



LOW BACK PAIN & THE BASKETBALL ATHLETE

McGill's Guide to Intervention and Rehab

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Tolerance

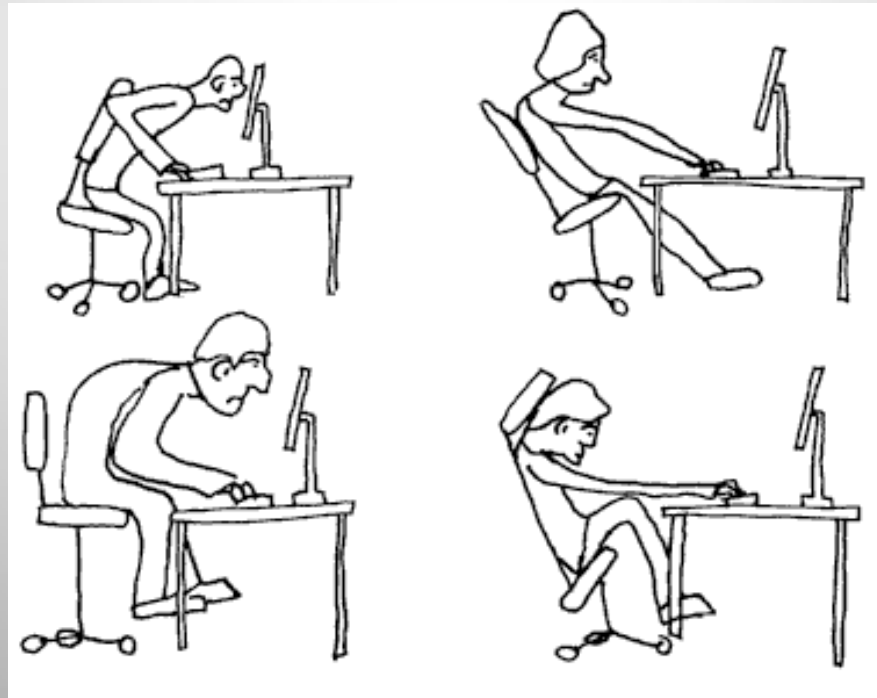
- Tolerance: training the back just under the their tolerance; the key is never to break this line, or we set them back
- Why we must document

Capacity



Back Hygiene: Stability with Exercise and Education

- Consider: Does patient have enough capacity to train by the time they get to the clinic?
After an entire day of increased spinal loads?



Back Hygiene: Stability with Exercise and Education

- Prepare patient for all activities involved in daily life (routine, job, exercise, etc.)
 - Educate on most appropriate spine-sparing postures/muscle patterns



Back Hygiene

Remove the Cause (slide from McGill's presentation at Distinguished Lecture Series in Sports Medicine.)

What are the problems that cause pain?

- Most important for the TFB!!
- Loads: compression, shear, bending
- Postures: sitting, standing, walking (would a lumbar pad help? Are they slouched during standing?)
- Motor patterns: improper stiffness/laxity/mobility
- The disc only have so many number of bends before they damage (Callaghan and McGill, 2001)

Flexion intolerance

- Sitting – and pull spine into compressive force
- Low load in class, but long duration
- Only modest concomitant compressive loads are needed with repeated lumbar flexion to produce herniation. (Callaghan, and McGill 2001)

Spine has a memory

McGill and Brown (1992)



Posture

- POSTURE: teach chin poke/tuck and importance of posture.
- Externally rotate hands to bring shoulders back, point thumbs from pointing in to outward position
- **BREAK OUT**



Abdominal Bracing vs Hollowing

- Focuses on activating muscles on abdomen to make them stiff/braced rather than hollowing or drawing in abdominal wall
- Hollowing= transverse abdominis (TA)
- Bracing= coactivation of transverse abdominis with external and internal obliques to ensure STABILITY in all positions- the active obliques provide stiffness with X-shaped muscle fiber alignment to increase stabilization
- Stiffness is essential for every rotation and translation axis to decrease instability
- In ADL's- use 5% MVC co-contraction of abdominal wall, use 10% MVC in rigorous activity

Abdominal Bracing vs Hollowing



Bracing and Fascial Racking

- Supine position with hand under low back
- Ask patient to encourage activation of abdominal wall
- Facilitate by gripping opposite rectus with thumb and fingers into the obliques.
- Ask them to initiate slight flexion with xiphoid as fulcrum
- Clinician now “rakes” the abdominal wall
- “push out against thumb/fingers” or “fight me with your abdominal wall”



