

PLANTAR FASCIITIS PROTOCOL

Plantar fasciitis is an inflammatory condition that occurs as a result of overstressing the plantar fascia. It is the most common cause of inferior heel pain and has been diagnosed in patients from the ages of 8 years to 80 years old. Plantar fasciitis affects approximately 10% of the population and is more commonly found in middle-aged women and younger male runners. Bilateral symptoms can occur in 20-30% of those diagnosed with plantar fasciitis. However in these cases it is important to rule out other systemic processes such as rheumatoid arthritis, systemic lupus erythematosus, Reiter's disease, gout and ankylosing spondylitis. The primary symptom of plantar fasciitis is pain in the heel when the patient first rises in the morning and when the plantar fascia is palpated over its origin at the medial calcaneal tuberosity.

The plantar fascia (aponeurosis) is a thick fibrous band of connective tissue that originates at the medial and lateral tuberosities of the calcaneus. The etiology of plantar fasciitis is multifactorial. The tension placed on the plantar fascia will increase as a result of anatomical factors such as abnormal foot posture or tight/weak posterior calf musculature. In addition, environmental factors such as increased frequency/distance/speed of walking or running, a change in terrain or changes in foot wear will place abnormal stress on this tissue structure. However it appears that the combination of both anatomical and environmental factors eventually lead to dysfunction and overload of the fascia.

Pain in plantar medial heel which is increased with first few steps out of bed in the morning or after a period of inactivity. Pain also worsens after prolonged weight bearing activity. May be precipitated after a recent increase in weight-bearing activity such as walking or running or after an increase in weight gain. Risk factors include limited ankle dorsiflexion and high body mass index in non-athletic populations.

The most common risk factors associated with plantar fasciitis are:

- Tightness or weakness of the posterior calf musculature
- Pes planus or pes cavus foot structures
- Sudden gain in weight or obesity
- Unaccustomed walking or running (i.e. increased speed, distance or uphill)
- Change in walking or running surface
- Occupations involving prolonged weightbearing
- Shoes with poor cushioning

Each of the above factors can predispose an individual to plantar fasciitis due to abnormal biomechanics in the foot. According to the literature, approximately 80-90% of people suffering from plantar fasciitis will have a complete resolution of their symptoms in 6-18 months, with or without treatment.

Rule out the following differential diagnoses:

- Haglunds Deformity
- Flexor Hallicus Longus/Peroneal Longus
- Flexor Digitorum Longus
- Gluteus medius strength
- Hamstring tightness
- Calcaneal stress fracture
- Calcaneal nerve compression
- Referred pain as a result of an S1 radiculopathy
- Bone bruise
- Fat Pad Atrophy
- Tarsal Tunnel Syndrome
- Soft tissue, primary, or metastatic bone tumor
- Paget disease of bone
- Reiter's Syndrome
- Sever's disease
- Plantar Fascia rupture

STAGES OF PLANTAR FASCIITIS:

- **Stage I:** Acute reversible inflammation. Minor achy pain after heavy activity or with first initial steps after period of inactivity. Symptoms are not constant and may resolve after basic anti-inflammatory measures followed by stretching exercises.
- **Stage II:** Intense pain with activity and symptoms also at rest. Usually can still perform routine activities. Decreased inflammatory cells and increased angiofibroblastic invasion. May have developed calcaneal spur.

- **Stage III:** Intense pain with activity and at rest. Significant functional limitations because of pain and cannot perform routine activities. May have partial or full rupture of plantar fascia. Extensive angiofibroblastic invasion.

Phases / Stages of healing: Evidence-Based Protocol for Progression of Activities

Acute Stage (0 to 4 weeks)

GOALS:

- Decrease pain & inflammation
- Improve function, flexibility, and ROM
- Iontophoresis (Osborne & Allison 2006) - 0.4% Dexmethasone or 5% acetic acid
- Ultrasound, phonophoresis, electrical stimulation, ice, heat

Taping (Hyland et al 2006)

- Calcaneal/Navicular sling or low dye taping

Activity Limitations

- Use reproducible measure of activity restrictions secondary to heel pain to determine if interventions are effective.
ie: Patient unable to stand longer than 5 minutes
- without heel pain and now can stand for 15 minutes without heel pain or use numeric pain scale. Helps demonstrate to clinician and patient whether interventions are working.
- Gastroc stretching with big toe dorsiflexed
- Gentle soft tissue mobilization

