UPPER LIMB

BONES OF UPPER LIMB

CORACOID PROCESS(SE)

Coracoid process is one of the processes of scapula which resembles a bent finger.

Attachments

Muscles

Upper surface- Pectoralis minor-

Tip of the process- Short head of biceps brachii and coracobrachialis

Supraglenoid tubercle - Long head of biceps

Ligaments

Medial border- coracoclavicular ligament

Lateral border- coracoacromial ligament

Root- transverse scapular ligament

Fascia

Lateral attachment of clavipectoral fascia

UPPER END OF HUMERUS (SE)

The upper end of humerus consists of head, neck, greater tubercle and lesser tubercle and intertubercular sulcus or bicipital groove.

Head

it is spheroidal(1/3 of sphere) and covered by articular cartilage

Articulates with glenoid cavity of scapula

Greater tubercle

To the upper surface, supraspinatus, infraspinatus, and teres minor (rotator cuff muscles)are attached.

Lesser tubercle

Subscapularis is inserted into it.

Intertubercular sulcus or bicipital groove

Long head of biceps passes through it.

Lateral lip of the sulcus gives insertion to pectoralis major
Medial lip gives insertion to teres major
Floor of the sulcus provides insertion to latissimus dorsi

PECULIARITIES OF CLAVICLE(SA)

Clavicle is only long bone placed horizontally and is subcutaneous
It has no medullary cavity
Ossifies mostly in membrane
It is sometimes pierced by Cutaneous nerves.
It is ossified by two primary centers
It is first to start ossification and last to complete.

MUSCLES ATTACHED TO CLAVICLE (SA)

Medial 2/3

Superior surface – sternocleidomastoid
Inferior surface – subclavian groove
Anterior surface- medial half provides origin to pectoralis major
Posterior surface – sternohyoid muscle near the sterna end

Lateral 1/3

Anterior border- deltoid muscle
Posterior border- trapezius
Inferior surface - conoid tubercle and trapezoid ridge gives attachment to the conoid and trapezoid part of coracoclavicular ligament

LIGAMENTS ATTACHED TO CLAVICLE (SA)

Costo-clavicular ligament connects the sternal end of clavicle to the first rib
Coraco-clavicular ligament has two parts, conoid and trapezoid part which are attached to the conoid tubercle and trapezoid ridge of the lateral 1/3 of clavicle.
It is a very strong ligament and suspends the scapula from the lateral third of clavicle.
It transmits the weight of the upper limbs to the axial skeleton.

SPINE OF SCAPULA (SA)

Spine of scapula is a triangular shelf like process present on the dorsal surface of scapula laterally it is continuous with acromion.

It has a base, apex upper and lower surfaces and posterior border (crest)

The upper surface provides attachments to supraspinatus

Inferior surface to the infrapinatus muscle

The crest of spine has upper and lower lips. Upper lip gives insertion to trapezius. Lower lip gives origin to deltoid muscle.

MEDIAL BORDER OF SCAPULA (SA)

Medial border of scapula extends from superior to inferior angle. The border has costal surface and dorsal surface.

Costal surface of medial border- gives attachments to seratus anterior

Dorsal surface of medial border receives insertion of levator scapulae from superior angle to apex of spine of scapula.

Rhomboids minor is attached opposite to the apex of the spine.

Rhomboids major is attached to the rest of the medial border.

BICIPITAL GROOVE OF HUMERUS(SA)

SURGICAL NECK OF HUMERUS(SA)

Surgical neck is the constriction between the upper end and cylindrical shaft of humerus.

It is posteriorly related to the axillary nerve and posterior circumflex humeral vessels.

Fracture of surgical neck may injure axillary nerve , resulting in paralysis of deltoid muscle.

SPIRAL GROOVE /RADIAL GROOVE OF HUMERUS(SA)

Spiral groove is present in the posterior surface of the upper part of the shaft of the humerus.

Structures passing through

Radial nerve .while passing through the groove radial nerve gives branches to medial and lateral heads of triceps muscle

Profunda brachii vessels.

NERVES RELATED TO HUMERUS(SA)

Axillary nerve related to surgical neck of humerus

Radial nerve passes through radial groove on the shaft of humerus.

Ulnar nerve is closely related to the posterior surface of medial epicondyle of humerus

POSTERIOR SURFACE OF SHAFT OF ULNA(SA)

Posterior surface of ulna lies between the posterior and interosseous borders.

The surface is divided by an oblique into upper $\frac{1}{4}$ and lower $\frac{3}{4}$. Lower $\frac{3}{4}$ is further divided into lateral and medial part.

Upper $\frac{1}{4}$ receives insertion of anconeus. Lower lateral part gives origin to abductor pollicis longus,extensor pollicis longusand extensor indicis.

The lower medial part is overlapped by extensor carpi ulnaris.

PISIFORM BONE(SA)

Pisiform is a pea shaped carpal bone in the proximal row of carpals

It is considered as a sesamoid bone in the tendon of flexor carpi ulnaris.

Pisiform articulates only with triquetral bone. Compared to other carpal bones it ossifies last (12years).

PECTORAL REGION

MAMMARY GLAND (LE)

MAMMARY GLAND- BLOOD SUPPLY, LYMPHATIC DRAINAGE AND APPLIED ANATOMY. (SE)

The female mammary gland is a gland of lactation. Though it is present in males it is not functional.

Extent

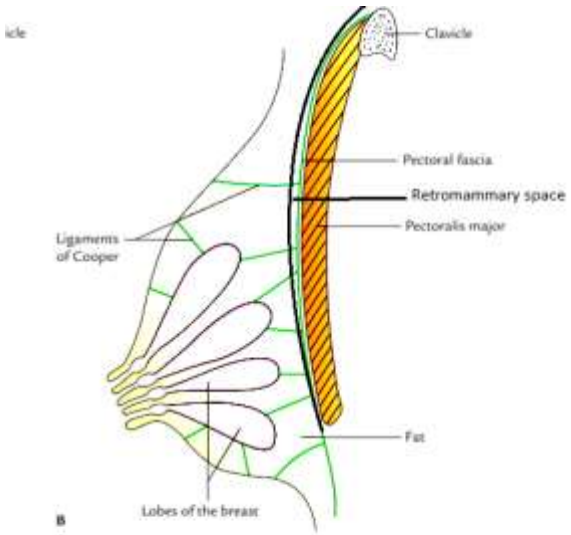
Transversely from lateral margin of sternum to midaxillary line
Vertically from 2nd to 6th rib
A small extension into the axilla is known as Axillary tail

Structure-

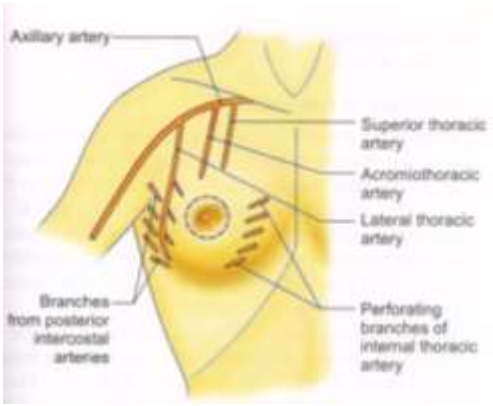
The mammary gland is made up of modified sweat glands and fibro-fatty tissue and lies wholly in the superficial fascia. In the central part there is a projection called the nipple and around it a pigmented area known as areola. The gland has 18 to 20 lobes, seperated by connective tissue. Each lobe is made up of a number of acini which opens separately through the nipple by lactiferous duct and presents a dilatation close to the terminal part called lactiferous sinus.

Fibrous septae extending between skin and pectoral fascia called suspensory ligament, anchors the gland to the underlying deep fascia.

Loose areolar tissue lies between the gland and the pectoral fascia known as retromammary space. It allows movement of the breast over the fascia



Blood supply:



Arterial supply

Lateral thoracic branch of axillary artery, internal thoracic artery, 3rd, 4th and 5th intercostal arteries

Venous drainage

Internal thoracic vein, Axillary vein, Intercostal veins.

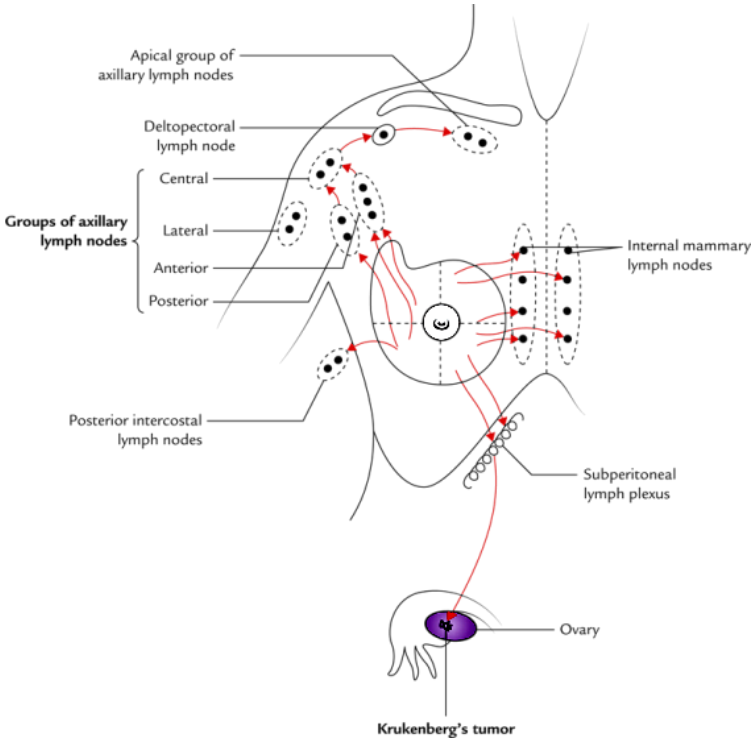
Lymphatic drainage

Skin:

Skin over the breast is divided into 4 quadrants- upper medial and lateral, lower medial and lateral.
upper and lower medial: into parasternal nodes and passes the midline to communicate with opposite parasternal nodes becoming bilateral.
Lower medial: sub-diaphragmatic nodes
Upper and lower lateral: axillary nodes
Lower lateral : posterior intercostal nodes

Parenchyma:

75% drain into axillary lymph nodes, 20% into internal thoracic, and 5% into posterior intercostal nodes



Nerve supply

Anterior and lateral cutaneous branches of 3rd, 4th and 5th intercostal nerves

Applied anatomy

Incisions on breast should be radial so as not to cut the ducts.
Cancer of breast may spread along lymphatics to liver, lungs, bones and ovary.
Regional lymph nodes become stony hard and fixed in cancer.

There may be retraction/ puckering of skin due to involvement of ligaments of Cooper.
Peau d' orange or edema with pitting skin- Cancer cells may obstruct cutaneous lymphatics causing edema and there will be fixation of hair follicles leading to pitting of skin.

