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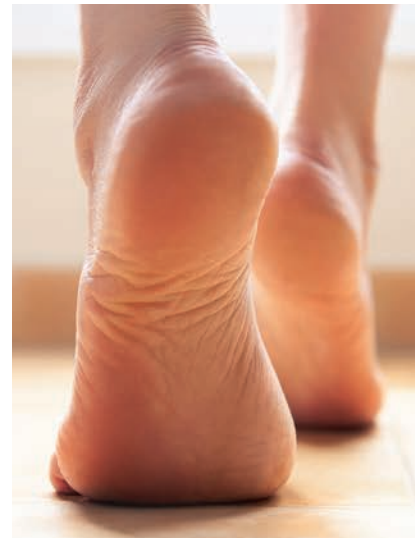
Treating Heel Pain: A 2022 Update

Find out how the experts approach the most common of all podiatric presentations.

BY MARC HASPEL, DPM

By most accounts, the complaint of heel pain is the most common one of presenting patients in a typical podiatric practice. Headed by the diagnosis of plantar fasciitis, there can be many causes for pain in this part of the foot. Fortunately, podiatric physicians are well-armed to handle this symptom. To begin with, once patients arrive with heel pain, there are a variety of effective diagnostic modalities, including superior imaging beyond plain radiographs, such as diagnostic ultrasound and MRI, and certain blood tests that can be ordered to help determine the root cause. Some physicians even order neurologic testing when indicated. Once a diagnosis is made, there are even more options available when establishing a treatment plan.

These options usually start with established conservative measures including taping, stretching and icing, use of night splints and/or wraps and the prescribing of anti-inflammatory medication in oral, injectable and topical form. Of course, the fabrication and dispensing of custom orthoses still remains a cornerstone of these conservative measures. In addition, effective orthotic therapy is usually coupled with appropriate shoe therapy. Further, treatments may continue on to more advanced non-invasive techniques such as shock wave therapies, platelet-rich plasma (PRP), and the use of new injectable amniotic agents that have recently become popular. Lastly, podiatric physicians may turn to direct invasive surgical procedures such as percutaneous tenotomy, endoscopic plantar fasciotomy and open procedures in very resistant cases.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Podiatry Management Magazine has invited several notable podiatric physicians to participate on this roundtable panel to discuss heel pain. These panelists, each with a varied area of concentration in podiatric medicine, have graciously taken the time to share their insights.

Joining this roundtable panel are:

Allen Jacobs, DPM is in private practice in St. Louis, Missouri. He is board certified by the American Board of Foot and Ankle Surgery, is a Fellow of the American College of Foot and Ankle Surgeons and an inductee in the *PM* Podiatry Hall of Fame.

Doug Richie, DPM is an associate clinical professor at the California School of Podiatric Medicine at Samuel Merritt University. Dr. Richie is a Fellow and past president of the American Academy of Podiatric Sports Medicine. Dr. Richie is the author of *Pathomechanics of Common Foot Disorders* (https://link.springer.com/book/10.1007/978-3-030-54201-6) including a chapter devoted to plantar heel pain.

Jeffrey Ross, DPM is a podiatric physician in Houston, TX specializing in diabetic foot amputation prevention and limb salvage. He is an

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associate professor in the division of Vascular Surgery and Endovascular Therapy in the Michael E. DeBakey Department of Surgery at Baylor College of Medicine. He graduated in 1979 from New York College of Podiatric Medicine. He later fulfilled a two-year residency with the Harris County Podiatric Residency Program, Podiatric Medicine and Surgery. Seeking to expand his knowledge base even further, Dr. Ross graduated with his Doctor of Medicine degree from the University of Health Sciences, Antigua School of Medicine in 2003.

Lisa M. Schoene DPM, ATC, is a dance and sports medicine specialist, practicing in Chicago and Gurnee, IL. She is board certified by the American Board of Foot and Ankle Surgery and the American Board of Podiatric Medicine. She is a fellow of the American Academy of Podiatric Sports Medicine and is a Certified Athletic Trainer. Dr Schoene has a faculty appointment at William M. Scholl College, and has been the podiatric consultant to the DePaul Blue Demons since 1992. She has covered and worked with numerous professional dance companies in Chicago since 1998.

Lowell Weil, Jr., DPM, is chief executive officer of the Weil Foot & Ankle Institute, a physician owned organization with 50+ podiatrists in five states. He served as fellowship director from 2000–2017. He is also the founder of Foot & Ankle Business Innovations (FABI), which has been helping podiatric physicians around the country improve patient care and practice profitability while creating better work/life balance since 2014. He has published more than fifty articles and peer-reviewed papers on treatment of foot and ankle conditions and has lectured nationally and worldwide.

James Wrobel, DPM is a staff podiatrist at The Villages Health. He received his DPM degree from the Ohio College of Podiatric Medicine. He completed a podiatric surgical residency at North Detroit General Hospital and is board certified by the American Board of Podiatric Medicine with Certificate of Added Qualification, Amputation Prevention & Wound Care. Dr. Wrobel has eighty-seven peer-reviewed and in-press publications with research interests including health services research, clinical epidemiology, and biomechanics of the diabetic foot.

Q ***PM:*** *How prevalent is heel pain in your practice? What key findings would you expect in taking a history and performing a physical examination on a patient complaining of heel pain?*

Ross: Heel pain is the most common "overuse" injury complaint that new patients present to my practice, particularly those who are runners or involved in sports activities. However, it is not uncommon to see patients who stand on their feet for long periods at work or who walk long distances during the course of the day.

My initial history-taking is imperative. Listening to the patient carefully will usually help with the diagnosis. Have there been any changes in their activity routine? Have they increased their mileage, running hills, doing speed work. Do they stretch routinely? Do they have pain first steps out of bed in the morning, or after they have been off their feet for a period and then begin to walk? How old are their running or athletic shoes—over 6 months of age or greater than 400-500 miles? Is there distortion of the heel counter? How long have they had the pain, and has it improved, or has it worsened? Have they been compensating and now have pain on the contralateral heel? Have they worn temporary insoles or Rx orthotics in the past?

The physical examination is essential. Is the pain retro-calcaneal (at the insertion of the Achilles), or infra-calcaneal (plantar fascia or bursa)? Is there pain upon palpation at the calcaneal tuberosity, or the longitudinal arch? Is there pain when squeezing the heel? (which could be indicative of a periostitis or possible fracture). Do they have radiating pain from the heel proximally to the posterior tibial nerve? (indicative of an entrapment of the medial calcaneal nerve branch). When checking for ankle joint dorsiflexion off weight bearing, is there a normal amount of motion, or is it limited, suggesting a possible ankle block, or equinus?. A gait analysis, either visually, or with the use of a computerized gait and pressure analysis, can help to identify a posterior equinus, excessive pronation/supination, asymmetry between the two feet and limbs, and a possible limb length discrepancy.

