First Metatarsophalangeal Joint Degeneration

Arthroscopic Treatment

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KEYWORDS

• Hallux rigidus • First metatarsophalangeal degeneration • Arthroscopic debridement • Arthroscopic fusion

KEY POINTS

- Arthroscopic treatment of hallux rigidus is appropriate after failed nonoperative treatment.
- Debridement with cheilectomy, and fusion are the main indications for arthroscopic treatment of hallux rigidus.
- If the cartilage damage is extensive and the patient has consented, then a fusion is performed at the same sitting.

INTRODUCTION

Although numerous causes have been proposed for hallux rigidus, its exact cause has yet to be elucidated. Several biomechanical and structural factors have been suggested. These factors include metatarsus primus elevatus,[1] a long[2,3] or a short[4,5] metatarsal, hypermobility of the first ray,[6,7] pronation, hallux valgus,[8,9] metatarsus adductus, and Achilles or gastrocnemius tendon tightness.[7] In addition, shoe wear and occupation might play a role in the development of hallux rigidus. However, studies have failed to prove a clear relationship between these factors and osteoarthritis of the first metatarsophalangeal (MTP) joint.[10–13]

Coughlin and Shurnas[14] identified a correlation between bilateral hallux rigidus and hallux valgus interphalangeus, MTP joint shape, female gender, and a positive family history.

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Nilsonne[2] classified hallux rigidus into 2 distinct age groups. He considered the adolescent form a primary deformity, whereas the adult form would be a secondary deformity resulting from the development of degenerative arthritis. However, Bingold and Collins[7] proposed that the 2 entities were simply a continuum of the same degenerative process. Similarly, Coughlin and Shurnas[14] found no evidence to support a requirement for a distinction based on age.

Goodfellow[15] and McMaster[16] were the first to describe acute or chronic trauma as a cause for hallux rigidus. Goodfellow reported 3 patients with osteochondral lesions of the metatarsal articular surface. Subsequently, McMaster described 7 patients with similar findings. He also demonstrated consistent histologic changes to be a cleavage of articular cartilage with detachment from, but not involvement of, subchondral bone. Therefore, he proposed the term chondritis dissecans.[16] Both suggested that adolescent hallux rigidus is a condition secondary to osteochondritis dissecans of the first metatarsal head; this seems to particularly hold true for unilateral hallux rigidus.[14]

At the authors' institution, operative procedures after failed nonoperative treatment include debridement, cheilectomy, fusion, and resection arthroplasties in selected cases. In addition, the authors' institution is involved in a prospective randomized trial evaluating the effectiveness of a new polyvinyl alcohol implant (Cartiva) to treat contained cartilage defects of the first metatarsal head.

Of the aforementioned operations, debridement, cheilectomy, and fusion can be done arthroscopically.

FIRST METATARSOPHALANGEAL ARTHROSCOPY

The first author to describe MTP arthroscopy was Watanabe in 1972.[17] However, it was not until after various authors described the technique[18–20] in the 1990s that the procedure gained clinical importance.

Since then, treatment of various pathologic abnormalities is described in literature including removal of pigmented villonodular synovitis, degenerative disease with early osteophytosis, chondromalacia, osteochondral defects, loose bodies, arthrofibrosis, synovitis, gouty arthritis,[21] medial sesamoidectomy,[22] excision of a recurrent ganglion,[23] hallux valgus,[24,25] and EHL (extensor hallucis longus) lengthening.[26]

Concerning arthroscopic treatment of hallux rigidus, Iqbal and Chana[27] reported 15 arthroscopic dorsal cheilectomies in 1998 with rapid recovery and rehabilitation, maintained pain relief, and good metatarsophalangeal joint power and motion.

Davies and Saxby[28] published the first outcome series of arthroscopic debridement in 1999 with no or minimal pain, decreased swelling, and an increased range of movement of the affected joint after a mean follow-up of 19 months.

A second case series with 19 of 20 patients becoming pain free after debridement of various intra-articular pathologic abnormalities was reported in 2006.[21]

In 1998, van Dijk and colleagues[19] reported a prospective study enrolling 24 consecutive patients including 17 high-level athletes treated arthroscopically for different pathologic abnormalities. Pain, swelling, sports, and work involvements were recorded. There was one persistent loss of sensitivity of the hallux. Although 8 of 12 patients after removing dorsally located osteophytes and 3 of 4 patients treated for osteochondritis dissecans showed good or excellent results, results after sesamoid bone removal and treatment of hallux rigidus were less favorable.[19]

The usually stated benefits of arthroscopic procedures compared with open procedures are reduction of wound complications, faster rehabilitation, and shorter hospital stays. Arthroscopic ankle fusion was shown to be superior to open fusion regarding ankle osteoarthritis scores after 1- and 2-year follow-up.[29] To date, no studies