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Physiotherapist - the adventures of...



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ENGLAND ATHLETICS



Developing Athletes – Developing Injury Potential??

Stuart Butler MSc MCSP

England Athletics Physiotherapist

Overview

- Types of Injury?
- How these injuries occur?
- Potential Reasons why?
- What we may be able to do to prevent / minimise injury



3 Sections

- Trauma
 - When thing go bump!
- Overuse
 - When we do too much!
- Developmental
 - When we should have looked at the athlete

Improve Performance and Minimalise Injury

- We have to look back to look forward
- We can only try to prevent injuries, unfortunately they will always have the potential to occur
- How we deal with them – athletics future



[Aust J Sci Med Sport](#). 1996 Sep;28(3):69-75.

Musculoskeletal injuries in track and field: incidence, distribution and risk factors.

[Bennell KL](#), [Crossley K](#).

Source: School of Physiotherapy, University of Melbourne, Australia.

- 95 Athletes 12 month period
- *‘The majority of injuries were overuse in nature and approximately one-third of all injuries were recurrent. The risk of injury was not influenced by gender or event group. The most common sites of injury were the leg (28%), thigh (22%) and knee (16%) with the most common diagnoses being stress fractures (21%) and hamstring strains (14%)’*

Average Track and Field Injuries

- Approx. 70% Track 30% Field Split
- Approx.
 - 30% Acute
 - 70% Gradual Onset
- Lower limb (70%)



Average Track and Field Injuries



- 75% in Training
- Average injury causes loss of 7 -14 days
- Likely to be muscle strain / ligament sprain



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SUMMARY

Injuries occur:

Training more than Comp, Likely to re-occur, Likely to be strain or strain in the lower limb



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Trauma



Trauma

- Young athletes are not small people
- Prepubescent Athletes are very prone to breaking bones due to the 'soft' nature of their bones