Rehabilitating the “Average” Back

1. Groove the motion patterns, motor patterns, corrective exercise
2. Build whole body and joint stability
3. Build Endurance
4. Build strength
5. Develop power, agility

(slide taken from Third Annual Distinguished Lecture Series in Sports Medicine)

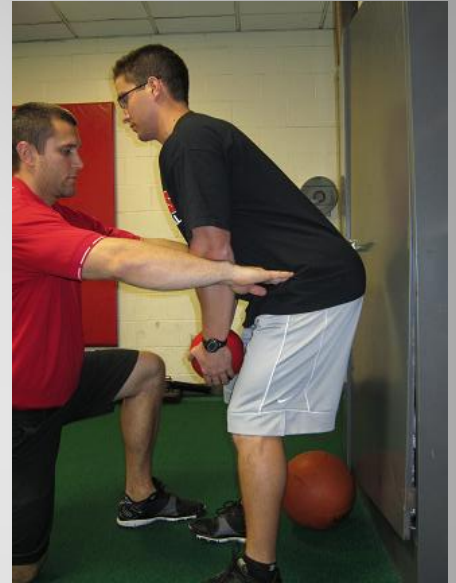
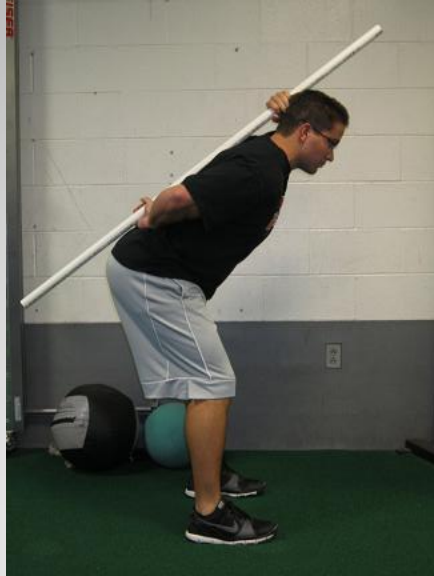
Groove the motion patterns, motor patterns and corrective exercise

- Groove the motion patterns, motor patterns, corrective exercise
 - Fundamental movement patterns exist (SFMA later) and they must be grooved
 - Corrective exercise is a start either after injury or prior to injury to address limitation in these fundamental movements
 - Then these movements must be grooved and perfected
 - Hip hinge (disassociation of hips and spine)
 - Facilitation of glutes

Establish Hip Hinge

- American baseball – hands down the front of the thighs
- Progress to butt touches to wall
- KB or external load





Mobility - Hips

- Stretching the Psoas vs iliacus
- Normal stretch is iliacus vs. integrating the psoas with hand above and lateral bend
- Poor Hip Mobility is linked to LBP (McGill SM et al. Previous history of LBP with work loss is related to lingering effects in biomechanical physiological, personal, psychosocial and motor control characteristics. Ergonomics 2003;46:731-46.)



Hip vs Lumbar

- Consciously need to separate hip rotation from lumbar rotation as well as hip flexion from lumbar flexion
- Achieve spinal position awareness- esp when poor patterns come out and teach patient to make necessary adjustments
 - Cues:
 - have patient put one hand on stomach and other on lumbar region to feel difference between proper and poor flexion when doing knee bends
 - Use stick along spine while having them flex hips keeping the stick along entire length of the spine

Glute amensia

- May be both a common consequence of back troubles and possibly a cause of them as well.
- The general principle that joint pain causes inhibition of the extensors and chronic facilitation of the flexors to the point of “tightness” appears to be true with hip or back pain. (McGill, Low Back Disorders)

Glute amensia

- People with troubled backs use their backs more: many of them have stronger backs but are less endurable than matched asymptomatic controls. (McGill et al, 2003)
- They tend to have more motion in their backs and less motion and load in their hips

