

Rethinking Core Training

By

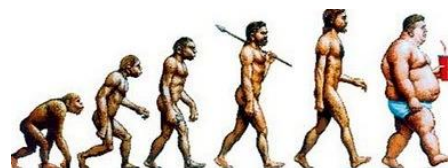
Jason Shea M.S., PICP, PES

What is the core and why do so many magazines and personal trainers espouse this term, explaining that it is the most important part of one's physical structure; proclaiming avoidance of injury and increase in athletic performance? Many of these "core" proponents forget that they are trying to isolate one segment of the body, whereas stability can be regarded as a multi-faceted co-activation of muscular systems required for both peripheral and core stability. As this system becomes more efficient as a whole, increases in stability, strength and power can be seen as well as decreased injury potential. To think of the core as a single muscle group is a recipe for disaster for the competitive athlete.

Horizontal isometric core exercises have planted their roots into strength and conditioning programs, but are the returns on investment really worth the time and energy? Could these exercises create faulty muscular recruitment patterns leading to at the very best, minimum transfer effects onto the field of play.

Evolution

Are we more similar to our vine swinging, leaf eating, knuckle dragging ancestors than we think? Looking in the mirror, I am sure some of us will find we are only a few notches up the evolutionary ladder. The similarities become quite visible when comparing core strength.



To see this point one must look no further than the core strength of a gymnast. Generally regarded as some of the strongest pound for pound athletes in the world, gymnasts are unrivaled in their core strength. The ability to control one's body from a hanging position requires tremendous amounts of strength, never mind controlling and stabilizing the body in such positions as the superman on the rings, handstands on the uneven bars, or lower body control during pommel horse rotations.

The fact that these athletes perform so much of their work from various hanging position poses the question, is this one of the major reasons for their unrivaled core strength. Studies have shown that when compared to other athletes, the core strength of gymnasts was far superior⁽⁵⁾. This brings us back to the monkey; have you ever watched a monkey swing effortlessly



from branch to branch controlling it's body with the greatest of ease? From work on the bars to the grueling capacity to stabilize on the rings, gymnastic training should be a model for core strengthening, rather than the current fads of

unstable surface training and long duration isometric plank holds. Have you ever noticed that the kids who took gymnastics when they were young typically had greater control and balance when competing in various other sports as they grew older. Instead of isometric plank holds on BOSU balls, athletes should consider incorporating more hanging abdominal exercises and chin-up variations to their workouts.

The World Record Plank Holder vs Mariusz Pudzianowski

It would be interesting to see who would win in a battle of core strength, the best plank holder in the world or the current Met-Rx World's Strongest Man, Mariusz Pudzianowski. Since it seems many mainstream media publications have crowned the prone plank hold as an exemplary core

exercise, it only makes sense to challenge this wisdom from a more functional perspective. Over the years strength coaches and personal trainers have witnessed many individuals whom were “freaks” at performing horizontal “circus acts” and stabilizing exercises, hoping to increase their core strength. Everything from balancing on multiple “gimmicks” at one time (the trainer in the video said this helps with TVA activation) to holding isometric plank holds for as long as humanly possible, these exercises have swelled in popularity.



vs



Which makes more sense for standing upright based contact sports?

When these “freaks” with their incredible horizontal core endurance are asked to walk with a compressive force down their spine, their cores seem to crumble, along with their egos. When performing a Super Yoke walk, one would think they are practicing a new dance move for the next season of America’s Best Dance Crew. It would seem that all those countless hours of mindlessly staring at the floor while holding a plank have led to exactly zero transfer of core strength and stability in the standing position.

Coaches and trainers may want to reassess their training methods and decrease the usage of horizontal isometric plank holds they:

- **Require different muscle action and activation levels than standing movements (4,9,10,12)**
- **Segmental stability not normally found in normal standing postures**
- **There is simply not enough load to generate progressive strengthening, so these are typically done for duration which trains isometric muscle endurance, not strength**
- **Gravitational force vector are perpendicular through the spine while in a plank**

position, whereas standing postures have a vertical force vector traveling down through the spinal column.

- **Standing postures allow for the pull of the pelvic musculature and intra-abdominal pressurization to disperse excessive loads while allowing upright stability (10,11).**

While the abdominals do play a role in static trunk stabilization, it is the activation of the erector spinae musculature that keeps us upright. In upright stabilization the abdominal/oblique muscles are merely a part of a looping system; when contracted, the anterior carriage muscles create intra-abdominal pressurization leading to spinal stability (4,10,11). But without peripheral, hip, and spinal erector co-activation, stability is unattainable. In today's sports world, too many coaches and trainers emphasize anterior abdominal training, while neglecting the spinal erectors, which can effectively lead to a break down in the body's overall stability.

By focusing their time and effort on more efficient means of training, athletes can achieve a greater transfer of training effect. The methods should be upright standing, load bearing, and preferably dynamic. Recently, an excellent study by Dr. Stuart McGill and colleagues, set out to establish trunk musculature activation of Strongman training modalities. Dr. McGill and his team found tremendous supporting evidence toward the usage of upright loaded strongman exercises and transferable activation of the "core"



musculature. Peak muscle activation of the rectus abdominis, internal and external obliques was found in all of the events, but was found to be ***highest in the walking phase of the Farmer Walk, Super Yoke Walk, and the Suitcase Carry (11).*** (Speaking of the super Yoke, hasn't coach Poliquin stated for years that the ability to run with a load on one's spine is one of the greatest predictors of physical ability!).

