac artery)

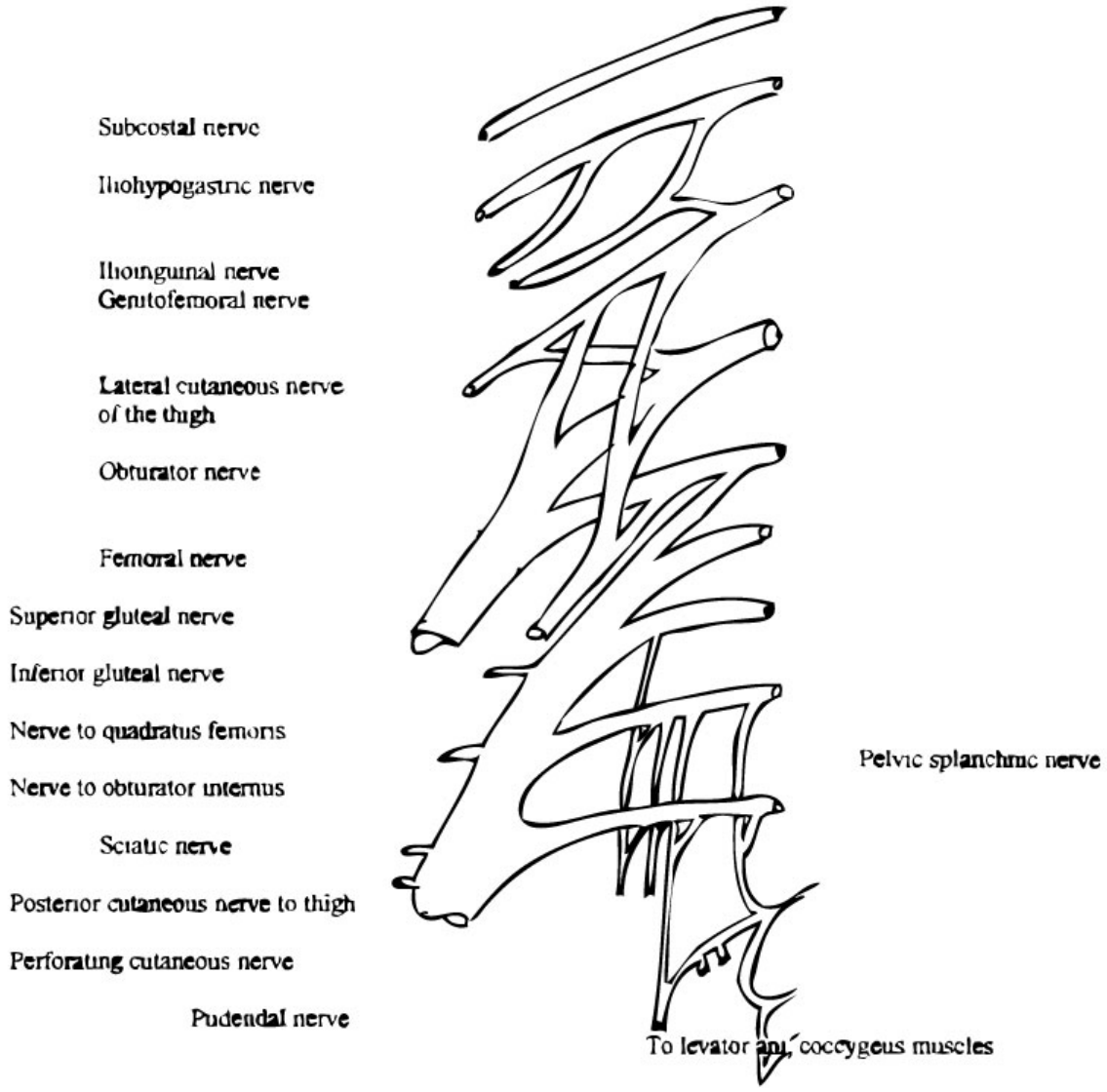
In male -inferior vesicular artery also supplies the prostate

• Nerve supply- Pelvic plexus S and PS (causes contraction)

