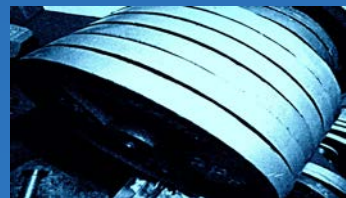


# ***Muscle Imbalances and the Performance Client***

***Assessments and Exercise Progressions to  
Improve Performance and Prevent Injury***

***Nick Rosencutter, CSCS, NSCA-CPT, LMT***





# About Me

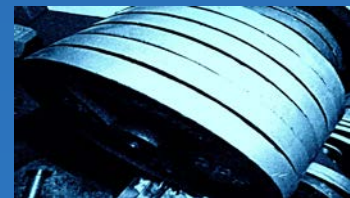
- **Strength Coach and Manual Therapist**
- **University of Wisconsin La Crosse ESS and S&C Programs**
- **Interned at Ifast**
- **Lakeside School of Massage Therapy**
- **Competitive Powerlifter, In the trenches training for over 12 years**
- **Work with various athletes, fat loss, pain syndromes**
- **Neuromuscular, ART, Fascial Release**
- **Owner Rosencutter Ultra Fitness & Performance, Co-Owner Moxie Performance and Therapeutics**

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# Presentation Overview

- Common issues seen in many athletes from different sports
- Some important assessments that can be used for many varieties of athletes
- Exercise progressions that can fix imbalances found with these tests, enhance performance and prevent injuries or help to return to high performance after injuries

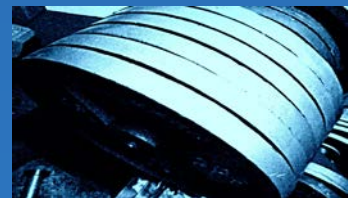


# Important Note

\*While we will discuss some specific possible issues that you may find, remember that areas from the head down to the feet can be involved and might need work to fix the whole problem

\*Always look at the whole picture

\*Don't forget about breathing



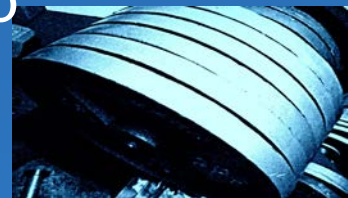
# Stiff vs Short

**Stiff-** Muscle tissue, connective tissue resistant to stretch

- Rubber band/spring type feel
- Strengthen antagonist/synergist, possible tissue work/stretching

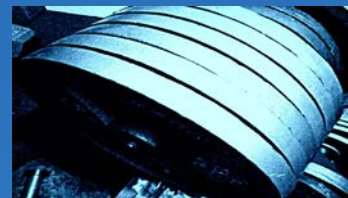
**Short-** Muscle in a shortened position, possible shortening at the joint

- More distinct end feel, lacks significant ROM
- Long duration stretches, more aggressive tissue therapy, antagonist strengthening can still help



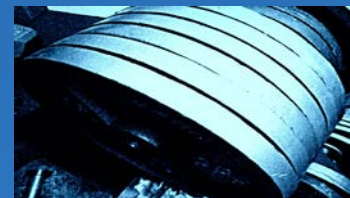
# Common Issues/Imbalances

- Stiff or short rectus femoris, tfl and/or psoas and overactive lumbar musculature with inhibited and/or weak glute(s)
  - Neural firing faults among posterior chain muscles: hamstring(s) overworked when glute(s) don't do their job: leads to hamstring strains, suboptimal performance



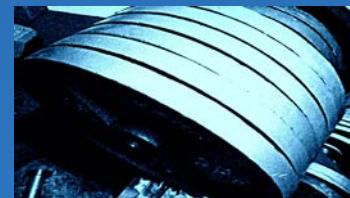
# Common Issues/Imbalances

- Poor lumbopelvic stability and control, either BL or UL
  - Weak abdominals, possible relative flexibility imbalance among quads and lumbar spine supporting cast; *see details later*
  - This can show up in running (hip wobble=energy loss), squatting (pelvic tuck, caving, etc.), walking and even sitting



# Common Issues/Imbalances

- Stiff, short and/or facilitated tfl and quadratus lumborum with inhibited and/or weak glute medius
  - Back/knee problems
  - Will often show up in running, landing from jumps, squatting, walking, agilities
  - No support from glute med = knee is free to go where it wants (knee cave) = limits performance potential and enhances chances of injury
  - Overloaded QL = spasm and strain = terrible pain, and compromised spine stabilization

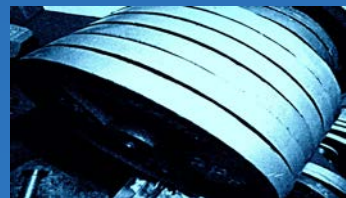




# Common Issues/Imbalances

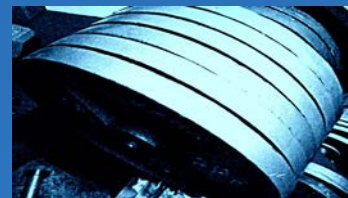
- Movement Faults

- Can *stem* from types of issues listed above or *result* in issues listed above
- Sometimes related to musculoskeletal problems
- Sometimes related to neural control problems



