



Introducing The CORE

Demystifying the Body of an Athlete

Editor

William C. Meyers

Co-Editors

Marc J. Philippon

Adam C. Zoga

Alexander E. Poor

Johannes B. Roedl

Jim McCrossin

Alex McKechnie

Guest Writer

Michael J. Bradley

Illustrator

Rob Gordon

SLACK Incorporated

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To understand the core, you must put on new eyes.

The core is like family. To go forward, your family must stay together.

—Marshawn Lynch, famous NFL running back.

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DEDICATION

- Our patients and the entire certified athletic training world
- All other fitness specialties
- Appreciating the history of medicine
- Leonardo da Vinci
- Brian, Erica, Riki, and Marley
- Cindy, Coleman, Remy, Corey, Jordan, and Age
- Sherry, my resident and attending colleagues, and everyone else who contributed to my well-being during the years of every other night call and then every night call
- Mom and Dad, Ann Marie, Marcia
- The North Durham Little League
- Inspiration from Steve Bandura, Mo'Ne Davis, and the rest of the Marian Anderson Monarchs
- My closest friends over the years: Joe and Annie, Ravi, R. Scott, John and Linda Nelson, the Doyk, the two Dicks, Mike Foley, Ted, Andres, Ari, Frank B., Steve Klasko, Rick Homan, Chris Wilmot, Tom Nerney, and everyone close I failed to mention
- Friends and professional colleagues
- The development of liver surgery
- Lee Hirsch, Bob Knarr, and the development of minimally invasive surgery
- The AHPBA, Tom Starzl, Bill Longmire, Marty Adson, Henri Bismuth
- Eddie Joe Reddick
- The Crowleys and Polar Beverages
- The sports world
- The sports medicine world, for accepting this outsider into it, and ISHA
- Traditional medicine and surgery
- Physicians, surgeons, and others who hold to the old principles of medicine
- Harvard University and the memories of my advisors, Bud Collins, Peter Gammons, Dr. Thomas Quigley, and Managing Editor Tom Winship
- *The Boston Globe* and *The Hasty Pudding Show*
- Botafogo and Flamengo
- David C. Sabiston
- Duke University
- Frank Bassett, Bill Garrett, and the rest of the Duke University sports medicine staff
- The Vincera Institute, Lashawn, Krista, Christy, Rita, the founding seven, our wonderful current staff, academic partners and co-owners, and the support and camaraderie you all provide

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FOREWORD BY MICHAEL WILLIAM KRZYZEWSKI

For the past few years, we have really stressed core strength at Duke. It improves an athlete's base, and that's vital, because so much emanates from there.

Strength, power, and endurance all flow from the core. And taking care of the core is also important for increasing performance.

If an athlete is strong in the middle, his/her extremities will be helped. For years, people didn't emphasize that, and as a result there were more extremity injuries than there should have been. Nothing can eliminate those injuries entirely, but good core strength helps cut them down.

We believe in training the core and work with our players on it year-round. We do a lot of band work that helps build the core. The training methods for that area of the body have changed throughout my career at Duke. Of course, I have been coaching 41 years, so a lot of things have changed, especially since I played. Back then, we didn't even lift weights.

We've put a huge emphasis on the hips. They are vital for players to get into their defensive stance (Figure F-1), for the running we do and the explosive strength our players need. Hip strength and core strength determine whether a player has a better landing base after jumping, and we are up and down on the court a lot. If players have weak cores, they aren't landing on strong bases.



Figure F-1. The Duke University defensive stance exhibits the nitty gritty of the core's neutral engagement posture. When well executed as a team, the posture displays "attitude."

It all makes more sense. That part of the body, which has been neglected, gives the body so much. A lot of people see 6-pack abs or strong biceps or leg muscles, but that's not what we're talking about. We're talking about strength you can't see, but you see it in performance.

I think one of the reasons that people haven't done a lot with the core is that you can't see the parts of the body that make up the core. But so much emanates from that.

So, it works for us in terms of injury prevention and performance. If a player on our men's basketball team isn't physically ready to play, I don't care how much talent he has, he can't get onto the court. We're making sure he's on the court as many minutes as possible, especially our better players. When they are on the court, we want to improve their levels of performance.

