

The Top 10 Things Foot and Ankle Specialists Wish Every Primary Care Physician Knew

NEIL M. PAIGE, MD, MSHS, AND AKSONE NOUVONG, DPM

Foot and ankle problems are common complaints of patients presenting to primary care physicians. These problems range from minor disorders, such as ankle sprains, plantar fasciitis, bunions, and ingrown toenails, to more serious conditions such as Charcot arthropathy and Achilles tendon rupture. Early recognition and treatment of foot and ankle problems are imperative to avoid associated morbidities. Primary care physicians can address many of these complaints successfully but should be cognizant of which patients should be referred to a foot and ankle specialist to prevent common short-term and long-term complications. This article provides evidence-based pearls to assist primary care physicians in providing optimal care for their patients with foot and ankle complaints.

Mayo Clin Proc. 2006;81(6):818-822

MRI = magnetic resonance imaging; MTP = metatarsal phalangeal

Foot and ankle problems are common complaints of many patients presenting to their primary care physician. Despite their prevalence, many physicians may be unfamiliar with the diagnosis and appropriate treatment of disorders that commonly affect the foot and ankle. Primary care physicians can address many of these complaints successfully but should recognize when their patient should be referred to a foot and ankle specialist. The evidence-based pearls in this article will help primary care physicians avoid common pitfalls in the recognition and treatment of such disorders and guide their decision to refer their patients to a foot and ankle specialist.

1. Although ankle sprains are usually considered minor injuries, prompt evaluation and effective treatment are imperative.

Ankle sprain is a common injury, affecting up to 23,000 people each day in the United States.^{1,2} Typically, a patient inverts the ankle while walking, stepping off a curb, or playing sports, leading to injury of the lateral ligamentous complex of the affected ankle. Pain, swelling, and diminished proprioception are the most frequent initial com-

plaints. Residual complaints can include pain, mechanical instability, and stiffness. In general, ankle injuries have been perceived to be benign and self-limited, although a growing number of studies have shown that residual symptoms may persist for months to years after an injury.^{2,3} In fact, in one study, 72% of patients reported residual symptoms 6 to 18 months after an ankle sprain.³ Prompt evaluation and effective treatment are imperative. The first priority of management is control of swelling with use of compression, ice, and elevation. In the past, immobilization has been the mainstay of treatment for all ankle sprains, but functional treatment (including elastic bandage, soft cast, tape, or orthoses and coordination training with a physical therapist) has been shown to have greater benefit in improving symptoms and functional outcomes in short-term (<6 weeks), intermediate-term (6 weeks to 1 year), and long-term (>1 year) follow-up.⁴ If marked ankle instability is noted or the condition does not improve with functional therapy, referral to a foot and ankle specialist is warranted.

2. Plain radiographs are indicated to rule out fracture in patients with acute ankle sprains whose physical examination findings meet the Ottawa ankle rules.

Plain radiographs should be obtained for all patients with an acute ankle sprain who meet any of the following criteria:⁵ (1) inability to walk 4 steps (immediately after the injury or on evaluation); (2) localized tenderness at the posterior edge or tip of either malleolus; and (3) localized tenderness of the navicular bone or base of the fifth metatarsal (Figures 1 and 2). Anteroposterior, lateral, and mortise films of the ankle should be obtained as well as a medial oblique film of the foot.

3. In patients with an acute ankle injury, rupture of the Achilles tendon should be considered.

Rupture of the Achilles tendon, although relatively uncommon, must be considered when a patient presents with an acute ankle injury.⁶⁻⁸ The typical patient is a recreational athlete who often believes he or she may have sprained an ankle. Characteristically, sudden pain occurs in the calf or the back of the ankle, and frequently the patient recalls hearing a "pop." Recent use of fluoroquinolones and corticosteroids may increase the risk. The injury usually occurs when the foot is dorsiflexed (eg, walking up stairs or stepping backward) or during forced plantar flexion (eg, jumping). A

From the Department of Medicine (N.M.P.) and Department of Surgery (A.N.), VA Greater Los Angeles Healthcare System, David Geffen School of Medicine at UCLA, Los Angeles.

A question-and-answer section appears at the end of this article.

Individual reprints of this article are not available. Address correspondence to Neil M. Paige, MD, MSHS, Department of Medicine, VA Greater Los Angeles Healthcare System, 11301 Wilshire Blvd (111A), Los Angeles, CA 90073 (e-mail: neil.paige@med.va.gov).

