Pitching with Internal Rotation (IR)

Compiled from posts on Discussfastpitch.com by Boardmember

Introduction

"Internal" or "medial" rotation is the act of rotating an external part toward the mid-line of the body.

First of all, we all know that grip, stance, posture, wind-up/load and leg drive all contribute to pitching a softball. IMO, none of these are on my list of "absolutes". They are "styles". That is, not every high level pitcher uses exactly the same style any of the above listed requisites of pitching.

The ONLY thing I view as an absolute in pitching is Internal Rotation. Which is why I focus on it so much. If I can teach a young lady/man to "throw" a softball correctly and efficiently, and literally "play catch throwing underhand" as naturally as they would overhand, my job becomes so much easier when it comes to adding "style".

With that in mind, let's talk about I/R as a training method to that end. Using drills that isolate the motions of I/R, and are progressive in nature to involve more and more of the sequence.

First of all, I/R is a "motor skill". Whether natural or learned, it is a skill that can either be taught or enhanced by focusing and training the bio-mechanics and physics that cause the motion to occur, in sequence.....

One of the first things that has to happen for a proper I/R delivery, is that the upper arm (bicep) must be trained that it is the stability point for Internal Rotation. It rotates AND stabilizes vertically. It must be properly positioned in close to the body and vertical in order for the forearm to internally rotate on the tightest radius possible. It ALSO must be trained to pass kinetic energy from the proximal to the distal parts of the sequence. IOW.....The energy must be passed from the arm circle, through the upper arm (proximal part), to the forearm (distal part) and down through the wrist into the fingers and ball.

In order for this transfer to occur, the upper arm must be caused to decelerate to almost a stop when it reaches the stable vertical position close to the side, and then continue forward as a follow through energy dissipation result.....That cause begins with Internal Rotation of the forearm "taking the energy" from the arm circle, causing decel of the upper arm.....

Take note of these pitchers stable vertical position of the turning upper arm.....And how the elbow stops advancing through the circle for a split second.....

In order to train the upper arm to stabilize, and transfer energy, we need to limit its ability to do anything but turn away then face forward by responding to the commands of the forearm as it REMAINS in the stable vertical position close to the body.

First Step

Lock It In Drill

The quickest way I've found to accomplish this is by using what I call the "lock it in" drill. A drill that keeps the elbow at the side, thereby keeping the upper arm stabilized and vertical and transferring energy to the forearm.....

The student must throw the ball using External Rotation than Internal Rotation/Pronation of the forearm WITHOUT moving the upper arm (elbow) back/away, OR forward past the body until release causes follow through.....It can turn back but it cannot MOVE back.....

Catch the Whip

As I stated in a another thread, one of the biggest challenges we face when teaching I/R is the release phase. Because the upper arm/forearm/wrist are actually rotating from back to front during the release phase, vs. pushing straight through, there is a whipping action (sudden acceleration) that occurs as the arm circle(s) change from a wide to narrow axis of rotation through the release phase. IE if you push the ball with no internal rotation, the axis point of the circle remains at the shoulder joint (wide).

But if you internally rotate the upper arm/forearm/wrist during the release phase, you've narrowed the axis of rotation from the shoulder joint (wide) to the forearm/wrist (narrow). This change in the distance of the ball from the axis of rotation causes angular acceleration. IE the closer the mass is to the axis of rotation the faster it turns.

Consider an ice skaters scratch spin. As she draws her arms/leg inward, her rotational velocity increases. It's basically the same principle.

Training release for a pusher simply involves training when to release the ball for a proper high/low trajectory where angular momentum is constant. IE there is no sudden increase in velocity during this phase. Their misses are limited to high/low.

Training the release phase for an internal rotator is MUCH more complicated because of the nature of the "beast". He/She is not only dealing with High/Low, but because of the I/R in the forearm/wrist, and the acceleration that occurs because of it.....We must deal with left right AND high low. It's SO MUCH EASIER to be a pitching coach who does NOT teach I/R believe me.....And that's why there's SO MANY of those out there.....

