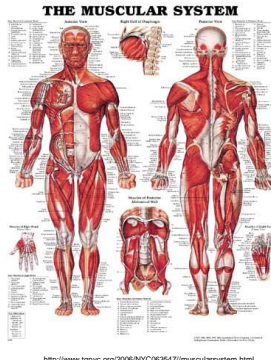


# Anatomy of the Muscular System

Chapter 9  
p. 275 – 281.5  
p. 289 (The Motor unit)  
Chapter 10  
Skip the lever system (p. 323-324)



<http://www.tqnyc.org/2006/NYC063547/muscularsystem.html>

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muscle (little mice) myo- mys- / sarco- (flesh)

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## Naming Skeletal Muscles

**Location of muscle**  
bone or body region – e.g. *temporalis*, *intercostal*

**Shape of muscle**  
eg: *deltoïd* (triangular), right & left *trapezius* muscles form a trapezoid

**Relative size of muscle:**  
maximus, minimus, longus, brevis – e.g. *gluteus maximus* & *gluteus minimus*

**Direction of muscle fibers:**  
e.g. *rectus* = straight, parallel to midline (*rectus femoris*)  
-*transversus abdominus*, *oblique*



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## Naming Skeletal Muscles

**Number of origins**  
Biceps (2 origins), triceps, quadriceps – eg: *biceps brachii*

**Location of muscle's origin and/or insertion**  
if both indicated, origin always indicated first–  
eg: *sternocleidomastoid*  
(neck region – dual origin on sternum and clavicle & insertion on mastoid process of temporal bone)



**Action of the muscle**  
flexor, extensor, adductor –  
eg: *adductor longus* for thigh adduction & *supinator* muscle in forearm

What can we say about the *extensor carpi radialis longus*???

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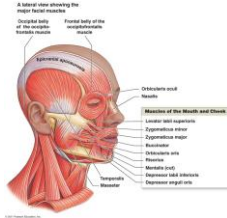
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## Muscles of the Head

Two groups

1. Muscles of facial expression
  2. Muscles of mastication and tongue movement
- insert into skin or other muscles, not bones
  - all are innervated by the **facial nerve**



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## Muscles of the Head

### Scalp

- Epicranius** = main muscle of scalp; bipartite muscle
  - Frontal belly (frontalis) raises eyebrows, wrinkles forehead
  - Occipital Belly (occipitalis) pulls scalp posteriorly



### Face/Facial expression

#### Orbicularis oculi

- surrounds rim of orbit
- protects eyes from light/injury – blinking, squinting, also draws eyebrows down

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## Muscles of the Head: Face/Facial Expression

#### Zygomaticus<sup>1</sup>

- zygomatic to corner of mouth:
- smiling muscle

#### Orbicularis oris<sup>2</sup>

- maxilla & mandible to muscle & skin around mouth
- closes, protrudes lips

#### Buccinator<sup>3</sup>

- mandible/maxilla to orb. oris
- deep to masseter – whistling, sucking; hold food in place when chewing; especially in nursing infants

#### Platysma<sup>4</sup>

- fascia of chest to mandible
- helps depress mandible;
- tenses skin of neck (shaving muscle)



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## Muscles of the Head- Mastication

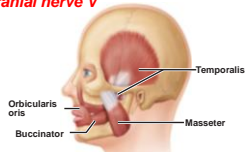
Four pairs involved in mastication

- Prime movers of jaw closure  
Temporalis and Masseter



- Grinding movements  
Medial and lateral pterygoids

all innervated by mandibular division of **cranial nerve V**



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## Muscles of the Head- Mastication

### Masseter

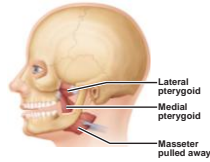
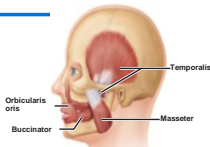
- zygomatic arch and zygomatic bone to angle and ramus of mandible
- prime mover of jaw closure (powerfully)

