

Basic Evaluation of Pitching Mechanics



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2013 Sport Medicine Update
KCAC
November 10th, 2013



Objectives

- Understand the phases of overhead pitching.
- Understand the use of video/pictures to evaluate pitching mechanics.
- Understand proper overhead pitching mechanics.
- Understand the relationship between proper pitching mechanics and injury prevention.



What is meant by “basic”?

- One camera
- Limited shutter speed
- No body markers
- Limited video software
- Limited angles



Why worry about mechanic?

- Decrease injuries^{1,2,}
- Improve accuracy
- Improve velocity



Why worry about mechanics?

1. J. T. Davis, Orr Limpisvasti, Derrick Fluhme, Karen J. Mohr, Lewis A. Yocum, Neal S. ElAttrache, and Frank W. Jobe

The Effect of Pitching Biomechanics on the Upper Extremity in Youth and Adolescent Baseball Pitchers Am J Sports Med August

2009 37 1484-1491;doi:10.1177/0363546509340226

Conclusions Youth pitchers with better pitching mechanics generate lower humeral internal rotation torque, lower elbow valgus load, and more efficiency than do those with improper mechanics. Proper pitching mechanics may help prevent shoulder and elbow injuries in youth pitchers.

Why worry about mechanics?

2. Stephen Lyman, Glenn S. Fleisig, James R. Andrews, and E. David Osinski

Effect of Pitch Type, Pitch Count, and Pitching Mechanics on Risk of Elbow and Shoulder Pain in Youth Baseball Pitchers
Am J Sports Med July 2002 30 463-468

Conclusions: Pitchers in this age group should be cautioned about throwing breaking pitches (curveballs and sliders) because of the increased risk of elbow and shoulder pain. Limitations on pitches thrown in a game and in a season can also reduce the risk of pain. Further evaluation of pain and pitching mechanics is necessary.

What is the chief complaint?

- Is it an issue of:
 - Pain
 - Stiffness
 - Accuracy
 - Velocity
- When did it start.
- What aggravates.



Medical history

- Look for:

- History of orthopedic injuries:

- UE
- Spinal
- LE

- History of neurological injuries.

- Pitching history.

- Recent pitch count.

- Training methods.



