Systematic Anatomy

Locomotor system - Part 7

Muscles of the lower limb

下 肢 肌

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复旦大学基础医学院解剖与组织胚胎学系

复旦大学枫林校区

Into Chinese

1.Coracobrachialis

2.Brachioradialis

3.Extensor carpi radialis longus

4.Extensor digitorum

5.Abductor pollicis longus

Into English

1. 小鱼际

2. 三角肌

3. 肱二头肌

4. 旋后肌

5. 示指伸肌

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Into Chinese

1.Coracobrachialis 喙肱肌

2.Brachioradialis　肱桡肌

3.Extensor carpi radialis longus

桡侧腕长伸肌

4.Extensor digitorum 指伸肌

1.Abductor pollicis longus 拇长展肌

Into English

1. 小鱼际 Hypothenar

2. 三角肌 Deltoid

3. 肱二头肌 Biceps brachii

4. 旋后肌 Supinator

5. 示指伸肌 Extensor indicis

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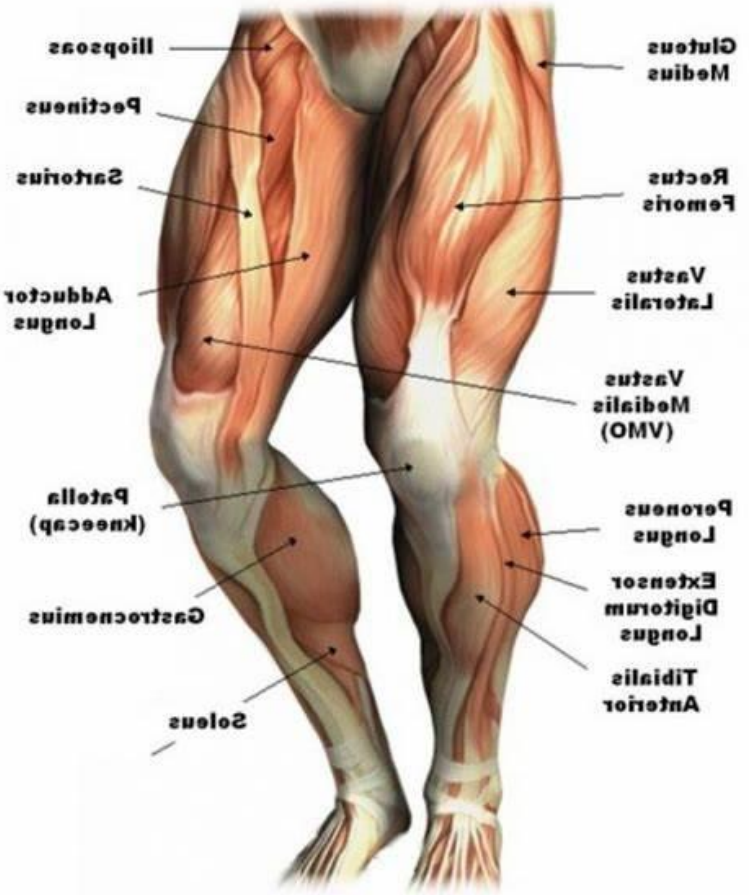
The muscles of the lower limb



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Muscles of the lower limb

Hip muscles (pelvic girdle)
- Anterior group 前群 2
- Posterior group 后群 8

Muscles of thigh
- Anterior group 前群 2
- Posterior group 后群 3
- Medial group 内侧群 5

Muscles of leg
- Anterior group 前群 3
- Posterior group 后群 4
- Lateral group 外侧群 2

Muscles of foot
- Dorsal muscles 足背肌
- Sole muscles 足底肌

Hip muscles

- Anterior group
  - Iliopsoas
    - Iliacus 髂肌
    - Psoas major 腰大肌
    - } iliopsoas 髂腰肌
  - Tensor fasciae latae 阔筋膜张肌
- Posterior group
  - Gluteus maximus 臀大肌
  - Gluteus medius 臀中肌
  - Gluteus minimus 臀小肌
  - Piriformis 梨状肌
  - Obturator internus 闭孔内肌
  - Gemellus superior 上孖肌
  - Gemellus inferior 下孖肌
  - Quadratus femoris 股方肌

Ant.group of hip mm.-Iliopsoas muscle

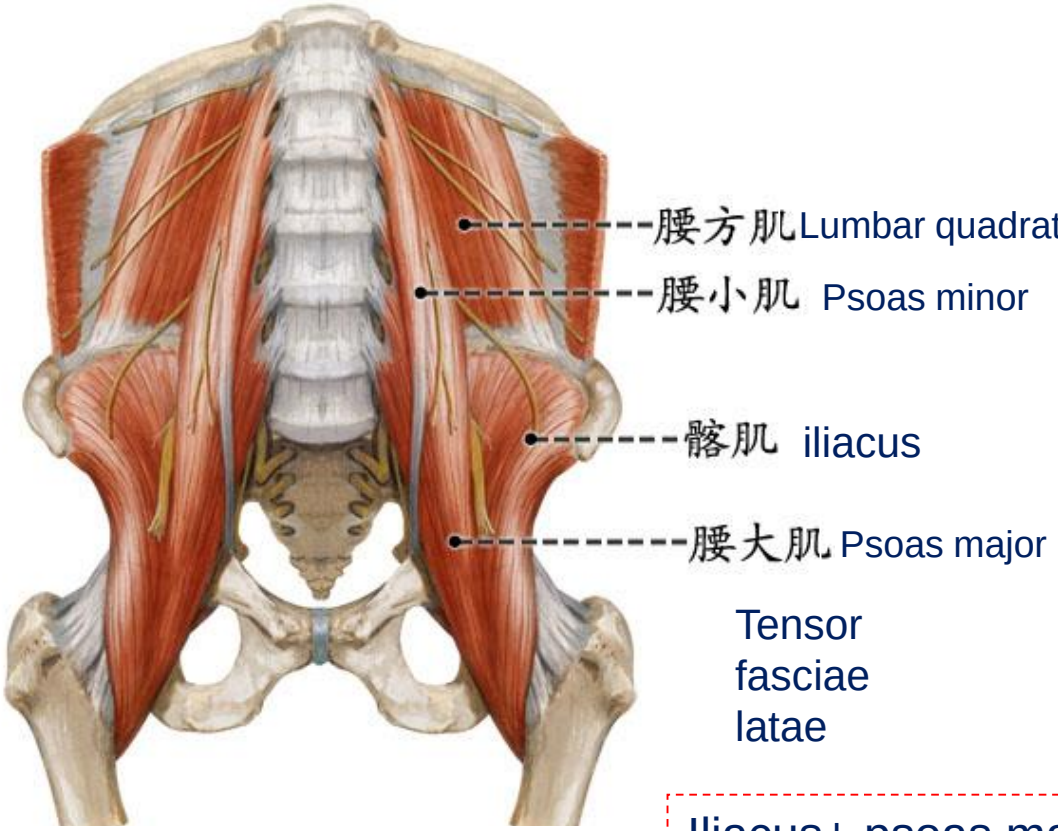
Iliacus 髂肌：

Origin: iliac fossa 髂窝。

Insertion: lesser trochanter

Action：flex hip joint and rotate laterally mainly 髋关节前屈和旋外。

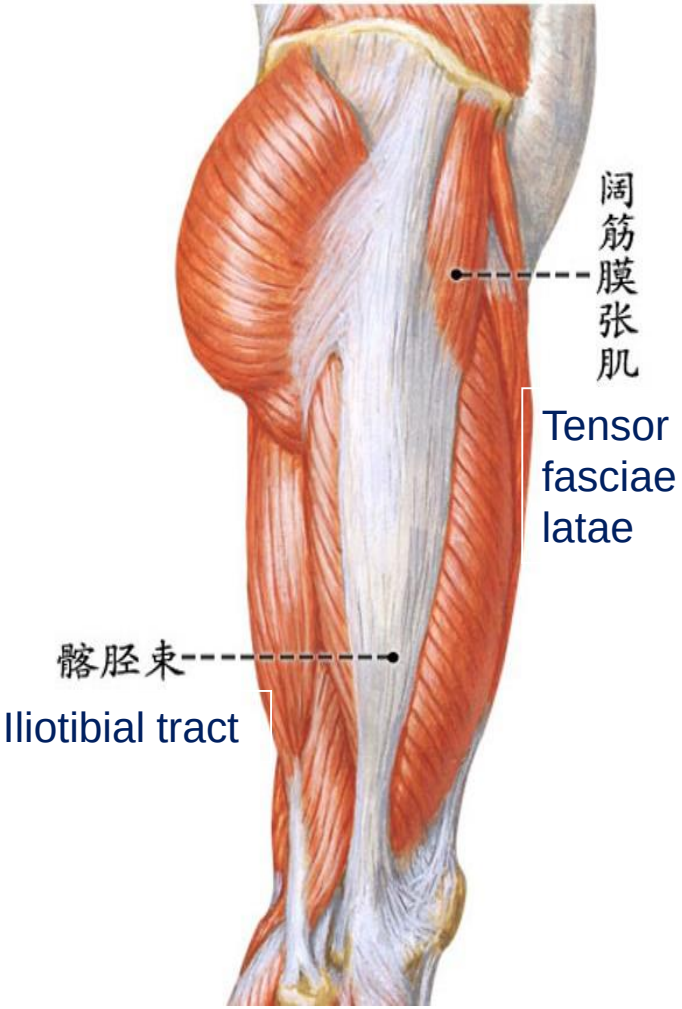
下肢固定时，使躯干和骨盆前屈。



Iliacus+ psoas major
髂肌与腰大肌 合称髂腰肌
iliopsoas

Psoas major 腰大肌:
Origin: the body and transverse process of lumbar vertebrae
Insertion: lesser trochanter of femur
Action: It is the most powerful flexor of the thigh. when lower limb is fixed it bends the Vertebral column forward and flexes the lumbar region laterally.

Ant.group of hip mm.- tensor fasciae latae



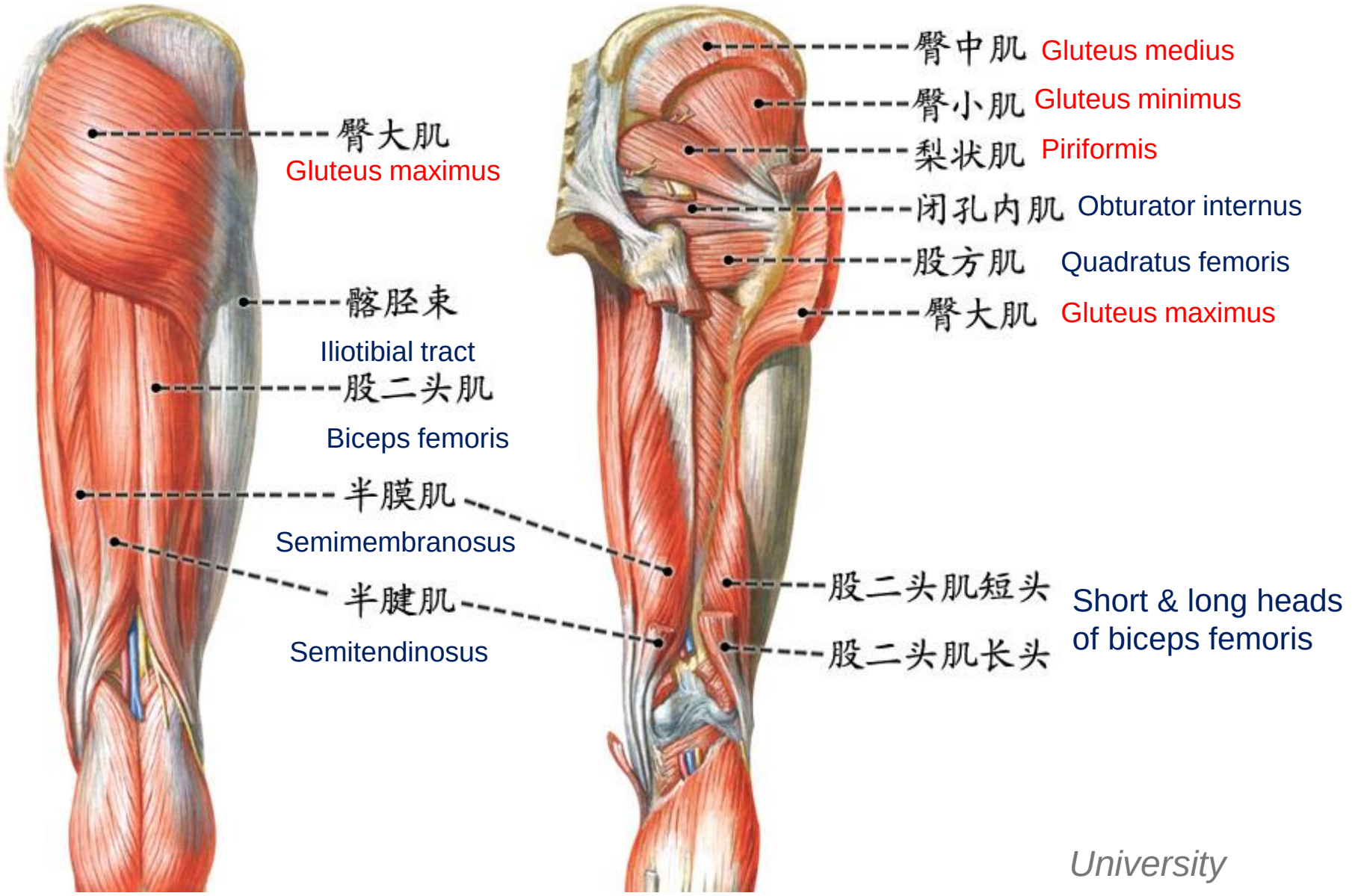
Position: On the anterolateral side of the thigh.

