

Getting to the “CORE” of Core Stabilization U of C Seminar, 2008

A Cutting Edge Approach to Treating Athletes

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Outline:

Part I: Anatomy

Part II: Injuries and Discussion

Part III: Rehab, Exercises, S&C

A silhouette of a runner in a starting crouch on a track, positioned to the left of the text for Part IV.

Part IV: Hinge Theory –
Application of LBP, Flexibility, Core
Conditioning and cutting-edge hypothesis

A silhouette of a runner in a starting crouch on a track, positioned on the left side of the slide. The runner is leaning forward with hands on the ground and feet in starting blocks. The background is a warm orange gradient with curved lines representing track lanes.

Part I: Core Anatomy and Review

Core

- ◆ Hips
- ◆ Abs
- ◆ Legs
- ◆ Back
- ◆ Proprioception



Hips

- ◆ ABDuctors
- ◆ ADDuctors
- ◆ Hip Flexors
- ◆ Hip Extensors
- ◆ External Rotators
- ◆ Internal Rotators

ABS

◆ Rectus

- Attachment at Breast bone and Pubic bone
- Fold you in half

◆ Transverse Abdominus

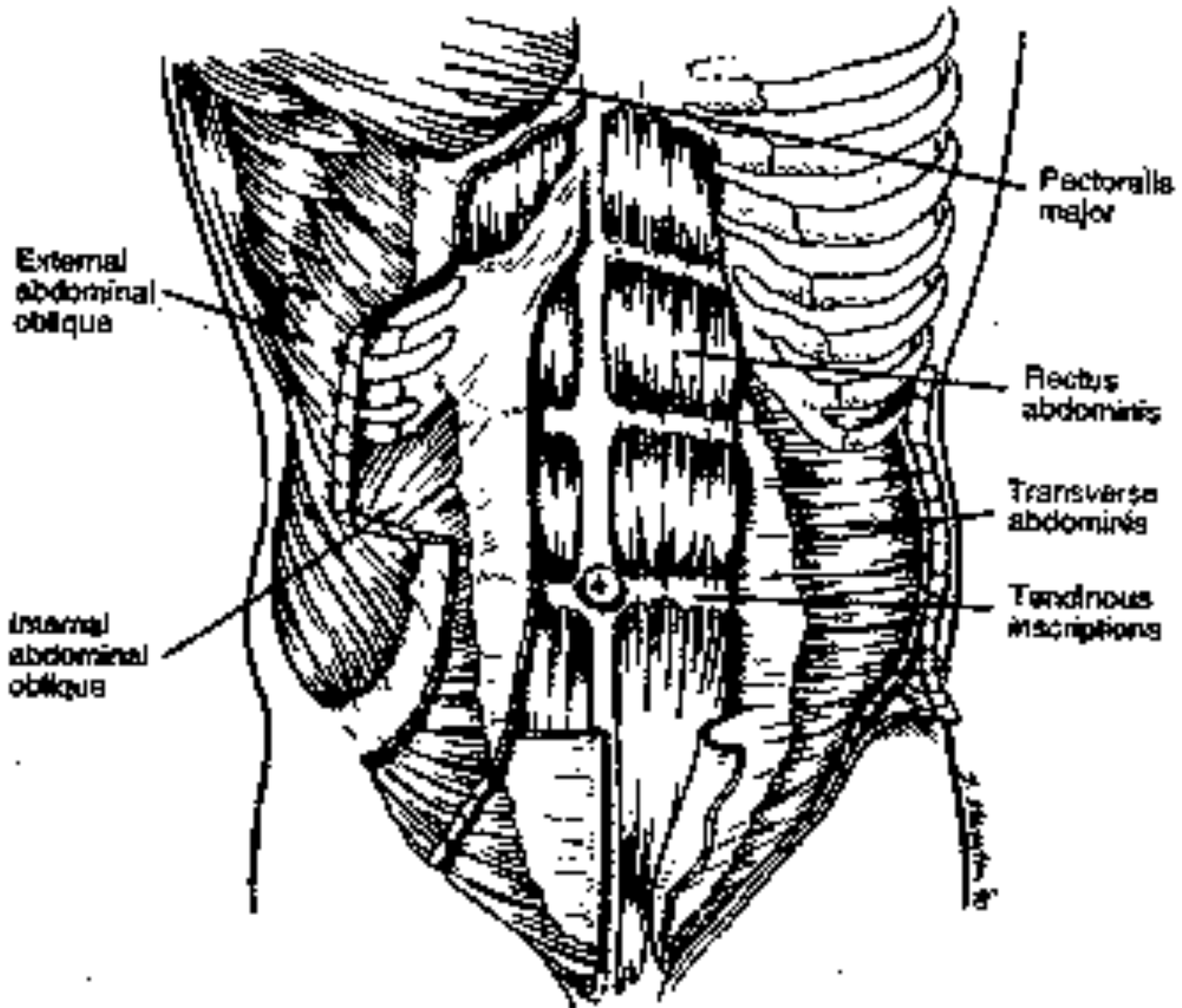
- Pilates-based muscle
- Isometric contraction
- Reverses the lordotic curvature of the spine, in essence

