

Overview of Muscle Tissue

- **Skeletal**-Muscle fibers are the longest of muscle types; striations; voluntary; somatic movement; adaptable.
- **Cardiac**-Constitutes bulk of heart walls; striated; involuntary; pacemaker sets contractions.
- **Smooth muscle**-Found in walls of visceral organs, forces fluids/substances through internal body channels; nonstriated; involuntary.

Muscle Functions

- **Producing movement**-Skeletal muscle is responsible for all somatic movements & manipulation; cardiac muscle courses blood through vessels; smooth muscle-peristaltic actions
- **Maintaining posture**-Continuously defying gravity via constant adjustments
- **Stabilizing/strengthen joints**
- **Generation of heat**-Skeletal muscle contractions responsible for heat production.

Skeletal muscle functions

- Produce somatic movements
- Maintain body posture/position
- Reinforce soft tissue-anterior/posterior walls/pelvic floor
- Guard entrances/exits-orifices of alimentary/urinary tracts
- Regulation of body temperature-heat loss by muscle contractions

Gross Anatomy of Skeletal Muscles

- **Epimysium**-dense CT surrounds entire muscle; blends with deep fascia.
- **Perimysium and fascicles**-fibrous CT surrounding bundles of fibers.
- **Endomysium**-sheath of CT surrounding muscle fiber.
- *CT coverings contributes to muscle tissue elasticity*

Nerve and Blood Supply

- *Normal activity of skeletal muscle dependant on nerve/blood supply*
- *Each muscle is served by one nerve, artery & vein*
- *Nerves penetrate CT septa; each fiber supplied with nerve ending (myoneural junction)*

Nerve and Blood Supply

- *Muscle requires large amount of energy*
- *Extensive blood supply delivers O₂ & nutrients for ATP production*

Attachments

- Movable **insertion** moves towards immovable **origin**.
- **Direct attachment**-epimysium fused to periosteum/perichondrium.
- **Indirect attachment**-epimysium extends beyond muscles as sheet like aponeurosis; anchors muscle to bone, cartilage or fasciae of other muscles.

Microscopic Anatomy of Skeletal Muscle

- Muscle fiber is long, cylindrical, oval multinuclear myocyte; sarcolemma
- Sarcoplasm contains glycosomes.
- Myoglobin-red pigment
- Myofibril-account for 80% of cellular volume.

Tendons and Aponeuroses

- Tendon-fusion point of collagen fibers of endo-, peri-, and epimysium that attach muscle to bone, skin, or another muscle; resemble thick cords or cables
- Aponeuroses-Formation of thick, flattened sheets.

Naming Skeletal Muscles

- **Location**-temporalis, intercostals
- **Shape**-deltoid, trapezius
- **Relative size**-maximus, minimus, longus, brevis
- **Direction**-rectus, oblique
- **Number of origins**-biceps, triceps
- **Location of attachments**-origin first/sternocleidomastoid
- **Action**-flexor, extensor, adductor.

Arrangement of Skeletal Muscle Fibers

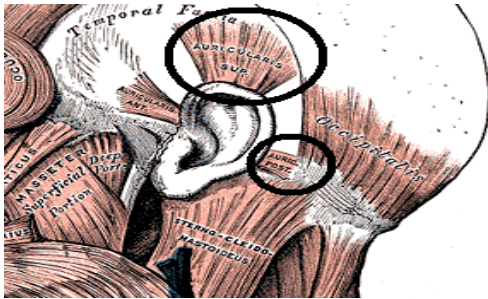
- **Circular**-orbicularis oris
- **Convergent**-pectoralis major
- **Parallel**-sartorius
- **Unipennate**-extensor digitorum longus
- **Multipennate**-deltoid
- **Fusiform**-biceps
- **Bipennate**-rectus femoris

The Axial Musculature

- The axial musculature is involved in moving the head and spinal column.
- Categorized into five groups: (1) muscles of the head; (2) muscles of neck & vertebral column; (3) muscles of the thorax; (4) muscles of the abdominal wall; (5) muscles of the pelvic floor/perineum

