King Saud University
College of medicine
Musculoskeletal block

Anatomy Team
433

Hip, Knee & ankle joints

20

Objectives

At the end of the lecture, students should be able to:

- ***List the type & articular surfaces of the hip, knee and ankle joints.***
- ***Describe the capsule and ligaments of the hip, knee and ankle joints.***
- ***Describe movements of hip, knee and ankle joints and list the muscles involved in these movements.***
- ***List important bursae in relation to knee joint.***
- ***Apply Hilton's law about nerve supply of joints.***

Color Index

- Red : Important.
- Violet: Explanation.
- Gray: Additional Notes.

Other colors are for Coordination

Say " bsm Allah" then start

Remember:

- **Synovial joint has a Capsule, ligaments and hyaline cartilage covering the articular surface.**
- **Always remember: Intracapsular = Extrasynovial --- (Anything enter to the capsule doesn't inter to the synovial).**

Hip joint

BONE	Femur+hip bone.
ARTICULAR SURFACES	Hemispherical head of the femur + the cup shaped acetabulum of hip bone.
TYPE	Synovial, ball & socket joint.
LIGAMENTS (5)	3 Extracapsular:- -**Iliofemoral ligament.** **-Pubofemoral ligament.** **-Ischiofemoral ligament.** ***2 Intracapsular (Extrasynovial):-*** -Transverse acetabular ligament. -Ligament of femoral head.
CAPSULE	▪ Strong and dense. ▪ Attachment: ▪ **Above**: Attched to margin of acetabulam ▪ **Below:** ▪ **Anteriorly:** covers the neck & is attached to intertrochanteric line ▪ **Posteriorly:** covers medial half of the neck of femur
MOVEMENTS *in general *	Flexion, Extension, Abduction, Adduction, Medial rotation, Lateral rotation.

Note: Acetabular labrum:

C-shaped fibro-cartilaginous collar attached to margins of acetabulum, increases its depth for better retaining of head of femur.

Ankle joint

BONE	malleolus+ tibia.
ARTICULAR SURFACES	**UPPER:** A socket formed by: Lateral malleolus. The lower end of tibia & medial malleolus. **LOWER:** Body of talus.
TYPE	Synovial, hinge joint.
LIGAMENTS (4)	-MEDIAL (DELTOID) LIGAMENT**:** a strong triangular ligament. ▪ **Apex:** attached to medial malleolus. ▪ **Base:** subdivided into 4 parts: 1. Anterior tibiotalar part. 2. Tibionavicular part. 3. Tibiocalcaneal part. 4. Posterior tibiotalar part. ▪ - LATERAL LIGAMENT.**(Composed of 3 separate ligaments)** :- 1. **Anterior talofibular ligament.** 2. **Calcaneofibular ligament.** **3. Posterior talofibular ligament.**
MOVEMENTS * in general*	**1)Dorsiflexion** **2)Planterflexion**

INVERSION & EVERSION MOVEMENTS occur *on the talo-calcaneo-navicular joint*

(Not on ankle joint).

Knee joint

BONE	(femur+tibia)+(patella+the patellar surface of the femur). **Notice: Fibula bone is not taken apart in the formation of knee joint.**
ARTICULAR SURFACES	-Femoro-tibial articulation. -Femoro-patellar articulation.
TYPE	Synovial (modified hinge) joint =(Femoro-tibial articulation)→ Due to slight rotation(that Femoro-tibial articulation do). Synovial (plane) joint = (Femoro-patellar articulation).
LIGAMENTS (6)	***4 Extracapsular:-*** **-**Ligamentum patellae (patellar ligament). -Medial (tibial) collateral ligament. -Lateral (fibular) collateral ligament. -Oblique popliteal ligament. **2 Intracapsular:- *(Extrasynovial)** -Cruciate Ligaments. *Anterior Cruciate ligament. * Posterior cruciate ligament.
CAPSULE	**Deficient anteriorly & is replaced by:** quadriceps femoris tendon, patella & ligamentum patellae. **Possesses 2 openings:** POSTERIORLY (for popliteus tendon)+ANTERIORLY (for suprapatellar bursa).
MOVEMENTS *in general *	**-FLEXION** **-EXTENSION** **-ACTIVE ROTATION (PERFORMED WHEN KNEE IS FLEXED):** A) MEDIAL ROTATION. B) LATERAL ROTATION. **-INACTIVE (DEPENDANT) ROTATION:** A) LOCKING OF KNEE. B) UNLOCKING OF KNEE.

