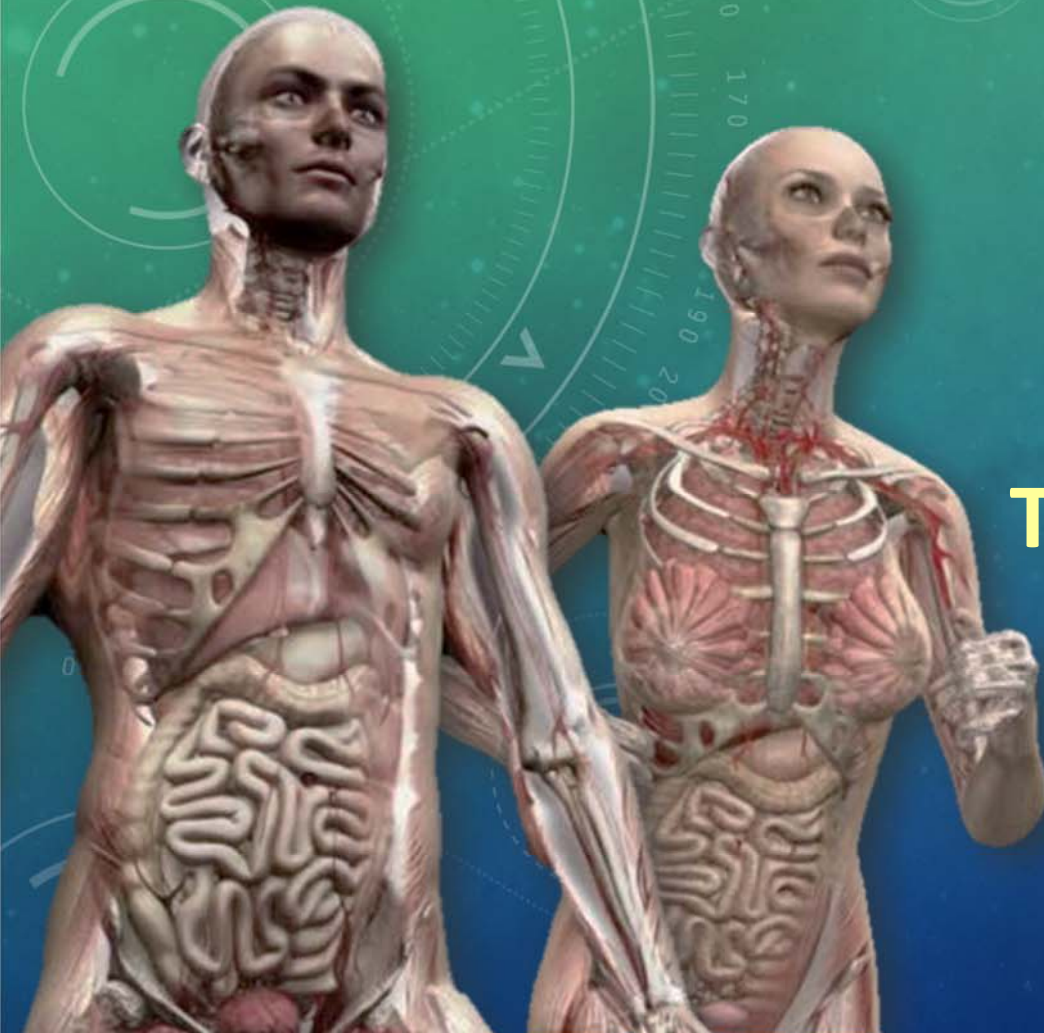


大體老師 無語良師



大體解剖學實驗

HUMAN DISSECTION

THE LOWER LIMB DISSECTION III

盧家鋒 助理教授

臺北醫學大學醫學系 解剖學暨細胞生物學科

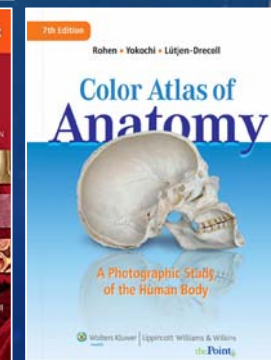
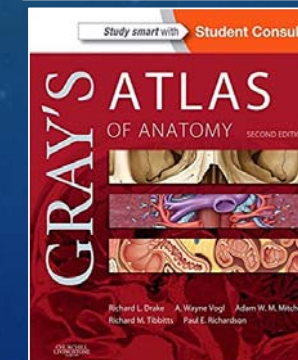
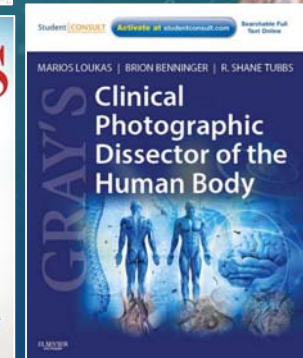
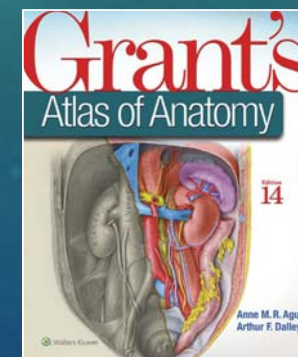
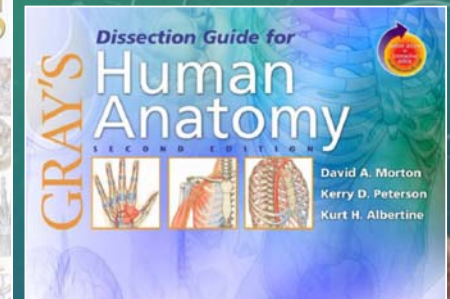
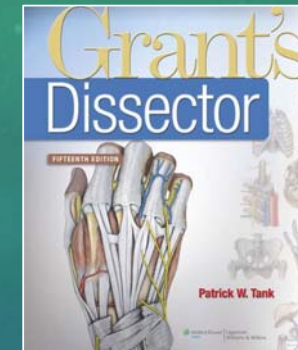
臺北醫學大學醫學院 轉譯影像研究中心

<http://www.ym.edu.tw/~cflu>

REFERENCES

- **Dissector's guide**
 - [1] Dissection Guide for Gray's Human Anatomy, 2ed, 2006
 - **[2] Grant's Dissector, 15ed, 2012**
- **Photographic Dissector**
 - [3] Gray's Clinical Photographic Dissector of the Human Body, 2013
- **Human Atlas**
 - [4] Gray's Atlas of Anatomy, 2ed, 2014
 - **[5] Grant's Atlas of Anatomy 13ed, 2012**
 - [6] Color Atlas of Anatomy: A Photographic Study of the Human Body, 7ed, 2011
 - [7] Atlas of Human Anatomy, 6ed, 2014

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LOWER LIMB (3/4)

- Anterior & medial compartments of the thigh
- Anterior compartment of the leg & dorsum of the foot
- Sole of the foot

