

# Florida Baseball ARMory's SAVAGE BATtery Hitting System



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# CHAPTER 1: GETTING SAVAGE

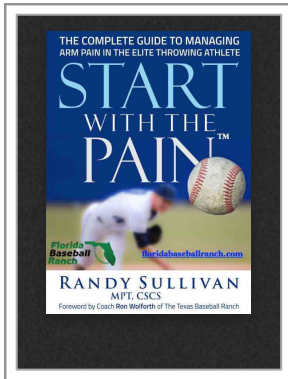
Thank you for your interest in our FBA SAVAGE BATtery Hitting System. Since we opened our doors as back in 2008, The Florida Baseball ARMory has emerged as a world leader in safely developing some of the game's highest performing pitchers. Our highly refined process of thorough and meticulous 360-degree assessment, our hyper-individualized training, along with our pioneering application of motor learning and skill acquisition science has helped over 450 "ARMory Guys" break the 90 mph barrier. This process allowed FBA students to garner over \$28 million in MLB signing bonuses between 2017 and 2023.



In 2016, after a visit to Kyle and Bret Wagner of Green Light Hitting in Red Land, Pennsylvania, we took our throwing process, retooled it, and began revolutionizing hitter training. Many people don't know this, but Randy was never a pitcher. Throughout his youth and high school career he was a shortstop, and in college, he became a catcher. Always curious and passionate about teaching hitting to the teams he led over 25 years as a coach, it made sense to direct and apply our incredibly successful motor learning and skill acquisition training principles to hitting.

## **Start With The Pain**

In 2016 Randy wrote a baseball training book called **Start With The Pain: The Complete Guide To Managing Arm Pain In The Elite Throwing Athlete**. It presented the first-ever comprehensive guide to assessing, managing, and



overcoming arm pain and injury of all levels of severity. In the introduction he wrote, “Pain is neither good nor bad. It is simply information -- a beacon that lights the way to dysfunction. If you want to improve your performance as a throwing athlete, you must first eliminate pain or the threat of pain. As our good friend and Major League Pitching Coach, Brent Strom says, “Survival will always trump performance.” No progress can be made in improving ability and performance until we address pain.

Teaching hitters is a little more complicated than teaching throwers, but one of the things we love about working with hitters is that we don't have to spend as many sleepless nights hoping and praying that an athlete with arm pain isn't seriously injured. That said, every hitter experiences pain. It may not be physical pain, but we all know the numbers ... if you only fail 70% of the time, you're considered a great hitter.

If you or your son/daughter are like most of the families we encounter, you may be experiencing a pain we see among hitters of all ages. Too many hitters perform very well when working off of a batting tee, in their hitting lessons, and during typical batting practice, but when the lights turn on and they face an actual pitcher they fail well above the accepted 70% threshold.

If you your son, or your daughter has reached the high school or college level and is being exposed to the stresses of recruiting or scouting, We're guessing you're

experiencing an additional level of pain that is becoming all-too-familiar to hitters. They make consistent contact, and they get lots of hits, but they don't or can't display the kind of eye-popping power that attracts the attention of next-level decision makers.

They play well.  
They win games.  
And no one cares.  
It's painful for them.  
And it's painful to watch.

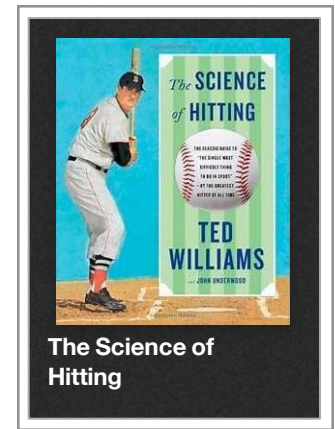
Way back in 1970, in what has become possibly the most clichéd quote in the history of the game, Ted Williams wrote, "Hitting is the most difficult thing to do in sports." Since the moment his epic book, *The Science of Hitting* was published, that thought has been the accepted as an absolute by nearly everyone in baseball.

We get it.

Hitting is hard.

Everyone knows it.

But, does it have to be?



Take a step back and consider this thought: Perhaps the way we teach and practice hitting makes it much more difficult than it should be.

The emergence of data analytics and advances in motor learning science are shining a prison yard flood light on the methods commonly used to teach hitters, and that light is revealing severe disconnections between truths in skill acquisition science and baseball's traditional approach to training hitters.

Let's start with one of the most pervasive training tools in the game: The Batting Cage. Batting cages are practical and efficient, but potentially corruptive. They frequently present the illusion that a ball hit to the back part of the cage is crushed for an extra-base hit, but in reality this is far from the truth.

Since Major League Baseball started using Statcast ® in 2015, we've had the ability to better understand specific metrics on batted ball outcomes and how they

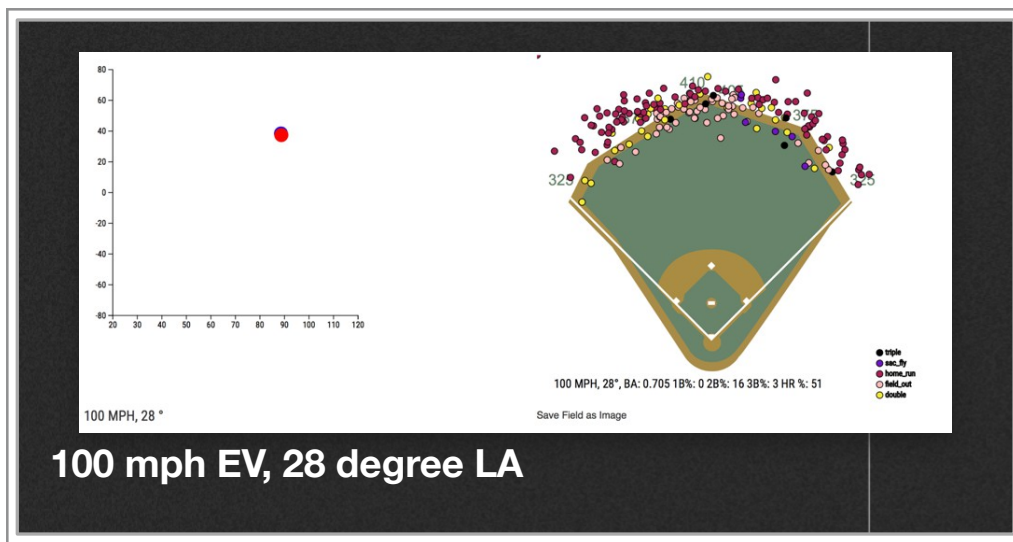


correlate to performance. One of those metrics, launch angle (LA), measures the vertical angle at which the ball comes off the bat.

For reference, [MLB.com](https://www.mlb.com) defines any ball hit under a 10 degree launch angle as a ground ball, 10-25 degrees as a line drive, 25-50 degrees as a fly ball, and anything over 50 degrees a pop up.

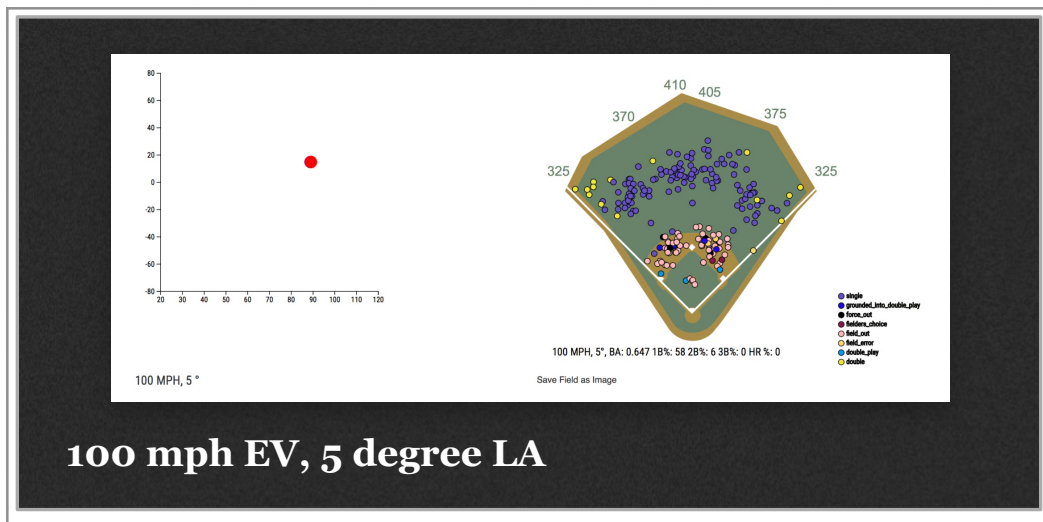
Variances in launch angle can have a significant impact on performance. For example, below are two batted balls at the same exit velocity - 100 mph - but at two different launch angles.

