Revision Surgery of the Foot and Ankle

Surgical Strategies and Techniques

Mark J. Berkowitz
Michael P. Clare
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Preface

Numerous excellent and comprehensive textbooks covering the field of foot and ankle surgery are available today. The best of these provide clear and concise, step-by-step instruction on how to perform the extensive array of surgical procedures that make up a typical practice. However, none to my knowledge exclusively addresses the countless unique challenges involved in *revision* surgery of the foot and ankle.

As anyone who has practiced foot and ankle surgery can attest, revision procedures are anything but routine and often do not proceed in "cookbook" fashion. In fact, the techniques described for primary foot and ankle procedures often are not applicable in the revision setting. Poorly placed incisions, compromised soft tissue, bone loss, failed internal fixation, and deformity not uncommonly render primary techniques ineffective and require alternative strategies and approaches.

This project was undertaken with the young foot and ankle surgeon in mind. In fact, its origins go back 15 years to my time as a novice foot and ankle surgeon in the US Army, freshly graduated from residency and without the benefit of fellowship training. During this exciting but stressful time, the traditional textbooks of foot and ankle surgery served as excellent resources for primary procedures. However, I found few resources available to provide guidance when tackling a complicated revision case. In order to fill this void and bring greater attention and granularity to the topic of revision foot and ankle surgery, an Instructional Course Lecture was developed and first presented at the 2015 AAOS Annual Meeting in Las Vegas. The success of this ICL directly lead to the development of the current textbook.

The current text aims to serve as a "go-to" resource for the early-career foot and ankle surgeon treating patients whose initial surgical treatment has failed. You will notice that it is presented in bullet format and is case-based. This format is intentional as it is not intended to be an exhaustive resource on all aspects of foot and ankle surgery. Rather, this book is intended to serve as a source of ideas for creative problem-solving, a necessary skill for the revision surgeon. It is hoped that the cases, techniques, and strategies presented in each chapter will stimulate the reader's own critical thinking and provide a template for successfully addressing even the most challenging revision situation.

Although we are excited to finally make the first edition of *Revision Surgery of the Foot and Ankle* available, we are already looking to make improvements to subsequent editions. Specifically, in subsequent editions, we will incorporate video clips demonstrating the revision techniques presented in the text. The goal will be to make this text increasingly useful and practical for the foot and ankle surgeon who is planning a revision procedure. Finally, we deeply appreciate and welcome feedback from our readers and will use their comments and suggestions to make future editions even better.

Cleveland, OH, USA Mark J. Berkowitz, MD, MBA

Acknowledgments

I would like to thank all of my coeditors who so graciously agreed to participate in this humble project, without whom, it never would have materialized. Each one of them has served as a mentor to me, either directly or from afar. Collectively, these individuals are true masters at revision foot and ankle surgery, and many of the creative strategies and techniques presented in this book were developed by these individuals. I have never stopped learning from these gentlemen, and I am confident that you will find their insight equally helpful in your practice.

All of the editors as a group are grateful to the numerous authors and contributors who have made this book come to fruition. Their time, energy, expertise, and commitment to this project brought needed valuable attention to the topic revision surgery of the foot and ankle. We sincerely appreciate all their hard work and dedication. Needless to say, without them, this book would not have been possible.

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Part I

Forefoot

Revision of Failed 1st MTPJ Fusion

1

Mark J. Berkowitz and Camille L. Connelly

Key Takeaway Points

- The goal of reconstruction is to establish a stable 1st ray with a balanced metatarsal cascade to reestablish an even forefoot weight-bearing pattern.
- Lesser metatarsal osteotomies may be necessary to establish a balanced metatarsal cascade after revision 1st MTPJ fusion.
- For an accurate assessment of fusion positioning intraoperatively, align the arthrodesis along a flat plate to stimulate weight-bearing.
- Bone loss should be estimated preoperatively to plan for structural autograft or allograft needs.
- The general indication for an interposition bone-block arthrodesis is bone loss greater than 10 mm.

Introduction

1st MTPJ arthrodesis is the "gold standard" operative treatment for end-stage hallux rigidus, severe hallux valgus, and salvage procedures of the 1st MTPJ [1, 2]. Historically, rates of fusion and patient satisfaction both exceed 90 percent [3–6]. Revision or salvage fusions, however, are less predictable, especially in cases of severe bone loss, with rates of fusion in the literature from 79 to 99 percent [7–9].

