

وسهلا



أهلا

يُمنع أخذ السلايدات بدون
إذن المحرر واي اجراء
يخالف ذلك يقع تحت طائلة
المسؤولية القانونية
جميع المعلومات للاستخدام
التعليمي فقط

الأستاذ الدكتور يوسف حسين

كلية الطب - جامعة مؤتة - الأردن

دكتورة من جامعة كولونيا المانيا

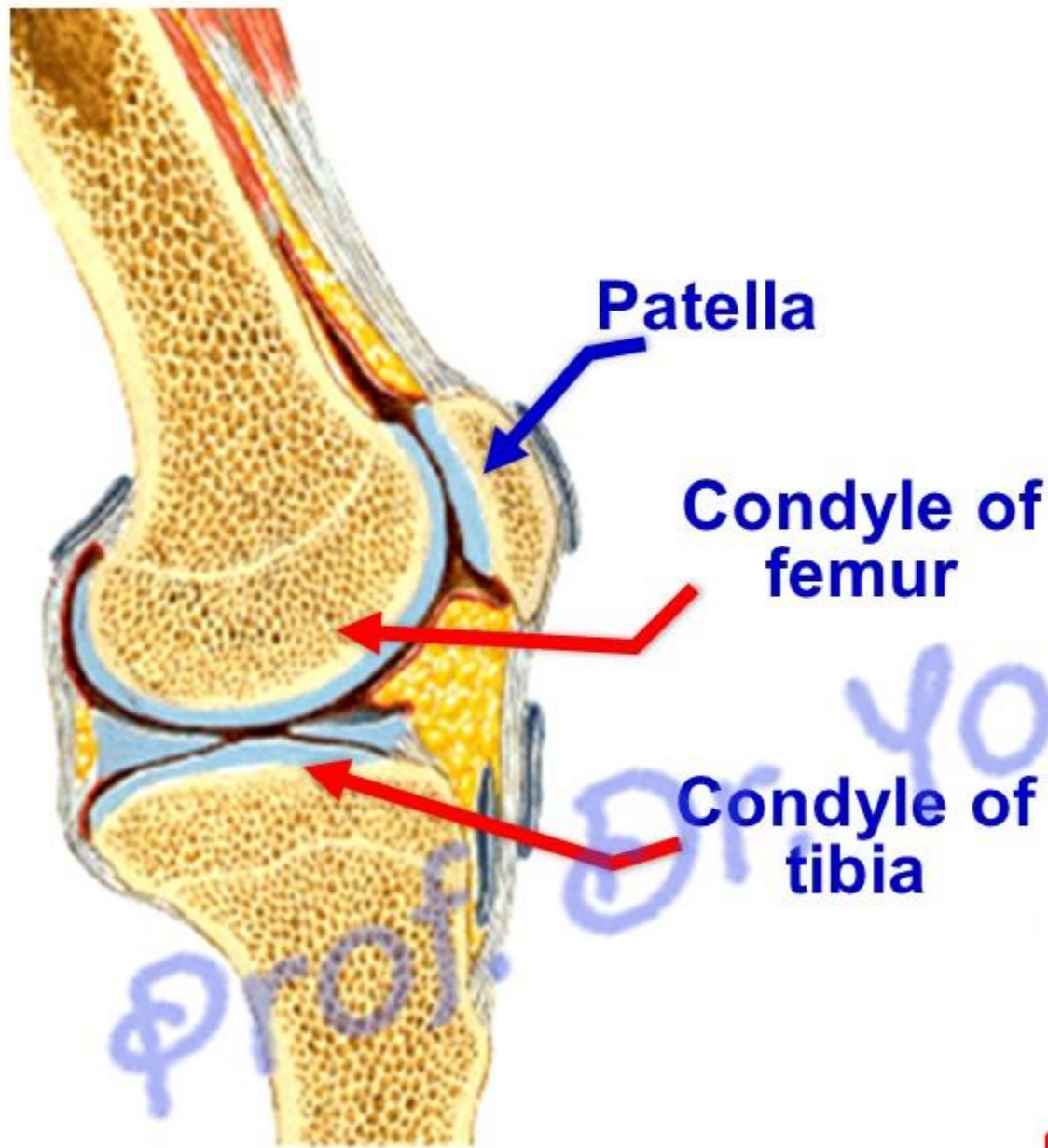
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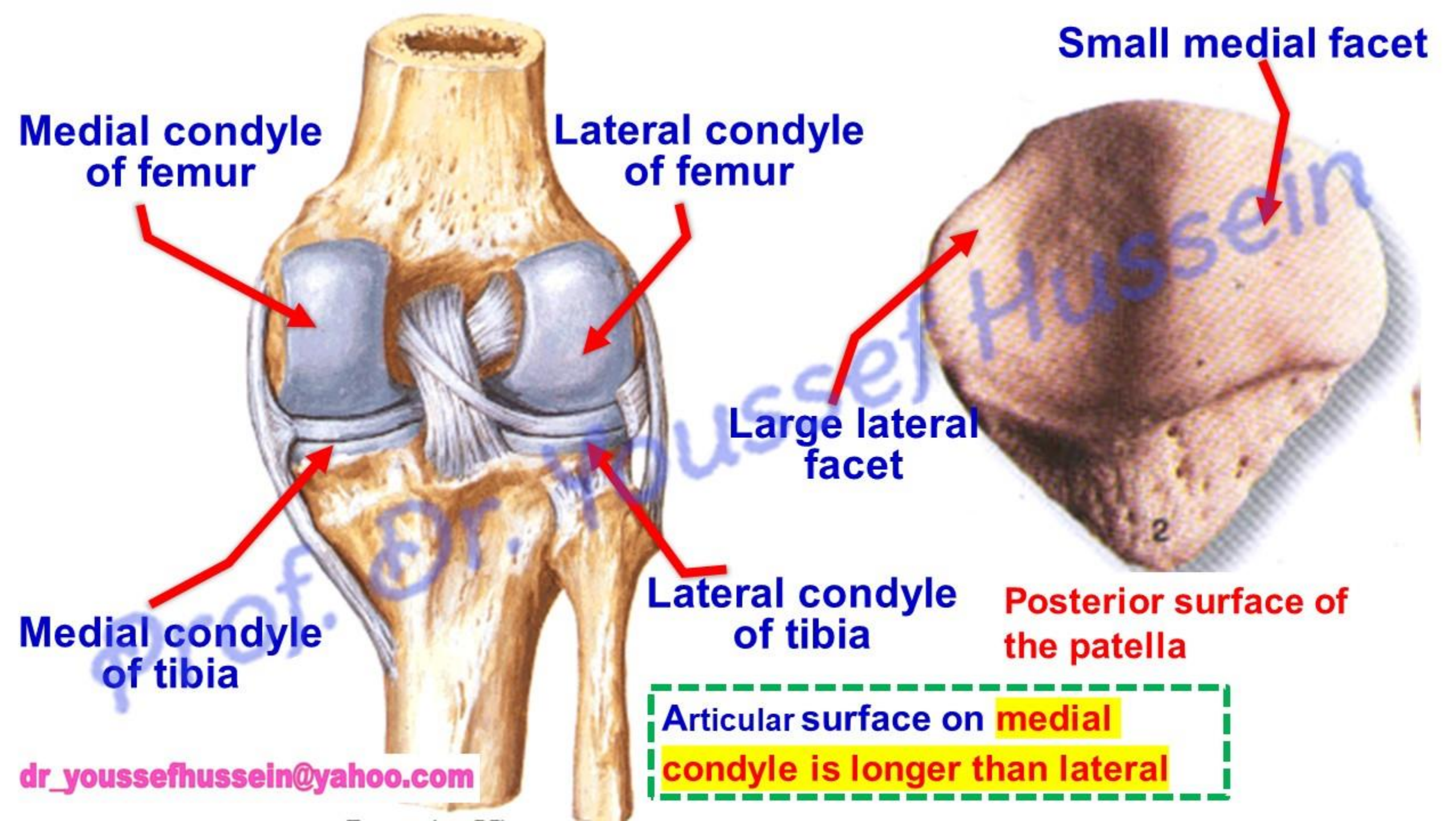
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Knee joint

