



**Valgus Extension Overload Syndrome  
in overhead athletes**







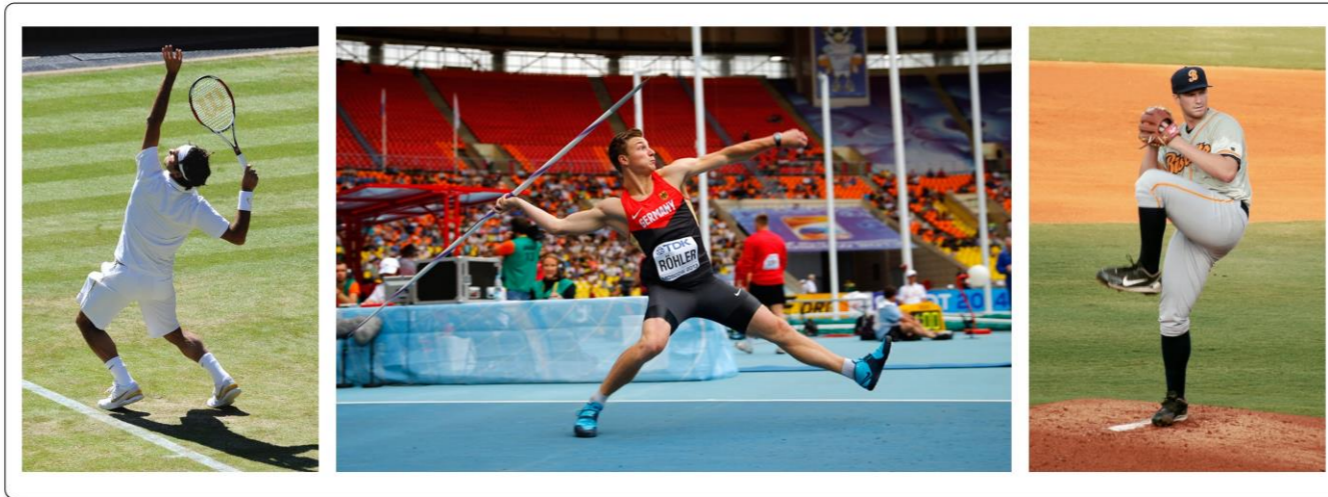








# WIND UP

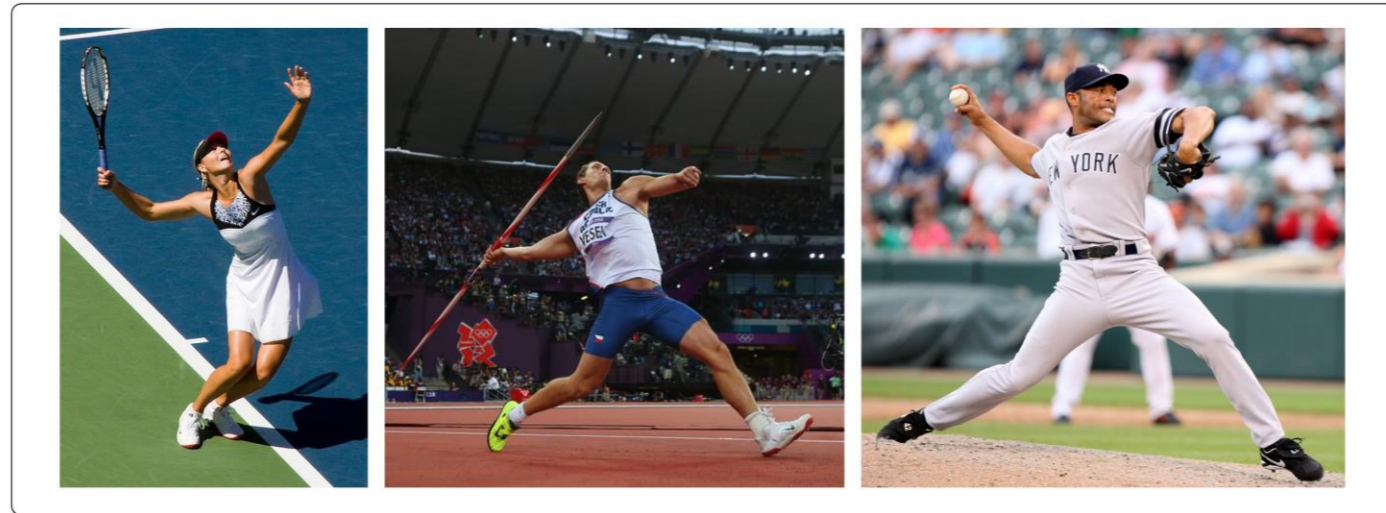


- the body creates tension
- the shoulder of the throwing arm is making a retraction movement
- The athlete keeps his centre of gravity above or a little behind his hind leg to create maximal momentum.





# EARLY COCKING



- the athlete will make a lunging movement
- **classically, the homolateral foot of the throwing arm is planted on the ground, creating a fixed point**
- in this movement the leg can be pulled up highly, diagonally to the body along the direction of the chest
- the heterolateral leg moves from the starting position to a forward lunging position
- the knee and hip of the standing leg will be extended when the foot is placed on the ground
- this movement is followed by a rotation of the trunk
- the shoulder is in external rotation.