Having a strong core pays huge dividends. It gives a player more confidence in his/her abilities. It provides more endurance and confidence.

Any athlete has to trust his/her body. With good core strength, the athlete can have more confidence and perform to his/her top capability.

This book, and the work Bill Meyers has done in the field, will bring good core health to the forefront and help everyone—elite athletes and others—to understand the importance of a strong core for performance and confidence.

Suggested Videos

Krzyzewski M. Duke Basketball: A Clinic With Coach K [DVD]. Champaign, IL: Human Kinetics; 2003.

Open practice: defensive skill development featuring Mike Krzyzewski [video]. YouTube. <https://www.youtube.com/watch?v=omg8mm6Uejs>. Published November 4, 2014.

FOREWORD BY JAMES RHEUBEN ANDREWS, MD

The core is the latest thing in physical development and performance. Nobody ever mentioned the core until 5 or 10 years ago, and while I'm sure that some of the physical fitness gurus might have used the word, we didn't use it in sports medicine. Bill Meyers has brought the core to the forefront.

Now, even in baseball, injury patterns you see in the shoulder and elbow are related to core imbalance. If you don't have a good core, you don't have good balance, and your injury chances go up. Building the core has become a major part of the rehabilitation we do with all athletes, especially baseball players.

For example, a pitcher who is throwing from the mound and goes into the stretch position has to drive off of one leg. If he/she doesn't have a good core, he/she is going to stress his/her shoulder and elbow and create an unstable situation. We will have athletes stand on one leg and do a dip. From that, we can tell if their core is strong. If it's weak, they almost fall over.

The core is important in running, because it helps with the stability of the lower extremities. That goes for every sport. If your core is not strong, you can become either bow-legged or knock-kneed. In basketball, when you come down for a rebound, or if you are a wide receiver and land after making a catch, if you don't have good core strength, all the impact goes to the knee and ankle, and you can get injured. It's even more important for female soccer players. If they have a weak core, they have a 3 to 5 times higher incidence of tearing their ACLs as compared with men.

The work that is done to develop the core does not have the same popularity as what's done to build pecs, biceps, and quads. We can see those muscles, but we can't see the core, which is more important to overall health and performance.

This book has been needed for a long time. As much as we talk about the core, it still isn't a glamorous part of medicine. But the work Bill has done has helped the idea of core strength become more popular, and this book could be what is needed to get it more attention.

FOREWORD BY BRYAN TALMADGE KELLY, MD

The timing of this book and the increased recognition of Bill Meyers' work in the area of core repair, rehabilitation, and development are perfect because progress in the field of hip and groin injuries in sports medicine has advanced considerably in the past 15 years. Treatment methods of the hip and core are moving on 2 parallel tracks.

I absolutely feel like the hip is the last frontier in sports medicine. You can compare it to the evolution of treatment of the knee and shoulder. The knee came first in the 1970s, when physicians began to treat torn ACLs differently, and the shoulder followed in the 1990s, as we developed a larger understanding of labral instability and tears. The 2000s have brought a better understanding of the hip as an athletic joint. Progress is coming, but we are learning more.

The concepts of athletic pubalgia and core muscle injuries were really invented by Dr. Meyers. Bill has done a tremendous job of figuring out the complex anatomy of the core. He noted that a lot of athletes had been suffering from groin injuries that wouldn't heal quickly and understood there was more at work than just a groin pull. Simultaneous to that, within the field of orthopedic surgery, there emerged a better understanding of mechanically derived injuries of cartilage and soft tissues in the hip joint, and our knowledge of that area grew.

The mechanical malalignment in the hip joint leads to cartilage injuries and limits motion. That can lead to injury of the joint, as well as the muscles around the joint. We have really started to understand the relationship between core injuries and femoroacetabular impingement. If the hip and socket in the hip are mismatched, there is a reduction in motion. This leads to increased mechanical injury to the cartilage and the hip joint.

Making the proper hip diagnosis can be difficult because some hip injuries can feel like groin injuries. There are also many muscles around the hip that can be affected. Things become interesting because there is so much overlap in the area. The ability to understand the pathologies is critical to providing good care for patients. This book can help in that regard.