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- **Type:** synovial joint; **modified hinge.**
- **Articular surfaces**
 - 1- Lower surfaces of both femoral condyles
 - 2- Superior surfaces of both tibial condyles (**Plateau**)
 - 3- Posterior surface of the patella.
- **Complex:**
 - a- Femoropatellar articulation
 - b- Femorotibial articulation



❖ Capsule of knee joint

is relatively thin

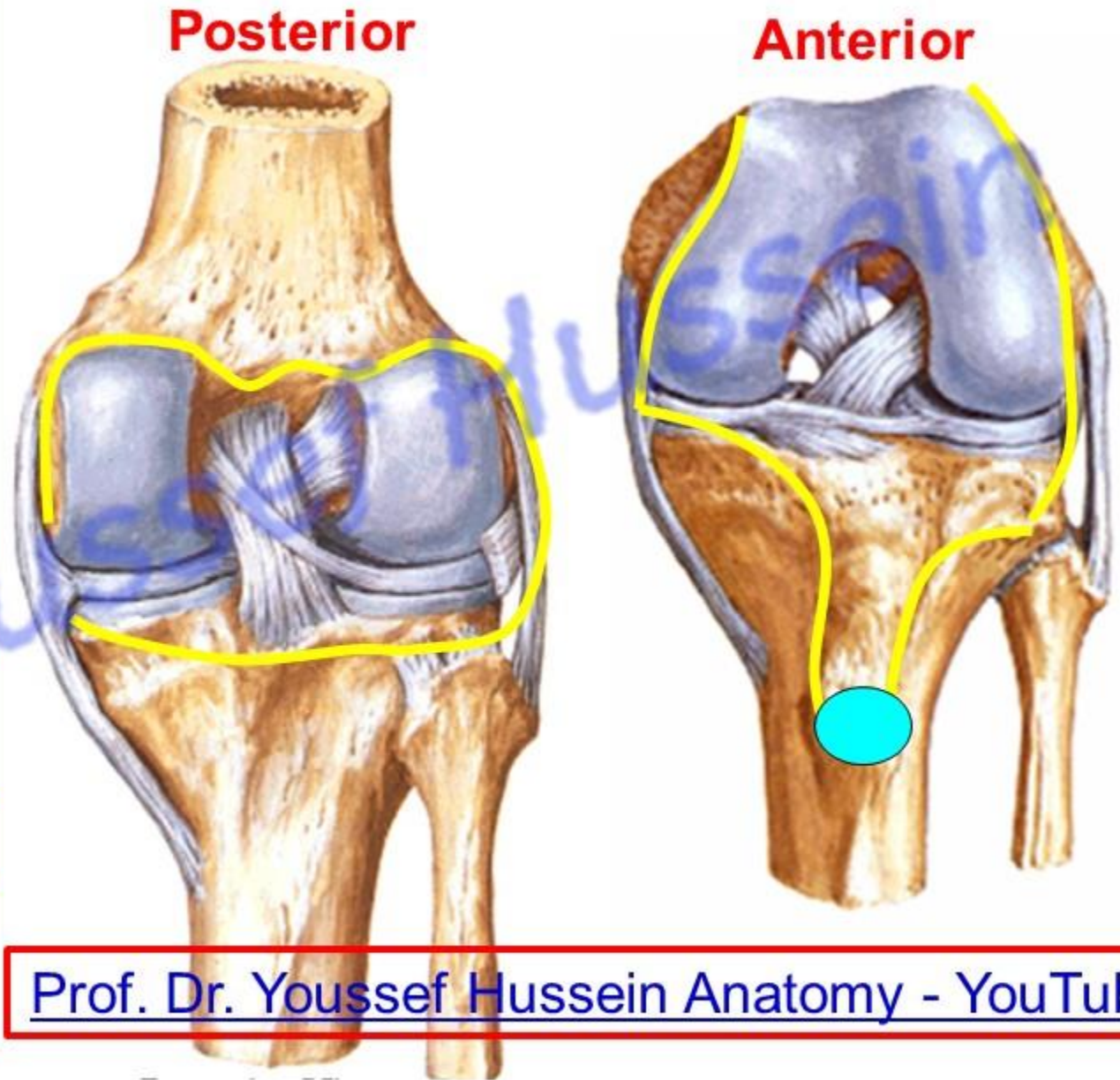
1- Attachment to the femur: to articular margin of the medial condyle.

- Laterally, articular margin to lateral condyle outside origin of **popliteus** muscle (popliteus is intracapsular extrasynovial)

2- Attachment to the tibia: to articular margins of both condyles.

3- Anteriorly, margins of patella.

N.B; the capsule may be absent **anteriorly** and replaced by quadriceps tendon and ligamentum patellae.