Meniscus: ((the C-shapes)) are fibro-cartilage help in:

1) **Deepen articular surfaces.**
2) **Serve as cushion.**

	Shape	Outer border	Mobility
Lateral Meniscus	Small & circular	separated from lateral collateral ligament by popliteal tendon	More Mobile
Medial Meniscus	Large & oval	attached to the capsule & medial collateral ligament	Less Mobile

Note:

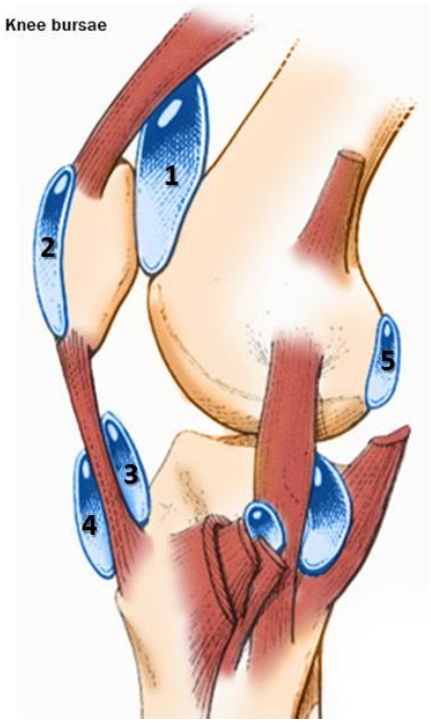
Medial meniscus has less mobility compared to the lateral, so it is more liable to damage.

Bursae related to the knee

The Bursae of the knee are the fluid sacs and synovial pockets that surround and sometimes communicate with the joint cavity.(التعريف من خارج المحاضرة)

You can know their locations by their name!

1. **Suprapatellar bursa:** between femur & quadriceps tendon, communicates with synovial membrane of knee joint (Clinical importance?)
2. **Prepatellar bursa:** between patella & skin.
3. **Deep infrapatellar bursa:** between tibia & ligamentum patella.
4. **Subcutaneous infrapatellar bursa:** between tibial tuberosity & skin.
5. **Popliteal bursa:** between popliteus tendon & capsule, communicates with synovial membrane of knee joint.



REMEMBER HILTON'S LAW:

"The joint is supplied by branches from nerves supplying muscles acting on it".

SUMMARY

- -Intracapsular=Extrasynovial.
- Synovial joint has a Capsule, ligaments and hyaline cartilage covering the articular surface.
- Menisci:they are 2 ((the C-shapes)) are fibro-cartilage help in:
  1) Deepen articular surfaces.
  2) Serve as cushion.
- -Acetabular labrum: C-shaped fibro-cartilaginous collar attached to margins of acetabulum, increases its depth for better retaining of head of femur.
- -Any infection affect bursa can affect the joint as well.

Remember That:

- ✓ **Any infection can affect bursa affect the joint as well, so as the reverse.**
- ✓ **Always remember: Intracapsular = Extrasynovial --- (Anything enter to the capsule doesn't inter to the synovial).**
- ✓ **Medial meniscus has less mobility compared to the lateral, so it is more liable to damage.**
- ✓ **Fibula bone is not taken apart in the formation of knee joint.**

Multiple Choice Questions

1) The menisci is formed of:
A. Fibro-cartilage plate B. Fibro-osseous plate
C. Hyaline-cartilage plate D. Hyaline- osseous plate

2) which one of these ligaments is extension of semimembranosus tendon:
A. Ligamentum patellae B. Medial collateral ligament
C. Oblique popliteal ligament D. The Cruciate Ligaments

3) which one of these menisci is less mobile:
A. Lateral meniscus B. Medial meniscus

4) which one of these menisci is less liable to injury:
A. Lateral meniscus B. Medial meniscus

5) Prepatellar bursa is between:
A. Patella & skin B. Tibial tuberosity & skin
C. Popliteus & capsule D. Tibia & ligament patella

Q Ans. :

1- A 2- C 3- B
4- A 5- A

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Good luck

Done by: Malak Almutairi. - Fatimah saad.

For any comments

Please don't hesitate to contact with us by

anatomy433@live.com