

FREIBERG'S DISEASE

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Freiberg's disease is typically described as avascular necrosis of a metatarsal head. It most commonly affects the second metatarsal. Other names describing this condition include infarction and Kohler's second disease. It was first described by Freiberg in 1914.

DIAGNOSIS

Patients with Freiberg's disease generally present with diffuse pain along the dorsal and plantar aspect of the second metatarsophalangeal joint (MPJ). They may have mild peri-articular edema and report pain during range of motion of the second MPJ. They may also have pain with compaction of the MPJ. Limited range of motion can be present; however this usually occurs in the later stages due to arthritic changes.

In the early stages, Freiberg's disease can be difficult to diagnose on plain radiographs because generally there are no radiographic changes. Diagnosis is made primarily on the basis of the history and physical exam. Differential diagnosis for Freiberg's disease includes stress fracture, tendonitis, capsulitis, neuroma, and lesser metatarsalgia.

In the initial stages, plain films may demonstrate a hyperemic response within the metatarsal head; the metatarsal head will have an osteopenic appearance. As the disease progresses, the metatarsal head will become flattened and loose bodies may form within the joint (Figure 1). The base of the proximal phalanx may also lose its concavity and become flattened (Figure 2). Unfortunately, if the patient is relatively asymptomatic or misdiagnosed through the osteonecrosis process, the arthritic changes that develop are irreversible.

Simillie developed a radiographic classification system in 1957¹ that consists of 5 stages: subtle fracture line through the epiphysis (stage 1), early collapse and central depression (stage 2), central depression leads to medial and lateral projections at the margins but the plantar hinge remains intact (stage 3), central portion frees from the intact plantar hinge, forming a loose body, and also there are fractures of the medial and lateral projections (stage 4), and flattening of the metatarsal head with secondary degenerative changes (stage 5).

Magnetic resonance imaging (MRI) examinations are useful in the diagnosis of Freiberg's disease; especially in the



Figure 1. Flattening of the second metatarsal head.



Figure 2. Loss of concavity and flattening of the proximal phalanx, second digit.

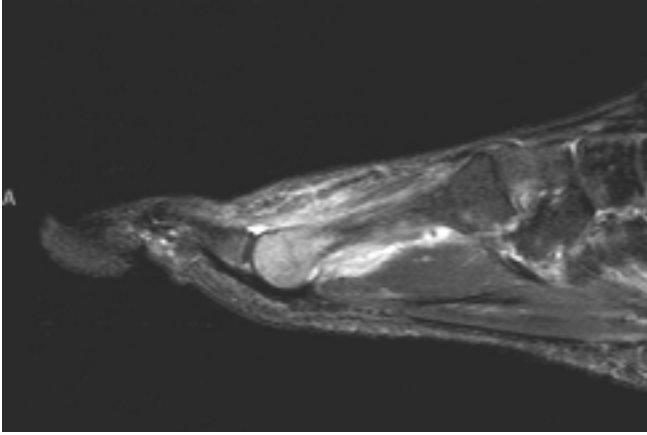


Figure 3. Magnetic resonance imaging, T-2 weighted sagittal view. Note the increased signal intensity at the second metatarsal head.

early stages before arthritic changes occur within the joint. On the T-2 weighted images, the metatarsal head will have increased signal intensity (Figures 3, 4). Computed tomography exams can also be used to evaluate the degree of arthritis within the joint.

CONSERVATIVE TREATMENT

Nonsurgical treatment consists of immobilization with or without crutches for 4 to 6 weeks or until symptoms resolve. This is especially important in the acute phase where there is no internal damage within the joint. Cortisone injections, nonsteroidal antiinflammatory drugs, ultrasound, bone stimulator, and physical therapy may be used as adjunct therapy. During the immobilization period, the patient should be restricted from physical activity. Once the symptoms resolve, a gradual return to full activity is recommended. During this gradual return, one may consider low impact activities such as swimming, cycling, and low impact aerobic machines. Also, custom orthotics and shoe modifications are recommended to help offload the metatarsophalangeal joint.

SURGICAL TREATMENT

When conservative treatment fails, there are joint salvage and joint destructive procedures one may consider. These procedures are very similar to the procedures to treat hallux limitus. Metatarsophalangeal joint arthroplasty is a simple first line procedure. Like a cheilectomy for the great toe joint, removing the osteophytes and remodeling the joint has shown good results.² With today's new cartilage replacement technology, cartilage damage can be replaced with a cartilage allograft. Metatarsal head repositioning has also been described in the literature.³⁻⁶



Figure 4. Magnetic resonance imaging, T-2 weighted transverse view. Note the increased signal intensity at the second metatarsal head.



Figure 5. Implant arthroplasty.

For severe degenerative joints or a failed arthroplasty, joint destructive procedures such as a mini-Keller, metatarsal head resection, or implant have been described. Selecting the appropriate procedure is dependent on the degree of arthritis. If the base of the proximal phalanx is arthritic, one may consider a mini-Keller or a mini-Keller with an implant (Figure 5).⁷

Both procedures allow the maintenance of the metatarsal length and possibly prevent later development of metatarsalgia. If the metatarsal head is arthritic, one may

consider a metatarsal head resection or metatarsal head remodeling with an implant.⁸ For all these procedures, complications include floating toe, transfer metatarsalgia, joint stiffness, and retracted digit.⁹

SUMMARY

Freiberg's disease can become a debilitating condition. If not treated properly, arthritic changes can occur at a young age. Immobilization is important in the acute stages. If conservative treatment fails, one has many surgical options to consider.

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