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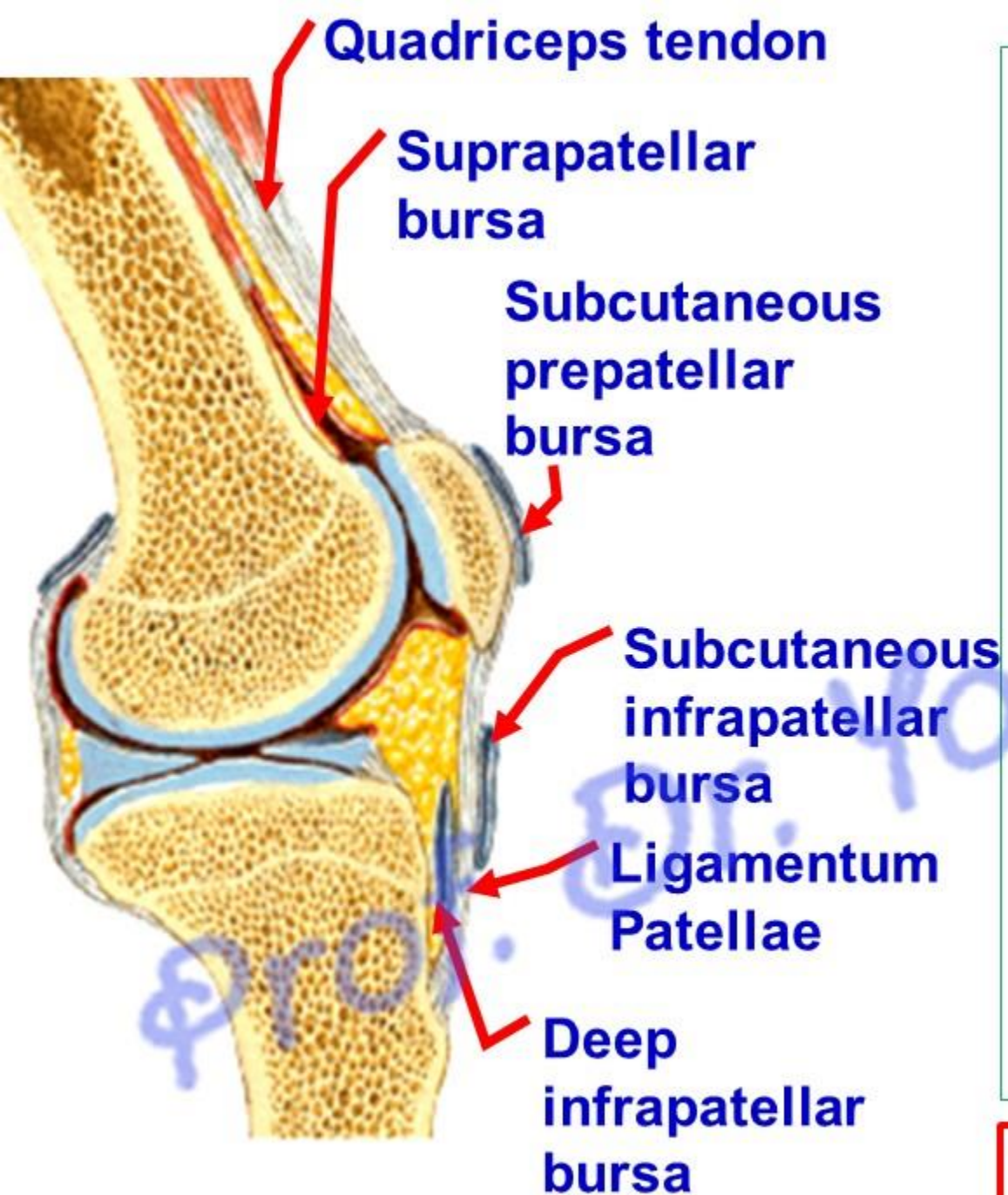
❖ **Synovial membrane**

-It lines the capsule and nonarticular structures

- 1) **Anteriorly**, extends upward above the patella forming **suprapatellar bursa**.
- 2) **Below the patella**, it forms **infrapatellar fold**.
- 3) **Laterally**, it forms a synovial sheath **around tendon of popliteus**.

❖ **Bursa On the medial aspect of knee joint**

- 1- A bursa between medial head of gastrocnemius and capsule.
- 2- A bursa between tibial collateral ligament and tendons of (S.G.S).
- 3- A bursa between Semimembranous and medial condyle of the tibia.



❖ **Bursa On the anterior aspect;**

1- Suprapatellar bursa: between lower part of anterior surface of femur and quadriceps tendon, continues with synovial membrane.

2- Subcutaneous prepatellar bursa: between skin and lower part of the patella.

- Inflammation and enlargement of this bursa usually affects persons who kneel over the knees during work. This condition is known as “**house maid’s knee**”

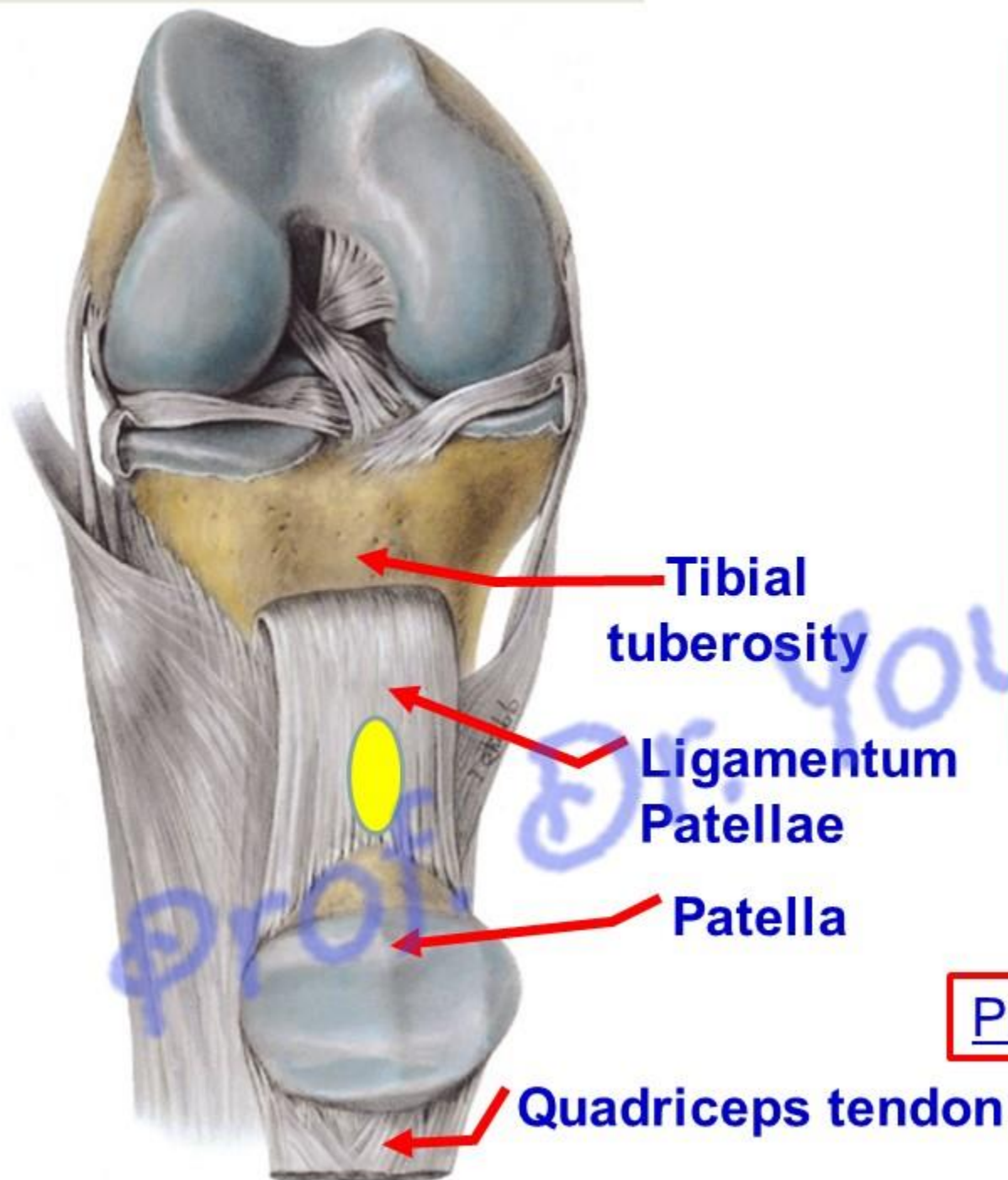
3- Subcutaneous infrapatellar bursa: between skin and lower part of tibial tuberosity.