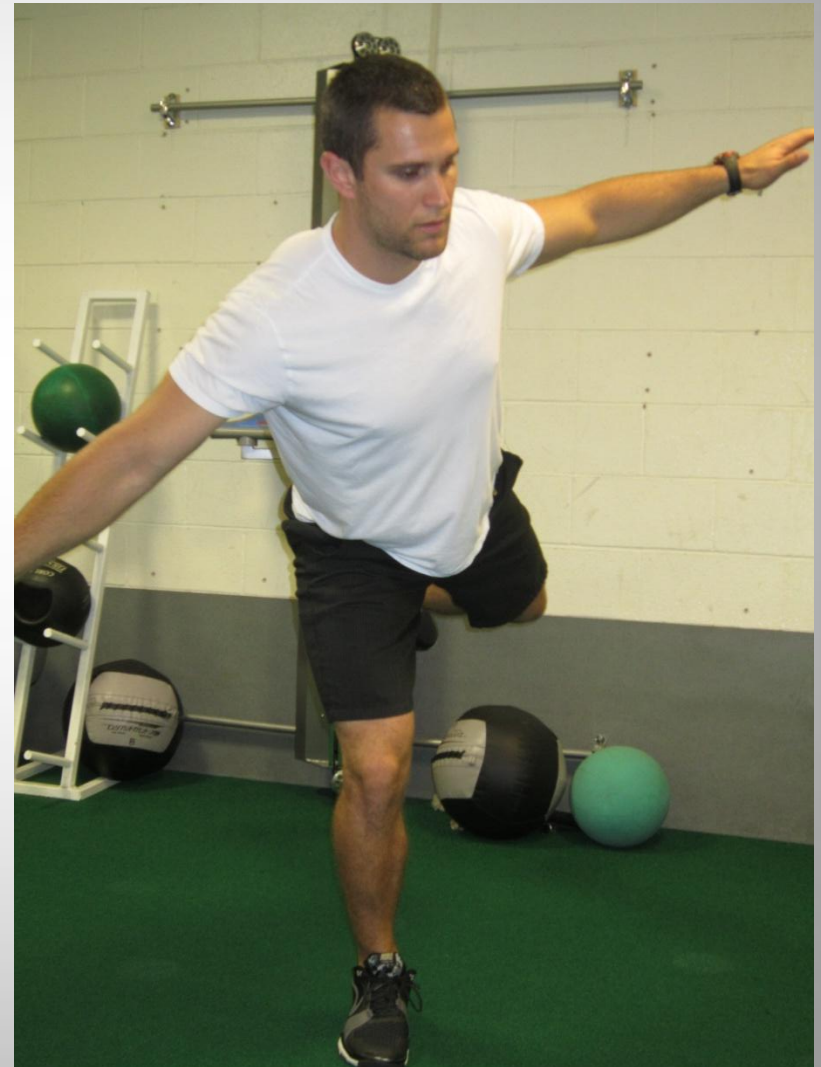


More Glutes Please



Glute Facilitation

- FACILITATING THE GLUTES: stop squeezing balls between the legs and start pushing the knees apart (spread the floor)
- Hip airplane will facilitate glutes as they were intended.



Build whole Body and Joint Stability

- Build whole body and joint stability
 - Mobility and stability continuum – get mobile hips, ankles and t-spine
 - McGill's big three
 - Side bridge (with hip hinge to begin)
 - Curl Up
 - Bird-dog



Increase Endurance

- Increase endurance
 - Russian descending pyramid
 - Should not make the athlete tired: don't increase time from 10 seconds to 30, increase number of reps
 - Example: bird dog – 4 reps L/R, rest, 3 reps L/R, 2 reps L/R



Build Strength / Develop Power & Agility

- Develop power, agility
 - Squatting: spread the floor, grip and ER



Break Out

1. Squat
 - Grip and spread the floor
1. Hip Hinge
 - Baseball stance
 - Slide hands down thigh
 - Wall butt touches
 - KB bottom hold Wall touch
2. Facial Raking
3. Glute Activation
 - Partner teach: gold coin
 - palpate hamstring to ensure they are not using
 - Problems: toes on your foot, athlete drives heel into ground
 - Stroke quads against growth of hair
 - Facilitate glutes by adding ER moment at knee



