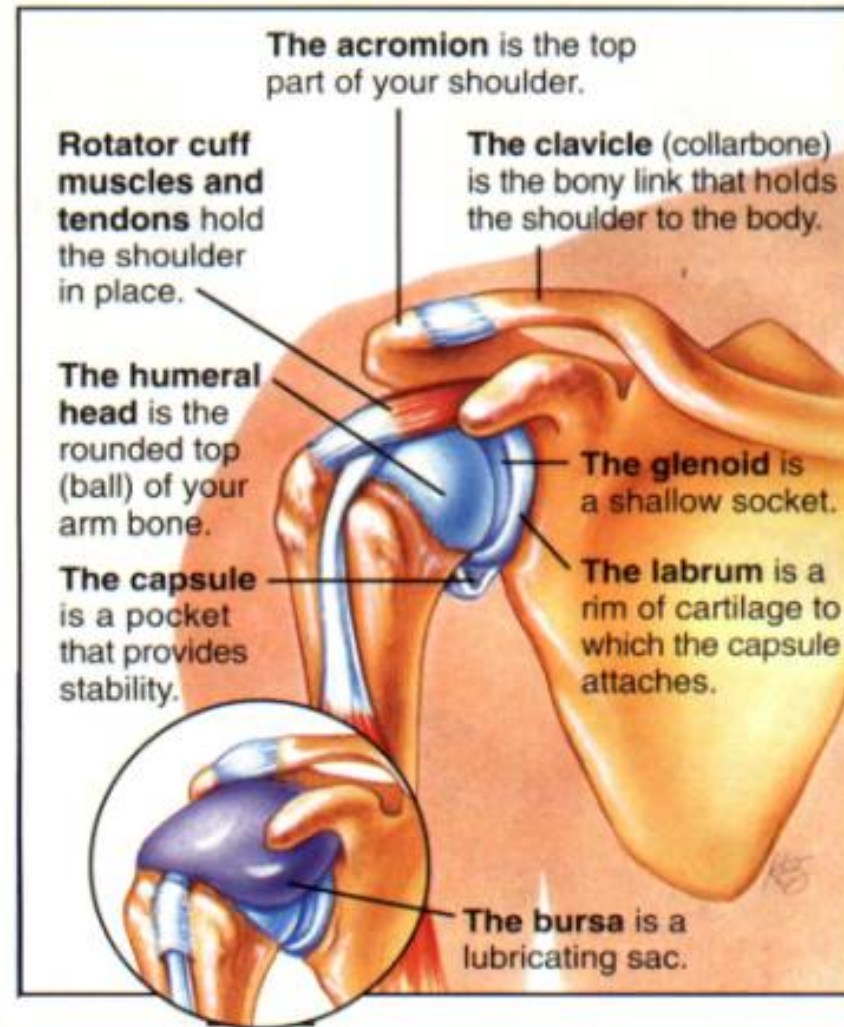


**Shoulder Mechanics and
Injury Prevention
for
Competitive Swimmers**

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Shoulder Anatomy

Shoulder Anatomy



The Shoulder Joint

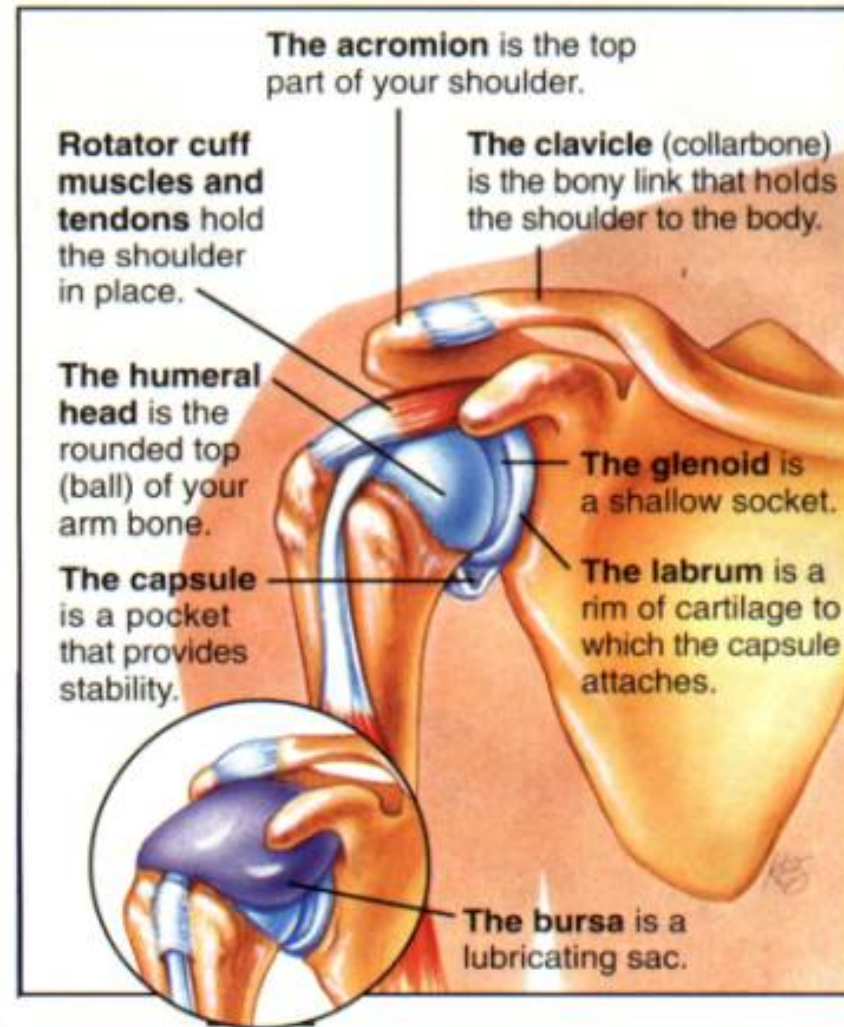
- Two Bones

 - Humerus

 - Scapula (shoulder blade)

