Ballistic Training Methods for Pitchers
A Weighted Baseball Velocity Development Program
Driveline Baseball
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Introduction

Weighted baseball and ballistic mini-med ball training have been popular topics on the Driveline Baseball blog and across various Internet baseball sites as amateur and professional baseball pitchers look to add a few ticks on their fastball. There’s quite a bit of literature out there that talks about how you can use weighted baseballs to improve your velocity and ballistic training to passively improve mechanics, but the sample programs are sparse and lack a clear roadmap for most athletes. The Ballistic Training Methods for Pitchers eBook was written to pick up where most of these sample programs left off.

Furthermore, this eBook was distributed freely! If you paid a single dollar for this, please get a refund – and tell me (kyle@drivelinebaseball.com) who was selling it.

This program was derived from the numerous case studies Driveline Research performed in our lab in Puyallup, WA, and heavily influenced by research papers written by Dr. Coop DeRenne and Alan Blitzblau.

This manual is written for biologically mature high school aged pitchers and up. As a general rule of thumb, we recommend the program in this book for 16 year olds who have a solid base of throwing and sound mechanics. Pitchers who are not currently working with a pitching coach who has a solid background in biomechanics, kinesiology, and uses video-based analysis techniques are advised to seek out a qualified pitching coach in their area before embarking on this program.

As always, consult your physician before starting any new workout regimen. Neither Kyle Boddy nor Driveline Baseball will be held responsible for injuries that happen as a result of following this or any other workout program. By voluntarily following this program, you agree to hold both Kyle Boddy and Driveline Baseball harmless. If you are under the age of 18, please seek parental or guardian consent before starting this program.

If you have questions or concerns, please contact the Driveline Baseball Support Team – support@drivelinebaseball.com.
The Science Behind Weighted Implement Training

The origin of peer-reviewed research on weighted baseball training starts and ends with Dr. Coop DeRenne’s work. *The Scientific Approach to Hitting* is one of his most famous books that deals with weighted implement training, and is worth picking up to read the source material alone.

Other research papers worth investigating are:

- Effects of General, Special, and Specific Resistance Training on Throwing Velocity in Baseball: A Brief Review (DeRenne et al, 2001)
- Effects of Baseball Weighted Implement Training: A Brief Review (DeRenne et al, 2009)
- Increasing Throwing Velocity (DeRenne, 1985)

Dr. Coop DeRenne concluded that training with baseballs within 20% of the regulation weight (5 ounces) that pitching velocity increased compared to control groups that just threw regulation baseballs or heavy baseballs or light baseballs alone.

Dr. DeRenne also cautioned against throwing baseballs that had a weight greater or less than 20% of the regulation baseball. Anything below 4 ounces or above 6 ounces could significantly alter throwing biomechanics and would possibly increase torque on the relevant structures in the body.
However, the Ballistic Training Methods for Pitchers program uses baseballs as light as 3 ounces and baseballs as heavy as 11 ounces. Why? Simply put, this program is not meant to necessarily mimic the thrower’s original biomechanics in his pitching motion. We want to improve them.

We have scaled out the overload/underload philosophy in our PlyoCare Program, which uses balls from 3.5 ounces to 4.4 pounds. The use of PlyoCare balls helps to “teach mechanics” without using functionally worthless verbal cues. When it comes time to throw your best fastball in a game setting, do you want to be thinking about mechanical cues or do you want to have the correct mechanics already ingrained?

Our PlyoCare Program is one big piece of the puzzle bridging the perceptive gap to teach better throwing patterns.

The PlyoCare drills are partial or constrained movements that will be backchained into the full throwing motion. These drills are designed to limit the pitcher from being able to actively recall the primary programming of his throwing motion and facilitate the development of better, safer patterns.

By the end of the program, the pitcher will be able to recruit new, more efficient movement patterns when throwing at maximum intensities because he learned them through carefully selected drills.

Throwing under/overloaded implements has two primary ways of increasing fastball velocity:

1. Providing a varied stimulus to the throwing arm, thus developing strength (heavy baseballs) and arm speed (light baseballs)

2. Altering the biomechanics of throwing to improve throwing efficiency

You probably thought you were getting into a program that focused on #1, but #2 is also materially important! Throwing heavy/light baseballs does indeed help build strength and arm speed in the throwing arm, but using baseballs that intentionally alter the biomechanics of the throwing motion can produce more efficient arm action and ball release mechanics!
Program Overview – 11 Weeks

The Ballistic Training Methods for Pitchers program is broken up into multiple phases that last 11 weeks overall:

- **On-Ramping Cycle**: The starting phase to prepare the arm for increased stressors on the elbow and shoulder structures. (2 weeks)

