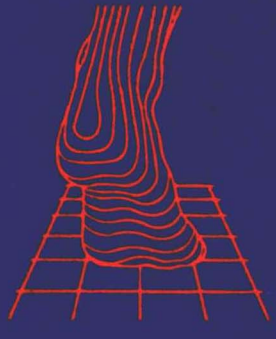
# CURRENT PRACTICE IN FOOT & ANKLE SURGERY

## A REVIEW OF STATE-OF-THE-ART TECHNIQUES

## VOLUME 2



GLENN B. PFEFFER · CAROL C. FREY

# CURRENT PRACTICE IN FOOT & ANKLE SURGERY

## A REVIEW OF STATE-OF-THE-ART TECHNIQUES

## VOLUME 2


**EDITORS**

**Glenn B. Pfeffer, M.D.**
Assistant Clinical Professor, Department of Orthopaedics
Chief, Orthopaedic Foot and Ankle Clinic
University of California School of Medicine
Chief, Orthopaedic Foot and Ankle Surgery
California Pacific Medical Center, Pacific Campus
San Francisco, California

**Carol C. Frey, M.D.**
Associate Clinical Professor, Department of Orthopaedic Surgery
University of Southern California School of Medicine
Director, Orthopaedic Foot and Ankle Center
Orthopaedic Hospital
Los Angeles, California



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*The editors dedicate this book*
*to the memory of their dear friend*
*Kenneth A. Johnson, M.D.*

# *Contributors**


**Richard Alvarez, M.D.** [12]
Southern Orthopaedic Foot and Ankle Center
Chattanooga, TN

**Michael W. Bowman, M.D.** [13]
Pittsburgh, PA

**Richard Claridge, M.D.** [1]
Department of Orthopaedics
University of British Columbia
Vancouver, BC, Canada

**Mark J. Conklin, M.D.** [10]
Woodbridge Orthopaedic Clinic
Wheat Ridge, CO

**Charles Day, M.D.** [2]
San Francisco, CA

**Keith Feder, M.D.** [5]
Director, Sports Medicine and Arthroscopy
Harbor UCLA Medical Center;
West Coast Center for Orthopedic Surgery and Sports Medicine, Manhattan Beach;
Clinical Instructor, UCLA School of Medicine

**David Friscia, M.D.** [7]
Assistant Clinical Professor
Universityof Southern California;
Teaching Staff, Rancho Los Amigos Medical Center, Downey, CA;
Director of Foot and Ankle Surgery
Desert Orthopedic Center;
Eisenhower Medical Center
Rancho Mirage, CA

**Russell C. Fritz, M.D.** [4]
Medical Director, California Advanced Imaging
Clinical Assistant Professor of Radiology
University of California San Francisco

**Reginald Hall, M.D.** [6]
Assistant Professor, Division of Orthopedic Surgery
Duke University Medical Center
Durham, NC

**Warren Hammerschlag, M.D.** [9]
Clinical Instructor, University of Medicine and Dentistry/New Jersey;
Chief, Orthopaedic Foot and Ankle Service
Attending Orthopaedic Surgeon and Chief, Orthopaedic Foot Service
Hackensack Medical Center, Hackensack, NJ

**Donald Crawford Jones, M.D.** [8]
Orthopedic Consultant, University of Oregon Athletic Department;
Orthopedic and Fracture Clinic
Eugene, Oregon

**David Lowenberg, M.D.** [2]
Assistant Clinical Professor
Director, Problem Fracture and Limb Deformity Clinic
Department of Orthopaedic Surgery
University of California, San Francisco

**David Thordarson, M.D.** [3]
Assistant Professor
Chief, Foot and Ankle Reconstruction and Trauma Surgery
Department of Orthopaedics
University of Southern California,
Los Angeles, CA

**Glenn B. Pfeffer, M.D.**
Asssistant Clinical Professor, Department of Orthopaedics
Chief, Orthopaedic Foot and Ankle Clinic
University of California School of Medicine;


*The number in brackets following the contributor's name refers to the chapter written or co-written by that contributor.