Failures of a primary arthrodesis can occur due to nonunion, malunion, or infection. Additionally, a salvage 1st MTPJ fusion may be indicated to address failed hallux valgus, 1st MTPJ arthroplasty, or failed resection arthroplasty surgery. Revision arthrodesis often must address substantial bone loss from previous 1st MT osteotomies, implant removal, or avascular necrosis. Shortening of the 1st ray causes weight-bearing loads to be transferred laterally to the lesser metatarsals resulting in painful metatarsalgia and increasing deformity [1, 3, 7–10]. Restoration of 1st MT length and plantigrade positioning are crucial to address transfer metatarsalgia [1, 8, 9]. In the setting of revision arthrodesis, and especially with the use of interposition bone-block arthrodesis, average time to union can exceed 12 weeks, and prolonged immobilization should be considered until radiographic union is achieved [7].

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Evaluation and Assessment

For the symptomatic 1st MTPJ and/or resulting transfer metatarsalgia, conservative measures including carbon fiber inserts, orthotics, accommodative shoes, and NSAIDs should be attempted before considering revision surgery.

A thorough history and physical examination should be performed. Previous surgeries on the extremity should be noted as well as any history of wound healing issues or infection and documentation of any current implants. Patient factors should also be considered including general health, current tobacco use, and ability to comply with postoperative limitations. Regarding cases of atrophic nonunion consider bone homeostasis and vitamin D levels. Additionally, counsel patients that revision fusions may require a longer time to union, with additional postoperative immobilization and patient compliance.

A physical examination should be completed with attention to the forefoot alignment, pain, evidence of transfer metatarsalgia, and abnormal callous formation. Carefully consider the complaints the patient presented with, and discuss with the patient if additional osteotomies of the lesser MTs or hindfoot realignments may be needed to restore a plantigrade foot.

Skin quality and vascular status should be noted. Scar locations should be noted regarding incision planning, and the overall alignment of the foot should be carefully evaluated for any significant hindfoot deformity that may require either concurrent or staged procedures to address. Preoperative weight-bearing radiographs of the foot (AP, lateral, and oblique) should be obtained to evaluate foot alignment, cascade, 1st ray bone loss, nonunion, AVN, osteolysis, presence of current implants, and broken hardware. If current infection is suspected, then ESR, CRP, and WBC levels should be obtained.

Surgical Planning

First metatarsal positioning is crucial to reestablish even forefoot weight-bearing [10, 11]. A 1st MTPJ fusion with excessive dorsiflexion resulting in a cock-up deformity will cause shoe impingement and pain at the dorsal IPJ and transfer metatarsalgia, while a plantarflexion malunion will result in a painful plantar IPJ callus, sesamoiditis, and a need to vault over the toe with gait. The 1st MTPJ angle necessary to achieve a plantigrade foot will vary with the overall geometry of the foot [11]. Therefore, it has been advocated to position the hallux such that the distal phalanx pulp rests just off (1–3 mm) a flat plate (surgical set box top) with the ankle at 90 degrees [8, 10, 11]. The authors have found this provides a simple and reproducible intraoperative approximation of final weight-bearing position.

The metatarsal cascade is used to gauge hallux length. Typically, when there is less than 5 mm shortening, an in situ fusion can be performed [10]. A deficit of 5–10 mm can be managed with an in situ fusion in conjunction with lesser metatarsal shortening osteotomies to rebalance the foot. Severe 1st ray bone loss, defined as greater than 10 mm shortening, should be addressed with a bone-block structural interposition arthrodesis with or without additional lesser metatarsal osteotomies as needed to restore a balanced cascade [1, 3, 4, 8–10].

Intraoperative considerations include the challenges of navigating a revision surgical field in addition to considerations for utilizing additional biology in the form of bone graft, restoration of 1st MT length, choice of fusion site preparation, and fixation technique. Additionally, the decision to use autograft versus allograft and the potential for donor site morbidity or infection transmission risks must be weighed.

The authors prefer to utilize a lag screw and dorsal compression/neutralization plate construct when able. This fixation is supported in the biomechanical literature demonstrating superior strength to competing screw and/or wire constructs [12].

