



ONBASE UNIVERSITY

THE BIG 15

THE 15 COMMON INHIBITORS TO AN EFFICIENT PITCH

THE KEY POSITIONS OF PITCHING

THE 14 KEY POSITIONS OF FASTPITCH PITCHING:

As you can see, we have divided the pitching motion into fourteen distinct positions. Those positions include:

1. Set - Before any motion starts.
2. Pre-Motion - point at which stride leg heel lifts up.
3. Lift Off - point where the stride foot first lifts off the ground.
4. Circle Start - when throwing arm is perpendicular to the ground pointing down.
5. Maximum Knee Lift - frame where the stride leg knee reaches maximum height.
6. $\frac{1}{4}$ Arm Circle - when throwing arm is parallel to ground pointing forward.
7. Drag Start - when the non-stride leg first starts to move forward (drag).
8. Circle Peak - when the throwing arm is perpendicular to the ground pointing up.
9. Foot Touch - when the foot first touches the ground
10. $\frac{3}{4}$ Arm Circle - throwing arm is now parallel to the ground pointing behind.
11. Connection - when the throwing elbow returns back to the players side.
12. Release - the frame closest to the point of release
13. Elbow Release - when the elbow leaves the hip - elbow usually flares out
14. Finish - end of the pitch - full weight carries forward.

THE 15 COMMON INHIBITORS OF AN EFFICIENT PITCH

We will start by discussing the 16 most common technical characteristics that typically reduce efficiency in pitchers. We call these “The Big 15 Inhibitors”, but they should be thought of as common technical styles that may (not always) reduce overall pitch efficiency.

All 15 Inhibitors have the following things in common:

1. **They Can Be Found on Great Pitchers** - even though we call these inhibitors, you can find most of these on a few current and retired elite-level pitchers. These players have the athleticism and talent to adjust or recover from these and still play at the highest level of softball. The problem is most average players are not so lucky and these tend to cause efficiency breakdowns in the kinematic sequence.
2. **They Have a Strong Physical Link** - All of these inhibitors can be linked to some possible physical limitation. In other words, these are the 12 most common characteristics that can be directly caused by physical limitations. The key fact to remember is - ***motor patterns are created around physical limitations***. For example, if a pitcher’s back hip can’t extend, they may Hang Back instead of driving forward. Once that new motor pattern is ingrained, just removing the physical barrier will not be enough. Relearning the correct motor pattern will be required.
3. **You Can Predict These From a Physical Screen** - Since there is such a strong link between certain physical limitations and these inhibitors, we are able to make good predictions about pitching mechanics after evaluating a pitcher’s body. That is the purpose of the physical screen, it allows us to predict which inhibitors a player may have.

The Four Measures of Pitching:

As we go through each of these inhibitors, try to think how each one will impact a player’s performance. We believe there are four possible measures of pitching that can be compromised with each of these inhibitors. Some will influence certain measures more than others. The four measures are:

1. **Power** - *ability to create speed on the ball*
2. **Control** - *ability to place the ball in your intended location*
3. **Deception** - *ability to deceive the hitter*
4. **Health** - *ability to pitch for a long time without injury (longevity)*

On the following page is a list of each of the Big 15 Inhibitors with their corresponding key positions in the pitch sequence where they are typically found.

THE 15 COMMON INHIBITORS OF AN EFFICIENT PITCH

THE 15 COMMON INHIBITORS FOR PITCHING:

<u>INHIBITOR</u>	<u>CAMERA VIEW</u>	<u>KEY POSITION</u>
1. Standing Up	FO	<i>LIFT-OFF</i>
2. Losing Space	DTL	
3. Staying Open	FO	<i>CIRCLE START</i>
4. Breaking the Plane	DTL	
5. Marching	FO	<i>MAXIMUM KNEE LIFT</i>
6. Hanging Back	DTL	<i>DRAG START</i>
7. Arching	DTL	<i>¼ ARM CIRCLE</i>
8. Staying in Front	FO	
9. Landing Early	FO	<i>CIRCLE PEAK</i>
10. Anchoring	FO	
11. Locking	FO	<i>¾ ARM CIRCLE</i>
12. Drifting	FO	
13. Pushing	FO	<i>CONNECTION</i>
14. Sweeping	FO	
15. Leaning	FO	<i>RELEASE</i>

STANDING UP

LIFT-OFF

DESCRIPTION

Creating and maintaining correct posture is essential to getting the most out of the pitch. Normally a pitcher will get into a sprint start position (a forward lean mimicking a sprinter coming out of the blocks). The key here is to get their center of gravity (center of mass) in front of the drive foot before they push. This will allow maximum horizontal speed off the rubber. An Standing Up is a loss of forward lean or loss of forward weight shift at Lift-Off, which makes it difficult for a player to get the proper momentum and leg drive when pushing off the rubber. This puts a lot of stress on the upper body to generate the appropriate arm speed.

VIDEO ANALYSIS

To diagnose Standing Up, it is best to view the player from the face-on camera angle. Start by advancing the player to Lift-Off. Draw a line straight up from the front of the player's drive leg knee. Now, compare the position of the player's mid-sternum (center of the base of the neck) and their drive foot toe to that line. The player's mid-sternum point should clearly be in front of that line and the drive toe should be clearly behind the line. If the player's mid-sternum point is on or behind the line or the drive toe is on or in-front of the line, they are Standing Up.



GOOD DRIVING POSTURE



STANDING UP

LOSING SPACE

CIRCLE START

DESCRIPTION

Losing Space is when a pitcher's lower body invades the space needed for the hand to travel in a perfect circle. Normally, the lower body will not move towards the throwing arm side to leave space for the pitching arm to pass. Losing Space can reduce Control and Efficiency.

VIDEO ANALYSIS

The easiest way to diagnose Losing Space is from the down-the line camera view. Put a vertical line outside the pitcher's non-stride leg hip at Circle Start. Now advance the player all the way to Release. The lower body should not cross that line, if it does, we call it Losing Space.



NORMAL SPACING



LOSING SPACE

STAYING OPEN

CIRCLE START

DESCRIPTION

Staying Open describes when a pitcher opens their shoulders and/or pelvis before circle start and doesn't close them back by 1/4 arm circle.

VIDEO ANALYSIS

To diagnose Staying Open, take the pitcher to Circle Start and look at the orientation of the shoulders and pelvis. They should be relatively square to the rubber at this point. If there is any excessive opening early, now advance the player to 1/4 arm circle. If they remain open by this point, they are Staying Open.



NORMAL



STAYING OPEN

BREAKING THE PLANE

CIRCLE START

DESCRIPTION

Breaking the Plane is characterized by a significant loss of shoulder or trunk flexion during the arm circle. Breaking the Plane is when the pitcher's arm (humerus) is too flexed and reduces the arc width of the pitch. This can interfere with all aspects of pitching: command, deception and power.

VIDEO ANALYSIS

To diagnose Breaking the Plane, stop the player at Circle Start and draw a long rectangle around the player, with the sides touching the outside of the player's shoulders and the box extending up above the players head. Now advance the player through their entire arm circle. There should never be a time when the hand or arm travels outside the rectangle. If it does, it is called Breaking the Plane.



GOOD ARM PLANE



BREAKING THE PLANE

MARCHING

MAXIMUM KNEE LIFT

DESCRIPTION

Marching describes a lack of lower body drive off the rubber. Normally, a pitcher will use an aggressive drive off the non-stride leg to help generate speed and momentum. Just like a sprinter coming out of the blocks, they should get into good hip extension to capitalize on the power from their lower body. If the pitcher doesn't drive from the ground and get into hip extension, it is called Marching.

VIDEO ANALYSIS

It is best to diagnose Marching from the face-on camera angle. Stop the video at Maximum Knee Lift and draw an arrow from the center of the hip to the center of the knee of the non-stride leg. At this frame, the hip should be extended with the arrow pointing towards the back foot of the non-striding foot. If the line is straight up and down or worse, pointing forward, they are Marching.



NORMAL



MARCHING

HANGING BACK

DRAG START

DESCRIPTION

Hanging Back describes when a pitcher leaves possible energy back on the non-stride leg, therefore limiting stride length and good weight transfer. This is basically an upper body dominated throw.

VIDEO ANALYSIS

To diagnose Hanging Back, take the pitcher to the first frame of video where you see their drive foot (back foot) start to slide forward, Drag Start. If the player's throwing arm is past the Top of the Arm Circle, it is called Hanging Back. If the pitcher has no forward slide of the back foot, that is also Hanging Back.



GOOD LOWER BODY DRIVE



HANGING BACK

ARCHING

$\frac{1}{4}$ ARM CIRCLE TO RELEASE

DESCRIPTION

Arching is characterized by any excessive increase in the lumbar curvature during the arm circle. Arching is when the pitcher has too much spinal extension (arching of the lower back - sway back) throughout the pitch. When the pitcher gets into excessive Arching, this can interfere with all aspects of pitching: command, deception and power.

VIDEO ANALYSIS

It is best to diagnose Arching from the down-the-line camera view. Start by observing the entire pitch. If at any point, the lower spine starts to hyperextend this is called Arching.



GOOD POSTURE



ARCHING

STAYING IN FRONT

CIRCLE PEAK

DESCRIPTION

Maintaining correct posture throughout the arm circle is essential to getting the most out of the pitch. Normally, the forward lean posture seen from Pre-Motion to $\frac{1}{4}$ Circle is reversed to a backward posture by Circle Peak. Not reversing the posture (leaning back) from $\frac{1}{4}$ Circle to Circle Peak is a form of loss of posture, we call it Staying In Front.

VIDEO ANALYSIS

To diagnose Staying in Front, it is best to view the player from the face-on camera angle. Start by observing the pitcher's trunk angle at Circle Peak. Draw an arrow starting from the center of the pelvis and extend it out directly through the center of the pitcher's head (yellow arrow). By this point, the trunk should be slightly tilted backward (leaning away from the hitter). A secondary check is to look at the relationship between the center of the player's head and the center of their pelvis. Draw a vertical line down from the center of the player's head (pink dotted line). That line should be slightly behind the center of the pelvis.



LANDING EARLY

CIRCLE PEAK

DESCRIPTION

Landing Early is when Foot Plant occurs early in the pitching sequence. This is a timing, sequencing problem, with the lower body coming out way too soon or the arm circle happening too late. The two halves of the body (upper and lower) are virtually disconnected from each other.

VIDEO ANALYSIS

The easiest way to diagnose Landing Early is from the face-on camera view. Advance the video to Foot Plant and draw a line parallel to the front shin that bisects the shin and extends up past the arm. If the throwing arm has not circled passed that line by this point in time, the player is Landing Early.



NORMAL



LANDING EARLY

ANCHORING

CIRCLE PEAK TO RELEASE

DESCRIPTION

Anchoring is when the drive leg (non-stride leg) drags on the ground, slowing down forward momentum. This occurs anywhere from Circle Peak to Ball Release. This is a potential power problem, with the lower body acting like an anchor, preventing good ground reaction forces and proper pelvic rotation.

VIDEO ANALYSIS

The easiest way to diagnose Anchoring is from the face-on camera view. Advance the video to Foot Plant and look at the non-stride foot. If the entire inside medial border of the drive foot is touching the ground before foot plant and it impedes lower body forward momentum, the player is Anchoring.



NORMAL



ANCHORING

LOCKING

$\frac{3}{4}$ ARM CIRCLE

DESCRIPTION

Locking occurs when the pitcher straightens the throwing arm by Foot Touch. We are looking for an arm with laxity in the elbow and a palm that is on the side of the ball. If the elbow is straight at or before the $\frac{3}{4}$ Arm Circle, the pitcher has a Locking. A loss of Power and Control may result from Locking.