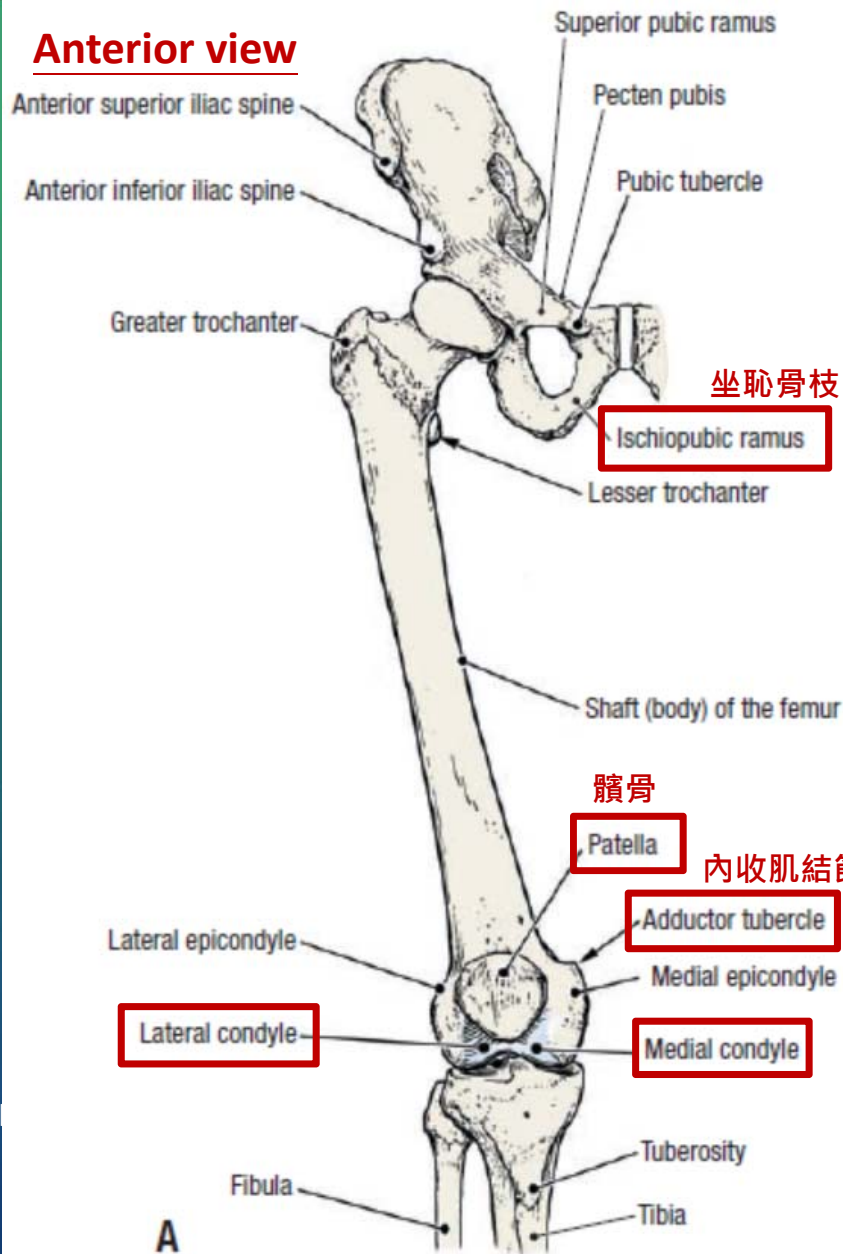


ANTERIOR & MEDIAL COMPARTMENTS OF THE THIGH

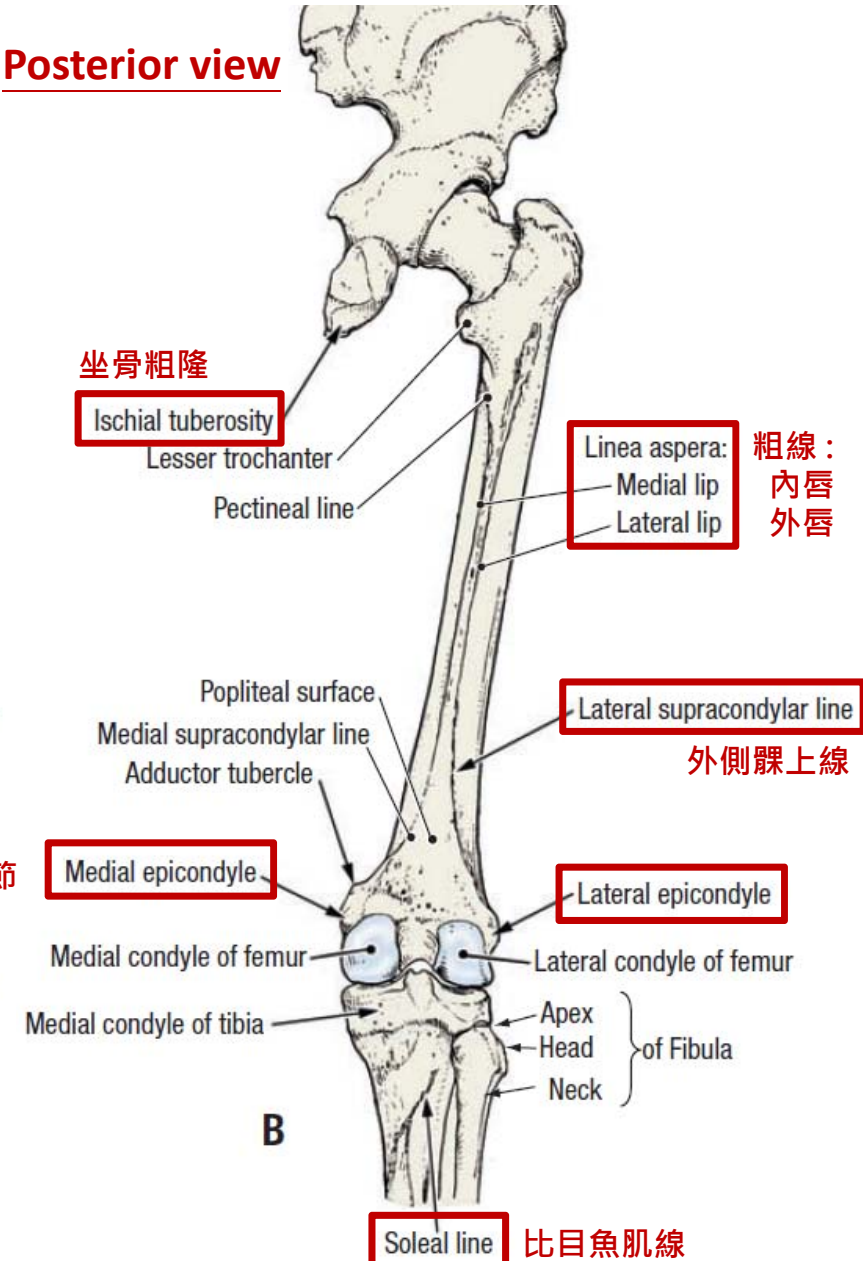
大腿前側 & 內側

OSTEOLOGY

Anterior view

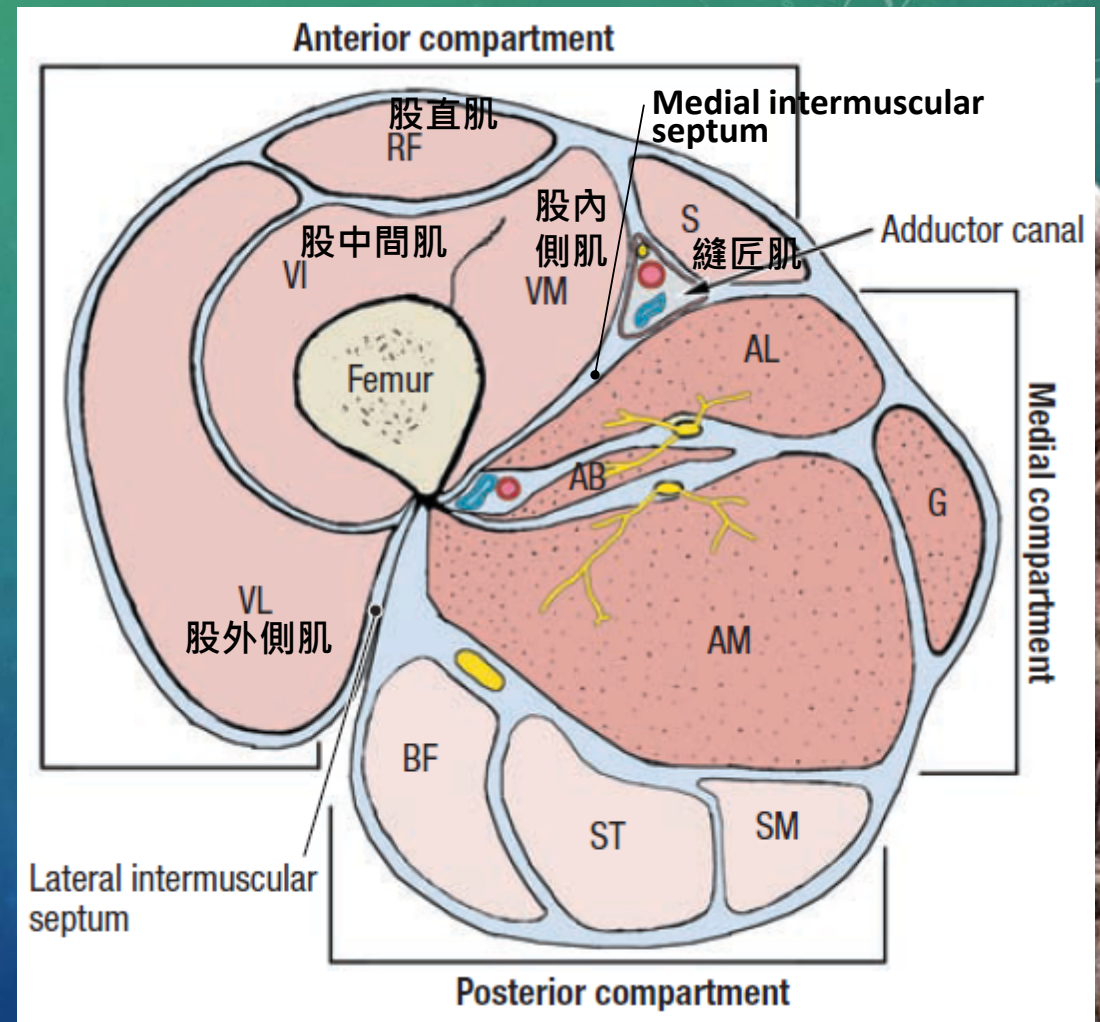


Posterior view



COMPARTMENTS OF THIGH

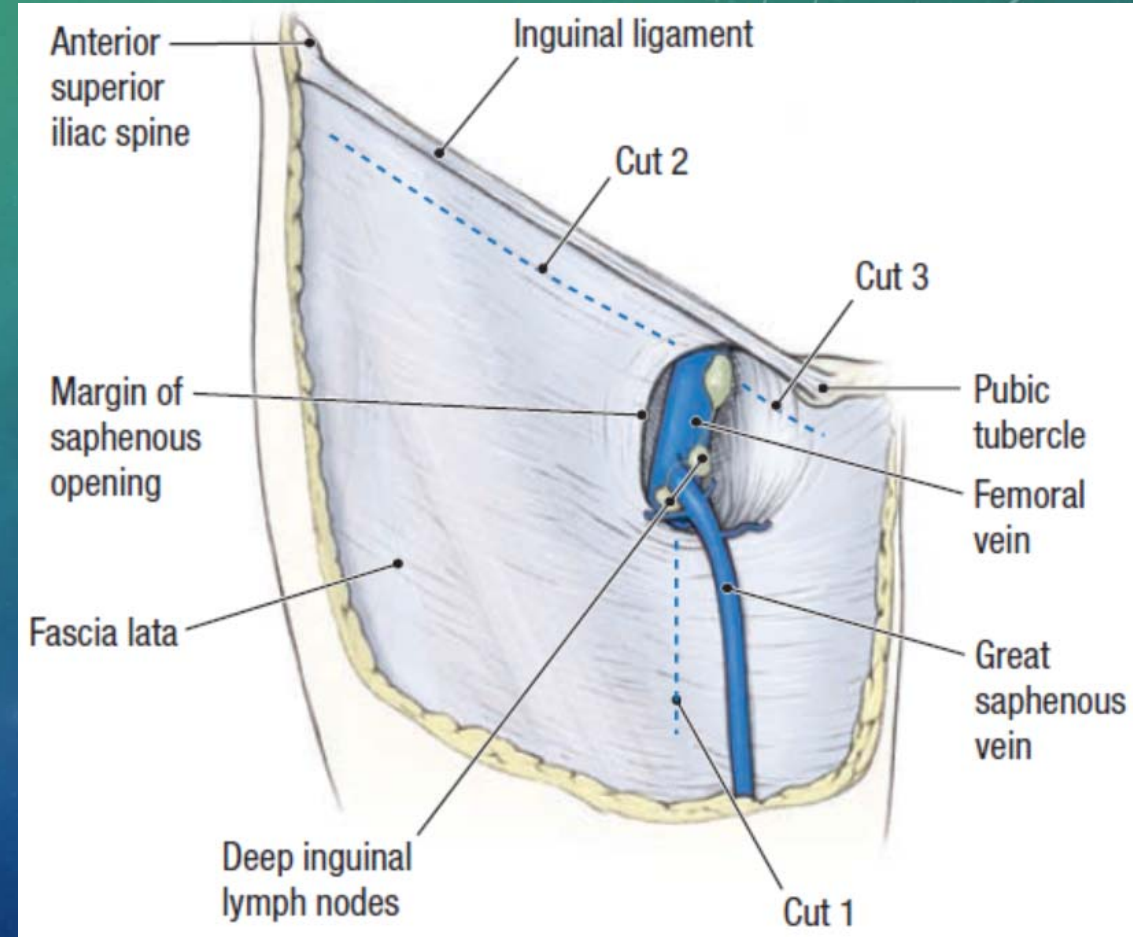
- **Anterior compartment:**
 - *VI*, vastus intermedius; *VL*, vastus lateralis; *VM*, vastus medialis; *RF*, rectus femoris; *S*, sartorius.
- **Medial compartment:**
 - *AB*, adductor brevis; *AL*, adductor longus; *AM*, adductor magnus; *G*, gracilis.
- **Posterior compartment:**
 - *BF*, biceps femoris; *ST*, semitendinosus; *SM*, semimembranosus

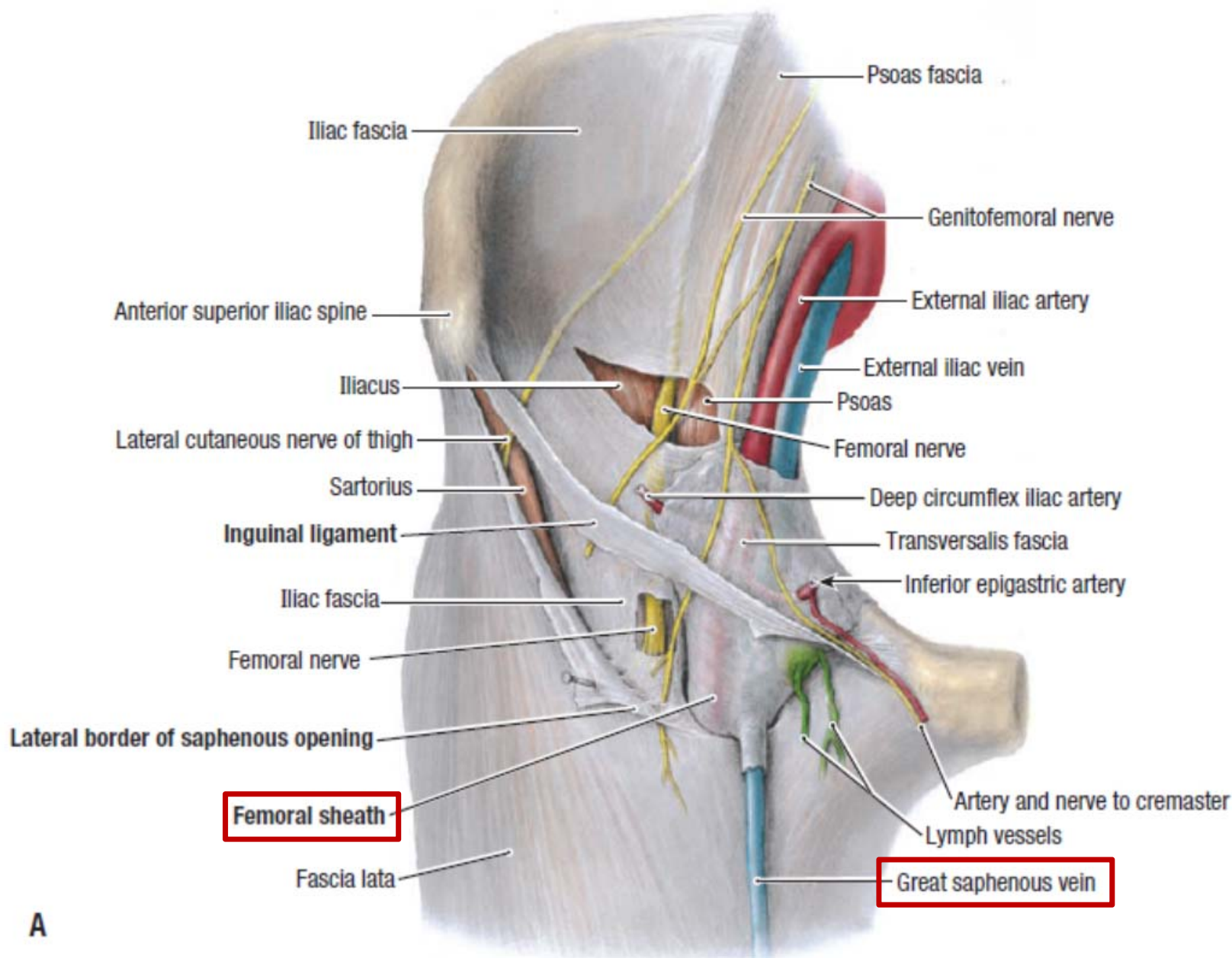


Inferior view of right thigh

SAPHENOUS OPENING

- Use a probe to dissect the connective tissue around the great saphenous vein where it passes deeply and define the margin of the **saphenous opening**.
- The superficial inguinal lymph nodes must be removed during this step of the dissection.
- Open and separate the fascia lata from deeper structures (**Cut 1, 2, and 3**).





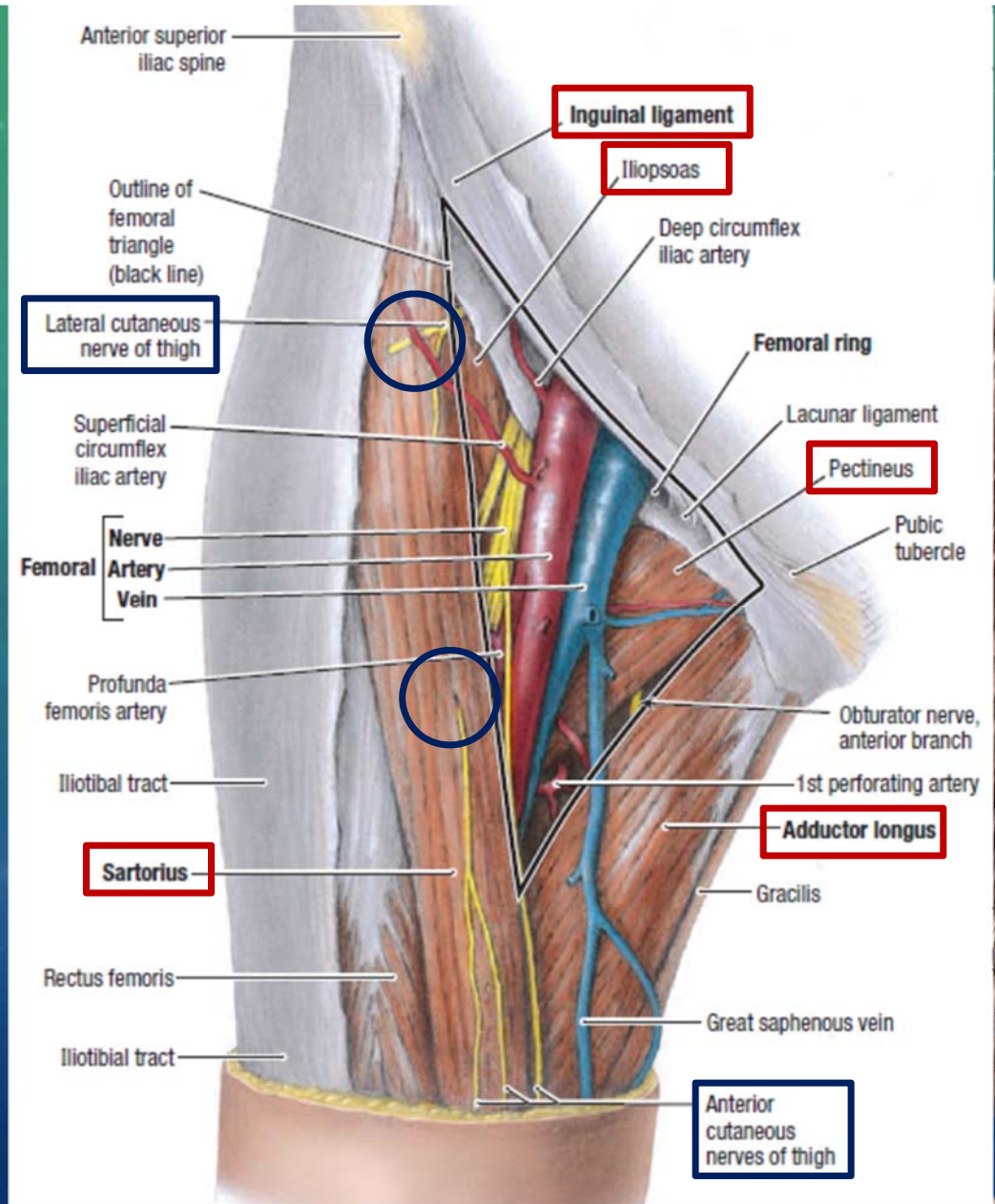
Ref. [5] p.379

<http://www>



FEMORAL TRIANGLE

- Superior – inguinal ligament
- Lateral – sartorius muscle
- Medial – adductor longus muscle
- Floor – iliopsoas and pectineus muscles