Examples

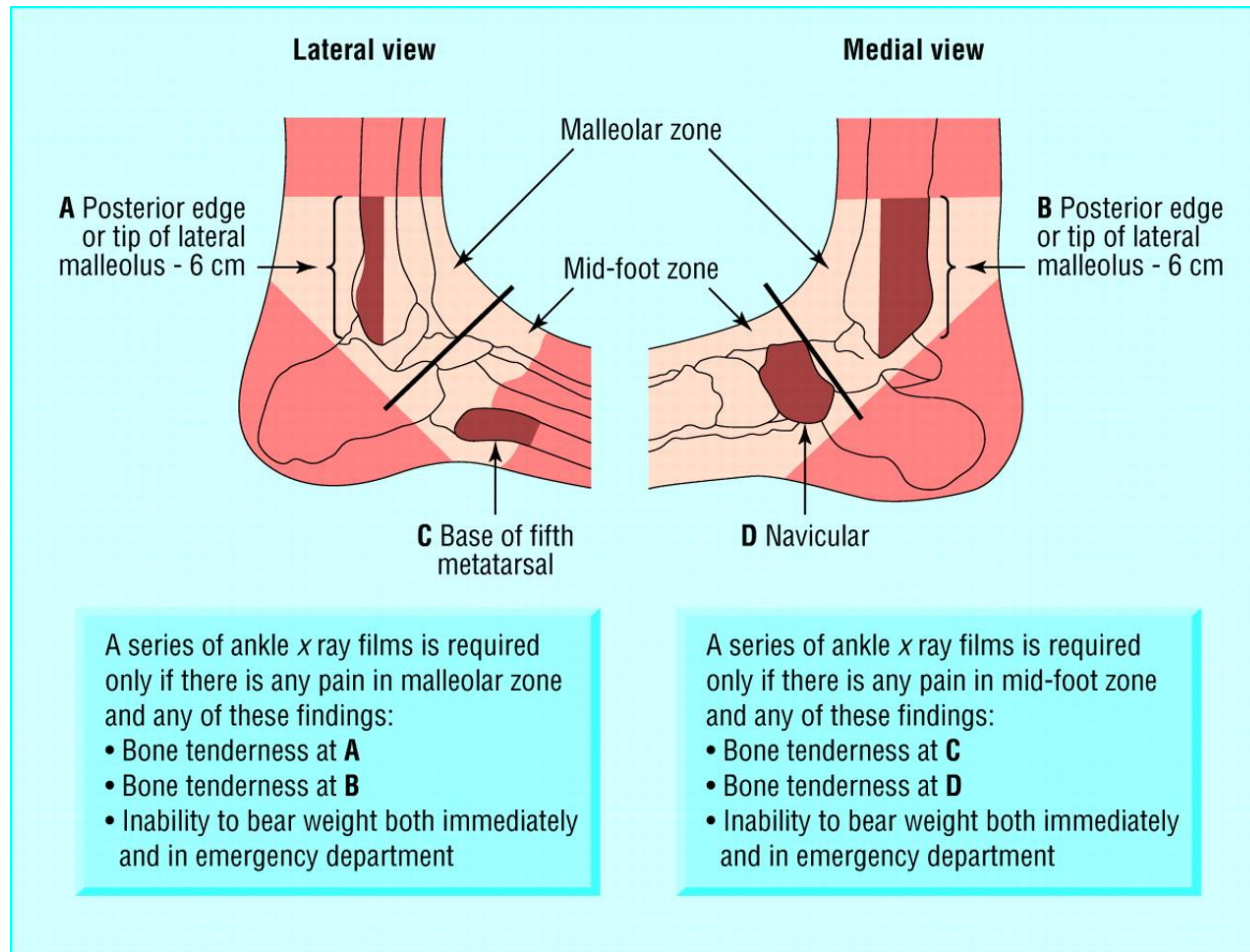
- Ankle Inversion Injury



Examples



Ottawa Ankle Rules

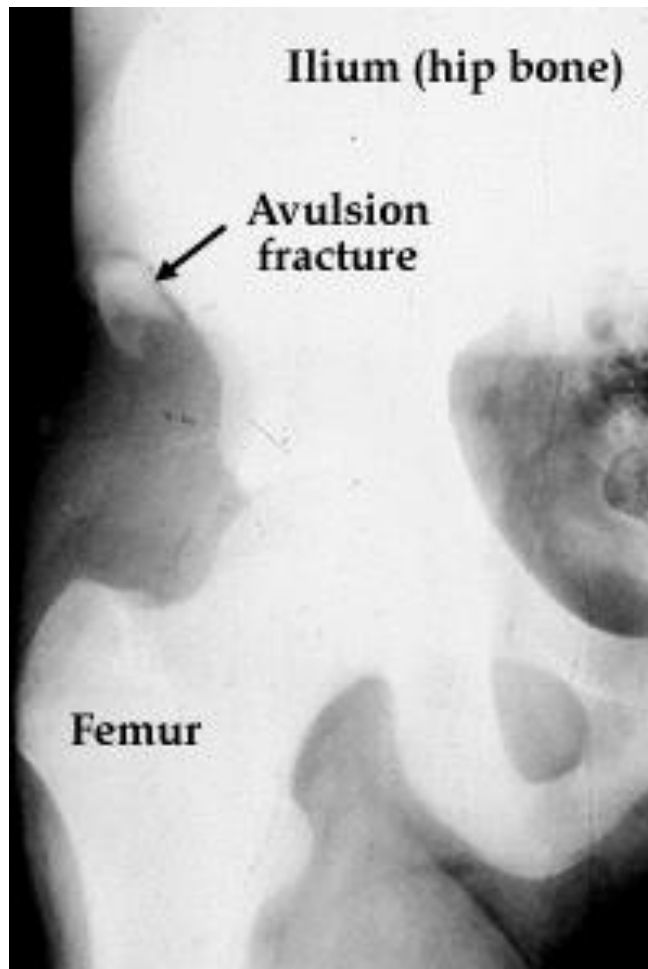


Examples

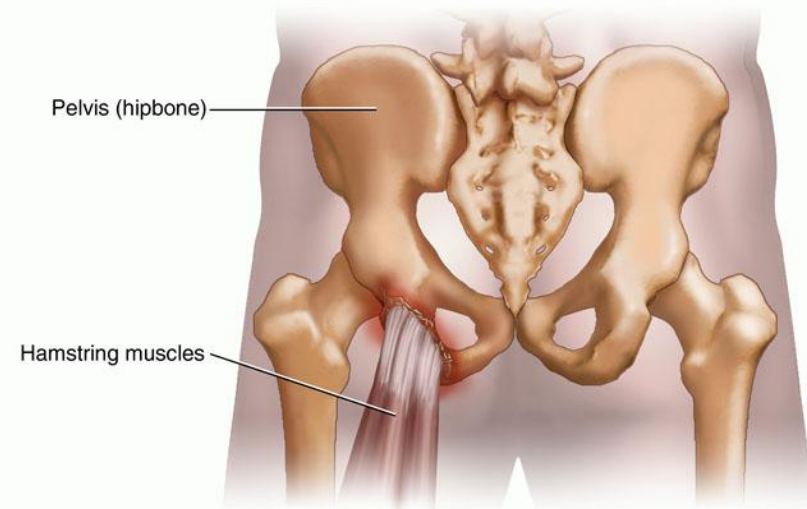
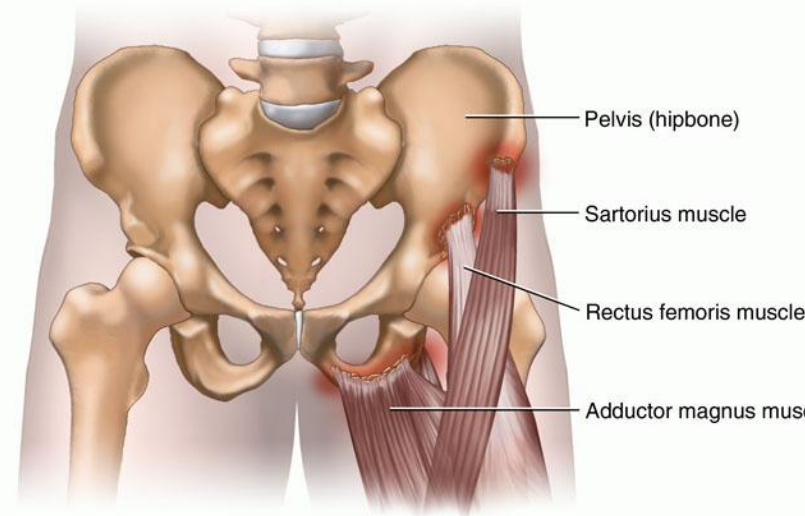
- Thigh Strain



Avulsion Tear of Rectus Femoris



Pelvic Avulsion Fractures





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Overuse



Overuse

- We do too much too often with too many forces
- Can be:
 - Too Much
 - Too Often
 - Too Many

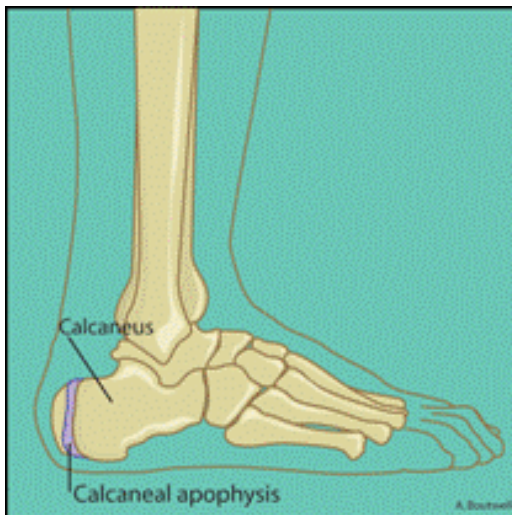
Overuse

- Developing skeleton + Growth!!