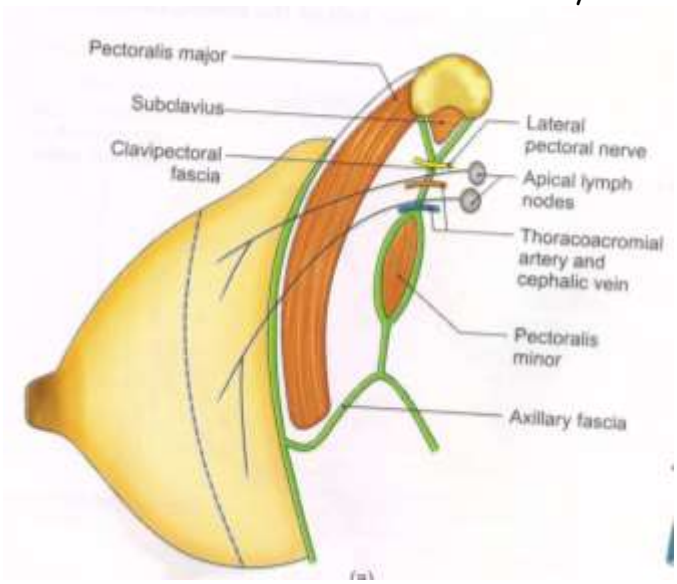
Development

2 milk ridges appear as linear thickenings of ectoderm on the ventral part of the embryo extending from axilla to groin.
In the milk ridges of pectoral region ectodermal cells grow into underlying mesenchyme to form glands.
From puberty in female- Gland enlarges due to deposition of fat and glandular proliferation.

CLAVIPECTORAL FASCIA (SE)

Extent-

Vertical- clavicle to axillary fascia
Horizontal- sternum to midaxillary line



Attachments

Medial: fuses with anterior intercostal membrane of upper two spaces, first costochondral junction
Lateral: coracoid process, blends with coraco-clavicular ligament
Above: splits to enclose subclavius muscle and attaches to clavicle

Below: splits to enclose pectoralis minor, reunites at lower border of the muscle and extends down as suspensory ligament of axilla.

Structures piercing

cephalic vein, lymphatics, lateral pectoral nerve, thoraco-acromial vessels.

SERRATUS ANTERIOR (SE)

Attachments

Origin

upper 8 ribs

Insertion

costal surface of medial border of scapula

Nerve supply-

Nerve to serratus anterior (C5, C6, C7)

Actions

Whole muscle- protraction of scapula (boxer's muscle)
Keeps medial border of scapula in firm apposition with chest wall
Lower 4 or 5 digitations- rotates scapula laterally and upwards

Applied anatomy

Injury to nerve to serratus anterior results in winging of scapula.
The medial border and inferior angle of scapula is raised when a person places hands on a wall and pushes.

RETROMAMMARY SPACE (SA)

It is present between base of mammary gland and deep fascia covering pectoralis major muscle.
It contains fat and allows the gland to move on it.
The space is relatively avascular with free flow of lymphatics.
Fibrous septae extending between skin and pectoral fascia called suspensory ligaments of Cooper.
They anchor the mammary gland to the underlying deep fascia.
Malignant tumors may invade deep fascia & pectoralis major muscle leading to fixation of breast.

PEU DE ORANGE (SA)

Peau d' orange refers to appearance of skin of breast affected by carcinoma. It resembles the skin of an orange.
Skin becomes edematous due to obstruction of cutaneous lymphatics by cancer cells .
There will be fixation of hair follicles leading to pitting of skin, resembling the skin of an orange.

PECTORALIS MINOR MUSCLE (SA)

Origin

Outer surface of 3rd, 4th and 5th ribs near costochondral junction

Insertion

Medial margin of coracoid process of scapula

Nerve supply

Medial and lateral pectoral nerves

Action

Forward movement of scapula and helps forced inspiration.

PECTORALIS MAJOR MUSCLE (SA)

Origin

One half of anterior surface of sternum

Medial 2/3 of clavicle

Insertion

Lateral lip of inter-tubercular sulcus of humerus

Nerve supply

Lateral and medial pectoral nerves

Action

Flexion, adduction and, medial rotation at the shoulder joint

CLAVIPECTORAL FASCIA/ STRUCTURES PIERCING CLAVIPECTORAL FASCIA (SA)

Attachments

Medial:

Fuses with anterior intercostal membrane of upper two spaces,

Lateral:

coracoid process, blends with coraco-clavicular ligament

Above:

Splits to enclose subclavius muscle and attaches to clavicle

Below

Splits to enclose pectoralis minor, reunites at lower border of the muscle and extends down as suspensory ligament of axilla.

Structures piercing:

Cephalic vein, lymphatics, laterals pectoral nerve, thoraco-acromial vessels.

WINGING OF SCAPULA (SA)

Winging of scapula is due to paralysis of serratus anterior muscle.
It is due to injury to nerve to serratus anterior also called long thoracic nerve.
The medial border and inferior angle of scapula is raised when a person places hands on a wall and pushes.
The name of this condition comes from its appearance, a wing-like resemblance, due to the medial border of the scapula projecting straight out from the back.
It can affect a person's ability to lift, pull, and push heavy objects. In some serious cases, the ability to perform activities of daily living such as changing one's clothes and washing one's hair may be hindered.

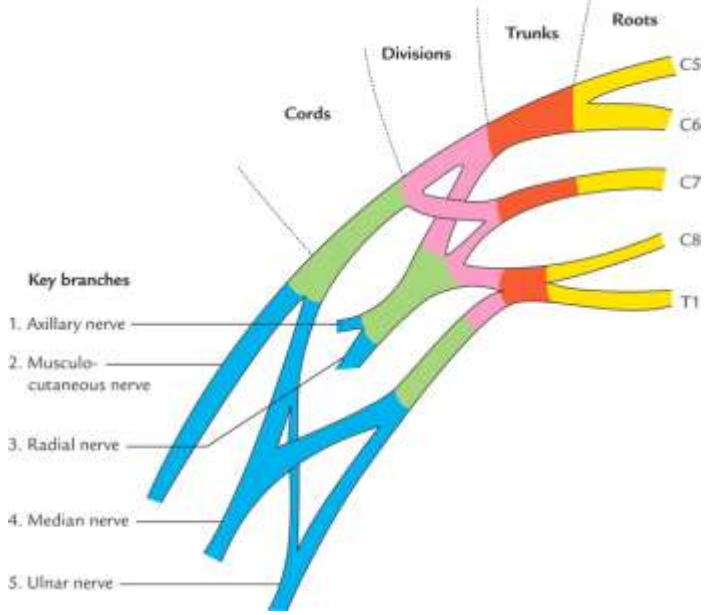
3.AXILLA

BRACHIAL PLEXUS (LE)

Formation:

Formed by the ventral rami of lower four cervical nerves and the first thoracic nerve (C5, C6, C7, C8, T1).

The brachial plexus consists of roots, trunks, divisions and branches.



PARTS:

Roots:

The roots are five in number. (C5-T1).

They emerge downwards and laterally between the scaleneus anterior and medius muscle.

Trunks: There are 3trunks. Upper – Middle - Lower. They appear in the posterior triangle of neck.

Upper trunk is formed by the union of C5 &C6.

Middle trunk is formed by C7

Lower trunk is formed by union on C8 & T1.

Divisions:

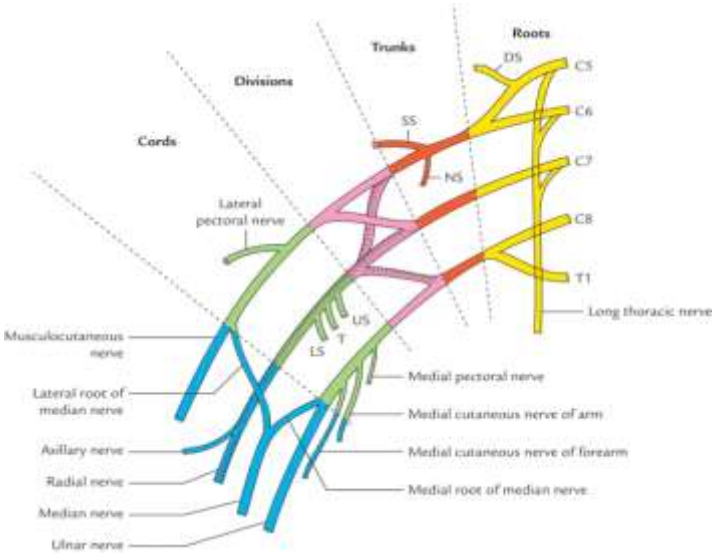
Each of the trunks splits into anterior and posterior divisions. Divisions unite or continue to form cords.

Cords: There are 3 cords.

Lateral cord-formed by anterior divisions of upper & middle trunks.

Medial cord-formed by anterior division of lower trunk.

Posterior cord-formed by posterior divisions of all the trunks.



Branches:

Branches of the roots:

Nerve to serratus anterior (long thoracic nerve) (C5,C6,C7)

Nerve to rhomboideus(dorsal scapular nerve) (C5).

Branches of the trunks. (Upper trunk)

suprascapular nerve (C5-C7).

nerve to subclavius (C5-C7).

Branches of the cords.

Branches of lateral cord.

Lateral pectoral(C5-C7).

Musculocutaneous(C5-C7).

Lateral root of median(C5-C7).

Branches of medial cord.

medial pectoral.(C8,T1).

medial cutaeneous nerve of arm(C8,T1).

medial cutaneous nerve of forearm(C8,T1).

ulnar (C7,C8,T1).

medial root of median(C8,T1).

Branches of posterior cord.

upper subscapular(C5,C6).
nerve to lattisimus dorsi(C6,C7,C8)
lower subscapular(C5,C6).
axillary(C5,C6).
radial(C5-C8,T1).

Applied anatomy:

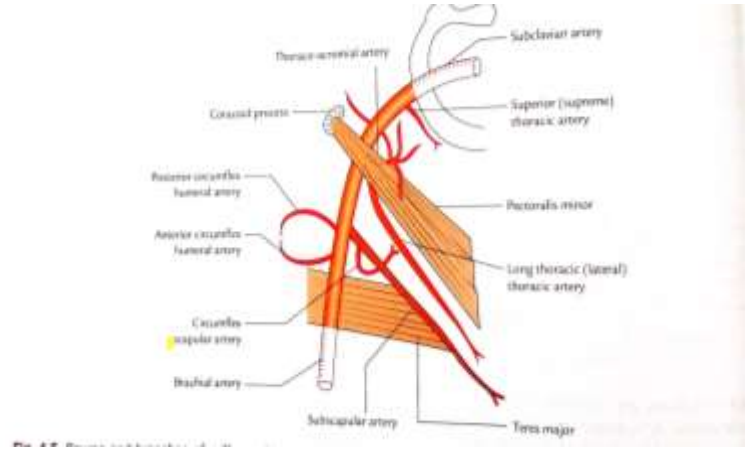
Injury to the long thoracic nerve produces winging of scapula.
Injury to the axillary nerve due to fracture of the surgical neck of humerus results in inability to abduct the arm with loss of sensation over the lower part of the deltoid.
Erb's palsy: injury to the upper trunk at the Erb's point.

AXILLARY ARTERY (LE)

Axillary artery is the continuation of subclavian artery.

Extent

From the outer border of 1st rib to the lower border of teres major muscle.
It continues as brachial artery.



The pectoralis minor muscle crosses the artery and divides it into 3 parts-

1st part - proximal to the muscle
2nd part – deep to the muscle
3rd part – distal to the muscle

Relations

1st part

Axillary artery with the cords of brachial plexus is enclosed within the axillary sheath.

Anterior – pectoralis major , loop of communication between lateral and medial pectoral nerves.

Posterior- medial cord, long thoracic nerve, serratus anterior.

Medial- axillary vein.

Lateral- lateral and posterior cords.

