

Spinal Health & Core Training



FROM BROKEN TO BADASS & EVERYTHING IN BETWEEN: CORE TRAINING FOR THE FITNESS MASSES

Dean Somerset, BSc Kinesiology, CEP, CSCS, MEPD

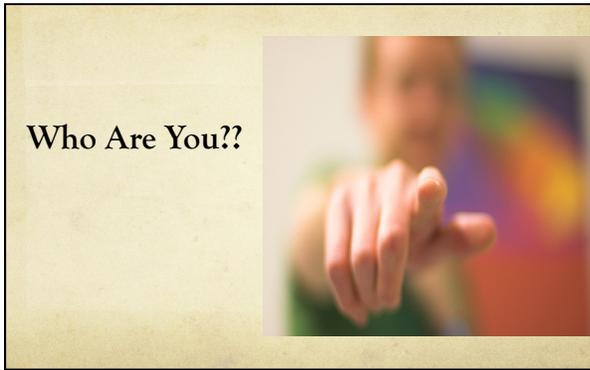
Who Am I?

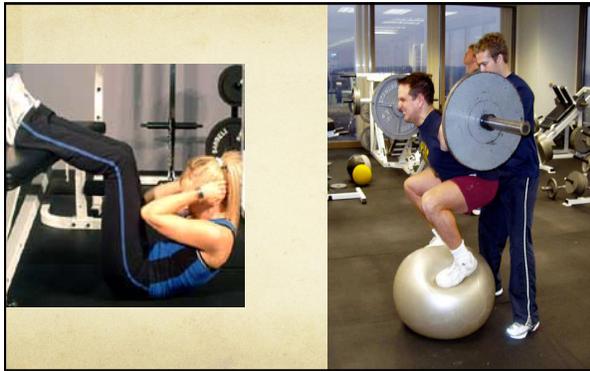
- Personal trainer for past 10 years, specializing in injury rehabilitation (sub-specialization in spinal recovery), clinical exercise physiologist
- Published author, international speaker
- Cancer & exercise expert, worked with over 200 cancer patients in gym & clinical research trials
- Meathead who lifts heavy things

LIVESTRONG

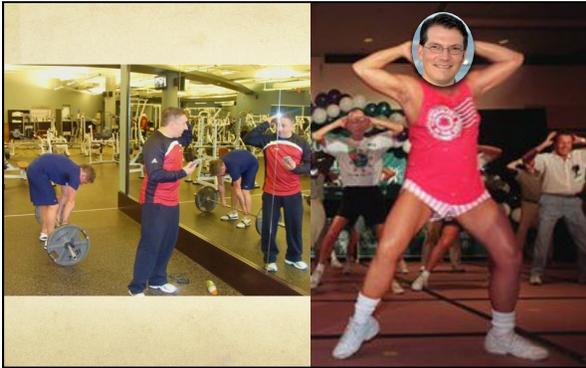










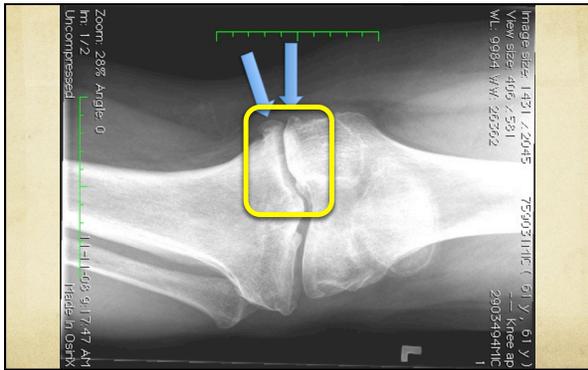


Before we Begin...

- Knowledge is power, but only if used
- Make it as simple as possible, but no simpler
- Movements train muscles, muscles don't train movements





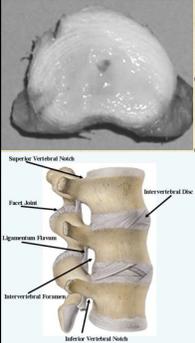




Spine - Functional Anatomy

- Thoracic Spine Mobility:
 - Flexion/extension - 4-12° increasing T1→T12
 - Lateral flexion - 6-9° increasing T1→T12
 - Rotation - 2-9° decreasing T1→T12
- Lumbar Spine Mobility
 - Flexion/extension - 13-14°, more flexion than extension
 - Lateral flexion - 3-8° lowest at L5-S1
 - Rotation - 2-5°, most at L5-S1

