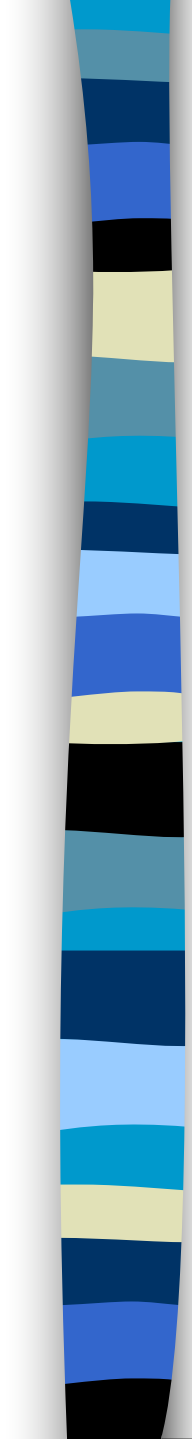
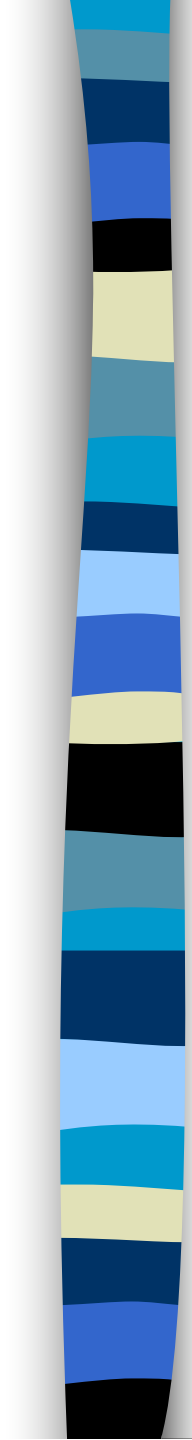


26a A&P: Muscular System - Fiber Types, Actions, and Contractions



26a A&P: Muscular System - Fiber Types, Actions, and Contractions Class Outline

5 minutes	Attendance, Breath of Arrival, and Reminders
10 minutes	Lecture:
25 minutes	Lecture:
15 minutes	Active study skills:
60 minutes	Total



26a A&P: Muscular System - Fiber Types, Actions, and Contractions Class Reminders

Quizzes:

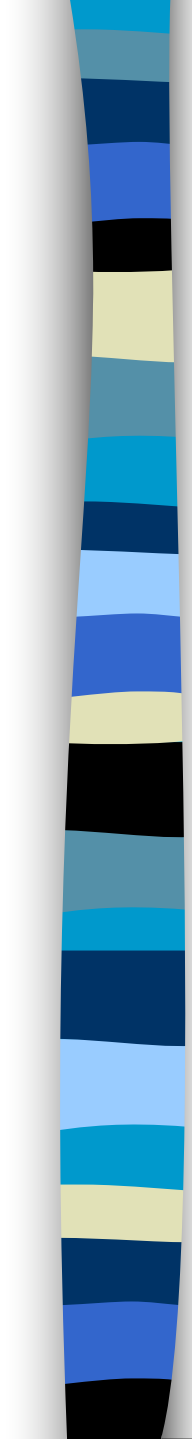
- 30a Kinesiology Quiz
 - Supraspinatus, infraspinatus, teres minor, subscapularis, pec minor, & serratus anterior
- 31a Quiz (18a, 20a/b, 21b, 23a, 24a/b, 25a, 26a, 27a, 28a, 29a/b, 30a/b)

Assignments:

- 30a Review Questions
 - Packet A: 141-158

Preparation for upcoming classes:

- 27a Pathology: Musculoskeletal System
 - Packet E: 49-54
 - RQ Packet A-153
- 27b Hydrotherapy: Cold and Contrast Treatments
 - Packet G: 25-28



Classroom Rules

Punctuality - everybody's time is precious

- Be ready to learn at the start of class; we'll have you out of here on time
- Tardiness: arriving late, returning late after breaks, leaving during class, leaving early

The following are not allowed:

- Bare feet
- Side talking
- Lying down
- Inappropriate clothing
- Food or drink except water
- Phones that are visible in the classroom, bathrooms, or internship

You will receive one verbal warning, then you'll have to leave the room.

Pectoralis Minor

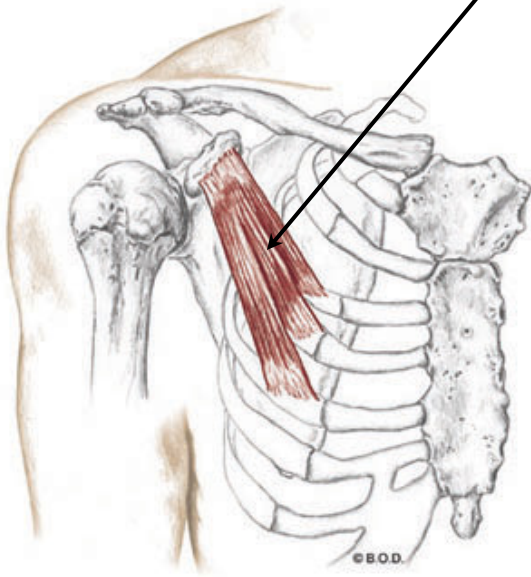
Trail Guide, Page 92

Pectoralis minor lies next to the ribcage deep to the pectoralis major.

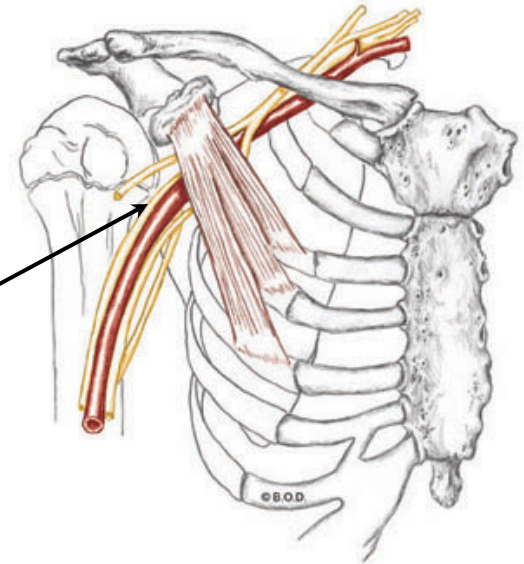
During aerobic activity the pectoralis minor helps to elevate the rib cage for inhalation.

Major vessels such as the brachial plexus, axillary artery and axillary vein pass underneath the pectoralis minor. This can create the potential for neurovascular compression.

Pectoralis minor, what does it do?



Anterolateral View



Anterior View

Pectoralis Minor, page 92

A Depress the scapula (scapulothoracic joint)

Abduct the scapula (S/T joint)

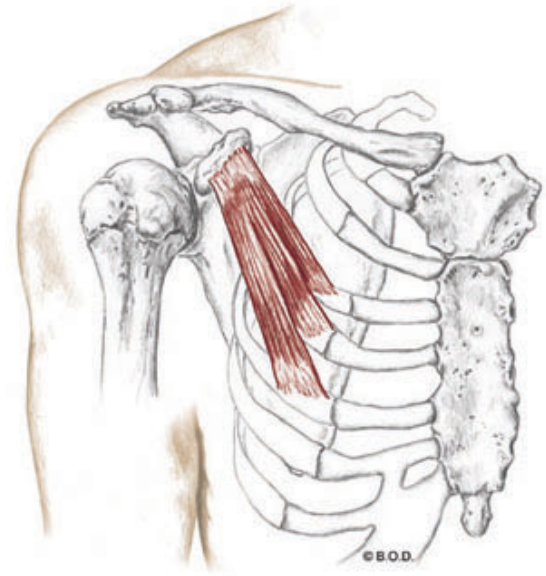
Downwardly rotate the scapula (S/T joint)

With the scapula fixed:

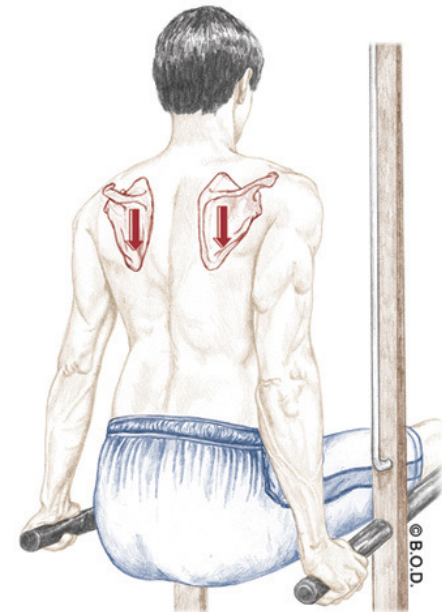
Assist to **elevate** the thorax during forced inhalation

