UCL: It Is Not Just the Forces; It Is the Time Spent In Each Position

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If You Continually Hit Your Thumb When Using A Hammer, Hammering Less Is Not the Answer

Efficient Pitching is Linear Yet Angular ——Not Curvilinear

Think Stacking

Think Angular

Pitching is Linear Yet Angular ——Not Curvilinear

More Curvilinear

More Linear

Guess Who Had UCL Reconstruction???

UCL & Shoulder Studies: Isolation vs. Integration

elbow flexion between 90-120 degrees during acceleration phase

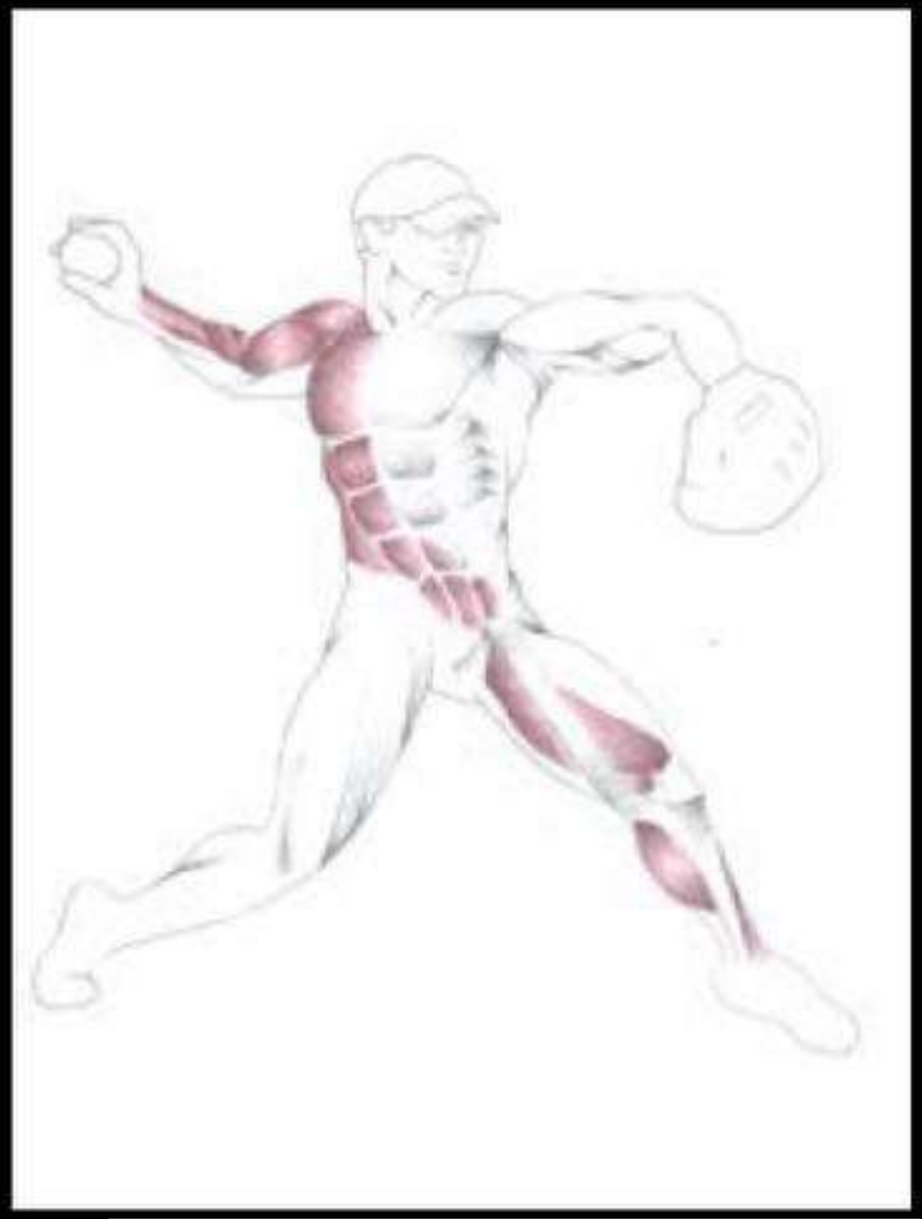
peak angular velocities > 4500 deg/sec

absorbed @ medial anterior oblique UCL

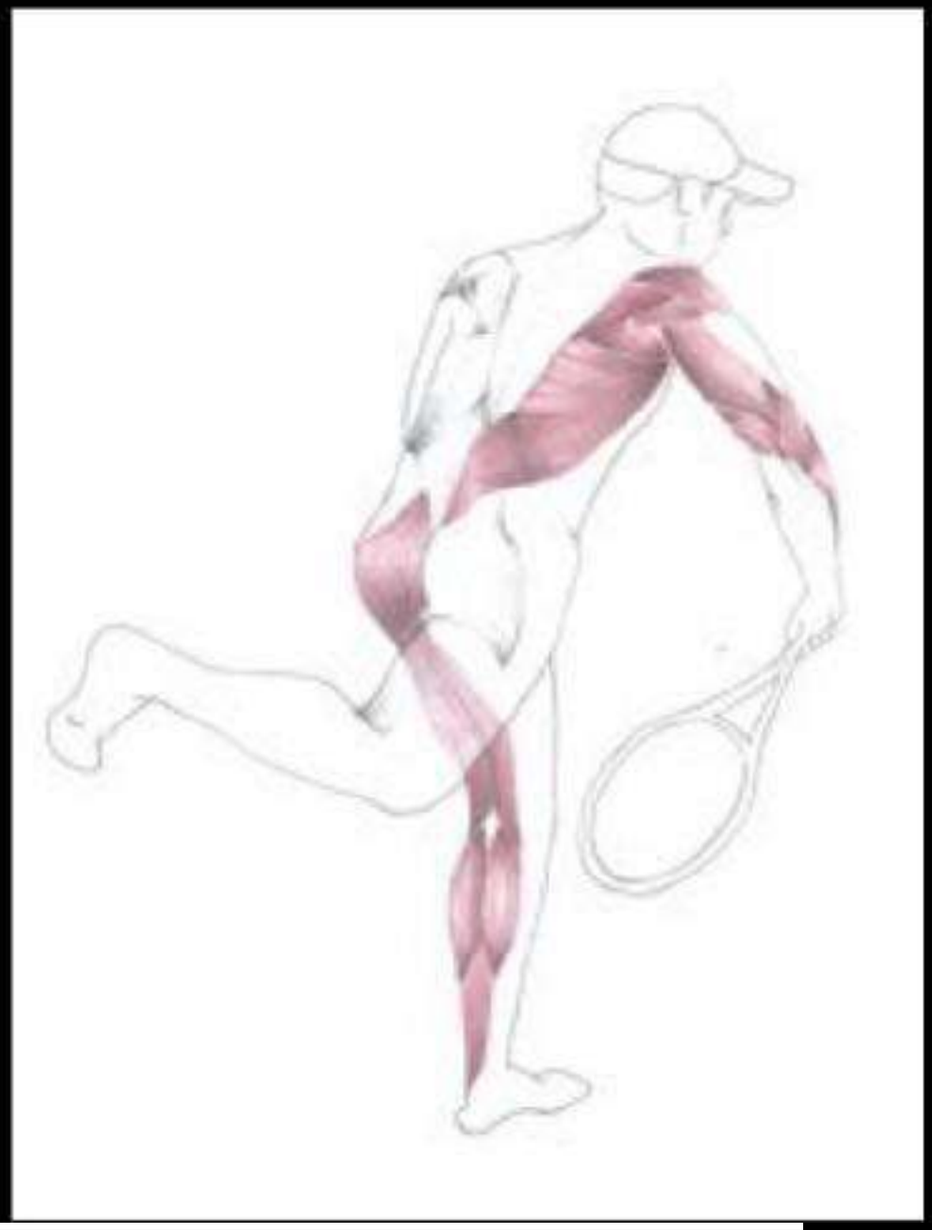
tightness in shoulder increases stress at elbow…

…but what about the hips???