The first one is 100 mph at a 28 degree launch angle. Inside a batting cage, this ball would hit the top of the cage about 30 feet from home plate. According to data from [baseballsavant.mlb.com](https://baseballsavant.mlb.com), these batted balls have generated a .705 batting average and produced extra base hits 70% of the time. Over half (51%) went for home runs.



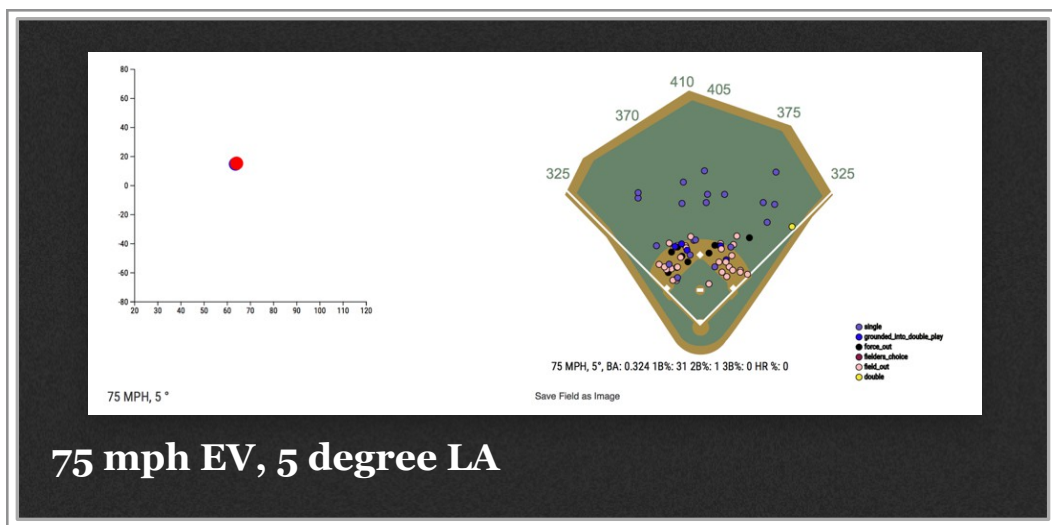
The second batted ball is hit at the same exit velocity of 100 mph, but only at a 5 degree launch angle. This is the type of batted ball that would hit the middle back part of the batting cage.

While these batted balls resulted in an impressive .647 batting average, they only produced extra base hits 6% of the time.



These numbers suggest a simple truth: If you can hit the ball 100 mph, you're going to get a lot of hits. But hitting it 100 mph at 28 degrees results in more damage.

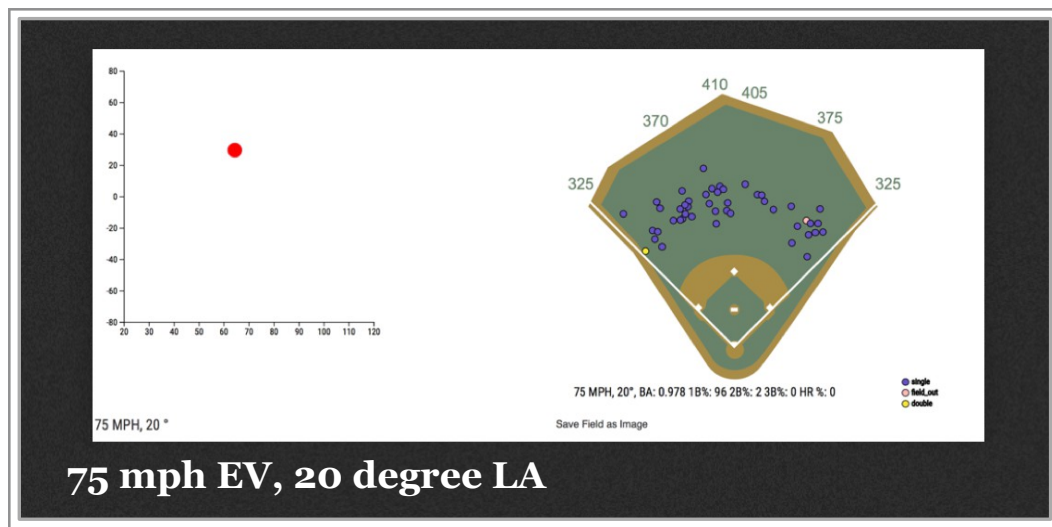
This is not specific to hard hit balls, either. Take a look at the results for 75 mph (75 mpg is little below average for a high school player) hit at a 5 degree launch angle. According to Statcast®, those hits have yielded a batting average of .324.



If you take the same exit velocity (75 mph) and increase the launch angle to 20 degrees, all of a sudden those batted balls produce a batting average of .978!

Inside a batting cage, 75 mph at a 20 degree launch angle looks like a lazy fly ball to the top of the cage. Outside, we know it's a line drive over the heads of the infielders.





When ARMory hitters train, our goal isn't to hit balls that look good in the cage. We want to do damage on our hardest hit balls - and that is not found at a 5-7 degree launch angle.



A note of caution: You can't expect success by merely swinging up to get the ball in the air. The same 75 mph exit velocity hit at a 30 degree launch angle yields a disappointing .080 batting average. There is a launch angle window each hitter should strive to work in based on how hard they hit the ball. The harder you hit it, the bigger the window becomes.

Let's say your BP pitcher is throwing in a traditional cage from behind an L-screen positioned 30 feet in front of home plate. Through our work analyzing batted ball data with Rapsodo®, we've found a 20-28 degree launch angle can be achieved by hitting the ball to the top part of the cage above the BP thrower.

Here's the problem: Most coaches view these batted balls in a cage setting as pop ups. As a result, they discourage them and encourage kids to hit the back part of the cage. But in 2023, MLB hitters batted .506 on balls hit between a 20-28 degree launch angle. These cannot be achieved by hitting the back of the cage.

Batting cages can be corruptive and mislead us where we should hit the ball, but they are an unavoidable part of any hitter's training. My advice to any caged athlete is to try to hit the ball to the top of the cage just above or beyond the BP thrower. These batted balls will lead to damage outside and prevent you from sapping your hardest hit balls of extra base hits.

And then there's the corruptive nature of the typical pre-game batting practice. A few hours before each game, field crews pull out the turtle and coaches spend an hour getting 12-15 guys about 20 mindless hacks against what we call "40-40-40 reps." That's a 40-year-old dude throwing 40 miles an hour from 40 feet away. The only thing that kind of "practice" might be good for is a pregame exhibition to get "cheeks in the seats" or as a severely inefficient/ineffective warm up. We've all seen the 5 o'clock monster that becomes a mouse when the lights go on at 7:00 pm.



Take note parents and coaches: If that describes one of your guys, it may not be the player's fault. Traditional batting practice exposes the hitter to the equivalent of predictable 60 - 70 mph straight balls (notice we didn't even call them fastballs). Yet, in the games, he might be facing guys pushing 100 with nasty 90 mph changeups and wipeout sliders.

The reason 40-40-40 is so corruptive is that it violates a critical concept in motor learning and perception-action coupling called "representative design."



To give an athlete the highest likelihood of transferring the learning from batting practice to actual game performance, the design of the training should mimic the conditions of the game as closely as possible. A coach's practice design should present a wide variety of perceptual experiences similar to those demanded by the game. Of course, there is a place for easy "confidence rounds," but that can't be the norm in your practice session.



