

# **PHYE 281 - Applied Kinesiology**

## **Lecture 6**

### **The Elbow and Radioulnar Joints**

Kevin Petti, Ph.D.  
Department of Natural Sciences  
Health, Exercise Science and Nutrition  
San Diego Miramar College

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## **Objectives**

Identify the bones of the elbow and radioulnar joints

Identify specific anatomic landmarks on these bones

List the movements of the elbow and radioulnar joints

Identify the muscles of the elbow and radioulnar joints

Know the origin, insertion and action for each of the shoulder joint muscles

Master detailed kinesiological analysis of the elbow and radioulnar joints

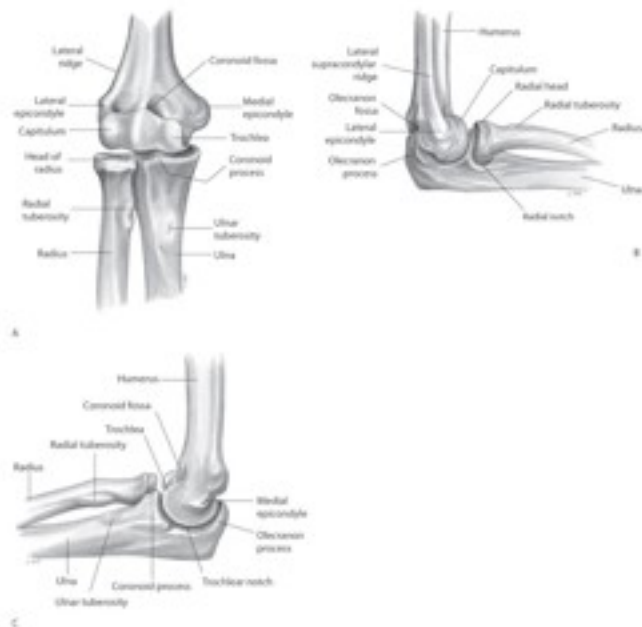
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# Bones of the Elbow and Radioulnar Joints

Humerus - distal epiphysis

Radius - proximal epiphysis

Ulna - proximal epiphysis



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# Humeral Landmarks

Medial epicondyle

Lateral epicondyle

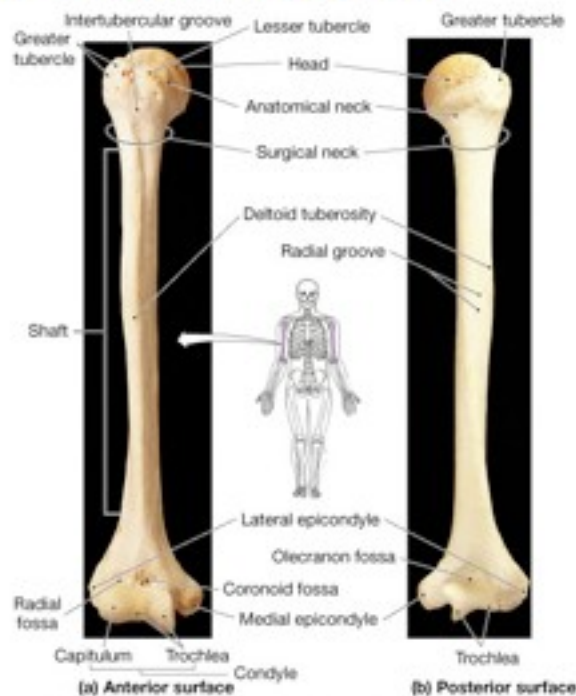
Capitulum

Trochlea

Coronoid fossa

Radial fossa

Olecranon fossa



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# Landmarks of the Radius and Ulna

