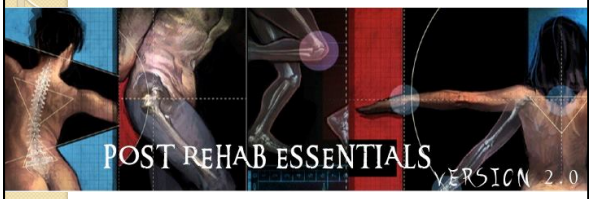
More Stuff About Me

- Personal trainer 10 years, specializing in injury rehabilitation (sub-specialization in spinal recovery)
- Worked with a LOT of low back pain, knee/ shoulder injuries, cancer patients, distance runners, metabolic disorders, paraplegics, even an Olympic gold medalist
- Meathead who lifts heavy things

Check Out….

Coming Soon!!



MARCH, 2013

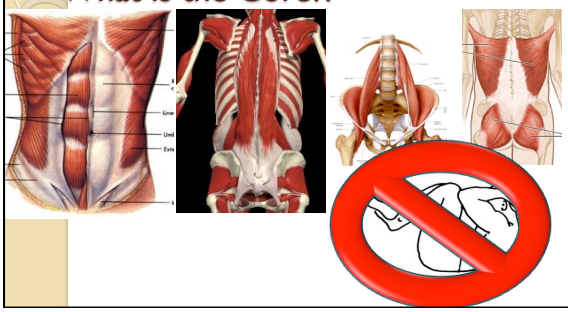
Today's Menu

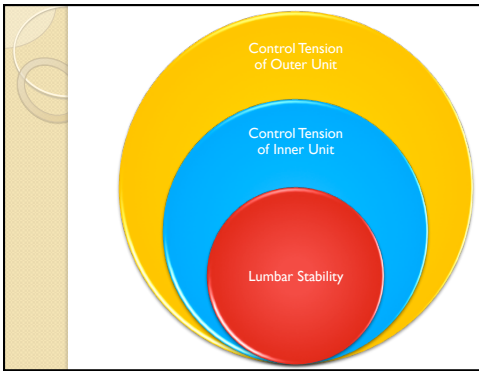
- What to look for when assessing core function
- Why hip complex training is the second most important part of core training
- The ONLY 4 exercises you need to build a bullet-proof core, and how to progress them

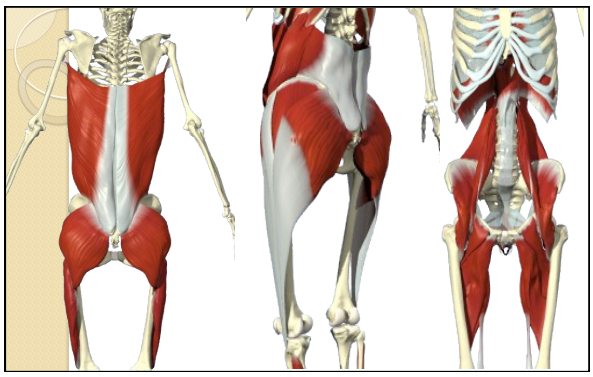
What is the Core??

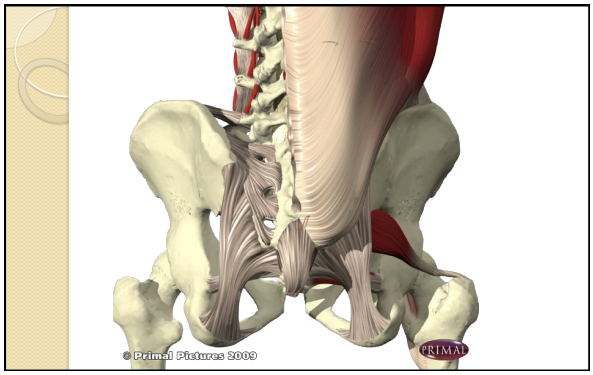
- Inner core –
- Outer core –
- Panjabi et al (1992), *Therapeutic Exercise for Spinal Segmental Stabilization in Low Back Pain*, "Australian Method" → TvA activation patterns
- Forgets to include latissimus dorsi, illipsoas, transversari, spinalis, glutes, thoracolumbar & intraabdominal fascial sheaths.....