Origin: ant.sup.iliac spine and enclosed by fascia latae. 髂前上棘，被阔筋膜所包绕。

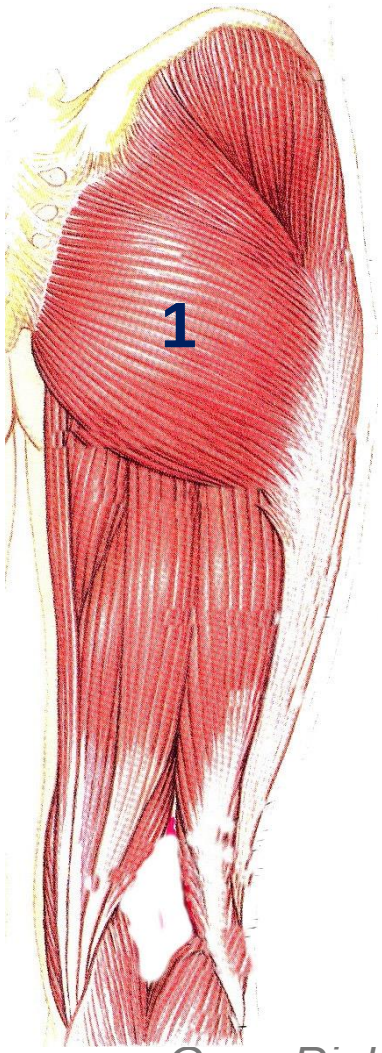
Insertion: to lat.condyle of femur by iliotibial tract. 经髂胫束至股骨外侧髁。

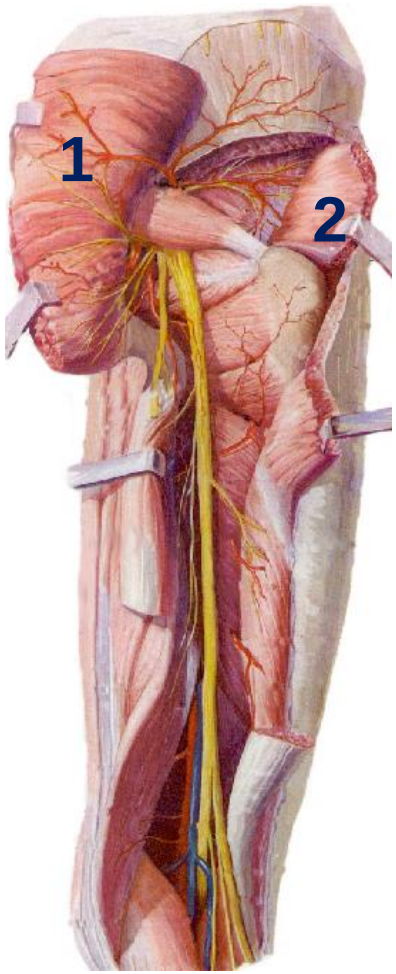
Actions: to tense fasciae latae. 紧张阔筋膜并屈髋关节。

Posterior muscular group of hip muscles

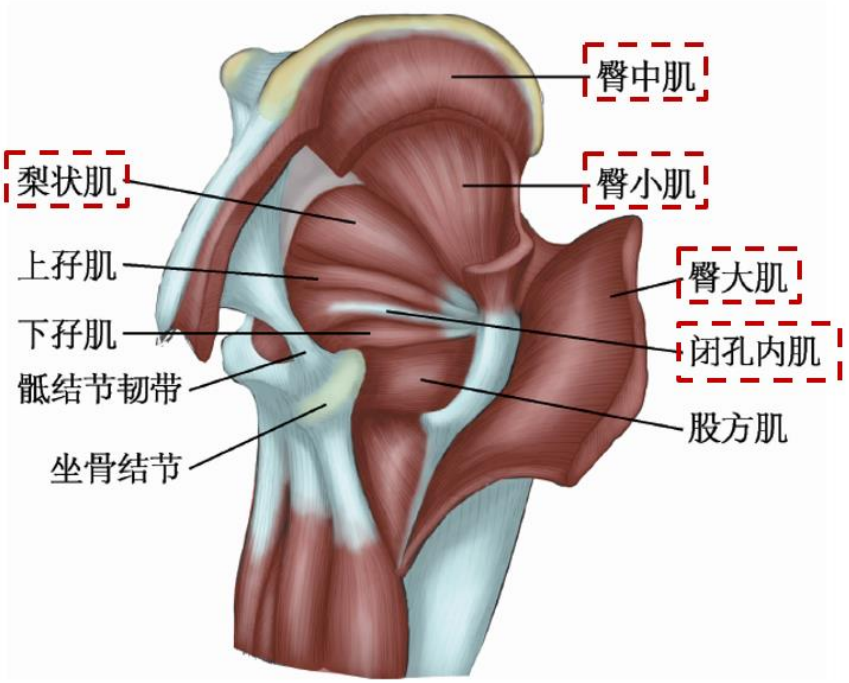


Posterior muscular group of hip muscles





1-Gluteus maximus 臀大肌
2-Gluteus medius 臀中肌
3-Gluteus minimus 臀小肌
4-Piriformis 梨状肌
5-Obturator internus 闭孔内肌



Posterior group of hip muscle

1-Gluteus maximus 臀大肌

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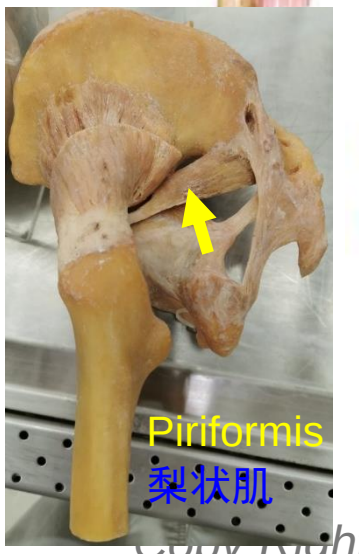
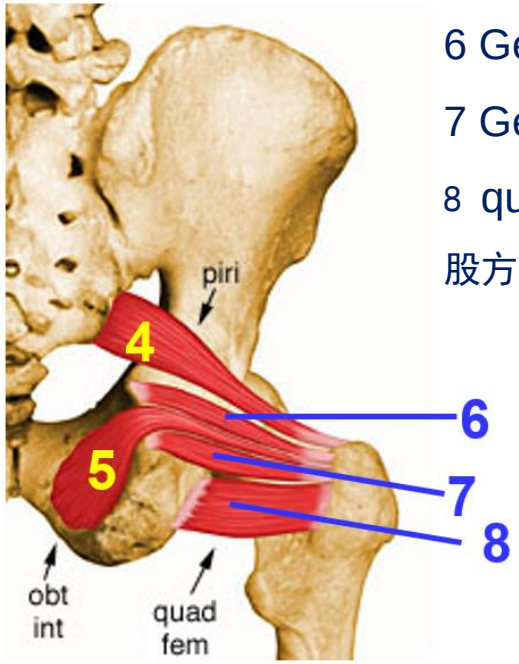




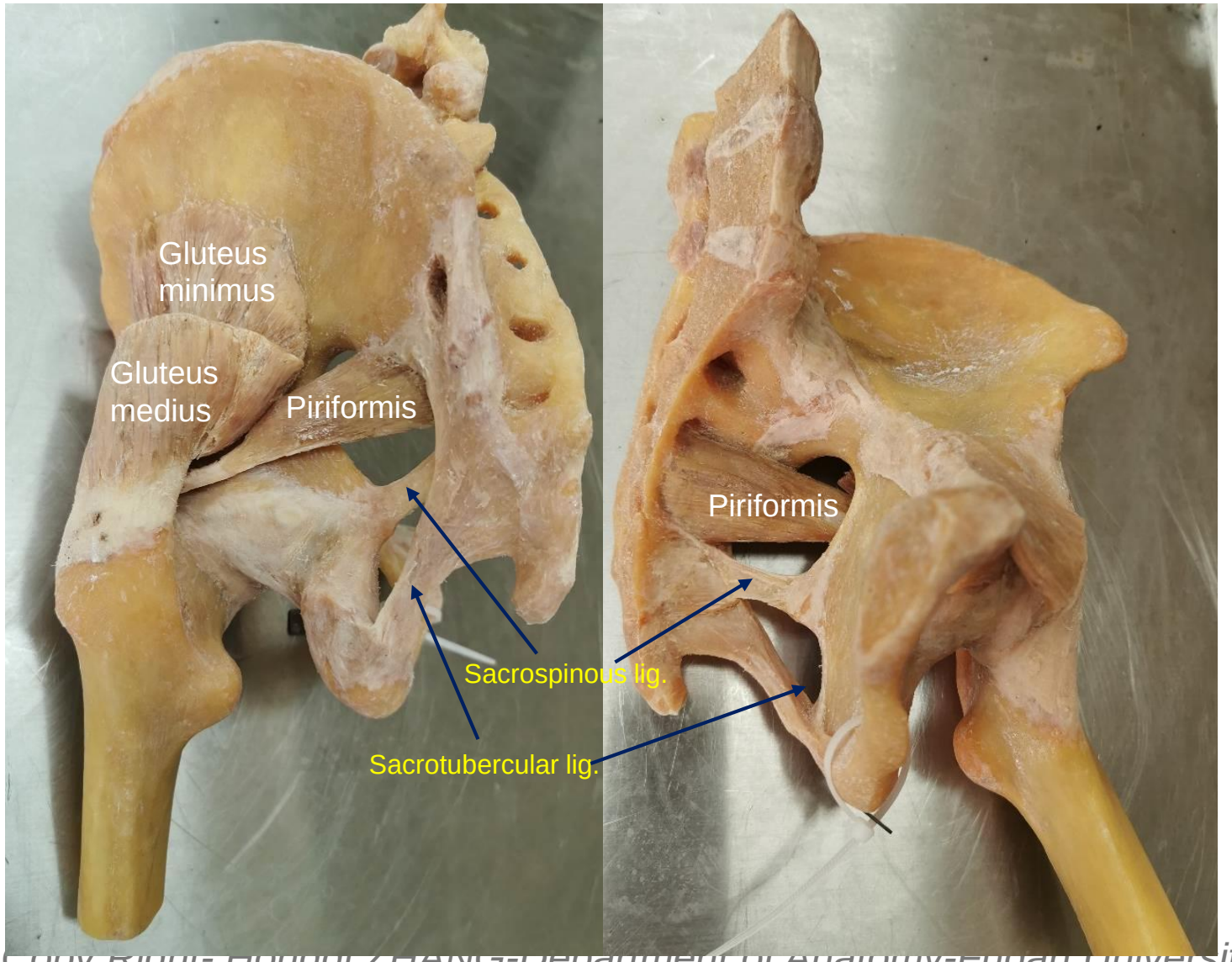
6 Gemellus sup.上孖肌

7 Gemellus inf.下孖肌

8 quadratus femoris

股方肌

C Posterior muscular group of hip muscles



Actions of the post.muscular group of the hip

Gluteus maximus 臀大肌

It is powerful extensor 伸肌 of the thigh. the most powerful rotator laterally 旋外

Gluteus medius 臀中肌

Abducts 外展 and rotates 旋 the thigh

Gluteus minimus 臀小肌

Abducts 外展 and its ant. fibers can medially rotate the thigh

Piriformis 梨状肌

Rotate 外旋 laterally and abduct 外展 hip joint

Obturator internus 闭孔内肌

Rotate laterally 外旋 the hip joint

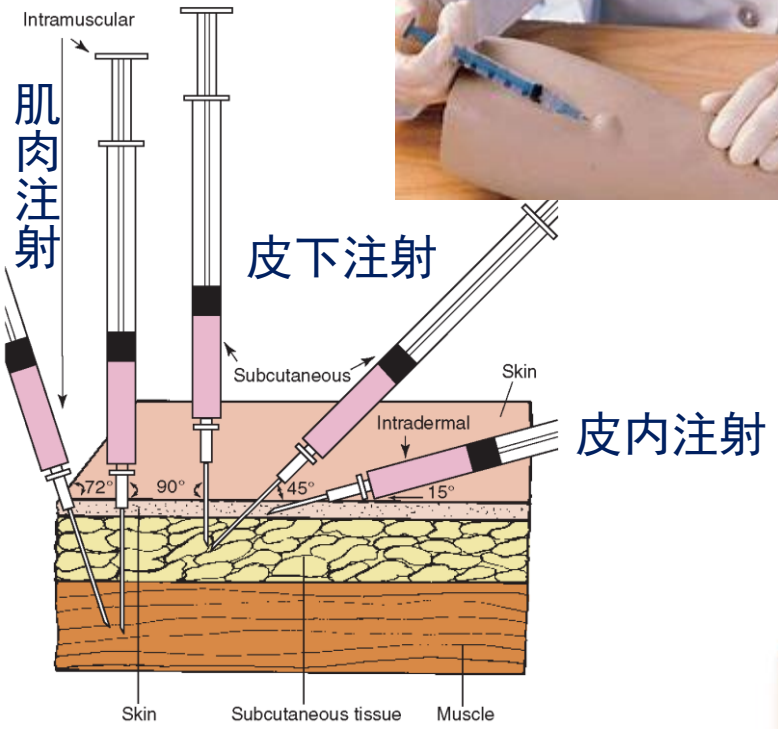
臀部后群肌肉的起止及功能

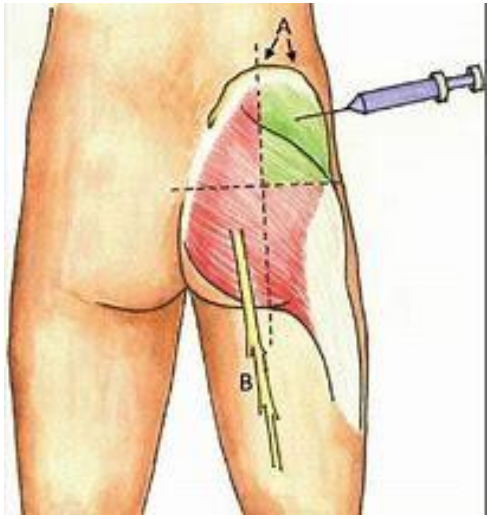
Name	Origin	Insertion	action
臀大肌	髂骨翼外面和骶骨背面	臀肌粗隆 髂胫束	髋关节伸及外旋
臀中肌	髂骨翼外面	股骨大转子	髋关节外展，内旋（前部肌束）和旋外（后部肌束）
梨状肌	骶骨前面骶前孔外侧	股骨大转子	髋关节外展外旋
闭孔内肌	闭孔膜内面及其周围骨面	股骨转子窝	髋关节外旋
股方肌	坐骨结节	转子间嵴	髋关节外旋
臀小肌	髂骨翼外面	股骨大转子前缘	髋关节外展，内旋（前部肌束）和旋外（后部肌束）
闭孔外肌	闭孔膜外面及其周围骨面	股骨转子窝	髋关节外旋

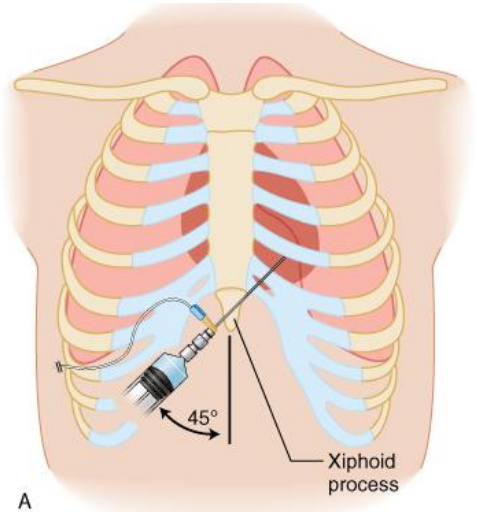
髋肌前群髂腰张，后大中小闭内梨

各种注射及其应用

1. 皮内注射
2. 皮下注射
3. 肌肉注射
4. 静脉注射
5. 动脉注射
6. 心内注射







Various injections in human body

1. Intradermal injection 皮内注射 – inject medicine into skin.
2. Subcutaneous injection 皮下注射 – inject medicine into subcutaneous tissue.
3. Intramuscular injection 肌肉注射– inject medicine into muscle. actually many regions could be used for it.
4. Intravenous injection 静脉注射 – inject medicine into vein.
5. Intraarterial injection 动脉注射 – inject medicine into artery.
6. Intracardiac injection 心内注射 – inject medicine into heart.