Chief, Orthopaedic Foot and Ankle Surgery
California Pacific Medical Center, Pacific Campus
San Francisco, CA

**Carol C. Frey, M.D.** [11]
Associate Clinical Professor, Department of Orthopaedic Surgery
University of Southern California School of Medicine;
Director, Orthopaedic Foot and Ankle Center
Orthopaedic Hospital
Los Angeles, CA

# *Preface*

*Current Practice in Foot and Ankle Surgery, Volume II,* is the second in a series that reviews, updates, and offers treatment approaches for the most timely foot and ankle topics of the current year.

In 1994, contributors to Volume II were invited to review and discuss current therapies, controversies, and standards of care in subjects specifically selected for their topical nature. Established expert authors use recent publications and information presented at foot and ankle courses throughout the year as resources. The text provides synopses of state of the art thought and practice in foot and ankle surgery.

In keeping with the timeliness of our coverage, the manuscripts presented were completed within five months of publication, making this the most current text on foot and ankle surgery available.

*Current Practice in Foot and Ankle Surgery, Volumes I and II,* will continue to be a valuable academic and surgical reference for any medical library.

# CURRENT PRACTICE IN FOOT & ANKLE SURGERY

VOLUME 2

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4. Advanced Imaging of the Foot and Ankle 77
*Russell C. Fritz*
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5. Arthroscopy and Endoscopy of the Foot 108
*Keith Feder*
Covered here are important recent advances in arthroscopic and endoscopic instrumentation, which have enabled the orthopaedist to visualize and surgically treat smaller joints as well as the plantar fascia and retrocalcaneal bursa of the foot.

6. Injuries of the Posterior Tibial Tendon 124
*Reginald L. Hall*
This chapter discusses the increased emphasis over the past decade on the recognition and treatment of pathology related to the posterior tibial tendon, most commonly seen as tendon dysfunction related to tenosynovitis or rupture.

7. The Subtalar Joint 157
*David A. Friscia*
Among the most poorly understood but most important joints of the foot, the subtalar joint is one of the last frontiers in the foot and ankle. This chapter reviews

anatomy, biomechanics, and function and covers innovations in arthroscopy in the subtalar joint, isolated subtalar arthrodesis, subtalar instability, sinus tarsi syndrome, and talocalcaneal coalition.

8. Posterior Heel Pain 173
*Donald C. Jones*

This well-illustrated chapter presents valuable material for orthopaedic specialists who are asked to evaluate a variety of knee and ankle complaints, including pain in the posterolateral knee, the anterolateral ankle, and the plantar and posterior heel. Discomfort in any of these areas may be caused by multiple sources of pathology, and diagnosis can be difficult.

9. Painful Afflictions of the Hallux 190
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Many conditions can interfere with the normal functioning of the hallux and first ray. This chapter reviews acquired and traumatic injuries of the hallux, with emphasis on recent research concerning etiology, diagnosis, and treatment.

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Lesser toe deformities, such as mallet toe, claw toe, hammertoe, and metatarsophalangeal joint subluxation or dislocation, are common and often painful. This chapter presents the orthopaedist with illustrations and complete descriptions of these deformities as well as techniques for correcting them.

11. Update on Athletic Shoes 229
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In developing their products, athletic shoe manufacturers rely on scientific research, prior experience, and the desire of all those involved in sports to improve performance. This chapter covers important aspects of design and technology, sport-specific needs, and medical and orthopaedic considerations in the development of athletic shoe wear.

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In the last 5 years the philosophy regarding the nonoperative and operative treatment of neuropathic foot and ankle problems has changed. This chapter addresses current pathophysiology and biomechanics as they pertain to each problem and presents a rational approach to nonoperative and operative treatment of first ray, midfoot, and hindfoot neuropathic problems.

