

## CONSERVATIVE CARE FOR HEEL PAIN

*A. J. Phillips, D.P.M.*

It is generally assumed that the vast majority of patients who present with chronic heel pain can be relieved with conservative care. However, the term conservative care is somewhat vague. What type of conservative care works best? What should be the first line of conservative treatment for heel pain? When should conservative care be discontinued and surgery be performed? There is an obvious need for a specific protocol for addressing heel pain.

### ETIOLOGY OF HEEL PAIN

There are numerous etiologies of heel pain that have been reported in the literature. The majority of these are listed in Table 1. However, in a general podiatric practice, the three most common are heel spur syndrome/proximal plantar fasciitis, nerve entrapment, and heel bursitis (heel pad syndrome). This paper will concentrate on the conservative methods of treating heel pain caused by these etiologies.

**Table 1**

### ETIOLOGY OF HEEL PAIN

1. Heel spur syndrome/plantar fasciitis
2. Heel bursitis
3. Nerve entrapment (medial calcaneal nerve, or first branch of the lateral plantar nerve)
4. Stress fracture
5. Neoplasm (osteoid osteoma, bone cyst, etc.)
6. Arthritis (Reiter's disease, gout, etc.)

Heel spur syndrome/proximal plantar fasciitis has been described as an inflammation of the plantar fascial insertion into the plantar medial tuberosity of the calcaneus. Abnormal physical stress caused by excessive pronation or excessive tension on the plantar fascia creates a strain of this tissue as it inserts into the calcaneus. This is a chronic pulling injury. The inflammatory process involved in repairing these tissues is thought to cause the pain. Frequently, this inflammatory

process results in a deposition of osseous tissue on the plantar medial aspect of the calcaneus known as the spur. Throughout this paper it will be referred to as heel spur syndrome.

Heel pain created by nerve entrapment involves either entrapment of the medial calcaneal nerve or the nerve to the abductor digiti minimi, which is the first branch of the lateral plantar nerve. In both situations, the nerve is entrapped between fascial layers. The medial calcaneal nerve is entrapped in the fascia of the abductor muscle belly. The nerve to the abductor digiti minimi is entrapped between the abductor muscle belly and quadratus plantae, as the nerve courses along the plantar aspect of the calcaneus, superior to the plantar tuberosity.

Heel bursitis (heel pad syndrome) is created by an out-pocketing of the systematically arranged fat corpuscles within the fat pad. This is a dysfunction of the absorptive qualities of the heel pad that can be caused by acute or chronic trauma to the fat pad. This is sometimes encountered with fat pad atrophy.

### CLINICAL EVALUATION

The purpose of the evaluation is to determine the etiology of the heel pain. This is vital because it will determine the conservative treatment protocol. The following is an outline specific for evaluating heel pain.

#### 1. History of heel pain

- A. Length of time of the heel pain
- B. Time during the day in which pain is present
- C. Type of pain (burning, dull, sharp)
- D. Specific site of pain
- E. Location of pain
- F. History of trauma
- G. History of weight gain
- H. Activity level (sedentary, runner, etc.)
- I. What relieves the pain

## 2. Past Medical History

- A. History of rheumatological disease
  - Gout
  - Rheumatoid arthritis
  - Psoriatic arthritis
  - Collagen vascular disease
- B. Diabetes
- C. Bone tumor
- D. Paget's disease
- E. Alcoholism
- F. Reflex sympathetic dystrophy
- G. History of carpal tunnel syndrome, tarsal tunnel syndrome

## 3. Physical Exam

- A. Specific area of pain (Fig. 1)
- B. Type of pain upon palpation (burning, dull, sharp)
- C. Presence of edema, erythema, ecchymosis
- D. Integrity of heel pad, palpable heel bursa
- E. Presence of Tinel's sign
- F. Pain on range of motion (ankle joint, subtalar joint)
- G. Foot type—collapsing pes plano valgus, cavus
- H. Functional hallux limitus