- **Blending Cycle**: A traditional 4 oz. to 6 oz. training period using Driveline Elite Weighted Baseballs, beginning mechanical blending with the Driveline PlyoCare Balls. (3 weeks)

- **Overload Cycle**: We will introduce progressively heavier baseballs in this phase that will increase arm strength and help the pitcher to feel what it’s like to “push” the baseball, in hopes of fixing this common flaw. (3 weeks)

- **Underload Cycle**: Introducing the 3 oz. baseball in this phase will help build arm speed and help the pitcher feel what it’s like to throw the baseball with increased intensity. (3 weeks)

Drill Overview

Pivot Pickoff Throws

- This drill improves forward rotation in the delivery, medial forearm strength and pronation speed/timing.

- Hang throwing hand back in neutral/supinated position. Before throwing, fold glove arm down. Drive wrist over elbow.

- [Video]

Reverse Throws

- This drill trains the posterior shoulder to be able to accept the force produced by higher velocities. Some thoracic spine mobility work.

- Drive shoulder and elbow back through your natural arm slot.
Rocker Throws

- Start this drill with feet near stride foot contact and throwing arm near the front shin. Bring the throwing arm back into high-cock, immediately reverse momentum and throw forward.
- Rotate around a braced front leg.

Walking Windups

- Facing your target with a weighted ball in your hand, take a step forward and rotate your foot as if to use the rubber to throw off a mound. Bring your leg up, stride out and throw the ball.
- Generate momentum toward the target

Upward Tosses

- Holding the ball in your throwing hand with arm out to the side, throw the ball up and catch it as it begins to fall.
- Let it drop before catching it

Weighted Ball Compression Throws

- Simple “Run and Gun” throw into a net from 20-40 feet away as hard as possible – intent, intent, intent to throw hard!

Jaeger Sports J-Band Routine

- You should have received a PDF of the J-Band routine, but if not, you can download it here. We recommend 10 reps of each exercise.

It’s important to note that this program is meant to be an off-season program only. We do provide in-season programming concepts that you can use while in the middle of a competitive season (high school, collegiate, professional), but the cycles as laid out are meant to be done when you have ample time to recover and focus on simply throwing – not pitching!
Products You’ll Need

To complete the Ballistic Training Methods for Pitchers program, you’re going to need some appropriately-weighted implements. Seems obvious enough!

You’ll need a **weighted baseball set** that has these weights in them:

- 3 oz. baseball
- 4 oz. baseball
- 6 oz. baseball
- 7 oz. baseball
- 9 oz. baseball
- 11 oz. baseball

And you’ll need **one** of each these:

- 2 kg mini-med ball
- 1 kg mini-med ball
- 400g mini-med ball
- 225g mini-med ball
- 150g mini-med ball
- 100g mini-med ball

Last, but not least, you’ll need some resistance bands / surgical tubing to do a series of arm exercises.

Believe it or not, we sell all of this equipment!
The Driveline Velocity and Arm Care MegaKit is the ideal package to complete this program. It comes with a full set of PlyoCare mini-med balls, Elite Weighted Baseballs, and a Jaeger Sports J-Band. If you already have some of the equipment and don’t need the full package, you can get the equipment piecemeal by going to the Driveline Baseball Online Shop:

- Driveline PlyoCare Balls
- Driveline Elite Weighted Baseballs
- Jaeger Sports J-Bands

You’ll also need a bucket of baseballs to complete the long toss / high-intensity throwing portion of this program with regulation weight (5 oz) baseballs. Ideally you’d have three dozen (36) baseballs, but you can make do with as few as six (6) if you don’t mind running around and picking them up repeatedly!

Macgregor 79P Leather Practice Baseballs

I happen to really like these leather practice baseballs because they’re cheap, they’re durable, and they have leather covers unlike the cheap plastic/hybrid covers you’ll find at the local sporting goods store. You can’t beat the feel of real leather when you’re throwing long toss!
On-Ramping Cycle

Simply jumping into a weighted baseball training program isn’t advisable. We recommend that all athletes starting this program have a solid base of throwing long toss or other high-intensity throwing before they start this program, and that they complete this on-ramping cycle to build arm strength safely and gain familiarity with the varying weight of the baseballs.

PlyoCare training will begin here as well to help build the base of arm strength for the later cycles in the book.

