KNEE JOINT- TYPE & BONES, CAPSULE& LIGAMENTS, INTRAARTICULAR STRUCTURES(MENISCUS & CRUCIATE LIG), BLOOD & NERVE SUPPLY, MOVEMENTS AND MUSCLE PRODUCING MOVEMENTS, BURSAE AROUND THE KNEE AND APPLIED ANATOMY.(LE)

Type of joint:

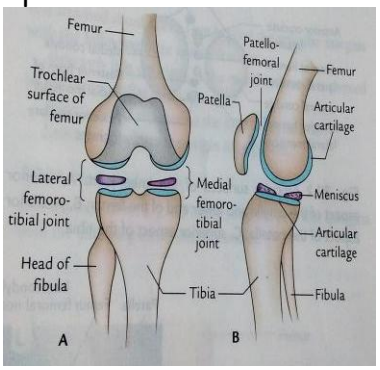
Knee joint is a synovial joint of modified hinge variety.

Articular surfaces-

It is a compound joint –

Right and left condylar joints between condyles of femur and tibia.

One saddle joint between femur and patella



Bones articulating in knee joint:

Articular surfaces of medial and lateral condyles of femur

Trochlear surface of femur

Articular surface of patella

Articular surfaces of medial and lateral condyles of tibia.

Ligaments of knee joint:

Capsular ligament

Ligamentum patellae

Tibial collateral ligament

Fibular collateral ligament

Anterior and posterior cruciate ligaments

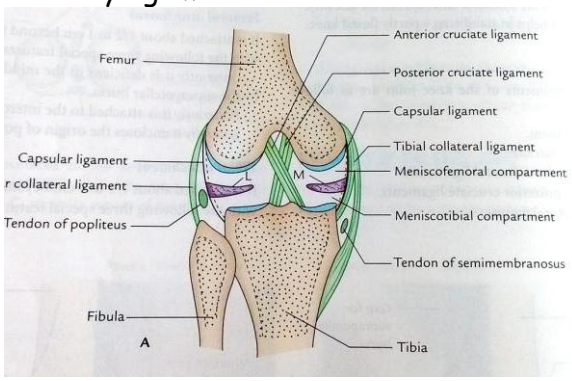
Medial and blaster all menisci

Oblique popliteal ligament

Arcuate popliteal ligament

Transverse ligament

Coronary ligaments



Intraarticular structures of knee joint(Menisci and cruciate ligaments)

Menisci of knee joint

These are two crescent shaped fibrocartilaginous discs. They deepen the articular surfaces of the condyles of tibia.

Partly divide the joint cavity into upper and lower compartments.

Each meniscus has

- Two ends- anterior and posterior
- Two borders- thick outer border and thin inner border
- Two surfaces- upper surface and lower surface.

Functions of Menisci-

- Menisci increase the concavity of tibial condyles
- They acts as shock absorbers
- They partly divide the joint cavity.
- They act as swabs to lubricate the joint cavity.

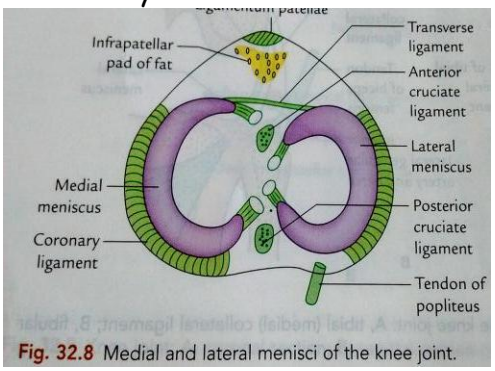


Fig. 32.8 Medial and lateral menisci of the knee joint.

Medial meniscus

- Semilunar in shape.
- It is adherent to deep part of tibial collateral ligament.

Lateral meniscus

- Nearly circular in shape.
- Lateral meniscus is attached to tendon of popliteus, hence less prone to injury

Cruciate ligaments of knee joint

There are two cruciate ligaments inside the knee joint.

Anterior cruciate ligament

Posterior cruciate ligament

These two ligaments cross each other like the lett er 'X'.

Function

They form direct bond between tibia and femur.

Help in maintaining antero-posterior stability of knee joint.

Anterior cruciate ligament:

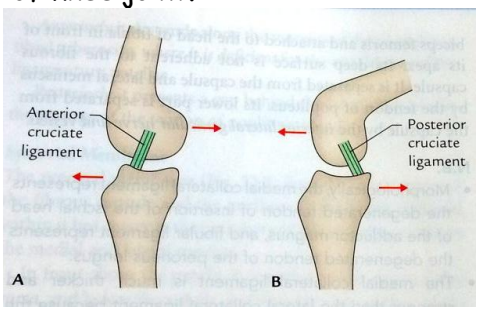
Attachment:

Below- Anterior part of inter condylar area of tibia

Above- medial surface of lateral condyle of femur.

It prevents posterior dislocation of femur on tibia.

It is the key stabilizer of knee joint.



Posterior cruciate ligament:

Attachment:

Below – Posterior part of inter condylar area of tibia

Above- lateral surface of medial condyle of femur.

It prevents anterior dislocation of femur on tibia.

Cruciate ligaments are supplied by middle genicular arteries.

Blood supply of knee joint

Five genicular branches of popliteal artery

Descending genicular artery, branch of femoral artery

Descending branch of lateral circumflex femoral artery

Two recurrent branches of anterior tibial artery

Circumflex fibular branch of posterior tibial artery.

Nerve supply

Femoral nerve, through its branches to vasti

Tibial and common peroneal nerves through their genicular branches.

Obturator nerve.

Movements and muscles producing movements

Flexion- Hamstring muscles

Assisted by popliteus, sartorius, gracilis, gastrocnemius and plantaris.

Extension-Quadriceps femoris

Assisted by tensor fasciae lata

Medial Rotation- semitendinosus, semimembranosus, popliteus

Assisted by -sartorius, gracilis

Lateral rotation-Biceps femoris

Assisted by – gluteus maximus and tensor fasciae lata.