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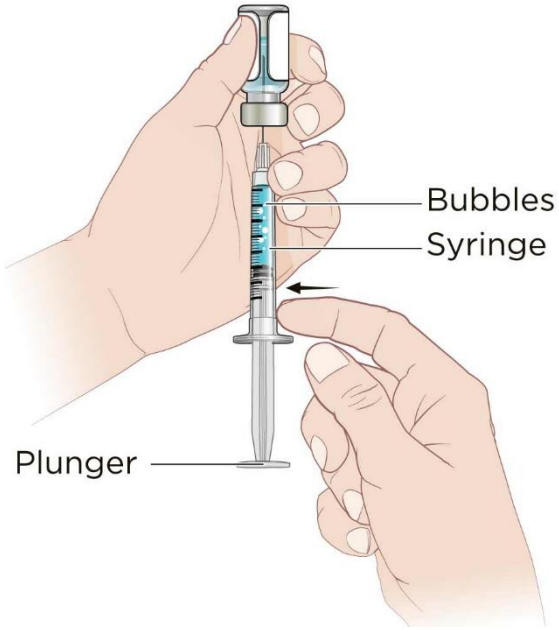
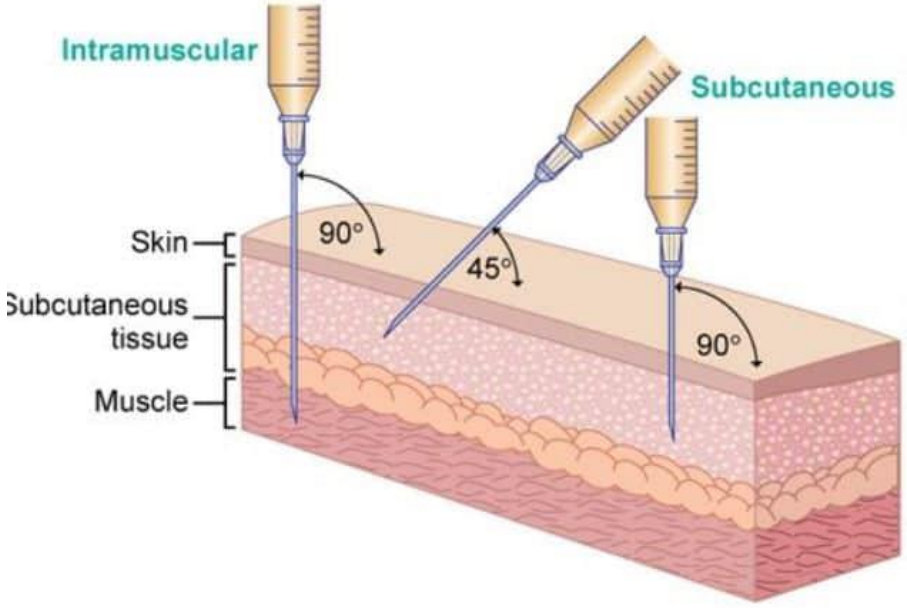
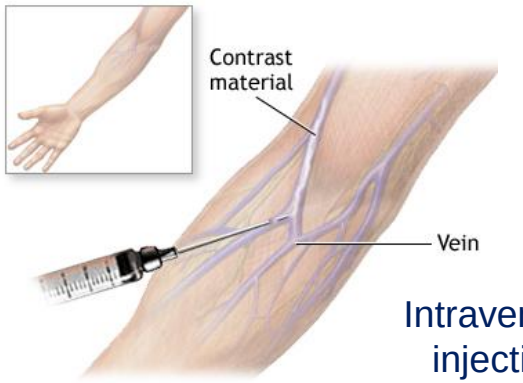
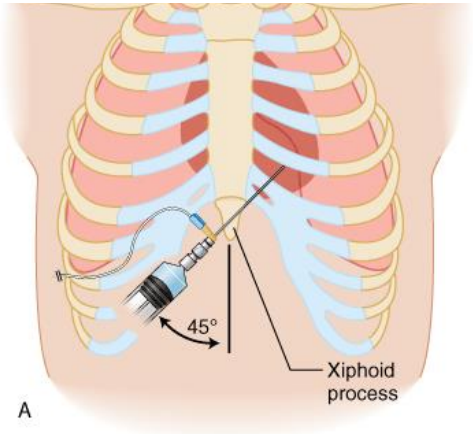
Various medicine injections in human body





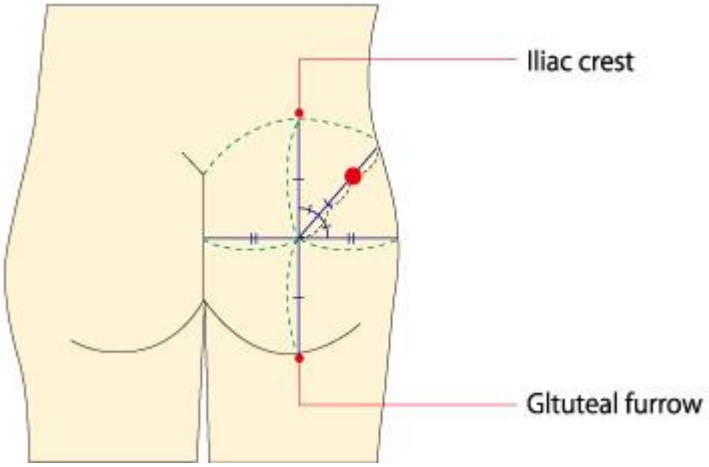


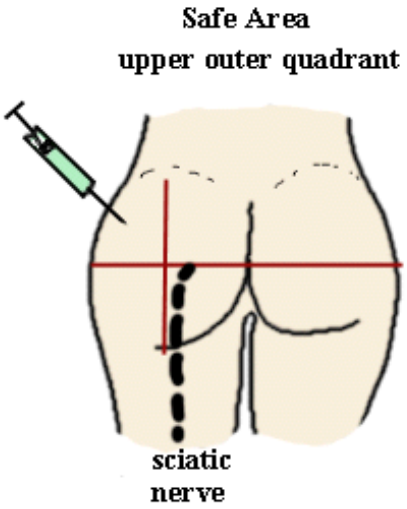
Intravenous injection

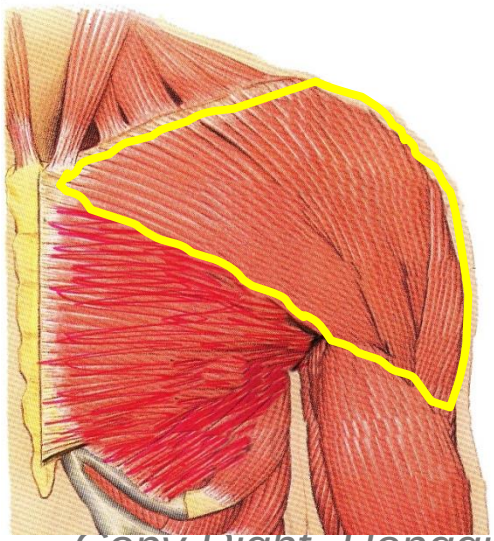


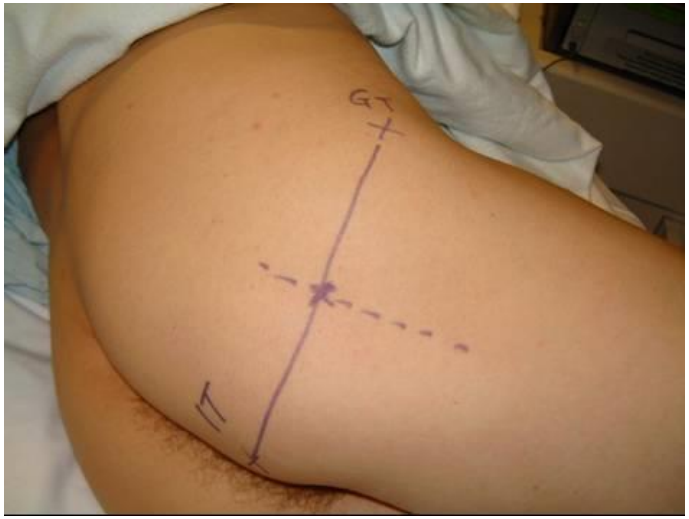
Intracardiac injection

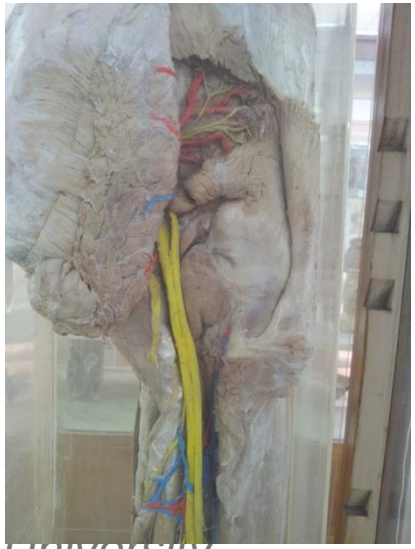
Intramuscular injection of hip











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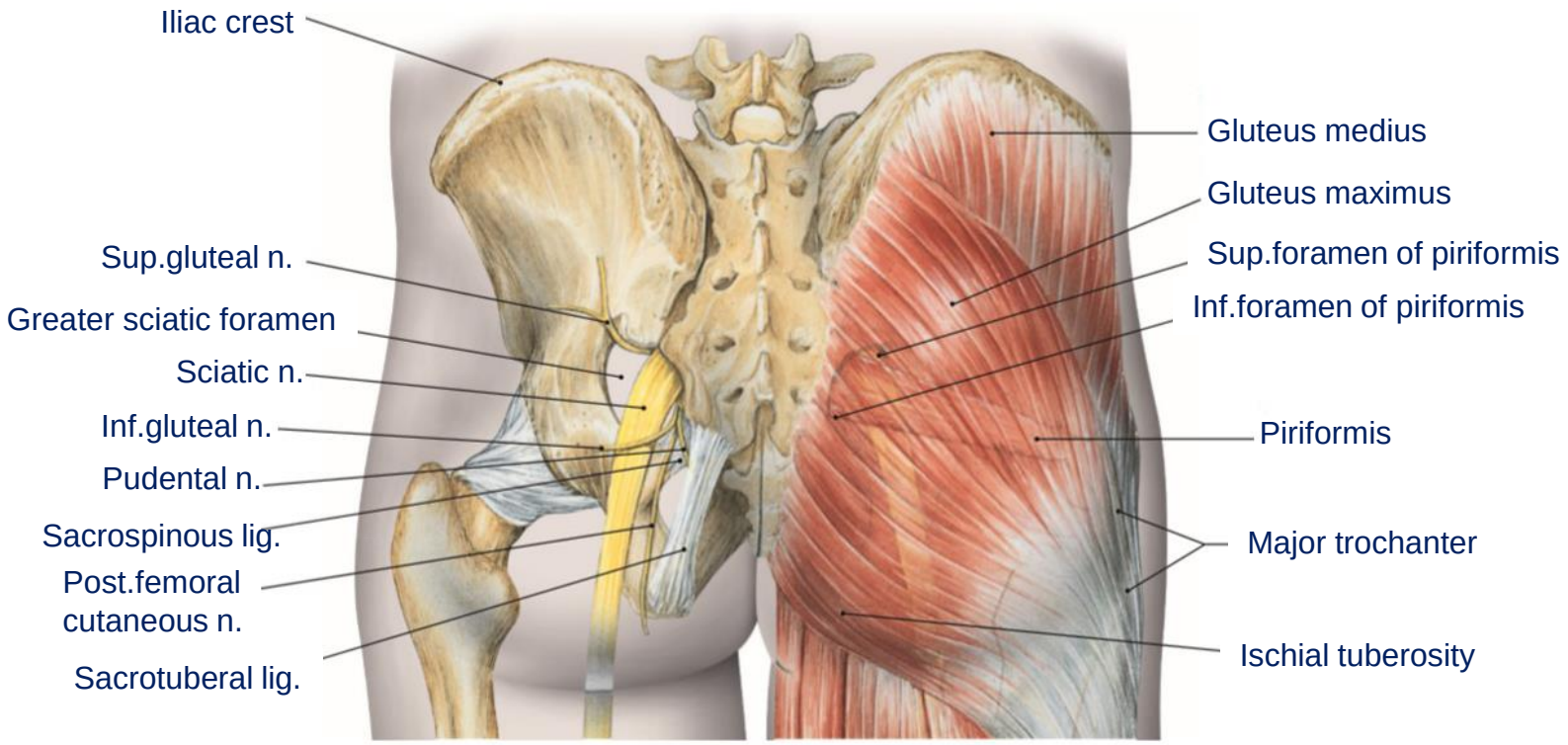
Safe intramuscular injection of hip

Learn it by yourself



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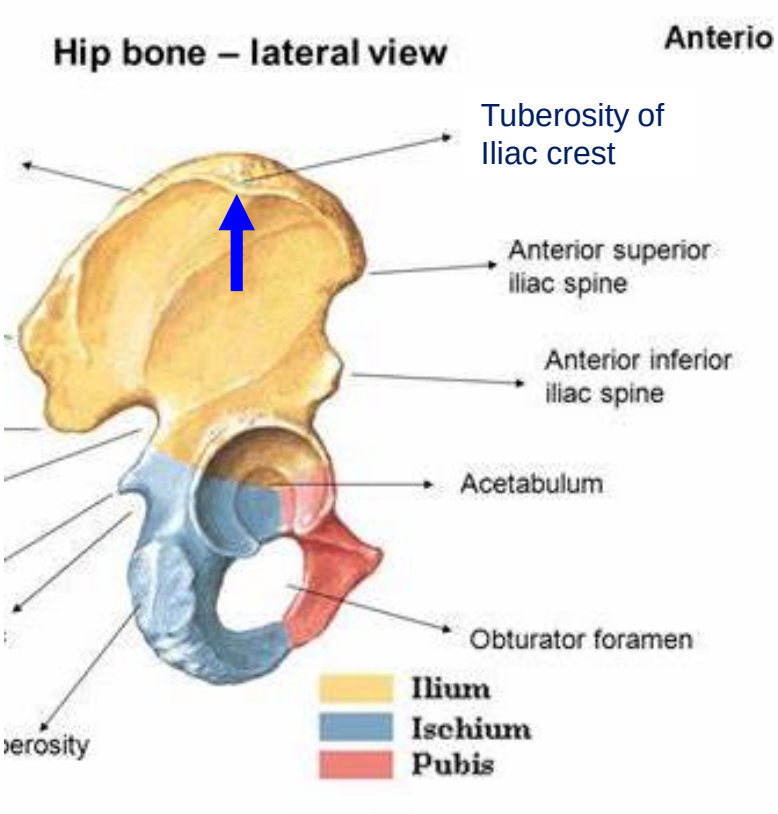
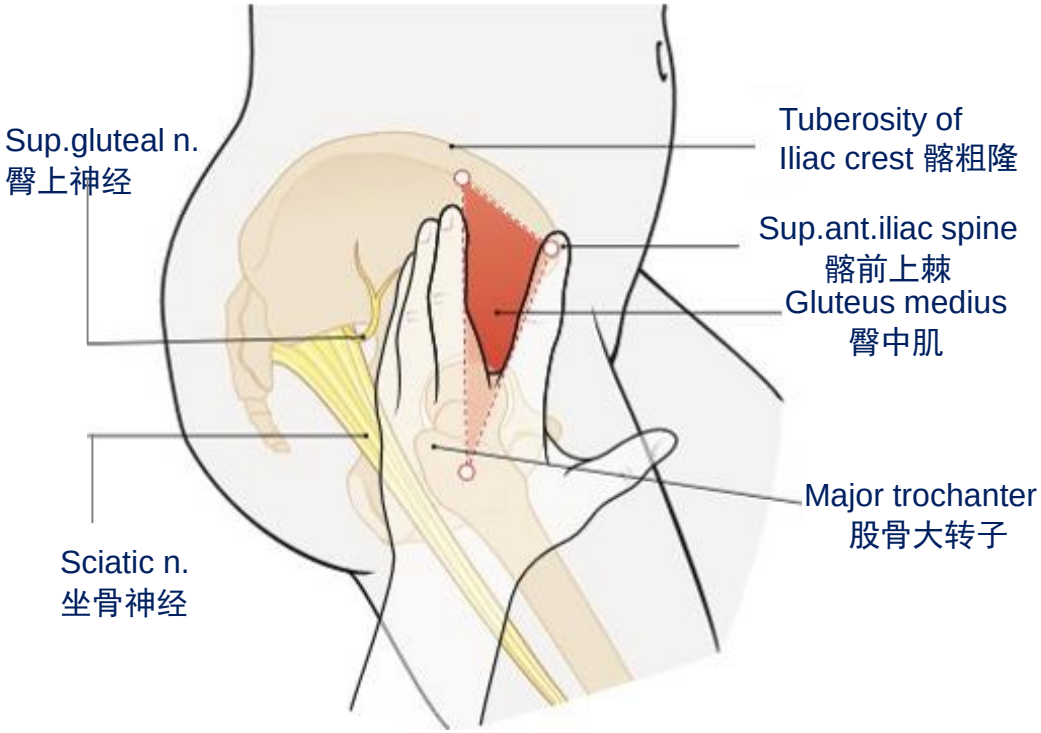