VIDEO ANALYSIS

The easiest way to diagnose Locking is from the face-on camera view. Advance the video all the way to the $\frac{3}{4}$ Arm Circle position. At this point the elbow should have a slight bend. If the elbow is straight, they are Locking.



DESCRIPTION

Drifting affects the pitcher's front side stability, which directly limits a player's ability to transfer energy to the ball. It occurs when the lower body continues to drift forward or to the side during Release. Drifting prohibits the full transition from linear movement to rotational speed. And pitchers who Drift reduce their lower body stability, therefore, dramatically reducing power into the upper body.

VIDEO ANALYSIS

The easiest way to diagnose Drifting is to observe the stride leg after Connection. Using the face-on camera angle, stop the pitcher at Connection. Now place a straight line in front of the pitcher's shin. Continue to advance the video through release and the pitcher's shin should not move past that line. If the shin continues to drift forward, we call that Drifting.



STABLE



DRIFTING

DESCRIPTION

Pushing is when a pitcher's throwing sequence is out of order. Normally, shoulder internal rotation is the last step in the throwing sequence, followed by wrist pronation. If the player has an early or no elbow extension or they typically start shoulder rotation too early. This leads to Pushing. Pushing can reduce overall velocity and hurt command.

VIDEO ANALYSIS

The easiest way to diagnose Pushing is from the face-on camera view. Advance the pitcher to Connection and observe the relationship between the throwing elbow and ball. You should see the elbow leading the ball at Connection, with a clear space between the ball and the back thigh. To visualize, draw a vertical line bisecting the throwing elbow at Connection. If the ball is in front of that line at Connection, they are Pushing.



SWEEEPING

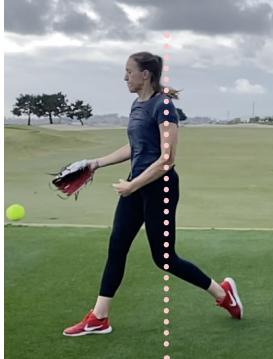
CONNECTION

DESCRIPTION

Sweeping is when a pitcher does not stabilize the throwing arm through release. Normally, after connection, the pitcher's arm (between their elbow and shoulder) will pin next to the body as the wrist and forearm continue to release the ball. This allows an efficient transfer of energy into the forearm and ball. If the player continues to advance or sweep their arm forward past their body, without stabilizing, we call that Sweeping. Sweeping can reduce overall velocity and hurt command.

VIDEO ANALYSIS

The easiest way to diagnose Sweeping is from the face-on camera view. Advance the pitcher to Connection and observe the throwing arm. You should see the arm temporarily stall out or pin next to the player's body (arm behind pink dotted line) as the forearm and wrist release the ball. If the arm never stops, they are Sweeping.



NORMAL



SWEEEPING

LEANING (FORWARD OR BACKWARD)

RELEASE

DESCRIPTION

Maintaining a good upright posture through ball release is essential to getting the most out of the pitch. Normally a pitcher will firm up their front side and stand tall by Release to get the best acceleration to the ball. Failing to move to an upright posture at Release is called Leaning.

VIDEO ANALYSIS

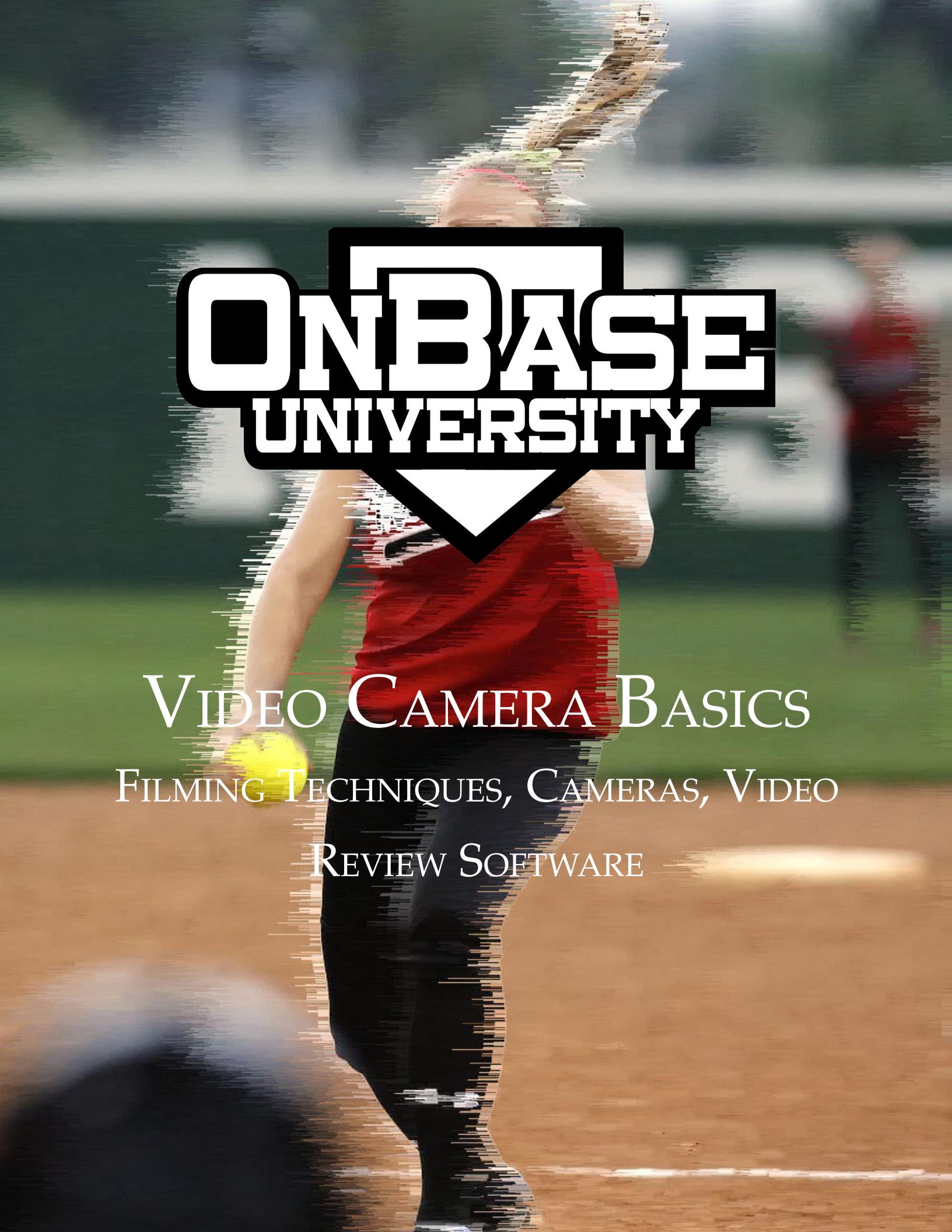
To diagnose a Leaning, it is best to view the player from the face-on camera angle. Start by advancing the video to Release. Observe the trunk lean. Now the trunk should be in a tall, upright posture. The center of the head should be directly over the center of the pelvis.



STABLE RELEASE

LEANING

NOTES



ON BASE UNIVERSITY

VIDEO CAMERA BASICS
FILMING TECHNIQUES, CAMERAS, VIDEO
REVIEW SOFTWARE

FILMING FROM FACE ON (FO) CAMERA ANGLE

KEY POINTS TO FOCUS ON FROM THE FO VIEW:

- Make sure the camera is always at the same height and position. We like hip high focused on the center of the body.
- Check the shutter speed and make sure it is at a minimum of 1/2000 of a second.
- The camera should be aligned perpendicular to the target line about 3 feet in front of the rubber.



PITCHING CHARACTERISTICS THAT ARE BEST VIEWED FROM FO VIEW:

1. Standing Up
2. Marching
3. Hanging Back
4. Staying in Front
5. Early Landing
6. Locking
7. Pushing
8. Drifting
9. Sweeping
10. Leaning

FILMING FROM DOWN-THE-LINE (DTL) CAMERA ANGLE

KEY POINTS TO FOCUS ON FROM DTL VIEW

- Make sure the camera is at the same height for all filming.
- The camera should be aligned parallel to the target line and pointing directly at the player's belt buckle.
- Check the shutter speed and make sure it is at a minimum of 1/2000 of a second.



PITCHING CHARACTERISTICS THAT ARE BEST VIEWED FROM DTL VIEW:

1. Lose of Space
2. Arching
3. Breaking the Plane
4. Closing Early

FILMING FROM OVERHEAD / DRONE CAMERA VIEW ANGLE

KEY POINTS TO FOCUS ON FROM THIS VIEW

- Make sure the camera is hovering and still the entire time.
- The camera should be aligned directly overhead.
- Check the shutter speed and make sure it is at a minimum of 1/2000 of a second.



PITCHING CHARACTERISTICS THAT CAN BE VIEWED FROM OVERHEAD:

1. Lose of Space
2. Breaking the Plane
3. Closing Early



ON BASE UNIVERSITY

PHYSICAL SCREENING
UNLOCKING THE BODY'S POTENTIAL

WHY SCREEN?

PHYSICAL CAUSES OF PITCHING ERRORS:

Coaches all too often encourage players to move their bodies into positions that their students are physically incapable of achieving. Often, the reason why players cannot achieve a certain pitch velocity is because they have limited mobility, poor stability, or even a prior injury that limits their range of motion. Yet, if coaches are unaware or untrained to assess such physical limitations, they will likely proceed with pulling out the video camera, drawing a few lines on a screen, and demonstrating that they don't know what they don't know.

OnBase University coaches are educated and knowledgeable in the area of movement screening as it relates to fastpitch softball. If the underlying cause of poor technique is poor movement quality, then a coach must be able to identify this and explain it to the player. The training recommendation could then include a combination of technical advice and exercises to improve the student's level of fitness or even to develop a pitch style that accommodates the student's physical limitations.

ONBASE UNIVERSITY'S PHILOSOPHY OF THE HUMAN BODY

"The body works in an alternating pattern of stable segments connected by mobile joints. If this pattern is altered - dysfunction and compensation will occur."

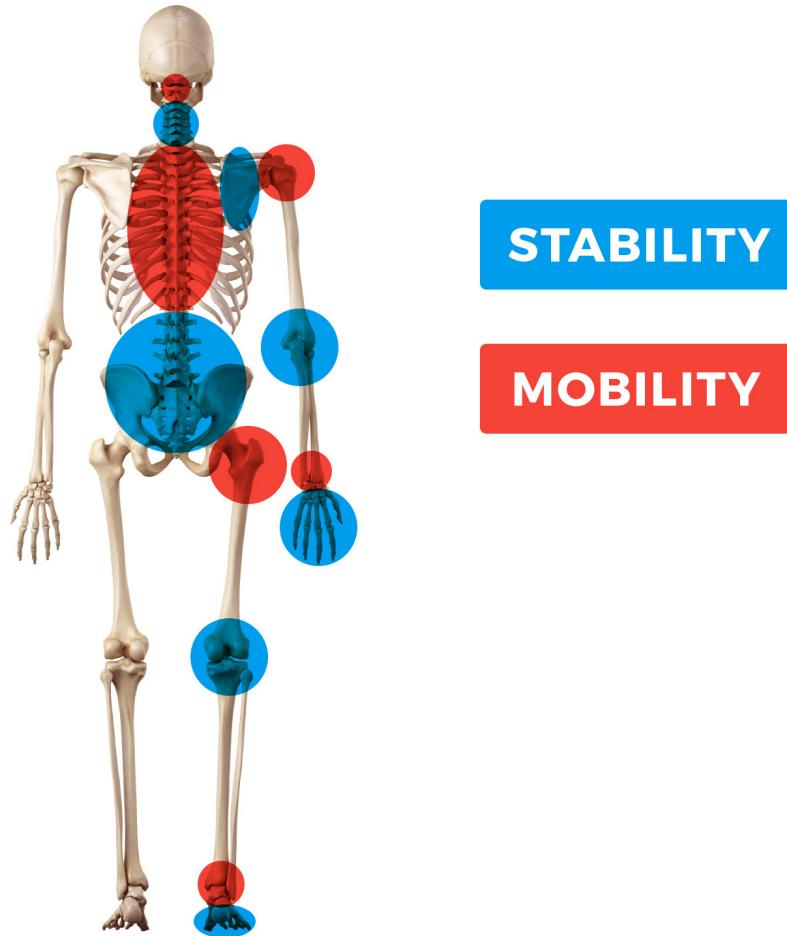
- First noted by Mike Boyle and Gray Cook.

