

Pitch Recognition

Peter Fadde Gives In-Depth Analysis Of How This Can Be Achieved

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CARBONDALE, Ill. — Plate discipline. Patience. OPS. Getting a good pitch to hit. Getting into the opponent’s bullpen earlier.

These are the qualities of hitters and teams that emphasize selective hitting as a philosophy of offensive baseball. Many professional, college, and high school coaches emphasize it, recognize it, and reward it. However, the skill of pitch recognition that underlies a selective hitting approach is not well understood and is generally conceded to come only from instinct and/or massed experience.

No major league team emphasizes selective hitting more than the Oakland Athletics. A player in the Oakland farm system cannot earn monthly honors unless he has drawn the requisite number of walks (ten percent of plate appearances).

Yet when Athletics general manager Billy Beane was asked, in the book *Moneyball*, if he thought pitch recognition could be taught his answer was “only if we get them in diapers.”

This article looks at sports science research and coaching principles to address the question of whether pitch recognition can in fact be learned and, if so, when, where, and how it should be taught.

What Is Pitch Recognition?

The first issue is to define what pitch recognition is.

A *Google* search on the terms “pitch recognition baseball” (if you don’t include “baseball” you’ll get a lot of items about teaching music students to recognize notes) produces a list of products and services related to vision training.

A number of optometrists have developed “eye-robic” exercise program. Some, like Dr. William Harrison, focus on vision training for baseball and have impressive lists of major league clients. Such programs generally attempt to improve perceptual skills such as visual acuity, dynamic tracking, and peripheral vision.

Vision programs use a variety of vision training devices and software programs. There are also baseball training facilities, such as *Frozen Ropes* that include elements of vision training in their programs.

It seems obvious that improving vision should improve pitch recognition, and therefore improve hitting. There are ample testimonials as to the value of vision training programs.

However, sports scientists studying expertise in ballistic sports actions such as hitting a pitched baseball have concluded that the performance advantage of experts is not so much a hardware advantage (vision), as a *software* advantage (decision-making).

Ted Williams, whose 20/10 vision served him well as a fighter pilot in Korea, said, “What I had more of wasn’t vision, it was discipline.”

Expert batters are better able to anticipate the upcoming pitch, make an early identification of the type of pitch, and predict where the pitch will be located in the strike zone. This pitch recognition ability is essentially a mental ability.

The Mental Half Of Hitting: Strategic And Perceptual Decision-Making

The Yogi-ism is that “the mental

half is 90 percent of hitting.” The physical half of batting includes attributes such as strength, coordination, and vision, along with swing mechanics.

The mental half consists of psychological attributes such as confidence and concentration, and decision-making skills. Decision making is separated into strategic decision-making and perceptual decision-making.

Strategic decision-making is what Ted Williams called “proper thinking.” To Williams that meant being disciplined and patient, taking pitches – including strikes – in order to “get a good pitch to hit.”

In his classic book *The Science of Hitting*, Williams emphasizes studying the opposing pitcher before the game, from the bench, from the on-deck circle, and between pitches. The ultimate goal is to *anticipate* the coming pitch. “Some call it guessing,” says Reggie Jackson, “but it’s not, it’s calculated anticipation.”

Anticipation is more critical for a rotational power hitter like Jackson or Williams than for a weight-shift contact hitter like Tony Gwynn, who describes his pitch recognition process as “my eyes see and my hands know what to do.”

Sports science has confirmed that reducing the choices that a batter must make improves reaction time. The whole point of disciplined at-bats is to get ahead in the count and be able to “look” for a certain pitch and/or location, to reduce the batter’s choice to a “Go-No Go” decision. Major league batting coach Gary Ward states that, “Maximum force can be generated when the hitter swings into an area about the size of a shoe box.”

Strategic decision-making to anticipate pitches is an important aspect of a disciplined approach to batting, but it is *perceptual decision-making* that represents the raw ability to identify the type of pitch being thrown and predict its location in the strike zone.

This recognition and decision process happens in the 150 to 200 milliseconds that covers release of the pitch through approximately 1/3 of the ball flight.