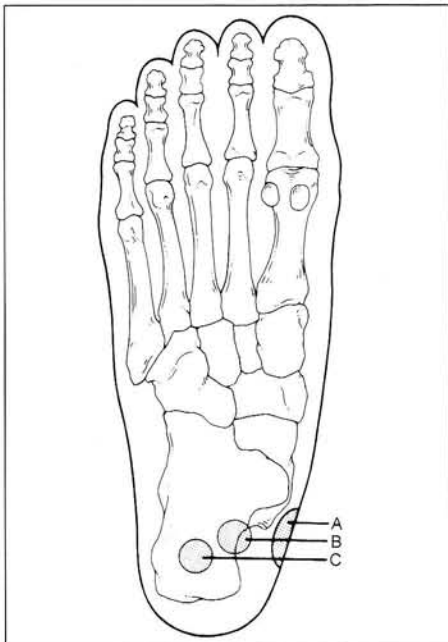


Figure 1. Diagram indicating specific areas of heel pain. A. Nerve entrapment pain. B. Heel spur syndrome/proximal plantar fasciitis. C. Heel bursitis. (Adapted from: Subcalcaneal heel pain. *Orthopedic Clinics of North America*. 25(1):161-175, 1994.)

## 4. Gait Evaluation

- A. Pronation upon heel-off
- B. Heel time (short, long)

## 5. Radiographs

- A. Lateral and calcaneal axial views
- B. Plantar heel spur presence
- C. Varus heel on calcaneal axial view

## DIAGNOSIS

The specific diagnosis is determined by the history and clinical evaluation, as detailed previously. The following are positive findings of the history and clinical evaluation for the common types of heel pain.

### Heel Spur Syndrome/Plantar Fasciitis

Patients will generally relate an insidious onset of pain, which is worse in the morning, and after periods of rest. Pain is usually described as dull and sometimes sharp. There is usually a history of increased physical stress to the foot via weight or athletic activity.

Physical exam reveals pain upon palpation of the plantar medial tuberosity of the calcaneus. There is pain at the plantar medial aspect of the insertion of the plantar fascia upon dorsiflexion of the ankle and the digits. The foot's structure is generally either pes planus or pes cavus. An equinus deformity is often present.

Gait evaluation will frequently reveal pain in the lower limb that functions the longest. Heel time is either very short or very long. Pronation of the subtalar joint is usually noted on heel-off. Lateral radiographs sometimes reveal a spur on the plantar tuberosity of the calcaneus (Fig. 2).



Figure 2. Lateral radiograph revealing a typical plantar calcaneal spur.

### Nerve Entrapment

Patients will also present with pain that sometimes begins insidiously. It is described as sharp, but sometimes burning. The pain is usually severe in the morning but is also reported when the patient is non-weight bearing.

Pain is present upon palpation of the area of entrapment. The pain is typically pin-point in location. Sometimes there is a Tinel's sign upon palpation, which extends either to the medial aspect of the heel or onto the lateral plantar aspect of the foot and the fifth digit. The direction of pain-radiation depends on the specific nerve which is entrapped.

Foot structure and gait evaluation results are usually similar to someone who experiences symptoms of heel spur syndrome/plantar fasciitis. Radiographs are generally not positive for a plantar calcaneal spur.

### Heel Bursitis/Heel Pad Syndrome

Patients who develop a true heel bursitis either have this develop insidiously or after trauma. Trauma can be acute or chronic in nature. Pain is dull and aching, and generally present only when weight bearing.

Pain is present upon palpation on the plantar central aspect of the heel, which usually corresponds to a palpable mass. This is most accurately palpated by using cream on the heel during the examination (Fig. 3). There is sometimes edema or erythema noted on the heel pad.

Foot structure is more commonly cavus. The patient's gait is usually guarded, there is a short heel time, and radiographs are negative for plantar spur formation.