O Third, fourth, and fifth ribs

I Medial surface of coracoid process of the scapula



Anterior View



Pectoralis Minor, page 92

A Depress the scapula (scapulothoracic joint)

Abduct the scapula (S/T joint)

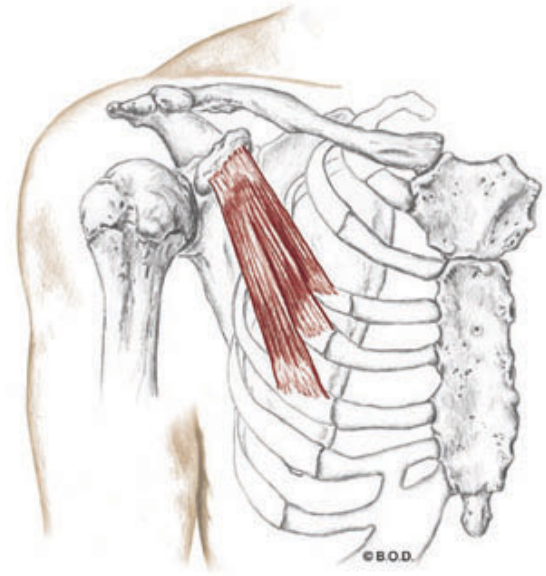
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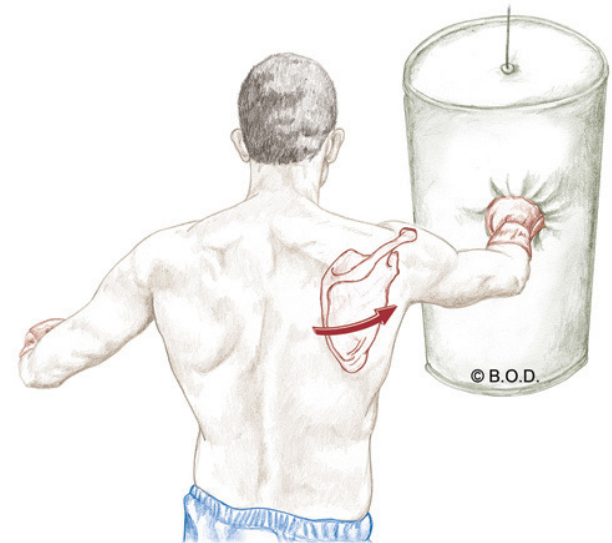
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Anterior View



Pectoralis Minor, page 92

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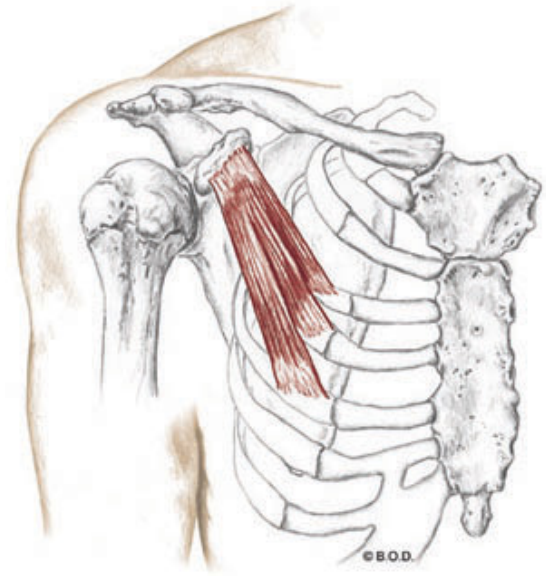
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Pectoralis Minor, page 92

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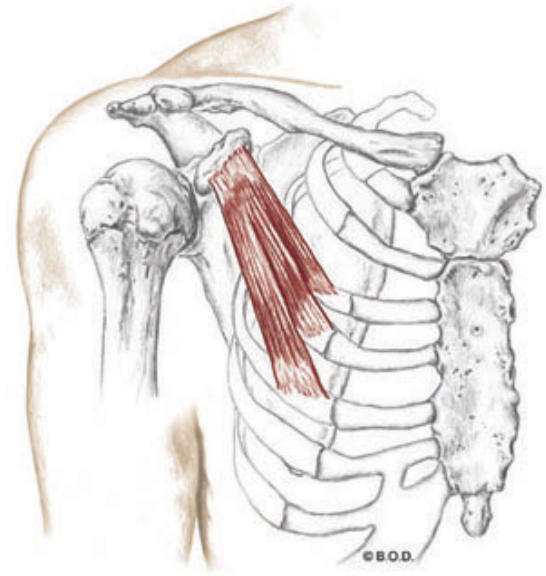
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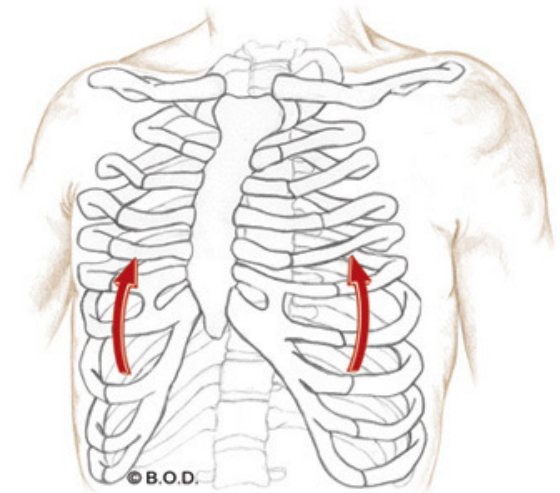
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Anterior View



Pectoralis Minor, page 92

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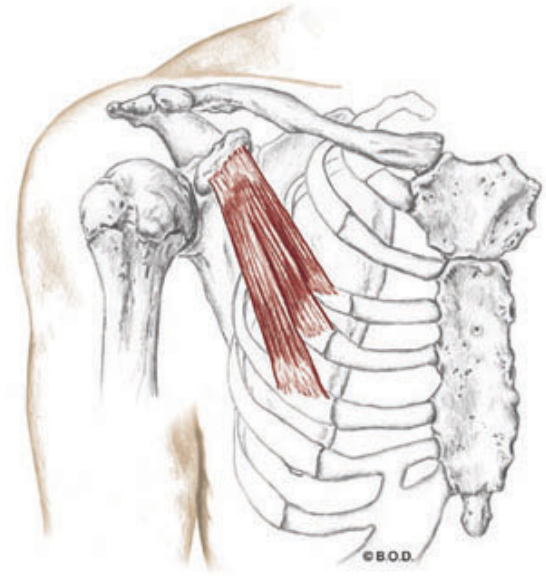
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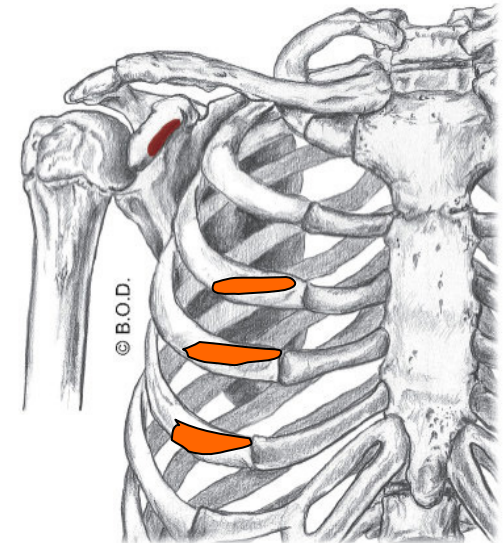
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Anterior View



