The Failed First Metatarsophalangeal Joint Implant Arthroplasty

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KEYWORDS

• Metatarsophalangeal joint • Arthroplasty • Surgery

KEY POINTS

- Chronic pain in a first metatarsophalangeal joint (MTP) arthroplasty can be due to infection or implant failure (early or late).
- Although excision arthroplasty can be considered, the most consistent surgical results for the painful first MTP arthroplasty will come from fusion.
- Conversion of an implant arthroplasty to fusion will probably require structural graft, with slower healing than a routine MTP arthrodesis.

INTRODUCTION

With the phenomenal success of implant arthroplasty in major weight-bearing joints, there has been much interest for decades in achieving similar success with joint replacement of the first metatarsophalangeal joint (MTP). The most common indication has been for degenerative arthritis, also referred to as hallux rigidus. Unfortunately, the results, both short term and long term, have been largely inconsistent, with some reports of good outcomes mixed with unacceptably high failure/revision rates.[1–3]

MTP implant arthroplasty has taken many forms, including total joint replacement (metatarsal head and proximal phalangeal base) and also hemiarthroplasty (either side of the joint). Much of the earlier failures came from applying technology derived from the hands; silicone metacarpophalangeal implants had achieved some success in the non-weight-bearing joints of patients with rheumatoid arthritis. In that application, the silicone implants acted as much as rubber spacers as actual articulating surfaces—a synthetic interposition arthroplasty of sorts. When implanted into the weight-bearing joints of the forefoot, implant fragmentation and failure were seen.

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Modern first MTP implants are unconstrained (2 separate components) that require some amount of bone resection. In any case, where a first metatarsal shortening has been performed, transfer metatarsalgia can be expected. Failure of a total joint or hemiarthroplasty is usually by 1 of 2 mechanisms. First, infection can occur, either acquired during surgery or some time later; resection of the implant is usually the required solution. Second, the patient can have pain in the MTP joint. The pain could be persistent from the beginning or could be acquired later from implant subsidence, loosening, or fragmentation.

THE INFECTED FIRST MTP IMPLANT ARTHROPLASTY

- Although single-stage surgery may be possible, in general, treatment will parallel that of an infected hip or knee arthroplasty.
- At a first-stage procedure, the implant is removed and cultures are taken.
- Patients should not take any antibiotics for days or longer, before surgery.
- An antibiotic cement spacer could be left to fill the gap, or the joint can be treated as a resection arthroplasty (see later discussion).
- As a planned second stage 6 weeks later (or if the patient is intolerant of the resection arthroplasty), reconstruction with structural bone graft can be performed (see later discussion).

NONOPERATIVE TREATMENT OF THE PAINFUL FIRST MTP ARTHROPLASTY

- A painful first MTP joint can be treated with a foot orthotic. Typically, this is a full-length rigid orthotic (carbon fiber or steel) extending to the tip of the first ray.
- Few patients will be satisfied with this option.

SURGICAL OPTIONS FOR THE PAINFUL FIRST MTP ARTHROPLASTY

Revision Arthroplasty

- In hip, knee, or ankle arthroplasty, revision arthroplasty is a viable option. In the first MTP joint, the amount of bone loss with a failed implant may be greater than manageable with any prosthesis. Rigid fixation of the new implant is probably not achievable, and a loose implant may be the source of pain in the first place.
- In the case of the well-fixed but persistently painful MTP implant, the source of pain is not well defined, and revision to a new implant may not improve symptoms at all. Therefore, revision arthroplasty is probably never indicated.

Excision Arthroplasty

- In an excisional arthroplasty, the implants are removed and the joint space is left to fill in with scar. In large weight-bearing joints, resection arthroplasty (such as the Girdlestone in the hip) is not especially functional. Some patients will not be satisfied with this in the foot.
- Despite those concerns, resection arthroplasty of the first MTP sometimes works very well. Although counterintuitive at first, remember that some patients with severe MTP arthritis on radiograph have no pain at all, more so than with the hip or knee.
- In the author's opinion, the best candidates for resection arthroplasty are those patients who were quite happy with their implant arthroplasty until something changed (infection or fracture). These patients are the ones with horrible-appearing radiographs of the implant; yet they are perfectly satisfied with the toe. Perhaps these patients require only an interposition arthroplasty (either with an implant or just with scar tissue) to be comfortable. As an anecdotal guideline,