Bursae around the knee –

Divided into three groups, according to their location.

Anterior Group:

Subcutaneous prepatellar bursa

Subcutaneous infrapatellar bursa

Deep infrapatellar bursa
Supra patellar bursa.

Lateral Group:

Bursa between lateral head of gastrocnemius and joint capsule.
Bursa between tendon of biceps femoris and fibular collateral ligament.
Bursa between tendon of popliteus and fibular collateral ligament.
Popliteus bursa between popliteus and joint capsule

Medial Group:

Bursa between medial head of gastrocnemius and joint capsule
Bursa between tibial collateral ligament and tendons of sartorius, gracilis and Semitendinosus (Bursa Anserine)
Bursa between superficial and deep parts of tibial collateral ligament.
Bursa between semimembranous and joint capsule.

Applied anatomy-

Osteoarthritis of knee joint

a common condition in elderly.

Injuries to cruciate ligaments

Leads to anteroposterior instability of knee joint.
Anterior cruciate ligament is more commonly injured than the posterior one. Integrity of cruciate ligaments can be tested by Anterior and posterior Drawers tests.

Meniscal tears

Twisting strains in slightly flexed knee can injure Menisci (football play)
Medial meniscus is more prone for injury because of its firm fixing to tibial collateral ligament. Lateral meniscus is protected by its attachment to popliteus.

Unhappy triad of knee joint-

Injury to tibial collateral ligament, medial meniscus and anterior cruciate ligament

DESCRIBE INTRAARTICULAR STRUCTURES OF KNEE JOINTADD A NOTE ON LOCKING AND UNLOCKING(LE)

The following are the intraarticular structures of knee joint.

Cruciate ligaments- Anterior and Posterior cruciate ligaments.
Menisci- Medial and Lateral Menisci
Tendon of popliteus.
Synovial membrane
Infrapatellar pad of fat
Ligaments of Wrisberg and Humphrey.

Menisci of knee joint –

These are two crescent shaped fibrocartilaginous discs.
They deepen the articular surfaces of the condyles of tibia.
Partly divide the joint cavity into upper and lower compartments.
Each meniscus has
Two ends- anterior and posterior
Two borders- thick outer border and thin inner border

Two surfaces- upper surface and lower surface. Functions of Menisci-
Menisci increase the co cavity of tibial condyles
They acts as shock absorbers

They partly divide the joint cavity.
They act as swabs to lubricate the joint cavity.

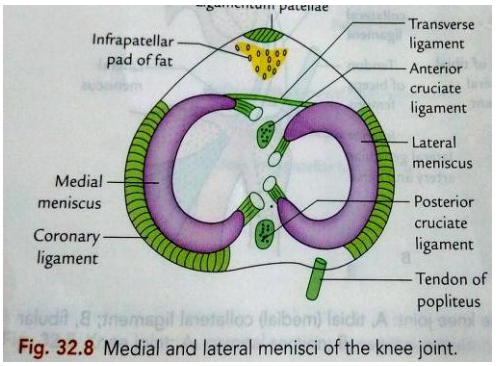


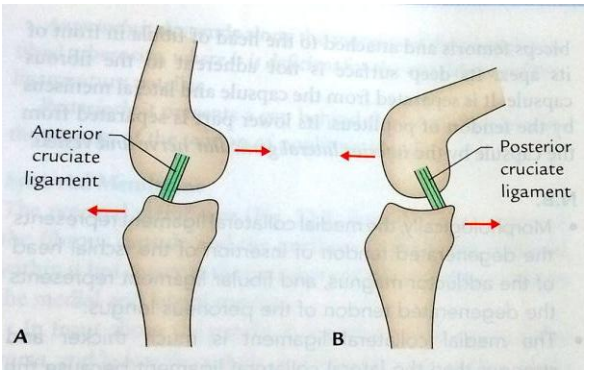
Fig. 32.8 Medial and lateral menisci of the knee joint.

Medial meniscus
Semilunar in shape.
Parts- anterior and posterior horns
Medial and lateral
margins
Superior and inferior surfaces.
It is adherent to deep part of tibial collateral ligament.

Lateral meniscus
Nearly circular in shape.
Parts- anterior and posterior
horns Medial and lateral
margins Superior and
inferior surfaces.
Lateral meniscus is attached to tendon of popliteus, hence less prone to injury.

Cruciate ligaments of knee joint
There are two cruciate ligaments inside the knee joint.

- Anterior cruciate ligament
- Posterior cruciate ligament



These two ligaments cross each other like the lett er 'X' . They form direct bond between tibia and femur.
Help in maintaining antero-posterior stability of knee joint.

Anterior cruciate
ligament: Attachment:
Below- Anterior part of inter condylar area
of tibia
Above- medial surface of lateral condyle of femur. It prevents posterior dislocation of femur on tibia.
It is the key stabilizer of knee joint.

Posterior cruciate
ligament: Attachment:
Below – Posterior part of inter condylar area of tibia
Above- lateral surface of medial condyle of femur. It prevents anterior dislocation of femur on tibia.
Cruciate ligaments are supplied by middle genicular arteries.

Integrity of cruciate ligaments can be tested by Anterior and posterior Drawers tests.

Meniscofemoral ligaments:
Posterior horn of lateral meniscus is attached to medial condyles of femur by anterior and posterior meniscofemoral ligaments.
Anterior meniscofemoral ligament is knows as ligament of Humphrey. Posterior meniscofemoral ligament is known as ligament of Wrisberg.

Applied anatomy-
Meniscal tear- twisting strains in slightly flexed knee can injure Menisci.
Medial meniscus is more prone for injury because of its firm fixing to tibial collateral ligament. Lateral meniscus is protected by its attachment to popliteus.

Injury to cruciate ligaments-

Leads to anteroposterior instability of knee joint.

Integrity of cruciate ligaments can be tested by Anterior and posterior Drawers tests.