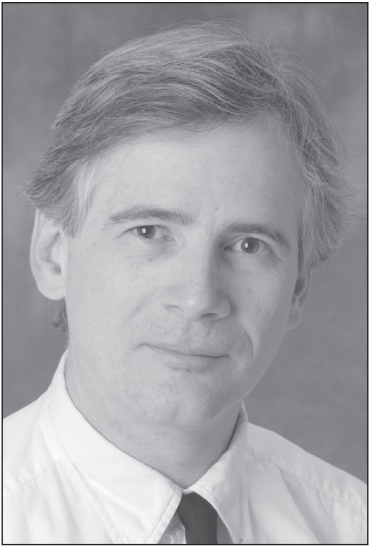
This is the time frame that laboratory experiments by sports scientists have isolated as the key difference between expert and less expert batters. The scientists don’t say *what* the expert hitter is seeing in that time frame, only that it is in that frame that he is picking up information that helps him identify the type of pitch and predict its ultimate location over the plate.

Wade Boggs, while acknowledging the influence of Williams’ *Science of Hitting*, claims that Williams’ anticipation strategy was based on 3-pitch repertoires of fastball, changeup, and curve. Williams called the slider, which was introduced later in his career, “the equalizer.”

The modern hitter faces a greater variety of pitches, including split-finger fastballs, the modern “equalizer.” Boggs relied on perceptual rather than strategic decision-making. “I didn’t have to guess,” said Boggs, “I could always tell within 5 or 10 feet (after release) what the pitch was.”

Recognizing Pitches – What Do Hitters See?

The problem with the perceptual decision-making aspect of pitch recognition is that it is an extremely



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rapid and largely unconscious mental process. Batters have difficulty expressing what they are seeing or thinking.

Batters disagree about things like “seeing” spin. Some, like Rafael Palmeiro and Will Clark, say seeing spin is the key to hitting. Others, like Sammy Sosa, say that they don’t look for spin, “just speed and direction.” Hank Aaron has said that he doubts anybody who says they can “see” the seams spinning. “I got everything I needed from zooming in on the pitcher’s hand.”

One of the reasons that players argue over seeing spin is that they don’t actually see the seams of the ball spinning. Rather, they pick up clues that indicate a particular type of spin. Along with spin clues, players are able to pick up information from the angle of the pitcher’s hand when releasing the ball. Release clues can give the batter an early read on the type of pitch.

Early trajectory of the ball, along with speed, can then be added to triangulate the eventual location of the pitch in the strike zone.

Modern learning theory suggests that advanced skills, like pitch recognition, are better taught implicitly than explicitly. That is, it’s better for batters to discover what works best for them than to “teach” them what to look for.

Still, it can be helpful to provide a set of clues that some hitters report using. These pitch recognition “tips” come from coaching books published by companies like Human Kinetics and batting instruction books written by former major league players and coaches.

Many of the instructional books were written ostensibly for young players (a larger market) and use graphics and language that are below the level of high school or college players.

However, almost all of the books mention the importance of pitch recognition. Some provide tips or hints, and a few suggest pitch recognition drills.

Specific pitch recognition clues include:

- Fastball** – out of hand with thrust
 - 4 seam – more “red” due to four-seam spin
 - 2 seam – the “whitest” pitch
 - Changeup** – less thrust out of hand, less white in hand at release
 - Curveball** – thin wrist, ball pop up out of hand, eyes bob
 - Slider** – quarter-sized white “hole” in the ball, out-and-around motion out of hand (seen by opposite-handed batter only)
 - Split-finger** – tumbling action - red then white, red then white
- Again, not all batters report

seeing these pitch recognition clues and “teaching” batters to look for particular clues is not recommended.

However, it can be helpful to provide a list of tips for batters to keep in the back of their mind while they practice pitch recognition.

A few of the instructional batting books include things that players did to train their eyes. Shoeless Joe Jackson reportedly stared at a candle to improve his ability to concentrate on a point in space. Reggie Jackson reported hitting a small ball hung on a string with a broomstick.

Coach Ron Polk put different colored balls in pitching machines and instructed batters to hit only a certain color. Other coaches have written numbers on balls and had players practice “reading” the numbers. These are actually vision drills more than pitch recognition drills.

The only true pitch recognition drill suggested is “standing in” against the team’s own pitchers. In fact, “standing in” is the best way to train pitch recognition.

The key is to add the elements that make up any good drill: repetition, feedback, and progressive difficulty. This article describes specific pitch recognition drills that were developed for video-based pitch recognition training but that can also be done “live.”

The approach is based on sports science research over the last 50 years, some of which validates what coaches have taught for years and some that provides new insights.

Sports Science Research

An 86 mile-per-hour fastball takes less than one-half second (450 milliseconds) to reach the plate. It takes most batters at least 200 milliseconds to execute the forceful, directed part of their bat swing.