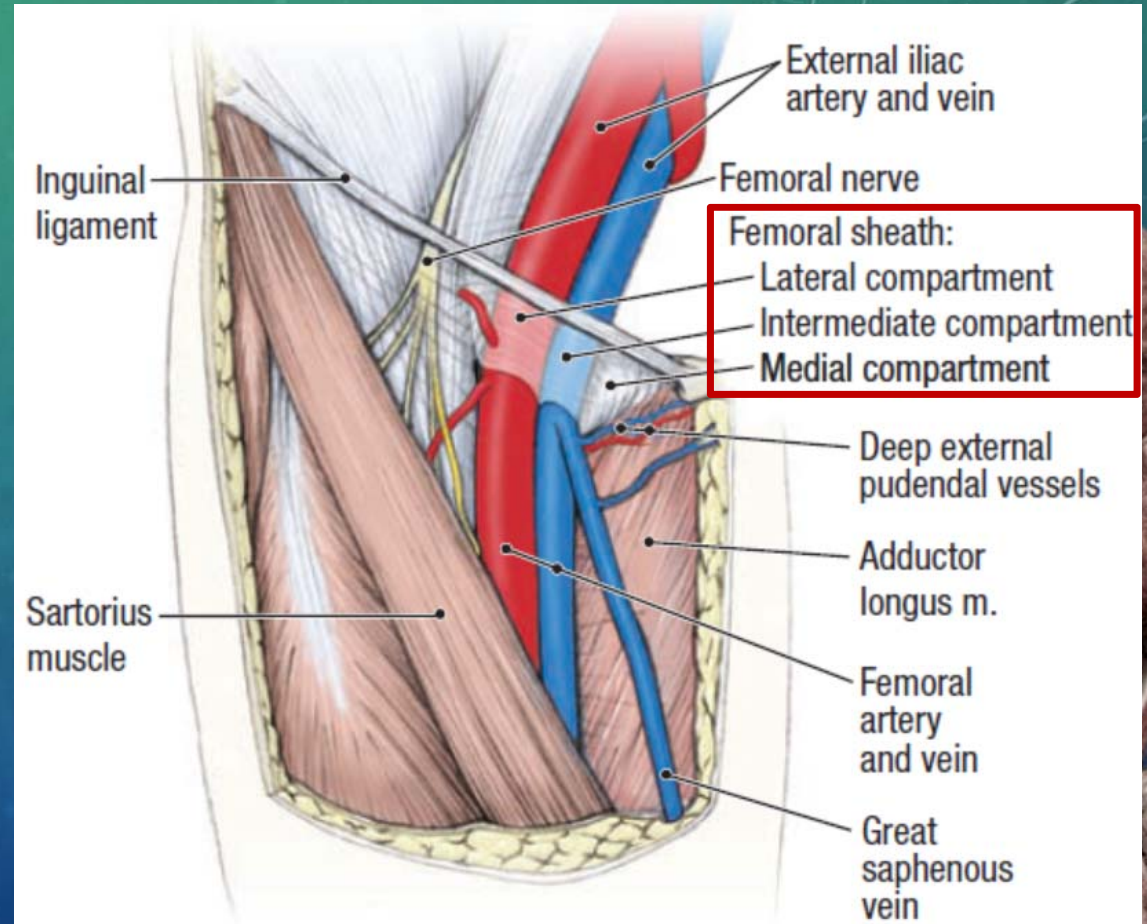


Ref. [5] p.380

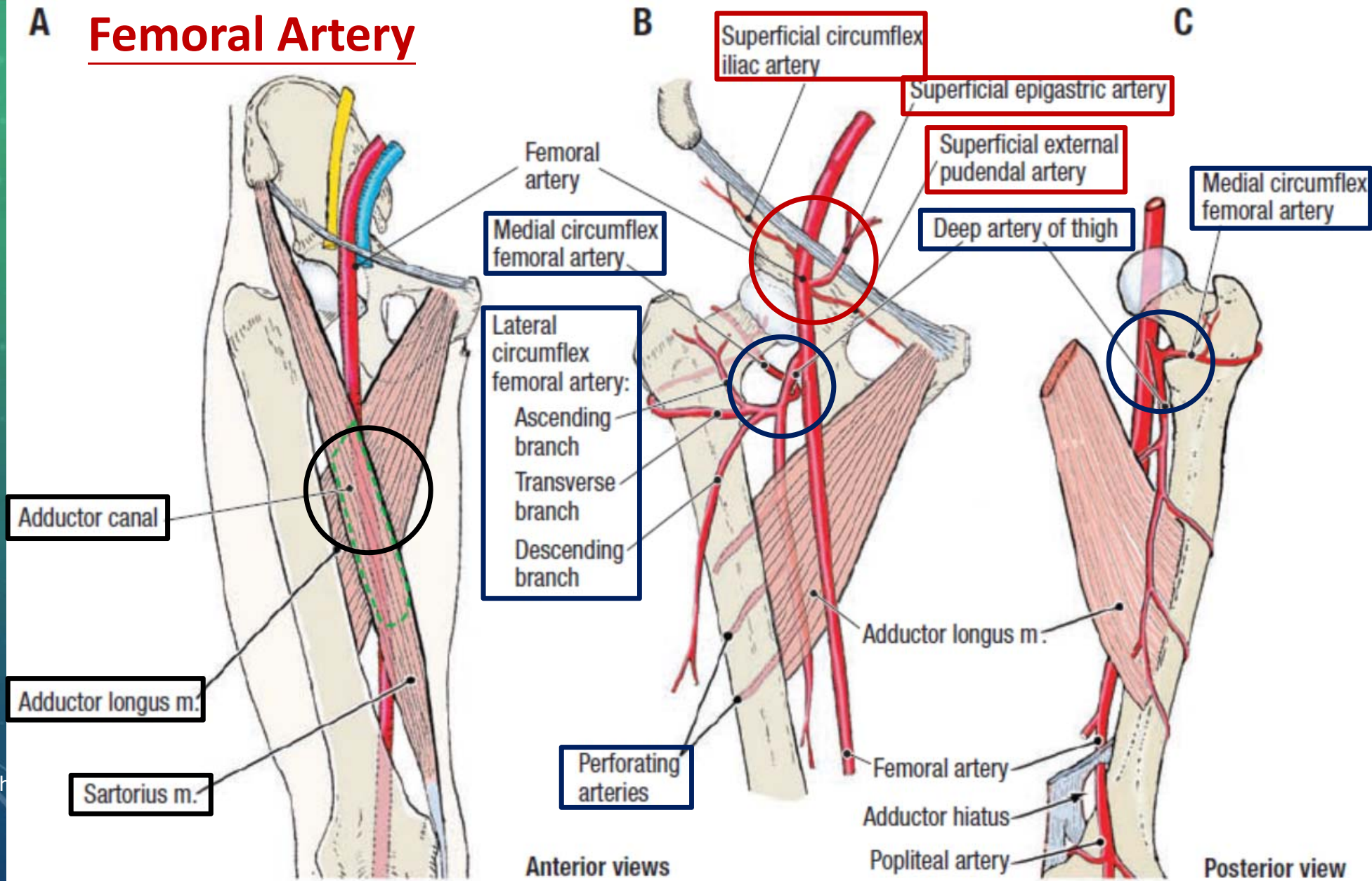
FEMORAL TRIANGLE

Contents:

- Femoral nerve and its branches
- Femoral artery and some of its branches
- Femoral vein and some of its tributaries
- Femoral sheath (femoral canal)

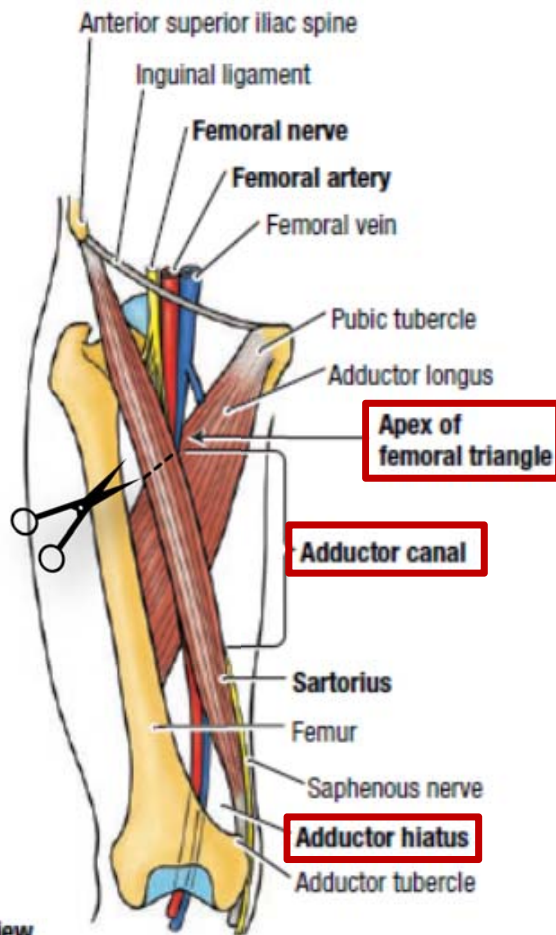


A Femoral Artery

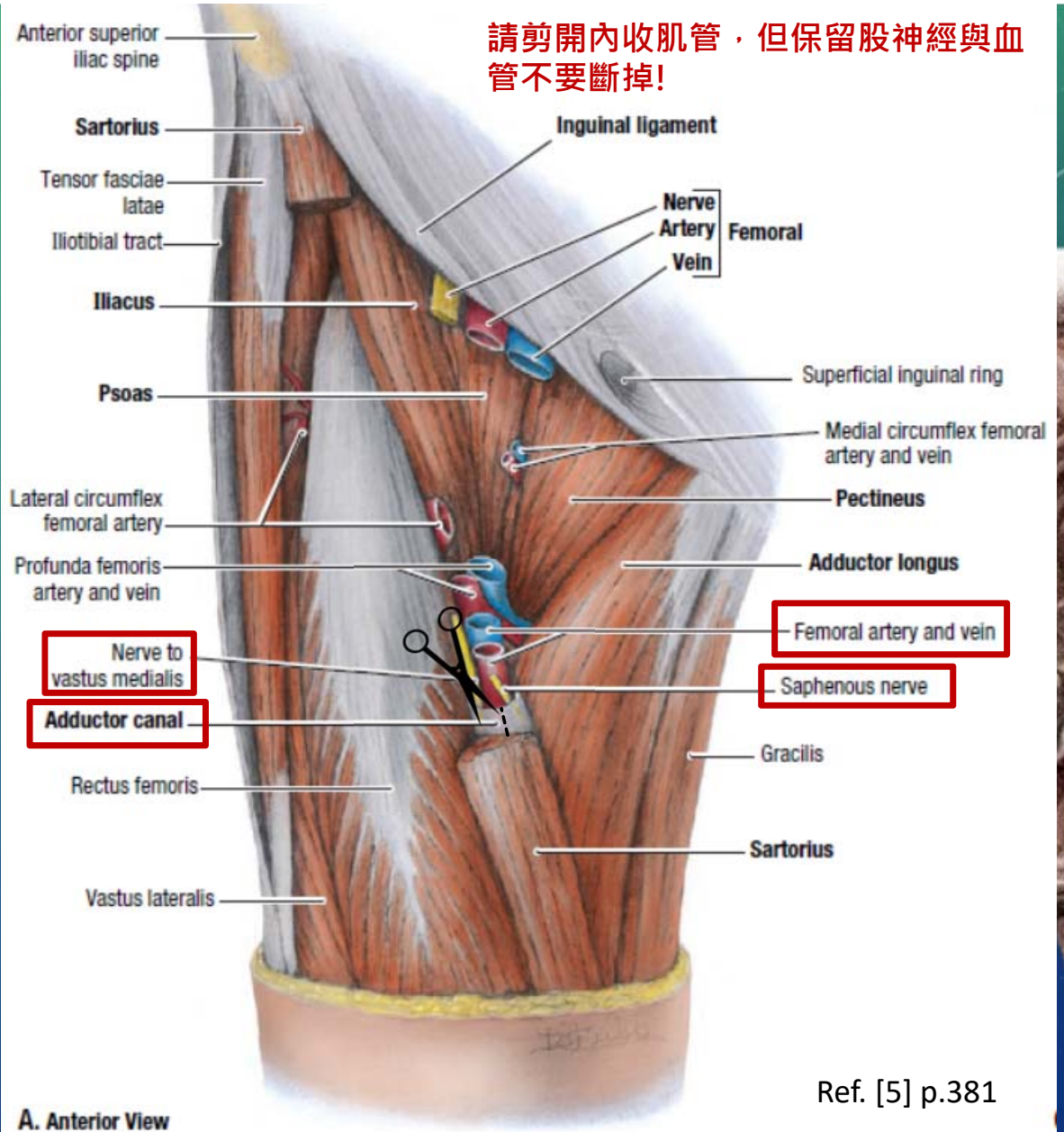


ADDUCTOR CANAL

The apex of the femoral triangle ⇔
The adductor hiatus



C. Anterior View



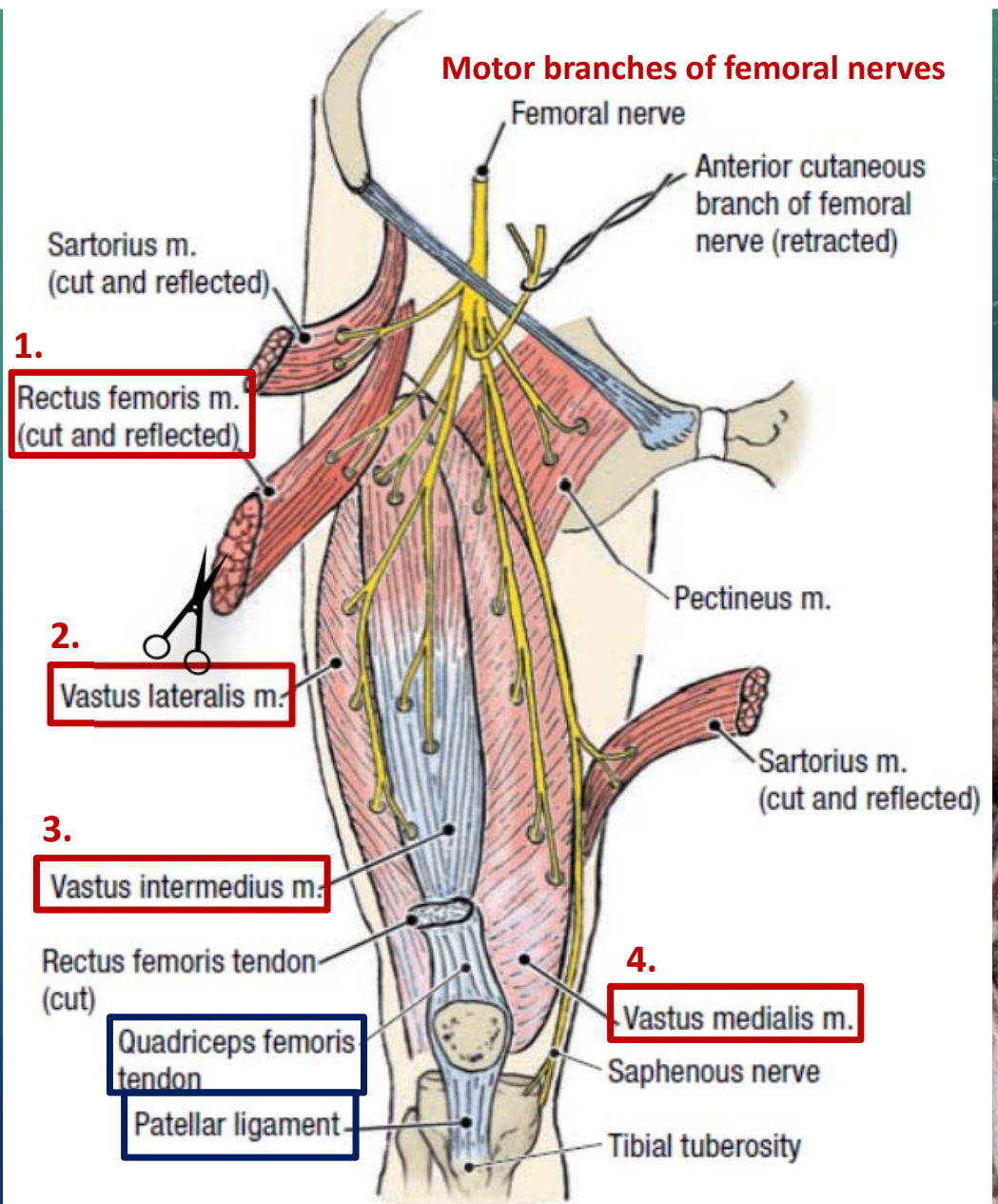
A. Anterior View

Ref. [5] p.381

QUADRICEPS FEMORIS MUSCLE

- The tendons of all four muscles unite to form the **quadriceps femoris tendon**.
- The quadriceps femoris tendon is attached to the **patella**.
- The **patellar ligament** attaches the patella to the tibial tuberosity.

Patellar tendon/quadriceps reflex tests function of L2~L4 and femoral nerve.



