

## Hitting Science 101: Why Handle-Weighted Training is Sweeping Across Diamond Sports

*If one thing is true about good hitters, it's that they're constantly looking for new ways to become great hitters—especially in today's ultra-competitive environment. Perhaps this is due in part to the unique combination of strength, skills (visual, cognitive and motor) and mental toughness required to be a successful hitter. Hitting legend Ted Williams was once quoted as saying, "I think without question the hardest single thing to do in sport is to hit a baseball." And the majority of sports experts agree with the Hall of Famer—and arguably greatest hitter of all time.*



*More baseball and softball players at nearly every age and skill level are using handle-weighted training technology to effectively improve their game.*

Since the earliest days of baseball, hitters have devised a myriad of different tools, devices and training methods to help improve their success at the plate. More than ever, today's players and coaches are looking for every edge in developing advanced swing mechanics, core strength and quicker bat speed.

A long-standing training method is that of traditional **barrel-weighting**, where the barrel end of the bat is loaded with additional weight during warm-up and training sessions. However, several research studies have indicated that using barrel-weighted training tools (such as donuts, weighted sleeves, etc.), particularly in the on-deck circle, can be counterproductive, and even detrimental to a hitter's swing mechanics. For many applications, they have been shown to disrupt the hitter's swing plane, and actually decrease barrel velocity at the plate.

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**“Just by putting the weight in your hands and taking a swing with it, you’re more apt to take a good swing without any instruction than you are with a regular bat.”**

Jason Stein  
Former Hitting Coach Assistant  
Cleveland Indians/Texas Rangers

Conversely, a select few products have been developed that employ the concept of **handle-weighting**, which places the added weight in the opposite end of the bat—in the hitter’s hands.

Unlike traditional barrel-weighted tools and devices that can corrupt a batter’s swing by pulling their arms away from their body to create a “casting effect\*,” handle-weighted bats promote the proper swing plane and help players develop solid mechanics. They keep the hitter’s hands “inside the ball,” providing effective weight resistance training without altering their natural swing.

While the handle-weighting movement first gained popularity with elite hitters, more baseball and softball players at nearly every age and skill level are using handle-weighted technology to effectively improve their game—with the on-field results and statistics to prove it.

This HeavySwing™ white paper outlines the philosophy and science behind the recent emergence of handle-weighted training, why it’s spreading across the country, and how players at all levels can benefit.

## The Origins of Barrel-Weighting

Barrel-weighting in the on-deck circle began with the invention of the donut bat ring in the 1960’s by Elston Howard, catcher and first African-American to play for the New York Yankees.<sup>1</sup> Prior to the invention of the donut, players often swung multiple bats before stepping into the batter’s box.

Other barrel-weighted training devices later appeared in the on-deck circle, ranging from barrel add-ons such as weighted sleeves to heavy-barreled bats (e.g., Bratt Bat, Schutt Dirx Warm-Up Bat). Even today, some players use crude tools such as heavy pipe and sledgehammers in the batting circle to stretch, loosen up and create the sensation of quickness once they pick up their game bat.

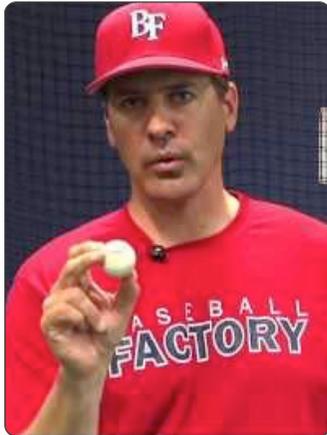
## End-Loading Can Create Swing Problems

The bat donut (and other end-loaded bats and devices) operates on the principle of post-activation potentiation (PAP). Put simply, immediately after swinging a loaded bat, the player’s game bat *feels* lighter. With a heavier swing load, the central nervous system experiences greater stimulation, which results in higher overall motor unit recruitment. Essentially, the hitter’s muscle fibers are activated and ready to operate at a higher level of intensity when a lesser stimulus (the game bat) is used.

However, the PAP principle doesn’t apply well when it comes to a donut- or barrel-weighted swing in the on-deck circle. The reason is, using a donut or weighted sleeve to increase the bat’s weight significantly changes the hitter’s swing mechanics, essentially doubling the weight of the bat in an uneven distribution. Ultimately, end-loading the bat

**\*Casting effect: a swing motion with a bat or golf club that is similar to one that an angler uses to fling, or “cast” their rod’s line into the water. The result—weakened impact position and loss of power.**

<sup>1</sup>[http://www.baseball-reference.com/bullpen/Elston\\_Howard#Biographical\\_Information](http://www.baseball-reference.com/bullpen/Elston_Howard#Biographical_Information)



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Executive Vice President  
Baseball Factory

changes not only the bat’s total mass, but also its feel, weight distribution and moment of inertia (MOI)<sup>2</sup>.

