

THE PECTORAL GIRDLE AND ARM

I. BONES OF THE PECTORAL GIRDLE AND ARM

A. The **pectoral girdle** refers to the incomplete circle of bones formed by the scapulae and clavicles attaching to the sternum (Fig. 7.1, p. 199 [186]). Use disarticulated bones and skeletons to study the following bones.

1. **Clavicle** (Fig. 7.29c, p. 226 [7.22a, p. 209]) You do not need to distinguish right from left.

Proximal end

Distal end

2. **Scapula** (Fig. 7.29a,b, p. 226 [7.24. p. 211]) Know right from left.

Acromion process

Coracoid process

Glenoid cavity

Lateral border

Inferior angle

Superior border

Supraspinous fossa

Spine

Medial border

Infraspinous fossa

B. The **arm** means only the “upper arm.” (Fig. 7.30, p. 227 [7.25, p. 212])

1. **Humerus** Know right from left.

Head

Deltoid tuberosity

Capitulum (“little head”)

Trochlea (“pulley”)

Medial epicondyle

Lateral epicondyle

Olecranon fossa (“Olecranon” means “elbow”)

C. Helpful tips for learning these bones

1. Below are names of “markings” of bones. See also page 17 of this *Lab Guide* for others. (Table 7.3, p. 201 [7.2, p. 187])

Border:	an edge of a bone
Cavity:	a hollow area of a bone
Epicondyle:	a rough bump above a joint where a muscle attaches
Fossa:	a shallow or hollow area of a bone
Head:	a more or less rounded end of a bone
Notch:	a small, smooth cut-out where another bone joins
Process:	a part that projects from a bone
Spine:	a sharp projection from a bone
Tuberosity:	a rough area of a bone where a muscle attaches

2. Bones “articulate” (join) with other bones to form the joints. Learn the following by observing a skeleton.

- a. The distal end of the clavicle articulates with the

_____ of the scapula.

- b. The proximal end of the clavicle articulates with the

_____.

- c. The head of the humerus articulates with the

_____ of the scapula.

3. Which is larger, the medial epicondyle or the lateral epicondyle? Use a humerus in lab or your own elbow to answer this:

_____. It is larger because it attaches the strong flexor muscles of the anterior forearm.

II. MUSCLES THAT MOVE THE PECTORAL GIRDLE AND ARM

A. Muscles that act on the **pectoral girdle** (Fig. 10.20, 10.21, pp. 339, 341 [11.19; 11.20, pp.335,337]) Use the torso models, including the orange torso model, to study these muscles. If an origin or insertion is included, you will usually be able to see it on the model.

- | | | |
|----|--|--|
| 1. | Pectoralis minor | Origin: Ribs
Insertion: Coracoid process
Actions (2): Depresses scapula and elevates ribs |
| 2. | Trapezius | Actions (4): Retracts, elevates, depresses scapulae; extends head |
| 3. | Rhomboideus major
Rhomboideus minor | Actions(2): Retract and fix scapula |

B. Muscles that act on the arm (Fig. 10.21, p. 341 [11.20, p. 337]) Use the torso models and upper limb models to study these muscles. Perform the actions as you learn them.

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|----|-------------------------|--|
| 1. | Deltoid | Origin: Clavicle and scapula
Insertion: Deltoid tuberosity
Actions (3): Abducts, flexes and extends arm |
| 2. | Pectoralis major | Origin: Clavicle and sternum
Insertion: Humerus
Actions (2): Adducts and flexes arm |
| 3. | Teres minor | Action: Laterally rotates arm |
| 4. | Teres major | Actions (2): Extends and medially rotates arm |
| 5. | Latissimus dorsi | Origin: Vertebral column
Insertion: Humerus
Actions(3): Adducts, extends, medially rotates arm |

C. Muscles that flex or extend the forearm (Fig.10.23, p. 344 [11.22, 11.23a-c, pp.

340,342]) Use the arm models to study these muscles.

