Is core stabilization really effective for back pain? By Steve Hoffman

If you prescribe core stabilization exercises to your back patients (i.e. tummy tucks, abdominal bracing, abdominal hollowing, dead bug, planks, wobble boards, balls, etc., etc.), you probably have noticed that they do not yield the outcomes many researchers and clinicians had hoped that they would.

This article explains why this is the case, and proposes an alternative to these commonly taught and prescribed core stabilization exercises.

First a little background on core training. Although core training has become very popular since the late 1990's, no standard has yet emerged. In the mid 1990's, Richardson and Jull noted some anecdotal success with core training. [1] Some subsequent small studies showed promising results too. [2,3] However, since then, there have been a limited number of larger controlled studies comparing core training with other forms of exercise. Some of the recent studies have shown results that are not as favorable. [4-7]

- In a 2006 review of evidence regarding the use of core stabilization exercises, Rackwitz et al concluded that "segmental stabilizing exercises are more effective than treatment by GP, but they are not more effective than other physiotherapy interventions." [8]
- Later, Cairns et al concluded after a well designed multi center random controlled trials with 97 patients that “There was no additional benefit of adding specific spinal stabilization exercises to a conventional physiotherapy package for patients with recurrent LBP (low back pain)”. [4]

This evidence could either mean that (1) core stability as we know it, *is just a myth* [9], or that (2) the specific core stability exercises studied are not optimized to achieve the desired core stabilization.

Not surprisingly, it appears that the stability model, as is widely known, may already be in decline. [10,11]

All the above listed core stabilization exercises (tummy tucks, abdominal bracing…) are inconsistent with some of the most important principles in motor learning and training. The most important are the similarity and specificity principles.[12] Basically they state that we become better at repeating what we do (good or bad) [13,14]. Another way to say it: "practice does not make perfect, rather, practice makes permanent". Practice a bad movement and it will become a bad habit. Alternatively, practice a good movement and it will become a good habit.

With regard to core stabilization exercises, one needs to first recognize the fact that core stability is very movement specific. It is a three-dimensional concept and function. A person may lack core stability in one movement, and have no deficiency in core stability for other movements. Thus, prior to embarking on core stabilization exercises, one needs to first identify which specific movement has deficiency in core stability. One method to test for lack of core stabilization is to manually apply external stabilization to the specific area, and evaluate if this alone will immediately relieve symptoms such as pain or limited range of motion.[15]

If I lack core stability in bending forward while in an upright weight bearing position, then would it help me to exercise any other movement? (i.e. tummy tucks while lying on my back, abdominal bracing while lying on my tummy, ball exercises on my back or tummy, etc., etc.)

Obviously, a skilled pianist that is deficient in playing a particular song would not consider practicing other songs that he or she has already mastered as a technique to becoming good at playing the particular deficient song.

Similarly, once a movement with deficient core stability is identified, it would be inefficient to exercise other movements that are unrelated.

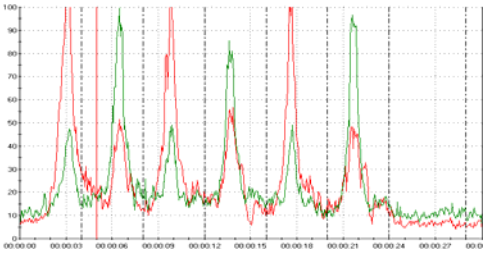
Now that we have established the importance of exercising the particular movement that is deficient, the next question is how to exercise it.

Before the skilled pianist starts to practice a new song in full earnest, she first has to make sure that she is playing it correctly, otherwise, it does not matter how much she practices, as she will never know how to play the song correctly.

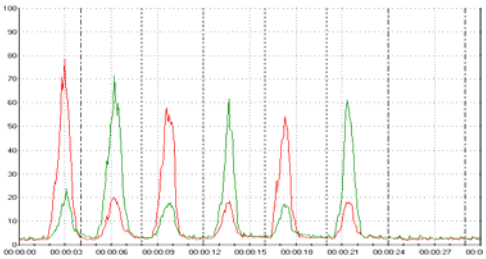
Similarly, before we embark on core stability exercises, we need to first be sure that the movement is correct. In other words, pain-free and with correct muscle activation patterns.

Therefore, in order for core stabilization exercises to even have a chance at achieving the desired outcomes, they must first of all be done (1) in the exact position and direction in which the patient has a problem (i.e. upright and weight bearing when applicable), and equally importantly, (2) the CNS must be firing the muscles correctly while in movement, prior to embarking on exercises. This ensures that during these core stabilization exercises, the CNS learns to fire the muscles correctly rather than incorrectly.

The following graphs show sEMG data for left and right paraspinal muscles while a subject is performing spinal rotations to the left and right (3 times in each direction) before and during an ATM®2 session.



Baseline – Paraspinal Muscle Activation during spinal rotations. Left paraspinal (red) peaks with left rotations and right paraspinal (green) peaks with right rotations



On ATM2 – Paraspinal Muscle Activation during spinal rotations. Left paraspinal (red) peaks with left rotations and right paraspinal (green) peaks with right rotations.

Based on the above data, when using the ATM2, the following changes in CNS muscle activation patterns are apparent:

1. Paraspinal muscle activity at rest is reduced from about 10 micro volts to about 2-3 micro volts (70-80% reduction).
2. Jittering (signal noise) in the paraspinal muscles is significantly reduced.
3. Percentage difference between left and right (red & green) at peek rotations is increased from under 60% to almost exactly 70%.
4. Percentage difference between left and right at rest is close to zero (normal) compared to about 30% prior to ATM2.

As can be seen in the above sEMG data, using the ATM Concept and an ATM2 system you can immediately and effectively alter the CNS muscle activation patterns in the position and direction in which the patient has a deficient movement. With sEMG, you have undisputable, specific, objective, and documentable real-time evidence that the ATM2 is normalizing muscle activation patterns. This is at the root of core stabilization exercises, and this explains the immediate pain relief and increases in range of motion you can achieve with the ATM2 for almost all back, neck, pelvis, hip, knee and shoulder patients.

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