

The Heavy Concept

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I was trying to find a way to have abdominal muscles fire first during kneelifts, which is the proper sequence of muscle activation. Muscle recruitment is supposed to be proximal to distal (the core muscles fire first and then the muscles of the extremities) but our bodies find the easiest way to do things and that causes the muscles of the arms and legs to fire first ... and the tail wags the dog (the trunk goes along for a ride instead of controlling the ride). You can imagine this by thinking of someone standing at the edge of the pool doing side-leg-lifts (unilateral hip abduction and adduction) - the leg is moving and the body is swinging/whipping everywhere.

The 'Heavy Concept' puts the focus back on the synergistic and stabilizing muscles and takes it away from the prime mover.

While you're sitting and reading, try doing 4 seated kneelifts (RLRL). Depending on how high you lift, you'll probably notice the body rocks side-to-side. Now imagine that someone has super-glued your foot to the floor and try to lift it. It won't come up but continue trying harder (without letting the body lean). What you've done, by imagining the foot is stuck, is activate deep tissue trunk/core muscles (synergists and stabilizers) - you can probably feel it in your abdominals. Next imagine that you're slowly overcoming the super-glue as you lift your leg. This is what I call the 'Heavy Concept'. It's actually neuromuscular retraining. I don't call it that because people don't understand. They DO understand 'heavy'.

'Reverse heavy' is simply returning to anatomical position while imagining the limb is too light. Lowering the knee from a kneelift is an example. Hold your knee up and then imagine surgical tubing holding the knee up - the middle of the tubing is under the knee and the two ends are attached to the ceiling. Now you can't put your knee back down but you're trying - this, once again, activates deep tissue trunk muscles.

Core / Balance

The main effect of injury or aging is the loss of neuromuscular timing, loss of balance, and loss of trunk control, which lead to a loss of skill and function. The Heavy Concept can help to restore these factors and promote normal musculoskeletal biomechanics.

Lack of core strength affects alignment and movement execution. A weak (and therefore unstable) core is a poor working foundation, which can lead to injuries and other weaknesses. Injuries can occur due to the loss of ideal posture when performing an exercise. If a client has poor core strength to start with, exercise only compounds the potential for injury.

Why So Little Improvement in Traditional Exercise? We're often too concerned with working the more superficially-placed muscles without first creating a solid infrastructure. In other words, we train prime movers without equal conditioning of the associated stabilizers. *We must understand that while we are leading our clients through exercises we are also programming their nervous systems with movement patterns.* If technique and posture are poor during

exercise the same will be true at work and in ADL's (Activities of Daily Living). Instead of improving musculoskeletal function, poor techniques and posture only accelerate musculoskeletal dysfunction.

Reprogramming Movement Patterns. The Heavy Concept can improve functional movement organization by re-educating neuromuscular patterns of the trunk, pelvis and shoulder girdle. Activation of the trunk and pelvis muscles precedes firing of the hip and leg muscles during lower extremity exercise, while contraction of the scapular muscles precedes upper extremity movements.

When we were infants we all worked from the inside-out. We didn't move an arm or leg without engaging inner core muscles first. Since our bodies are good at finding the easiest way to do things, we gradually learn to move from the outside in (as I mentioned, the tail is wagging the dog). When we lift our arm to the side we offset it with head and leg movement (for balance) rather than engaging the trunk.

Muscle strength and endurance, as well as posture and tone can be enhanced by reversing this natural process. *Heavy* uses stabilizing and synergistic focus. Usually (in traditional exercise) strong muscles get stronger and weak get weaker. Not with this concept. Appropriate timing of muscle activation reduces the biomechanical demands on joint structures (such as the vertebral joints, rotator cuffs, hips and feet) and more distally placed muscles.

Skilled movements are characterized by reduced variability and increased efficiency. Development of skill requires the repetition of precise, well-coordinated movement with accuracy, quality not quantity, and knowing the primary mover is not the focus. Stabilizers and synergists engage first and should be felt internally anchoring the body.

Try This

Lift both of your arms to shoulder height. Where do you feel initiation of the exercise? My clients don't feel it start anywhere! You might. Now imagine you'd like to do that exercise again but your arms are too heavy to lift. Continue to try to lift them but they're WAY too heavy. Do you feel the scapular depression? You should. Now, imagine that they're heavy but you succeed in lifting them – do you still feel scapular depression? Again, you should. That was an exercise using the Heavy Concept to change the muscle recruitment sequence. When we think it's heavy, we move from the inside out – the way we should.

How Does It Work?

Proprioception / Kinesthetic Sense is Enhanced with Heavy. Development of functional movement organization and improved awareness of the body in space is a direct result of several factors.

First, activation and control of the core muscles leads *to increased input into the central nervous system* from muscle spindles and tendon organs.

Increased input provides the musculoskeletal system with the *information to coordinate and control movements*.

Intuitively, activation of a greater number of receptors will make more information available to the central nervous system, leading to *greater awareness of the position of the body and limbs with respect to self and space. (Proprioception is the sum of input from all of the sensory receptors of the musculoskeletal system, including muscle spindles, skin receptors, mechanoreceptors, etc. The sensation is primarily from muscles and joints. Input is based upon muscle contraction or stretching. Feedback is received through the degree and rate of angulations – positional changes. Neuromuscular spindles are wrapped around muscle fibers. Golgi tendon organs are located at the muscle and tendon junction and sense tendon stretch.)*

Inside Out – How to Teach

I tell my clients they're going to work from the inside-out, not from the outside-in. "Inside out" means that deep tissue, inner core, muscles fire first. The focus is on the synergists and stabilizers rather than the prime mover. Just like a building, we want the infrastructure to be solid before adding the insulation and siding. The majority of activities of daily living (and sports related movements) should be proximal to distal (from the inside out).

Teaching Hints

Try only one aspect of the stabilization (scapula, gluteals or abdominals) at a time. Invite precise, efficient recruitment and timing of neuromuscular activation

Watch for breath retention. Encourage continuous breathing with exhalation during the effort.

Work toward excellent technique. Encourage the execution of smooth movement flow, advancing coordinated movement by concentration and avoiding ballistic movements.

Work toward neutral spine. Keep shoulders relaxed and down. Watch for "chin forward."

Move slowly and with control. This could mean only 4 reps (where you'd usually do 6) before your client's brain goes somewhere else!

Sequence movement with repetitions in one position first and then consider positional variety. This enhances reinforcement of functional movement organization and facilitates transfer of control and preferred organization into activities of daily living. Example – while performing the exercise do it first with upright alignment, then do it with a lean R, L, forward, back, stand against the wall, change arm position or head position, etc. That's using positional variety to reinforce the skill.

You can imagine you're using weights or tubing but, if you actually use them, you'll go back to moving from the outside in. It's the 'thought' of heavy (or reverse heavy) that gets us to move correctly.

This concept won't work with those who have impaired cognition.

You can start the 'Heavy Concept' with actual movement. You don't have to start with 'so heavy you can't move'. I like to have clients imagine it's so heavy they can't move – then there's a proprioceptive trace in the muscle fibers and the muscles know what they're supposed to do when actual movement occurs. It's up to you how to apply the concept.

Never confuse movement with action.

You'll love the outcomes once you get the hang of it!

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