Richie: Heel pain is the most prevalent complaint of new patients presenting to my practice. Approximately one in three new patients presented with heel pain.

The key part of the history is determining causative factors. For my athletic patients, there has usually been a change in intensity or frequency of training. I also often find that they have started a new activity, which often involves ballistic loading of the foot.

"A key contributing factor is improper footwear—this must be identified, and corrected, or else all treatment interventions will fail."—Richie

Also, a key contributing factor is improper footwear. This must be identified, and corrected, or else all treatment interventions will fail. Often, people fail to recognize the importance of wearing proper footwear in the home setting as they may stand for hours in the kitchen or on a hard surface. I practice in a beachside community in southern California, where a barefoot or flip flop lifestyle is prevalent, which is predictably why I probably see so much heel pain.

As I am concerned about the overall health status of the patient, I always consider the possibility of an autoimmune-mediated inflammatory reaction at the plantar fascia origin or at the Achilles insertion. I make

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sure that my history recording takes into account any other areas of pain and swelling in the body, as well as any diagnosed autoimmune disease. I feel that all patients should be asked about stiffness in the low back in the morning, which may point to the possibility of ankylosing spondylitis.

I believe gait analysis is critical to the physical exam as it will demonstrate the severity of pain, presence of equinus, and abnormal alignment of the rear foot. The off-weight-bearing exam will confirm equinus as well as any other limitations of joint range of motion. Certainly, palpation is also critical to determine if the pain is located in the plantar fascia, or perhaps might be more medial and proximal at the inferior calcaneal (Baxter's) nerve. For that pathology, I always ask patients to spread their toes to activate their abductor digiti minimi brevis muscles. It is surprising how often these small muscles are compromised in patients who present with long-term chronic heel pain.

Wrobel: Heel pain is one of the most common reasons for a new patient referral. I ask about trauma or changes in activity levels, footwear, or types of activities. I practice in the largest U.S. retirement community, and I see this quite frequently from patients moving in or increasing the use of flip flops. We also see acute trauma-induced heel pain from pickleball, softball, or repetitive new stress from increased levels of walking. Seasonal cleaning can also be a source from use of a ladder or shovels, etc. I focus on the usual history of present illness variables including morning or first step pain, pain after activity or later in the day, and any non-weight-bearing pain. I definitely want to know what was tried in the past, and how beneficial (or not) those treatments were. For the physical exam, studies suggested that severity of equinus, and heel valgus were predictors of treatment failure. I examine for pain with dorsiflexion of the ankle and digits, palpate the plantar medial fascial band, plantar central tubercle of the calcaneus, and compress the medial/lateral aspects of the calcaneus as well as assess for increased vibration. I will also observe for any inflammatory changes and take dermal temperatures to assist in decision making for advanced imaging, if needed. I will also percuss the tibial nerve and use neural stretch with dorsiflexion and eversion.

"For the physical exam, studies suggested that severity of equinus, and heel valgus, were predictors of treatment failure."—Wrobel

Jacobs: Obviously, plantar fasciitis represents one of the most common pathologies encountered in the daily practice of most podiatric physicians. Key findings include a history of post-static dyskinesia, and inferior heel pain. I find that the absence of significant swelling or discoloration are equally important. The presence of painful compression of the calcaneal body might suggest stress fracture, and the presence of fluctuance, or crepitus, might suggest bursitis. It is important to listen carefully to patients for any characteristics of their pain suggestive of a neurologic ideology. It's also important to rule out sciatica, Baxter nerve entrapment, calcaneal nerve entrapment, and tarsal tunnel syndrome.

"It is important to listen carefully to patients for any characteristics of their pain suggestive of a neurologic ideology."—Jacobs

Schoene: Heel pain is probably the most common diagnosis that presents in my office. If the pain is at the medial plantar aspect of the heel, then plantar fasciitis is suspected at first. The key signs and symptoms include: pain at the medial plantar tubercle, and sometimes along the fascia band; patients may complain of foot or leg tightness or cramps: usually absent are warmth, swelling, ecchymosis, nighttime pain. I believe the 3 main etiologies of plantar fasciitis are: (1) increase in activity from work, or exercise; (2) increasing body weight, either from gaining weight or prolonged lifting/carrying; and (3) shoe gear, either poorly-fitting, old, unsupportive, or absent. Traditionally, pain with the 1st step is common; but other symptoms like nighttime pain, neurological symptoms, low back/radicular or local nerve entrapment differentials are considered.

Weil: Plantar fasciitis happens to be the single most common problem for which people are seen in the Weil Foot & Ankle organization. As such, I think getting a good history is one of the key components in diagnosing heel pain. Too often, people are diagnosed with plantar fasciitis without taking a good history of the present illness. The key things that I ask are some of the most obvious: e.g., pain first steps in the morning, or after prolonged sitting. I have found, however, that asking more specific questions like at what time is the pain the worst, or whether there is pain while driving, or during sedentary activities such as watching television or reading, can be important. Moreover, I want to know if there is pain the longer the patients are on their feet, such as standing in line in a store. Further, I question them whether shoes, arch supports, or orthoses help the problem. I ask about the presence of back pain. Certainly, I feel that relevant questions can help narrow down some of the different causes of heel pain. I ask these

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questions at every visit as things can evolve and change throughout the process and previous diagnoses may now change.

From an examination perspective, pain at the plantar medial heel or inferior heel can be plantar fasciitis. Side-to-side compression of the calcaneus can help determine if there is pain coming from the calcaneal body, possibly indicative of stress fracture or stress syndrome. Pain on stimulation to the tarsal tunnel, porta pedis or calcaneal branches of the tibial nerve are also indicators of possible neurologic contributions to heel pain. I also find pain in the body of the plantar fascia to be rare, and usually a sign of a neurologic factor related to pain.

"If there is radiating pain along the posterior tibial nerve, consider an EMG/NCV study to rule out tarsal tunnel syndrome."—Ross

PM: *What diagnoses are included in your differential for a patient with heel pain? What diagnostic studies would you order (e.g., diagnostic ultrasound, blood work, MRI, etc.)?*

Ross: The diagnoses that I include in my differential for patients with heel pain are usually the following: (a) fracture of the calcaneus, (b) tear or partial tear of the plantar fascia, (c) septic arthritis, (d) periostitis of the calcaneus, (e) rheumatoid or psoriatic arthritis, (f) entrapped medial calcaneal nerve branch, (g) Sever's disease or calcaneal apophysitis in the adolescent, (h) unicameral or aneurismal bone cyst.

