CHAPTER 5

Flex-T Elbow Position at Release Point

"No one pitch, thrown properly,
puts any more stress on the arm than any other pitch."

Alan Blitzblau, Biomechanist

When I first heard Alan Blitzblau's remark on the previous page, I was more than a little skeptical. He had to be wrong. For many years, I, like everyone else, had been telling parents of Little Leaguers that their youngsters should not throw curveballs, that curveballs were bad for a young arm. "Now wait a minute," I said, "you've just discounted what's been taught to young pitchers all over the United States. Are you sure?" "I'm sure," he responded. Alan sat down in front of the computer and showed me what he had discovered. From foot to throwing elbow, every pitch has exactly the same neuromuscular sequencing. The only body segments that change when a different type of pitch is thrown are the forearm, wrist, hand, and fingers, and they change only in angle. Arm speed is the same, the arm's external rotation into launch is the same, and pronation during deceleration is the same. It is the different angles of the forearm, wrist, hand, and fingers that alter velocity, rotation, and flight of a ball.

He also revealed another surprise. The grip of a pitch is secondary to this angle, and all pitches leave the middle finger last! This was blasphemy. I was stunned. But Alan wasn't finished. "Tom, for every one-eighth inch the middle finger misses the release point when the arm snaps straight at launch, it (the ball) is eight inches off location at home plate So throwing strikes means getting the middle finger to a quarter-sized spot on the middle of the baseball with every pitch." Wow!

This chapter will dispel myths about what happens to pitcher's elbows, forearms, wrists, and fingers at release point. For years, pitching coaches (me included) taught pitchers to "pull" their glove-side elbow to their hip when throwing. We all thought this was a power movement that would increase arm speed and velocity. For years, pitching coaches (me included) taught pitchers to loosen grips for "wrist snap," "off center" the ball for movement, and separate hands "thinking fastball on all pitches," finding and delivering off-speed or breaking ball pitches while the arm was en route. We all taught incorrectly; what our eyes saw wasn't what pitchers actually did!

By chance during the off-season in 1996, I asked Dan Moffet, our current computer whiz at BioKinetics, to quantify the elbow positions of a few pitchers at foot strike (chapter 3) and release point. I was preparing for a presentation at the 1997 ABCA Convention in Dallas, Texas, and wanted some valid numbers. What he got from the three-dimensional data (table 5.1) was quite a surprise.

The angles and distances of elbows, forearms, wrists, thumbs, and middle fingers at release point showed quite the opposite of what we had been instructing. Successful, healthy pitchers kept *both* elbows in front of head and center of gravity (c.g.) line when delivering a baseball. In fact, the more out front and the more fixed glove-side elbow positioning was, the better the pitcher seemed to be. With forearms, wrists, thumbs, and middle fingers, successful, healthy pitchers had

- established fastball, breaking ball, off-speed forearms, and wrist angle at *separation;*
- held their wrists *perfectly straight* at release point on all pitches; and

- placed their middle fingers on *middle of baseball* at release point with all pitches (except the split finger in which their *thumb* found middle of baseball.

If you are at all like I was, at this point you are thinking "Oh my! How many kids have I misinformed?" Well, don't look back, look to change and move forward. Here's the information and instruction.

Table 5.1

PITCHING ELBOW QUANTITATIVE ANALYSIS

The following measurements are elbow angles and locations at front foot landing and torso rotation into release point.

Nolan Ryan—Elbows are 195 degrees (hyperextension) at foot strike. Front elbow is 10 inches in front of center of gravity (c.g.) during torso rotation into release point.

Todd Van Poppel—Elbows are 226 degrees (hyperextension) at foot strike. Front elbow is 8.66 inches in front of c.g. during torso rotation into release point.

Roger Clemens—Elbows are 185 degrees (hyperextension) at foot strike. Front elbow is 11.17 inches in front of c.g. during torso rotation into release point.

Orel Hersheiser—Elbows are 190 degrees (hyperextension) at foot strike. Front elbow is 7.82 inches in front of c.g. during torso rotation into release point.

Kevin Brown—Elbows are 193 degrees (hyperextension) at foot strike. Front elbow is 13.58 inches in front of c.g. during torso rotation into release point.