Locking of knee joint-

When the foot is on the ground,

Locking of the knee joint is defined as medial rotation of femur on tibia during the final stages of extension.

It is brought about by quadriceps femoris muscle.

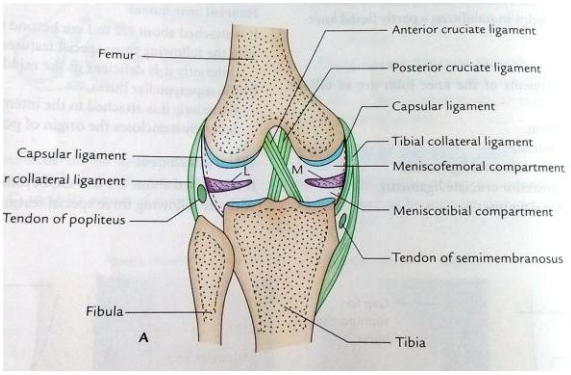
When the knee is locked it becomes absolutely rigid and all the ligaments are taut. This is known as screw home mechanism.

Unlocking-

When the foot is on the ground

It is defined as the lateral rotation of femur on the tibia during initial phase of flexion. Popliteus is responsible for unlocking.

(Short Essay) Medial ligament of knee



It is also known as Tibial collateral ligament

It is a strong, thick band of fibrous tissue. It is about 10cm in length

Parts-

2 parts:

Superficial and deep part.

Superficial part-

Attachments:

Above- medial epicondyle of femur just below adductor tubercle

Below- upper part of medial border and adjoining posterior part of medial surface of tibia.

Superficial part covers inferior medial genicular vessels and tendon of semimembranosus

It is crossed by tendons of sartorius, gracilis and semitendinosus.

Deep part-

Attachments:

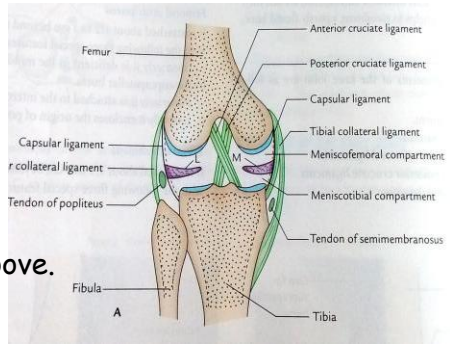
Above- medial epicondyle of femur just below adductor tubercle

Below- medial condyle of tibia above the groove for semimembranosus. Deep part is short and blends with capsule of knee joint

Peripheral part of medial meniscus is attached to it. Morphology of tibial collateral ligament-

Represents the degenerated tendon of adductor Magnus .

(Short Essay) Lateral ligament of knee



It is also known as fibular collateral ligament. It is short cord like ligament 5 cm in length.

Attachments :

Above- lateral epicondyle of femur just above popliteal groove.

Below- head of fibula in front of its apex. It is free from the fibrous capsule.

It is separated from the capsule and lateral meniscus by tendon of popliteus.

Morphology of fibular collateral ligament-

Represents the degenerated tendon of peroneus longus.

(Short Essay) Cruciate ligaments

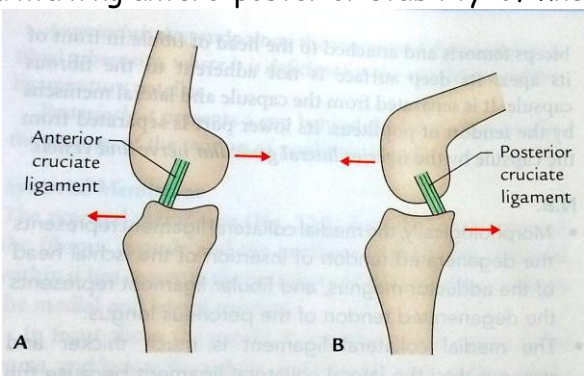
There are two cruciate ligaments inside the knee joint.

- Anterior cruciate ligament
- Posterior cruciate ligament

These two ligaments cross each other like the letter 'X'.

They form direct bond between tibia and femur.

Help in maintaining antero-posterior stability of knee joint.



Anterior cruciate ligament: Attachment:

Below- Anterior part of inter condylar area of tibia

Above- medial surface of lateral condyle of femur. It prevents posterior dislocation of femur on tibia.

It is the key stabilizer of knee joint.

Posterior cruciate

ligament: Attachment:

Below – Posterior part of inter condylar area of tibia

Above- lateral surface of medial condyle of femur. It prevents anterior dislocation of femur on tibia.

Cruciate ligaments are supplied by middle genicular arteries.
Integrity of cruciate ligaments can be tested by Anterior and posterior Drawers tests.

(Short Essay) Medial meniscus

Medial meniscus is a fibrocartilaginous tissue inside the knee joint
Semilunar in shape.
Parts- anterior and posterior
horns Medial and lateral
margins Superior and
inferior surfaces.
Its lateral margin is adherent to deep part
of tibial collateral ligament.

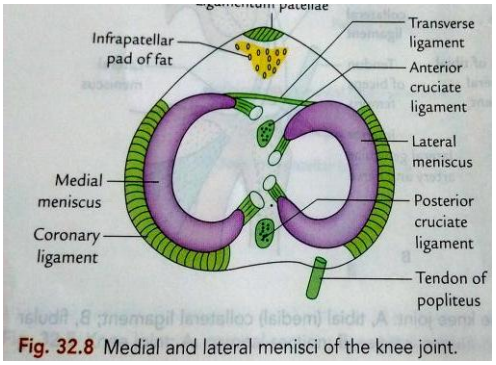


Fig. 32.8 Medial and lateral menisci of the knee joint.

Functions of Medial Meniscus-
Menisci increase the co cavity of tibial condyles
They acts as shock absorbers
They partly divide the joint cavity.
They act as swabs to lubricate the joint cavity.