That leaves the hitter at most one-quarter second (250 milliseconds) to decide if and where to swing his bat. 250 milliseconds is literally the time it takes to blink your eyes.

Sports science researchers have primarily investigated *where* expert batters look and *when* they pick up key information. Research going back to the 1950s has determined that expert hitters:

1. Focus more intently (but for less time) on the pitcher’s release point,
2. Do not move their eyes for 150 milliseconds after release of a pitch,
3. Track the ball by jumping their eyes ahead rather than smooth tracking, and
4. Lose sight of the ball 3 to 5 feet in front of the plate.

Many baseball players and coaches are surprised by the finding that batters cannot track the pitch from release to contact, “but,” said Ted Williams, “the master carpenter doesn’t need to see the nail to hit it square every time.” Dusty Baker says that batters “use their imagination” to make contact, especially with breaking balls.

Laboratory studies have been conducted to determine when the expert batter is picking up information that the less expert batter is not. These studies typically involve batters viewing a film or video projection of a pitcher that depicts the point-of-view of a live batter.

The “pitcher” delivers a pitch and the display is edited to black at various points in the ball flight.

Using this *occlusion* (masking) technique, scientists have isolated the first 150 milliseconds after release of the pitch (approximately 1/3 of ball flight) as the key time when experts were able to read pitch recognition cues.

Two studies have been done that used similar film/video tasks to not only measure but improve the pitch recognition ability of college baseball players.

One study was done in 1984 and showed that film-based training did improve the performance of batters in a live test in which the batters identified the type and location of pitches. My study, conducted 20 years later, trained half of the hitters on a college baseball team over nine 10-minute video sessions. The training was done during regular winter practice with the “control” players who did not receive video training getting extra batting practice instead.

The hitting performance of the trained batters was significantly better than the control group in an 18-game test period (the team’s pre-conference schedule). Trained batters had higher batting average, on-base percentage, and slugging percentage.

It should be noted that the batters in the video training went down in their hitting *during* the training period, as measured during the team’s at-bat drills (scrimmage situation). However, the “one step back for two steps forward” progression is familiar to coaches and players whenever automatic functions are made more conscious in order to work on them.

Simulation Training Of Pitch Recognition

Although there is not an abundance of sports science research on training the skill of pitch recognition, there is sound evidence that video-based perceptual training can improve batters performance.

It is surprising that such programs have not been developed as products and made available to baseball teams and individual players.

What is now available are batting cages that use video projection to simulate a real pitcher. Systems by companies like *ProBatter* feature a pitching machine capable of delivering a variety of pitches that is placed behind a video screen on which the life-size image of a pitcher is projected.

The pitching machine sends the ball through a hole in the screen in perfect synchronization with the video pitcher releasing the pitch. Such systems would seem to be a tremendous advance over pitching machines that fire balls with no relation to timing the motion of a pitcher.

However, there is not any scientific evidence at this point that video batting cages can improve batters’ pitch recognition ability. It is also not clear if the technique of sending the ball through the projection screen in synchronous timing with the video pitcher’s motion actually obscures the pitcher’s hand at the critical point of releasing the pitch.