# LATE COCKING



- the arm is in maximal backward position
- the Late Cocking Phase occurs during the ground contact time of the standing leg and the moment of maximal external rotation of the shoulder
- **the elbow is in a flexed position**
- the knee of the standing leg is extended
- in tennis, the centre of gravity will be moved from the rear to the front leg



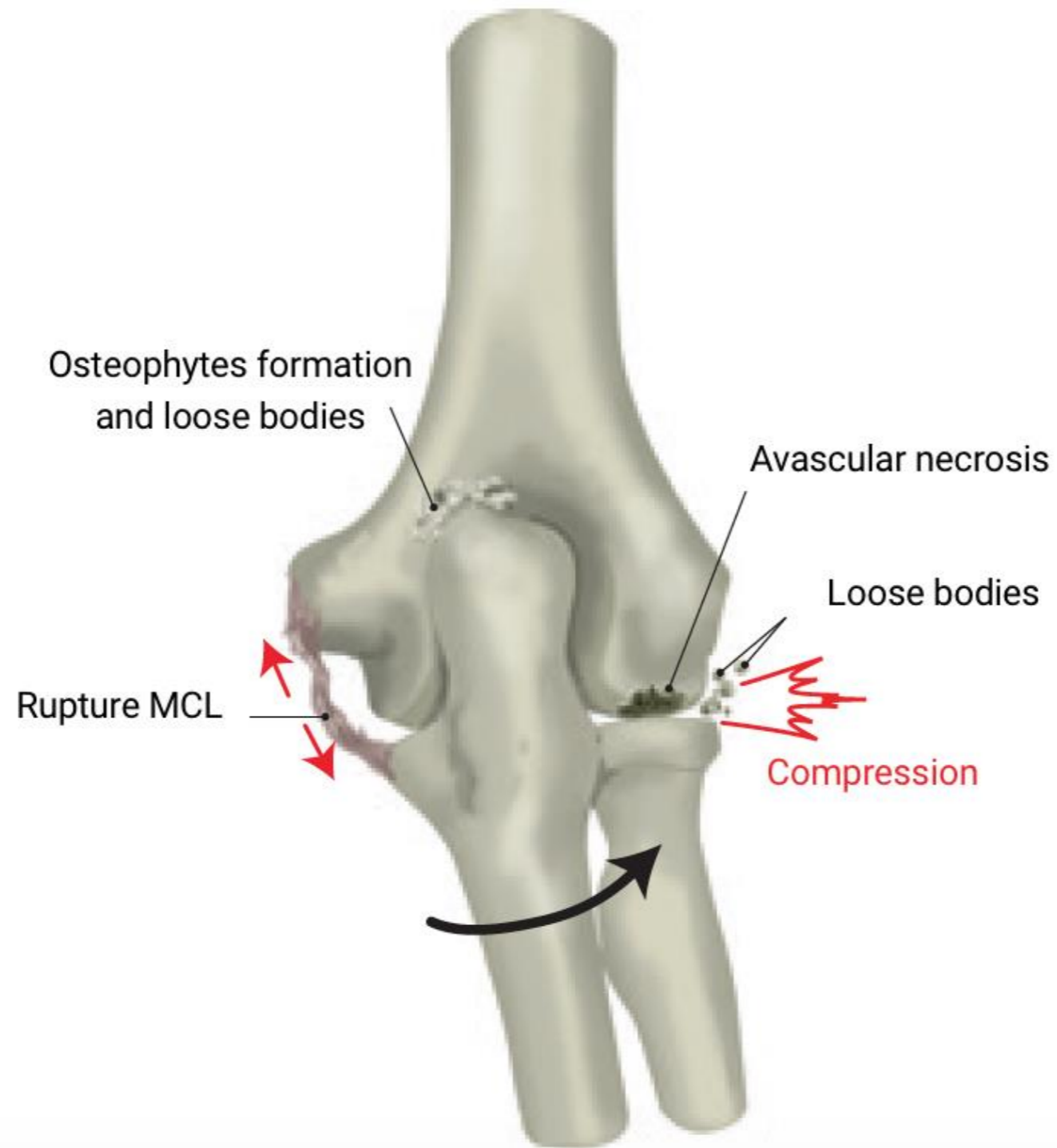


# ELBOW IN LATE COCKING PHASE



- there will be a maximal valgus load on the elbow
- The flexor pronator muscles of the forearm will contribute to resist these forces and need to create a varus moment
- Maximal flexion of the elbow will be limited by eccentric contraction of the triceps
- This will be followed by a concentric contraction when the elbow extends from the Late Cocking Phase to the acceleration phase
- The biceps brachii has maximal effort when the elbow flexes and a stabilizing function in over the shoulder joint.

