

# Biomechanical Video Analysis

## Baseball Pitchers

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# Objectives

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- Overview of Pitching Phases
- Evidence Based Pitching Parameters
- Gain an Appreciation of Video Analysis to Enhance Performance and Reduce Injury

# Coaching Management – Old School

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## ● Past

- 🥇 Arm pain normal in pitchers
- 🥇 Treated with rest, ice, NSAIDS
  - (rarely referred for PT)
- 🥇 “Throw when not painful and gradually increase throwing”



# Coaching – New School

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## ● Present

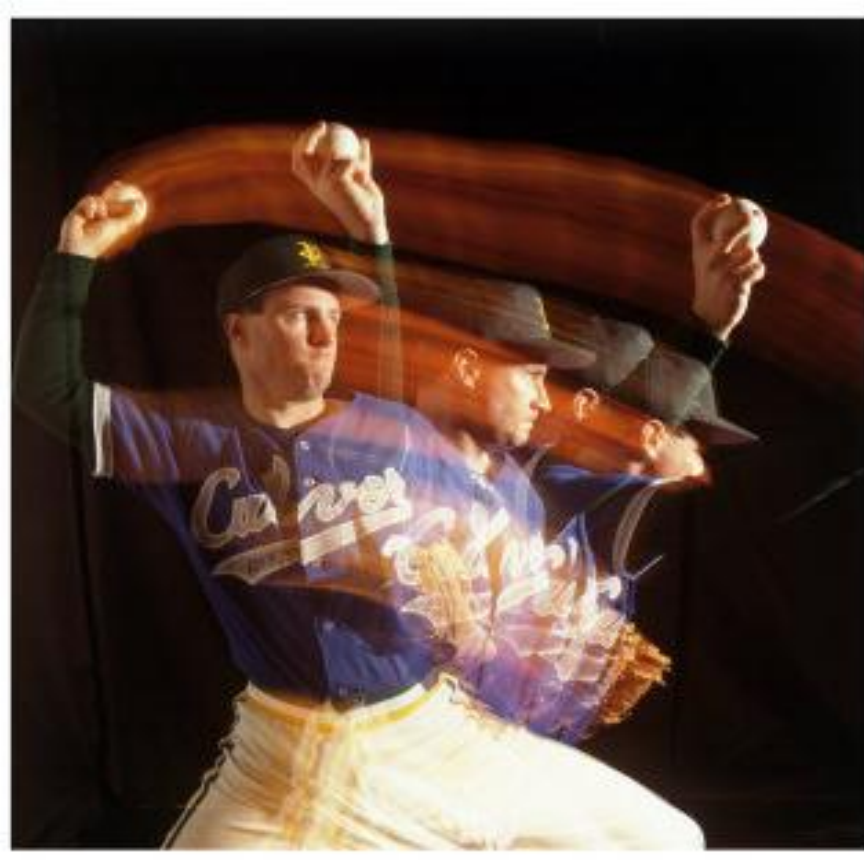
- 🧤 Pain is not normal
- 🧤 Specialized Care
- 🧤 Head to Toe Evaluation
- 🧤 Key – Address Early
- 🧤 Video Analysis



# Evidence Based Pitching Phases

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- Wind Up
- Stride
- Arm Cock
- Arm Accel
- Follow Th



# Wind Up

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- Begins with initiation of movement and ends when the leg reaches max height
- Key to wind-up is good balance position “Balance Point”



# Wind Up

- Things to look for:

- 🧤 Smooth
- 🧤 Straight forward/consistent
- 🧤 Eyes on target
- 🧤 Balance in all planes



# Balance Point

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- Goal: Improve the “Stable base” and establish a “power platform”
- Thrower = comfortable





# Stride

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- Starts: Lowering of lift leg
- Ends: Foot contact
- Timing important
- Down-out-up motion back toward 2<sup>nd</sup> base
- Stay “on top of ball”



# Stride – Foot Contact

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- Stride Offset: < 3 in. on either side of “line”
  - 🧤 Line = center of stance foot to home plate
- Stride Foot Angle: 0 to 30 degrees closed
- Stride length: 80-90% of body height
  - 🧤 Some discrepancy in literature as to how to measure
  - 🧤 Findings for youth 15-20% shorter

# Follow Through

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- Continuation of all the previous motions
- Increase stresses if not allowing it to happen
- Very little ms activity



# Follow Through

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- Back foot goes up in to the air (not dragging) with back knee  $\sim 90^\circ$ .
- Arm follows through to the side of front foot so that you can see back of shoulder.