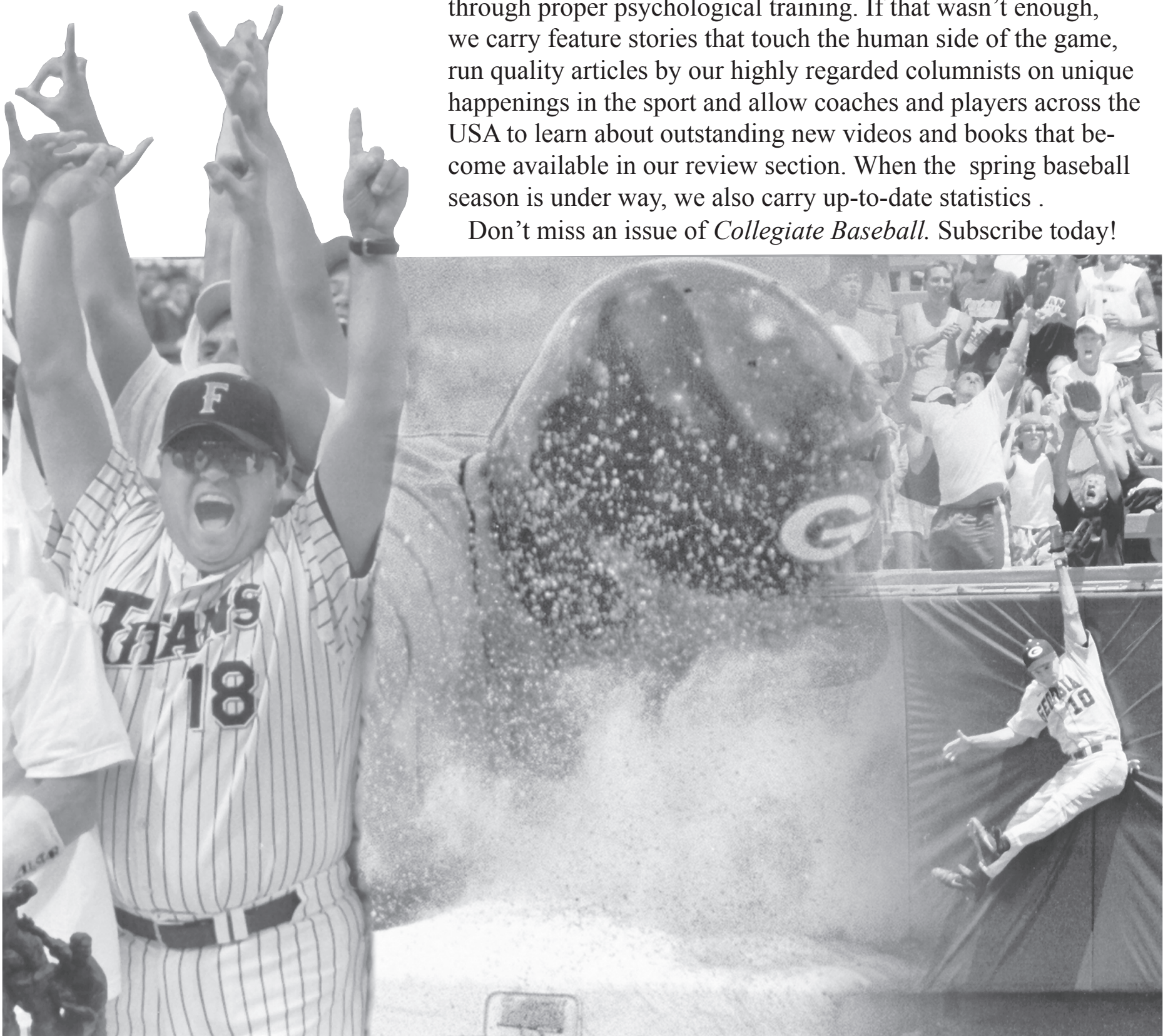
Another simulation approach to training pitch recognition that has some promise is the video game. Baseball video games like *High Heat* have quite realistic graphics based on digitized movements of actual pitchers.

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Recognizing Pitches Is Crucial For Hitters To Excel

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However, the key release clues are not specifically associated with particular types of pitches and the point-of-view is not that of an actual batter. To be used for training pitch recognition, commercial video games would need to be re-tooled to emphasize the key aspects related to picking up release and spin clues. In essence this would then be a virtual reality training system.

There is precedent for video games being used for training in the military. Pilots now do some of their pre-flight training using *Microsoft Flight Simulator*.

The army worked with a commercial game developer to produce two versions of *Full Spectrum Warrior*. There are slight differences between the versions intended for training and entertaining. For example, in the training version a smoke grenade takes 30 seconds to fill a room while in the entertainment version the room is filled with smoke in a few seconds.

As interesting and promising as these simulation approaches are, however, they don’t offer much help to the coach or batter who wants to work on improving pitch recognition now. What are available to coaches and players in a team environment are actual pitchers.

If drills are set up properly the hitters can work on their pitch recognition at the same time that pitchers are doing their “bullpen” or other pitching drills. The old “stand in” drill can be extended to add the elements of repetition, feedback, and progressive difficulty that build skills.

Live Pitch Recognition Drills

If the goal is to get the batter to focus on the pitcher’s release point and early ball flight, then it is necessary to *occlude* (mask) the rest of the ball flight. It is not enough to instruct the batter to concentrate on the release point and early ball flight only.

He will naturally track the ball rather than concentrate on reading early ball flight. It is similar to having batters swing next to a fence to keep them from sweeping or in other ways cutting off part of the whole action in order to focus on one aspect.

In this case, it is to focus on the release and early ball flight that sports science has shown to be the key pitch recognition time for expert batters.

