Case Study: Single-Stage Lengthening Osteotomy for Brachymetatarsia of the 4th Metatarsal

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Purpose
The purpose of this case study is to evaluate the efficacy of a single-stage lengthening metatarsal osteotomy for the treatment of symptomatic brachymetatarsia.

Case-study continued
modification, NSAIDS and metatarsal pads. The patient wished to undergo surgical correction of his right 4th toe. On physical examination of the right foot, the 4th toe was in a hammerred, dorsiflexed position, floating above the weight-bearing surface. There was pain with palpation and hyperkeratosis to the plantar aspect of the 1st, 2nd and 3rd MPJs. A deep sulcus was noted under the 4th toe. Radiographically, the 4th metatarsal was short and underdeveloped with an osteopenic head (Figure 1). At this time, the patient was diagnosed with brachymetatarsia of the right 4th metatarsal. Surgical options were discussed and the patient opted for a single-stage lengthening osteotomy. A long Z-cut osteotomy of the right 4th metatarsal was performed. The osteotomy was distracted 12mm and fixed using a non-locking plate and four 2.7mm cortical screws (Figure 2). Post-operative management for the patient included 6 weeks full weight-bearing in a footoffloading shoe. Radiographic confirmation of consolidation of the osteotomy occurred at 6 weeks post-op. The patient then transitioned from the offloading shoe to a running shoe. The patient returned to his normal physical activities at 8 weeks post-op without incident. Following surgical lengthening of the patient’s right 4th metatarsal, complaints of metatarsalgia disappeared and hyperkeratosis eventually subsided. The patient did present with mild, painless 4th MPJ stiffness which led to hardware removal at 18 months post-op. After hardware removal, the patient had full painless ROM of the 4th MPJ.

Discussion
Brachymetatarsia leads to abnormal pressure distribution of the forefoot, resulting in excessive weightbearing of the adjacent metatarsals. Lengthening the metatarsal is indicated and can be achieved via callus distraction, single-stage lengthening osteotomy with or without bone grafts, or a combination of both.

References
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