© 2006 Mayo Foundation for Medical Education and Research

common misconception is that a patient with an Achilles tendon rupture cannot walk or has weak plantar flexion because the peroneal, deep posterior, and plantar muscles are also involved in plantar flexion of the foot. A palpable defect may be noted on the lower Achilles tendon, or it may be obscured by edema. The Thompson test (Figure 3) is a reliable indicator of acute Achilles tendon rupture.⁸ While the patient kneels on a chair with the feet dangling over the edge of the seat, the clinician squeezes the mid calf, which should cause plantar flexion. If no plantar flexion occurs, the test is positive for Achilles tendon rupture. Comparison with the unaffected leg is paramount. Plain films may be helpful but are unreliable for detection of rupture, whereas magnetic resonance imaging (MRI) is definitive. A 90-degree posterior splint should not be used for treatment; rather, the patient's ankle should be plantar-flexed to allow for appropriate healing. Referral to an orthopedist or podiatrist is warranted in all suspected cases of Achilles tendon rupture.

4. Plantar fasciitis is a common, often self-limited, cause of heel pain in adults.

Plantar heel pain is invariably caused by plantar fasciitis, which classically presents as heel pain with the first steps in the morning or after a period of inactivity.⁹⁻¹¹ The pain gradually improves with more walking, only to worsen by the end of the day. It characteristically affects runners who have increased the intensity of their running regimen or have recently purchased new shoes. Obesity and occupations that require prolonged standing are also risk factors for plantar fasciitis. Nocturnal pain should raise suspicion for other conditions such as neuropathy, infection, and bone tumor. Bilateral symptoms should raise suspicion for underlying spondyloarthropathy. On physical examination, the anteromedial aspect of the heel is often tender to palpation. In selected individuals, plain radiographs may help rule out a calcaneal stress fracture. Heel spurs are commonly seen on x-ray films, but the spur itself may not contribute to the pain. Plantar fasciitis is usually self-limited and resolves in 80% of patients within 1 year, regardless of therapy.⁹ Thus, low-risk conservative interventions such as bilateral heel cushions, regular stretching of the Achilles tendon, limitation of physical activity, and a trial of nonsteroidal anti-inflammatory medications may be a reasonable cost-effective approach. In patients who continue to have pain, referral to a foot and ankle specialist is recommended because orthotics or corticosteroid injection may be warranted.

5. Bunions may be painful, but other causes of pain in the first metatarsal phalangeal (MTP) joint should be considered.

In patients with hallux valgus deformity or bunion, the great toe deviates laterally while a bony deformity develops on



FIGURE 1. Medial view of the foot and ankle. Palpate for localized tenderness at the posterior edge or tip of medial malleolus (2) and over the navicular bone (3).

the medial aspect of the first MTP joint.^{1,12-14} A bursa at the medial aspect of the bunion is prone to develop inflammation (bursitis) that is often triggered by tight-fitting shoes. Moreover, the deranged MTP joint is susceptible to osteoarthritis. The bunion itself, an inflamed bursa (bursitis), or osteoarthritis is relatively innocuous and can be treated conservatively with over-the-counter nonsteroidal anti-inflammatory medications and accommodating footwear. Gout and septic arthritis should always be considered as well. Clinical suspicion should guide the decision regarding arthrocentesis, but previous episodes of gout make recurrence more likely. When in doubt, arthrocentesis is mandated to rule out septic arthritis. Patients with chronic bunions resulting in pain or deformity should be referred to a foot and ankle specialist



FIGURE 2. Lateral view of the foot and ankle. Palpate for localized tenderness at the posterior edge or tip of lateral malleolus (2) and over the base of the fifth metatarsal (3).



FIGURE 3. Thompson test is a reliable indicator of acute Achilles tendon rupture. While the patient kneels on a chair with feet dangling over the edge of the seat, the clinician squeezes the mid calf, which causes plantar flexion. If no plantar flexion occurs, the test is positive. Comparison with the unaffected leg is paramount.

because further interventions such as orthoses, bracing, and surgery may be necessary.

6. In patients with peripheral neuropathy, a warm, erythematous, and edematous foot or ankle may signify Charcot arthropathy.