- Ball and Socket Joint

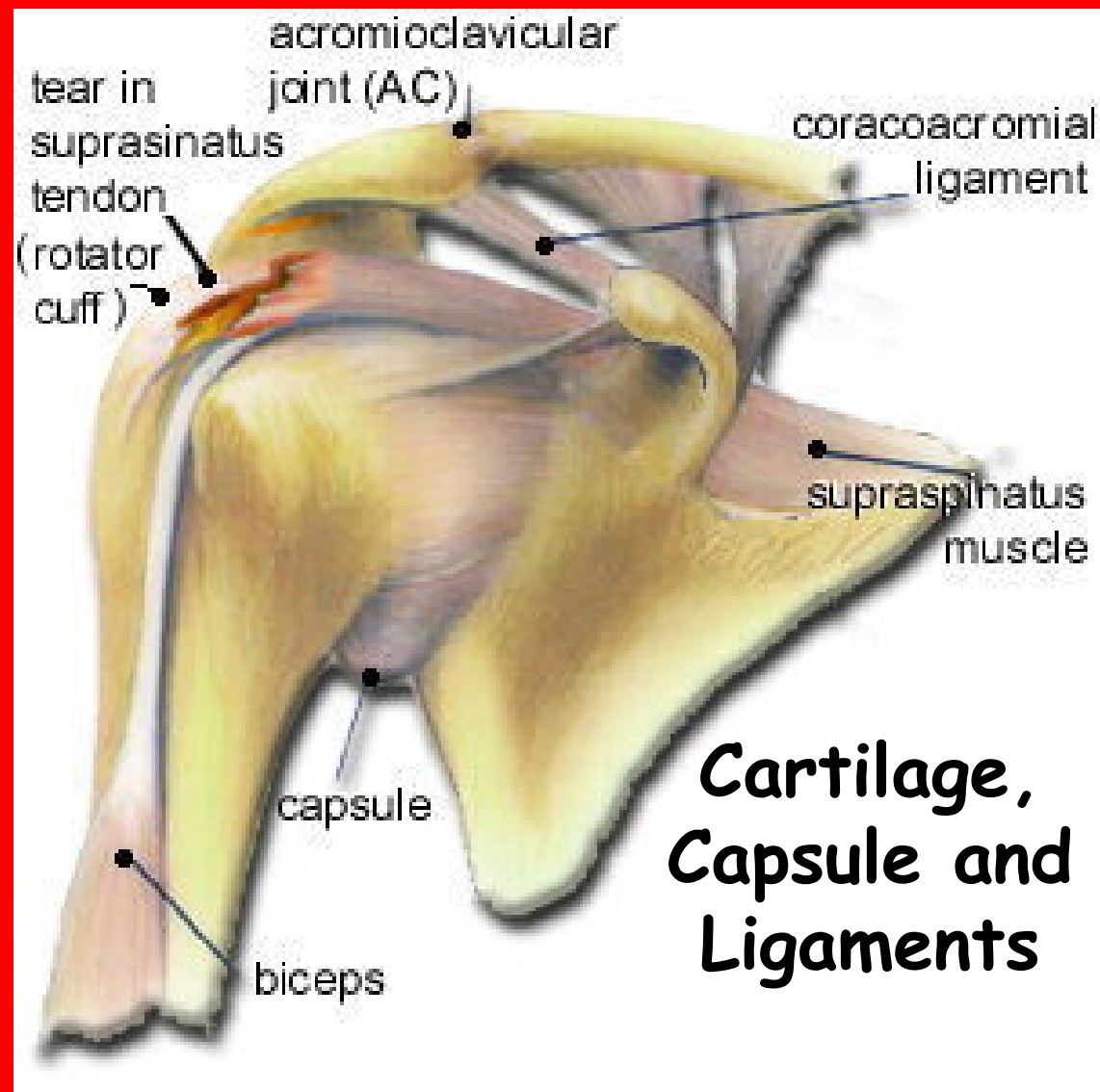
Shoulder Anatomy



The Shoulder Joint

- Significant size difference
- Joint does not fit closely together
- Requires other structures for stability