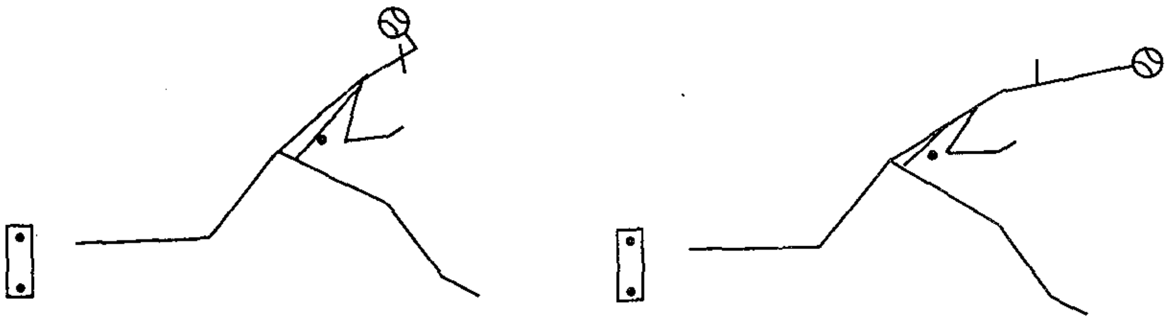
Cade Gaspar—Elbows are 183 degrees (hyperextension) at foot strike. Front elbow is 5.05 inches in front of c.g. during torso rotation into release point.

Rob Nen '89—Elbows are 205 degrees (hyperextension) at foot strike. Front elbow is 12 inches in front of c.g. during torso rotation into release point.

Rob Nen '94—Elbows are 187 degrees (hyperextension) at foot strike. Front elbow is 13.97 inches in front of c.g. during torso rotation into release point.

ENERGY TRANSLATION AT LAUNCH

The more in front and the more *fixed* front elbow position is at launch, the stronger a pitcher will be with all pitches (see figure 5.1.) He'll also be more efficient in sequential muscle loading and better able to find a consistent release point. As energy is translated from feet to middle finger of the throwing hand, a *fixed* front elbow *directs* all force and power into the throwing arm. If the front elbow moves, even with perfect timing, energy is split and misdirected *away* from home plate. Visualize a Y; energy comes up the base to where the Y splits. If both sides move then energy is split. If the front side stays firm, then all energy goes to the throwing side. With a moving front side, kinetic muscle links fire out of sequence, causing the arm to be *pulled* or *dragged* by the torso through its natural genetic path. This places excess strain on the shoulder and elbow, creating an inconsistent elbow-to-elbow relationship and a widening cone of release that should actually be narrowing. To get a proper feel for this process, sit in a pec deck machine with resistance set at 50 pounds. (That's about what a 90 mph fastball puts on your arm.) Bring your glove-side arm out to a position right in front of your nose and hold the machine there. Slowly start your throwing arm forward and at the same time let your glove-side arm come back. Feel the stress on throwing shoulders and elbow. Go back to the original position. Start the throwing arm forward but keep glove-side arm locked in front of your nose. Notice there is significantly less stress on the throwing arm. That is what's supposed to happen. Also a wide cone of release adversely affects both the angle and the distance of the baseball in its flight to the plate. So, besides excess shoulder and elbow stress and inconsistent release point, hitters will actually see all pitches earlier. They will also recognize breaking ball and off-speed pitches quicker because nonpower pitches leave the middle finger with a different trajectory, being cast above the fastball plane.



◆ Figure 5.1 The distance of a pitcher's front elbow in front of center of gravity (belly button) is constant into launch. The greater this distance, the less strain and more strikes.

RELEASE POINT

For the forearm, wrist, hand, thumb, and middle finger to impart maximum force or rotation on a baseball, enery must pass through the centerline of a baseball. There should be no wrist twist, wrist snap, bent wrist, or off-center finger pressure as the ball wouldn't—actually it *couldn't*—advance forward. The forearm, wrist, hand, thumb, and middle finger line up with the center of the ball, *completely* straight at the release point. This direct line from elbow to middle finger becomes an axis for straight, supinate, or pronate positioning.

