

Keeping you on the road and out of the doctor's office

Presented by
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Background

- Clinic Manager for Select Physical Therapy
- Master of Physical Therapy, Old Dominion University, 1999.
- Master of Health Administration, MCV/VCU, 2006.
- Competitive age group triathlete

Goals

- Educate active individuals regarding home treatment options for common lower leg injuries associated with sporting competition
- Maximize workout sessions and sporting longevity
- Minimize time away from training and competition due to injury

Goals: continued

- This seminar will not provide a comprehensive review of lower extremity biomechanics or medical management of the injuries we discuss.

Functional Anatomy of the lower leg

- Divisions of the lower leg- Shin/calf, rearfoot, midfoot, and forefoot
- Movements- Plantar flexion, dorsi flexion, supination, and pronation.



Movements defined

- Supination- Natural movement of the foot that increases the height of the arch



Movements defined

- Pronation- Natural movement of the foot that decreases the height of the arch



Rear foot joint

- Bones: calcaneus, talus, tibia, and fibula
- Motions: Moves in all directions
- “Motion coach” that sets the stage for how your foot will move (Dr. Brian Hoke) or the key to the dead bolt.



Midfoot

- Bones: cuboid, cuneiforms, and navicular
- Movements: Moves in all directions based on two motion axis
- “Motion star” that guides the motion of the arch (Dr. Brian Hoke) or the deadbolt



Forefoot

- Bones: Metatarsals
- Movement: Primarily moves up and down, but also does some rotations
- Without good forefoot stability you end up with splayed toes



Essential foot functions during the runner's gait cycle

- Propulsion- ridged foot position/supination

Mechanics

- Rear foot locks the foot into supination
- Windless mechanism of the plantar fascia



Essential foot functions

- Shock absorption- flexible foot position/pronation
 - Mechanics
 - Pronation unlock of the rear foot allowing for arch mobility
 - Posterior tibialis muscle controls the descent of the arch as it flattens out (ie pronates)



Foot type spectrum

- Excessive pronation- your arch collapses and you have too much foot flexibility



- Neutral- just the right balance of flexibility and rigidity



- Excessive supination- you can park your car in your arch and you have too much foot rigidity

Common injuries of the lower leg

- Metatarsalgia
- Posterior tib tendonitis
- Plantar fasciitis
- Achilles tendonitis
- Stress fractures



<http://ironman.com/events/ironman70.3/boise70.3/the-pictures-say-it-all-craig-alexander-and-chris-lieto-sprint-to-the-line-at-ironman-70.3-boise>

Metatarsalgia

- Pain in the region of the forefoot
- Self diagnosis: Tenderness to touch under the balls of the feet or between the bones of the forefoot. On occasion you can also have numbness in the toes or midfoot.



Metatarsalgia: Causes

- Excessive compression of the forefoot from the sides
- Inadequate pressure reduction under the area of pain



Metatarsalgia: treatment options

- Lacing system: Re-lace your shoes skipping the bottom eyelets to decrease lateral pressures
- Reconfigure your insole to reduce pressures
- Shoe consideration: increased toe box width

Metatarsalgia: treatment options

- Adjust insole using an old shoe insole
 1. With a permanent marker mark the area of pain on the bottom of your foot (dot approach works best)
 2. Put your running shoe on and walk around
 3. Take off your shoe and remove the insole
 4. Cut the insole including the area of pain and the one toe above it.



Plantar fasciitis

- Chronic pain associated with irritation and degeneration of the plantar fascia



Plantar Fascia function

- The plantar fascia serves as a guide wire to maintain the arch of the foot and to increase foot rigidity during propulsion.
- The plantar fascia was created to resist significant forces



Causes: Plantar fasciitis

- Chronic irritation and degeneration of the plantar fascia
 - Significant change in shock absorption demands
 - Weight gain, hills, old shoes
 - Compensatory motion
 - Tight gastroc or hamstrings.
 - Degenerative changes of the plantar fascia



Self Diagnosis: Plantar Fasciitis

- Pain with pressure on the underside of the heel
- Pain when you first stand up

Plantar Fasciitis: Self treatment

- Ice- bath or bottle
- Night splint
- Orthotics
- Consider a shoe that assists shock absorption or controls motion?
(consult your shoe expert)