The diagnostic studies that I typically will order are: x-rays, particularly lateral and posterior axial views, to rule out fracture, MRI to rule out thickening of the plantar fascia, nerve entrapment, medullary edema of the calcaneus. Ultrasound is often helpful for detecting an infra-calcaneal bursitis, CBC with differential and sedimentation rate to rule out infection or septic arthritis, RA factor C-reactive protein to rule out inflammatory response for rheumatoid or psoriatic arthritis. C.T scans are used if there is a high suspicion of a stress fracture that is not seen on routine radiographs. If there is radiating pain along the posterior tibial nerve, consider an EMG/NCV study to rule out tarsal tunnel syndrome.

Wrobel: The diagnoses I would consider for plantar heel pain include plantar fasciitis, fat pad atrophy or morphology changes, compression neuritis and spinal stenosis, bone tumor, stress fracture, or, if there are arthritic sensations, possibly ankylosing spondylitis. I will use dermal temperatures to compare to the contralateral if not bilateral. If I am suspicious of other causes, I will get a plain x-ray. If I am concerned about various forms of arthritis, I may consider a lab work-up. Ultrasound can be helpful to examine for partial or full thickness tear as well as biconvexity pattern that may not respond to mechanical measures. If I am concerned about stress fracture, I will order MRI or Tc-99 scan if they can't have MRI. I have been using MRI more lately due to caring for very active retirees and I have been seeing more partial plantar fascial tears and stress fractures than previously. I have also recently been seeing more fat pad inflammation on MRI.

"My favorite diagnostic test in addition to traditional weight bearing x-rays, is Diagnostic Ultrasound."—Schoene

Schoene: The differential diagnoses for heel pain: plantar fasciitis, hypertonic plantar fascia, plantar fibroma, fibroadipose nodules, medial calcaneal nerve impingement, radicular issues from the lower back, posterior heel issues; insertional Achilles tendonitis, or "bump" pain issues. Occasionally an autoimmune-driven enthesiopathy condition may present to the office. My favorite diagnostic test in addition to traditional weight bearing x-rays is diagnostic ultrasound—I refer patients out for the test, as I am fortunate to have a very experienced MSK ultrasoundographer near my office. This test affords excellent soft tissue evaluation and functionality, as one can see if the band is "hypertonic." This particular diagnosis presents with similar symptoms, but with an unusually tight "bow string" fascia, not thickened or torn, but exquisitely tender to palpation or painful along the more distal portion of the fascia. These patients have more than usual pain along the actual fascia. The beauty of the US also measures the thickness of, and detailed evaluation of the fascial fiber alignment, and can pick up very small tears down to less than 1 mm, as well as discovering muscle atrophy of the intrinsics; and if only unilateral, then suspicion of radiculopathy rather than a BIL neuropathy diagnosis is made. If I suspect a stress fracture or some unusual lesion within the calcaneus I will order a MRI. Rarely do I order blood work, or NCV/EMG unless I suspect gout, autoimmune issues, or neurological conditions.

Jacobs: Beyond standard x-rays, for the patient with recalcitrant heel pain, my go-to test would be an MRI. MRI would be helpful for the diagnosis of any type of osseous pathology as well as soft tissue pathology such as bursitis. In the presence of a nerve entrapment, the MRI may demonstrate atrophy or deterioration of the

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intrinsic musculature. In the absence of inflammatory changes in the plantar fascia, an MRI might suggest the possibility of a less common ideology to the heel pain.

Weil: Plantar fasciitis, calcaneal stress syndrome, calcaneal stress fracture, nerve entrapment, and radiculitis make up ninety-nine percent of the heel pain I see. I would order bilateral weight-bearing x-rays. I believe that if patients have long-standing heel pain or multiple previous heel pain experiences, I would expect there to be inferior calcaneal bone spurs. An absence of heel spurs leads me in the direction of other causes of heel pain, such as neurologic. If there is long-standing heel pain that has not responded to previous appropriate care, or substantial pain, I order an MRI. An MRI can help determine whether there is pathology in the plantar fascia, the morphology of the plantar fascia to determine best treatment options, microfracture and bone marrow edema in the calcaneus, stress fracture of the calcaneus, degenerative abductor digiti minimi (neurologic component), mass in the tarsal canal, or some unusual findings. I find MRI far more useful than ultrasound in diagnosis-recalcitrant heel pain. I will order EMG/NCV when history and clinical symptoms indicate. On the other hand, I rarely order blood work.

Richie: I think it is safe to assume that ninety percent of patients who present with plantar heel pain actually have plantar fasciopathy. I rarely order any diagnostic tests other than plain radiographs on the initial office visit for patients who present with plantar heel pain. Entrapment of the inferior calcaneal nerve (i.e., Baxter's nerve) would be the second most likely cause of plantar heel pain, and is often seen in combination with chronic plantar fasciopathy. Stress fractures of the calcaneus are rare. I am now retired from a busy sports medicine practice where I saw less than one calcaneal stress fracture per year. I commonly see bone marrow edema on MRI in patients with severe chronic plantar fasciopathy, and this could be considered a form of a stress reaction or fracture. At the same time, patients with severe plantar heel pain are going to be treated the same, with or without MRI. I would order ultrasound, and MRI, if all treatments had failed and I was contemplating radiofrequency nerve ablation, or possibly plantar fasciotomy.

Q ***PM:*** *Assuming you have a patient with plantar fasciitis, what conservative treatment do you order? How effective are strappings, tapings, night splints, and plantar fasciitis sleeves for this condition?*

Weil: I have a standard, evidence-based protocol that I utilize for heel pain on initial presentation. It starts with recommending proper footgear. Shoes with higher heels relax the equinus, and unload the heel and plantar fascia, which provides relief. Running shoes are best. I tell patients to avoid low heels, sandals that are flat, slippers, and bare feet. All patients are urged to purchase medical grade arch supports from our retail store and/or recommended to get custom orthotic devices. The arch supports can be sufficient as a starting point, but even when orthotic devices are needed, getting them arch supports for the time it takes the devices to be ready is important. I do not tape and strap. I have personally found that patients prefer the arch supports than tape on their skin. I dispense a night splint at the initial visit for nearly all patients with plantar fasciitis. This has evolved over my career, as research has corroborated its use, and it is now a mainstay in my treatment. I also refer patients to physical therapy as a rule. I start patients on either NSAIDS or topical compounded pain creams that include pain reliever, NSAIDS and often gabapentin (when given the option, many patients prefer the topical route even when it's a noncovered alternative), and recommend icing. I also educate them on proper non-weight-bearing exercise until the problem is under control.