Applied anatomy-
Meniscal tear- twisting strains in slightly flexed knee can injure Menisci.
Medial meniscus is more prone for injury because of its firm fixing to tibial collateral ligament.

(Short Essay) Movements of knee joint

Movements and muscles producing
movements- Flexion- Hamstring muscles
Assisted by popliteus, sartorius, gracilis, gastrocnemius and
plantaris. Extension-Quadriceps femoris
Assisted by tensor fasciae
lata
Medial Rotation- semitendinosus, semimembranosus, popliteus
Assisted by -sartorius,
gracilis
Lateral rotation-Biceps femoris
Assisted by – gluteus maximus and tensor fasciae lata

Locking of knee joint-
When the foot is on the ground,
Locking of the knee joint is defined as medial rotation of femur on tibia during the final stages of extension.
It is brought about by quadriceps femoris muscle.
When the knee is locked it becomes absolutely rigid and all the
ligaments are taut. This is known as screw home mechanism.
Unlocking-

When the foot is on the ground

It is defined as the lateral rotation of femur on the tibia during initial phase of flexion. Popliteus is responsible for unlocking.

(Short Essay) Locking and unlocking

Locking of knee joint-

When the foot is on the ground,

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Unlocking-

When the foot is on the ground

It is defined as the lateral rotation of femur on the tibia during initial phase of flexion. Popliteus is responsible for unlocking.

SAQ Tibial collateral ligament

It is about 10cm in length

Parts-

2 parts:

Superficial and deep

part. Attachments:

Above- medial epicondyle of femur just below adductor tubercle

Below-

Superficial part - upper part of medial border of tibia

Deep part- medial condyle of tibia above the groove for semimembranosus.

Deep part gives attachment to Medial meniscus

Morphology of tibial collateral ligament-

Represents the degenerated tendon of adductor Magnus .

SAQ Enumerate intraarticular structures of knee joint The following are the intraarticular structures of knee joint. Cruciate ligaments- Anterior and Posterior cruciate ligaments. Menisci- Medial and Lateral Menisci

Tendon of popliteus.

Synovial membrane

Infrapatellar pad of fat

Ligaments of Wrisberg and Humphrey.

SAQ Medial meniscus

Medial meniscus is a fibrocartilaginous tissue inside the knee joint

Semilunar in shape.

Parts- anterior and posterior

horns Medial and lateral
margins Superior and
inferior surfaces.

Its lateral margin is adherent to deep part of tibial collateral ligament. Applied anatomy-

Meniscal tear- twisting strains in slightly flexed knee can injure Menisci.

Medial meniscus is more prone for injury because of its firm fixing to tibial collateral ligament

SAQ Functions of menisci

Menisci make tibial articular surface more concave and congruent. They act as shock absorbers.
Help in evenly spreading synovial fluid.
Divide the joint cavity into two chambers for independent movements; Upper – flexion and extension
Lower- rotation

SAQ Bursae around the knee

Bursae around the knee are divided into three groups, according to their location. Anterior Group:
Subcutaneous prepatellar bursa
Subcutaneous infrapatellar bursa
Deep infrapatellar bursa
Supra patellar bursa. Lateral Group:
Bursa between lateral head of gastrocnemius and joint capsule.
Bursa between tendon of biceps femoris and fibular collateral ligament. Bursa between tendon of popliteus and fibular collateral ligament. Popliteus bursa between popliteus and joint capsule
Medial Group:
Bursa between medial head of gastrocnemius and joint capsule
Bursa between tibial collateral ligament and tendons of sartorius, gracilis and Semitendinosus (Bursa Anserine)
Bursa between superficial and deep parts of tibial collateral ligament. Bursa between semimembranous and joint capsule.

SAQ Locking and unlocking

Locking of knee joint-
When the foot is on the ground,
Locking of the knee joint is defined as medial rotation of femur on tibia during the final stages of extension.
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When the knee is locked it becomes absolutely rigid and all the ligaments are taut.
This is known as screw home mechanism. Unlocking-
When the foot is on the ground
It is defined as the lateral rotation of femur on the tibia during initial phase of flexion. Popliteus is responsible for unlocking.

SAQ Muscles producing medial rotation of knee joint.

Medial Rotation- semitendinosus, semimembranosus, popliteus

Assisted by -sartorius, gracilis

HIP JOINT ANKLE JOINT AND SUBTALAR JOINT

DESCRIBE HIP JOINT UNDER THE FOLLOWING HEADINGS- A)TYPE AND BONES TAKING PART (ARTICULAR SURFACES), B) LIGAMENTS C) RELATIONS D) MOVEMENTS AND MUSCLES PRODUCING THEM E) BLOOD SUPPLY AND F) APPLIED ANATOMY? (LE)

a) Type –

Ball and socket variety of synovial joint

b) Articular surfaces-

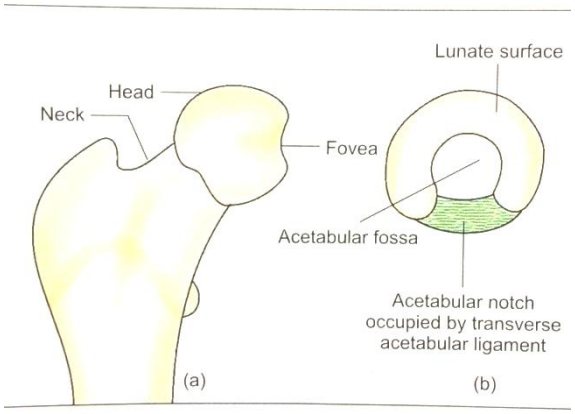


Fig. 12.1: Articular surfaces of the hip joint.

Head of the femur articulates with the acetabulum of hip bone to form the hip joint.

The articular surfaces of the head of femur and on acetabulum are reciprocally curved , but are not co-extensive.

The hip joint is unique in having a high degree of stability as well as mobility.