ABS pg. 2

◆ Obliques

- Internal
- External
- Work in conjunction to rotate the body





Back

◆ Lats

- Their role with the back, support, strength, mens and womens specific gymnastics

◆ Paraspinals

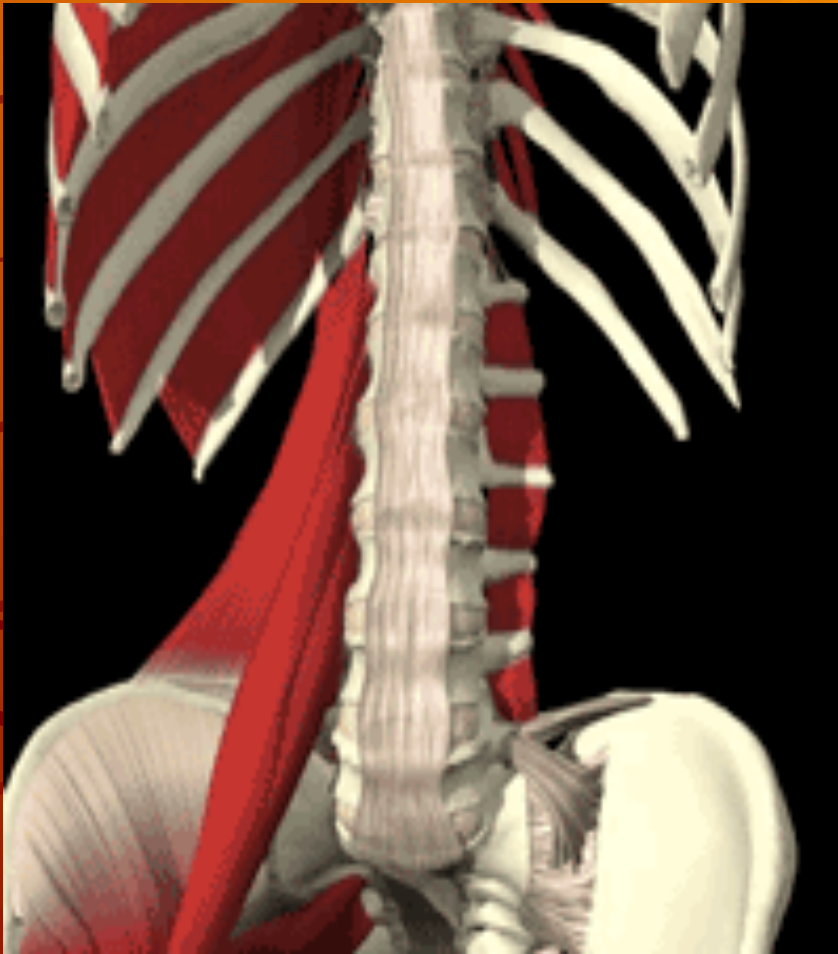
- ◆ You can see and feel
- ◆ Ridged when increase in tone
- ◆ Serve to extend the back
 - Non active in passive extension unless asked to hold lordosis

