



HOW TO TRAIN THE CORE: SPECIFIC TO SPORTS MOVEMENTS

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When training an athlete's core, the training should mimic real life sport movements. The core should be trained in multiplanar and multidirectional movements, using unilateral and bilateral stances and various force lines. Training should incorporate the various planes of motion (frontal, sagittal, and transverse) with the athlete in a combination of unilateral and bilateral stances. The sports performance coach should also be able to provide equipment and training methods that utilize the three major force lines: horizontal, vertical, and diagonal. This article will provide several examples of exercises that can be used to train those types of movements, planes, stances, and force lines.

When looking at human movement in all sports, movements usually involve pulling (e.g., judo athlete), pushing (e.g., lineman in football), locomotion (e.g., baseball player stealing a base), rotation (e.g., tennis forehand), level change (e.g., MMA fighter tossing his opponent), or complexity, which is any combination of those movements (e.g., linebacker in football shedding a block and making a tackle).

However, when looking at training those movements, are those movements incorporated in training? Integrated movement is the key. Sports performance coaches should provide athletes the ability to train with integrated movements and have the option to train using a combination of these movements. Training athletes in only one plane of motion robs them of their ability to perform at their highest level; as well as puts them at a greater risk for injury, due to the underdevelopment of less utilized muscles in the body. Training the core musculature in the various planes, stances, and force lines to match the demands of a given sport may help improve overall performance when utilized in addition to traditional training methods.

Many of the traditional training methods that are seen today do not utilize multiplanar movements. The most popular training methods (i.e., power lifting, Olympic lifting, CrossFit training, bodybuilding, etc.) tend to work primarily in the sagittal plane. Very few, if any, movements work in the transverse or frontal planes. A majority of the exercises in these training methods fail to incorporate multiplanar movement, which is a combination of frontal, sagittal, and transverse planes of motion. It does not mean that it is wrong to utilize these popular training methods to train athletes, though. The question coaches should ask themselves is whether there are better ways to incorporate sport-specific movements that athletes will perform on the field of play.

Sport-specific movements are performed from a combination of unilateral and bilateral stances. For simplicity, a unilateral stance can be defined as a stance in which only one foot is in contact with the ground, and a bilateral stance is one that both feet are in contact with the ground. From the basketball player trying to make a layup (unilateral jump) to a football lineman resisting and pushing back against the drive of a defensive tackle (bilateral push), these movements are commonplace across all sports. When training athletes with traditional methods, a majority of the movements will work in a bilateral stance, with little or no unilateral stance. It would benefit the athlete to work in both stances to help improve their core and performance on the field. It would also benefit the athlete to perform an exercise where they move the weight to the ball of the foot versus a square stance, which occurs more in traditional training. Research has shown that unilateral snatch lifts are just as effective as bilateral snatch lifts (1). Olympic lifting (bilateral stances) can provide muscular activation on a large scale, but that form of training may not develop general athletic power optimally. Once again, this does not mean that it is wrong to use this form of training to train athletes, but it raises the question, “are there better ways to incorporate sport-specific movements in training so that the athletes will see improved core development and performance on the field?”

The core can be broken down into several categories (2):

- The Superficial Front Line core muscles and fascia are primarily in the frontal line of the body. They can be challenged by pushing, squatting, and locomotion. Most of these exercises are generally performed in the prone position. An example is the Bilateral Prone Push-Up (Figures 20 and 21).
- The Spiral Line core muscles and fascia perform transverse plane movements. They can be worked using rotational types of exercises. A great example is the Bilateral Rotational Push-Up (Figures 22 and 23).
- The Superficial Back Line core muscles and fascia are primarily muscles that work in the sagittal plane. They can be challenged using a supine position. An example would be the Single-Arm Alternating Overhead Press (Figures 14 and 15).
- The Lateral Line core muscles and fascia are the muscles that are frontal plane dominant. They can be stressed by using side lying and staggered stance exercises. One specific example would be the Bow and Arrow (Figures 24 and 25).