Static Stability



Dynamic Stability

Front View

Muscles of the Rotator Cuff

Back View

Subscapularis

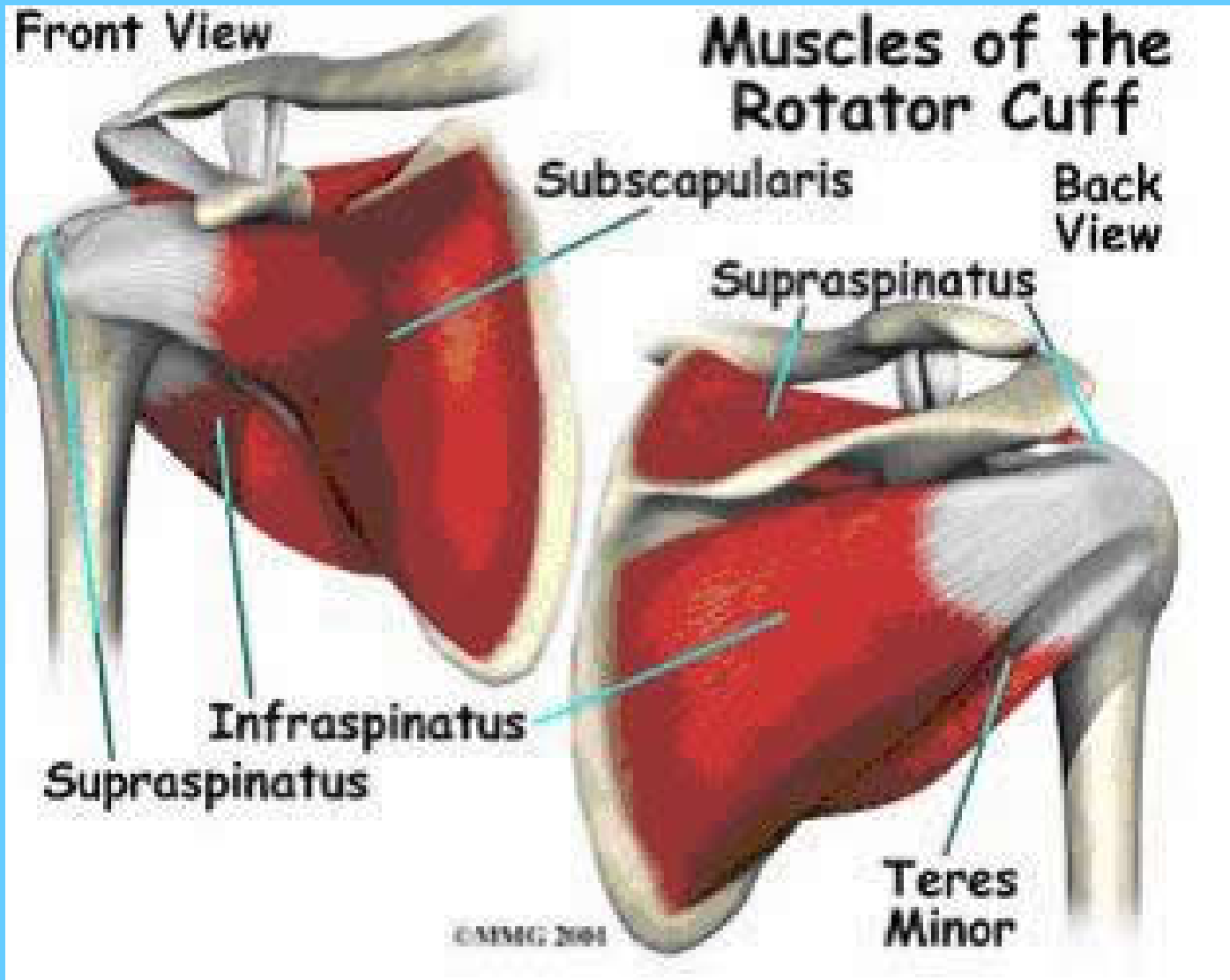
Supraspinatus

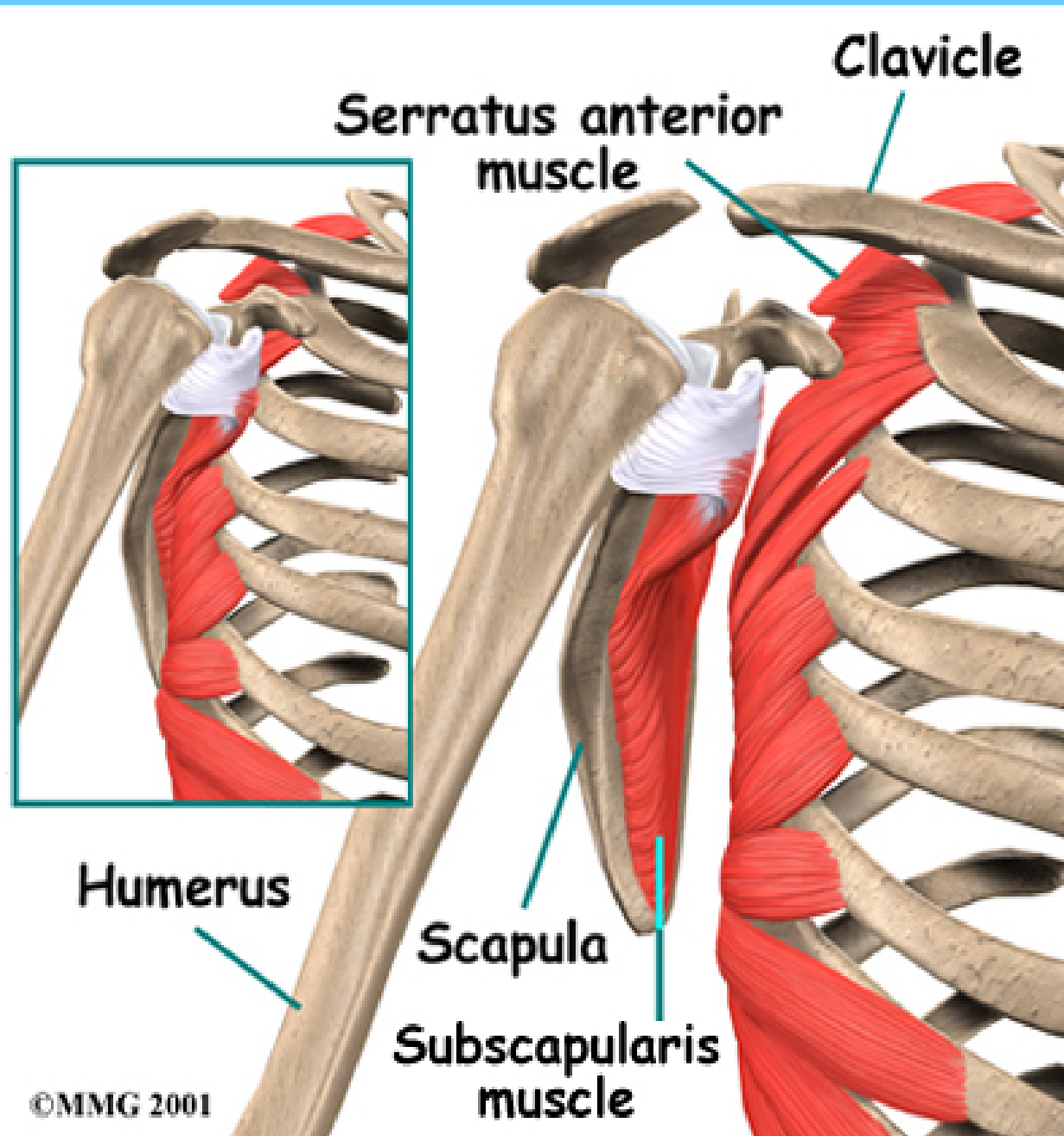
Infraspinatus

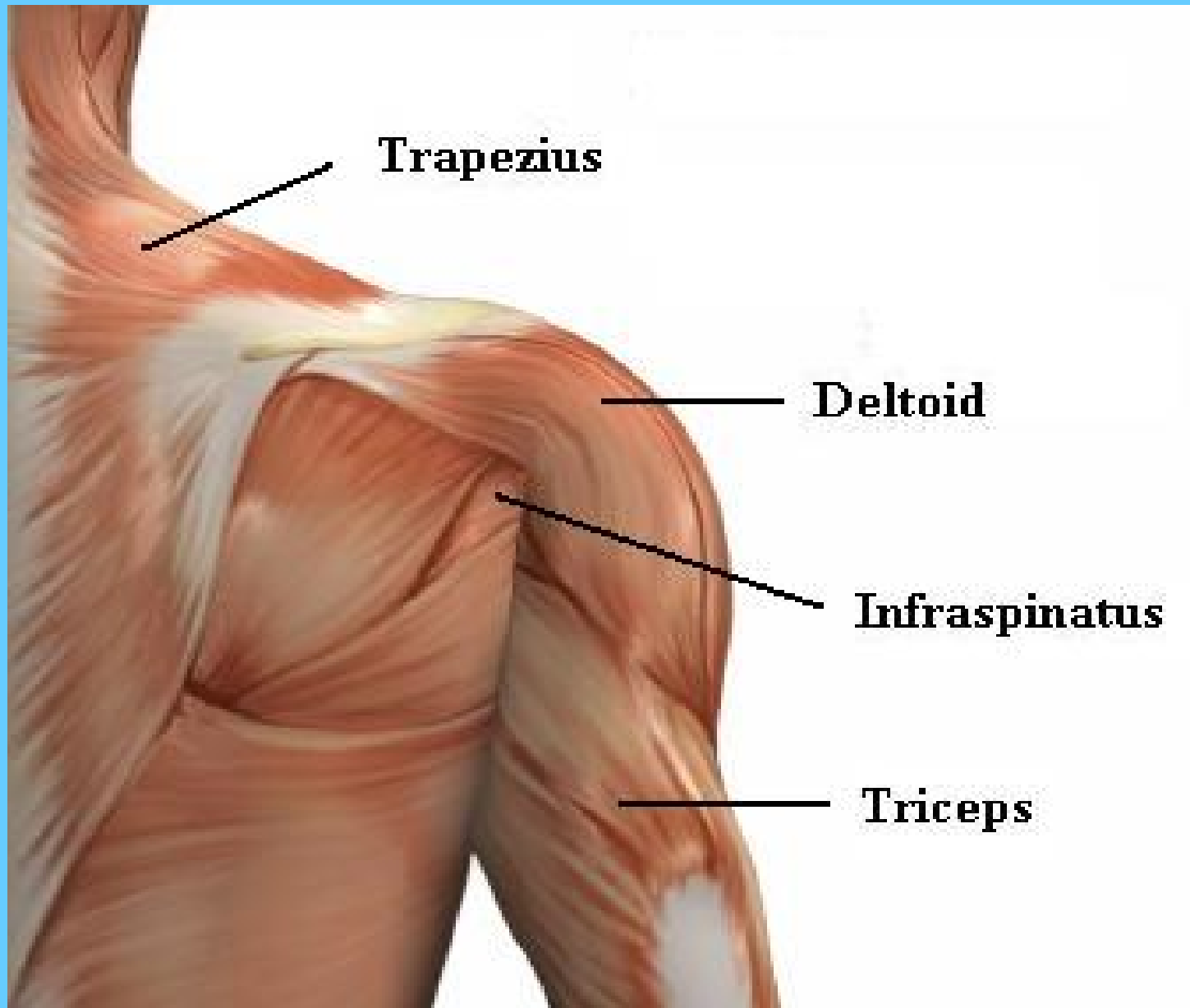
Supraspinatus

Teres Minor

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Deltoid



Pectoralis



Biceps



Balance Through Control



The Key Ingredients:

- Flexibility
- Strengthening
Core Stability & Rotator Cuff Control
- Sports-Specific Technique

Flexibility

Anterior muscles tend to be less flexible than the posterior muscles.