Subacute Stage II (4 weeks to 3 months)

GOALS:

- Improve function
- Decrease pain
- Improve joint mobility
- Improve neural mobility (Meyer et al 2002)
- Improve soft tissue mobility
- Provide stability during weight-bearing activities
- Manual Therapy (Young et al 2004)
 - o Talocrural joint posterior glides
 - o Subtalar joint lateral glides
 - o Ant/Post glides of 1st TMT joint
 - o Subtalar joint distraction manipulations
 - o Increased pain noted with SLR test with passive dorsiflexion and eversion to put increased stress on tibial nerve
- Passive and active mobilization of soft tissue aimed at restoring pain-free mobility along the course of the median nerve
 - o Perform procedures in a slumped sitting position
 - o 10 treatment sessions over a 1 month period of time
 - o May provide short term pain relief (1-3 mos) and improvement in function

Calf and Plantar fascia stretching (Porter et al 2002)

- Calf muscle or plantar fascia specific stretching can be performed 2-3 times per day.
- Transverse friction massage
- Foot intrinsic strengthening exercises
- Ankle balance board exercise, BAPS
- Correct lower quarter imbalances in flexibility and strength

Footwear type/foot assessment

Chronic 3 months to 1 year

Goals

- Improve function
- Work toward return to sport/recreational activity
- Continue to improve joint and soft tissue mobility
- Continue to improve neural mobility if appropriate
- Make referral to appropriate medical professionals if necessary
- Night Splints (Crawford/Thomson 2003)
- Should be considered as an intervention in patients with symptoms greater than 6 month duration
- Desired length of time for wearing the device is 1-3 months
- The type of night splint used (posterior/anterior/sock-type) does not appear to affect the outcome
- Continue with interventions cited in Phase II if proven effective with functional outcome questionnaires

There is no guarantee on outcome. All conservative management options have risk of worsening pain, progressive irreversible deformity, and failing to provide substantial pain relief. All surgical management options have risk of infection, skin or bone healing issues, and/or worsening pain. Our promise is that we will not stop working with you until we maximize your return to function, gainful work, and minimize pain.

REFERENCES

1. Tisdell CL, Donley BG, Sferra JJ. Diagnosing and treating plantar fasciitis: A conservative approach to plantar heel pain. *Cleve Clin J Med.* 1999;66:231-235.
 2. Singh D, Angel J, Bentley G, Trevino SG. Fortnightly review. plantar fasciitis. *BMJ.* 1997;315:172-175.
 3. DeMaio M, Paine R, Mangine RE, Drez D, Jr. Plantar fasciitis. *Orthopedics.* 1993;16:1153-1163.
 4. Barrett SJ, O'Malley R. Plantar fasciitis and other causes of heel pain. *Am Fam Physician.* 1999;59:2200-2206.
 5. Pyasta RT, Panush RS. Common painful foot syndromes. *Bull Rheum Dis.* 1999;48:1-4.
 6. Charles LM. Plantar fasciitis. *Lippincott's Prim Care Pract.* 1999;3:404-407.
 7. Young CC, Rutherford DS, Niedfeldt MW. Treatment of plantar fasciitis. *Am Fam Physician.* 2001;63:467-74, 477-8.
 8. Schepisis AA, Leach RE, Gorzyca J. Plantar fasciitis. etiology, treatment, surgical results, and review of the literature. *Clin Orthop.* 1991;(266):185-196.
 9. Saidoff D, McDonough AL. Medial calcaneal heel pain upon weight bearing in an intrinsic foot deformity. In: *Critical Pathways in Therapeutic Interventions - Extremities and Spines.* 1st ed. St. Louis, MO: Mosby; 2002:319-338.
 10. Fredericson M. Common injuries in runners. diagnosis, rehabilitation and prevention. *Sports Med.* 1996;21:49-72.
 11. Michaud T. *Foot Orthoses and Other Forms of Conservative Foot Care.* 1st ed. Newton, MA: Thomas C Michaud; 1997.
 12. Bedi HS, Love BR. Differences in impulse distribution in patients with plantar fasciitis. *Foot Ankle Int.* 1998;19:153-156.
 13. Kibler WB, Goldberg C, Chandler TJ. Functional biomechanical deficits in running athletes with plantar fasciitis. *Am J Sports Med.* 1991;19:66-71.
 14. Gross MT, Byers JM, Krafft JL, Lackey EJ, Melton KM. The impact of custom semirigid foot orthotics on pain and disability for individuals with plantar fasciitis. *J Orthop Sports Phys Ther.* 2002;32:149-157.
 15. Buchbinder R. Clinical practice. plantar fasciitis. *N Engl J Med.* 2004;350:2159-2166.
 16. Khan KM, Cook JL, Taunton JE, Bonar F. Overuse tendinosis, not tendinitis. part 1: A new paradigm for a difficult clinical problem. *Physician Sportsmed.* 2000;28:38-43, 47-8.
 17. Sharma P, Maffulli N. Tendon injury and tendinopathy: Healing and repair. *J Bone Joint Surg Am.* 2005;87:187-202.
 18. Rolf C. Overuse injuries of the lower extremity in runners. *Scand J Med Sci Sports.* 1995;5:181-190.
- ** St. Luke's Elks Rehab, Evidence Bases Protocols for Therapeutic Intervention, Plantar Fasciitis, which incorporates the following references:
19. Crawford F, Thomson C. Interventions for treating plantar heel pain. *Cochrane Database Syst Rev.* 2003; CD000416. <http://dx.doi.org/10.1002/14651858.CD000416>
 20. De Garceau D, Dean D, Requejo SM, Thordarson DB. The association between diagnosis of plantar fasciitis and Windlass test results. *Foot Ankle Int.* 2003;24:251-255.