So how do we train an I/R release phase that both controls the high/low, AND the in/out as well. We must train them to release the ball "mid-snap" so to speak. In order to accomplish this, we must get them thinking about release BEFORE mid-snap. Because IF they release the ball AFTER mid-snap, (turn the ball over) they MISS the acceleration phase of I/R. The best way I've found to accomplish this is to "work into" the mid-point, vs. trying to work "back out of it". Working INTO mid-snap would have the ball releasing EARLIER than later.

IOW.....I try to get my students to MISS RIGHT (RH'r) FIRST vs. holding on to the ball through mid-snap and turning it over left (RH'r) without "catching" the added velocity of angular acceleration. I accomplish this by making sure I have opposites. IE the forearm/wrist turning over toward the LH batter, and the ball spinning right toward the RH batter (RH'r). This tells me that the student is working INTO the snap during the learning process. And hasn't "missed the whip" so to speak. This is why I love to get calls from people asking me to take a look at a student who "constantly misses right" (RH'r). IE "My DD is constantly hitter batters".....What does that tell me IF everything else is basically correct?.....I HAVE A POTENTIAL FLAME THROWER!

So, bottom line is WHEN TRAINING I/R.....Get the ball turning toward the RH batter as the forearm/wrist are turning through toward the LH batter.....

It's hard to accomplish this from the "lock it in drill" but NOT impossible. My best advise is to find a concrete wall and have the student throw a ball underhand from close range until she can get the ball turning right and the forearm and wrist turning left (RH'r).....You can stand off to the side and retrieve early releases and return the ball to the student so that many training throws can be made in one session.....

The goal is to accomplish this action and still throw the ball straight ahead, bouncing back to her, vs. losing it to the right. Believe it or not, the body WILL ADAPT the sequence to spinning it right (RH'r) but THROWING IT STRAIGHT.

BULLET SPIN IS NOT THE GOAL.....INWARD/FORWARD SPIN is the goal....."Catching the Whip".....

This is a view of proper spin from a RH'd pitcher. IF we can catch this spin as the forearm/wrist  turns through, we're in really good shape:

This is a 4 seam-2 finger grip with the thumb splitting the fork. Most younger students will use a 3 finger grip with the middle finger centered opposite the thumb.....

This is the spin we're looking for as we learn to "whip" the ball.....Notice the black line orientated to the Right even though the ball is going straight.....

The ball should be spinning to the RIGHT as we throw it straight ahead.....

From the catcher's perspective the ball should be spinning to the left toward the RH'd batter as we throw it straight ahead.....Of course the Opposite is true for LH'rs.

9’ O’Clock Drill (Unlocking It)

Next we can move on to "Unlocking It".....Or the 9:00 Drill as I call it.....Allowing the elbow to release from the side SLIGHTLY as we E/R the forearm and wrist to 9:00, then RETURN the upper arm to the stabilized position in the "lock it in" drill and throw the ball, allowing for natural follow through.....It should look something like this:

Remember....When learning I/R.....MISSING TO THE RIGHT (RH'r) is a GOOD THING not a bad thing in the training stages of I/R. Because we are working INTO the whip vs. holding on THROUGH the whip.....

Magician Drill

One thing we know about ***motor learning*** is that the more things we can incorporate into training that are directly related to the skill being learned, the easier it is to learn that skill. And isolation WITH progression leads to continued non-isolated motor learning of the parts previously isolated. Ya I know....."Who's on first?".....

When I'm training I/R, I use a specific drill that helps students gain deeper sensory understanding of the function of rotary motion that the upper arm, forearm and wrist are capable of. The reason I do this is three-fold. One is to give them the reverse feel of the same forward action. Another is to create a load with the feeling of an UNloading motion. And lastly it helps the shoulder complex relax open.

That's exactly what the "Magician" drill is designed to do.....

When doing this drill there is a catcher directly behind the target line about 10 feet back. Students should be opening the upper arm/forearm/palm during swing from front to back, and putting over-spin on the ball directly toward the catcher. Under spin or sidespin would indicate either no, or limited E/R was accomplished.