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# chapter 1

# Chronic Lateral Ankle Pain

*Richard J. Claridge*

## INTRODUCTION

Inversion ankle injuries are the most common musculoskeletal complaint in the emergency room; one-third of West Point recruits can expect an ankle sprain during their 4-year term.[5] Most of these injuries occur in the second to fourth decade. Ankle sprains result from a sudden, violent inversion and flexion stress to the hindfoot. The lateral ligamentous complex is overwhelmed as the weight-bearing force passes lateral to the body of the talus and is partially absorbed by the lateral ligaments. The degree of damage determines the severity of the sprain—mild, moderate, or severe. The inciting event encompasses the full gamut of human activities, from a casual stroll to a collision in professional sport. Ankle sprain is the most common sporting musculoskeletal injury, comprising 16 percent of sports injuries at an Oslo emergency clinic.[32] An 18 percent incidence of ankle sprains, more common in heavier and taller recruits, was found among 390 Israeli military recruits.[35] Ankle sprains are the most common injury in soccer, comprising 17 to 20 percent of all injuries, for an incidence of 1.7 to 2.0 sprains per 1000 hours of exposure.[15] Peters estimates the incidence as one inversion injury per 10,000 persons per day.[43] Because ankle sprains are so common, they are often regarded lightly by both the patient and the examining physician. This can lead to inadequate assessment and treatment, which can significantly prolong recovery.

This sometimes cavalier attitude toward ankle sprains by both the patient and the physician can have consequences other than a prolonged recovery. The anatomy of the lateral hindfoot is complex, and many other structures may be injured by mechanisms similar to those that produce the common ankle sprain. When these injuries are missed, the opportunity for early diagnosis and treatment is lost. The purpose of this chapter is to outline a method of approaching the patient with chronic lateral ankle pain attributed to an ankle sprain the symptoms of which will not resolve.

## THE PROBLEM

Most patients recover from their sprain in a matter of weeks, depending on the severity of the injury. With modern aggressive rehabilitation, the majority of patients are back to their athletic activities within 3 weeks. Some form of protection is required for the next 6 weeks.[33] When pain and disability extend beyond the accepted recovery time for an ankle sprain, further investigation and appropriate treatment are indicated. Though the timing of this further investigation is arbitrary, 3 months would seem more than sufficient time for the patient with a routine ankle sprain to recover and return to full activities. No estimate is available for the number of injuries that are misdiagnosed as ankle sprains, though it is estimated that 10 to 30 percent of people with ankle sprains have chronic symptoms.[43]

## ANATOMY

The anatomy of the lateral hindfoot involves many soft tissue and bony structures. The ankle joint is a hinge with its axis pointing laterally and posteriorly in the transverse plane and laterally and inferiorly in the coronal plane.[33] The talus is nestled in the mortise created by the medial and lateral malleolus. The body of the talus is wider anteriorly than posteriorly, contributing to the stability of the joint in extension. This stability is further enhanced by the syndesmotic ligaments, the deltoid ligament medially, and the lateral ligament complex.

The ligaments stabilizing the syndesmosis consist of the anterior and posterior inferior distal tibiofibular ligaments and the distal end of the interosseus membrane, the interosseous ligament (Fig. 1-1). These ligaments act together to stabilize the distal tibiofibular articulation, allowing some distraction in extension as well as some rotation along the vertical axis of the fibula.[2]

The lateral ligamentous complex of the ankle consists of the anterior talofibular (ATF) ligament, the calcaneofibular (CF) ligament, and the posterior talofibular (PTF) ligament (Fig. 2-1). The PTF ligament is the strongest of the three and is injured in only the most severe cases.[43] The ATF is a thickening of the lateral ankle capsule; when the ATF is torn, a hemarthrosis results. The CF is extraarticular, closely associated with the overlying peroneal sheath. Both the ATF and the CF ligaments are subject to injury with inversion stress. The long axis of the ATF is parallel to the fibula when the ankle is flexed and is most likely to be injured in this position with an inversion stress.[11,43] The CF ligament is most stressed with the ankle in extension and is most likely to be injured when the ankle is inverted in extension.[11,43] Bony avulsion injuries can occur where these ligaments insert into bone.