Charcot arthropathy, a clinical syndrome of unclear etiology and pathogenesis, can lead to joint destruction.^{15,16} Recognizing this disorder presents an important clinical challenge for primary care and emergency department physicians. Patients typically do not have much pain and present with a foot that is warm, erythematous, and edematous, signs that are also associated with cellulitis, osteomyelitis, and gout. The ankle can be likewise affected. Failure to recognize Charcot arthropathy may ultimately lead to joint destruction and development of a rocker-bottom foot if the patient continues to walk (bear weight) on the affected foot. Charcot foot occurs in patients with peripheral neuropathy due to diabetes or vitamin B₁₂ deficiency

but is also associated with advanced syphilis. Physical examination often reveals intact pulses, warm skin (hyperemia), swelling, erythema, and joint crepitus. Plain radiographs may yield normal findings or show osteopenia. Results of MRI or bone scan may be abnormal in both Charcot arthropathy and osteomyelitis. Because distinguishing Charcot arthropathy from cellulitis, osteomyelitis, or gout is extremely difficult, clinical suspicion should be high in every patient with peripheral neuropathy who presents with a red, hot, swollen foot. In patients with suspected Charcot foot, weight bearing should be strictly prohibited, and the patient should be referred urgently to a foot and ankle specialist for further evaluation and definitive treatment. Commonly, patients are given antibiotics because infection cannot be ruled out at the time of presentation.

7. A common cause of metatarsalgia is Morton neuroma.

Morton neuroma is an entrapment of one of the common digital nerves, usually occurring at the base of the third and fourth toes^{1,12,13} but occasionally at the base of the second and third toes. In the classic presentation, the patient complains of a burning pain or numbness during weight bearing, which radiates distally from the base of the affected toes, often described as feeling like “walking on a pebble.” The condition occurs most frequently in women (female-male ratio, 8:1), and is thought to be exacerbated by wearing high-heeled, pointed-toe shoes (narrow toe box) because these shoes compress the forefoot while elevating the heel, transferring the weight forward. On physical examination, exquisite tenderness with direct palpation between the affected metatarsal heads is characteristic, especially on compressing the foot mediolaterally. Compression alone may also elicit the symptoms. The differential diagnosis includes plantar fat pad atrophy, synovitis, capsulitis, avascular necrosis, and metatarsal stress fracture. Clinical reevaluation may be necessary to confirm the diagnosis. Radiography may help distinguish Morton neuroma from stress fracture but only 10 to 14 days after the onset of symptoms; it may also help identify avascular necrosis. The initial treatment of Morton neuroma, fat pad atrophy, and synovitis includes avoidance of high-heeled, pointed-toe shoes in favor of low-heeled shoes with a wide toe box. Metatarsal padding under the forefoot may also be helpful. Injection with corticosteroids can be used as adjuvant therapy, but it should be avoided unless the diagnosis is nearly certain and the practitioner is experienced with the procedure. Nonsteroidal anti-inflammatory medications are not usually beneficial.¹³ With avoidance of wearing high-heeled shoes with a narrow toe box, pain usually resolves after several weeks. Patients with abnormally se-

vere pain or with a protracted course should be referred to a podiatrist or orthopedic surgeon.

8. Surgical treatment of onychocryptosis (ingrown toenail) should be performed by experienced clinicians only.

Ingrown toenail is a common disorder of the hallux but can occur in any toenail. The condition occurs when the nail plate penetrates or traumatizes the skin at the side of the nail, causing pain, swelling, and sometimes infection. Causes of onychocryptosis include improper nail trimming, ill-fitting shoes, external pressure, trauma, and fungal infections (onychomycosis). Most early cases respond to conservative management that includes proper nail trimming (cutting the nail straight across), wearing open-toed shoes, soaking in Epsom salt or aluminum subacetate, and taking oral antibiotics if infection is present.^{12,13} Patients with a severely ingrown toenail (infection with purulent drainage) should undergo partial nail avulsion to the matrix. Simple excision of the corner of the ingrown nail may relieve pain temporarily, but the recurrence rate is high. With partial nail avulsion, proper anesthetic technique is imperative because of the unique innervation of the nail bed. Dorsal and plantar digital blocks are necessary since the plantar digital nerves innervate the nail bed. The use of phenol or silver nitrate, which has been advocated by some to prevent recurrence, should be avoided unless administered by an experienced clinician because their use increases the risk of postprocedure infection dramatically.¹⁷ This is especially true in patients with diabetes, peripheral neuropathy, and peripheral artery disease.

9. In patients with peripheral neuropathy, a simple corn, callus, or verruca can be limb-threatening if not addressed properly.