Hips

- ◆ ABDuctors
 - Pull the leg away from the body
- ◆ ADDuctors
 - Pull the leg into the body
- ◆ Hip extensors
 - Lift leg behind the body
- ◆ Hip flexors
 - Pull leg forward, running importance
- ◆ Hip internal rotators
 - Turn in – from the femur, NOT from below the knee
 - Ballet importance
- ◆ Hip external rotators
 - Turn out

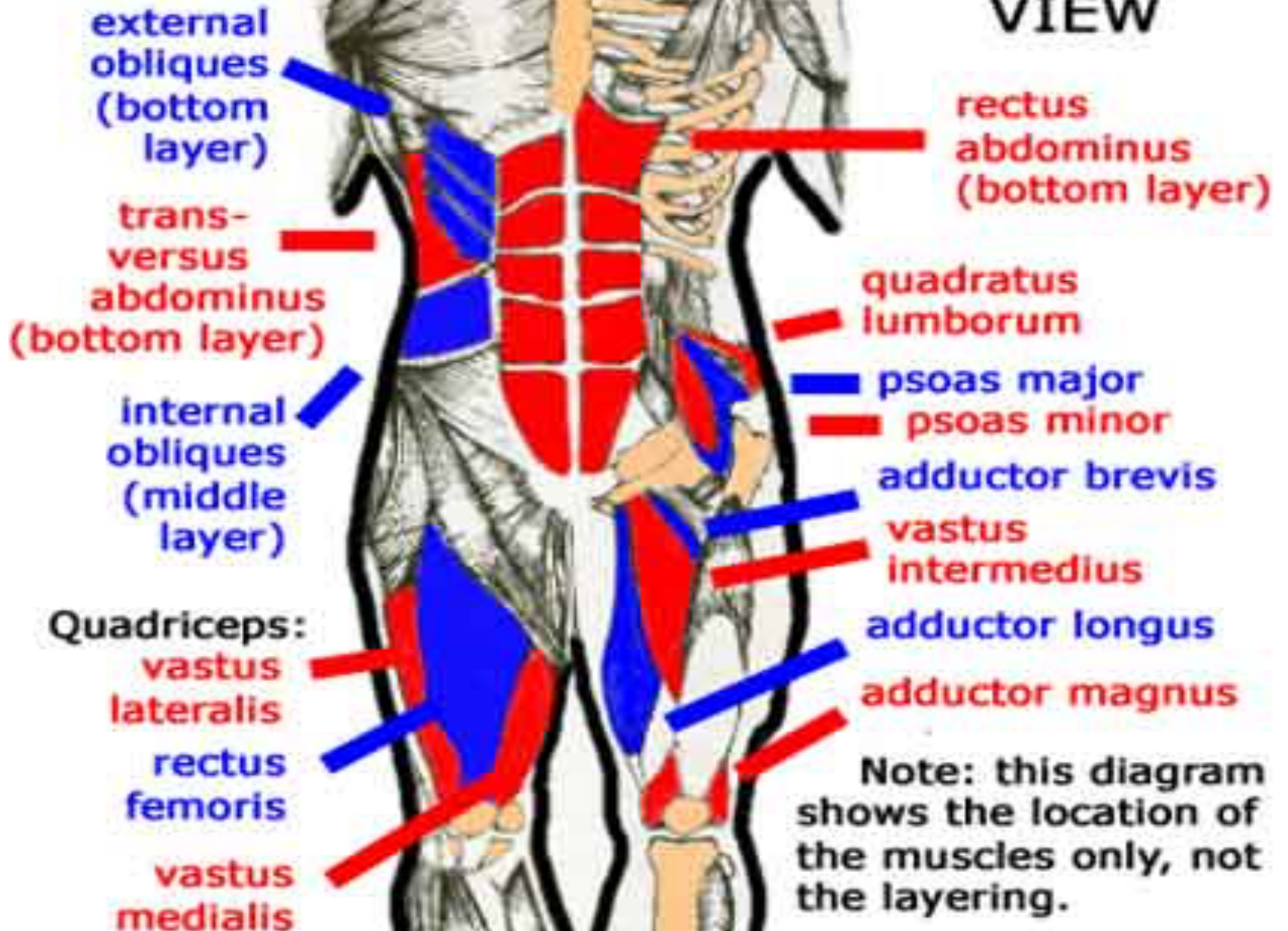


Psoas



- ◆ Makes the hips 'dump' forward, or anteriorly rotate
- ◆ Butt out posture
- ◆ Very painful to touch