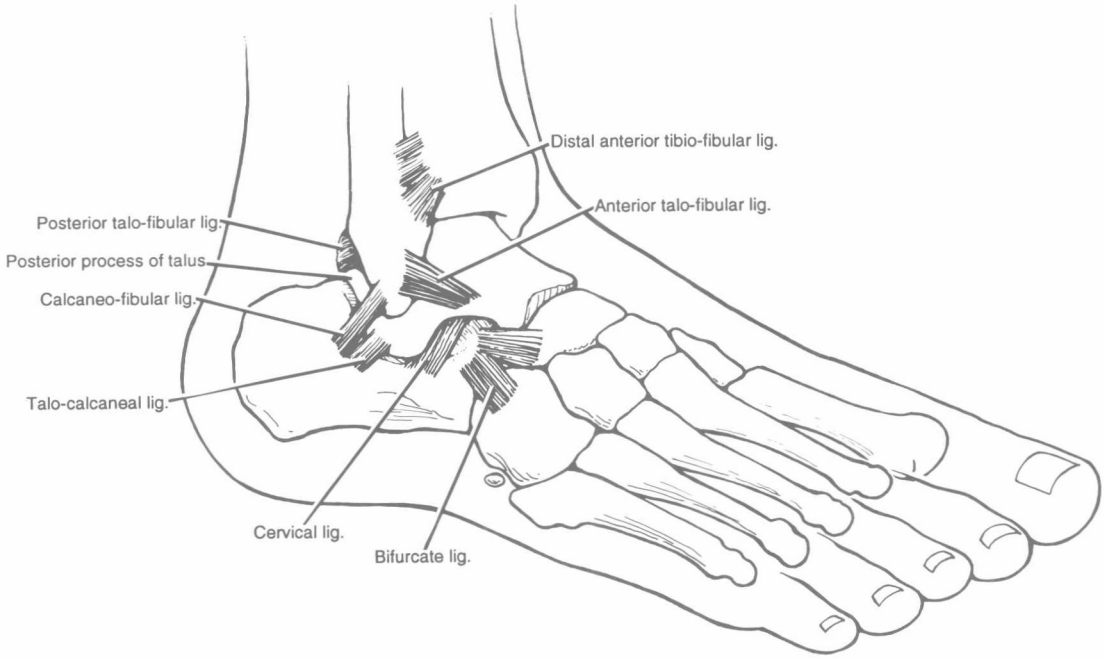


**FIGURE 1-1** Ligaments of the lateral hindfoot.

The subtalar joint is stabilized by the talocalcaneal (TC) ligament, the interosseous (IO) ligament, the cervical ligament, and the CF ligament.[14] These ligaments can also be injured by inversion stress, which, if extreme, can result in medial subtalar dislocation.

Overlying these ligamentous structures are the peroneal tendons which course along the posterior surface of the distal fibula and are held there by the superior peroneal retinaculum (Fig.1-2). In most patients the posterior surface of the fibula forms a shallow groove for the peroneal tendons. This groove is augmented laterally by a fibrocartilagenous ridge 3 to 4 cm in length along the posterolateral corner of the fibula.[7] The peronei turn at the peroneal tubercle of the calcaneus on their way to insert into the base of the fifth metatarsal for the peroneus brevis and the plantar aspect of the medial midfoot for the peroneus longus, via the peroneal groove on the plantar aspect of the cuboid. In many patients the os peroneum, a sesamoid bone of the peroneus longus, articulates with the cuboid in the peroneal groove (Fig. 1-3). According to Sarrafian it is present in the majority of patients, though it is usually fibrocartilagenous. It is radiographically apparent in 5 to 26 percent of cases, the best view being an oblique projection of the foot.[44] It can be multipartite and is firmly anchored by fibrous attachments to the