Traction Apophysitis

- Traction Apophysitis
 - Osgood Slatters
 - Sinding-Larsen-Johansson
 - Severs



Risk Factors

- Training Errors
- Increased workload
- Inappropriately conditioned athletes
- One sport (repetition)
- Muscle Imbalances
- Inappropriate technique
- GROWTH

Bone Development

Builders (Osteoblasts) Vs Demo Crew
(Osteoclasts)



6 Weeks





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Developmental

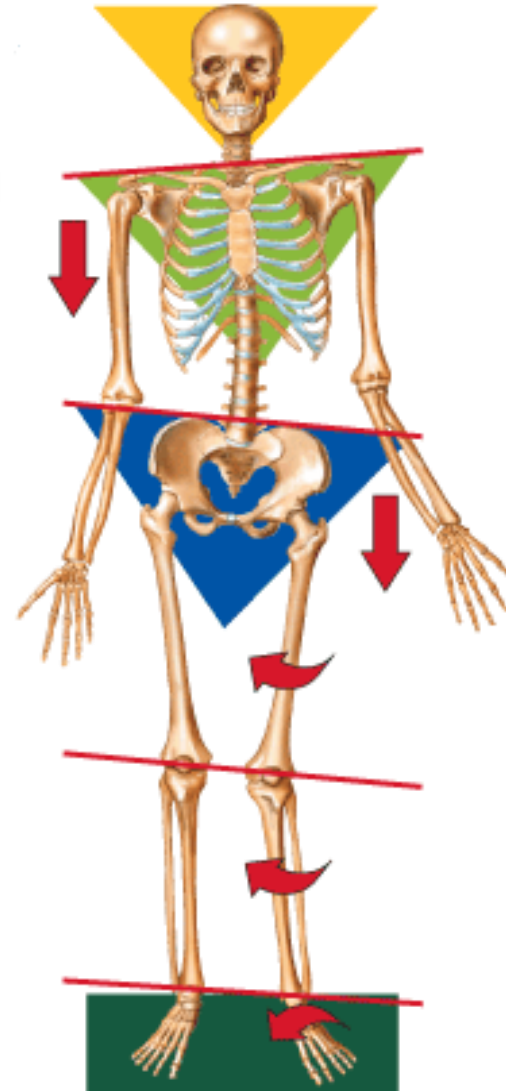
How we're set up

and

How we move

Dysfunction of the Kinetic Chain

- Excessive Pronation
- Knee Turning in
- Thigh turning in
- Hip dropping
- Shoulders uneven



Predisposing Factors

- 600 Elite Athletes
- 6 Main areas of Focus
- Each correlates to a increased incident of injury
- **Asymmetries!!!**



Trunk Rotation

- Ability to rotate Right and Left
- Aim to be symmetrical
- Must sit tall, and lock the pelvis still

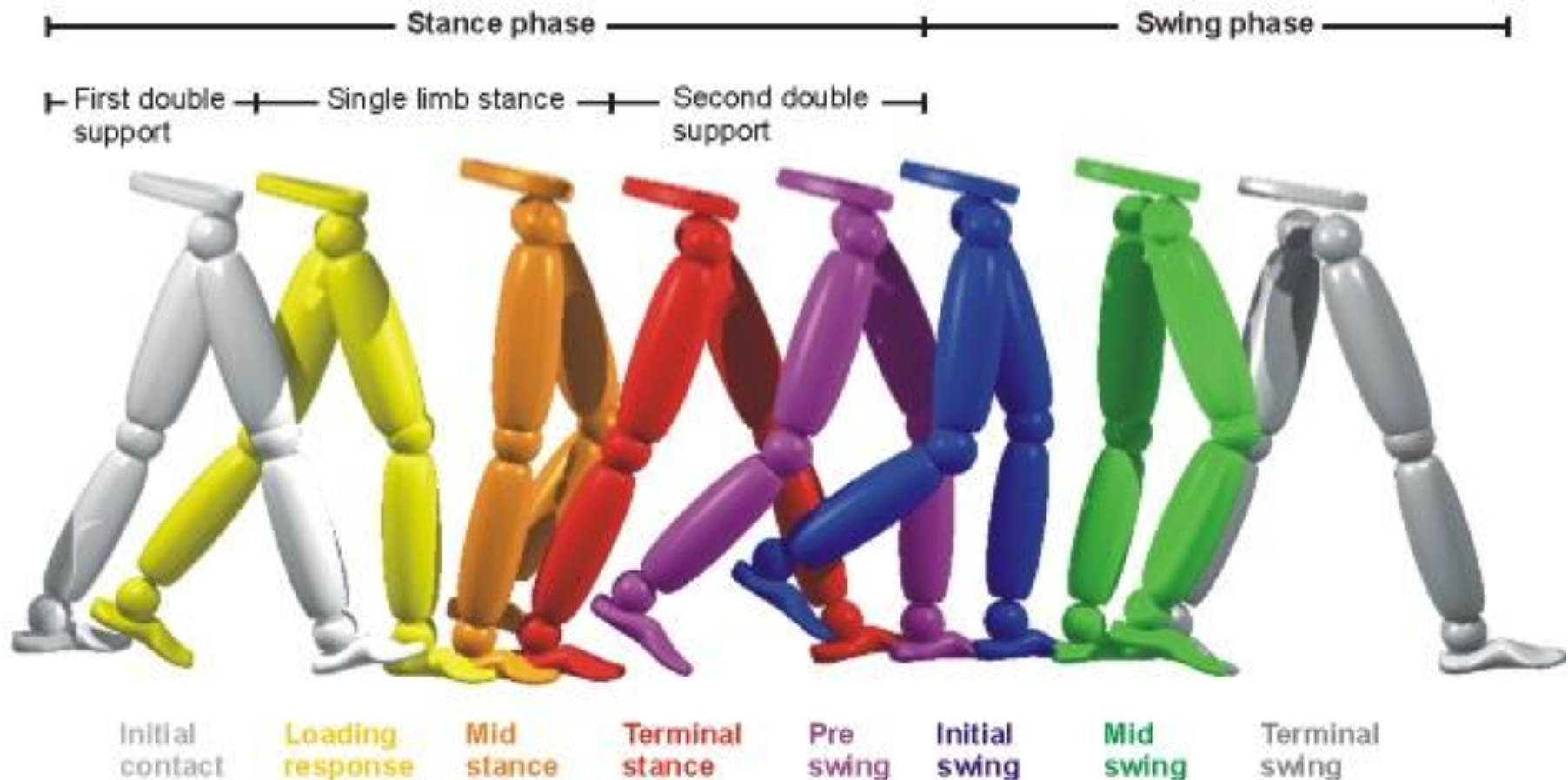


PLEASE
KEEP HEATERS CLEAR
OF OBSTRUCTIONS
AND TOWELS

Hip Extension

- Difficult to assess
- Important in Gait
- Best tested in Thomas position
- Can potentially measure distance from foot to the floor
- Must keep opposite knee pulled into chest