4- Deep infrapatellar bursa: between upper end of tibia and ligamentum patellae.

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Extracapsular Ligaments

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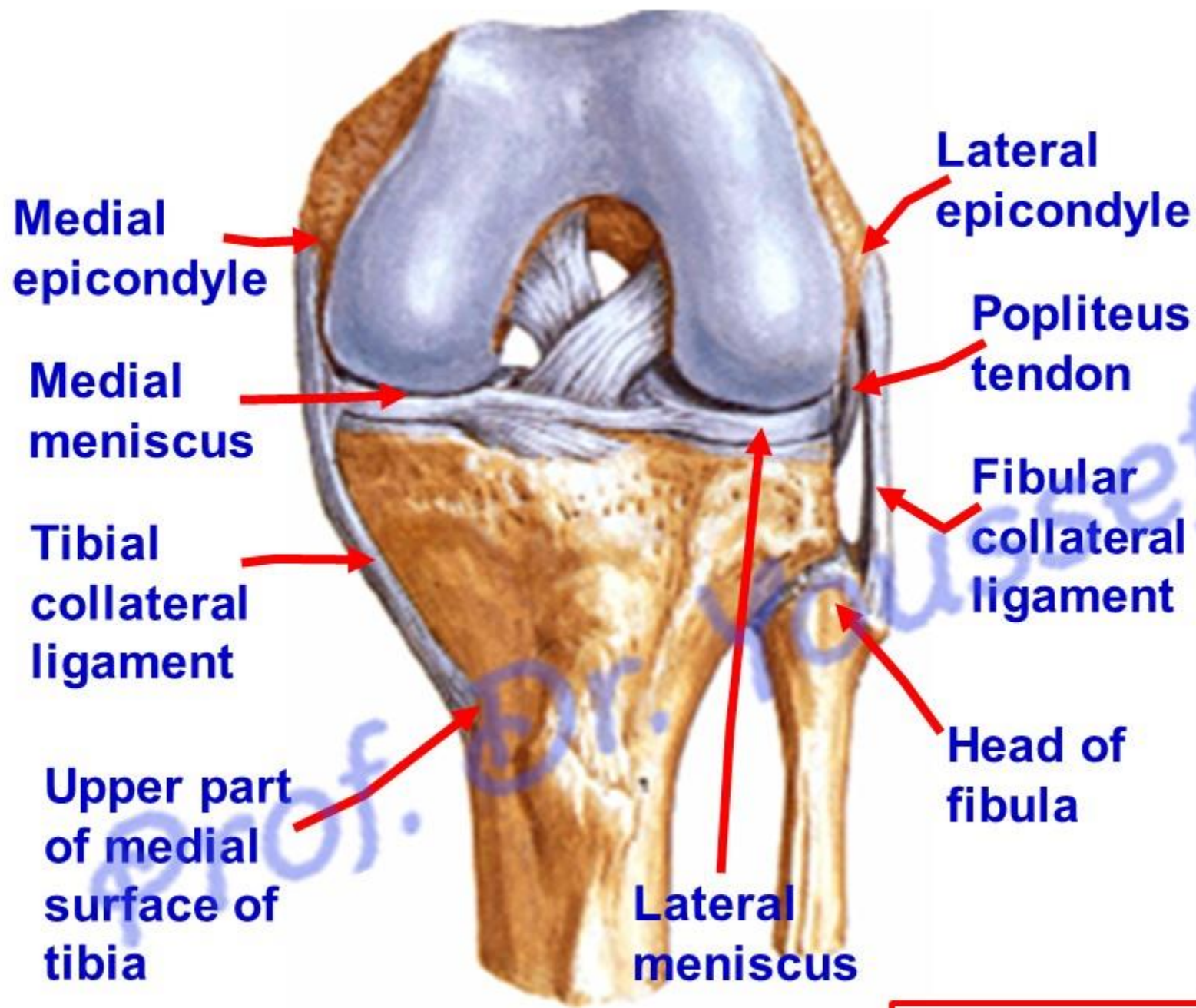


Ligamentum patellae (anterior):

- It is a strong ligament.
- It extends from the **apex** of the patella to the upper part of the **tibial tuberosity**.
- The deep surface is separated from the upper end of tibia by the **deep infrapatellar bursa**.

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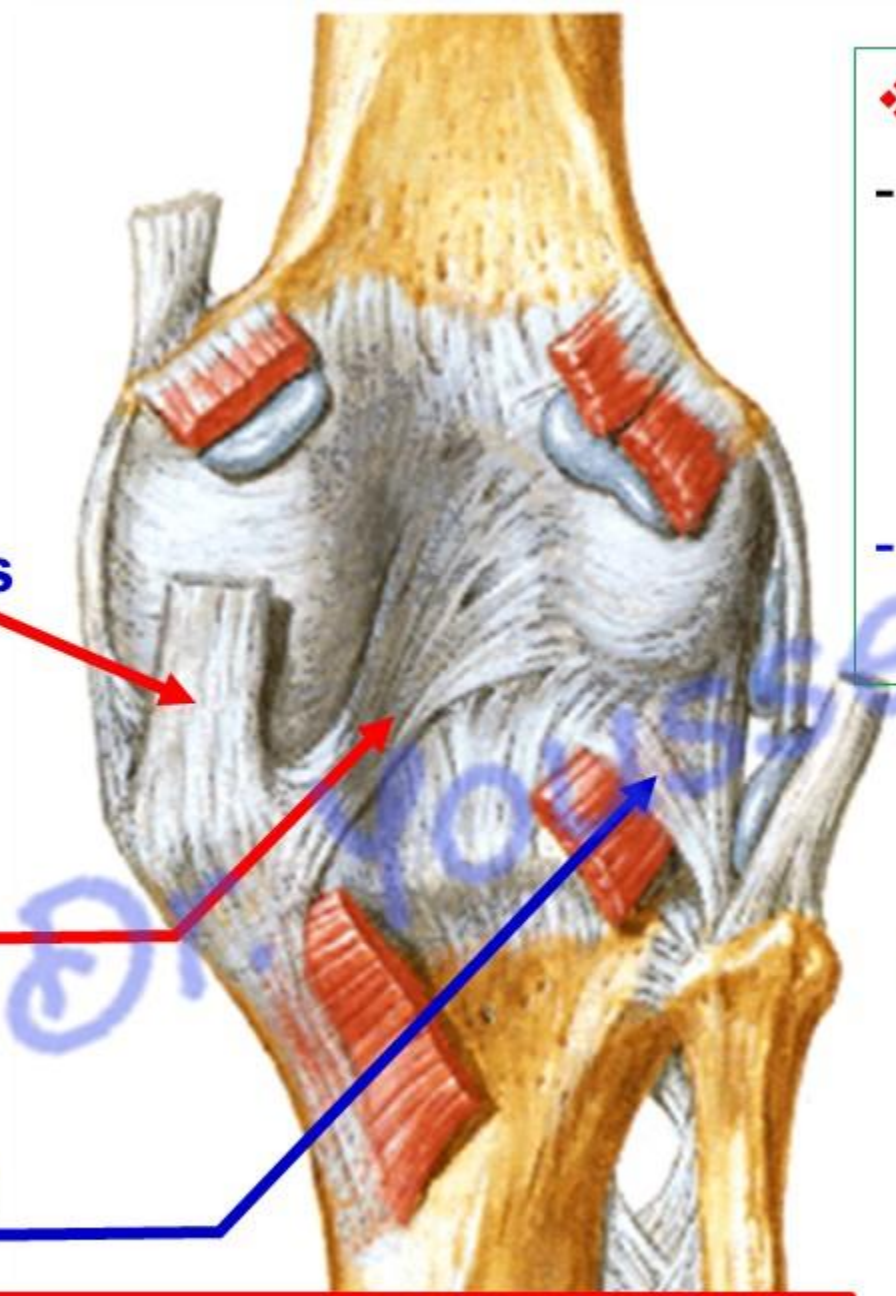


❖ **Medial collateral (tibial) ligament:** extends from medial epicondyle of femur to medial condyle and upper part of medial surface of tibia.

