DC_65_Global Stabilizers for the Lower Back
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We'll continue our Stabilization series with an article on low load training of the global stabilizers. I suggest you first read my first article, Stabilization Principles[i]. This rehab series is based primarily on the work of Kinetic Control (UK).

Why more on rehab? Here's what I think. I don't think we can change our cultural authority, our image as a profession; strictly through a PR campaign, or by shutting down the "bad apples" in our profession. I think it is up to each of us to change what we do. Our profession is too often thought of as, "you'll have to go to the chiropractor forever." Chiropractic is looked at as good for acute pain only.

I don't think adjustments (no matter how perfectly targeted) and/or soft tissue work are enough to solve chronic pain patterns. I don't think laser, microcurrent, decompression, _____ (fill in your own favorite here) are enough to solve chronic pain. I love all of these tools, and they do affect muscular function, but they are not enough. Chronic pain has a critical motor control component. The patient needs to learn to use their body differently. If you become a rehab oriented chiropractor, you will reach a whole different population of patients. You won't have as many "fix me' patients, draining your energy. You'll have more patients who will fully engage in their own healing process.

Global Stabilizer Muscles and their function

What are the global stabilizers[ii,iii]? These are the "outer" core muscles. They are the one joint stabilizers whose main role is to control direction-specific stress and strain. They include the more superficial multifidi, the lateral QL fibers, the oblique abs, the anterior psoas, and all of the gluteals. These are the larger postural muscles of the core.

Global stabilizers have three primary functions. First, to concentrically shorten through full available range. Second, to isometrically hold inner range (shortened) positions. Third, to eccentrically control the return to neutral. They must be able to do all of these with efficient slow motor unit recruitment. If you understand and know how train all of the above, you are way ahead in your rehab understanding. I'll try to explain these concepts in the rest of this article. I've included a table[iv] outlining the way this model looks at the various muscles of the body.
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Core Stability Overview

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Training principles for Core Stability

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	Symmetrical Strengthening (Limb)	'Core' Strengthening (Trunk)	'Motor Control' Stability: Global	Motor Control' Stability: Local
Training Threshold	**high**	**high**	**low**	**low**
Muscle Bias	**global mobilisers**	**global stabilisers**	**global stabilisers**	**local stabilisers**
Position / Plane of 10 Loading	**flex-ext plane +/- SB / ab-ad Rot eliminated**	**neutral position +/- rot plane Rot challenge**	**rot plane +/- neutral position 3 D**	**neutral position No D (dimension)**
Type of Loading	**isotonic (conc) +/- isometric & isokinetic**	**isometric +/- isotonic (concentric)**	**isotonic (eccentric) & isometric**	**isometric**

	Symmetrical 'Traditional' Strengthening (Limb)	'Core' Strengthening (Trunk)	'Motor Control' Stability: Global	Motor Control' Stability: Local
Guidelines for Training	• **fatiguing high load exercise** • **+/- speed** • **symmetrical limb load** • **limb or trunk lifting in the flexion-extension plane** • **No rotation** • **global mobiliser dominance** • **encourage core 'rigidity**	• **fatiguing high load exercise** • **+/- speed** • **asymmetrical limb or trunk load** • **resist rotation force at trunk** • **rotate against resistance** • **discourage global mobiliser dominance**	• **no- fatigue low load exercise** • **asymmetrical limb or trunk load** • **Maintain trunk neutral** • **emphasise rotation control at trunk and girdles +/- flex –ext control** • **Short range hold for postural control**	• **no-fatigue low load exercise** • **trunk stays in neutral** • **only slight global muscle activity** • **discourage core 'rigidity** • **(MH) bias toward activating local stab musles**

In states of pain, or from tissue pathology, or even just from patterns of habitual misuse, specific movement dysfunctions develop. This observation was one of the genius concepts from Vladimir Janda, which has been validated via research. The patient loses the ability to perform the three functions of the global stabilizers listed above. This is significant both for treatment/rehab of painful conditions, and for prevention of recurrence. The primary indication for needing/doing global stability training is a recurrence of movement related pain or direction specific stress or strain. The classic examples are the patients who always seem to get worse with brushing teeth, loading dishes, gardening, etc. A common theme here; flexion related stress and/or flexion hurts but extension relieves it. Global stabilizers are also critical to control extension and rotation, but this article will focus on the most common deficit, lack of control of flexion.

SLOW, LOW LOAD RECRUITMENT

Why low load? To understanding this, first let go of the word "strength." Strength and low load stability are totally different physiological concepts. Stability is referring to recruitment efficiency while strength is referring to the ability to produce force. In low

load exercise, we are training for low threshold recruitment and motor control training, rather than hypertrophy or strength. To accomplish this requires non-functional training, training that takes the person out of their normal motor habits. We will have the patient move one joint system while maintaining neutral position in an adjacent joint system. coordinating this type of movement is the basis for both testing of global motor control, and for global stability exercises.