Fascial Alignment Connects the Shoulder to the Hips



Anterior X-Factor
enhances ext. &
rot. moments



Posterior X- Factor
enhances flex. &
rot. moments

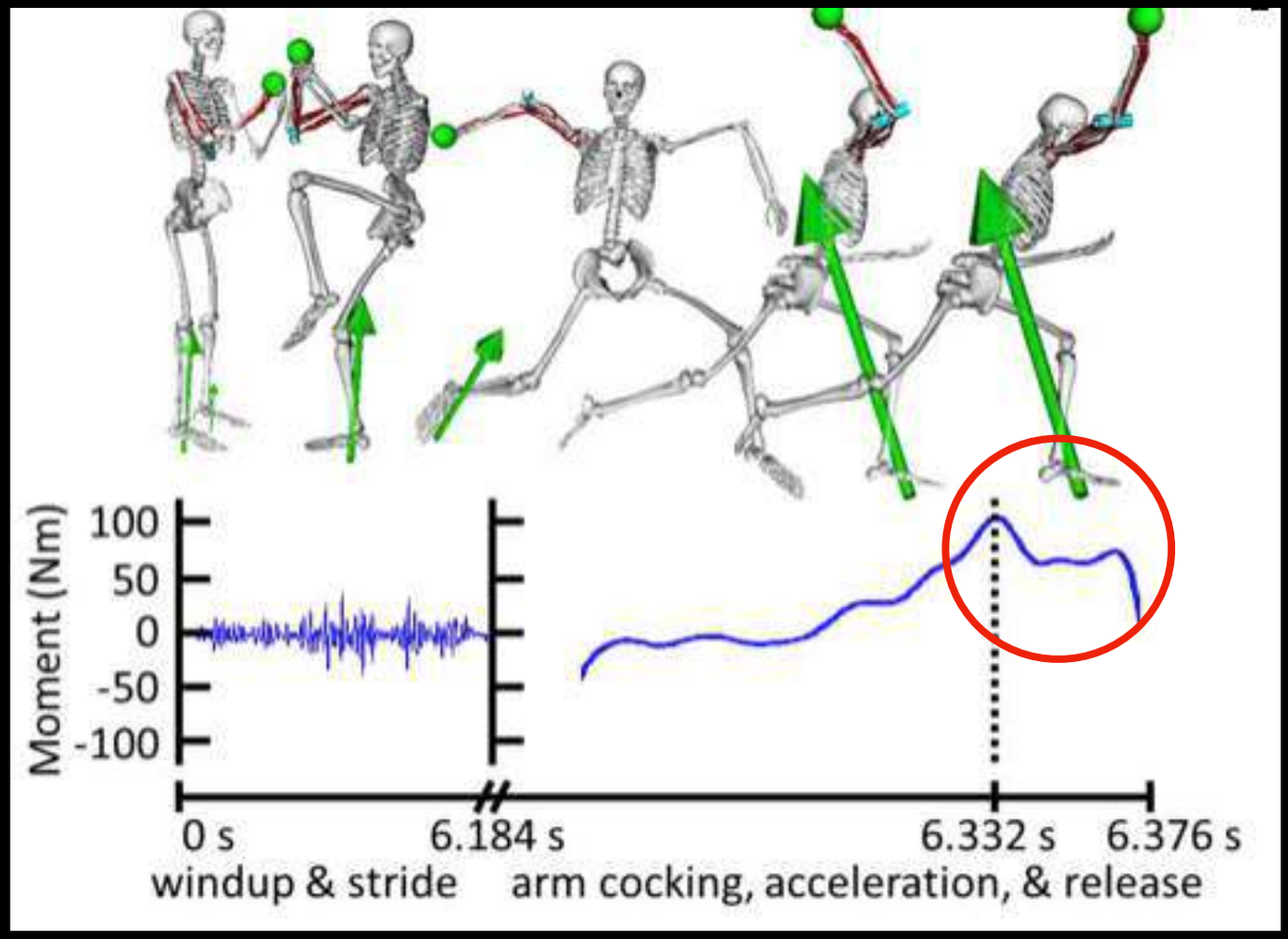
Association of Opposing Hip Internal Rotation to Elbow Injuries

Base upon Single Leg Balance IHR Assessment

***Non-Injured Players Average IHR*: <u>34.5 degrees</u>**

***Injured Players Average IHR*: <u>29.4 degrees</u>**

Secondary Valgus Force During Release & Deceleration



Nm = .74 pound-foot

Longer arm with lateral trunk flexion increases TUT and valgus force on the elbow. Study says 33% of valgus variance resulted in injury

(summary of study by Sabick et al)

About 10% of all shoulder injuries in high school players result in surgery

73% of pitchers with a horizontal arm delivery (sidearm throwers) reported shoulder or elbow injury vs 21% with more vertical arm slot

Huang et al reported youth players with a history of elbow pain threw with more elbow extension at maximum external rotation & greater lateral trunk flexion at release — — — leads to increased TUT!