A study by Anderson et al 2007 had similar findings with regards to trunk activation and object holding/carrying. The researchers had 11 male subjects walk between 1.9 and 3.3 mph while carrying a barbell at 3 different heights and then a bucket of potatoes at 3 different heights. The researchers found 33%, 49%, and 47% increase in erector spinae musculature in the walking barbell group versus the standing barbell group. ***The walking group also had a 51% and 65% greater activation in the rectus abdominis and external oblique when compared to standing group(1).***



Of even greater significance was the abdominal activity of the group walking with the bucket of potatoes. The researchers found a ***132% increase in rectus abdominis activity in the walking group compared with the standing group(1).*** When walking with the bucket at knuckle or elbow height there was a two fold increase in rectus abdominis activity.

Conventional lifts such as squats and dead lifts have also shown to have much greater core activation than many of the now popular horizontal "core" stabilization exercise. Hamlyn et al (2007) performed a comparison study between squats, dead lifts and 30s horizontal isometric holds on trunk musculature activation. The researchers ***found a statistically significant greater activation of the "core" musculature when performing 80% 1RM squats and dead lifts compared to 30s horizontal isometric holds(8).*** One could assume the differences would have been even greater had the researchers required the subjects to perform full squats, rather than the parallel squats used in the



study.

So why is this important for athletes? In 2009 McBride et al performed a study on 17 college football players, correlating their 1 rep max squat to their performance in 5, 10, and 40 yard sprints. The researchers found a **significant positive correlation between the relative 1RM squat strength of the athlete and their performance in the 10, and 40 yard sprints**(9).



Long time APECS athlete and strength coach, Matt Aronson. No horizontal planks, but plenty of squats, deadlifts, Oly lifts, and strongman over the years for the former 2X Massachusetts Lacrosse Player of the Year and Yale Lax captain

In essence, for transfer of training effect onto the field of play, a common sense approach must be taken toward “core” training and athletic development. Hanging abdominal exercises and chin up variations, standing exercises such as squats, dead lifts, and Olympic lifts as well as more dynamic strongman exercises including farmer carriers, super yoke walks, tire flips and keg carries have all been shown to be highly effective as well as efficient methods for training the core musculature. These exercises should take precedent over time consuming horizontal isometric exercises that may have little or no transfer to the competitive field.

References:

1. Anderson A, Meador K, McClure J, Makrozahapoulos D, Brooks D, Mirka G. A biomechanical analysis of anterior load carriage. *Ergonomics*. 50(12); Pp 2104-2117. 2007.
2. Bennet S. Using “Strongman” exercises in training. *National Strength and Conditioning Association*. 30(3); Pp 42-43. 2008.
3. Berning J, Adams K, Climstein M, Stamford B. Metabolic demands of “junkyard” training: pushing and pulling a motor vehicle. *Journal of Strength and Conditioning Research*. 21(3); Pp 853-856. 2007
4. Callaghan J, McGill S. Muscle activity and low back loads under external shear and compressive loading. *Spine (Phila, Pa 1976)*. 20(9); Pp 992-998. 1995

5. David P, Mora I, Perot C. Neuromuscular efficiency of the rectus abdominis differs with gender and sport practice. *Journal of Strength and Conditioning Research*. 22(6); Pp 1855-1861. 2008.
6. Granata K, Bennett B. Low back biomechanics and static stability during pushing. *Hum Factors*. 47(3); Pp 536-549. 2005
7. Granata K, England S. Stability of dynamic trunk movement. *Spine (Phila Pa 1976)*. 31(10); Pp E271-E276. 2006.
8. Hamlyn N, Behm D, Young W. Trunk muscle activation during dynamic weight-training exercises and isometric instability activities. *Journal of Strength and Conditioning Research*. 21(4); Pp 1108-1112. 2007
9. McBride J, Blow D, Kirby T, Haines T, Dayne A, Triplett N. Relationship between maximal squat strength and five, ten, and forty yard sprint times. *Journal of Strength and Conditioning Research*. 23(6); Pp 1633-1636. 2009.
10. McGill S, Karpowicz A, Fenwick C, Brown S. Exercises for the torso performed in a standing posture: spine and hip motion and motor patterns and spine load. *Journal of Strength and Conditioning Research*. Pp 1-10. 2009
11. McGill S, McDermott A, Fenwick C. Comparison of different strongman events: trunk muscle activation and lumbar spine motion, load , and stiffness. *Journal of Strength and Conditioning Research*. 23(4); Pp 1148-1161. 2009.
12. Monfort-Panego M, Vera-Garcia F, Sanchez-Zuriaga D, Sarti-Martinez M. Electromyographic studies in abdominal exercises: a literature synthesis. *J Manipulative Physiol Ther*. 32(3); Pp 232-244. 2009
13. Siff M. *Fact and Fallacies of Fitness*. Denver, Co. 2003.
14. Waller M, Piper T, Townsend R. Strongman events and strength and conditioning programs. *National Strength and Conditioning Association*. 25(5); Pp 44-52. 2003