Pectoralis Minor, page 92

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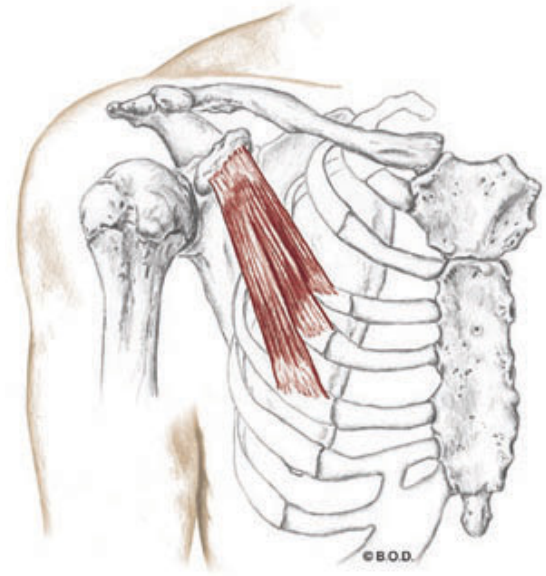
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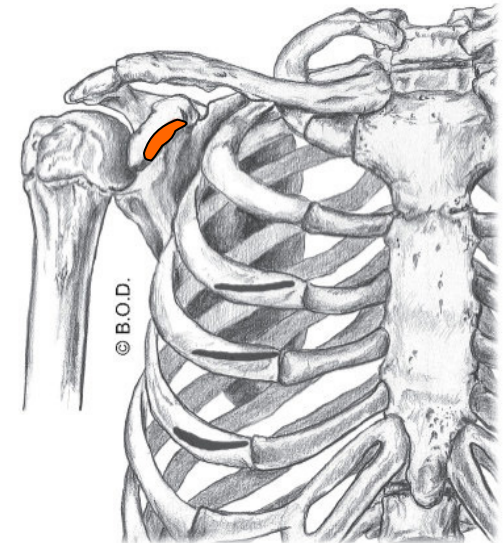
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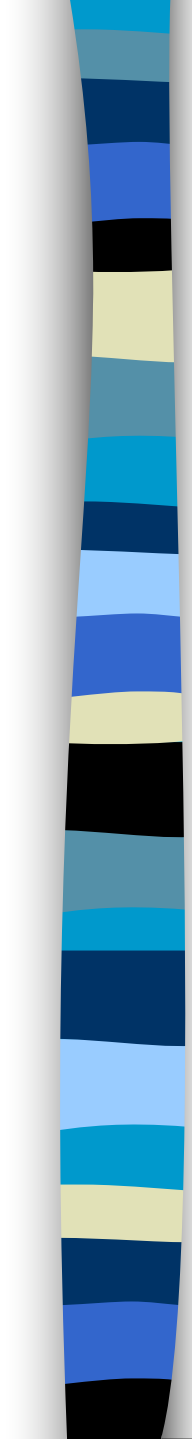
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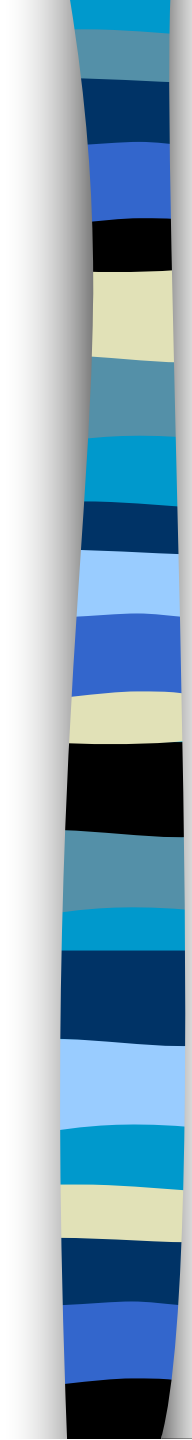
Anterior View





26a A&P: Muscular System - Fiber Types, Actions, and Contractions

E - 45

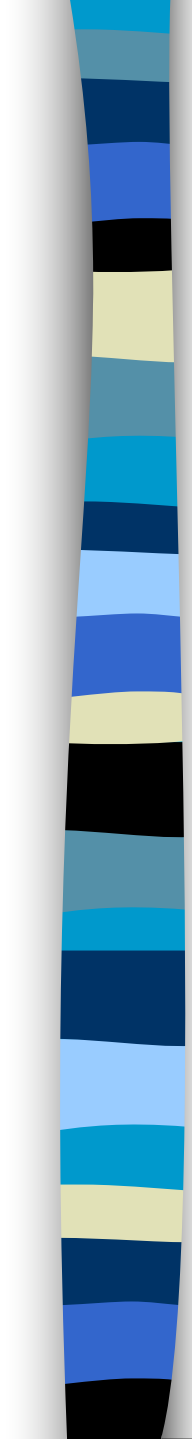


Energy Sources for Contraction

Adenosine triphosphate

Fuel

Oxygen

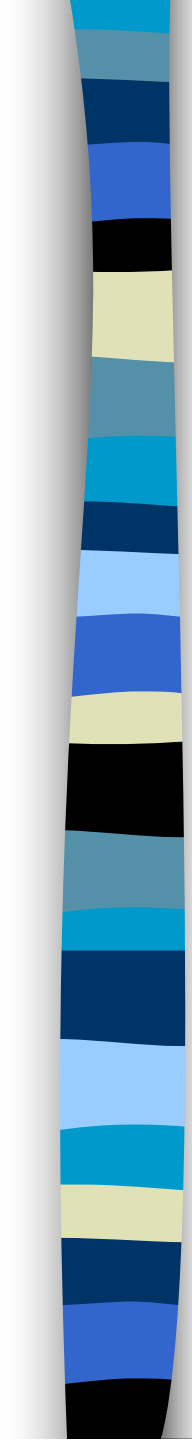


Energy Sources for Contraction

Adenosine triphosphate (AKA: ATP) The body's energy storage molecule.

Fuel Glucose, fat, or, rarely, protein. Used to form ATP in the mitochondria. By-products are CO₂ and water (from aerobic metabolism), or, from the initial anaerobic process (which only uses carbohydrate, and not O₂), lactic acid.

Oxygen Combined with fuel in the mitochondria during aerobic metabolism, yielding energy (for making ATP) plus CO₂ plus H₂O.



Types of Skeletal Muscle Fibers

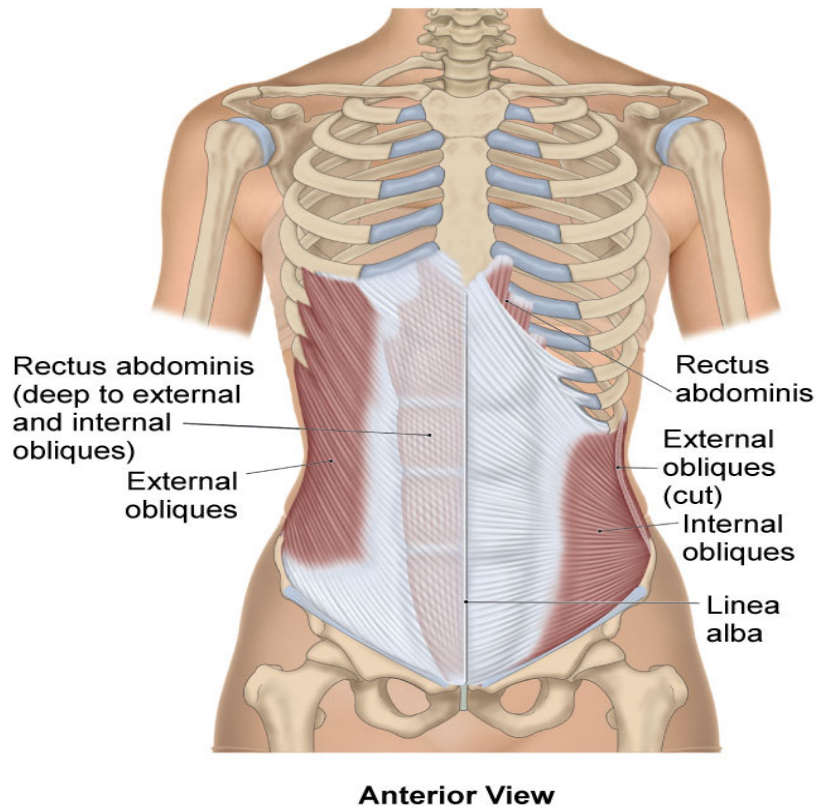
Slow twitch (red muscle)

Fast twitch (white muscle)

Intermediate twitch (pink muscle)

Types of Skeletal Muscle Fibers

Slow twitch (AKA: red muscle) Skeletal muscle fibers that contract slowly and are fatigue resistant. Examples: postural muscle, core muscle, or legs of long distance runners.