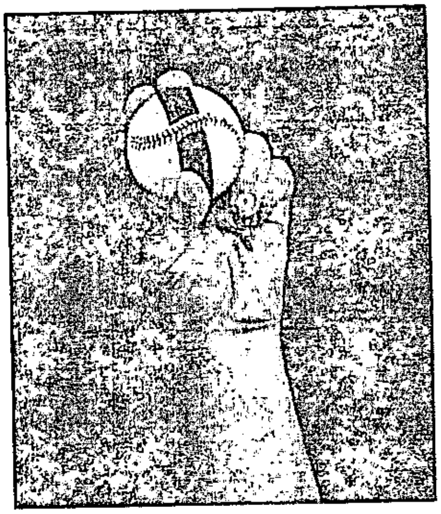
Figure 5.2 shows the release position for the fastball, curveball, and screwball. In simple terms, if the palm faces the catcher, it's a fastball (see figure 5.2*a*). If the palm is supinate (that is, turned in toward the pitcher), it's a curveball (see figure 5.2*b*). If the palm is pronate, or facing away from the pitcher, it's a screwball (see figure 5.2*c*). Notice in all cases that the centerline of the ball rests on the thumb. What about the release position of other pitches? A split-finger fastball is still a fastball, so the angle of the wrist is the same as a fastball. The palm faces the catcher. A slider is about one half the angle of a curveball—the palm is not quite facing the pitcher but is angled a bit more toward the catcher. Going the other way (pronate), a sinker is about one-half the angle of the screwball—the palm doesn't face straight out but is angled a bit more toward home plate. With the fastball, breaking ball, and change-up, the middle of the the baseball must leave the middle finger last because it's the longest finger on the hand. With the split finger, the thumb imparts the power and rotation.

BASIC GRIPS

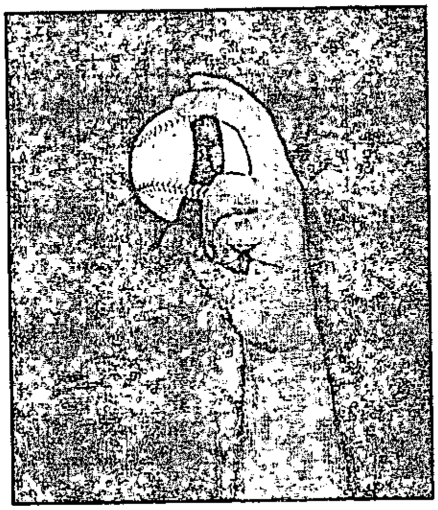
The following section illustrates the basic grips and finger placement on the baseball. But remember, a batter doesn't hit what a pitcher throws; he hits what he sees. Changing speeds and having late movement and good location make it difficult for hitters to see and read a pitch. This can be taught to pitchers of any age, and is explained in detail in table 5.2 on pitch velocity on page 46. Remember that the key to a pitch's movement is not the grip—it is arm speed with proper forearm, wrist, and hand angle.

Fastball

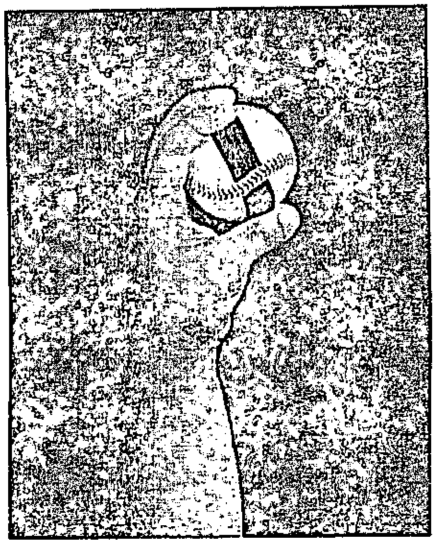
There are three main grips for throwing the fastball. Throwing across four seams is a power pitcher's fastball grip. Biomechanically, it maximizes force through the center axis of the ball and imparts a reverse spin on the ball that works in the airflow to minimize the pull of gravity. The ball appears to hop. Actually, it drops less than the other types of fastballs.



◆ **Figure 5.2 *a*** **Fastball release.** The palm faces the catcher at the fastball release point. Though the fastball can be thrown with a number of different grips, the release angle is the same. The split-finger release is in the same position, but the thumbs imparts the force, power, and rotation.



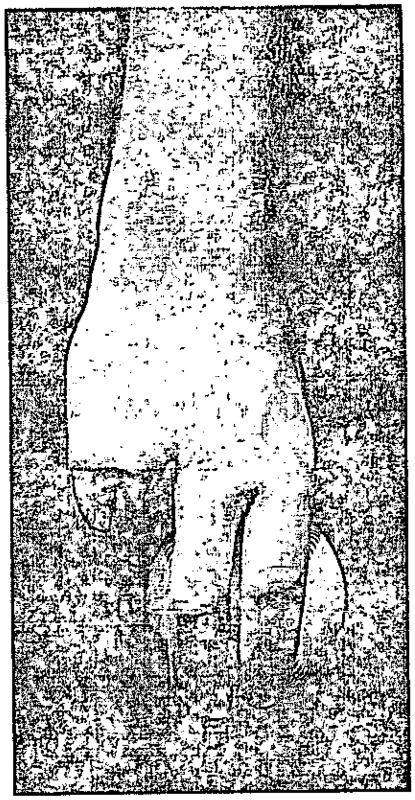
b **Curveball release.** The palm supinates and turns in toward the pitcher at the curveball release. The slider, another breaking ball, has a similar release angle, about one-half that of the curveball.



c **Screwball release.** The palm pronates and turns out away from the pitcher at the screwball release. The sinker also has a pronated angle of release, about one-half that of the screwball.