Flexibility

- Inappropriate stretches

vs.

- Appropriate Stretches

Static

Ballistic/Dynamic

On The Pool Deck

- Stretches witnessed on the pool deck for more than 30 years.
- They tend to be passed down from one generation to another
- Are they creating more harm than good?

WARNING:

Stretch tight muscles

NOT

ligaments or the joint capsule

Inappropriate Stretch #1: stretching the anterior capsule.



Inappropriate stretch #2:
Pulling the elbow overhead with the opposite arm, stretching the inferior capsule.





Inappropriate Stretch #3:
Pulling the arm across the trunk in a horizontal adduction direction, stretching
the posterior capsule.





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Inappropriate Stretch #4:

A partner stretch and/or solo stretch in which the swimmer's arms are pulled behind her in a horizontal abduction direction, stretching the anterior capsule.





Appropriate Stretches

Static Stretches

- Each stretch should be performed 3-5 times
- Each exercise should be held 10-30 seconds
- Alleviates the DOMS; delay onset of muscle soreness

Door Frame Stretch For the Pectoral Group

Stand at doorway with forearm on doorframe. Elbow bent to 60-90 degrees. Step through the door. A good stretch should be felt along the anterior chest, not the shoulder joint. If you are stretching the right shoulder, step through with the right leg. Complete 3 x 30 seconds each side, two times a day and **especially after workout**. The angle of the arm can vary depending on which fibers of the pectoral group you wish to stretch. A combination of angles can be added to the stretching routine to incorporate the different fibers.



Pectoralis Stretches

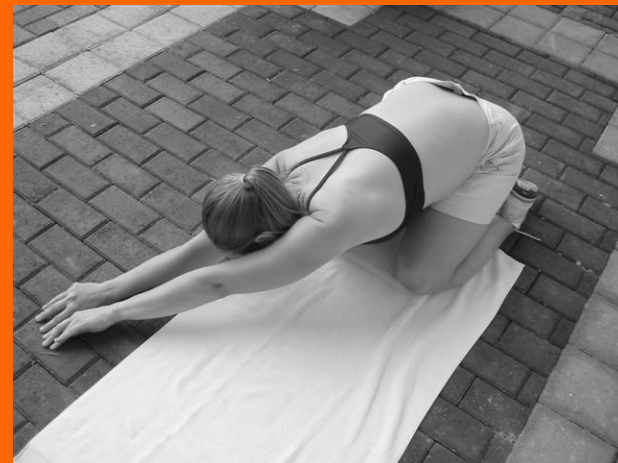


Pectoralis Stretches



Two Part Latissimus Dorsi Stretch

Arch your back up like an angry cat to round out your back. Keep your back rounded and drop your rear to your heels. Reach out with your hands and then reach to a side to specify the stretch and address each of the Latissimus Dorsi. Hold each stretch 30 seconds and repeat twice, alternating sides.



Upper Trapezius / Levator Scapulae Stretch

Sit on a chair and grasp the seat with the hand on the side of the tightness. Place your other hand on your head as outlined below and gently pull down and diagonally to the other side. Two versions of this stretch are shown below. The first version is to turn your nose towards your armpit and gently pull down. The second version is to look straight ahead and gently pull down. Hold for 30 seconds and repeat twice, alternating sides.



Pre-Race Stretching

- Static stretching should never be performed prior to competition
- Decreases performance
- Increases chance of injury

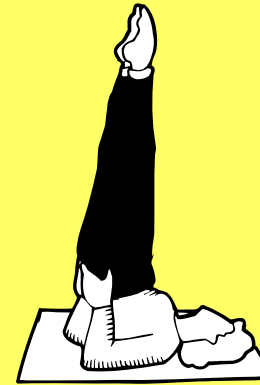
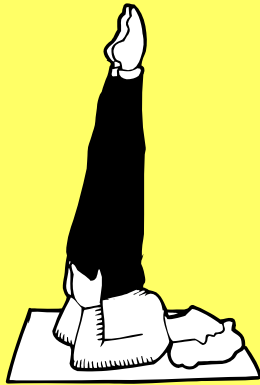
Ballistic Stretches

- Active and dynamic
- Warms up muscles
- Improves muscle function
- Should be utilize during pre-race routine

Hold times and repetitions

- Each stretch should be performed 5 times
- Each stretch should be held for 2-4 seconds
- Dynamic movement
- Sport specific stretches

Yoga!!!!