Hip Extension







Lunge Stretch

- Lunge Position
- Push hips forward
- Lean out to opposite side



Medial Rotation (Hip)

- Often associated with tight 'gluets'
- Again important in Gait, especially in single leg stance, both for support and propulsion
- Asymmetries
- Can measure distance between ankles

BOX

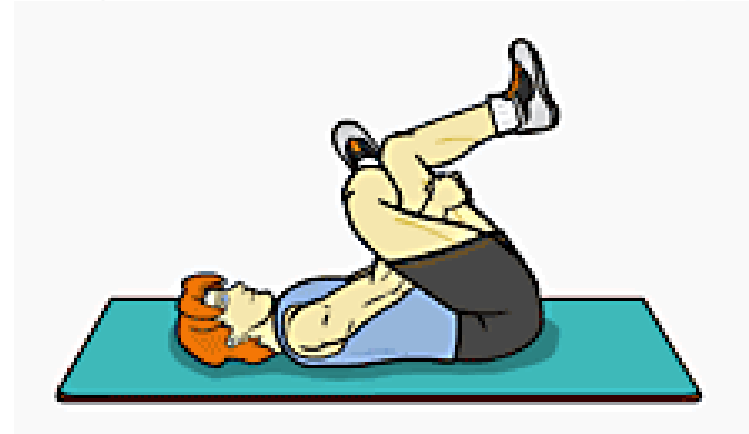






Gluts Stretches

- Squeeze - 10s
- Relax - 20s



Loss of Dorsiflexion

- Ability to pull for toes towards your body- 'Calf Tightness'
- Asymmetries
- Can measure distance from wall to big toe, keeping heel on the floor



Calf Stretch

- Heal Down
- Straight Leg
- Bent Leg
- Hanging off bottom Step





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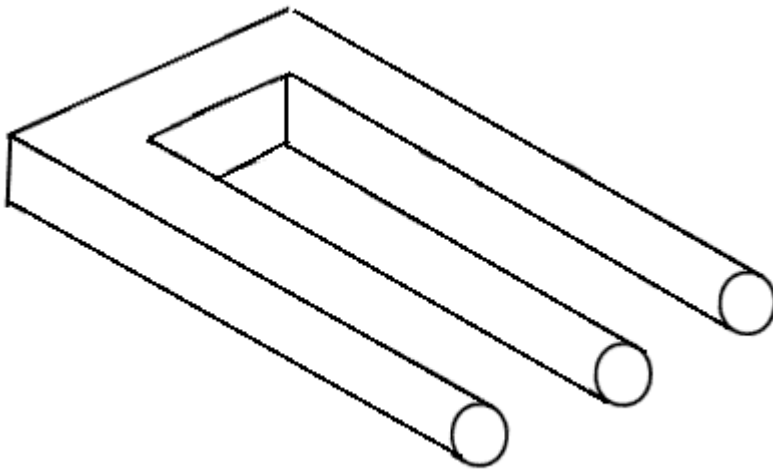
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Functional Assessment

What to look for..... And what we
see

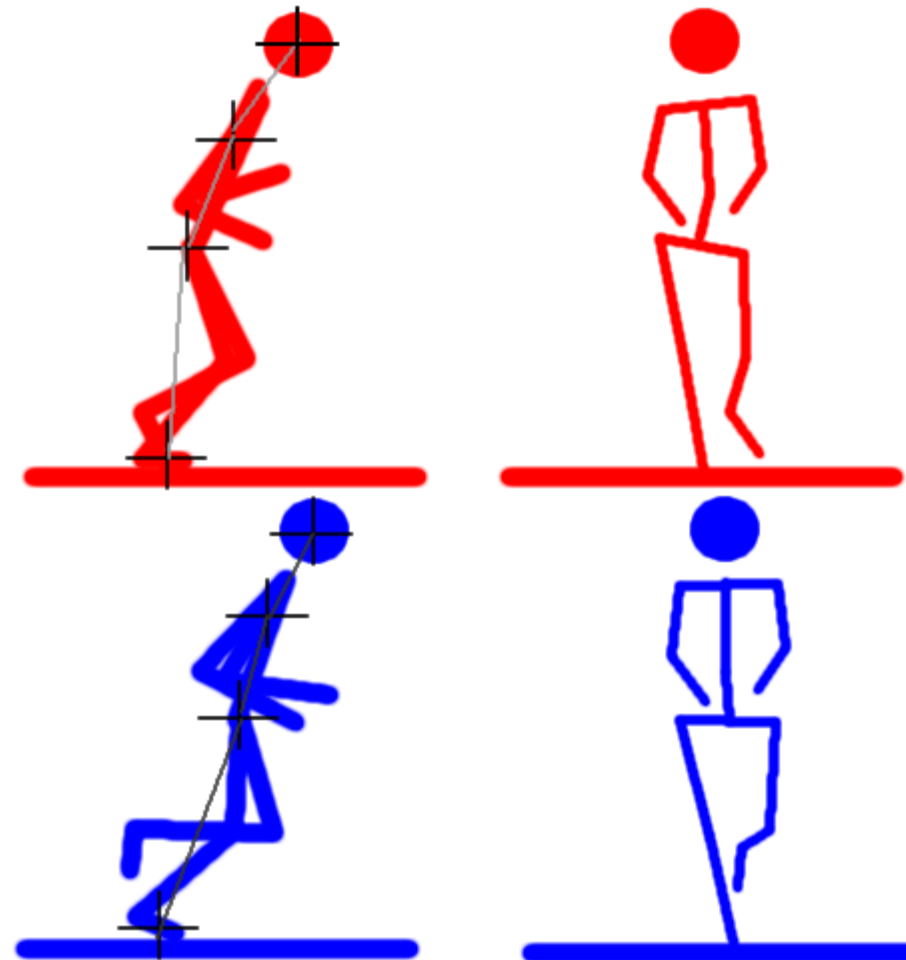
Seeing What??