2nd part

Anterior – pectoralis minor

Posterior- posterior cord , subscapularis

Medial – medial cord of brachial plexus , axillary vein

Lateral – lateral cord of brachial plexus

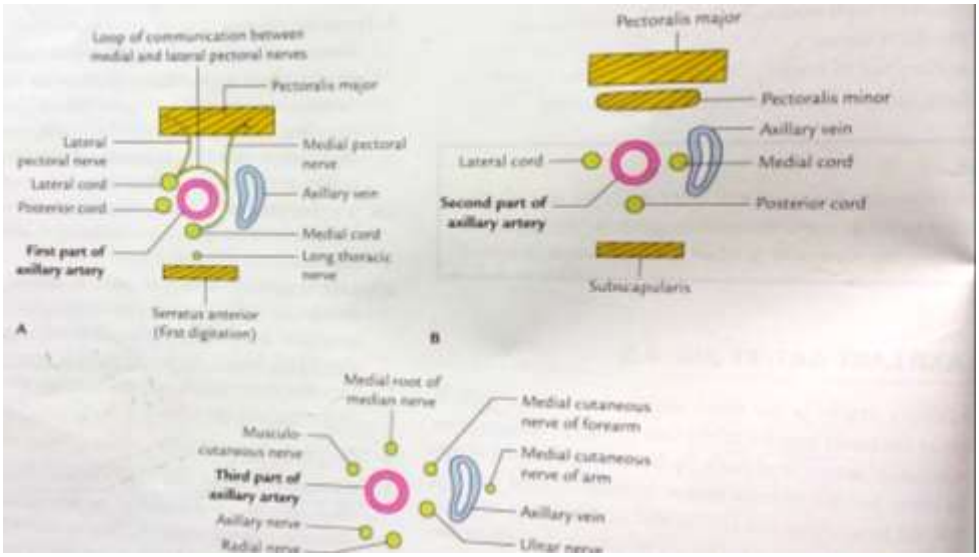
3rd part

Anterior- medial root of median nerve

Posterior – radial nerve, axillary nerve, subscapularis, teres major

Medial – axillary vein, medial cutaneous nerve of forearm, ulnar nerve

Lateral – musculocutaneous nerve.



Branches : Axillary artery gives 6 branches

From 1st part-

Superior thoracic artery

From 2nd part

Thoracoacromial artery

Lateral thoracic artery

In females the artery is large and gives off lateral mammary branches to the breast.

From 3rd part

Subscapular artery

It gives off a large branch – circumflex scapular artery which takes part in the anastomosis around scapula.

Anterior circumflex humeral artery

Posterior circumflex humeral artery

Passes through the quadrangular intermuscular space.

Applied anatomy

Axillary artery pulsations can be felt against the lower part of lateral wall of axilla.

The artery can be effectively compressed against the humerus to check bleeding from distal part of the limb (in injuries, operations and amputation).

When the axillary artery is blocked , scapular anastomosis serves as a potential pathway (collateral circulation) between the subclavian artery and axillary artery.

AXILLARY ARTERY – EXTENT, RELATIONS AND BRANCHES (SE)

Axillary artery is the continuation of subclavian artery

It extends from the outer border of 1st rib to the lower border of teres major muscle

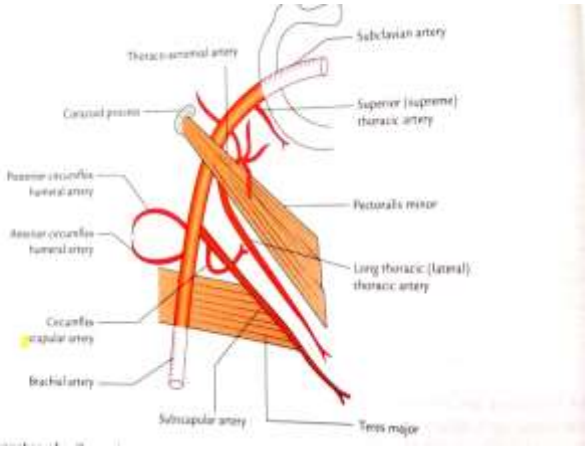
It continues as brachial artery.

The pectoralis major muscle crosses the artery and divides it into 3 parts-

1st part - proximal to the muscle

2nd part – deep to the muscle

3rd part – distal to the muscle



RELATIONS

1ST PART-

Axillary artery with the cords of brachial plexus is enclosed within the axillary sheath

Anterior – pectoralis major , loop of communication between lateral and medial pectoral nerves

Posterior- medial cord, long thoracic nerve, serratus anterior

Medial- axillary vein

Lateral- lateral and posterior cords.

2ND PART-

Anterior – pectoralis minor

Posterior- posterior cord , subscapularis

Medial – medial cord of brachial plexus , axillary vein

Lateral – lateral cord of brachial plexus

3RD PART

Anterior- medial root of median nerve

Posterior – radial nerve, axillary nerve, subscapularis, teres major

Medial – axillary vein, medial cutaneous nerve of forearm, ulnar nerve

Lateral – musculocutaneous nerve.

Branches

Axillary artery gives 6 branches

Superior thoracic artery

Thoraco-acromial artery

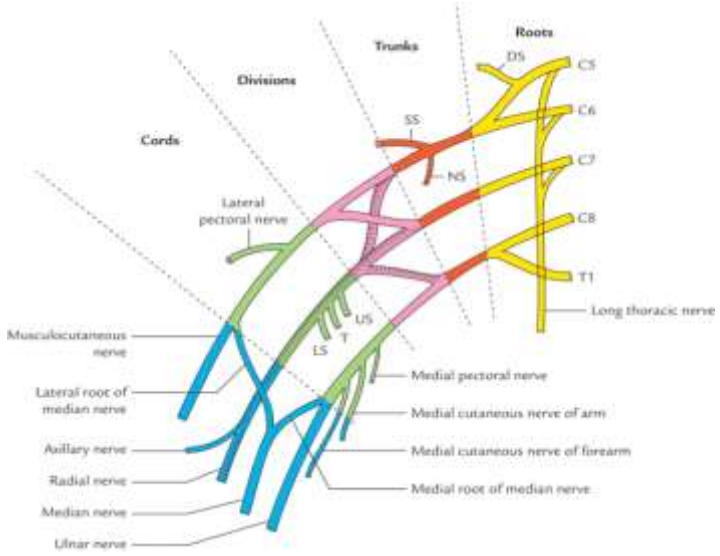
Lateral thoracic artery

Subscapular artery

Anterior circumflex humeral artery
posterior circumflex humeral artery

DRAW A NEAT LABELLED DIAGRAM OF FORMATION & BRANCHES OF BRACHIAL PLEXUS.(SE)

FORMATION OF BRACHIAL PLEXUS. (SE)



LATERAL CORD OF BRACHIAL PLEXUS. (SE)

Lateral cord of brachial plexus is formed by the union of anterior divisions of upper & middle trunks.

It lies lateral to the axillary artery.

Branches of lateral cord.

Lateral pectoral(C5-C7).

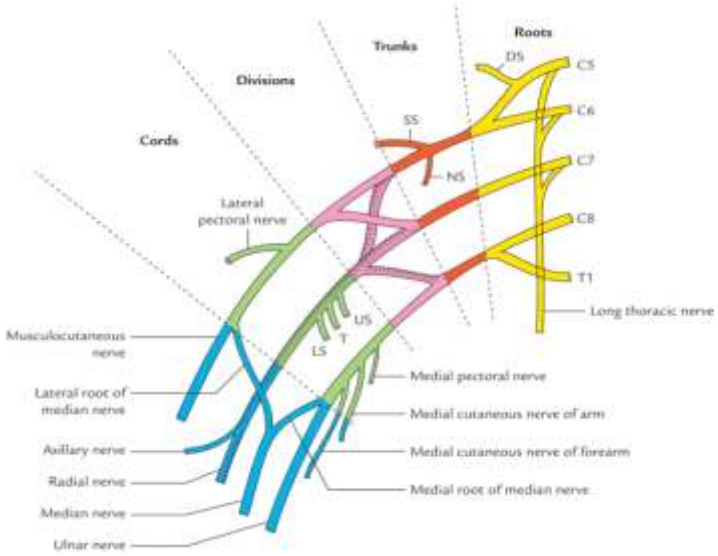
Musculocutaneous(C5-C7).

Lateral root of median(C5-C7).

Lateral pectoral nerve: it is a branch of the lateral cord,conveys the fibres from C5,C6,C7. It pierces the clavipectoral fascia & supplies the pectoralis major and minor muscles.

Musculocutaneous nerve: it is derived from the lateral cord.it pierces the coracobrachialis, & supplies it before it piercing it.

Lateral root of median nerve joins with medial root & forms the main trunk of median nerve.



THIRD PART OF AXILLARY ARTERY(SE)

Axillary artery is divided into 3 parts by pectoralis minor muscle.

1st part - proximal to the muscle

2nd part – deep to the muscle

3rd part – distal to the muscle

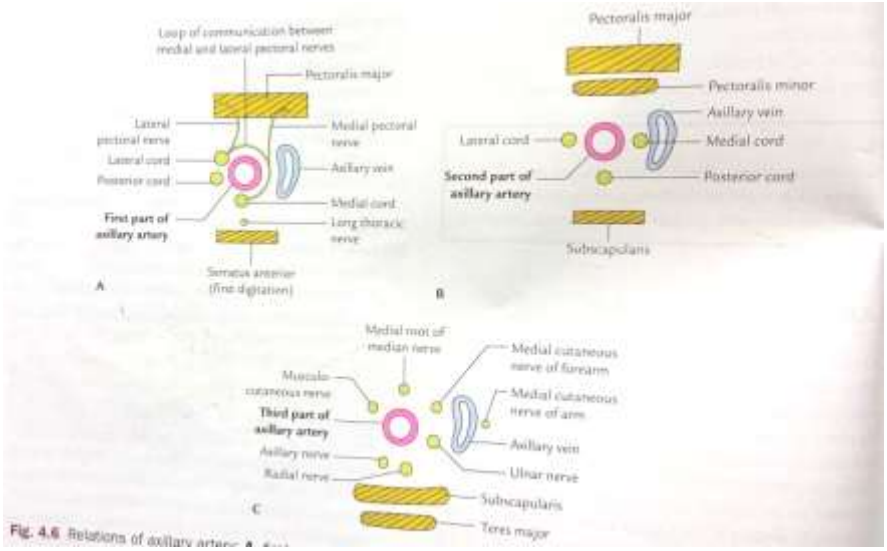


Fig. 4.6 Relations of axillary artery: A, first part; B, second part; C, third part.

Relations of 3rd part of axillary artery

Anterior- medial root of median nerve
Posterior – radial nerve, axillary nerve, subscapularis, teres major
Medial – axillary vein, medial cutaneous nerve of forearm, ulnar nerve
Lateral – musculocutaneous nerve.

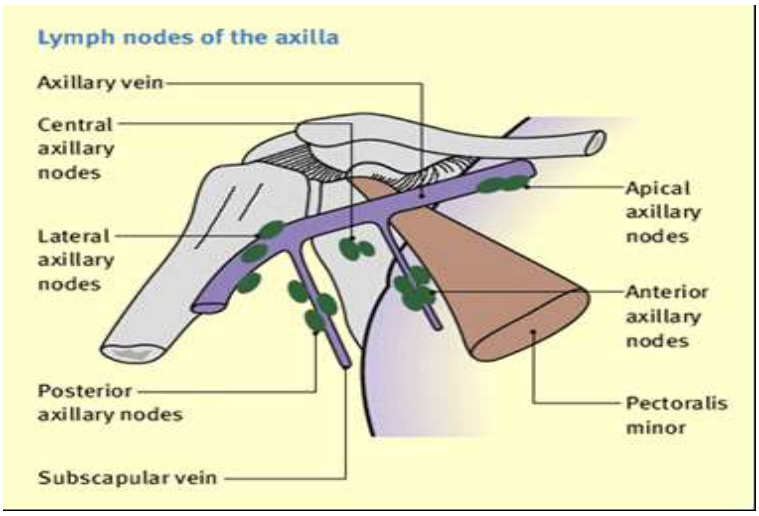
3 **branches** arise from the 3rd part of axillary artery

Subscapular artery
Anterior circumflex humeral artery
Posterior circumflex humeral artery

Arterial anastomosis around scapula is formed between the branches of 1st part of subclavian artery and 3rd part of axillary artery.
When the axillary artery is blocked, scapular anastomosis serves as a potential pathway (collateral circulation) between the subclavian artery and axillary artery.

