Late Stage Freiberg Infraction in a Division I Collegiate Tennis Player

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What to Learn from this Article?
Freiberg infraction is a relatively rare osteochondrosis of the metatarsal head. Early diagnosis can lead to complete recovery. Athletes with later stages of Freiberg infraction can find relief with conservative management but ultimately may require surgical intervention.

Abstract

Introduction: Freiberg infraction is a relatively rare osteochondrosis of the metatarsal head. The etiology of Freiberg infraction is poorly understood but likely involves factors such as, repetitive trauma and vascular compromise. When discovered early, Freiberg infraction can be cured with conservative measures but late presentations require surgical intervention. We present a case of stage V Freiberg infraction in a Division I collegiate tennis player that responded to conservative treatment.

Case Report: A 20 year old female tennis player presented with worsening of her chronic foot pain. She had tenderness to palpation and diminished range of motion at the second metatarsophalangeal joint. Radiographs revealed late stage Freiberg infraction of the second metatarsal. This patient's pain was successfully treated with conservative measures; prolonging her collegiate tennis career.

Conclusion: Surgical intervention is required for definitive treatment of late stage Freiberg infraction. Conservative treatment can be effective in prolonging the athlete's career.

Keywords: Osteochondrosis, Freiberg infraction, Metatarsal, Foot pain.

Introduction
Freiberg infraction is a relatively rare osteochondrosis of the metatarsal head [1-5]. The etiology of Freiberg infraction is poorly understood but likely involves factors such as, repetitive trauma and vascular compromise [1-5]. When discovered early, Freiberg infraction can be cured with conservative measures but late presentations require surgical intervention [1-5]. Smillie staging, based upon the level of bone and joint degradation found on radiograph, can aid in the prognosis and treatment planning [1, 5]. Early stages, I-III can be cured with conservative measures but later in the course of the disease, stages IV and V, surgical intervention is required for definitive cure [1, 4, 5]. We present a case of stage V Freiberg infraction in a Division I collegiate tennis player whose pain was successfully treated with conservative treatment.

Case report
The patient is a 20 year old female tennis player who presented with a complaint of worsening of her chronic foot pain. She stated that she had a condition with a “funny name” affecting her right foot
that began around age thirteen. The condition caused pain in the
top of her foot that worsened when she participated in tennis.
Forcefully pushing off on the right foot, while making lateral
direction changes from right to left, exacerbated her pain. The
pain previously occurred only with tennis but for over a year had
been present most of the time with variable intensity. The quality
of the pain was aching and usually only moderate in intensity. It
did not affect her activities of daily living but had affected her
practice. She guarded against putting direct pressure on the mid
foot by planting more medially or laterally during direction change
in practice. She did not let the pain affect her push off
during competition and usually had the most severe pain post
competitive play. She had recently increased the intensity of her
practices from a relative rest over the summer. She denied any
mechanical symptoms of the foot. She had used various over the
counter non steroid anti inflammatory medications without
much relief. She did get some relief from prescription carbon fiber
shoe inserts and padded insole supports (Fig 1), prescribed by a
podiatrist, and regularly replaced her tennis shoes. She wanted to
know if anything more could be done to relieve her pain.

She had a past medical history of forearm fracture at around one
year of age. Her family history was non-contributory. Her social
history found that she enjoyed competitive tennis, was doing well
in school, and denied substance abuse. Review of symptoms was
negative. She was a healthy appearing female. There were no lower
extremity color changes or edema. Ankles had symmetric active
eversion, inversion, dorsiflexion and plantarflexion. Active
dorsiflexion and plantarflexion of the toes revealed a limitation in
the range of motion at the second toe of the right foot (Fig 2).
Passive dorsiflexion of the second toe was blocked at 30 degrees
and plantarflexion was painful at 30 degrees. She had dorsal and
plantar tenderness to palpation over a bony deformity at the
second metatarsophalangeal joint but no other tarsal, metatarsal
or phalangeal tenderness. Single leg toe raise was painful on the
right. She had normal arches and gait. The lower extremity
neurovascular exam was normal.
The differential diagnosis included metatarsalgia, Morton
neuroma, stress fracture, Freiberg infraction
X-ray of the right foot revealed second metatarsal head bony
changes which included flattening of the bone, sclerosis, and
fragmentation.

The final diagnosis was osteochondrosis of the second metatarsal
head – Freiberg infraction (Fig 3).

Discussion

Freiberg infraction is a relatively rare osteochondrosis of the
metatarsal head [1-5]. It is the fourth most common
osteochondrosis and the second most common in the foot [1]. The
second metatarsal head is most commonly affected but any can be
involved and the condition can occur bilaterally [1, 2, 4]. The
condition is five times more common in females when compared to
males [1]. Freiberg infraction can occur at any age but the peak onset
is in adolescence [1, 3].

The etiology of Freiberg infraction is poorly understood but likely
involves factors such as, repetitive trauma and vascular
compromise [1-5]. A longer and less mobile second metatarsal may
take more stress during gait and athletic activities with the resulting
edema also contributing to compromised blood flow [1]. Chronic
illness and prescription steroid use are risk factors [1, 3]. The patient
will present with pain, usually near the second metatarsal, that is
worsened by activity [1-4]. There may be associated swelling,
mechanical symptoms like crepitus and clicking, and lost range of
motion [1-4] (Fig 2).

Diagnosis of Freiberg infraction is by x-ray and is best seen with a
forty five degree oblique view [1-5]. Joint space widening may be
the first visible sign [1, 3, 4]. Late in the course radiographic findings
include joint depression, loose bodies, fragmentation and sclerosis
[1, 3, 4, 5]. Magnetic resonance imaging may be necessary if the
patient presents very early in the course or if planning surgical
intervention[1].

Smillie staging can be useful in prognosis and in planning
 treatment [1, 5]. In stage one an ischemic epiphysis develops fissure
type fractures [1, 5]. An altered articular contour

Figure 3: Oblique & AP radiograph: Second metatarsal head bony changes consistent with stage IV osteochondrosis of the second metatarsal head – Freiberg infraction.
of the metatarsal head results from central bone resorption in stages two and three [1, 5]. In stage four loose bodies form due to fracturing of the lateral and dorsal projections [1, 5] (Fig 3). Stage five is marked by complete metatarsal head flattening and a deforming arthrosis is present [1, 5].

Early in Freiberg infraction, stages one through three, conservative treatment includes activity modification, insoles, metatarsal pads, casting or controlled ankle motion walking boot and non-steroidal anti-inflammatory medications and patients may spontaneously improve [1-4] (Fig 1). Local steroid injection may also provide some relief. Surgical intervention is reserved for stages four and five and may include debridement, bone grafting, osteotomy, or joint replacement if the disease is advanced or if symptoms are severe [1, 4, 5].

**Conclusion**

Conservative measures can be successful in treating and curing early stage Freiberg infraction, while later stages require surgical intervention. Although she had late stage Freiberg infraction, our patient's pain responded well to conservative treatment. It is unknown at this time how long these temporizing measures will last. Eventually, she may require alteration in her activity level and/or surgical correction.

**Clinical Messegue**

Freiberg infraction is a relatively rare osteochondrosis of the metatarsal head. Early diagnosis can lead to complete recovery. Athletes with later stages of Freiberg infraction can find relief with conservative management but ultimately may require surgical intervention.

**Reference**