In cases requiring structural bone graft, autograft or allograft may be used. Traditionally tricortical iliac crest autograft has been the most utilized source of structural graft; however the recent literature supports high fusion rates and safety using allograft [1, 8, 9]. For interposition grafts, the authors prefer to utilize allograft with the addition of bone marrow aspirate to provide osteoconductive, osteoinductive, and osteogenic properties while limiting donor site morbidity. Additionally, the authors prefer to utilize a cannulated conical reaming system, when able, to prepare both the joint surfaces and the interposition bone graft to maximize surface area and facilitate positioning of the fusion [6].

Case Examples

Case 1.1 Failed 1st MTPJ Fusion After Implant Arthroplasty

History

- Failed 1st MTPJ fusion after metal hemiarthroplasty
- Continued and worsening pain and limited range of motion 2 years after metal hemiarthroplasty for hallux rigidus (Fig. 1.1a, b)

Reasons for Failure

- Implant loosening
- Restricted and painful 1st MTPJ ROM

Surgical Plan

- The surgeon should be prepared to use structural bone graft if a large gap exists after implant removal.

Approach

- The patient is positioned supine on the operative table with a thigh tourniquet, with an ipsilateral hip bump, and with the ipsilateral iliac crest prepped in sterilely to obtain bone marrow aspirate or structural graft.
- A dorsal incision is made over the 1st MTPJ, incorporating previous scars when possible. The extensor hallucis longus is retracted laterally and a capsulotomy performed.
- When necessary, a Z-lengthening of the EHL is performed.

Fig. 1.1 Preoperative anterior-posterior (**a**) lateral (**b**) radiographs demonstrate a metal 1st MTPJ hemiarthroplasty implant

Fig. 1.2 An osteotome is used here to demonstrate and remove a grossly loose metallic hemiarthroplasty implant

Fig. 1.3 A cannulated reamer set is used to prepare the joint surfaces

- The 1st MTPJ is mobilized allowing exposure of the hemiarthroplasty implant. The implant (Fig. 1.2) is noted to be loose and is removed using an osteotome.
- The joint surfaces are prepared using conical reamers (Fig. 1.3) and a 1.5 mm wire pass drill to increase bony ingrowth. Drilling is completed under cooling to prevent thermal necrosis.
- After joint preparation, the toe is positioned, and the gap measured (Fig. 1.4). With the gap measuring 1 cm, a decision for structural bone grafting is made.
- A femoral head allograft is prepared with conical reamers until fitting the contours of the bone gap (Figs. 1.5, 1.6, and 1.7). Iliac crest aspirate is harvested and mixed with the structural bone graft. Demineralized cortical fibers are also packed on each surface of the joint and the structural bone graft implanted.
- The toe is provisionally pinned and alignment checked against a flat plate. The guide pin is exchanged for a cannulated lag screw. A dorsal neutralization plate is applied under compression with a combination of cortical and locking screws.

Fig. 1.4 After joint preparation, the toe is pulled to the desired position and the gap measured to determine need or size of an interposition bone graft

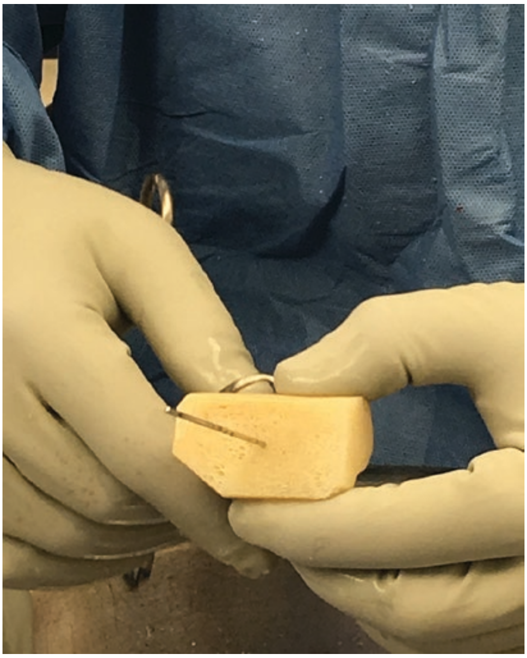

Fig. 1.5 A femoral head allograft is thawed and sectioned. A K-wire is placed centrally in the graft for shaping with the conical reamers

