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That Tricky Hamstring

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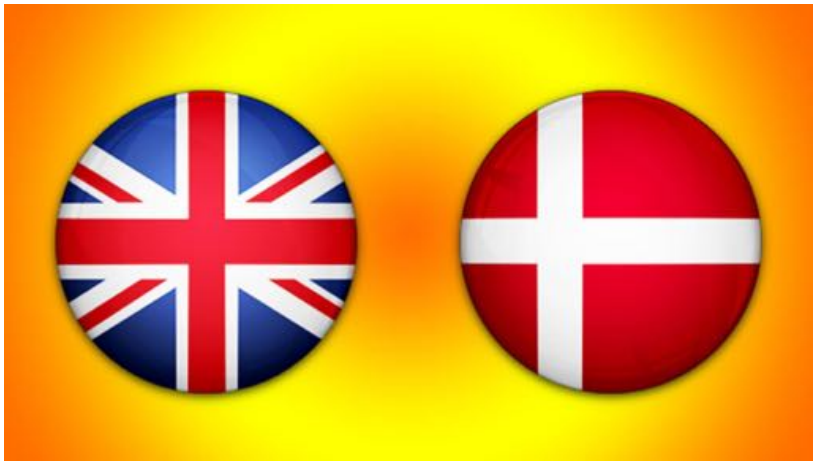
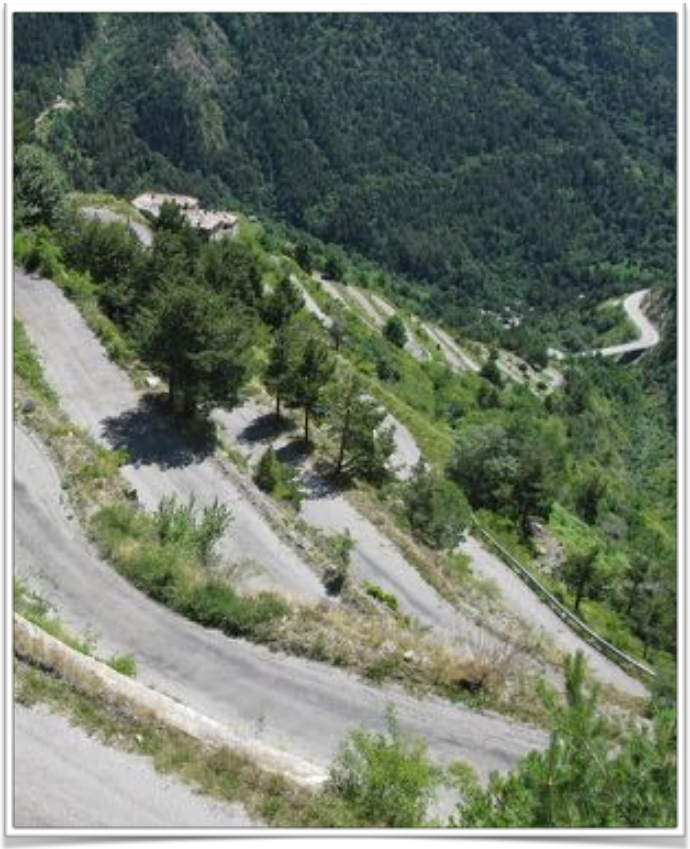
- Language
- Experience
- Audience



Roadmap

- Incidence and risk factors
- When it's not a hamstring
- Assessment
  - Incl practical
- Treatment
  - Incl practical
- Management
  - Incl R2P protocols
- Prevention