## CONSERVATIVE TREATMENT MODALITIES

Conservative methods of treatment generally either address relieving the patient's symptoms or addressing the specific cause of the heel pain. Conservative therapy designed to address the cause of the heel pain should provide the best long-term results. Symptomatic relief is especially helpful initially in the acute phase.

There are a variety of conservative treatments that can be utilized. These are outlined below.

1. *Low-dye taping with Kinetic wedge*—Taping can be applied q 3 days for 3–4 visits. Tape



Figure 3. Identifying a plantar heel bursa is accomplished by palpating the plantar aspect of the heel with cream.

mimics the effect that an orthotic device has on the heel. With the addition of a felt metatarsal pad, the functional motion of the 1st MPJ is increased. This will relieve the pulling pressure from the plantar medial aspect of the heel at the site of the plantar fascia and the abductor muscle belly (Figs. 4A, 4B).

2. *OTC (Over the counter) orthotics* — These are useful in providing additional support to a patient who has improved with taping and physical

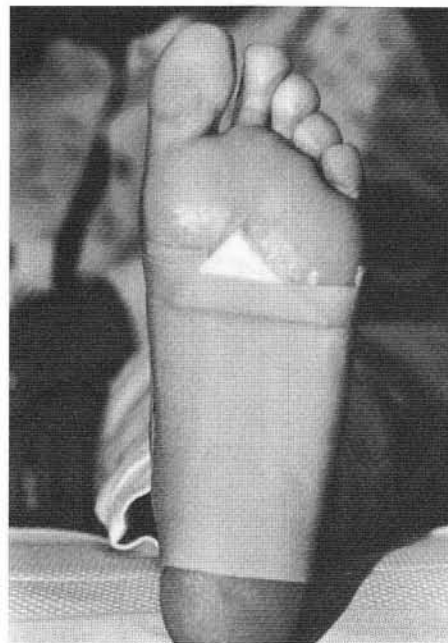


Figure 4A. Plantar view of a Low-dye strapping over a Kinetic Wedge.

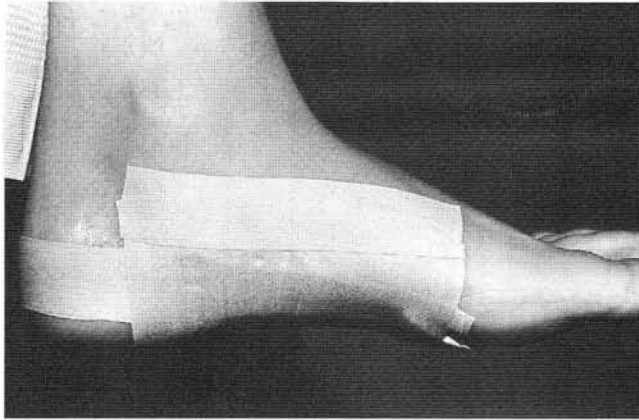


Figure 4B. Medial view of Low-dye strapping.

therapy. Over the counter orthotics are especially helpful when treating a patient with heel spur syndrome/plantar fasciitis (Fig. 5).

3. *Custom made orthotic* — These are necessary in patients with heel pain who also have significant

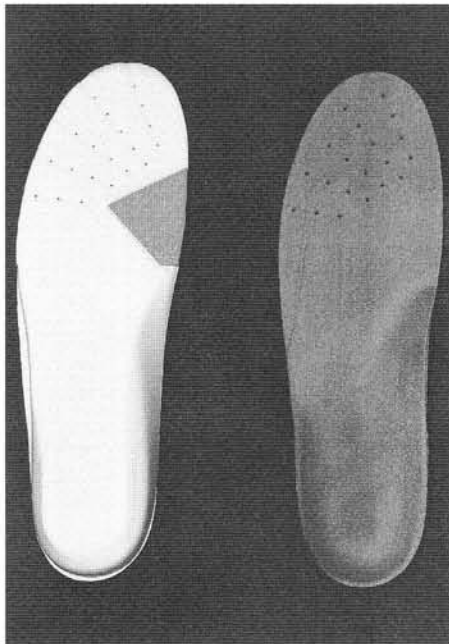


Figure 5. Example of over the counter, Kinetic Wedge orthoses.