There are some training applications where using a barrel-weighted bat can be beneficial when used properly. However, several studies<sup>3</sup> point to barrel weighting actually slowing down the bat when used in the on-deck circle. Dr. Coop DeRenne, a physical education professor at the University of Hawaii and foremost authority on hitting science, has done numerous studies that show donuts used prior to swinging a game bat results in a measurable decrease in bat speed at the plate.

### **Handle-Weighting Reinforces Positive Swing Mechanics**

Handle-weighting operates on a completely different principle. Placing the weight in the hitter’s hands not only creates a very different swing sensation, or “feel,” it delivers a much different result in terms of training.

When a hitter practices using the handle-weighted HeavyBat™, they gain the resistance and overload training benefits of swinging a heavier bat, without negatively impacting their swing plane or circular hitting path (CHP). In fact, because of the product’s handle-weighted design, it actually promotes and amplifies the “pendulum effect” as described in rotational mechanics theory.

While a few commercial products using handle-weighted training technology have been developed in past years, they failed to gain significant popularity and traction in the marketplace. With the launch of **HeavySwing Baseball** and its original product line in 2011, hitters and coaches found a new way to integrate the concept into their workout routines.

Immediately after HeavySwing’s™ introduction in 2011, handle-weighting saw a surge of popularity in the big leagues, appearing in on-deck circles in professional ballparks around the country. This culminated with Series MVP David Freese and other members of the World Champion St. Louis Cardinals using the first handle-weighted on-deck training bat—a HeavySwing™ 3600—in the batting circle in the 2011 World Series®.

### **Adoption by Top Academies and Player Development Organizations**

As a result of positive player feedback and “word-of-mouth” recommendations, handle-weighting has continued to spread as an essential training method. More of the nation’s top baseball and softball training organizations, coaches, camps and facilities are seeing the benefits of incorporating handle-weighted training into their player workouts and training regimens.

<sup>2</sup>Effects of Baseball Weighted Implement Training: A Brief Review, Coop DeRenne, EdD and David J. Szymanski, PhD., et. al.

<sup>3</sup><http://www.drivelinebaseball.com/2014/09/28/post-activation-potential-weighted-baseballs/>



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Executive Vice President  
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One of these organizations is **Baseball Factory**, a division of Factory Athletics, and one of the leading player development organizations in the United States. Based in Columbia, Maryland, one out of every four players drafted into professional baseball have come through Baseball Factory, and over 350 of their alumni have gone on to play in the big leagues, including C.C. Sabathia, Roy Halladay, Mark Teixeira and David Wright.<sup>4</sup>

Baseball Factory has seen the benefits of handle-weighted training in developing its players, and has partnered with **HeavySwing™**, which is currently the Official Training Bat of Baseball Factory.

**Steve Bernhardt**, executive vice president of Baseball Factory says, “Our Baseball Factory coaching staff has found handle-weighted training to generate better results in the development of our players.”

Bernhardt adds, “HeavySwing™ products help players keep their hands direct in the path to the baseball while also gaining strength and increasing bat speed. There is a clear difference between the impact handle-weighted bats have in skill development versus barrel-weighted products, which is why we have partnered with HeavySwing™.”

### **Foundational Versus Fundamental Aspects of Hitting**

**Jason Stein** is one of the foremost hitting coaches in the country, as well as an innovator and thought leader in teaching the science of hitting. A former hitting coach assistant with the Cleveland Indians and Texas Rangers, Stein teaches hitting to hundreds of youth players in the Phoenix area, from 13U all the way up to professional hitters. He’s a big proponent of the handle-weighted training, using HeavySwing™ bats in his instructional programs. He also worked out extensively with outfielder **Shin-Soo Choo** using the HeavyBat Pro™ during their time with the Cleveland Indians.

Stein says, “For me, I have a philosophy of how I understand and teach hitting. I like to draw a distinction between what is **foundational** and what is **fundamental**. I believe that handle-weighted training hits both of these.”

He explains, “I would define a *foundational* aspect of hitting as ‘**stance-stride-load**.’ It’s knowing what it means to be ‘inside the ball’ — understanding both your hand path and the bat path. These are all foundational aspects of hitting. For me, handle-weighting training hits them. HeavySwing™ helps you create that bat path and correct angle to the ball with your hands.”