FRONT VIEW



Legs

- ◆ Hamstrings
- ◆ Quads
- ◆ Sartorius/gracilis
 - Attachment hip and below knee
 - Rotational properties
 - ◆ Ex: kids who lift the leg and internally rotate the hip, while having to bend the knee



Eccentric vs. Concentric

- ◆ What are we talking about?
- ◆ Why do we care
- ◆ Reversal of the tight arch to the tight hollow-
 - Concentric
- ◆ Prevention of the hollow to the arch
 - Eccentric

A silhouette of a sprinter in a starting crouch on a track, positioned to the left of the main title. The background is a warm orange gradient with curved lines representing track lanes.

Part II: Injuries and Discussion

The injuries- what are they?

- ◆ Hip flexor tears
- ◆ Back fractures
 - Spondylolysis
 - Spondylolisthesis
 - Multifidus strain
 - Facet joint strain
 - Paraspinal strain



Early education

- ◆ The early years
- ◆ Core positioning at first
- ◆ Core awareness second
- ◆ Core posturing third
- ◆ Core education and innate positioning forth
- ◆ Core stability last

Early intervention

- ◆ Lordotic awareness
- ◆ Proper observation and monitoring
- ◆ Spondy... once a spondy, always a recovering!
- ◆ Parental awareness– the importance of carry-over



A silhouette of a sprinter in a starting crouch on a track, positioned on the left side of the slide. The background is a warm orange gradient with curved lines representing track lanes.

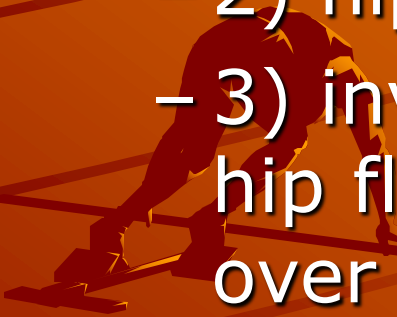
Part III: Exercises and Strength Ideas

Strength and Conditioning

- ◆ FORM FOLLOWS FUNCTION
- ◆ How you train is how you perform
- ◆ The importance of Vertical Body Awareness (VBA)
- ◆ Monitor!
- ◆ 1/2 motion, 1/2 stability
 - Tricks that require stability
 - Tricks that require hinging/mobility
 - Isolation
 - ◆ isolate shoulders, core stab, OH athlete example
 - ◆ Maximize plyometric potential

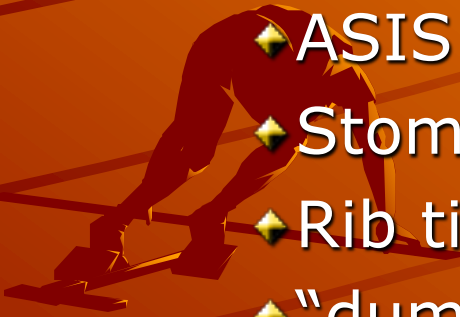
Details- Prevent Overtraining/Mistraining

- ◆ The idea of the TIGHT HOLLOW
- ◆ Compensations include:
 - 1) rib rocking
 - 2) hip flexion
 - 3) inversion weight balancing (rib tilt + hip flexion to ensure center of gravity over hands (COG))
 - 4) sucking in



Practical Application

- ◆ Stand up, lets go!
 - Hip anterior tilt
 - ◆ Arching
 - ◆ Lordosing
 - ◆ ASIS and xiphoid further apart
 - ◆ Stomach mm stretch
 - ◆ Rib tilt posterior
 - ◆ “dump the bucket” out forward
 - Hip posterior tilt- opposite