gait abnormalities and require long-term orthotic control. A first ray cutout in the orthotic device helps to plantarflex the first ray allowing the hallux to override the first metatarsal head efficiently at heel-off. This will reduce the strain of the plantar fascia on the plantar medial aspect of the calcaneus (Fig. 6).

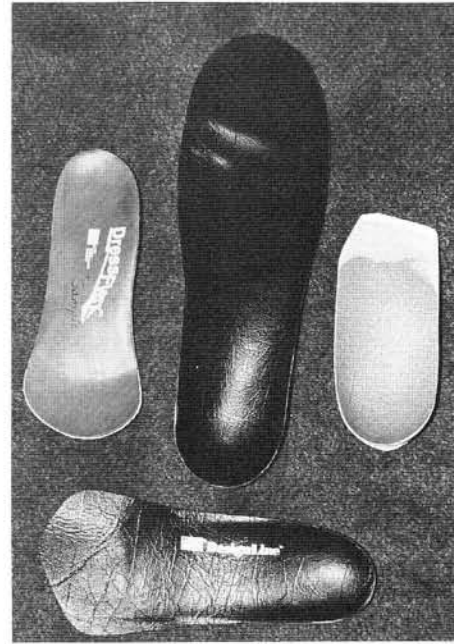


Figure 6. Example of custom made orthotic devices.

4. *NSAIDs (Nonsteroidal Anti-inflammatory Drugs)* — These are especially helpful in the acute phase of heel pain. Long-term control with NSAIDs is impractical, and other modalities should be utilized to accomplish this.

5. *Cortisone Injections* — Long acting steroid preparations injected at the site of pain are also helpful in the acute phase of all three of the primary types of heel pain. The injectable steroid helps to reduce the inflammatory process and thus reduces pain. The majority of the time, it is only a temporary aide in reducing the symptoms.

#### 6. *Physical Therapy*

##### A. Home Therapy

1. Ice
2. Stretching (plantar fascia, achilles tendon)

##### B. Office

1. Ultrasound
2. Iontophoresis
3. Phonophoresis
4. Friction Massage
5. TENS Unit (Figs. 7A, 7B)

7. *Heel Cups (soft or hard)* — This treatment is meant to protect the heel pad, and is more effective in treating heel pad syndrome. The goal is to protect the pad itself.

8. *Night Splints* — These are ankle-foot orthoses worn at night, at 5 degrees of dorsiflexion. Proponents of this treatment believe that it prevents contracture of the achilles tendon and plantar fascia,

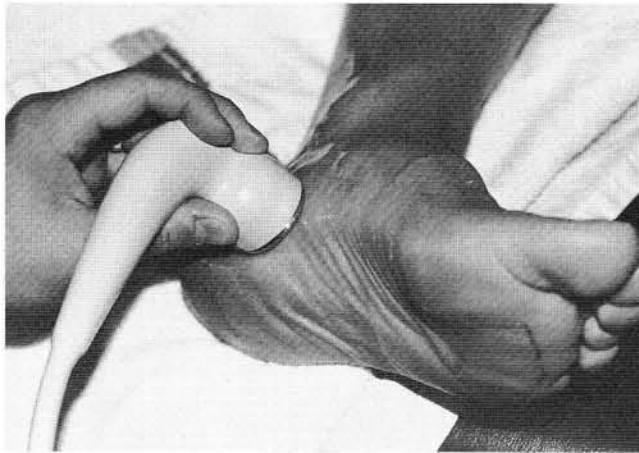


Figure 7A. The use of ultrasound to the heel provides deep heat and symptomatic relief.

