

Assessment of biomechanical Efficiency System: ACES

ACES Study Video # _____ Rater: _____ Trial: 1 2 (circle)

Note: Please review the ACES Instruction Sheet prior to scoring individuals on the ACES.

I. Windup* (side, front)

*begins with first motion, ends with max knee lift

- Center of gravity (COG) over back (stance) leg?
 Error (1) No Error (0)
- Maximum knee height $\geq 90^\circ$?
 Error (1) No Error (0)
- Premature forward momentum (lead hip) "leading with the hips"?
 Error (1) No Error (0)

II. Stride* (side)

*begins with lead leg moving towards target

- Arms/hands separate equally, symmetrically, with bilateral shoulder abduction ($\sim 90^\circ$)?
 Error (1) No Error (0)
- Lead (stride) hip externally rotates, back (stance) hip internally rotates (*both conditions met*)?
 Error (1) No Error (0)
- Hand on-top position (rather than hand under-ball)?
 Error (1) No Error (0)
- Does pitcher complete first forward movement (lead hip moving forward following max knee height) to stride foot contact in less than 0.95-1.05 seconds?
 Error (1) No Error (0)

III. Stride- Foot Contact* (side, front)

*1st frame that shoe deformity occurs on mound—either heel or toe

- At stride foot contact (SFC), the throwing arm is semi-cocked with the elbow flexed, the shoulder is abducted and externally rotated (*all 3 conditions met*)?
 Error (1) No Error (0)
- Stride length ≥ 75 -85% of height?
 Error (1) No Error (0)
- Lead shoulder position is slightly closed (eg, 3rd base side for RHP), in line with stance foot and home plate? Stride foot position towards home plate or slightly closed? Stride foot pointed slightly inward (*all 3 conditions met*)?
 Error (1) No Error (0)
- Trunk rotation delayed until after SFC?
 Error (1) No Error (0)

IV. Arm Cocking* (side, front)

*begins with SFC, ends with max ER

- Avoid excessive contralateral tilt (mean $24^\circ \pm 10^\circ$)?
 Error (1) No Error (0)
- Max ER ≥ 150 -180°?
 Error (1) No Error (0)

V. Acceleration*(side)

*begins with max ER, ends with ball release

- Forward trunk tilt (mean 32 -55°)?
 Error (1) No Error (0)
- Lead leg knee flexed in acceleration, then extending at ball release (*both conditions met*)?
 Error (1) No Error (0)

VI. Deceleration* (side)

*begins with ball release, ends with max IR

- Shoulder IR continues after ball release?
 Error (1) No Error (0)
- Lead knee extension continues after ball release?
 Error (1) No Error (0)

VII. Follow-through*(side, front)

*begins with max IR, ends with arm across body

- Arm crosses body diagonally, without sidearm or submarining?
 Error (1) No Error (0)
- Trunk flexes forward?
 Error (1) No Error (0)

VIII. Overall Impression

- Does pitcher appear stable, balanced, with good head stability, eyes focusing on target, throughout entire delivery, finishing in a balanced fielding position?
 Excellent (0) Average (1)
 Poor (2)