Ross: For a patient with a diagnosed plantar fasciitis, the conservative treatments that I order are as follows: icing, using a frozen water bottle, stretching, night splints, not ambulating barefooted, wearing arch-supportive flip flops in the house at the minimum. I prefer deep cross friction massage, physical therapy modalities, low energy nerve stimulation, ultrasound, low dye strapping, temporary insoles in advance of prescription orthotic devices, and non-weight-bearing for short periods, even via the use of a knee scooter or pair of crutches. Cessation of all impact activites (running and even walking). I do turn to therapeutic steroid injections in cases of extreme pain, or after other conservative modalities have been attempted, and have had limited success. I also like platelet-rich plasma injections, and occasionally, amniotic stem cell injections. I order shock wave therapy after previous therapies fail. Non-steroidal anti-inflammatory oral and topical diclofenac gel medication also have an important role.

"Shoes with higher heels relax the equinus, and unload the heel and plantar fascia, which provides relief. Running shoes are best."—Weil

Taping is very effective for a short period of time after administration. The patients usually quickly state the foot feels better following taping after taking a first step. Night splints also have truly been one of my most effective therapies, and patients report their benefit.

Supportive new running shoes, even rocker type shoes such as the HOKA have been beneficial. Of

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course, you cannot treat the plantar fasciitis with only these well-known remedies—the biomechanics of the patient is the key and correcting those imbalances or compensatory effects will help not only to relieve the symptoms, but also to prevent recurrence of the condition.

Wrobel: I find my initial treatment plan really depends on what the patients have tried in the past. Initial management certainly depends on severity of pain. With severe pain that is being worked up with ultrasound or MRI, I may start with a CAM boot. For moderate pain levels, I will use just about everything else. I will typically give them a home program for stretching and direct ice massage that was validated in our plantar fasciitis study. These modalities alone have been proven to result in a significant reduction of pain before patients acquire their orthotic devices and shoes. I am also a big fan of physical therapy that consists of deep tissue massage with Graston technique, ultrasound, and stretching. I also favor this modality when chronic conditions exist that may influence the onset or outcome, such as core strength, posture, gait, mobility restrictions, strength asymmetries, etc. Frequently, I may go with pre-fabricated foot orthoses. I will also prescribe a custom foot orthosis, and the prescription is dependent on the patients' activities and body habitus. Our data showed that patients were more active sooner and use less ice in the custom foot orthosis prescription group.

I will use plantar fascia night splints, especially with significant morning pain. Typically, I will have them wear these during the evening hours the first week and try sleeping with it at night the following weekend. I will use taping and strappings on occasion, especially with the popularity of kinesiotape. I find that podiatric physicians sometimes tend to overlook this strategy. In our plantar fasciitis study, patients treated with a removable longitudinal metatarsal pad reported significant improvement in pain before receiving the shoes and orthoses. If there is significant inflammation, I will sometimes go with an Unna boot and application of external functional tapings, such as a Campbell's, low dye, and/or J strap.

"Typically, if prescribing oral steroids, I will utilize prednisone 40 mg daily for three days, then slowly taper patients off with a small dose every three subsequent days."—Jacobs

Schoene: I tell patients I have a "recipe" for treating plantar fasciitis; I feel that as podiatric physicians we need to treat acute foot pain ASAP! My regimen includes a 2-pronged approach: inflammation and mechanical treatments. These may include corticosteroid injection and ice, coupled with mechanical treatments which are the most important; removable L&M pad (Longitudinal and Metatarsal arch pad, calf stretching, higher profile heels for all patients, no barefoot, and cross training only, no running, jumping or fitness walking. I will add Ultrasound and laser treatments on day one as well. If the patient is not at least 75% better after one visit, we add additional treatments on visit #2—we'll continue regimen from visit #1 plus more PT treatments including; myofascial massage therapy, ultrasound, class IV laser, self-massage/ball rolling, and a night splint. If by the third visit the compliant patient is not 80+% better, I order the diagnostic US test, and decide if we need to change directions into a "chronic" mode protocol—which includes prolotherapy and/or ESWT along with aggressive PT treatments. I will employ a walking boot, if patients are limping or very acute. I find the simple L&M pad is my most prized part of the treatment plan. I make them for just about every mechanical diagnosis that patients come into the office for. After making probably 20,000 pads over the years, patients continue to rave about their effectiveness. They are a great precursor to discussion about and fabrication of custom orthotics.

"In our plantar fasciitis study, patients treated with a removable longitudinal metatarsal pad reported significant improvement in pain before receiving the shoes and orthoses."—Wrobel

Richie: One of my mantras when I lecture on this subject is the fact that podiatric physicians are the best specialists to treat plantar heel pain based upon knowledge of the contributing factors, and are able to directly implement all of the effective treatment interventions. Still, I see many of my colleagues treating the new patient with plantar heel pain exactly the same as any primary care physician would, with instructions for stretching, icing, massage, use of night splints, and perhaps recommending an over-the-counter arch support. All of this information can be found on the Internet. Chances are that the patient has already tried these interventions. Therefore, I feel that this condition must be treated as a biomechanical disorder.

Research has shown that there are three mechanical factors which

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cause overload of the plantar fascia: excessive tension on the Achilles, abnormal arch mechanics, and dysfunction of the windlass mechanism. Podiatric physicians should be able to evaluate and determine the contribution of any three of these factors, and then intervene appropriately.

The Achilles tendon often needs to be neutralized with a heel lift. The arch needs to be stabilized with strapping. This is mandatory on the first visit, and I often teach patients how to self-tape. There is accumulating evidence that excessive dorsiflexion of the 1st MTPJ creates the greatest tensile load on the plantar fascia. This dorsiflexion activating the windlass may be neutralized with stiff sole shoes or rocker bottom shoes such as the Hoka. A carbon fiber footplate inserted into an athletic shoe is an effective strategy to limit the windlass. A walking boot can neutralize the Achilles tendon and contains a rocker sole, and sometimes is required for severe cases of plantar heel pain.

Q ***PM:*** *What role do non-steroidal anti-inflammatory medications play in your treatment of plantar fasciitis? Do you use Medrol dose packs in your treatment plan?*

There is a big difference between the effectiveness of non-steroidals as compared to steroids when treating plantar heel pain.—Richie

Jacobs: Typically, if prescribing oral steroids, I will utilize prednisone 40 mg daily for three days, then slowly taper patients off with a small dose every three subsequent days. If I choose to order an anti-inflammatory medication, I will use a long-acting one, such as piroxicam. More frequently, I will utilize a topical anti-inflammatory together with a local anesthetic in the form of a compounded medication.