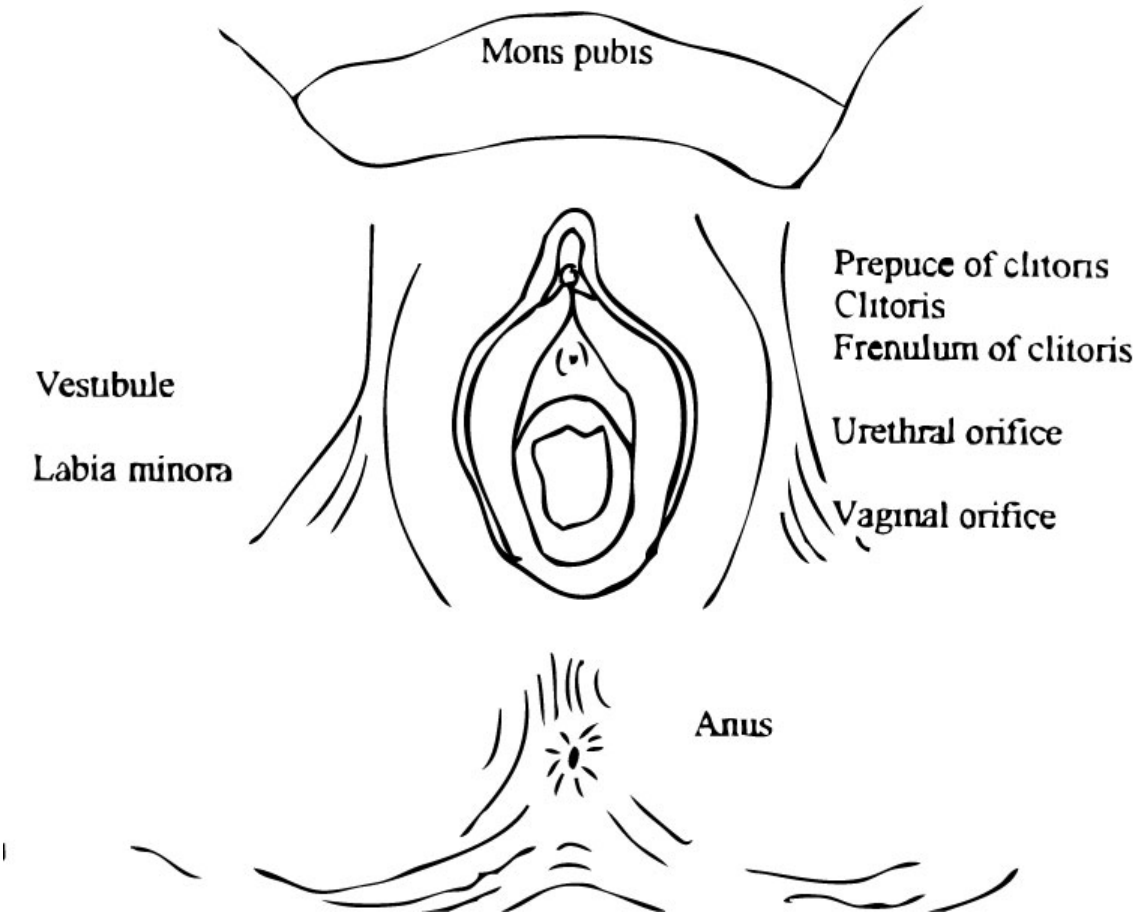
Branches of the External and Internal Iliac Arteries



Lumbosacral Plexus



FEMALE EXTERNAL GENITALIA



Vulva

1) Mons pubis
   contains fat, sweat glands, sebaceous glands

2) Labia majora (labium majorus pudendi)
   homologous to the scrotum
   termination of the round ligament (analogous to the spermatic cord)

3) Labia minora
   contains no fat-homologous to the corpus spongiosum in the male

4) Vestibule
   clitoris
   urethral orifice
   vaginal orifice

3 Intraperitoneal Ligaments form Broad Ligament

1) mesometrium- to uterus

2) mesovarium- to ovary

3) mesosalpinx- to fallopian tubes

Fimbria of fallopian tubes are open in the body cavity
The discharged ovum must travel through the peritoneal cavity before it reaches the fallopian tube.