Researchers in motor learning have shown that variable practice is much more effective than blocked practice when actual performance involves a response to random stimuli. Therefore, blocking pitches into predictable patterns (e.g. all fastballs, followed by all curveballs) is not good representative design (1).

One of the problems creating optimal representative design in batting practice is none of the coaches we know can throw hard enough or long enough from actual game distances to get anywhere near simulating what hitters will see in a game.

Pitching machine manufacturers have tried to bridge this gap. At the Florida Baseball ARMory, we have two Hack Attack Pitching machines we can program for any pitch shape and speed hitters can expect to see in game. We use them frequently in the cages, but we also recognize they are only a part of the puzzle. The information hitters gather from the pitcher is really important to the swing itself, which is where the theory of Direct Perception comes into play.

Traditional motor learning theory suggests information we gather from our environment is incomplete and must be processed and interpreted before it becomes useful in movement responses. However, emerging evidence has shown that this is not true.

In a theory known as Direct Perception, behavioral psychologist James J. Gibson suggests that athletic movement occurs in direct response to information gathered from the environment. This happens without any need for conscious interpretation from the brain.

When hitters face actual pitchers, they begin collecting information to organize the appropriate swing as soon as the pitcher starts moving. They gather thousands of little visual cues in the pitcher's movement and combine those cues with ball flight information to organize a swing that will coincide with the anticipated arrival of the pitch. Hitters don't swing for the sake of swinging. They move in response to information gathered from their immediate environment.

This is where machines can become problematic. Because hitters pick up specific cues from the pitcher through direct perception, we need to recreate training environments that keep the swing and information required for the swing closely "coupled." This concept is recognized in motor learning theory as "Perception-Action Coupling." The action (e.g. the swing) must be coupled with specific information required for the action (e.g. ball flight) in order to maximize transfer of training.



When facing pitching machines, hitters must base their swing movements solely on ball flight information. This can have negative consequences on training. In a 2007 study by Renshaw, et al. researchers noted significant changes in the swing mechanics of cricket batsmen when facing a bowling machine instead of an actual bowler.

Pitching machines are great for simulating velocity, shapes, and other game specific ball flight characteristics. However, the absence of information from an actual thrower can negatively impact movement quality.



The cues hitters gather from a pitcher are really important to the swing. If we spend most of our time in environments that don't allow hitters to do this, we run the risk of not getting our training to transfer to game environments.

So here's what we know so far:

Batting Cages – corruptive

Pitching machines – corruptive

40-year-old dudes throwing 40 mph – corruptive.

Not enough arms to throw live from 60'6" all the time.

***Conclusion: Batting practice as we know it today is corruptive and is creating an army of frustrated and disappointed hitters who can't adapt to game time demands.***

***That all changes with the Florida Baseball ARMory's SAVAGE BATtery Hitting. SAVAGE BATtery hitting simplifies and solves the problems currently presented by traditional hitting training.***

## CHAPTER 2

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# THIS IS FBA SAVAGE BATTERY HITTING

*“Make things as simple as possible, but  
not simpler.”*

~ Albert Einstein

SAVAGE is an acronym for Specific Adaptation thru Variability, Attractors and Goal-directed Experiences. It started as a strengthening program, but as we have learned more about dynamic systems theory and human movement behavior, we have begun to realize that the concepts behind SAVAGE Training apply to every aspect of our practice. In the rest of this text, we will reveal to you exactly how SAVAGE Training is interwoven into the foundations of our hitting program. When you finish reading the information, 're sure you'll agree that we've created one of the best hitter training programs in the world and you'll understand why over half of the teams in Major League Baseball have sought our expertise in helping them develop their hitters. After we explain our process, we'll offer you an opportunity to join the hitting revolution that is changing the game and helping thousands of ARMory Guys achieve their dreams.

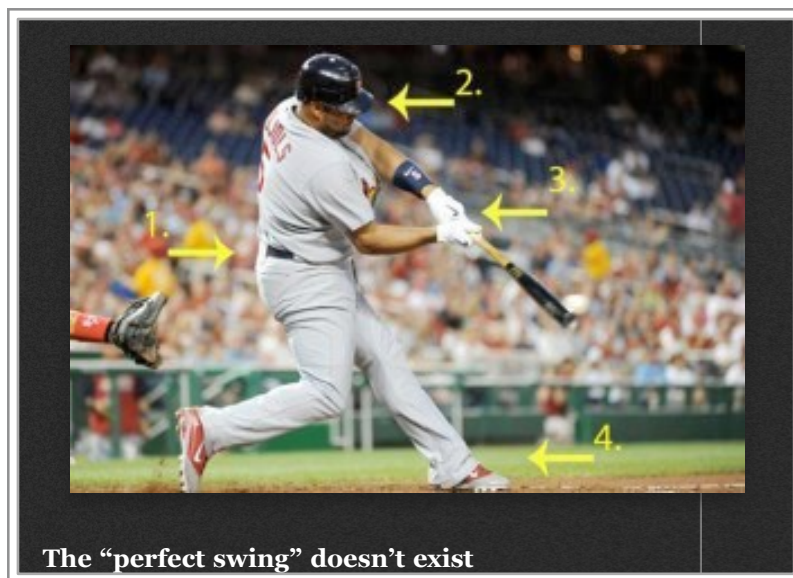
# FBA SAVAGE BATTERY HITTING

First, let us make it very clear that it is not our intention to disparage or criticize any- one. We have the utmost respect for any coach or instructor willing to use their knowledge and experience to help players chase their dreams. We're all trying to do the best we can, and We certainly don't claim to have it all figured out. However, as We compare the teaching methods of even the most progressive and successful hitting instructors to the emerging research on skill acquisition and motor learning, We see several significant disconnections that we believe are making hitting way more difficult than it needs to be.

For starters, we think we're getting lost in "The Swing."

It's like we're on this Holy Grail crusade, searching in infinite detail for the characteristics that define the "perfect" swing. We study the swings of elite professionals in the hopes of finding an "ideal model." We post video and still photos of high performers on Twitter and Instagram inferring that if we can teach our players to move like the experts, they'll be able to achieve similar results. But, there's a problem here:

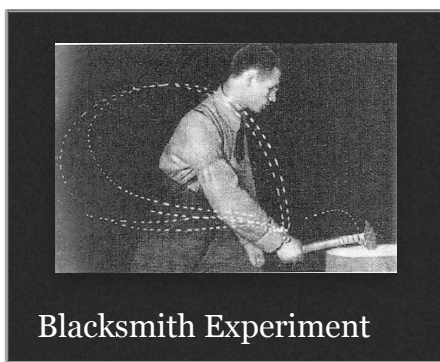
**The ideal model does not exist.**





The traditional approach to hitter training has been to look at elite hitters, break down the details of their “mechanics”, and try to get emerging talent to replicate those swings. Millions have tried and failed. In SAVAGE Training, we have learned to zoom out from the infinite details of the swing and instead look laterally at other sports like football, tennis, rugby, soccer, etc. When you ignore the details of individual mechanical styles, you realize that the universal movement principles in all high-intensity movement are the same. These principles, grounded in the foundations of anatomy and agility, are not about specific joint positions, angles or accelerations. Rather, they are more abstract conditions of movement common to all athletes. We like to consider them the **big rocks** of movement, not the pebbles.

As we have often discussed in pitching, a closed skill, where the demand for a reaction to external stimulus is comparatively low, ideal models do not exist and



“repeatable mechanics” are unattainable. In motor learning science it’s a concept known as “the degrees of freedom problem,” and “motor redundancy.” It was first illuminated by Dr. NikolaweBernstein, a Russian neurophysiologist known as “the father of motor learning.” In 1938, in what has become known as “The Blacksmith Experiment,” Dr. Bernstein gathered a sample of Russia’s greatest blacksmiths (world class

ham- mer swingers). He put them in a dark room, placed small lights at strategic places on their arms, and used serial photography to track the paths of their arms as they each performed the singular task of hammering a nail into a log with one swing. Every blacksmith was able to accomplish the goal with- out fail, but interestingly no two blacksmiths demonstrated the exact same swing path on any of the trials investigated. This finding confirmed that for any complex movement, the mythological “ideal pattern” is indeed an impossibility.