○ Low Back Disorders, 2nd edition. Dr. Stuart McGill, 2007

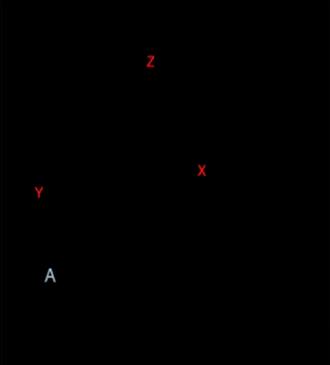


Spine - Functional Anatomy

- disc consists of 10-20 fibrous annulus rings around jelly-like nucleus centre
- Extremely high water content (80%), subject to dehydration, easily damaged when dehydrated
- Strong against compression, weak against shear, torque

COUPLED MOTION - ABILITY TO MOVE THROUGH MULTIPLE PLANES OF ACTION AT ONCE.

FLEXION MOMENT THAT ALSO CAUSES ROTATION & LATERAL FLEXION

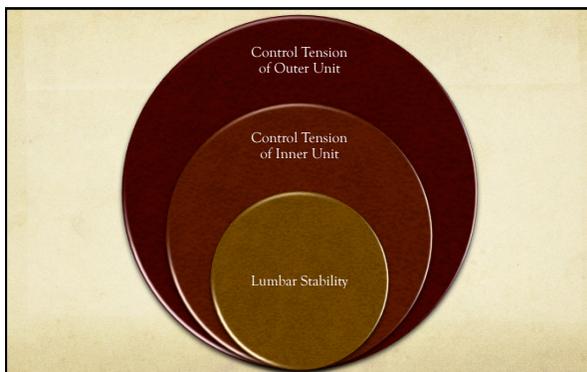


What is the Core??

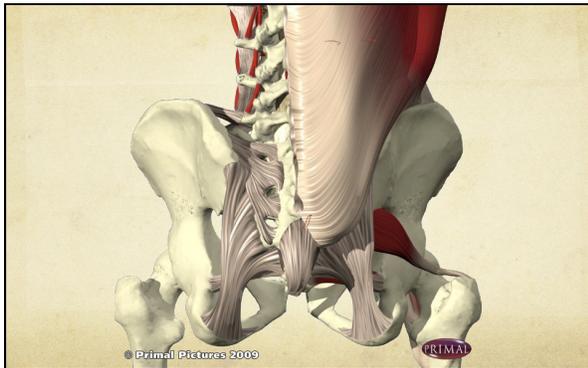
- Common belief of “inner core” & “outer core”
- Inner core - diaphragm, pelvic floor, TvA, multifidus
- Outer core - QL, ROE, ROI, rectus abdominis

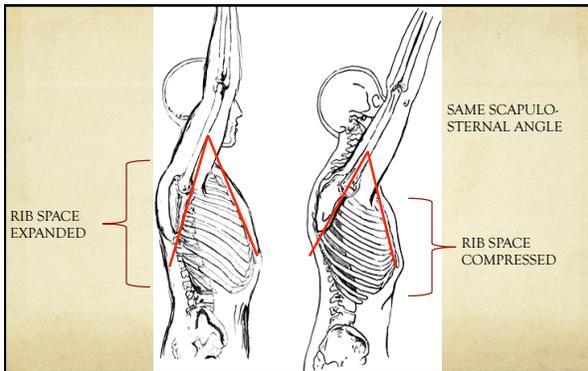
What is the Core??

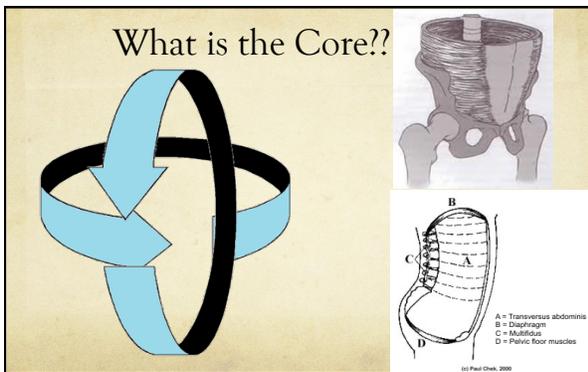
- Panjabi et al (1992), *Therapeutic Exercise for Spinal Segmental Stabilization in Low Back Pain*
- segmental spinal injury caused TvA to down-regulate, took other muscles that specifically controlled that segment
- Forgets to include latissimus dorsi, iliopsoas, transversari, spinalis, glutes, thoracolumbar & intraabdominal fascial sheaths.....