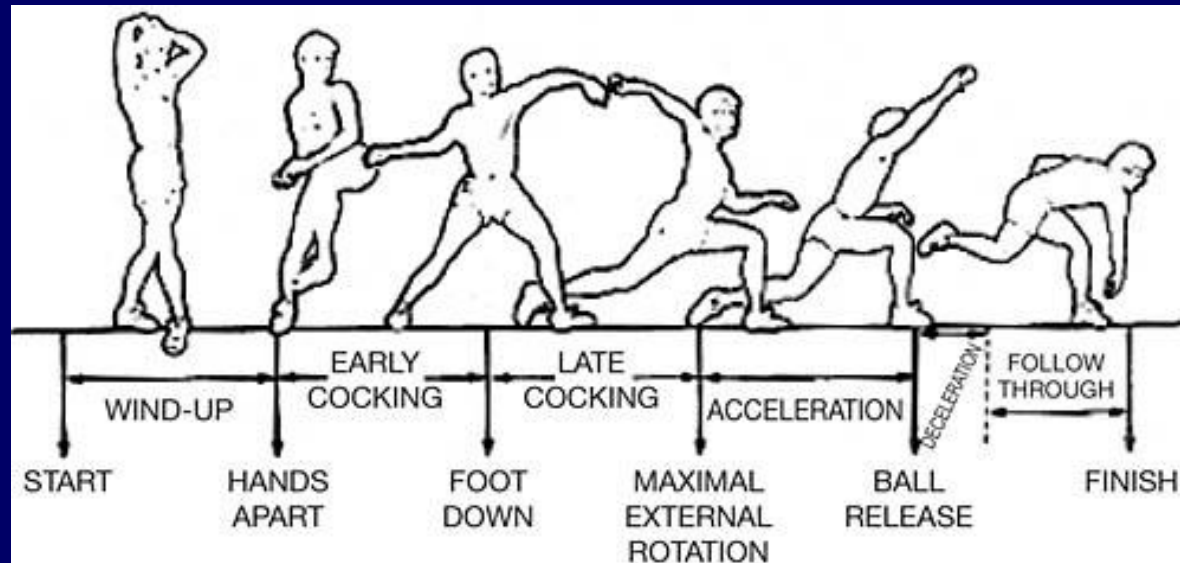
General Musculoskeletal Evaluation

- Look at:
 - Posture
 - ROM of UE's – Especially IR/ER
 - Strength of UE's/Shoulder Complex
 - Core strength/ Spinal ROM
 - Lower extremity strength/ROM
 - Hamstring length
 - Palpation



Breaking Down the Pitching Mechanics

- 1. Wind-up.
- 2. Early Cocking.
- 3. Late Cocking.
- 4. Acceleration.
- 5. Follow-thru.



- It's helpful to breakdown the throwing mechanics with high speed video/pictures to further assess the athletes performance.

Capture high speed video/pictures

- Collect these angles for full windup and stretch position:

- Open side
- In front
- From behind

Be sure pitcher is pain free.

Be sure to throw from a mound.

Be sure pitcher is fully warmed up.



Wind-Up Phase

- Windup starts with hands together and ends once hands come apart.
- **LOOK FOR –**
 - **1. Balance Point**
 - Pitcher balances on back leg
 - Front thigh parallel or > to ground
 - Back shoulder over rubber



Wind-Up Phase

- Stay on the “backside”. Balanced over back leg.



Wind-Up Phase

- Make sure the pitcher is not starting an early movement with glove-side shoulder to the plate.



Early Cocking Phase

- This phase starts once hands begin to separate and ends once front leg lands on the mound. (Stride and Separation)
 - **Look for:**
 - **Early separation of hands. Sweeping action. (Ball out early)**
 - **Front hip lead. Hard drive from back leg.**
 - **Long stride. (about 80% - 85% of body height)**
 - **Elbow to elbow and shoulder to shoulder position.**
 - **Hips and shoulders closed just before front leg contacts mound.**
 - **The “Power Position”****

Early Cocking Phase

○ Look For:

● Early separation of hands

- This allows the throwing arm enough time to be in good position for late cocking phase.



Early Cocking Phase

- Look For:
 - Early separation of hands



Early Cocking Phase

○ Look For:

- Late separation of the hands will effect late cocking phase of throwing and ultimately delivery of the ball. The throwing arm will have to “catch-up”. This increase humeral internal rotation velocity.



Early Cocking Phase

- **Look for:**

- **Front hip lead. Hard drive from back leg.**
- Generates kinetic energy



Early Cocking Phase

○ Look for:

- Front hip lead and back leg drive.



Early Cocking Phase

○ Look for:

- **Long stride (about 80 - 85% of body height in pros)**
 - Further develops kinetic energy.
 - 12" closer to plate = 3 MPH.



Early Cocking Phase

○ Look for:

- **Long stride.** (about 65 - 70% of body height in young athletes)



Early Cocking Phase

○ Look for:

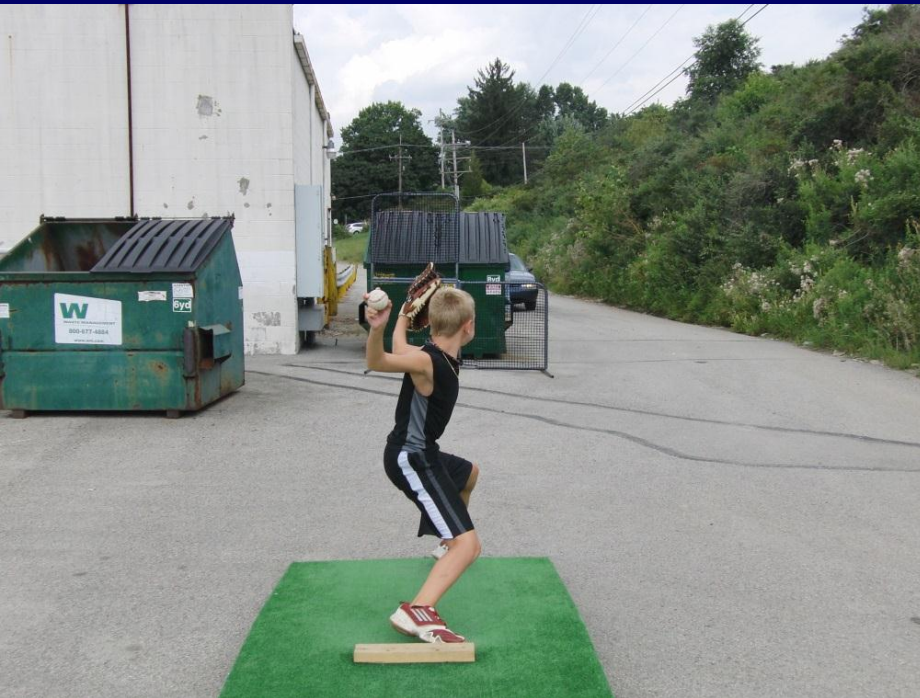
- **Elbow to elbow and shoulder to shoulder position right before front foot contact or just at foot contact.**
 - Allows for accuracy and reproducibility of the throwing mechanics.



Early Cocking Phase

○ Look for:

- Elbow to elbow and shoulder to shoulder position



Early Cocking Phase

- **Look for:**

- **Hips closed.** Belt buckle pointed to third base.

- Pitcher should push down the mound “closed” to home plate.



Early Cocking Phase

- Look for:

- Hips closed. Belt buckle pointed to third base.



Early Cocking Phase

○ Look for:

● “Power Position”

- Last part of Early Cocking.
- Arms extended.
- Front shoulder elevated.
- Front shoulder closed.
- Hips closed.
- Shoulders girdles retracted.
- Back hip just beginning to rotate.
- **It should look like the pitcher is throwing up hill.**

Early Cocking Phase

○ **Power Position.**



Early Cocking Phase

○ **Power Position – good.**



Early Cocking Phase

○ **Power Position - Limited**



Late Cocking Phase

- This phase begins when the stride foot hits the ground and ends once maximum external rotation of the throwing arm has been achieved.



Late Cocking Phase



○ Look for:

- 1. “Toe to Toe” position.
- 2. 80 to 90 degrees of external rotation.

Late Cocking Phase

- **Look for:**

- **Foot to foot position. Good**



Late Cocking Phase

- **Look for:**

- **Foot to foot position - Limited**



Late Cocking

○ Look for:

- 80 to 90 degrees of external rotation. Good.



Late Cocking Phase

○ Look for:

- 80 to 90 degrees of external rotation. Limited.



Acceleration Phase

- This phase begins with maximal external rotation of the throwing arm and ends at ball release.
 - Look for:
 - 90 degrees of abduction during acceleration.
 - Look for ball release over the front foot.



Acceleration Phase

- **Look for:**
 - **90 degrees of abduction. Good.**



Acceleration Phase

- **Look for:**
 - **Limited shoulder abduction.**



Acceleration Phase

- **Look for:**
 - **Ball release at toes or slightly beyond.**



Follow Through Phase

- This phase begins at ball release and ends once the back leg moves forward and contacts the ground.
 - **Look for:**
 - The throwing arm to cross the body and the back leg to release forward.