ANTERIOR COMPARTMENT OF THE THIGH

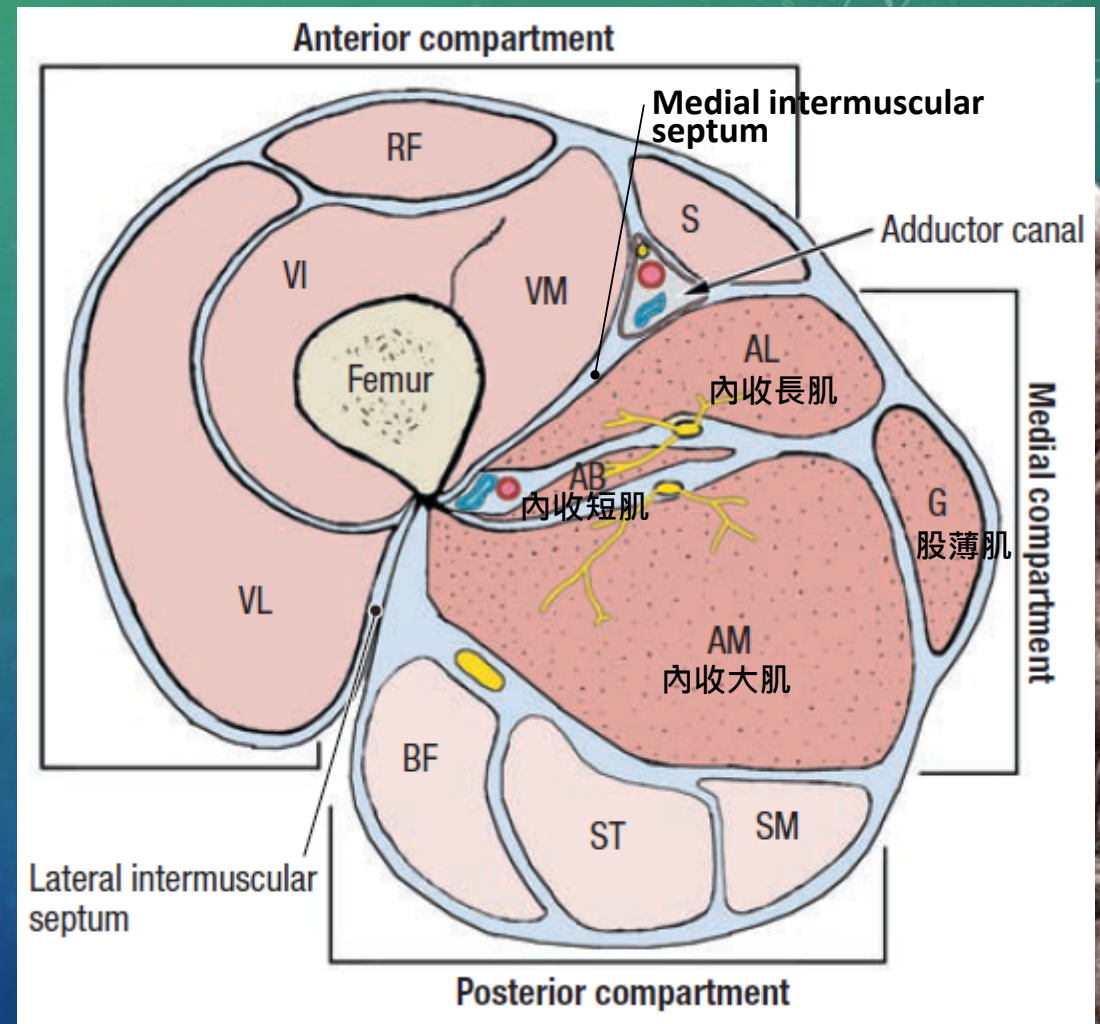
Muscle	Proximal Attachment	Distal Attachment	Action	Innervation
Sartorius	Anterior superior iliac spine	Proximal and medial surfaces of the tibia	Flexes the hip and knee joint	Femoral n. (L2–L3)
Quadriceps femoris				
• Rectus femoris	Anterior inferior iliac spine	All four muscles of the quadriceps femoris form a common tendon that envelopes the patella and inserts on the tibial tuberosity	Flexes the hip; extends the knee	Femoral n. (L2–L4)
• Vastus medialis	Intertrochanteric line and linea aspera		Extend the knee	
• Vastus lateralis	Linea aspera			
• Vastus intermedius	Anterior and lateral surfaces of the femur			

Ref. [1] p.502

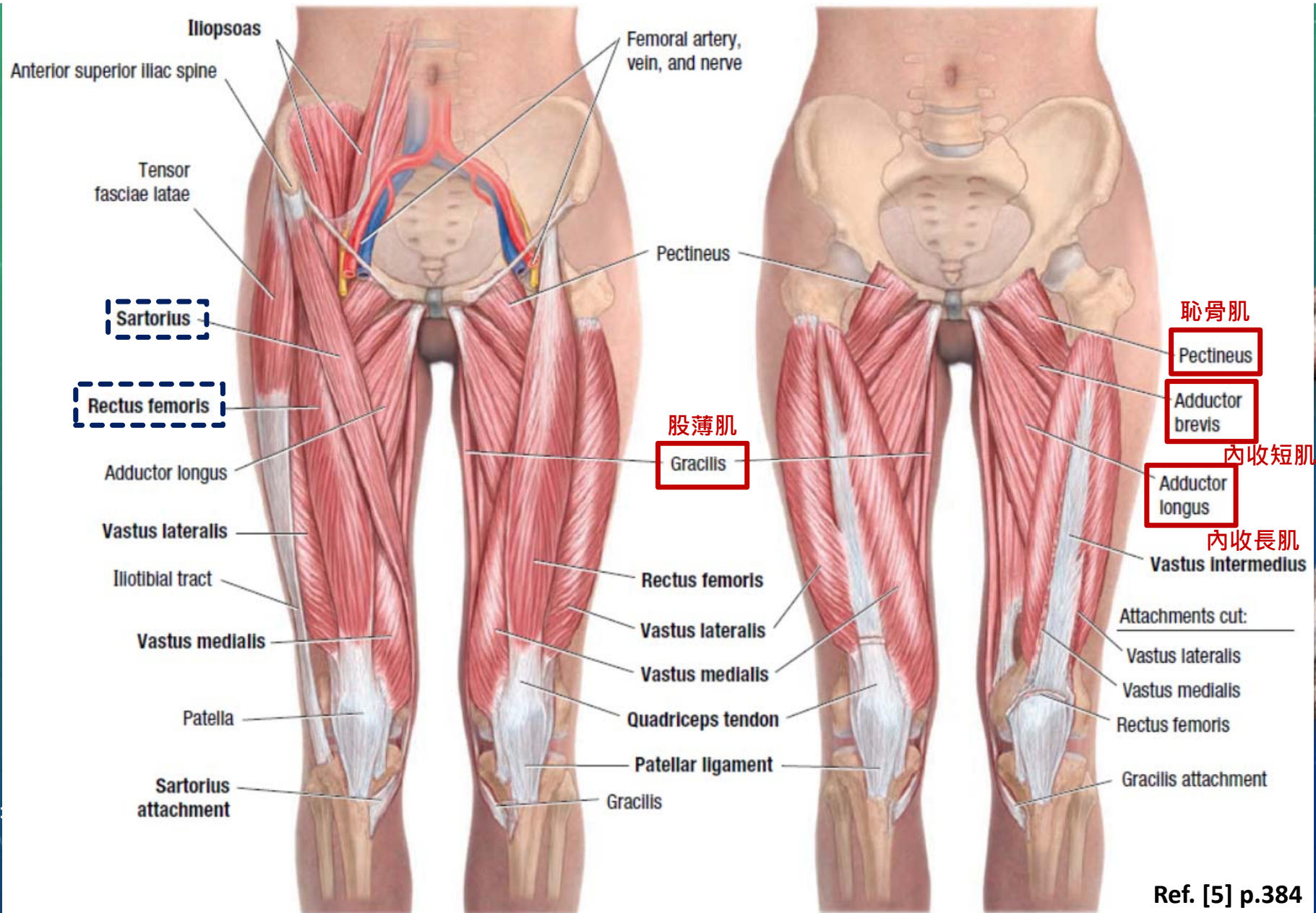
COMPARTMENTS OF THIGH

- **Anterior compartment:**
 - *VI*, vastus intermedius; *VL*, vastus lateralis; *VM*, vastus medialis; *RF*, rectus femoris; *S*, sartorius.
- **Medial compartment:**
 - *AB*, adductor brevis; *AL*, adductor longus; *AM*, adductor magnus; *G*, gracilis.
- **Posterior compartment:**
 - *BF*, biceps femoris; *ST*, semitendinosus; *SM*, semimembranosus

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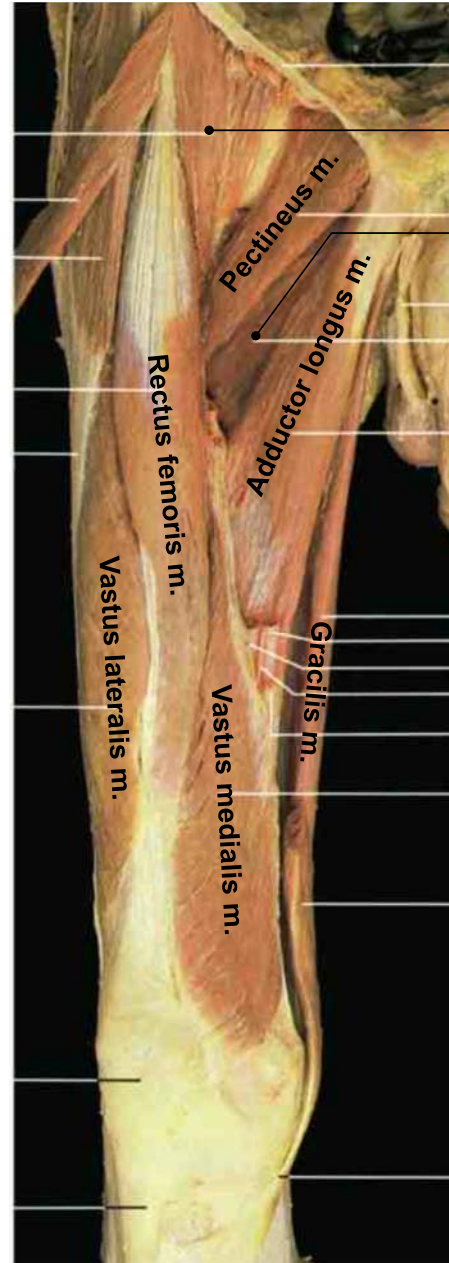
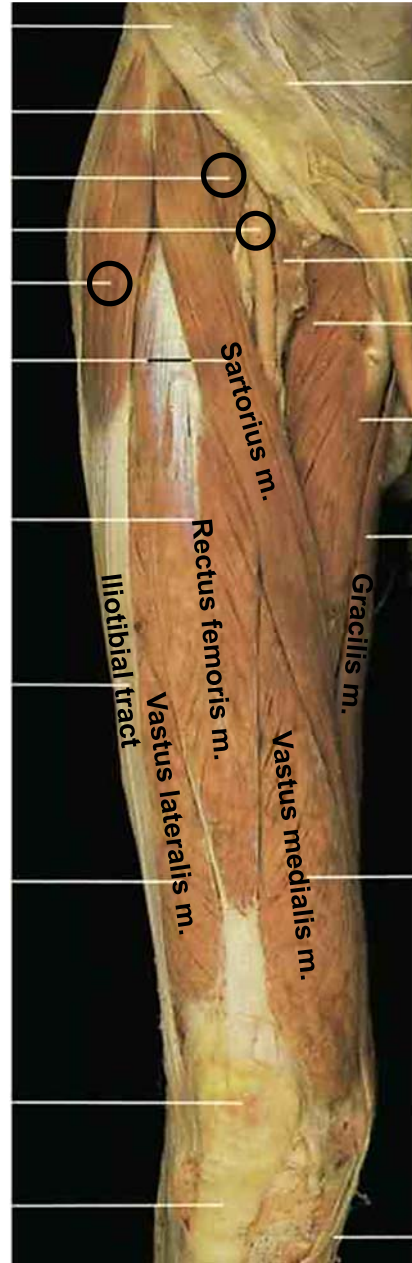


Inferior view of right thigh



Ref. [5] p.384

Iliopsoas m.
 Femoral artery
 Tensor fasciae latae m.



Iliopsoas m.
 Adductor brevis m.

Ref. [6] p.452



FULL ASPECT...

Circumflex iliac a.

Femoral a.

Femoral n.

Deep femoral a.

Lateral circumflex femoral a.

Sartorius m.
(cut and reflected)

Rectus femoris m.

Vastus medialis m.

Inguinal ligament

External pudendal a. and v.
Femoral v.

Medial circumflex femoral a.
Deep femoral artery with
perforating aa.
Adductor longus m.

Great saphenous v.
Obturator a. and v.
Accessory saphenous v.

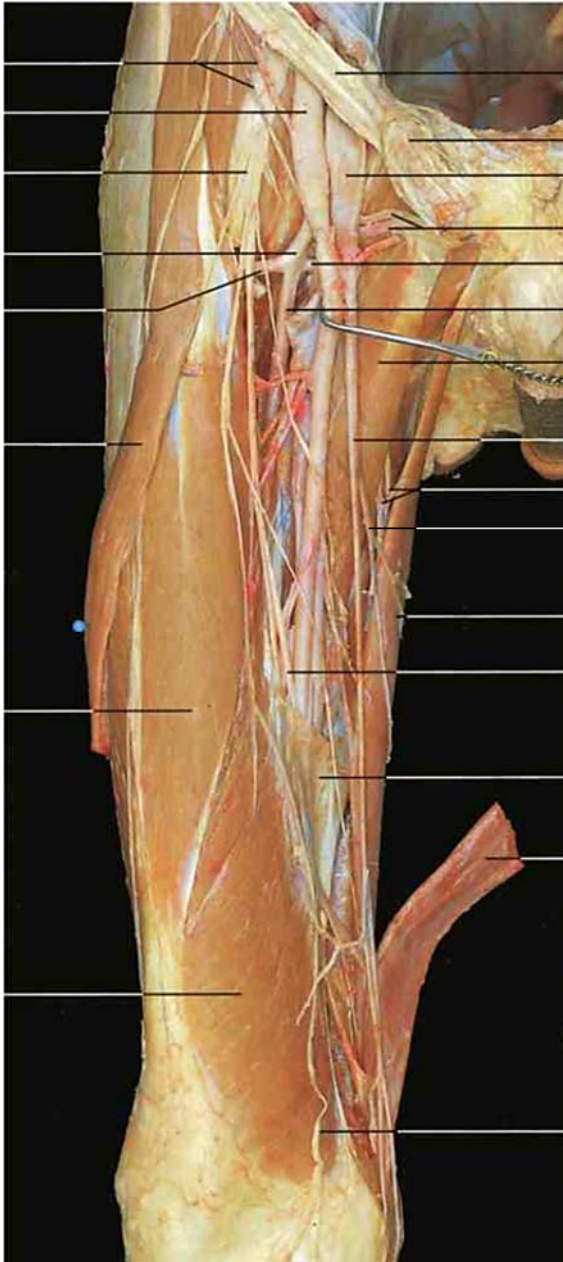
Gracilis m.

Saphenous n.

Tendinous wall of adductor canal

Sartorius m.
(cut and reflected)

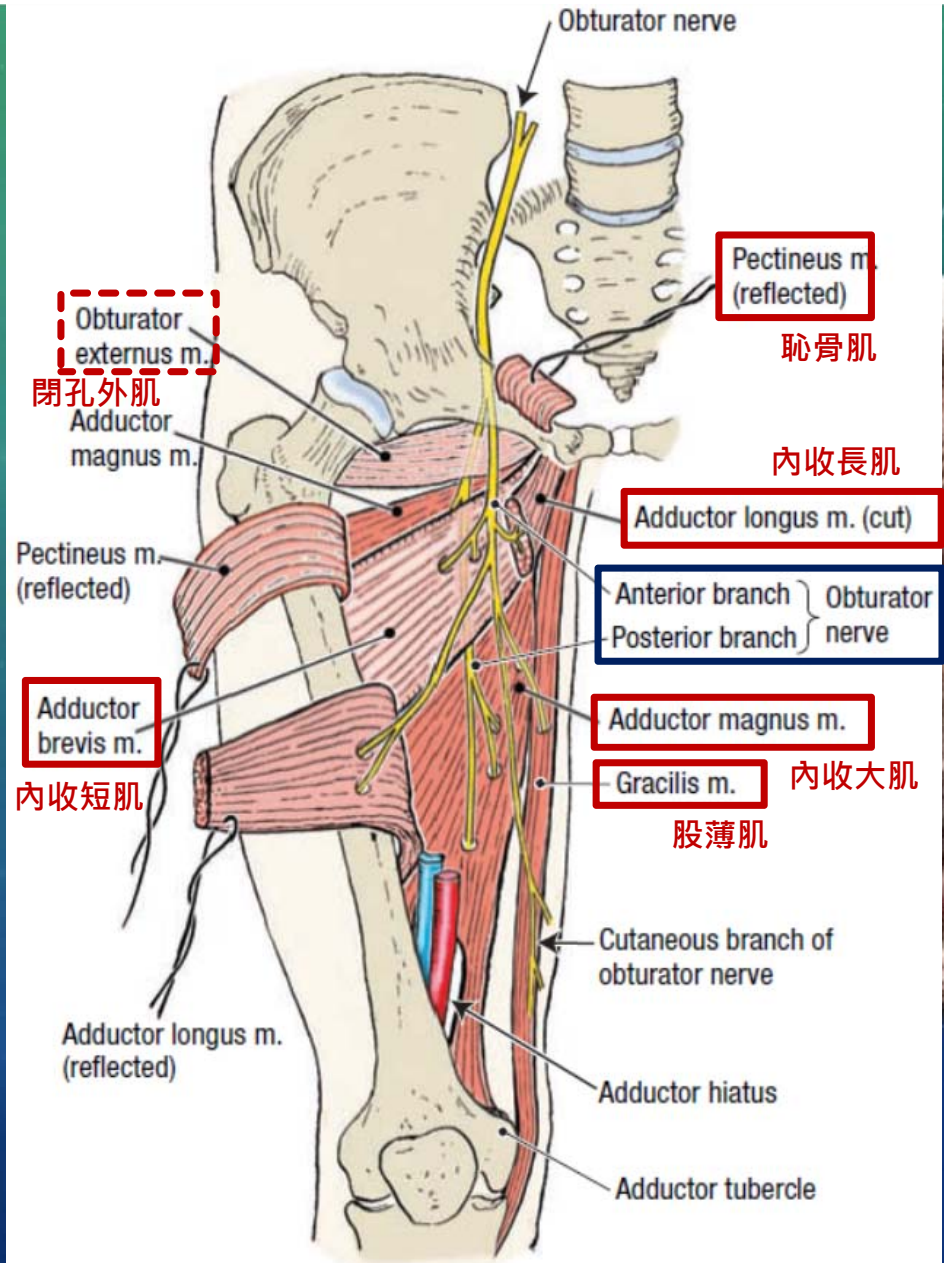
Anterior cutaneous branch
of femoral n.