- It is **adherent** to the capsule and medial meniscus.

❖ **Lateral collateral (fibular) ligament:** extends from lateral epicondyle of femur to head of the fibula (*styloid process*).

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



Semimembranosus tendon

Posterior oblique ligament

Arcuate popliteal ligament

❖ **Posterior oblique ligament:**

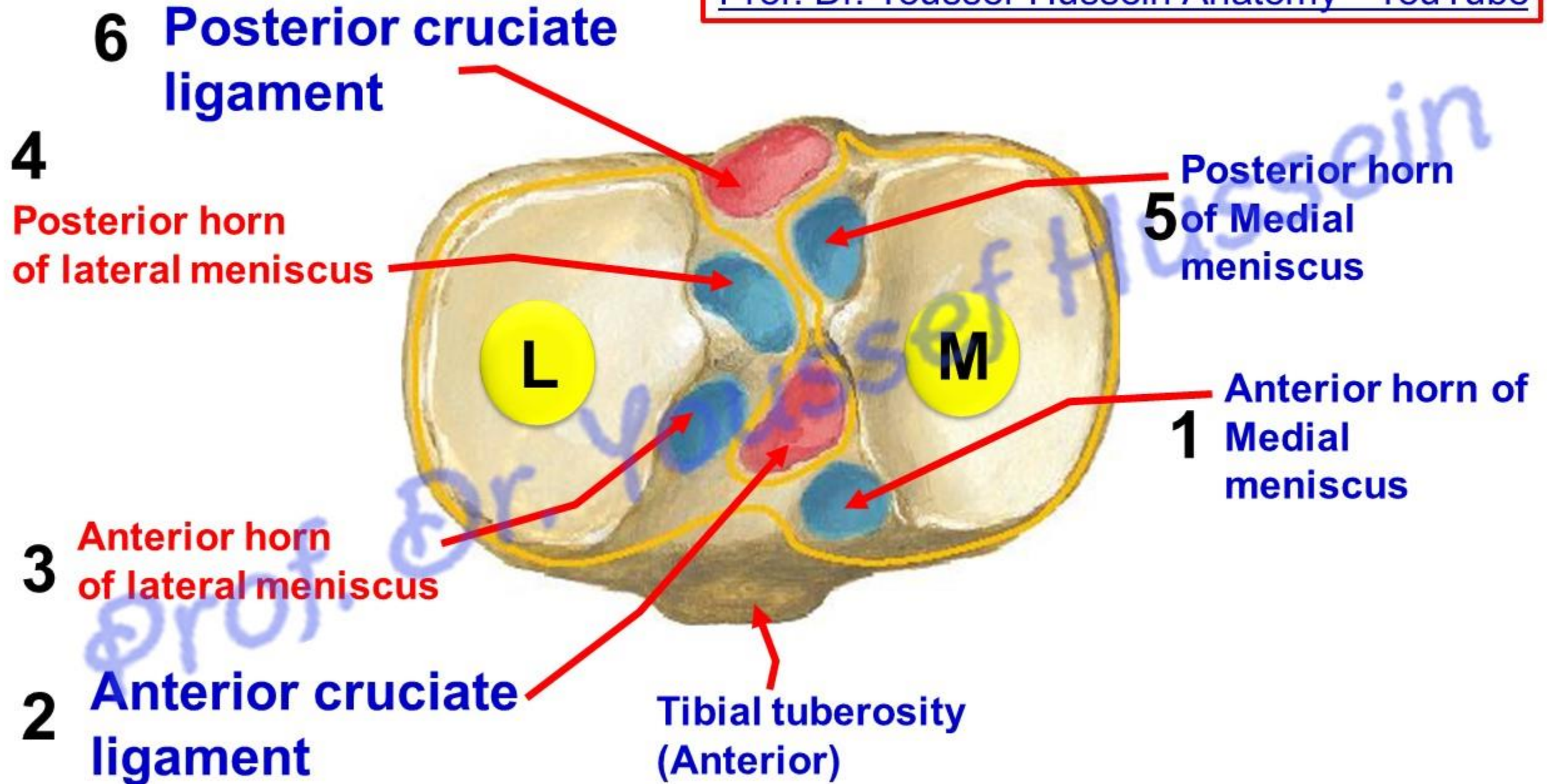
- It is a reflection from the semimembranosus tendon extends upwards and laterally to the lateral condyle of the femur.
- **Arcuate popliteal ligament.**
Arches over Popliteus tendon

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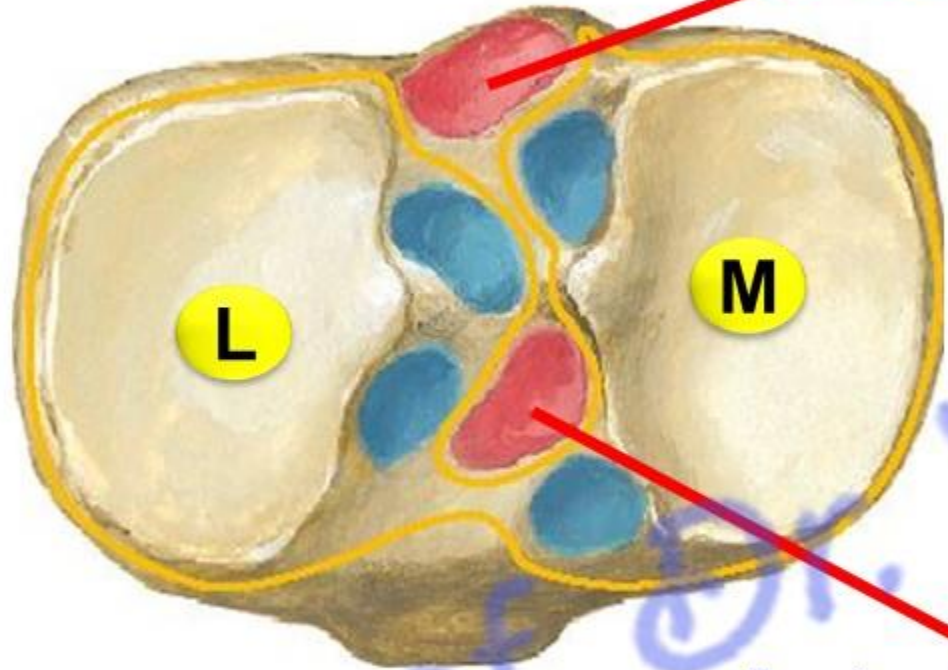
Intracapsular Ligaments