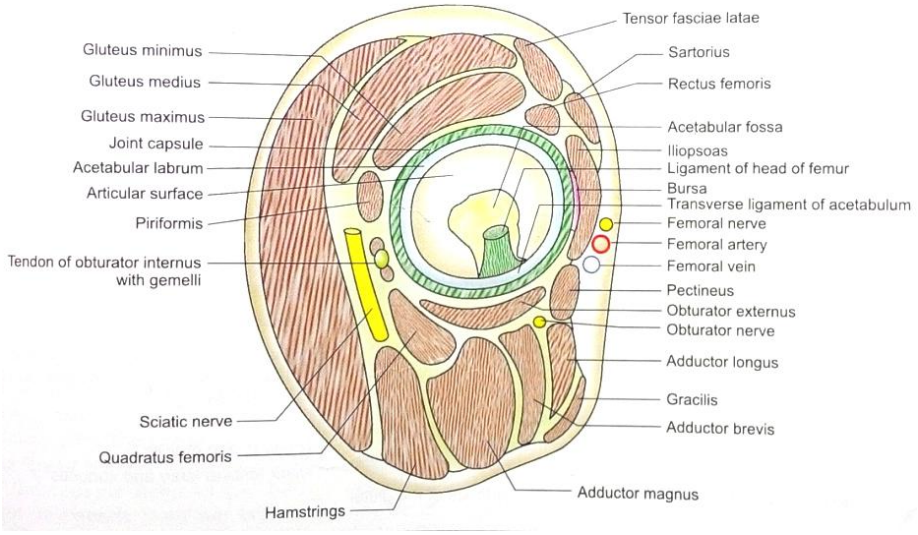
c) Ligaments –

Fibrous capsule
Iliofemoral ligament
pubofemoral ligament
ischiofemoral ligament
ligament of the head of femur
acetabular labrum
transverse acetabular ligament.

Iliofemoral ligament is inverted Y shaped triangular ligament.

This ligament lies anterior to the hip joint.

d) Relations-



1) Anterior

Tendon of iliopsoas separated by a bursa and femoral vein
Femoral artery
Femoral nerve

2) Posterior

Tendon of obturator externus covered by quadratus femoris , obturator internus and gemelli, pyriformis , sciatic nerve and gluteus maximus muscle.

3) Superior

Reflected head of rectus femoris covered by gluteus minimus, gluteus medius and partly by gluteus maximus.

4) Inferior

Pectineus , obturator externus , gracilis, adductor longus, brevis , magnus and hamstring muscles.

e) Movements and muscles producing them-

1) Flexion and extension
2) Adduction and abduction
3) Medial and lateral rotation
4) Circumduction

Muscles producing movements at the hip joint

MOVEMENT	CHIEF MUSCLES	ACCESSORY MUSCLES
Flexion	Psoas major Iliacus	Pectineus Rectus femoris

		Sartorius Adductor longus
Extension	Gluteus maximus Hamstrings	-
Abduction	Gluteus medius and minimus	Tensor fasciae latae sartorius
Medial rotation	Tensor fasciae latae Gluteus medius and minimus(anterior fibres)	-
Lateral rotation	Obturator externus and internus Superior and inferior gemelli Quadrates femoris	Piriformis Gluteus maximus Sartorius

f) Blood supply

Arterial supply – is by the following arteries

- obturator artery
- medial circumflex femoral artery
- lateral circumflex femoral artery
- superior gluteal artery
- inferior gluteal artery.

g) Applied anatomy

- **Congenital dislocation**
  Is more comman in the hip than any other part of the body.
  This causes a lurching gait.
- **Acquired dislocation**
  Uncommon because the joint is stable.
  Dislocation is posterior , with injury to the sciatic nerve.
  Affected limb is shortened and medially rotated
- **Fractures of neck of femur**
  Comman in individuals of more than 60 years of age.
  Caused by indirect violence of trivial nature.
  Affected limb is shortened and laterally rotated

DESCRIBE ANKLE JOINT UNDER THE FOLLOWING HEADINGS-

a) TYPE B) CAPSULE AND LIGAMENTS C) RELATIONS D) MOVEMENTS AND MUSCLES PRODUCING THEM E) BLOOD SUPPLY AND F) APPLIED ANATOMY? (LE)

a) Type

Ankle joint is a Synovial joint of hinge variety

b) capsule and ligaments

The joint is supported by:

fibrous capule
deltoid / medial ligament
lateral ligament

fibrous capsule-

It surrounds the joint and is attached all around the articular margins with 2 exceptions,

posterosuperiorly, it is attached to transverse tibiofibular ligament
anteroinferiorly, it is attached to dorsum of neck of talus at some distance from the trochlear surface.

The anterior and posterior parts of the capsule are loose and thin to allow hinge movements.

On each side it is supported by strong collateral ligaments.

The synovial membrane lines the capsule.

Deltoid /medial ligament-

It is a very strong triangular ligament present on medial side of ankle.

The ligament is divided into superficial and deep parts.

Both parts have a comman attachment above to the apex and margins of medial malleolus.

The lower attachment is indicated by the name of the tarsal bone to which they are attached.

Superficial part –

Anterior or tibionavicular fibres are attached to the tuberosity of navicular bone and medial margin of spring ligament.

Middle or tibiocalcanean fibres are attached to the whole length of sustentaculum tali

Posterior /tibiotalar fibre are attached to the medial tubercle and medial surface of talus

Deep part/ anterior tibiotalar is attached to anterior part of medial surface of talus.

The deltoid ligament is crossed by the tendons of tibialis posterior and flexor digitorum longus.