即使这样，也有可能损伤到臀上神经至阔筋膜张肌的分支

However, the muscular branch of the superior gluteal nerve, running to the tensor fasciae latae muscle , still remains at risk

The muscles of the thigh

Anterior group 2

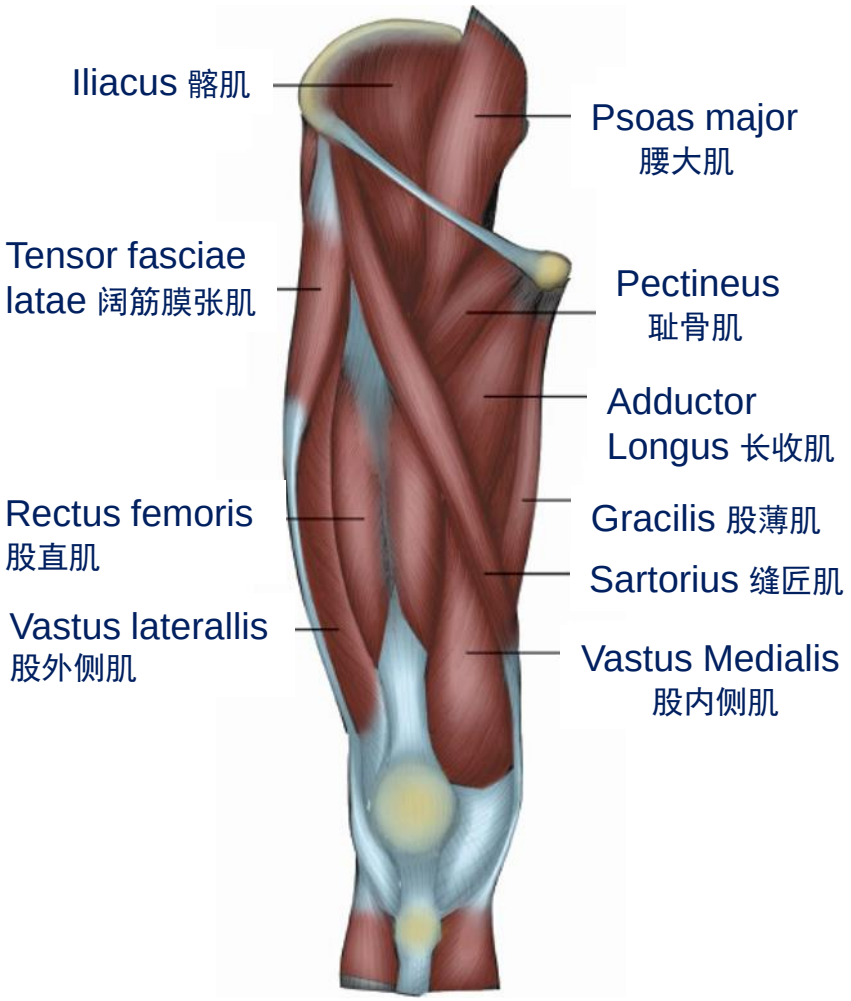
Flex hip joint and extend knee joint

Medial group 5

Adduct hip joint

Posterior group 3

Extend hip joint and flex knee joint



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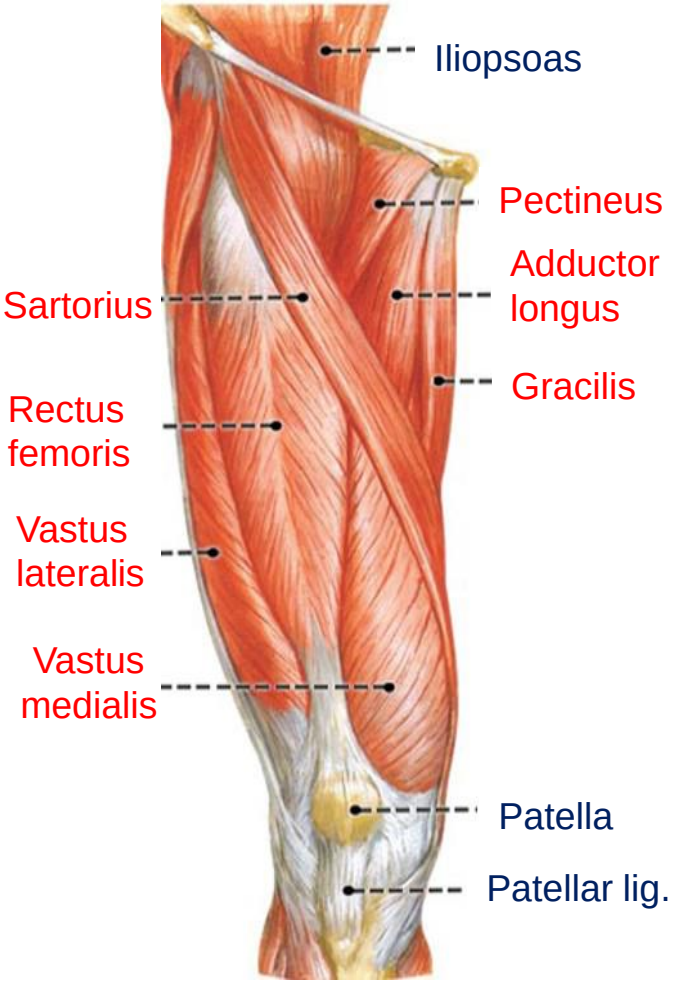
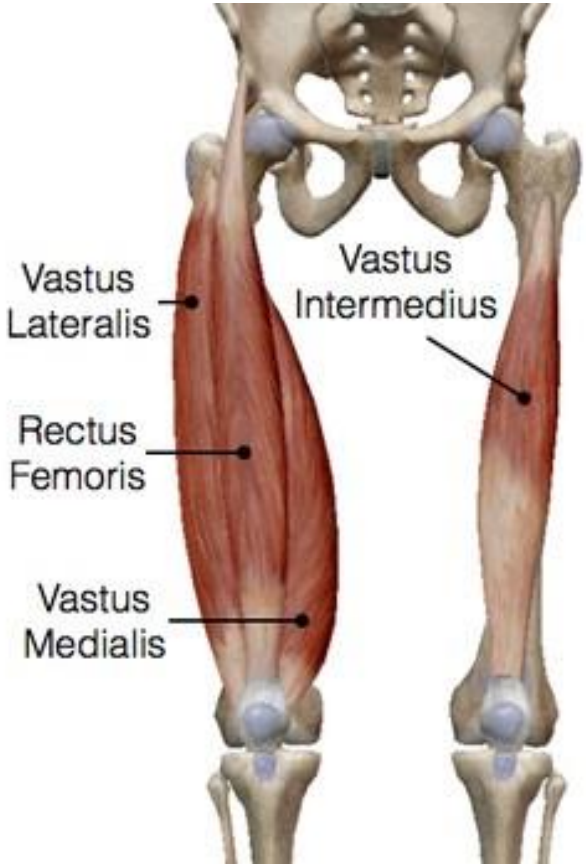
Anterior muscular group of the thigh

Sartorius Quadriceps femoris (with four heads)



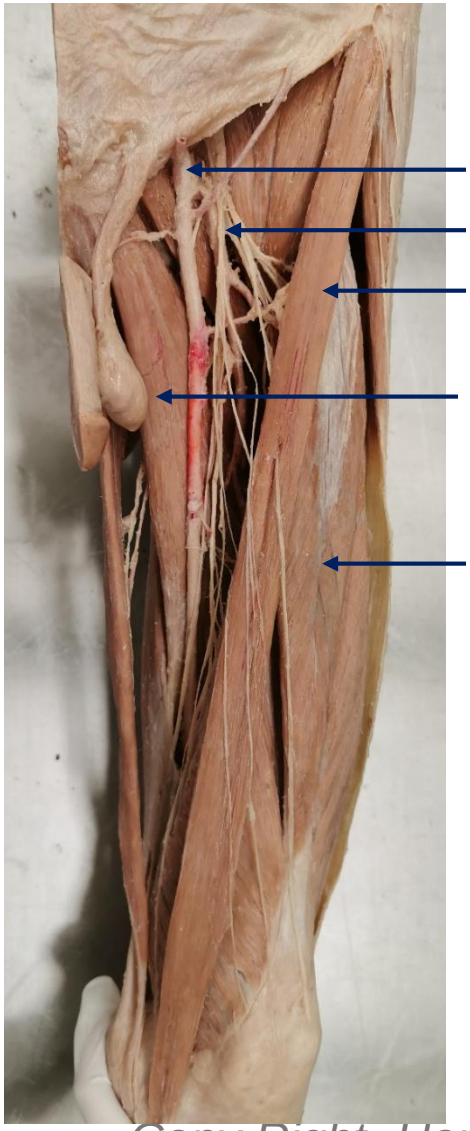


Anterior view

Sartorius act to flex the hip and knee joints, the longest muscle of the body

Quadriceps femoris acts to extend the knee joint mainly and flex the hip joint

Anterior muscular group of the thigh - 2



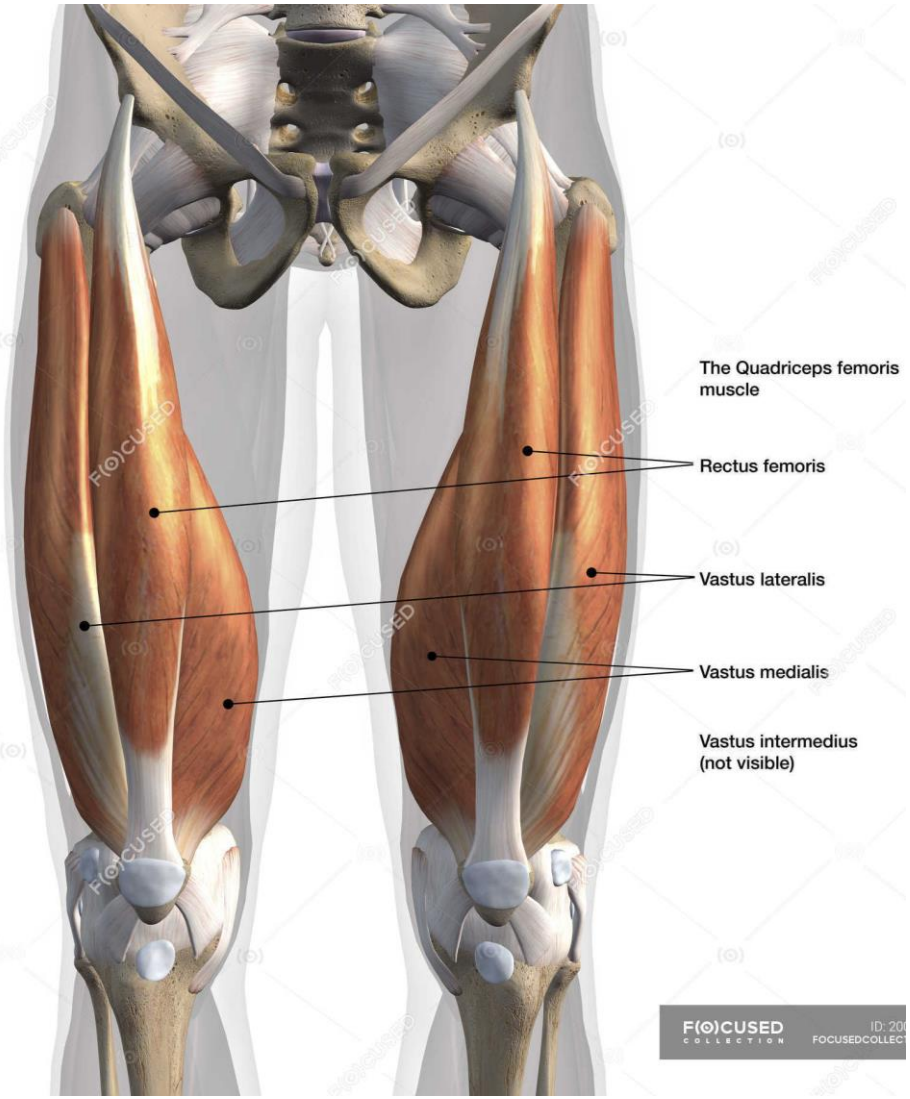
股动脉 femoral a.

股神经 femoral n.

缝匠肌 satrorius.

长收肌 adductor longus

股外侧肌 vastus lateralis.



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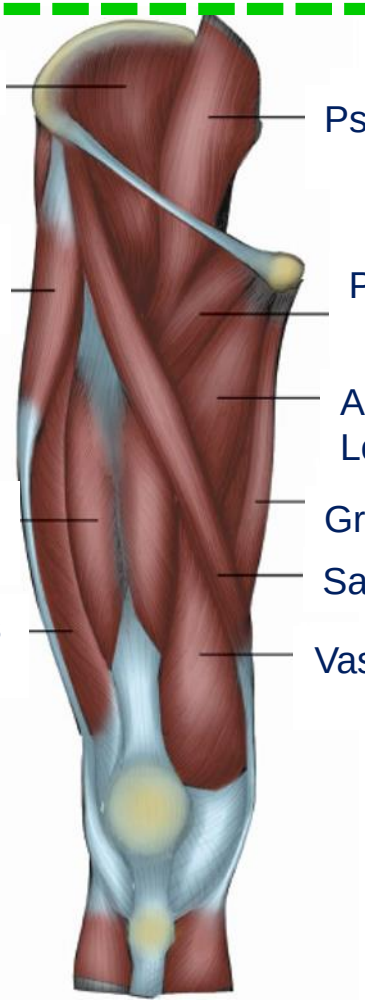
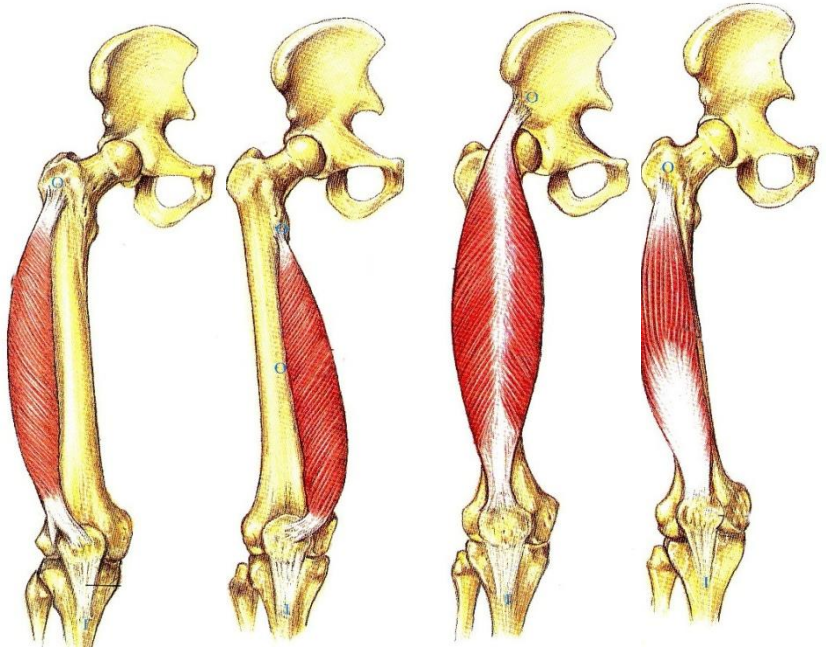
Anterior muscular group of the thigh



Sartorius Quadriceps femoris (with four heads)