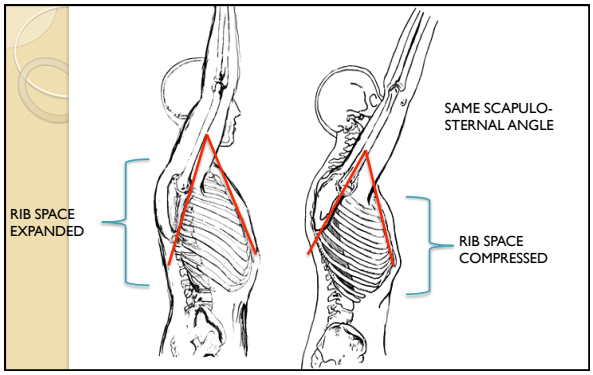
What is the Core??



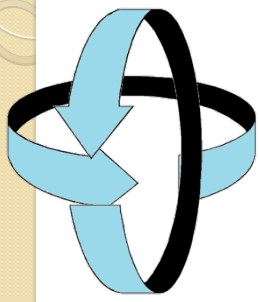


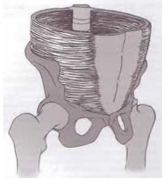


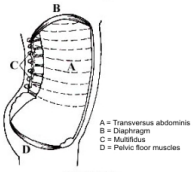

© Primal Pictures 2009
PRIMAL


SAME SCAPULO-STERNAL ANGLE
RIB SPACE EXPANDED
RIB SPACE COMPRESSED

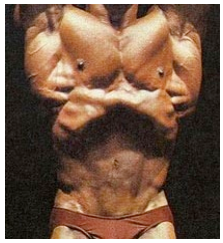
What is the Core??

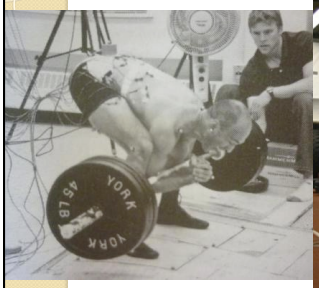






What is the Core??





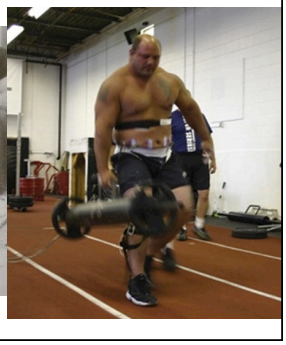


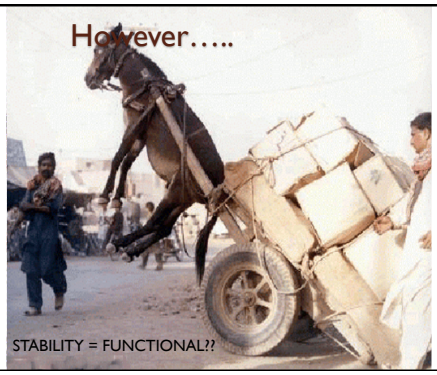
Table 2. Average peak muscle activation for the trunk and selected hip and thigh muscles recorded during all strongman events (the case study of the KWRS, KWLS, and SL are included).