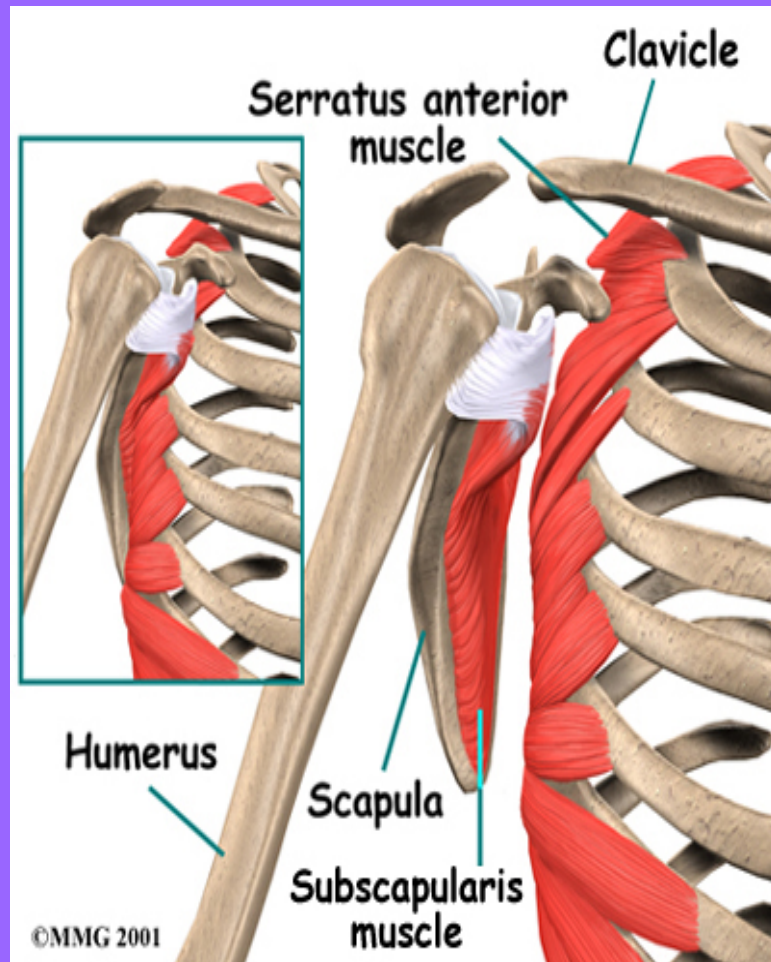
Strengthening

Anterior muscles tend to be overdeveloped and the posterior muscles weaker

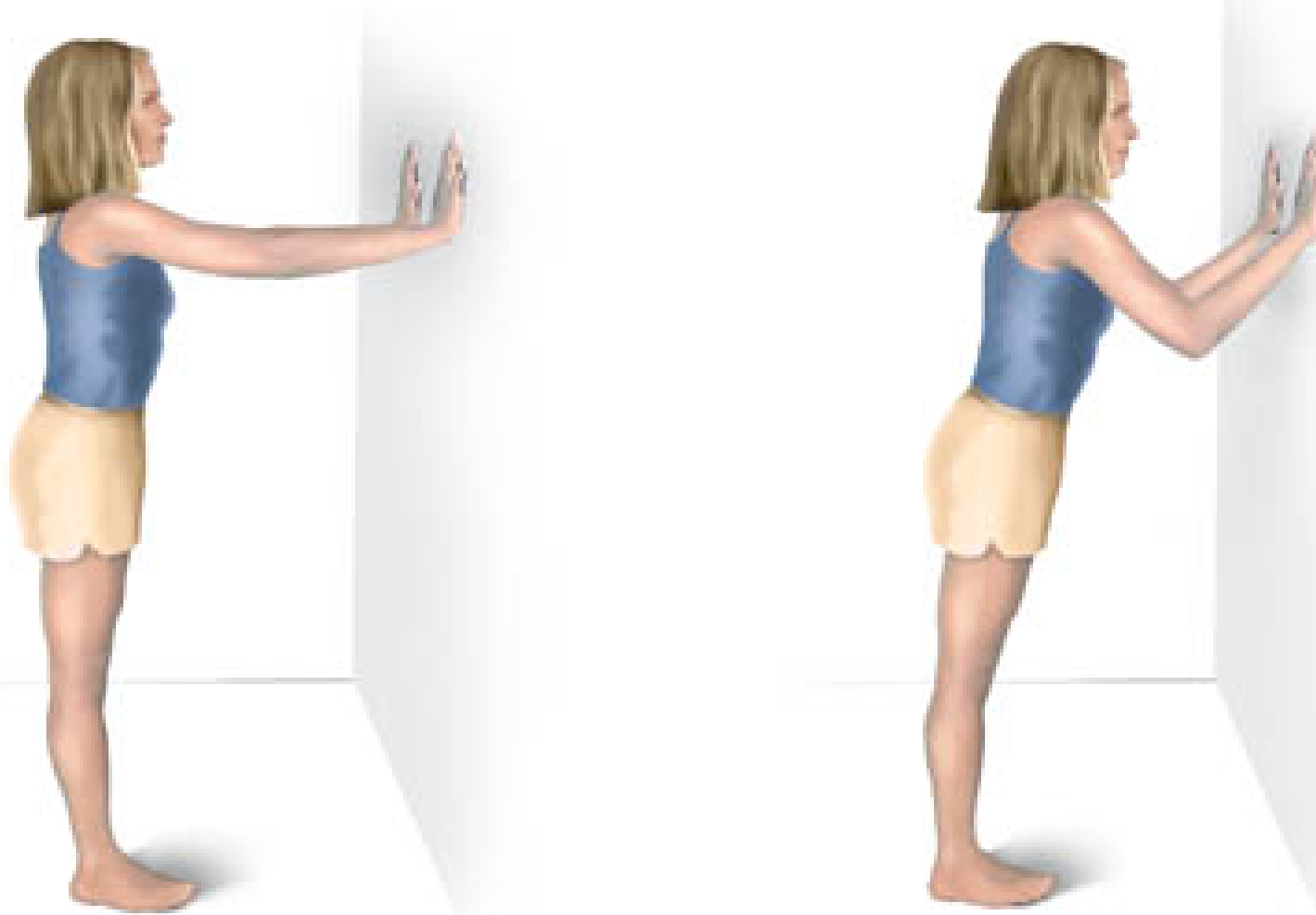
Core Strengthening

- Critical areas are the upper back, neck, and muscle supporting the shoulder
- Main function is stability for the shoulder blade
- Prevents extra loading on the shoulders

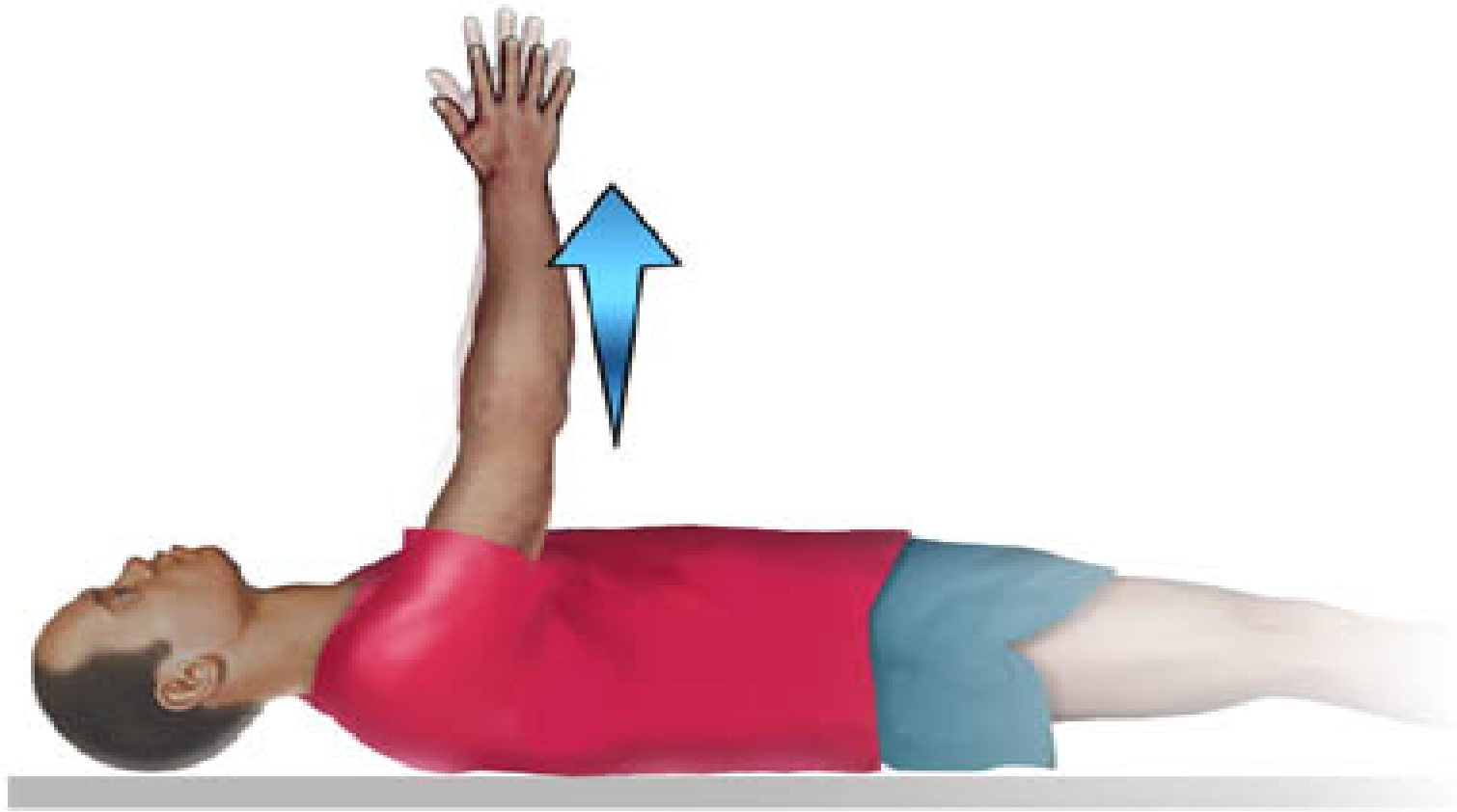
The muscles responsible for stabilizing the shoulder blade are the middle/lower trapezius and serratus anterior.