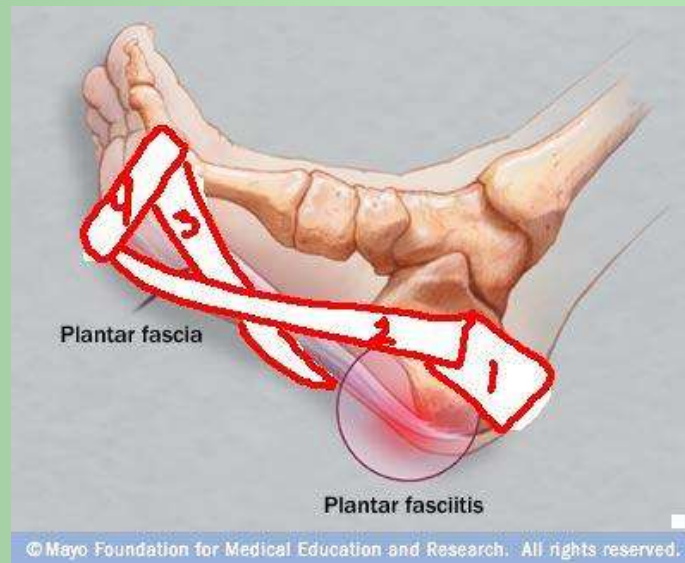
Plantar Fasciitis: Self treatment

- Stretching- plantar fascia, quads, calf/gastroc, hamstrings, and “heel presses”



Plantar Fasciitis: Taping

1. 4 full width pieces of tape
2. #1 across the back of the heel
3. #2 and #3 criss-cross from each side of #1 to the balls of the feet
4. #4 goes across the balls of the feet and over the ends of #2 and #3



Posterior Tib Tendonitis

- Chronic pain associated with inflammation and degeneration of the posterior tib tendon



Posterior tib function

- Shock absorption by eccentrically controlling pronation as the foot impacts the running surface



Causes: Posterior Tib Tendonitis

- Increased shock absorption demands (old shoes, running down hills, etc.)
- Arthritis/degenerative changes
- Increased body weight (limited off season training)
- Changes in program
 - Periodization
 - New program

Self Diagnosis: Posterior tib tendonitis

- Pain descending hills
- Pain with pressure behind your medial malleolus up along the edge of the bone
- Pain is reproduced when you actively turn your ankle in.

Self Treatment: Posterior Tib Tendonitis

- Ice bath
- Shoe consideration- control shock absorption. The more your shoe can do the better.
- Relative Rest

Taping: Posterior tib

- 3 narrow straps.
 - #1 and #2 trace the path of the posterior.
 - #3 wraps around the top of #1 and #2 two times, tucking the tails after first wrap in order to lock straps #1 and #2 in place



Achilles tendonitis

- Chronic irritation and degeneration of the Achilles tendon. Often associated with bone spurs and micro-tears of the tendon.



Achilles tendon function

- The primary function of the Achilles tendon as it relates to running is to provide an explosive forward propulsion during mid to terminal stance of the running gait cycle.



Self diagnosis: Achilles tendonitis

- Increased pain with pressure on the back of the heel
- Increased pain during the “push-off” portion of the gait cycle
- Increased pain running up hills

Treatment: Achilles tendonitis

- Stretch the gastrocs, hamstrings, quads and plantar fascia
- Ice baths
- Eccentric gastroc strengthening

Eccentric gastroc strengthening

- Using dumb bells or a back pack to increase resistance, place your uninjured foot on a step, lift your body weight up using your uninjured leg, and lower your body weight down with your injured leg¹.



Stress Fractures

- Small fracture of the bones caused by repetitive trauma and insufficient recovery.
- Typically occurs in the long bones of the lower leg and foot.

Self Diagnosis: Stress Fracture

- Pain at the start of exercise that goes away briefly during the workout, but comes back before the end of the workout.
- Pain typically in the shin or the outside of the forefoot.
- Process of elimination

Self Treatment: Stress Fracture

- REST. Sorry, if you don't rest a stress fracture you will only make your time off longer. You **can't** run through stress fractures.
- Cross train- Deep water running, biking, etc. Anything that gets your heart rate up and does not reproduce the pain.

When should I stop or consider seeking medical attention?

- Rest if your pain changes your normal daily activities. For example, you have trouble sleeping, you have to walk with a limp, or you are unable to sit comfortably in one position for more than a few minutes.
- Consider medical attention if after you have rested your injury for more than a week and the pain continues to impact daily activities.
- Sooner works better than later.

How to get a PT referral

- Most insurances require that you have a written prescription from a doctor.
- Once you have your prescription you can set up an appointment with your Physical Therapist for an evaluation.
- If you don't have a physical therapist that you normally use you can contact your physical therapist of choice.

Acknowledgements

- Select Physical Therapy



- Runabout Sports



References

1. P, Jonsson et al. New regimen for eccentric calf-muscle training tendinopathy: results of a pilot study patients with chronic insertional Achilles. British Journal of Sports Med. 2008;42;746-749



Questions?

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