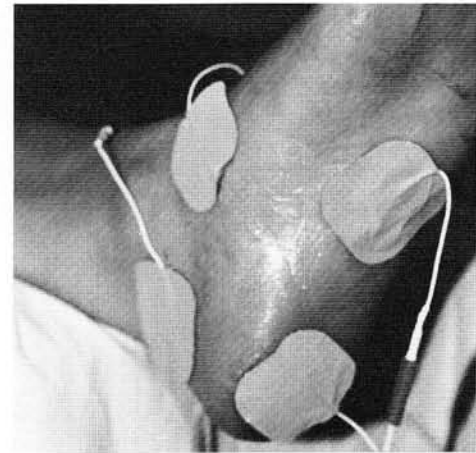


Figure 7B. Use of electrical stimulation can also provide symptomatic relief.

as a result of the plantarflexed posture of the foot during sleep.

9. *Casting*—Casting up to a 4–6 week period can be done for recalcitrant heel pain.

10. *Activity Monitoring*

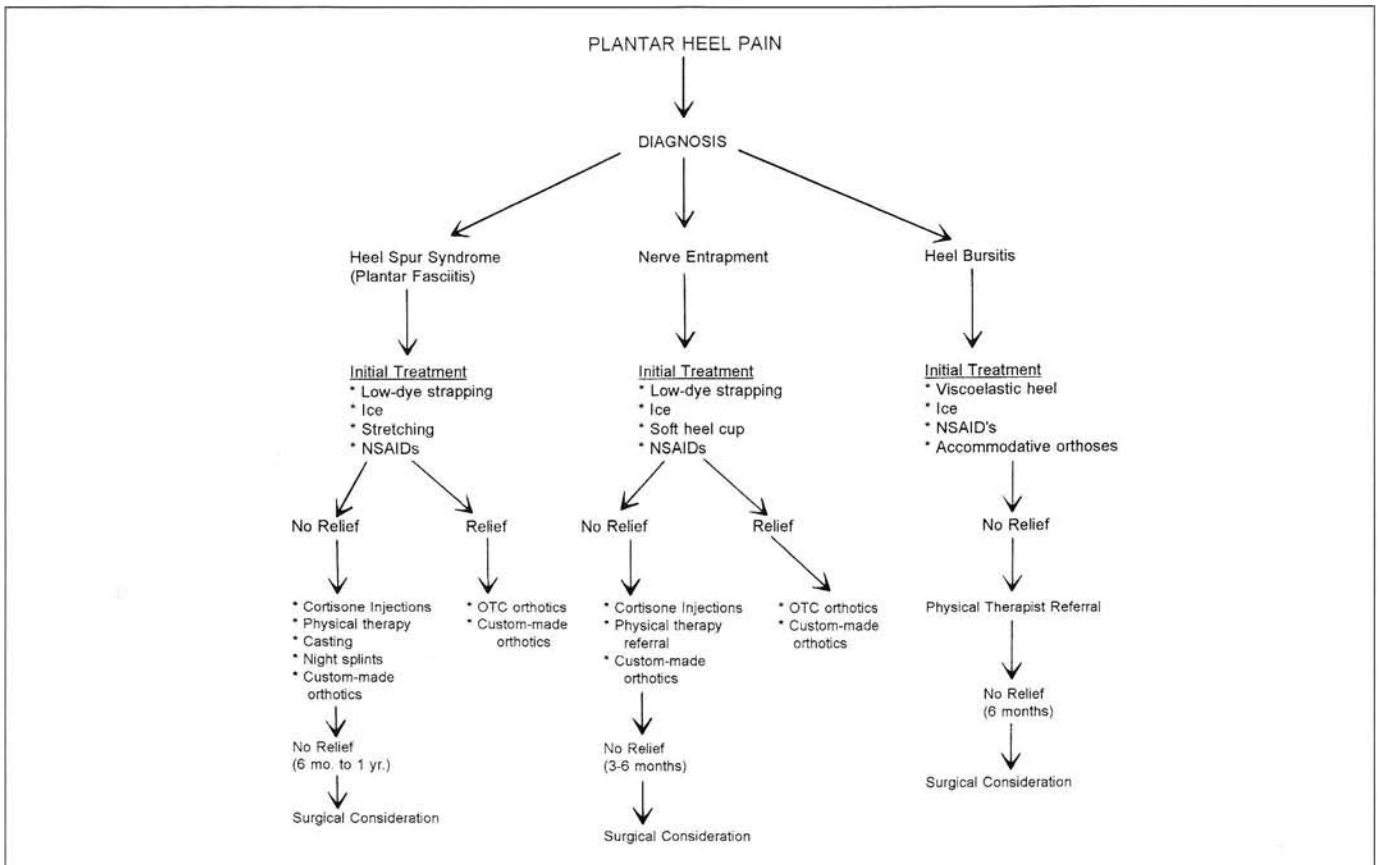
11. *Weight Control*

### CONSERVATIVE HEEL TREATMENT PROTOCOL

A vital first step in the treatment of heel pain is identifying the etiology (Table 2). Each etiology should have its own treatment regimen.

### CONSERVATIVE TREATMENT PROTOCOL

Table 2





### **Plantar Fascitis/Calcaneal Spur**

Treatment should involve addressing the cause of inflammation at the plantar fascia site. This would involve initially low-dye strapping, ice therapy, and stretching. NSAIDs are also recommended initially when pain is severe. If after two weeks there is improvement, dispensing OTC orthoses, or casting for custom-made orthotic devices will help functionally support the arch, and prevent a recurrence of the strain on the plantar fascia and development of a heel spur.

If there is relatively no relief with initial treatment, a series of cortisone injections are recommended. Deep heat via an ultrasound device or friction massage can be administered by a physical therapist. These treatments will address the symptoms of the heel pain. A custom made orthotic can be instituted at this time to provide long-term mechanical control. Changes in activity level are also suggested at this time. Joining a weight loss clinic is suggested if needed. Changing sporting activities to exercises which are less physically strenuous on the plantar arch is also recommended (ie. changing running to swimming, etc.)