Ref. [6] p.466

OBTURATOR NERVE

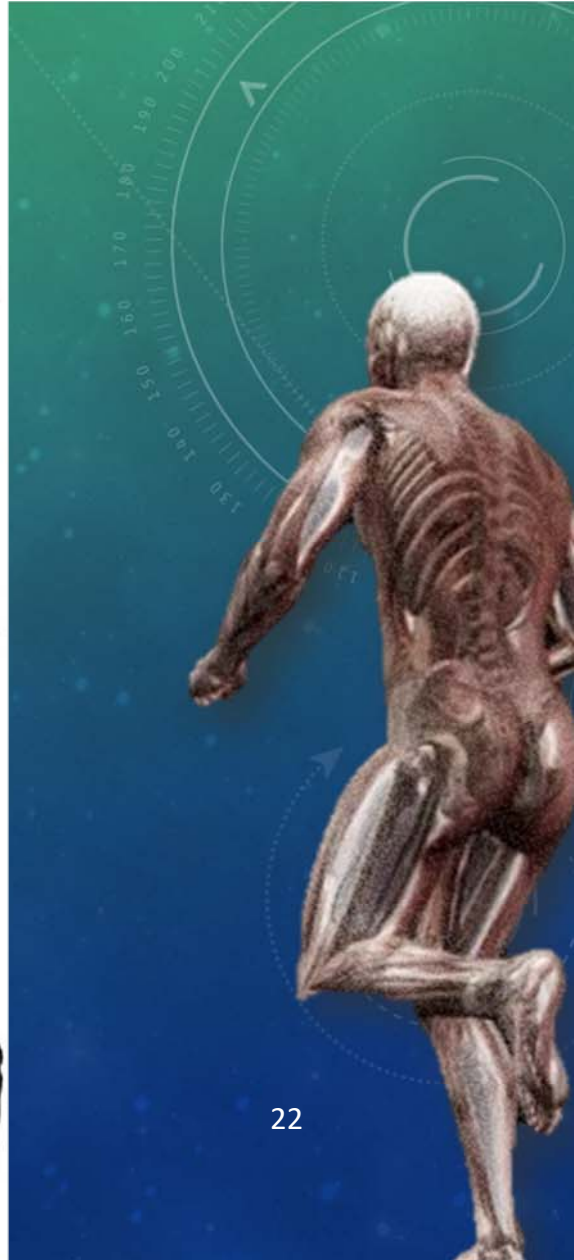
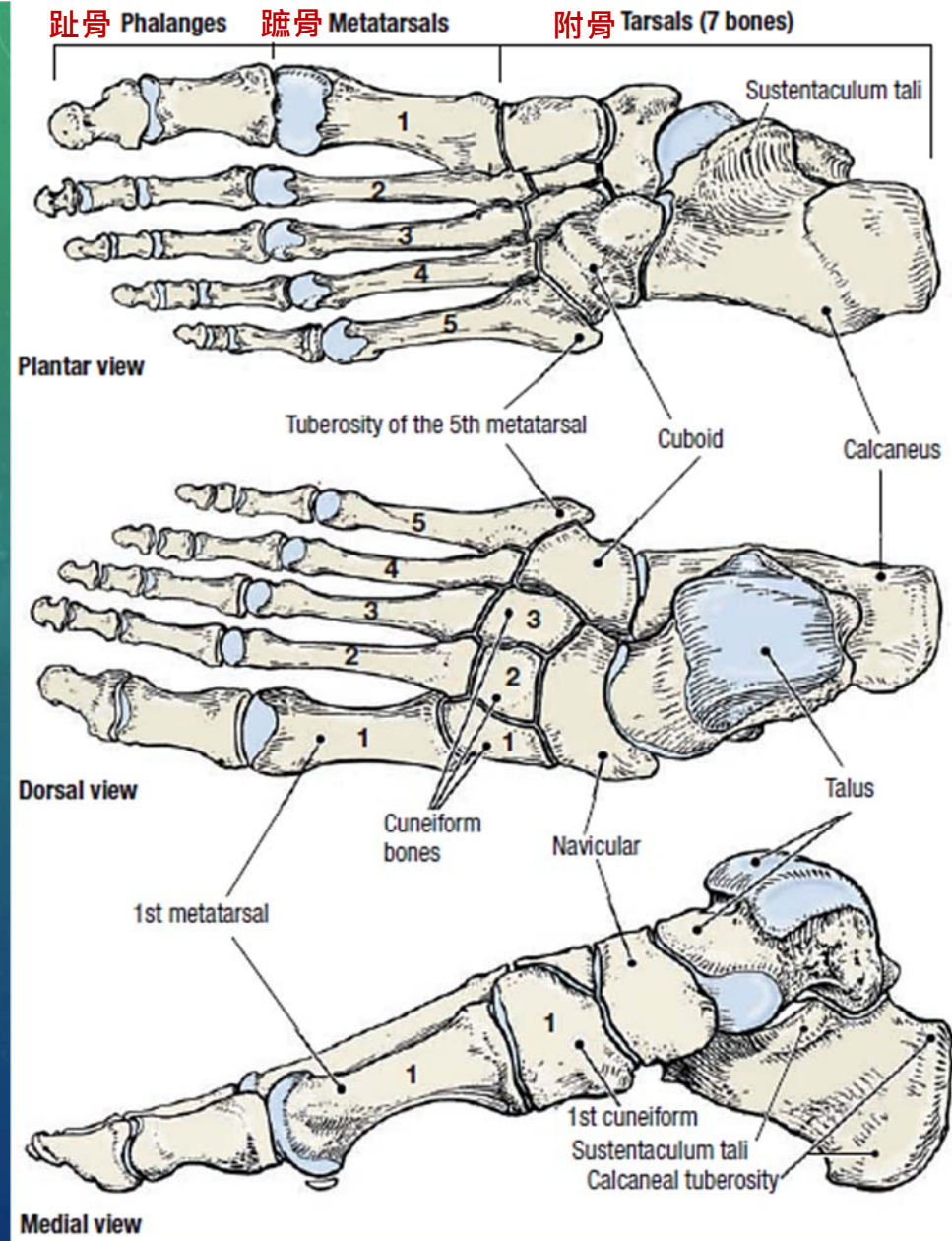
- The anterior branch of the obturator nerve crosses the anterior surface of the **adductor brevis muscle** and that the posterior branch of the obturator nerve crosses its posterior surface.



Muscle	Proximal Attachment	Distal Attachment	Action	Innervation
Pectineus	Pectineal line of the superior pubic ramus	Pectineal line of the femur	Adducts and flexes the hip	Femoral n. (L2–L3); may receive a branch from the obturator n.
Adductor longus	Pubis	Linea aspera (medial one third)	Adducts and medially rotates the hip	Obturator n. (L2–L4)
Adductor brevis	Inferior ramus of the pubis	Linea aspera (superior part)	Adducts the hip	Obturator n. (L2–L3)
Adductor magnus	Adductor division: ischiopubic ramus Hamstring division: ischial tuberosity	Linea aspera Adductor tubercle	Adducts and medially rotates the hip	Obturator n. (L2–L4) Tibial division of the sciatic n. (L2–L4)
Gracilis	Inferior ramus and body of the pubis	Proximal, medial surface of the tibia	Adducts the hip and flexes the knee	Obturator n. (L2–L3)
Obturator externus	Margins of the obturator foramen and obturator membrane	Trochanteric fossa of the femur	Rotates the hip laterally	Obturator n. (L3–L4)

