

The Core – Eccentric Loading & Range of Motion

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This article discusses how most of the Core training we do is for initiation of movement and not for controlling movement. Also we most often train through a limited range of motion (ROM) but most of the injuries we incur come from the controlling aspect of contraction and extreme ROM through the core.

Controlling Functionality:

When we look at the functionality of the core (or any muscle for that matter), there are two main functions or roles that muscle plays:

1. Muscle contracts and initiates a movement around a joint, and
2. Muscle slow down and/or stops a movement that has begun (control of the contraction movement around the joint).

Most training is aimed at the initiating part of the muscle function (lifting or moving a weight through some range of motion).

What we do very little of is to prepare muscles to rapidly decelerate a joint movement and it is often this lack of muscular preparation that leads to injury when the muscles/joints are required to undertake such a controlling/resisting role.

As a recent example, a member at my local gym was telling me that he had quite badly hurt his lower back because his teenage daughter ran up to him and leap onto him and he twisted and arched his back to catch her and his core had no idea how to protect him from this rapid core loading resulting in him badly straining his lower back.



This example posed a 'double whammy' problem:

1. He hadn't trained his core to support extreme ranges of motion (such as with twisting and extending), and
2. His core didn't know how to safely rapidly contract upon impact (daughter jumping onto him) and this resulted in much of the force not being absorbed by the core musculature, and being transmitted directly to the lumbar spine with the resultant injury.

If we focus on the core and look to add some exercises that will target the rapid deceleration of any spine movement and any extreme range of motion there are some simple but very effective exercises you can do to begin to prepare the core for better spine protection with irregular movements and loads.

I am not one for swinging iron around in a gym setting and as such I am a huge fan of medicine balls (hard, soft, leather, rubber, slam balls, etc). These devices are so multi functional and in particular, the air filled rubber variety offer so many functional training opportunities that all gyms should have a variety of sizes and weights.

Some of the exercises that you could consider adding to your routine to begin the preparation of your core to handle both extremes of range of motion (ROM) and deceleration speeds include:

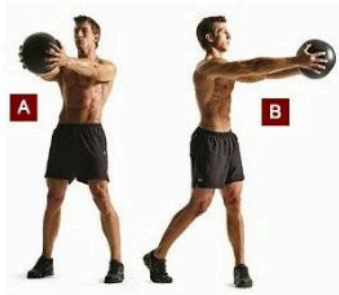
1. Round the worlds (ROM).



1. I have my clients perform an extreme version of the image above.
2. The client is to reach out as far as they can as well as lean backwards (arch their back) and reach as far behind themselves as they can.

3. The movement is more horizontal in nature than vertical.

2. Rapid deceleration med ball swings.



1. You don't need a huge weight for this exercise.
2. You want to try to move the MB through several different planes.
3. The goal is to rapidly decelerate the ball at the end of the movement prior to beginning the movement in the opposite direction.
4. You must focus on a strong core and engage **"PRIOR"** to getting to the end of range otherwise your lumbar spine will take the brunt of the load.

3. Controlled Spine extension exercises (ROM).



1. Ensuring the core is able to support an extended spine is very important.
2. A safe way of beginning to train the core/spine in this ROM is to complete varying Superperson routines.
3. Adding a twist during the movement begins to prepare the spine for extension and rotation – an important functional strength.

4. Partner Medicine Ball Throws/Catches.

Whilst these exercises require a partner, they are the true eccentric controlling core training exercises that will provide you with a highly robust core with the capacity to handle all kinds of rapid eccentric loaded movements upon the spine.

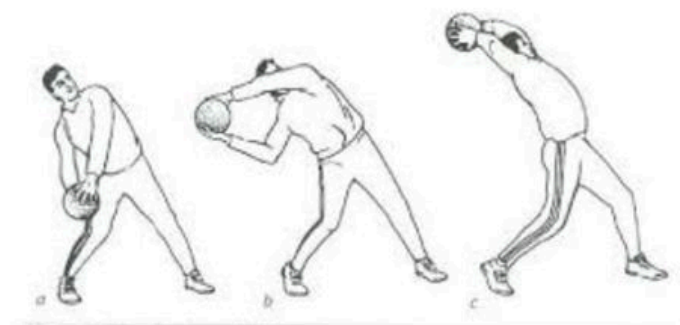


This particular exercise can be made more functional by having the thrower not just toss the ball directly to the client, but to throw it slightly to the side with the client required to catch with both hands, rock back and throw back dynamically with both hands. Only a 2-3kg ball is required.



Any partner throwing exercise where there is a focus on controlling the weight when you first catch it is a great core trainer.

In the middle image, the focus on the trainer with the red shirt should be to strongly resist the ball from twisting his body, and only once he has controlled this force should he rotate to throw the ball back to his training partner.



Any form of dynamic build up to a throw is great to prepare the core for extreme ranges of motion.

Medicine ball throws to a wall/partner and even with a rotation (Javelin throw – see above) all prepare the core to support rapid extreme ranges of motion under load.

Hopefully this article has given you some ideas around how you might better prepare your core for the day to day demands of work and exercise (and in particular how to handle those extreme events that typically lead to lower back injury).

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