Types of Skeletal Muscle Fibers

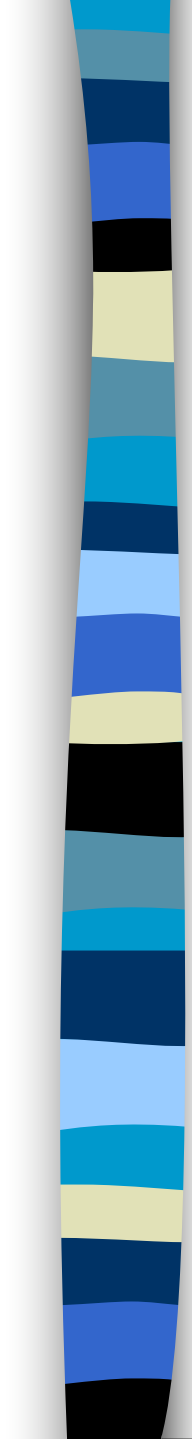
Fast twitch (AKA: white muscle) Skeletal muscle fibers that contract forcefully and fatigue rapidly. Examples: arm muscles.



Types of Skeletal Muscle Fibers

Intermediate twitch (AKA: pink muscle) Skeletal muscle fibers that are more fatigue resistant than fast twitch, and more forceful than slow twitch. Examples: legs of world class sprinters and arms of world class boxers.





Parts of Skeletal Muscle

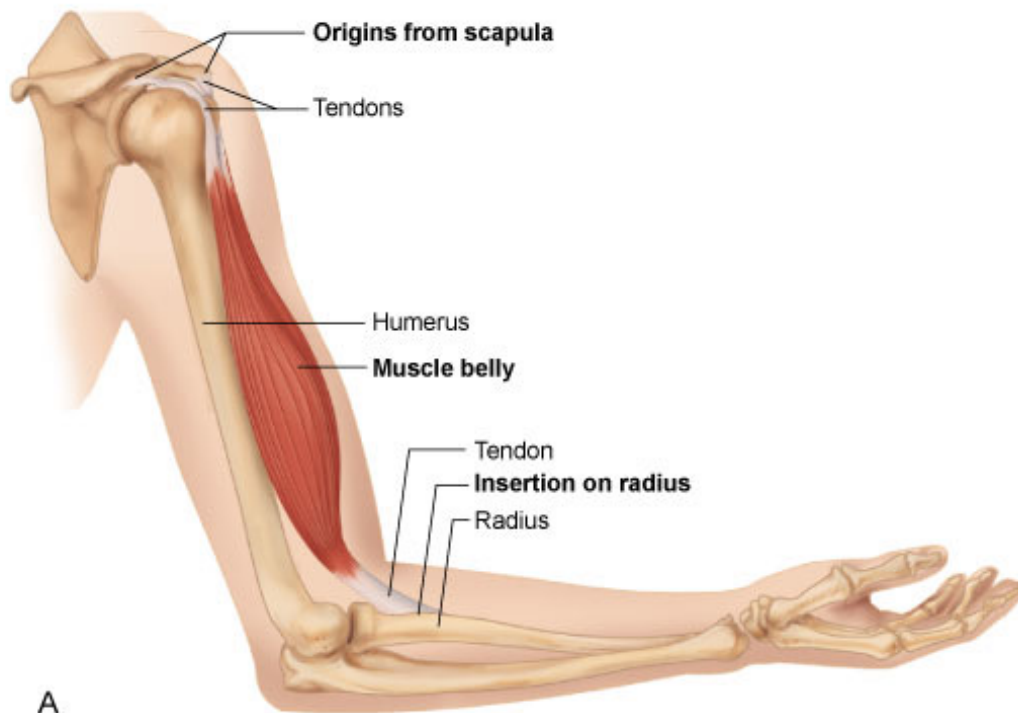
Belly

Origin

Insertion

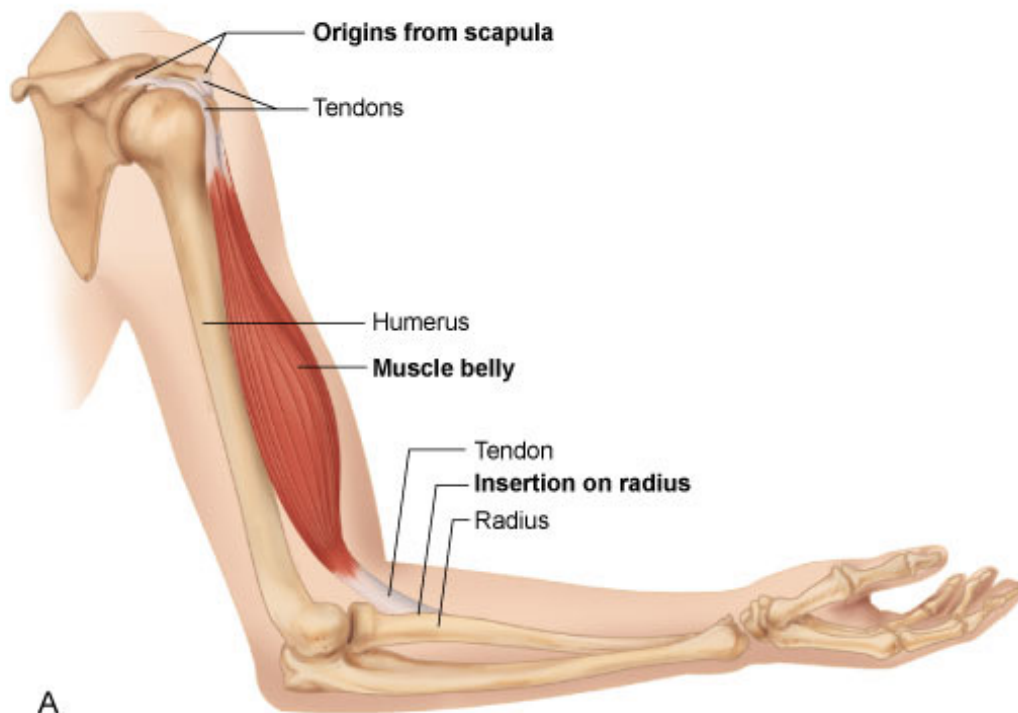
Parts of Skeletal Muscle

Belly The wide central portion of a skeletal muscle that contains the sarcomeres.