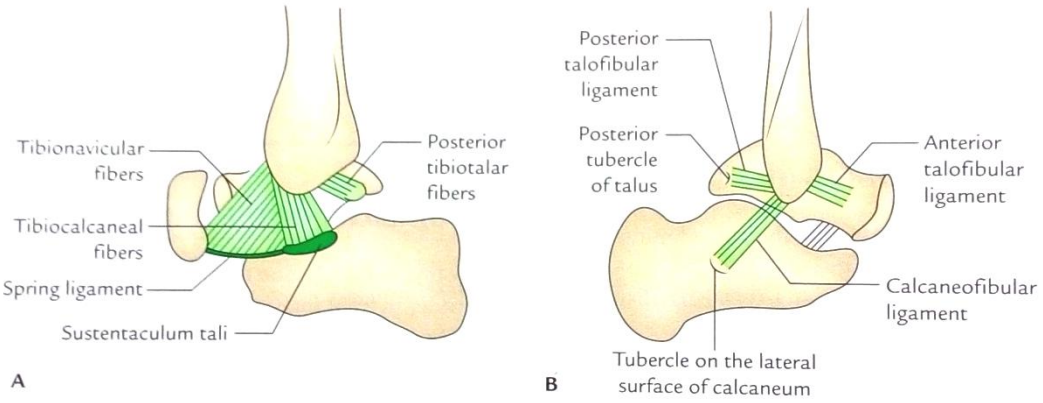


Fig. 32.14 Collateral ligaments of the ankle joint: **A,** deltoid ligament; **B,** lateral ligament.

1) Lateral ligament

It consists of 3 bands:

1. Anterior talofibular ligament

It passes from the lateral malleolus to the neck of talus

2. Posterior talofibular ligament

It passes from the malleolar fossa of fibula to the lateral tubercle of talus.

3. Calcaneofibular ligament

It passes from the notch on the lower border of lateral malleolus to the tubercle on the lateral surface of calcaneum.

It is crossed by the tendons of peroneus longus and peroneus brevis.

a) Relations

Anterior relations from medial to lateral side

Tibialis anterior

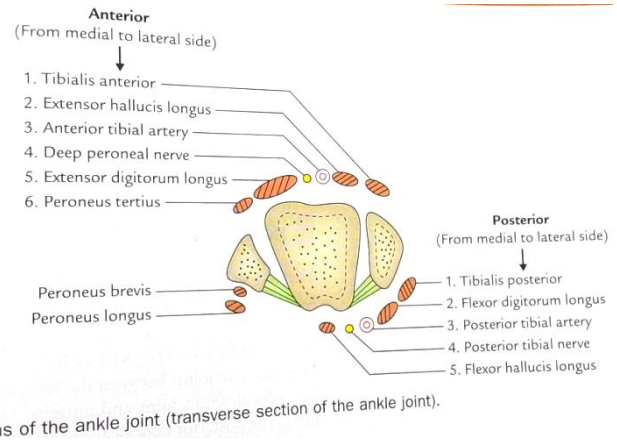
Extensor hallucis longus

Anterior tibial vessels

Deep peroneal nerve

Extensor digitorum longus

Peronius tertius



Relations of the ankle joint (transverse section of the ankle joint).

Posterior relations – from medial to lateral side-

Tibialis posterior
Flexor digitorum longus
Posterior tibial vessels
Tibial nerve
Flexor hallucis longus
Peroneus brevis
Peroneus longus

Movements

1) Dorsiiflexion
2) Plantarflexion

In dorsiflexion the forefoot is raised and the angle between the front of the leg and dorsum of foot is diminished. It is a close packed position with maximum congruence of the joint surface. There are no chances of dislocation in dorsiflexion as the ankle joint is more stable.

In plantarflexion the forefoot is depressed and the angle between the front of the leg and dorsum of foot is increased. It is loose packed position of ankle joint . There are more chances of dislocation in plantarflexion as the ankle joint is more unstable.

Muscles producing the movements

MOVEMENT	PRINCIPAL MUSCLES	ACCESSORY MUSCLES
Dorsiflexion	Tibialis anterior	Extensor digitorum longus Extensor hallucis longus Peroneus tertius
Plantarflexion	Gastrocnemius Soleus	Plantaris Tibialis posterior Flexor hallucis longus Flexor digitorum longus

Arterial supply

1) Anterior tibial artery
2) Posterior tibial artery
3) Peroneal artery

Applied anatomy

1) Ankle sprains-

Excessive stretching or tearing of ligaments of ankle joint is called ankle sprain. Ankle sprains are usually caused by falls or twists.

2) Dislocation of ankle-

Dislocations of ankle joint are rare because it is a very stable joint.

Dislocations are always accompanied by fracture of one of the malleoli.

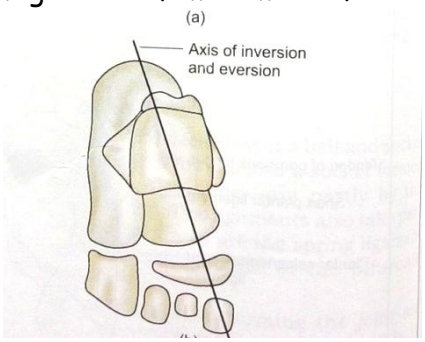
DESCRIBE INVERSION AND EVERSION . NAME THE JOINTS IN WHICH THESE MOVEMENTS OCCUR AND NAME THE MUSCLES PRODUCING THESE MOVEMENTS WITH THEIR ATTACHMENTS AND NERVE SUPPLY IN A TABULATED FORM. (LE)

Inversion and eversion are rotational movements of the foot on the talus.

Inversion is a movement in which medial border of the foot is elevated so that the sole faces medially.

Eversion is a movement in which lateral border of the foot is elevated so that the sole faces laterally.

Fig : Axis of movement of inversion and eversion



The joints in which these movements occur are-

Main joints -

subtalar (talocalcanean)

Talocalcaneonavicular

Accessory joints -

Transverse tarsal joints.