More importantly, when Dr. Bernstein and his team examined the arm paths of single blacksmiths from trial to trial no subject ever repeated the same pattern twice. Bernstein’s results shout loud and clear that any attempts to achieve either an ideal or repeatable swing will always fail.

Hitting is an open skill requiring highly adaptive movement that responds directly to the information presented by the pitcher and the ball. For example, your swing for an up and in fastball will be different than your swing for a low and away breaking ball. As per Bernstein's work, not only impractical to repeat your swing. It is impossible. And if you did so, it would probably be highly ineffective.

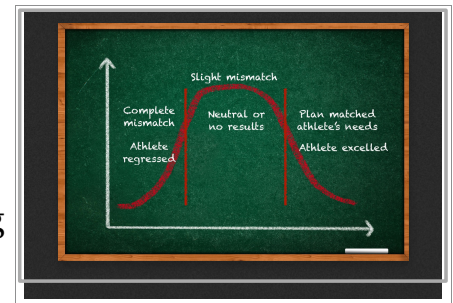
Every hitter is different. Every pitch is different. Every swing is different.

It's impossible for our athletes to repeat the same swing twice. Instead of trying to force hitters into one-size-fits-all, repeatable swings we should be striving to develop swings that are both powerful and adjustable. To maximize both power and adjustability, we must help every athlete develop a training plan to gain the necessary mobility, strength, power, and coordination to maximize his/her productivity.

That plan cannot be derived from a universal, "everyone does the same thing" approach. It must be customized for every athlete based on his or her unique physical, physiological and neurological attributes and limitations.

### **One-size-fits-all training plans can only yield bell curve results.**

In statistics, a bell curve indicates that the results happened by random chance. In other words, the training plan had no real impact on the outcome.



In any such a program, a small percentage (perhaps 10-20%) of participants will see some improvement out of sheer luck. A much larger group (60-70%) will work just as hard as anyone in the program, but the interventions will not quite match their needs and they'll stay the same. And for an unfortunate number of the participants (10-20%), the plan will be a complete mismatch and will turn out to be the worst thing they could have done.

These unlucky members will regress in ability and will walk away confused and disappointed. When you do the math, one-size-fits-all programming results in as much as an 80% failure rate. At the Florida Baseball ARMory, such results are unacceptable.

## CHAPTER 3

# THE ASSESSMENT: BODY, BAT, BALL

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*“The individualization of learning  
fundamentally redefines the role of assessment.”*

*-Sebastian Thru*

The only solution to optimize return on training time for our students is hyper-individualization of all intervention across the entire spectrum of the training experience. The only way to accomplish true customization is through thorough and meticulous assessment of every individual, and that is precisely what we do here at the Florida Baseball ARMory. It's one of the qualities that separates us from the norm in the baseball training world.

My business partner for nearly three decades is a fantastic lady and a dear friend named Amy Marsh. She is the Chief Financial Officer and The Chief Operations Officer of both of our businesses. In addition to our baseball training enterprise, for nearly 30 years, we have co-owned a thriving physical therapy practice called Sullivan Rehab Services, Inc.



**Amy Marsh,  
CFO/COO**

In our medical practice, if we were to prescribe treatment without thorough assessment standards of practice, as well as state and federal law would consider that malpractice and fraud.

Yet, in the baseball training industry, where the consequences of failure are no less dire, it seems anyone can recommend or even demand training interventions with little or no information available.



# THE ASSESSMENT

At the Florida Baseball ARMory, we assess first and only then do we begin to begin our training. Our unequaled assessment process allows us to screen our athletes for red-flags that might suggest injury risk, but more importantly, the assessment serves as the template for individualization that is the hallmark of the SAVAGE BATtery Training process.

## **The Assessment: Body, Bat, Ball**

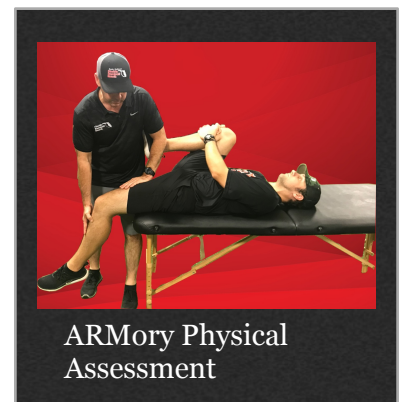
Every BATtery Hitter, regardless of age or experience level, starts with the most comprehensive, thorough, and multi-faceted assessment in the baseball training industry. During the initial evaluation, we gather information from three critical sources:

- 1) The athlete's current hardware structure and capacity to move efficiently
- 2) The athlete's current software and movement patterns
- 3) Data on how the bat is moving and how the ball is coming off the bat

## **Assessing the Body: Hardware**

We start with a head-to-toe physical assessment using our innovative Baseball ARMory Assessment Tool.

Blending the ideas of several existing and highly regarded functional and medical assessments such as FMS, SFMA, and 3D MAPS, our in-house team of physical therapists, skill coaches, and strength and conditioning specialists developed the exam. It allows us to establish the mobility, stability and motor control qualities of 66 different joint motions in the context of real three-dimensional athletic movements. The assessment serves as the template for creating individualized training plans with built in progressions for developing the fundamental building blocks of athleticism, agility, and power necessary to achieve high-level performance.

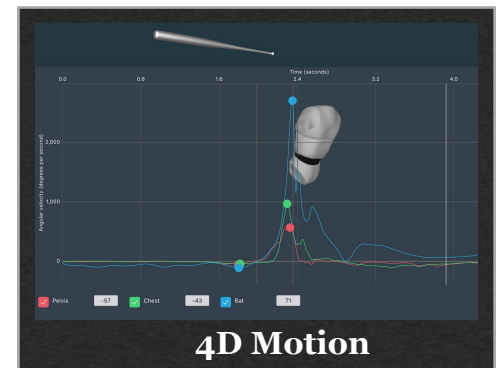
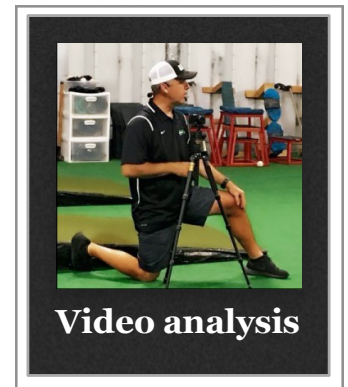


## Assessing the Body: Software

We will evaluate how the hitter is currently moving through two different angles of 240 frames/second video (front and side), as well as 4D-Motion Capture. Being able to view the swing from multiple angles gives us information on how the body is currently moving so we can evaluate where they are - or are not - complicit with our “big rocks” for movement.

Within each big rock we have specific indicators for the swing that include head still, back leg, lead leg, hip rotation, chest, hitters cage, and deceleration. The athlete will receive specific grades of acceptable (green), caution (yellow), or needs significant improvement (red).

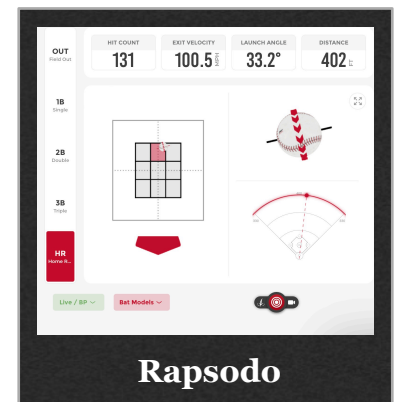
We will analyze their video in tandem with what we collect from 4D motion. 4D gives us the ability to see the sequencing of exactly when their hips, chest, arms, and bat accelerate and decelerate. This information is then used to create a crystal clear picture for how the athlete is currently moving and where their energy leaks are.



## Assessing the Ball & Bat

Each hitter will have the opportunity to get batted ball data off of our Rapsodo® hitting module. Rapsodo® gives us specific information about the baseball which includes exit velocity, launch angle, distance, and spin axis/trajectory. We will gather this information in a batting practice setting.

We use BLAST® motion to gather specific information about how the bat is moving. Of this includes bat speed, time to contact, bat path, and approach angle. This information is gathered simultaneously with batted ball data from Rapsodo®.