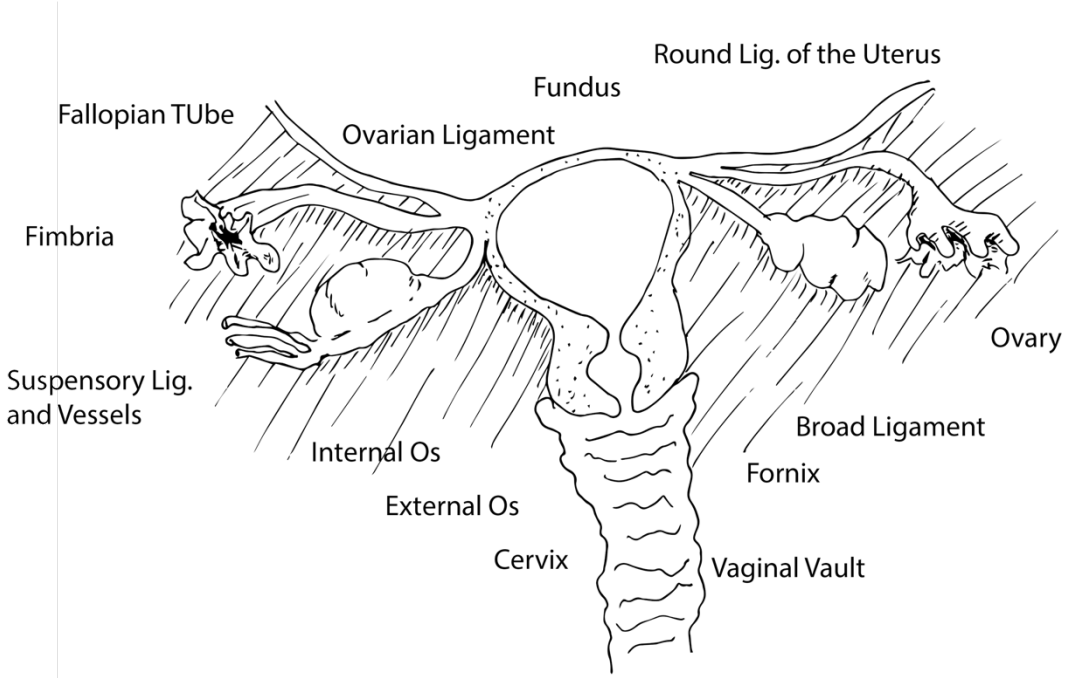
Uterus
intraperitoneal (blanketed by broad ligament)

Cervix
an extension of the uterus into the vagina
composed of 3 parts
1) Internal os
2) external os
3) fornix
surrounds the wall of the cervix within the vagina

Broad Ligament
blanket covering the uterus and surrounding structures except for fimbriated end of uterine tube

composed of 3 parts

uterus	mesometrium
ovary	mesovarium
uterine tube	mesosalpinx



Vestibule

1) Clitoris

similar to a miniature penis

2 corpora cavernosa- fill with blood during erection

prepuce

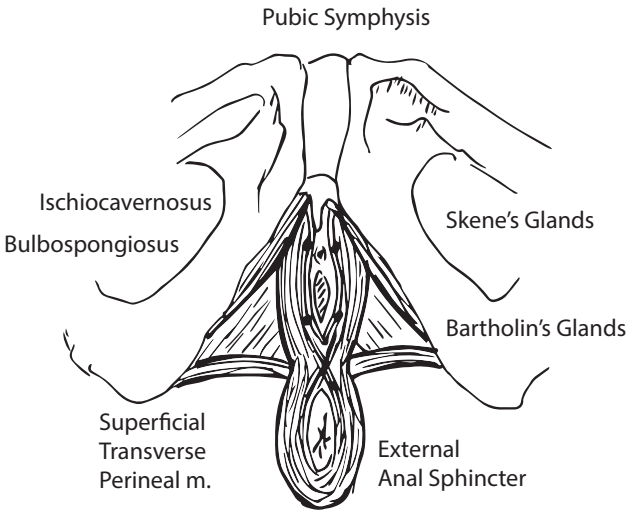
outer skin containing corpora cavernosa frenulum

2) Urethra

(Female 3 - 5 cm long)
(male 20 cm long)

3) Vagina

hymen - thin mucosal fold over vagina



Blood Supply to Female Genital
External and internal pudendal arteries (off external and internal iliac arteries)

Innervation
A) Labia majora and minora - ilioinguinal nerve (L I) (anterior labial nerve)
-Pudendal nerve (posterior labial nerve)

B) Clitoris
- dorsal nerve of clitoris (off pudendal nerve)
- PS- S234
- nervi erigentes- for engorgement of blood
- S- L1, L2, (L3) for orgasm

Male External Genitalia
Penis
- root of the penis
-bulb and crura
-body of the Penis
-shaft
-corpus spongiosum
-forms the corona glandis (glans penis)
-contains the urethra
-corpus cavernosum (right, left)
-fills with blood during erection
-connected to and surrounded by the Tunica Albuginea