The “stand in” pitch recognition drills require a batter, a pitcher, a catcher, and a scorekeeper (could be the “on deck” batter). An occlusion screen is set up on the inside of the batter’s box so that the batter can see the pitcher but cannot see the plate or the catcher.

The occlusion screen should be angled slightly in front of the batter so that the pitch will disappear behind the screen after the first half of the ball flight. The occlusion screen is made by draping a tarp over a protection screen so that the batter can’t see through it.

The batter can have a bat in his hands but obviously will not swing. With the batter not swinging, the pitcher is able to concentrate on the goals of his work session, say 80 percent throwing, without the competitive juices rising. That can come later.

With the occlusion screen in place and the batter positioned behind the occlusion screen, the pitcher can proceed with his normal



MODEL OF CONSISTENCY — Brandon Larson of Louisiana State University had a monster season in 1997 as he led the Tigers to a national championship and was named MVP of the College World Series. Recognizing pitches was a key reason why he belted 40 home runs during that memorable year.

work. If the pitcher is working on locating his fastball on all four corners, then the batter can “guess” ball or strike. The catcher gives immediate feedback.

The scorekeeper notes the actual location and the batter’s guess. At the end he calculates the batter’s score for the drill.

If the pitcher is working with all of his pitches the batter can work on identifying the type and/or location of the pitch. For variety, a drill that helps batters learn plate discipline is Hit Ahead Drill. The batter identifies his *zone* that he looks for ahead in the count.

The scorekeeper draws or describes the hitter’s zone. It could include different pitches, for instance, “curve up and fastball middle-in.”

The batter than says “go” to indicate he would have swung at the pitch or says nothing to indicate taking the pitch. The scorekeeper assigns 3 points for “swinging” at a pitch in the batter’s zone, 2 points for “taking” a pitch outside of his zone (even if it is a strike), 0 points for swinging at a pitch outside of the zone, and -3 points for taking a pitch in the zone.

Live pitch recognition drills can be done inside, but adequate light is a consideration. If pitchers are working short distance that will help. A good background behind the pitcher will also help. The pitch occlusion drills, whether live or using video, provide coaches and players who are in a team environment with a means of practicing the elusive but important skill of pitch recognition.

As players get good at a particular drill it can be made more difficult by moving to longer distance or positioning the occlusion screen to mask more of the ball flight. The element of progressive difficulty builds the “mental muscle” in the same way that weight lifting and conditioning build the body.

Even if the live occlusion drills are not used in a systematic way to enhance batters’ pitch recognition skill, the drills can still be used to *measure* each player’s pitch

recognition ability, separate from the full hitting skill.

This can be valuable information for coaches and batters. If the coach decides to make selective hitting a part of his offensive philosophy, then testing using an occlusion screen gives the coach a way to measure the skill of pitch recognition and to see which of his batters have the underlying skill to be able to become a selective hitter.

Some players have the skill and some do not. They can all be improved, but it is unlikely that they can be changed. Consider that the New York Yankees under Joe Torre have emphasized selective hitting and running up opponents’ pitch counts – yet for a number of years had Alphonzo Soriano at the top of the lineup.

Torre was smart enough not to try to fit Soriano, one of MLB’s freest swingers, into the Yankees favored selective hitting mode.

Measuring Selective Hitting

It is possible, in fact much more common, to emphasize selective hitting without trying to training pitch recognition. That is what the Yankees, Athletics, Blue Jays, Red Sox, and Mariners have done over the last several years.

The emphasis comes in the form of the players who are acquired more than developed in players. College coaches can also recruit selective hitters. High school coaches may have to train the hitters they get, but they are closer to “being in diapers” and potentially amenable to perceptual training.

A coach who determines to emphasize selective hitting in his program needs to: 1) value plate discipline, 2) measure the batters’ “eye”, and 3) reward selective hitting. That begins by recruiting the batter who demonstrates good pitch recognition ability, even if he is less athletic than another prospect. It means keeping, and making the team aware of, statistics that emphasize selective hitting.

This includes valuing on-base percentage ahead of batting average. Another measure is what some

baseball statisticians call “eye” factor (Bases-on-Balls to Strike Outs ratio). An “eye” of 1.0 is very good. This statistic does not punish strike outs. Lance Berkman struck out 100 times in the 2004 season. But he walked 128 times for an outstanding “eye” factor of 1.28. Berkman also had an outstanding walk ratio (BB%) of 19%.