Developing collaborative efforts like the one Bill and I have forged allows us to get athletes back to action in a timely fashion, because we know about those overlaps. Bill has done a fabulous job of figuring out where, anatomically, those overlaps are. On the orthopedic side, we have done a lot of work on the complex problems in the hip joint. It's exciting now to see the interrelationship of the 2 areas.

When someone has pain around the hip and pelvis, there are 4 layers that can be affected. There is the bony layer, which is the foundation; how does the ball fit in the socket? There is the interarticular structure that contains large, inert areas that don't have contractile components. The muscular layer is where the core comes into play. How does it respond to a hip injury? And then there is the neuro layer. How are the nerves in the area of the hip impacted by an injury to the core and the hip socket?

This is an exciting time, and we still have a long way to go. Orthopedic and general surgeons are looking at the problems and making progress in the treatments that will advance the field. Relationships like the one Bill and I have established will help us move forward. This book is another step in that direction.

INTRODUCTION

The Strike Zone

There is no more important area of the body for an athlete—okay, for anyone—than the core. It's the engine room, the place where power is generated and then distributed. Strength there makes life easier for shoulders and knees. It produces speed and explosiveness. Endurance and grit. Build the core, and you have built the house.

It extends from the chest to the thighs and includes a network of muscles, tendons, ligaments, and joints that interconnect to provide the burst necessary for optimal performance. Perhaps because this is where the body generates its power, the core just so happens to be the same as the baseball/softball strike zone (Figures I-1 and I-2), at least the way the American League umpires call strikes these days.