# VEOLS





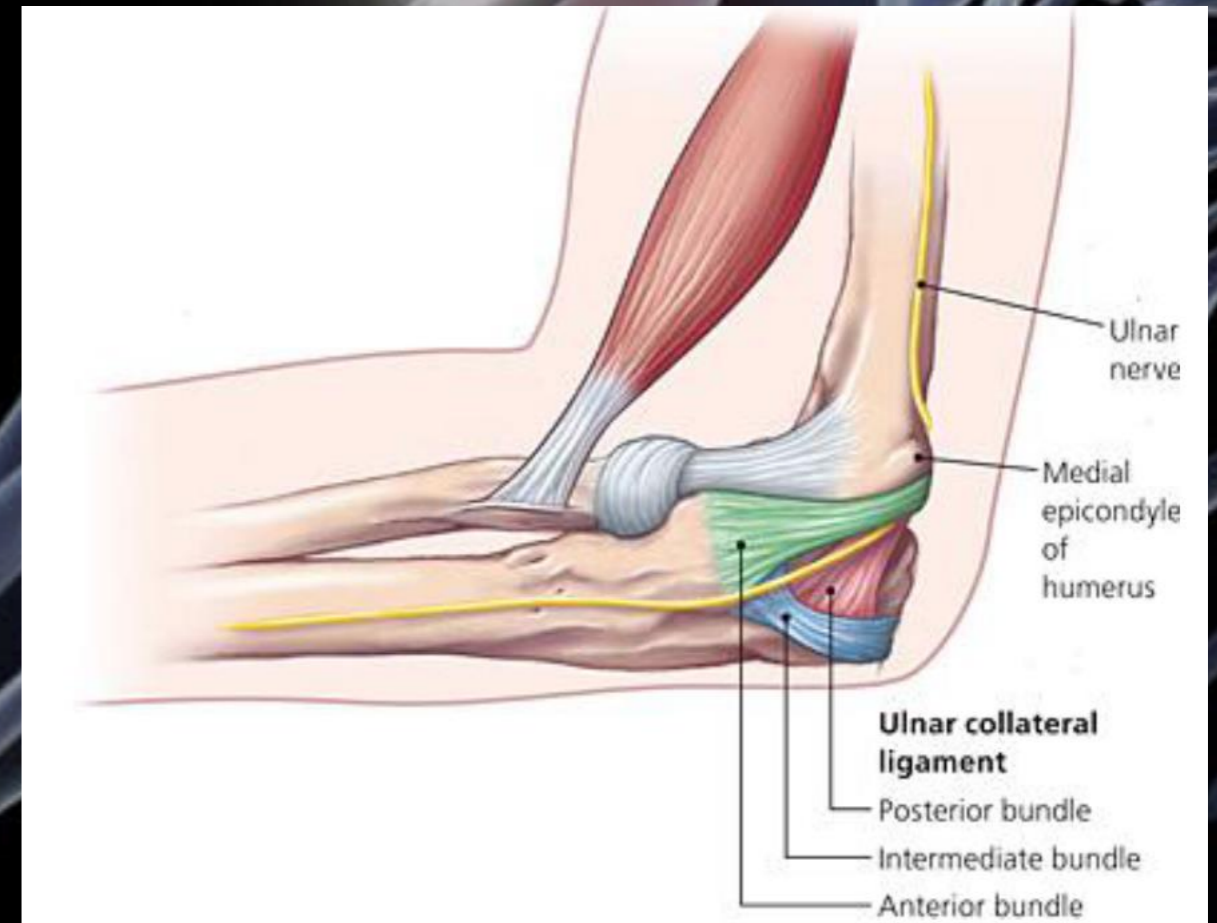
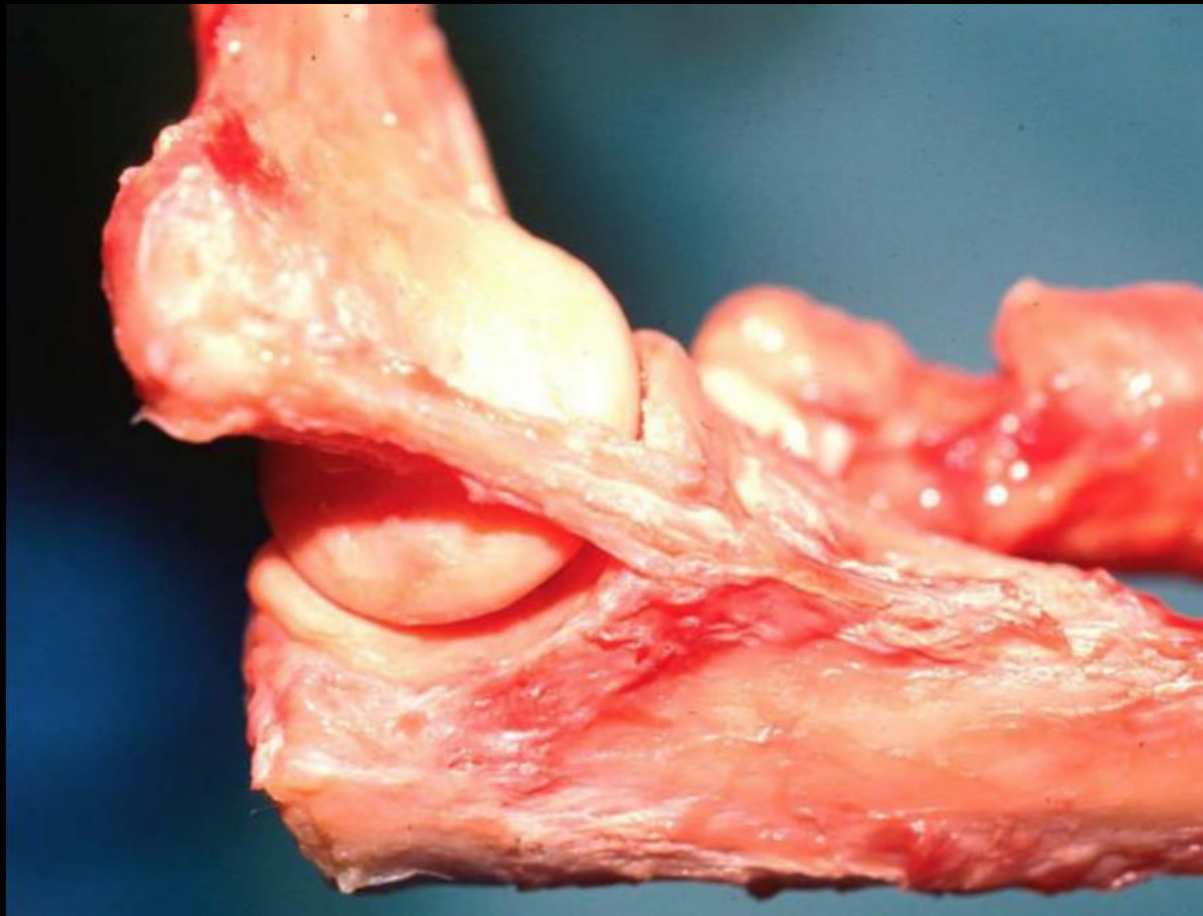
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# Complaints