Dorsal nerve and artery of Penis

Fossa navicularis
- dilation of the urethra

Deep veins

Skin

loose, elastic, dark

foreskin (prepuce) overhangs the glans penis
-Removed by circumcision

Phimosis
Foreskin around glans penis is constricted possibly obstructing Urination

Smegma.
Sebaceous secretions occurring about the scrotum and penis

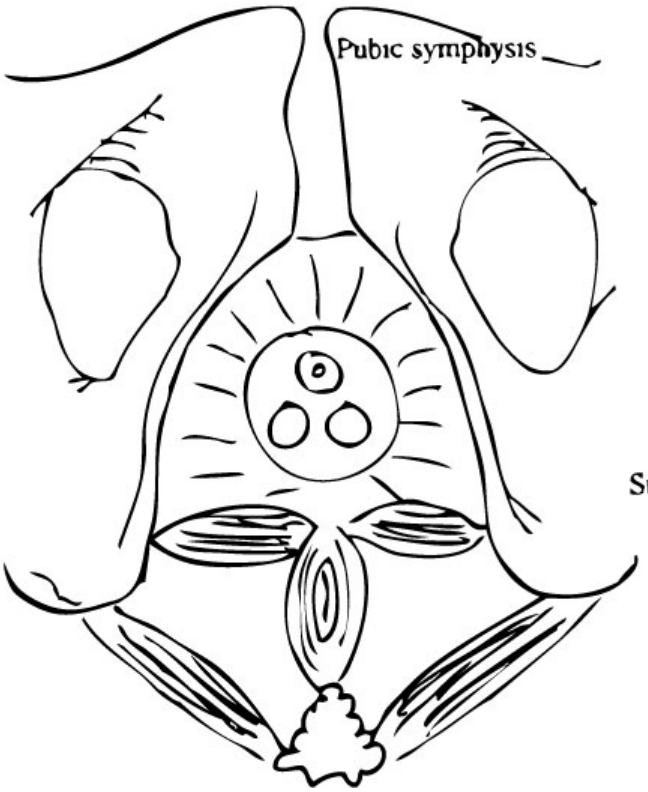
Hypospadius-
Urethra opens on the underside of the penis or on the perineum.

Blood supply to the penis- external and internal pudendal arteries

Venous drainage- great saphenous vein

Innervation of Penis

-pudendal nerve - S234 dorsal nerve of penis mechanical stimulation
-Pelvic nerve - PS S234 (nervi erigentes)-* for engorgement of blood
-S - LI L2- Orgasm



Urogenital diaphragm

Corpus spongiosum with urethra

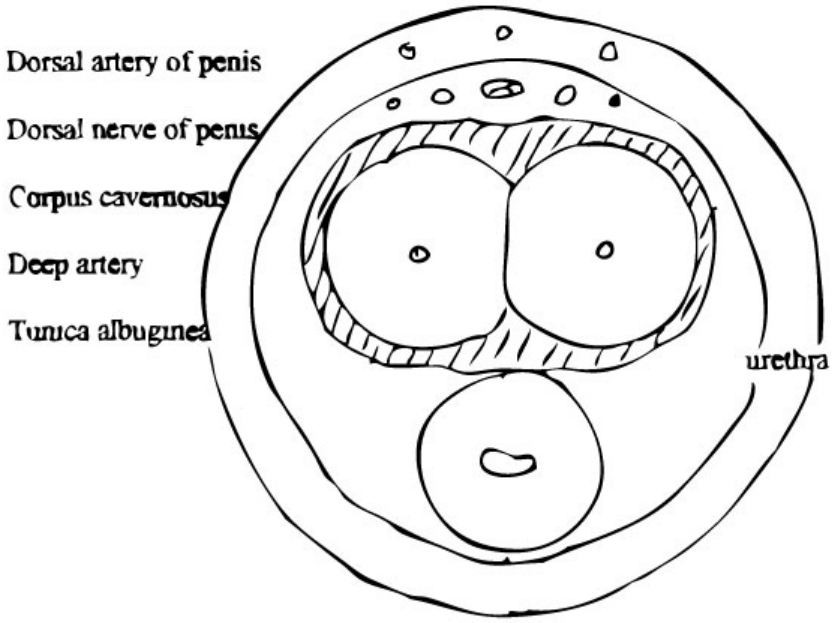
Corpus cavernosus

Superficial transverse perineal muscle

Levator ani

Gluteus maximus

Cross section near glans penis



Descent of the Testes

• Testis develops on the lower border of the posterior peritonium within the transversalis fascia.