Fastball across two seams.

Fastball across four seams.



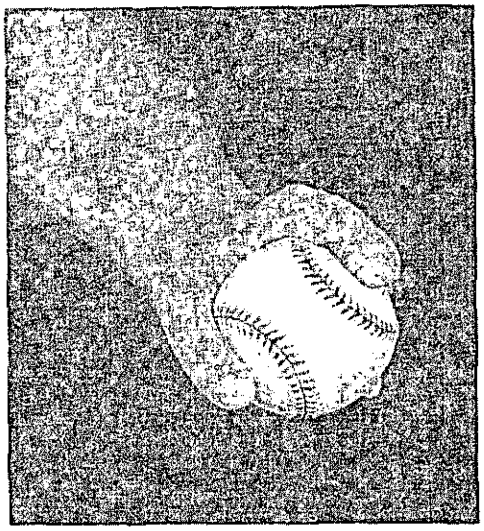
Fastball with two seams.

Throwing across two seams is a transitional grip leading to throwing with two seams. Both of these grips are for location pitchers who want to run or sink on the ball. The middle finger will impart rotation that works with gravity in the airflow to get movement horizontally or down. At the release point the arm should snap straight to full extension, with the wrist firm behind the ball and the middle finger imparting force through the center axis of the baseball.

GLOVE POSITIONING

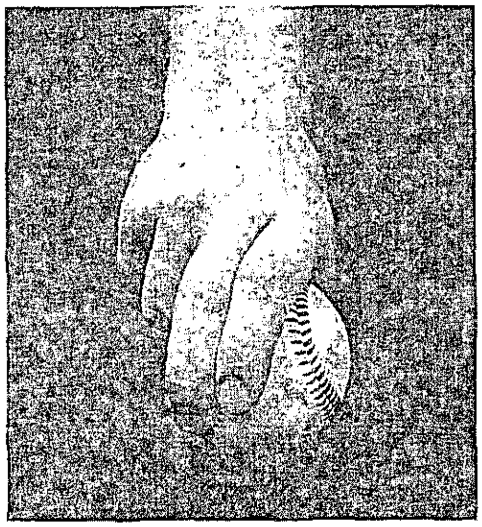
After lining up elbows at foot strike, keep glove over the landing foot as much as possible as body rotates around head/c.g. axis to direct and deliver energy into the baseball toward the plate. Bring throwing arm elbow to a fixed glove-side elbow. Keep it firm and out front at whatever height comes natural.

Pre-set forearm, wrist, hand, and grip angles on all pitches in the glove during skill work, at separation during competition.



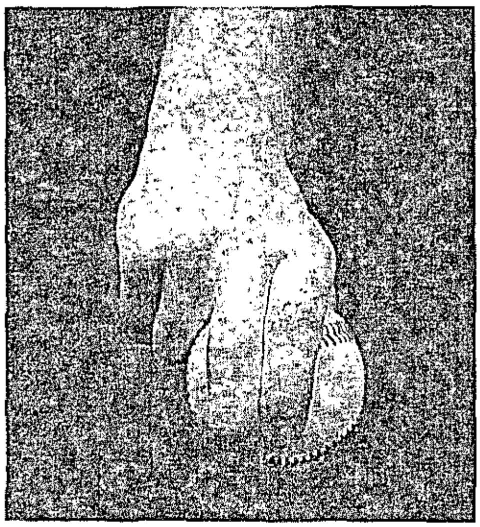
Split Finger

The split finger is thrown exactly like the fastball. The wrist will want to follow the middle finger off to the side. Don't let it happen. Have the pitcher pretend there is a phantom middle finger through the center of the ball. This will firm up the wrist and create the same biomechanical delivery of a regular fastball. At the release point, the arm should snap straight to full extension with the wrist firm behind the ball. The index and middle fingers should be on the side of the ball. For direction, the thumb drags on a seam under the ball which will add a tumbling action to the ball, usually off-speed.