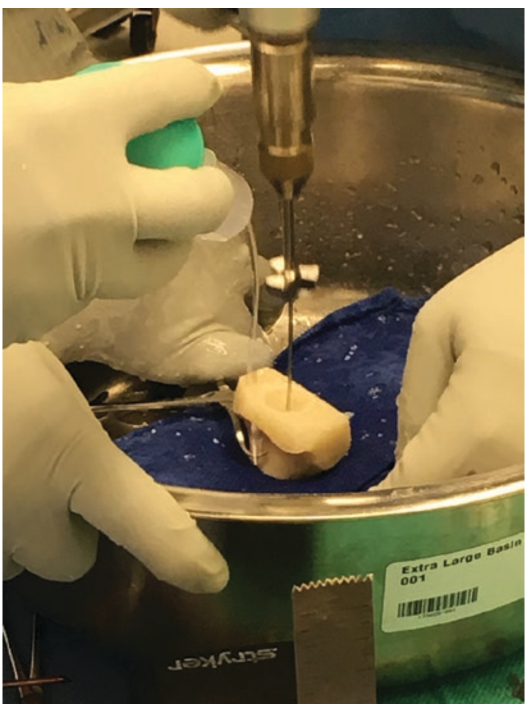

Fig. 1.6 Conical reamers are used to create an interposition bone-block corresponding to the gap measured and sizes used in preparation of the 1st MT head and base of the proximal phalanx

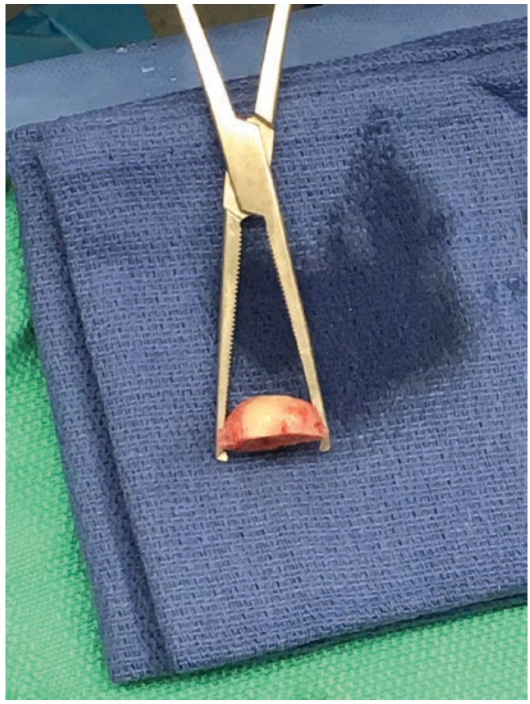

Fig. 1.7 The final interposition allograft fashioned with concave and convex ends

- The tourniquet is released prior to closure and hemostasis achieved. The wound is closed in layers.
- A bulky dressing and splint are applied. The post-op splint is changed to a non-weight-bearing short leg cast at the first post-op appointment. Sutures are removed 2–3 weeks post-op, and another non-weight-bearing short leg cast is placed. The patient is kept non-weight-bearing in a short leg cast until radiographic evidence of healing (Fig. 1.8a, b), generally 6–10 weeks, with transition to a boot and progressive weight-bearing at that point.

Implants

- Lag screw and neutralization plate construct of choice. This case featured:
  - OrthoHelix 1st MTPJ fusion plate
  - OrthoHelix 4 mm lag screw

Pearls and Pitfalls

- Carefully debride the joint of synovitis, fibrous tissue, and avascular bone to expose healthy bleeding surfaces.