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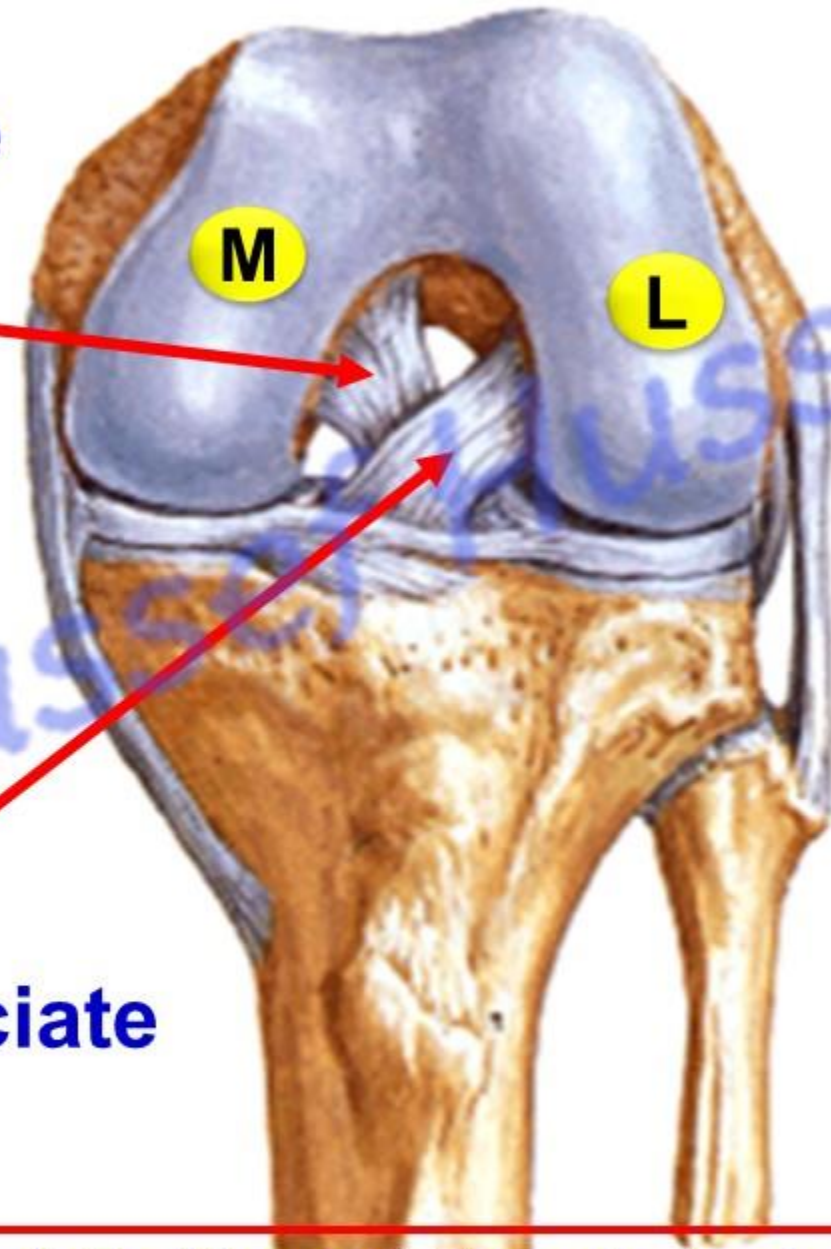
X-shaped figures

Posterior cruciate
ligament



Intercondylar
area of tibia

Anterior cruciate
ligament



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- They are so called because they form an **X-shaped figure**.
- They are named anterior and posterior according to their attachment to the tibia.

a- Anterior cruciate ligament: the most common to injury.

- **Attachment to the tibia;** anterior intercondylar area behind anterior horn of medial meniscus.
- **Course;** It extends upwards, **backwards** and **laterally**.
- **Attachment to the femur;** to posterior part of the medial surface of the lateral condyle.
- **Function:** 1- Prevents posterior displacement of femur on tibia.
2- Prevents hyperextension of the knee.

- **Lax in flexion while tense in full extension**

b- Posterior cruciate ligament (*larger and stronger than the anterior*):

- **Attachment to the tibia;** posterior intercondylar area behind posterior horn of medial meniscus.
- **Course;** It extends upwards, **forwards** and **medially**.
- **Attachment to the femur;** to the anterior part of the lateral surface of the medial condyle.
- **Functions;** It prevents anterior displacement of femur on tibia.

- **Tense in flexion while lax in extension**

Transverse ligament

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**Anterior horn of
Medial meniscus**