# Ulnar Collateral Ligament



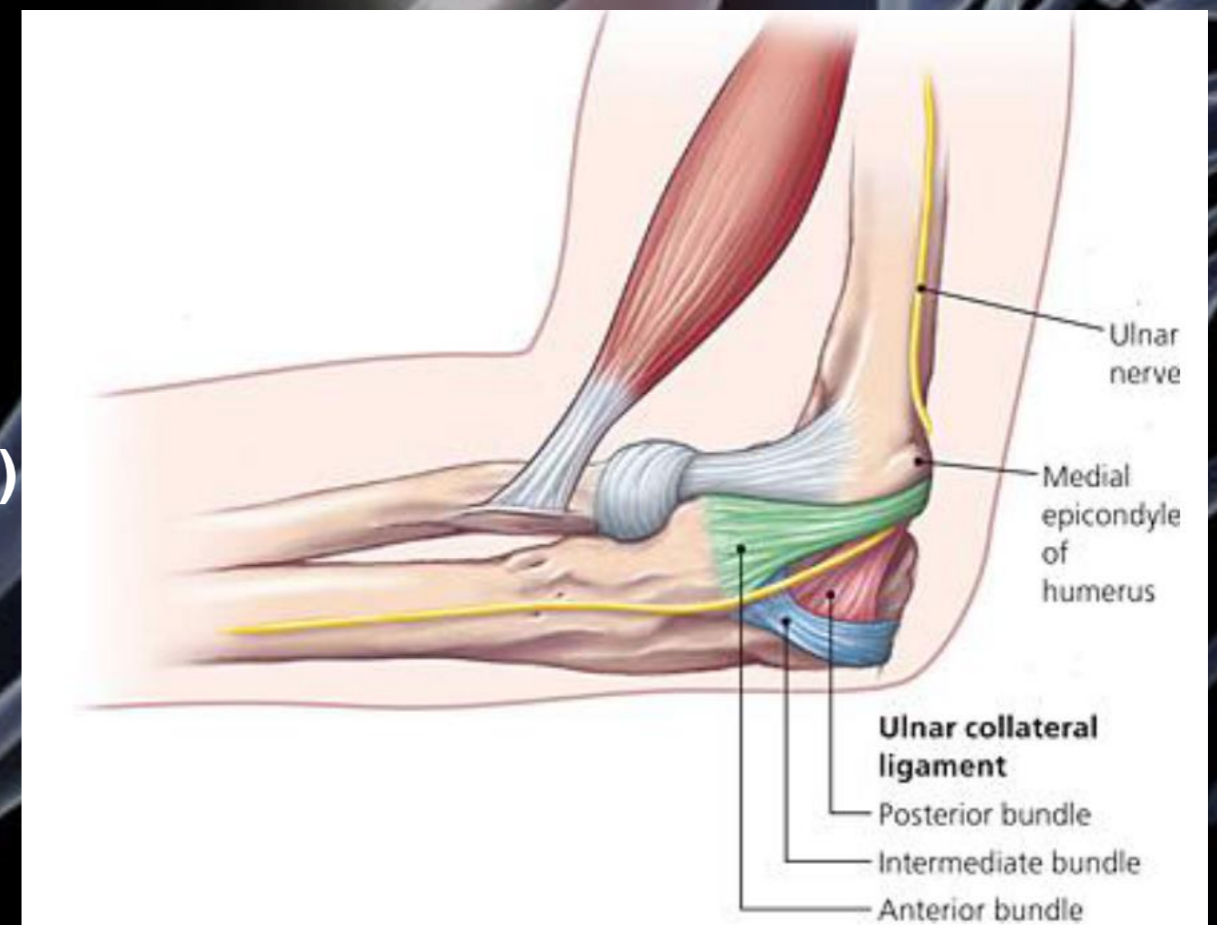
# Complaints

# Ulnar Collateral Ligament

**Anterior Medial Collateral Ligament (AMCL)**  
Stability flexion-extension movements

**Posterior Medial Collateral Ligament (PMCL)**  
Valgus stability 60-135° flexion-extension