Laying down

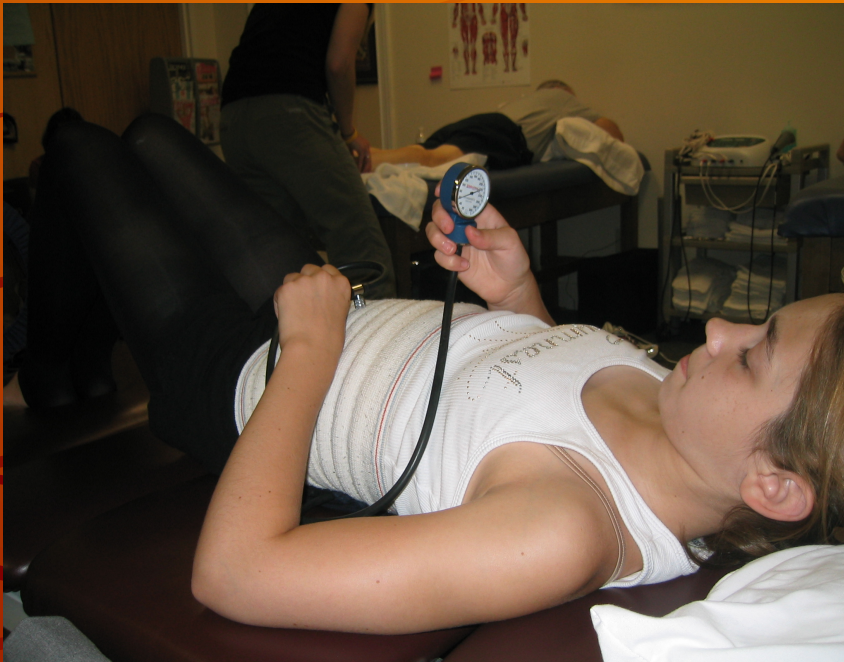
- ◆ Eliminate other mm fighting gravity
- ◆ Much taken from Shirley Sahrman exercises
- ◆ Mistake – posterior pelvic tilt when you really want isometric activation, or keeping the ribs and the hips in *relative* neutral while the spine un-lordoses itself!
 - Feedback – blood pressure cuff, hand, etc.

Biofeedback – Adapted Sahrman Method



- ◆ Blood Pressure Cuff
- ◆ Each gym should have at least one for every 5 team athletes
- ◆ Use for BIOFEEDBACK for ab training
- ◆ As lordosis decreases, pressure rises
- ◆ If it rises too much, rectus is used
- ◆ If holding breath, ribs come out and cannot speak or breath, obvious other complications!

Basics



- ◆ 1. Oscillate between 40 and 60, learn control
- ◆ 2. Hold for 10-60 seconds
- ◆ 3. Hold while speaking

Step 2, Basic Leg Recruitment



- ◆ Step 2
- ◆ Starting to move the legs
- ◆ Teaching the body that the legs and abs can work together
- ◆ If the hip flexor works too hard, the back will arch (remember attachments and hip tipping tendency)
- ◆ If the rectus works, shoot above 60

Step 3- quad involvement



- ◆ Step 3
- ◆ Begin single leg extensions
- ◆ Must get to ALL the way straight (terminal quad extension)
- ◆ This pulls in all of the quads, making the abd have to work harder to pull opposite, to **DISALLOW** the hips from anteriorly rotating

Step 4 and 5

- ◆ Both legs in the air
- ◆ Recruits similar to uneven bar and pommel horse work
- ◆ Leg extension – TKE



Additional

- ◆ There are 21 steps before a person becomes upright
- ◆ There are alterations to these exercises for performing arts specific sports, running/endurance sports such as triathlon, marathon, soccer, track, as well as upper body sports with overhead throwing (OHT)
 - Contact me and I will send the whole packet

Part IV:

Hinge Theory and Spine



Hinge Theory!!!

- ◆ Core stabilization necessary to prevent LBP, but this theory of flexibility make give a whole new meaning to people who diagnose Spondy-category or facet/pars injuries
- ◆ Causes LBP:
 - Repetitive – sport or work
 - Trauma/acute – sport, accident
 - Acute on chronic – straw that broke the camel's back
 - Genetic – spondy predisposition, nodes, etc.