Shoulder external rotation can range between 170-190 degrees (normal ranges 120-140 deg.). Combine with trunk lateral flexion, increase risk of Valgus force on elbow and posterior shoulder impingement

Common Throwing Faults

Drift

Throwing Uphill

Hands Separate Late

Over Stride

Hand Too Low

Tight Internal Rotation of Lead Hip

Drills to Improve Throwing Mechanics

Goals

Improve Arm Slot
Improve Arm Speed
Improve Timing/Rhythm
Proper Stride Length
Increase Flexibility

Drift, Hands Separate Late, Chest Behind Lead Leg

Drifts

Hands Late

Look for Shoulder ABD/ER moment

Chest not over lead leg

Throwing Drills &Technique

Association of Hips & Shoulders: The X-Factors

Towel Drills from Knee

Develop timing for early hand separation

Get out front so arm doesn’t lag behind

Develop hip/torso dissociation

Chest to Glove Hand

Get out front so arm doesn’t lag behind

Develop strong glove side

Throwing Drills &Technique

Association of Hips & Shoulders: The X-Factors

Load the Back Side

Prevent drifting

Hips over rubber: weight back

Inside Pick Off Move

Improve arm slot

Shorter arm slot: reduce TUT

Increase Arm Speed

Overstride

Drifts

Hands too high:
too long of motion

Hands Late

Overstriding

Chest not over
lead leg

Tight R ADD
lacks triple ext.

C-profile of spine

Lead hip relative
ABD causing
lack IHR

Overstride
Corrective Drills

Throwing Uphill & Hands Too Low

Drifts

Hands too high: too long of motion

Hands Late

Throws Uphill

Throwing hand too low

Overstriding

Chest not over lead leg

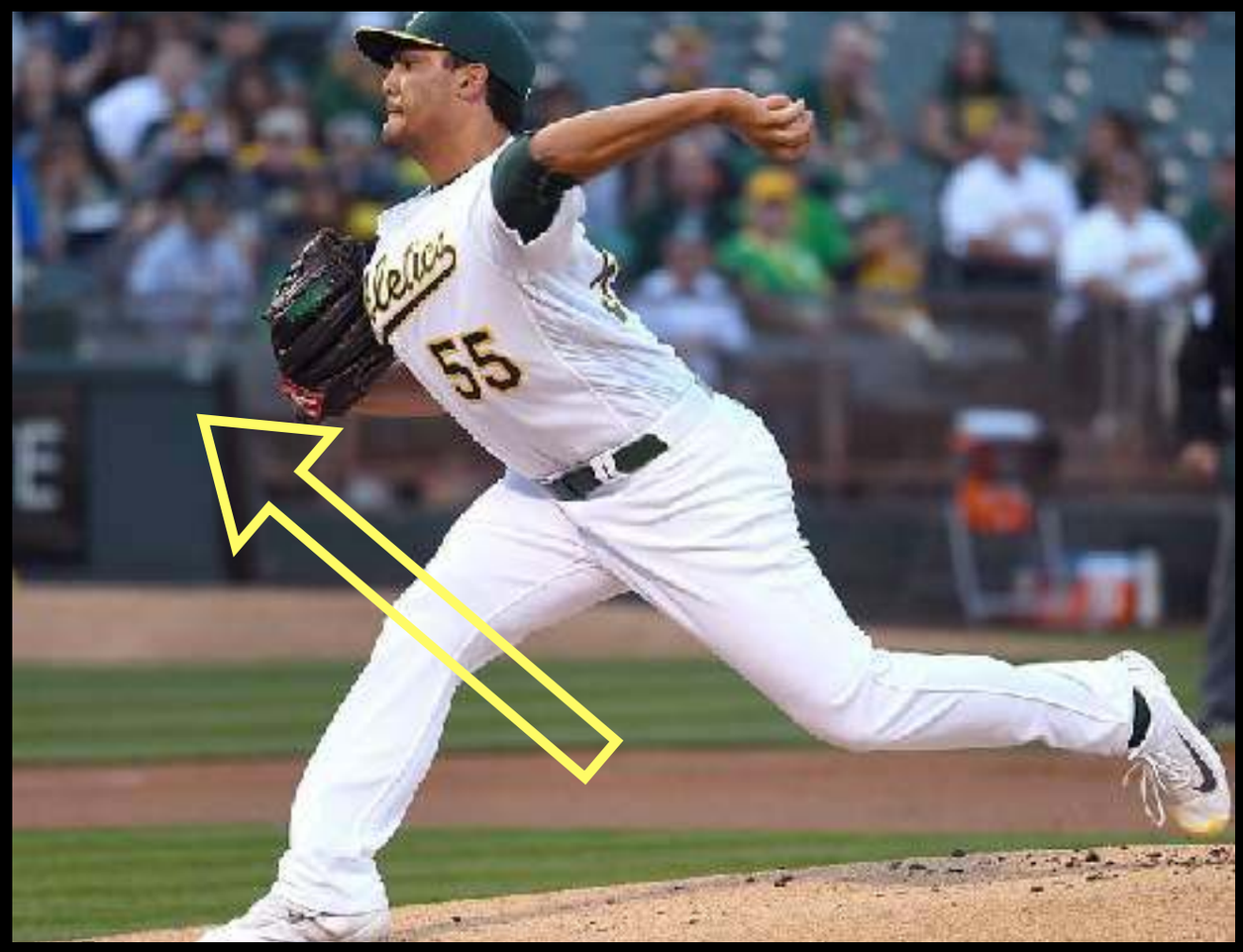
Throwing Uphill & Hands Too Low
Corrective Drills