NORMAL PATTERN

Foot	Stable
Ankle	Mobile
Knee	Stable
Hip	Mobile
Pelvis/Sacrum/Lumbar Spine	Stable
Thoracic Spine	Mobile
Scapulo-Thoracic	Stable
Gleno-humeral/Shoulder	Mobile
Elbow	Stable
Wrist	Mobile
Cervical Spine	Stable

You can see how this observation of an alternating pattern of mobility and stability can help describe how injuries occur. If you take the lower back as an example, you will often find that the hip joints and thoracic spine are limited in mobility. Therefore, the lumbar spine will sacrifice stability to obtain more motion. This abnormal motion in the lumbar spine can be one of the primary reasons for disc and facet injuries in the lower back. Unfortunately, limited thoracic spine and hip mobility are two of the most common findings in many players. This may be why lower back injuries are so common in softball.

SCREENING - THE FOUNDATION MOBILITY/STABILITY



LIMITATIONS IN MOBILITY CAN PREDICT INSTABILITY

Poor mobility leads to muscle imbalances:

- **Reciprocal Inhibition** - The neuro-muscular phenomenon that occurs when a tight muscle decreases the neural drive to its' functional antagonist. This leads to compensation patterns and predictable injury patterns.
- **Synergistic Dominance** - The neuro-muscular phenomenon that occurs when synergists, stabilizers, and neutralizers take over for a weak or inhibited prime mover.
- **Arthrokinetic Inhibition** - The neuro-muscular phenomenon that occurs when a muscle is inhibited by joint dysfunction or the capsule that crosses the joint.

SCREENING - THE FOUNDATION OF MOBILITY/STABILITY

MOBILITY

Mobility is the combination of normal joint range of motion and proper tissue flexibility. This is a must for proper mechanics and for injury prevention. Mobility allows the body to move in all six degrees of freedom, therefore giving the ability to perform any motion – without having to sacrifice stability!

Mobility allows the generation of ELASTIC ENERGY between muscles, and therefore establishes a base for efficient power production.

Mobile Joints refer to joints that move great in all three planes of motion.

Stretch-Shorten Cycle

"A common pattern of muscle activation, particularly during high performance tasks, is to use an eccentric-concentric sequence in which the active muscle is first lengthened and then shortened. The advantage of this pattern is that a muscle can perform more positive work if it is actively stretched before being allowed to shorten."

- Neuromechanical Basis of Kinesiology, Roger Enoka

STABILITY

Stability is the ability of any system to remain unchanged or aligned in the presence of change or outside forces. That is a good summary of what many areas in our body that are defined as stabilizers (such as the lumbar spine) are asked to do.

If you want to keep the bow of a bow and arrow stable as you pull the string back, you must have good motor control, balance, strength, and endurance. This is the same principle involved in creating a powerful pitching motion. The ability to keep one part of the body secure while stretching and contracting adjacent segments, allows us to generate speed and maintain a consistent posture throughout the pitching motion. That is Stability!

Stable Joints refer to joints that only like to move in one plane of motion

ON BASE UNIVERSITY

PITCHING SCREEN

IDENTIFYING THE PITCHER'S LIMITATIONS

THE ONBASEU FAST-PITCH SCREEN

STANDING TESTS

1. Pelvic Tilt Test
2. Pelvic Rotation Stride Test
3. Torso Rotation Stride Test
4. Toe Tap Test
5. Hip 45 Test
6. Fish Tail Test
7. Finger Extension Test
8. Forearm Rotation Test
9. Wrist Hinge Test
10. 3-Point Windshield Wiper Test
11. Lunge with Extension
12. Tandem Dorsiflexion Test
13. Side Step Walkout Test
14. Heel Lift Test

SEATED TESTS

15. Seated Trunk Rotation
16. Ankle Rocking Test

LYING DOWN TESTS

17. Active Straight Leg Raise Test
18. Side-Lying Clock Circle Test
19. Prone Shoulder Extension Test

THE RULES OF SCREENING

There are several rules that must be followed to perform the physical screens correctly. Let's go through each one:

No warm-up. This is critical for consistency from screen to screen. Plus, we are trying to evaluate basic movement. The body should be moving properly even before a warm-up.

If it looks like a dog, smells like a dog, it's a dog! Remember this when your are grading a screen and you're unsure if it's a pass or fail. Your grading accuracy will get better with each screen you perform. If the pattern of movement looks bad in anyway, it is probably really bad - so score it as dysfunctional.

Be picky! This is similar to rule #2. We think the biggest mistake you can make is to pass someone that should have really failed. Ask yourself: "Can I make the player's screen any better with exercise?" If the answer is yes, then they are failing the test.

Shoes on for most of the testing. There are only two times when shoes will be removed. Other than that, please keep your client's shoes on for all screens.

Monkey see - Monkey do. This applies to the speed of testing. You will learn with experience that demonstrating the screen to the client is much faster than a verbal explanation. If possible, perform the screens with your client.

No pain is allowed. This is the most important rule of all. If there is pain at any point during the screen, stop and refer them to a medical professional.

ONBASEU SCREENING OVERVIEW

When to Perform the OnBaseU Screen:

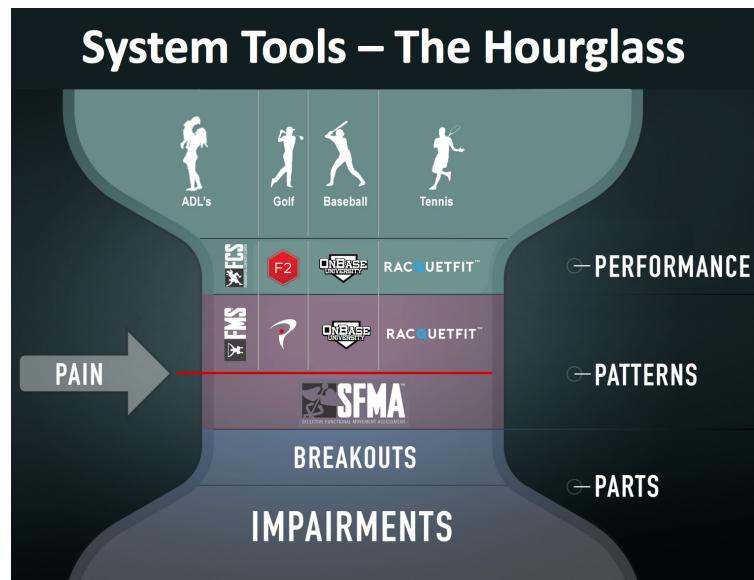
It is important to understand where the OnBaseU Screen fits in with the overall assessment of the player. Many times, you will be asked to evaluate a player to see if you can improve their overall performance. They have no complaint of pain, they just want to either prevent problems from occurring or improve their overall performance. The evaluation of this player should begin with the appropriate screen. The OnBaseU screen was designed to evaluate softball specific patterns of movement to identify or highlight altered patterns in pain free players, so the observer can predict the player's pitching mechanics. ***It does not make any fitness or medical diagnosis,*** it just helps predict if and how a player's body is altering their pitching mechanics.

If the OnBaseU screen produces pain or the player is complaining of pain from the start, then the screen needs to be progressed to a thorough medical assessment - that is the SFMA. The SFMA will help identify the cause of the pain and direct the treatment of the individual. Once the pain has been resolved, the OnBaseU screen can be used to re-evaluate the pitching movement patterns of the player. If the OnBaseU screen is dysfunctional, it is highly likely that the player's body is affecting their pitching mechanics.

To learn what is wrong (make a diagnosis) with the player's body, further functional testing should be performed. In conjunction with the OnBaseU screen, we recommend checking the player's basic functional movements (non-softball specific) that are associated with activities of daily living (ADL's). For that we use the FMS (Functional Movement Screen). Many times the player's primary dysfunction is related to poor sleeping posture, over-training, training errors, playing with their kids, travel activities or other non-softball specific activities. The FMS is great at identifying altered basic human movement and helping the fitness and health professional determine where to start the player's corrective program.

If the OnBaseU screen was normal and no altered patterns were detected, then the next level of evaluation should include the FCS (Fundamental Capacity Screen). Before we learn and acquire occupational, recreational or sport specific skills, we express energy through elemental capacities that can, and should, be measured. Fundamental Capacity testing allows us to identify "leaks" in an individual's ability to express energy.

The next step in the progression is to assess skill and/or specific characteristics needed for an activity. This will allow the evaluator to see how the player or patient performs in their specific sport or activity. This is where 3D motion capture, 2D video, statistics, trackman and other skill based evaluations come into the equation. Deficiencies in performance should be addressed at that time.



ONBASEU SCREENING OVERVIEW

Murder Mystery

A great analogy to help understand what should be tested on each player is to think of yourself as a police detective. There has been a murder and you need to investigate the crime. Somebody murdered this player's pitching mechanics. The good news is, there are only 19 suspects. And even better news is, all nineteen suspects are part of 5 gangs. So all we have to do is interview each of the gangs and get statements from each of the members.

The gangs are as follows:

- **Core Control Gang (3 Members)**
 - » Pelvic Tilt Test
 - » Pelvic Rotation Test
 - » Torso Rotation Test
- **Rotation Gang (3 Members)**
 - » Toe Tap Test
 - » Hip 45 Test
 - » Seated Trunk Rotation Test
- **Stride Gang (6 Members)**
 - » Side Step Walkout Test
 - » Active Straight Leg Raise Test
 - » Lunge with Extension
 - » Tandem Dorsiflexion
 - » Heel Lift Test
 - » Ankle Rocking
- **The Shoulder Gang (3 Members)**
 - » Side-Lying Clock Circle Test
 - » Prone Shoulder Extension Test
 - » 3-Point Windshield Wiper Test
- **The Wrist Gang (4 Members)**
 - » Fish Tail Test
 - » Finger Extension Test
 - » Forearm Rotation Test
 - » Wrist Hinge Test

This is a great way to remember and group your tests. This line of thinking will also help determine what the player's pitch might look like.

Core Rotary Screens

There are three core screens that we use in all the rotary sports that we test. For example these screens are used in TPI's Golf Screen and Racquetfit's Tennis Screen. These screens can help shed some light on a player's Body-Pitching Connections. Those include:

- **Pelvic Tilt Test** - This allows us to examine the player's ability to control their core and pelvic orientation.
- **Pelvic Rotation** - This allows us to examine the player's ability to disassociate the lower body from the upper body.
- **Seated Trunk Rotation** - This allows us to examine the player's mobility in the thorax. This is critical in all rotary sports.