- We can only see what we have seen.....



Core Controls Middle

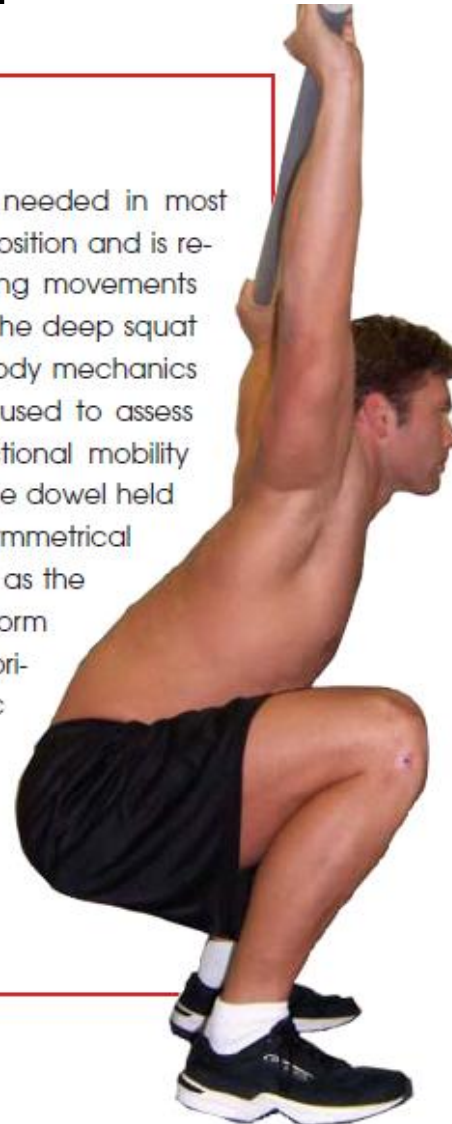
- Core = central control
- Poor control leads to excess rotation and twisting of the pelvis



And then try and analyse them in functional positions

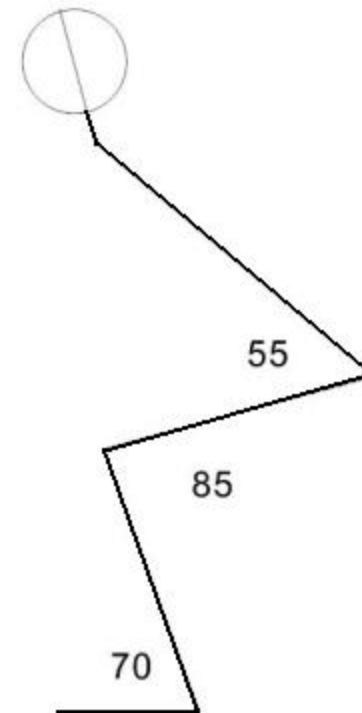
Test 1: Deep Squat

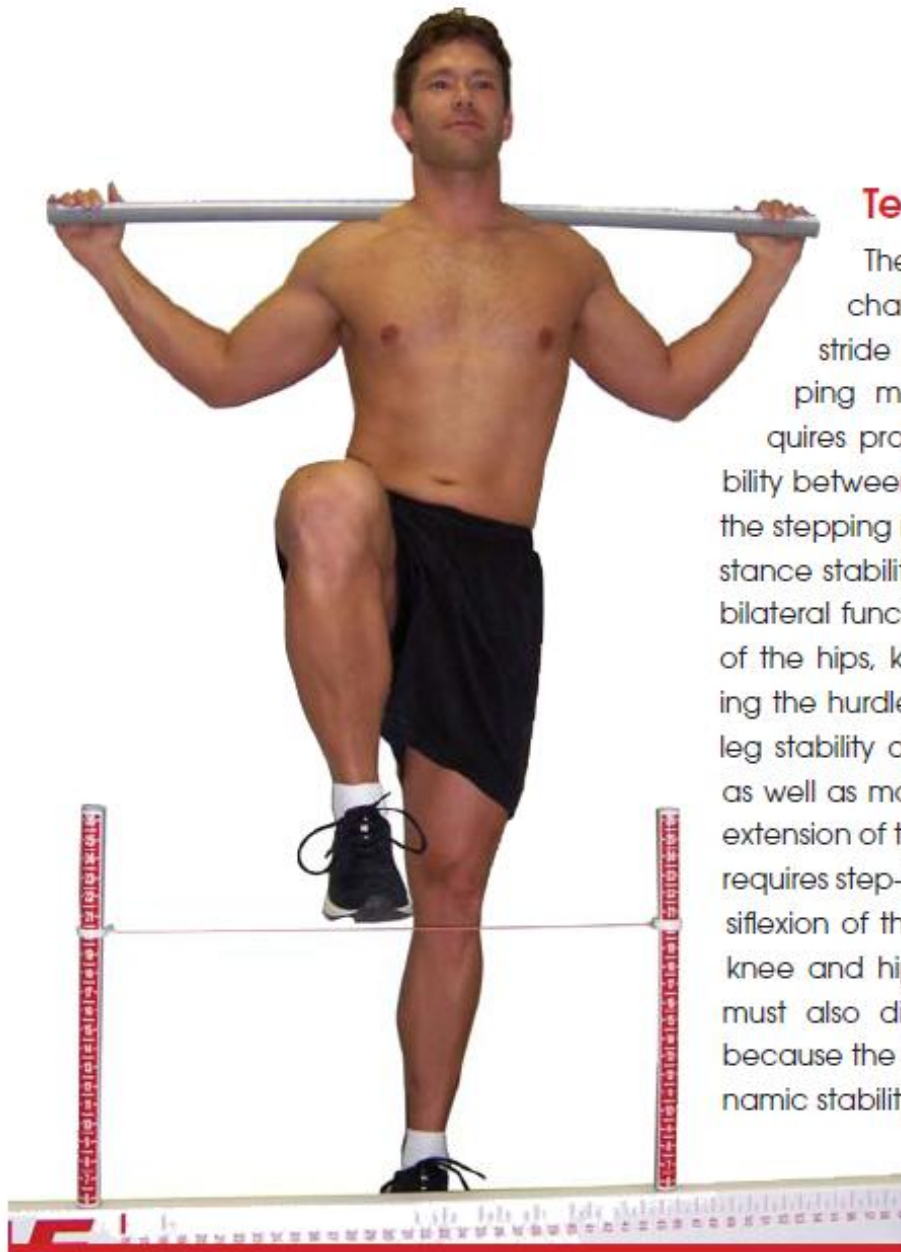
The squat is a movement needed in most athletic events. It is the ready position and is required for most power and lifting movements involving the lower extremities. The deep squat is a test that challenges total body mechanics when performed properly. It is used to assess bilateral, symmetrical and functional mobility of the hips, knees and ankles. The dowel held overhead assesses bilateral, symmetrical mobility of the shoulders as well as the thoracic spine. The ability to perform the deep squat requires appropriate pelvic rhythm, closed-kinetic chain dorsiflexion of the ankles, flexion of the knees and hips and extension of the thoracic spine, as well as flexion and abduction of the shoulders.