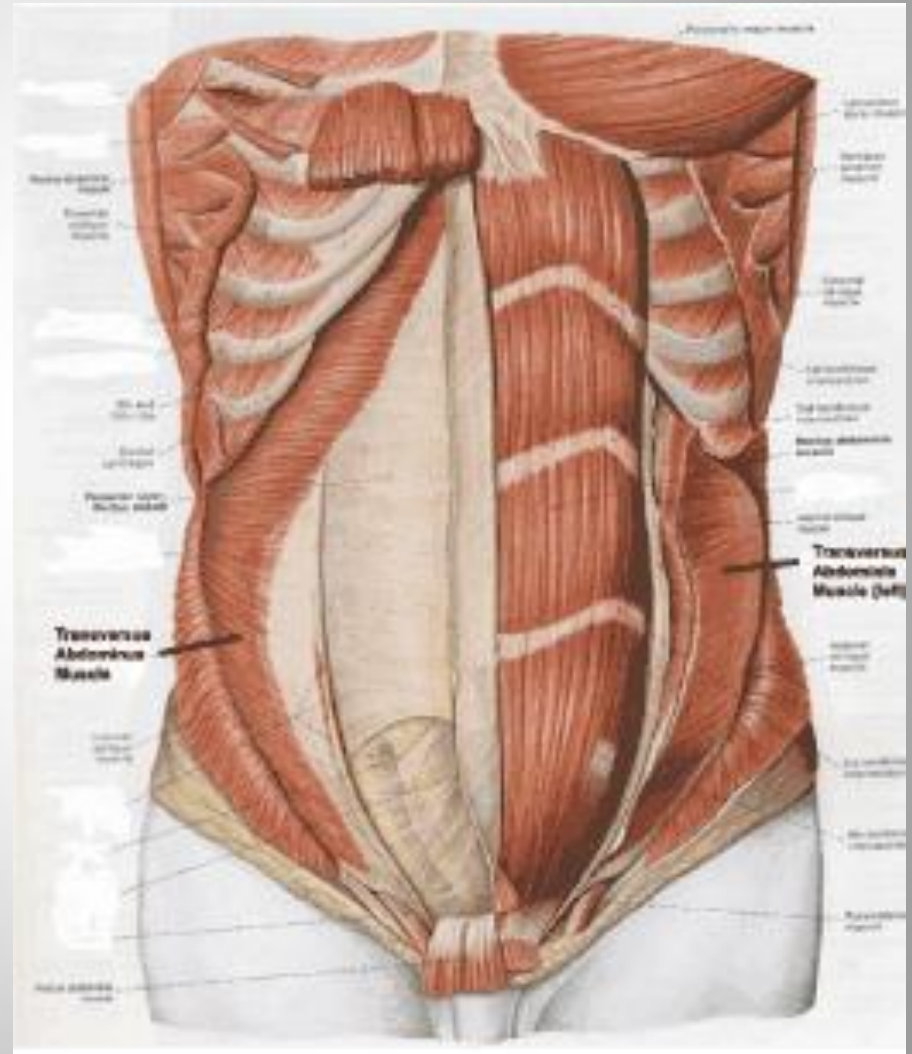
Traditional “core training”

- SIT-UPS: both compression and shear are higher when you bend the knee as opposed to a straight leg sit up (3234 to 3413 and 257 to 302 respectively)
- National institute of occupational safety and health (NIOSH): looked at 400 lifting tasks and determined that when compression goes above 3400 newtons, you are at an increased risk for injury in the back
- www.cdc.gov.niosh/docs



Rectus Abdominis

- **RECTUS ABDOMINIS:** the contractile components are interrupted with transverse tendons giving the “6-pack” look. The muscle is not designed for optimal length change but rather to function as a spring. Why have these transverse tendons in rectus abdominis? The reason is that when the abdominals contract, “hoop stresses” are formed by the oblique muscles that would split the rectus apart (McGill. Low Back Disorders, 2007)



Main Exercises

- McGill's BIG THREE
- STIR THE POT (hide the physio-ball in a good exercise, rather than a curl up)
- Anti-Rotation Exercises
- Short side bridge with hip hinge, bird-dog with square.

What not to do

- Med ball throws or producing rotation about the lumbar spine
- This motion needs to come from T-spine and hips
- Did you qualify them for this activity?
- Qualify for rotational exercises: Prone touch!!!







- Spine Stability: the unstable spine is also flexion intolerant and with associated intolerance to compression. Therefore sitting on an exercise ball and performing movement exercises increases spine compression to the spine (McGill et al. Sitting on a chair or an exercise ball: Various perspectives to guide decision making. Clin Biomech 21:353-360,2006.)

