RUNNING INJURIES: PREVENTION AND REHABILITATION

FURMAN INSTITUTE OF RUNNING & SCIENTIFIC TRAINING FIRST
Topics of Tonight’s Lecture

- Common Injuries and Treatments
- Causes of Common Injuries
- Measures to Avoid Injury
Most Common Running Injuries

- Plantar Fascitis
- Achilles Tendonitis
- Tibial Stress syndrome
  - AKA shin splints
- Iliotibial band syndrome
- Runner’s knee
- Stress fractures
- Acute Muscle Tears

Caused by
- 1) Training errors (too much too soon, for too long)
- 2) Inappropriate footwear
- 3) Inadequate strength
- 4) Inadequate flexibility
- 5) Poor biomechanics
Common Anatomical Afflictions

- Reduced Ankle Range of Motion
- Leg-length asymmetry
- Increased quadriceps angle
- Bow Legs
- Knock knees
- Subtalar Hyper Mobility
- High-arced or flat feet
Factors Related to Risks of Running Injuries

- Previous injury
- Lack of running experience
- Competitive running
- Excessive weekly running distance
- Low body mass
How To Avoid Injury

- Proper shoes
- Warm-up
- Training methods
- Stretching
- Muscle strengthening
Pes Cavus/Pes Planus

Pes Cavus associate with a more rigid foot and lateral leg injuries

Pes Planus associated with hypermobile foot and medial leg injuries
Definition:
Inflammation of plantar fascia most often occurring at the origin on the heel (inside edge).

Also may be associated with heel spurs (not necessarily the cause of the fasciitis)

Chronic injury caused by repetitive overuse (changes in training levels)
Plantar Fascia of Right Foot

Common Site for Pain of Plantar Fasciitis
Plantar Fasciitis

**Etiology:**
- Repetitive stress (traction) during weight bearing and/or push off
- Predisposing factors: rigid pes cavus, shortened achilles tendon, hypermobile forefoot

**Pathology:**
- Microtrauma/inflammation at the insertion of the plantar fascia into the calcaneous with w/out bony exostosis formation (calcaneal spur)
Plantar Fasciitis/Heel Pain

**Symptoms:**
- Pain located in middle to medial aspect of heel
- Mornings bad, improves slightly during day and worse by end of day
- Pain is activity dependent

**Treatment:**
- Effective in 95-98% of people
- **Stage 1:**
  - NSAID’s, stretching, heel pads, over the counter orthotics, physical therapy
- **Stage 2:**
  - Steroid injection, night splint, custom orthotics, physical therapy
- **Stage 3:**
  - Surgical considerations after 6-12 months of failed conservative RX, new “shock wave therapy”
The Pain of Fasciitis
Treatments for Plantar Fasciitis

Helps increase flexibility of Plantar fascia.

Prevents shortening of fascia over night.
Pronation of Talar and Subtalar Joints

Stresses
Tibial/Fibular Joints
Achilles’ Tendon
Deltoid Ligament
Spring Ligament
Longitudinal Arch of Foot
Transverse Arch of Foot
Tibialis Posterior Muscle
Anterior Tibialis
Foot Pronation and Tibial Torsion:
Prevention of Over Pronation

- **Proper Shoe Selection**
  - Heel Wedge to Prevent Excessive Motion

- **Strengthening of Anterior/ Posterior and Lateral/Medial Muscles of Leg**

- **Strengthening of Arch Muscle of Foot**

- **Proper Running Biomechanics**
Achilles Tendonitis

**Definition:**
- Inflammation of the Achilles tendon most often occurring at the insertion on the back of the heel.
- Often associated with a “pump bump” or bone spur.
Achilles Tendonitis

**Symptoms:**
- Morning stiffness
- Pain with steps (esp. down)
- Pain with activity
- Pain can be located in middle of tendon as well and can produce a “nodule”

**Treatment:**
- NSAID’s, physical therapy, heel lifts, stretching, ice/heat
- AVOID steroid injections!
- Casting if no relief with other conservative treatment
- Surgery as an absolute last resort
Calf Stretches
Medial Tibial Stress Syndrome
AKA Shin Splints