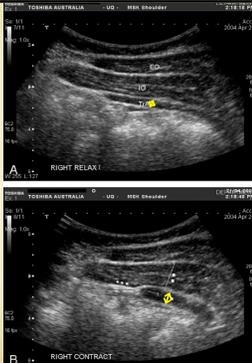
What is the Core??



The image contains three distinct visual elements. On the left is a large, bright yellow-green tennis ball. In the center is a smaller image of a tennis ball in contact with a tennis racket's strings. On the right is a photograph of a male bodybuilder's muscular torso, showing the abdominal muscles.

What is the Core??

- Australian Method:
- Belief that TvA is major influencer of spinal stability
- Activated through a “drawing in,” can influence multifidus function & increase spinal stability



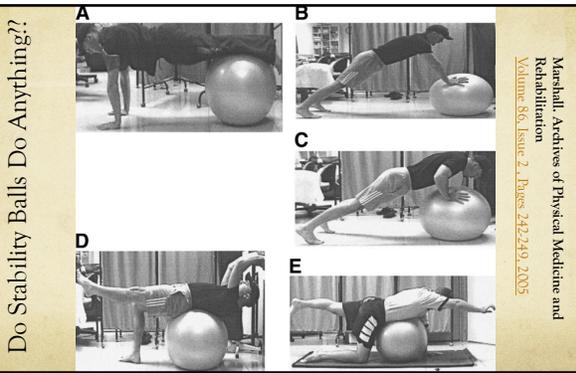
The image shows two ultrasound scans of the right side of the body. The top scan is labeled 'RIGHT RELAX' and the bottom scan is labeled 'RIGHT CONTRACT'. Both scans show a cross-section of the body with a yellow arrow pointing to a specific area. The text 'TOSHIBA AISTEALIA' and 'UD Ben Sheehar' is visible at the top of the scans.

What is the Core??

- McGill Model
- Says that drawing in disrupts natural mechanics of core, and can lead to more instability.
- “Bracing” of the abdomen gives the best stability, increases compression & reduces shear forces

However...

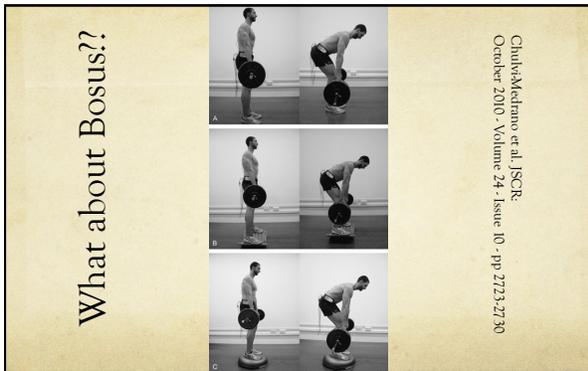
- Spine MUST flex and extend....
- Moment of impact requires spine to instantly stiffen to buttress forces, limit shearing
- Normal gait REQUIRES ~8 degrees between flexion & extension per vertebrae, or you look robotic & waste energy

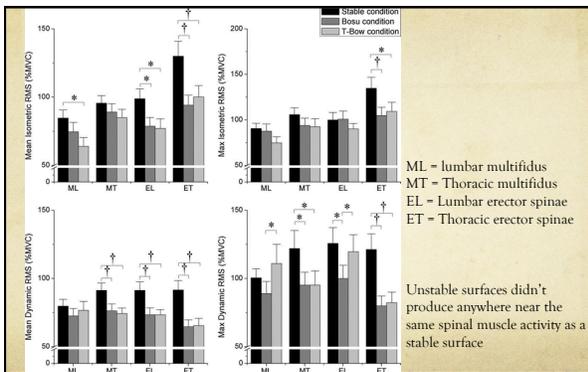


Do Stability Balls Do Anything?

- Found a greater level of muscle activation in rectus by using unstable surfaces (GREAT!!)
- These also altered the relationships between different muscle activation patterns between the exercises compared to stable surfaces (BOOO!!!)
- Lots of clinical research has shown less activation of RA compared to increased activation of obliques and transverse is necessary for LBP patients (HUH????) *Aust J Physiother* . 1993;39:187-193







What About the Bosu??