Rehab Programs

- If in pain- do NOT try to restore function too early
 - Often leads to substitution patterns (“spine limping”)
- Goal= pain free therapeutic exercise
 - Ex. Hit thumb repeatedly with hammer= pain; tissues become hyper-sensitized to slightest touch → need to remove hammer to desensitize tissues leading to decreased pain and increased motion

Flexibility

- With injured back- don't emphasize flexibility until spine stabilized and has endurance/strength
 - Spine flexibility has little prediction value of future LBP
 - Too much flexibility training= decrease stretch reflex and increase ms spasm
- Increase trunk stab with neutral spine and stress mobility of hip and ankles
 - Decrease lumbar flexion in AM (NO knees to chest and toe touches!)

Basketball Specific



Death by a Thousand Cuts

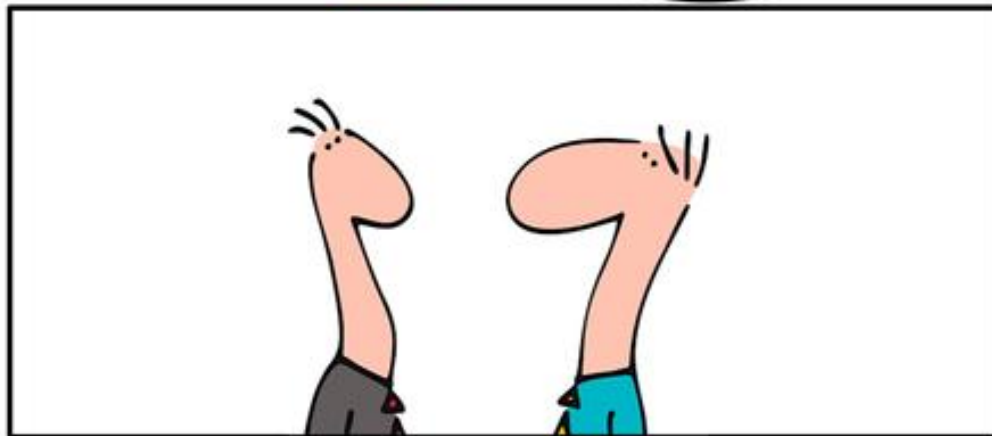
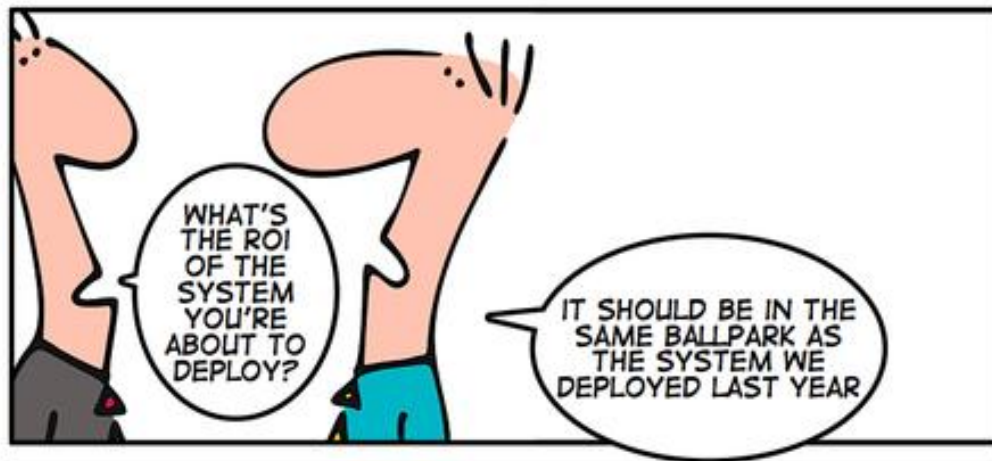
- Recognize aberrant movement patterns
 - Development of tendonopathy
 - Therefore a need for initial assessment and corrective work on a daily basis... never accept anything but perfect form...
 - Exercise is the test, test is the exercise?

Evaluation Comes First



Trunk Normative Data

- **Right-Side Bridge / Left Side Bridge Endurance Ratio > 0.5** (simply said, they should be pretty close to equal) McGill suggests the RSB/LSB ratio should not differ from unity (1) by more than 0.05 (ie: the ration should be between 0.95 and 1.05). Outside, of these values the muscle balance is UNACCEPTABLE (within ACCEPTABLE)
- **Side Bridge (either side) / Extension Endurance Ratio > 0.75** Therefore if this ratio gives a result less than or equal to 0.75 it is ACCEPTABLE: a ratio of greater than 0.75 is UNACCEPTABLE.
- Stuart McGill. Low Back Disorders: Evidence-Based Prevention and Rehabilitation. Champaign, IL: Human Kinetics, 2002.