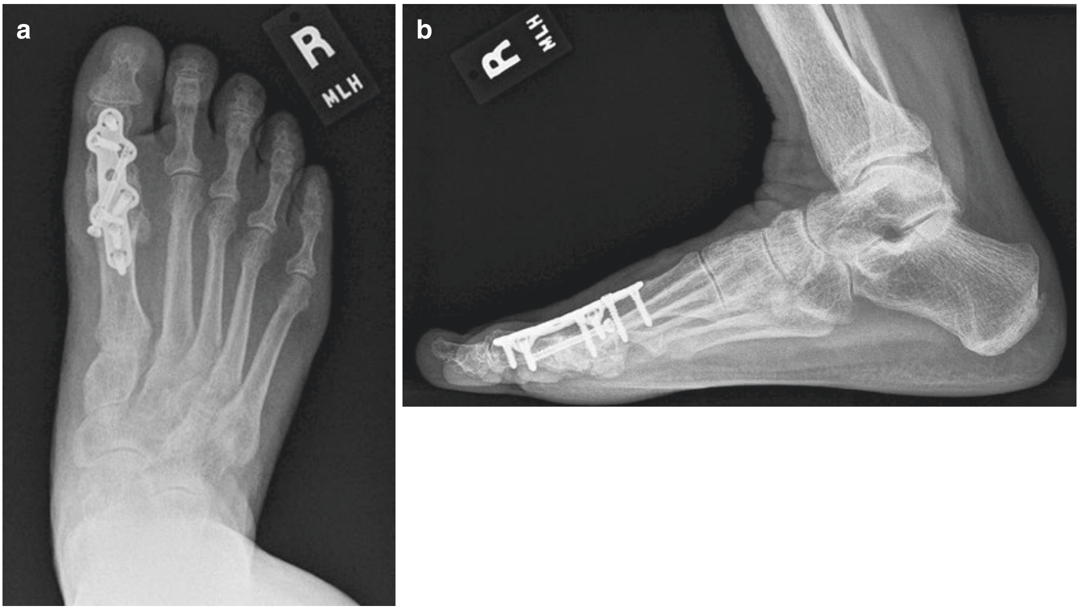

Fig. 1.8 Postoperative AP (**a**) and lateral (**b**) radiographs demonstrate a healed interposition allograft arthrodesis with lag screw and dorsal plate construct

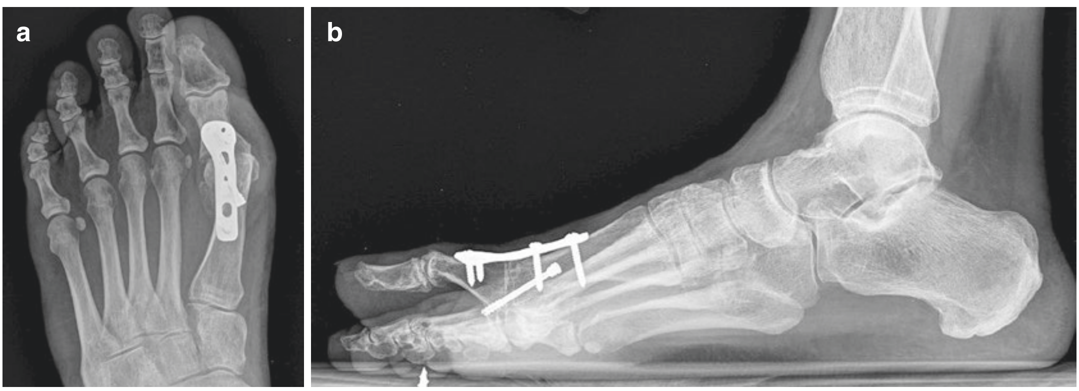

Fig. 1.9 Preoperative AP (**a**) and lateral (**b**) radiographs demonstrate a dorsiflexion malunion of a 1st MTPJ arthrodesis

- Avoid malposition of the hallux by utilizing fluoroscopy and a flat plate intraoperatively.
- A combination of lag screws, pins, and non-locking and locking implants may be required to achieve stable fixation in poor bone quality.
- Restore 1st MT length without comprising vascularity. Performing surgery without tourniquet or releasing the tourniquet prior to interposition bone-block placement may help avoid vascular compromise from over lengthening.
- A bone-block interposition graft is at higher risk for nonunion with two potential failure interfaces and may require prolonged immobilization.

Case 1.2 Malunion of a 1st MTPJ Fusion

History

- Dorsiflexion malunion of a 1st MTPJ fusion resulting in painful transfer metatarsalgia (Fig. 1.9a, b)

Fig. 1.10 A dorsiflexion malunion is demonstrated by stimulated weight-bearing against a flat plate. Excessive dorsiflexion leads to dorsal IPJ pain and callus, shoe impingement, and transfer metatarsalgia

Fig. 1.11 Dorsiflexion malunion 1st MTPJ after implant removal

Reason for Failure

- Malunion with excessive dorsiflexion and valgus alignment resulting in transfer metatarsalgia (Fig. 1.10)

Surgical Plan

- Revision of malunion site with a dorsal opening wedge osteotomy with nonstructural bone graft

Approach

- The patient is positioned supine on the operative table with a thigh tourniquet, with an ipsilateral hip bump, and with the ipsilateral iliac crest prepped in sterilely to obtain bone marrow aspirate or graft.