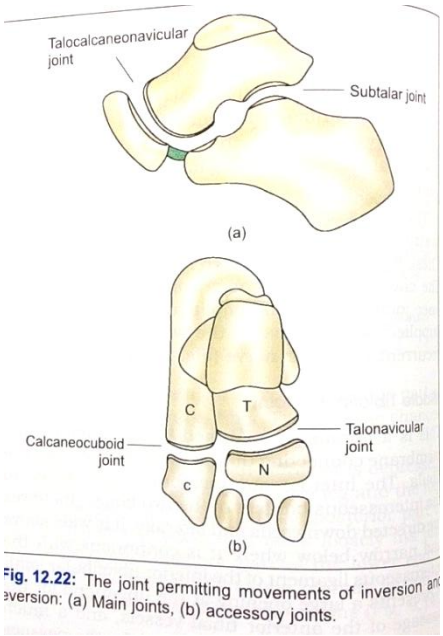


Fig. 12.22: The joint permitting movements of inversion and eversion: (a) Main joints, (b) accessory joints.

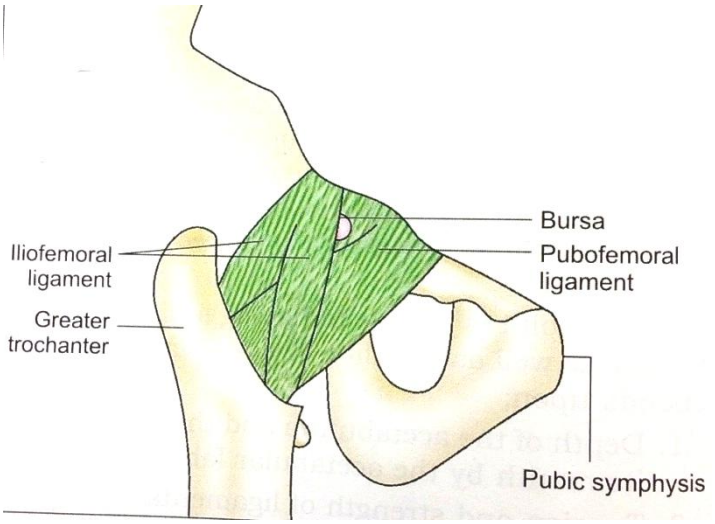
Muscles producing movements of inversion and eversion

MOVEMENT	PRINCIPAL MUSCLES	ORIGIN	INSERTION	NERVE SUPPLY
Inversion	Tibialis anterior	1.lateral condyle of tibia 2. upper 2/3rd of shaft of tibia. 3.interosseous membrane	Inferomedial surface of medial cuneiform and the base of 1st metatarsal bone	Deep peroneal nerve
	Tibialis posterior	upper 2/3rd of lateral part of posterior surface of tibia below the soleal line	Tuberosity of navicular bone and other tarsal bones except talus	Tibial nerve
	ACCESSORY MUSCLES			
	Flexor hallucis longus	Lower 3/4ths of posterior surface of fibula.	Plantar surface of base of distal phalanx of big toe	Tibial nerve
	Flexor digitorum longus	upper 2/3rd of medial part of posterior surface	Bases of distal phalanges of shaft of	Tibial nerve

		of tibia below the soleal line	lateral 4 toes	
Eversion	PRINCIPAL MUSCLES			
	Peroneus longus	1.head of fibila 2.upper 2/3rds of lateral surface of fibula	1.lateral side of base of 1st metatarsal bone 2.medial cuneiform bone	Superficial peroneal nerve
	Peroneus brevis	1.lower 2/3rds of the lateral surface of shaft of fibula 2.anterior and posterior intermuscular septa of leg	Lateral side of base of 5th metatarsal bone	Superficial peroneal nerve
	ACCESSORY MUSCLES			
	Peroneus tertius	1.lower 1/4th of medial surface of shaft of fibula 2.interosseous membrane	Dorsal surface of base of 5th metatarsal bone	Deep peroneal nerve

Iliofemoral ligament attachments and applied anatomy? (SE)

Iliofemoral ligament/ inverted Y shaped ligament of Bigelow.
This ligament lies anterior to the hip joint. It is triangular in shape.
Apex – lower half of anterior inferior iliac spine
Base –inter trochanteric line.
The upper oblique and lower vertical fibres form thick and strong bands, while the middle fibres are thin and weak
It is one of the strongest ligaments of the body.
It prevents the trunk from falling backwards in standing posture

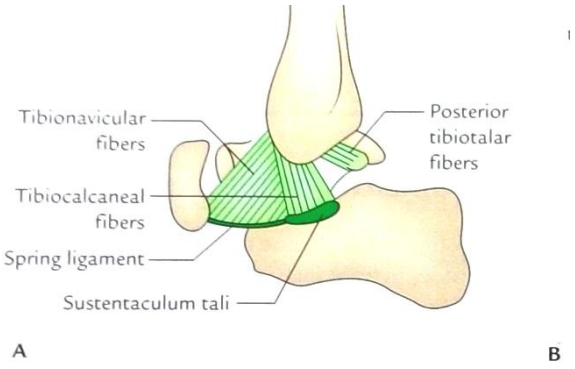


Deltoid ligament of ankle joint (SE)

Deltoid /medial ligament-

It is a very strong triangular ligament present on medial side of ankle.

The ligament is divided into superficial and deep parts.



Collateral ligaments of the ankle joint: **A,** deltoid ligamer

Both parts have a common attachment above to the apex and margins of medial malleolus.

The lower attachment is indicated by the name of the fibres.

Superficial part –

a) Anterior or tibionavicular fibres are attached the tuberosity of navicular bone and medial margin of spring ligament.
b) Middle or tibiocalcanean fibres are attached to the whole length of sustentaculum tali .
c) Posterior /tibiotalar fibres are attached to the medial tubercle and medial surface of talus

Deep part/ anterior tibiotalar is attached to anterior part of medial surface of talus.

The deltoid ligament is crossed by the tendons of tibialis posterior and flexor digitorum longus.

1) Movements and applied anatomy of ankle joint?(SE)

ans:-

Movements of ankle joint are-

1) Dorsiiflexion
2) Plantarflexion

In dorsiflexion the forefoot is raised and the angle between the front of the leg and dorsum of foot is diminished. It is a close packed position with maximum congruence of the joint surface. There are no chances of dislocation in dorsiflexion as the ankle joint is more stable.