The key component to incorporating these various muscle and fascia lines into a training regimen is to remember that muscles are interconnected with multiple connective tissue sheaths, which act as elastic bands. This amplifies the force that is produced through muscle contractions. A great example of this is to put your hand on your chest. Now, try to raise your middle finger and thump your chest as hard as possible. That did not produce much power, right? Now, take that same finger and pull it back with your other hand and release. It should snap to your chest with power. This is a great example of converting potential energy into kinetic energy. Another way to portray this is to imagine stretching a rubber band out, hold it, and then release it. Now, stretch the rubber band out quickly and release it. You will notice that when you stretch the rubber band out and quickly release it, that it covers more distance.

Many exercises, pieces of equipment, and movements are available to the sports performance coach to help cover a majority of planes of motions, stances, force lines, and human movements in training. The following are several exercises that can be integrated into any program to help develop the core and overall sports performance. The following list serves as a guide for exercises that require movements through the various planes, stances, and force lines utilizing suspension training straps and anchored, ground-based apparatuses with an assortment of attachments.

The first exercise is the Squat to Press (Figures 1 and 2) using clean and jerk attachments on an anchored, ground-based apparatus. This exercise encompasses a diagonal load, pushing, level change, sagittal plane movement, and a bilateral stance.

The next exercise is the Lineman Squat (Figures 3 and 4). This exercise uses a similar attachment as the squat to press but the load should remain at shoulder level. This exercise utilizes a diagonal load, pushing, level change, a sagittal plane movement, and a bilateral stance.

The Suitcase Carry (Figures 5 and 6) uses the anchored, ground-based apparatus with a barbell. This exercise encompasses a diagonal vector line, pulling, a frontal plane movement, and a bilateral staggered stance position.

The Single-Arm Wheelbarrow (Figures 7 and 8) uses the anchored, ground-based apparatus with a barbell but the athlete faces the base. This exercise involves a diagonal load, pulling, rotation, transverse and frontal plane movements, and a bilateral staggered stance position.

The Bear Fight (Figures 9 and 10) uses the anchored, ground-based apparatus with a barbell equipped with an ergonomic handle grip. This exercise involves a diagonal vector line, pulling, rotation, with transverse and frontal plane movements, using a bilateral staggered stance position.

The Upper Cut (Figures 11 and 12) uses the anchored, ground-based apparatus with a barbell equipped with an ergonomic handle grip. This exercise involves a diagonal vector line, pulling, pushing, and rotation, with transverse and frontal plane movements, using a bilateral staggered stance position.

The Single-Arm Lateral Pull (Figure 13) uses the anchored, ground-based apparatus with a barbell equipped with an ergonomic handle grip. This exercise involves a diagonal vector line, pulling, rotation, with transverse and sagittal plane movements, using a bilateral staggered stance position.

The Single-Arm Alternating Overhead Press (Figures 14 and 15) uses the anchored, ground-based apparatus with a barbell equipped with an ergonomic handle grip. This exercise involves a diagonal vector line, pushing, rotation, with transverse and sagittal plane movements, using a bilateral staggered stance position.

The Lateral Lunge (Figures 16 and 17) uses the anchored, ground-based apparatus with a barbell rested across the chest (weight plates can be included for added resistance). This exercise involves a diagonal load, pushing, level change, sagittal and frontal plane movements, and a bilateral staggered stance.

The Single-Leg RDL Ipsilateral (Figures 18 and 19) uses the anchored, ground-based apparatus with a barbell equipped with an ergonomic handle grip. This exercise involves a diagonal vector

line, pulling, rotation, frontal and transverse plane movements, and a unilateral stance.

The Bilateral Prone Push-Up (Figures 20 and 21) uses a suspension trainer. This exercise involves a diagonal vector line, pushing, sagittal and transverse plane movements, and a bilateral stance.

The Bilateral Rotational Push-Up (Figures 22 and 23) uses a suspension trainer. This exercise involves a diagonal vector line, pushing, rotation, sagittal and transverse plane movements, and a bilateral stance.

