OPTP Product Bulletin

Improving Core Stability

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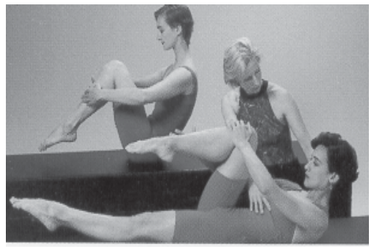

Photo from: *Essential Matwork* Video Series by Moira Stott [5]

What is core movement?

The visible motion we see is the result of voluntary movement of superficial muscles. The beauty of that movement relies on complex patterns deep within the CNS (central nervous system). Just as the seed, the source of life of the apple, resides at the very core, so the seed of our movement lies deep within our intrinsic muscles. The intrinsic muscles ('core stabilizing muscles') are responsible for joint stability, mobility and posture.

Which muscles react?

Translated to the back, the erector spinae and the rectus abdominis muscles produce voluntary movement while the multifidus and transverse abdominis muscles provide stability. The multifidus cross one, two and three intervertebral spaces, allowing fast reaction time and minute control over each disc. The specificity of the fibers allows the muscle to stabilize the spine and prevent excessive deflections. The deep intrinsic muscles react first, with superficial movement secondary.

When we move from our 'core', our CNS immediately recruits both the deep erectors and the transverse abdominis, and then the ancillary muscles.

Sometimes, with repetitive strain or movement (as in sports related injuries), sustained end range loading or trauma, the body learns compensatory movement patterns to protect injured muscles. If compensatory patterns are repeated often enough, and long enough, they become habitual. In this case, the CNS may bypass the deep stabilizing muscles, and may send movement messages directly to the superficial muscles. The movement pattern may look much the same, but it is missing the element of core stability. Lack of core stability leads to more muscle imbalance, which in turn can be a precursor to more injury. For example, an ankle strain can lead to knee dysfunction, and end up as low back pain.

Core (n.)
the central or innermost part of anything, the central or most important part

Stability (n.)
[Latin stabilis, to stand] the state or quality of being stable, or fixed; steadiness, the capacity of an object to return to equilibrium or its original position after being displaced

To reactivate core stability you need to reprogram the CNS. But the programming is locked away in the unconscious mind. The key to unlocking the system is bypassing the automatic switches and getting the message down to the lowest level of neuromuscular system. You do this by becoming aware of movement (gaining conscious control) and thinking through the movement, thereby activating the movement learning centers of the brain. Moshe Feldenkrais[2, 4], Vladimir Janda[3], Moira Stott[5] and other movement specialists advocate 'conscious' movement as a valid tool for movement retraining. This movement does not require great effort; it is small, slow and precise. In fact large, forceful movement restricts the brain's ability to make sensory distinctions while small movement with little effort prompts the CNS to reprogram.

Try this self-test

This self-test will help you feel co-contraction of the deep erectors and the transverse abdominis.

Sit erect in a chair. Place your hands on your hips with your fingers just medial to your ASIS. Draw your navel in as you simultaneously brace your back. Do not raise your rib cage. You should be able to feel the muscles tighten under your fingers. This is co-contraction.

Foam Rollers can help

Foam Rollers provide excellent 'prompts' and are especially helpful in core stability retraining. Because foam rollers are cylindrical, and inherently unstable, they challenge conscious awareness, provide sensory motor challenges on two planes, and enhance balance reactions, body awareness, muscle reeducation, motor planning and neural flexibility[6]. Because the roll is unstable, the mind is actively engaged in trying to stay on the Roller! From this very conscious balancing act, it is an easy step to becoming mindful of each movement.

Exercises *Using Foam Rollers by OPTP*

Marjorie King, MS, PT, ATC[7] recommends these exercises to help retrain core muscles. OPTP's 36" x 6" Foam Roller (#FR366) is required.

1 Lie on the floor with your hips flexed 30 - 40°; your knees flexed 90 -100° and your feet flat on the floor. Distribute the weight evenly between both feet and equally across each sole. Flatten your back by pressing your back into the floor (neutral spine). Gently co-contract your abdomen and gluteus maximus. (You want to use both your back and abdominal muscles.) Do not raise your ribs.

2 Repeat the same flat back position on the Foam Roller[8]. Lie on the Roller with hips and knees flexed and feet flat on the floor. Keep your back flat. If there is a space between the pelvis or the low back and the Foam Roller, then there is an anterior pelvic tilt, and that is not the goal of this exercise. The goal is to keep your back in contact with the Foam Roller. Reduce thoracic extension. The shoulder should be positioned on the rib cage using the scapular stabilizing muscles to retract and depress the scapula position (You may have to manually bring the scapula down and under). The shoulder in this flat position is now ready for movement.

3 Add movement to your stable core position. Practice moving your arm (glenohumeral flexion, extension, and abduction and glenohumeral external rotation) while maintaining the flat back or neutral pelvis position.

4 To strengthen your core, add supine balancing. Lie in the same position on the Foam Roller. Raise one leg while maintaining a neutral spine (the transverse abdominals will fire first when moving the leg, stabilizing the trunk as a cylinder). Lower the leg and raise the other leg. Alternate raising and lowering your legs, making sure to keep your back in contact with the Foam Roller.

Advanced Exercises
After you have mastered lying on the Foam Roller and moving your extremities while maintaining core stability, you can add more movement. Initially, you should have a spotter. Even if you feel confident, always have something available to help you balance. Make sure your exercise area is safe and free from obstructions. Do not attempt these advanced exercises if you have a fear of falling, ligamentous laxity, or if you experience dizziness, ringing in the ears, or increased pain or numbness.

Standing Neutral Position[9]
Place a roller upright in front of you for balance. Stand on a second foam roller placed horizontal on the floor with feet shoulder width apart. Maintain standing with a natural curve in the back. To keep balance, move arms out away from the body.

Standing Shoulder Flexion[10]
Stand with Roller horizontal on floor in front of the body. Place one foot at a time on roller. Stand on roller with feet shoulder width apart. Raise one arm overhead. Keep eyes level. Lower arm and raise opposite arm overhead.

Tip: Be conscious of your movement. This is not an exercise in speed. Small, controlled, conscious movement helps reprogram the CNS.

These exercises are a beginning. Once you feel comfortable using a foam roller you will find yourself creating your own variations. More information on defining and maintaining neutral spine can be found in materials by the following authors;

[1] Liebenson, Craig , *Simple, Low Tech Procedures for Promoting Spinal Stability*, MCA lecture, Oct '99.

[2] Feldenkrais, Moshe, *Awareness Through Movement*, 1977*

[3] Janda, Vladimir, Motor Learning Impairment and Back Pain, *Journal of Manual Medicine*, Springer-Verlag, 1984:22

[4] Zemach-Bersin, David, *Relaxercise: The Easy New Way to Health and Fitness*, 1990*

[5] Stott, Moira, *Essential Matwork* Video Series *

[6,8,9,10] Creager, Caroline. *Therapeutic Exercises Using Foam Rollers*, 1996*

[7] King, Marjorie A, Core Stability: The Missing Link to Upper and Lower Extremity Rehabilitation, NATA, Kansas City, MO, June 1999. Workshop.

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