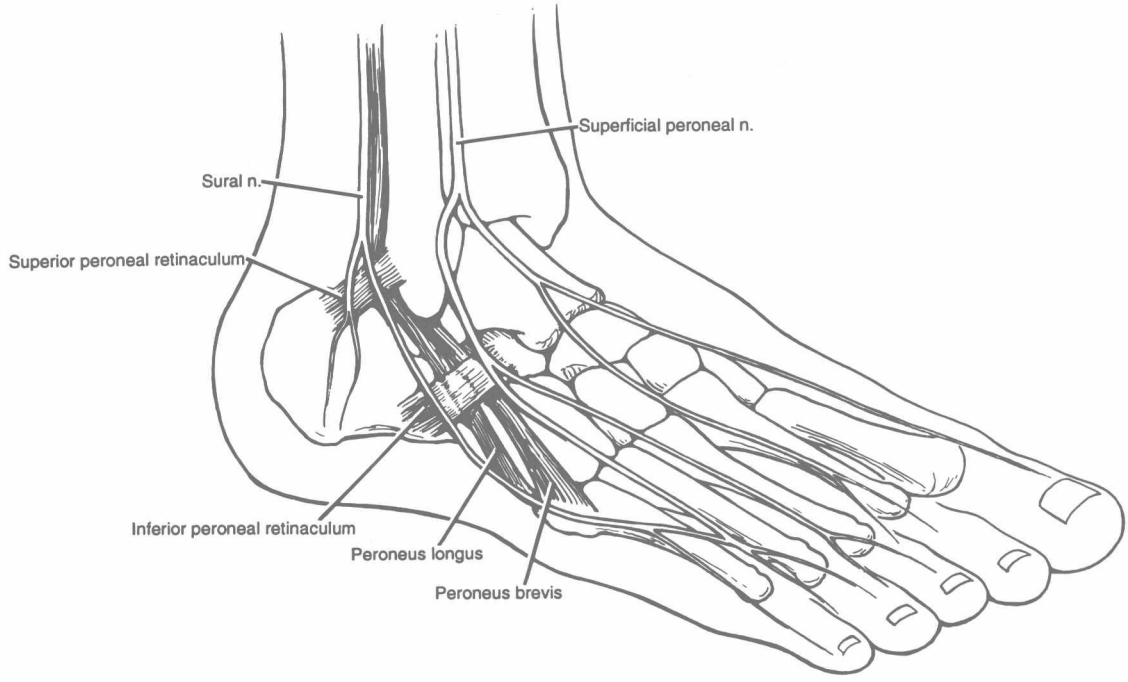


**FIGURE 1-2** Peroneal tendons and cutaneous nerves.

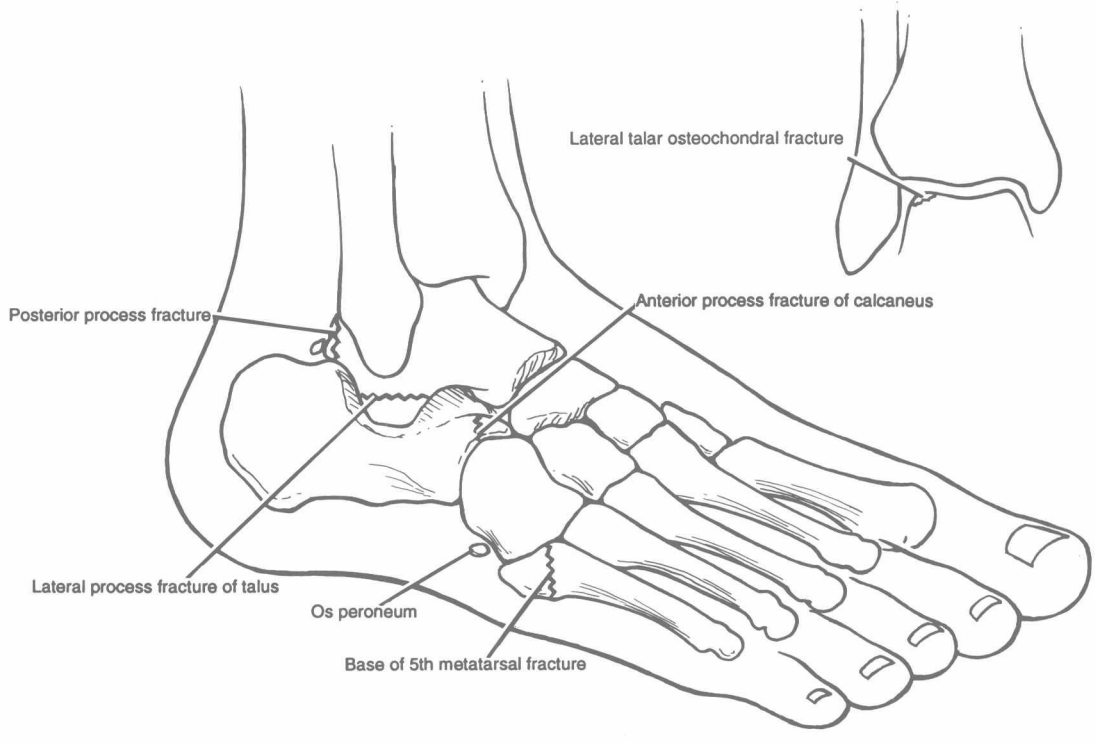


**FIGURE 1-3** Occult lateral hindfoot fractures.

cuboid and the base of the fifth metatarsal, the anterior and posterior frenular ligaments.[47]

The extensor digitorum brevis takes origin from the anterior process of the calcaneus and is easily identifiable as a soft bulk that hardens with toe extension. Further dorsally are the long extensors, beginning with peroneus tertius, then extensor digitorum longus, extensor hallucis, and tibialis anterior. Their tendons are held in place by the superior and inferior extensor retinaculum. A relatively thin layer of skin and subcutaneous tissue covers the lateral hindfoot, innervated by the sural nerve laterally and dorsally by the superficial and deep peroneal nerve.

## DATA GATHERING

### History

As in all clinical disciplines, the single most important diagnostic tool for assessing the patient with chronic lateral ankle pain is taking the time to obtain an adequate history of the events leading up to the current problem. Details on prior injuries and a sporting history are very important. A popping or cracking sound may be recalled by the patient, suggesting rupture or avulsion of a tendon or ligament. It is important to determine the mechanism of injury as accurately as possible. The most typical mechanism is an inversion stress, often described by the patient as "my foot turned in," but there are other possibilities. It is important to determine the site of the initial pain and swelling. Medial ankle sprains are rare, and pain in this area is more likely a result of a posterior tibial tendon injury. A lateral ankle injury sustained in a ski boot suggests a peroneal tendon injury. Recurrent lateral ankle injuries with a familial history of cavus feet may lead to a diagnosis of neuromuscular imbalance with flexible hindfoot varus and a plantar flexed first ray (Fig. 1-4). A patient who has recently immigrated from Asia who presents with chronic pain and swelling without a history of injury should suggest to the orthopedist the possibility of a chronic infection such as tuberculosis (Fig. 1-5).

Various occult fractures near the ankle are a common cause of chronic ankle pain (Fig. 1-5). The location of the initial swelling and bruising may be helpful in sorting these out. Episodes of locking or painful catching suggest that the fragment is loose and interfering with joint motion. "Giving way" can be the result of true ankle or subtalar instability. Alternatively, one of these fragments can interfere with joint motion, producing pain and causing a temporary loss of muscular balance.

Athletes must be asked about any changes in their training routine, as they can lead to overuse injuries. Stress fractures of the lateral malleolus, the cuboid, or calcaneus can produce lateral ankle pain. Previously seden-