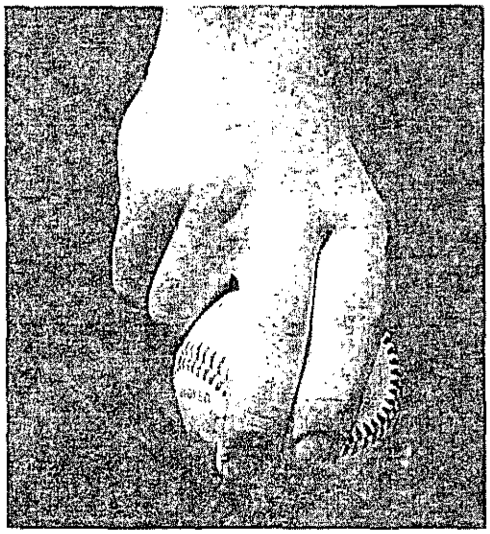
Sinker

The sinker is thrown with fastball arm speed, and with the forearm, wrist, and hand angle at one-half of full pronation. The middle finger will push through the center axis of the ball creating rotation equal to the angle of the forearm. The wrist and hand perform an inside-out action. At the release point, the arm should snap straight to full extension with the wrist firm and angled with a slight supination. This enables the middle finger to impart a push-like rotation through the center axis of the ball. A sinker is considered a velocity pitch.



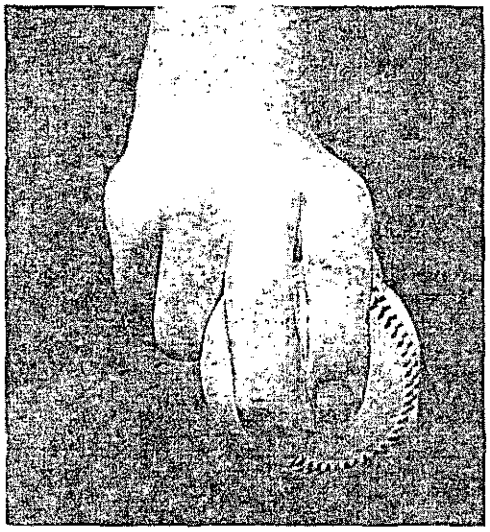
Slider

The slider is thrown with fastball arm speed. The forearm, wrist, and hand angle should be half of a karate chop. The middle finger will cut through the center axis of the ball creating rotation equal to the angle of forearm, wrist, and hand. Think of it as an outside-in action. At the release point, the arm should snap straight to full extension, with the wrist firm and angled with a slight supination. This enables the middle finger to impart a cutting rotation through the center of the ball. A slider is considered a velocity pitch.



Screwball

The "scroogie" is thrown with fastball arm speed, and the forearm, wrist, and hand angle are at full pronation, leading with the thumb; this enables the middle finger to impart rotation over the center axis of the ball, creating a spin that works with gravity in an inside-down action. At the release point, the arm should snap straight to full extension with the wrist firm and angled palm out. This enables the middle finger to impart a maximum of pronated rotation on the ball. A screwball is considered an off-speed pitch because the arm angle puts rotation, not force, on the ball.



Curveball

The curve is thrown with fastball arm speed, and with forearm, wrist, and hand angle at full supination, karate chop-like. This enables the middle finger to impart rotation over the center axis of the ball, creating a spin that works with gravity in an outside-down action. At the release point, the arm should snap straight to full extension again, with the wrist firm and angled in a full karate chop. This enables the middle finger to impart a maximum of supinated rotation on the ball. A curveball is considered an off-speed pitch because the arm puts rotation, not force, on the ball.

Circle Change

The circle change is the same as a screwball, but the O should be thrown directly at the catcher.

Choke all pitches. Squeeze thumb and middle finger on fastball, breaking ball, change-up; squeeze thumb only on split finger. This helps to eliminate floppy wrist with weak or tired pitchers (from Little League to major league.)

Well, now you have the fifth and final of contemporary sport science's pitching absolutes—flex-T elbow, forearm, wrist, thumb, and middle finger position at release point. Learn them and let the inevitable happen!

Table 5.2

PITCH VELOCITY

Speed ranges for the types of pitches (fastball, slider, curveball, and change-up) at different levels of play are unique to each pitcher—a function of his best fastball. At any level, hitters don't hit what a pitcher is throwing; they hit what they see. It's great to have a 90 mph fastball, but a pitcher doesn't have to throw hard to get hitters out. Pitchers get hitters out with location, movement, and change of speed.