ANTERIOR COMPARTMENT OF THE LEG & DORSUM OF THE FOOT 小腿前側 & 足背

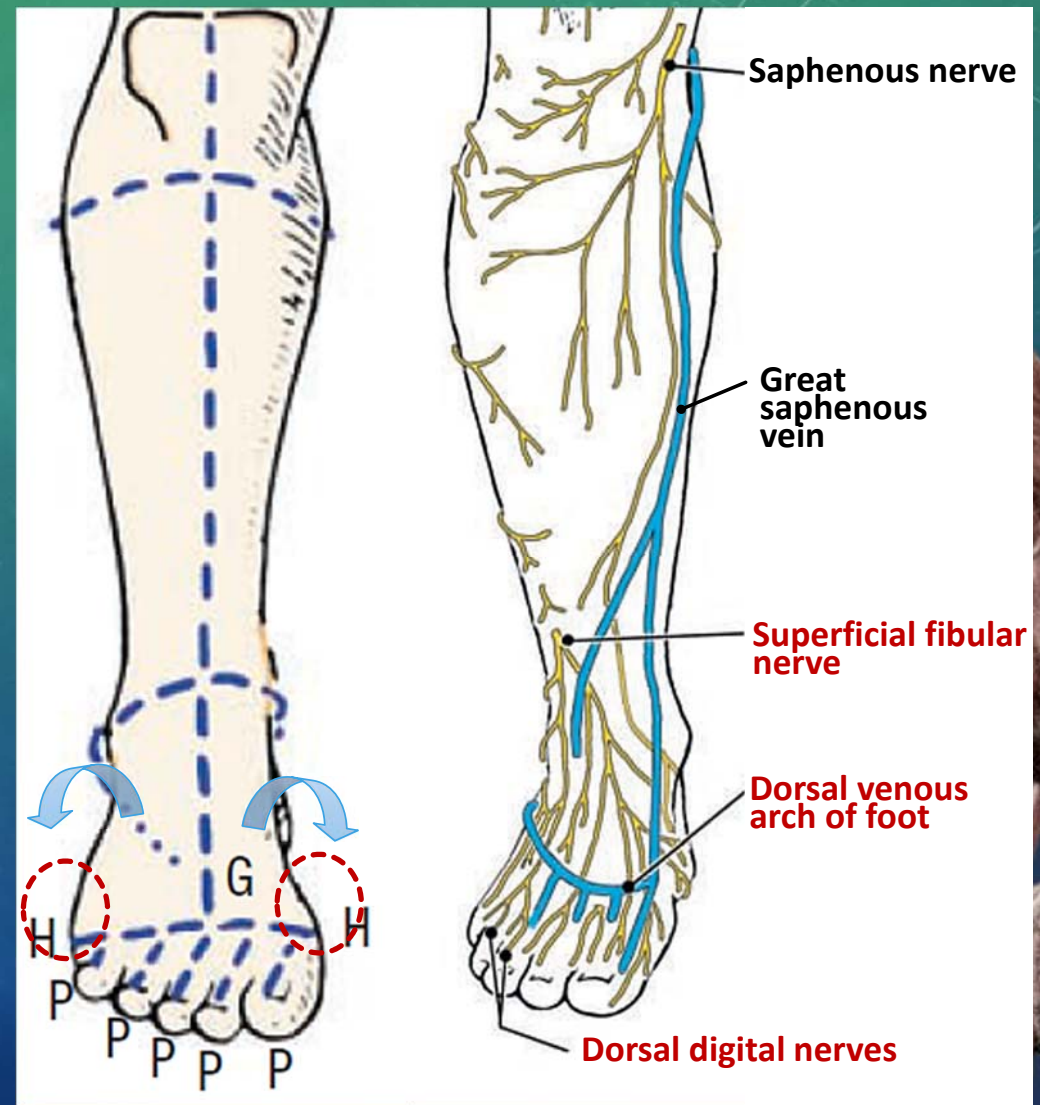
OSTEOLOGY



<http://www.ym.edu.tw/~cflu>

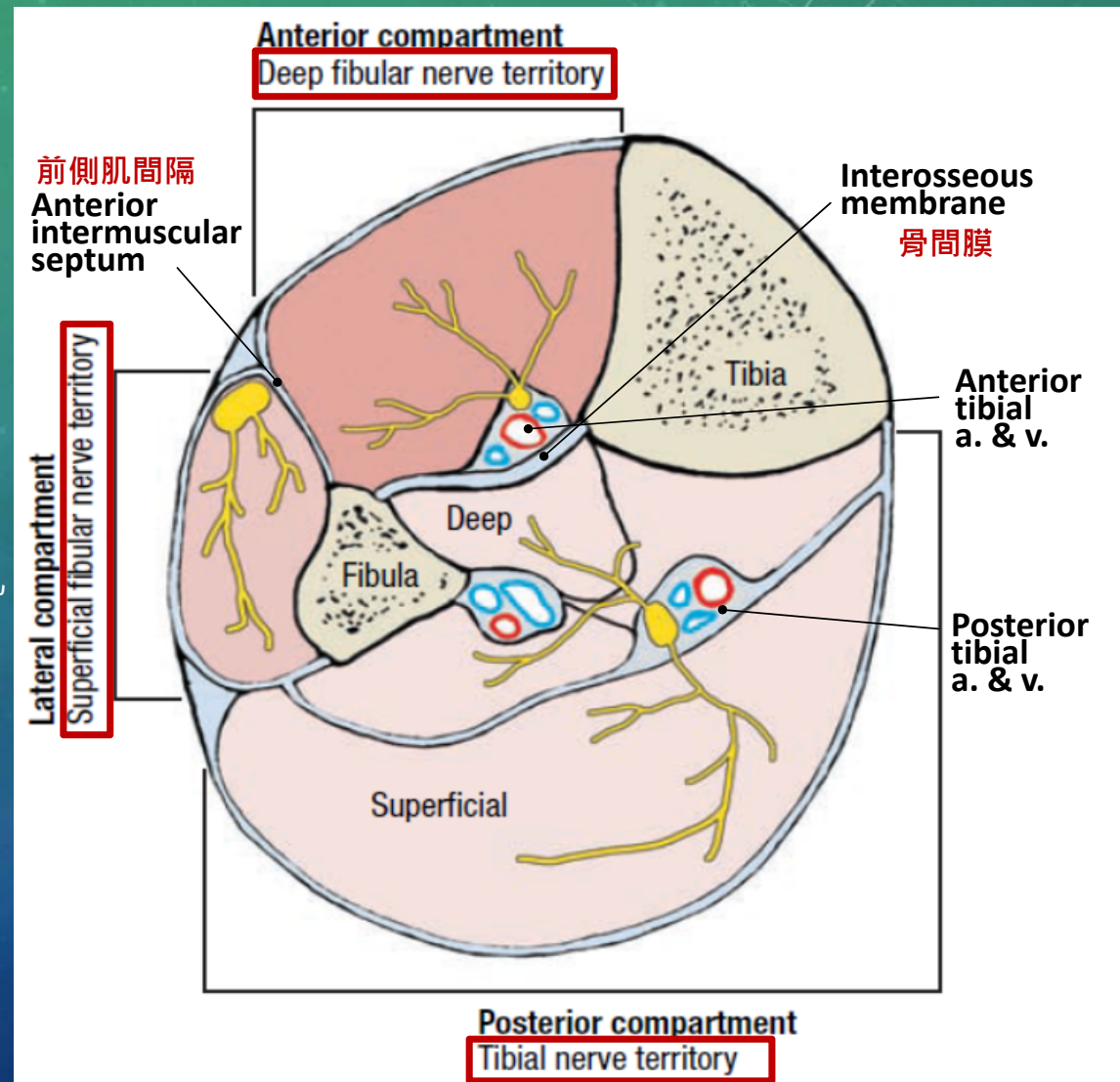
SUPERFICIAL STRUCTURES OF FOOT

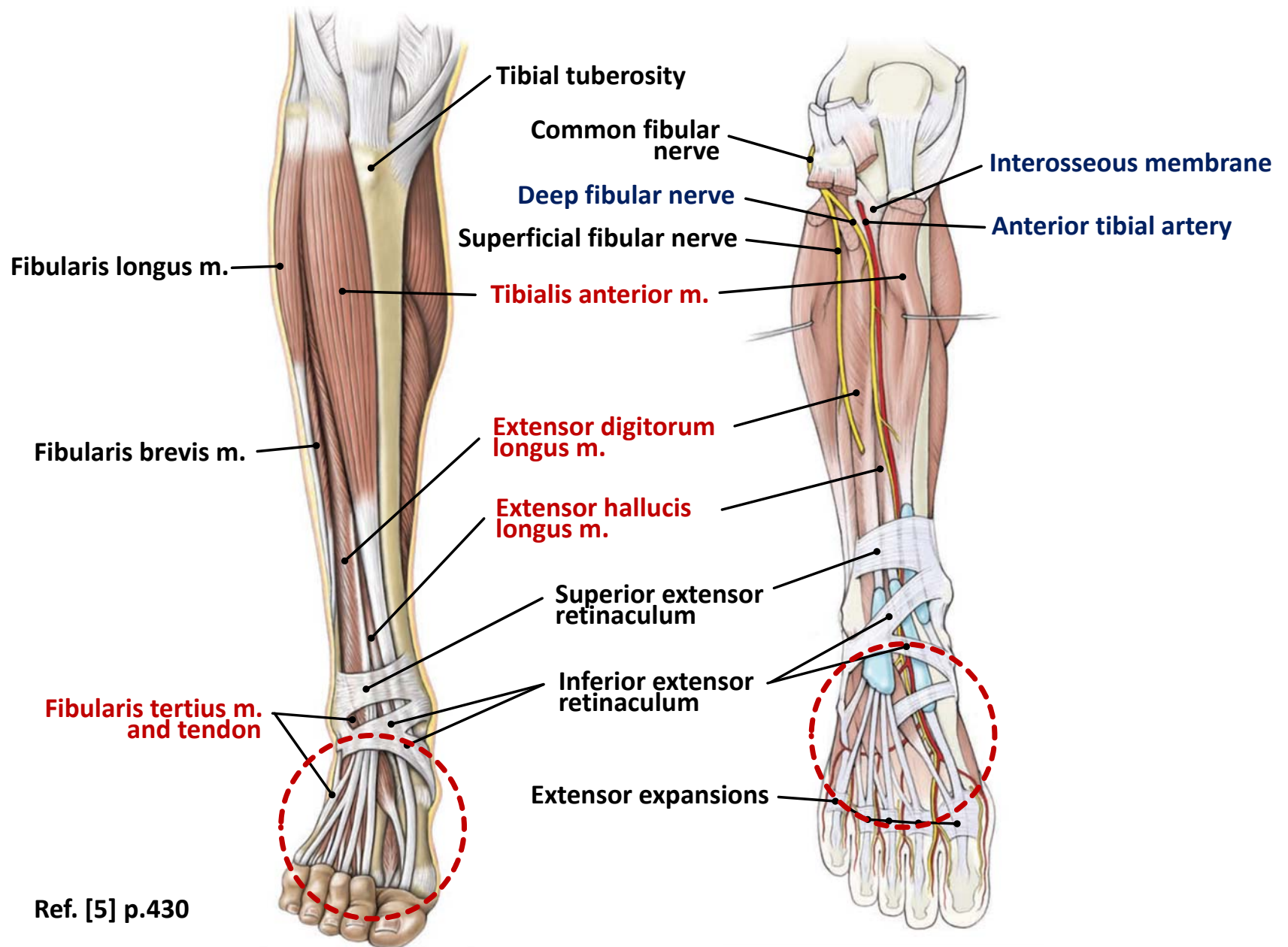
- Make a cut across the dorsum of the foot at the webs of the toes (H to H). **The skin is very thin on the dorsum of the foot.**
- Make one cut along the dorsal midline of each toe to the proximal end of the nail (H to P).
- Identify the superficial structures and open the crural and pedal fascia.



COMPARTMENTS OF LEG

- The anterior compartment
 - Tibialis anterior muscle 脛前肌
 - Extensor hallucis longus muscle 伸姆長肌
 - Extensor digitorum longus muscle 伸趾長肌
 - fibularis tertius muscle 第三腓骨肌





Ref. [5] p.430



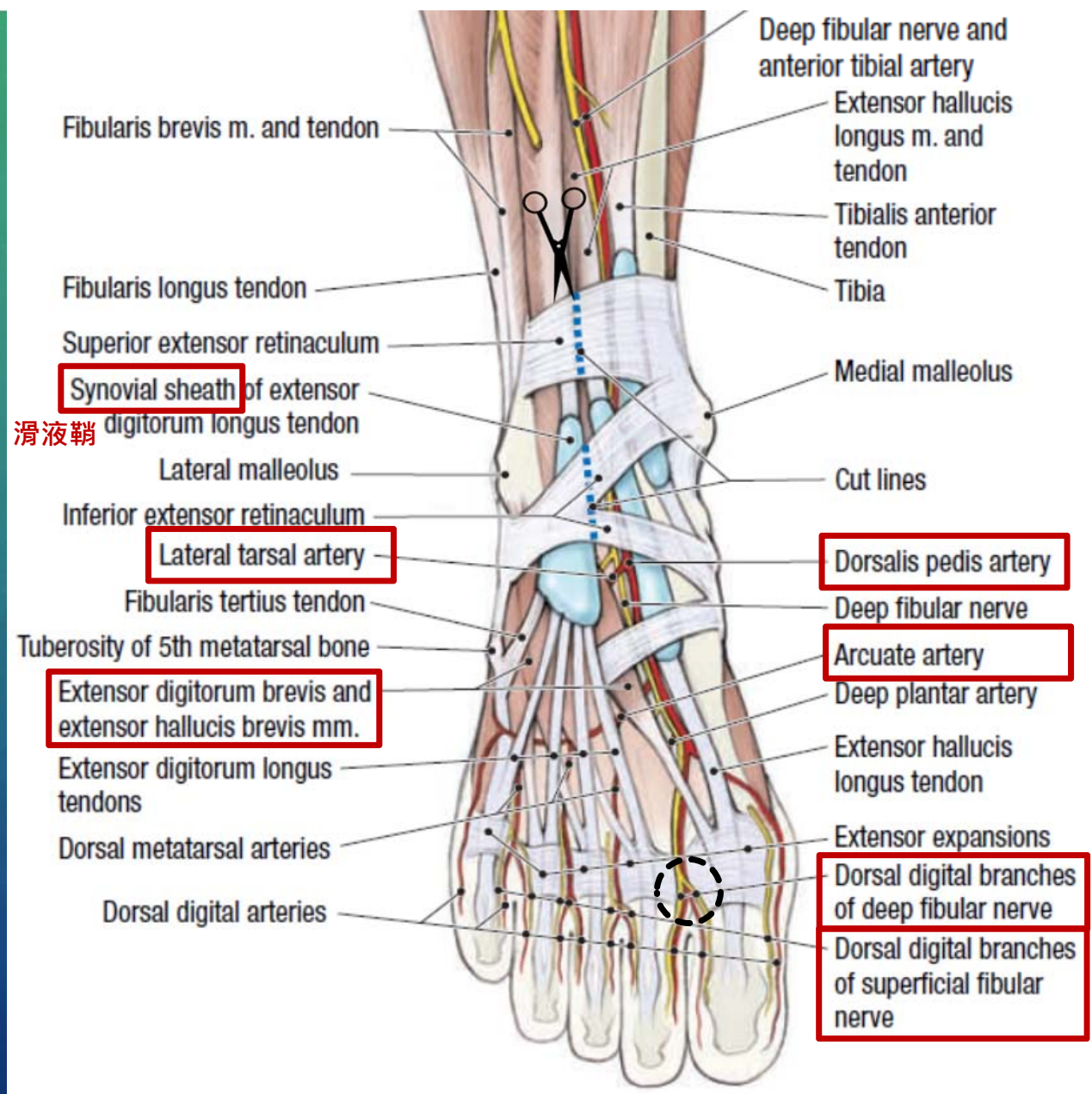
ANTERIOR COMPARTMENT OF LEG

Muscle	Proximal Attachment	Distal Attachment	Action	Innervation
Tibialis anterior	Lateral proximal surface of the tibia	Base of the first metatarsal bone	Dorsiflexes and inverts the foot at the ankle; dynamically supports the medial arch of the foot	Deep fibular n. (L4–L5)
Extensor digitorum longus	Lateral condyle of the tibia	Middle and distal phalanx of digits 2–5	Extends digits 2–5 and dorsiflexes the foot at the ankle	Deep fibular n. (L5–S1)
Extensor hallucis longus	Fibula	Distal phalanx of the great toe	Extends the great toe and dorsiflexes the foot at the ankle	
Fibularis tertius		Base of the fifth metatarsal bone	Dorsiflexes and everts the foot at the ankle	

Ref. [1] p.504

DORSUM OF THE FOOT

- Use scissors to cut the superior and inferior extensor retinacula between the extensor digitorum longus and extensor hallucis longus tendons.
- Identify the labeled structures.



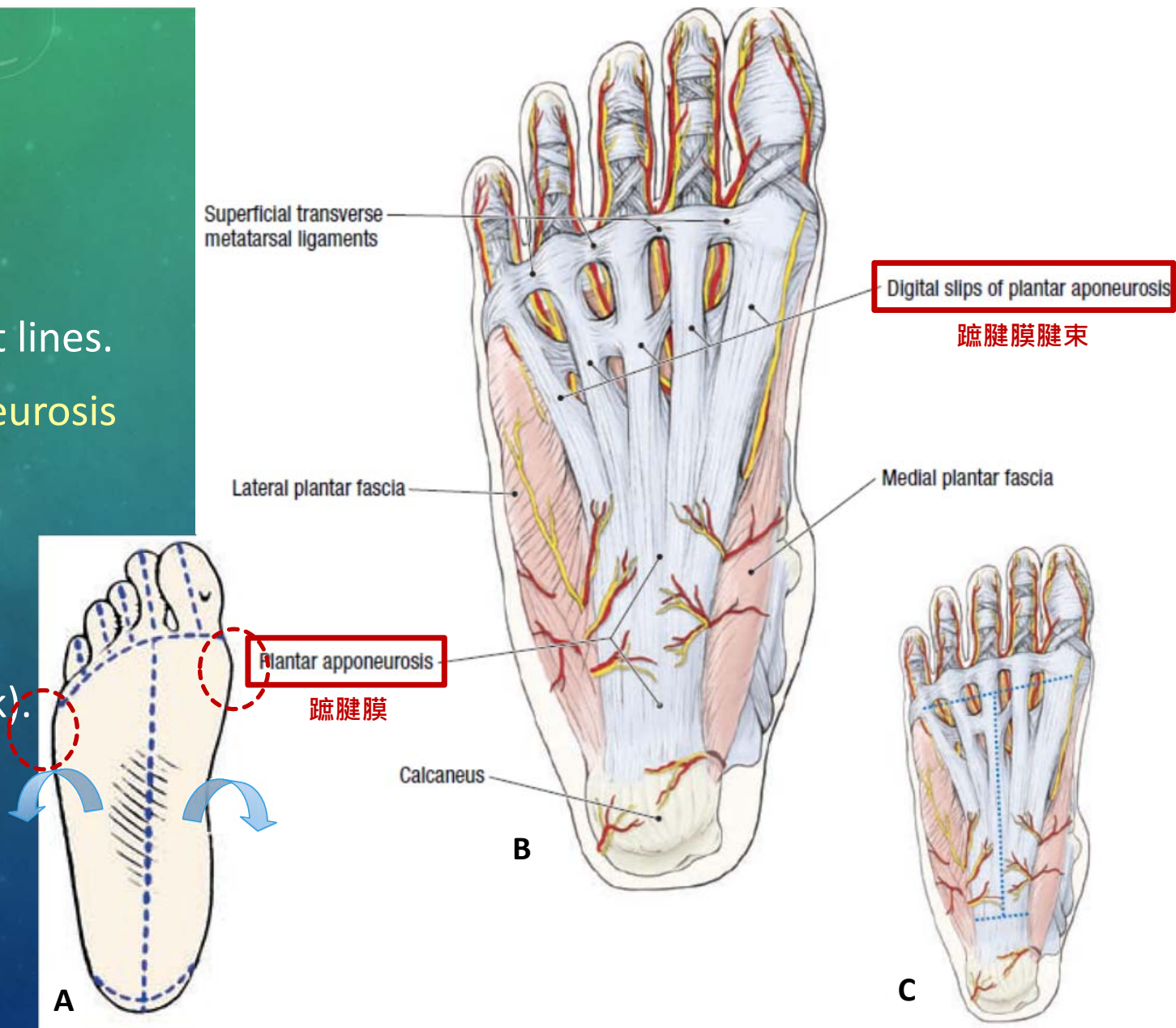
SOLE OF THE FOOT

足底

<http://www.ym.edu.tw/~cflu>

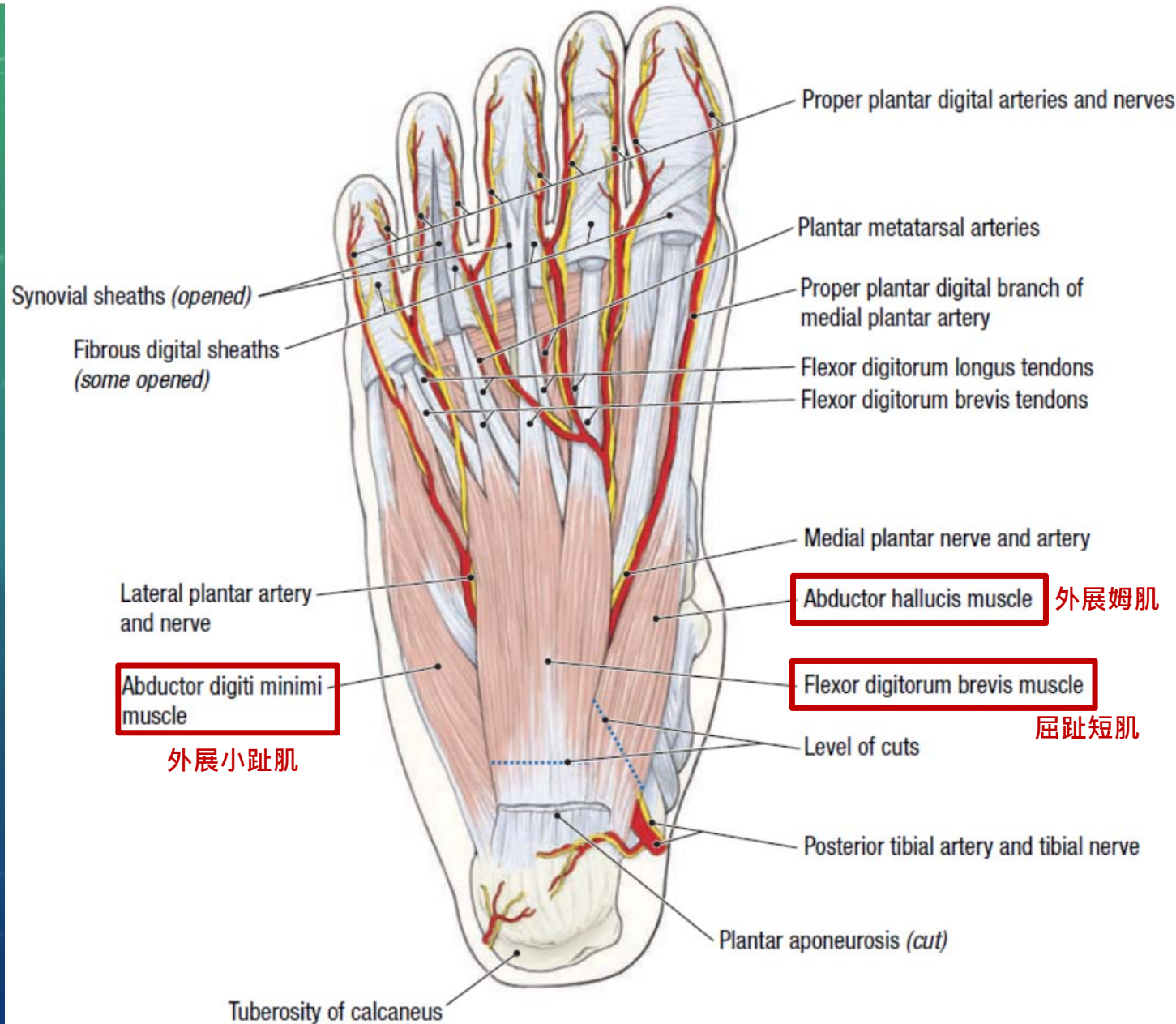
DISSECTION STEPS

- A. Remove skin based on cut lines.
- B. Identify the **plantar aponeurosis** in the middle of the sole.
- C. Use a scalpel to cut and remove the plantar aponeurosis (approximately 4-mm thick).