### **Nerve Entrapment**

Treatment involves attempting to relieve the nerve entrapment. If there is an obvious biomechanical reason for the heel pain, low-dye taping should help. If this does help, an orthoses (either OTC or custom made) should be prescribed, depending on the severity of the biomechanical abnormality. A soft heel cup or soft orthotic is reported in the literature to relieve some patients. If this initial treatment does not help, cortisone and a long-acting anesthetic should be infiltrated at the site of the entrapment to decrease the inflammation, and atrophy the tissue involved in the entrapment. Phonophoresis can also be helpful in providing a method to deliver corticosteroid medication, as well as deep heat.

### **Heel Bursitis (Mechanical Defect in Heel Pad, Heel Pad Syndrome)**

Treatment involves addressing the absorption dysfunction of the heel pad, and relieving the inflammation surrounding the palpable bursa. Low-dye strapping generally does not relieve this type of heel pain. Initial therapy should include NSAIDs and soft or hard heel cups to protect the heel pad.

Viscoelastic heel pads have been known to be especially helpful. Accommodative soft orthotics can also protect the heel, as well as provide support. Cortisone injections should be used on a very limited basis. Cortisone could cause continued atrophy of the heel pad, thus creating more of a problem. Deep heat via ultrasound will help reduce inflammation.

## **DISCUSSION**

One of the more difficult decisions to make with regards to treating heel pain is when to give up conservative care and offer a surgical approach. It is well-documented that the majority of heel pain cases are successfully treated by conservative means. However, it is helpful to use a certain general time limit to determine whether conservative treatment has failed. In the literature, when describing surgical procedures for heel pain, most authors relate at least six months of conservative therapy before surgical intervention is performed.