**Intermediate ligament**

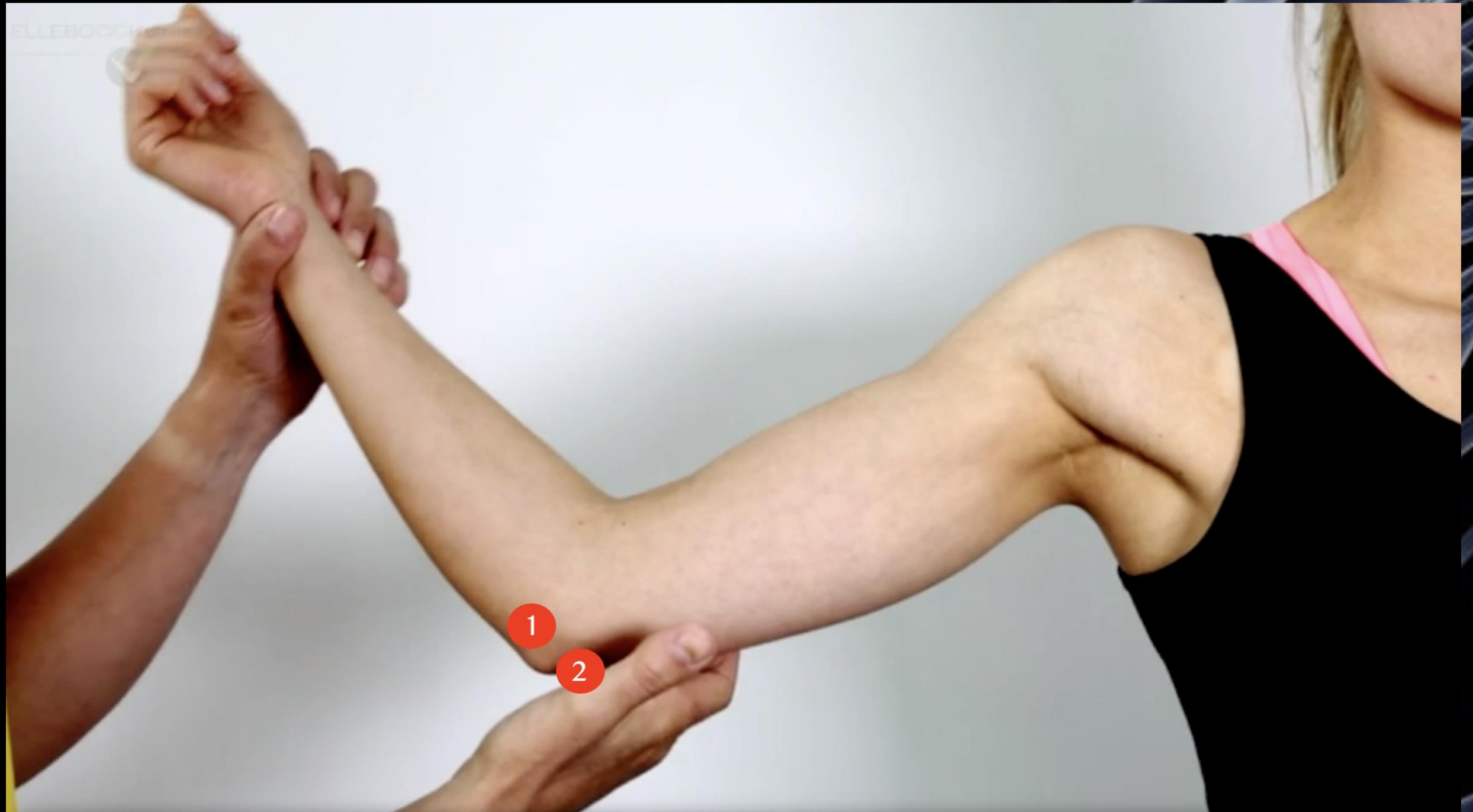


# Moving Valgus Stress Test





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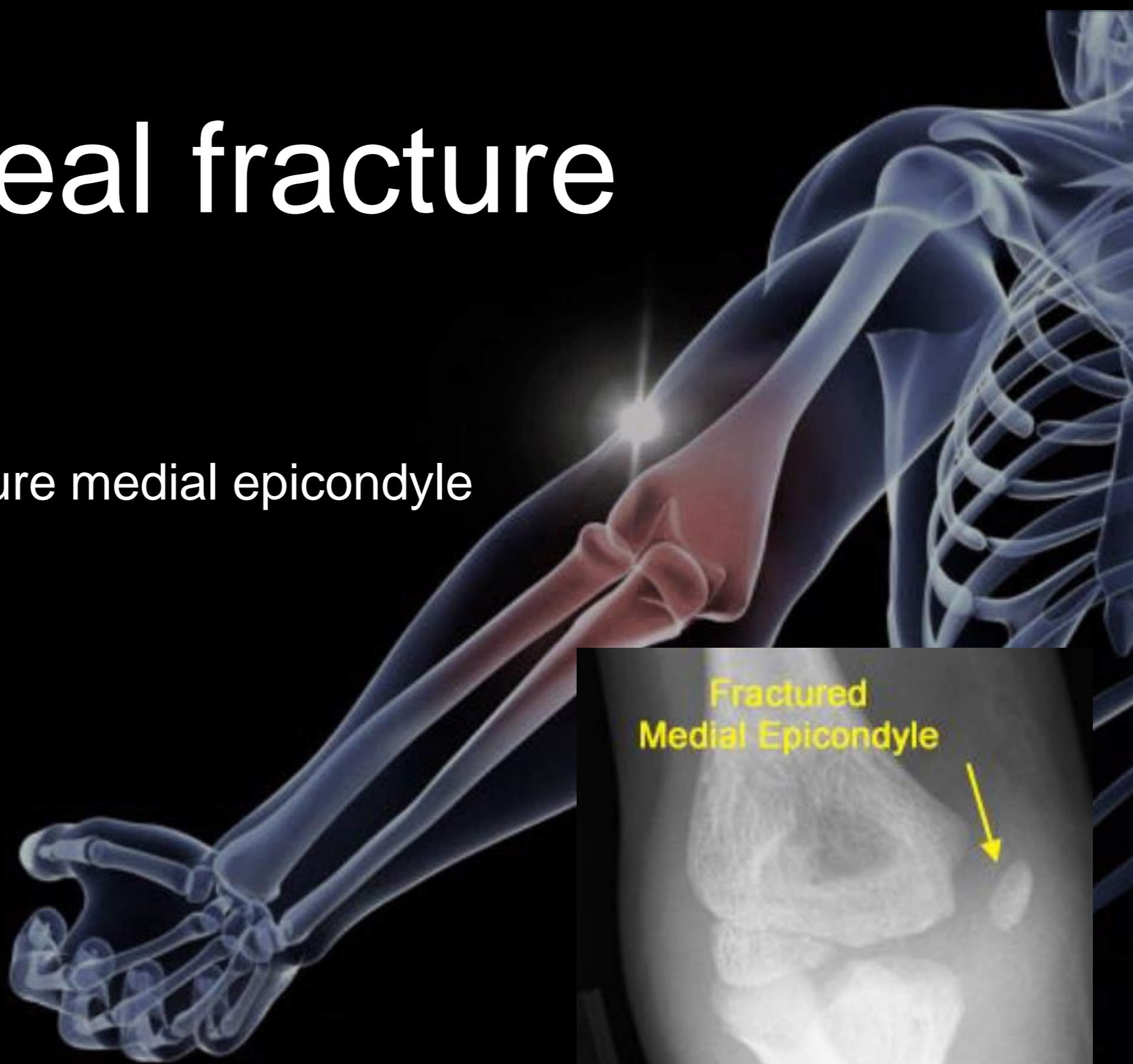
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# Epiphyseal fracture