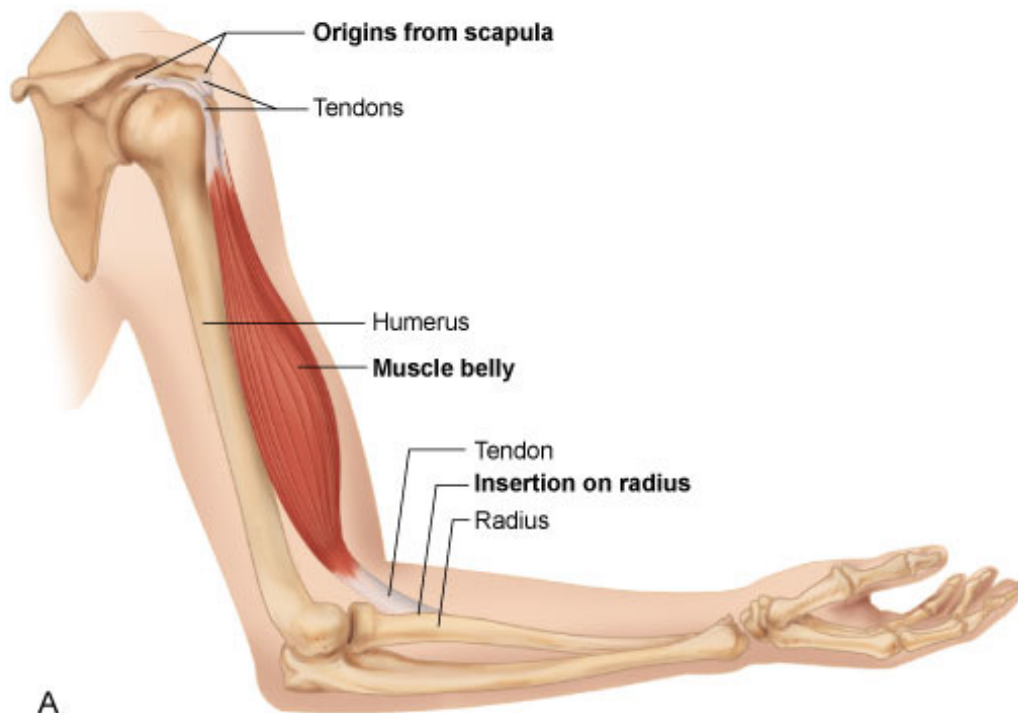
Parts of Skeletal Muscle

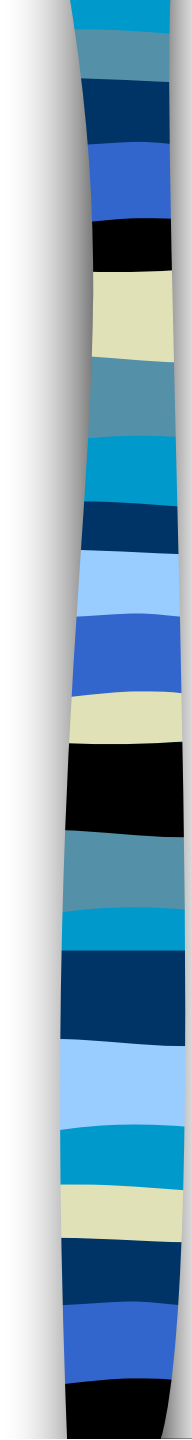
Origin Tendinous muscle attachment on the less movable bone or other structure. Typically medial or proximal to the insertion.



Parts of Skeletal Muscle

Insertion Tendinous muscle attachment on the more movable bone or structure. Typically lateral or distal to the origin.





Muscle Actions

Prime mover (agonist)

Antagonist

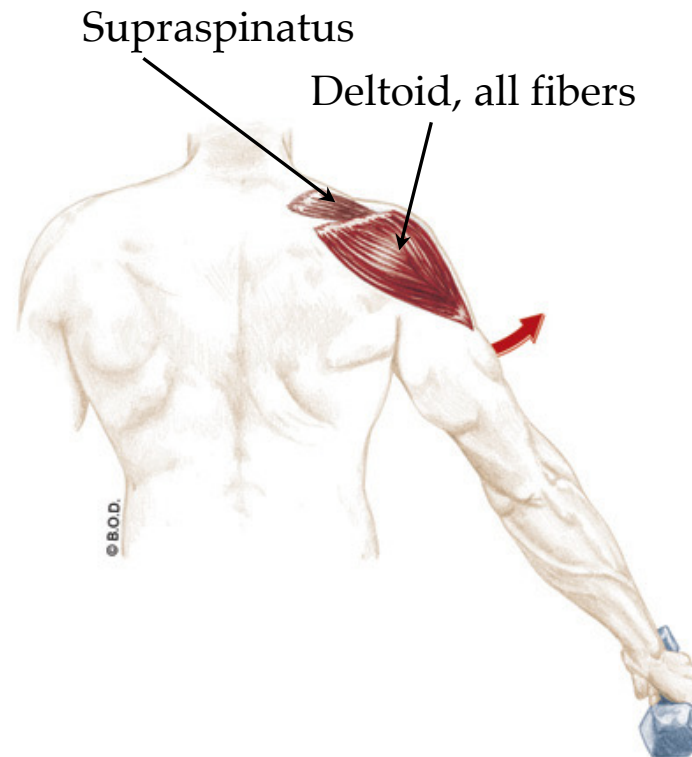
Synergist

Fixator

Muscle Actions

Prime mover (AKA: agonist) Muscle responsible for causing a specific or desired action.

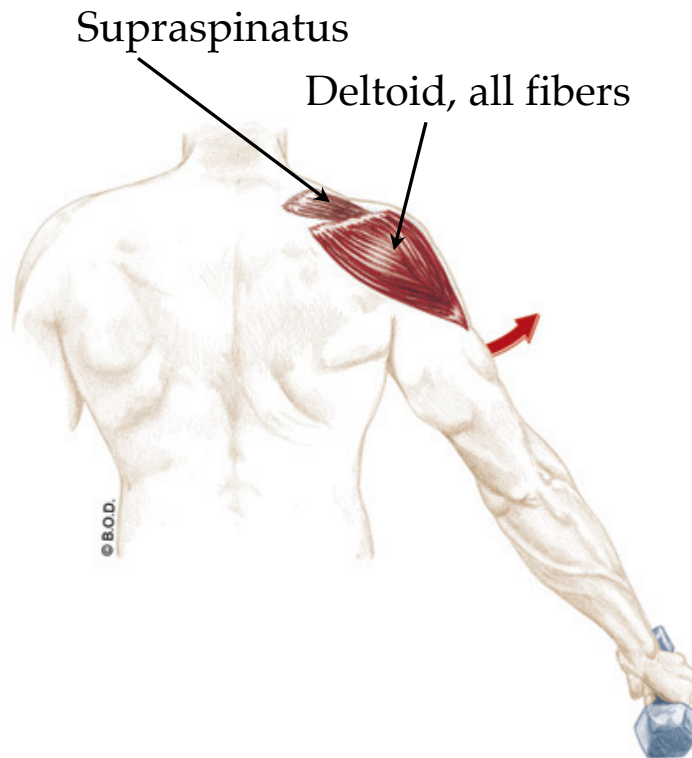
Glenohumeral abduction prime movers:



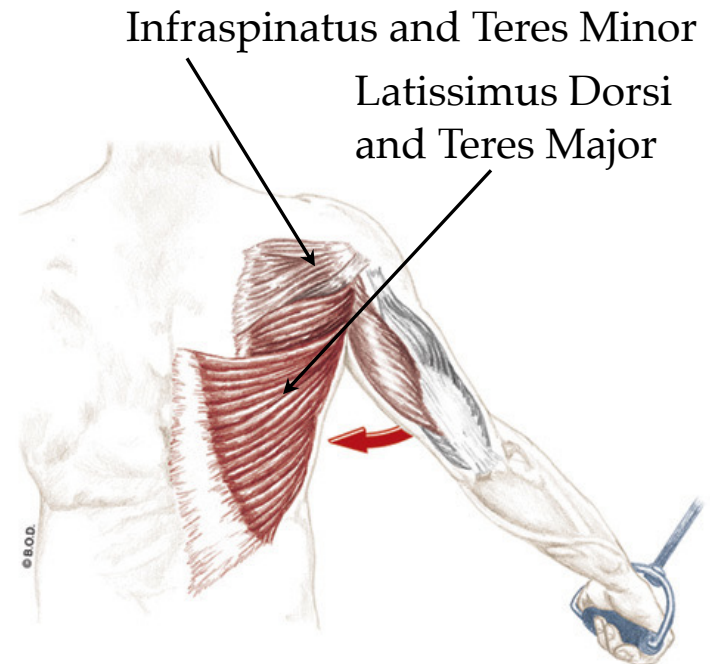
Muscle Actions

Antagonist Muscles that must relax and lengthen or eccentrically contract and lengthen to allow the actions of the prime mover to occur.