State of Mind

- ◆ 3 parts to an arch
 - 1) Shoulder opening (anatomical flexion)
 - 2) Back bending, or lordosing
 - 3) hip opening (or anatomical extension)
- ◆ Most people stretch the arch positioning by increasing the low back flexibility
 - You are stretching 50% muscles and 50% trying to change the kinematics of the spine
 - Shoulders and hips- muscular flexibility – MUCH more of a chance to actually make a change without pain!

History

- ◆ Came about from treating 214 Spondyloarthritis category injuries – probably more than most PT's in a lifetime
- ◆ Seeing trends – always poor posture, but not from family, or studying, from a lack of available ROM!
- ◆ Started to treat 50% spine, and 25% shoulder, 25% hips, and got BETTER results
(informal personal patient research)

Relevance

- ◆ Think of a slinky- where each piece takes a piece of the pie, and the result is a curve
- ◆ If one piece is stuck, or is not working, the others have to chip in
- ◆ Look- what is the shoulder angle – is it even 180?



Study

- ◆ Athletes all level 9-10
 - 9's have to have scored at least 35.0
 - Girls
 - No matter the age (we will cross-stat this is SPSS to see if there is a correlation)
- ◆ 3 categories of injury:
 - Pre-stress reaction (bone scan only not plain film)
 - Fracture current with or without slip (listhesis)
 - Fracture diagnosed with unsuccessful rehab
- ◆ 50% traditional therapy to low back, including ART to spine
- ◆ 50% having the 50/25/25 treatment, marked by time, mobilization, and ART pass count
- ◆ Results are..... 1 year away!

Example - HIPS

◆ Hips:



The more flexibility in the capsule and anterior musculature, the more the hip can work without the lower back arching, or jamming, and without the hips turning out, or externally rotating

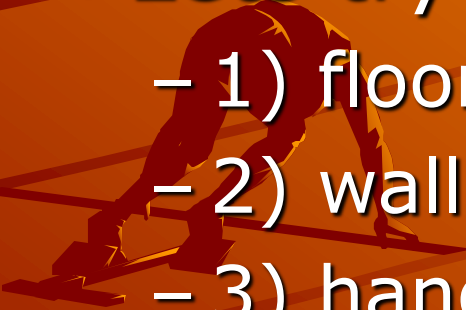
Compensations

- ◆ If the low back is not flexible, joint above and joint below can help
 - Thoracic spine
 - Hips
- ◆ If the upper back is not flexible, joints can help as well
 - Lower back
 - shoulders



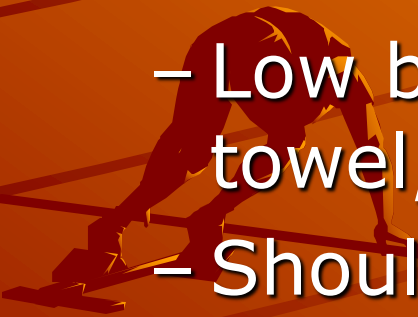
Example: Shoulders

- ◆ The shoulders should be able to move above the head, with the spine at least in neutral, to 180 degrees
- ◆ Lets try –
 - 1) floor
 - 2) wall
 - 3) handstand example



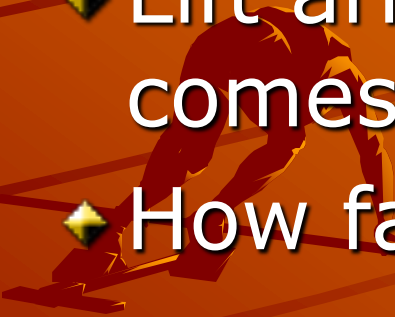
Wall

- ◆ Stand against the wall, lift arms overhead
- ◆ Try to keep all of the following:
 - Feet 6 inches from wall
 - Butt on wall
 - Low back pressed against hand, or towel, or better yet –wall!
 - Shoulder blades start on wall
 - Head on wall in neutral
- ◆ Lift arms overhead, keeping all on the wall



Floor

- ◆ Lay on floor
- ◆ Keep low back as flat as possible, or smash something – neutralizes spine
- ◆ Lift arms overhead, STOP when back comes off of floor
- ◆ How far did you go?