Two-Week Onramping Cycle – 3 days per week, 1 or more days of rest between workouts

- **Warm-Up:** Do a full dynamic warm-up as well as the included Jaeger Sports J-Band Routine to prep the arm and body.
- **Throwing Program:** We recommend a long toss program like Thrive on Throwing by Alan Jaeger with an extension and a compression phase. If weather is an issue or you have no partner, an indoor short throwing program is sufficient as well.
- **PlyoCare Program:** Perform the following drills, in order:
  - Reverse Throws – 2 sets of 10 with a 1 kg mini-med ball (Green)
  - Pivot Pickoff Throws – 2 sets of 10 with a 1 kg mini-med ball (Green)
- **Weighted Baseball Program:** Do this program TWICE in a week, so skip the middle workout. For example, you train Mon/Wed/Fri. Do all drills above on all three days, but throw these weighted balls on Monday/Friday only, skipping Wednesday.
  - 5 oz. regulation ball – 4 times
  - 6 oz. heavy ball – 5 times, first throw at 80% intensity, rest at 100% intensity
  - 5 oz. regulation ball – 3 times
  - 4 oz. light ball – 5 times, first throw at 80% intensity, rest at 100% intensity
- **Recovery:**
  - Complete the Jaeger Sports J-Band Routine again.
  - Upward Tosses – 2 sets of 15 with a 1 kg mini-med ball (Green)

The point of throwing the heavy/light balls at lower intensity before uncorking some max intensity throws is to gain familiarity with not only the weight of the baseballs, but the feel of them in your hand and the way they alter your throwing mechanics.

Remember, the gains in velocity come not only from the training stimulus that you get from using variable weight baseballs, but the changes to the biomechanical markers in your throwing motion – so getting accustomed to the changes at lower intensities is critical to understanding how this will affect you going forward.

After you’ve completed the on-ramping program, go on to the first cycle – the **Blending Cycle**.
Blending Cycle

The first cycle the Ballistic Training Methods for Pitchers program features stays in line with most conventional thinking on weighted baseballs – we keep the weight plus/minus 20% of regulation weight, meaning nothing lighter than a 4 oz baseball and nothing heavier than a 6 oz. baseball, since the regulation weight of a baseball is 5 oz.

Our reasoning is that this cycle is critical for gaining familiarity with the minor biomechanical changes that will occur when throwing lighter and heavier baseballs, and will sufficiently prepare the arm for the increased changes to come in future cycles.

We also start to introduce the more complicated PlyoCare drills, including the Walking Windup and the Rocker Drill throws.

Three-Week Blending Cycle – 3 days per week, 1 or more days of rest between workouts

- **Warm-Up:** Do a full dynamic warm-up as well as the included Jaeger Sports J-Band Routine to prep the arm and body.
- **Throwing Program:** We recommend a long toss program like Thrive on Throwing by Alan Jaeger with an extension and a compression phase. If weather is an issue or you have no partner, an indoor short throwing program is sufficient as well.
- **PlyoCare Program:** Perform the following drills, in order:
  - Reverse Throws – 2 sets of 10 with a 1 kg mini-med ball (Green)
  - Pivot Pickoff Throws – 2 sets of 10 with a 1 kg mini-med ball (Green)
  - Walking Windups – 1 throw each with a 450g, 225g, 150g, and 100g mini-med ball. Then repeat the set once more. *(Order of Throws: Blue, Red, Yellow, Gray, Blue, Red, Yellow, Gray)*
  - Rocker Drills – 1 throw each with a 450g, 225g, 150g, and 100g mini-med ball. Then repeat the set once more. *(Order of Throws: Blue, Red, Yellow, Gray, Blue, Red, Yellow, Gray)*
- **Weighted Baseball Program:** Do this program TWICE in a week, so skip the middle workout. For example, you train Mon/Wed/Fri. Do all drills above on all three days, but throw these weighted balls on Monday/Friday only, skipping Wednesday.
  - 5 oz. regulation ball – 4 times
  - 6 oz. heavy ball – 7 times, first throw at 80% intensity, rest at 100% intensity
  - 5 oz. regulation ball – 3 times
  - 4 oz. light ball – 7 times, first throw at 80% intensity, rest at 100% intensity
- **Recovery:**
  - Complete the Jaeger Sports J-Band Routine again.
  - Upward Tosses – 2 sets of 15 with a 1 kg mini-med ball (Green)

The **Blending Cycle** is meant to slowly introduce you to different stressors on the shoulder and elbow without overloading you too quickly. By the end of the third week, you should be comfortably throwing both the 6
and 4 oz. baseball with near-identical throwing mechanics as the 5 oz. baseball at full intensity from a crow-hop.

If you are using a radar gun, we strongly recommend shelving it and only using it at the end of each cycle – constant monitoring of fastball velocity is counter-productive, as your throwing mechanics will change and evolve throughout the program, meaning that your peak fastball velocity will fluctuate rapidly over the course of 11 weeks.