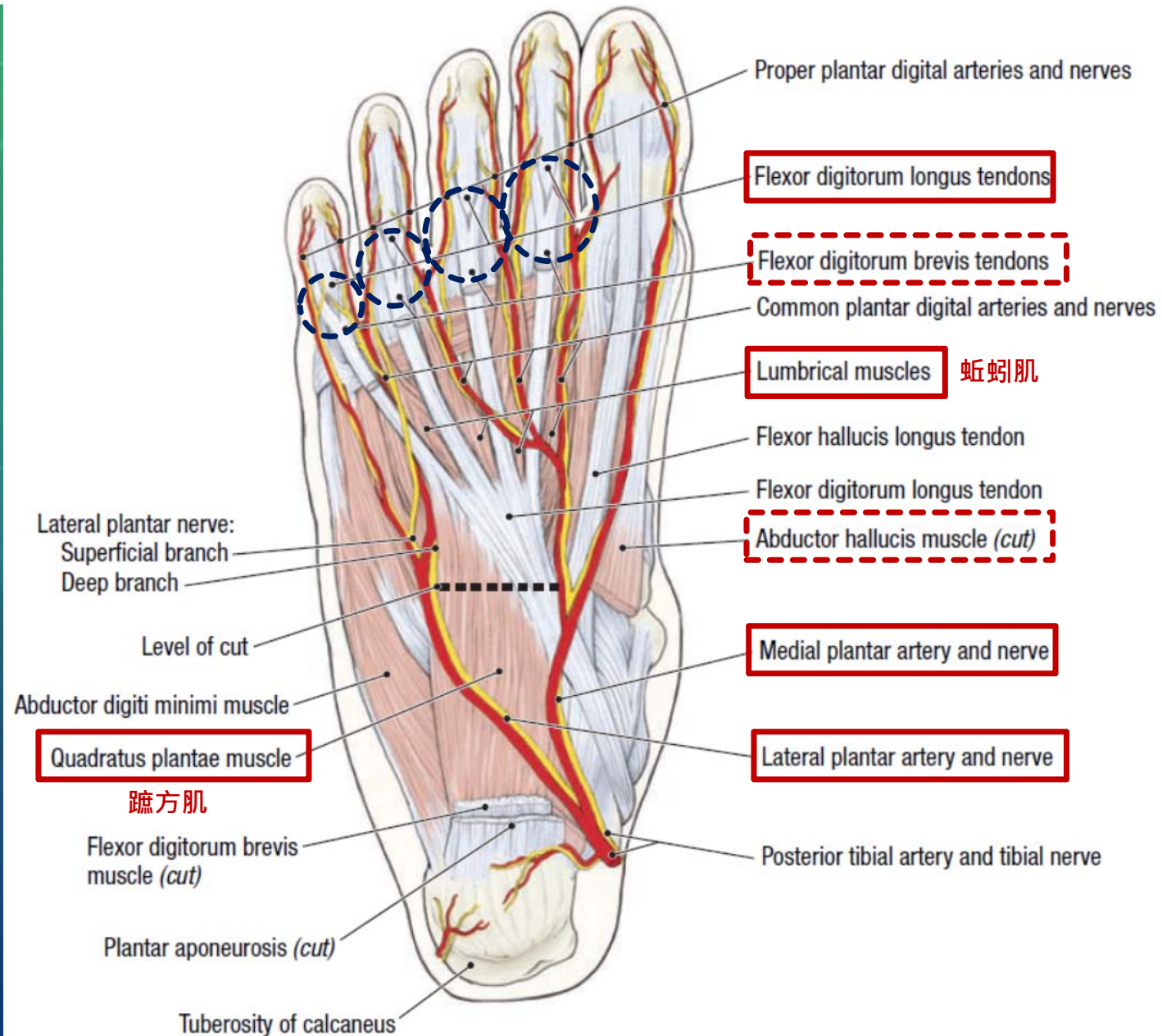
FIRST LAYER OF MUSCLES

- Identify the labeled structures.
- Transect and reflect flexor digitorum brevis muscle and abductor hallucis muscle distally.



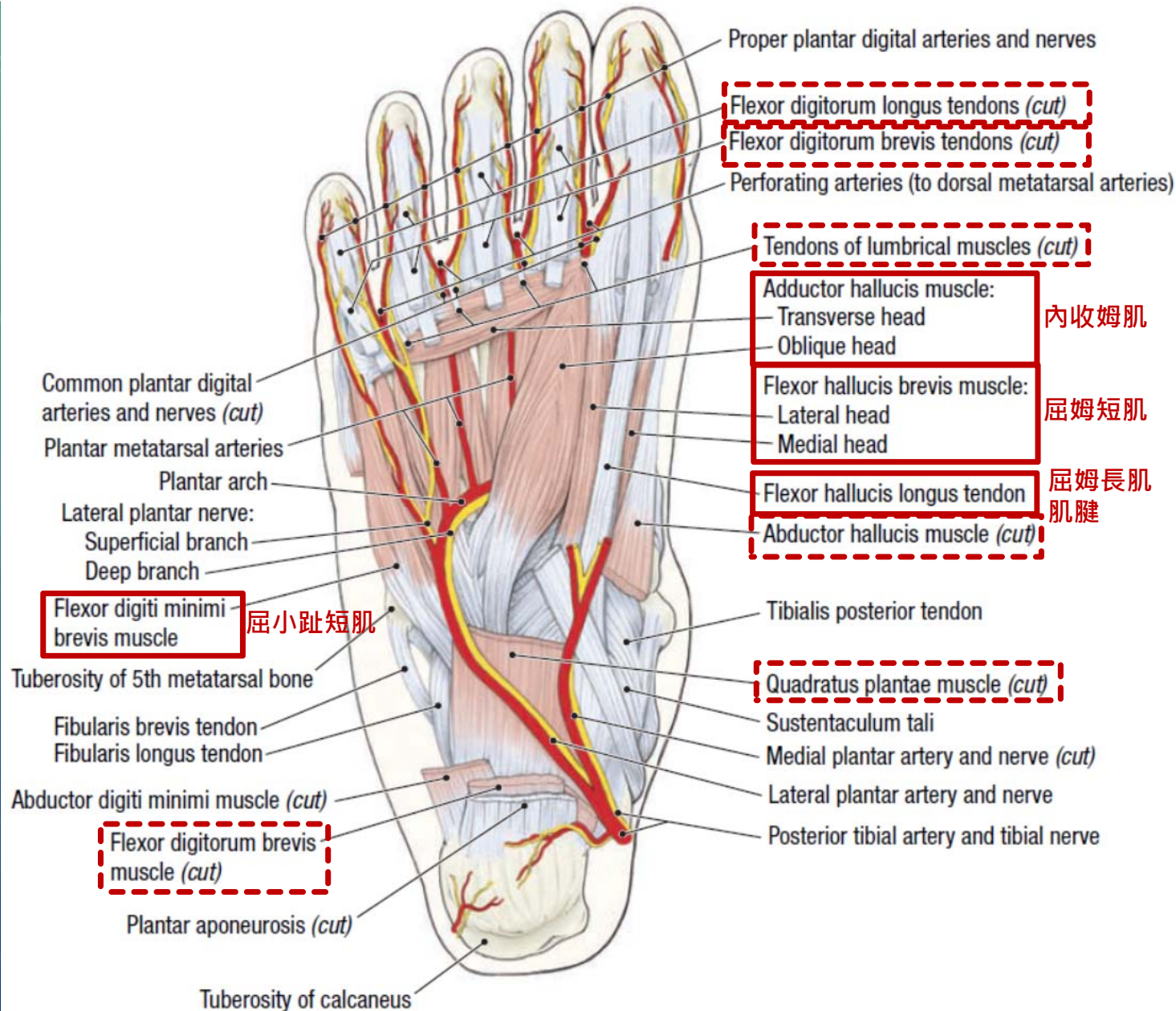
SECOND LAYER OF MUSCLES

- Identify the labeled structures.
- Transect and reflect the **flexor digitorum longus tendon** where it is joined by the quadratus plantae muscle.



THIRD LAYER OF MUSCLES

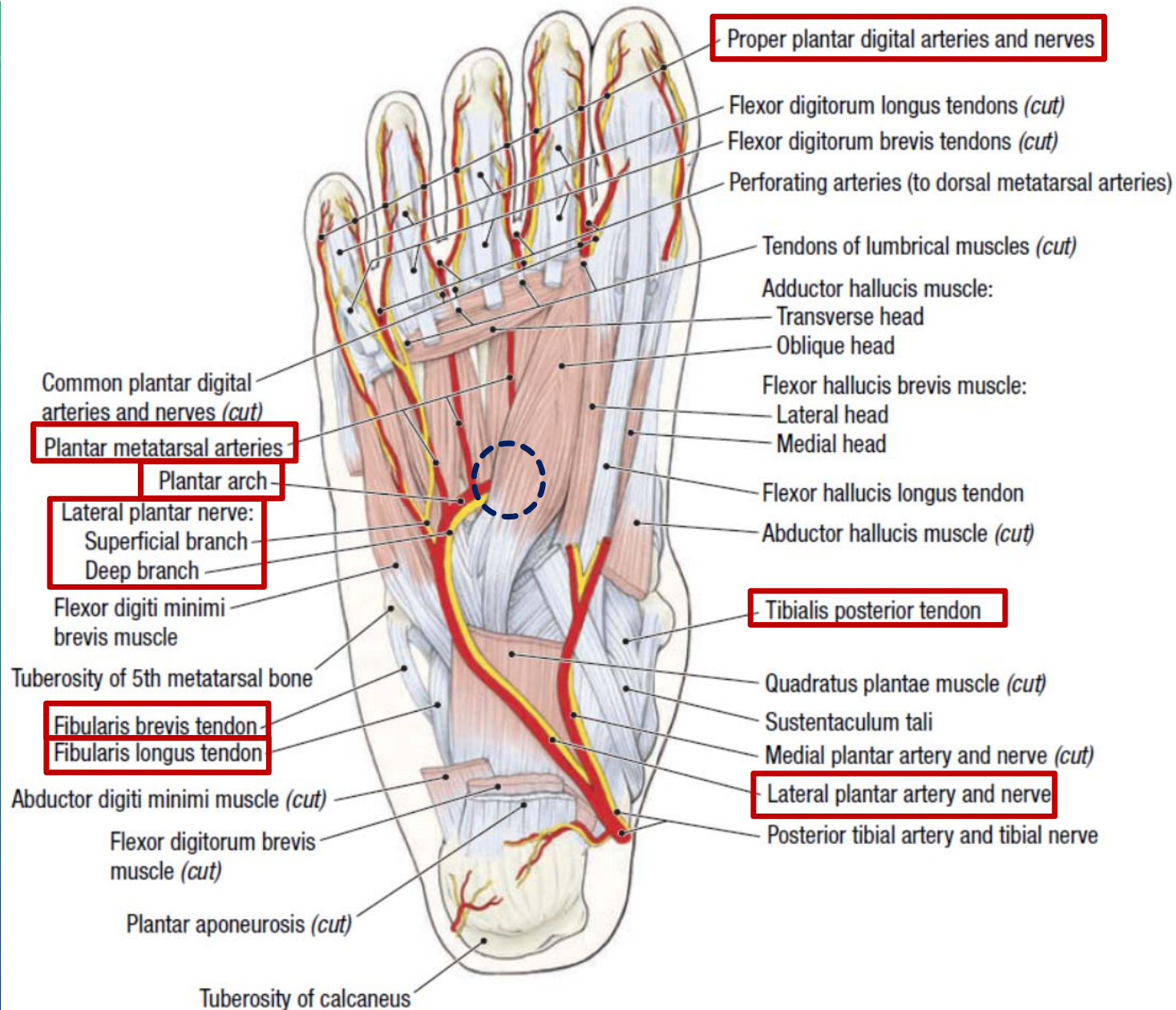
- Identify the labeled structures.



FORTH LAYER OF MUSCLES

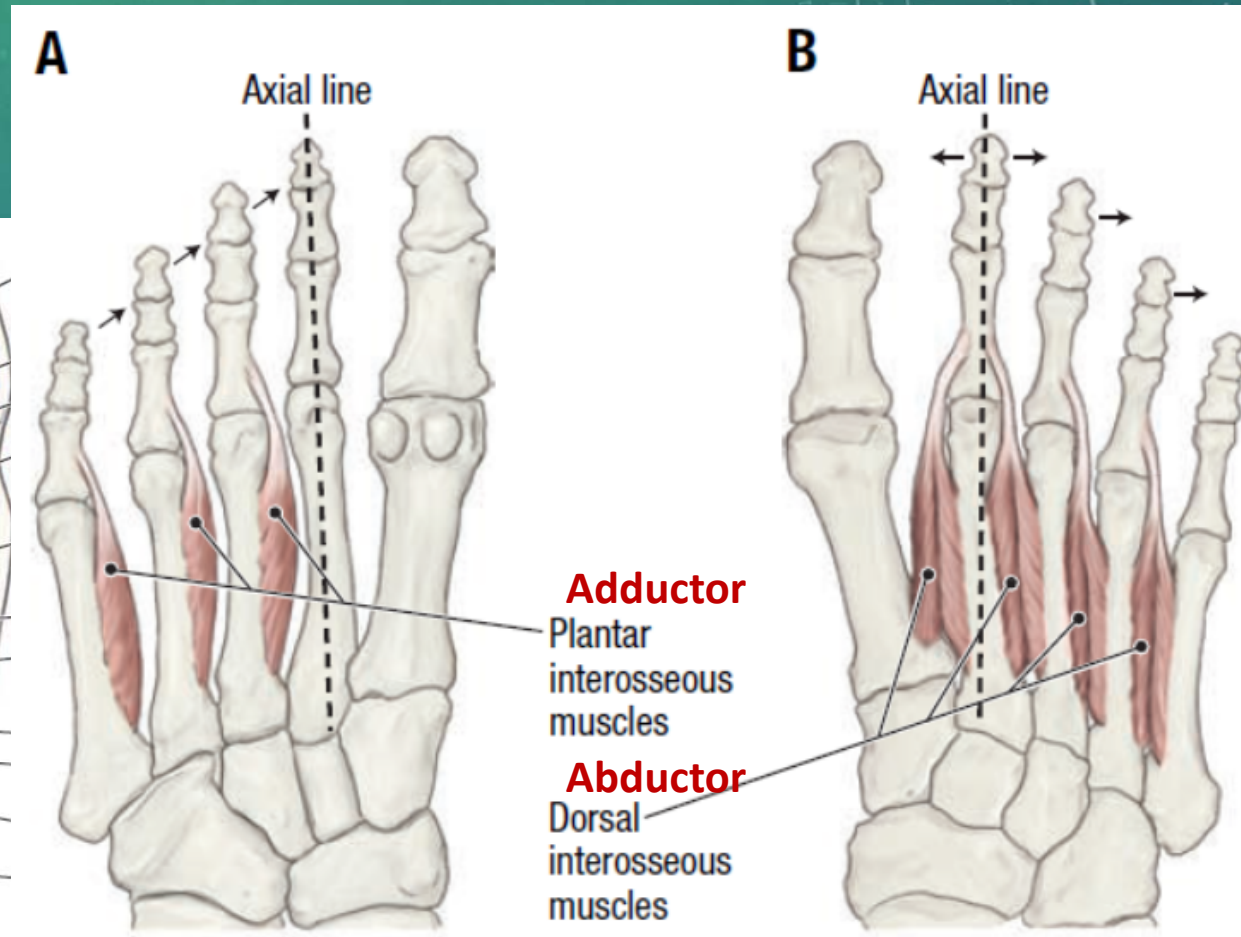
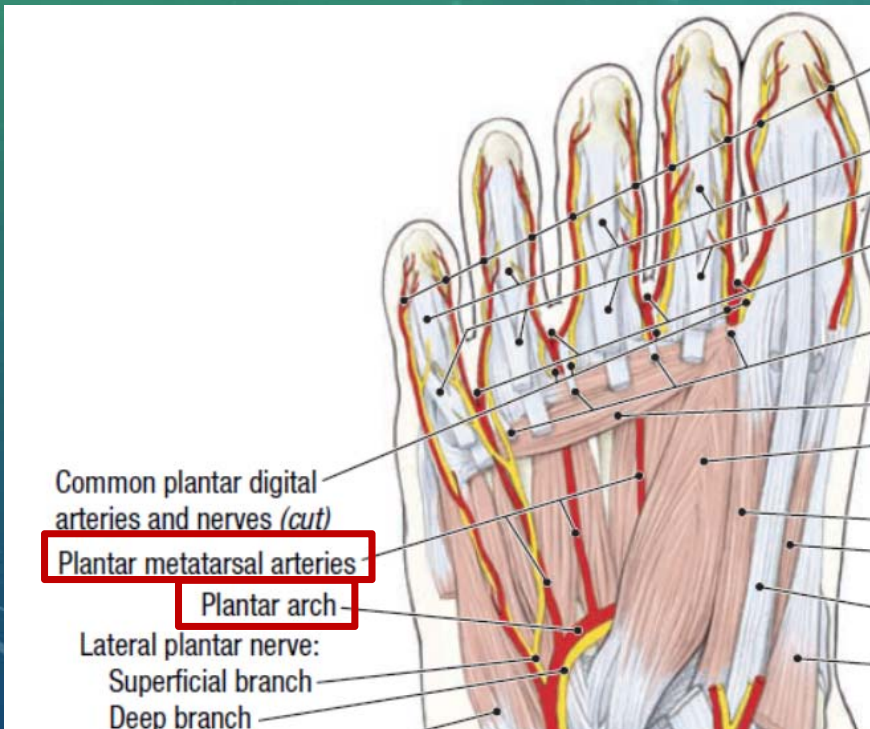
- Identify the labeled structures.
- The medial end of the plantar arch is formed by the deep plantar artery, a branch of the dorsalis pedis artery.