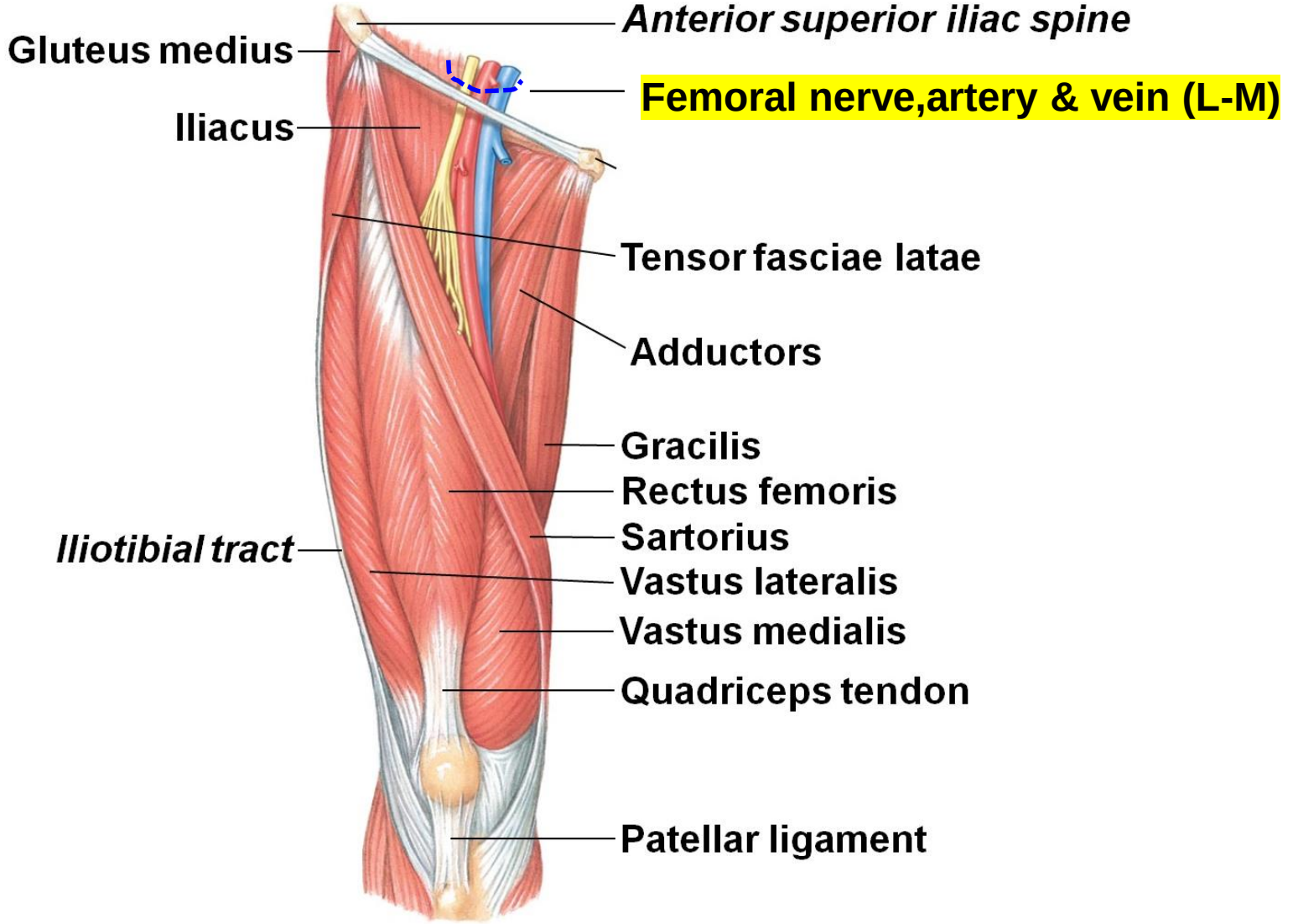


1 2 3 4

1 - Vastus lateralis股外侧肌
2 - Vastus medialis股内侧肌
3 - Rectus femoris股直肌
4 - Vastus intermedius 股中间肌

Sartorius act to flexs the hip and knee joints,the longest muscle of the body
Quadriceps femoris acts to extend the knee joint mainly and flex the hip joint

Thigh muscles & main blood vessels & nerve



Quadriceps and thigh muscles, anterior view

Medial muscular group of the thigh - 5

Superficial layer：

1 Pectineus 耻骨肌

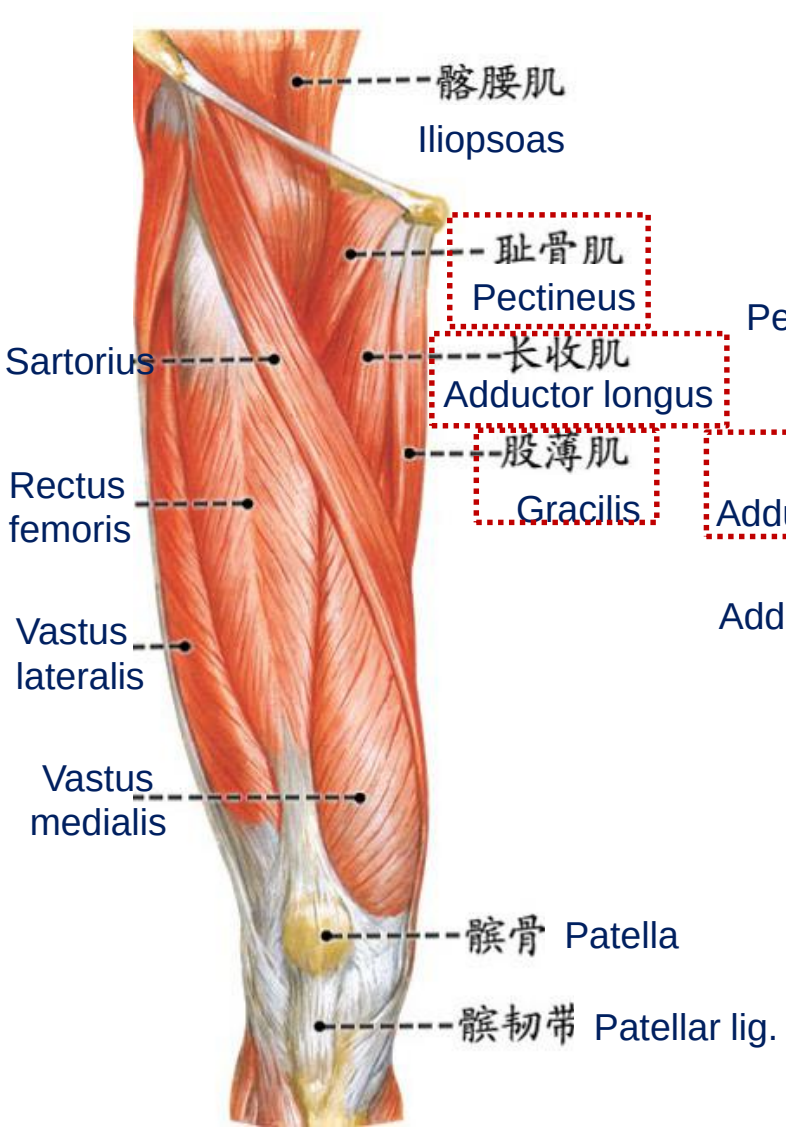
2 Adductor longus
长收肌

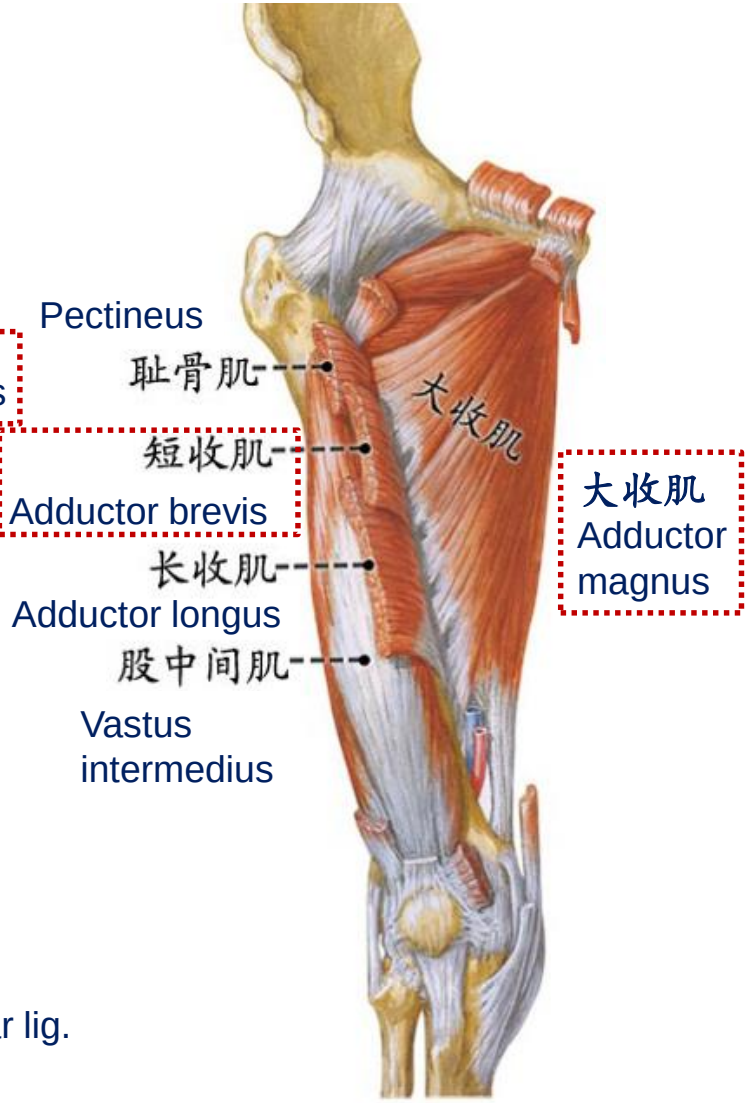
3 Gracilis 股薄肌

Deep layer

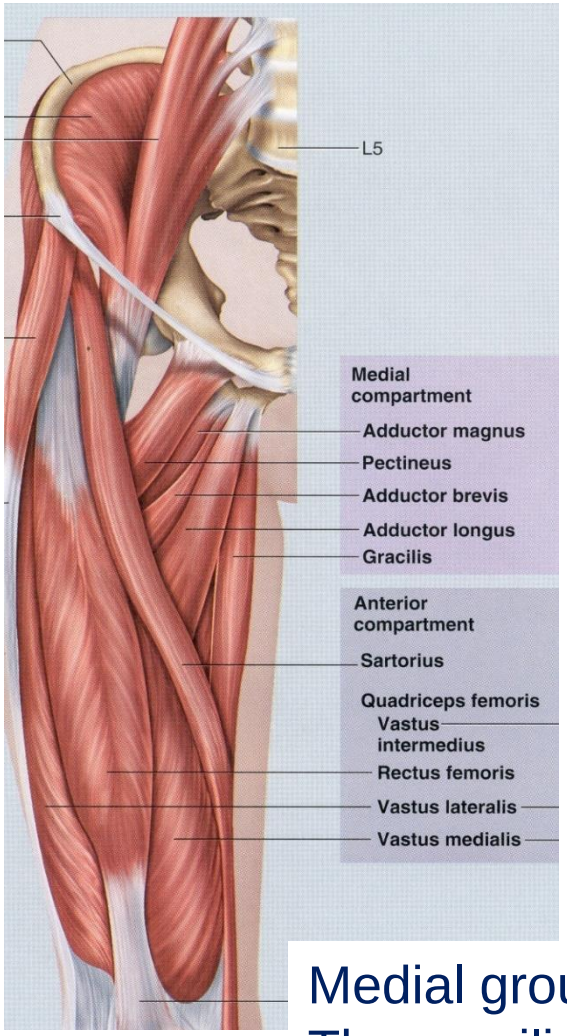
4 Adductor brevis
短收肌

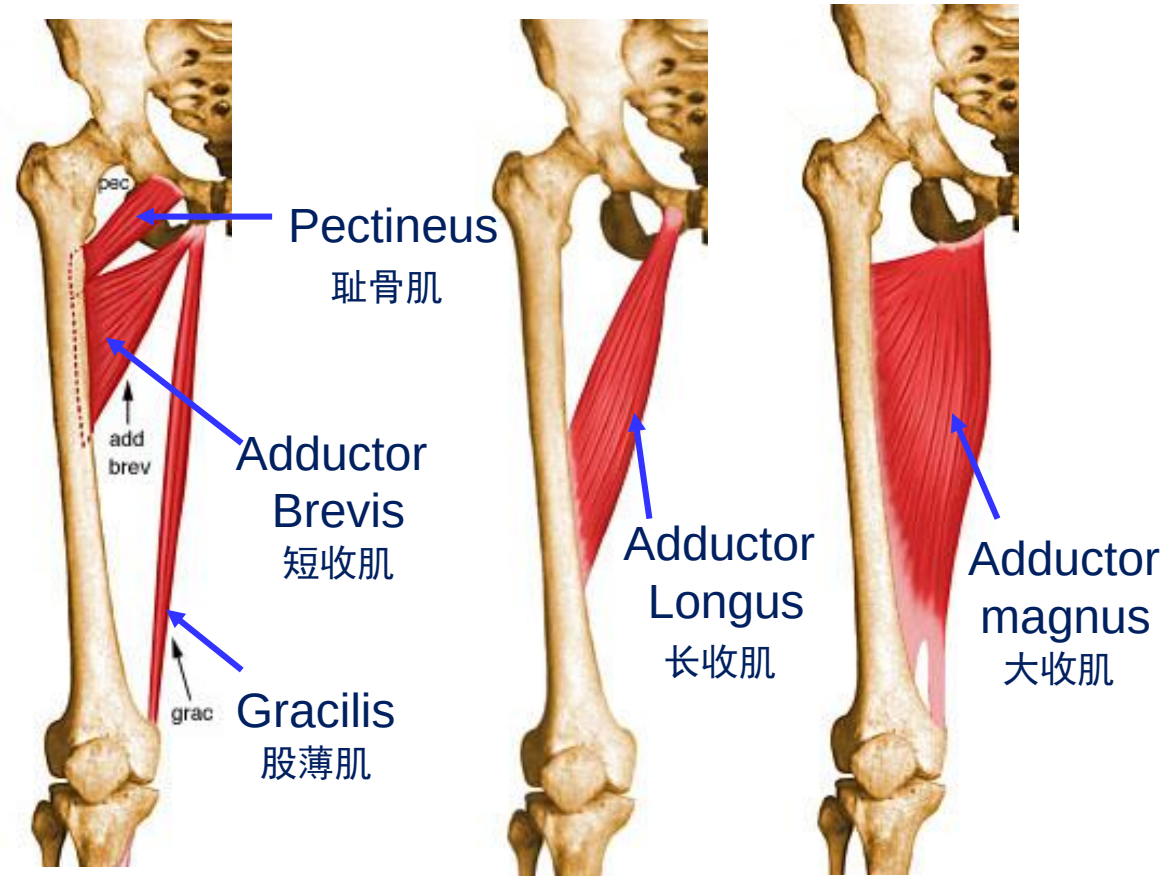
5 Adductor magnus
大收肌





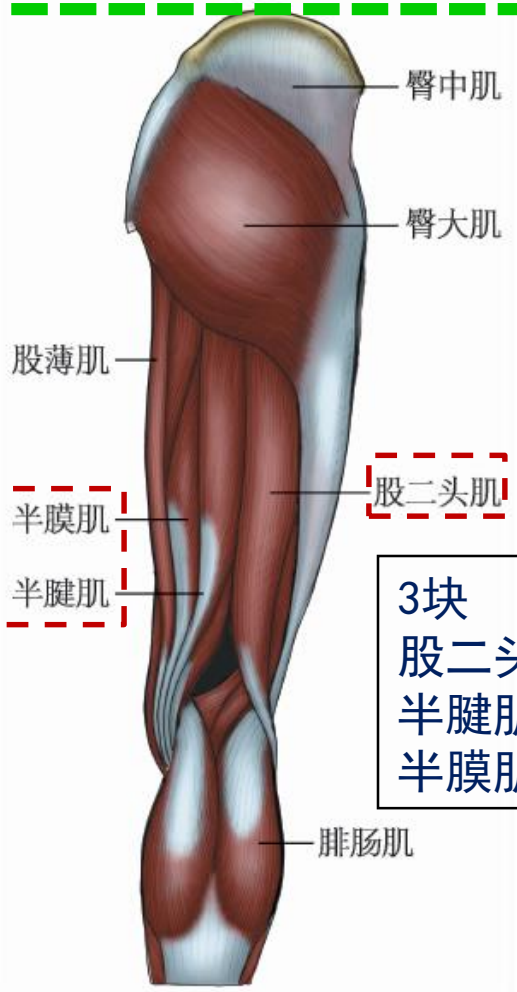
Medial group of the thigh





Medial group act to adduct, flex and laterally rotate the thigh. The gracilis can adduct the hip joint and flex the knee joint.