Wrobel: I will also use these medications on occasion depending on the severity of pain and would prefer a single daily dosing strategy. I limit the treatment course to four to six weeks. I will occasionally use a Medrol dose pack.

Weil: I standardly prescribe non-steroidal anti-inflammatory med-

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ications or topical compounded creams as discussed above. Either route can help reduce pain in a non-habit forming way, which is critical in today's environment, reduces swelling, and breaks the pain cycle. Normally, people want prescriptions instead of being told to take over-the-counter medications. I do use Medrol dose packs occasionally when pain and swelling dictate and there is no fracture, and that is rare.

Richie: There is a big difference between the effectiveness of non-steroidals as compared to steroids when treating plantar heel pain. Many studies have verified that there is minimal evidence of inflammation in plantar fasciitis, thus the reason for the term plantar fasciopathy. Compared to NSAIDS, steroids have potential to reverse collagen hyperplasia, which occurs commonly in plantar fasciopathy. If the mechanical load on the plantar fascia is minimized, steroid therapy, both oral and injectable, can be very helpful in the treatment. That is why in the literature, steroid injections, not NSAIDS, are always cited as the most effective treatment of plantar heel pain.

"I prefer not using steroids, since they only mask the problem, and inhibit the healing process."—Ross

Ross: Non-steroidal anti-inflammatory medications both oral and topical play a strong adjunctive role in the treatment of plantar fasciitis. I try to avoid oral medication, particularly in cases of chronic kidney disease, hypertension, cardiac disease or in the patient who has a pain level of six or below. Conversely, I routinely prescribe topical anti-inflammatory diclofenac medication. Moreover, I try to avoid prescribing Medrol dose packs in my treatment plan. I prefer not using steroids, since they only mask the problem, and inhibit the healing process. I prefer the platelet rich plasma or amniotic stem cell injections to stimulate growth factors in order to jump-start the healing process. The paradigm should be "help the body heal itself".

Schoene: I rarely prescribe any oral pharmaceutical medications, including medrol packs, for most of the musculoskeletal conditions at my office; I generally prefer various injection therapies at the site of the problem, which I have found to be very effective. If a patient presents with overall inflammation issues, due to autoimmune disease or other etiologies, and/or prefers to stay away from pharmaceutical products, then I will prescribe supplements that are well studied for inflammation: fish oils, curcumin, and other natural supplements in a therapeutic dosage.

Q ***PM:*** *When do you turn to administering injectable corticosteroids for plantar fasciitis, and what is the course of your injection therapy? Where do you prefer to locate the site of the injections? When would you discontinue this therapy?*

Schoene: I use a corticosteroid injection as my first line treatment for each patient, but only when all the other mechanical treatments are instituted that day (my "recipe" protocol mentioned above) . I find that it is not only therapeutic but diagnostic to me—if the patient does well with the first 1-2 weeks of treatments, then this tells me the problem is most likely acute in nature and will most likely resolve quickly with a bit more care and time. If they are about 40-60% better, I will consider a second and final steroid injection, and always add the additional PT treatments, massage, night splint, shoe changes, and cross training treatments. If after the 1st or 2nd visit, they return and claim complete compliance but very little relief, then I change direction immediately towards "chronic" mode protocol and order a diagnostic US and change the treatment course right away. I do not stall on my treatments. I tell patients on day 1, "if you are not better in 2 visits, we will get a diagnostic US and change direction with treatments"—my athletic and active patients appreciate that. For injections, I typically administer the injection from the medial side at the insertion point. On occasion, I will administer the injection directly plantar, if I suspect or receive the US report back that there is a fibroadipose nodule within the fat pad, as the injection directly into the nodule typically resolves pain very quickly. I will incorporate a horseshoe type pad to off-load the little nodule, a treatment that works well.

Wrobel: Based on our study, I would use this strategy if there is a biconvexity pattern on diagnostic ultrasound imaging. I will also use it with refractory cases to all the above strategies described, and if there is a focal trigger point. I am more cautious with using this due to the number of partial plantar fascia tears and stress fractures I have been seeing lately. I prefer to administer this injection medially. If there is no response to the first two injections, however, then I will typically not continue this strategy.

Ross: I refrain from injecting steroids on the initial visit. I want to see how the conservative measures have fared before initiating a steroid injection. When I do administer steroid injections, which I do rarely, for plantar fasciitis, I will use Decadron phosphate 1 ml, Marcaine 0.5% plain 1.5 ml, Xylocaine 1% plain 1.5 ml, Vitamin B-12 1 ml. The first injection is for extreme pain with a level of eight to ten, or after conservative modalities have not proven to be successful with the pain level not being reduced to a four or less. After a first injection, a second may be attempted two to four weeks later, and no more than three injections are given in total. After an injection I advise the patient cease all running or impact activity for a minimum of two weeks, to prevent spontaneous tear of the fascia. They must wear their temporary insoles or orthotics during that period.

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My preferred point of injection is the medial aspect of the heel at the medial band, and at the insertion of the plantar fascia to the calcaneus. After the first injection, or possibly the second injection, if there has been no significant improvement, then I, too, would discontinue the injection therapy, and consider alternatives, such as PRP or amnionic stem cell injections.

Richie: I am very likely to inject corticosteroids on the initial visit of a patient with plantar heel pain, particularly if the symptoms have been present for over two months. Although there are documented cases of rupture after steroid injection, I have never seen one my thirty-seven years of practice. I actually have seen at least twenty cases of spontaneous rupture of the plantar fascia in an athlete who never had received a steroid injection.

I would never inject a steroid, however, without addressing the mechanical causes of plantar fascia overload, so taping the arch is mandatory on the day of the injection. I try to limit the injections to one time only. If I do two, or rarely three injections, I space them at one month apart. My injection is 0.5 cc Celestone Soluspan mixed with 2 cc 0.5% Bupivicaine, administered under a posterior tibial nerve block. This allows me to target the point of maximal tenderness marked out before the block, and using a plantar approach to the target, rather than a medial approach. I inject directly into the fascia itself, not above or below it.

I have found that most cases are manageable without cortisone.—Weil

Jacobs: In recalcitrant cases, I first will reconsider the leading diagnosis. When an injection is indicated, I will inject through a medial approach. Personally, I do not utilize ultrasound guidance as the literature available does not suggest there is any benefit to the use of ultrasound guided heel spur injections versus touch-guided injections.

