Core Training for Improved Performance

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Core training has penetrated a variety of fitness and performance related fields. Health clubs offer core training group exercise classes. Physical therapists prescribe core training programs to rehabilitate a variety of injuries. Personal trainers incorporate core training during one-on-one sessions. Even the armed forces have included core training into their regimes. Core training is not a fleeting trend, and should not be ignored.

Evolution of Core Training

Coaches and athletes have long understood the value of a strong core in improving performance and reducing injuries on the playing field. This knowledge has served as the greatest support and reasoning behind Olympic movements (the clean and jerk and the snatch), plyometric exercises, and medicine ball throwing programs. These training modalities have been the mainstay in performance enhancement training for years.

However, a variety of factors have allowed core training to develop into a more specific and universal training tool not just for athletes, but fitness enthusiasts as well.

- **Increased interest in the core:** The core has become the focus of interest among biomechanists, kinesiologists, and physiologists. These experts agree that the core plays a significant role not only in athletic movements, but everyday activities as well. Furthermore, research has revealed that crunches and back extensions- once the standard for increasing core strength- are not the most effective movements to ensure a strong and stable core. Instead, specific and functional type movements are proving to be most beneficial.
- **Functional Training:** Incorporating exercises that are specific to one's goal and that require the involvement of many muscle groups in more than one plane is the basic premise of functional training. As this focus on function becomes more prevalent, its methods continue to improve and evolve. Coaches and personal trainers are incorporating functional training for the core in ways that are goal oriented, innovative, and can be performed using a wide array of equipment.
- **Equipment manufacturers:** Training equipment and tools are mirroring the functional training trend. New products continue to be introduced to assist with training the core, while traditional products are being used in new ways. This allows coaches, physical therapists, personal trainers, and fitness enthusiasts to incorporate functional based core training into programs that meet individual needs and abilities.

What Is the Core?

It has been called "the hub of the wheel," "the power zone," and "power house." It is where the body's center of gravity is located and more importantly, from which all movements are initiated. Furthermore, the core is responsible for developing power, maintaining balance and stability, and improving coordination during movement.

Muscles of the core include the **abdominals** *(rectus abdominus, transverse abdominus, internal and external obliques)*, **hip** *(psoas, rectus femoris, sartorius, tensor facia latae, pectinius, gluteus maximus,medius and minimus; semitendinosus; semimembranosus; biceps femorus; adductor brevis, longus, and magnus; gemellus superior and inferior; obturator internus and externus; quadratus femoris; piriformis)* and **back** *(erector spinae; quadratus lumborum; paraspinals; trapezius; psoas major; multifidus; iliocostalis lumborum and thoracis; rotatores; latissimus dorsi and serratus anterior).*

These muscles are responsible for supporting postures, creating motion, coordinating muscle actions, allowing for stability, absorbing force, generating force, and transmitting forces throughout the body. This means that regardless of the movement or activity, the center of your body is responsible for the process and outcome. Whether swinging a golf club, throwing a softball, diving into a pool, carrying groceries, moving furniture,

or performing your favorite exercise, the muscles of your core are acting concentrically, eccentrically, and/or isometrically in a variety of planes to successfully complete a movement or movement pattern.

Benefits of a Strong and Stable Core

Because the core plays such a significant role during motion, it makes sense to ensure its strength and stability. The benefits of a strong and stable core include:

Increased Power Development

Power is the predominant component of many sports. Golf, tennis, baseball, football, and track and field events are only a few examples of power related sports where the combination of speed and strength make all the difference in performance outcomes. Whether changing direction, or accelerating one's body, limb, or implement, power can be the determining factor between movement success and failure. A strong and stable core allows power to be generated and transferred through the kinetic chain.

Improved Stability and Efficiency

Most major muscles of the upper and lower body attach to the spine or pelvis. Strengthening this anchor helps to provide a stable platform, allowing more powerful and efficient movements of the limbs. Baseball players, tennis players, and other athletes who rely on a racket or other implement to impart power must have strong and stable core muscles in order to be successful.

Improved Balance

When the spine and pelvis serve as a strong anchor and stable platform, perturbances to balance are less likely. A stronger core helps the spine and pelvis maintain stability while the muscles of the shoulders, arms, and legs are active. Consider the offensive lineman whose success depends on his ability to withstand forces from defensive lineman without collapsing at the spine or falling off center. A stronger core will help prevent being placed in an off-balance position.

Reduced Risk of Injury

Experts theorize that a weak core can lead to an overload on the extremities, causing injury in certain situations. Increasing one's ability to generate power while maintaining stability and balance leads to a reduced risk of injury. The muscles of the core when strong, stable, and efficient are better able to absorb and translate force, putting less stress on extremities.

