

FEMUR AND PATELLA

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Learning objectives-

By the end of this teaching session on Femur & Patella, all the students must be able to correctly:-

- ▶ Identify femur and patella.
- ▶ Demonstrate the different parts, borders and surfaces OF Femur.
- ▶ demonstrate apex, base, borders and surfaces of patella.
- ▶ Determine the side of femur and patella.
- ▶ Hold femur and patella in their anatomical position.
- ▶ demonstrate attachment of joint capsule and muscles on femur.
- ▶ demonstrate attachment of muscles on patella.
- ▶ Describe ossification of femur and patella.
- ▶ Describe the importance of ossification of lower end femur.

FEMUR

▶ Longest and strongest bone of body present in thigh.

▶ Features-

A) Upper end- contains

1) Head- directed medially, upwards and slightly forwards and articulates with acetabulum.

2) Neck- 3.7 cm long

Two borders- upper and lower

Two surfaces- anterior and posterior

Neck shaft angle- 125 degree in adults

but wider in female.

3) Greater trochanter- Quadrangular prominence

Have an apex and an upper border

Three surfaces- Anterior

Medial- deep trochanteric fossa.

Lateral- oblique ridge.

4) Lesser trochanter- Conical eminence

5) Intertrochanteric line

6) Intertrochanteric crest- Quadrate tubercle

B) Shaft- Upper 1/3 have 4 borders and 4 surfaces

Middle 1/3 have 3 borders and 3 surfaces

Lower 1/3 have 4 borders and 4 surfaces

C) Lower end- contains

1) Lateral condyle- Strongest and weight bearing

Lateral epicondyle

Popliteal groove

2) Medial condyle- Medial epicondyle

Adductor tubercle

3) Intercondylar fossa/notch and intercondylar line.

- ▶ Side determination- Head comes superiorly.
Head directed medially.
Prominent part of condyles comes posteriorly.
- ▶ Anatomical position
- ▶ Attachments

Upper end of femur	Muscular and Ligamentous attachments
Fovea	Round ligament or ligamentum teres/femoris
Greater trochanter	Piriformis- apex Gluteus minimus- ant surface Gluteus medius- lat surface Trochanteric bursa for gluteus maximus- lat sur. Obturator internus- medial surface Two gemelli- medial surface Obturator externus- medial surface
Lesser trochanter	Psoas major Iliacus
Intertrochanteric line	Capsular ligament Upper and lower band of iliofemoral ligament Upper fibres of vastus medialis and lateralis
Intertrochanteric crest	Quadratus femoris on quadratus tubercle
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Upper shaft