Weil: As my career has progressed, my utilization of cortisone injections for plantar fasciitis has substantially lessened. I have found that most cases are manageable without cortisone. With more research showing the deleterious effects of cortisone, I'd rather find regenerative ways to help patients. I also almost never perform an injection on initial presentation. Ironically, my belief is I am doing a disservice to the patients in making them immediately pain-free. If they become pain-free, most of them will not follow the directions of mechanical change of footgear and orthotic support, and improving their condition of equinus. Then, when the injection wears off, they are in worse shape.

Interestingly, there are virtually no studies validating the benefits of cortisone injections for heel pain. In the unusual event that patients have complied with previous treatments, and have not responded, having continued pain and swelling, I will utilize a cortisone injection. I will rarely perform a second injection. I use a combination of 1.5 cc of 0.5% Marcaine plain, 0.5 cc of dexamethasone and 0.5cc of Kenalog in a 3cc syringe, and a thirty-gauge needle. Under ultrasound guidance, I introduce the needle from directly medial and inject the contents between the plantar fascia and calcaneus.

Q ***PM:*** *What physical therapy modalities would you order in treating plantar fasciitis? Do you perform these treatments in-office, have a physical therapist on staff, or do you refer them out?*

Ross: I typically would order physical therapy modalities consisting of nerve stimulation, ultrasound, deep cross-friction massage, eccentric contraction stretching, kinesiology tape, and occasionally sport laser. At one time, in my practice, I performed the physical therapy modalities myself, or had my assistant perform them. Now, however, I refer the patients out to a physical therapist and physical therapy facility. I will check periodically as

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to their progress, and to determine if there has been a reduction in the pain level.

Wrobel: As previously mentioned, I am a very big fan of physical therapy for this condition for all of the reasons that I outlined. I don't use them in the office.

Weil: I think impacting the posterior muscles and tendons is critical here. In my mind, it is all about loosening that tissue through stretching, manual manipulation, and stimulation. Also, building strength in the extremity is important. Often, the hip flexors are weak, which can impact everything. We have physical therapists on staff who take care of ten to fifteen percent of our patients who need physical therapy. The rest are referred out.

We offer many PT treatments in our office and make them a very integral part of the protocol, from the very beginning.—Schoene

Richie: We happen to have an in-house physical therapy team. The team is integral to our success in treating heel pain. Physical therapy always helps to assure success of a comprehensive treatment plan. Therapeutic massage is probably the key ingredient, followed by ultrasound.

Schoene: We offer many PT treatments in our office and make them a very integral part of the protocol, from the very beginning. Included are various manual massage and therapeutic exercise techniques, with massage therapists, ultrasound, electric stimulation, Class III and IV laser treatments, Kinesiology tape, the L & M padding, and occasionally TENS units. I almost always hand out bouncy balls of 2 different sizes to patients and have them use these every day. For the recalcitrant "chronic" protocols, I even hand out flat rocks that mimic massage tools. I instruct patients to massage the plantar fascia themselves in between office visits. We all get a good laugh, but the balls and rock work very well when integrated with the traditional podiatric protocols. Patients receive the treatments mentioned above by the medical and massage staff.

Jacobs: With regard to physical therapy, I rely upon simple splinting, stretching, and range of motion exercises. Iontophoresis and ultrasound have been shown to be of some benefit for treatment of recalcitrant heel pain.

Q ***PM:*** *What role does orthotic therapy play in treatment of heel pain, and how are orthotics biomechanically effective in treating this condition?*

Richie: I am a big proponent of custom foot orthotic therapy in treating plantar heel pain. I realize that there are several studies published that show no superiority of custom foot orthoses over pre-fab devices in treating plantar heel pain. That has not been verified, however, by my own experience. At least half of new patients presenting with heel pain in my practice are already using some type of pre-fab arch support, which has failed to resolve their pain. Regardless of what some research shows, custom foot orthotic therapy following Root principles will give positive results ninety percent of the time, in my experience. Patients should be casted non-weight-bearing, with a neutral suspension technique, everting the forefoot on the rear foot as much as possible. Pushing down on the first ray will assure pronating or everting the forefoot during the casting procedure. The lab should intrinsically balance the positive cast to capture this position. The everted forefoot will offload the plantar fascia, as research has shown.

"Regardless of what some research shows, custom foot orthotic therapy following Root principles will give positive results ninety percent of the time."—Richie

Jacobs: I believe that orthoses represent a mainstay of long-term management. In the pronated foot, I typically will treat the patient utilizing 5° of hind foot varus with an extrinsic post, and 3° forefoot with an intrinsic posting. I will typically include heel spur padding with the orthotic device. With a high arch or more rigid foot, I usually line the orthotic device with shock-absorbable material and adjust material distribution into the arch to offload the medial arch of the foot.

Schoene: I feel orthotics are a very important tool that all DPMs should be utilizing for all of the musculoskeletal conditions that we treat. We should be considered as the experts in biomechanical evaluation of the foot and ankle, as it relates to overall skeletal health. Having said this, I feel there is a timing issue as to when to dispense the devices to patients with plantar fascitis. I prefer to use a true functional orthotic for my active or athletic populations. I consider a functional device as a rigid/semi-rigid device with the appropriate corrections for the biomechanical faults, and to support the body weight properly. I still do biomechanical exams on all my orthotic patients evaluating prone, standing and then on the device when dispensing. Whatever the method, I teach students that it's imperative to perform a meticulous impression technique. A soft material accommodative insole is not what I consider a

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true "functional orthotic" and prefer to save these for our diabetic or rheumatoid patients. Polypropylene devices will last many years, and can easily be refurbished, so are a cost saving for the patient long-term vs soft material devices that need to be replaced every couple of years. Until the heel pain is at least 90% improved the patient will often complain that the orthotics are not comfortable, so I hold off on dispensing a new device. The breaking in of the device can backfire as symptoms may return because for many patients with tight gastroc-soleus, there is reduced dorsiflexion at the ankle joint so the needed dorsiflexion compensation occurs at the midtarsal joint through the oblique midtarsal joint axis. So when you give a firmer device to a patient the symptoms return again, causing pain at the plantar fascia attachment. The L&M pad gently supports the foot without stopping compensation, so patients do very well with something softer like this. I prefer to wait to dispense a functionally correct device rather than give a patient a soft device and then hear no complaints from the patient. Also the L&M pad fits in many shoes and slippers, sandals, so it stays on the foot, not in the shoe, so I get better compliance.

The timing of orthotic dispensing is a pearl that I have taught many students over the past 20+ years of teaching. Because of this, I prefer to use the L&M pad until at least 90% improvement has been obtained, then gradually ease them into the new devices. I always instruct patients to continue their stretching routines when breaking in orthotics for this reason. I also evaluate for any leg length discrepancy (typically functional in nature), and although not normal, it's very common. I check this standing, and always correct with a lift if needed with or without the orthotic. I often hear from patients with long-standing hip, sacroiliac or low back pain that the cork lift I dispense has worked miraculously well for them.