### Temporalis

- temporal fossa to coronoid process of mandible
- elevates and retracts mandible (closes jaw)
- maintains closed jaw at rest

### Medial and lateral pterygoid

- sphenoid to mandible
- additional jaw movements (e.g. side-to-side grinding movements)



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## Muscles of Head/Face

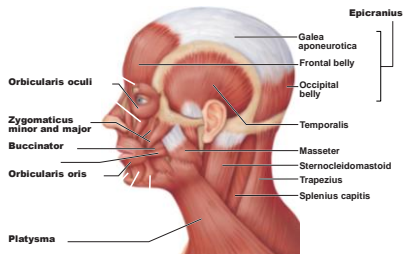


Figure 10.6 Lateral view of muscles of the scalp, face, and neck.

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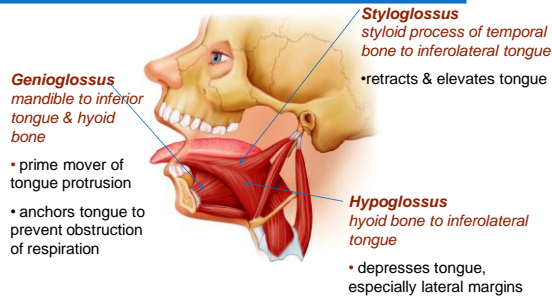
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## Muscles of the Head: Tongue Movement



**Genioglossus**  
mandible to inferior tongue & hyoid bone

- prime mover of tongue protrusion
- anchors tongue to prevent obstruction of respiration

**Styloglossus**  
styloid process of temporal bone to inferolateral tongue

- retracts & elevates tongue

**Hypoglossus**  
hyoid bone to inferolateral tongue

- depresses tongue, especially lateral margins

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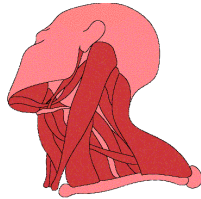
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## Muscles of the Neck & Vertebral Column- Head and Trunk Movements

- Two functional groups
  - Muscles that move the head
  - Muscles that extend the trunk and maintain posture



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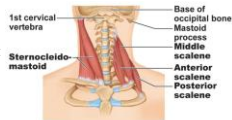
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## Muscles of the Neck & Vertebral Column- Head Movements

• head moved by muscles originating from axial skeleton

**Sternocleidomastoid:** manubrium/clavicle to mastoid process of temporal bone

- prime mover (both muscles) of head flexion (lift head when lying on back);
- individual muscle action for head rotation to side, head tilt

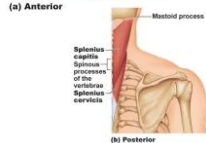


**Scalenes:** cervical vertebrae to 1<sup>st</sup> 2 ribs

- elevates first 2 ribs
- flexes & rotates neck
- role in coughing

**Splenius:** spinous process of vertebrae to mastoid process of temporal bone & occipital bone

- head extension (both sides)
- rotation, tilts head (one sided)



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## Muscles of the Neck & Vertebral Column- Trunk Extension

- Two functional groups
  - Muscles that move the head
  - Muscles that extend the trunk and maintain posture
    - extend, laterally flex and rotate the vertebral column, as well as rotate and extend the head

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## Muscles of the Neck & Vertebral Column- Trunk Extension

- Deep/ intrinsic back muscles
- trunk movements and back posture
  - form a broad, thick column extending from sacrum

**Erector spinae** (sacrospinalis) group—prime movers of back extension and lateral bending

- Iliocostalis
- Longissimus
- Spinalis

**Semispinalis** - extends vertebral column

**Quadratus lumborum**—synergists in extension and rotation



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## Muscles of the Neck & Vertebral Column- Trunk Extension

### Erector Spinae

- prime mover of back extension
- consists of 3 columns of muscles
  - **Iliocostalis 3 parts**
  - **Longissimus 3 parts**
  - **Spinalis 2 parts**
- provides resistance to bending forward
- extensors for return to erect position
  - unilateral action: lateral flexion - ribs and transverse processes.



