



Statement of Purpose

Great toe hemi-implant arthroplasty is an accepted treatment option for end-stage hallux rigidus with favorable mid-term outcomes reported.¹⁻⁸ Implant mal-alignment at the time of insertion can lead to persistent pain, prosthetic component loosening and metallic wear debris resulting in failure.⁹⁻¹¹ We present two cases of failed hemi-implant arthroplasties secondary to mal-alignment and loosening treated with explantation and conversion to a two component total joint prosthesis.

Literature Review

Salvage of failed hemi-implant arthroplasty of the first metatarsal-phalangeal joint (MTPJ) has been described with explantation and conversion to a bone block distraction arthrodesis^{10,11} but not a two component total joint prosthesis. Many surgeons provide an arthrodesis of the first MTPJ after a failed implant either due to believing it is the gold standard for hallux rigidus¹¹ or because after explantation rarely is their enough bone stock for reimplantation of an implant¹². Usuellis¹² states many patients may wish to undergo implant placement initially as they would like to keep motion in the first MTPJ, and we believe for certain patients this remains true even after failed hemi-implants. To the authors knowledge these are the first case studies to present explantation of a failed hemi-implant with conversion to a two component total joint implant.

Case Studies

A 59-year old woman with grade 1 hallux rigidus^{13,14} initially underwent a decompression first metatarsal osteotomy with oblique screw fixation for hallux rigidus on her right foot in 2003 with good pain relief for 10-years time. She developed pain to her great toe with restricted motion and underwent a metallic hemi-implant arthroplasty and attempted screw removal in 2013. Ultimately this failed to relieve her great toe joint pain due to development of avascular osteonecrosis of the first metatarsal (Figure 1). The patient also developed unremitting pain to her central and lateral forefoot secondary to compensatory gait. She underwent explantation of her hemi-implant arthroplasty with conversion to a two component total joint prosthesis and osteotomies of her second, third and fifth metatarsals in 2016. She healed uneventfully and at 16-months follow-up has some stiffness but no pain to her great toe, and resolved forefoot pain (Figure 2).

The second case is a 56-year old woman with grade 3 hallux rigidus^{13,14} on exam and verified by radiographs who underwent a hemi-implant arthroplasty in 2008. The patient had little relief with continued great toe joint pain due to collapse of the first metatarsal head with intramedullary cyst formation (Figure 3). Upon exam there was continued pain with palpation and range of motion over the first MTPJ. The patient wished for definitive treatment and underwent explantation of her hemi-implant with conversion to a two component total joint prosthesis in 2016 (Figure 4, 5). She healed uneventfully and at 13-months follow-up has some stiffness to her great toe but no pain.



Figure 1. Pre-operative anterior-posterior weightbearing radiographs of the right foot



Figure 2. Post-operative anterior-posterior weightbearing radiographs of the right foot



Figure 3. Pre-operative anterior-posterior weightbearing radiographs of the right foot



Figure 4. Post-operative anterior-posterior weightbearing radiographs of the right foot

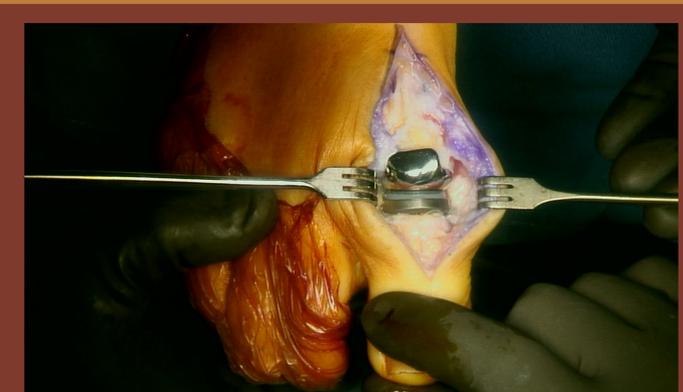


Figure 5. Intra-operative photograph demonstrating two-component total joint prosthesis

Analysis and Discussion

Metallic hemi-implant arthroplasty of the first MTPJ, when placed accurately and for appropriate indications, has similar outcomes compared with first MTPJ arthrodesis.¹⁵⁻¹⁹ Unfortunately, hemi-implant arthroplasties that fail, leave few options beyond implant removal and either reimplantation of a thicker hemi-implant or a soft-tissue interpositional arthroplasty, conversion to a stemmed one-piece silicone-type prosthesis or arthrodesis with use of a structural bone graft. In our patients, loss of the majority of the first metatarsal head, coupled with the failed hemi-implant, further reduced the treatment option to only a structural bone block distraction arthrodesis of the first MTPJ. This is a very morbid procedure with a lengthy recovery period of non-weightbearing in excess of 6 to 12 weeks time with high risk of symptomatic nonunion¹¹. Instead, in an effort to provide some motion, we performed explantation of the hemi-implant arthroplasty and resection of the metatarsal head to viable bone that easily accepted the two component total joint prosthesis. We were able to relieve the pre-operative pain and achieve acceptable function at 13 and 16-months follow-up. While the short-term results are promising, concerns exist regarding future salvage options for the first MTPJ which remain limited to revision with another two component total joint prosthesis, structural bone block distraction arthrodesis or partial first ray amputation.^{18,19} Ultimately, we advocate for long-term surveillance to provide additional insight into the efficacy of the above approach.

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