# Common Issues/Imbalances

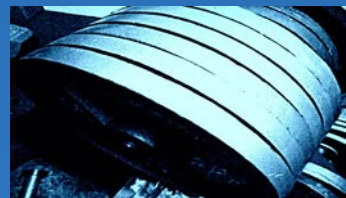
- Squatting faults: BL, usually worse UL
  - Pelvic tuck
  - Pelvic tilt, shift, rotation
  - Thoracic caving
  - Onto toes
  - Knee cave, poor hip control
  - Poor hip extension
  - Excessive quad dominance in general



# Common Issues/Imbalances

- Pulling Faults

- Lumbar rounding
- Quad dominance
- Onto toes
- Poor hip extension/Hyperextension in LB
- Excess spine motion, limited hip motion
- Hitching



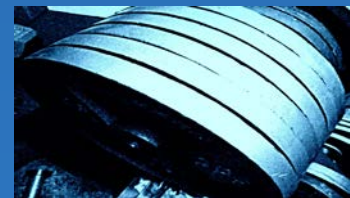
# Common Issues/Imbalances

- Running, Jumping, Skating, Agilities: The base issues just mentioned carry over and highlight with complex sporting activities



## Running faults

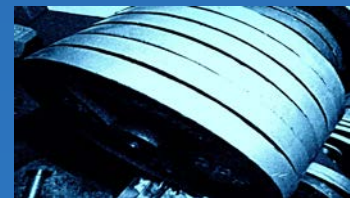
Knee cave,  
“limping”  
hard steps  
poor trunk stability  
poor rib and thoracic  
positioning  
overuse of hamstrings and/or  
adductors  
back stress  
foot/ankle issues,  
the list goes on



# Assessments

- Thomas Test

- Look for length/tension of Psoas, Rectus Femoris and Tensor Fascia Latae
- Big Implications for many physical activities and movements
- Coincides with hip extension test discussed later
- Also need to check strength of these muscles, especially psoas

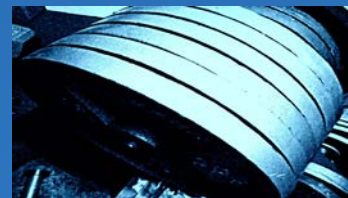


# Thomas Test

## Video

- Faults to look for

- Hip flexes=psoas shortness or stiffness
- Knee extends/hip flexes= rectus short or stiff
- Hip abducts/tibia externally rotate=tfi short or stiff



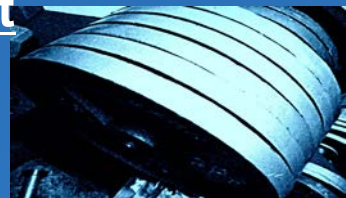
# Why is This Important for Athletes?

- Recovery of leg in flexion affects sprinting performance. Faults in the main hip flexors can cause problems here.
  - Weak psoas, overactive rf, tfl, proximal anterior adductors=possible injuries, suboptimal hip flexion
  - Stiff or short psoas, rf, tfl, prox ant adductors, etc. = less than optimal starting position for sarcomeres, which means less potential for hip flexion power
- Stiffness in any of these muscles can inhibit glute and hip extension function (affects running, jumps, etc) and also cause back issues
- Unilateral issues will cause worse compensations



# Prone Hip Extension Test

- Looks at posterior chain firing patterns- glute max, hamstrings, LB
- Are they firing? What fires when? What order? Compare side to side.
- Also look at pelvic stability. Does it tilt? Is their hyperextension?
- Looking at Chaitow and Delany's Book "Clinical Application of Neuromuscular Techniques," proper firing pattern is said to be 1) glute 2) hamstrings 3) contralateral erectors 4) ipsilateral erectors. Not all clinicians agree on this pattern. (p. 89)
- Based on research I've done and things I've seen, I believe this pattern to be optimal. Glutes should fire first or at least simultaneously with hamstrings.





# Prone Hip Extension

- Faults to look for

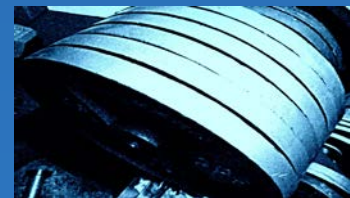
- Knee flexion of the ipsilateral leg (excess hamstring activity)
- Delayed or nonexistent glute max firing
- “False” hip extension occurring at sacroiliac joint instead of the true hip joint
  - i.e. low back hinge vs hip hinge
- Pelvic anterior tilt or pelvic rotation (poor lumbopelvic stability)
- Activation of the upper back muscles to compensate for lack of lumbar stability

- VIDEO



# Prone Hip Extension

- From Clinical Application Book, discussing Janda's research: “Janda says, “The poorest pattern occurs when the erector spinae on the ipsilateral side, or even the shoulder girdle muscles, initiate the movement and activation of gluteus maximus is weak and substantially delayed... the leg lift is achieved by pelvic forward tilt and hyperlordosis of the lumbar spine, which undoubtedly stresses the region” (P. 90, Chaitow)
- If the athlete is doing this in this situation, imagine what happens in real time sporting activity



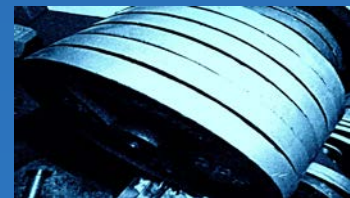
# Why Does This Matter For Athletes?