AXILLARY LYMPH NODES(SE)

Axillary lymph nodes are scattered in the fibro fatty tissue of axilla.



They are divided into 5 groups

Anterior (pectoral) group

They lie along lateral thoracic vessels

Receive lymph from upper half of anterior wall of trunk and mammary gland.

Posterior (scapular) group

They lie along subscapular vessels

Receive lymph from upper half of posterior wall of trunk and axillary tail of mammary gland.

Lateral group

They lie along upper part of humerus, medial to axillary vein.

They receive lymph from the upper limb.

Central group

They lie in the fat of upper axilla.

They receive lymph from anterior , posterior and central groups and drain into the apical group.

Apical (infraclavicular) group

They lie along axillary vessels.

They receive lymph from central group, upper part of mammary gland and from the thumb and its web.

ERB'S POINT & ITS APPLIED ANATOMY (ERB-DUCHENNE'S PARALYSIS)(SE)

Erb's point present in one of the region of upper trunk.

Six points meet here. They are-

C5,

C6,

suprascapular nerve,

Anterior and posterior division of upper trunk.

Nerve to subclavius.

Site of injury: Erb's point. (six nerves meet here).

Causes of injury: Undue separate of the head from the shoulder caused due to

Birth injury

Fall on the shoulder

During anaesthesia

Nerve roots involved: mainly C5 partly C6
Muscles paralysed:
Biceps brachii
Deltoid
Brachialis
Brachio radialis
Deformity: porters tip hand.
Disability: the following movements are lost.
Abduction and lateral rotation of the arm.
Flexion and supination of the forearm.
Biceps and supinator jerks are lost.
Sensations are lost over a small area over the lower part of the deltoid.

STRUCTURES FORMING ANTERIOR WALL OF AXILLA. (SA)
Pectoralis major in front .
Clavipectoral fasciaPectoralis minor.

CONTENTS OF AXILLA.(SA)
Axillary artery and its branches
Axillary vein and its tributaries
Infraclavicular part of brachial plexus
Axillary lymph nodes and its associated lymphatics
Long thoracic and intercostobrachial nerves
Axillary fat and areolar tissue

LONG THORACIC NERVE.(SA)
It is the nerve to serratus anterior.
Arises from dorsal aspects of C5,C6,&C7 roots.
The C5 & C6 roots pierce the scalenus medius and pass downwards behind the brachial plexus.
They unite and enter the apex of axilla behind the first part of axillary artery.
The nerve is closely applied to the serratus anterior,descends posterior to the midaxillary line & supplies the muscle segmentally.
Applied anatomy:
Injury to long thoracic nerve produces winging of scapula.

BRANCHES OF MEDIAL CORD OF BRACHIAL PLEXUS.(SA)

medial pectoral.(C8,T1).
medial cutaeneous nerve of arm(C8,T1).
medial cutaneous nerve of forearm(C8,T1).
ulnar (C7,C8,T1).
medial root of median(C8,T1).

BRANCHES OF POSTERIOR CORD OF BRACHIAL PLEXUS.(SA)

upper subscapular(C5,C6).
nerve to lattisimus dorsi(C6,C7,C8)
lower subscapular(C5,C6).
axillary(C5,C6).
radial(C5-C8,T1).

BRANCHES OF AXILLARY ARTERY (2^{ND}& 3^{RD} PART) (SA)

Thoracoacromial artery(2^{nd} part)
Lateral thoracic artery(2^{nd} part)
subscapular artery(3^{rd} part)
anterior circumflex humeral artery(3^{rd} part)
posterior circumflex humeral artery(3^{rd} part)

ERB'S PARALYSIS.(SA)

Site of injury: Erb's point.(six nerves meet here).
Causes of injury: Undue separate on of the head from the shoulder caused due to

-birth injury
-fall on the shoulder
-during anaesthesia

Nerve roots involved: mainly C5 partly C6
Muscles paralysed:

Biceps brachii
Deltoid
Brachialis

Brachio radialis

Deformity: porters tip hand

Disability: the following movements are lost.

abduction and lateral rotation of the arm.

flexion and supination of the forearm.

biceps and supinator jerks are lost.

sensations are lost over a small area over the lower part of the deltoid.

KLUMPKE'S PARALYSIS.(SA)

Site of injury:

lower trunk of the brachial plexus.

Cause of injury:

Undue abduction of the arm,as in clutching something with the hands after a fall from height.or in birth injury.

Nerve roots involved:

Mainly T1 and partly C8.

Muscles involved:

Intrinsic muscles of hand(T1)

Ulnar flexors of the wrist and fingers.

Deformity:

claw hand.

Disability:

Hyperextension at the metacarpo-phalangeal joints & flexion at the interphalangeal joints.

4. SCAPULAR REGION

DESCRIBE THE ROOT VALUE, FORMATION, COURSE, RELATIONS AND BRANCHES OF AXILLARY NERVE. GIVE ITS APPLIED ANATOMY. WHAT ARE EFFECTS OF INJURY AT SURGICAL NECK OF HUMERUS (LE).

Root value:

Its root value is ventral rami of 5^{th} and 6^{th} cervical segments of spinal cord (**C5, C6**)

Formation:

The axillary nerve arises from the *posterior cord* of the brachial plexus near the lower border of subscapularis.

Course:

Runs backwards on subscapularis the enter the quadrangular space and terminates into anterior and posterior branches

Relations:

In the lower part of axilla:

The nerve runs downwards behind the third part of axillary artery

Lies on the subscapularis muscle and related

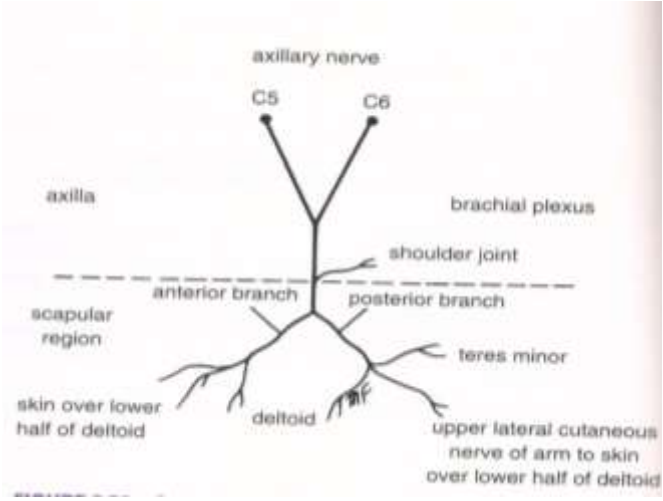
Medially - median nerve

Laterally - coracobrachialis

The nerve leaves the axilla by winding round the lower border of subscapularis and enters quandrangular space.

In the quandrangular space:

Here it is accompanied by posterior circumflex humeral vessels.



Relations

Superiorly:

Subscapularis

Lowest part of capsule of the shoulder joint

Surgical neck of humerus

Inferiorly:

Teres major

Medially:

Long head of triceps brachii

In the quandrangular space,the nerve divides into anterior and posterior branches in relation to the deltoid muscle.

Branches:

Anterior branch:

Accompanied by posterior circumflex humeral vessels.

Winds around surgical neck of humerus

Supplies the deltoid and skin over its anteroinferior part

Posterior branch:

Supplies teres minor and posterior part of the deltoid and continues as upper lateral cutaneous nerve of the arm.

The nerve to teres minor bears a pseudoganglion

Applied anatomy:

Intramuscular injections are often given into the deltoid. They should be given in the middle of the muscle to avoid injury to the axillary nerve.

The axillary nerve may be damaged by dislocation of the shoulder or by the fracture of surgical neck of humerus.

Effects of injury at surgical neck of humerus:

Rounded contour of shoulder is lost, greater tubercle of humerus becomes prominent.

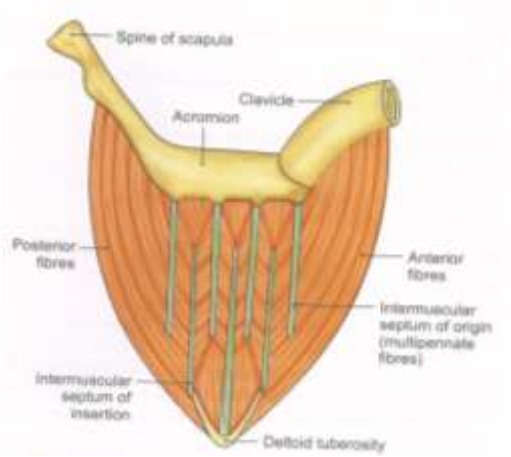
Deltoid is paralysed with loss of power of abduction upto 90° at the shoulder.

There is sensory loss over the lower half of deltoid in a badge like area called **regimental badge.**

DELTOID MUSCLE – LOCATION, ATTACHMENTS NERVE SUPPLY AND ACTIONS (SE)

Location:

It is a scapulohumeral muscle



Attachments:

Origin:

The anterior clavivular part

Lateral third of clavicle – upper surface and anterior border

The middle acromial part:

Acromion – lateral margin and upper surface

The posterior spinous part:

Spine of scapula – lower lip of the crest of the spine

Insertion:

"V " shaped deltoid tuberosity

Nerve supply:

Axillary nerve (C5, C6)

Actions:

Clavicular fibres – flexors and medial rotators

Spinous fibres - extensors and lateral rotators

Acromial fibres - strong abductor of the arm 15° to 90°

ROTATOR CUFF OF SHOULDER (SE)

Rotator cuff/***musculotendinous*** cuff of the shoulder is the fibrous sheath formed by the tendons of

Supraspinatus

Infraspinatus

Teres minor

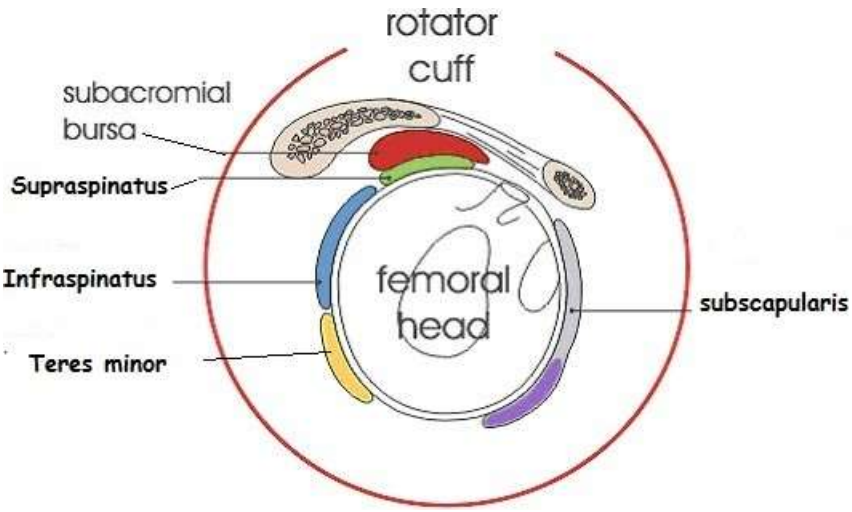
Subscapularis

They arise from scapula gets inserted into humerus and blend with the capsule of the shoulder joint.