Ten percent is the goal set by the Oakland Athletics and other teams that emphasize plate discipline. Berkman’s batting average was over .300, his on-base percentage over .400, his slugging percentage over .500, and his on-base+slugging (OPS) near 1.000.

He meets all the statistical targets as a hitter with great plate discipline in the classic sense of getting a good ball to hit or taking his base — more strike outs, more walks, and more extra-base hits.

Along with the measures of “eye” (BB/K), BB%, and OBP, another valuable statistic is pitches-per-at bat. The 1998 New York Yankees set a record for team pitches-per-at bat on their way to winning 120 games. The Yankees bench-mark was near 4.0 pitches-per-at bat.

Manager Joe Torre notes that higher pitch counts get starters out of the game faster...all the more significant in college baseball weekends.

The coach who preaches the plate discipline and measures the skill must also be certain to reward the behavior. The coach controls the rewards of playing time, position in the batting order, and simply his approval.

Learning to control at-bats through selective hitting is difficult and not understood by fans and sometimes by teammates or coaches. The selective hitter is likely to strike out more than he would by “hacking” at anything close. When Scott Hatteburg was acquired by the Athletics, he said that it was the first time in his playing career that he felt people understood and appreciated his selective hitting approach.

Summary

The batting philosophy of selective hitting has proven rewards

Top 96 Will Add Showcases Throughout United States

WAYLAND, MA. — After 11 years of running showcases in New England, TOP 96, Inc. will add a dozen or more invitational baseball showcase events for high school ballplayers throughout the United States this year.

Each two-day event presents the top 144 player selected from the many hundreds who typically apply. The showcases employ both pro-style workout sessions as well as simulated games.

Plans are being finalized with organizations and colleges to host TPX TOP 96 Invitational Showcases this spring and summer in northern and southern California, Connecticut, Georgia, Maryland, Massachusetts, Michigan, New York City, Upstate New York, Pennsylvania, South Carolina, Tennessee, and Texas. Complete information about cities and dates can be found on the TPX TOP 96 Showcase Web site: www.top96.com. Applications are being accepted through the website.

The New England TPX TOP 96 Invitational Showcase has grown. For each of the last five summers, the TPX TOP 96 has attracted more than 140 college coaches and pro

for individual batters and for teams. It takes commitment by coaches and discipline by batters. It also relies on a process of perceptual decision-making that is little understood and generally thought to be un-trainable.

Sports scientists as well as coaches and batters have recognized pitch recognition as being essential to expert hitting. Yet there has been very little in the way of drills and approaches to systematically develop this key mental skill.

Research suggests that pitch recognition can be improved through video-based training that focuses on release point and early ball flight.

Although largely unexplored, “live” pitch recognition drills with real pitchers should be at least as effective as video-based training. By adding the drill elements of repetition, feedback, and progressive difficulty, simply “standing in” against pitchers can be expanded into focused pitch recognition drills that develop this valuable and elusive skill.

There are many questions beyond “can pitch recognition be taught” that have yet to be answered by sports scientists, coaches, and batters. What type of batter benefits from pitch recognition training? When should such training be done in a batter’s development?

Little League? High school? College? Minor leagues? When in the baseball year is it best to do pitch recognition training? Can it be used as a “slump buster” in season? (Slumping players say they’re not “seeing” the ball, then change their swing!)

Is learning pitch recognition something best done in a team environment or is it something that batters should look at developing on their own or with a personal batting coach?

Obviously, there are many more questions than answers. However, the assumption that pitch recognition is an innate talent, or that it comes only with massed experience, can be challenged. Forward thinking coaches and batters can indeed improve pitch recognition ability with targeted training.

scouts. Over the 11-year history of the event, more than 1,100 players have attended and more than 83% of them have gone on to play baseball in college or in the pros.

For further information, contact the administrator at admin@top96.com or call 508-655-9696.

East Carolina Names Stadium

GREENVILLE, NC. — While the construction of East Carolina University’s new baseball stadium nears completion, the ECU Educational Foundation has officially announced that the William H. Clark Family has committed the lead gift of \$1.5 million in support of the project.

East Carolina will honor Clark’s generosity and the accomplishments and contributions of former Pirates’ head coach Keith LeClair, who guided ECU from 1997 to 2002 before beginning his battle with Lou Gehrig’s Disease, by naming the facility Clark-LeClair Stadium.

LeClair played an integral role in the push for a new, state-of-the-art baseball stadium.