The Bow and Arrow (Figures 24 and 25) uses a suspension trainer. This exercise involves a diagonal vector line, pulling, rotation, frontal and transverse plane movements, using a bilateral stance.

Adding these exercises to a program can help ensure that the athletes work various core muscle groups while performing exercises through various planes. Additionally, these exercises are beneficial because they require the athletes to work in various muscle groups with multiplanar and multidirectional movements, unilateral and bilateral stances, and various force lines, which are all applicable to sport movements. ■

REFERENCES

1. Lauder, MA and Lake, JP. Biomechanical comparisons of unilateral and bilateral power snatch lifts. *Journal of Strength and Conditioning Research* 22(5): 653-660, 2008.
2. Myers, T. Anatomy trains: Dynamic education for body-minded professionals. Kinesis Myofascial Integration. Retrieved July 1, 2013 from <http://www.anatomytrains.com>.

ABOUT THE AUTHOR

Travis Brown has led a career as a strength and conditioning coach for over 14 years in Atlanta, GA and at the University of Tennessee, Knoxville. He currently works for Pinnacle Athletics, which is a sports performance company that trains professional, college, and high school athletes. He has trained, or played next to, over 120 National Football League (NFL) starters, including dozens of Pro Bowlers and 1st round NFL draft picks. Throughout his career he has trained a number of athletes ranging from youth to elite professionals, which include several Major League Baseball (MLB) and National Basketball Association (NBA) athletes and two Olympic Medal winners. Brown is currently working towards his PurMotion Master Trainer certification and is a Certified Strength and Conditioning Specialist® (CSCS®) with Distinction through the National Strength and Conditioning Association (NSCA).



Figure 1. Squat to Press



Figure 2. Squat to Press - Finish



Figure 3. Lineman Squat



Figure 4. Lineman Squat - Finish



Figure 5. Suitcase Carry



Figure 6. Suitcase Carry - Finish



Figure 7. Single-Arm Wheelbarrow



**Figure 8. Single-Arm Wheelbarrow -
Finish**



Figure 9. Bear Fight

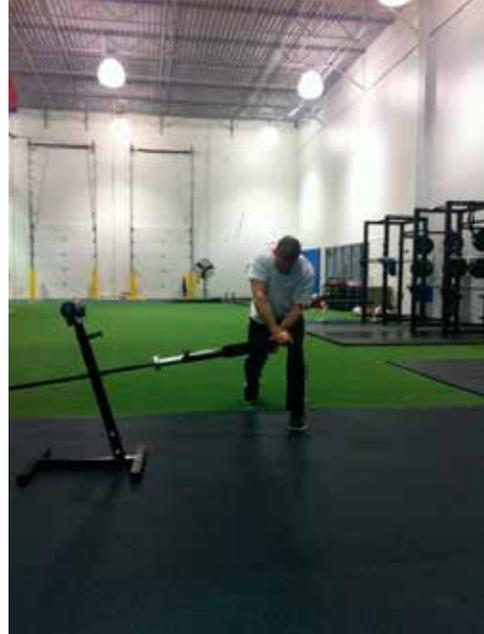


Figure 10. Bear Fight - Finish



Figure 11. Upper Cut



Figure 12. Upper Cut - Finish



Figure 13. Single-Arm Lateral Pull



Figure 14. Single-Arm Alternating Overhead Press



Figure 15. Single-Arm Alternating Overhead Press - Finish



Figure 16. Lateral Lunge



Figure 17. Lateral Lunge - Finish



Figure 18. Single-Leg RDL Ipsilateral



**Figure 19. Single-Leg RDL Ipsilateral -
Finish**



Figure 20. Bilateral Prone Push-Up



**Figure 21. Bilateral Prone Push-Up -
Finish**



Figure 22. Bilateral Rotational Push-Up



**Figure 23. Bilateral Rotational Push-Up
- Finish**



Figure 24. Bow and Arrow



Figure 25. Bow and Arrow - Finish

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