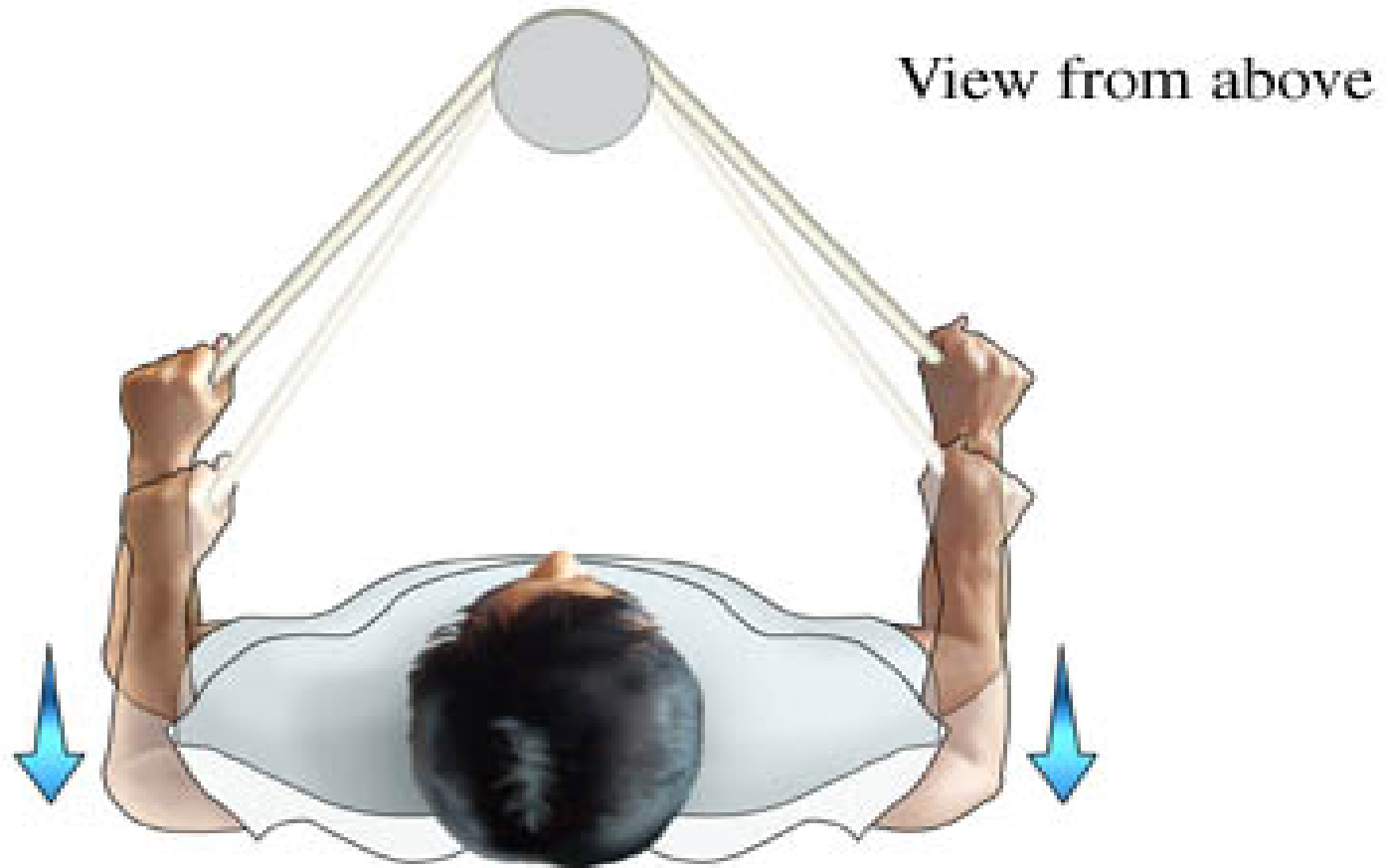
Scapular exercise: Wall push-ups



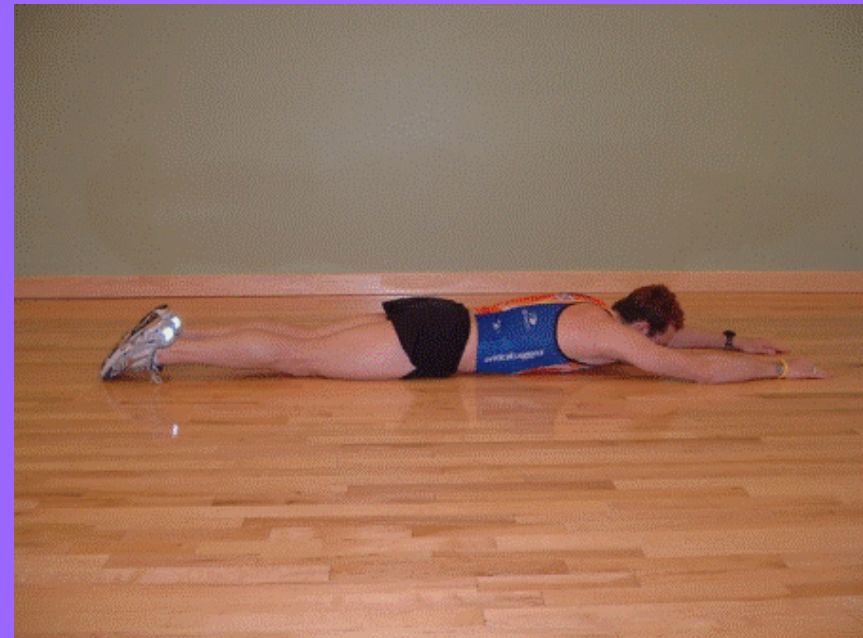
Scapular exercise: Arm reach



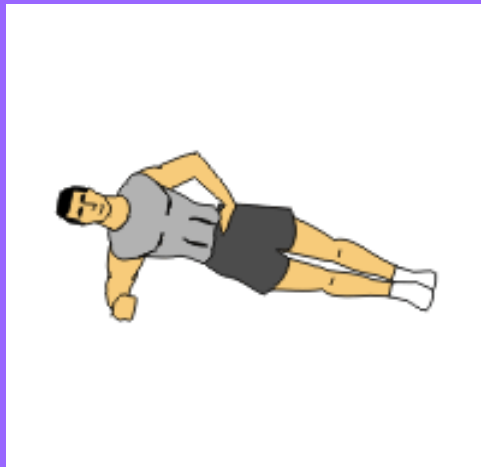
Scapular exercise: Retraction



Hitch Hiker, Fish Flops, Superman



Core Strengthening



- Pelvic Thrust
- Lateral Bridges
- Prone Bridges

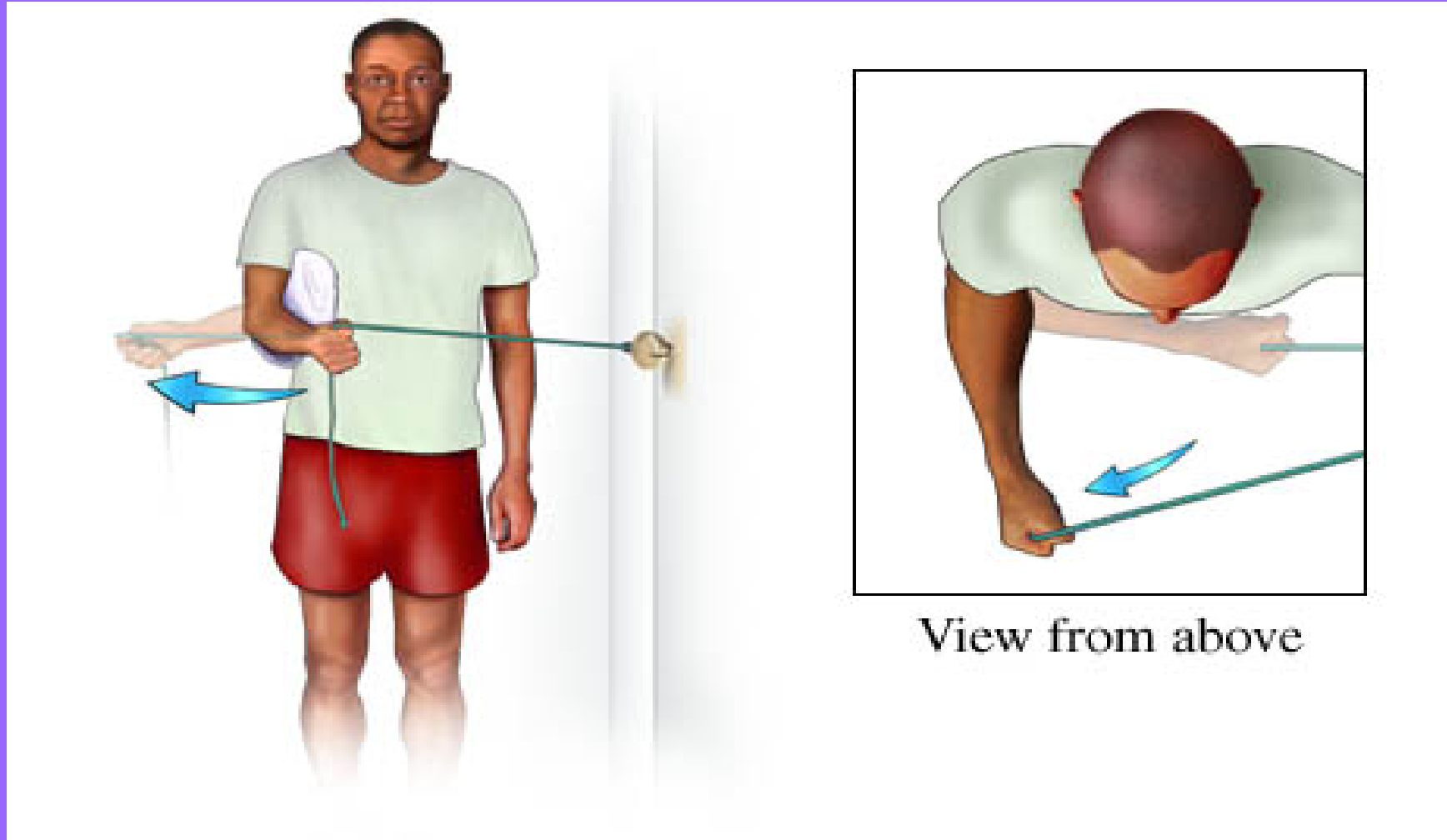
Core Strengthening

- POSTURE! POSTURE! POSTURE!
- PILATES! PILATES! PILATES!