# Pitching Parameter Check List

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1. **Balance Point**
2. **Timing**
3. Hand on Top/Arm Path
4. Horizontal ABD (< 30)
5. **Elbows Shld Hgt (FC)**
6. Elbow ~ 90 Deg (FC)
7. Shoulders Closed (FC)
8. **Stride Length (FC)**
9. **Foot Angle/Place (FC)**
10. **Follow Through**
  - Eyes on target
  - Arm cross body
  - Body horizontal
  - Trail leg kick

# THROWING DRILLS

**#2 ONE KNEE DRILL:** USED TO IMPROVE ELBOW POSITION, ARM PATH AND RELEASE POINT.

COMPLETE \_\_\_\_\_ # OF THROWS \_\_\_\_\_ X PER WEEK.



Kneel down with front foot slightly in front of back knee. Make sure elbows are above 90° and hand is on top of the ball. Eyes remain on target from the start to the end of the drill.



Initiate trunk rotation with the glove hand by driving the elbow to hip and contracting oblique abdominals. Throwing elbow should still be above 90° as you progress to ball release. Head and eyes should still be on line with the target.



Snap the release and remember to use a long follow through after the ball release. Head and eyes should finish on line with the target.



# THROWING DRILLS

**#4 “No Touch” DRILL:** USED TO CORRECT EARLY HIP AND TORSO ROTATION  
CORRECT THROWING ARM HORIZONTAL ABDUCTION.  
COMPLETE \_\_\_\_\_ # OF THROWS \_\_\_\_\_ X PER WEEK.



Begin by standing one foot (8-12 inches) in front of wall or fence. The pictures above and to the right demonstrate the proper standing position for this drill.

Have the pitcher begin the pitching motion. This can be done from the stretch or windup position. The pitcher should be able to deliver the ball without touching the wall or fence with any part of the body. If the glove, arm, or shoulder contacts the wall, then early rotation likely took place. If done properly, no part of the pitcher will contact the wall or fence

# THROWING DRILLS

**#6 TOWEL DRILL:** USED TO IMPROVE DYNAMIC BALANCE, PATH OF THROWING ARM, AND FOLLOW THROUGH POSITION.

COMPLETE \_\_\_\_\_ # OF THROWS \_\_\_\_\_ X PER WEEK.



Place a small towel in the throwing hand. Have a target (glove) placed 5 feet from your stride foot at foot contact and about 3-4 feet off the ground. Your goal is to smack the target with the towel. When beginning the throwing motion make sure to keep fingers on top of ball.

Proceed into stride. Pay special attention to elbow position and balance. Your weight should be centered between the balls of your feet and your head should be over your center of gravity (or belly-button). Eyes should remain on target. This is known as dynamic balance and postural stability. Also may work on proper stride length, foot angle and offset.

Improper balance, such as leaning to the right or left, will cause you to miss the glove (or target) to the right or left. Too much weight on your back foot will cause you to lean back and miss the glove short. Also pay attention to throwing arm path. You should throw over-the-top, smacking the top of the glove. A low elbow position may create a shallow arm path causing you to miss over the top or under the glove. After smacking the glove, extend your follow-through and finish across lead knee. Eyes remain on target.



# USA Baseball Medical & Safety Advisory Committee

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- ✓ Regulate pitch count
- ✓ No breaking pitches in competition until puberty
- ✓ Pitchers should not participate in any throwing drills or any stressful overhead activities for at least 2-3 months
- ✓ Pitchers should not pitch for  $> 1$  team in overlapping seasons
- ✓ Commit to year-round physical conditioning
- ✓ Develop and maintain proper mechanics