PELVIC TILT TEST

TEST OBJECTIVE FOR THE PELVIC TILT TEST

The Pelvic Tilt Test is a great test for overall mobility of the hips and the lumbar spine and their ability to control the position of the pelvic posture. The ability to move and control the position of the pelvis is critical for optimal power transfer from the lower body to the upper body during the pitching motion.

HOW TO PERFORM THE PELVIC TILT TEST

Begin by having your player assume a normal athletic posture and then place their arms across their chest (hands resting on shoulders). Observe their starting posture. Notice if the lower back has an accentuated arch (Arching), if it is flat (N-posture), or if it is rounded into a slouched position (C-posture). Once the starting position has been established, ask the client to tilt the pelvis anteriorly or forward, increasing the arch in the lumbar spine.

Once this move is accomplished, ask the client to tilt the pelvis posterior, or backward, removing the arch from the lower back. Proper execution of this test will yield a forward and backward tilting of the pelvis with minimal leg/knee movement and limited upper body forward and backward movement. Observe the smoothness or “shake and bake” nature of the movement, when the client is tilting the pelvis. This will indicate with what frequency those muscles are being used on a day-to-day basis. They are probably not using those muscles on a regular basis in their pitching motion if there is a lot of shaking with the posterior tilt.

Make sure to observe the amount of motion both in the forward/anterior and backward/posterior directions. There can be limitations found in one direction as compared to the other.

CORRECT TESTING FORM



Neutral
(Flat Back)

Anterior Tilt
(Arched Back)

Posterior Tilt
(Slouched Back)

PELVIC TILT TEST

PHYSICAL CAUSES OF LIMITED PELVIC TILT

When a player presents with limitations in either mobility or coordination during the Pelvic Tilt Test, we will look to some key regions for answers:

- **Lumbar Spine Mobility** - If the backward/posterior tilt is limited, then we can look at the lumbar spine mobility as a possible cause for the limitation. Lumbar spine degenerative disc disease, joint arthritis, or other disc pathologies can all limit lumbar spine mobility.
- **Lower Crossed Syndrome** - The most common reason for limited pelvic tilt in both directions is a Lower Crossed Syndrome. We discussed this earlier in the manual and it is easy to see how this would limit their pelvic tilt. First, the player is already in a maximum anterior tilt position, so we know anterior tilting is going to be limited. Due to the tight hip flexors, tight erector spinae, weakness in the abdominals and weakness in the glutes, the player has a tough time performing a posterior tilt.
- **Poor Coordination** - We classify this test as a coordination issue if the player's range of motion is acceptable, but the quality of the movement is suspect. This usually presents itself as a shaky or choppy movement that we call "shake and bake." If "shake and bake" is present, there is usually a disconnect between the brain and the pelvis, or a lack of training involved. Most people do not train for this motion, so the brain is not used to such a task. You will find players sometimes getting frustrated with this because it seems easy in description, but in application, it is more difficult.

PELVIC TILT TEST PITFALLS

When taking a player through this exam, be aware of the following:

- Players oftentimes will attempt to tilt their pelvis with their knees and legs. This will usually show itself as a thrusting forward and backward with the hips. The pelvis may actually be tilting, but not independent of the rest of the body as we are seeking.
- Players may be embarrassed to perform this test, thinking they look like an idiot. Perform the movement with them at the same time to make them feel at ease. It is much easier to convince someone to do the test if you are actively participating as well.
- Players often times will attempt to tilt their pelvis via their upper body and back. This will usually show itself as a thrusting forward and backward with the torso. Again, the pelvis may be tilting, but not independent of the rest of the body as we are seeking.

PELVIC ROTATION TEST

TEST OBJECTIVE FOR PELVIC ROTATION TEST

The Pelvic Rotation Test checks the player's ability to rotate the lower body independently from the upper body. This is an important skill for properly sequencing the stride and to create a good separation between the upper and lower body. This movement requires good mobility of the spine, hips and pelvis, along with simultaneous stability of the thorax.

HOW TO PERFORM THE PELVIC ROTATION TEST

Begin by having the player assume a normal athletic posture and place their arms crossed over the shoulders. Their feet should be approximately shoulder width apart and their hands should be resting on the front of each shoulder. Once they are in position, tell them to not move the upper body while trying to rotate the lower body (belt and below) back and forth. Look for any movement of their shoulders or excessive lateral motion of the pelvis versus rotation. It should appear as if the player is doing the twist with no shoulder motion. Continue testing in both directions being sure to monitor the fluidity of motion of the pelvis both in the right and left directions because that fluidity is important in determining pitching issues. Be sure to monitor the motion of all body segments above the waist line including the torso, shoulders, arms, and head/neck region. A proper Pelvic Rotation Test will yield no motion above the waist line with only the pelvis rotating. It is acceptable for the legs and knees to be moving slightly along with the pelvis. However, any excessive knee bending and straightening should be noted.

If they have difficulty performing this action, try to differentiate between a stability or mobility problem. Do that by holding their upper body stable for them while having them try to rotate. If they still can't separate, they have a mobility problem. If they can separate, it is a stability problem.

CORRECT TESTING FORM



PELVIC ROTATION TEST

WHAT TO LOOK FOR IN THE PELVIC ROTATION TEST

Mobility: Bilateral hip mobility and pelvis-to-thorax separation is needed to properly rotate during this test. We are looking for a smooth turn to the right and to the left with no choppiness or lateral movement. Look carefully for a shifting of the pelvis in a lateral direction to the right or left as compared to a rotary motion with the pelvis. Also, pay close attention to the movement of the legs and knees. Minimal movement is expected with this test; gross movement patterns with the legs straightening and bending should not be present.

Stability: Another key aspect of this test is to see if the player can stabilize their upper body and freely mobilize their pelvis. This will be seen by a torso that remains facing straight forward and arms and hands that are quiet and unmoving on the shoulders. The head and neck should also remain quiet during this screen.

TORSO ROTATION TEST

TEST OBJECTIVE FOR TORSO ROTATION TEST

The Torso Rotation Test checks the player's ability to rotate the upper body independently from the lower body. This is an important skill for properly sequencing the pitch and generating a good separation or coil. This movement requires good mobility of the thoracic spine and simultaneous stability of the lower body.

HOW TO PERFORM THE TORSO ROTATION TEST

Begin by having the player assume a normal athletic posture with their arms crossed over their shoulders. Their feet should be approximately shoulder width apart and the hands should be resting on the front of each shoulder. Once they are in position, tell them not to move the lower body while trying to rotate the upper body (the torso) back and forth. Look for any movement of the hips or extension and side bend of the thoracic spine versus rotation. Continue testing in both directions being sure to monitor the coordination of motion, as this is important in determining golf swing issues. A proper Torso Rotation Test will yield no motion below the waistline with only the thorax and shoulders rotating.

If they have difficulty performing this action, try to differentiate between a stability or mobility issue. Hold their pelvis stable for them while having them try to rotate their upper body. If they still can't separate, they have a mobility problem. If they can separate, they have a stability problem.

CORRECT TESTING FORM



TORSO ROTATION TEST

WHAT TO LOOK FOR IN THE TORSO ROTATION TEST

Look for two main physical components in this test: Mobility and Stability.

Mobility: Thoracic spine mobility and thorax-to-pelvis separation is needed to properly rotate during this test. We are looking for a smooth turn to the right and to the left with no choppiness or loss of posture. Look carefully for any postural changes or excessive lateral shifts compared to a rotary motion with the thorax. The player should also be able to keep their head facing forward and down during the test if they have good cervical spine mobility.

Stability: Another key aspect of this test is to see if the player can stabilize their lower body and freely mobilize their thorax. This will be seen by a lower body that remains facing straight forward with no movement in the legs or feet. The head should also remain quiet during this test.

TOE TAP TEST

TEST OBJECTIVE FOR THE TOE TAP TEST

The Toe Tap Test evaluates hip internal rotation and highlights any limitations that may affect the players ability to coil and load into the hips.

This is a good way to measure the internal rotational mobility of the lower quarter. Hip and tibial internal rotation and ankle mobility are essential for proper pitching. The hip, tibia and ankle all coil and load in the wind-up and rotate and post in the lead leg from foot plant to finish. There is potential for excessive lateral motion in pitching (Sway, Hanging Back, Collapsing the Front Knee, etc.) anytime a player finds restrictions in internal rotation of the lower quarter.

HOW TO PERFORM THE TOE TAP TEST

Have the player stand with their feet one of their own foot lengths apart. Use a bat to help get into the correct starting position. Now place the handle of a bat directly between the feet (see picture below). Have the player try to rotate the left toe inwards (keeping the heel down) to touch the bat. This forces the player to rotate around the testing leg. The toe should easily reach the bat. Repeat on the other leg and compare. Each lower quarter should be able to rotate enough to touch the bat.

CORRECT SET-UP



TOE TAP TEST

WHAT TO LOOK FOR IN THE TOE TAP TEST

This test measures the amount of hip and tibial internal rotation that the player can perform standing. Our research shows that this physical attribute is paramount for proper loading into the back hip during the wind-up or to firm up into the front hip after foot plant.

Many players present with less than 40 degrees of internal rotation, where the average is over 40 degrees both directions. Pain may also be present with this test, so perform the test slowly and stop if there is any discomfort. Also make sure to note any big discrepancies between left and right.

HIP 45 TEST

TEST OBJECTIVE FOR HIP 45 TEST

This is a good way to measure the external rotational mobility of the lower quarter. Hip and tibial external rotation and ankle mobility are essential for proper pitching. There is potential for excessive or limited lateral motion or loss of posture in pitching anytime a player finds restrictions in the lower quarter.

HOW TO PERFORM THE HIP 45 TEST

Have the player get into a 45 degree angle between their feet (you can use home plate for a guide if needed). Place their hands on their hips and all their weight on the right leg. Have the player try to rotate their pelvis as far as possible towards the unloaded foot (to the left), which is angled at 45 degrees away from the right foot. Make sure the player keeps the right foot planted firmly on the ground and all of the weight on the right leg. This forces the player to rotate only around the right leg. They should be able to rotate their pelvis past the 45 degree mark (the left foot). Repeat on the left leg and compare.

CORRECT TESTING FORM



HIP 45 TEST

WHAT TO LOOK FOR IN THE HIP 45 TEST

This test measures the amount of hip and tibial external rotation that the player can perform standing. Our research shows that this physical attribute is paramount for good pitching mechanics.

Many players present with less than 45 degrees of external rotation, where the average is over 50 degrees both directions. Pain may also be present with this test, so perform the test slowly and stop if there is any discomfort. Also make sure to note any big discrepancies between left and right.

SEATED TRUNK ROTATION TEST (WITH CERVICAL SPINE)

TEST OBJECTIVE FOR SEATED TRUNK ROTATION TEST

The Seated Trunk Rotation Test with the Cervical Spine is designed to identify how much rotational mobility is present in the cervical-thoraco-lumbar spine. Good separation between the upper and lower body is important for proper sequencing, to help generate speed and maintain a stable posture during pitching.

Many players lack true thoracic or cervical spine rotation. The lack of rotation may cause them to create excessive lumbar spine rotational forces or over use the shoulder joint to compensate for limited thoracic spine mobility.

HOW TO PERFORM THE SEATED TRUNK ROTATION TEST

Begin by asking the client to get into a seated position with knees and feet together, body in an upright and erect posture and arms extended out in the “W” position supporting a bat across the shoulders. Use two bats placed perpendicular to each other or home plate on the ground to see a 45 degree angle to measure the players rotation. First, if you are going to evaluate right rotation, have the player cross their right foot in front of their left leg and place the foot flat on the ground. This helps eliminate pelvic rotation during the test.

