Surface Anatomy of the Limbs

VEINS AND PULSES IN THE LOWER LIMB

ANTEROMEDIAL

1. Anterior view of left lower limb to show: GREAT (LONG) SAPHENOUS VEIN

Perforating veins at 3.5cm above ankle

3. Saphenous nerve

POSTERIOR

2. Posterolateral view of right lower limb to show: SMALL (SHORT) SAPHENOUS VEIN

Pulses
1. Femoral in groin
2. Popliteal in popliteal fossa
3. Posterior tibial behind medial malleolus
4. Dorsalis pedis on dorsum of foot between extensor hallucis longus & extensor digitorum

Great saphenous vein commences at the medial side of the dorsal venous arch and passes just anterior to the medial malleolus with the saphenous vein lying alongside it. It passes a hand’s breadth posteromedial to the patella.

The small saphenous vein commences at the lateral side of the dorsal venous arch and passes just behind the lateral malleolus. It passes upwards on the posterior aspect of the calf with the sural nerve lying alongside it. It perforates the popliteal fascia and joins the popliteal vein at a variable site.
LOWER LIMB LYMPHATICS

- Leg
  - Medial thigh
  - Foot

Superficial vertical group

Superficial horizontal group
- Buttocks
  - Abdominal wall
  - Perineum
  - Lateral thigh

Iliac & lateral pelvic

Para-aortic

Cloquet’s node is highest in femoral canal, medial to femoral vein, lateral to lacunar ligament

Deep inguinal
- Anterior perineum
- Thigh
- Leg
- Foot

Popliteal
- Skin of sole of foot & posterior calf
MEDIAL THIGH

Branch of obturator artery via ligamentum teres to fovea of head of femur


OBURATOR NERVE

From anterior divisions of L2,3,4

Anterior branch:
Lies between adductors longus & brevis, contributes to subsartorial plexus for medial thigh skin, supplies gracilis, adductors longus, brevis

Posterior branch:
Lies between adductors brevis & magnus, supplies adductor portion of adductor magnus, obturator externus & knee joint via a small branch that passes through the adductor hiatus

Medial collateral ligament of knee is probably a remnant of the tendon of the hamstring portion of adductor magnus that was originally attached to the tibia

ADDUCTOR HIATUS
Transmits femoral artery, femoral vein, the small genicular branch of the posterior branch of the obturator nerve. The saphenous nerve may pass through it, but if so, then it immediately returns more superficially so that it does not enter the popliteal fossa
VEINS AND PULSES IN THE LOWER LIMB

ANTEROMEDIAL

1. Anterior view of left lower limb to show:
   GREAT (LONG) SAPHENOUS VEIN

2. Perforating veins at 3, 6, 9 cm above ankle

3. Saphenous nerve

POSTERIOR

2. Posterolateral view of right lower limb to show:
   SMALL (SHORT) SAPHENOUS VEIN

Pulses
1. Femoral in groin
2. Popliteal in popliteal fossa
3. Posterior tibial behind medial malleolus
4. Dorsalis pedis on dorsum of foot between extensor hallucis longus & extensor digitorum

Great saphenous vein commences at the medial side of the dorsal venous arch and passes just anterior to the medial malleolus with the saphenous vein lying alongside it. It passes a hand's breadth posteromedial to the patella.

The small saphenous vein commences at the lateral side of the dorsal venous arch and passes just behind the lateral malleolus. It passes upwards on the posterior aspect of the calf with the sural nerve lying alongside it. It perforates the popliteal fascia and joins the popliteal vein at a variable site.
RIGHT PATELLA

Largest sesamoid bone in body
Mobile from side to side

Upper lateral part is site of bipartite patella

Apex
Anterior view

Anterior/posterior is obvious

Lateral/posterior surface is: Larger, longer, more steeply sloped

Patella tendon attaches to the tibial tubercle

Posterior view

ARTICULATION WITH FEMUR

1. In extension
2. In slight flexion
3. In flexion
4. In full flexion

Lateral  Medial

OSSIFICATION

Several centres between 3 & 6 years that fuse at puberty (they appear as child starts running). Sometimes a separate centre superior/lateral at 6 years - fuses at puberty

Deviations from the vertical (the tibia) to a line along the femur (pull of quadriceps). Wider the pelvis, the greater Q angle (F > M)
Offset tends to pull patella laterally. 3 factors avoid dislocation

1. Insertion of lower fibres of vastus medialis into medial side of patella
2. Stronger medial retinacular fibres of knee capsule
3. More anteriorly protuberant lateral condyle of lower femur. Note that lateral condyle is smaller than medial one but it protrudes further anteriorly

THE Q ANGLE AND PATELLA DISLOCATION
FASCIA LATA

- Tensor fasciae latae
- Cribiform fascia
- Great saphenous vein
- To margin of medial tibial condyle
- To patella
- To margin of lateral tibial condyle
- To head of fibula

ILIOTIBIAL TRACT
- Thickening of fascia lata over greater trochanter after insertion of tensor fasciae latae and gluteus maximus. Attaches to anterior surface of lateral tibial condyle. It maintains knee locked.