		Muscle														
Event		RRA	LRA	REO	LEO	RIO	LIO	RLD	LLD	RLES	LLES	RGMED	RGMAX	RBF	RRF	
FW	Mean	13.3	20.6	50.4	39.3	110.8	80.9	151.7	169.2	91.4	77.4	143.5	105.8	108.4	114.1	54.0	77.4
	SD	3.8	12.6	17.4	30.6	33.0	26.9	25.7	55.4	54.7	29.3	36.7	51.1	66.9	70.3	13.7	35.6
RHSC	Mean	5.6	21.2	29.0	61.5	62.6	47.3	91.4	68.9	52.1	32.4	44.1	77.4	57.3	50.5	48.3	56.5
	SD	1.8	14.6	17.8	21.9	26.8	45.3	39.1	23.2	17.3	4.6	9.1	21.3	23.6	31.2	8.6	11.4
LHSC	Mean	14.6	6.3	65.1	12.6	51.9	31.5	65.3	97.4	24.9	47.1	96.9	31.6	64.1	78.2	31.2	41.1
	SD	4.5	2.2	24.4	5.3	41.5	4.6	6.2	55.7	17.6	6.3	20.4	10.1	38.7	39.5	7.5	9.2
YW	Mean	22.3	32.5	58.8	47.5	128.3	52.6	45.5	51.0	65.6	69.3	107.4	79.2	108.1	113.0	61.7	106.9
	SD	18.1	22.7	29.1	31.7	21.7	40.8	31.7	26.4	14.4	17.5	31.5	10.2	69.7	52.1	6.3	23.5
LL	Mean	27.3	29.1	61.5	49.6	98.1	91.3	146.2	179.7	128.0	135.7	161.7	93.0	156.1	157.6	73.2	100.2
	SD	27.8	12.4	49.1	27.9	44.0	30.6	90.8	102.2	87.8	87.0	92.8	37.6	163.9	147.1	26.4	69.5
TF	Mean	87.8	69.3	106.6	80.5	141.5	97.6	227.2	237.9	118.1	100.3	236.2	157.7	179.8	200.4	90.7	154.5
	SD	63.9	70.6	45.4	12.2	54.6	34.1	145.4	84.1	47.2	21.1	72.2	31.0	75.6	61.5	7.2	86.2
KWLS	Mean	30.5	45.6	73.6	87.0	105.4	85.3	57.1	108.1	102.3	72.2	114.3	84.6	87.5	64.5	70.0	53.4
	SD	14.8	42.8	62.2	46.0	14.3	36.9	35.4	17.4	67.3	36.6	26.5	16.3	31.9	7.0	25.8	29.4
KWRS	Mean	19.9	23.2	64.9	39.7	96.4	79.1	49.4	102.2	91.4	76.2	138.7	92.6	131.7	89.7	75.2	72.0
	SD	1.7	6.4	21.4	17.7	11.3	20.2	20.1	15.7	29.5	46.0	29.2	35.9	0.3	24.5	22.5	40.6
SL	Mean	77.6	76.8	97.6	103.6	102.0	117.5	109.3	148.9	131.8	154.7	226.0	137.3	288.6	259.1	85.4	176.8
	SD	41.6	24.7	67.7	2.5	63.0	67.3	37.5	58.6	77.1	36.4	81.0	30.9	131.6	154.9	7.8	52.1

FW = farmer's walk; RHSC = right-hand suitcase carry; LHSC = left-hand suitcase carry; YW = supervoke walk; LL = log lift; TF = tire flip; KWLS = keg walk–left shoulder; KWRS = keg walk–right shoulder; SL = Atlas stone lift; RRA = right rectus abdominis; LRA = left rectus abdominis; REO = right external oblique; LEO = left external oblique; RIO = right internal oblique; LIO = left internal oblique; RLD = right latissimus dorsi; LLD = left latissimus dorsi; RLES = right upper (thoracic) erector spinae; LLES = left upper (thoracic) erector spinae; RLES = right lumbar erector spinae; LLES = left lumbar erector spinae; RGMED = right gluteus medius; RGMAX = right gluteus maximus; RBF = right biceps femoris; RRF = right rectus femoris.