Next, ask the client to rotate the thorax to the right as far as possible, keeping the knees together and the feet on the ground. See if they can rotate past the 45 degree mark. If they clear the 45 degree mark, next ask them to rotate their head in the opposite direction, to the left. They should be able to get their chin over their clavicle (collarbone). In order to pass right rotation, they must clear both the shoulder turn and the head turn. Repeat in opposite direction for left rotation. Make sure you switch the legs as well (left on top of right).

Many players just rotate their shoulder blades and it looks like they are making a good shoulder turn, but they lack true thoracic spine rotation. This test assesses their true thoracic rotation with their shoulder blades locked to get a real picture of their spinal mobility.

CORRECT TESTING FORM



Right Rotation

Left Rotation

SEATED TRUNK ROTATION TEST

WHAT TO LOOK FOR IN THE SEATED TRUNK ROTATION TEST

They should be able to rotate past the 45 degree mark. Typical measurements range from 45-60 degrees in both directions.

Watch the player's knees and hips. It is imperative that the knees and pelvis stay still and pointing forward during the test.

FISH TAIL TEST

TEST OBJECTIVE FOR THE FISH TAIL TEST

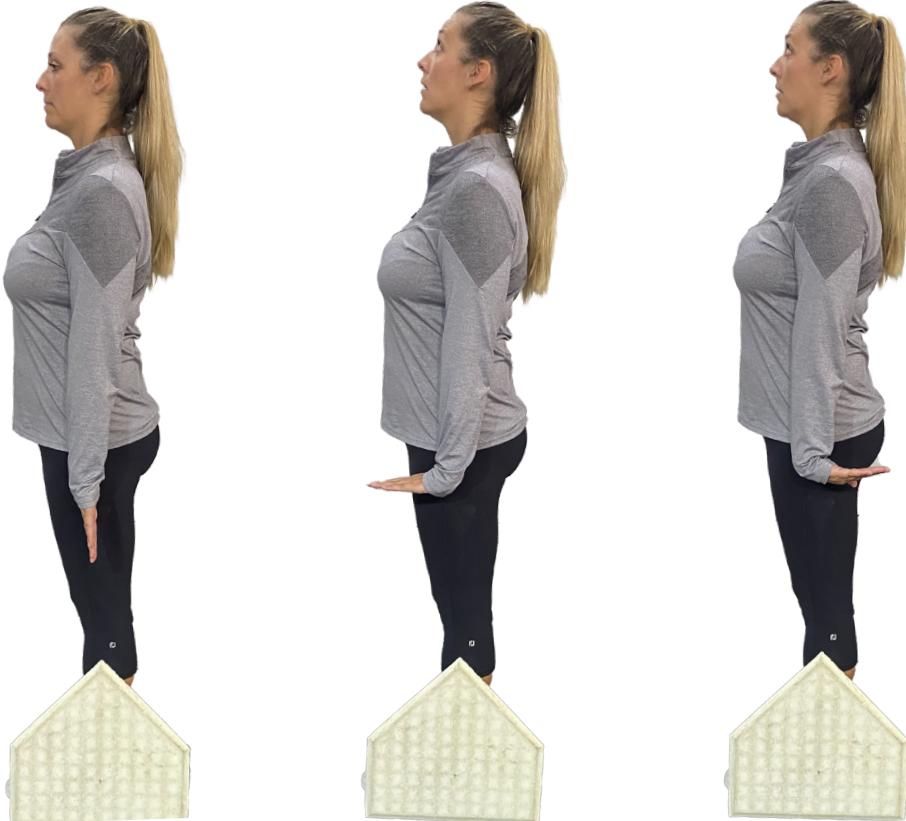
The Wrist Flexion Test is a great test to determine if the wrists have enough ability to flex or "bend forward". This motion is imperative in the golf swing as it affects both the downswing as well as the backswing. Any limitation in Wrist Flexion can cause compensations during both of these portions of the golf swing, which can ultimately lead to poor mechanics, injuries or both.

The Wrist Extension Test is a great test to determine if the wrists have enough ability to extend or "bend backward". This motion is imperative in the golf swing as it affects both the downswing as well as the backswing. Any limitation in Wrist Extension can cause compensations during both of these portions of the golf swing, which can ultimately lead to poor mechanics, injuries or both.

HOW TO PERFORM THE FISH TAIL TEST

In a standing position, begin test by extending both arms directly out in front of you. Make sure to keep the arms level (parallel) with the ground, and hands approximately at chest height. Form a fist with each hand and have the palms facing the ground about 6-10 inches apart from one another. Next, ask the client to simply bend both fists downward toward the ground while keeping the arms locked and parallel to the level of the ground.

CORRECT TESTING FORM



FISH TAIL TEST

WHAT TO LOOK FOR IN THE FISH TAIL TEST

The Wrist Flexion Test will give information regarding how much or how little the client is able to flex or “forward bend” their wrists. To get this measurement, simply place a 6-iron on the wrist joint from the a side-looking position. Make sure to start the test at a flat position which we will term 0 degrees of Wrist Flexion. Once the client begins flexing, the measurement will begin to increase. Ultimately the measurement should end up over 60 degrees of forward bend or flexion (that is the lie angle of the 6-iron). Anything less than can possibly lead to limitations that could possibly affect swing mechanics and potentially cause injuries.

Any flexion limitation in the lead wrist can lead to scooping or a cupped lead wrist through impact.

FINGER EXTENSION TEST

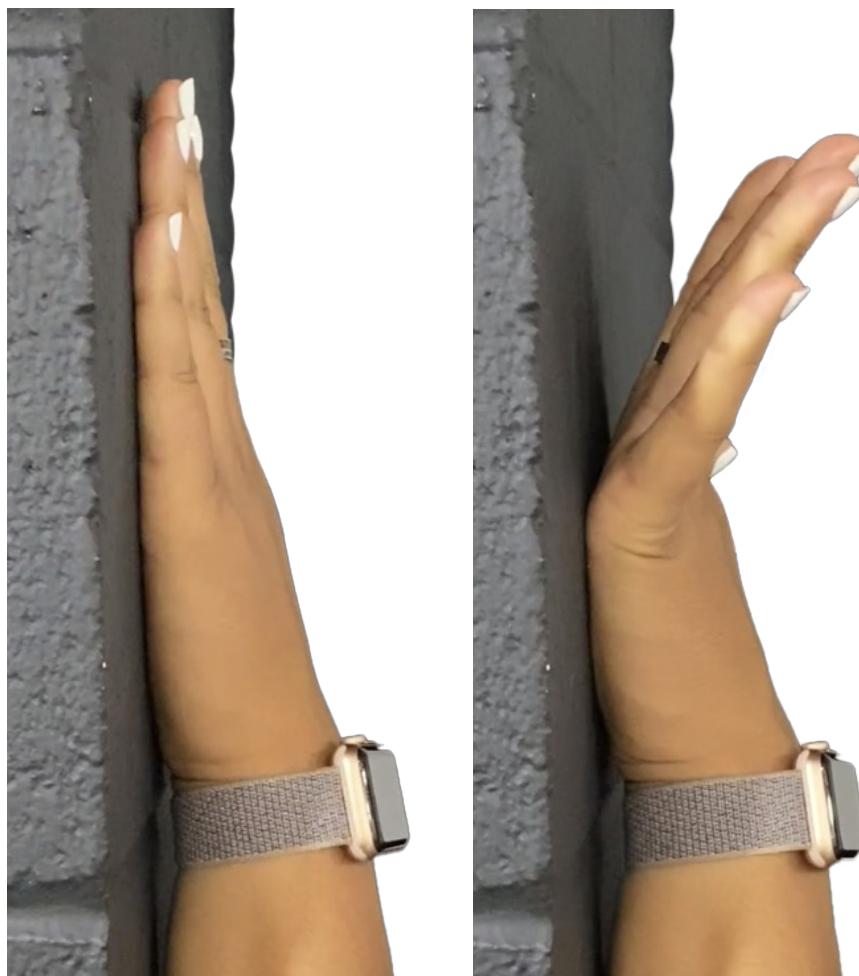
TEST OBJECTIVE FOR THE FINGER EXTENSION TEST

The Tandem Heel Lift Test is a great test for ankle plantarflexion. This is a key movement that helps a pitcher gain distance and drive in their stride. Many times plantarflexion dysfunctions go undiagnosed for years.

HOW TO PERFORM THE FINGER EXTENSION TEST

Have the player stand with their left foot perpendicular to a wall, with their toes touching the wall. Place the right foot directly behind the left foot with the toes of the right foot touching the heel of the left foot. Both feet should be perpendicular to the wall. Now have the player lift their left foot off the ground and place it next to the right foot, but still in the air. Maintaining balance only on the right foot, have the player try to lift their right heel up off the ground.

CORRECT TESTING FORM



FINGER EXTENSION TEST

WHAT TO LOOK FOR IN THE FINGER EXTENSION TEST

They should be able to get at least 30 degree off the wall.

FOREARM ROTATION TEST

TEST OBJECTIVE FOR THE FOREARM ROTATION TEST

The Hitch Hiking Test is an important test to determine the mobility of the wrist, elbow and forearm in two specific movement patterns; Pronation and Supination. The ability to both Pronate and Supinate the wrist is imperative for proper set and release of the bat, as well as power production in the swing.

HOW TO PERFORM THE FOREARM ROTATION TEST

In a standing position, begin test by having the player bend their elbows to 90 degrees with their arms by their sides and their forearms pointing directly in front of them. Next, set the thumbs to point towards the ceiling, and have both palms directly facing one another. Once in this position, begin the test by trying rotate both hands outwards so that the thumbs roll laterally (Supination). Maintain the setup position with the straight and parallel forearms during the entire Supination portion of the test. Once they gain as much range of motion into the Supination direction, begin the second portion of the test which is exactly opposite of the first. With forearms in the straight and parallel position, slowly bring the thumbs back towards the vertical and continue turning inwards as far as they can go, in a medial direction (Pronation).



FOREARM ROTATION TEST

WHAT TO LOOK FOR IN THE FOREARM ROTATION TEST

During this test you are looking for adequate ranges of motion, both into the Pronation and Supination directions.

- Normal Pronation is 80 degrees
- Normal Supination is 80 degrees

Any rotation limitation in the wrists, elbow or forearm can lead to major problems with bat path, bat angle and bat release.

WRIST HINGE TEST

TEST OBJECTIVE FOR THE WRIST HINGE TEST

This test determines the mobility of the wrist. The ability to both Ulnar and Radial deviate the wrist is imperative for proper set and release of the ball, as well as power production in certain pitches.

HOW TO PERFORM THE WRIST HINGE TEST

In a standing position, begin test by placing arms down by your side and bend the elbows to 90 degrees. Next, make a fist in each hand and set your thumbs to point towards the ceiling. Once in this position you will begin the test by trying to hinge the wrists up and down. Remember to keep both palms facing directly at one another, and elbows locked during both phases of this test.



ULNAR DEVIATION



RADIAL DEVIATION

WRIST HINGE TEST

WHAT TO LOOK FOR IN THE WRIST HINGE TEST

During this exam you are looking for adequate ranges of motion, both into the Radial and Ulnar directions. The Radial component of the movement is very important for proper setting of the club into the backswing, while the Ulnar component is vital for proper release of the golf club through the impact zone.

- Normal radial deviation is 20 degrees bilaterally.
- Normal ulnar deviation is 30 degrees bilaterally.

SIDELYING CLOCK CIRCLE TEST

TEST OBJECTIVE FOR THE SIDELYING CLOCK CIRCLE TEST

The Shoulder Windshield Wiper Test checks the player's ability to internally and externally rotate the shoulder (turn the thumb up and down) when the arm is extended. This is an important skill for maintaining a good hand position during the arm circle. This movement requires good mobility of the shoulder girdle, forearm and thoracic spine.