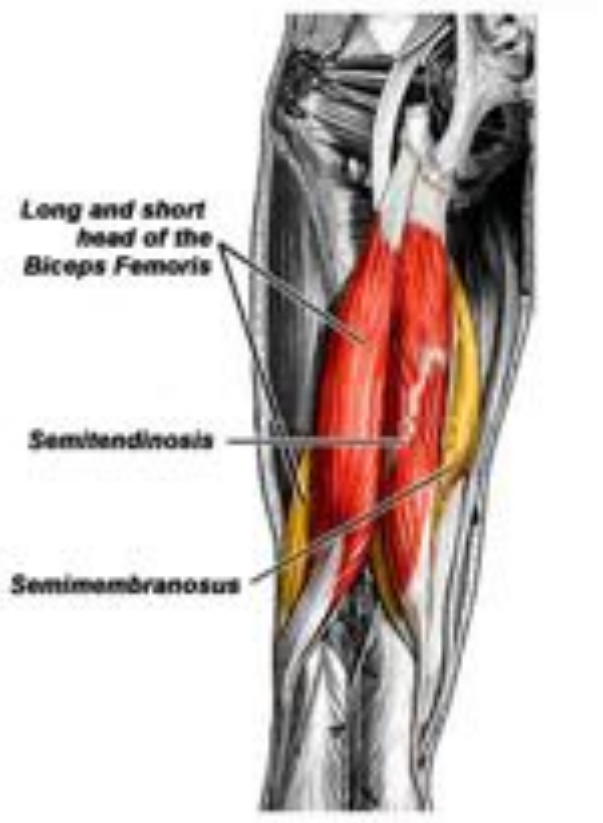


Why is it tricky?

- Why does it injure so often?
- Rarely a standalone injury
- Sometimes not a hamstring injury at all
  - Neural hamstring
  - Hypertone/Trigger point
  - The “Chronic hamstring” - is usually a proximal tendinopathy

Hamstring Strain

- Semitendinosis/ semimembranosis or Biceps Femoris (83%)
- Grade 1-3
- Palpation
- Resisted testing
- Bridge Test



Hamstring Strain Grading

- Grade 1
  - Overstretching without tearing of muscle or tendon fibres.
  - Symptoms may not present until activity is over.
  - Usually no loss of muscular strength or flexibility.
  - Increased tightness in the muscle during stretch or through a full range of motion.
  - A feeling of pain may be reported with sitting or while walking uphill or ascending stairs.
  - Depending on the severity, weight bearing activities may or may not be possible, walking properly may be possible and there will be minimal swelling.
- Grade 2
  - Partial tear in the muscle.
  - Muscular strength and flexibility in reduced.
  - Pain is more immediate and more severe than the pain of a Grade 1 strain.
  - Pain on stretch and contraction of the muscle, and is usually sore to touch.
  - Limping is likely during walking and occasional sudden twinges of pain during activity may occur.
  - Bending the knee against resistance will cause pain and there may be some difficulty in fully straightening the knee.
- Grade 3
  - Severe or complete rupture of the muscle. May be a large lump (of muscle tissue) above a depression where the tear is.
  - Sudden, sharp pain in the back of the thigh.
  - Walking is not possible without pain.
  - After a few days with Grade 2 and 3 injuries, a large bruise may appear below the injury site caused by bleeding within the tissues.
  - May require surgical repair.

Incidence

- Most common sports injury and main cause of injury absence
- Accounts for over 1/3 of muscular injuries in soccer
- Huge frequency and cost to athletes and clubs - 250.000.000 Dkr to UK premiership in 1 season
- Incidence: 4/1000 hr competition; 0.5/1000 hr training
  - Increasing with 4% per year - more so in training
- Long R2P which depends on management - amateur runners average 16 weeks. Elite footballers average 14 days
- Usually during high speed running - and during deceleration phase of swinging leg

- Askling C.M., Koulouris G., Saartok T., Werner S., Best T.M. Total proximal hamstring ruptures: clinical and MRI aspects including guidelines for postoperative rehabilitation. Knee Surg Sports Traumatol Arthrosc. 2013;21(3):515–533
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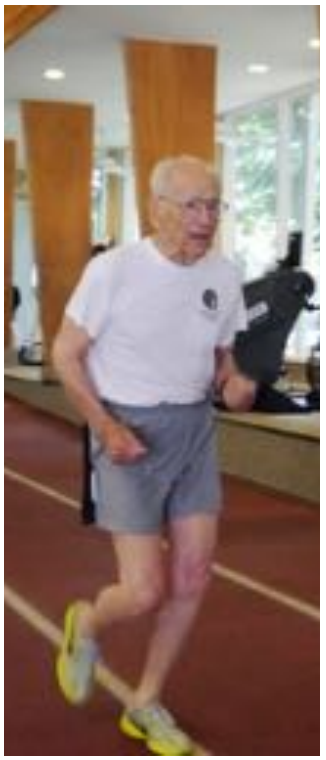
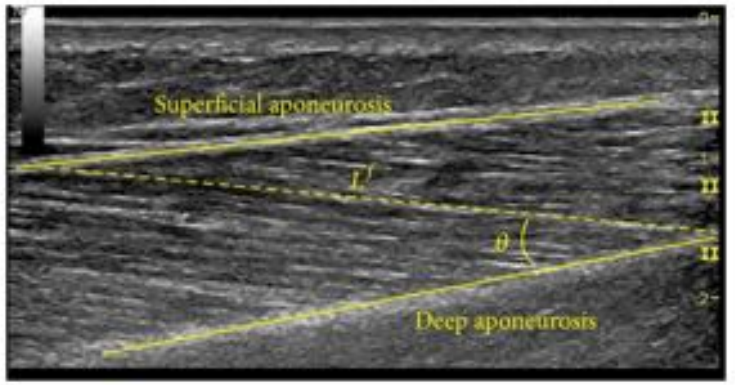
  Kerkhoffs G.M., van Es N., Wieldraaijer T., Sierevelt I.N., Ekstrand J., van Dikk C.N. Diagnosis and prognosis of acute hamstring injuries in athletes. Knee Surg Sports Traumatol Arthrosc. 2013;21(2):500–509