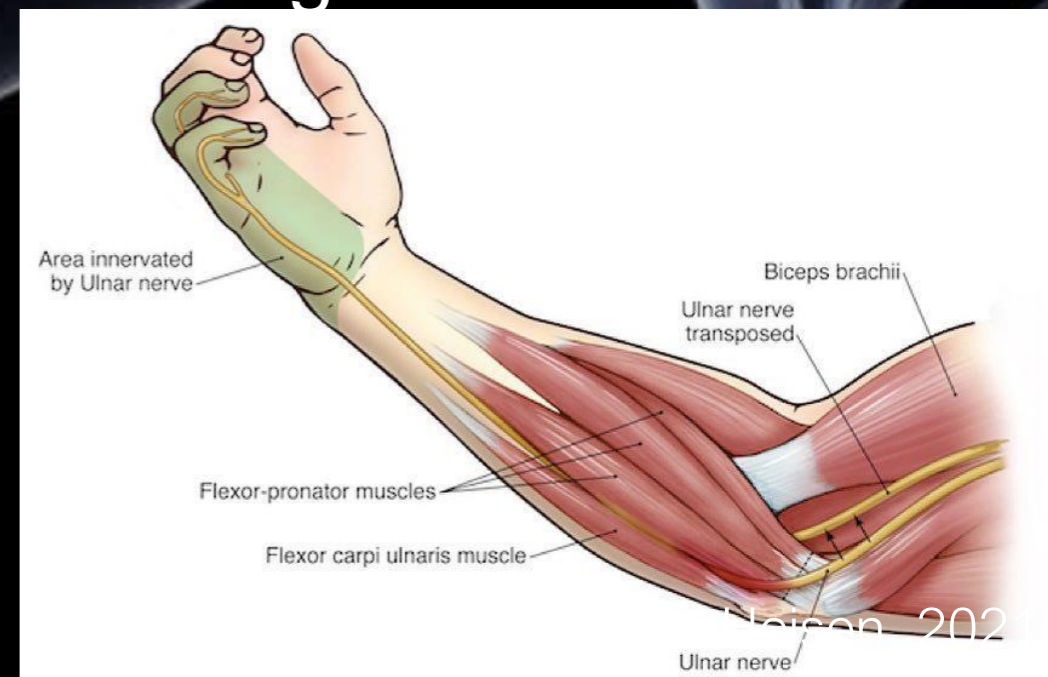
- Avulsion fracture medial epicondyle



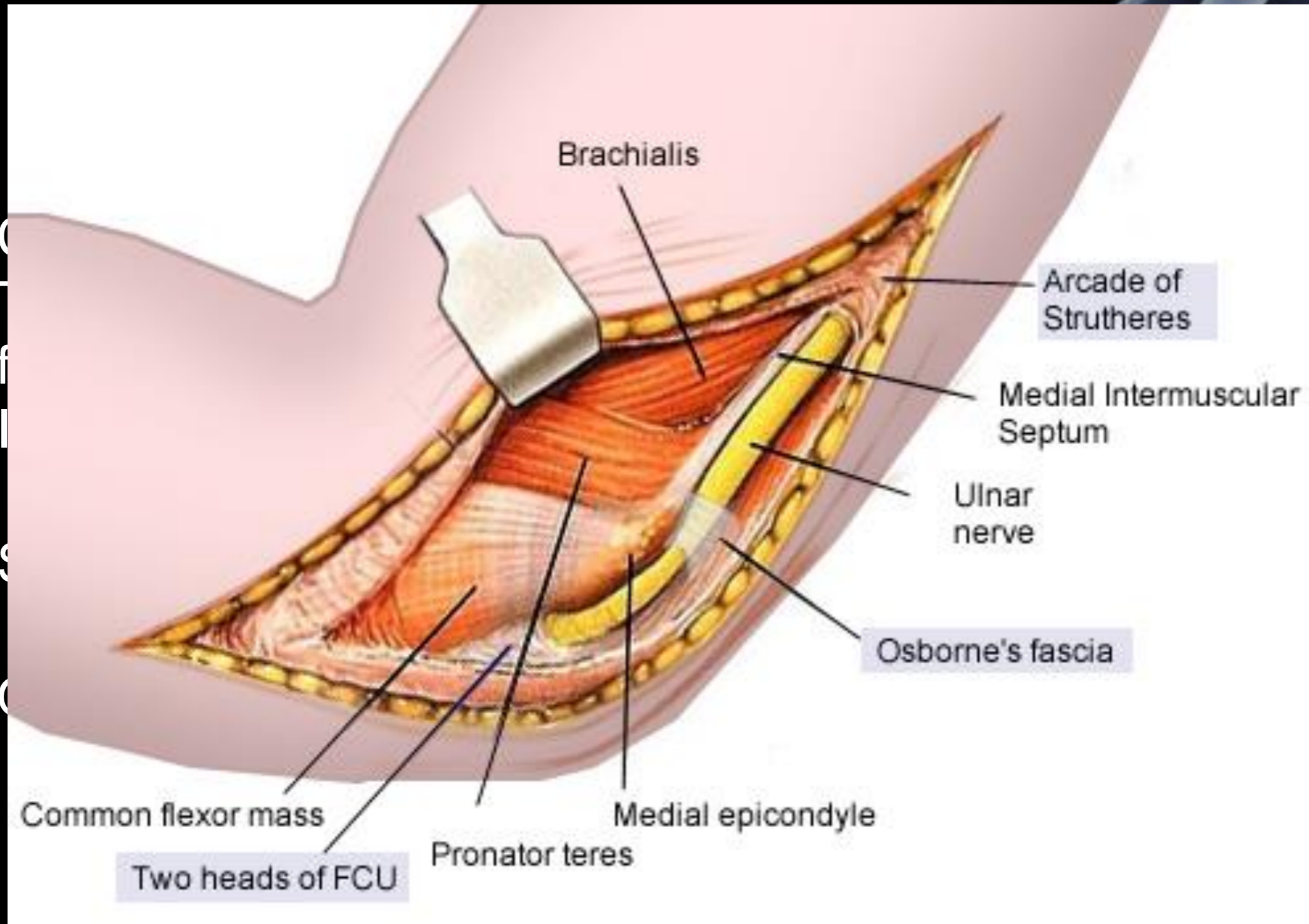


# Subluxations ulnar nerve

- Complaints:  
Tingling feeling in little finger and little finger side of forearm  
Inability to lift and / or squeeze
- Snapping sensation
- Overuse: repetitive valgus stress in throwing movement



# Entrapment ulnar nerve





# Subluxations triceps muscle



- Complaints:  
Pain provocation in extension elbow
- Snapping sensation