Squat

- Key Points
 - Knees over toes
 - Knees forward
 - Flex at waist
 - Back straight



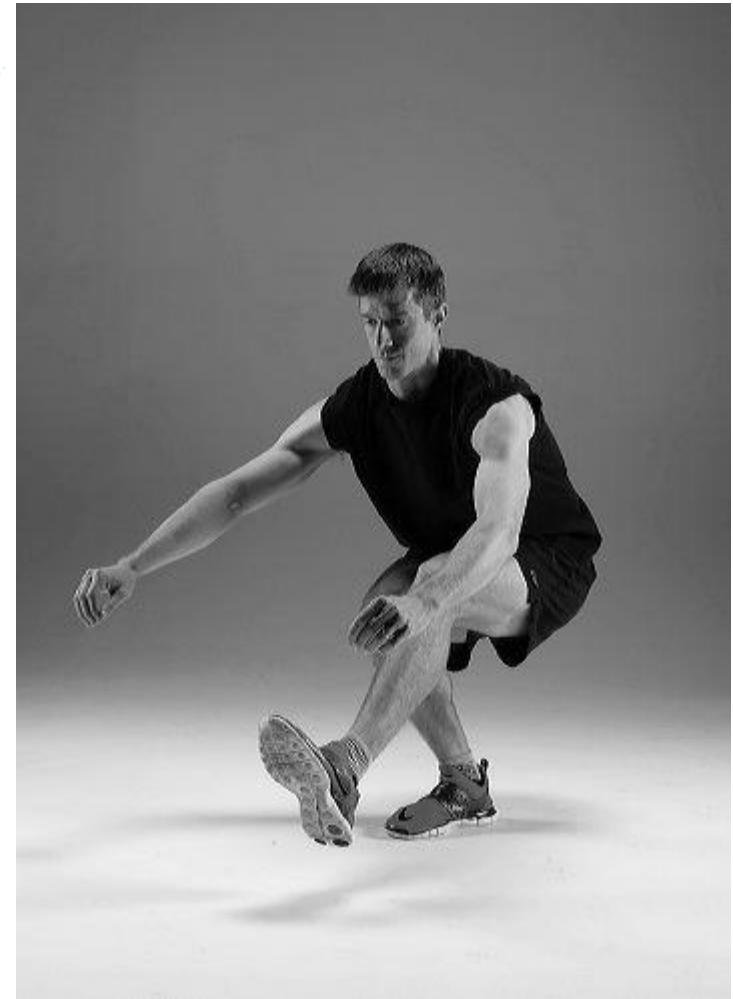


Test 2: Hurdle Step

The hurdle step is designed to challenge the body's proper stride mechanics during a stepping motion. The movement requires proper coordination and stability between the hips and torso during the stepping motion as well as single leg stance stability. The hurdle step assesses bilateral functional mobility and stability of the hips, knees and ankles. Performing the hurdle step test requires stance-leg stability of the ankle, knee and hip as well as maximal closed-kinetic chain extension of the hip. The hurdle step also requires step-leg open-kinetic chain dorsiflexion of the ankle and flexion of the knee and hip. In addition, the subject must also display adequate balance because the test imposes a need for dynamic stability.

Hurdle Step / Single leg Stance

- BALANCE
- Knee Forward and over toes
- Hips Level



Test 3: In-Line Lunge

This test attempts to place the body in a position that will focus on the stresses as simulated during rotational, decelerating and lateral-type movements. The in-line lunge is a test that places the lower extremity in a scissored position, challenging the body's trunk and extremities to resist rotation and maintain proper alignment. This test assesses torso, shoulder, hip and ankle mobility and stability, quadriceps flexibility and knee stability. The ability to perform the in-line lunge test requires stance-leg stability of the ankle, knee and hip as well as apparent closed kinetic-chain hip abduction. The in-line lunge also requires step-leg mobility of the hip, ankle dorsiflexion and rectus femoris flexibility. The subject must also display adequate stability due to the rotational stress imposed.





- Lower Limb Mobility
- Trunk Stability



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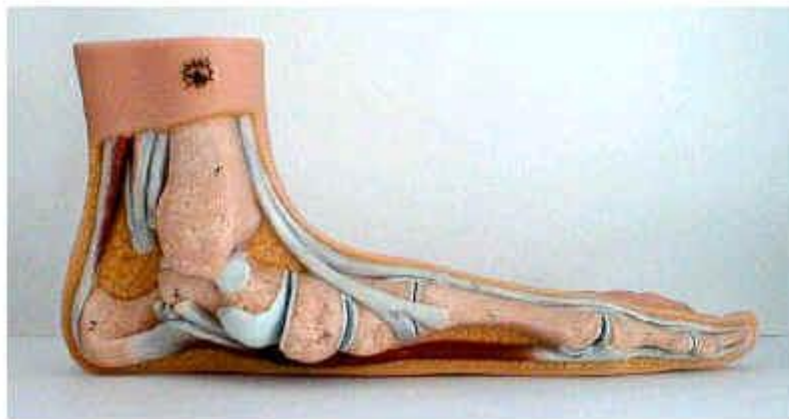
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Feet

At the bottom of the problem???