21. Hyland MR, Webber-Gaffney A, Cohen L, Lichtman PT. Randomized controlled trial of calcaneal taping, sham taping, and plantar fascia stretching for the short term management of plantar heel pain. *J Orthop Sports Phys Ther.* 2006; 36: 364-371. <http://dx.doi.org/10.2519/jospt.2006.2078>
22. Kinoshita M, Okuda R, Morikawa J, Jotoku T, Abe M. The dorsiflexion test for diagnosis of tarsal tunnel syndrome. *J Bone Joint Surg Am.* 2001;83-A:1835-1839.
- 5) Landorf KB, Keenan AM, Herbert RD. Effectiveness of foot orthoses to treat plantar fasciitis: an randomized trial. *Arch Intern Med.* 2006;166:1305-1310.
<http://dx.doi.org/10.1001/archinte.166.12.1305>
- 6) Martin RL, Irragang JJ, Burdett jRg, Conti SF, Van Swearingen JM. Evidence of validity for the Foot and Ankle Ability Measure (FAAM), *Foot Ankle Int.* 2005; 26: 968-983.
- 7) Martin RL, McPoil Tg. Reliability of ankle goniometric measurements: a literature review. *J Am Podiatr Med Assoc.* 2005;95:564-572.95/6/564 [pii]
- 8) McPoil TG, Cornwall MW. Use of longitudinal arch angle to predict dynamic foot posture in walking. *J Am Podiatr Med Assoc.*2005;95:117-120.
- 9) Meyer J, Kulig K, Landel R. Differential diagnosis and treatment of subcalcaneal heel pain: a case report. *J Orthop Sports Phys Ther.* 2002;32:114-122; discussion 122-114.
- 10) Osborne HR, Allison GT. Treatment of plantar fasciitis by LowDye taping and iontophoresis: short term results of double blinded, randomised, placebo controlled clinical trial of dexamethasone and acetic acid. *Br J Sports Med.* 2006;40:545-549; discussion 549.
<http://dx.doi.org/10.1136/bjsm.2005.021758>
- 11) Porter D, Barrill E, Oneacre K, May BD. The effects of duration and frequency of Achilles tendon stretching on dorsiflexion and outcome in painful heel syndrome: a randomized, blinded, control study. *Foot Ankle Int.* 2002;23:619-624.
- 12) Stratford PW, Gill C, Westaway MD, Binkley JM. Assessing disability and change on individual patients: a report of patient specific measure. *Physiother Can.* 1995;47:258-263.
- 13) Young B, Walker MJ, Strunce J, Boyles R. A combined treatment approach emphasizing impairment-based manual physical therapy for plantar heel pain: a case series. *J Orthop Sports Phys Ther.* 2004;34:725-733.
<http://dx.doi.org/10.2519/jospt.2004.1506>
- 14) Standard of Care: Plantar Fasciitis Copyright © 2007 The Brigham and Women's Hospital, Inc. Department of Rehabilitation Services.
- 15) Additional Differential Diagnosis information from *J Res Med Sci.* Aug 2012; 17(8): 799-804