- By definition it is irritation of the anterior compartment of the tibia
- Can also occur posteriorly or along the fibula
- Very broad definitions depending on your sources
Shin Splints

Shin splints is the name given to pain at the front of the lower leg. The most common cause is inflammation of the periostium of the tibia (sheath surrounding the bone). The injury is an overuse injury and can be caused by running on hard surfaces, running on tip toes and sports where a lot of jumping is involved. If you over pronate then you are also more susceptible to this injury.
Shin Splints

**Symptoms:**
- Pain is activity dependent
- Burning/deep ache along distal 1/3 of tibia
- Some numbness and tingling may occur in the toes
- Need to be aware of pain localizing to one point as sign of stress fracture developing

**Treatment:**
- Modify training schedules, change routes
- Add cross training/pool workouts
- Ice, shoe evaluation, possible orthotic intervention
Patella Femoral Stress Syndrome

- Mechanism
- Signs and Symptoms
Knee Anatomy

The knee’s stability and “health” is greatly dependent on the soft tissues that surround it, with muscle balance being a major factor.
The Q-angle is the angle formed by a line from the anterior superior spine of the ilium to the middle of the patella and a line from the middle of the patella to the tibial tuberosity. Males typically have Q-angles between 10 to 14°, females between 15-17°.
Atypical Q-angles

- Bowleggedness
  - Genu Varum
    - Small or negative Q angle
- Knock-knees
  - Genu Valgum
    - Q angle > 17 degrees
Treatment for Runner’s Knee

- Rest (relative or absolute)
- Ice after exercising
- NAISDs
- Strengthen quadriceps
- Stretch Iliotibial Band
- Stretch hamstrings and gastrocnemius and soleus
Iliotibial Band Syndrome

**IT-band**
- thick strong band of ligamentous tissue
- connects tensor fascia latae to the lateral condyle of the femur and the lateral tuberosity of the tibia

**IT-band rubs against the lateral femoral condyle when there is excessive tension**
Iliotibial Band Friction Syndrome

Mechanism
- Overuse
- Running down hills
- Over pronation
- Worn out shoes
- Running on cambered surface
- Tight band
- Bow legs
- Weak quadriceps
Iliotibial Band Syndrome

**Signs and Treatment**

**Signs/Symptoms**
- Pain on outer side of knee
- Pain usually increases with run
- Subsides slowly after run

**Treatment**
- Ice
- Relative Rest
- NSAIDs
- ITB Stretches
- Quad Strengthening
- Pelvic Stability Ex
- Proper Shoes
Excessive pronation increases internal rotation of the tibia, which accentuates the friction of the IT band and femoral condyle.

Tibial alignment and size of femoral condyle may also contribute to the development of this condition.
Stress Fractures

Symptoms:
- Rapid Onset of Pain
- Well Localized
- Usually of the lower limb

Causes:
- Abnormal concentration of stress
- Bones insufficiently strong
Acute Muscle Tears

Result of:
- Muscular strength imbalance
- Inflexibility
- Inadequate warm-up
- Eccentric contraction
Acute Muscle Tears

**Treatment:**
- Ice
- Stretching
- Strengthening
Chronic Muscle Tears

Characteristics:
- Gradual rather than sudden
- Progresses and makes running difficult, particularly speed work
- Knots appear in affected muscle
- Common in calf muscle
- Develop eccentric muscle weakness, exposed during faster running
Chronic Muscle Tears

Treatment:
- Stretching
- Strengthening
- Cross-friction massage
Side Stitch

- Exercise-induced abdominal pain
- Cramp of the diaphragm muscle
- Occurs with fast running and uncomfortable breathing
- Treatment requires breathing out fully rather than panting
Some Basic Tips

- Don’t increase mileage by more than 10% a week.
- Don’t run more than 45 miles a week.
- Don’t run or stand on uneven surfaces.
- Don’t run on sand.
- Don’t run through pain.
- Ice often.
- Change your running shoes every 450 miles.
- Work regularly on strengthening.
- Work regularly on flexibility of ankle.
Foot Rehabilitation

**Strengthening**
- A number of exercises can be performed
  - Writing alphabet
  - Picking up objects
  - Ankle circumduction
  - Gripping and spreading toes
  - Towel gathering
  - Towel Scoop