Low load exercise is defined as an exercise the patient can do for four minutes without fatigue or substitutions. We are attempting to retrain, recruit, the slow postural muscles that we use to stand, to sit, to accomplish simple activities of daily living. By going slow, by doing sustained activities, we are primarily recruiting the slow motor units, the postural, tonic motor units within the muscles. The movements must be done with slow continual movements, void of substitutions by other muscle groups, must not have a respiratory cost (breath holding), and must be done in the low threshold environment. These types of exercises will optimize postural control and stability. What day to day activities activities or exercises enhance global stabilizers? Ballroom dancing, yoga, Feldenkrais, tai chi or chi kung come to mind.

Once we add a higher load (weights, machines, etc) or more speed; then we are primarily utilizing the fast motor units. This recruits the bigger mobilizer muscles, and the fast motor units within the stabilizer muscles. For global stabilizer training, we are not trying to change muscle structure. We are attempting to improve the nervous system's ability to co-ordinate and improve efficiency *(sounds like a chiropractic principle to me!).*

Low load exercises are mentally challenging. First, it's hard to get "athletes" to slow down. Second, when proprioception is diminished, the sense of effort increases in doing low load exercises.

The principles for both testing and training are fairly simple. Can these patients control direction related stress and strain? Our example will be testing for lack of global extensor function, for patients who fail to control flexion. We are testing and/or recruiting primarily the global multifidi. Have the patient flex below the lumbar spine, and see if they can maintain the lordosis, hold neutral in the lumbar spine. Examples of this include "the waiters bow"(have the patient bend forward, while maintaining lumbar neutral) and the hip hinge (stand to sit, and sit to stand). Craig Liebenson has a nice handout on the hip hinge on his web site[v]. The main question the test is assessing is simple. Can the patient maintain neutral lumbar spine as they do these isolation type motions. Watch closely from the side.

Another test, done supine hook lying, is to have the patient lift either one bent leg at a time to 90 degrees, or lift both bent legs. Can the patient maintain the lumbars in lordosis. You can test with a flat hand under the spine. Ideally, put a pressure biofeedback stabilizer unit (or blood pressure cuff) under the lumbars, to give the patient visual feedback. Can they maintain a 40 pound pressure? It's OK if the pressure goes up 2 pounds with one leg lift, or up to 10 pounds with the double leg lift

Keeping it simple, these same motions can be used as the retraining exercises. I like the ease of these motions. They are not hard for the patient to learn, and can really make a difference. The hip hinge is both an exercise and an integration into a functional activity, going from sit to stand. The exercises have to be done with attention to detail, specifically keeping the lumbar spine in neutral, not letting the lumbars flex while moving at the hips. Keeping the hips in neutral, rather than letting the knees fall outward or inward, is also important.

A brief clinical note. I reinjured my low back two weeks ago, and I kept having morning glitches, little spasms and catches in my right lower back. I noted that my right local multifidi had stopped working properly, I had a huge timing delay once again. I worked on this for several days using the exercise I outlined in the local stabilizer section of Stability Principles article(*editor, see below, insert end note one, for a second time here).* This was slow going, until my exercise coach suggested I first do a few brief squats[vi], to reset my lower back musculature. Immediately, the timing delay was mostly gone, and I stopped having daily AM glitches! Doing a brief global stability exercise immediately improved my lumbar motor function. Another patient of mine, with chronic low back pain when she gardened, had a similar response. This is not a miracle, just some good changes. I've shot a video for this article, titled "Global Stability tests and exercises," search youtube for marchellerdc to see it.

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Once again, I've attempted to distill and simplify someone else's comprehensive body of work. The goal: to introduce you to some newer concepts, some new ways of looking at rehab. You may already be teaching some of these exercises. Perhaps you will look at them differently, see where they fit, who they are for. In the next two articles, we'll address both local stabilizer muscle function, and higher load training for the global stabilizers. The Kinetic Control model has profoundly reframed how I look at rehab. I hope these ideas help you and your patients, as well.

[i] *Editor, please insert the proper e-address here, for the permanent address of my last article , what I call DC_64_Stabilization Principles*

[ii] Bergmark A., Stability of the lumbar spine. A study in mechanical engineering. Acta Orthop Scand Suppl. 1989;230:1-54.

[iii] Bradl I, Mörl F, Scholle HC, Grassme R, Müller R, Grieshaber R.
Back muscle activation pattern and spectrum in defined load situations.
Pathophysiology. 2005 Dec;12(4):275-80. Epub 2005 Oct 7.
PMID: 16214309 [PubMed]

[iv] Comerford MJ, Mottram SL & Gibbons SGT 2008 Understanding Movement & Function - Concepts Course Notes. Kinetic Control, KC International UK. www.kineticcontrol.com

[v] Liebenson, Craig, Hip Hinge exercise explanation, http://www.lasportsandspine.com/pdfs/HipHinge-03.pdf

[vi] Pdf for Spine Squat exercise, http://www.marchellerdc.com/pro_resources/Articles/spine_squat.pdf