HOW TO PERFORM THE SIDELYING CLOCK CIRCLE TEST

To test the left shoulder, begin by having the player grab a softball in their left hand and stand tall with their feet pelvic width apart and their left arm extended directly out to their side. Have the player start with their palm facing the ground. Now, ***keeping the shoulder 90 degrees and the hand in-line with the trunk***, have them rotate the thumb down as far as possible. They should be able to rotate to 90 degrees (thumb goes vertical) Repeat in the opposite direction for the right shoulder.

Next, check the same range of motion with the shoulder flexed directly out in front of the player. Have the player start with their palm facing the ground. Now, ***keeping the shoulder 90 degrees***, have them rotate the thumb down as far as possible. They should be able to rotate to 90 degrees (thumb goes vertical) Repeat in the opposite direction for the right shoulder.

SIDELYING CLOCK CIRCLE TESTING FORM



SIDELYING CLOCK CIRCLE TEST

WHAT TO LOOK FOR IN THE SIDELYING CLOCK CIRCLE TEST

During this exam you are looking for adequate ranges of motion in the internal rotation of the shoulder.

The results will be scored as one of the following findings:

- = or > 90 degrees (front)
- < 90 degrees (front)
- = or > 90 degrees (at side)
- < 90 degrees (at side)

PRONE SHOULDER EXTENSION TEST

TEST OBJECTIVE FOR THE PRONE SHOULDER EXTENSION TEST

To assess active shoulder extension mobility and stability/motor control in an unloaded posture. Shoulder extension occurs before circle start and can contribute to overall arm speed.

HOW TO PERFORM THE PRONE SHOULDER EXTENSION TEST

Instruct the player to assume the prone position with the arms and hands by the thighs with palms facing up. The player then attempts to extend their arm up as high as possible into full shoulder extension, without moving into abduction. Make sure the elbow stays extended at all times during the test. Make sure they keep their torso in contact with the table (no thoracic extension or rotation). Monitor for any anterior dumping of the shoulder.

NORMAL PRONE SHOULDER EXTENSION



PRONE SHOULDER EXTENSION TEST

WHAT TO LOOK FOR IN THE PRONE SHOULDER EXTENSION TEST

During this exam you are looking for adequate range of motion in shoulder extension.

The results will be scored as one of the following findings:

- = or > 50 degrees
- < 50 degrees

3-POINT WINDSHIELD WIPER TEST

TEST OBJECTIVE FOR THE 3-POINT WINDSHIELD WIPER TEST

The 3-Point Windshield Wiper Test checks the player's ability to internally and externally rotate the arm (turn the thumb up and down) when the arm is extended. This is an important skill for maintaining a good hand position during the arm circle. This movement requires good mobility of the shoulder girdle, forearm and thoracic spine.

HOW TO PERFORM THE 3-POINT WINDSHIELD WIPER TEST

To test the right shoulder, begin by having the player stand tall with their feet pelvic width apart and their right arm extended directly down by their side. Have the player start with their palm facing behind them. Now, ***keeping the arm in-line with the trunk***, have them internally rotate (pronate) as far as possible. They should be able to rotate to 90 degrees (thumb points behind them). Now check external rotation (supination). They should be able to rotate 180 degrees (thumbs points to the right)

Next, check the same range of motion with the shoulder extended directly out in front of the player. Have the player start with their palm facing the ground. Now, ***keeping the shoulder 90 degrees***, have them rotate the thumb down as far as possible. They should be able to rotate to 90 degrees (thumb points down). Now check external rotation (supination). They should be able to rotate 180 degrees (thumbs points to the right).



Finally, check the same range of motion with the shoulder flexed directly up above the player. Have the player start with their palm facing forward. Now, ***keeping the arm in-line with the trunk***, have them internally rotate (pronate) as far as possible. They should be able to rotate to 90 degrees (thumb points in front of them). Now check external rotation (supination). They should be able to rotate 90 degrees (thumbs points behind them)

3-POINT WINDSHIELD WIPER TEST



WHAT TO LOOK FOR IN THE 3-POINT WINDSHIELD WIPER TEST

During this exam you are looking for adequate ranges of motion for internal and external rotation of the shoulder.

Internal Rotation (pronation) is scored as one of the following findings:

- = or > 90 degrees (down, front and up)
- < 90 degrees (down, front and up)

External Rotation (supination) is scored as one of the following findings:

- = or > 180 degrees (down and front)
- < 180 degrees (down and front)
- = or > 90 degrees (up)
- < 90 degrees (up)

ACTIVE STRAIGHT LEG RAISE TEST

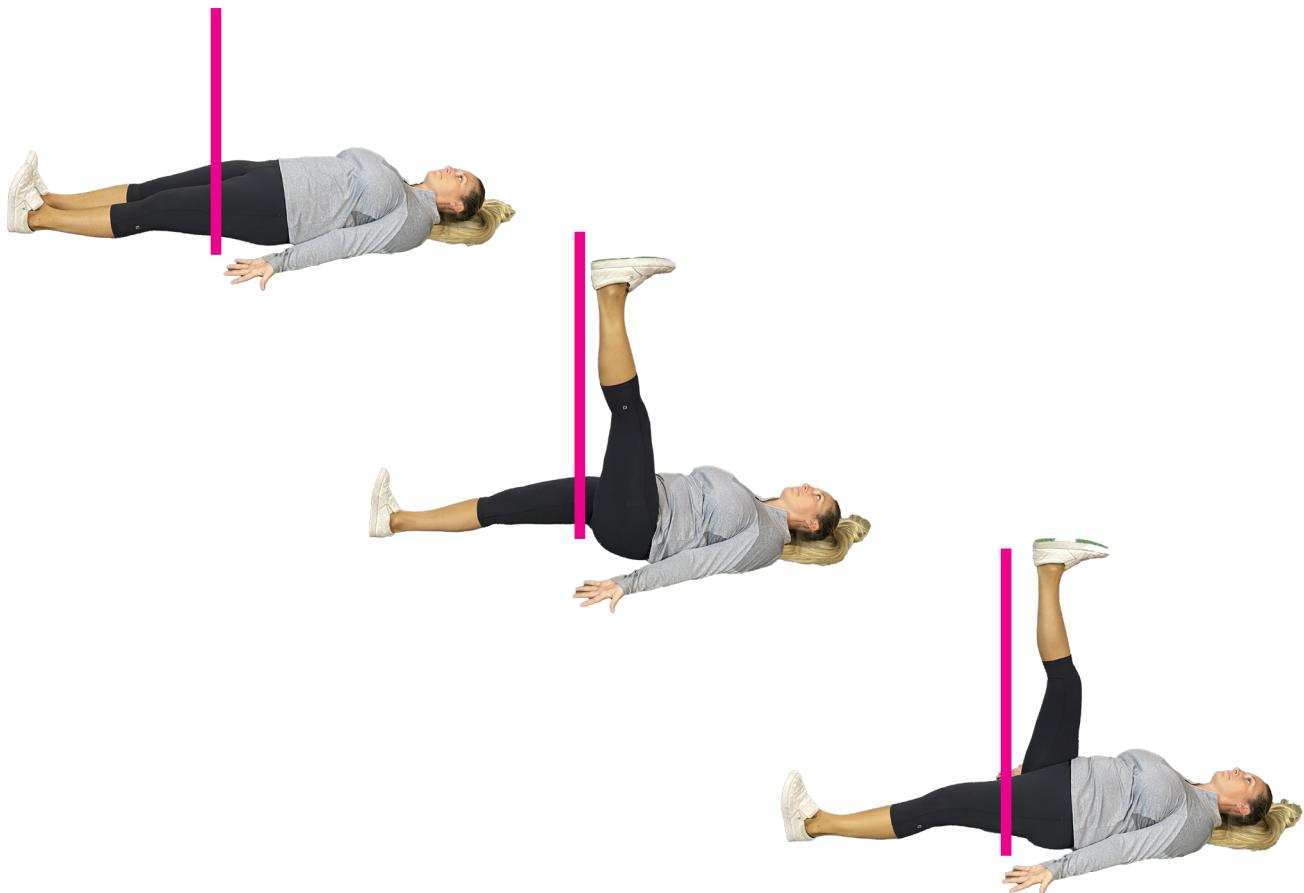
TEST OBJECTIVE FOR THE ACTIVE STRAIGHT LEG TEST

The active straight-leg raise identifies the active mobility of the flexed hip, but also includes the stability as well as the available hip extension of the alternate hip. This is not so much a test of hip flexion on one side, as it is an appraisal of the ability to separate the lower extremities in an unloaded position. This is extremely important for a pitcher to be able to make a large stride in the proper direction.

HOW TO PERFORM THE ACTIVE STRAIGHT LEG TEST

Start with the player on their back with the arms by the sides, palms up and head flat on the floor. A bat is placed under the knees. Both feet should be in a neutral position, the soles of the feet perpendicular to the floor. Find the point between the anterior superior iliac spine (ASIS) and the joint line of the knee then place a dowel or bat at this position, perpendicular to the ground. Next, the client lifts the test limb while maintaining the original starting position of the ankle and knee. During the test, the opposite knee should remain in contact with the bat; the toes should remain pointed upward in the neutral limb position, and the head remains flat on the floor. Once reaching the end range, note the position of the upward ankle relative to the non-moving limb. Perform the active straight-leg mobility test a maximum of three times bilaterally. Make sure the non-moving limb maintains a neutral position and repeat the test on both sides.

CORRECT TESTING FORM



ACTIVE STRAIGHT LEG RAISE TEST

WHAT TO LOOK FOR IN THE ACTIVE STRAIGHT LEG TEST

When it comes to scoring the test, the moving limb identifies the side being scored. We score the test in one of three categories: Past the mid-thigh line, Equal to the mid-thigh line or Less than the mid-thigh line. Normal is the moving limb's ankle is able to travel past the mid-thigh line. Restricted is either equal to the mid-thigh line or less than the mid-thigh line.

PHYSICAL CAUSES OF LIMITED ACTIVE STRAIGHT LEG TEST

When a player presents with a limitation in thorax rotation:

- **Core Control** - Pelvic control may not be sufficient for the execution of a pattern.
- **Poor Hip Mobility** - The client may have inadequate mobility of the opposite hip, stemming from inflexibility associated with limited hip extension.
- **Poor Tissue Extensibility** - The client may have poor tissue extensibility in the posterior chain of the moving limb.
- **Poor Reciprocal Control** - A combination of these factors will be exhibited if a client has relative bilateral, asymmetric hip mobility. The non-moving limb is at work during the optimal pattern; when the pattern is correct, the non-moving limb demonstrates stability, (an automatic task), while the moving limb demonstrates mobility, (a conscious task).

LUNGE WITH EXTENSION TEST

TEST OBJECTIVE FOR THE LUNGE WITH EXTENSION TEST

The Lunge with Extension tests for normal extension of hips and spine while maintaining full shoulder flexion.

HOW TO PERFORM THE LUNGE WITH EXTENSION TEST

Have the player lay supine on the ground. Place one baseball outside their heel and another baseball outside their shoulder (AC Joint). Without moving the baseballs, have the player stand up. Now have the player get into a wide lunge (stride stance) with their front foot inside the top ball, their back heel inside the bottom ball and their front knee directly over the back of their front heel. Next, have the player raise their arms into a full shoulder flexion position, with their elbows fully extended. Ask the player to bend backward as far as possible, making sure the front knee position remains unchanged. Direct the player to look up towards hands during the movement.