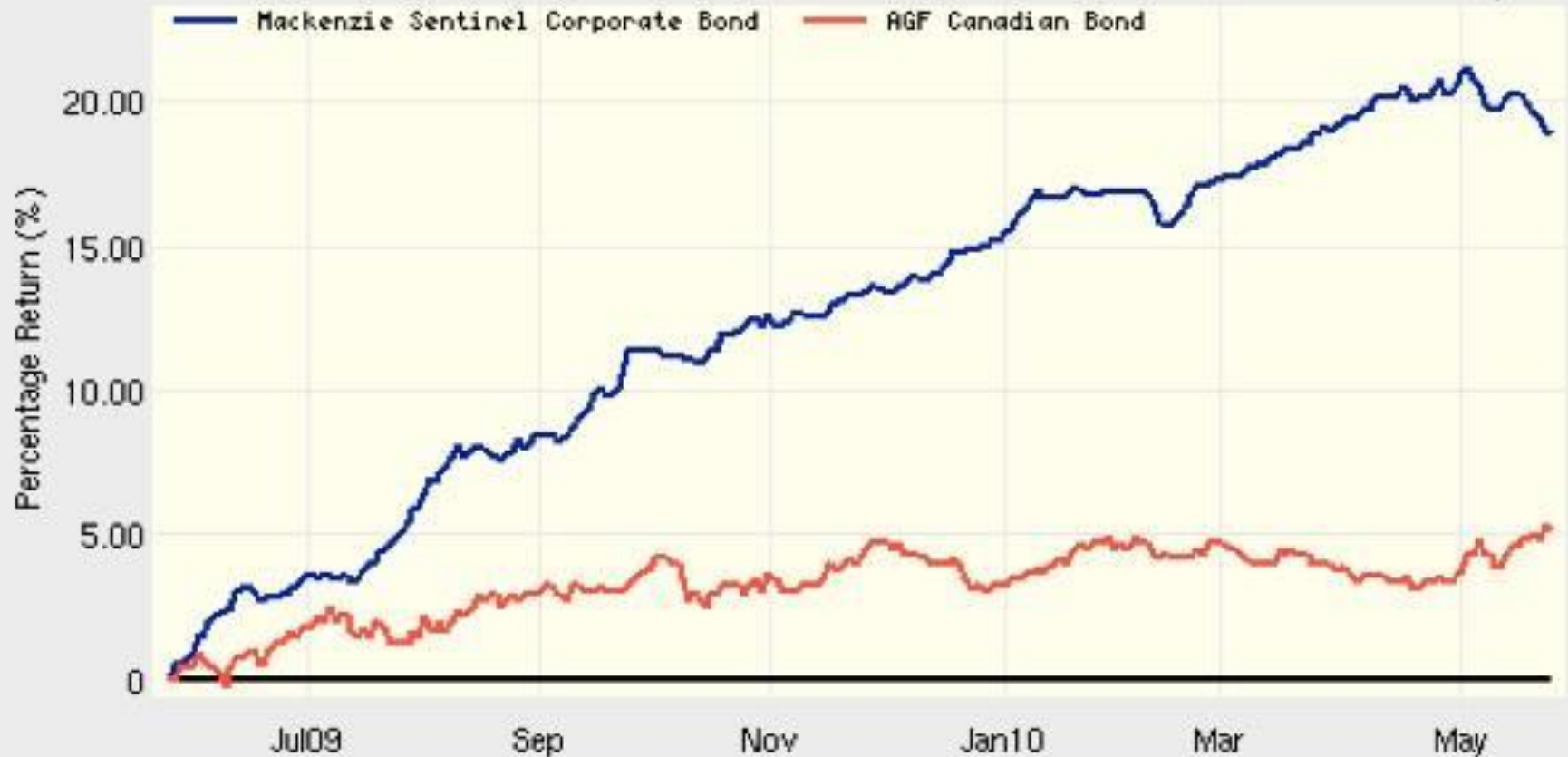
Are you filling the right gaps?

- 5 v 5 year round
- Basketball is in a constant state of in-season and rehabilitation.
- What defines success? What exercises will you *invest* the most time in?