• In the 7th month of fetus growth, the testis descend.
Failure to descend -

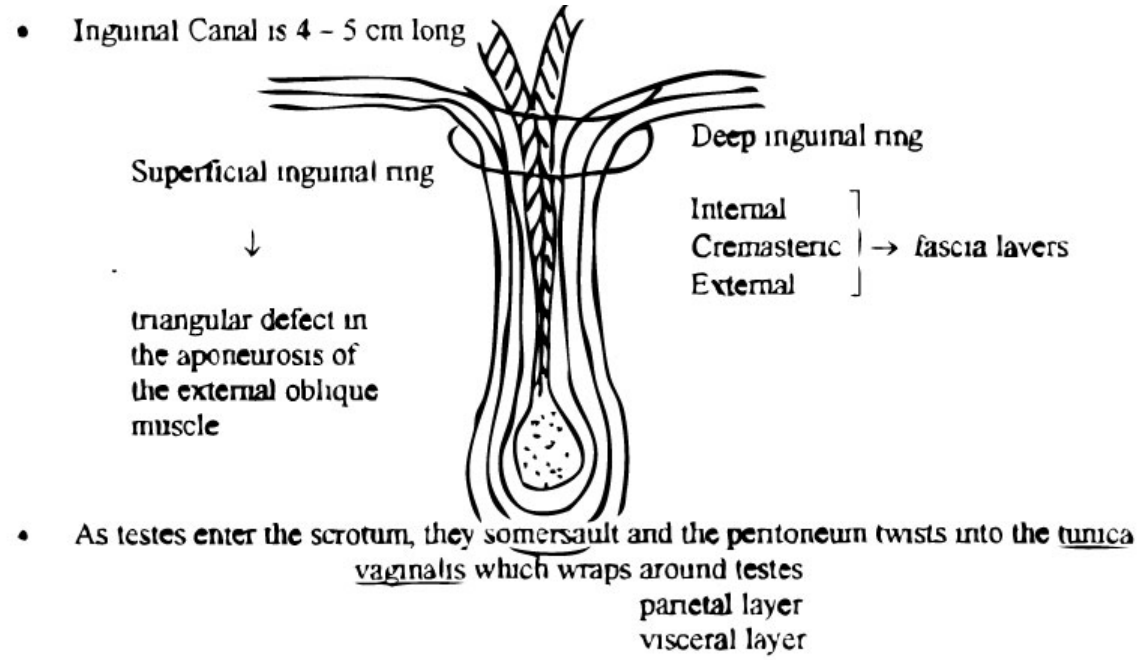
• During descent, testis carries with it the peritonium and subserous fascia.
Descends through the aponeuroses of:

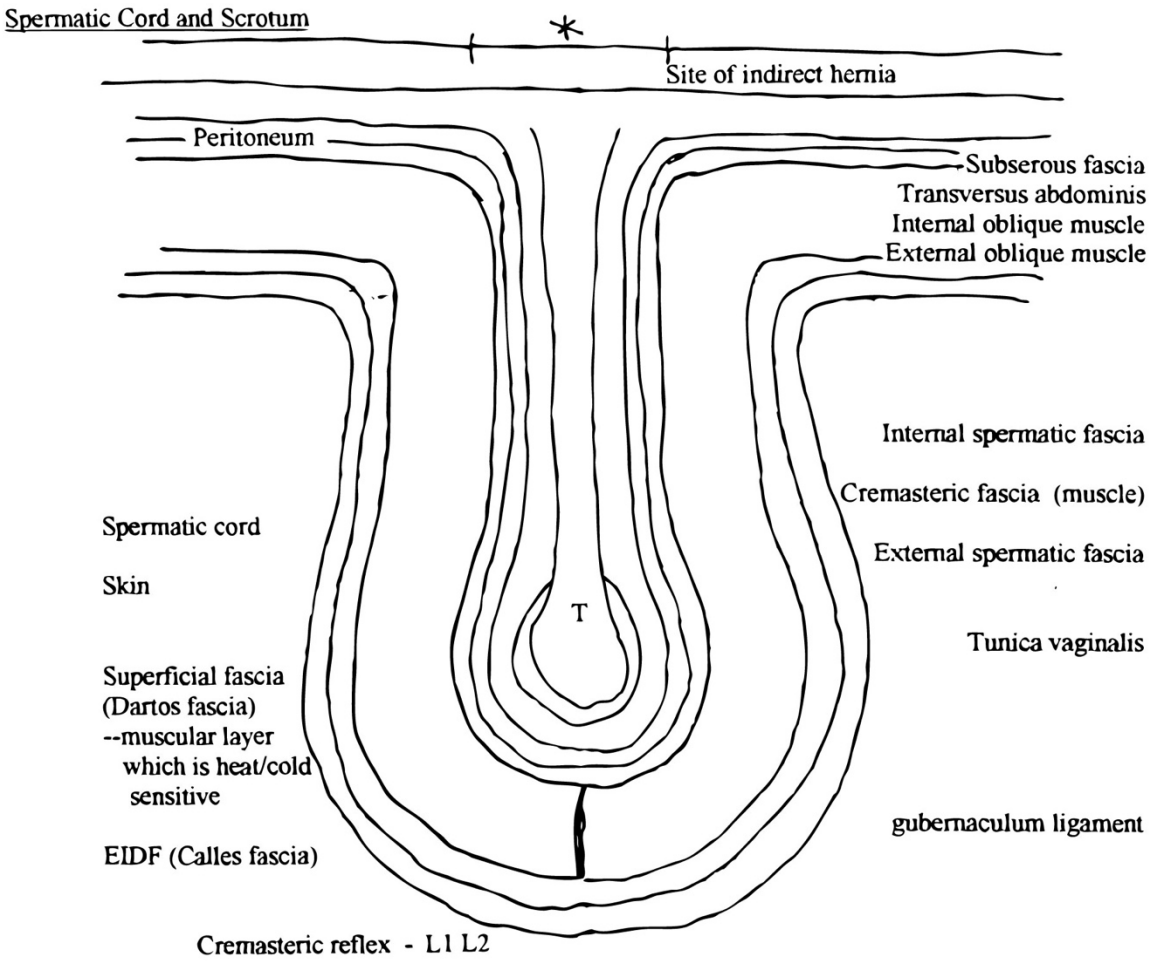
1) Transversalis Fascia (Internal Spermatic Fascia)
2) Internal Oblique Muscle (Cremasteric Layer)
3) External Oblique Muscle (External Spermatic Fascia)

Inguinal Canal is 4 - 5 cm long

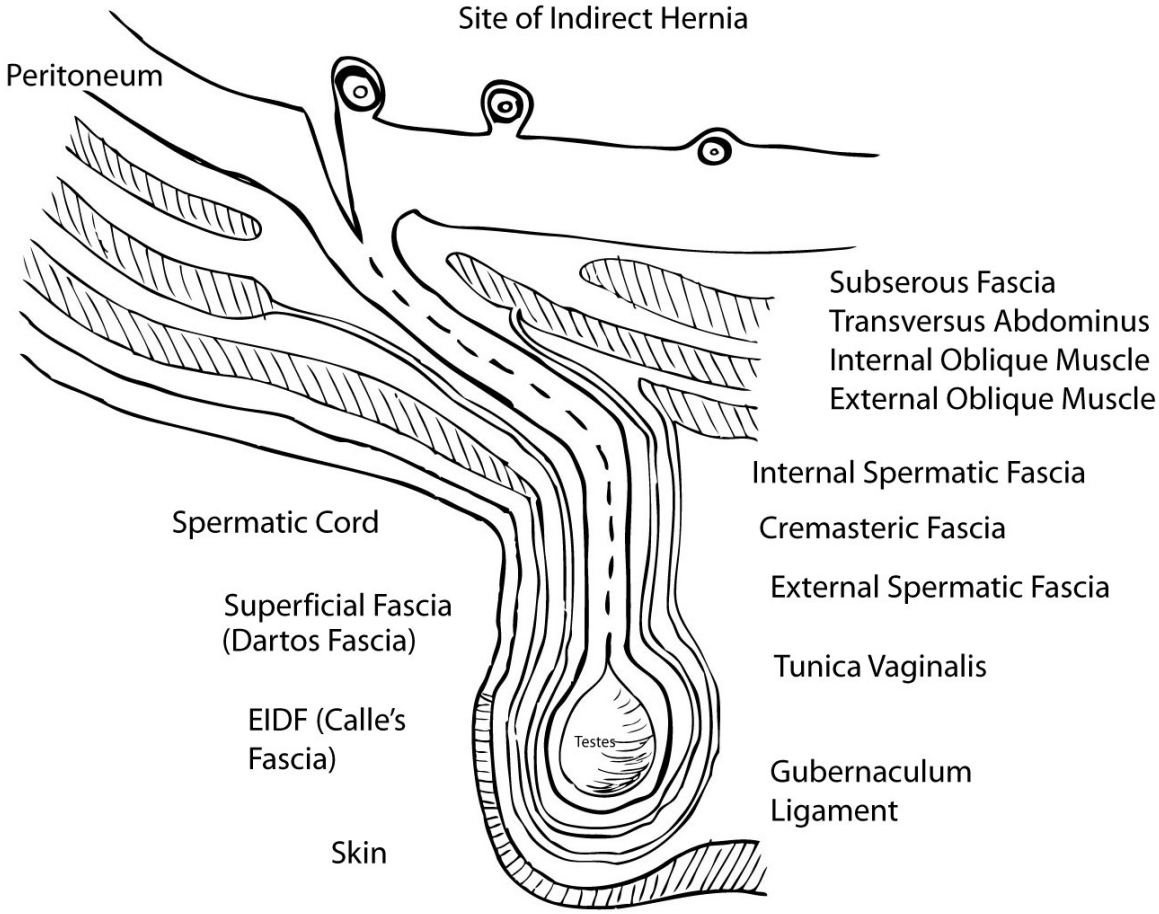
• blood supply - external pudendal artery
internal pudendal artery