Special Note: If the arms do not start in a full shoulder flexion position, the test is already dysfunctional. Proceed through the motion to only check for pain.



LUNGE WITH EXTENSION TEST

WHAT TO LOOK FOR IN THE LUNGE WITH EXTENSION TEST

Any limitation in full extension (either shoulder, spine or hip) highlights the player's inability to maintain upright posture in a lunge pattern. The player should be able to achieve the following positions:

- Maintain full shoulder flexion throughout test (humerus covers ear)
- Shoulders cross the back mid-thigh line (the line that bisects the back hamstring)

PHYSICAL CAUSES OF LIMITED LUNGE WITH EXTENSION TEST

When a player presents with limitations we look at the following:

- Potential Mobility Limitations
 - » Hip Joint Restrictions
 - » Muscular, Capsular, & Myofascial Restrictions in the Hip and Pelvic Musculature
 - » Thoracic Spine Mobility
 - » Muscular & Myofascial Restrictions in the Thorax and Spinal Muscles
 - » Shoulder Girdle Mobility
 - » Muscular & Myofascial Restrictions in the Shoulder Girdle Muscles
- Potential Stability Limitations
 - » Weight Bearing Hip Extension Dysfunction
 - » Weight Bearing Thorax Extension Dysfunction
 - » Weight Bearing Shoulder Flexion Dysfunction
 - » Postural Stability Problem

TANDEM DORSIFLEXION TEST

TEST OBJECTIVE FOR THE TANDEM DORSIFLEXION TEST

To test closed-chain dorsiflexion of the ankles.

HOW TO PERFORM THE TANDEM DORSIFLEXION TEST

Instruct the player to assume the tandem gait stance using the wall for support. Tandem stance set-up is the left foot toes against the wall and the right foot toes against left heel, the 2nd/3rd toe in line with left heel. Once in position, test the right ankle by bending the right knee forward without the right heel coming off the ground or valgus collapse of the right knee. Switch legs for set-up and then repeat with left ankle.



TANDEM DORSIFLEXION TEST

WHAT TO LOOK FOR IN THE TANDEM DORSIFLEXION TEST

Normal motion for closed chain knee flexed dorsiflexion is 40 degrees. A good approximation of that 40 degrees is the knee cap moving past the mid ankle joint (the middle of the medial malleolus).

Watch carefully for valgus collapse and/or the heel lifting off the ground. An Airex can be used to keep the feet in proper position - align it along the medial border of front foot and lateral border of back foot.

SIDE-STEP WALKOUT TEST

TEST OBJECTIVE FOR THE SIDE STEP WALKOUT TEST

The purpose of the Side Step Walkout Test is to evaluate hip joint mobility and groin flexibility. This will show whether the pitcher has the ability to stride and separate the feet effortlessly.

HOW TO PERFORM THE SIDE STEP WALKOUT TEST

Have the player lay supine on the ground. Place one softball outside their heel and another softball outside their shoulder (AC Joint). Without moving the softballs, have the player stand up. Now, start with their left foot directly in-line with one of the softballs. Next, instruct the player to walk out to the right (towards the other softball) as far as they can go without moving the left foot. Once the player has walked out as far as they can go, compare their right foot position to the other softball. There are three possible outcomes:

1. The right foot ends up outside the other softball (great range).
2. The right foot ends up in line with the other softball (normal range).
3. The right foot ends up short of the other softball (limited range).

CORRECT TESTING FORM



STEP ONE



STEP TWO



STEP THREE

SIDE STEP WALKOUT

WHAT TO LOOK FOR IN THE SIDE STEP WALKOUT TEST

Look for the athlete to be able to walk out past the other softball. This should be equal to roughly 85% of the athletes height. This will give the athlete an advantage of maintaining posture with a large stride.

PHYSICAL CAUSES OF LIMITED SIDE STEP WALKOUT TEST

When an athlete presents with limitations in their walkout distance we look at the following:

FOR MOBILITY ISSUES

- **Limited Ankle Mobility** - poor mobility of the ankle, especially into inversion/eversion will limit their side step walkout.
- **Hip Joint Mobility** - Hip Joint restrictions are extremely common amongst softball players.
- **Muscular, Capsular, & Myofascial Restrictions in the Hip and Pelvis Musculature**
- Any tightness or fascial restrictions of the intrinsic hip rotators, joint capsule, glutes, piriformis, TFL, IT band, and hip flexors can limit mobility.

SIDE STEP WALKOUT TEST PITFALLS

When taking an athlete through this exam, be aware of the following:

- Don't let the feet flare out.
- Make sure the starting foot remains planted on the ground and doesn't shift

HEEL LIFT TEST

TEST OBJECTIVE FOR HEEL LIFT TEST

The Heel Lift Test is a great test for ankle plantarflexion. This is a key movement that helps a pitcher gain distance and drive in their stride. Many times, plantarflexion dysfunctions go undiagnosed for years.

HOW TO PERFORM HEEL LIFT TEST

Have the player stand with their left foot perpendicular to a wall, with their toes touching the wall. Place the right foot directly behind the left foot with the toes of the right foot touching the heel of the left foot. Both feet should be perpendicular to the wall. Now have the player lift their left foot off the ground and place it next to the right foot, but still in the air. Maintaining balance only on the right foot, have the player try to lift their right heel up off the ground.

CORRECT TESTING FORM



HEEL LIFT TEST

WHAT TO LOOK FOR IN THE HEEL LIFT TEST

They should be able to get at least 40 degree off the ground (approximately one baseball should fit completely under the player's heel).

PHYSICAL CAUSES OF LIMITED HEEL LIFT TEST

- **Ankle Joint Mobility** - Ankle plantarflexion joint restrictions, specially with a history of ankle sprains or Achilles tendon injuries.
- **Fascial Restrictions** - Any restriction in the anterior or posterior chain fascial chain can lead to ankle or tibial rotation limitations.



ANKLE ROCKING TEST

TEST OBJECTIVE FOR THE ANKLE ROCKING TEST

The Ankle Rocking test is great for checking ankle mobility and stability. This will show whether the player has the ability to invert and evert which is critical when loading and weight shifting.

HOW TO PERFORM THE ANKLE ROCKING TEST

Having the player sit on a chair keep their knees at 90 degrees and their legs separated. Instruct the player to evert both ankles then invert both ankles without moving their knees. If they are unable to perform this without accessory motion, have them place their two fists between their knees to help stabilize. Instruct the player to evert both ankles then invert both ankles without letting the knees and hands separate. The fists should prevent accessory knee or hip movements during this test and help improve stability dysfunctions.

This test is a qualitative not quantitative (pass or fail), but the correct range of motion for the ankle is 30 degrees inversion and 20 degrees of eversion.

CORRECT TESTING FORM



ANKLE ROCKING TEST

WHAT TO LOOK FOR IN THE ANKLE ROCKING TEST

If the player's knees continue to move outward even with their hands between their knees, assume they must have mobility limitations in the ankles.

If they can't do the motion without their hands between their knees, but they can with the hands, assume they have a stability problem.

PHYSICAL CAUSES OF THE ANKLE ROCKING TEST

- **Ankle Joint Mobility** - Ankle joint restrictions are very common, specially with a history of ankle sprains.
- **Muscular, Capsular, & Myofascial Restrictions in the Ankle** - Previous trauma, scar tissue, any tightness or fascial restrictions of the peroneals, anterior tibialis, gastrocs, soleus, flexors and extensors can all limit ankle inversion and eversion.

Fast-Pitch Screen														
Name:				Age:		Date:		Favorite Pitches:						
Hits: RT LT		Throws: RT LT		Weight:		Height:		1) 2)						
Pelvic Tilt		Toe Tap Test		Wrist Hinge Test		3-Point Windshield Wiper		Tandem Dorsiflexion						
Athletic Posture (Subjective)		L	One Foot Length Apart	R	L	Elbows By Side - Hinge Up	R	L	To Side - Supination (turn palm forward)	R	L	Right Foot Back	R	
Neutral Tilt			Touches			Good Range			= or > 180°			Knee goes past left ankle		
S-Posture			Short			Limited			< 180°			Limited		
C-Posture		L	Holding Pelvis	R	L	Elbows By Side - Hinge Down	R	L	To Side - Pronation (turn palm backward)	R	L	Left Foot Back	R	
Amount of Motion			Improves			Good Range			= or > 90°			Knee goes past right ankle		
Normal Motion			No Change			Limited			< 90°			Limited		
Hard Time Arching Back		Hip 45 Test			Sidelying Clock Circle			L	Out Front - Supination (turn palm forward)	R	Side Step Walkout			
Hard Time Flattening Back		L	45 Degree Angle	R	Left Side Down (Rt Arm)				= or > 180°		Top of Shoulder to Foot			
Both Limited			Greater than 45 degrees		Never loses contact				< 180°		Past Ball			
Quality of Movement			Equal to 45 Degrees		Comes off Between 3 & 1 O'Clock			L	Out Front - Pronation (turn palm backward)	R	Equal to Ball			
Smooth Movement			Less than 45 degrees		Comes off Between 1 & 12 O'Clock				= or > 90°		Less than Ball			
Shake and Bake Movement		Seated Trunk Rotation			Comes off Between 12 & 11 O'Clock				< 90°		Heel Lift Test			
Did Not Test		L	Bat Behind Back	R	Comes off Between 11 & 9 O'Clock			L	Up High - Supination (turn palm forward)	R	L	Height of Lift	R	
Pelvic Rotation Stride			Greater than 45 degrees		Comes off after 9 O'Clock				= or > 90°			Good Lift		
L	Without Holding Shoulders	R	Equal to 45 degrees		Right Side Down (Lt Arm)				< 90°			Limited Lift		
	Good		Less than 45 degrees		Never loses contact			L	Up High - Pronation (turn palm backward)	R	L	Quality of Lift	R	
	Limited		Fish Tail Test			Comes off Between 9 & 11 O'Clock				= or > 90°			Raises Straight Up	
L	Holding Shoulders	R	L	Flexion	R	Comes off Between 11 & 12 O'Clock				< 90°			Rolls Outside	
	Improves			> 45 degrees		Comes off Between 12 & 1 O'Clock			Active Straight Leg Raise			Ankle Rock Test		
	Doesn't Improve			<= 45 degrees		Comes off Between 1 & 3 O'Clock			L	On Back	R	L	Seated w/o Holding	R
L	Coordination	R	L	Extension	R	Comes off after 3 O'Clock				Foot Past Mid-Thigh Line			Good Inversion	
	Good Rotary Movement			> 80 degrees		Prone Shoulder Extension				Foot On Mid-Thigh Line			Good Eversion	
	More Lateral Movement			<= 80 degrees		L	Face Down Palm Up	R	Foot Below Mid-Thigh Line				Limited Eversion (Roll In)	
Torso Rotation Stride		Finger Extension			Greater than 50 degrees				Lunge w/ Extension			Limited Inversion (Roll Out)		
L	Without Holding Pelvis	R	L	Palm Against Wall	R	50 Degrees or Less			L	In 85% Height Stride	R	L	Seated Holding	R
	Good			Good Finger Extension						Can Get Into Starting Position			Improves Eversion	
	Limited			Limited						Can't Get into Starting Position			Improves Inversion	
L	Holding Pelvis	R	Foerarm Rotation Test						L	Trying to Extend	R		Limited Eversion (Roll In)	
	Improves	L	Palm Down (Pro)	R					Good Extension			Limited Inversion (Roll Out)		
	Doesn't Improve			80 degrees or More					Shoulders Don't Clear Mid-Knee					
				Less than 80 Degrees					Lost Shoulder Flexion					
		L	Palm Up (Sup)	R										
				80 degrees or More										
				Less than 80 Degrees										