McGill et al (2009). **Trunk Muscle Activation and Lumbar Spine Motion, Load and Stiffness.** *J Strength Cond Res* 23(4): 1148-1161

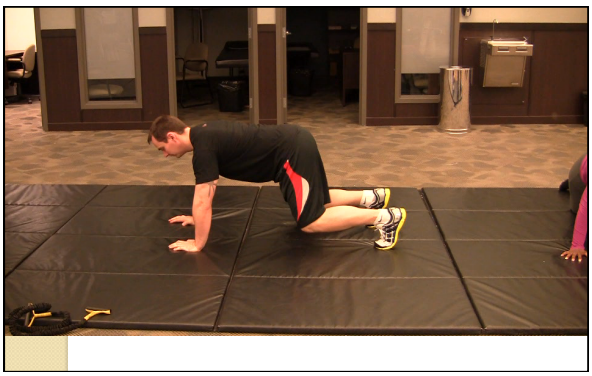
However…..



STABILITY = FUNCTIONAL??

However…

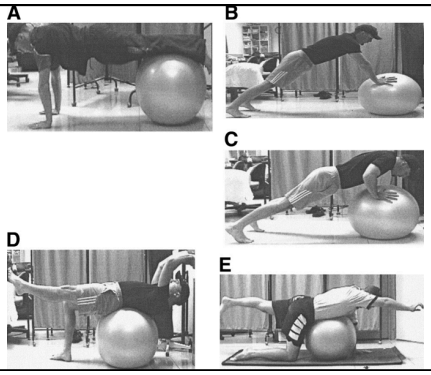
- Spine MUST flex and extend…..
- Moment of impact requires spine to instantly stiffen to buttress forces, limit shearing
- Normal gait REQUIRES ~8 degrees between flexion & extension per vertebrae, or you look robotic & waste energy



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

Do Stability Balls Do Anything??



Marshall. Archives of Physical Medicine and Rehabilitation
Volume 86, Issue 2, Pages 242-249 2005

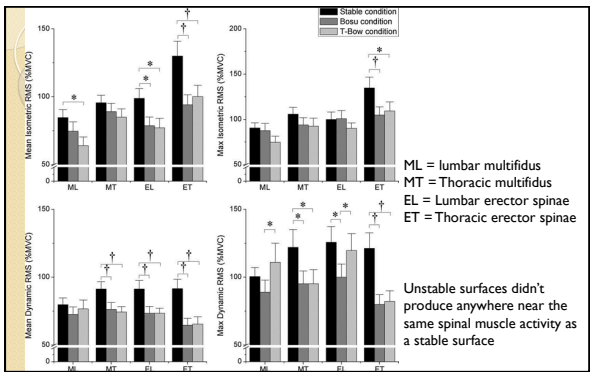
Do Stability Balls Do Anything?

- Greater level of muscle activation in rectus by using unstable surfaces (GREAT!!)
- Altered the relationships betw different activation patterns betw exercises compared to stable surfaces (BOOO!!!)
- Research has shown < activation of RA compared to > activation of obliques & transverse is necessary for LBP patients (HUH????) *Aust J Physiother* . 1993;39:187–193

What about the Bosu??

What about Bosus??

Chulvi-Medrano et al. JSCR- October 2010 -Volume 24 - Issue 10 - pp 2723-2730



ML = lumbar multifidus
MT = Thoracic multifidus
EL = Lumbar erector spinae
ET = Thoracic erector spinae

Unstable surfaces didn't produce anywhere near the same spinal muscle activity as a stable surface

What About the Bosu??