Glenohumeral abduction prime movers:



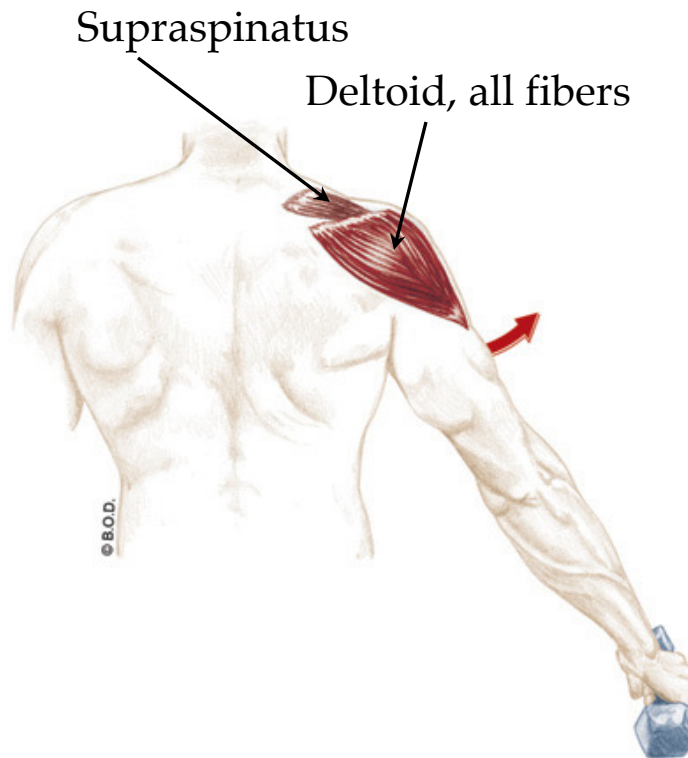
Glenohumeral abduction **antagonists**:



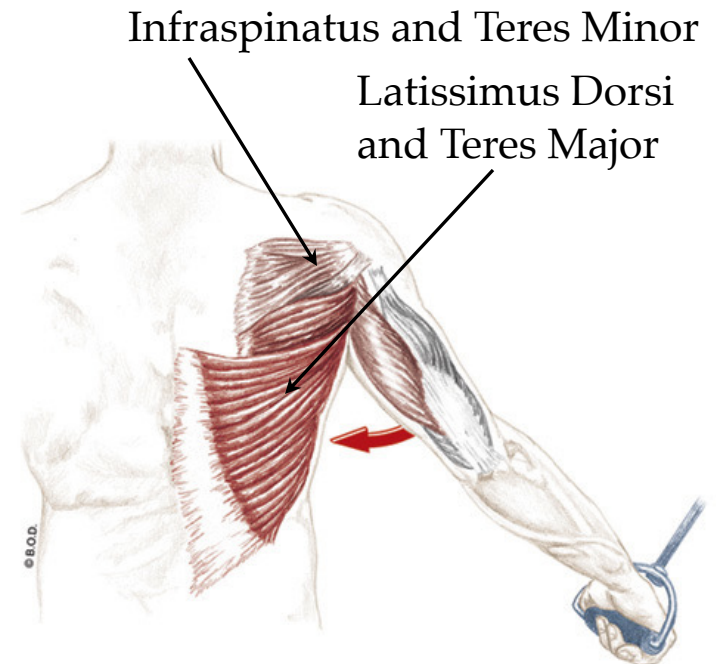
Muscle Actions

Synergist Muscle that aids movement by contracting at the same time as the prime movers.

Glenohumeral abduction synergists:



Glenohumeral adduction synergists:



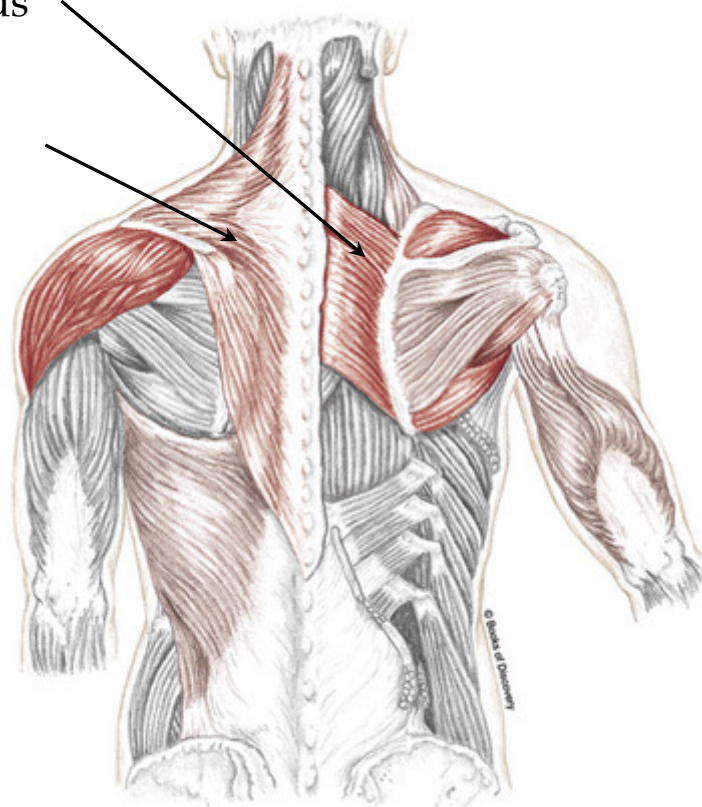
Muscle Actions

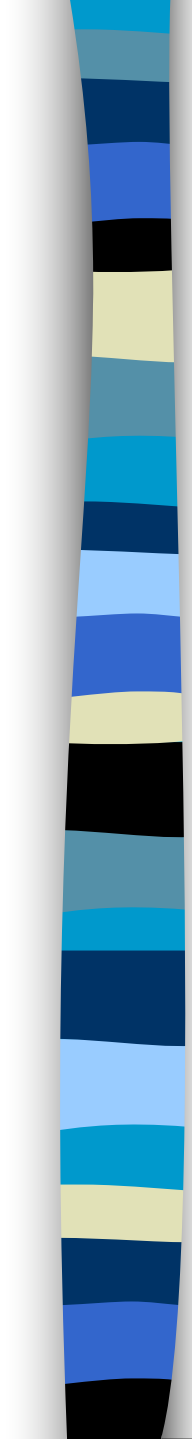
Fixator Specialized synergist muscles that act as a stabilizer.

Fixators during glenohumeral abduction:

Rhomboids

Trapezius





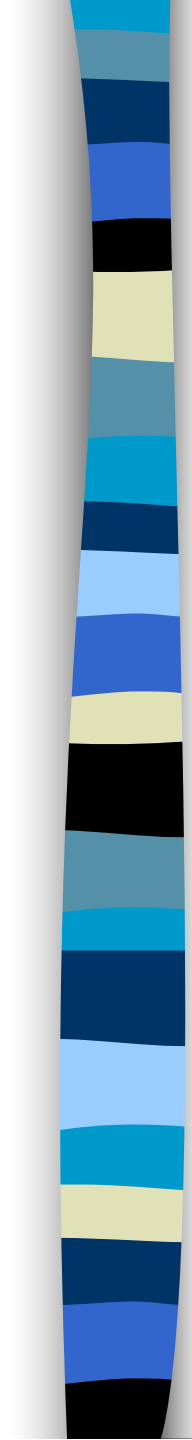
Types of Contractions

Isotonic contraction

Concentric contraction

Eccentric contraction

Isometric contraction



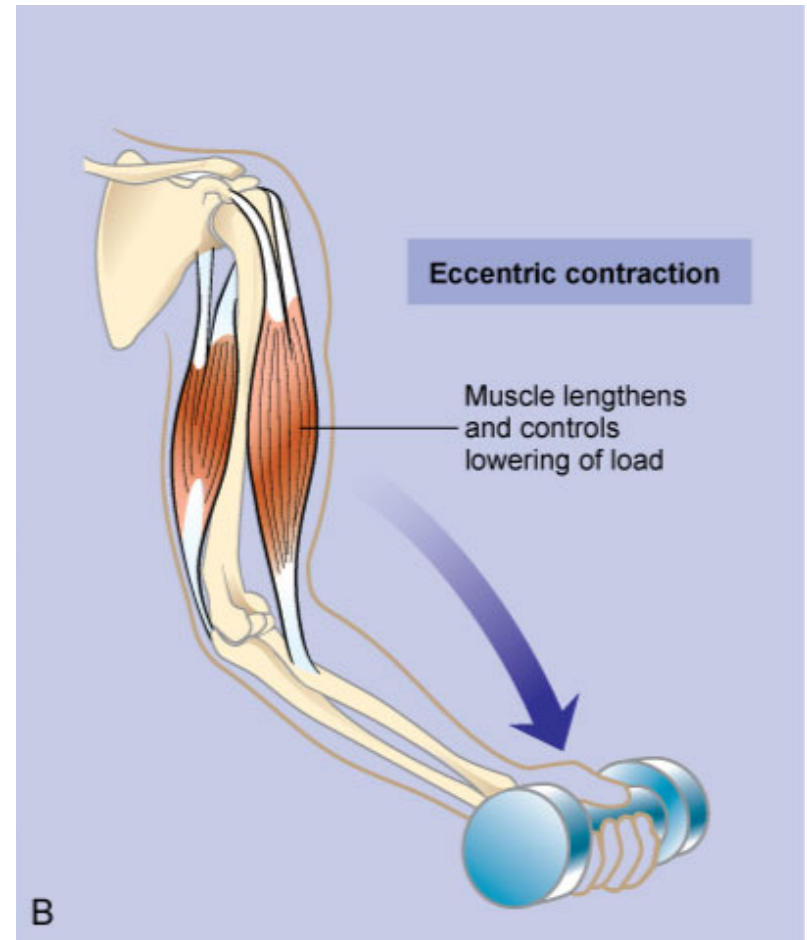
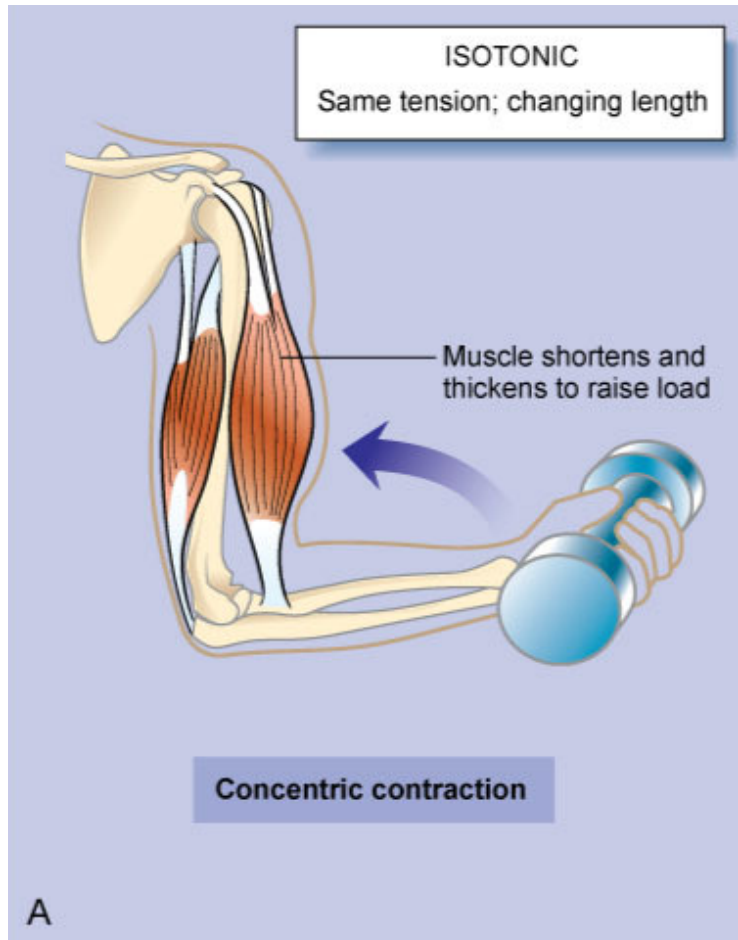
Types of Contractions

Isotonic contraction Contraction in which muscle changes length.

Concentric contraction Isotonic contraction. The muscle shortens.

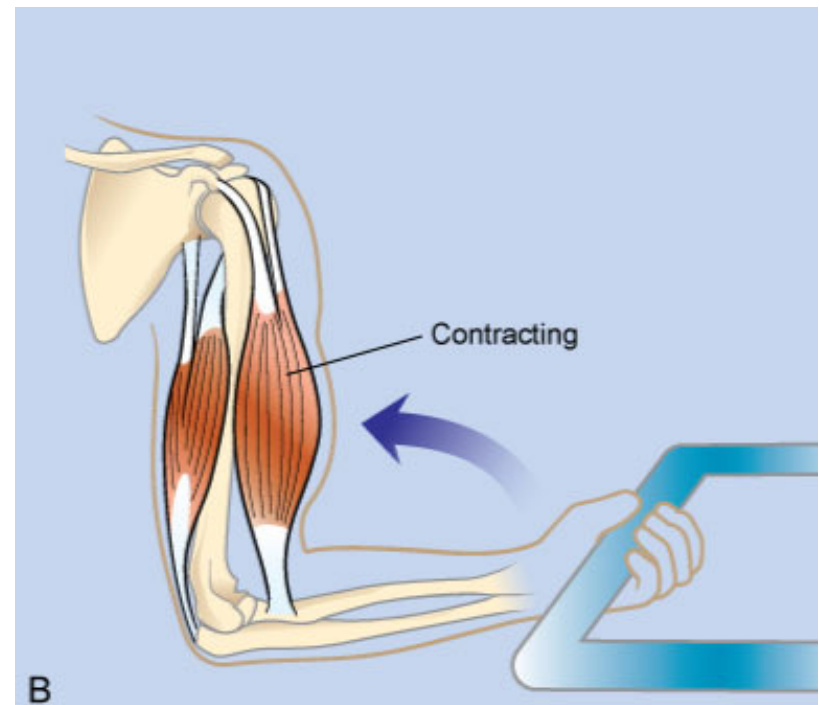
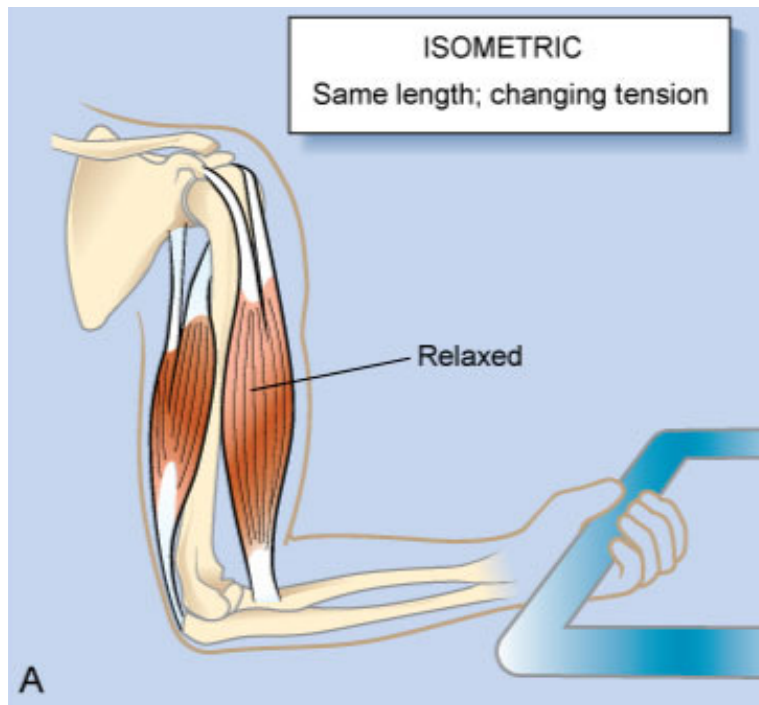
Eccentric contraction Isotonic contraction. The muscle lengthens.

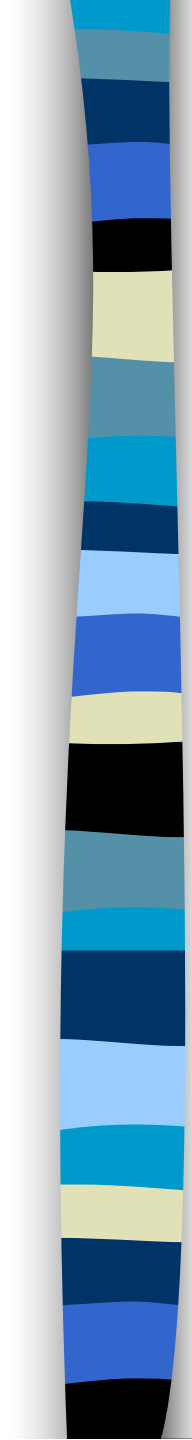
Types of Contractions



Types of Contractions

Isometric contraction Contraction in which muscle length remains the same.