Fast-Pitch Screen																	
Name: _____				Age: _____		Date: _____				Favorite Pitches:							
Hits: RT LT		Throws: RT LT		Weight: _____		Height: _____		1) 2)									
Pelvic Tilt		Toe Tap Test			Wrist Hinge Test			3-Point Windshield Wiper			Tandem Dorsiflexion						
Athletic Posture (Subjective)		L	One Foot Length Apart		R	L	Elbows By Side - Hinge Up		R	L	To Side - Supination (turn palm forward)	R	L	Right Foot Back		R	
Neutral Tilt			Touches				Good Range				= or > 180°			Knee goes past left ankle			
S-Posture			Short				Limited				< 180°			Limited			
C-Posture		L	Holding Pelvis		R	L	Elbows By Side - Hinge Down		R	L	To Side - Pronation (turn palm backward)	R	L	Left Foot Back		R	
Amount of Motion			Improves				Good Range				= or > 90°			Knee goes past right ankle			
Normal Motion			No Change				Limited				< 90°			Limited			
Hard Time Arching Back		Hip 45 Test				Sidelying Clock Circle				L	Out Front - Supination (turn palm forward)	R	Side Step Walkout				
Hard Time Flattening Back		L	45 Degree Angle		R	Left Side Down (Rt Arm)				= or > 180°			Top of Shoulder to Foot				
Both Limited			Greater than 45 degrees				Never loses contact				< 180°			Past Ball			
Quality of Movement			Equal to 45 Degrees				Comes off Between 3 & 1 O'Clock			L	Out Front - Pronation (turn palm backward)	R		Equal to Ball			
Smooth Movement			Less than 45 degrees				Comes off Between 1 & 12 O'Clock				= or > 90°			Less than Ball			
Shake and Bake Movement		Seated Trunk Rotation				Comes off Between 12 & 11 O'Clock					< 90°		Heel Lift Test				
Did Not Test		L	Bat Behind Back		R	Comes off Between 11 & 9 O'Clock			L	Up High - Supination (turn palm forward)	R	L	Height of Lift		R		
Pelvic Rotation Stride			Greater than 45 degrees				Comes off after 9 O'Clock				= or > 90°			Good Lift			
L	Without Holding Shoulders		R	Equal to 45 degrees			Right Side Down (Lt Arm)				< 90°			Limited Lift			
	Good			Less than 45 degrees			Never loses contact			L	Up High - Pronation (turn palm backward)	R	L	Quality of Lift		R	
	Limited			Fish Tail Test				Comes off Between 9 & 11 O'Clock				= or > 90°			Raises Straight Up		
L	Holding Shoulders		R	L	Flexion		R	Comes off Between 11 & 12 O'Clock				< 90°			Rolls Outside		
	Improves				> 45 degrees			Comes off Between 12 & 1 O'Clock			Active Straight Leg Raise			Ankle Rock Test			
	Doesn't Improve				<= 45 degrees			Comes off Between 1 & 3 O'Clock			L	On Back	R	L	Seated w/o Holding		R
L	Coordination		R	L	Extension		R	Comes off after 3 O'Clock				Foot Past Mid-Thigh Line			Good Inversion		
	Good Rotary Movement				> 80 degrees			Prone Shoulder Extension				Foot On Mid-Thigh Line			Good Eversion		
	More Lateral Movement				<= 80 degrees			L	Face Down Palm Up		R	Foot Below Mid-Thigh Line			Limited Eversion (Roll In)		
Torso Rotation Stride		Finger Extension				Greater than 50 degrees				Lunge w/ Extension					Limited Inversion (Roll Out)		
L	Without Holding Pelvis		R	L	Palm Against Wall		R		50 Degrees or Less		L	In 85% Height Stride	R	L	Seated Holding		R
	Good				Good Finger Extension							Can Get Into Starting Position			Improves Eversion		
	Limited				Limited							Can't Get into Starting Position			Improves Inversion		
L	Holding Pelvis		R	Foerarm Rotation Test							L	Trying to Extend	R		Limited Eversion (Roll In)		
	Improves		L	Palm Down (Pro)		R					Good Extension			Limited Inversion (Roll Out)			
	Doesn't Improve			80 degrees or More							Shoulders Don't Clear Mid-Knee						
					Less than 80 Degrees						Lost Shoulder Flexion						
					L	Palm Up (Sup)		R									
					80 degrees or More												
					Less than 80 Degrees												

Fast-Pitch Screen																	
Name:				Age:		Date:				Favorite Pitches:							
Hits: RT LT		Throws: RT LT		Weight:		Height:		1) 2)									
Pelvic Tilt		Toe Tap Test			Wrist Hinge Test			3-Point Windshield Wiper			Tandem Dorsiflexion						
Athletic Posture (Subjective)		L	One Foot Length Apart		R	L	Elbows By Side - Hinge Up		R	L	To Side - Supination (turn palm forward)	R	L	Right Foot Back		R	
Neutral Tilt			Touches				Good Range				= or > 180°			Knee goes past left ankle			
S-Posture			Short				Limited				< 180°			Limited			
C-Posture		L	Holding Pelvis		R	L	Elbows By Side - Hinge Down		R	L	To Side - Pronation (turn palm backward)	R	L	Left Foot Back		R	
Amount of Motion			Improves				Good Range				= or > 90°			Knee goes past right ankle			
Normal Motion			No Change				Limited				< 90°			Limited			
Hard Time Arching Back		Hip 45 Test				Sidelying Clock Circle				L	Out Front - Supination (turn palm forward)	R	Side Step Walkout				
Hard Time Flattening Back		L	45 Degree Angle		R	Left Side Down (Rt Arm)					= or > 180°		Top of Shoulder to Foot				
Both Limited			Greater than 45 degrees			Never loses contact					< 180°		Past Ball				
Quality of Movement			Equal to 45 Degrees			Comes off Between 3 & 1 O'Clock				L	Out Front - Pronation (turn palm backward)	R	Equal to Ball				
Smooth Movement			Less than 45 degrees			Comes off Between 1 & 12 O'Clock					= or > 90°		Less than Ball				
Shake and Bake Movement		Seated Trunk Rotation				Comes off Between 12 & 11 O'Clock					< 90°		Heel Lift Test				
Did Not Test		L	Bat Behind Back		R	Comes off Between 11 & 9 O'Clock				L	Up High - Supination (turn palm forward)	R	L	Height of Lift		R	
Pelvic Rotation Stride			Greater than 45 degrees			Comes off after 9 O'Clock					= or > 90°			Good Lift			
L	Without Holding Shoulders	R	Equal to 45 degrees			Right Side Down (Lt Arm)					< 90°			Limited Lift			
	Good		Less than 45 degrees			Never loses contact				L	Up High - Pronation (turn palm backward)	R	L	Quality of Lift		R	
	Limited		Fish Tail Test				Comes off Between 9 & 11 O'Clock					= or > 90°			Raises Straight Up		
L	Holding Shoulders	R	L	Flexion		R	Comes off Between 11 & 12 O'Clock					< 90°			Rolls Outside		
	Improves			> 45 degrees			Comes off Between 12 & 1 O'Clock				Active Straight Leg Raise			Ankle Rock Test			
	Doesn't Improve			<= 45 degrees			Comes off Between 1 & 3 O'Clock				L	On Back	R	L	Seated w/o Holding		R
L	Coordination	R	L	Extension		R	Comes off after 3 O'Clock					Foot Past Mid-Thigh Line			Good Inversion		
	Good Rotary Movement			> 80 degrees			Prone Shoulder Extension					Foot On Mid-Thigh Line			Good Eversion		
	More Lateral Movement			<= 80 degrees			L	Face Down Palm Up		R	Foot Below Mid-Thigh Line			Limited Eversion (Roll In)			
Torso Rotation Stride		Finger Extension				Greater than 50 degrees				Lunge w/ Extension			Limited Inversion (Roll Out)				
L	Without Holding Pelvis	R	L	Palm Against Wall		R	50 Degrees or Less			L	In 85% Height Stride	R	L	Seated Holding		R	
	Good			Good Finger Extension							Can Get Into Starting Position			Improves Eversion			
	Limited			Limited							Can't Get into Starting Position			Improves Inversion			
L	Holding Pelvis	R	Foerarm Rotation Test							L	Trying to Extend	R		Limited Eversion (Roll In)			
	Improves	L	Palm Down (Pro)		R					Good Extension			Limited Inversion (Roll Out)				
	Doesn't Improve		80 degrees or More							Shoulders Don't Clear Mid-Knee							
				Less than 80 Degrees							Lost Shoulder Flexion						
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Neutral Tilt			Touches				Good Range				= or > 180°			Knee goes past left ankle			
S-Posture			Short				Limited				< 180°			Limited			
C-Posture		L	Holding Pelvis		R	L	Elbows By Side - Hinge Down		R	L	To Side - Pronation (turn palm backward)	R	L	Left Foot Back		R	
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Shake and Bake Movement		Seated Trunk Rotation				Comes off Between 12 & 11 O'Clock					< 90°		Heel Lift Test				
Did Not Test		L	Bat Behind Back		R	Comes off Between 11 & 9 O'Clock				L	Up High - Supination (turn palm forward)	R	L	Height of Lift		R	
Pelvic Rotation Stride			Greater than 45 degrees			Comes off after 9 O'Clock					= or > 90°			Good Lift			
L	Without Holding Shoulders	R	Equal to 45 degrees			Right Side Down (Lt Arm)					< 90°			Limited Lift			
	Good		Less than 45 degrees			Never loses contact				L	Up High - Pronation (turn palm backward)	R	L	Quality of Lift		R	
	Limited		Fish Tail Test				Comes off Between 9 & 11 O'Clock					= or > 90°			Raises Straight Up		
L	Holding Shoulders	R	L	Flexion		R	Comes off Between 11 & 12 O'Clock					< 90°			Rolls Outside		
	Improves			> 45 degrees			Comes off Between 12 & 1 O'Clock				Active Straight Leg Raise			Ankle Rock Test			
	Doesn't Improve			<= 45 degrees			Comes off Between 1 & 3 O'Clock				L	On Back	R	L	Seated w/o Holding		R
L	Coordination	R	L	Extension		R	Comes off after 3 O'Clock					Foot Past Mid-Thigh Line			Good Inversion		
	Good Rotary Movement			> 80 degrees			Prone Shoulder Extension					Foot On Mid-Thigh Line			Good Eversion		
	More Lateral Movement			<= 80 degrees			L	Face Down Palm Up		R	Foot Below Mid-Thigh Line			Limited Eversion (Roll In)			
Torso Rotation Stride		Finger Extension				Greater than 50 degrees				Lunge w/ Extension			Limited Inversion (Roll Out)				
L	Without Holding Pelvis	R	L	Palm Against Wall		R	50 Degrees or Less			L	In 85% Height Stride	R	L	Seated Holding		R	
	Good			Good Finger Extension							Can Get Into Starting Position			Improves Eversion			
	Limited			Limited							Can't Get into Starting Position			Improves Inversion			
L	Holding Pelvis	R	Foerarm Rotation Test							L	Trying to Extend	R		Limited Eversion (Roll In)			
	Improves	L	Palm Down (Pro)		R					Good Extension			Limited Inversion (Roll Out)				
	Doesn't Improve		80 degrees or More							Shoulders Don't Clear Mid-Knee							
				Less than 80 Degrees							Lost Shoulder Flexion						
				L	Palm Up (Sup)		R										
				80 degrees or More													
				Less than 80 Degrees													

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