Radius

Head

Neck

Tuberosity

Ulna

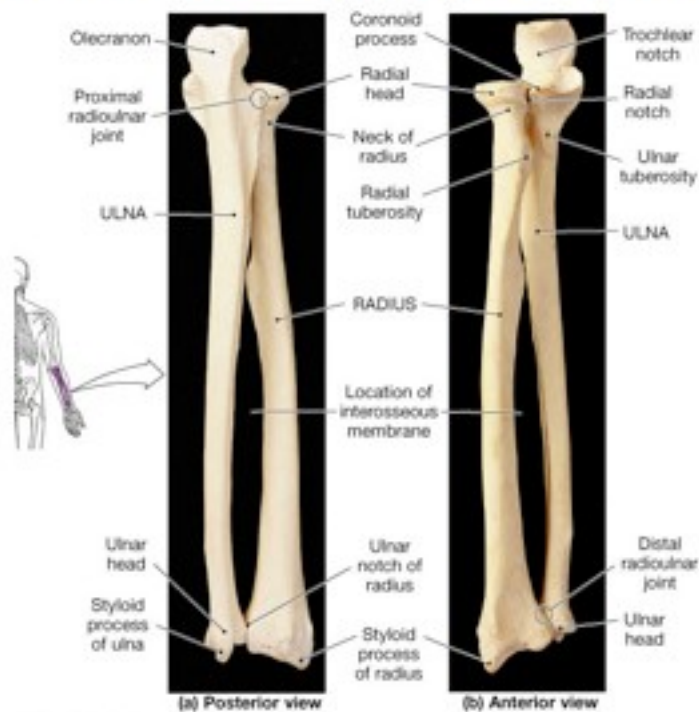
Trochlear notch

Olecranon process

Coronoid process

Tuberosity

Radial notch



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## The Elbow Joint

Hinge joint - allows only flexion and extension

Trochlea of humerus articulates with the trochlear notch of the ulna

Capitulum of humerus articulates with the head of the radius

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# Elbow Joint Movements

Flexion

Extension



Flexion



Extension

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# Radioulnar Joint Movements