The benefits of core strength and stability are interrelated. That is, without improved stability and balance, power cannot be generated at great rates, and movement efficiency suffers. Thus, strength, stability, and balance must be addressed when creating a core training program.

Getting Started

Incorporating effective core training into an existing strength training program is easy. However, it should be a progressive process starting with one or two simple movements. As you obtain mastery of those movements, more specific and challenging movements can be added to any program. To begin try the following:

Get Up

Perform some of the exercises you currently do in a seated position, in the standing position. For example: Instead of performing the seated row to improve back strength and posture, do the same exercise on a cable apparatus, in a standing position. Examples of other exercises that can be performed in a standing posture include chest press (on a cable apparatus) and shoulder press. Keep in mind that in the standing position, the resistance that can be used to perform the movement correctly may be reduced. Maintain a balanced position by placing your feet parallel or in a staggered stance with feet hip width apart, knees and hips flexed.

Get Functional

Isolative movements, that is movements that occur about one joint, target only one muscle. Involve the core in your exercises by using functional movements—those that involve multiple muscle groups, and are more specific to the demands of your life and sport. The lunge is a functional movement that is specific to tennis, football, soccer, and baseball. Perform it laterally or at a 45-degree angle to make it more specific to your sport and life demands.

Move About the Spine

Flexion and extension alone are not enough to fully strengthen and stabilize the spine. Rotational or diagonal movements are more specific to athletic and everyday movement demands. Try chopping exercises, performed on a cable apparatus or with medicine balls.

Challenge Balance

Perform activities on one leg or on unstable surfaces (balance boards, foam pads/rollers, or stability balls) to improve your balance and thus effectively improve your core stability. Single leg squats can be an effective movement that challenges balance, thus targeting the core while improving leg strength as well.

Sample Core Training Program

Add the following movements to your current program to ensure the core is receiving the appropriate attention.

Day 1

Single Leg Squat

Stand with one leg resting on a low bench or step behind you, the other placed on the floor in front of you. Your stance should

be wide enough that when you squat, your front heel remains on the ground and your knee stays aligned behind your shoelaces (see Figures 1a & 1b). Use dumbbells as resistance.

Increase the challenge:

- Rest your back foot on an unstable surface like a stability ball
- Forgo the resistance, and rotate about the spine by performing a punching motion with the opposite arm

Figure 1a.
Single Leg Squat

Figure 1b.
Single Leg Squat

Chopping

Grab the upper cable handle with both hands with arms extended over one shoulder (see Figure 2a). Initiate the movement by pulling the handles downward and across your body keeping your arms extended (see Figure 2b).

You should finish with your arms extended at the opposite hip. Use a medicine ball to emphasize power development.

Increase the challenge:

- Perform the motion as described above while squatting
- Perform the motion as described above while standing on one leg