Risk Factors



- Previous Hx
- Age
- Fascicle length
- Eccentric control/strength
- Exposure to running above 24km/hr
- - David Opar's research



and when it's not the hamstring

- "Neural hamstring"
- Essentially Sciatic pain
  - But can of course be both as neural disturbance will cause poor recruitment on lack of eccentric control
- Can be alongside an actual strain
  - and may be a risk factor!
- Tests
  - Slump
  - Neural Interface Palpation

Hamstring strain - WHY??

- Hamstring crosses 2 joints
  - Hip extension vs knee flexion
  - Concentric vs eccentric
- Not loss of flexibility
- Loss of strength and control - especially eccentric
- Primary: Loss of hamstring control
- Secondary: Hamstring overload from poor function of other pelvic stabilisers: Glutes, adductor esp

Palpation

- Site of pain
  - Hypertone
  - Palpable tear
  - Watch for bruising
- Hamstring overall tone
- Remember glutes and calves!

Bridge Test for Hamstring

- 3 level progression
- Contralateral leg straight and lifted off bench
  - 1) Bridge off bench
  - 2) Bridge off shoulder - must pass for jog
  - 3) Drop and catch - must pass for sprint

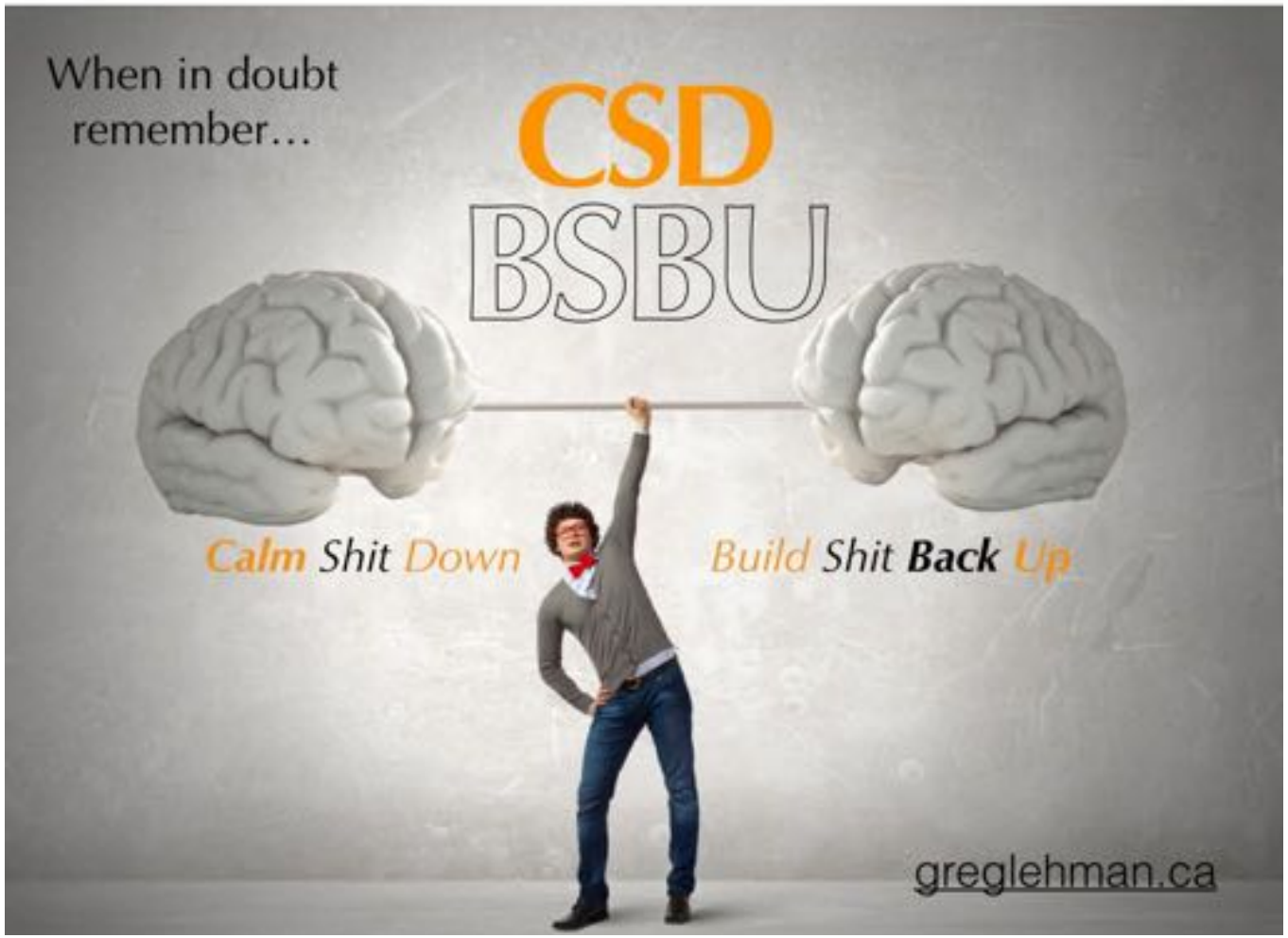
Pertubation test for hamstring

- Patient supine
- Cup and lift both heels off the table
- Patient does an active bridge test with heels supported by practitioners hands
- Vigorously move your hands back and forth randomly whilst patient maintains active bridge
- Watch for awareness of hamstring pain

Seated core stability

- Test hip flexion with and without using arms for Lx stability
- If strong when using arms but weak when not, this indicates use of psoas as spinal stabiliser due to weak spinal stabiliser recruitment