Pronation

Supination



Pronation



Supination

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# Elbow Joint Muscles

## Elbow joint flexors

Biceps brachii

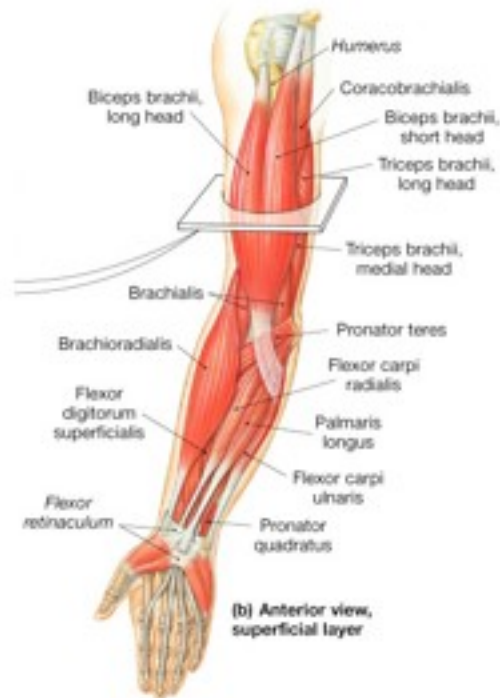
Brachialis

Brachioradialis

## Elbow joint extensors

Triceps brachii

Anconeus



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# Biceps Brachii

## Origin

Long head - Supraglenoid tubercle of scapula

Short head - Coracoid process of scapula

## Insertion

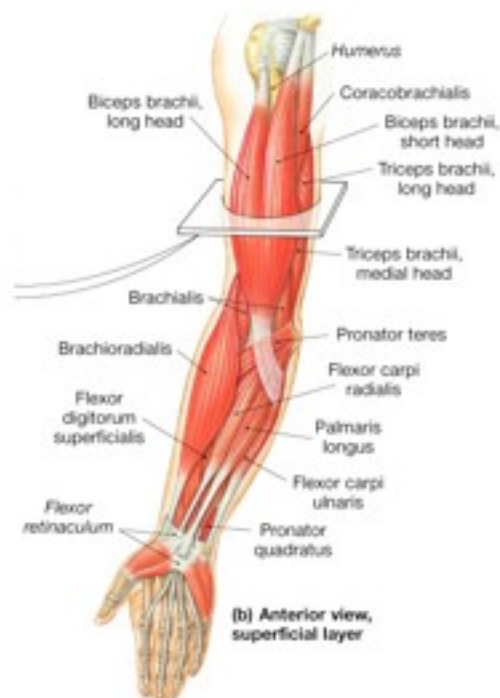
Radial tuberosity

## Action

Elbow joint flexion

Shoulder joint flexion

Radioulnar joint supination



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# Brachialis

## Origin

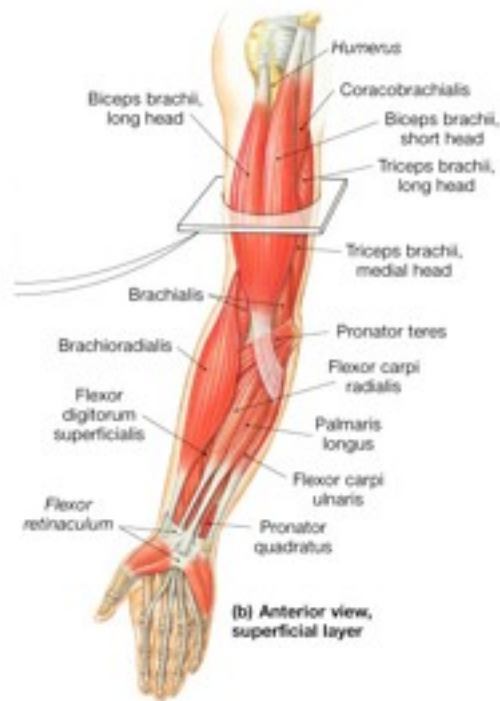
Distal, anterior humeral diaphysis

## Insertion

Ulnar tuberosity

## Action

Elbow joint flexion



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# Brachioradialis

## Origin

Distal, lateral humeral diaphysis

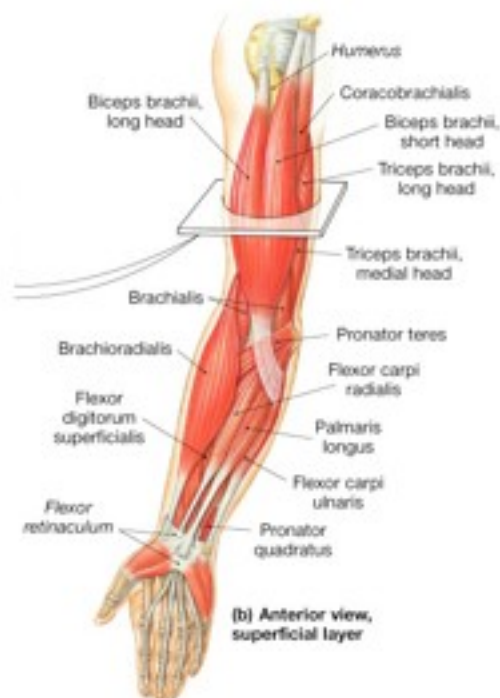
## Insertion

Lateral, distal radius at styloid process

## Action

Elbow joint flexion

Radioulnar pronation and supination to midposition



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# Triceps Brachii

## Origin

Long head - Infraglenoid tubercle of scapula

Lateral head - Proximal, posterior humerus

Medial head - Distal, posterior humerus

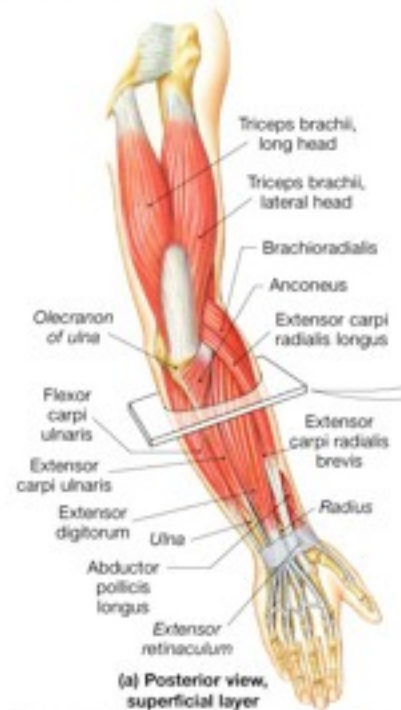
## Insertion

Olecranon process of ulna

## Action

Elbow joint extension

Shoulder joint extension (long head only)