It's arm speed that makes a baseball go fast, and arm speed, like foot speed, is genetic. Good mechanics and proper conditioning won't improve velocity; they'll only help make velocity consistent. So what can a pitcher do to improve the effectiveness of his fastball? He can master different pitches, and different speeds with these pitches. This will make it more difficult for hitters to see, read, and commit to swinging at what is being thrown.

Perception is reduced when various pitches are delivered with fastball arm speed without being fastballs. Here are the optimal velocity ranges for change-ups, curveballs, and sliders based on a pitcher's own best fastball (no matter what his age or natural ability).

Best fastball to best change-up = 17–20 mph slower

Best fastball to best curveball = 13–16 mph slower

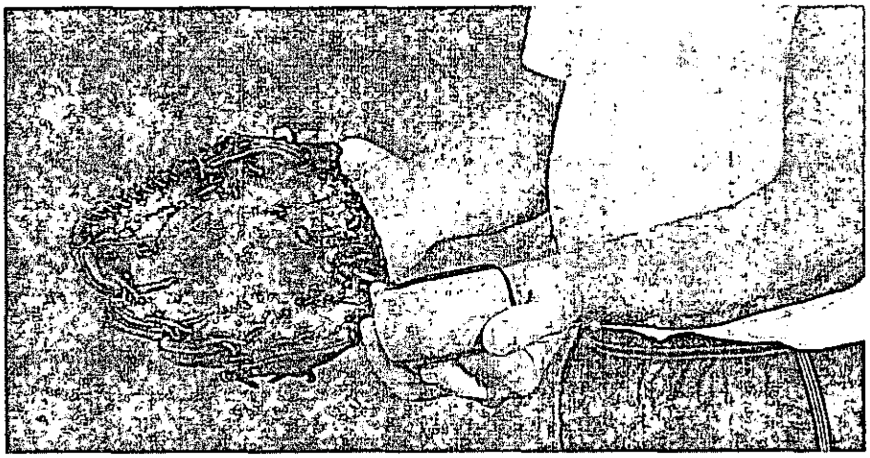
Best fastball to best slider = 9–12 mph slower

These calibrations differ slightly for pitchers who throw very hard and for pitchers who throw very slow. Very hard throwers require less change of speed. Nolan Ryan's change-up (at 84 mph) was 2 mph quicker than my best fastball (at 82 mph.) Soft throwers require larger changes in the velocity of *all* their pitches. Tewksbury throws a 55 mph curveball to complement his 80 mph fastball! My screwball was 60 and it helped my fastball *look* faster than it was.

Drills for Skills

Front-Side Facilitator

The best drill I've found to improve direction, distance, and integrity of glove-side elbow is a *front-side facilitator*. It's actually two to four pounds of aerobic wrist weights held in the pitcher's glove during a throw or pitch. After lining elbows up into foot strike, the glove weight is directed toward target, firming up and stopping over landing foot. The body then glides forward and rotates to the glove weight, throwing arm closing into a narrow cone of release with glove arm. Done correctly the pitcher will feel little, if any, resistance from the glove weight. Done incorrectly, the glove weight will misdirect force and energy proportionate to the speed and distance it moves offline with target. Two to 4 pounds feel like 10 to 20 pounds on glove-side shoulder and arm! The front-side facilitator can be used with the towel drill also.



The front-side facilitator drill with weight to be placed into glove. If the glove is offline, the weight will misdirect energy and feel noticably heavy. Done correctly, with glove in proper alignment with the target, it should feel like an empty glove.

Hockey Puck Drill

The best drill I've found for reinforcing forearm, wrist, hand, and grip positioning into release point is the *hockey puck drill*. Get a hockey puck, stand about 15 feet from a concrete or brick wall in the stretch position, pre-set fastball, breaking ball, change-up, or split finger, and with low intensity throw the hockey puck against the wall. If mechanics are efficient the hockey puck will bounce off the wall and roll, tirelike, straight back to pitcher. If anything in the pitcher's mechanics is out of alignment into release point, the hockey puck won't bounce or roll straight back.