Modern concepts in rehabilitation



Treatment

- Depends on stage of acuteness
- And concurrent factors
  - lower limb biomechanics
  - neural considerations

POLICE

- New guidelines for acute injury management because RICE became PRICE and is now POLICE
  - Protect
  - Optimal Loading (with pain free function)
  - Ice (analgesia)
  - Compression (most effective swelling control)
  - Elevation
- Also - no NSAIDs for the first 48 hours
- Bleakley CM, Glasgow P, MacAuley DC. PRICE needs updating, should we call the POLICE?. British Journal of Sports Medicine. 2011 Sep

Load

- The body needs appropriate load to heal
- Load is good - overload is bad
- Load makes you stronger
- Load makes your tissues less sensitive

Treatment – acute phase

- POLICE – although ice is now being put into question
- Pain inhibition is biggest cause of loss of immediate function, but you have a huge mass of uninjured muscle, which could function appropriately
- Taping (SPRT/K-tape) to facilitate early loading
- Consider IASTM to facilitate appropriate healing and collagen fibre orientation
- Dry needling to reduce acute spasm

Treat FUNCTION

- The hamstring healing will take care of itself (with a little help)
- Your skill in functional analysis and treatment is the key to a quick return to play and reduced re-injury risk

Functional Treatment

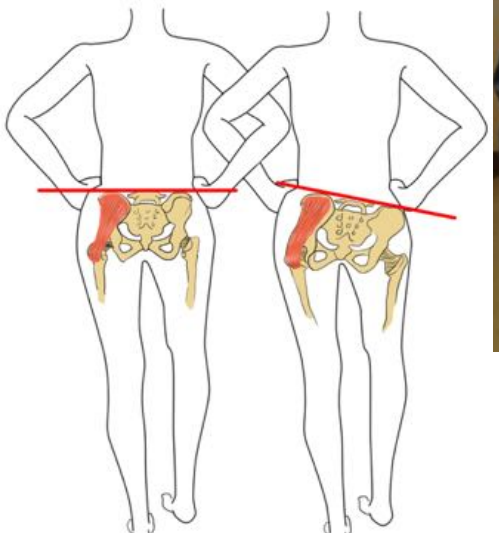
- Manual therapy
  - Under load
  - With movement
  - In functional positions
    - Often with reproduction of mild symptoms
- Active Release Technique (ART)
- IASTM (Instruments)
- STR (Soft tissue release)
- G'n'R (Grip and Rip!)