**Anterior horn of
lateral meniscus**

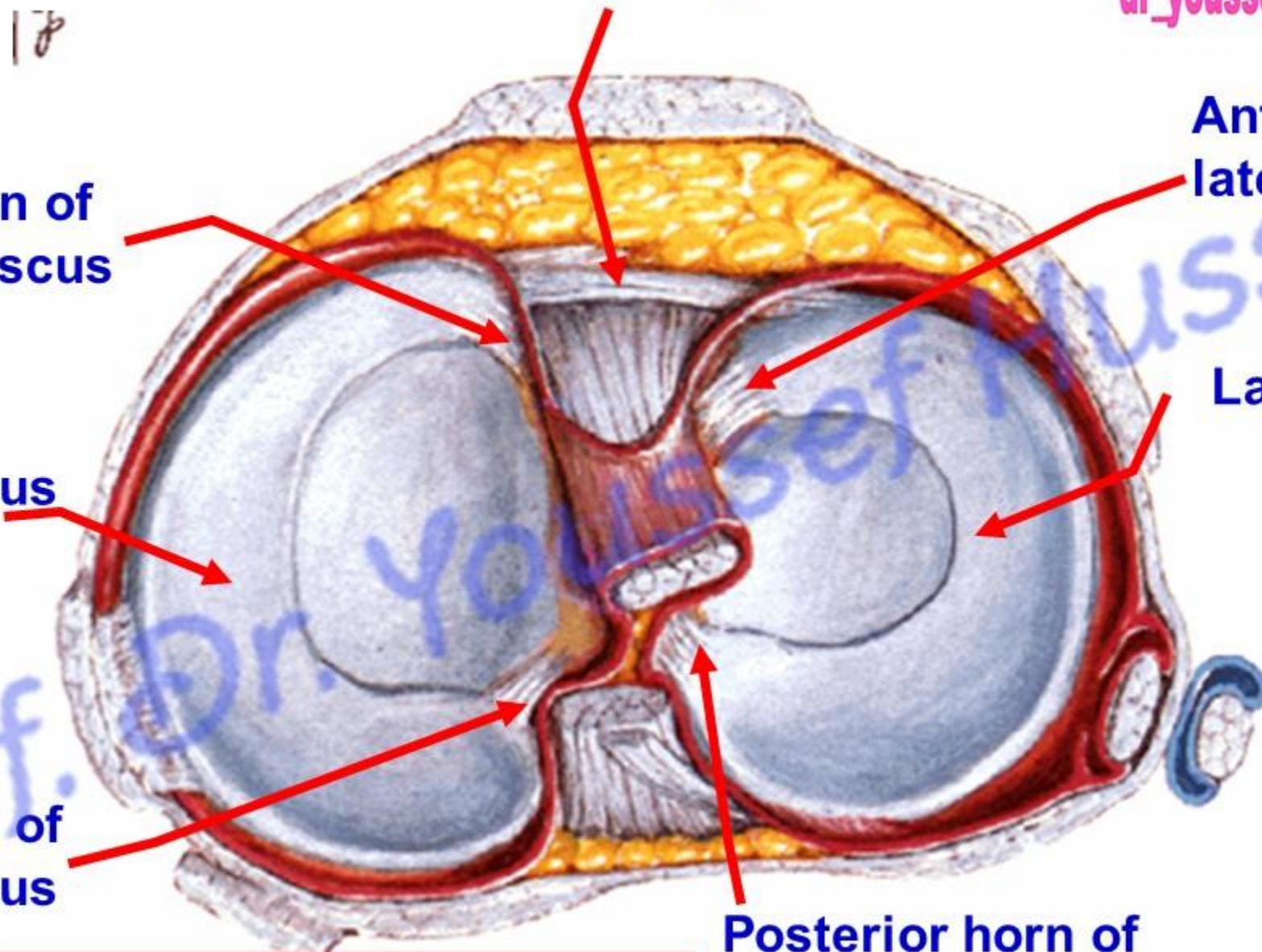
Medial meniscus

Lateral meniscus

**Posterior horn of
Medial meniscus**

**Posterior horn of
lateral meniscus**

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- **Menisci (Semilunar cartilages, C-shaped):**

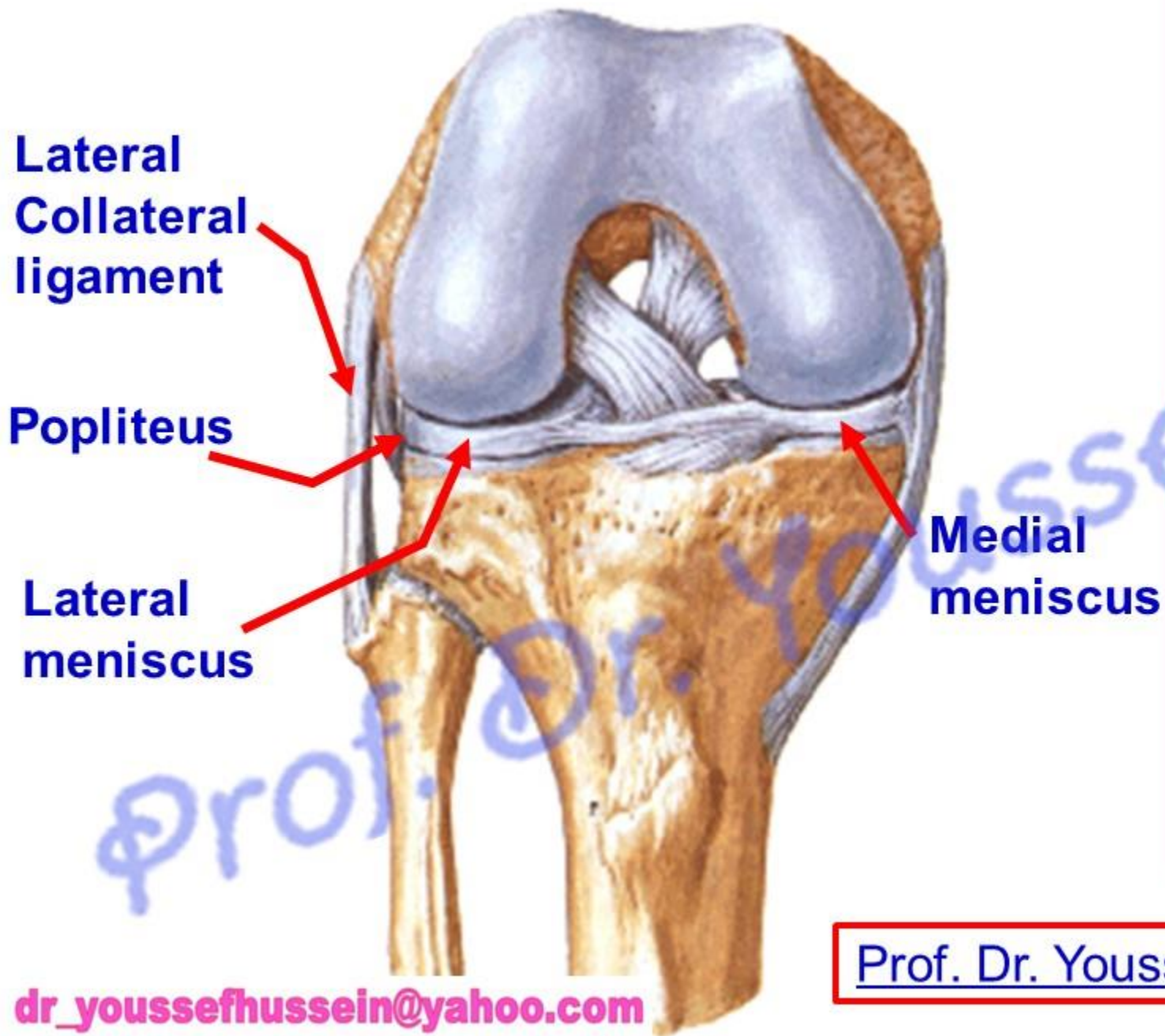
- They cover the articular surfaces of both tibial condyles.
- Their peripheral borders are thick, but they gradually become thinner towards their inner borders.
- It is not covered by synovial membrane.
- They are attached to the intercondylar area by anterior and posterior horns.

- **Medial meniscus** is **larger than lateral meniscus**, **SO** The lateral horns inside the medial horns.

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- **Transverse ligament:** It connects the **anterior** horns of both menisci

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* **Lateral meniscus, more mobile** because the outer border is separated from the capsule and fibular collateral ligament by the tendon of **popliteus**. **So**, it is less frequently to injury.

- Injury of menisci and cruciate ligaments are common especially in football players.