The role of orthotic therapy is extremely important, and is an effective adjunct in the treatment of plantar fasciitis.—Ross

Ross: The role of orthotic therapy is extremely important, and is an

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effective adjunct in the treatment of plantar fasciitis. It is a standard course of treatment for my patients with this condition. From a biomechanical standpoint, if my patients have pes planus, or are excessive pronators, orthotic devices will be of great benefit, contrary to some evidence-based studies. I will biomechanically evaluate all of my patients, taking measurements, and conduct a visual as well as a mat scan pressure gait analysis to determine asymmetries, and any gait pathology. The prescription orthoses should biomechanically allow for sub-talar joint neutrality, yet provide the ability to pronate and supinate, while maintaining a stable medial column and mid-tarsal and talo-navicular joint. Concomitantly, they should provide forefoot stability in cases of forefoot varus or forefoot valgus. Other modifications I have ordered for patients with a functional hallux limitus include a first ray cut out and Morton's extensions. I typically add a heel pad bilaterally for all patients with chronic heel pain.

In the fabrication of these orthotics, I will perform either a plaster casting or a 3-D scan to create the foot representation. The 3-D scan has proven very successful, with fewer patient complaints in my practice than with traditional plaster casting.

It is important to take advantage of the mechanical properties of each footwear strategy in conjunction with the patients' foot types.—Wrobel

Wrobel: Based on the results of our randomized study, the custom foot orthosis group demonstrated significantly faster return to activity than other groups, and those patients reported less of a need to use direct ice massage. Describing orthoses as biomechanically effective is a broad term that encompasses changes in kinematics, kinetics, and muscle activation magnitude and timing. In healthy subjects, kinematic and kinetic differences with use of custom foot orthoses while running have been found. I do not believe there are studies that have looked at these variables with foot pathology, such as biomechanical etiologies from different foot types with pathological conditions, and then at the kinematic or kinetic changes before and after the use of orthotic devices.

It is also more difficult to detect differences with normal walking unless one uses invasive bone pins as done in select studies. There is literature that supports the use of custom foot orthoses for reducing pain in pes cavus foot types. Anecdotally speaking, I do use less functional foot orthotics for people who have increased standing times with their occupation or recreational activities. I will still use functional orthotics in those patients who are not custom foot orthotic-naïve, active in recreational activities, or have worn them in the past. I also believe they also have a significant role for foot type extremes.

Weil: Simply put, I feel that orthotic therapy plays a huge role. I, however, utilize a tri-laminate device that's softer than typical functional devices. I have found that patients with heel pain respond much better to these softer, more forgiving devices. It is important to note that when patients are not getting improvement with orthotic devices, the problem may have evolved from plantar fasciitis into more of a neurologic entity. I caution practitioners to not be so arrogant to tell their patients that their previous orthotic devices were not made correctly and that they can make a better pair of devices. In these cases, the devices might not be the problem; rather, an improper diagnosis may be.

Q ***PM:*** *What shoe therapies and modifications would you consider in patients with plantar fasciitis?*

Richie: Proper footwear is essential to complement all aspects of heel pain treatment. There are three key shoe components: a heel drop of twelve millimeters or more, a stiff shank, and a stiff stable forefoot with minimal flexion. Stiff, rocker style shoes have shown ability to offload the plantar fascia, and this design can be found in some athletic shoe designs. I like some of the Hoka shoe models as long as the heel drop is over twelve millimeters. Hiking shoes and work boots can provide these same criteria. For women, a wedge slide or clog with a thick forefoot platform can be ideal, but may not be suited for custom foot orthotic therapy intervention.

Schoene: I instruct patients to always wear shoes indoors even in the evening, to utilize a very supportive shoe/sneaker or slipper around the house. I suggest wearing the L&M pad with all shoes. For the women I ask them to wear heels as much as possible, and for the men to wear the highest heel profile shoe they have as well. The shoe aspect of treatment is so important for resolution, and very helpful for symptom control. The athletic shoe industry's new standards of the low profile/zero drop is not helpful for plantar fascia or posterior heel conditions, so I try to instruct patients to look for a higher heel drop for the duration of the treatment regimen.

Wrobel: I am a big fan of using orthopedic sandals as house shoes when immediately initiating activity such as rising out of bed. I find that it also depends on the foot type. Sometimes, I will use an accommodative foot orthotic device with a motion control shoe and rocker soles. Other times, I will use a neutral cushioning running shoe with a functional orthotic device. It is important to take advantage of the mechanical properties of each footwear strategy in conjunction with the patients' foot types.

Ross: For patients in need of shoe therapies, particularly for those with limb length discrepancies, heel lifts are very important. On occasion, additional heel padding or medial wedges to create rear foot varus posting can be effective. For the lateral heel and forefoot striker, lateral phalanges have also proven to be effective. For the runner

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patient I recommend a neutral running shoe with the use of Rx orthotic. A mild elevation of the rearfoot is also beneficial. A rocker bottom type shoe such as a HOKA has also proved effective in treating plantar fasciitis.

"When presented in the right way, ESWT/EPAT is fantastic for plantar fasciitis."—Weil

Jacobs: In the majority of patients, I also recommend an elevated heel, and avoidance of flat shoes, as well as shoes that have no support within the insole. Frequently, I will also recommend a shoe that has good shock absorbency characteristics.

PM: *Some of the more advanced therapies for heel pain include the use of ESWT, EPAT, and cryosurgical units, as well as lasers; newer contenders include percutaneous tenotomy (e.g., Tenex, Hydrocision), amniotic membrane matrix, and platelet-rich plasma (PRP). Do you include one or more of these in your protocol?*

Weil: The vast majority of patients will improve with conservative treatment. There are, however, a few things to consider. Patients may want to try to get better faster. With higher deductibles, patients may not want to go through the standard care, and prefer to get to more advanced therapies more quickly. I have been using ESWT/EPAT since February of 2000. It has proven to be better than ninety percent effective, in our research. In fact, I believe the less than ten percent on whom it has not been effective have actually had another cause of heel pain that went undiagnosed. High level research supports ESWT/EPAT more than all other treatments combined, including surgery. I have had patients who requested EPAT/ESWT much earlier in the treatment paradigm than I recommended, because they wanted to take an aggressive approach.

