Systematic Anatomy
(For international students)

Department of Anatomy, Fudan University

Teaching contents
Muscles of lower limbs

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The muscles of the lower limb
Muscle of the Anterolateral abdominal wall

1-External oblique
2-Internal oblique
3-Rectus abdominis
4-Transversus abdominis

The direction of muscular fiber

Anterolateral abdominal wall, H section
Rectus sheath - Cross section above arcuate line

1. Skin
2. Subcutaneous tissue
3. External oblique m
4. Internal oblique m
5. Transversus abdominis m
6. Extraperitoneal fascia
7. Transverse fascia
8. Peritoneum
9. Anterior layer of rectus sheath
10. Rectus abdominis muscle
11. Posterior layer of rectus sheath
12. Linea alba
13. Appneurosis of external oblique m
14. Appneurosis of internall oblique m
15. Appneurosis of transversus abdominis m

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Posterior group of abdominal muscle

Psoas major

- introduce in lower limb muscle

Quadratus lumborum

A roughly quadrilateral thick muscle

In between 12th rib and iliac crest

Fixes and lowers the 12th rib,
acting alone, bends the trunk toward the same side
Muscles of Upper Limb

Ms of shoulder
  { Superficial layer 1
    Deep layer 5
  
Ms of arm
  { Anterior group 3
    Posterior group 1
  
Ms of forearm
  { Anterior group 9
    Posterior group 10
  
Ms of hand
  { Lateral group 4
    Intermediate group 11
    Medial group 3
  
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**Muscle of the shoulder-pectoral girdle**

**Superficial layer 1**
- Deltoid m

**Deep layer 5**
- 1-Supraspinatus
- 2-Infraspinatus
- 3-Teres minor
- 4-Teres major
- 5-Subscapularis
Anterior muscular group of arm

Superficial and deep layer, three muscles

- Superficial layer:
  - Coracobrachial muscle
  - Biceps brachii

- Deep layer:
  - Brachial muscle
Feature of ant. muscular group of forearm

- Most muscles originate from medial epicondyle, attach to wrist and finger.
- Brachioradial muscle is the muscle of landmark
- Their action: flexes the wrist, finger, & pronation
Feature of posterior muscular group of forearm

10 muscle in posterior muscular group of forearm

- Most muscles originate from lateral epicondyle, attach to wrist and finger.
- We often recognize them according their insertions.
- Their action: extends the wrist and finger and supination.
Muscle of the hand

Thenar (lateral group) 4 — movement of the thumb
Intermediate group 11 — movement of 2-5 finger
Hypothenar (medial group) 3 — movement of 5th finger
Muscle of the lower limb

- **Hip muscle** (pelvic girdle)
  - Anterior group,
  - Posterior group

- **Muscle of thigh**
  - Anterior group
  - Posterior group
  - Medial group

- **Muscle of leg**
  - Anterior group
  - Posterior group
  - Lateral group

- **Muscle of foot**
  - Dorsal muscle
  - Sole muscle
Hip muscle

Anterior group

Iliopsoas

Tensor fasciae latae

Posterior group

Gluteus maximus

Gluteus medius

Gluteus minimus

Piriformis

Obturator internus

Iliacus

Psoas major
Iliopsoas m & tensor fasciae latae

Iliacus

Psoas major

Origin: transverse process of lumbar vertebrae and iliac fossa
Insertion: lesser trochanter of femur

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.
**Tensor fasciae latae**

**Position:** On the lateroanterior side of the thigh.

**Origin:** ant, sup. iliac spine is enclosed within the fascia lata.

**Attach:** to the iliotibial tract and insert into the lateral condyle of the tibia.

**Actions:** tense the fasciae latae flexes (and abducts) the hip.
Posterior group of hip muscle

1- Gluteus maximus
2- Gluteus medius
3- Gluteus minimus
4- Piriformis
5- Obturator internus
Posterior group of hip muscle

1-Gluteus maximus
2-Gluteus medius
3-Gluteus minimus
4-Poriformis
5-Obturator internus

6 Gemellus sup.
7 Gemellus inf.
The action of the post.muscular group of the hip

Gluteus maximus
It is powerful extensor of the thigh, the most powerful lateral rotator
Gluteus medius
Abducts and rotates the thigh
Gluteus minimus
Abducts and its anterior fibers can medially rotate the thigh
Poriformis
Lateral rotate and abduct the hip joint
Obturator internus
Lateral rotate the hip joint
Various injections in human body

1. Intradermal injection – inject medicine into skin.
2. Subcutaneous injection – inject medicine into subcutaneous tissue.
3. Intramuscular injection – inject medicine into muscle.
   actually many regions could be chosen.
4. Intravenous injection – inject medicine into vein.
5. Intraarterial injection – inject medicine into artery.
6. Intracardiac injection – inject medicine into the heart.
Intramuscular injection of hip

Intramuscular injection of shoulder

Safe Area
upper outer quadrant

sciatic nerve

buttock
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
Anterior group of the thigh

Sartorius

Quadriceps femoris (with four heads)

1 - Vastus lateralis
2 - Vastus medialis
3 - Rectus femoris
4 - Vastus intermedius

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.
Medial group of the thigh muscles

1- Pectineus
2- Adductor longus
3- Gracilis
4- Adductor brevis
5- Adductor magnus
Medial group act to adduct, flex and laterally rotate the thigh.

The gracilis can adduct the hip joint and flex the knee joint.
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.
1. Popliteal fossa
2. Semitentinosus
3. Semimembranosus
4. Lat. head of gastrocnemius
5. Med. head of gastrocnemius
6. Long head of biceps femoris
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
2-Extensor digitorum longus
3-Extensor hallucis longus

Action:
All the muscles can dorsiflex the ankle joint, in addition, the tibialis anterior can invert the foot. The extensor hallucis longus extends the big toe and the extensor digitorum longus extends the other toes.
lateral muscular group of the leg

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.
Deep layer
3- Flexor hallucis longus
4- Tibialis posterior
5- Flexor digitorum longus

Superficial layer
1- gastrocnemius
2- soleus
posterior muscular group of the leg
The muscle of foot

Similar in name and number to those of the hand.

Three groups:
Medial group - movement of 1\textsuperscript{st} toe
Intermediate group - movement of 2\textsuperscript{nd}-5\textsuperscript{th} toe
Lateral group - movement of 5\textsuperscript{th} 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 contents today

◆ understand the name, position and action of the muscle 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 muscle of the foot
See you next time!

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