- | | | |
|----|------------------------|--|
| 1. | Biceps brachii | Origin: Scapula
Insertion: Radial tuberosity*
Actions (2): Flexes and supinates forearm |
| 2. | Triceps brachii | Origin: Scapula and humerus
Insertion: Olecranon process of ulna*
Action: Extends forearm |
| 3. | Brachioradialis | Origin: Humerus
Insertion: Radius
Action: Flexes forearm |

* Studied with the bones of the forearm.

D. Reminder-- helpful tips for learning muscle origins, insertions, and actions

1. On the trunk origins are more medial; insertions are more lateral. On the limbs origins are more proximal; insertions are more distal.
2. Muscles cause movement by shortening (contracting), which pulls one bone toward or away from another bone. Notice the direction of the fibers of the muscle, which are the parts that shorten.
3. Muscles on the limbs usually cause movement of the part of the limb distal to their belly.
5. As you learn each muscle, draw your fingers slowly along the belly from the origin to the insertion. Say the name. Name the origin and name the insertion as you touch each end on the models or yourself. Then, perform the actions with your own muscles as you say the name of the actions aloud. In lab, use the models and your own muscles. At home, use your own muscles.
6. What does each name mean? Each name is meant to identify some characteristic of the muscle. Use these meanings as helps to remembering names.
7. Usually you can see the assigned origin and insertion on the models.

Optional notes on the bones and muscles of the pectoral girdle and arm

1. The clavicles are the most often fractured bone of the body, because they take the force of a fall broken with the upper limbs.
2. The **scapulae** (plural) are seldom fractured, due to their protected, "padded" position. The scapulae serve as the moveable attachment for muscles which move the arms.
3. A "shoulder separation" is an injury to the acromioclavicular (A-C) joint.
4. "Coracoid" means "crow-like." Can you see the crow whose beak is formed by the **coracoid process**?
5. The **humerus** is most often fractured between the **head** and the **deltoid process**.
6. Are you big-boned, medium-boned, or small-boned? One test for frame size is to measure the distance between the **medial epicondyle** and **lateral epicondyle**. Place your elbow on a piece of paper on a table and mark the distance between the epicondyles. Measure it. For men 5'8" to 5'11" tall, 2 3/4" indicates a small frame; 3" indicates a large frame. For women 5'4" to 5' 11" tall, 2 3/8" indicates a small frame; 2 5/8" indicates a large frame.¹ Also, compare the size of the **head of the ulna** of various students. Do you think that it is related to overall bone size?
7. The **teres minor** muscle of the posterior shoulder is part of the rotator cuff, or rotocuff muscles, which form a muscular support of the **humerus** in the shallow **glenoid cavity** of the **scapula**. Rotocuff muscles additionally perform a number of actions on the arm. Injuries to these muscles have sidelined many a pitcher and tennis player. See pages 340-341 for text and illustration of these muscles.
8. Pushups powerfully exercise the **deltoids**, **pectoralis majors**, and **triceps**. Try one to see why. The motion of rowing a boat exercises the **latissimus dorsi** muscles, because of the work involved in pulling the oars toward the body, which requires extension of the arms. Why do we need such positions or equipment to strengthen a muscle? In the anatomical position, gravity will extend and adduct the upper limb, so that the muscles do not need much to expend much effort.
9. "**Teres**" means shaped like a rounded tube--like a piece of hose. **Teres major, teres minor, and pronator teres** are all somewhat like flattened tubes.
10. Other Latin word meanings: **deltoid**--delta-shaped; **rhomboideus**--shaped like a rhomboid; **trapezius**--shaped like a trapezoid (kite-shaped); **latissimus**--very wide; **biceps**--two heads; **triceps**--three heads; **minor**-- small; **major**-- large.

Notes and Sketches

¹ Murray, M., and Pizzorno, J. (1998). *Encyclopedia of Natural Medicine*. Rocklin, CA: Prima Publishing, 62.