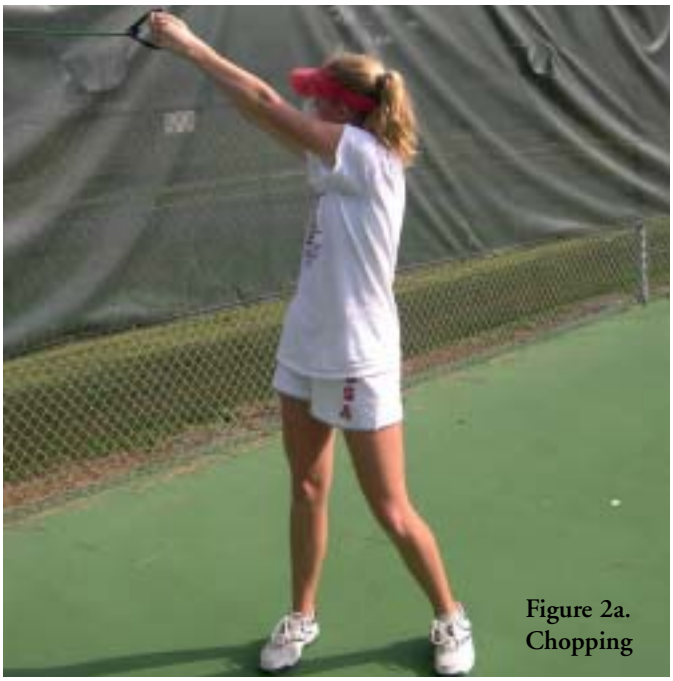

Figure 2a.
Chopping

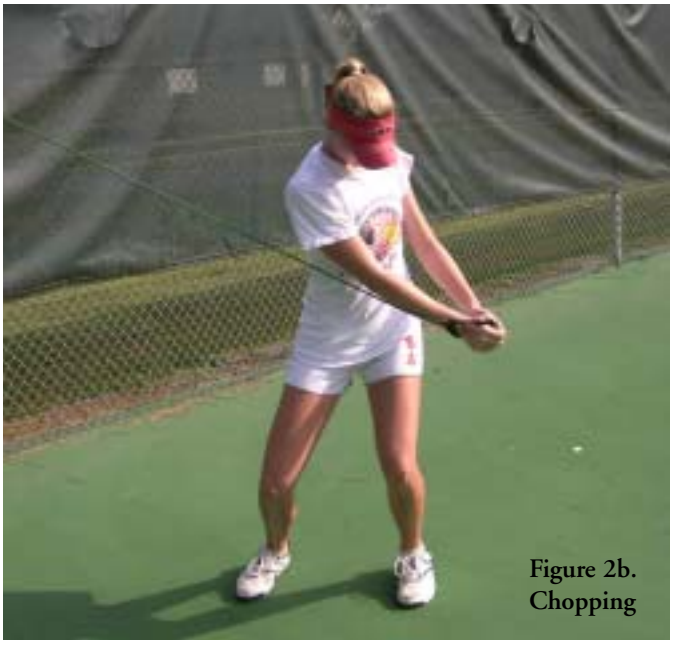

Figure 2b.
Chopping

Day 2

Standing One Arm Row

Stand facing the cable apparatus, grasping the lower handle in one hand with arm extended in front of you. Maintain a balanced position and perform a one arm row (see Figures 3a & 3b).

Increase the challenge:

- Perform the motion described above while standing on the opposite leg.
- Perform the motion described above with rotation. That is, position your body with your arm extended across the center of your body, shoulder slightly rotated. Perform the rowing motion rotating your shoulders as you pull. Stand on one leg (the opposite leg) to make this even more challenging.

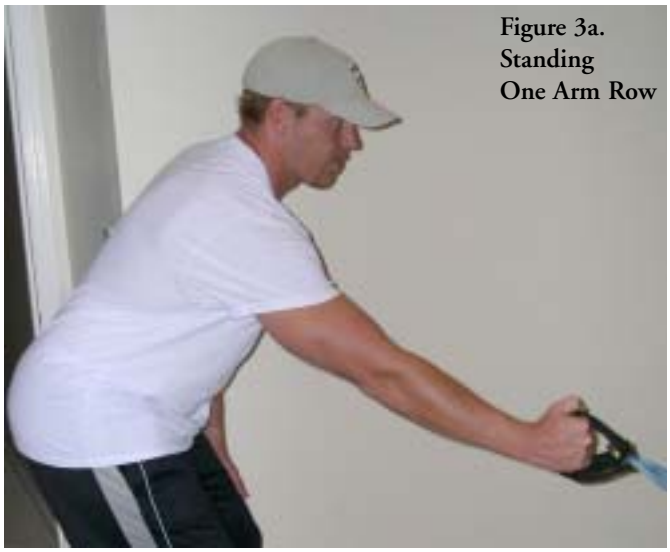

Figure 3a. Standing One Arm Row

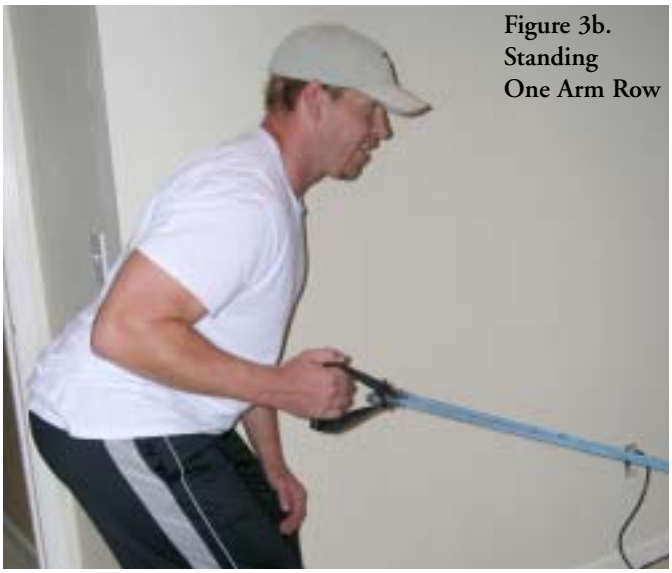

Figure 3b. Standing One Arm Row

Plank

Maintain stability through your core in the prone position with your weight on your elbows and toes. Imagine that your body is a table and you must not only maintain balance, but keep your body in a straight line from your heels to your head (Figure 4).

Increase the challenge:

- Increase the amount of time that you hold this position
- Alternate lifting one foot off the ground at a time, being sure to maintain the 'stable table' position.