Foot Types



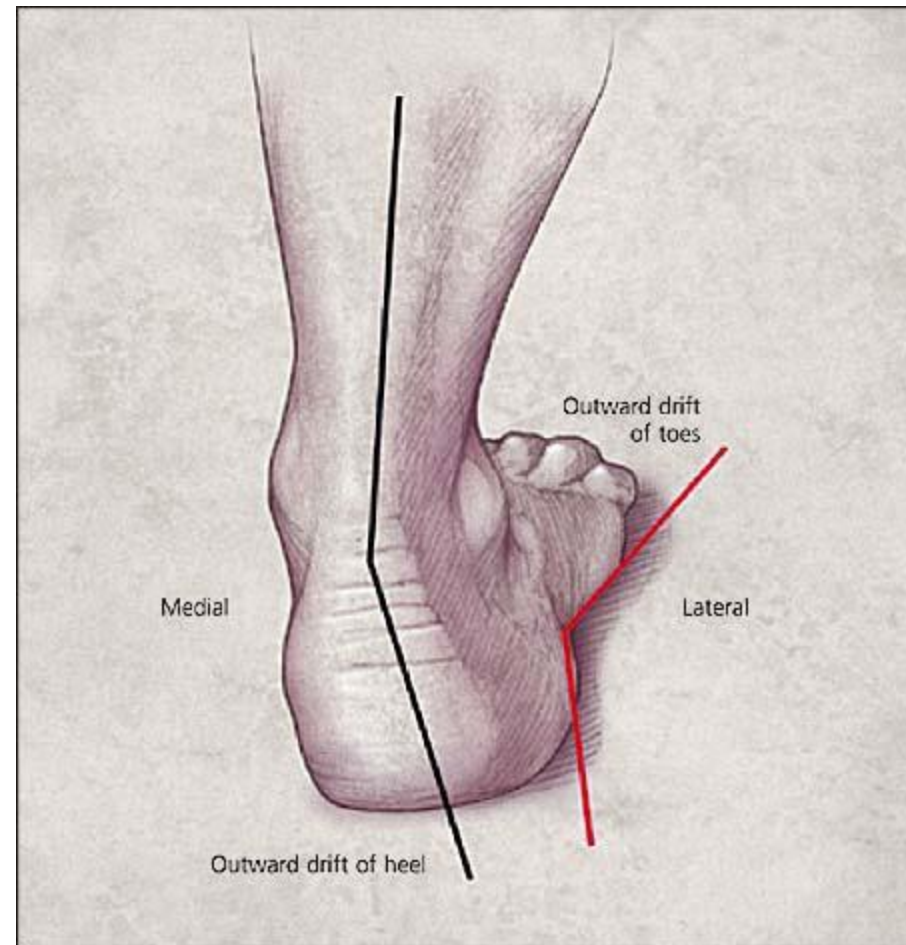
Shin and Foot Complaints

- Biomechanics
- Foot type
- Footwear
- Training load, intensity and type

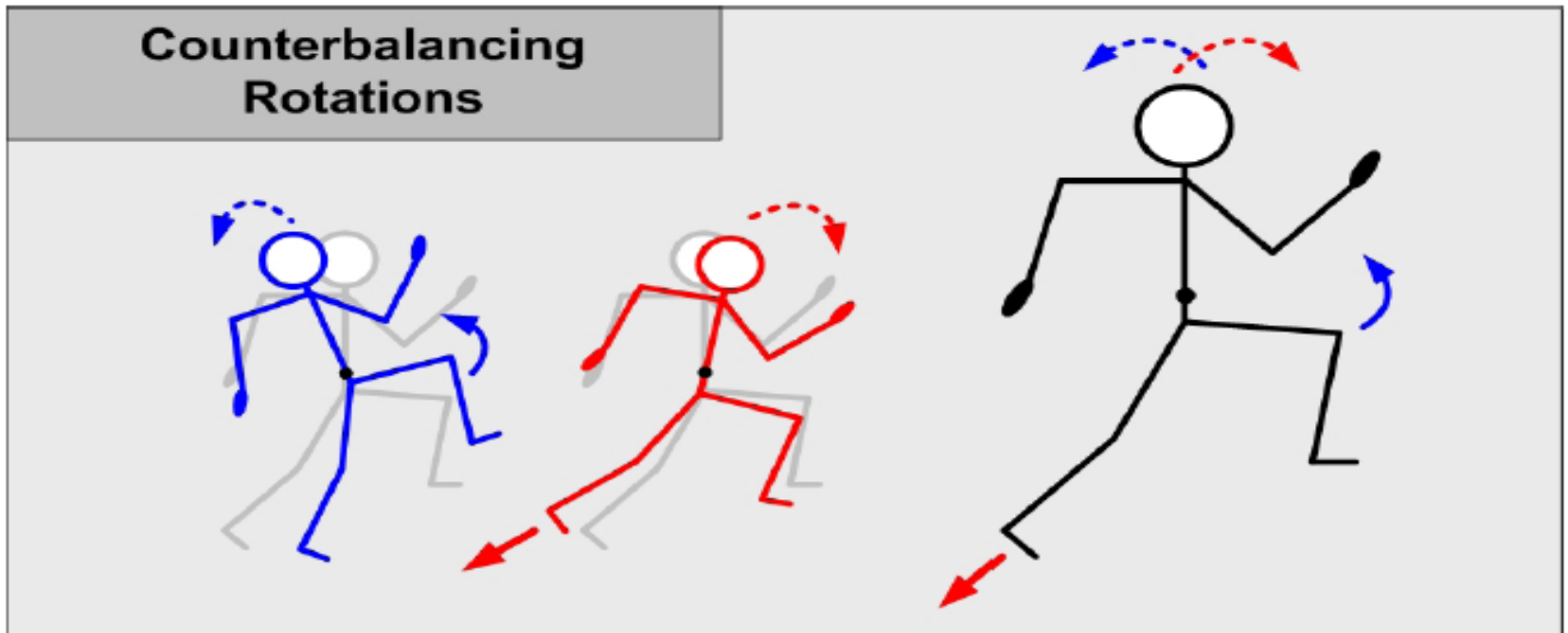


Foot Mechanics

- Pronation
(Collapsing of the arch)
- Supination
(Reformation of the arch)