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# Anconeus

## Origin

Posterior lateral epicondyle of humerus

## Insertion

Posterior, lateral olecranon process of ulna

## Action

Elbow joint extension



(d) Posterior view, deepest layer

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# Radioulnar Joint Muscles

## Pronators

Pronator teres

Pronator quadrates

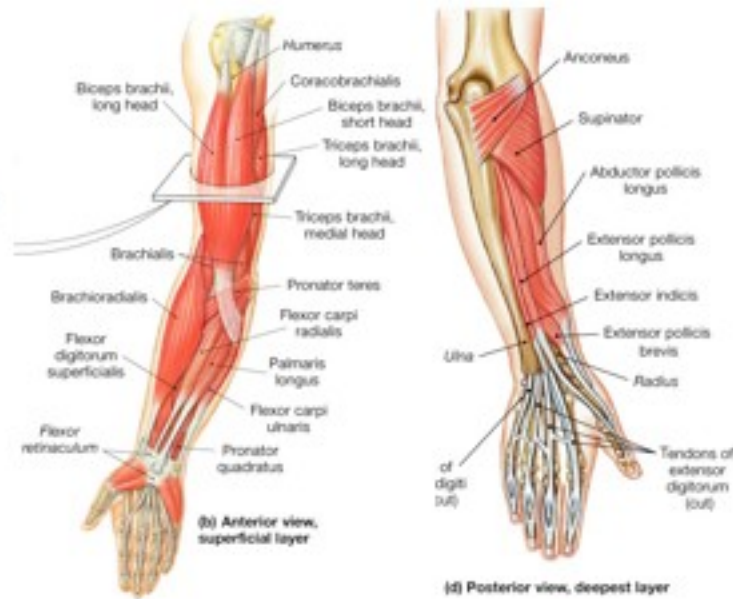
Brachioradialis

## Supinators

Biceps brachii

Supinator

Brachioradialis



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# Pronator Teres

## Origin

Anterior aspect of  
medial epicondyle of  
humerus

## Insertion

Lateral radius at  
mid-diaphysis

## Action

Radioulnar pronation

Weak elbow flexion



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# Pronator Quatratus

