



Juan Carlos Santana, MEd, CSCS
Column Editor

summary

Competitive swimmers benefit from having a strength training program that focuses on increasing core strength. This column discusses these benefits and gives examples of some exercises.

Traditionally strength programs for competitive swim teams have mostly been limited to the use of stretch cords and swim benches, with exercises that are intended to simulate the arm action of swimming. Whether these exercises hinder a swimmer's technique is debatable, but the fact that they do not involve the use of the core is not. Some strength programs also include the use of resistance machines and free weight exercises. Most of these exercises are single joint movements performed in a single plane of motion using muscles in isolation while being supported by a machine in a seated or lying position.

The core is defined for our purposes as the area between the sternum and the

knees, with a focus on the abdominal region, low back, and hips. When an athlete performs exercises in a seated or supported position, this area is neglected and therefore is minimally trained. Most movements originate and are transferred through the core to the outer extremities, making it the anchor or reference point of all movement. Unlike ground-based sports in which the ground becomes the reference point of movement, in swimming and other sports that do not require ground contact to direct force the core becomes the point of reference of all movement.

In swimming, the arms (i.e., humerus) and the hips (i.e., femur) are responsible for propelling the body through the water and both are directly connected to the lumbar spine. A strong core will enable more energy to be transferred from the core to the pull and kick components of the stroke. A weak core will allow more energy to leak out, resulting in a less powerful pull and kick. This is

why developing a strong core is especially important in swimming. Swimmers should be trained with the philosophy that training movements that are specific to swimming and strengthening the core will have an excellent transfer of strength and power from the gym floor into the pool. This type of core training has been labeled by some industry leaders as "training from the inside out" (1).

The core is most effective in generating power when creating rotation between the hips and shoulders. This is due to the diagonal nature of the muscles in the core working together as a unit, also known as the Serape Effect

(2). The muscles that produce this effect are the rhomboids, serratus anterior, external obliques, and internal obliques (Figure 1). These muscles allow the core to produce powerful rotational movement very efficiently. This type of rotation can be seen in both freestyle and backstroke. Exercises that train the Serape Effect will ob-





Figure 1. The serape musculature: rhomboids, serratus anterior, external obliques, and internal obliques.

viously improve the power and efficiency of this movement. Adding exercises of this nature to a swimmer's strength training program will ultimately increase the power and speed of the stroke.

The involvement of the core in swimming goes beyond producing rotational power. Core strength is needed to maintain proper posture, balance, and alignment in the water. If these elements are not maintained, then resistive forces will increase and stroke technique will break down, leading to an inefficient stroke. Increasing the core strength of a swimmer will improve his or her ability to maintain efficient technique throughout the entire race.

When designing a strength program for competitive swimmers, one should incorporate exercises that involve movements that are specific to swimming while challenging the core musculature. By teaching these muscles to work together, the body will utilize more of the strength that is already there, developing strength the swim-

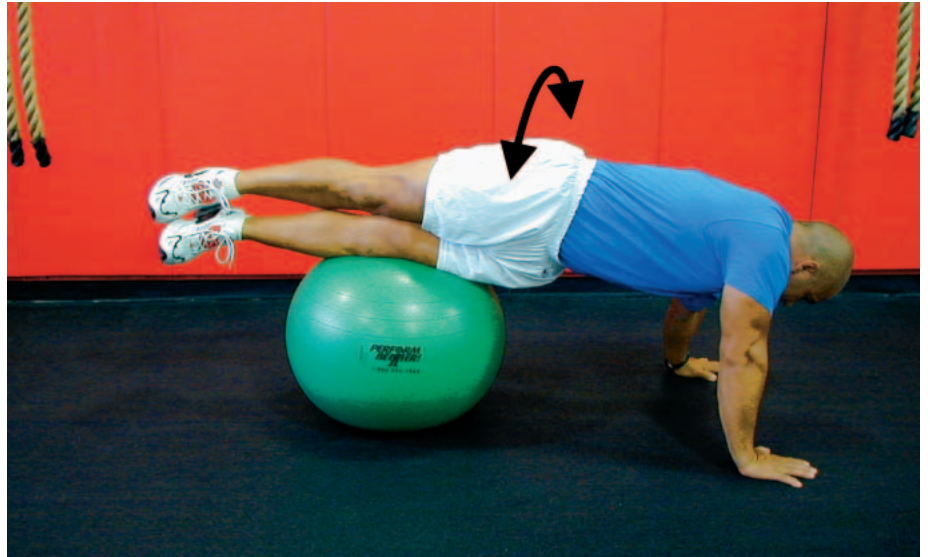


Figure 2. The stability ball log roll can be used to train core rotation in a horizontal position.

mer can use. Here is a philosophical coaching scenario to drive home the point: A coach has a swimmer that can perform 8 repetitions with 130 lbs on a supported row machine (which focuses on isolating the latissimus dorsi while the core is supported). However, the swimmer can only apply 50% of that strength in the water because the anchor point (i.e., the thoracolumbar fascia/lumbar area) has never been trained to stabilize itself during resisted shoulder extension (the machine pad has always stabilized it). Since the limiting factor in producing force during the stroke cycle is the stabilization of the spine (i.e., the anchor point of the movement), would the coach be better off increasing the amount of strength on the machine row or increasing the strength of the anchor point (i.e., the core)? The most efficient way to approach this training challenge is to bring the strength of the core in proportion with the strength of the latissimus.

There are many fun and challenging exercises that enhance core strength for swimmers. The stability ball log roll is an excellent core exercise (Fig-

ure 2). This exercise involves the rotational muscles of the core and strengthens the muscles that stabilize the spine. Place a stability ball under the legs just above the knees. One must have enough strength in the upper body to hold oneself up in the locked arm position. Hold the core tight and roll the hips from side to side. As this becomes easier, pick up the tempo.

Cable diagonal chops train the core musculature in the diagonal pattern used during freestyle and backstroke (Figure 3). Begin the exercise by holding a cable or resistance band over one shoulder and "chop" in a diagonal pattern past the opposite knee. Perform this motion continuously, focusing on using the core. It is better to use a lighter resistance so the exercise can be performed properly through its full range of motion.

These are just a few of the many exercises that are effective in training the core. Hopefully some of these exercises are useful to your strength training program. Core strength is crucial to



Figure 3. Diagonal chops are great for developing rotational power in the core. Increasing rotational power will increase the power of the stroke.

swim performance; therefore, it should be one of the focal points of any coach's dry-land or strength training program. This type of strength training philosophy may seem like common sense; however, many coaches still have their swimmers training muscles in one plane of motion in isolation and not addressing the needs of the core musculature. Remember, swimmers should train like swimmers, not bodybuilders! ♦

Reference

1. Santana, J.C. *The Essence of Stability Ball Training Companion Guide*. Cranston, RI: Perform Better, 2000. p. 205.
2. Santana, J.C. The serape effect: A kinesiological model for core training. *Strength Cond. J.* 25(2):73–74. 2003.

Grif Fig is a swim and performance coach.