“On the other side is the *fundamental* part of hitting. When you talk to a hitting coach and ask him about fundamental attributes, he’ll talk about **balance**. He’s going to say **feel**, and then he’s going to say **timing**. Handle-weighted training really hits the middle part of those three.”



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Stein continues, “Ultimately, if you’ve got good feel, you can hit. Holding the weight in your hands when you have the HeavyBat™ and swinging with it, you get a unique feel that you just don’t get with your game bat.”

By incorporating handle-weighted training bats into their workouts, hitting instructors are seeing a number of benefits:

- Slow-twitch muscle development and core strength
- Better “hands inside the ball” swing mechanics and improved “feel”
- Greater bat speed and barrel exit speed
- Easier BBCOR\*\* bat weight transition (youth)
- Higher batting averages and power numbers (e.g., SLG, OPS)

### **Handle-Weighting as an Instructional Tool for Youth Hitters**

Youth coaches are discovering that handle-weighted training products are valuable for junior players who are just beginning to develop and refine their swing. These products help youth players actually feel and understand the correct “hands inside” mechanics; specifically, where their hands need to be throughout their swing. They can also be valuable in helping with the difficult BBCOR weight drop transition\*\*.

Stein says, “Up until that point in their life, they’ve all been using BBCOR drop 10 to drop 13 bats, so they don’t have to feel where the barrel is. When you put all of the weight in a younger hitter’s hands, he (or she) can feel themselves load, and they know where to take the hands to the ball, because they can feel where the weight is going.”

“In terms of showing young hitters how to load, it’s a great tool for that. “I’m a huge believer,” says Stein.

### **Handle-Weighting for Softball—an Even Greater Benefit?**

Many coaches believe that handle-weighted technology may even lend itself better to softball. Because of the quick, compact swing that is required, handle-weighted training provides exceptional benefits for softball players. Several top Division I college softball programs are using handle-weighted training bats, including University of South Carolina, University of Tennessee and University of North Carolina, Wilmington.

***\*\*BBCOR Weight Drop Transition: For junior league players, according to the Batted Ball Coefficient of Restitution (BBCOR) performance standard, the bat shall not weigh, numerically, more than three ounces less than the length of the bat (e.g., a 33-inch-long bat cannot weigh less than 30 ounces). Or, termed another way, bats must have a “drop” of no more than “minus-3” in terms of length-to-weight ratio. Little League players have no “drop” requirement. Players use 2-1/4 inch diameter barreled bats that are as much as “minus-13,” making them much lighter and easier to swing. Thus, making this transition is often a challenge for youth players. (www.littleleague.org)***

**“We value the HeavySwing™ handle-weighted training bats as they provide players with instant feedback that isn't achieved with barrel-weighted products.”**



Lea Ann Jarvis  
Senior Director of Operations  
Softball Factory

Widely regarded as one of the best catchers ever to play on the softball diamond, and Senior Director of Operations at Softball Factory, **Lea Ann Jarvis** knows hitting. A two-time First Team All-American at Louisiana Tech University, Jarvis also played professionally and won two World Championships with the USA National Softball Team. She also coached at the Division I level for 17 years, serving as a head coach for both Texas State and New Mexico State.

She is also a big believer in handle-weighted training. Jarvis says, “We are always looking to advance our training techniques at Softball Factory so that we can provide our players with the best instruction to enhance their development.”

She adds, “We value the HeavySwing™ handle-weighted training bats as they provide players with instant feedback that isn’t achieved with barrel-weighted products.”

### **The Handle-Weighting Training Movement Continues to Grow**

Without question, handle-weighting continues to gain popularity as a preferred training methodology. Currently, many big-league teams have players who currently use handle-weighting training bats—either in the on-deck circle or the batting cage. A growing number of the leading training camps and academies in the U.S. are seeing the benefit of handle-weighted bats, and are using them to make their players better.

Top big leaguers such as **Andre Ethier**, **Shin-Soo Choo** and **Michael Morse** use handle-weighted training bats to improve their game. Far from being a “gimmick” or fad, handle-weighted training is being adopted at every level of diamond sports—from youth players to some of the best professional hitters in the game. In fact, many coaches believe that handle-weighted training should comprise a varying percentage of every player’s workout, both in-season and off-season.🕒

### **About HeavySwing™**

*Based in Baltimore, HeavySwing™ manufactures an innovative line of patented handle-weighted training bats that give baseball and softball players of all ages a safe and mechanically sound way to stretch and strengthen their swing. HeavySwing’s integrated system helps players build strength, improve bat speed, and increase core power. The HeavySwing™ system is used by hitters at every age and level of play, including a majority of big league clubs. Learn more at [www.heavyswing.com](http://www.heavyswing.com).*

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