Tendon of supraspinatus fuse superiorly

Tendon of infraspinatus and teres minor fuse posteriorly

Tendon of subscapularis fuse anteriorly



Functions: Stabilizes shoulder joint

Grasp the relatively large head of humerus and hold it against the smaller, shallow glenoid cavity.

QUADRANGULAR AND TRIANGULAR SPACES (SE).

Quadrangular space:

Boundaries:

Superior:

Subscapularis anteriorly

Teres minor posteriorly

Capsule of the shoulder joint

Inferior:

Teres major

Medial:

long head of triceps brachii

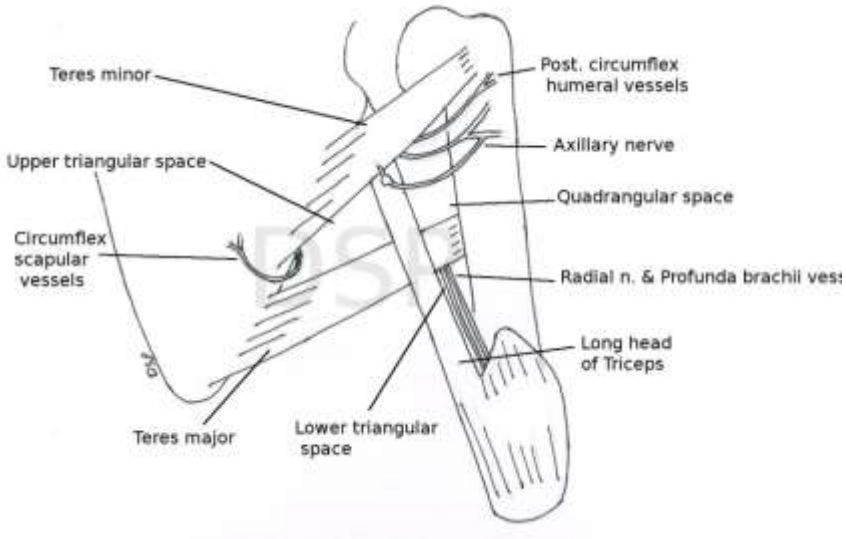
Lateral:

surgical neck of humerus

Contents:

Axillary nerve

Posterior circumflex humeral vessels



Upper triangular space:

Boundaries:

Medial:

teres minor

Lateral :

long head of triceps

Inferior:

teres major

Contents:

Circumflex scapular artery

Lower triangular space:

Boundaries:

Medial:

long head of triceps

Lateral:

shaft of humerus

Superior:

teres major

Contents:

Radial nerve

Profunda brachii vessels

AXILLARY NERVE (CIRCUMFLEX NERVE) (SE)

Root value:

Its root value is ventral rami of 5th and 6th cervical segments of spinal cord

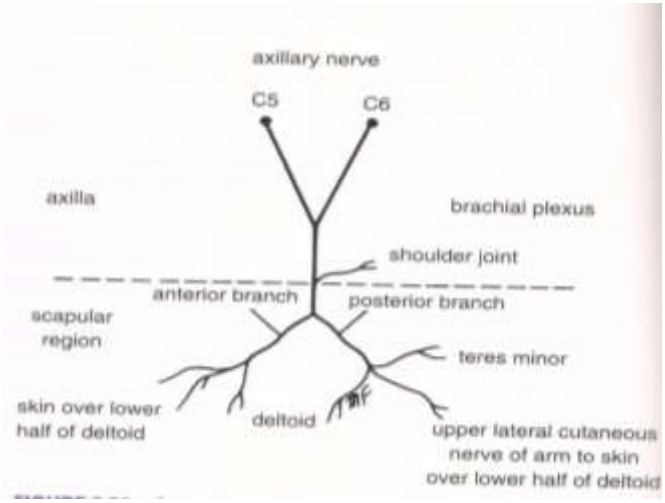
(**C5, C6**)

Formation:

The axillary nerve arises from the posterior cord of the brachial plexus near the lower border of subscapularis.

Course:

Runs backwards on subscapularis, then enters the quadrangular space and terminates into anterior and posterior branches



Branches:

Anterior branch:

Accompanied by posterior circumflex humeral vessels.

Winds around surgical neck of humerus

Supplies the deltoid and skin over its anteroinferior part

Posterior branch:

Supplies teres minor and posterior part of the deltoid and continues as upper lateral cutaneous nerve of the arm. The nerve to teres minor bears a pseudoganglion

ANASTOMOSIS AROUND SCAPULA(SE)

Arterial anastomoses - **subclavian artery & axillary artery**

Sites:	**1st part of subclavian artery**	**2nd part of axillary artery**	**3rd part axillary artery**
Body of scapula	• **Supra scapular artery &** • **Deep branch of transverse cervical artery.**		**Circumflex scapular**
Acromion process	**Acromion branch of supra scapular artery.**	**Thoraco acromion artery**	**Posterior circumflex humoral artery.**

NERVE SUPPLY AND ACTION OF DELTOID(SA)

Nerve supply:

Axillary nerve (C5, C6)

Actions:

Anterior/Clavicular fibres – flexors and medial rotators
Posterior/Spinous fibres - extensors and lateral rotators
Middle/Acromial fibres - strong abductor of the arm 15° to 90°

MUSCLES ATTACHED TO GREATER TUBERCLE OF HUMERUS WITH NERVE SUPPLY(SA)

Upper impression - supraspinatus

Middle impression - infraspinatus

Lower impression - teres minor

ROTATOR CUFF (MUSCLES FORMING IT)(SA)

Rotator cuff/musculotendinous cuff of the shoulder is the fibrous sheath formed by the tendons of

Supraspinatus
Infraspinatus
Teres minor
Subscapularis.

QUADRANGULAR SPACE – BOUNDARIES AND CONTENTS(SA)

Boundaries:

Superior: Subscapularis anteriorly

Teres minor posteriorly

Capsule of the shoulder joint

Inferior: Teres major

Medial: long head of triceps brachii

Lateral: surgical neck of humerus

Contents:

Axillary nerve

Posterior circumflex humeral vessels

CONTENTS OF INFERIOR TRIANGULAR SPACE OF ARM(SA)

Radial nerve
Profunda brachii vessels

AXILLARY NERVE – MUSCLES SUPPLIED AND CLINICAL IMPORTANCE.(SA)

Muscles supplied:

Anterior branch: deltoid

Posterior branch: deltoid and teres minor

Clinical importance:

(1) Intramuscular injections are often given into the deltoid. They should be given in the middle of the muscle to avoid injury to the axillary nerve.
(2) The axillary nerve may be damaged by dislocation of the shoulder or by the fracture of surgical neck of humerus.

CLINICAL IMPORTANCE OF DELTOID MUSCLE(SA)

Intramuscular injections are often given into the deltoid. They should be given in the middle of the muscle to avoid injury to the axillary nerve.

- **Paralysis of deltoid:** produced by any damage to the axillary nerve

Resulting in loss of power of abduction upto 90° at the shoulder.

Paralysis of Deltoid muscle (inability to abduct the shoulder)

Sensory loss over the lower half of deltoid (regimental badge anaesthesia)

ANTERIOR COMPARTMENT OF ARM

CORACOBRACHIALIS (SE)

Origin-

tip of the coracoid process of scapula

Insertion-

middle of medial border of humerus

Nerve supply-

musculocutaneous nerve

Actions-

flexion and adduction of arm

Events occurring at the level of insertion-

Ulnar nerve pierces medial intermuscular septum enters posterior compartment of arm

Radial nerve pierces lateral intermuscular septum enters anterior compartment of arm

Median nerve crosses in front of brachial artery from lateral to medial side

Basilic vein pierces deep fascia and becomes deep

Shaft of humerus becomes triangular in shape

Nutrient branch of brachial artery enters nutrient foramen of humerus

BICEPS BRACHII MUSCLE- ATTACHMENTS, NERVE SUPPLY AND ACTIONS(SE)

Origin:

Long head- supraglenoid tubercle of scapula

Short head- tip of coracoid process of scapula

Insertion-

posterior part of radial tuberosity

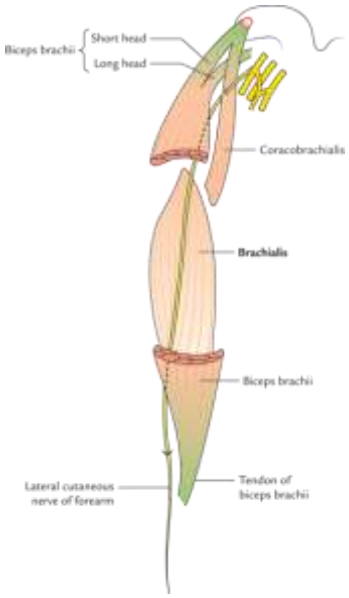
Nerve supply-

musculocutaneous nerve

Actions-

supination of forearm when elbow is flexed, flexion of elbow and shoulder

MUSCULOCUTANEOUS NERVE- ROOT VALUE, ORIGIN, RELATIONS, COURSE, BRANCHES(SE)



Root value-

C5, C6

Origin-

from lateral cord of brachial plexus

Course and relations-

it runs lateral to 3rd part of axillary artery, pierce coracobrachialis and descend in front of arm between biceps brachii and brachialis. Just above the elbow it pierces the deep fascia and becomes lateral cutaneous nerve of forearm.

Branches-

Muscular branches- coracobrachialis, biceps brachii, brachialis

Cutaneous branch- musculocutaneous continues as lateral cutaneous nerve of forearm supplies skin over lateral side of forearm

Articular branches- elbow joint

BRACHIAL ARTERY(SE)

Origin-

it is the continuation of the axillary artery at the level of the lower border of teres major

Course-

it runs downwards in front of arm till the neck of radius in cubital fossa where it terminates by dividing into terminal branches radial and ulnar arteries

Relations

Anterior-

skin, superficial fascia, deep fascia, median nerve crossing from lateral to medial side, bicipital aponeurosis

Posterior-

long head of triceps, medial head of triceps, coracobrachialis, brachialis, radial nerve, profunda brachii artery

Lateral-

median nerve in upper part, biceps brachii in lower part

Medial-

ulnar nerve, basilica vein, medial cutaneous nerve of forearm in upper part, median nerve in lower part

Branches

Muscular branches

Profunda brachii artery- supplies posterior compartment of arm

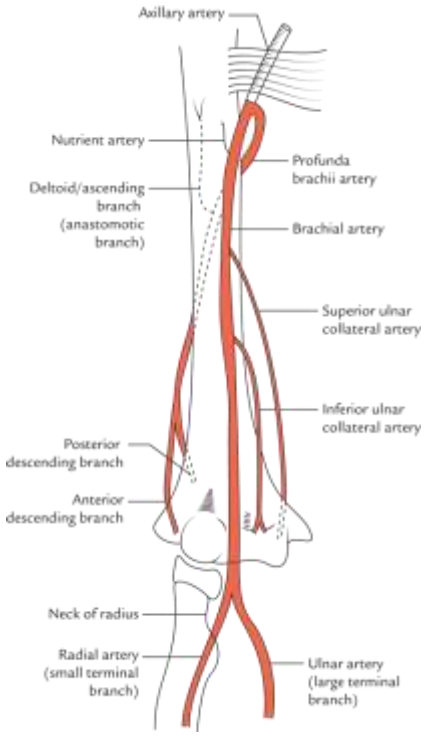
Superior ulnar collateral artery- runs along with ulnar nerve and takes part in anastomosis around the elbow joint