- Standing on an unstable surface is more challenging than on a stable surface, isn't related to muscular activity
- Muscle activation on unstable surfaces < stable surfaces or altered enough to produce new firing sequences



Conclusion...

Diesels don't ride on skinny tires

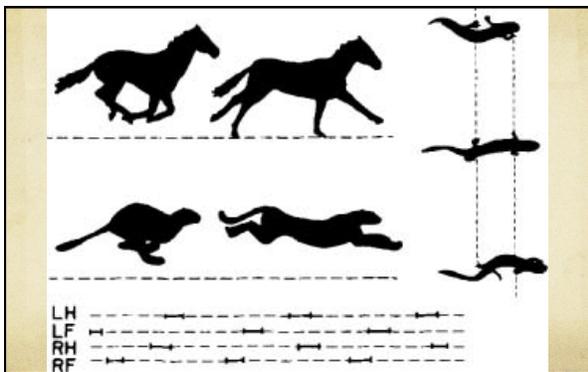


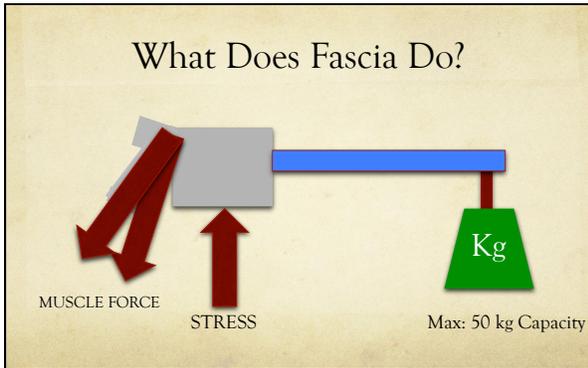
Lift heavy from the floor

You look way cooler

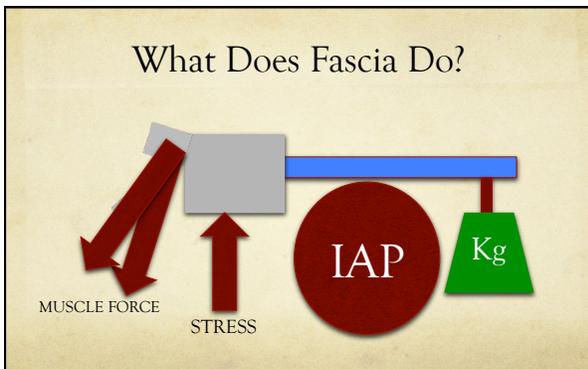








- ### What Does Fascia Do?
- We know humans can lift more than 50kg
 - Old mathematical model left constructs of muscles exerting “negative force,” or muscles pushing
 - Created concept of intra-abdominal pressure pushing up on diaphragm, reducing the load



What Does Fascia Do??



- Biomechanical model left undesirable side effect of clients exploding under heavy loads
- How embarrassing.....



What Does Fascia Do??

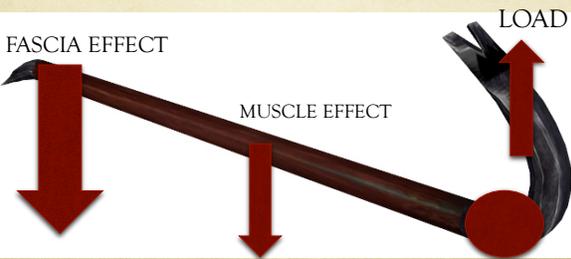
- Provides additional forces to assist musculature, contractile elements, and “negative force” requirements
- Common surgeries disrupt fascia → decreased lumbodorsal fascial integrity → decreased lumbar stability → explosions



What Does Fascia Do?

