Athlete Profiling
Injury Prevention
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Special interest in:
- Basketball
- Athletics
- Race Walking

Research
Performance markers
(screening / HR assessments / biomechanics)
Athlete Profiling

Affects on Common Race Walking Injuries
Aim of session

- Aim:
  - Demonstrate two KEY areas of testing
  - Highlight how to develop a profiling system
  - How this could be linked to
    - reductions in injury
    - Improvements in performance
  - Assessment of the kinetic chain

Identify a problem and create a solution
A continual process of development
Profiling

Process of building information about an athlete

<table>
<thead>
<tr>
<th>Physical</th>
<th>Mental</th>
<th>Skill level</th>
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Follows a 4 stage process

1. *Understanding*: Highlight areas for development
2. *Analysis*: Identify the characteristics and desired movements/strength/flexibility patterns
3. *Interpretation*: Screen the athlete
4. *Delivery*: Analysis of the results with aim to develop method of improving that athlete
Profiling

Understanding

Consider all components of a muscle

- Effects on directly length
- Effects on kinetic chain
- Effects on given athletes performance

Remember all athletes are individuals
Profiling

Analysing

Additional stress on a joint / muscle will cause excessive work load & possibly lead to injury & reduction in performance

• Examples are:
  • Tibialis anterior injury due to hip tightness
  • Hamstring tightness / injury due to shoulder girdle tightness
Psoas Muscle

Function
Stabilise spine
Hip flexor
Mild external rotator of hip

Works
Concentrically
Eccentrically
Shortened Psoas & Rectus Femoris Muscle

Effects of shortening the Psoas muscle around the hip, resulting in early knee bend and delayed heal off due to excessive pronation of the foot resulting in reduced activation of Tibialis Posterior & Gastrocnemius
Shortened Psoas & Rectus Femoris Muscle

Reduced pelvic posterior tilt on leg swing side, increases activation of hamstrings (inhibits their eccentric elongation prior to heal strike)

Over pronation restricts ankle ROM, overstretching Tibialis posterior and reducing ankle dorsiflexion
Screening for Psoas tightness

**Muscle Length**

Hip should be able to become horizontal with the bed (as red line)

Shortness is indicated by the knee not being able to reach this position

"The Thomas test"
Screening for Psoas Activation

**Kinetic Chain assessment**
Lumbar spine should be controlled. NOT following the leg

Hip should be able to turn inwards towards end

Leg should be straight
Screening for Psoas Activation

Wrong Technique shown by red lines demonstrating lower spine movement
Treatment for tight Psoas

Kneel on right knee
Push hip forward (do not let spine curve)
Lean to left (arm above head)

Rotate body round to right
Keep hip pushed forward
Treatment for Activation of Psoas

Level 1
Leg swings

Level 2
Add head rotation with arm swings
Disassociates glute / psoas / spinal control
Tibialis Posterior

**Function**
- Inversion of the foot
- Plantar flexion of the foot
- Along with peroneus longus stabilise the ankle joint (talus & sub-talar joint)

**Works**
- Concentrically
- Eccentrically
Screening for Tibialis Posterior Weakness

Wrong technique
Heal flick switches muscle off

Correct technique
Weight coming straight up therefore has to be using the muscle correctly
Screening for Tibialis Posterior Weakness

Kinetic Chain assessment

Tip toes should be able to maintain good heal alignment

This video shows the heal flick in the wrong direction
Screening for Tibialis Posterior Weakness

Kinetic Chain assessment
Unable to stabilise from hip. This increases the heel flick in the wrong direction.
Exercise for Tibialis Posterior Weakness

Lean backwards
Lift toes off floor

Keep toes off & bring body to upright position
Drive up onto single leg with tip toes
Additional areas to screen

• **Gluteus Medius strength**
  • lunge / hip abduction / squat (determine strength or tightness)

• **Glute Medius control kinetic chain**
  • lunge with trunk or head rotation

• **Ankle ROM & muscle strength & control**

• **Hip rotation**
  • internal >30° and external >60° and abduction > 40°(optimal)

These are based on optimal models so should be adapted for each individual
Additional areas to screen

- Thoracic rotation
- Lumbar rotation
- Shoulder Range Of Movement (ROM)
  - Require 85° extension & 35° flexion
- Pectoral girdle (ability to depress, pectoralis major or minor tightness)
- Cervical side flexion (upper traps)

These are based on optimal models so should be adapted for each individual.
THANK YOU FOR LISTENING

Questions?
References

- Massage & bodywork november/december edition 2008
- Student Clinic Body works
  http://students.clinicalbodyworkers.com/students/frame_page/muscle_chapter_3_hips.htm
- Football rescue
  www.footballrescue.com/tibpost.jpg
- Thanks to Leeds Met Carnegie Race Walking Squad (Brendon & Lauren)