The funny thing is I used to call this the "Back-Flip" drill. But once at a clinic I was putting on, an 8yo apparently didn't see the ball go backwards into the catcher's glove and asked her dad if I made the ball "disappear".....So I re-named the drill.

Progression

By the time my students have become fairly proficient at throwing the ball underhand, we progress to the "Liberty Drill".....Simply MORE of the same? Well, an uneducated person might think so. But remember what I said previously.

Who's on first?

"And isolation WITH progression leads to continued non-isolated motor learning of the parts previously isolated."

In other words, when we progress NOT TOO FAR, but just far enough, the learned motor skill is "close enough" to the whole of the next drill that it is CLEARLY still represented in that drill.....

For example, IF I allowed my student to progress to FULL MOTION practice drills from this point, the learned I/R motor skill would be so far away (at the end) from the full motion drill, I/R would deteriorate. I NEVER WANT I/R to deteriorate at the expense of progressing too far too fast.

Liberty Drill

Liberty Side and Rear.....If you'll notice, this drill closely mimics the actions of the Magician drill:

Thanks to my wife who brought her glove to work and caught for the first time in 20 years so I could film these drills at work.....With the sun in her eyes no less!

12 O’Clock (Show It and Throw It) Drill

After proficiency at Liberty, we move on to "Show it And Throw it".....Or the 12:00 Drill.....
This drill helps the student progress to what I consider the most important part of the pitching motion.....WITHOUT sacrificing emphasis on I/R.....This drill places emphasis on ball position at the top and the "pull down" in the motion WITH an I/R delivery.....

Then on to relaxed "long toss" full circle drills.....

I hope these visuals help you to gain a better understanding of what I write about concerning I/R delivery and the importance of learning to "throw a ball underhand" before learning to be a pitcher.

One thing I've learned over my 30 or so years of teaching fastpitch. I could spend 3-6 months on posture, grip, wind-up and leg drive, only to find out you DON'T KNOW HOW TO THROW THE BALL in the first place.....

Progressive training side effects include helping to train arm circle, posture and delivery methods that ensure the end product produces expected results.

Last.....Train them from WHERE THEY ARE.....NOT WHERE YOU WANT THEM TO BE.

Movement Patterns

Internal rotation of the upper arm (humerus):

When this guy pulls the handle across body he is performing "internal" or "medial" rotation of the humerus (upper arm) in the glenohumeral (shoulder) socket.
When he moves the handle back away from the mid-line he is performing "lateral" or "external" rotation of the humerus.
Notice his forearm/wrist are NOT rotating in this clip.
General movement patterns for upper arm

Internal rotation of the forearm/wrist:

When this guy rotates his forearm over to a palm down position, he is "internally rotating" his forearm/wrist. It is also called "pronating". When he rotates his forearm back to palm up, he is "externally rotating", also called "supinating".

General movement patterns for forearm

To understand internal rotation of the of the upper arm, forearm and wrist as it relates to fastpitch, we will use REVERSE CHAINING. (meaning we'll start at the end and work backwards),

WITHOUT A BALL - Stand with your hips/shoulders/feet slightly more closed toward home, then fully open (toward third) to the target line. Do NOT stand completely open (shoulders inline with the target line) for this exercise. And do NOT stand more than 45 degree closed (toward the target line EVER).

Rest your throwing arm **comfortably** (not "stiff") at your side, and your palm facing inward, **against the thigh**.

Reverse Chaining/Motor Learning

Step One/POSITION 1. **WITHOUT moving or rotating your upper arm,** externally rotate the palm to facing forward toward the target. Maintain this position with the palm facing forward.

Step Two/POSITION 2 (must be done from more than 45 degrees open to the target line to avoid injury to the shoulder joint). Move the forearm and the upper arm away from the side of the body so the hand is 4-6 inches out from the thigh. Not forward or back, but straight out from the thigh. Now externally rotate the upper arm in the shoulder socket, so the elbow is facing inward toward the body, and the bicep, forearm and palm are facing outward away from the body. You should feel your tricep resting against your body, and your elbow should be relaxed (slightly bent, not stiff/straight). You have now EXTERNALLY ROTATED the entire throwing mechanism (wrist/forearm, upper arm). THIS POSITION REPRESENTS THE BEGINNING OF THE RELEASE PHASE of the pitch.