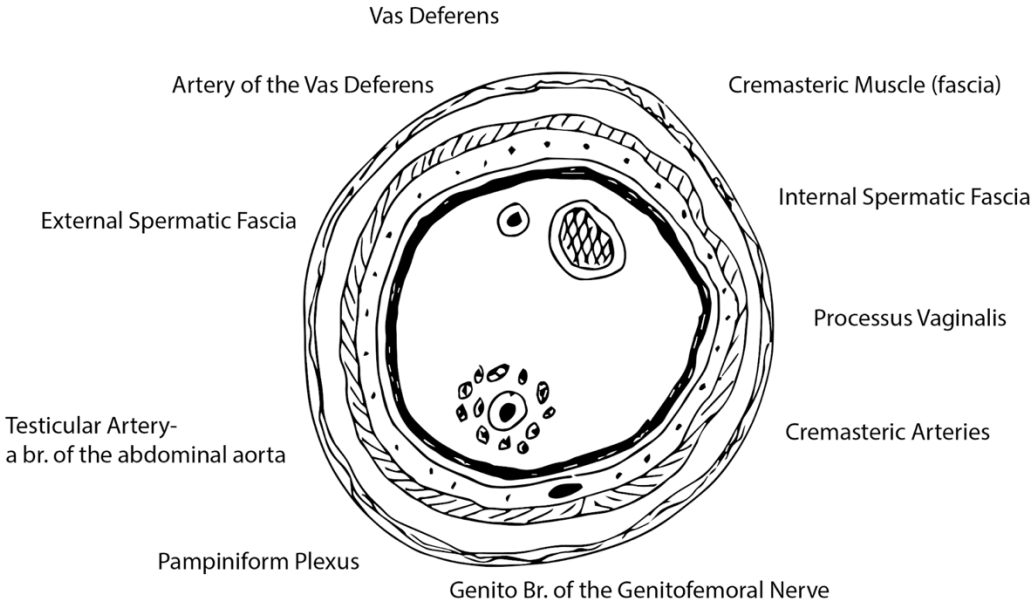
• nerve suppiy- ilioinguinal nerve - L 1
genitofemoral nerve - L 1, L2 from lumbar plexus




Spermatic Cord and Scrotum
Site of indirect hernia
Peritoneum
Subserous fascia
Transversus abdominis
Internal oblique muscle
External oblique muscle
Internal spermatic fascia
Cremasteric fascia (muscle)
External spermatic fascia
Tunica vaginalis
gubernaculum ligament
Spermatic cord
Skin
Superficial fascia
(Dartos fascia)
--muscular layer
which is heat/cold
sensitive
EIDF (Calles fascia)
T
Cremasteric reflex - L1 L2

SPERMATIC CORD AND SCROTUM





Hernias

Indirect

Abdominal contents enter the spermatic cord due to a failure of closure of the Peritoneum after the testes descend.