A callus, which is a thickening or hyperkeratosis of the epidermis, develops over a bony prominence as a protective mechanism in response to repetitive trauma or irritation.^{12,13} This can occur as a consequence of poorly fitting shoes or excessive pronation during walking. A corn is a highly concentrated hyperkeratotic callus, and a verruca (wart) is similarly hyperkeratotic. When a corn is pared down, the skin lines are absent. In a pared-down wart, small black specks representing thrombosed blood vessels are typically seen. Corns may develop a bursa that can become inflamed (bursitis) and cause pain. Verrucae, corns, and calluses may be burdensome for otherwise healthy persons, but in diabetic patients, they can lead to serious morbidity. Any hyperkeratotic lesion can put pressure on the underlying dermis, making the tissues prone to breakdown and ulceration leading to osteomyelitis in susceptible patients.^{13,18} In patients with diabetes, all foot infections are potentially limb-threatening and should be treated aggressively. Verru-

cae, corns, and calluses should be débrided using a sterile number 10 or 15 scalpel because any reduction in thickness will help alleviate pain.¹³ Only experienced clinicians should débride hyperkeratotic lesions in diabetic patients, who often have neuropathy and peripheral artery disease that increase their risk of infection. Keratolytic agents also may be considered but should be used cautiously to avoid damage to surrounding tissue. Frequent reevaluation is paramount. Because orthotics or specially padded shoes may be considered, referral to a podiatrist is prudent.

10. Onychomycosis should be confirmed by laboratory evaluation before oral antifungal medication is administered.

Onychomycosis (fungal infection of the nail) is a common condition that causes discoloration, thickening, and distortion of the nail. Dermatophytic fungi cause 90% of cases, and *Candida* species or other more rare fungal organisms cause the remaining 10%.¹⁹ Only 50% of all cases of nail dystrophy can be attributed to fungal infections (onychomycosis).^{20,21} Other causes of nail dystrophy include psoriasis, lichen planus, trauma, and eczematous skin changes. Dystrophic nails may cause trauma to the adjacent skin, sometimes leading to secondary bacterial infection. Quality-of-life measures specific to onychomycosis suggest that onychomycosis may affect physical, functional, psychosocial, and emotional aspects of a patient's life.^{22,23} Patients often complain of difficulty walking or wearing shoes and of being embarrassed. Effective treatments are available. Both terbinafine and itraconazole are effective first-line agents for onychomycosis, with mycological cure rates of 50% to 90%.²⁴ Topical treatment with azoles has been ineffective, but newer agents such as topical ciclopirox have shown modest benefit.²⁵ Because terbinafine and itraconazole have a treatment duration of 3 months and may have serious adverse effects and drug interactions, confirming the diagnosis of onychomycosis is important before initiating therapy. Nail plate and subungual debris scrapings with a potassium hydroxide preparation or nail fungal culture should be performed before administering oral therapy. In patients taking terbinafine or itraconazole, a complete blood cell count, creatinine evaluation, and liver function tests should be obtained at baseline and 6 weeks after initiation of treatment.

CONCLUSION

Problems of the foot and ankle are common complaints and important causes of morbidity for many patients. Early recognition and direct treatment or early referral to a foot and ankle specialist may prevent the short- or long-term complications commonly associated with these conditions.