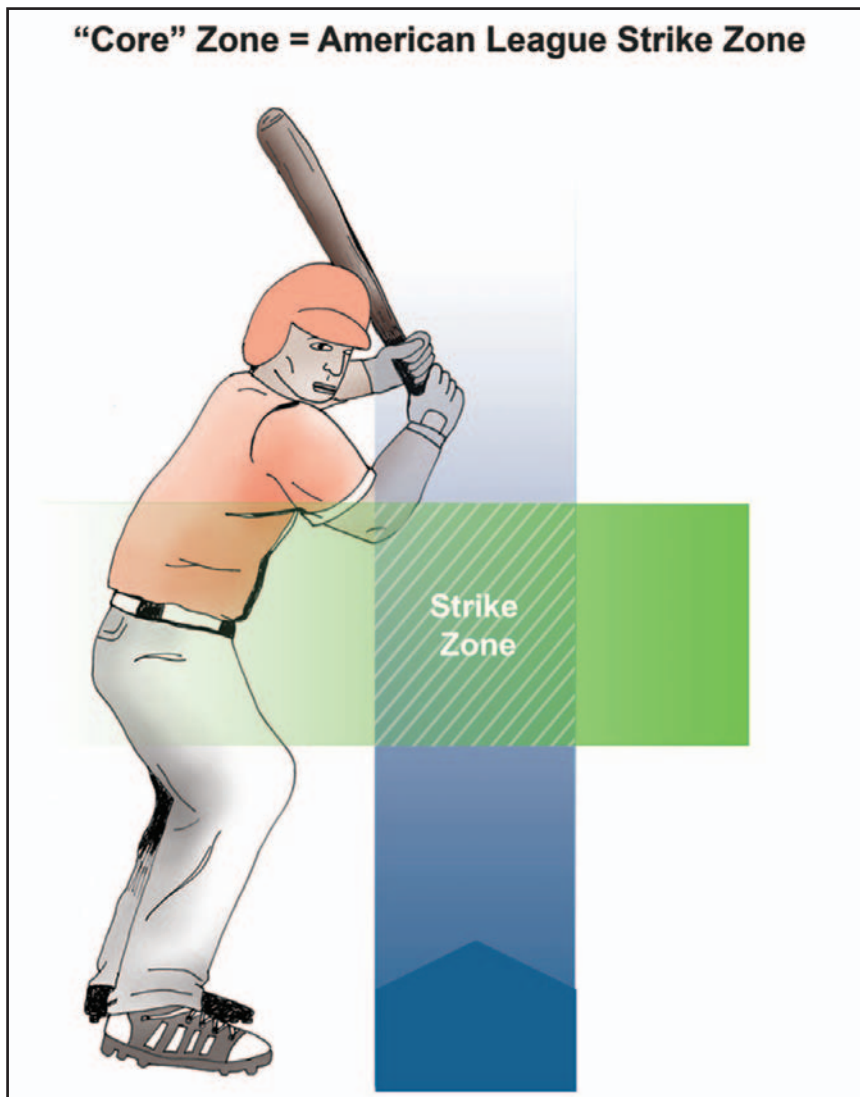


Figure I-1. It so happens that the American League baseball strike zone delineates the same area of the body we are calling the *core*. According to baseball myth, the strike zone defines the portion of the body where power and athleticism are generated. Within this area, the real battle between the pitcher and batter takes place.

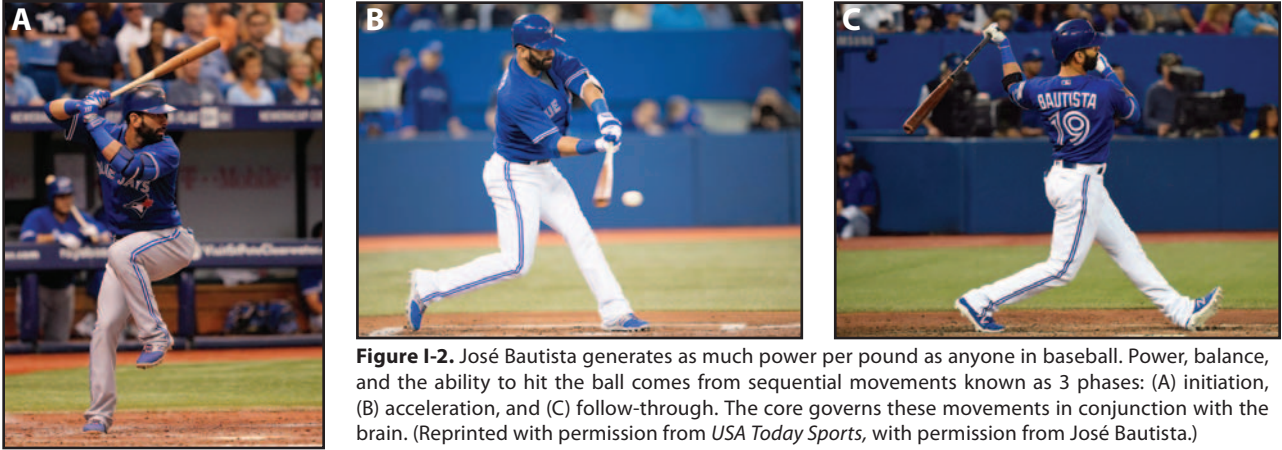


Figure I-2. José Bautista generates as much power per pound as anyone in baseball. Power, balance, and the ability to hit the ball comes from sequential movements known as 3 phases: (A) initiation, (B) acceleration, and (C) follow-through. The core governs these movements in conjunction with the brain. (Reprinted with permission from *USA Today Sports*, with permission from José Bautista.)

A set of bulging biceps or polished pecs may look great on the beach, but those who want success on the field, the court, the ice, or anywhere competition is staged need to tone their foundation.

But how does it all work? This hub is a tricky place, where the intertwining of tissue creates a series of reciprocal reactions and effects that can bring success or, in the event of a failure, agony. Understanding the relationships between the core's parts helps an athlete train more effectively and allows a physician to repair problems that arise. You may see 6-pack abs, but there is more to core strength than looking good. Much more.

The same thing happens in soccer (Figure I-3) and every other sport. The head, arms, and legs all depend on the core as their leader.



Figure I-3. Both (A) Lionel Messi and (B) Mia Hamm demonstrate the core translating into athleticism. The sturdiness of the core enables balance, accuracy, and strength. Note the harmony that both Lionel's and Mia's cores achieve with the ground. ([B] Reprinted with permission from AP Photo/Don Heupel and Mia Hamm.)

The leadership of power and athleticism belongs to the core. This last statement holds in sports and for everyday movement (Figure I-4). It also holds for both men and women. But we need to peer inside the 2 sexes and see the certain anatomical differences besides what's so outwardly noticeable. Sex differences in core anatomy seem subtle but become huge when one considers injuries that result.