

Statement of Purpose

The purpose of this study was to report a case study using a synthetic cartilage implant as an alternative treatment option for interpositional arthroplasty of the fourth and fifth tarsometatarsal joints in patients with underlying lateral column pain secondary to arthrosis of the fourth and fifth tarsometatarsal joints. The authors also present an alternative surgical technique for interpositional arthroplasty of the lateral column with use of a synthetic cartilage implant.

Literature Review

Arthritis associated with the lateral column that has been refractory to conservative treatment can pose a challenge to the foot and ankle surgeon. In most cases, the underlying cause of arthritis to the fourth and fifth tarsometatarsal joint is due to trauma. However, it may also be due to primary degenerative or inflammatory arthritis (1,2,3). Patients refractory to conservative treatment may elect to undergo surgical intervention: joint sparing vs. arthrodesis.

Historically, lateral column pain, whether isolated or associated with midfoot arthritis, was most commonly secondary to trauma and surgically treated via lateral column fusion (1,4,5). However, following fusion of the lateral column difficulties in gait were noted. Subsequently an alternative to lateral column fusion was developed, and more recently interpositional arthroplasty of the lateral column has been advocated (2,3,6).

In the presence of painful arthrosis to the midtarsal and/or tarsometatarsal joints, Mann et al. (7) recommended arthrodesis as the treatment of choice. However, regarding the lateral column, arthrodesis may result in unfavorable outcomes long term due to majority of the motion within the tarsometatarsal joints occurring at the fourth and fifth metatarsal cuboid articulation (8,9). Ouzounian and Shereff reported their findings on midfoot motion and noted that greater motion occurred at the fourth and fifth tarsometatarsal joints for dorsiflexion-plantarflexion and supination-pronation compared to the first, second, and third tarsometatarsal joint. Komenda et al. reported their findings on fusion of the tarsometatarsal joint in 32 patients following post-traumatic arthritis, and the authors recommended against fusion of the lateral column due to the motion present within the lateral column normally and is important for optimum function. Park et al. cautioned against fusion of the lateral column due to its potentially unfavorable biomechanical effects, with potential loss of mobile adaptor unit of the lateral column during gait (5).

Surgical Technique

A dorsolateral skin incision was made over the lateral aspect of the midfoot, starting at the level of the cuboid and carried distally in line with the fourth and fifth tarsometatarsal joints. Soft tissue dissection was then carried down to the respective tarsometatarsal joints, with care to retract the extensor tendons out of the surgical field. In order to visualize the joints, debridement of any fibrous tissue, and/or osteophytes overlying the lateral column was performed. Once exposure of the joints was obtained, and confirmed under fluoroscopy, attention was directed to joint preparation. Following joint preparation, a trial sizer was utilized to confirm the desired implant size, and then the synthetic cartilage implant was placed into the respective tarsometatarsal joint. Next, the incision site was closed in a layered fashion, and a posterior splint was applied.



Results

Three cases of osteoarthritis and/or traumatic arthritis of the Fourth-Fifth Tarsometatarsal joint, that had underwent arthrodesis of fourth tarsometatarsal joint and interpositional arthroplasty of the fifth tarsometatarsal joint were reviewed. The average age was 60, with a range of 49 to 68 years old. Of these patients, all three were female. One patient developed lateral column pain secondary to Lisfranc fracture/dislocation. The other two had developed lateral column pain secondary to osteoarthritis. Plain film radiographs demonstrated either loss of joint space and/or malalignment to the lateral column. The average time to weightbearing was 90 days, with a range of 60 to 120 days. At 12 months follow up two of the three patients were noted to be asymptomatic to the lateral column following surgical intervention. One patient had developed a non-union to the fourth tarsometatarsal joint and had been treated conservatively with immobilization and bone stimulator.



Analysis and Discussion

Arthritis associated with the lateral column, refractory to conservative treatment, poses a significant challenge to the foot and ankle surgeon. In most cases, the underlying cause of arthritis to the fourth and fifth tarsometatarsal joint is due to trauma, however, it may also be due to primary degenerative arthritis or inflammatory arthritis. Patients refractory to conservative treatment measures may ultimately elect to undergo surgical intervention: joint sparing vs. arthrodesis. In this case study, we presented three patients with lateral column pain and radiographic changes consistent with arthrosis to the involved lateral column. Two of the three patients with lateral column pain resolved uneventfully following surgical intervention. While the other patient is currently being treated conservatively following development of non-union.

A variety of interpositional arthroplasty techniques are available, including use of autogenous tendon, allograft tendon, synthetic material such as ceramic spheres and the method described here. The proposed surgical technique described here addresses painful arthrosis to the lateral column, while sparing donor site tendon and maintaining function of the autogenous tendon. It is the hope that this alternative surgical technique will improve symptoms of the patients with lateral column pain long term following surgical intervention. This technique may be a valuable adjunctive treatment option for arthrosis to the involved lateral column. However, in the presence of debilitating arthritis refractory to conservative treatment and joint sparing surgical techniques, arthrodesis of the lateral column may be indicated.

References

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