Where are you putting your \$\$?

Mackenzie Sentinel Corporate Bond

as of 26-May-10



Gap #1

- Frontal Plane stability, strength and power
- Side Bridge
- Asymmetrical Carries and Lunges
- Farmers Walk
- KB Carry – Bottom up

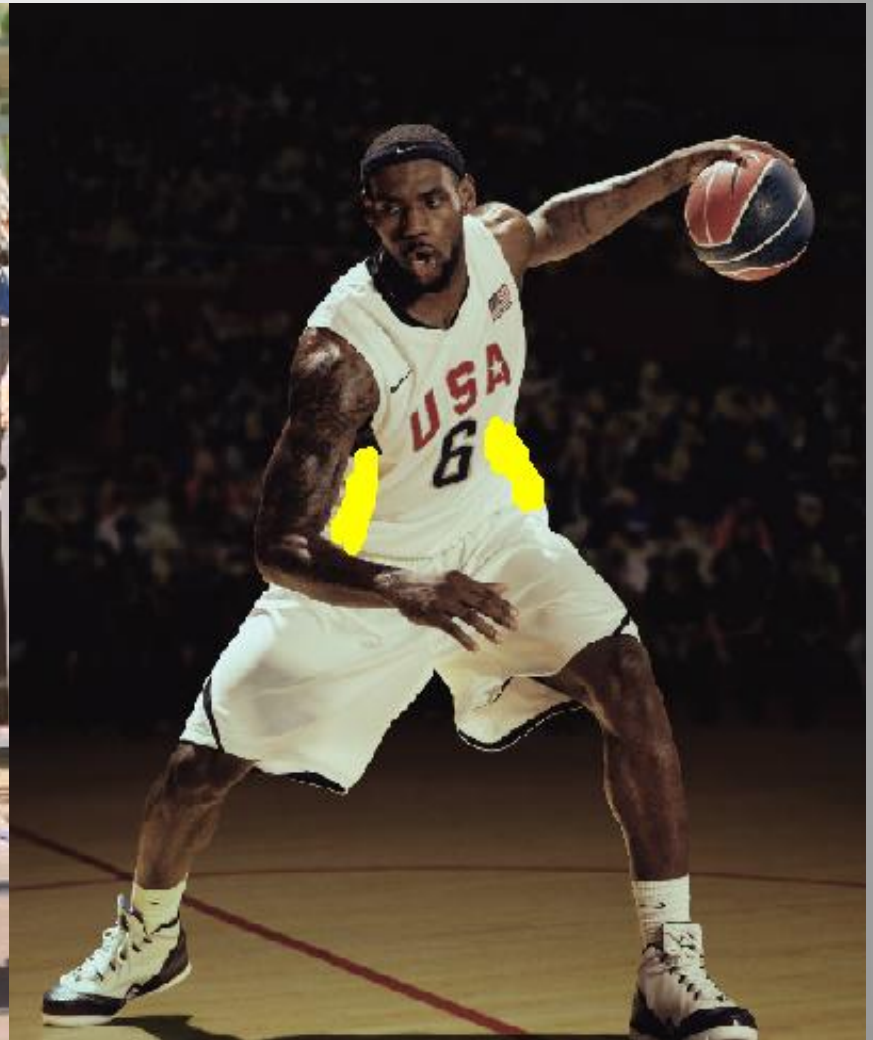


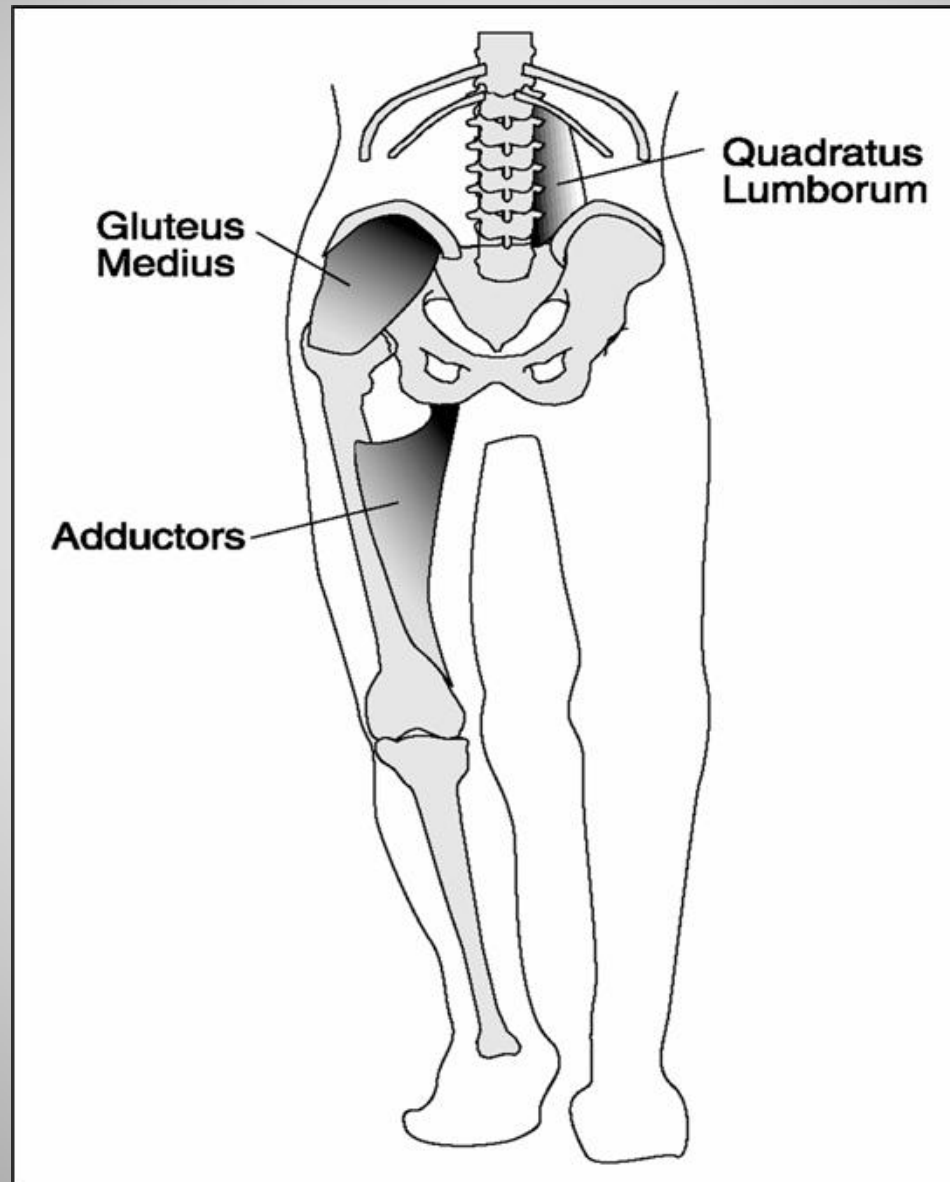


You can't push a rope



Stu tells the strongman story





Killer Cross-Over

- Requires killer QL strength
- Great guards live and die by their ability to change direction in the frontal plane – both on offense and defense.
 - This cannot be accomplished in the squat alone
- Lateral line: glute med, QL, Obliques





Gap #2

- Games missed due to injury
- Ankle (mobility): dorsiflexion
- Knee (stability): anterior knee pain
- Shoe Surface interface
- Back Pain (stability)
 - Previous discussion



Harry How, Getty Images

Ankle mob with motion

(Mulligan technique – MWM)



Knee Pain

- Lower injury rate in athletes with stronger hip ABD & ER. Study highlighted “the importance of proximal stabilization for LE injury prevention (Leetun, Ireland et al, 2004)
- PFP during functional tasks and increased hip IR, decreased hip muscle strength and increased gluteus maximus activation (Souza and Powers, 2009)
- Unilateral PFP demonstrated significant impairments in hip strength compared to control – ABD, EXT and ER (Robinson and Nee, 2007)
- Glute Med strength (Other research by Powers)

Shoe-Surface Interface



Gap #3: Basketball and Bench Press



Basketball and Bench Press

- Standing two arm press is only ½ of laying or bench press, single arm press has no correlation and rotational core strength is the limiting factor
- Quadratus lumborum and obliques
- The Kevin Durant Factor



Gap #4 Stability Under Fatigue



Too Tall – Morning Workouts

- CAT-CAMEL: this is a motion, not a stretch, do not push at the end range, viscosity is measurably reduced after just a few cycles - all am lifts and rowing should do this!!!

(Yingling and McGill)

- 6am lift? – get them shorter!!!



Prolonged Flexion



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