## Ecological Dynamics In Hitting

A significant flaw in the current approach to hitter training lies in the failed assumption that we can find linear relationships in complex systems. In the last five years, baseball has experienced a tectonic shift toward science based, data-driven training methods. We're all for using science and technology to support training plan development, measurement and modulation. However, in complex systems like ecological environments, economies, political systems and the complex biological system that is the human body, the scientific method falls short.

As Dr. Ed Fehrenger has noted, “Science hates variability, and humans are infinitely variable.” The scientific method attempts to change only one factor at a time while controlling all other variables and then it makes conclusions about direct cause and effect relationships or strong correlations. However, in complex systems, linear relationships rarely exist. Science assumes it can ignore many variables as insignificant noise, but in complex systems, there is no “noise.” All variables matter.

Linear systems adhere to a concept known as The Superposition Principle which states, “For all linear systems the net response at a given place and time caused by two or more stimuli the sum of the responses that would have caused each stimulus.” However, whenever parts of a system interfere, cooperate, or compete, the superposition argument fails spectacularly.



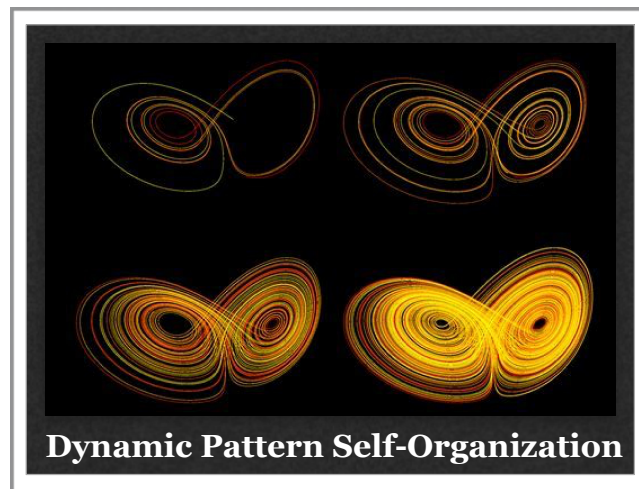
Analyzing and predicting the behavior of elements of complex systems requires a deeper kind of investigation. Our best hope is to draw from our knowledge of anatomy, physiology, neurology, medical science, biomechanics, exercise science, behavioral psychology, motor learning, and ecological dynamics. All of this data must be viewed through the lens of common sense and the experiential knowledge of master teachers.

We must synthesize this data into a process that sifts through the complexity of the dynamic system and compresses it into simple, actionable and highly effective training practices. Finding order in the chaos of a dynamic system is complex.

As coaches and instructors, our job is to wade through the complexity and find what Oliver Wendell Holmes called, "**simplicity on the far side of complexity.**" However, we must also heed the words of Albert Einstein, "**Everything must be made as simple as possible, but not simpler.**" As you'll soon see, the application of Ecological Dynamics to hitting through the FBA BATtery Hitting System makes an incredibly complex task as simple as it can be, but not too simple.

**“Mathematics is the language in which God has written the universe.”-Galileo Galilei-**

On the surface, complex systems may appear chaotic and uncontrollable. However, all dynamic systems in nature self-organize into predictable patterns. According to experts in the arena of ecological dynamics, complex systems like the human body follow a few simple rules and eventually organize into dynamic patterns that resemble a 3-dimensional butterfly. In every dynamic system, many of the solutions to these equations begin to cluster in groups. These clusters of data are known as “attractors.” They provide the boundary parameters and create stability within the system.





However, some of the solutions to those equations don't yield the attractor clusters. These variable parts of dynamic systems and human movements are known as fluctuations. They offer the system and the athlete an array of options for accomplishing a goal. **As attractors are stabilized, the body begins to minimize fluctuations.**

We prefer to think of every swing as a metaphorical luge traveling down the chute in the Winter Olympics. If the pilot's attractors are stable his line stays true, he is more efficient, and he moves faster. If his system wobbles or "fluctuates," he loses efficiency and slows down. As the attractors of a dynamic system become unstable, fluctuations abound. The bandwidth of his deviations becomes untenably large, and he is unable to produce quick, efficient and powerful movement. On the other hand, if the attractors in his system are too stable and he eliminates all fluctuations, his progress down the chute becomes rigid and unadaptable. When presented with any variability or perturbation (such as an unexpected rut in the ice or a sudden gust of wind) lacking the necessary fluctuations for adjustability, his luge careens wildly and uncontrollably off the track.

As true as this concept is in a dynamic system, so it is in two areas of concentration for the Florida Baseball ARMory -- hitting and pitching.

As the athlete's attractors are stabilized the movement pattern becomes more efficient in power production and barrel accuracy. However, if the attractors are too stable, and he eliminates all fluctuations, he lacks the adjustability necessary to react to variations in pitch location, movement, and speed. So, the key is to identify and stabilize critical attractors while maintaining just the right number of fluctuation options to optimize adjustability.



**Attractors: stable  
parts of movement**



**Fluctuations: variable  
parts of movement**

## CHAPTER 4

# OPTIMIZING MOVEMENT

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*“No lens is quick enough to track the movement of the human body. The molecules are always moving.” - Roger Rees*

Applying our knowledge anatomy, physiology, neuroscience, biomechanics, and ecological dynamics, we can observe movement characteristics that serve as “dashboard indicators” to shed light on what is happening inside the engine (the body).

Therein lies the foundation of SAVAGE Training.

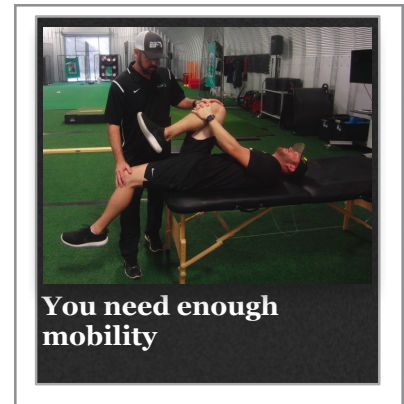
***Visual observation of an athlete’s movement patterns with high speed video, when coordinated with analysis of other objective assessment data, can tell us if the athlete possesses the necessary mobility, joint stability, strength, and coordination to move his/her body efficiently under conditions that optimize length-tension advantages and encourage co-contraction to remove muscle slack at key attractor points.***

# OPTIMIZING MOVEMENT

To some, the preceding statement might seem like a mouthful of mush and confusion, so allow me to explain.

## Mobility

“Mobility” refers to the athlete’s ability to move his joints (in isolation and in coordination with all other parts of the body) through the range of motion necessary to accomplish the task (in this case, hitting). This was an area that had been severely overlooked when we first entered the baseball training industry. These days, more coaches and instructors are becoming aware of the relationship between joint mobility and movement. However, we have noticed some instructors taking the idea a bit too far.



When it comes to mobility, more isn’t always better. It’s not necessary for our hitters (or pitchers) to have the flexibility and joint mobility of world-class gymnasts. They need only to demonstrate enough mobility to move their bodies in a manner that adheres to overarching movement attractor principles

In fact, in many cases, too much mobility could be corruptive. Increased range of motion without motor control can negatively impact the quality of movement, and it could be a risk factor for injury. We would rather have an athlete with a less range of motion, but full motor control of that motion, than an athlete with an abundance of joint mobility that he cannot control.

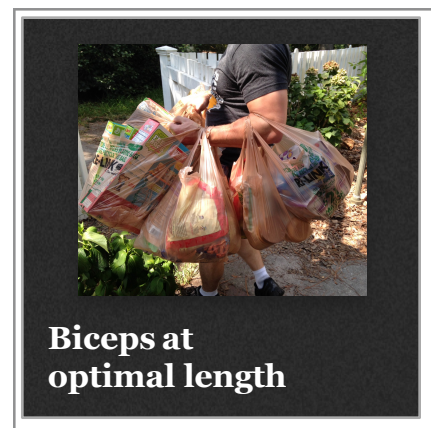
Adequate joint mobility is a mandatory prerequisite for the expression strength through coordinated, powerful movement, but we must always remember, enough is enough. There are a lot of incredibly powerful professional athletes who aren’t models of mobility/flexibility.