Inferior ulnar collateral artery- arises 5cm above elbow joint and takes part in anastomosis around elbow joint

Nutrient artery- to humerus

Applied anatomy-

pulsations can be felt in front of elbow medial to biceps brachii tendon



ANASTOMOSIS AROUND ELBOW JOINT(SE)

In front of lateral epicondyle of humerus-

anterior branch of profunda brachii with radial recurrent artery

Behind lateral epicondyle of humerus-

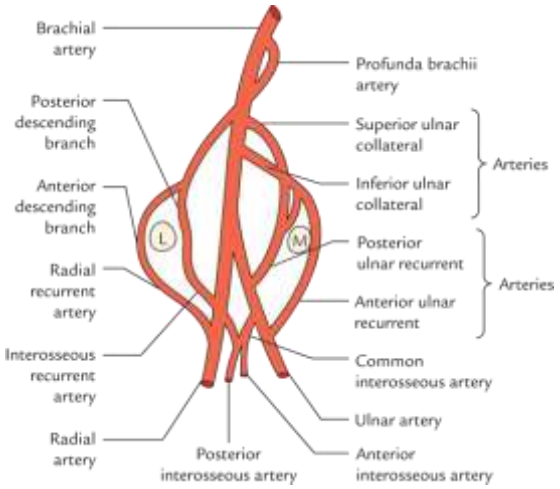
posterior branch of profunda brachii with interosseous recurrent artery

In front of medial epicondyle of humerus-

anterior branch of inferior ulnar collateral with anterior ulnar recurrent branch

Behind medal epicondyle of humerus-

superior ulnar collateral artery and posterior branch of inferior ulnar collateral with posterior ulnar recurrent artery



CUBITAL FOSSA- BOUNDARIES AND CONTENTS(SE)

Boundaries

Lateral- brachioradialis

Medial- pronator teres

Apex- crossing of brachioradialis over pronator teres

Base- imaginary line connecting two epicondyles of humerus

Roof-

skin, superficial fascia, deep fascia, bicipital aponeurosis, median cubital vein, basilica vein, cephalic vein, medial cutaneous nerve of forearm, lateral cutaneous nerve of forearm

Floor-

brachialis, supinator

Contents

Brachial artery, ulnar artery, radial artery

Median nerve

Tendon of biceps brachii

EVENTS OCCURRING AT INSERTION OF CORACHOBRACHIALIS (SA)

Ulnar nerve pierces medial intermuscular septum enters posterior compartment of arm

Radial nerve pierces lateral intermuscular septum enters anterior compartment of arm

Median nerve crosses in front of brachial artery from lateral to medial side

Basilic vein pierces deep fascia and becomes deep

Shaft of humerus becomes triangular in shape

Nutrient branch of brachial artery enters nutrient foramen of humerus

BICEPS BRACHII MUSCLE- NERVE SUPPLY AND ACTIONS(SA)

Nerve supply- musculocutaneous nerve

Actions- supination of forearm when elbow is flexed, flexion of elbow and shoulder

BRACHIALIS - ATTACHMENTS, NERVE SUPPLY AND ACTION(SA)

Origin-

lower half of anterior surface of shaft of humerus, adjacent surfaces of medial and lateral intermuscular septa

Insertion-

ulnar tuberosity, anterior surface of coronoid process of ulna

Nerve supply-

musculocutaneous, radial

Actions-

flexion of elbow

MUSCULOCUTANEOUS NERVE(SA)

Origin-

from lateral cord of brachial plexus

Course and relations-

it runs lateral to 3rd part of axillary artery, pierce coracobrachialis and descend in front of arm between biceps brachii and brachialis. Just above

the elbow it pierces the deep fascia and becomes lateral cutaneous nerve of forearm.

Branches -

Muscular branches- coracobrachialis, biceps brachii, brachialis

Cutaneous branch- musculocutaneous continues as lateral cutaneous nerve of forearm supplies skin over lateral side of forearm

Articular branches- elbow joint

NAME THE MUSCLES SUPPLIED BY MUSCULOCUTANEOUS NERVE(SA)

Coracobrachialis, biceps brachii, brachialis

BRANCHES OF BRACHIAL ARTERY(SA)

Muscular branches

Profunda brachii artery

Superior ulnar collateral artery

Inferior ulnar collateral artery

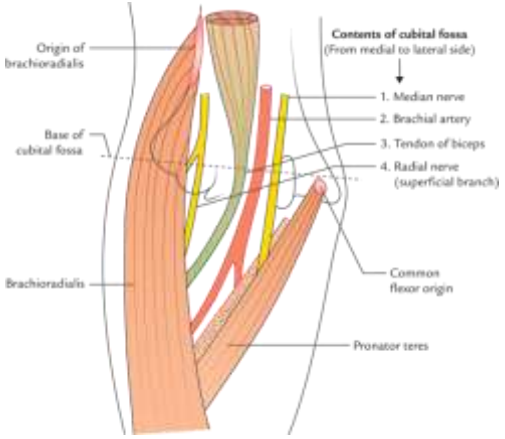
Nutrient artery

CUBITAL FOSSA- BOUNDARIES, CONTENTS AND CLINICAL APPLICATIONS(SA)

Boundaries

Lateral- brachioradialis

Medial- pronator teres



Apex- crossing of brachioradialis over pronator teres

Base- imaginary line connecting two epicondyles of humerus

Roof-

skin, superficial fascia, deep fascia, bicipital aponeurosis, median cubital vein, basilica vein, cephalic vein, medial cutaneous nerve of forearm, lateral cutaneous nerve of forearm

Floor-

brachialis, supinator

Contents

Tendon of biceps brachii

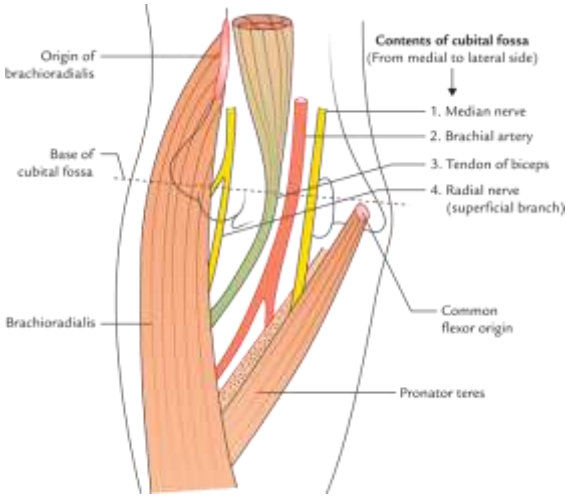
Brachial artery, ulnar artery, radial artery

Median nerve

Clinical applications

Median cubital vein used for veni puncture, Intravenous injections and cardiac catheterizations

DRAW A NEAT LABELED DIAGRAM OF BOUNDARIES AND CONTENTS OF CUBITAL FOSSA(SA)



Cubital fossa is a triangular hollow area situated in front of elbow.

Boundaries:

Laterally- Brachioradialis muscle

Medially- Pronator Teres muscle

Base- Directed upwards formed by imaginary line joining the two epicondyles of humerus

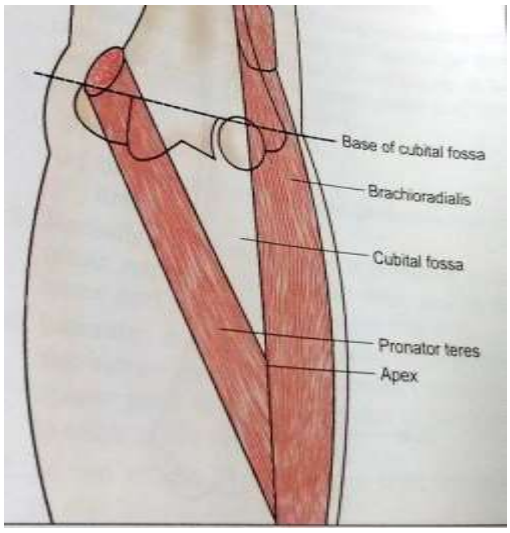
Apex – Directed downwards formed by meeting point of medial and lateral borders.

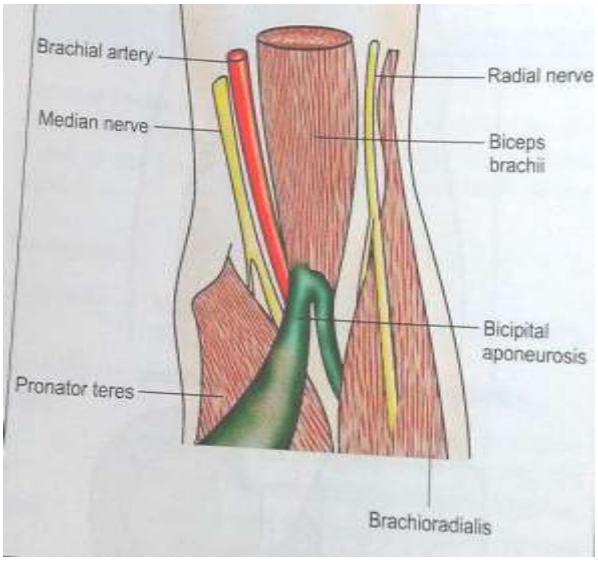
Roof- skin, superficial fascia containing median cubital vein,medial and lateral cutaneous nerves of forearm.

Deep fascia-Bicipital aponeurosis

Floor – formed by 2 muscles

Brachialis, Supinator





Contents- From medial to lateral,

Median Nerve

Brachial artery – terminates by dividing into Radial artery & Ulnar artery.

Tendon of Biceps Brachii

Radial Nerve

ORIGIN, ROOT VALUE , COURSE,RELATIONS , BRANCHES AND APPLIED ANATOMY OF RADIAL NERVE(TILL IT REACHES ELBOW) (LE)

Origin

Posterior cord of brachial plexus

Root value

C5-C8 and T1

Course

It runs behind the third part of axillary artery.

In the arm it runs behind the brachial artery and enters the lower triangular space to reach the radial groove on the back of the humerus.

The nerve reaches the lateral side of the arm 5 cms below the deltoid tuberosity, pierces lateral intermuscular septum and enters the anterior compartment of arm

It descends down across lateral epicondyle into cubital fossa.

It terminates by dividing into superficial and deep branch below the level of lateral epicondyle.

Relations

In the lower part of axilla

Anteriorly

Third part of axillarey artery

Posteriorly

Subscapularis,latissimus dorsi and teres major

Laterally

Axillary nerve, coracobrachialis.

Medially

Axillary vein

In the upper part of arm

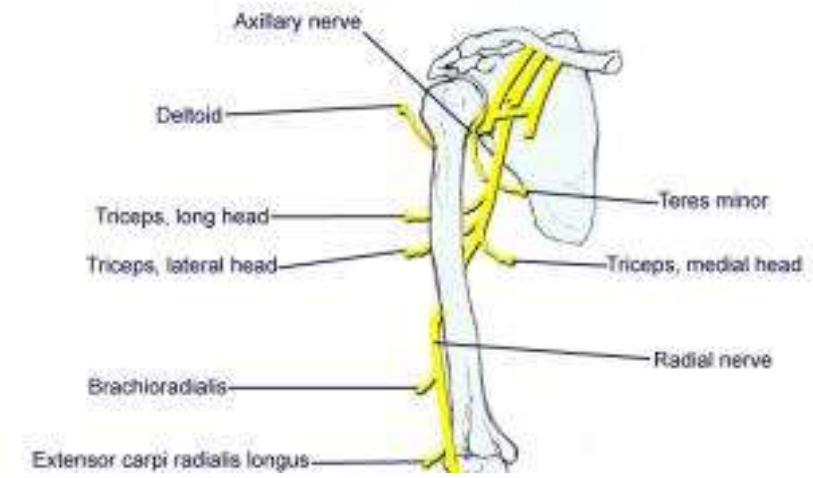
It continues behind brachial artery and passes through the lower triangular space with the profunda brachii vessels.