- **Stuart McGill says it well in his book “Ultimate Back Fitness and Performance,”**
  - *“Developing spine power compromises both safety and performance. Power is developed in the extremities and transmitted through the torso.” (P. 271)*
- **Low back hinge instead of hip hinge=decreased performance w/ running, jumping, squatting, power cleaning, etc. and potential injury**



# Why Does This Matter for Athletes?

- **Excess hamstring activity can lead to chronic hamstring strains**
- **Unilateral differences will cause even worse compensation patterns**
  - overload of back or hamstring muscles on side with glute malfunction. Associated w/ hip rotation, shifting, etc.
- **If its faulty during a prone bodyweight hip extension, then imagine what happens under load or extreme activity**
- **Bottom Line: Correct the hip extension pattern and teach a proper hip hinge for improved performance**



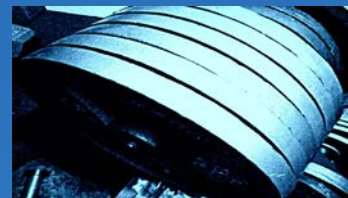
# Also....

- Before or after checking hip extension, check out prone knee flexion
- Can tell you more about relative flexibility among trunk and hip muscles
- Looking at Sahrman's book, possible imbalances include
  - Rectus femoris is short (knee flexion stops before full ROM is reached, would require lengthening)
  - Stiff/short rf w/ lumbopelvic compensation (rectus is *stiffer* than the supporting structures of the spine; *need to increase stiffness of abs/supporting cast in addition to lengthening rf*) **\*\*Most common that I see**



# Prone Knee Flexion cont.

- Compensatory lumbopelvic motion w/ no rf stiffness (unstable lumbopelvic area, need to increase abdominal stiffness)
- No lumbopelvic counter stabilization (pelvis tilts posteriorly as knee flexion begins, need to gain control of joint stabilizers)
- (Sahrmann P. 31-32)
- **Taking these possible observations into account, a very common problem you'll tend to see is the lack of control by the external obliques, which yields energy leaks and loss of power**
- [Video](#)

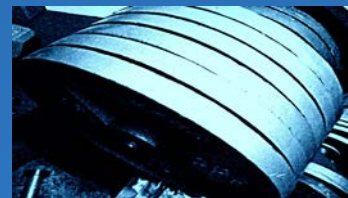


# Side Leg Raise

- Checks firing pattern w/ hip abduction, glute medius strength
- Things to look for
  - Does their hip flex? (tfl dominance)
  - Does their hip hike or trunk sidebend? (Excess QL activity)
  - Can they resist your push when their hip is in true abduction? (glute med strength)

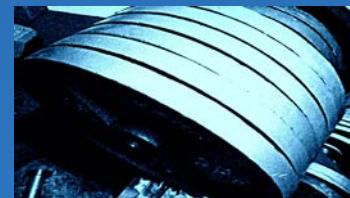
- [Video](#)

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# Why is This Important for Athletes

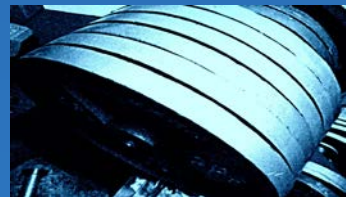
- Hip abduction function and glute med strength come into play with landing, single leg stance in running, skating, spinning, side shuffles w/ defense, throwing kicks, and the list goes on
- Glute med needs to be able to help control knee position and pelvic position (prevent excessive adduction) to optimize performance and prevent injury
- Overactive QL can be cause of chronic back pain
- Overactive TFL can be cause of IT Band problems and knee issues
- Appropriate hip and trunk stability carries over to pretty much any sporting activity you can think of





# Movement Briefing

- How do the previous tests carry over to real time movement?
- Video



# On to the Exercises! Single Leg Hip Hinge Progressions

If stiff hip flexors are a problem, get them to relax first

- Hip flexor stretch
- Soft tissue work
- Glute Bridge, Alternating Glute Bridge, One Leg Glute Bridge
- Hip Thrust, Alternating Hip Thrust, One Leg Hip Thrust
- Cable One Leg RDL, One Leg RDL Off Box, One Leg RDL w/ Db or Kb, One Leg RDL w/ 2 Db's or Kb's, One Leg RDL w/ Farmers Bar, One Leg RDL w/ Barbell
- Other options include one leg reverse hypers, one leg glute ham raises, one leg ball leg curls, band stomps, bird dog variations