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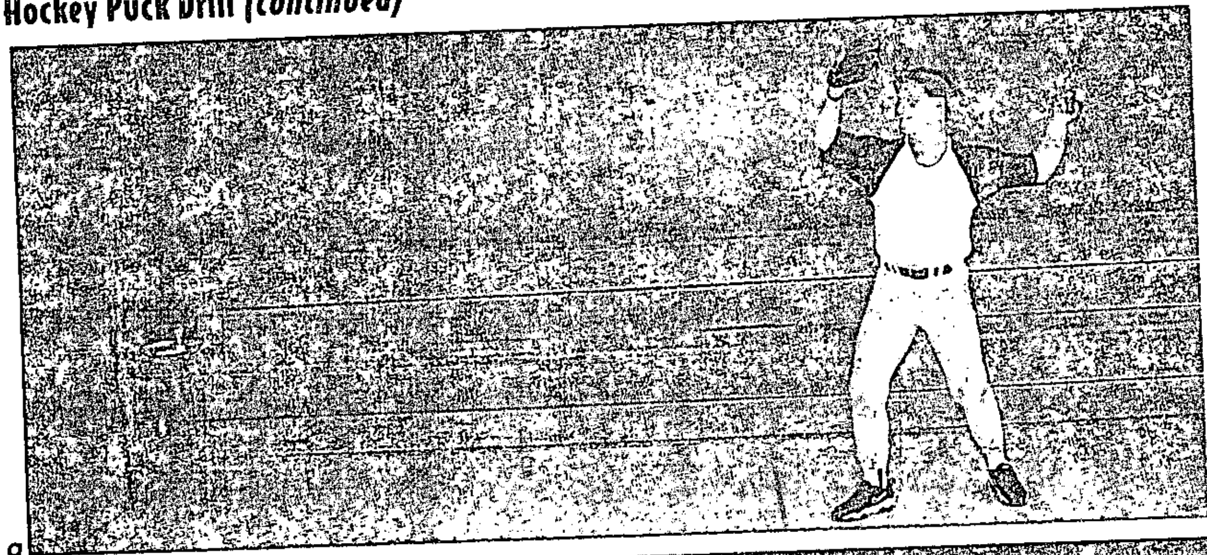
Hockey Puck Drill (continued)



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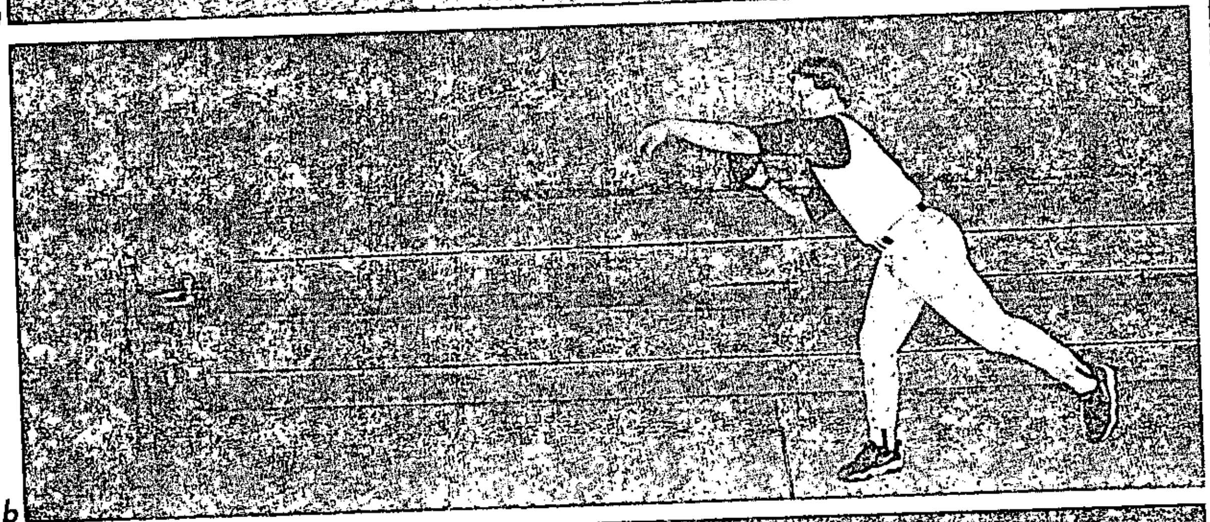