Muscular attachments

Lateral and anterior surface

Vastus intermedius

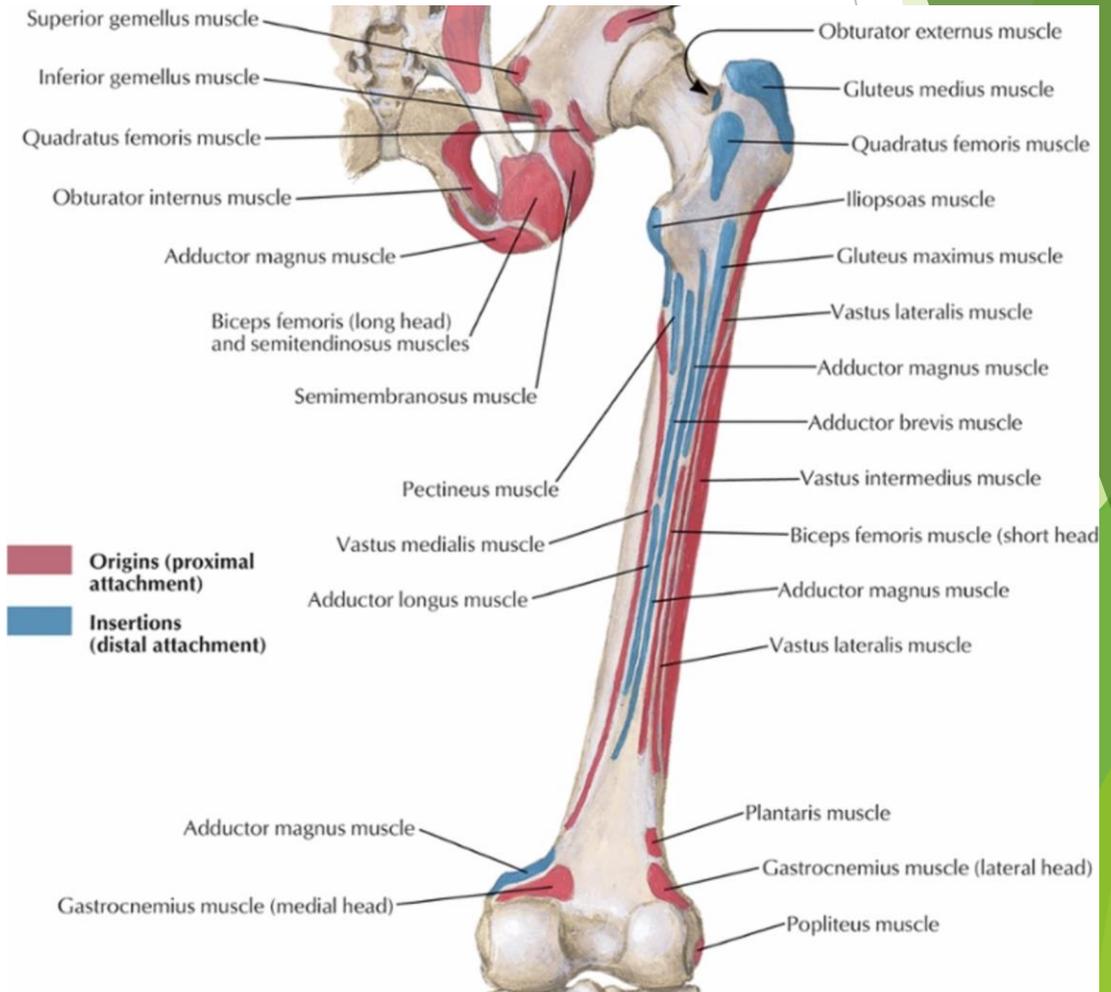
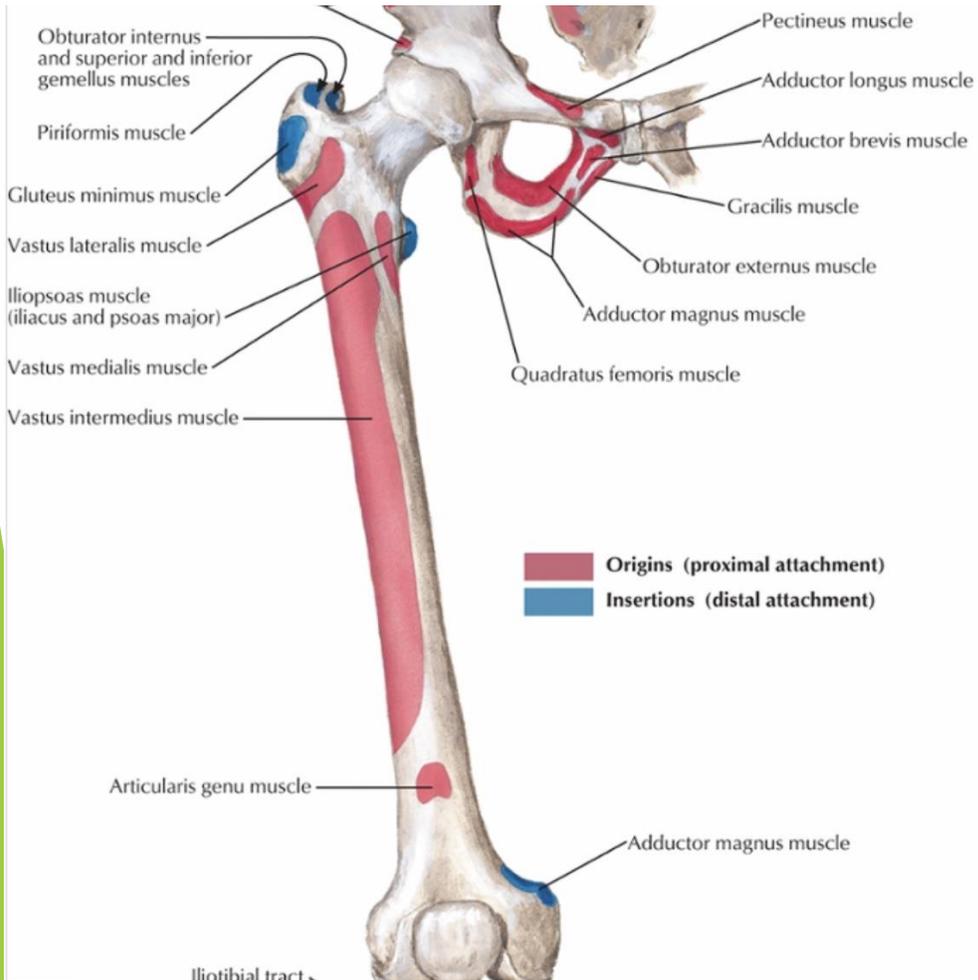
Spiral line