Fig. 1.12 An osteotome is used to open the malunion site

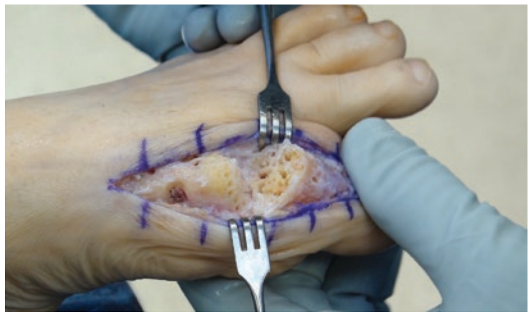

Fig. 1.13 After joint surface preparation

- The patient's previous dorsal incision is reopened. Full-thickness flaps are raised, and the EHL is mobilized and protected.
- The hardware is removed (Fig. 1.11). In this case, a bur is used to assist in locating and removing a buried headless lag screw.
- The fusion is inspected and an osteotome used to perform an osteotomy through the original fusion site (Fig. 1.12). The fusion is mobilized and the bone surfaces prepared with a combination of osteotomes, curettes, rongeurs, motorized bur, and a 1.5 mm wire (Fig. 1.13).
- After preparation, the joint is flexed into the corrected position, creating a gap dorsally.
- The position is then pinned with two K-wires and checked on a flat plate intraoperatively for appropriate weight-bearing characteristics and alignment (Fig. 1.14).
- Iliac crest bone aspirate is harvested and mixed with allograft bone and packed densely into the dorsal gap (Fig. 1.15).
- The position is secured with a 1st MTPJ fusion plate and lag screw (Fig. 1.16). Appropriate positioning and placement of hardware is con-

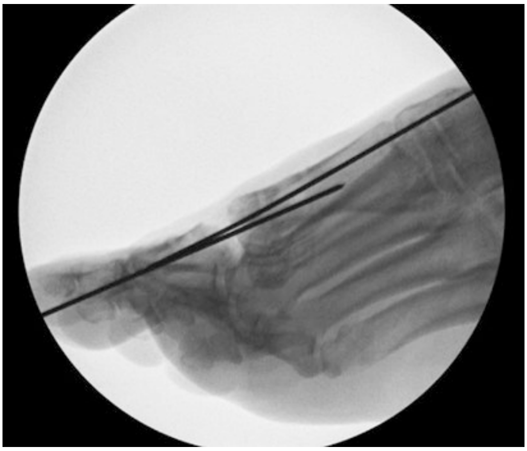

Fig. 1.14 Intraoperative fluoroscopic imaging demonstrating K-wire placement and alignment of the dorsal opening wedge osteotomy

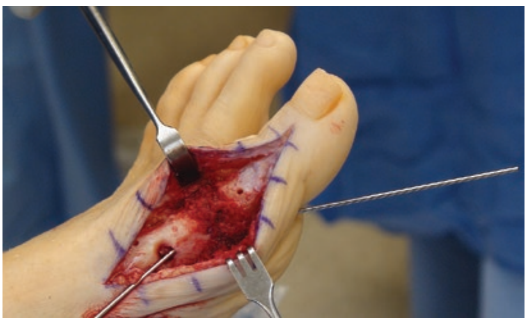

Fig. 1.15 A dorsal opening wedge is created through the joint, pinned with K-wires, and filled with allograft soaked in bone marrow aspirate

firmed on fluoroscopy (Fig. 1.17) and again with the flat plate (Fig. 1.18).

- The tourniquet is released and hemostasis obtained. The wound is closed in layers and bulky dressing and splint applied.
- The patient is kept non-weight-bearing in a short leg cast until radiographic evidence of healing (6–10 weeks) with transition to a boot and progressive weight-bearing at that time (Fig. 1.19a, b).

Implants

- Lag screw and neutralization plate construct of choice. This case featured:
  - OrthoHelix MaxLock 1st MTPJ fusion plate
  - OrthoHelix 4 mm cannulated lag screw