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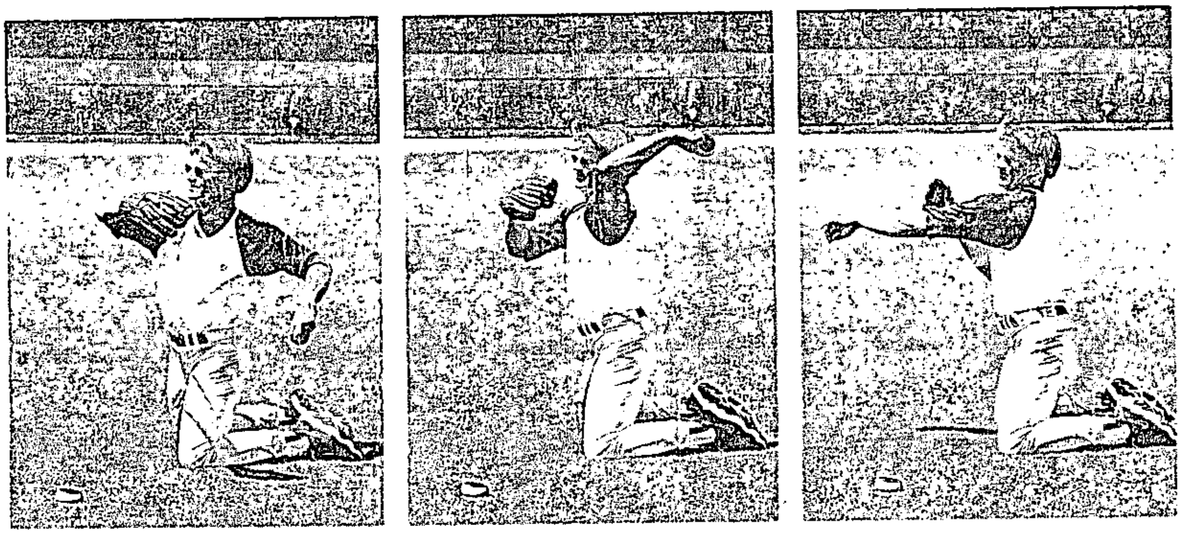
c

Two Knee Drill

The best drill I've found to integrate throwing and pitching release points at any distance (to tolerance) is the *two knee drill*. On flat ground, square off to your target, knees shoulder width apart. Lean forward until you feel like you may fall and tighten your abdominals and lower back to maintain that posture. With this body position, match your normal arm path with an equal and opposite glove side and rotate your torso into launch. With short, medium, and long tosses from this position, the smallest posture change or inefficient glove movement will cause the throw to miss right or left or up or down, respectively. Done properly, even Little Leaguers can throw a baseball accurately at 60 to 75 feet. Work up to 10-15 perfect tosses at 120 feet (no matter what your age or skill level). It's the longest throw you'll have to make in competition!

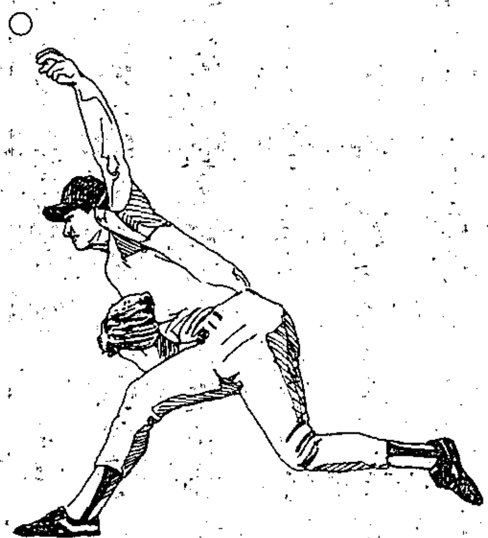
With pitching, you can use a baseball or a hockey puck, with or without a front-side facilitator. Set up with a partner 30 to 45 feet away, pre-set (in the glove) all your grips with proper forearm, wrist, and hand angle. Throw 10 to 15 perfect pitches each with your fastball, breaking ball, and change-up or split-finger.



Correct Position at Release Point

Randy Johnson's glove is over stride foot at landing and stays there as body and throwing arm glide forward and rotate into a firm front side elbow. The glove has not moved at release point.

Incorrect Position at Release Point



Jose Rijo's glove is at center of gravity (c.g.) and his elbow is behind c.g. The result isn't stuff or command; it's arm stress and injury.

Ditto with Dave Righetti. His glove is at c.g., not over stride foot.

Drills for Skills

One-Hop Drill

The simplest release-point drill I've found for getting a pitcher "out front" is the *one-hop drill*. On flat ground or mound, move home plate to about 45 feet and one hop *all pitches* off the plate into a catch screen. A pitcher cannot bounce a pitch off the shortened plate unless his release point is out front. (Front-side facilitator can also be used in this one-hop drill, and remember to pre-set all pitches!)