It then enters the radial groove.

In the radial groove

The nerve runs downwards and laterally between the lateral and medial heads of triceps brachii, in contact with the humerus. At the

lower end of the groove the nerve pierces the lateral intermuscular septum and passes into the anterior compartment of the arm to reach the cubital fossa.



Branches

Muscular branches –

Long and medial head of triceps brachii

Lateral head of triceps brachii

Anconeus

Brachialis (proprioceptive fibres)

Brachioradialis

Extensor carpi radialis longus.

Cutaneous branches

Posterior cutaneous nerve of the arm

Lower lateral cutaneous nerve of the arm

Posterior cutaneous nerve of the forearm

Articular branches

To elbow joint

Applied anatomy

Radial nerve is commonly damaged in the radial groove.

The causes are

Saturday night palsy- sleeping in an armchair with the limb hanging by

the side of the chair

Crutch paralysis- pressure of the crutch.

Fracture of the shaft of the humerus resulting in wrist drop

Wrist drop- weakness and loss of power of extension of the wrist and sensory loss over a narrow strip on the back of forearm and lateral side of dorsum of the hand

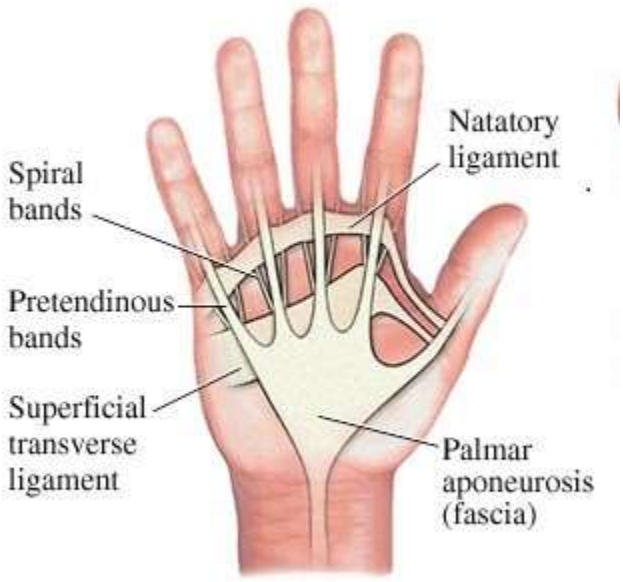
FOREARM AND HAND

NAME THE SPACES IN THE PALM. DESCRIBE THE BOUNDARIES OF MIDPALMAR SPACE.ADD A NOTE ON APPLIED ANATOMY.(LE)

PALMAR APONEUROSIS (SE)

Palmar aponeurosis is the deep fascia in the central region of the palm.

It is regarded as the degenerated tendon of palmaris longus.



Features

It is Triangular in shape and has

Apex, Base, Medial border and Lateral border

Apex

Is the narrow proximal end.

It blends with flexor retinaculum.

Base

is the broad distal end

divides into four longitudinal slips proximal to heads of metacarpals to medial four digits

each slip further divides into two slips which blend with fibrous flexor sheath of corresponding digits.

The digital nerves, vessels and tendon of lumbricals emerge through the interval between four longitudinal slips

Medial border

Continuous with deep fascia covering the hypothenar muscles

Gives origin to palmaris brevis

Lateral border

Continuous with deep fascia covering the thenar muscles

From the medial and lateral borders, medial and lateral palmar septa pass backwards and divide the palm into compartments.

Functions:

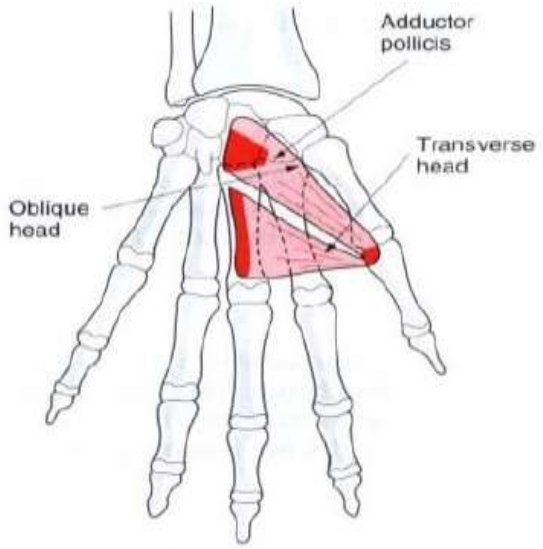
Helps to improve the grip of hand by fixing the skin
Protects the underlying tendons, nerves and vessels

ADDUCTOR POLLICIS MUSCLE (SE)

Adductor pollicis is a fan shaped muscle located deep in the palm.

Origin

Consists of two heads **(a) oblique (b) transverse**
Oblique head : base of 2nd and 3rd metacarpal
Transverse head: shaft of 3rd metacarpal



Insertion:

Base of proximal phalanx of thumb

Nerve supply:

Deep branch of *ulnar nerve*(C8, T1)

Action:

Adduction of the thumb

LUMBRICALS – ATTACHMENTS , NERVE SUPPLY AND ACTIONS (SE)
NERVE SUPPLY AND ACTIONS (SA)

Lumbricals are four small, worm-like muscles in each hand.

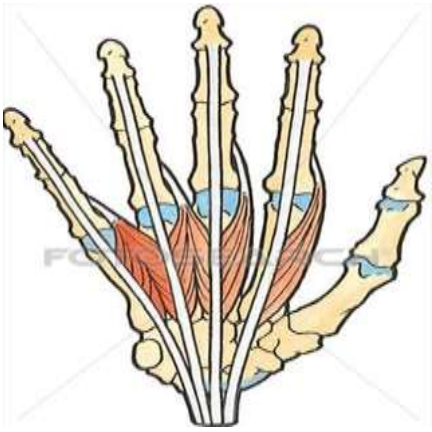
Origin

All arise from 4 tendons of flexor digitorum profundus.
Lumbricals 1 and 2 (unipennate)

From lateral side of lateral two tendons of flexor digitorum profundus
Lumbricals 3 and 4 (bipennate)
From adjacent sides of medial three tendons of flexor digitorum profundus

Insertion

To lateral side of dorsal digital expansion of 2nd to 5th digits



Nerve SUPPLY

1st and 2nd lumbricals – median nerve
3rd and 4th lumbricals- deep branch of ulnar nerve

Actions

Flexion at metacarpophalangeal joints
Extension at proximal and distal interphalangeal joints

PALMAR APONEUROSIS (SA)

It is central part of the **deep fascia** of the palm and degenerated tendon of palmaris longus.

Features

It is triangular in shape
It has Apex, Base, Medial border,& Lateral border

Apex

Is the narrow proximal end.
It blends with flexor retinaculum.

Base

Is the broad distal end
Divides into four longitudinal slips to medial four digits

Each slip further divides into two slips which blend with fibrous flexor sheath of corresponding digits.

The digital nerves, vessels and tendon of lumbricals emerge through the interval between four longitudinal slips

Medial border

Continuous with deep fascia covering the hypothenar muscles

Gives origin to palmaris brevis

Lateral border

Continuous with deep fascia covering the thenar muscles

Functions

(1) Helps to improve the grip of hand by fixing the skin

(2) Protects the underlying tendons, nerves and vessels

ADDUCTOR POLLICIS (SA)

Origin:

Oblique head : base of 2nd and 3rd metacarpal

Transverse head: shaft of 3rd metacarpal

Insertion:

Base of proximal phalanx of thumb

Nerve supply

Deep branch of ulnar nerve (C8, T1)

Actions

Adduction of the thumb

MUSCLES OF HYPOTHENAR EMINENCE (SA)

abductor digiti minimi

flexor digiti minimi

opponens digiti minimi

Supplied by deep branch of ulnar nerve.

NERVE SUPPLY OF DORSAL INTEROSSEI OF HAND (SA)

All the four dorsal interossei are supplied by deep branch of ulnar nerve.

ACTIONS OF INTEROSSEI OF HAND (SA)

Palmar interossei:

Adduct fingers towards centre of middle finger

Dorsal interossei:

Abduct fingers from centre of third digit.

Both palmar and dorsal interossei flex the matacarpophalangeal joints and extend the interphalangeal joints.

DUPUYTREN'S CONTRACTURE (SA)

It **is** a condition in which there is fixed forward curvature of one or more fingers,

Cause

Progressive fibrosis in the medial part of palmar aponeurosis

↓

Results in permanent contraction

↓

Causing fixed flexion deformity of liitle and ring fingers

↓

Proximal and middle phalanges are acutely flexed but distal phalanges remain unaffected.

SUPINATOR MUSCLE (SE)

Supinator is a deep muscle of forearm.

Origin

Lateral epicondyle of humerus

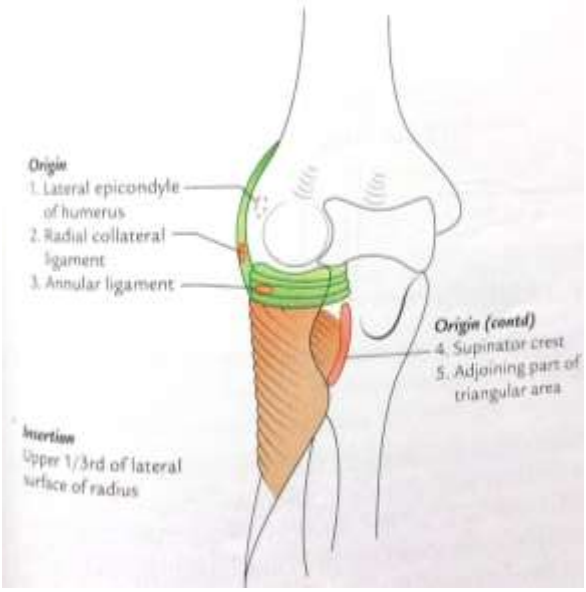
Lateral ligament of elbow joint

Annular ligament

Supinator crest of ulna.

Insertion

Upper 1/3rd of posterior , lateral and anterior surface of radius.



Nerve supply

Posterior interosseous nerve – branch of radial nerve.

Action

Supination of forearm.

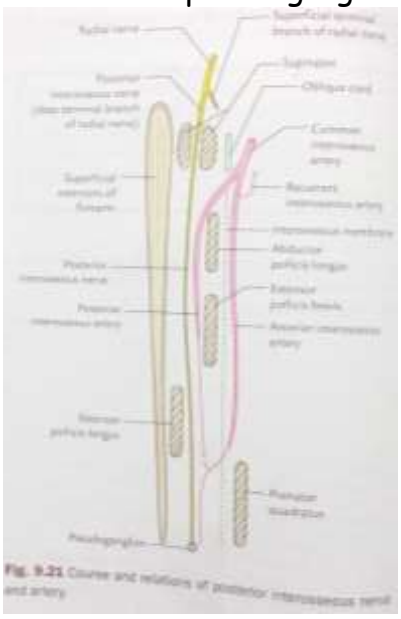
Posterior interosseus nerve (SE)

Posterior interosseus nerve is the deep terminal branch of radial nerve.

It is the chief nerve of the back of forearm.

It begins at the cubital fossa and passes through supinator muscle to reach the back of forearm.