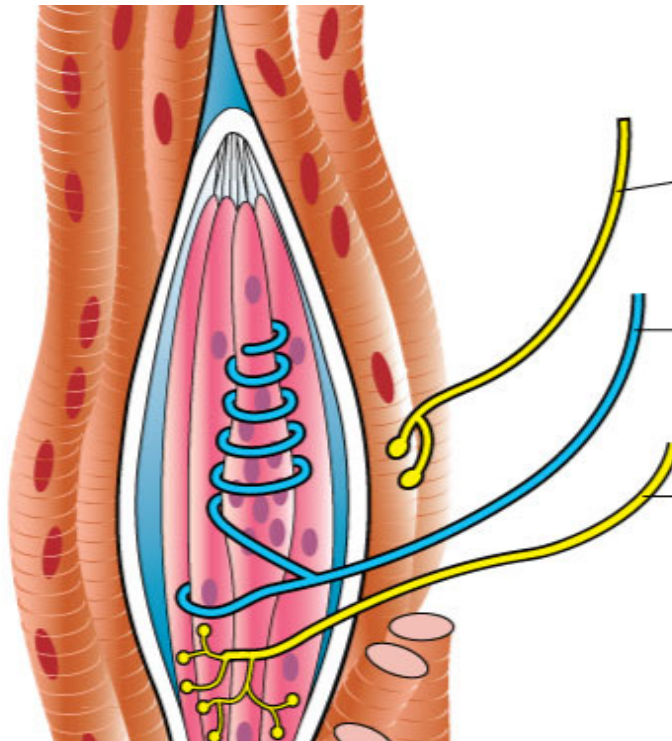




Stretching and Stretch Receptors

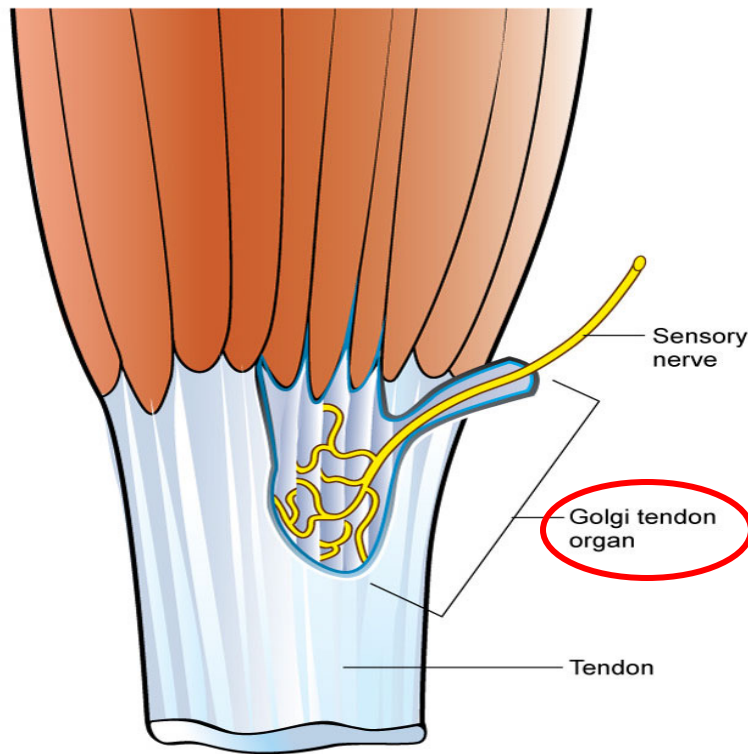
Stretching and Stretch Receptors

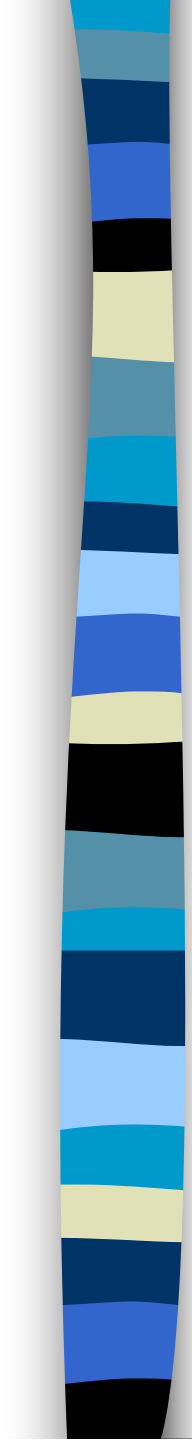
Muscle spindle Stretch receptor located within the muscle belly. Detects sudden stretching, causing the nervous system to respond by reflexively contracting the muscle.



Stretching and Stretch Receptors

Golgi tendon organ Receptor located at the musculotendinous junction. Detects tension and excessive stretch, causing the nervous system to respond by inhibiting contraction.



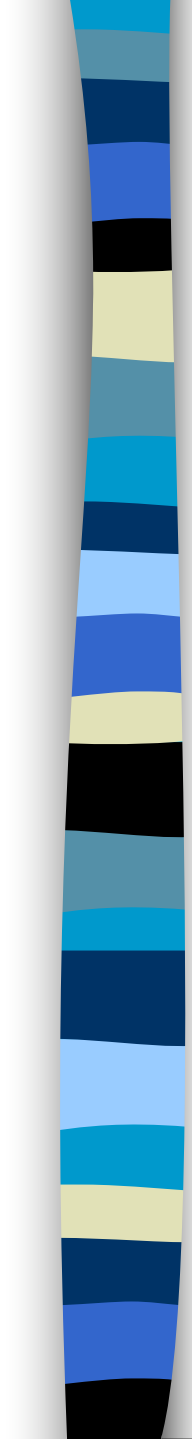


Posture and Muscle Tone

Posture and Muscle Tone

Muscle tone (AKA: tonus) Continued partial contraction of skeletal muscle.

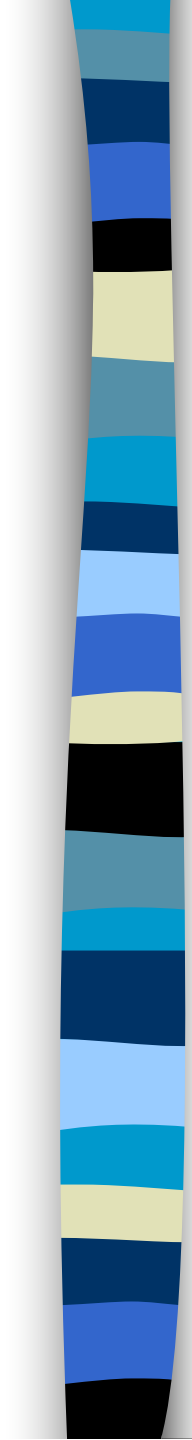




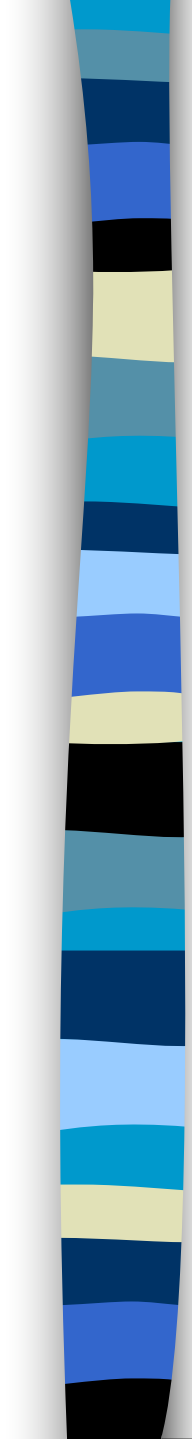
Posture and Muscle Tone

Flaccid Skeletal muscle with less tone than normal.

Spastic Skeletal muscle with more than normal tone.



Effects of Massage Therapy on the Muscular System



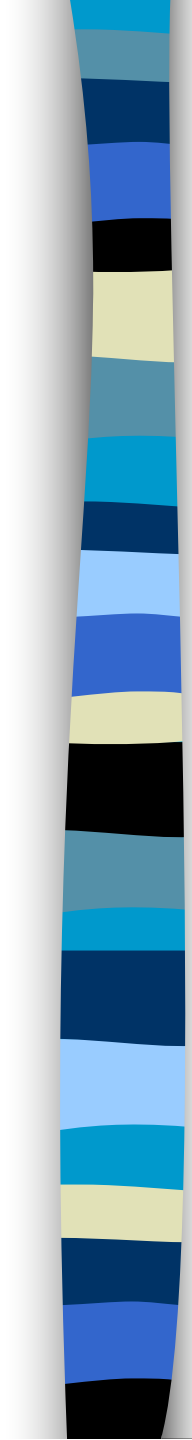
Effects of Massage Therapy on the Muscular System

Decrease tension within the muscle-tendon unit.

Increase range of motion (ROM)

Decrease delayed onset muscle soreness (DOMS)

Enhance exchange of nutrients and waste to speed recovery from fatigue/soreness



26a A&P: Muscular System - Fiber Types, Actions, and Contractions