Focusing on short-term results is not a good way to spur progress!

When you’ve completed all three weeks of the Blending Cycle, it’s time to move on to the Overload Cycle.
Overload Cycle

After completing the Blending Cycle, you should be feeling comfortable with throwing light/heavy baseballs at maximum intensity, so the natural progression is to further disrupt homeostasis to produce a training effect. We’ll do this by focusing on heavier baseballs in this three week program to build arm strength and to help teach you how to stop “pushing” the baseball in the throwing motion. A lengthy discussion of throwing/pitching mechanics is not the focus of this book, but a brief description of “pushing” the baseball follows:

Youth pitchers are often repeatedly told to throw strikes and to not worry about velocity. While this is a decent strategy for producing moderate success at the lower levels of baseball, parents and coaches are wasting a valuable opportunity. Research shows that focusing on maximum velocity/speed/power is a far better way to teach young how to build efficient rotational force transfer mechanics. Pitching skill is best developed simultaneously – that includes velocity and control.

Youth athletes must learn that “chaos” is the natural order of things in any high-performance athletic movement – especially rotational mechanics! To tell a youth pitcher to focus on control will lead them to pushing the baseball to the target, effectively ruining their arm action and upper torso rotational mechanics – not to mention their intent to throw.

Throwing a heavy baseball will help pitchers feel what it’s like to push a baseball and can help to restore violent upper torso rotation, which is what it takes to throw 90+ MPH.

Three-Week Overload Cycle – 3 days per week, 1 or more days of rest between workouts

- **Warm-Up:** Do a full dynamic warm-up as well as the included Jaeger Sports J-Band Routine to prep the arm and body.
- **Throwing Program:** We recommend a long toss program like *Thrive on Throwing* by Alan Jaeger with an extension and a compression phase. If weather is an issue or you have no partner, an indoor short throwing program is sufficient as well.
- **PlyoCare Program:** Perform the following drills, in order:
  - Reverse Throws – 2 sets of 10 with a 1 kg mini-med ball (Green), 1 set of 10 with a 2 kg mini-med ball (Black)
  - Pivot Pickoff Throws – 2 sets of 10 with a 1 kg mini-med ball (Green), 1 set of 10 with a 2 kg mini-med ball (Black)
  - Walking Windups – 1 throw each with a 450g, 225g, 150g, and 100g mini-med ball. Then repeat the set once more. *(Order of Throws: Blue, Red, Yellow, Gray, Blue, Red, Yellow, Gray)*
  - Rocker Drills – 1 throw each with a 450g, 225g, 150g, and 100g mini-med ball. Then repeat the set once more. *(Order of Throws: Blue, Red, Yellow, Gray, Blue, Red, Yellow, Gray)*
- **Weighted Baseball Program**: Do this program TWICE in a week, so skip the middle workout. For example, you train Mon/Wed/Fri. Do all drills above on all three days, but throw these weighted balls on Monday/Friday only, skipping Wednesday.
  - 5 oz. regulation ball – 4 times
  - 6 oz. heavy ball – 4 times, first throw at 80% intensity, rest at 100% intensity
  - 7 oz. heavy ball – 5 times, first throw at 80% intensity, rest at 100% intensity
  - 9 oz. heavy ball – 5 times, first throw at 80% intensity, rest at 100% intensity
  - 11 oz heavy ball – 3 times, first throw at 80% intensity, rest at 100% intensity
  - 5 oz. regulation ball – 3 times, first throw at 80% intensity, rest at 100% intensity
  - 4 oz. light ball – 4 times, first throw at 80% intensity, rest at 100% intensity

- **Recovery**:
  - Complete the Jaeger Sports J-Band Routine again.
  - Upward Tosses – 2 sets of 15 with a 1 kg mini-med ball (Green), 1 set of 15 with a 2 kg mini-med ball (Black)
Underload Cycle

If the **Overload Cycle** was built to help you stop pushing the baseball, the **Underload Cycle** is built to help you develop the strong intent to throw the baseball hard.

Pitchers are brought up with an obsessive focus on control/command of their fastball and not the development of velocity. While this leads to mechanical tweaks that often have a pitcher pushing the ball to the plate, it also diminishes the intensity that a pitcher will have when throwing his best fastball. This alone will ensure that a pitcher will never hit 90 MPH! While it looks like some of the hardest throwers in baseball are effortlessly throwing at elite velocities, that couldn’t be farther from the truth. The hardest throwers have the most violent rotational mechanics (Source: The Hardball Times; Fastball mechanics: The hardest and softest throwers), and with good reason – torso rotational velocity is one of the biggest contributors to fastball velocity.