## Origin

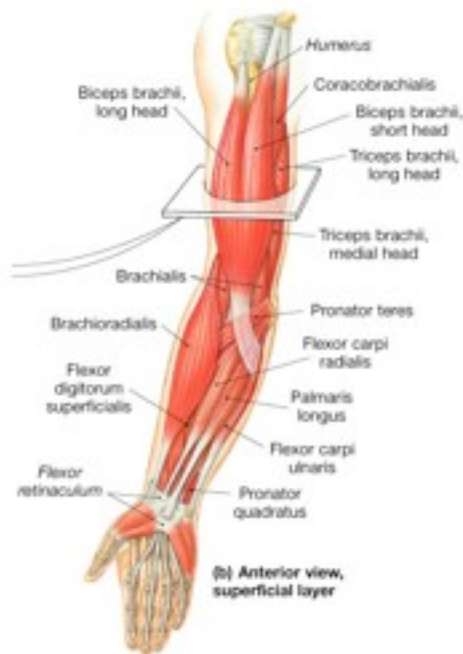
Distal anterior ulna

## Insertion

Distal anterior radius

## Action

Radioulnar pronation



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# Supinator

## Origin

Lateral epicondyle of humerus and posterior ulna

## Insertion

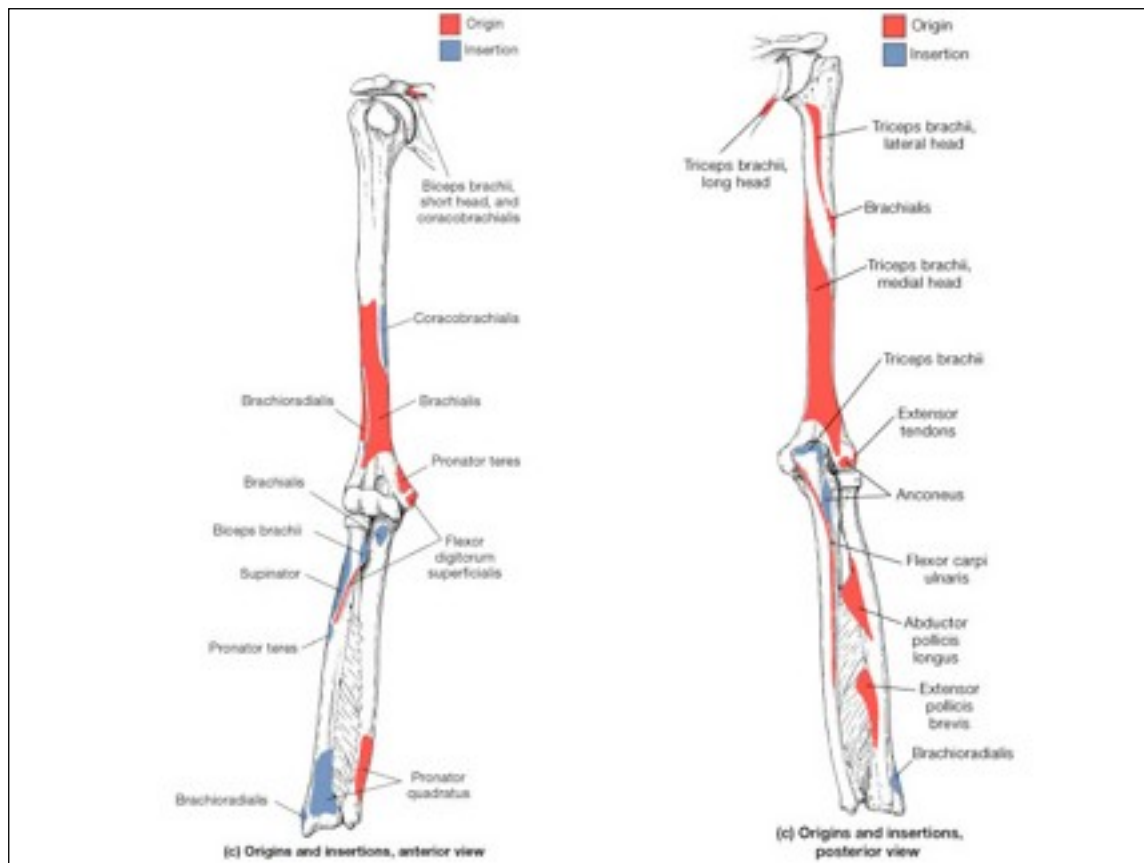
Lateral aspect of proximal radius

## Action

Radioulnar supination



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## Elbow and Radioulnar Joint Kinesiological Analysis

Identify three different exercises that involve elbow and radioulnar joint movements

Identify the specific elbow and radioulnar joint actions for each phase (up/down) of the exercise

Identify the muscles involved

Identify the type of muscle contractions (concentric vs. eccentric) for each phase

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