Towel Drills from Knee

Chest to Glove Hand

Inside Pickoff Move

Timing & TUT



Good Timing

Hands slightly high

Throwing hand at excellent level

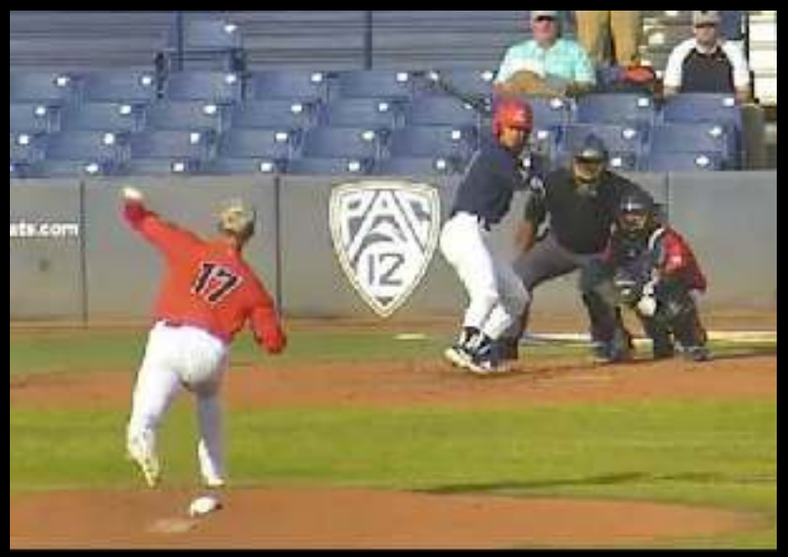
Good stride length

Good extension

Chest over lead leg

Great balance

Relationship of Chest Over the Lead Leg



Thank You for Attending!!!

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Shoulder external rotation can range between 170-190 degrees (normal ranges 120-140 deg.). Combine with trunk lateral flexion, increase risk of Valgus force on elbow and posterior shoulder impingement

Must improve mechanics and reduce time under tension upon the UCL

Internal rotation velocities between 6000-7000 deg/sec; while elbow extension at rates up to 2000 deg/sec

Shoulder rate of deceleration go from 7000 deg/sec to 0 in 50 ms
Increases strain to posterior shoulder capsule and muscle tissue...
But need to dissipate those forces through PXF

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Drift, Hands Separate Late, Chest Behind Lead Leg Corrective Drills