

Pitching Mechanics: the basics of a sound delivery



Above: Randy Johnston

All young players should be given the chance to pitch: it is the most active role on defence, and certainly at a junior level, should not be the exclusive reserve of those who are good at it. Besides, if they don't appreciate the many issues involved in pitching, they will never understand the game.

For this reason, all coaches should be able to provide simple guidelines to ensure that the pitcher is not unnecessarily at risk.

A word of warning: the use of sound pitching mechanics does have a role in the prevention of injury, but it is not the biggest factor in this regard. Research shows that it ranks 3rd on the list of critical risk factors for pitchers. The two biggest risks are:

1. Fatigue and overuse
2. Throwing velocity

No amount of technical excellence can protect a player from a coach who allows, or even worse, encourages, him or her to pitch too much. Throwing when fatigued, even if the pitcher feels no need to stop, is far and away the biggest cause of injury in pitchers. Unfortunately, we are often tempted to use a hard thrower too much because he helps us win! This, of course, is exposing that individual to the two greatest risk factors simultaneously.

For those who are wondering about the curve ball: it is number four.

A few Biomechanical Principles

At every level, pitchers can be assisted by some knowledge of important biomechanical principles: the search for most efficient way to use the various parts of the body during movement. Three easily understood and practical principles are very useful to pitching coaches:

1. **Transfer of force:** force generated in one part of the body can be transferred to another. This is common sense, and is widely used in all sports by skilled players who have never even heard of biomechanics, but it is critical that a coach understands this point.
2. **Summation of forces:** if movements are executed in the correct sequence, the total force generated is equal to the sum of the forces generated in each portion of the movement. (This generally means that forces should be generated first in the larger parts of the body and transferred to the smaller parts, which can then add greater speed). If, on the other hand, the movement is not properly sequenced, the total force generated can be limited to that generated by the weakest part of the movement.
3. **Stretch-shorten sequence:** a muscle contracts with more if it is firstly put on stretch. This explains why we can jump higher if we go quickly down then up, rather than start from a static, lower position.

These principles are readily seen in action during the pitching delivery.

Mechanics in Pitching

There is a great deal of variety in pitching motions, but all pitchers who are effective over a long period share some common mechanics. A great pitching delivery is a masterpiece of rhythm and coordination.

The pitcher utilises three major components to maximise the efficiency of the throwing action. These are:

1. **Weight shift:** whether pitching from the windup or the set position, the actual delivery commences with all the weight over the back leg. The pitcher then moves sideways to the target so that at ball release all weight is on the front leg. Moving the weight over a greater distance (ie, taking a longer stride), can generate more force, as long as it does not inhibit the following actions.
2. **Trunk rotation:** as the front foot makes first contact with the ground (and not before), rotation of the trunk from the hips up is commencing. The arms must be balanced and in position to take advantage of this rotation – they should both be at shoulder height so that the most efficient arm action can follow.
3. **Arm action:** as the trunk rotates, the throwing elbow is pulled strongly forward, with the upper arm lagging behind, creating a forceful external rotation of the shoulder. As the pitcher becomes chest on to the plate, the upper arm is rotated forward and extended very rapidly to provide ideal ball release. The arm action is in fact an extremely complex and ultimately sub-conscious movement. Other than a few easily monitored checkpoints (eg, elbows up at foot contact), it is best developed through drills and conditioning rather than instruction. Baseball coaches have ruined more arms than they have helped with overcoaching on the action of the arm.

These must be done in a finely tuned sequence, one after the other with minimal overlap, in order for the summation of forces to be maximised, for the pitcher to get the most out of his or her body.

Throwing from the wind up

The wind up is used when there is no threat of a runner advancing on the pitch. It should be rhythmic and controlled throughout: a good windup is an excellent example of dynamic balance. It is difficult to throw the ball with any consistency if the body is off balance or rushed.

Right: Grant Balfour

Preliminary stance

The stance is taken in front of the rubber, with some part of the throwing-side-foot in contact with the rubber. While it is often recommended to commence square to the plate, this is now considered a matter of personal preference.



The ball should be placed deep in the glove to help conceal the grip from the batter. This can be varied somewhat according to preference, but it is worthwhile preventing the opposition gaining any insight into the pitch to be thrown.



The pitcher will initiate the wind-up moving the weight onto with the non-throwing-side foot so that the throwing-side foot can be turned side-on to the pitch direction. An easy and coordinated lift of the hands may assist with balance and rhythm.

Once the support foot is in position, the pitcher turns side-on to the direction of the pitch while lifting the front leg, finishing with the shoulders and hips completely “closed” (ie, side-on). This is the point from which the actual delivery begins: movements prior to this have been mainly for balance and rhythm. It is important to remember that this posture, while very important, is one of dynamic balance, not a static one. The pitcher must stay balanced and rhythmic during the this action, as at all other times of, to keep the movements of the body, legs and arms coordinated.

