

# Treatment of Freiberg Disease



Jeffrey D. Seybold, MD<sup>a,\*</sup>, Jacob R. Zide, MD<sup>b</sup>

## KEYWORDS

- Freiberg disease • Avascular necrosis • Metatarsal • Osteotomy
- Interpositional arthroplasty

## KEY POINTS

- Freiberg disease, or osteochondrosis of the lesser metatarsal head, most commonly involves the second metatarsal and typically presents during the second or third decades of life.
- The most commonly used staging system effectively identifies cases in which normal joint anatomy can be restored.
- Conservative measures that limit overload of the affected metatarsal head are the first-line treatments in all stages of Freiberg disease, with high success rates for Smillie stage I to III disease.
- Operative treatments are divided into joint-preserving and joint-reconstructing procedures. Although multiple case series describe success with numerous techniques, there are no currently established guidelines for treatment.
- In general, joint debridement with a metatarsal osteotomy is preferred for Smillie stage II to III disease; joint debridement with interpositional arthroplasty is reserved for stage IV and V disease.

## INTRODUCTION

The first reported treatment of Freiberg disease was described by the eponymous Dr. Albert H. Freiberg<sup>1</sup> in 1914. In his account of 6 cases, he reported that 4 patients were managed conservatively, whereas 2 required metatarsophalangeal (MTP) joint arthroplasty with removal of loose bodies.

Conservative measures are the first line of treatment when managing symptomatic Freiberg disease. When nonsurgical strategies fail, a wide variety of surgical alternatives have been reported. However, guiding the patient toward the appropriate surgery

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<sup>a</sup> Twin Cities Orthopedics, 4010 West 65th Street, Edina, MN 55435, USA; <sup>b</sup> Department of Orthopaedic Surgery, Baylor University Medical Center, 3500 Gaston Avenue, Dallas, TX 75246, USA

\* Corresponding author.

E-mail address: [jseybold@tcomn.com](mailto:jseybold@tcomn.com)

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can be challenging because most of these options are based on small case series and no validated algorithm exists to help guide surgeons in their decision making. This article provides an update regarding available treatments and support for their use in the management of Freiberg disease.

## CLINICAL AND RADIOGRAPHIC EVALUATION

### *Clinical Evaluation*

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The peak age at the onset of symptoms is within the second decade of life. Patients usually present with pain localized to the affected MTP joint. They may recall a traumatic event involving the foot or the pain may simply arise without an obvious injury to the forefoot. Barefoot walking and wearing shoes with an elevated heel often amplify the symptoms because increased pressure is placed on the metatarsal head. Symptoms typically involve a single metatarsal and bilateral involvement is present in less than 10% of cases.<sup>2</sup> The second metatarsal is most commonly affected, comprising approximately two-thirds of all cases, with the third metatarsal involved in 27%.<sup>3</sup>

Examination of the affected MTP joint generally reveals an effusion and surrounding swelling. This swelling is frequently seen as a loss of the normal contour of the extensor tendons to the toe. The MTP joint is tender to palpation and range of motion is often diminished. Pain generally diminishes quickly as palpation is performed away from the joint. There may be palpable grinding with passive joint motion depending on the severity of arthritic change present. As the disease process progresses, coronal and/or sagittal plane deformity may develop, with a clinical appearance similar to a claw toe or crossover toe.

### *Radiographic Evaluation*

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Standard radiographic evaluation begins with standard 3-view weight-bearing images of the foot (anteroposterior, oblique, and lateral). Early in the disease process, typically within 3 to 6 weeks of the onset of symptoms, the joint and osseous structures may look normal aside from subtle widening of the joint space.<sup>4</sup> As the disease progresses, flattening of the metatarsal head and increased subchondral bone density are noted.<sup>2,5</sup> Anteroposterior radiographs may appear unremarkable in early disease with flattening of the dorsal metatarsal head only noted on the oblique view. Over time, additional findings include loose bodies in the joint, progressive narrowing of the joint space, and metatarsal head sclerosis.<sup>6</sup>

In more subtle or inconclusive cases, MRI may be helpful in confirming the diagnosis. Osteonecrosis of the metatarsal head on the MRI classically appears hypointense on T1-weighted images with a mix of low and high signal intensity on T2-weighted images.<sup>7</sup>

## STAGING

Several staging and classification systems are available to describe changes and offer treatment suggestions for Freiberg disease.<sup>3,6,8</sup> The classic 1966 staging system by Smillie<sup>6</sup> describes the structural changes of the metatarsal head observed intraoperatively, although many of the pathologic findings are evident radiographically. This system is the most commonly referenced in outcomes studies and is outlined in **Box 1**.

## NONOPERATIVE MANAGEMENT

Nonoperative management should be first line of treatment regardless of the severity of disease at the time of presentation. Strategies for conservative treatment include

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