Step Three/POSITION 3. From position 2, maintaining slight elbow flexion, move your arm backwards up the back of the circle to parallel to the ground (called the 3:00 position). **NOTICE THIS**: As you move your arm backwards up the circle, the upper arm is allowed to further externally rotate to a "palm to the sky" (supinated) position. You have now REVERSE CHAINED to the most critical position in fastpitch.....POSITION 3.....

Note: IMO, anyone being taught to throw a ball underhand should be started from this 3:00 POSITION 3, "palm to the sky".....

FORWARD CHAINING the mechanism in slow motion

From the 3:00 position 3, palm to the sky, elbow slightly bent (flexed), slowly begin to move back down the circle "palm up", **until you feel the tricep just meet the body, and STOP,** maintaining the SLIGHT flexion in the elbow and palm up.

From this position, and allowing the elbow to straighten slightly as you approach the bottom, move back down to the externally rotated position of POSITION 2, with the elbow in - bicep/forearm/palm out just at the back of the thigh.

Release Phase

Continue internally rotating the upper arm, forearm and wrist AS YOU MOVE move past/through the release phase, allowing the hand to pass the thigh toward the target as it INTERNALLY rotates from out to in through the sequence. **The hips/shoulders should be allowed to naturally rotate during the sequence. Do NOT force them closed.**

One problem I frequently see is someone who possesses the Natural move, but begins his/her internal rotation prematurely, resulting in the dreaded "flying elbow". Premature shoulder rotation will also cause a "flying elbow", and can cause injury in the most extreme cases.

This sequence should be practiced gradually until it starts to flow naturally. The beauty of it is that IT IS NATURAL. As the arm moves from position 3 (3:00 palm up), through position 2 (release phase) it will SEEK THE NATURAL STARTING POSITION 1, causing a natural release phase, and what might feel like a "flip over" of the wrist through release.

You can then begin at position 1 (palm forward at the bottom), "rock it up" to position 3, 3:00 palm to the sky, and back down through release without pause to build the natural flow of the release phase. THIS IS THE 2nd BEST DRILL IN FASTPITCH IMO.....

IF YOU CAN FEEL THIS, you've recognized the NATURAL movement of release that allows UNEO to throw over 70mph.

KNOW THIS: External/Internal rotation (pronation/supination) of the forearm IS THE FASTEST MOVING PART OF THE HUMAN ANATOMY.....One only has to hold the forearm out vertically and quickly rotate pronate/supinate back and forth the forearm with a loose wrist to see the speed of the action. The hand will actually "blur" from the speed.

IF you then move the arm up from the 3:00 position to the 12:00 position (4), above the shoulder socket **and slightly past** (forward toward the plate), NOT OVER THE HEAD, with the ball position UNCHANGED, and the elbow remaining slightly flexed, you will be "showing the ball to the batter" at the top. The arm will look like a wide open "C" maintaining elbow flexion. THIS POSITION IS CRITICAL to the success of pitching mechanics IMO.

You can then begin practicing the "half drill" rocking up to just past the top, and back down through the release phase.....Here is the "chant" when doing this drill to insure proper external/internal rotation of the sequence:

"SHOW IT, AND THROW IT".....THIS IS THE BEST DRILL IN FASTPITCH IMO.....

All of this should be done WITHOUT A BALL initially.....And from the sideways slightly closed position.

A ball can then be added to both the 3:00 drill and the 12:00 "half drill" to begin working on the release phase with a ball. Timing of release is critical to the chain, and must be done in a fashion that imparts inward/forward spin to insure the pitcher doesn't "hang on to long" and miss the acceleration phase of the "natural snap". **This is where an instructor is invaluable to progression.....**

From the basic "show it, throw it" drill, progression to a position where the stride foot starts behind the pivot foot, weight is shifted back **prior** to the up swing "show it" phase, and then a stride/push/drive is incorporated during the "throw-it" phase of the down swing. This will insure the proper transfer timing of the stride/push/drive/throw.....