(6)

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## Muscles of the Neck & Vertebral Column- Trunk Extension

### Semispinalis:

- Deeper, 3 parts
- composite muscle from thoracic region to head
- extends vertebral column & head,
- rotation of head
- synergistic with sternocleidomastoid muscles of opposite side




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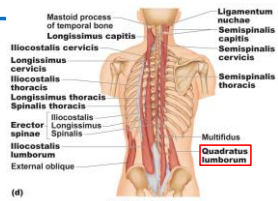
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## Muscles of the Neck & Vertebral Column- Trunk Movements

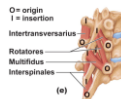
### Quadratus lumborum

- iliac crest to lumbar vertebrae
- individual muscles flex vertebral column laterally
- jointly they extend lumbar spine & fix 12<sup>th</sup> rib
- maintain upright posture



### Intervertebral muscles

- stabilize the spine
- synergize rotation and extension
- maintain upright posture



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## Muscles of the Thorax: Muscles of Respiration

### External intercostals

- More superficial muscles
- 11 pairs between ribs; oblique
- bottom of one rib to the top of the adjacent rib.
- pull ribs together to elevate rib cage for inspiration
- (1<sup>st</sup> ribs fixed by scalene muscles)

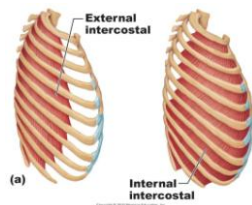


Fig. 10.10

### Internal intercostals

- Deeper muscles
- 11 pairs, between ribs; ⊥ external intercostals
- obliquely backwards from the bottom of one rib to the top of the adjacent rib
- draw ribs together to depress rib cage; aids forced expiration
- 12<sup>th</sup> ribs fixed by quadratus lumborum

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## Superficial muscles of the Posterior thorax

### Trapezius

occiput, ligamentum nuchae & vertebrae to clavicle & scapula (acromion & scapular spine)

- superficial
- stabilizes, raises, retracts, rotates scapula

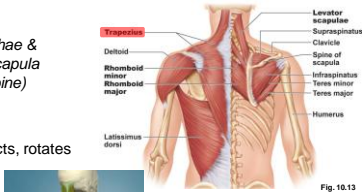


Fig. 10.13



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## Superficial muscles of Posterior thorax

### Rhomboids

vertebrae to scapula (vertebral border)

- deep to trapezius
- aid in scapula movements (adducts scapula and performs downwards rotation)
- e.g.: squaring shoulders, rotation when lowering arm

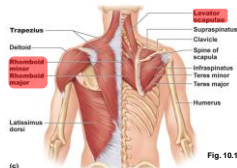
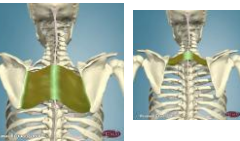


Fig. 10.13



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### Levator scapulae

C1-4 to medial border of scapula

- Elevates & adducts the scapula

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## Muscles Crossing the Shoulder Joint

**Nine muscles** cross the shoulder joint to insert on and move the humerus

Some originate off the scapula; others originate off the axial skeleton

Three are prime movers of the arm

- Pectoralis major<sup>1</sup>
- Latissimus dorsi<sup>2</sup>
- Deltoid<sup>3</sup>



Actions include flexion, extension, adduction, abduction, and rotation of humerus

- Four muscles are rotator cuff muscles
  - Supraspinatus<sup>4</sup>
  - Infraspinatus<sup>5</sup>
  - Teres minor<sup>6</sup>
  - Subscapularis<sup>7</sup>



- Reinforce the capsule of the shoulder
- Act as synergists and fixators

- Two additional muscles are synergists: coracobrachialis<sup>8</sup> and teres major<sup>9</sup>

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