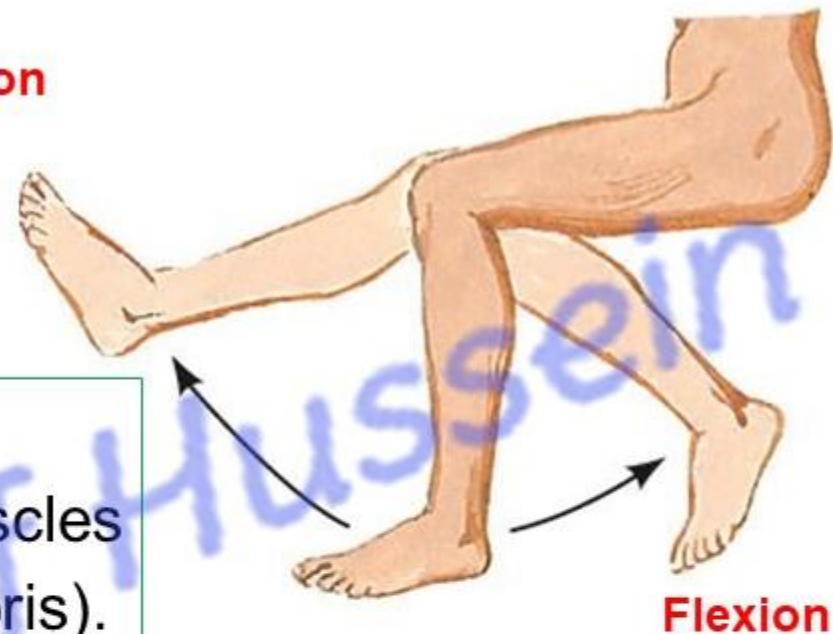
- It is caused by sudden rotatory movements of the partially flexed knee with the foot fixed on the ground.

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- **Movements of knee joint**

- 1- **Flexion:** mainly by the hamstring muscles (semimembranosus, semitendinosus and biceps femoris).
 - **Gastrocnemius, plantaris when the foot is fixed on ground**
- 2- **Extension:** by the quadriceps femoris (rectus femoris, vasti medialis, lateralis, and intermedius).
- 3- **Medial rotation:** (SGS) Sartorius, gracilis & semitendinosus and semimembranosus .
- 4- **Lateral rotation** by the biceps femoris only.



Unlocking of knee joint

At the beginning of flexion by
Popliteus muscle

Lateral rotation of **femur** on tibia
by **Popliteus** when the foot is
fixed on the ground

Or **M**edial rotation of **tibia** on
femur by **Popliteus** when the
foot is raised from the ground

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Locking of knee joint

- **At the end of extension:** tightening of the **anterior cruciate ligament** terminates the movement of the **lateral condyle** of femur
- **Full extension:** The articular surface on the **medial condyle is longer than lateral.**



Medial rotation of femur on tibia when the foot is fixed on the ground

Or **Lateral rotation of tibia on femur when the foot is raised from the ground**

Nerve supply

1- Femoral nerve through nerves to 3 vasti muscles.

2- Obturator nerve from the posterior division.

3- Tibial nerve;

a- Superior **medial genicular** nerve.

b- Inferior **medial genicular** nerve.

c- **Middle** genicular nerve.

4- Common peroneal (lateral popliteal) nerve;

a- Superior **lateral genicular** nerve.

b- Inferior **lateral genicular** nerve.

c- **Recurrent** genicular nerve.

Anastomosis around the knee joint

- 5 Branches from popliteal artery

- 1- Superior **lateral genicular** artery.
- 2- Inferior **lateral genicular** artery.
- 4- Superior **medial genicular** artery.
- 5- Inferior **medial genicular** artery.
- 3 - Middle genicular artery.

- 2 Branches from femoral artery

- 1- **Descending** genicular artery.
- 2- **Descending** branch of lateral circumflex femoral artery.

- 2 Branches from anterior tibial artery

- 1 - Anterior **tibial recurrent** artery.
- 2- Posterior **tibial recurrent** artery.

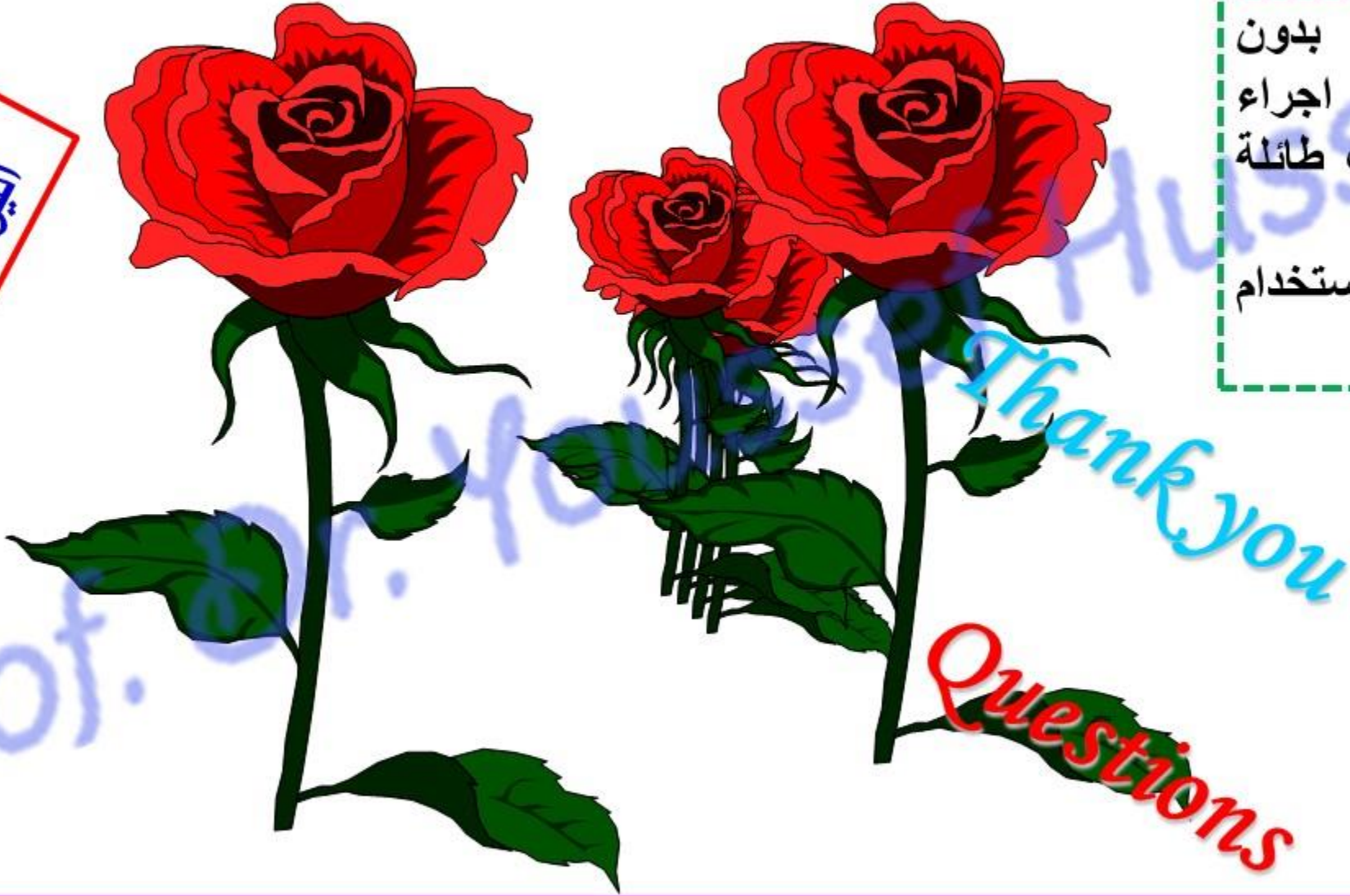
- 1 Branch from posterior tibial artery

- 1- Circumflex fibular artery.

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