Posterior group of thigh m.-3 muscles



3块
股二头肌
半腱肌
半膜肌

Biceps femoris
(Long head)
股二头肌长头

Biceps femoris
(Short head)
股二头肌短头

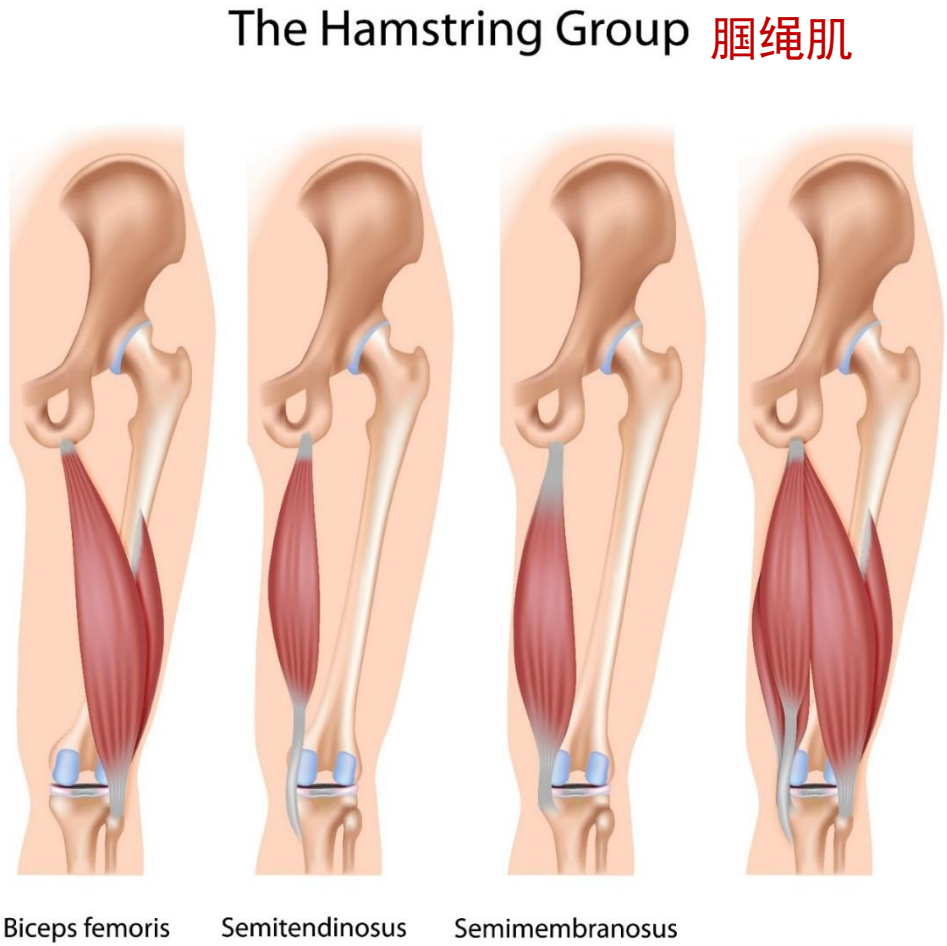
Semitendinosus
半腱肌

半膜肌
semimembranosus

They are the main extensors of the thigh and flexors of the leg.
When the knee joints is semi-flexed, they can also rotate the leg.

The hamstring group 腘绳肌

腘绳肌：大腿后群三块肌与大腿前群肌相对应，均起自坐骨结节止于胫腓骨，受坐骨神经支配，起伸髋屈膝的作用。



The hamstring muscles 腘绳肌

腘绳肌(hamstring muscles)，就是大腿后侧的肌群，包括半腱肌、半膜肌、股二头肌，腘绳肌与强有力的股四头肌相对应。股二头肌长头，半腱肌，半膜肌均起于坐骨结节，股二头肌短头起于股骨粗线。股二头肌长头和短头止于胫骨外面于腓骨，半腱肌，半膜肌止于胫骨内侧髁。股二头肌长头，半腱肌，半膜肌收缩动作是髋伸展和膝屈曲，股二头肌短头收缩动作是膝屈曲。它收缩的主要功能就是屈膝和后伸髋关节，是维持膝关节稳定性，尤其是防止胫骨过度前向错动的重要动力性稳定结构，运动员易发生腘绳肌的扭伤、撕裂等形式的损伤。

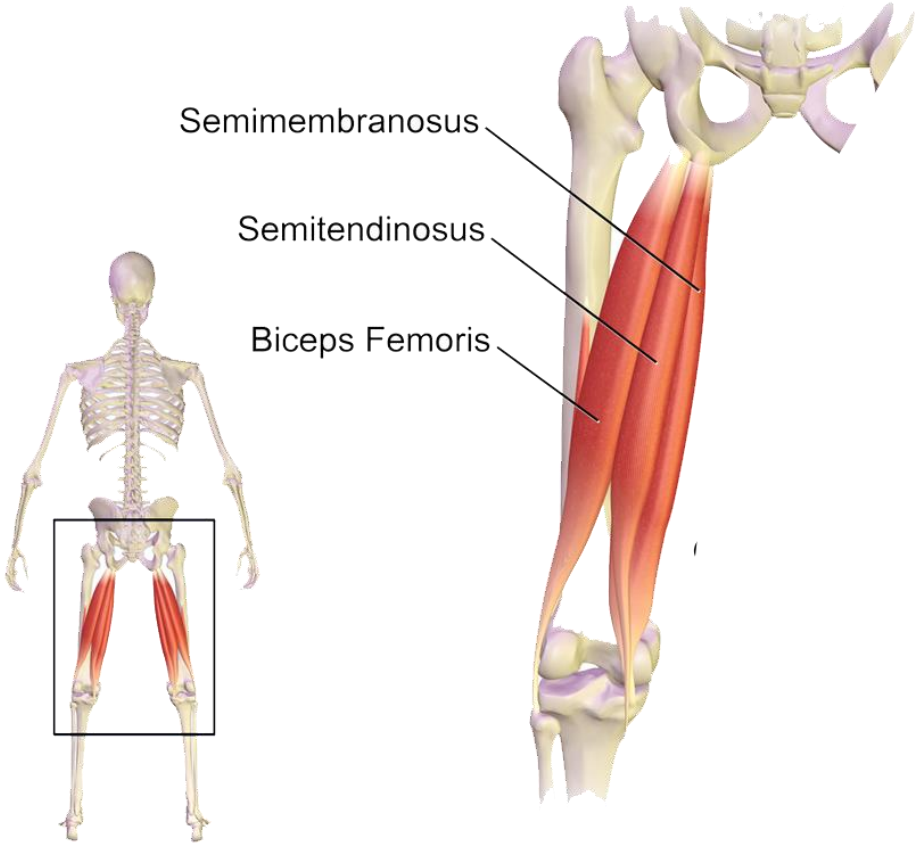
大腿肌肉顺口溜

大腿三群缺乏外

股内外直中缝挨

内耻长短薄大收

后半腱膜股二头



大腿肌的起止及功能

Name	Origin	Insertion	Action
缝匠肌	髂前上棘	胫骨上端内侧面	屈髋、屈膝关节，已屈的膝关节旋内
股四头肌	髂前下棘、股骨粗线内侧唇，股骨体的前面	经髌骨及髌韧带止于胫骨粗隆	屈髋关节，伸膝关节
耻骨肌	耻骨支、坐骨支前面	股骨耻骨肌线	内收、外旋髋关节
长收肌		股骨粗线	
股薄肌		胫骨上端内侧面	
短收肌		股骨粗线	
大收肌	耻骨支、坐骨支、坐骨结节	股骨粗线和内上髁的收肌结节	
股二头肌	长头：坐骨结节 短头：股骨粗线	腓骨头	伸髋关节、屈膝关节并微旋外
半腱肌 半膜肌	坐骨结节	胫骨上端内侧面 胫骨内侧髁后面	伸髋关节、屈膝关节并微旋内

The muscles of the leg

Anterior group 3

Extend ankle & extend toe of foot

Lateral group 2

Strephexopodia（足外翻）

Maintain transverse & lateral longitudinal arches of the foot

Posterior group 4

Flex the toe & strephenopodia （足内翻）

Anterior muscular group of the leg

1-Tibialis anterior

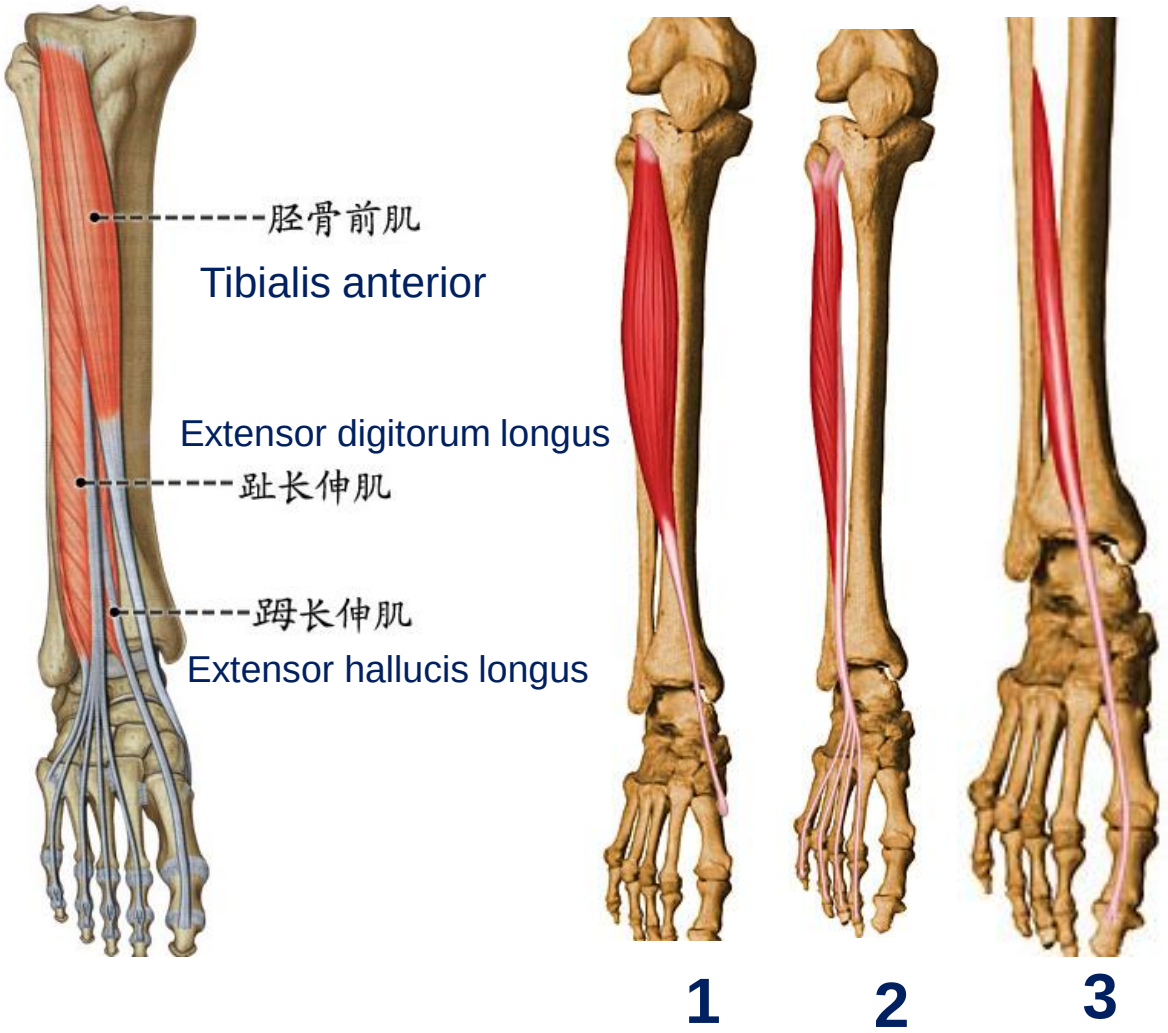
胫骨前肌（足内翻）

2-Extensor digitorum

longus 趾长伸肌

3-Extensor hallucis

longus 拇长伸肌



Lateral muscular group of the leg - 2

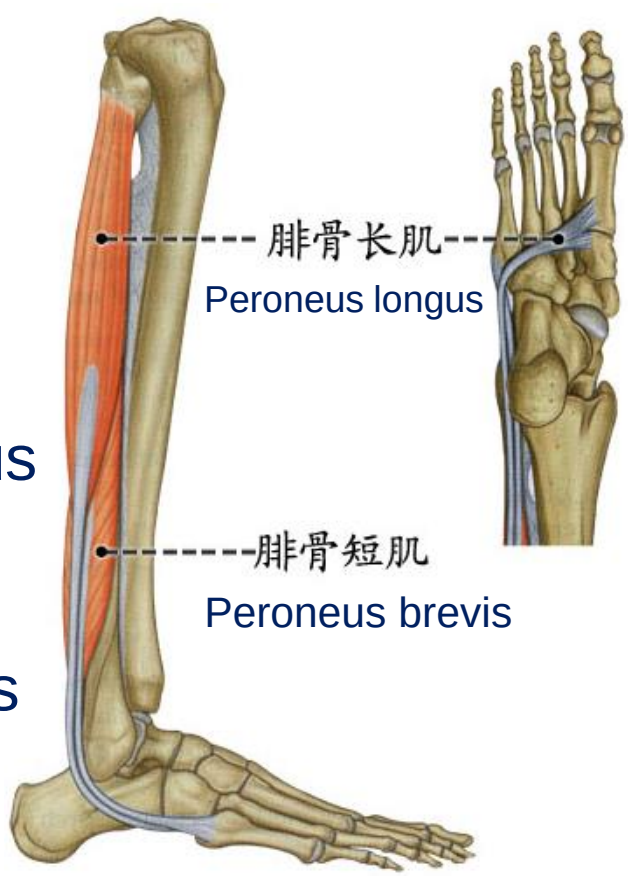
2 muscles

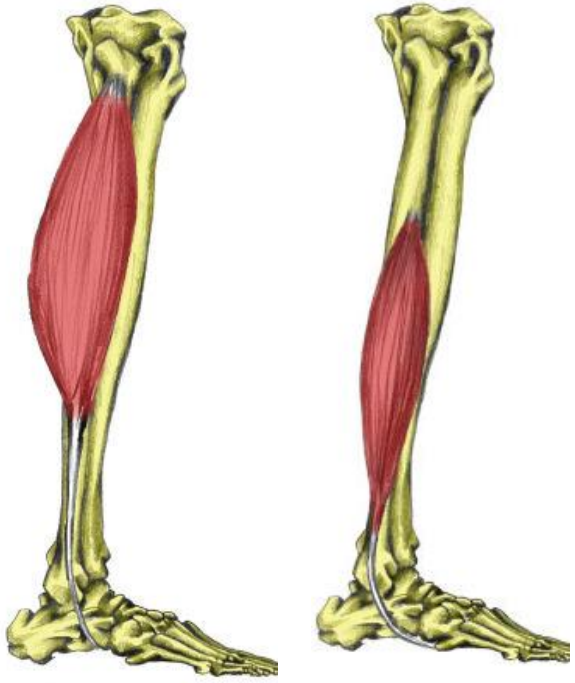
1、Sup.layer

Peroneus longus

2、Deep layer

Peroneus brevis





Peroneus longus
腓骨长肌（浅层）

Peroneus brevis
腓骨短肌（深层）

Actions : acting together ,they flex and evert the ankle joint.The peroneus longus with the tibialis anterior helps to maintain the transverse and lateral longitudinal arches of the foot