ATTACHMENTS OF FASCIA LATA

START → Pubic tubercle → Inguinal ligament → ASIS → Outer margin of iliac crest → Iliac tubercle → Posterior gluteal Line → Sacrotuberous ligament → Ischial tuberosity

END ← Along pectineal line ← Below pubic tubercle ← Body of pubis ← Ischiopubic ramus ← Ischial tuberosity
**FEMORAL TRIANGLE**

- Anterior superior iliac spine
- Inguinal ligament
- Iliopsoas
- Femoral vessels
- Pectineus
- Pubic tubercle
- Adductor longus

**BOUNDARIES**

- **Lateral**
  - Medial border of sartorius
- **Roof**
  - Fascia lata
- **Floor**
  - Marked muscles with adductor brevis just showing. It has the anterior division of the obturator nerve on its surface

**Superior**
- Inguinal ligament

**Medial**
- Medial border of adductor longus

**Contains**
- Femoral nerve
- Femoral artery
- Femoral vein
- Deep inguinal nodes
VEINS AND PULSES IN THE LOWER LIMB

ANTEROMEDIAL

1. Anterior view of left lower limb to show: GREAT (LONG) SAPHENOUS VEIN

Perforating veins at 3,6,9cm above ankle

3. Saphenous nerve

Pulses
1. Femoral in groin
2. Popliteal in popliteal fossa
3. Posterior tibial behind medial malleolus
4. Dorsalis pedis on dorsum of foot between extensor hallucis longus & extensor digitorum

4. Saphenous nerve

POSTERIOR

2. Posterolateral view of right lower limb to show: SMALL (SHORT) SAPHENOUS VEIN

Sural nerve

Lateral malleolus

Great saphenous vein commences at the medial side of the dorsal venous arch and passes just anterior to the medial malleolus with the saphenous vein lying alongside it. It passes a hand's breadth posteromedial to the patella.

The small saphenous vein commences at the lateral side of the dorsal venous arch and passes just behind the lateral malleolus. It passes upwards on the posterior aspect of the calf with the sural nerve lying alongside it. It perforates the popliteal fascia and joins the popliteal vein at a variable site.
TENDON & NEUROVASCULAR RELATIONSHIPS ON LATERAL ASPECTS OF RIGHT ANKLE

Tibialis anterior (CF-D): extension & inversion

Neurovascular bundle:
- Dorsalis pedis artery
- Accompanying vein
- Deep branch of common fibular n

Extensor hallucis longus (CF-D): extension

Extensor digitorum longus (CF-D): extension

Fibularis brevis (CF-S): eversion & flexion

Fibularis longus (CF-S): eversion & flexion

Lateral malleolus
Inferior extensor retinaculum

Fibularis brevis

Fibularis tertius (CF-D): extension & eversion

(CF-S) = Superficial br of common fibular n
(CF-D) = Deep br of common fibular n

Mnemonic for dorsal tendons, vessels & nerves from medial to lateral:
“Timothy Has A Very Nasty Diseased Foot”
From: Apex of femoral triangle to adductor hiatus
Borders:
Lateral: Vastus medialis
Medial: Adductor longus superiorly & adductor magnus inferiorly,
Roof: Sartorius, fascia, Subsartorial plexus (contributed to by the anterior branch of obturator, medial cutaneous n of thigh, saphenous nerve. It supplies the skin of medial thigh)
Contains: Femoral artery & vein; saphenous nerve; nerve to vastus medialis
Transmits: A small branch of the posterior division of the obturator nerve to the knee joint
Relations: Femoral artery is always between vein & saphenous nerve. Femoral vein spirals from medial to artery in femoral triangle to posterior to artery in canal.
Femoral artery gives descending genicular artery as it leaves the adductor hiatus
NERVE LESIONS IN THE UPPER LIMB - 14

AXILLARY NERVE DAMAGE IN FRACTURE OR DISLOCATON OF NECK OF HUMERUS

Aetiology: Fractured neck of humerus or dislocation of shoulder (in 5% of dislocations)

Muscle: Loss of deltoid and teres minor

Movement loss: Diminished flexion, extension & abduction of shoulder.

