STRENGTH TRAINING FOR THE MARTIAL ARTS: CORE STABILITY PART I

INTRODUCTION

The world of sport and fitness has seen many fads come and go but probably none have been more popular and controversial than “core training”. Core training became popularized in the early 1990’s and it was at this point in time that fitness enthusiasts really began preaching the importance of a strong core to prevent injury and improve physical performance. The information being purported by core training enthusiasts has found broad appeal not only with high performance athletes but also with members of the general public. This is not surprising since it has been estimated that 80% of people experience back pain at some point in their lives.

The martial arts community is yet another group with a very specific interest in core training. I have practiced several different styles of martial arts and I have yet to find a style or club that does not emphasize core training. The reasons most commonly given by martial artists for the importance of core training are:

1. Increased core stability for injury prevention
2. Increased power production for striking
3. Protection against strikes to the body

While all three reasons probably deserve equal attention I think the least understood is the role of core stability for injury prevention.

BASIC ANATOMY

In order to accurately understand how to develop core stability a basic knowledge of the core musculature is required. Most people associate the core with the superficial abdominal and

spinal muscles. The most obvious muscle is the rectus abdominis or the “six pack” muscle. The primary function of the rectus abdominis is to flex the spine. Other commonly known muscles are the obliques (external and internal) which cause rotation, and the back extensors which extend the spine. Another muscle that has gained popularity in recent years is the transversus abdominis (TA). TA is the deepest layer of muscle in the abdominal wall and the fibres run transversely across the abdomen. TA has become a buzz word amongst fitness professionals and has often incorrectly been referred to as a muscle that contributes significantly more to spinal stability than the other core muscles.

Underneath the superficial back extensor are the deep muscles of the back. These muscles are often referred to as the paraspinal muscles. The multifidus is a paraspinal muscle that, along with TA, has earned the reputation of contributing more than other muscles to spinal stability. One final muscle that should be mentioned is the quadratus lumborum (QL). The QL runs from the ribs to the pelvis and its action is to side flex the spine. Bear in mind that this is a very simplistic overview of the core musculature and many other muscles contribute to core stability. These muscles include but are not limited to: the muscles of the pelvic floor, the diaphragm, and certain hip flexors. The important observation is that the core muscles surround the spine in a circular fashion and provide 360 degree support. If you want to learn more about the core musculature visit Kasterstener Publications. This site offers many anatomy related resources (http://www.kasterstener.com).

WHAT IS CORE STABILITY?

The goal in this section is to help you re-define core stability. The reason this is important is that athletes often train the ability of the core muscles to move the spine not stabilize the spine.

Moreover, due to incorrect training methods, many athletes actually increase their risk for spinal dysfunction by doing what they think is core stabilization.

The first component of core stability is called local motor control (1). In order to visualize the concept of local motor control, think of your spine as a stack of twenty five blocks that is braced with elastic bands. In one scenario you could use a single elastic band that runs from the first block all the way down to the twenty-fifth block. In the second scenario a series of elastic bands could be used running two blocks at a time and each elastic band would overlap with the previous band. The second scenario illustrates the concept of local motor control as each segment of blocks would be stabilized by its own elastic band.

In the spine, the deep paraspinal muscles are primarily responsible for local motor control and are comparable to the elastics in our "block" example. In addition to the deep paraspinal muscles, transversus abdominis (TA) also assists in providing local motor control to segments of the lower spine. When TA and the paraspinal muscles are contracted they provide increased muscle stiffness to a particular segment of the spine and help to control the movement of one vertebra across another.

Local motor control is critical for segmental spinal stability. Scientific research reveals that after a back injury many individuals present with a loss in local motor control at the location of the injury, and this increases segmental spinal instability (2). The loss in motor control is associated with a disruption in the firing pattern of TA and a decrease in the size of the multifidus.

Interestingly, subsequent research has shown that with re-education, a back pain patient can regain local motor control with specific exercises designed to recruit TA and multifidus.

Unfortunately many have misinterpreted this research, and as a result personal trainers run behind their clients in the weight room reminding them to contract TA while doing just about everything from front squats to drinking a post-workout recovery shake. The scary thing is that there is actually some evidence which indicates that an overemphasis on TA during gross motor movements like squatting and dead lifting may actually decrease spinal stability (3)!

A second factor in core stability is global stability or global motor control (1). Global motor control involves a group of muscles which generate force to limit range of motion, to hold an isometric position, and control eccentric movement. In order to better understand global motor control, consider the following example (3). Suppose you took a flexible rod and stood it on its end. If you were to apply compressive force at the tip of the rod it would buckle. If guy wires are now placed in a circular pattern around the rod and these wires are tensioned equally the rod can handle considerable compressive force but if one of the wires is cut the rod buckles under the load.

In this example the rod is comparable to the spine and the guy wires are comparable to the core musculature. As indicated in the example above, the core muscles must provide 360 degree support to the spine in order to effectively provide global stability (3). No single muscle contributes more or less stability, and as in the example above ALL the muscles are important.

Furthermore, each muscle must be appropriately activated so that the spine can remain stable and so that movement can be properly controlled.

SUMMARY

To summarize, you will notice that instead of stability I have often been using the term motor control. This is a critical concept. An athlete's level of motor control dictates their stability. As such, the primary objective in training core stability is grooving proper motor patterns and developing global motor control. In the next issue I will discuss training methods to groove proper motor patterns and develop global motor control. Also, if you have specific questions about this topic or any other topic related to strength training please visit my web site: http://www.jordanstrength.com. I will try and post as many answers as possible in my Question and Answer section.

REFERENCES

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3. McGill, S. (2004). *Ultimate Back Fitness and Performance.* Wabuno: Waterloo.