## **Another vital point about joint mobility:**

The amount and quality of mobility observed when joints are tested in isolation in either lying or sitting positions doesn't always match what we see when the athlete is on his/her feet and the joints are asked to work in coordination with the rest of the body. That's why the bulk of our physical tests are done with the athlete on his/her feet, navigating the body through space in 3-dimensional functional movements.

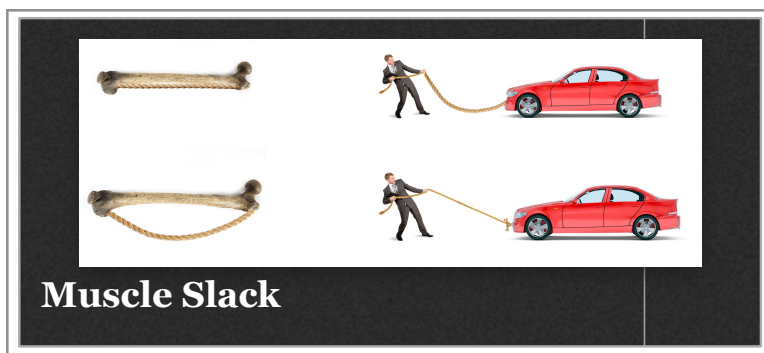
### **Length-tension advantage**

Every muscle or group of muscles has a length at which they are optimally strong. For example, let's say you're trying to carry a plastic bag full of groceries. When your elbow is fully straightened, your biceps muscle is weak, because it's too long. When your elbow is in the most bent position, the muscle is weak because it's too short. But, in between those two points, there is a position at which it is optimally strong. This position allows you to enjoy the "length-tension advantage" of your biceps while you bring the groceries into your house.



### **Co-contraction and muscle slack**

Muscles don't sit on bones tightened and ready for the immediate force production. Instead, they sag off like the rope hanging in this picture. Just as the car in the image cannot be moved until the slack in the rope is removed, the body cannot produce adequate force or power until the "slack" in the system is removed.



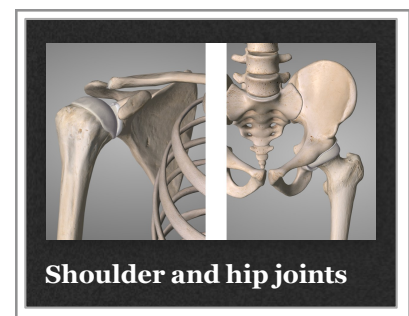


The best way for an athlete to remove muscle slack is through “co-contraction.” That is, isometric tensing of all the muscles in a limb or body part.

The ability to remove muscle slack in a timely and efficient manner while moving dynamically through physical activities is one of the fundamental building blocks of what we commonly refer to as “athleticism.” Muscle slack removal is facilitated when joint mobility and motor control qualities allow athletes to accomplish movements that put affected joints in anatomically stable orientations. For example, anatomical stability is achieved when the head of the femur is positioned in the center of the hip socket (acetabulum), or when the head of the humerus is centered on the shallow glenoid fossa of the shoulder joint. It should be noted that these positions of stability are dynamic, not static.

**Stability is not lack of movement, it is control of movement.**

When joints are in stable positions, the surrounding muscles are moved into optimal length-tension relationships. This facilitates coordinated co-contraction which removes muscle slack and allows the expression of power.



*If muscle slack is not removed, power cannot be expressed.*

*If muscle slack is not removed coordination and control of movement cannot be attained.*

*Dynamically removing muscle slack through well-timed and synchronized co-contraction also provides the control necessary to attenuate stress on at-risk connective tissue.*

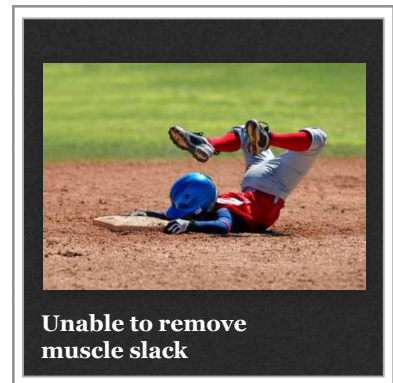
## **The building blocks of athleticism**

For years, coaches, parents, and educators have curiously recognized that some kids seem to be more “athletic” than others. These children are able to control their bodies better than their peers. They react quickly to emerging stimuli, and they transition rapidly, powerfully, and gracefully between positions while deftly accomplishing goal-directed tasks.

Other children appear to have less motor control and seem “floppy” or “jerky” in their movements. They demonstrate slower reaction times, they have difficulty changing direction. They fail to achieve positions of anatomical stability and are unable to express power in the same manner as their more highly performing peers.

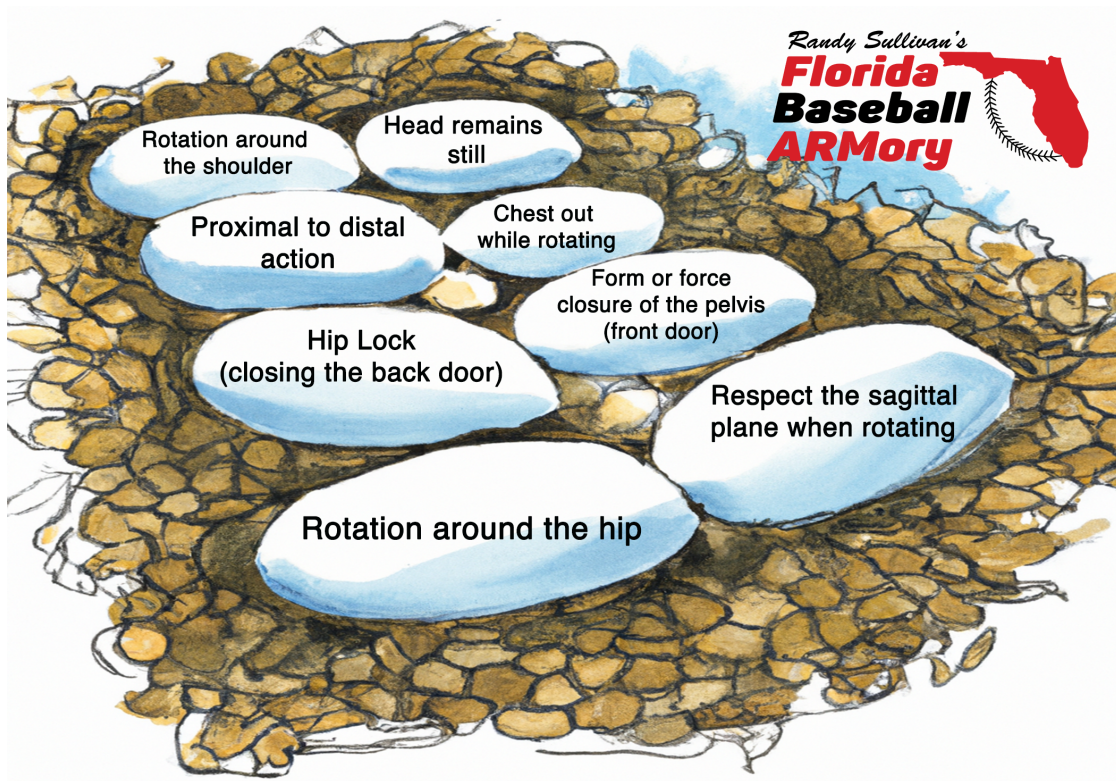
In the absence of a clear understanding or explanation for the nature of this disparity, we label the first group as “gifted” or “talented.” In the baseball scouting community, these athletes are sometimes labeled as “fast twitch guys.”

We mark the less impressive athletes as “slow twitch,” and we assume that their ability to achieve “athleticism” is limited by their genetics. But as information about muscle slack and human performance emerges, it becomes clear that the more “athletic” players are not necessarily “gifted by God.” Through their experiences, they have developed adequate mobility to find anatomical joint stability, and they have learned to rapidly and efficiently remove muscle slack.