Posterior muscular group of the leg-4

Superficial layer

小腿三头肌 triceps surae

1-Gastrocnemius 腓肠肌

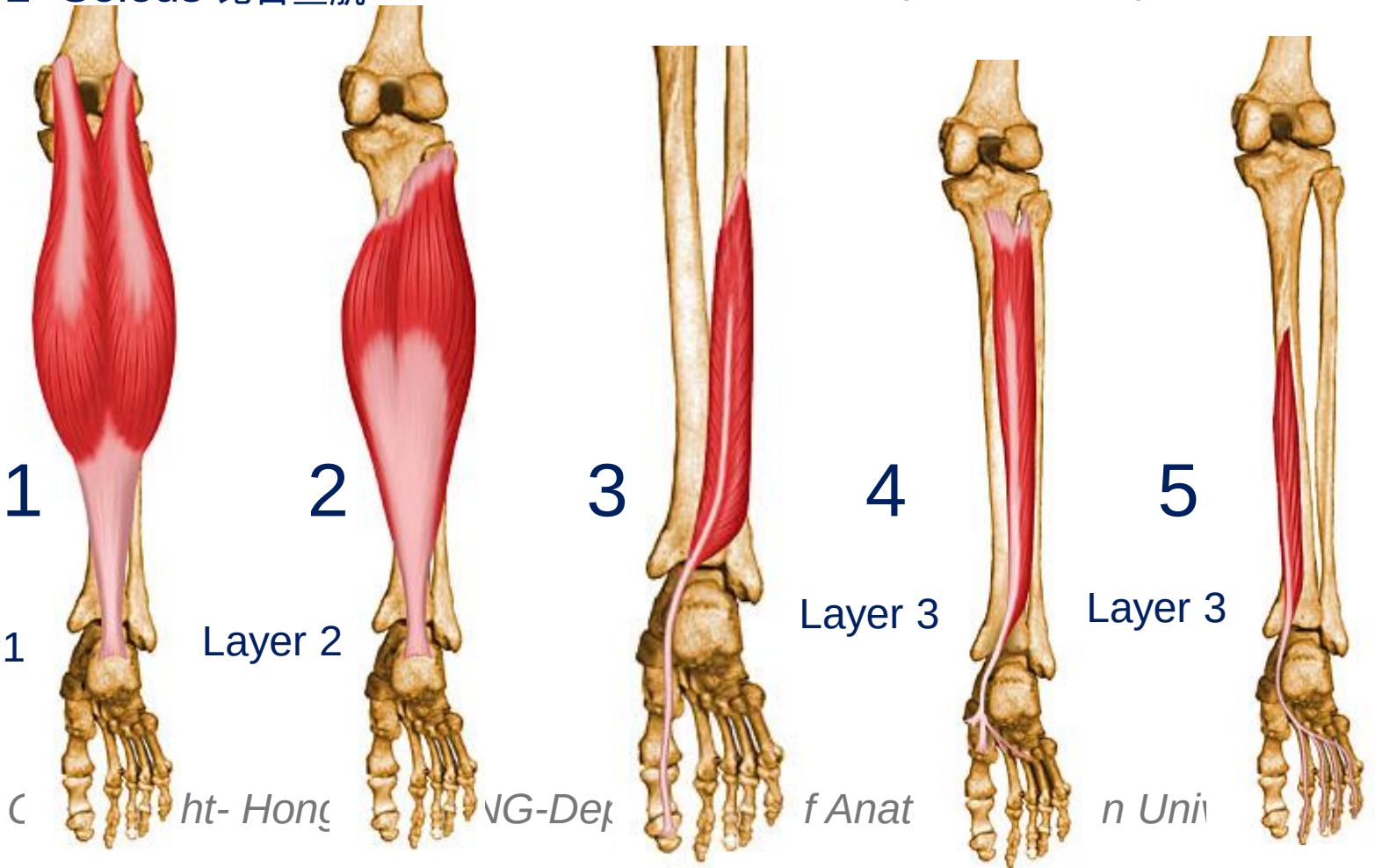
2- Soleus 比目鱼肌

Deep layer

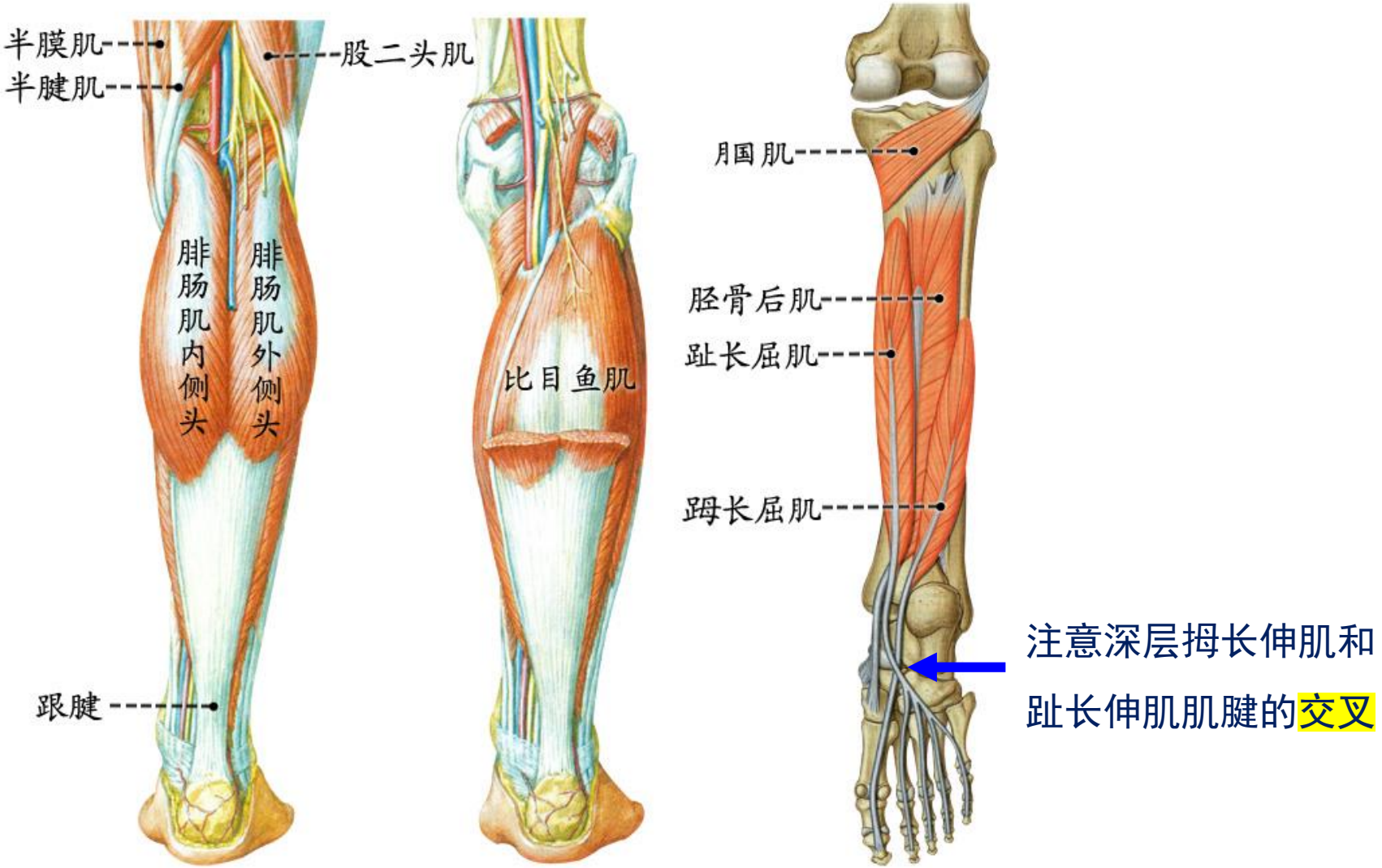
3-Flexor hallucis longus 拇长屈肌

4-Tibialis posterior 胫骨后肌

5-Flexor digitorum longus 趾长屈肌



Posterior muscular group of the leg-4



Origins & insertions of lower limb muscles

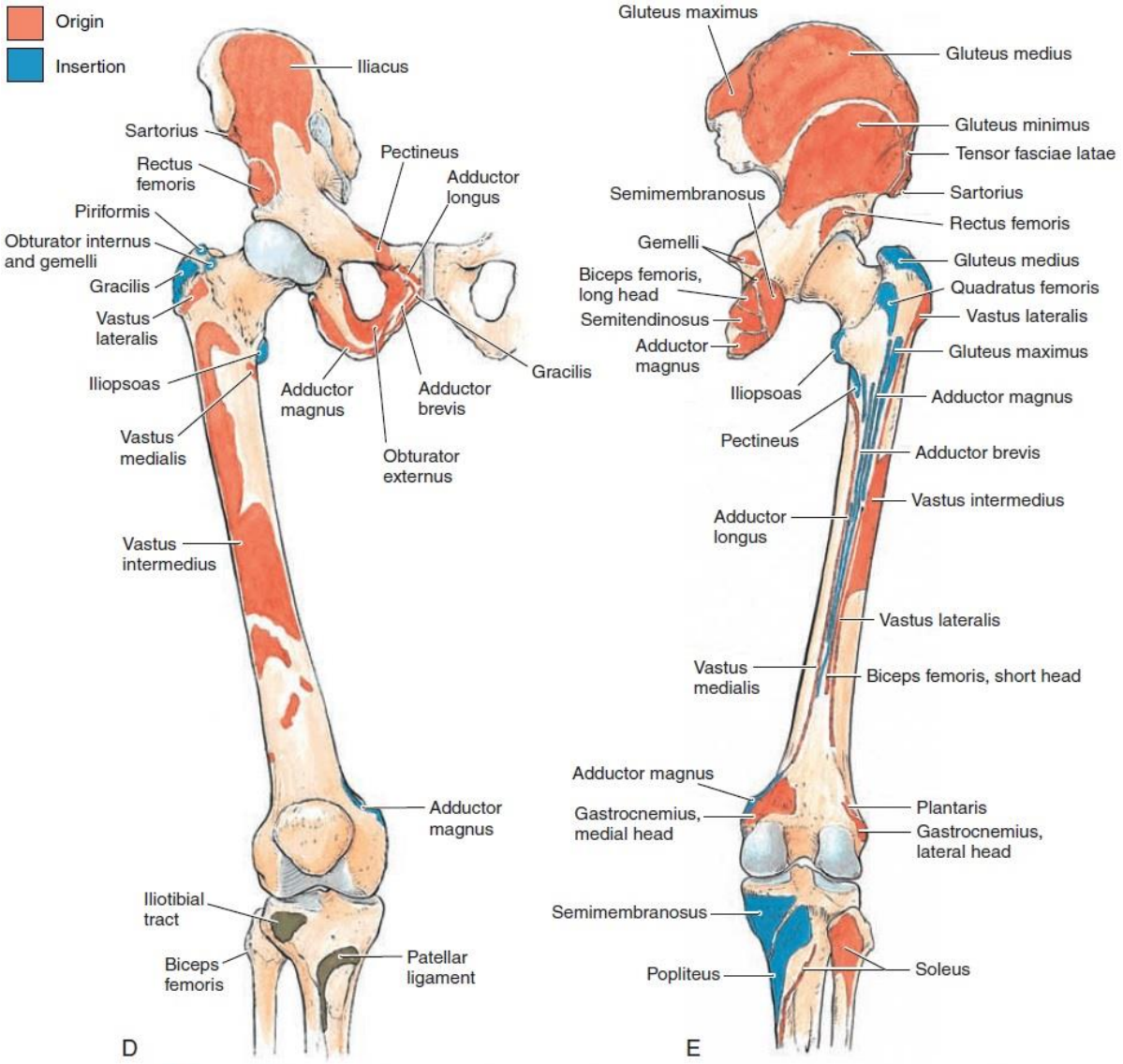


FIGURE 4.33., cont'd Muscles That Move the Thigh. **D,** Hip Bone, Showing Origin and Insertion of the Muscles (Anterior View); **E,** Hip Bone, Showing Origin and Insertion of the Muscles (Posterior View)