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

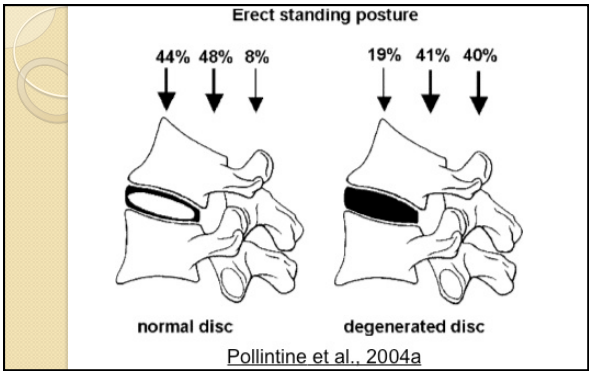
Conclusion…

Diesels don't ride on skinny tires

Lift heavy from the floor

You look way cooler

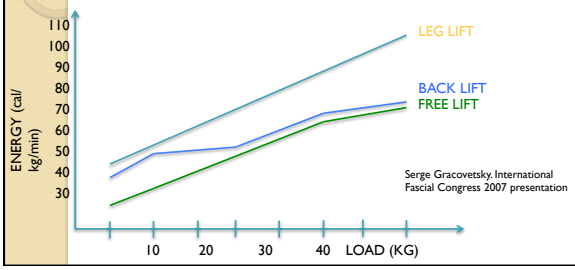

Sweet Baby Jeebus
MAKE IT STOP!!!

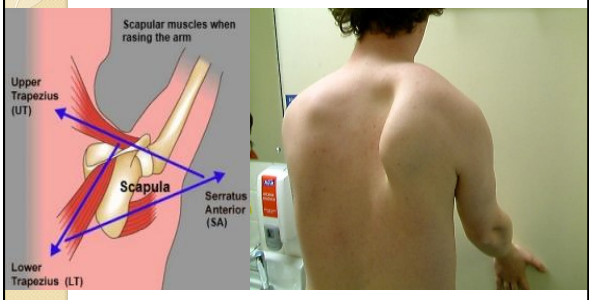

Erect standing posture
44% 48% 8%
19% 41% 40%
normal disc
degenerated disc
Pollintine et al., 2004a

Deficient Motor Pattern

- People lose ability to do what they don't do repeatedly
- Entropy – return system to minimal level of energy, make things easier, find new strategies to succeed
- Reduce strain on one part, place it somewhere else

So then why do we always slump?





Rules to Core Training

- Assume every client over 40 has possible spinal damage → be conservative
- Assume every client under 40 could develop spinal damage → be SMRT
- Train control 1st, then movement capability 2nd, then speed/power development.

Assessing core function

- Manual muscle testing – more advanced, takes time to learn
- Gross motor patterns
- FMS/SMFA
- Movement intolerance testing – pain present
- "assessment exercises"

Assessing core function

What you're looking for:

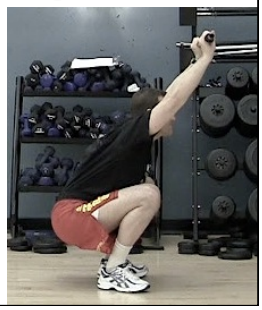
1. Can you stabilize your lumbar spine?
2. Can you handle a load& generate power?
3. Does it hurt when you do something?
4. Does something look off? (ie. Flex from low back, no hips, hitching, rotating, etc)

Toe Touch

Extension Resistance (Bird Dog)

Hip Hinge

Overhead squat



Any Assessment works

- Look at ability to stabilize lumbar spine while creating hip movement
- Look at stabilization against flexion, extension and rotation
- Breathing patterns → diaphragm, ribs, neck
- Train what they need, get them their goals

Rehab → Juggernaut: Best 4 Exercises

- Exercises you can use with any one, at any time, for any goal.
- Loaded Carries
- Planks (front and side)
- Hip hinging (deadlifts)
- Pallof Press

Rehab → Juggernaut

- Alter loads, duration, ROM & directional vector as needed
- Movements used for everyone from spinal rehab to elite athletes
- Main impetus: Spinal control coupled with hip movement.

THANK YOU ALL!!

DEAN SOMERSET
WWW.DEANSOMERSET.COM
dsomerset@worldhealth.ca