- Overuse: repetitive valgus stress in throwing movement



# Examination Medial Side

# Golfer's Elbow



- Complaints:  
Pain medial side elbow when squeezing or tensioning wrist flexor-pronator muscle mass
- Musculotendinous injuries of the muscles that originate at medial epicondyle flexor-pronator mass
- Overuse or trauma due to repetitive throwing movement
- Loss and/or pain in grip strength

# Golfer's Elbow Test







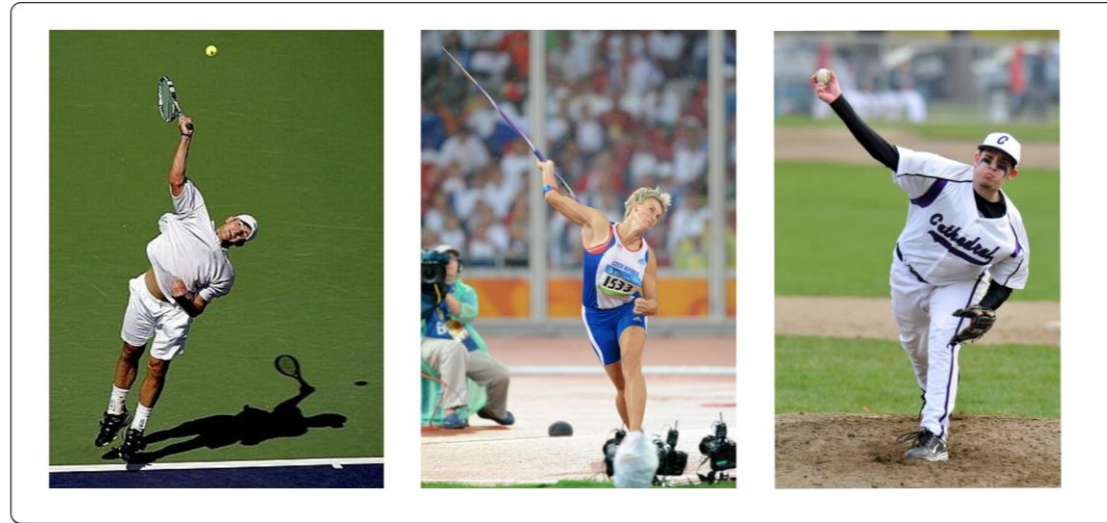


[www.pastimeathletics.com](http://www.pastimeathletics.com)