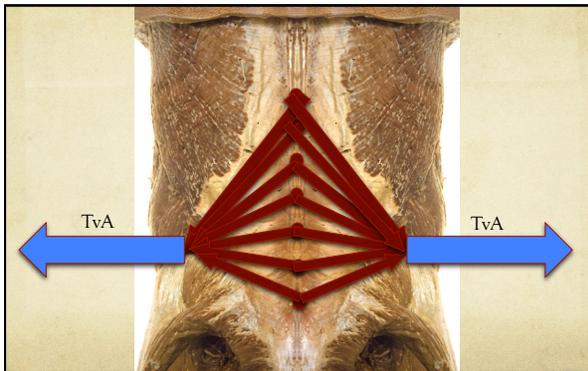
- Fascia wraps diagonally, provides cross-links, additional buttressing systems, and sensory integration to help create tension
- Fascia is farther from axis of rotation and creates greater leverage than the muscles near the joint

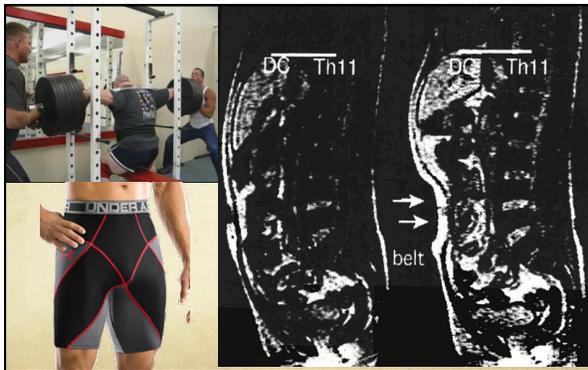
What Does Fascia Do??



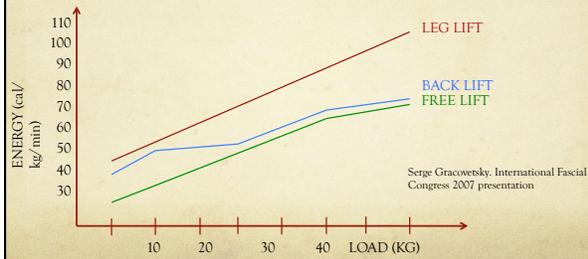
What Does Fascia Do??

- Low back pain increases muscle activity of spinal erectors, decreases activity of lumbodorsal fascia
- Fascial damage may be result/cause of LBP
- IAP causes fascial contraction, which pulls diagonally and brings transverse processes together, helping in extension

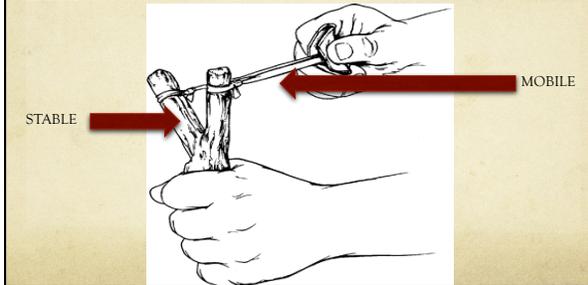




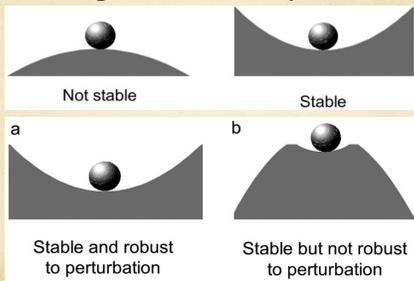
So then why do we always slump?



Another Way to Think of It...



Spinal Stability



Reeves et al (2007). Spine Stability: The Six Blind Men and the Elephant. Clin Biomech, March, 22(3): 266-274

Dean's School of Core Training

- NEUTRAL, BRACE, BREATHE
- Train stability, anti flexion/extension and anti-rotation
- Train pelvic mobility with stable stiff spine
- Train rotation by teaching hip and shoulder rotation instead of localized spinal rotation
- Train T-spine mobility, specifically extension, and scapular depression & retraction
- 6-packs are dietary, strong cores are trained

Core Training Progressions



Core Training ALGORYTHM

$$\text{CORE INFLUENCE} = \frac{F \times L^2 + P}{B \times D}$$

- F - FORCE
- L - LEVER ARM LENGTH
- P - PERTURBATION, FREQUENCY OF APPLICATION
- B - BASE OF SUPPORT
- D - DIRECTION OF FORCE APPLICATION

EXAMPLE...

Dead Bugs	Force	Lever	Perturbations	Base of Support	Direction
Supported & Stable					
Supported & Unstable					
Unsupported & Stable					
Unsupported & Unstable					



- Back Pain Pointers**
- Figure out offending movements, avoid them
 - GET OFF YOUR BUTT!!
 - Train the glutes
 - Train the glutes
 - Work on vertical pulling, core stability, T-spine mobility, neutral spine, dynamic stability
 - Breathing mechanics!!!

Thanks!!!!



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Old School Strength with a New Age Twist



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