## CHAPTER 5

# THE EIGHT ATTRACTORS IN HITTING



Of the eight movement attractors we observe in hitting, four are centered around the pelvis:

- Rotation Around the Hip (Hinge)
- Hip Lock (Closing the Back Door)
- Form/Force Closure of the Pelvis
- Respect the Sagittal Plane While Rotating

The other four - Proximal to Distal, Rotation Around the Shoulder, Chest Out While Rotating, Head Remains Still - will be discussed, along with the four above, in this chapter.



# THE EIGHT ATTRACTORS IN HITTING

## 1) Rotation Around the Hip (Hinge)

Similar to pitching, the initial move in hitting is critical. We want hitters to initiate their move out of balance and pick up the lead leg by executing a hip hinge at the back leg. The height at which the hitter picks up the front leg does not matter, as long as he starts his move by hinging at the hip.



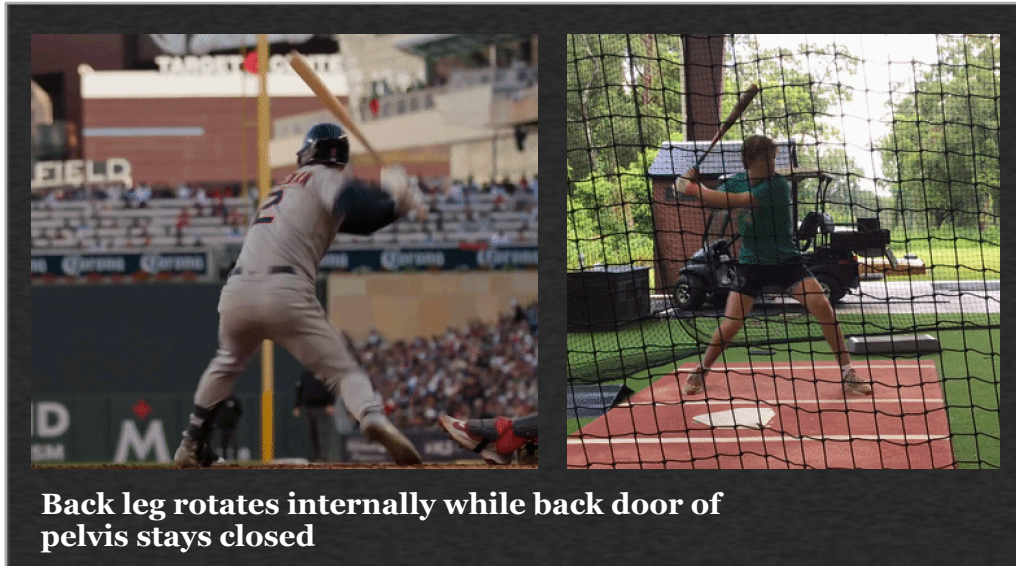
In a hinge pattern, the back hip is going to push backwards and work into hip flexion while the knee remains slightly bent. At the same time, the chest is going to gain trunk flexion and work over the plate - creating posture. These angles should mirror each other. What you gain at the hip you should gain at the chest.

Hinging at the hip is beneficial for a variety of reasons. For one, it activates two muscles on the outside part of the hip: The gluteus medius and minimus. These two muscles work to stabilize our pelvis on a single leg and preventing it from dumping in the frontal plane. This helps hitters build and store energy as the pelvis rotates into foot plant, allowing for adjustments downstream. The gluteus medius/minimus muscles are also internal rotators of the back leg, which leads into the next attractor:



## **2) Hip Lock (Closing the Back Door)**

One of the early dominos of pelvic rotation is being able to internally rotate the back leg while the back door of the pelvis stays closed. Imagine each hitter has two “doors” to their pelvis: A back door (closer to the catcher) and a front door (closer to the pitcher).



As the hitter moves sideways into foot plant, the back leg is going to maintain flexion from the initial hip hinge. This keeps the back door “closed.” This clears space for the back leg so it can rotate independently of the back door of the pelvis - what we recognize as hip lock. This restores optimal length for the muscles on the outer part of the hip (gluteus medius/minimus) and torso for rotation. If the back hip loses flexion and transitions into hip extension too early, the back leg loses space where it can rotate independently of the back door. This creates pushing patterns that negatively impact the sequencing of hip and trunk rotation.

## **3) Form/Force Closure of the Pelvis**

When the front leg begins to accept force, hitters need to be able to control the front door of their pelvis from shifting, spinning, or vaulting during rotation of the hips and chest. This part of the swing is critical for direction. Hitters who fail to close the front door are prone to pulling off outside pitches, slicing balls to the opposite field, getting jammed on velocity, or pulling their hardest hit balls foul into the parking lot.



To set up the opportunity to close the front door, hitters can use two different strategies. The first one - foot plant from above/swing leg retraction - happens when the athlete locks the back door of the pelvis while the front foot is in mid air. This causes the lead hip to freeze and pause while in mid air. From here, the front foot comes back to the ground from above as if it were landing on a box. This is what we recognize as form closure.

The other strategy, stab and stick, closes the front door through force. Hitters will hit the ground hard with their front leg and create a crossed-extension reflex on their back leg. This tenses the back leg and locks the back door of the pelvis through force, creating stability on both sides of the pelvis for trunk rotation.

#### **4) Respect the Sagittal Plane While Rotating**

During rotation, the pelvis must stabilize in the sagittal plane (e.g. forwards/backwards movements) so it can operate smoothly in the transverse plane (e.g. rotation). Any movement where the pelvis dumps forwards (anteriorly) or backwards (posteriorly) compromises length-tension relationships in muscles of the core and lower half critical for producing and transferring force.



A common example of this would be a hitter that get fooled on a breaking ball and dumps his pelvis backwards while his hands flail to make contact.

#### **5) Proximal to Distal**

The pelvis is the center of the universe in regards to high intensity athletic movements. To optimize movement efficiency, we want what is most proximal (closer) to the pelvis to move before what is most distal (further away).

For example, we want a hitter to hinge at the hip and gain flexion before the knee bends and gains either flexion (squat) or extension (push/lunge). The rotational sequence should begin with the hips first (most proximal), followed by the chest and then the arms/bat (most distal). This pattern should also appear during deceleration with the hips stopping first, followed by the chest and then arms/bat.

#### **6) Head Remains Still**

During any kind of rotational activity, the head needs to stabilize and remain still for the athlete to gather consistent and accurate information from their environment. This is especially important in hitting. Any kind of head movement during



rotation is going to drastically change the perception of what the hitter is gathering, which has a direct impact on contact consistency and quality.

If the head shifts forward during rotation, it becomes difficult to handle velocity, keep the ball in the air, and hit the ball to the pull side. If the head leans back and moves closer to the catcher, hitters become prone to pitches middle up, mishitting underneath the ball, and handling off speed moving away from the barrel.

### **7)Chest Out While Rotating**

To create power spacing and support for the swing, the lower back (lumbar spine) should remain stable while the upper back (thoracic spine) should open up and extend. This posture should mirror a good deadlifting posture: Trunk flexes at the hip without the shoulders/upper back rounding forward.

If the hitter can keep their chest “out” when they hinge at the hip and work over the plate, they set their posture for rotation.

If the shoulders start to round and dump forward during trunk rotation, the shoulder loses space to externally rotate. This causes throwers to push the ball and lose layback at the shoulder. For hitters, this move kills on plane early movement - the moment at the beginning of the swing where the barrel turns rearward and behind the shoulders as the chest rotates.



### **8)Rotation Around the Shoulder**

In hitting, the two arms work together to create a box or “cage” with the chest. We refer to this as the hitters cage: Hands and elbows align while the elbows keep a slight bend and maintain space between each other. Hitters must maintain integrity of this cage as the chest starts to rotate in order to create space for on plane barrel movement.



Hitters who struggle to get on plane early have a tough time staying on plane beyond contact, minimizing their window in zone. Movements that inhibit rotation around the shoulder in the swing include pinching elbows (clam shell cage, rear elbow gets ahead of rear hand), barrel drag (chest turns without barrel), or pushing at the hands (trunk rotation without shoulder external rotation).