It ends in a pseudoganglion in the 4th compartment of extensor retinaculum.



Branches

Muscular branches – to the extensor group of muscles
To extensor carpi radialis brevis , supinator , extensor digitorum, extensor digiti minimi, extensor carpi ulnaris, abductor pollicis longus, extensor policis brevis, extensor pollicis longus, extensor indicis.

Articular branches to wrist joint, distal radioulnar joint.

Sensory branches to radius and ulna.

RETINACULA AND SPACES OF HAND

Name the spaces in the palm. Describe the boundaries of midpalmar space. Add a note on its applied anatomy (LE)
Boundaries and contents of midpalmar space (SA)

Spaces in the palm-
- Midpalmar space
- Thenar space
- Web space
- Pulp space

Midpalmar space

Boundaries-

Anterior
- skin, superficial fascia, medial part of palmar aponeurosis, superficial palmar arch, ulnar bursa

Posterior
- 3rd and 4th doral and palmar interossei with the anterior interosseous fascia covering them

Medial

hypothenar septum (medial palmar septum)

Lateral

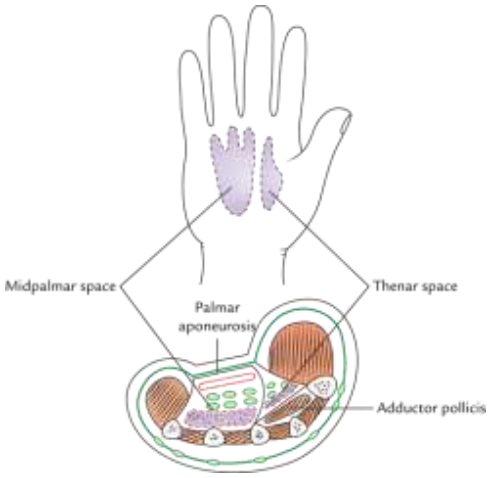
midpalmar septum separating it from the thenar space

Distal

space is continuous with medial 3 web spaces through lumbrical canals

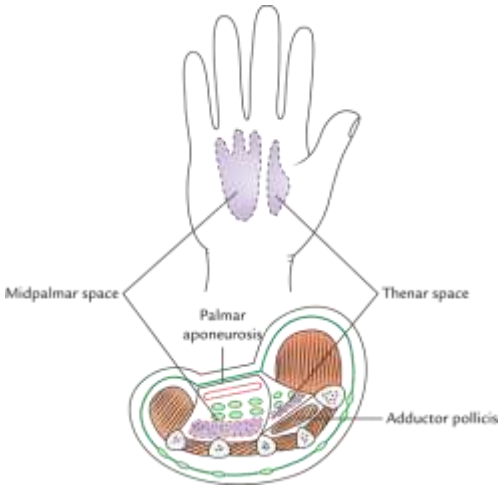
Proximal

space is continuous with space of parona in the forearm between flexor tendons and pronator quadratus



Contents - 2nd, 3rd, 4th lumbrical muscles

Applied anatomy - Infections may spread into the midpalmar space through ulnar bursa and can spread to lumbrical canals and web space.The pus in the space is drained by putting vertical incision in the medial 2 web spaces



FLEXOR RETINACULUM OF HAND (SE)
FLEXOR RETINACULUM ATTACHMENTS (SA)
STRUCTURES SUPERFICIAL TO FLEXOR RETINACULUM (SA)

It is thickened part of deep fascia over the carpus

Attachments

Medial

pisiform, hook of hamate

Lateral

tubercle of scaphoid, crest of trapezium. Near the trapezium it splits into two slips, superficial attaches to crest and deep to medial margin of groove on trapezium.

Upper margin-

continues with deep fascia of forearm and Palmaris longus

Lower margin-

gives attachment to the apex of palmar aponeurosis

It gives origin to thenar and hypothenar muscles of hand

Relations

Superficial to flexor retinaculum

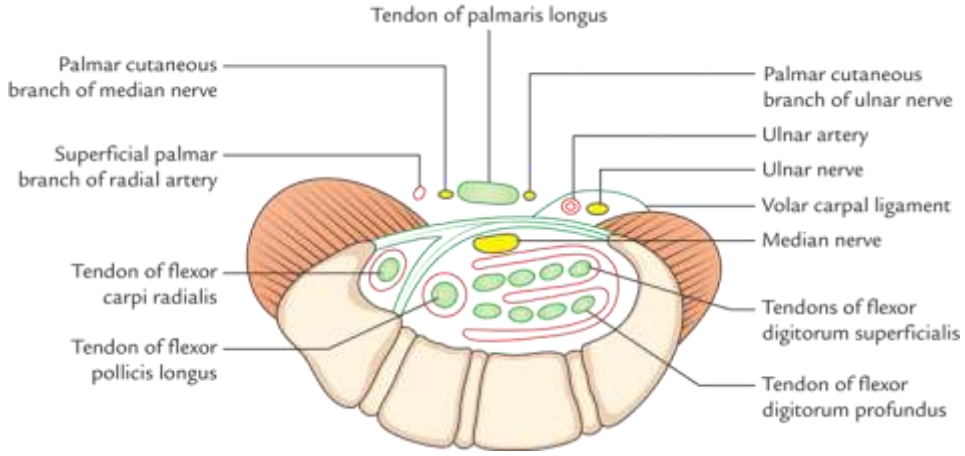
ulnar nerve, ulnar vessels, palmar cutaneous branch of ulnar nerve, tendon of Palmaris longus, palmar cutaneous branch of median nerve, superficial palmar branch of radial artery

Deep to flexor retinaculum

long flexor tendons of digits, median nerve

Applied anatomy-

carpal tunnel syndrome-



median nerve is compressed leading to burning pain along three and half fingers and wastage of thenar muscles

CARPAL TUNNEL SYNDROME (SE)

Carpal tunnel syndrome (**CTS**) is a medical condition due to compression of the median nerve as it travels through the wrist at the carpal tunnel

Causes- Exact cause is not known

Risk factors include obesity, repetitive wrist work eg computer work vibrating tools, pregnancy hypothyroidism and rheumatoid arthritis.

Symptoms

The main symptoms are pain, numbness and tingling, in the thumb, index finger, middle finger, and the thumb side of the ring fingers.

Symptoms typically start gradually and during the night. Pain may extend up the arm. Weak grip strength may occur and after a long period of time the thenar muscles may waste away. In more than half of cases both sides are affected.

Treatment

Symptoms can be improved by wearing a wrist splint or with corticosteroid injections. Surgery to cut the transverse carpal ligament is effective with better results

PALMAR APONEUROSIS (SE)

It is triangular deep fascia which occupies central area of palm and has following features

Apex

It is directed proximally and attached to flexor retinaculum.

Base

Is directed distally and divides into 4 slips. Each slip divides into two bands one passing to skin, and the other passing deep to the root of finger and attached to fibrous flexor sheath and deep transverse ligaments.

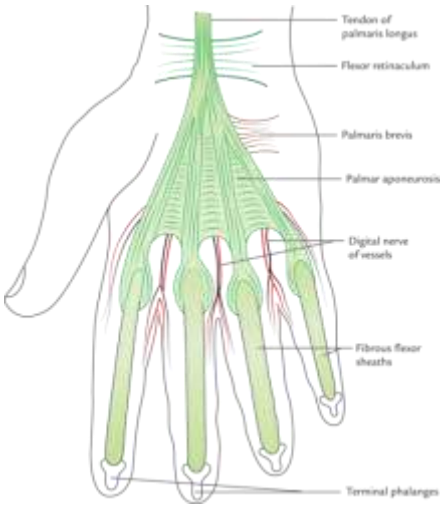
Medial and lateral borders

Are continuous with thinner deep fascia covering hypothenar and thenar muscles and sends septa posteriorly.

Functions

The palmar aponeurosis give firm attachment to the overlying skin, improves the grip and protect the underlying tendons

Clinical anatomy - Dupuytren's contracture- localized thickening and contracture of palmar aponeurosis which limits the hand functioning and eventually disable the hand.



EXTENSOR RETINACULUM OF WRIST (SE)

Attachments-

Medial-

triquetral, pisiform bones

Lateral-

lower part of anterior border of radius

The retinaculum sends five septa and divides the space beneath it into 6 compartments. The structures passing through the compartments are as follows

1st compartment- abductor pollicis longus, extensor pollicis brevis

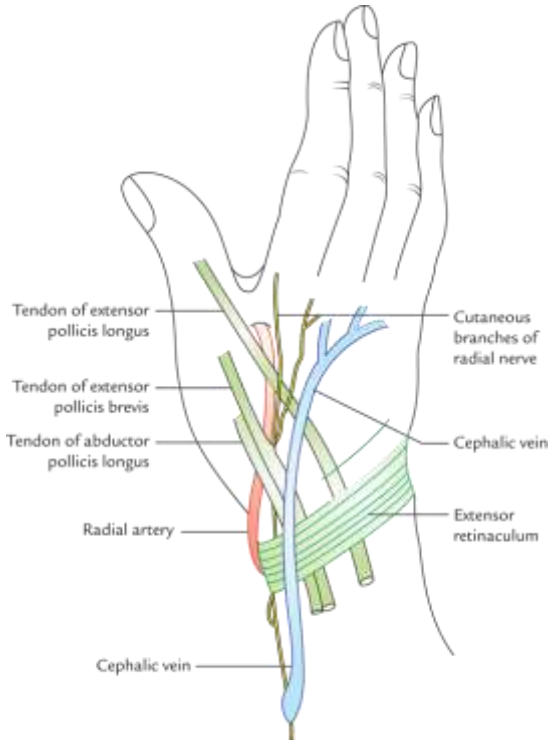
2nd compartment- extensor carpi radialis longus, extensor carpi radialis brevis

3rd compartment- extensor pollicis longus

4th compartment- extensor digitorum, extensor indicis, anterior interosseous artery, posterior interosseous nerve

5th compartment- extensor digiti minimi

6th compartment- extensor carpi ulnaris



STRUCTURES PASSING THROUGH CARPAL TUNNEL (SA)

Tendons of Flexor digitorum superficialis
flexor digitorum profundus
median nerve

STRUCTURES AFFECTED IN CARPAL TUNNEL SYNDROME (SA)

Tendons of Flexor digitorum superficialis
flexor digitorum profundus
median nerve

PALMAR APONEUROSIS (SA)

The palmar aponeurosis give firm attachment to the overlying skin, improves the grip and protect the underlying tendons
Apex is directed proximally and attached to flexor retinaculum
Base is directed distally and divides into 4 slips. Each slip is attached to skin, fibrous flexor sheath and deep transverse ligaments.

Medial and lateral borders are continuous with thinner deep fascia covering hypothenar and thenar muscles and sends septa posteriorly.

FASCIAL SPACES OF HAND (SA)

They are certain potential spaces which become obvious when infected

Dorsal spaces of hand-

Dorsal subcutaneous space

Dorsal subaponeurotic space posterior interosseous space

Palmar spaces-

Midpalmar space

Thenar space

Web space

Pulp space

CONTENTS OF 4TH COMPARTMENT UNDER EXTENSOR RETINACULUM OF HAND (SA)

extensor digitorum

extensor indicis

anterior interosseous artery

posterior interosseous nerve

CARPAL TUNNEL SYNDROME (SA)

median nerve is compressed due to thickening of synovial sheaths of fingers or fracture dislocation of carpal bones leading to burning pain along three and half fingers and wastage of thenar muscles

DUPUYTREN'S CONTRACTURE (SA)

It is a localized thickening and contracture of palmar aponeurosis which limits the hand functioning and eventually disable the hand