Pectineus

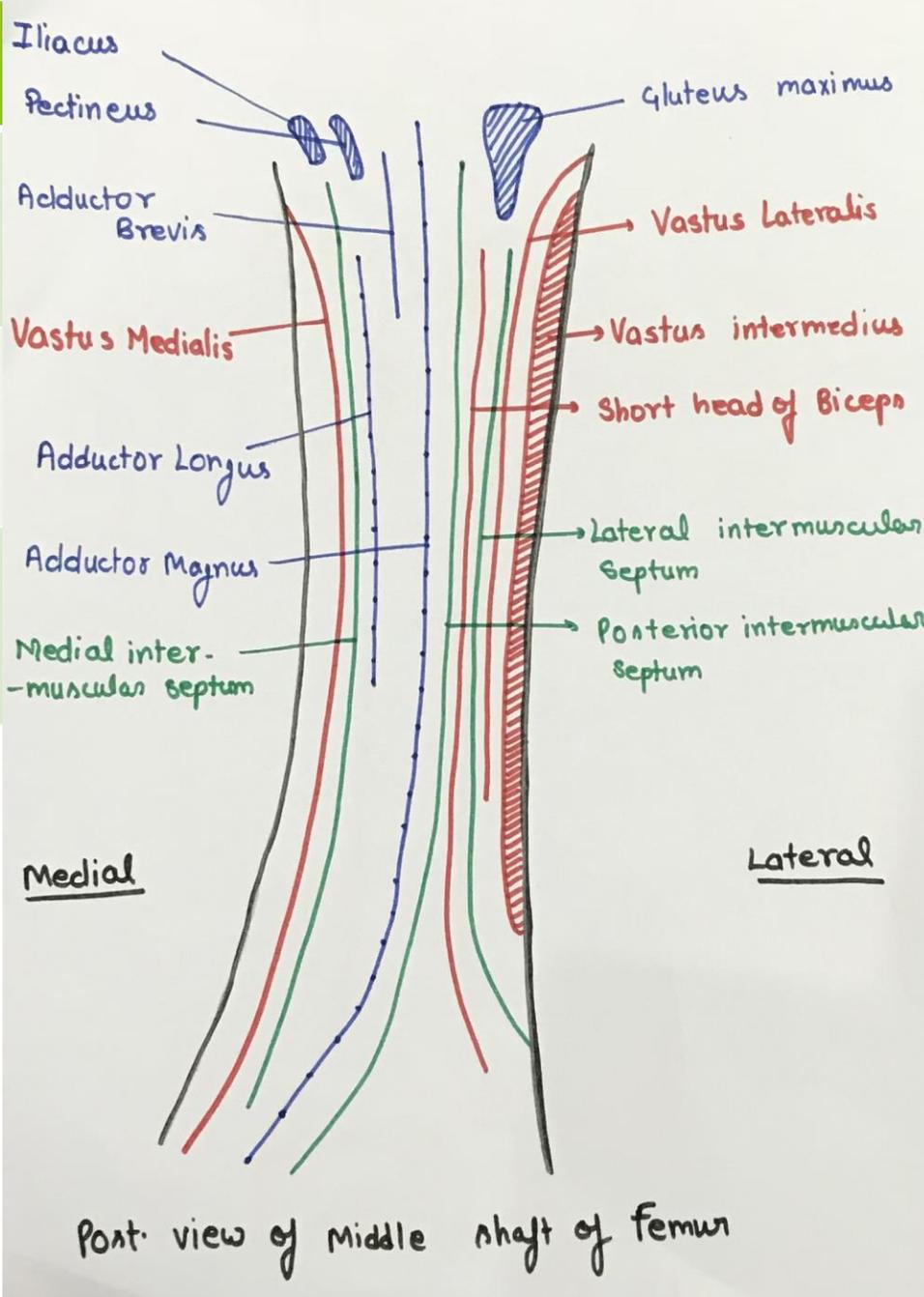
Gluteal tuberosity

Gluteus maximus
Adductor magnus

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Middle 1/3 shaft	site	Muscular attachment
3 extensors	Present on whole circumference of shaft except inner portion of linea aspera	1) Vastus medialis 2) Vastus intermedialis 3) Vastus lateralis
3 adductors	Present between medial and posterior intermuscular septum on linea aspera	1) Adductor brevis 2) Adductor longus 3) Adductor magnus
1 flexor	Present between posterior and lateral intermuscular septum on linea aspera	Short head of biceps femoris



Lower 1/3 shaft	Muscular attachment
Anterior upper surface	Articularis genu
Medial supracondylar line	Adductor magnus
Medial lower part of popliteal surface	Medial head of gastrocnemius
Lower end of lateral supracondylar line	plantaris
Above lateral epicondyle	Lateral head of gastrocnemius

- Adductor magnus leaving a gap in its line of insertion for popliteal vessels.