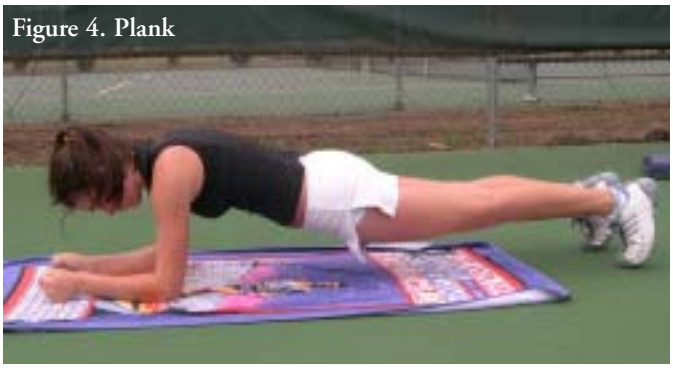

Figure 4. Plank

Day 3

Medicine Ball Pullover-Throw

Lay on your back on the floor or a wide bench with your knees bent, feet flat. Hold a medicine ball over your head with your arms extended. Sit up and throw the medicine ball against a wall. Catch the ball as it rebounds off the wall and return to the lying position and repeat. This can also be performed with a partner who catches the ball and throws it back to you instead of a using a wall (see Figures 5a & 5b).

Increase the challenge:

- Perform the exercise while lying on an exercise ball
- Using a lighter medicine ball, perform the exercise with one arm at a time

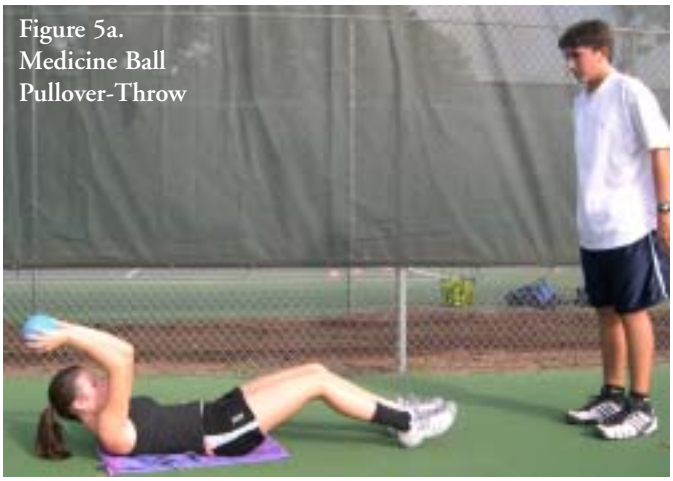

Figure 5a. Medicine Ball Pullover-Throw

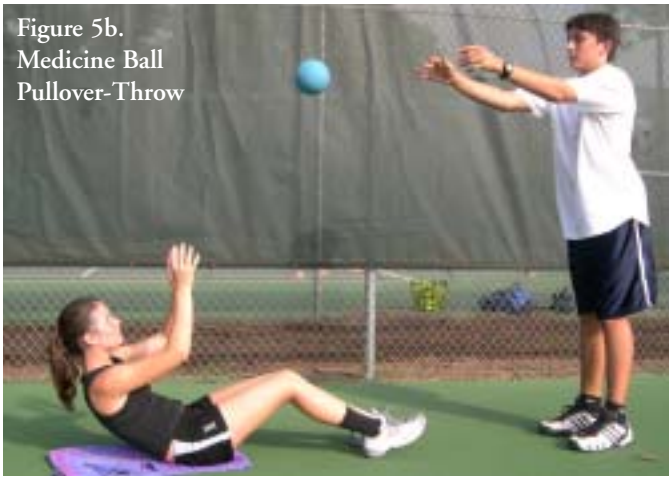

Figure 5b.
Medicine Ball Pullover-Throw

Squat Jump Throw

Hold a medicine ball at your chest while standing in a stable, hip width stance (see Figure 6a). Squat slightly, but rapidly, and jump as high as you can into the air, while throwing the medicine ball as high as you can (see Figure 6b). Catch the ball and repeat.

Increase the challenge:

- Perform the exercise in a split/staggered stance
- Perform the exercise on one leg

Figure 6a.
Squat Jump Throw

Figure 6b.
Squat Jump Throw

Conclusion

The importance of training for a strong and stable core cannot be ignored. Reduced risk of injury as well and improved overall performance can be achieved by incorporating even just a few core training movements into your current program. Keep in mind that core training is not a replacement for all other training regimes. Strength training that focuses on increasing the rate of force development is essential. Furthermore, training to induce hypertrophy and increased maximal strength may be warranted for certain individuals and training goals.

For the greatest success, incorporate core training movements that are functional and specific to your goals and sport demands. And remember to progress slowly when making core training more challenging.

About the Author

Tracy Morgan Handzel, CSCS is the owner and head Performance Coach of Train for the Game in Atlanta GA. She currently trains elite and professional tennis players and writes training related articles for various trade publications. Tracy has served as assistant director at the International Performance Institute and assistant strength and conditioning coach at the University of Washington, San Diego State University, and the University of California San Diego.