Cephalic muscles

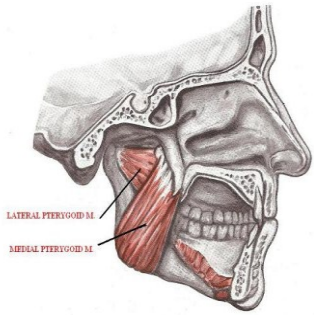
- Scalp
Epicranius-frontalis/occipitalis
- Facial
Orbicularis oculi
Zygomaticus
Risorius
Orbicularis oris
Buccinator
Platysma



Gray's Anatomy

Cephalic Muscles (cont'd)

- Mastication
Temporalis
Medial/lateral pterygoids
Buccinator
- Tongue movements
Genioglossus



Neck & Vertebral Column

- Neck
 - Sternocleidomastoid*
 - Scalenes*
- Vertebral Column
 - Erector Spinae-spinalis, longissimus, iliocostalis*
 - Semispinalis*
 - Quadratus lumborum*

Muscles of the Thorax

- *External intercostals*
- *Internal intercostals*
- *Diaphragm*

Muscles of the Abdominal Wall

- *Rectus abdominis*
- *External oblique*
- *Internal oblique*
- *Transversus abdominis*

Muscles of the Pelvic Floor

- *Levator ani (pubo-, iliococcygeus)*
- *Sphincter urethrae*
- *Ischiocavernosus*
- *Bulbospongiosus*

Appendicular Skeletal Muscles

- Involved in stabilization of pectoral & pelvic limbs.
- Accounts for 40% of skeletal muscle mass.

Pectoral Girdle Muscles/Upper Limbs

- 4 divisions
 1. Pectoral girdle positioning
 2. Brachium movement
 3. Antebrachium movement
 4. Hand/finger movement

Pectoral Girdle Positioning

- *Anterior Thorax*
 - Pectoralis minor*
 - Serratus anterior*
- *Posterior thorax*
 - Trapezius*

Brachium movement

- *Pectoralis major*
- *Latissimus dorsi*
- *Deltoid*
- *Subscapularis*
- *Supra-,infraspinatus*
- *Teres major, minor*
- *Coracobrachialis*

Antebrachium Movement

- Posterior aspect: extensors

Triceps

Anconeus

- Anterior aspect: flexors

Biceps brachii

Brachialis

Brachioradialis

Hand/Finger Movement

- Anterior aspect

Pronator quadratus, teres

Flexor carpi radialis, ulnaris

Palmaris longus

- Posterior aspect

Supinator

Extensor carpi radialis, ulnaris

Extensor digitorum

Intrinsic hand muscles

- *Thenar* (ball of thumb)
- *Hypothenar* (ball of little finger)
- *Midpalm* (lumbricals, interossei)

Pelvic Girdle Muscles and Lower Limbs

- Larger, stronger than pectoral limb muscles
- 3 groups: (1) Thigh movement; (2) Leg movement; (3) Foot & toe movement.

Thigh Movement

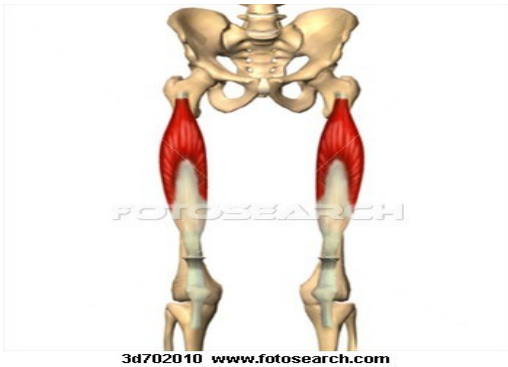
- Anterior compartment
 - Iliopsoas*
 - Sartorius*
- Medial compartment
 - Adductor magnus, longus, brevis*
 - Pectineus*
 - Gracilis*

Thigh Movement (cont'd)

- Posterior compartment
 - Gluteus maximus, medius, minimus*
 - Piriformis*
 - Obturator internus*
 - Gemellus*
 - Quadratus femoris*

Leg Movement

- Anterior thigh compartment
Rectus femoris
Vastus lateralis, medialis, intermedius
- Posterior thigh compartment
Biceps femoris
Semitendinosus
Semimembranosus



Foot & Toe Movement

- Anterior compartment
Tibialis anterior
Extensor digitorum longus
Extensor hallucis
- Lateral compartment
Peroneus longus, brevis

Foot & Toe Movement (cont'd)

- Posterior compartment

Gastrocnemius

Soleus

Flexor digitorum longus

Tibialis posterior

Flexor hallucis longus