Lower end femur	Muscular and ligamentous attachment
Medial epicondyle	Tibial collateral ligament
Lateral epicondyle	Fibular collateral ligament
Popliteal groove	popliteus

- Nutrient artery of femur- second perforating artery, branch of profunda femoris artery.

► Ossification-

1 primary centre- 7week

4 secondary centres-

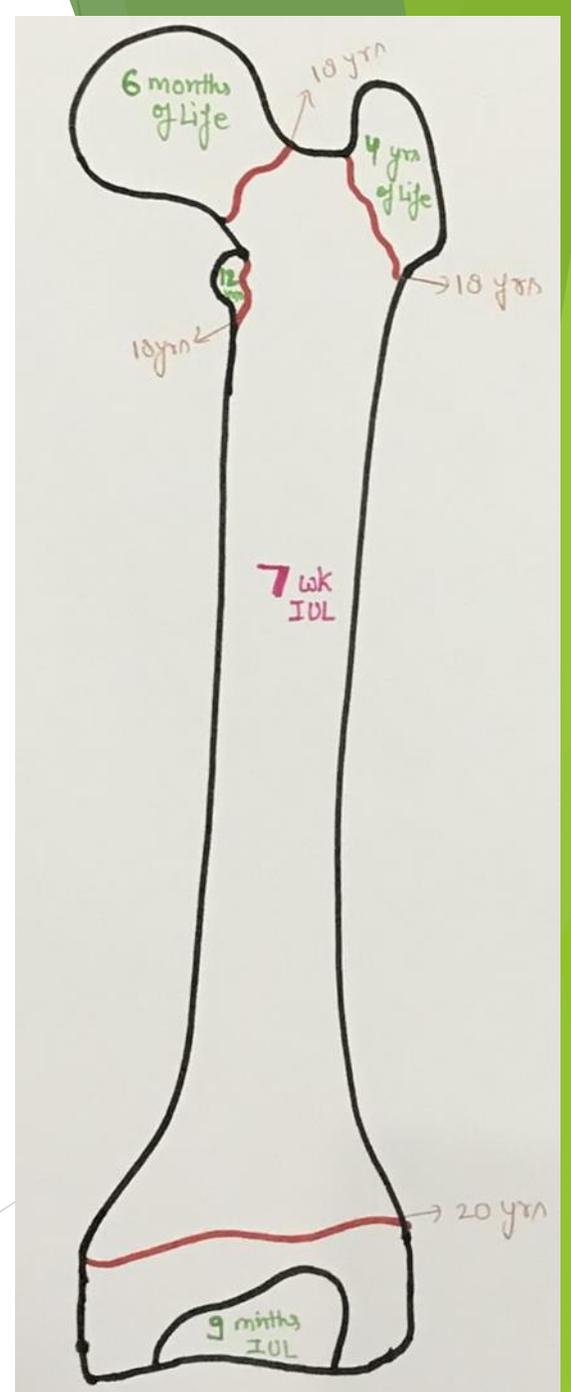
At 9 month of IUL for lower end

At 6 month of life for head

At 4 year age for greater trochanter

At 12 year age for lesser trochanter

► Ossification of lower end of femur have medicolegal importance- to differentiate still born and live born baby.



PATELLA

▶ Largest sesamoid bone in body, developed in tendon of quadriceps femoris.