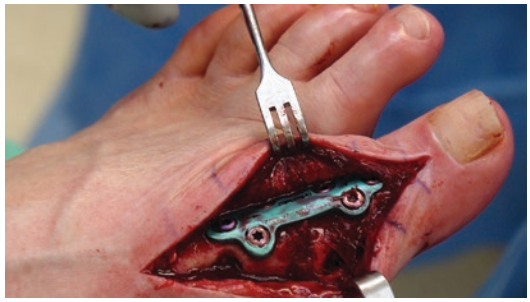

Fig. 1.16 Final fixation is placed

Fig. 1.17 Intraoperative imaging showing final plate and lag screw construct

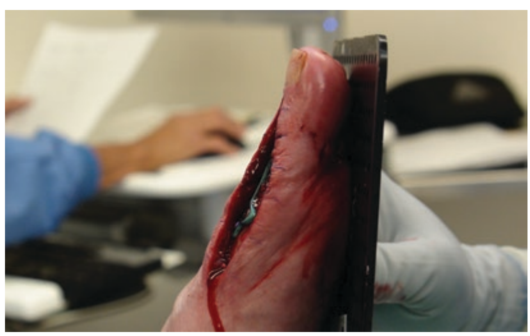

Fig. 1.18 Simulated weight-bearing position of the revision 1st MTPJ fusion against a flat plate

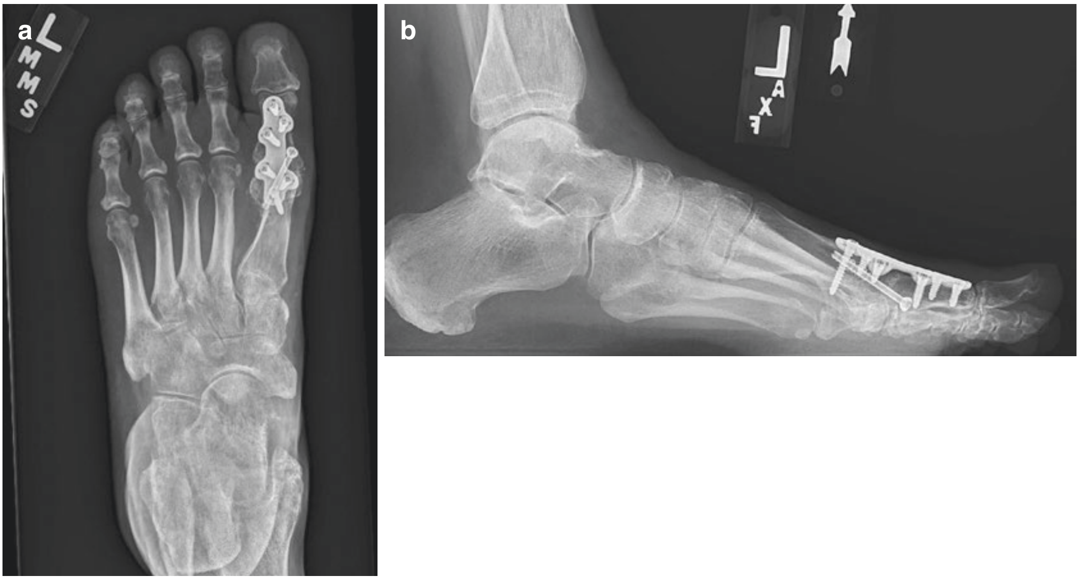

Fig. 1.19 Postoperative radiographs AP (**a**) and lateral (**b**) demonstrate a healed 1st MTPJ fusion in improved alignment after revision with a dorsal opening wedge and nonstructural allograft

Pearls and Pitfalls

- Avoid malposition of the hallux by utilizing fluoroscopy and a flat plate intraoperatively. To approximate weight-bearing, the flat plate should be used with the ankle at 90 degrees. The tip of the hallux should be 2–3 mm off the flat plate and lying adjacent to but not touching the second toe [1, 9].
- Simple flat cut opening or closing wedge osteotomies can be created at the apex of the original fusion to correct plantarflexion and dorsiflexion malunions.
- Opening wedge defects are packed with allograft or autograft at the surgeon's discretion.

Case 1.3 Nonunion of 1st MTPJ Fusion

History

- 1st MTPJ fusion for hallux rigidus with early implant failure and plate breakage noted on follow-up (Fig. 1.20a, b, c).
- Patient had been on an immediate WBAT protocol.
- Patient is now 3 years out from index surgery with continued pain, nonunion, and broken hardware.

Reasons for Failure

- Early weight-bearing and implant failure?
- Poor biology?
- Inadequate fixation?

Surgical Plan

- Revision fusion with nonstructural graft and rigid fixation

Approach

- The patient is positioned supine on the operating room table with a thigh tourniquet and ipsilateral iliac crest prepped into the sterile field.
- The prior dorsal incision is reopened over the 1st MTPJ. The extensor hallucis longus is retracted laterally and capsulotomy performed, exposing the hardware.
- The plate is noted to be broken (Fig. 1.21) and screws loose. All hardware is removed allowing visualization of the nonunion site, which is grossly mobile (Fig. 1.22). The nonunion site is debrided aggressively with a curette, creating two concave bone defects on both the proximal phalanx and the first metatarsal head.
- No significant longitudinal bone loss was encountered.