Understandably, many have shied away from cash services like ESWT/EPAT. Now, however, in the world of high deductibles, we are dealing with cash services on nearly every patient. When presented in the right way, ESWT/EPAT is fantastic for plantar fasciitis. Since 2017 I have increased my usage of placenta-derived injections (not covered by insurance). I much prefer them over cortisone. They are regenerative and non-harmful. I often use them in combination with ESWT/EPAT, and have anecdotally found quicker and better response compared to each individually. I have mostly given up on PRP as I did not see the results that others have reported.

Wrobel: In chronic refractory cases, I will typically refer to colleagues that have ESWT or that do the Tenex procedure. I have seen benefit with both modalities. There is an ongoing RCT for injectable amniotic membrane matrix that is being submitted to FDA so I am awaiting these results.

There was a promising study published in *Foot & Ankle International* by Monto in 2014 that found PRP had an increased and more durable response compared to steroids over a two-year follow-up period. Carriers don't cover PRP or ESWT. My preferred last line of treatment would be percutaneous tenotomy (available from Tenex and Hydrocision).

Richie: If one looks at the research, two therapies stand out which have shown impressive results for treatment of chronic heel pain: ESWT and radiofrequency nerve ablation. EPAT is essentially the same as radial shock wave, and it shows similar excellent results compared to ESWT. None of the other therapies mentioned in this question have been tested, or proven effective in any quality prospective studies. I was one of the co-authors of the original study of radiofrequency nerve ablation, by Landsman et al., which was a blinded, prospective, placebo-controlled study. This Level 1 study showed that 80% of patients with chronic heel pain can be successfully treated with radiofrequency ablation of the inferior calcaneal nerve with a high level of satisfaction and zero complications. Since then, there have been four other high-quality studies of radiofrequency nerve ablation of the inferior calcaneal nerve show-

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ing similar impressive results. In our practice, we use radiofrequency nerve ablation, EPAT—which is really radial shockwave—and PRP injections. We have great success with the first two therapies, and moderate success with PRP. Patients usually prefer shockwave because it is less invasive than radiofrequency nerve ablation, although the latter procedure is more successful.

Ross: The more advanced modalities that I have included in my protocol for chronic heel pain are platelet-rich plasma injections (PRP) and amniotic stem cell injections, in conjunction with a posterior tibial nerve block. I conducted a two-year study of over thirty patients with the use of PRP, and reported a significant reduction in pain in over sixty percent of the patients. PRP studies have been mixed, however. The amniotic stem cell injections' effectiveness is also largely anecdotal, but the early results have been promising, with significant reduction of pain. The injections themselves, however, can be painful. I refer patients out for the sport laser treatment. On occasion, I do perform ESWT, but my results have continued to be only fair to good over the years.

Schoene: In regard to some of the newer technologies, I feel that they work well for plantar fasciosis rather than the "itis" as they are designed to stimulate collagen production. When deemed chronic, thickened, or torn, I typically use in-office protocols. I utilize a needling/prolotherapy approach, coupled with stringent myofascial therapies, along with the above-mentioned earlier treatments with the exception of any corticosteroid injections. These treatments are covered by insurance and can be done in the office easily with less time, money, and insurance expenditures. I feel this is a win-win for the patient, doctor, and insurance carriers. I will offer the alternative treatments of ESWT shockwave or PRP if patients are interested or they live far away and prefer to keep visits at a minimum. I have not performed a surgical release of the plantar fascia for 30 years, so prefer to keep the treatments aggressive but conservative.

PM: *When do you decide to operate on patients with plantar fasciitis, and what is your procedure of choice?*

Jacobs: In the unusual circumstance that I am required to consider surgical intervention for this problem, I consider performing a tendoAchilles lengthening, or gastrocnemius recession, appropriate nerve decompression surgery if indicated, or pronation-limiting surgery. If I do section the plantar fascia, I release the entire plantar fascia.

Wrobel: When everything else fails, I recommend percutaneous tenotomy. Even with selected medial plantar fascia release, patients can still experience lateral column instability despite good post-operative orthotic devices and shoes. I am intrigued by the distal plantar medial percutaneous fasciotomy; however, I have not seen outcomes reported yet.

Weil: It is very rare that I have to take someone to surgery for isolated plantar fasciitis. More commonly, the surgery performed is a tarsal tunnel release, and micro-fasiotomy with coblation. I am now frequently finding evidence of calcaneal stress syndrome, with micro-fracture and bone marrow edema on MRI. As a result, I have been performing a subchondral biologic stabilization of the micro-fracture with results that are not short of amazing. People with months of substantial problems are pain-free within days after the procedure. It has been one of the most game-changing things I've done in years.

Richie: With our newer treatment modalities, our need to operate on chronic heel pain has been reduced to about one percent of all patients who present with this condition. When I do operate, I perform a percutaneous release of the medial one third of the central band of the plantar fascia. I do not like endoscopic plantar fasciotomy because it limits the release to the plantar fibers only, while a release of the medial fibers is necessary, in my opinion. The percutaneous approach is a quick and easy procedure, but the recovery from any plantar fasciotomy is unpredictable. I really do not like cutting the most important ligament support of the human foot. I keep the patients non-weight-bearing for six weeks, and in a walking boot for a total of twelve weeks. I believe the fascia does repair in a lengthened fashion, and does become functional again with this protocol. Fortunately, however, I rarely have to perform this procedure anymore.

Schoene: I do not do any surgical intervention on plantar fasciitis, as the chronic protocol relieves the pain and restores the collagen integrity within the fascia.

Ross: My decision for surgical intervention for the chronically painful heel patient is made only after exhaustive conservative care has been attempted with various modalities: night splints, injections, and the use of prescription orthotic devices. If, after conservative measures have failed, only then do I consider surgical intervention as a last resort. Over the years, over ninety percent of my heel pain patients' conditions have resolved with conservative treatment, without having needed to resort to surgical intervention.

My preferred procedure is the endoscopic plantar facsciotomy. I only release the medial band and a small portion of the middle band of the plantar fascia. I make sure that I have released all the fibers of the medial band. After removal of the cannula, the real key is exploring for an entrapped medial calcaneal nerve branch and performing a decompression of the nerve branch. Moreover, I rarely perform complete plantar fasciotomy, and resection of the heel spur. It is important to reiterate that after EPF, orthotic therapy is essential to maintain the lateral column of the foot, and prevent calcaneal-cuboid joint dysfunction and forefoot compensation. If there is a true equinus, I will consider a percutaneous tendo-Achilles lengthening, or gastrocnemius recession. **PM**

Dr. Haspel is senior editor of this magazine and past-president of the New Jersey Podiatric Medical Society. He is a member of the American Academy of Podiatric Practice Management.