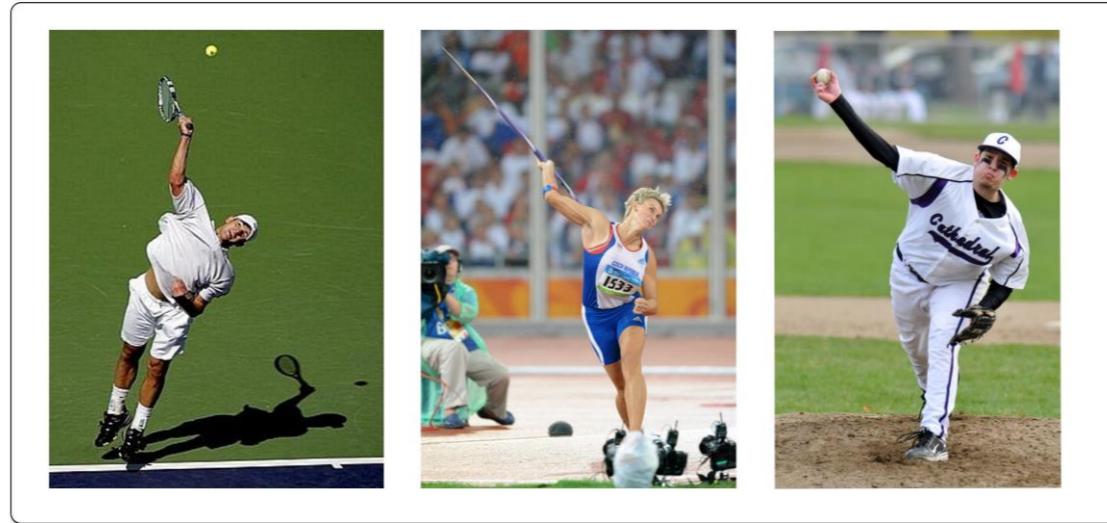


# ACCELERATION



- the acceleration phase is defined as the time between maximal external rotation of the shoulder and the moment the athlete will release the throwing object
- **the trunk continues to rotate, whereby the shoulder generates a horizontal adduction movement and a high intensity internal rotation**

# ACCELERATION



- During the acceleration phase, the elbow flexes from 90 to 120° flexion to  $\pm 25^\circ$  extension just before the release of the object
- Extension of the elbow is caused by a combination of centrifugal forces, which are generated by the trunk rotation and concentric contraction of the triceps.
- Just before the release, the elbow extension reaches a maximal angular velocity of 2251° per second.
- A palmar flexion movement and radioulnar pronation movement of the wrist supports the release of the object.

# Posterior impingement

- Complaints:  
Sharp pain posterior side elbow in end position extension
- Restricted end position extension
- Overuse: repetitive valgus stress in throwing movement



# Posterior impingement

# Arm bar test

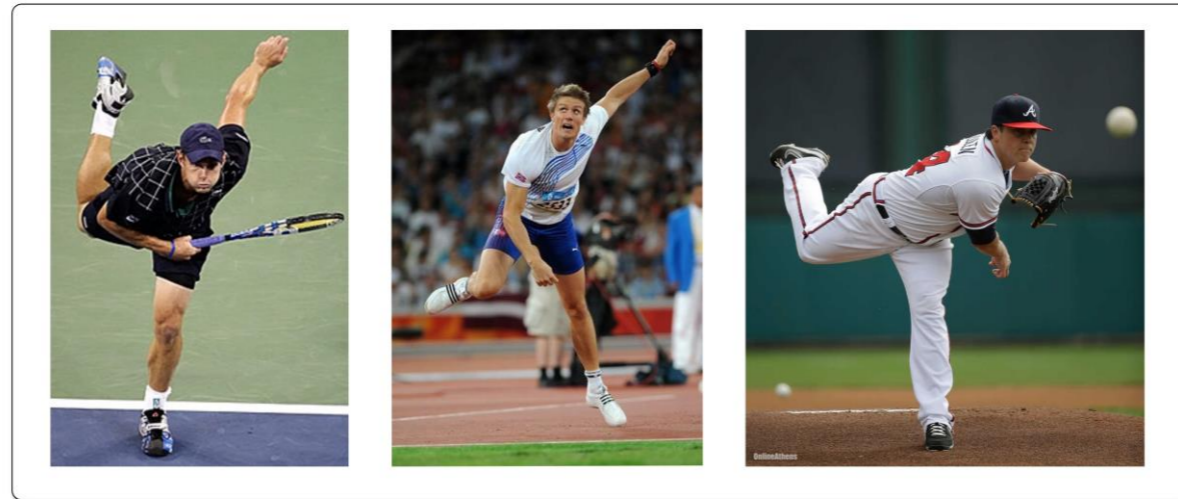


- Arm Bar Test



- Extension Impingement Test

# FOLLOW THROUGH



The Follow Through Phase is also known as the Deceleration Phase.

This phase is known as the phase between the release time of the object and the maximal internal rotation position of the shoulder and extension position of the elbow.

The phase ends with finishing the humeral rotation to  $0^{\circ}$ , shoulder abduction to  $100^{\circ}$  and an increase of the horizontal adduction to  $35^{\circ}$ .

The load on the shoulder joint is the greatest in this phase of the throwing cycle. The posterior shoulder muscles (teres minor, infraspinatus and deltoid) have to resist the loads in the deceleration phase.

**After the release of the object the trunk is bending forward. The elbow will relax in a flexion movement and the arm is in adducted position. During the deceleration, the biceps brachii and brachialis will contract to retard the extension movement of the elbow and pronation of the forearm.**



In 10 minutes you remember only 50% of what I just have said

Tomorrow that drops down to 25%

In a week only 10%

.....

The Late Cocking and Acceleration phase are the most important phases to analyse elbow injuries in overhead athletes

Evaluate what's the main cause of the complaints

On the medial side differentiate in UCL#, flexor-pronator muscle mass, ulnar nerve, posteromedial impingement

**jelle heisen**