Left: Phil Stockman



The leg lift is essentially a mechanism for raising the centre of gravity and allowing the body to coil. The high centre of gravity will assist with momentum late in the delivery and should be maintained as long as possible (ie, keep the knee up during the first part of the move forward).

For the sake of smoothness and coordination, the eyes can be taken off the target during the first parts of the windup, but once the knee reaches its highest point, the eyes must lock onto the target intensely and remain there until the ball arrives at the glove. This provides feedback to the sub-conscious and nervous system which will permit automatic adjustment.

Above: Grant Balfour

The bodyweight should be moved under control directly toward the plate. This shift can be initiated with a slight flex of the support leg, while keeping the front knee up, and should start at moderate pace, accelerating steadily to be forceful by the time the front foot lands. The body should still be closed (side-on) as the foot makes contact to facilitate rapid trunk rotation which adds greatly to the efficiency of the delivery.



Right: Phil Stockman

As the body moves forward, the throwing arm should follow a smooth path generally down back and up into the launch position. Several variations are workable, but there should be no stoppages and no straightening of the arm during this phase. It is also considered important that the fingers remain on top of the ball at all times during this action. (In fact, the only time the palm faces up is for the instant the wrist whips back and forward in releasing the ball).



It is useful to look at where everything is when the front foot makes first contact with the ground. At this time, the hips may be slightly open, but the shoulders must still be closed is the time that the. Once the hand is up, the arm will be accelerated rapidly to the ball release, and both elbows should be at shoulder height to assist trunk posture and ensure that the bone of the upper arm (the humerus) can be properly positioned in the shoulder capsule .

In many pitchers, particularly those with good control, the glove is directly above the front foot at this time. In these pitchers, the glove tends to remain in the same position in space as the trunk rotates, thus becoming something of a fixed point which greatly assists balance. The front arm often rotates, but the glove remains substantially in the same place. Have a look at the front arm in photos: when the front foot lands, the elbow is above the glove; when the ball is released, the elbow is below the glove.



Rhythm and coordination are important, to ensure that the forces developed by the movement of the body toward the plate followed by the forceful trunk rotation can be transferred effectively into the arm action and ultimately the ball.



Above (l to r): Ryan Rowland-Smith, PJ Bevis, Brad Thomas



Above: Phil Stockman



Above: Grant Balfour

A good delivery will make for a good/natural follow through (the reverse is not necessarily true). A short follow-through can be a problem as it often inhibits the delivery itself, and can create overuse injuries: the process of decelerating that arm is best spread over as long a distance as possible. Most durable pitchers have a long follow-through, often finishing with the throwing shoulder lower than the hips.

Control side vs power side

It can be useful to consider the two sides of the body as having different functions in the pitching delivery: the front side provides stability and control, the back side provides the explosive power. Confusing the two creates a lot of difficulties in pitching.

The rear leg initiates forward movement, then provides an explosive push to commence the hip rotation as the front foot touches down; the front leg receives all the force generated by the rear leg, stabilising the front hip so that rotation occurs, and providing a stable fulcrum for the trunk to come over in a fluid follow-through.

The actions of the lead arm, not surprisingly, have an impact on balance, rhythm and coordination. It is a mistaken belief that the front arm can add directly to velocity. In fact, it contributes by improving balance, rhythm and coordination, thus allowing the rear side to be explosive.



Above: Adrian Meagher

The set position

The set is used to make it more difficult for runners to advance, so it is mainly used when runners are on base. It can however be used at any time: some pitchers always pitch from the set, as they feel the simpler delivery is beneficial.

In the set position (or when “pitching from the stretch”), the pitcher will be side-on to the hitter, in a stable, athletic posture, with the back foot touching along the front side of the pitching rubber. The hands are joined around the midline of the body: too far forward or back makes a coordinated delivery more difficult.



To initiate the pitch, the pitcher lifts the front knee, advisedly with a simultaneous lift of the hands, so to reach the same position from which the delivery would commence if winding up. From there, the mechanics are the same as for the windup delivery: shift to the plate, then rotate, then throw.

Pitchers need to practice working out of the set, as they can expect to spend a substantial amount of time in the set position during a game. It's also a fact that most games are won or lost with a pitcher in this situation.

Some basic principles to adhere to when teaching the set:

- Have the pitcher take the signal prior to coming set
- Hold the ball in the glove at all times
- The hands should come set at a height no lower than the waist
- The shoulders should remain square to the plate when set

Pitchers need to understand the rules in relation to balks etc and how they impact upon their movements, either to the plate or towards a base or bases. Some of this is covered elsewhere in the section on pickoffs.