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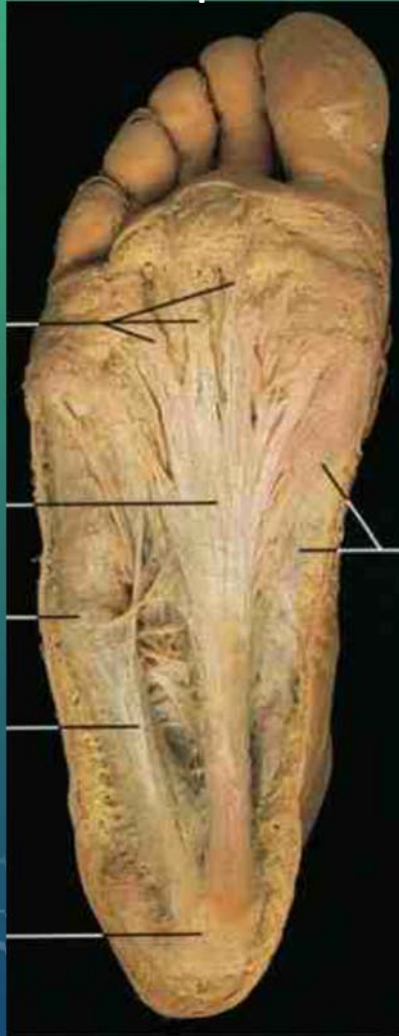
FORTH LAYER OF MUSCLES

- The **interosseous muscles** are located deep to the plantar arch.



MUSCLES LAYERS

Plantar aponeurosis



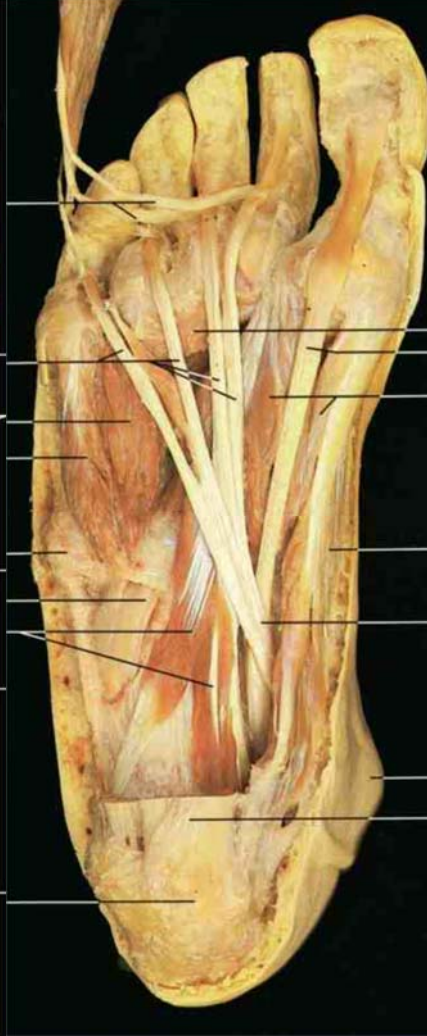
Ref. [6] p.463

First layer



Ref. [6] p.463

Second layer



Ref. [6] p.464

Third layer



Ref. [6] p.465

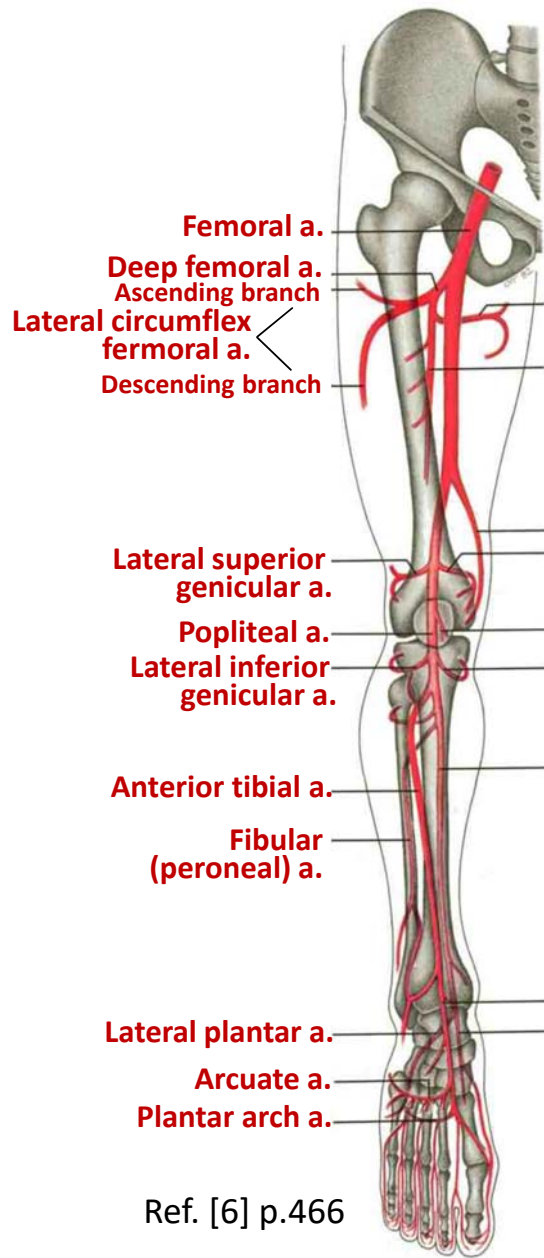
Fourth layer



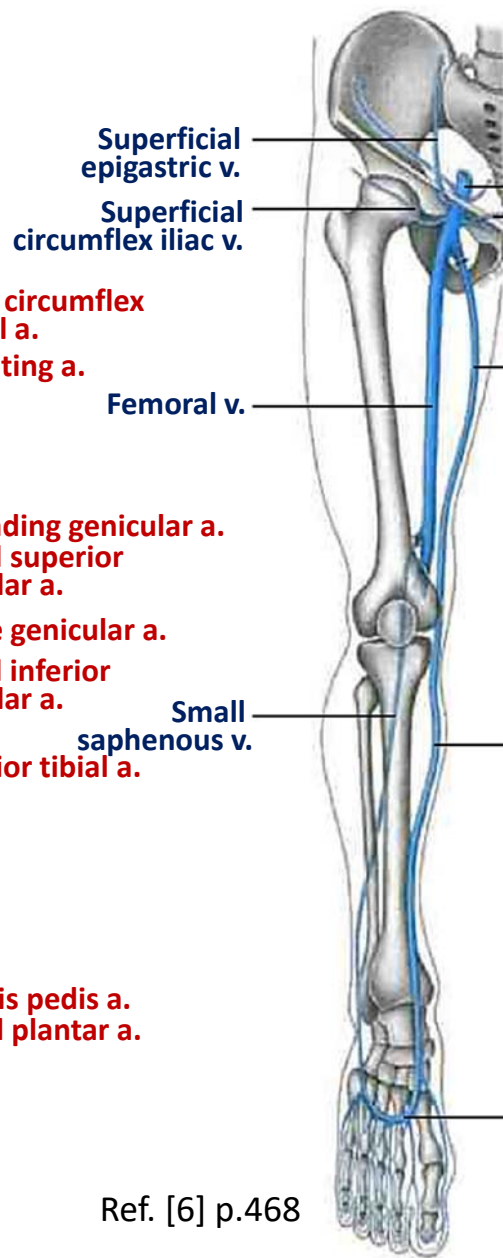
Ref. [6] p.465

Muscle	Proximal Attachment	Distal Attachment	Action	Innervation
Plantar compartment of the foot (Layer 1)				
Abductor hallucis	Calcaneus bone	Proximal phalanx of the great toe (digit 1)	Abducts and flexes the great toe	Medial plantar n. (S2–S3)
Flexor digitorum brevis		Lateral surfaces of the middle phalanx of digits 2–5	Flexes digits 2–5	
Abductor digiti minimi		Lateral side of the base of the proximal phalanx for digit 5	Abducts and flexes digit 5	Lateral plantar n. (S2–S3)
Plantar compartment of the foot (Layer 2)				
Quadratus plantae	Calcaneus bone	Tendon of the flexor digitorum longus	Flexes digits 2–5	Lateral plantar n. (S1–S3)
Lumbricals	Tendons of the flexor digitorum longus	Expansion over digits 2–5	Flexes the proximal phalanges and extends the middle and distal phalanges of digits 2–5	Medial one: medial plantar n. (S2–S3) Lateral three: lateral plantar n. (S2–S3)

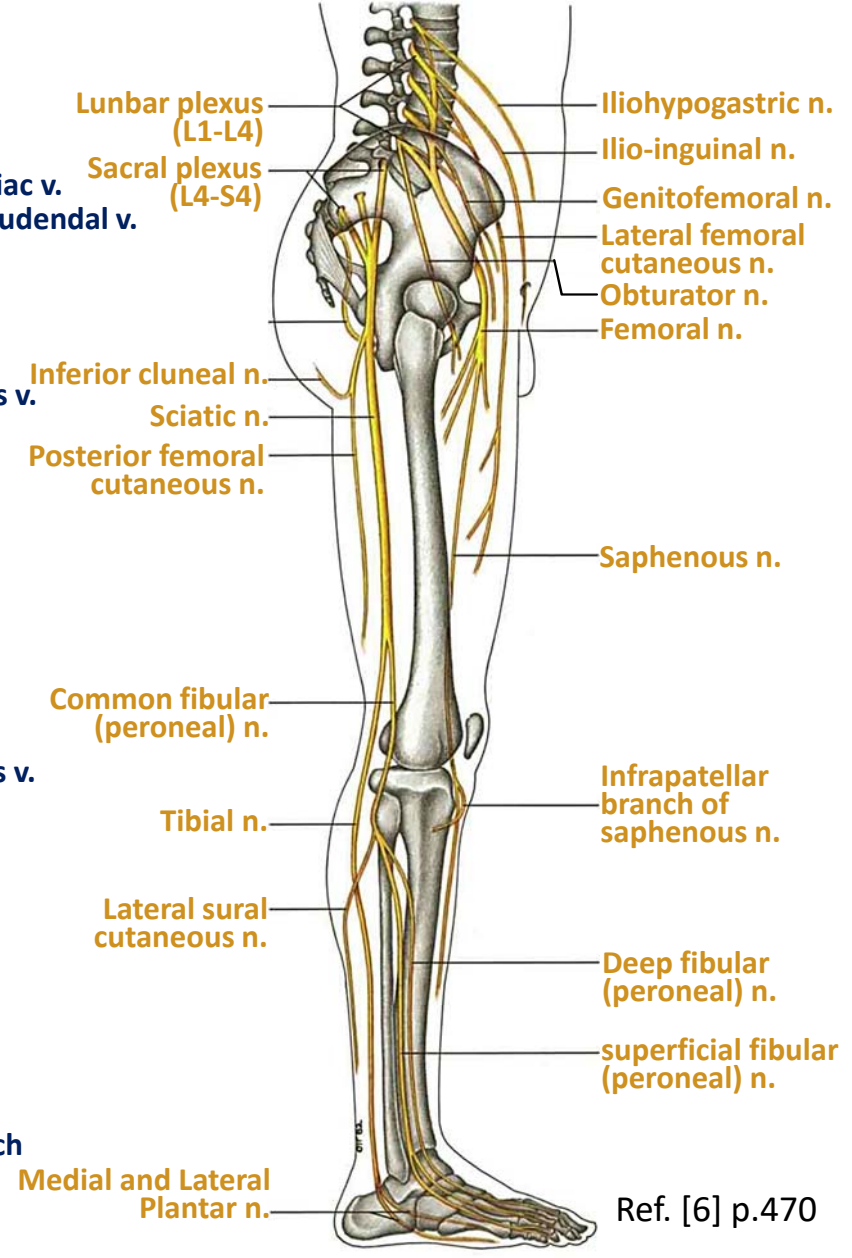
Muscle	Proximal Attachment	Distal Attachment	Action	Innervation
Plantar compartment of the foot (Layer 3)				
Flexor hallucis brevis	Cuboid and lateral cuneiform bones	Base of the proximal phalanx of the great toe	Flexes the great toe	Medial plantar n. (S1–S2)
Adductor hallucis	Oblique head: base of metatarsals 2–4 Transverse head: metatarsophalangeal joints	Proximal phalanx of the great toe	Adducts the great toe	Deep branch of the lateral plantar n. (S2–S3)
Flexor digiti minimi brevis	Base of the fifth metatarsal bone	Base of the proximal phalanx of digit 5	Flexes the proximal phalanx of digit 5	Superficial branch of the lateral plantar n. (S2–S3)
Plantar compartment of the foot (Layer 4)				
Plantar interossei (three muscles)	Base and medial side of metatarsals 3–5	Medial side of the base of the proximal phalanx of digits 3–5	Adducts digits 2–4 and flexes the metatarsophalangeal joints	Lateral plantar n. (S2–S3)
Dorsal interossei (four muscles)	Adjacent sides of metatarsals 1–5	First: medial side of the proximal phalanx of digit 2 Second to fourth: lateral side of digits 2–4	Abducts digits 2–4 and flexes the metatarsophalangeal joints	



Ref. [6] p.466



Ref. [6] p.468



Ref. [6] p.470

THE END

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