By throwing underload implements, we’re also training the arm to move quicker and accelerate at a faster rate. This can be dangerous since peak forces are high here, which is why this portion of the program comes last – your arm strength should be adequately built due to the previous cycles you’ve gone through.

**Three-Week Underload Cycle – 3 days per week, 1 or more days of rest between workouts**

- **Warm-Up:** Do a full dynamic warm-up as well as the included Jaeger Sports J-Band Routine to prep the arm and body.
- **Throwing Program:** We recommend a long toss program like Thrive on Throwing by Alan Jaeger with an extension and a compression phase. If weather is an issue or you have no partner, an indoor short throwing program is sufficient as well.
- **PlyoCare Program:** Perform the following drills, in order:
  - Reverse Throws – 2 sets of 10 with a 1 kg mini-med ball (Green)
  - Pivot Pickoff Throws – 2 sets of 10 with a 1 kg mini-med ball (Green)
  - Walking Windups – 1 throw each with a 450g, 225g, 150g, and 100g mini-med ball. Then repeat the set once more. *(Order of Throws: Blue, Red, Yellow, Gray, Blue, Red, Yellow, Gray)*
  - Rocker Drills – 1 throw each with a 450g, 225g, 150g, and 100g mini-med ball. Then repeat the set once more. *(Order of Throws: Blue, Red, Yellow, Gray, Blue, Red, Yellow, Gray)*
- **Weighted Baseball Program:** Do this program TWICE in a week, so skip the middle workout. For example, you train Mon/Wed/Fri. Do all drills above on all three days, but throw these weighted balls on Monday/Friday only, skipping Wednesday.
  - 5 oz. regulation ball – 4 times
  - 6 oz. heavy ball – 4 times, first throw at 80% intensity, rest at 100% intensity
  - 4 oz. light ball – 6 times, first throw at 80% intensity, rest at 100% intensity
  - 3 oz. light ball – 6 times, first throw at 80% intensity, rest at 100% intensity
- **Recovery:**
- Complete the Jaeger Sports J-Band Routine again.
- Upward Tosses – 2 sets of 15 with a 1 kg mini-med ball (Green)
**Future Off-Season Cycles**

If you’ve finished the program in here in the off-season (and hopefully added 3-5MPH to your best fastball!) and want to know what to do in future off-seasons, you can simply repeat this program in its entirety. Or, if you want to make some changes, that’s fine too – after completing this program verbatim, you probably have a pretty good grasp on how you can make some tweaks that better fit your individual style.

Some common changes we’ve made for individuals repeating the program at Driveline Baseball’s Elite Pitching Program:

- Go into heavy ball throwing right after pulldowns in the long toss phase
- Introduce the 3 oz. baseball earlier in the program
- Create a hybrid light/heavy program after the Light Ball Focus cycle
- Throw long toss with the 4 oz. baseball
- Add more PlyoCare throws in the Recovery portion

All we ask is that you complete the program in its entirety as it is laid out. Once you’ve done this, we think you’ve earned the right to make changes at will by increasing/decreasing the loads or changing the weights of the baseballs to better suit your needs.
Conclusion / Wrap-Up

We hope you’ve found this portion of our velocity development program interesting. We’d love to hear your feedback on the program – please let us know how it turned out for you and how much faster your best bolt became! Email kyle@drivelinebaseball.com with your experiences, comments, and general feedback.

Coaches: Please feel free to share this information. We humbly ask that you share the link on our website where you can get this book – http://www.drivelinebaseball.com/free-weighted-baseball-program-ebook - rather than send this PDF directly. This way, all coaches can check out the hundreds of free articles and resources on our website.

Hacking the Kinetic Chain: The Complete Guide to Developing High-Velocity Pitchers

Driveline Baseball will be self-publishing a comprehensive fastball velocity set of videos and books in late 2014 / early 2015. By sending an email to our autoresponder to get this book, we’ve automatically added you to our notification list. (Don’t worry, we won’t spam you or sell your address to anyone.) We’ll send you periodic updates on the progress of this book, which will feature a complete weight training program, a more detailed weighted baseball program, chapters on flexibility/mobility/stability exercises, a full long toss program, nutrition concepts, and much, much more!

If you want more information, email support@drivelinebaseball.com make sure you’re notified when the book is first published. People on the mailing notification list will receive a substantial discount and free supplementary products, so don’t miss out!

Thanks for reading,

Kyle Boddy (kyle@drivelinebaseball.com)

President of Driveline Baseball and Driveline Athletics