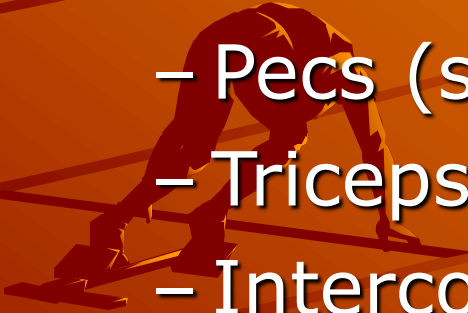
Practical Testing



- ◆ First pic- flat back, about 150 degrees
- ◆ 2nd pic- arched back
- ◆ FAKE 180 degrees, look at the ribs tilt backwards- the spine is already in lordosis

Shoulder Anatomy and Explanation

- ◆ When raising your arms overhead, many things are stretched:
 - Abs
 - Lats
 - Pecs (some fibers)
 - Triceps
 - Intercostal muscles
 - Shoulder capsule



Hip Anatomy

◆ When extending the hip, many things are stretched:

– Abs

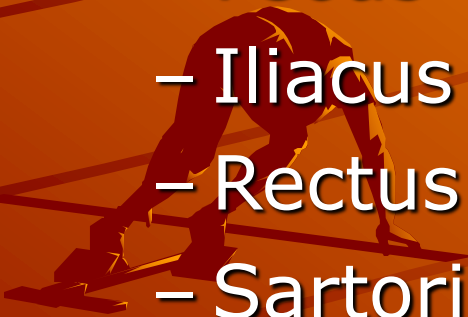
– Psoas

– Iliacus

– Rectus femoris

– Sartorius

– Other fascia and hip flexors



Spine Functional Anatomy

- ◆ When the spine is lordosed, the following happens:
 - Facet joints close down
 - Abs are stretched
 - Hip flexors are stretched (lumber and sacral)
 - Muscles can work to get the spine there
 - If too much of an angle, you can have approximation, touching, or jamming (never good!) of the spinous processes

How do we FIX it?

- ◆ Make sure that time is spent stretching the hips and shoulders properly
- ◆ Make sure that this is done EARLY
- ◆ Ensure that your athletes understand the concept (even just standing them against a wall helps!)
- ◆ Test and measure the flexibility and chart it – in public, so they can keep track
 - Measure with a goniometer, or have your PT do it for you to ensure accuracy and

Proper and Improper Evaluation and Strength Technique



Evaluation - Hips

- ◆ Need to make sure that the spine is in neutral, for reliability of measurement
- ◆ Need to make sure the athletes understand this position
- ◆ Need to make sure the back leg is never in external rotation, or compensation patten, will skew results



Evaluation - Spine

- ◆ Measure the distance between heel of hand and heel of foot
- ◆ Measure height from belly (highest point) to floor
- ◆ Just for knowledge
- ◆ Pictures are best
 - Measure the shoulder angle and hip angle there, too

Take Home message

- ◆ **Physicians**: Make sure that you are sending to a therapist that understands biomechanics and the neuromuscular component of core activation. If you do not know a good one, let me know, and we will find one for you!
- ◆ **ATC's**: Understand that in a school setting, although you are limited to time and resources, take the time to make sheets with exercises that are nicely explained, so that the athletes can perform them on their own and go outside the box of sit-ups and plank holds...
- ◆ **PT's**: Remember that flexibility, stability, and strength are all “opposites” on a triangular model, and that they both fight with one another, and work against one another at the same time – keep this in mind with treatment, and when you are stuck
- ◆ **Coaches, trainers, etc**: walking comes before jumping, jumping before running. So, remember when requesting strength training of your athletes to know that you need to give them the beginning building blocks in order to accomplish the end goal. Because the exercise looks hard, and makes them work hard, also leads to compensations. Take your time, teach them, no matter what the level they “should” be, and results will follow.

The legal things...

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