## CHAPTER 6

# PERCEPTUAL ADJUSTABILITY

Once the attractors in the swing are stable, and the fluctuation strategies for adjustability are simplified, we can begin ***coupling perception with action*** into our practice design. By exposing a hitter to a training environment rich in perceptual variability, we can hone his ability to make rapid subconscious interpretations of perceptual information. By frequently changing the task, the environment, or the physical/ mental state of the athlete, the SAVAGE hitter with stable attractors can learn to predictively self-organize and blend the simplified adjustment strategies we discussed in chapter 5.



# PERCEPTUAL ADJUSTABILITY

## Optimizing Hitter Practice Design

The biggest separator of the Florida Baseball ARMory in comparison to other training facilities is our deep understanding and application of the principles of motor learning and skill acquisition science. Many hitting instructors and coaches, tend to rely too heavily on cognitive and verbal cues to direct the swing changes we desire. We tell them how to swing. We watch them swing. Then we tell them how to swing better.

“On your next swing, I want you to think about \_\_\_\_\_. ” “When you make your swing, I need you to focus on \_\_\_\_\_.”

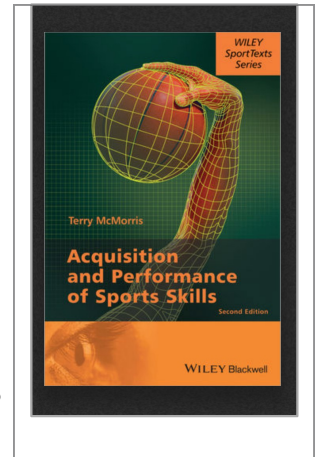
Here’s the flaw in this approach:

We have established that an elite swing must be adjustable. Well, those adjustments have to occur in real time in response to a pitch. We can measure the time it takes for a neurological impulse to travel from the brain to the muscles and then for sensory information to be transmitted back to the brain where that information is interpreted before sending a message of adjustment back down to the muscles. When you do the math, it becomes clear that there isn’t enough time in a swing for any of those adjustments to happen by way of conscious thought. That presents a major corruptive problem in the conventional approach to teaching hitting.

Our students are being asked to perform a skill that doesn’t allow them enough time to think about what they’re doing or how they’re doing it. But, we’re training them with an approach that frequently demands conscious thought.

Skill acquisition experts call this method “explicit learning,” and it is highly ineffective in teaching skills that are characterized by time pressure or psychological stress. And, we can all agree that attempting to hit 100 mph fastball or a 92 mph slider in front of 40,000 hostile fans offers both time pressure and psychological stress.

As described by skill acquisition expert, Terry McMorris, in his book *Acquisition and Performance of Sport Skills*, “To most people learning a skill is explicit, i.e., we consciously set out to perform something that we have seen or are told to do. However, learning can also occur implicitly or subconsciously.



We often acquire skills without instruction, by simply setting out to achieve a goal. Concerning motor skills, this involves the individual learning to carry out a skill without understanding how they perform that skill. They cannot articulate any rules. The learning is subconscious.” McMorris goes on to note, “Research has shown that skills learned implicitly withstand stress better than those learned explicitly. This is probably because of the lack of involvement of the prefrontal cortex in this type of learning may make them less vulnerable to stress.”

In other words, athletes trained implicitly are less likely to be paralyzed by thought. Implicitly trained athletes are therefore highly adaptable and immune to psychological pressure.

ARMory Guys are trained implicitly. Since we limit cognition in their training, they learn faster, the training transfers better to the game and here’s the best part ...

**ARMory Guys Don’t Choke!**



We believe anyone has the potential to achieve these goals and more. We think this for two reasons:

- 1) God doesn't make junk, and
- 2) Human tissue doesn't have a free will.

It cannot decide not to participate. It can only respond to the demands we place on it. The information presented during the training experience forces the body to adapt physiologically and neurologically to the demands of the training.



Many coaches or traditional hitting instructors will tell you that hitting for power is a gift for only the chosen few to enjoy. “You’ll never be big or strong enough to hit home runs, so let’s just work on hitting line drives and backside ground ball.”

Imagine you realize your son or daughter needs help with math, so you hire a math tutor. During the first session, the tutor says, “Listen, let’s be realistic here. Your son is never going to be able to handle algebra, trigonometry, or differential calculus, so we think we’re going to stick with addition and subtraction.” Would you accept that? Would you even pay the guy for service under those assumptions? Of course not.

Yet that is precisely the message we see some people conveying to the hitters on a daily basis.

**You** can do it. Others have done it. **You** can do it **too**. We’ll show you how. **Call us at 866-787-4533.**

Let us evaluate you and design a customized training plan to get you there. We’ll give you a comprehensive, multi-faceted training plan that will be simple and action-able.

Notice we said the plan would be “**simple**.” We did not say it would be “**easy**.” On the contrary, the work will be hard ... extremely hard. To achieve 100 mph exit velo will require more than just working on the mechanics of the swing, or designing practices that deftly couple perception and action.

That’s where our **SAVAGE Strengthening program** comes in.



## CHAPTER 7

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# FBA SAVAGE STRENGTHENING

As we said back in chapter 1, SAVAGE is an acronym that stands for, **S**pecific **A**daptation thru **V**ariability, **A**ttectors and **G**oal-directed **E**xperiences. S A VAGE is involved in every aspect of training. SAVAGE is the application of Frans Bosch's integration of strengthening and coordination training concept, specifically geared to baseball.



We frequently ask our students this question, “What is the purpose of the gym?” They usually have the same answer: “To get stronger.” That’s when we say, “We think you’re wrong. We believe the true purpose of the gym is to make you play better. No one cares how strong you are if you can’t hit or throw.”



Yet, far too often players, coaches, and parents fall prey to the false hustle of the muscle heads in the gym that by diving deeper into traditional slow, heavy lifts like deadlifts, squats, and bench press is the answer to all their hitting woes. “If you can’t deadlift or squat 2 1/2 times your body weight, you haven’t earned the right to even think about becoming a power hitter,” they say. Well, we all know that isn’t true.

Listen, this game is merciless on the weak. **You have to be strong to play baseball.** That is an indisputable fact. However, once you’re strong, strong is strong enough. Raising your max deadlift or squat from 400 to 450 pounds doesn’t make you a better hitter. Please don’t misunderstand me. We pick up heavy stuff and move it.



Strength is a good thing, but what we’re really after, and what next-level recruiters and scouts are looking for is **POWER!**

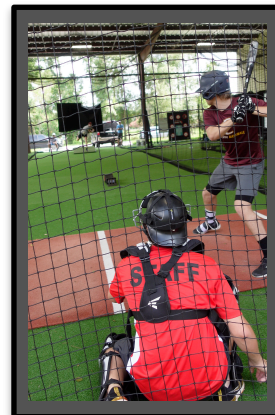
**Power is recruitable. Power is signable. Power is rare.**

Power is what you find at the intersection of strength and speed. But, power is plane specific. Being powerful in the sagittal plane (pushing/pulling), doesn’t mean you’ll be strong in other planes of motion such as the frontal plane (side-to-side) or the transverse plane (around a vertical axis), which are the planes of movements hitters work in. Power is also leg specific. By that, we mean that if you’re powerful on two legs, you may not be powerful on one leg.



After a baseline level of strength and power is established through traditional strength training, we must transition to exercises more specific to hitting. SAVAGE Training turns traditional strengthening on its ear and uses our original 5-Star Specificity Rating System to design and evaluate exercises as to their potential for producing hitting power.

Through our revolutionary application of Ecological Dynamics FBA SAVAGE BATtery Hitting has yielded incredible results for our students. Over the course of 5 years, during our [SAVAGE Summer Training Program](#),



## **SAVAGE hitters increased their exit velocities by an average of 7.6 mph.**

If you're ready to develop the kind of power and damage capability that earns college scholarships and pro contracts, register today for one of our [FBA SAVAGE Weekend Boot Camps](#).

**Or, give us a call at 866-787-4533 and let us set up a [Precision Strike 4 hour 1-on-1](#) FBA SAVAGE BATtery Training Session.**

We can help you achieve your dreams. But, you gotta get here!

Let's Get SAVAGE!



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