Equating this to full windmill fastpitch

When the throwing arm rotates upward to start the pitch, the palm is facing the natural "inward" position. As the arm rises, it should rotate to/through the "show it" phase at the top, and the downward motion should feel more like a "pull down" then a "push down".

As the arm passes through position 3 (3:00), internal rotation takes over, and the natural whip release phase results in tremendous acceleration of the sequence, resulting in NATURAL VELOCITY.....

I'll end with this: MANY MANY YOUNG KIDS/COLLEGE PLAYERS who I see/teach, NEVER have to be taught this NATURAL SEQUENCE.....They somehow just "get it".
Others, have ZERO CLUE as to how it should feel, until they are "taught".

And MANY MANY OTHERS, have been taught by instructors a completely UNNATURAL sequence that COMPLETELY UNDERMINES what the body wants to do naturally.....

IMO, if your instructor isn't ALLOWING or TEACHING some form of this sequence, YOU SHOULD QUICKLY MOVE ON.....

Disclaimer:

Permanent damage or injury can result when dealing with complex movements of the shoulder. Not everyone is built the same, and not everyone possesses or maintains enough flexibility to perform these complex actions.

ALWAYS SEEK THE HELP OF A "QUALIFIED" INSTRUCTOR WHO EXHIBITS AT LEAST SOME KNOWLEDGE OF THE SHOULDER COMPLEX AND INJURY PREVENTION.

Mis-Taught Mechanics

Here are a few examples of the highly misunderstood/mis-taught mechanics that are flooding our youth.

Start with this one. This instructor clearly shows her student the "get on top the ball early, push it down and wave it up" mechanics. However, when the student throws the pitch, that ISN'T what she's doing, yet she is praised for doing it correctly!

Clip 1.....

This is what she's doing that makes this instructor happy, and the instructor doesn't even know it!

Here is another example of reinforcing a mechanic that clearly DOESN'T happen in elite pitchers.....And she even adds OPENING the wrist to begin the pitch. NOT GOOD IMO.....:
"Open it up, get on top the ball early, underhand wave-up" the snap

Here is YET ANOTHER INSTRUCTOR who insists the hand gets/stays BEHIND the ball early, and through the release phase. She eventually says it's OK to roll hand AFTER the ball is gone, as long as it STAYS behind the ball for a long time! She clearly has NO IDEA why the hand "rolls".
Wave it up!

The point is, instructors **who are very good**, have ZERO understanding of the fundamental mechanics of the release phase of the pitch. And unless you are teaching a student who is "blessed" with natural mechanics, and whose body knows what to do DESPITE what you teach, you CANNOT begin to help her realize her potential. Video's like these are all over the softball world.

I have YET to see an instructor who truly understands, and TEACHES what actually happens.....

"Get on top the ball early, and push it down, and wave it up".....AMAZING.

"Flip the ball straight up".....
Classic push down-pull up, hand behind the ball, underhand "wave the wrist" pattern reinforcement.....Not optimal.....

If one knee drills are used, the wrist should be "snapping" inward toward the front thigh using radial ulnar internal rotation of the forearm and wrist.....Unless you are specifically teaching "peel drop". And even then is isn't a straight "flip-up" underhand wave of the wrist.....

Hollowell's peel drop.....Watch the release carefully.....It isn't a flip straight up palm to the sky.....It "snaps" toward the front thigh.....then follows up.....

See any "wrist waving" here?.....



Here is are warm up clips I shot yesterday. This kid is a D1 Pac 10 Soph who throws 65+.....

She's been my student since the age of 14. Her mechanics show what I've been talking about here regarding the release phase.....And the difference between "waving it up" and "throwing it".....

Of course different pitches required different forearm/wrist/finger mechanics.....But learning the throw the ball in this manner will increase efficiency across the board.....

Understanding that is not high speed video, the minutia of detail is mimimized.

Regarding the thumb.....It is actually "coming off the ball" before it turns inward....The ball is NOT being rolled with the wrist.

Ring Finger-Middle-Index Finger is the catalyst for proper inward/downward spin.....