Follow Through Phase

- **Look for:**

- **the throwing arm to cross the body and back leg to release forward. Good.**

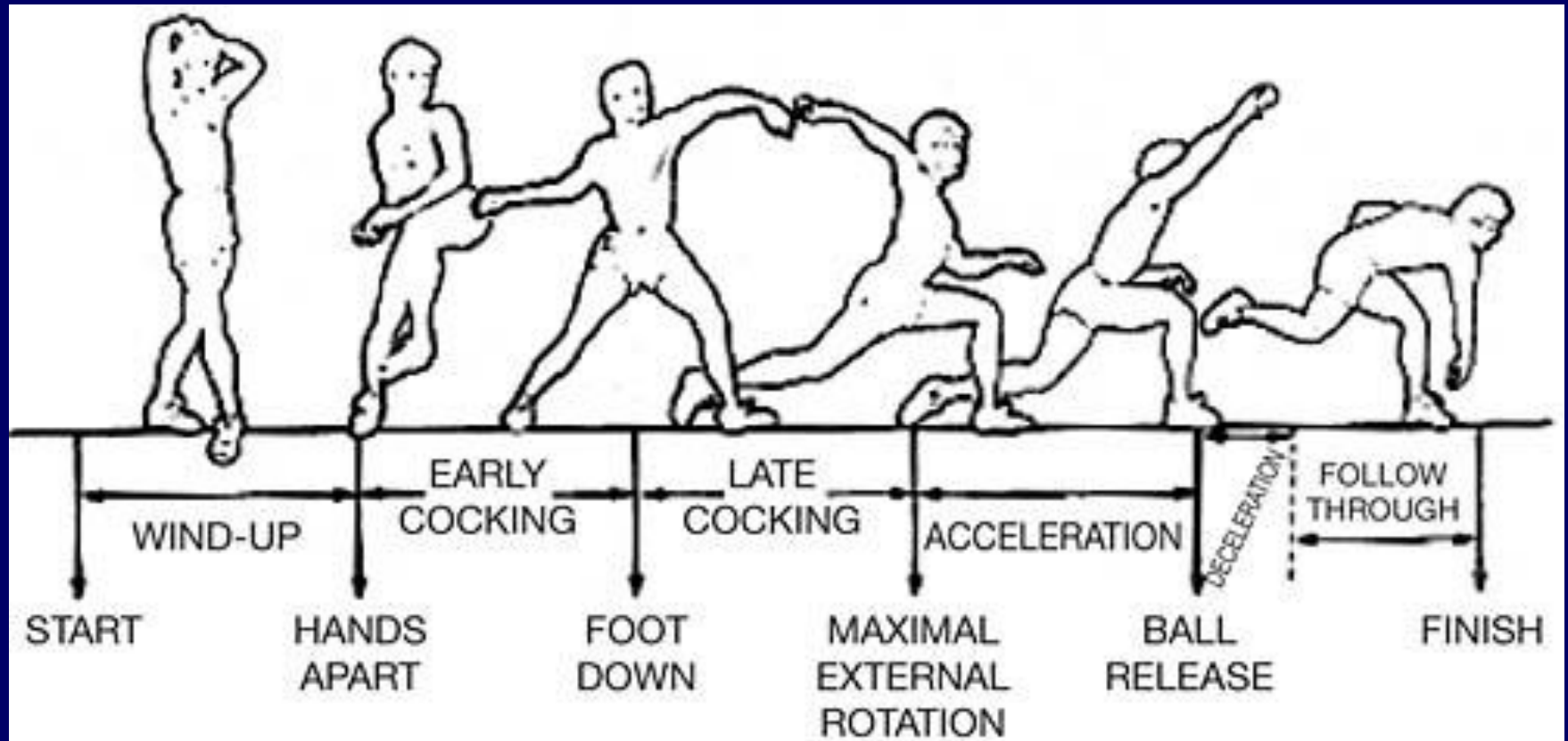


Follow Through Phase

- **Look for:**
 - **Limited back leg release.**



Review



Review – Windup Balance Point



Review – Early Cocking

Ball out early.



Review – Early Cocking

Front hip lead, with weight on back side.



Review – Early Cocking

Shoulder and pelvis stay closed



Review – Early Cocking

Long stride



Review – Early Cocking

Elbow to Elbow and Shoulder to Shoulder



Review – Early Cocking Power Position**



Review – Late Cocking

Foot to Foot



Review – Late Cocking

80 – 90 Degrees External Rotation



Review – Acceleration

90 degrees of shoulder abduction is maintained.



Review – Acceleration

Ball Release Over Front Toes



Review – Follow Through

Throwing arm across body with back leg release.



Questions



Special Thanks



MIKE CONNOLLY

Oneonta H.S.

- H.S. Draft Pick
- 9Yrs Pro
- Pirates, Royals,
Sinon Bulls (Taiwan), et

Special Thanks



RICK ROBERTS

Forest Hills

- H.S. Draft Pick
- 8Yrs Pro
- Tigers & Dodgers

Special Thanks



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