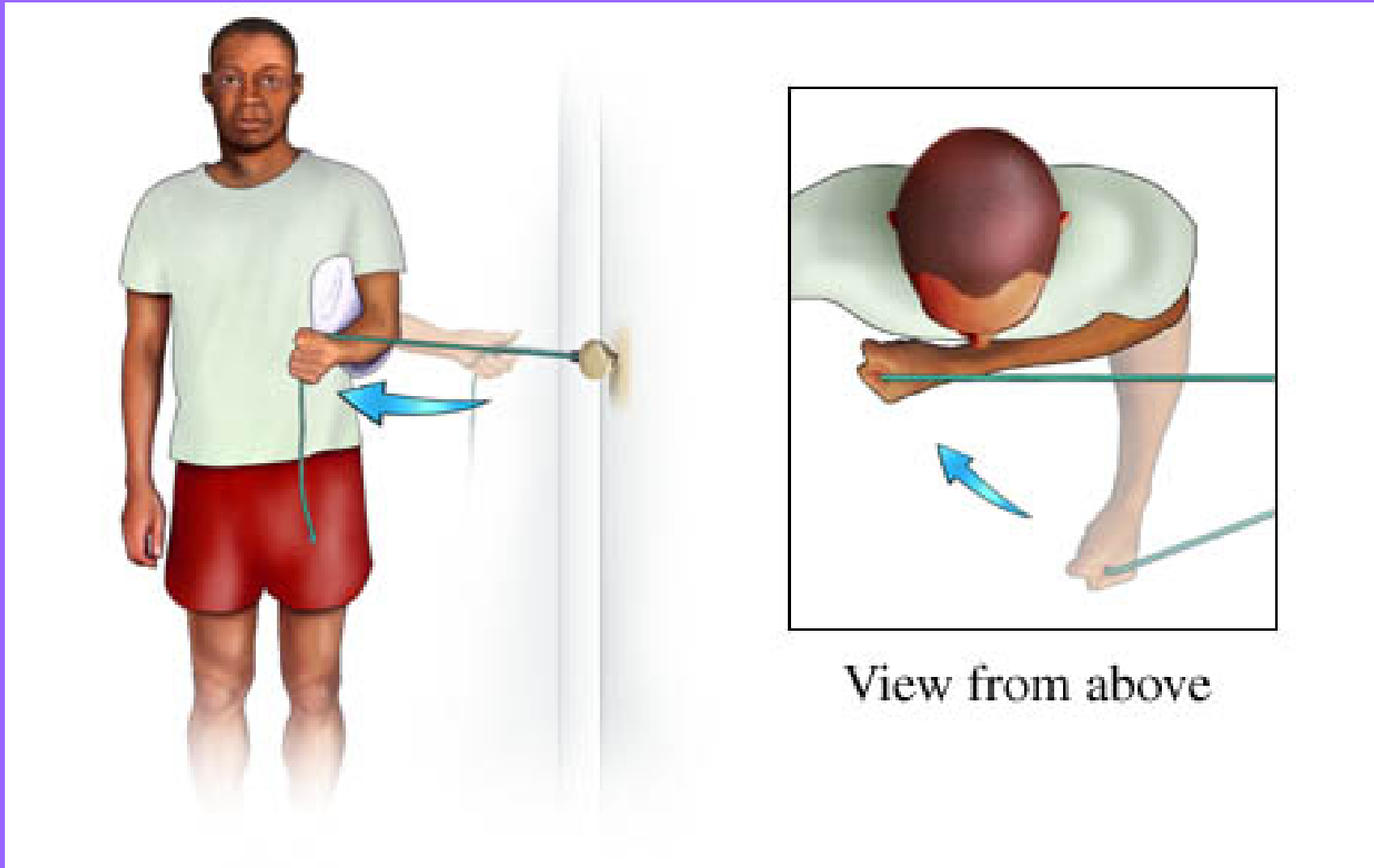
Rotator Cuff Strengthening

- Made of up four small muscle
- Function is to maintain the head of humerus in the center of joint
- Fatigues easily

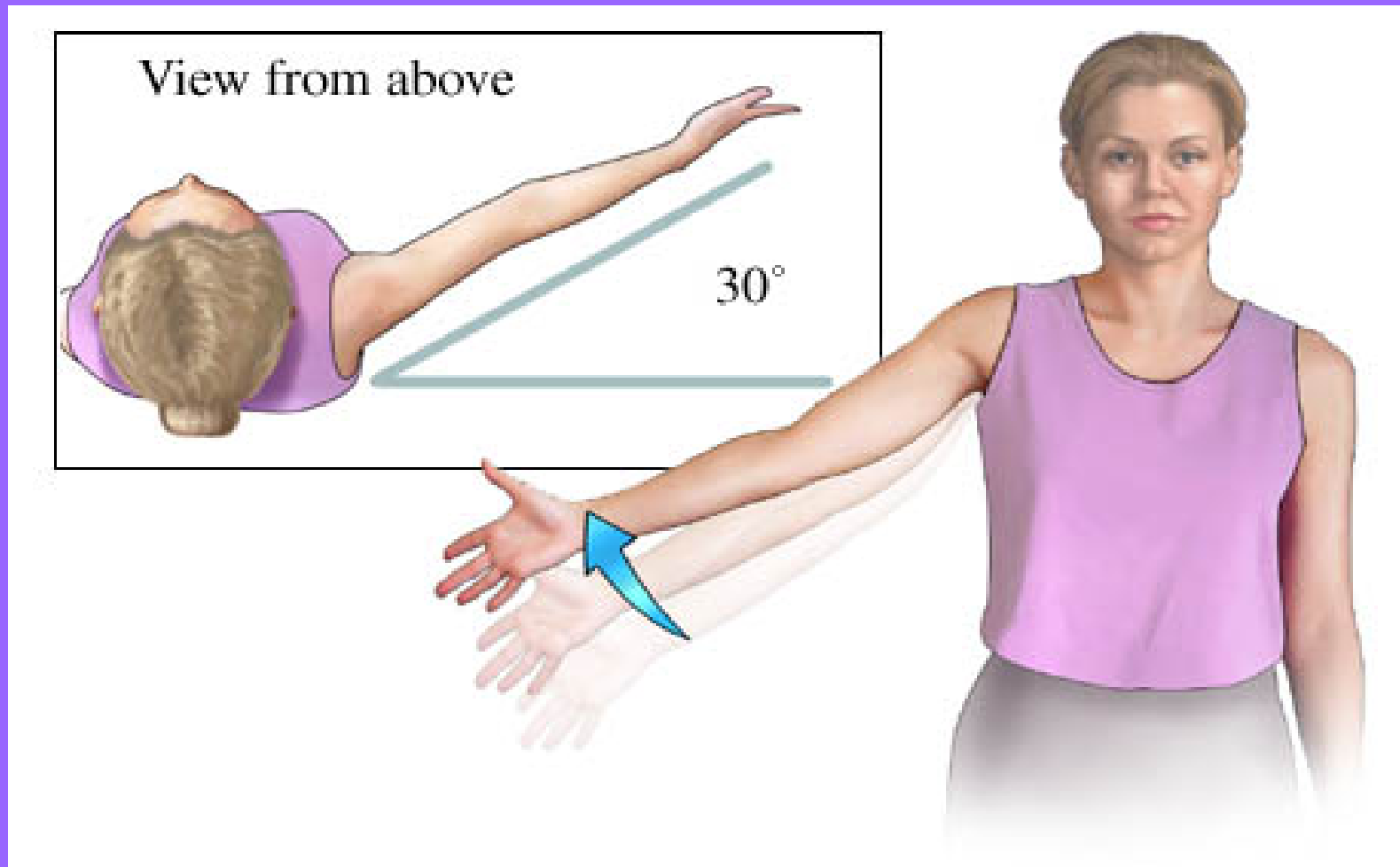
External rotator strengthening exercise



Internal rotator strengthening exercise



Arm raises to the side



Sport-Specific Technique which may cause problems

- Insufficient body roll
- Same side breathing
- Crossover pull-through (catching to the water too close to the midline)
- Thumb-first hand entry
- Poor use of legs!

Overuse? Overtraining?

- No scientific determine guidelines
- Occur with moderate activity with some kids and not in others
- Increase occurrence during growth spurts
- Early treatment of symptoms
- Addressing causative factors

Treatment

- Ice for the first 24-48 hours
- Gentle/Ballistic/Active Stretches
- Check with parents regarding
over the counter
Anti-inflammatory Medications
- If no improvement, see your doctor