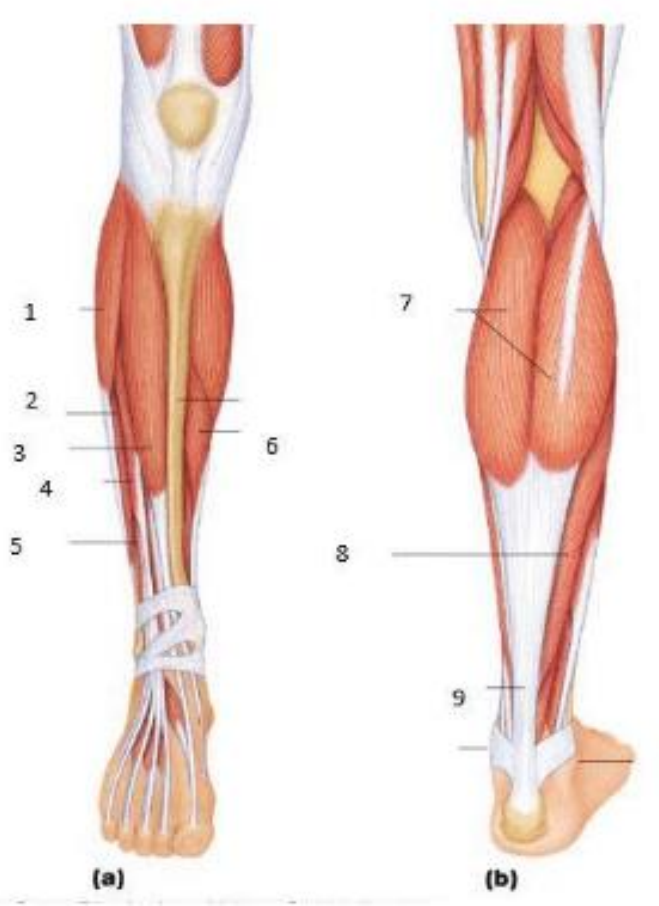
小腿肌肉顺口溜

小腿三群缺乏内

胫前趾长拇长伸

外侧腓骨长短肌

后有三头深前屈



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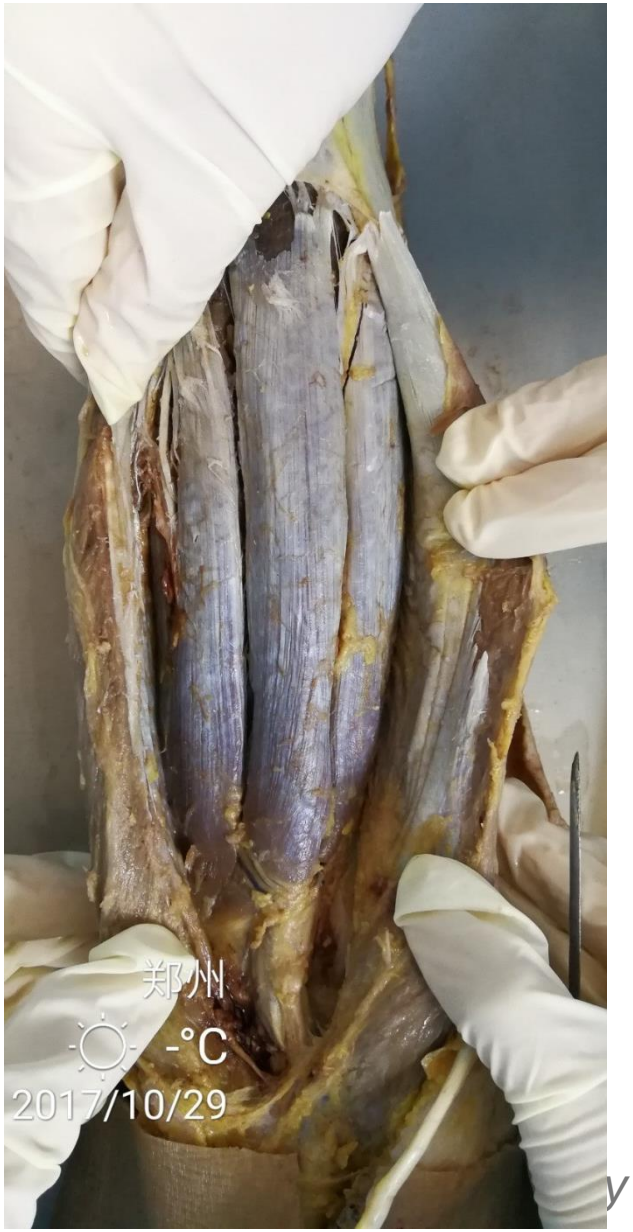
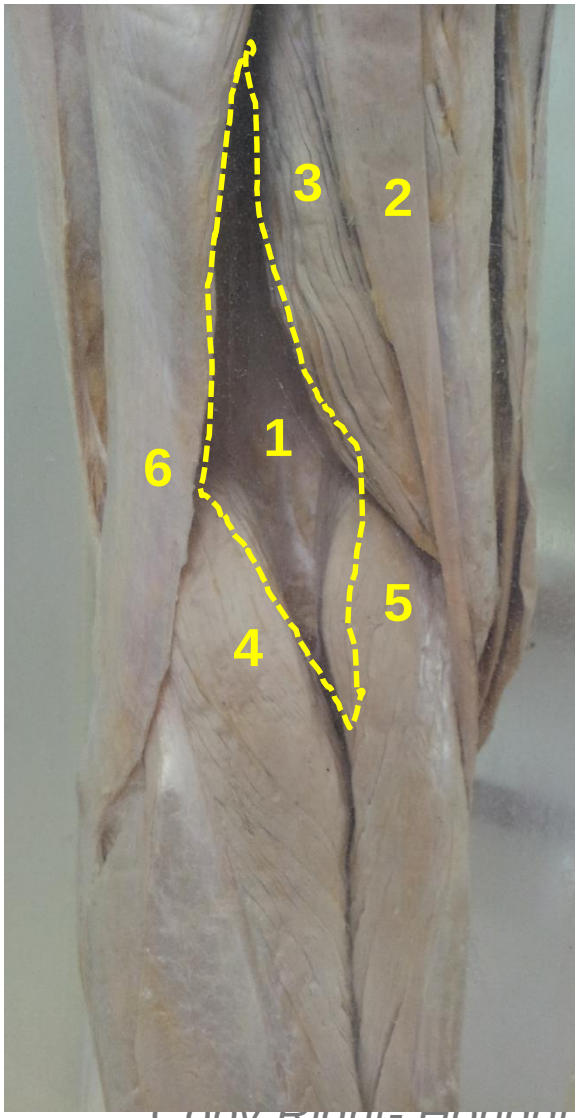
Clinical significance of lower limb muscles

1. 阔筋膜张肌位置表浅，有恒定的血供和神经支配，切取后对功能影响不大，为临床常用的肌皮瓣或髂胫束供体。
2. 股薄肌位置表浅，为带状长肌，是内收肌群中比较薄弱的肌，切除后对功能影响不大，为临床常用的移植肌瓣的供体，用于修复肛门括约肌。
3. 半腱肌也是一块适合做移植肌瓣或肌皮瓣的良好供肌，临床常用与覆盖修补臀部压疮或外伤缺损。

分叶状比目鱼肌 Lobulated soleus



Popliteal fossa 腘窝



1. Popliteal fossa 腘窝
2. Semitentinosus 半腱肌
3. Semimembranosus 半膜肌
4. Lat.head of gastrocnemius
   腓肠肌外侧头
5. Med.head of gastrocnemius
   腓肠肌内侧头
6. Long head of biceps femoris
   股二头肌长头

Contents in fossa
Tibial nerve
Popliteal vein
Popliteal artery

小腿肌的起止及功能

	Name	Origin	Insertion	Action
小腿三头肌	胫骨前肌	胫骨腓骨上端及骨间膜前面	内侧楔骨内面、第一跖骨底	足背屈、内翻
	拇长伸肌		足拇指末节趾骨底	足背屈、伸足拇指
	趾长伸肌		第2-5趾趾背腱膜，止于第5跖骨底者是第三腓骨肌	伸2-5趾，足背屈
	腓骨长肌	腓骨外侧	内侧楔骨、第1跖骨底	足跖屈、外翻
	腓骨短肌		第5跖骨粗隆	
	腓肠肌	内侧头：股骨内上髁 外侧头：股骨外上髁	经跟腱止于跟骨结节	屈膝关节，足跖屈
	比目鱼肌	胫腓骨上端		足跖屈
	腘肌	股骨外侧髁外侧面上缘	胫骨比目鱼肌粗线以上骨面	屈膝、内旋小腿
	趾长屈肌	胫腓骨后面及骨间膜	第2-5趾远节趾骨底	足跖屈、屈第2-5趾骨
	胫骨后肌		足舟骨粗隆，内侧、中间和外侧楔骨	足跖屈、内翻
	拇长屈肌		拇指远节趾骨	屈足拇指、足跖屈

The muscle of foot

Similar in name and number to those of the hand.

Three groups:

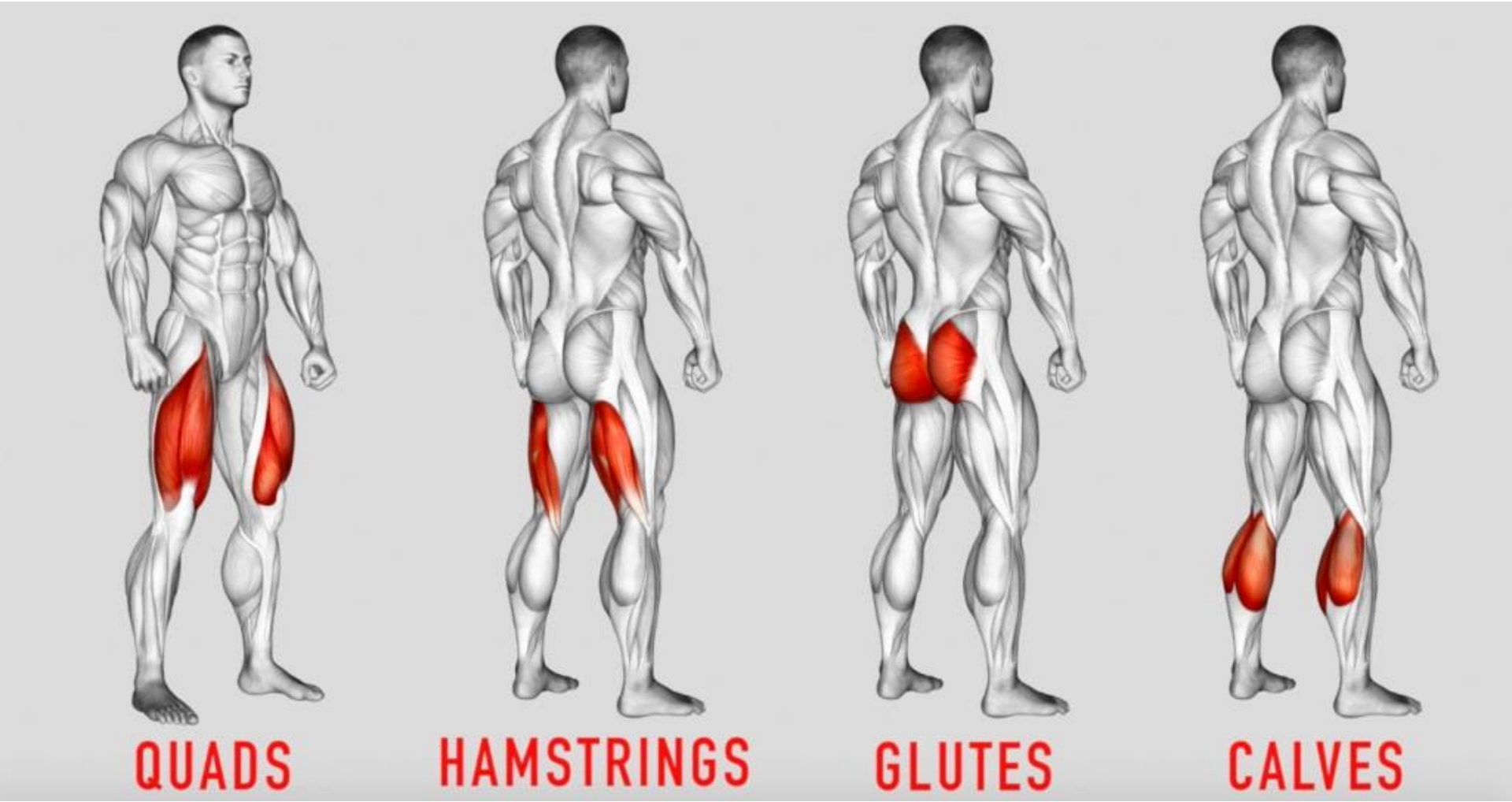
Medial group-movement of 1st toe

Intermediate group-movement of 2nd-5th toe

Lateral group-movement of 5th toe

The foot is adapted to provide support while bearing body weight rather than to grasp objects. The plantar muscles are grouped into four layers. But these are difficult to associate, even in dissection, the muscles function either to move the toes or to support the arches of the foot through their contraction. because of their complexity the muscles of the foot will be presented only in illustration.

The important muscle of lower limb



Important English words

1. Iliopsoas 髂腰肌
2. Iliacus 髂肌
3. Psoas major 腰大肌
4. Iliotibial tract 髂胫束
5. Tensor fasciae latae 阔筋膜张肌
6. Gluteus maximus 臀大肌
7. Piriformis 梨状肌
8. Obturator internus 闭孔内肌
9. Sartorius 缝匠肌
10. Quadriceps femoris 股四头肌
11. Vastus medialis 股内侧肌
12. Rectus femoris 股直肌
13. Adductor magnus 大收肌
14. Adductor longus 长收肌
15. Adductor brevis 短收肌
16. Gracilis 股薄肌
17. Pectineus 耻骨肌
18. Biceps femoris 股二头肌
19. Semitendinosus 半腱肌
20. Semimembranosus 半膜肌
21. Extensor digitorum longus 趾长伸肌
22. Extensor hallucis longus 拇长伸肌
23. Tibialis anterior 胫骨前肌
24. Triceps surae 小腿三头肌
25. Gastrocnemius 腓肠肌
26. Soleus 比目鱼肌
27. Flexor digitorum longus 趾长屈肌
28. Flexor hallucis longus 拇长屈肌
29. Popliteal fossa 腘窝
30. Peroneus brevis 腓骨短肌

The important contents today

- Understand the name, position and action of the muscles of the hip.
- Master the name, position and action of the muscles of the thigh.
- Master name, location and function of the muscles of the leg.
- Understand grouping of the muscles of the foot

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The story about the Achilles' heel

跟腱与阿喀琉斯之踵

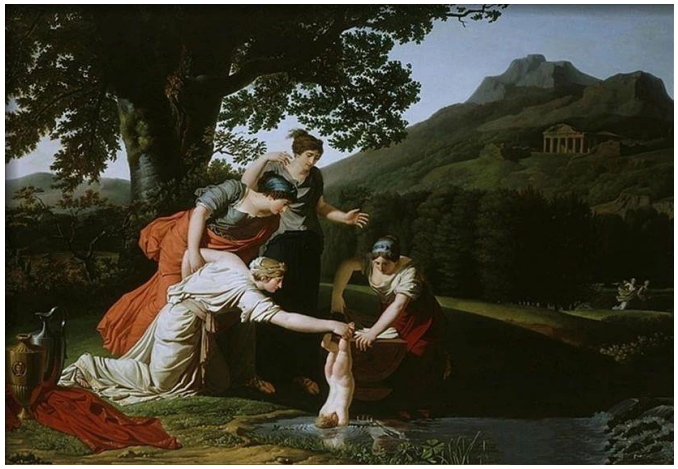
相信很多人对“阿喀琉斯之踵（Achilles' heel）”非常熟悉了，这个词儿通常被用来形容致命的弱点、要害。而Achilles tendon是跟腱的英文名。

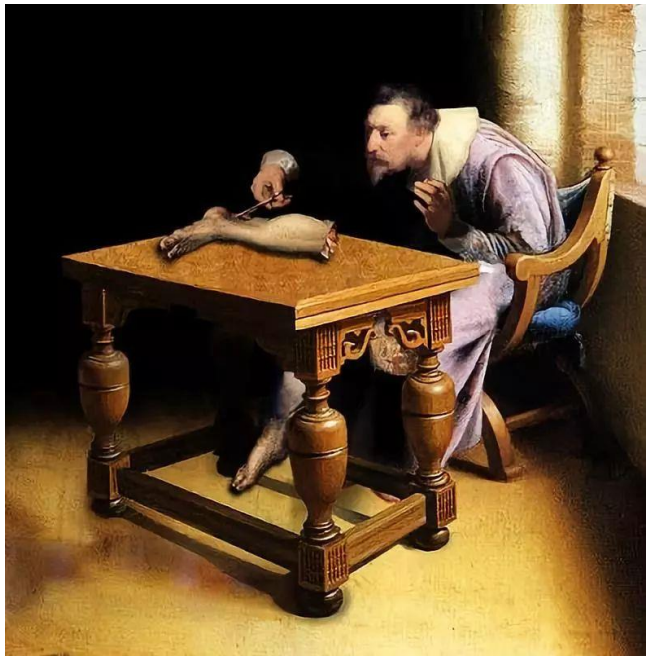
阿喀琉斯被称为希腊第一勇士。他一出生就被母亲倒提着脚后跟浸泡到冥河中，近乎全身刀枪不入。只是阿喀琉斯的脚后跟因为露在了外面，所以成了他唯一的弱点。在特洛伊战争中，阿喀琉斯被特洛伊的王子一箭射中脚后跟而身亡。

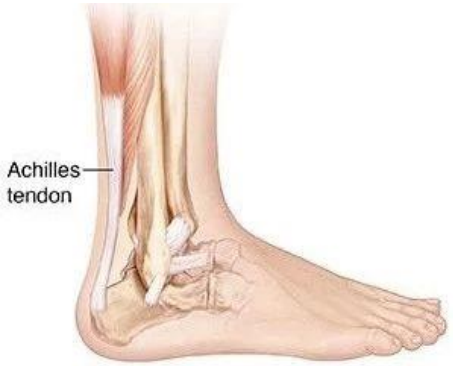
Achilles被用于指代跟腱，最早出现在1693年。当时，弗兰德（今在比利时）的解剖学家Philip Verheye在他的著作中，首次用拉丁文chorda Achillis指代跟腱[4]。

相传[1]，Philip Verheye为了医学放弃了神学，得到的惩罚是自己的左腿被截肢，但是，他把断肢保留了下来，还进行了解剖，然后就有了用 chorad Achillis 命名跟腱的灵感

后来，德国的解剖学家Lorenz Heister在1717年的著作中首次用拉丁文tendo Achillis指代跟腱[5]。在这之后，Achilles tendon就被许多18世纪的解剖学家用来指代跟腱了，这个名词也被保留至今。







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