▶ Features- An apex- Covered by expansion of rectus femoris

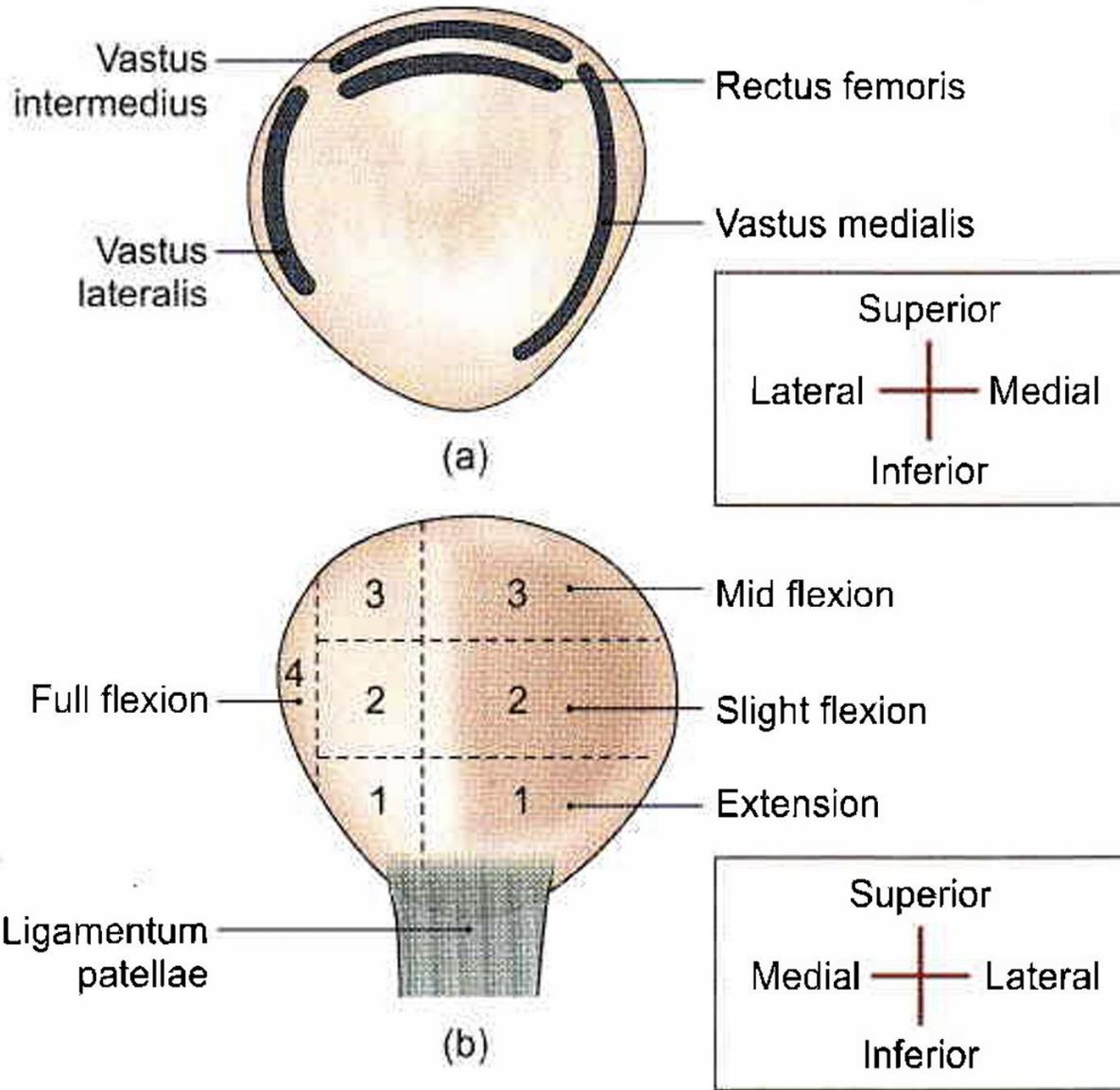
Separated from skin by prepatellar bursa

3 borders- Superior, Lateral, Medial

2 surfaces- Anterior

Posterior- $\frac{3}{4}$ is articular

Divided by 2 vertical and 2 transverse lines into
3 pairs of medial and lateral articular facets and
one medial strip.



Figs 2.21a and b: Features of the right patella: (a) Anterior view, and (b) posterior view

Pair of facet articulates with femur	Action of kneejoint
Lower pair	Extension
Middle pair	Beginning of flexion
Upper pair	Mid flexion
Medial strip	Full flexion

- Side determination- Apex comes inferiorly.
Rough anterior surface comes anteriorly.
Large area of posterior surface comes laterally.
- Anatomical position

- Attachments- Rectus femoris
 - Vastus medialis
 - Vastus intermedius
 - Vastus lateralis
 - Ligamentum patellae
- Ossification- From several centres at 3-6 year of life and fusion complete at puberty.
 - Some centres not fuse and make bipartite and tripartite patella
- Clinical significance- Fracture of patella should be differentiated from a bipartite and tripartite.