REFERENCES

- Jupiter JB, Ring D. Approach to minor orthopedic problems of the foot and ankle. In: Goroll AH, Mulley AG Jr. *Primary Care Medicine: Office Evaluation and Management of the Adult Patient*. 4th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2000:868-873.
- Anandacoomarasamy A, Barnsley L. Long term outcomes of inversion ankle injuries. *Br J Sports Med*. 2005;39:e14.
- Braun BL. Effects of ankle sprain in a general clinic population 6 to 18 months after medical evaluation. *Arch Fam Med*. 1999;8:143-148.
- Kerkhoffs GM, Rowe BH, Assendelft WJ, Kelly K, Struijs PA, van Dijk CN. Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults. *Cochrane Database Syst Rev*. 2002;3:CD003762.
- Bachmann LM, Kolb E, Koller MT, Steurer J, ter Riet G. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot: systematic review. *BMJ*. 2003;326:417-423.
- Byank RP, Moshirfar A, Mears SC, Wenz JF. Knee and leg pain. In: Barker LR, Burton JR, Zieve PD. *Principles of Ambulatory Medicine*. 6th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2003:1073-1093.
- Coughlin MJ. Disorders of tendons. In: Coughlin MJ, Mann RA, eds. *Surgery of the Foot and Ankle*. Vol 2. 7th ed. St Louis, Mo: Mosby; 1999:835-840.
- Üfberg J, Harrigan RA, Cruz T, Perron AD. Orthopedic pitfalls in the ED: Achilles tendon rupture. *Am J Emerg Med*. 2004;22:596-600.
- Buchbinder R. Plantar fasciitis. *N Engl J Med*. 2004;350:2159-2166.
- Williams SK, Brage M. Heel pain-plantar fasciitis and Achilles enthesopathy. *Clin Sports Med*. 2004;23:123-144.
- Korda J, Balint GP. When to consult the podiatrist. *Best Pract Res Clin Rheumatol*. 2004;18:587-611.
- Robbins JM. Recognizing, treating, and preventing common foot problems. *Cleve Clin J Med*. 2000;67:45-47, 51-52, 55-56.
- Lebowitz BS, Kern DE. Common problems of the feet. In: Barker LR, Burton JR, Zieve PD. *Principles of Ambulatory Medicine*. 6th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2003:1094-1105.
- Robinson AH, Limbers JP. Modern concepts in the treatment of hallux valgus. *J Bone Joint Surg Br*. 2005;87:1038-1045.
- Stefansky SA, Rosenblum BI. The Charcot foot: a clinical challenge. *Int J Low Extrem Wounds*. 2005;4:183-187.
- Brodsky JW. The diabetic foot. In: Coughlin MJ, Mann RA, eds. *Surgery of the Foot and Ankle*. 7th ed. St Louis, Mo: Mosby; 1999:940-957.
- Rounding C, Bloomfield S. Surgical treatments for ingrowing toenails. *Cochrane Database Syst Rev*. 2005 Apr 18;(2):CD001541.
- Boulton AJ, Kirsner RS, Vileikyte L. Neuropathic diabetic foot ulcers. *N Engl J Med*. 2004;351:48-55.
- Elewski BE. Onychomycosis: pathogenesis, diagnosis, and management. *Clin Microbiol Rev*. 1998;11:415-429.
- Crawford F. Athlete's foot and fungally infected toe nails. *Clin Evid*. 2004;2128-2132.
- Evans EG. The rationale for combination therapy. *Br J Dermatol*. 2001;145(suppl 60):9-13.
- Elewski BE. Onychomycosis: treatment, quality of life, and economic issues. *Am J Clin Dermatol*. 2000;1:19-26.
- Shaw JW, Joish VN, Coons SJ. Onychomycosis: health-related quality of life considerations. *Pharmacoeconomics*. 2002;20:23-36.
- Tom CM, Kane MP. Management of toenail onychomycosis. *Am J Health Syst Pharm*. 1999;56:865-871.
- Gupta AK, Joseph WS. Ciclopirox 8% nail lacquer in the treatment of onychomycosis of the toenails in the United States. *J Am Podiatr Med Assoc*. 2000;90:495-501.

Questions About Common Foot and Ankle Problems

- A 27-year-old woman presents with ankle pain and difficulty walking after inverting her ankle 2 days previously. She has mild ecchymosis along the lateral aspect of the right ankle, which is mildly tender to palpation. She is able to walk more than 4 steps and has no tenderness at the posterior edge of the malleolus or base of the fifth metatarsal. Which one of the following is the most appropriate next step?
 - Complete immobilization with 90-degree posterior splint
 - Complete immobilization with the ankle splinted at 45 degrees of plantar flexion
 - Functional therapy including elastic bandage, orthotics, and coordination training
 - Crutches and elastic bandage
 - Immediate referral to an orthopedic surgeon
- Which one of the following statements regarding the diagnosis of plantar fasciitis is false?
 - It is a common cause of heel pain
 - The patient typically complains of pain with the first steps in the morning
 - Tenderness to palpation is noted along the anteromedial aspect of the heel
 - A heel spur is often the cause
 - Obesity is a risk factor
- Which one of the following signs and symptoms is usually not present in a patient with suspected early Charcot foot?
 - Swelling, warmth, and erythema
 - Severe pain
 - Unremarkable plain radiographs
 - Peripheral neuropathy
 - Intact pulses
- Which one of the following statements regarding the surgical management of an ingrown toenail is false?
 - Local anesthesia of the dorsal digital nerve is sufficient for nail avulsion
 - The use of phenol or silver nitrate to permanently ablate the nail matrix should be avoided unless administered by an experienced clinician because it increases the risk of infection
 - Simple excision of the corner of the ingrown nail may relieve symptoms temporarily
 - Nail avulsion to the matrix is indicated in all cases of severely ingrown toenails
 - Proper nail trimming, soaking, and oral antibiotics if signs of early infection are noted are considered appropriate treatment for early first-time ingrown toenail
- Which one of the following statements regarding corns, calluses, and verrucae is false?
 - The lesion can be débrided using a sterile number 10 or 15 scalpel
 - Corns may develop a bursa that can become inflamed (bursitis)
 - Keratolytic agents may be considered but should be used cautiously to avoid damage to surrounding tissue
 - In diabetic patients with peripheral neuropathy, corns, calluses, and verrucae can lead to ulcerations
 - Frequent reevaluation of treated corns, calluses, and verrucae is unnecessary in patients with diabetes

Correct answers:

1. c, 2. d, 3. b, 4. a, 5. e