In plantarflexion the forefoot is depressed and the angle between the front of the leg and dorsum of foot is increased. It is loose packed position of ankle joint . There are more chances of dislocation in plantarflexion as the ankle joint is more unstable.

Muscles producing the movements

MOVEMENT	PRINCIPAL MUSCLES	ACCESSORY MUSCLES
Dorsiflexion	Tibialis anterior	Extensor digitorum longus Extensor hallucis longus Peroneus tertius
Plantarflexion	Gastrocnemius soleus	Plantaris Tibialis posterior Flexor hallucis longus Flexor digitorum longus

Applied anatomy

1) Ankle sprains-

Excessive stretching or tearing of ligaments of ankle joint is called ankle sprain. Ankle sprains are usually caused by falls or twists.

2) Dislocation of ankle-

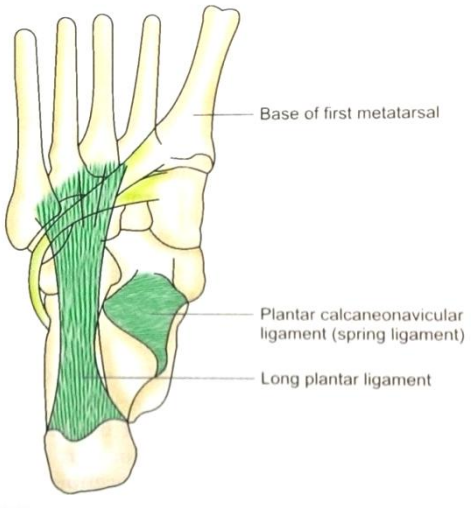
Dislocations of ankle joint are rare because it is a very stable joint.
Dislocations are always accompanied by fracture of one of the malleoli.

2) Spring ligament (SE)

Ans:-

Spring ligament or plantar calcaneonavicular ligament .

It is the most important ligament for maintaining the medial longitudinal arch of the foot.



Attachment –

Anteriorly to the plantar surface of navicular bone

Posteriorly to the anterior margin of sustentaculum tali.

The head of talus rests directly on the upper surface of the ligament, which s covered by fibrocartilage.

The plantar surface of the ligament is supported by tendons of tibialis posterior medially and tendons of flexor hallucis longus and flexor digitorum longus laterally.

3) Inversion and eversion of foot (SE)

Inversion and eversion are rotational movements of the foot on the talus

Inversion is a movement in which medial border of the foot is elevated so that the sole faces medially.

Eversion is a movement in which lateral border of the foot is elevated so that the sole faces laterally.

The joints in which these movements occur are-

Main joints -

subtalar (talocalcanean)

Talocalcaneonavicular

Accessory joints -

Transverse tarsal joints.

Muscles producing movements of inversion and eversion

MOVEMENT	PRINCIPAL MUSCLES	ACCESSORY MUSCLES
INVERSION	Tibialis anterior	Flexor hallucis longus

	Tibialis posterior	Flexor digitorum longus
EVERSION	Peroneus longus	Peroneus tertius
	Peroneus brevis	

Iliofemoral ligament (SA)

Iliofemoral ligament/ inverted Y shaped ligament of Bigelow
It is triangular in shape
Apex – lower half of anterior inferior iliac spine
Base –inter trochanteric line.
The upper oblique and lower vertical fibres form thick and strong bands, while the middle fibres are thin and weak
It is one of the strongest ligaments of the body.
It prevents the trunk from falling backwards in standing posture.

Muscles performing lateral rotation of thigh (SA)
Obturator internus and externus
Superior and inferior gemilli
Quadrates femoris
Piriformis
Gluteus maximus
Sartorius

Adductors of hip joint (SA)

Adductor longus
Adductor brevis
Adductor magnus
Pectineus
Gracilis

Abductors of hip joint (SA)

Gluteus medius
Gluteus minimus
Tensor fasciae latae
Sartorius

Deltoid ligament attachment (SA)

Deltoid /medial ligament-
The ligament is divided into superficial and deep parts.

Both parts have a common attachment above to the apex and margins of medial malleolus.

The lower attachment is indicated by the name of the fibres.

- **Superficia**l part –

a) Anterior or tibionavicular fibres are attached the tuberosity of navicular bone and medial margin of spring ligament.
b) Middle or tibiocalcanean fibres are attached to the whole length of sustentaculum tali .
c) Posterior /tibiotalar fibres are attached to the medial tubercle and medial surface of talus

- **Deep part**/ anterior tibiotalar is attached to anterior part of medial surface of talus.

Movements taking place at ankle joint? (SA)

Movements of ankle joint are-

a) Dorsiiflexion
b) Plantarflexion

In dorsiflexion the forefoot is raised and the angle between the front of the leg and dorsum of foot is diminished. It is a close packed position with maximum congruence of the joint surface. There are no chances of dislocation in dorsiflexion as the ankle joint is more stable.

In plantarflexion the forefoot is depressed and the angle between the front of the leg and dorsum of foot is increased. It is loose packed position of ankle joint . There are more chances of dislocation in plantarflexion as the ankle joint is more unstable.

Muscles producing plantar flexion(SA)

Ans:

Gastrocnemius
Soleus
Plantaris
Tibialis posterior
Flexor hallucis longus
Flexor digitorum longus

Name subtaloid joint and mention movements possible in it (SA)

Ans:

Subtaloid joint – talocalcanean joint
Movements occurring in this joint are-
Inversion and eversion of foot.

Spring ligament attachments (SA)

Ans:

Attachment –

Anteriorly to the plantar surface of navicular bone
Posteriorly to the anterior margin of sustentaculum tali.
The head of talus rests directly on the upper surface of the ligament, which is covered by fibrocartilage.

Muscles responsible for eversion of foot (SA)

Ans:
Peroneus longus
Peroneus brevis
Peroneus tertius.