Treatment

- Neurodynamic Mobilisation (Slump)
- Assess spinal, pelvic and lower limb mechanics including gait
- Assess Lx, pelvic and hip stabiliser strength (especially eccentric strength)
- RTP should be guided by Bridge Test, graduated and supervised

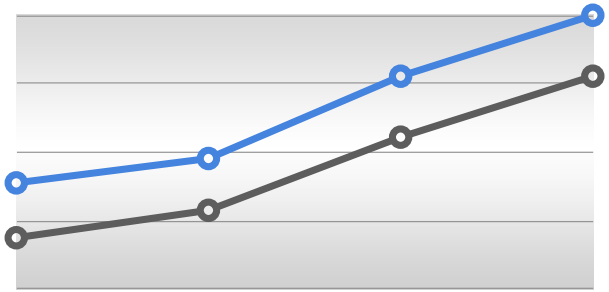
Associated kinematic considerations

- Foot and ankle function
- Pelvic and Lumbar spine
- Knee function
- Posterior chain activation from toe flexors to spinal stabilisers
- And as far as your treatment model will take you
  - Thoracic, cervical, jaw, diaphragm etc et



Return 2 Play (R2P)

- Or 'getting your life back'!
- Graduated and controlled loading
  - "suck it and see"
- Patient education is key
- Be prepared for set-backs
- "The only stupid mistake is the one we don't learn from"
- Couch to 5k principle
- Rehab is "getting a patient to do what they currently can't in the quickest and safest way"
- Rehab early - treat late!
- Meaningful activities



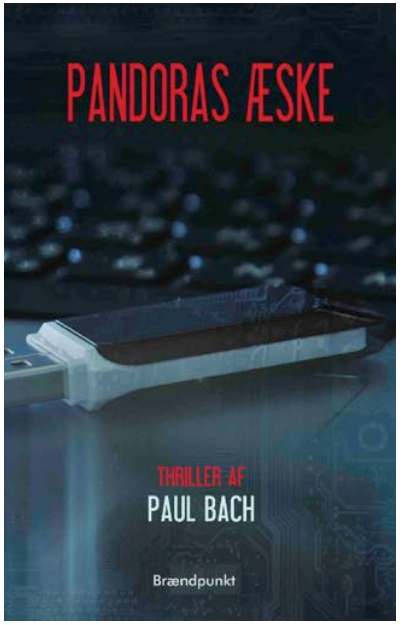
Psychological considerations

- Bio-Psycho-Social
  - Individual mindset
  - Hypersensitive
  - Team pressure
  - Parental pressure
  - Competition targets


Always aim to return a better athlete
than they were before an injury

Hamstring Injury Prevention

- Why stretch?
- Eccentric strength
  - Remove causes of inhibition
  - Strengthen with Nordic/eccentric
  - Change in fascicle length
- Optimise full body mechanics to avoid hamstring overloading
- Monitor and control fast running loads



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- Opar et al. (2014). Nordic hamstring exercise weakness is a risk factor for hamstring injury in elite Australian football: A prospective cohort study. Journal of Science and Medicine in Sport,18, e140

The Nordic Hamstring

- Is a test and an exercise
  - For test you measure angle of 'break' - or load through a dynamometer
- For prevention NOT rehab
- NOT to be used on an injured hamstring!
- A very high load and should be started slowly
- Fierce DOMS expected!
- Increases eccentric strength and fascicle length

- Presland et al. (2018). The effect of Nordic hamstring exercise training volume on biceps femoris long head architectural adaptation. Scandinavian Journal of Science & Medicine in Sports, 28(7), 1775-1783.

Take home

- Understand the pathology
  - Hamstring v neuro
- Understand functional treatment to all related structures
- Understand the patient
  - Their R2P requirements
  - Their individual risk for recurrence
  - Their psychological state