The author believes that the majority of heel pain can be resolved by conservative methods. When conservative therapy does not appear to be helping, a complete re-evaluation of the patient's symptoms and clinical and radiographic findings should be performed. The symptoms and overall evaluation findings can definitely change over a period of a few months, and thus deserve to be reassessed.

The following is the author's opinion, based on clinical success with conservative heel pain treatment, and recommendations from the current literature. Six months to a year without significant improvement of heel pain caused by heel spur syndrome should constitute surgical evaluation. It is then up to the surgeon to recommend a viable procedure.

Three to six months without relief of entrapment heel pain should constitute surgical intervention. Surgical intervention for nerve entrapment heel pain involves neurolysis of the nerve entrapment, and has shown better overall surgical results than that for heel spur syndrome.

Six months to a year without significant improvement of heel bursitis justifies surgical evaluation. If the heel is already significantly atrophied, surgical intervention is not recommended.

## CONCLUSION

The correct diagnosis of the type of heel pain is the key to treatment. Once this has been done, various treatment protocols can be instituted. Remember that patients prefer to have their pain relieved without surgery. It is to our advantage to have a thorough understanding of heel pain, in order to provide the best type of conservative treatment.

## REFERENCES

- Baerg RH: Calcaneal decompression for heel pain. *Clin Podiatry* 1:197-202, 1991.
- Baxter DE, Pfeiffer GB: Treatment of chronic heel pain by surgical release of the first branch of the lateral plantar nerve. *Clin Orthop*. 279:229-236, 1992.
- Bergman JN: History and mechanical control of heel spur pain. *Clinics in Podiatric Medicine and Surgery*. 7(2):243-259, 1990.
- Berkowitz JF, Kier R, Rudicel S: Plantar fasciitis: MR imaging. *Radiology*. 179(3):665-667, 1991.
- Black JR, Bernard JM, Williams LA: Heel pain in the older patient. *Clin Podiatr Med Surg*. 10(1):113-119, 1993.
- Dailey JM: Differential diagnosis and treatment of heel pain. *Clin Podiatr Med Surg*. 8(1):153-166, 1991.
- Davidson MR, Copoloff JA: Neuromas of the heel. *Clin Podiatr Med Surg*. 7(2):271-288, 1990.
- Didia BC, Horsefall AU: Medial calcaneal nerve. An anatomical study. *J Am Podiatr Med Assoc*. 80(3):115-119, 1990.
- Intenzo CM, Wapner KL, Park CH, Kim SM: Evaluation of plantar fasciitis by three-phase bone scintigraphy. *Clin Nuclear Med*. 16(5):325-328, 1991.
- Jahss MH, Kummer F, Michelson JD: Investigations into the fat pads of the sole of the foot: Heel pressure studies. *Foot Ankle*. 13(5):227-232, 1992.
- Karr SD: Subcalcaneal heel pain. *Orthopedic Clin N America*. 25(1):161-175, 1994.
- Levitz SJ, Dykyj D: Improvements in the design of viscoelastic heel orthoses. *J Am Podiatr Med Assoc*. 80(121):653-656, 1990.
- Lichniak JE: The heel in systemic disease. *Clin Podiatr*. 7(2):225-241, 1990.
- Moreau G, Letts M: Unicameral Bone cyst of the calcaneus in children. *J Pediatric Orthopaedics*. 14(1):101-104, 1994.
- Prichasuk S: The heel pad in plantar heel pain. *J Bone Joint Surg (Br)* 76(1):140-124, 1994.
- Schon LC, Glennon TP, Baxter DE: Heel pain syndrome: electrodiagnostic support for nerve entrapment. *Foot Ankle*. 14(3):129-135, 1993.
- Wall JR, Harkness MA, Crawford A.: Ultrasound diagnosis of plantar fasciitis. *Foot Ankle*. 14(8):465-470, 1993.