Result: Wasting of deltoid

Sensory loss: Upper lateral cutaneous nerve of arm from its posterior branch. The autonomous area for this nerve is an area the size of a 'regimental patch'

Test: For loss of sensation as indicated. In the acute clinical situation it is not practical to test for motor activity in deltoid
SURFACE ANATOMY

Henry’s method for finding the posterior interosseous nerve

3 fingers inferior to head of radius as the nerve passes into supinator
PALPABLE STRUCTURES IN THE UPPER LIMB

- Acromioclavicular joint
- Medial & lateral epicondyles
- Olecranon
- Head of radius
- Anconeus (posterior to olecranon)
- Radial & ulnar styloid processes
- Dorsal (Lister’s) tubercle of radius
- Hook of hamate
- Biceps tendon and aponeurosis
  Brachial, radial & ulnar pulses

Coracoid process
Both superior to deltopectoral groove
Lesser tuberosity
VULNERABLE NERVES IN THE ARM

RADIAL NERVE
Passes from where the posterior axilla meets the arm to a point 2/3 down a line from acromion to the lateral epicondyle then it passes anterior to the lateral epicondyle
NERVES NEAR SURFACE OR PALPABLE IN UPPER LIMB

Upper trunk over first rib
Supraclavicular
Median between palmaris longus & flexor carpi radialis
Median over brachial artery
Ulnar behind medial epicondyle
Ulnar lateral to pisiform
Extensor pollicis longus
Extensor pollicis brevis
Abductor pollicis longus
Superficial branch of the radial nerve palpable over tendon of extensor pollicis longus
Cephalic vein
SURFACE ANATOMY

Extensor pollicis longus to base of distal phalanx
Extensor pollicis brevis to base of proximal phalanx
Snuff box
Trapezium & Scaphoid
Abductor pollicis longus to base of first metacarpal

ANATOMICAL SNUFF BOX

Superficial branch of the radial nerve
Radial artery lying on scaphoid & trapezium in snuff box
Cephalic vein
CUTANEOUS NERVES OF UPPER LIMB

Upper lateral cutaneous n of arm (axillary C5,6)

Lower lateral cutaneous n of arm (radial 5,6)

Lateral cutaneous n of forearm (musculo-cutaneous C5,6)

Median (C6,7,8)

Supracleavicular (C3,4)

Intercostobrachial (T2)

Medial cutaneous n of arm (C8,T1)

Posterior cutaneous n of arm (radial C5,6,7,8)

Posterior cutaneous n of forearm (radial C5,6,7,8)

Medial cutaneous n of forearm (C8,T1)

Ulnar (C8,T1)

Upper lateral cutaneous n of arm (axillary-C5,6)

Lower lateral cutaneous n of arm (radial 5,6)

Lateral cutaneous n of forearm (musculo-cutaneous C5,6)

Radial (C6,7,8)

Note: there is no lateral cutaneous branch of T1. The intercostal nerve T2, intercostobrachial, & T3 have anterior & posterior branches that anastomose with medial cutaneous nerve of arm to supply medial arm & floor of axilla
SUPERFICIAL VEINS AND PULSES IN UPPER LIMB

**Cephalic vein**
Pierces the clavipectoral fascia at upper end of the deltopectoral groove to enter axillary vein

**Radial artery**
Pulse. Lateral to the tendon of flexor carpi radialis

**Basilic vein**
Pierces the fascia in the medial mid arm to join the **venae committantes** which together, at the inferior border of teres major, become the **axillary vein**

Dorsal venous arch

Commencement of the **basilic vein** (medial side)

Commencement of the **cephalic vein** (lateral side)
SUPERFICIAL CUBITAL FOSSA (RIGHT SIDE)

Boundaries:
- Triangular area between:
  - Pronator teres
  - Brachioradialis
  - Line between epicondyles

Contains:
- Brachial artery
- Median nerve
- Biceps tendon
- Lymph nodes

Roof:
- Deep fascia of forearm
- Bicipital aponeurosis
- Median cubital vein
- Medial cutaneous nerve of forearm
- Lateral cutaneous nerve of forearm

Floor:
- Brachialis
- Supinatior

[Diagram of the superficial cubital fossa with labeled muscles and nerves]