NEWTONS 3RD LAW



For every action, there is an equal and opposite reaction.
These are the forces we fight during running



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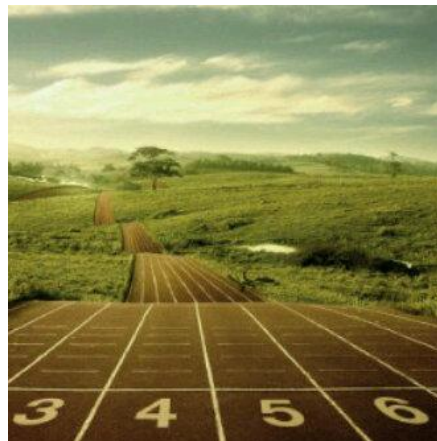
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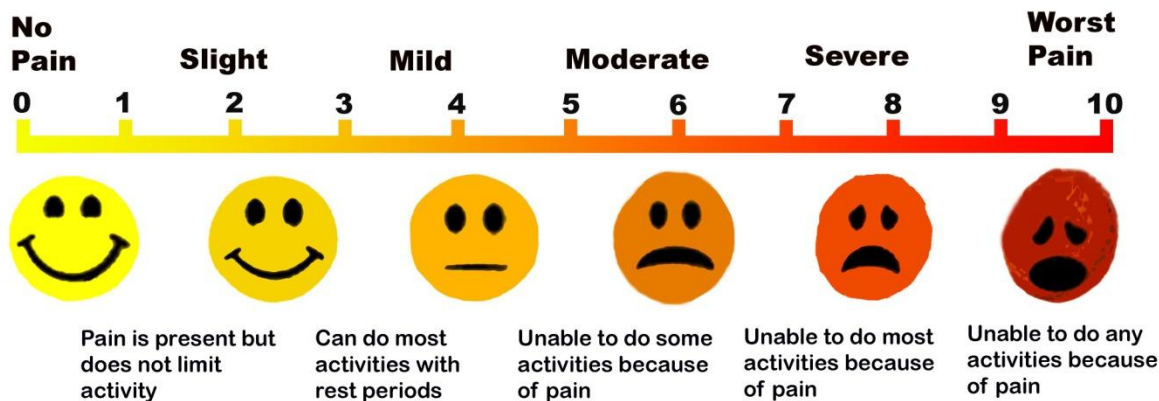
Injury

What to do when it all goes wrong!!!



VAS / RPE

How is your Pain Today?



Theramax Therapy Services, PC

AskTheTrainer.com

RPE Chart

Rate of Perceived Exertion

| | |
|-----|---|
| 10 | Max Effort Activity Feels almost impossible to keep going Completely out of breathe, unable to talk |
| 9 | Very Hard Activity Very difficult to maintain exercise intensity Can barely breath & speak a single word |
| 7-8 | Vigorous Activity On the verge of becoming uncomfortable Short of breath, can speak a sentence |
| 4-6 | Moderate Activity Feels like you can exercise for hours Breathing heavily, can hold short conversation |
| 2-3 | Light Activity Feels like you can maintain for hours Easy to breathe & carry a conversation |
| 1 | Very Light Activity Anything other than sleeping Watching TV, riding in a car, etc. |

DON'T PANIC

- **HURT**

Vs

- DOMs
(Delayed Onset of Muscle soreness)
- Settles with days



- **HARM**

- Sharpe shooting pains
- Burning sensations
- Immobility
- Night pain
- Lasts more than a couple of days
- Unfamiliar pain

Basics

- RICE (24 hrs) MICE (>24hrs)
 - Rest
 - Ice
 - Compression
 - Elevation
 - Mobility (>24hrs) Relative Rest

Seek Specialist Advice

- Physiotherapist
- Drs
- Other Professionals – Sports Rehabilitators, Strength and Conditioning, Podiatrist, Nutritionist, Psychologist...

FIRST AID

- AED = Automated External Defibrillator??



SUMMARY

- Injury potential is always present
- By raising awareness of potential sites / mechanisms of injury coaches will be better placed to recognise, and minimise.
- Profile your athletes – what are they likely to suffer from.....
- Don't panic – seek suitable help

knee below hip



heel eversion

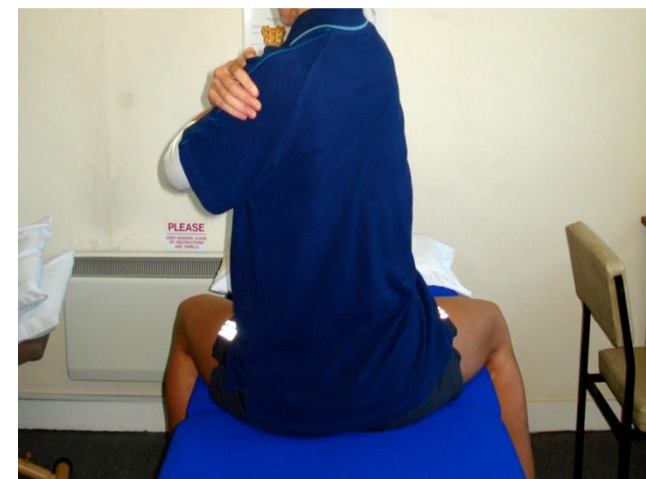


knee past foot



heel raise

corner to corner



Questions?



Stuart Butler MSc MCSP

Allen Physiotherapy

www.physiosportsmed.co.uk

stuart@myrehab.co.uk