Can be congenital or genetic
more common than direct hernia
more common on the right
more common in males

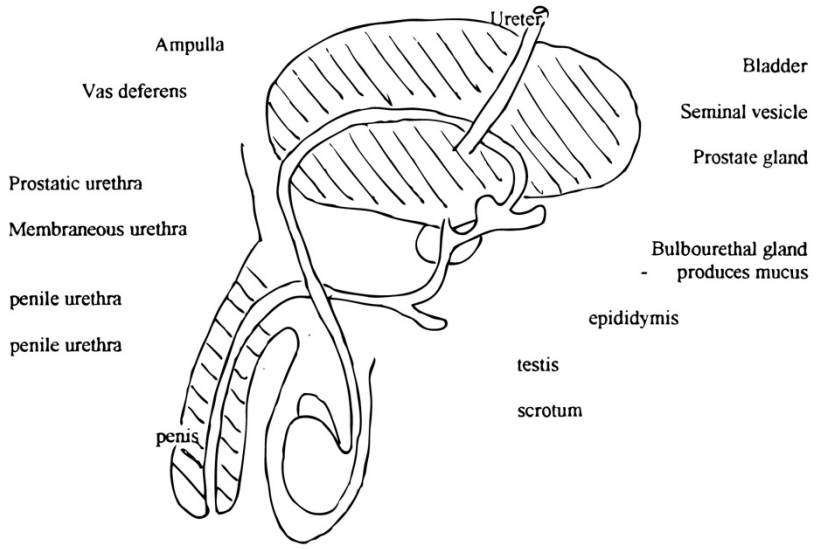
Direct

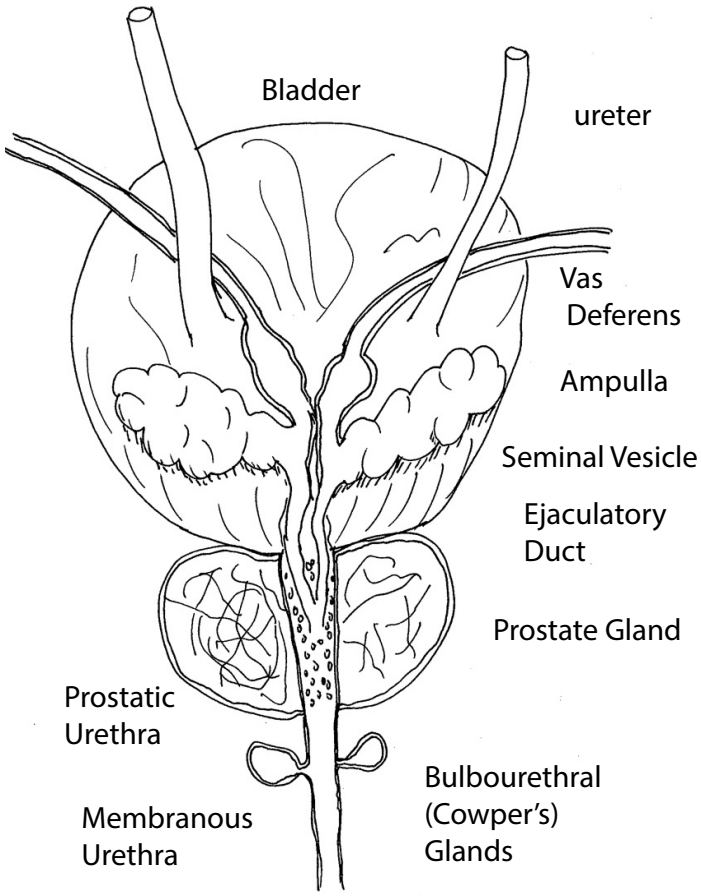
Abdominal contents enter inguinal canal due to weakness in the posterior wall of the canal.

Acquired
Caused by great pressure -Lifting

Other Types of Hernias

Femoral - female
Umbilical
Epigastric





Path of Sperm Testis - epididymis -vas deferens

- movement is accomplished by peristaltic action of contractile cells
- other functions of this route are:

1) epididymis and first portion of vas deferens store sperm prior to ejaculation.

2) During passage through the epididymis for storage, a final maturation confers motility and fertility to the spermatozoa. The epithelium of the epididymis is responsible for secreting a fluid responsible for maturation.

3) At ejaculation, sperm (100 - 300 million) are expelled from the ampulla by strong contractions of the smooth muscles lining the duct.