Fig. 1.20 AP (**a**), lateral (**b**), and oblique (**c**) radiographs demonstrate a broken plate and nonunion of a 1st MTPJ arthrodesis

- The joint surfaces are prepared with a 1.5 mm wire pass drill and a 4 mm bur back to punctate bleeding bone.
- Iliac crest bone marrow aspirate is harvested and mixed with cancellous or demineralized cortical fiber allograft. This is packed densely into each concave bone defect (Fig. 1.23).
- The joint is then realigned and held with guide pins (Fig. 1.24a, b, c) and inspected against a flat plate (Fig. 1.24d). Two crossed cannulated

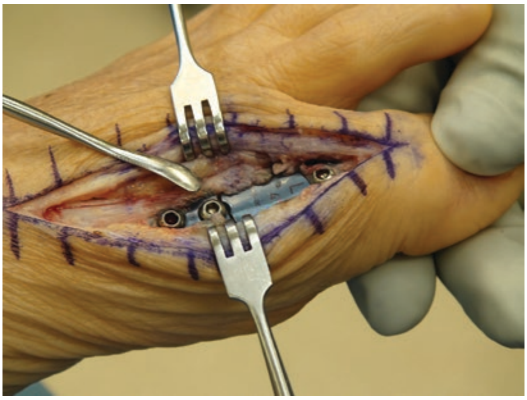

Fig. 1.21 Broken plate in a nonunion of a 1st MTPJ fusion

Fig. 1.22 Removal of hardware and exposure of nonunion

lag screws are placed over the wires (Fig. 1.25), and a dorsal neutralization plate is placed (Fig. 1.26).

- Final intraoperative imaging is inspected demonstrating appropriate alignment and stable fixation (Fig. 1.27a, b).
- The tourniquet is released and hemostasis obtained. The wound is closed in layers and a bulky dressing and splint applied.

Fig. 1.23 Bone defects are packed with nonstructural bone graft

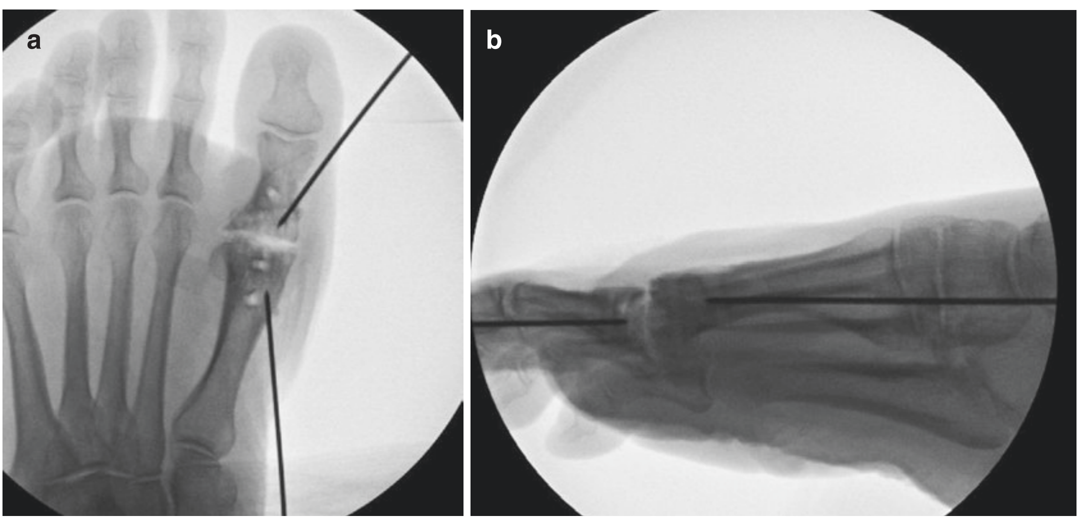

Fig. 1.24 Intraoperative fluoroscopic images demonstrate guide pin alignment for a planned crossed screw construct (**a**). Wires are positioned medial to lateral with one wire dorsal based and the other plantar based to avoid screw interference (**b**)**.** The final crossed wire construct (**c**) and screw placement (**d**)

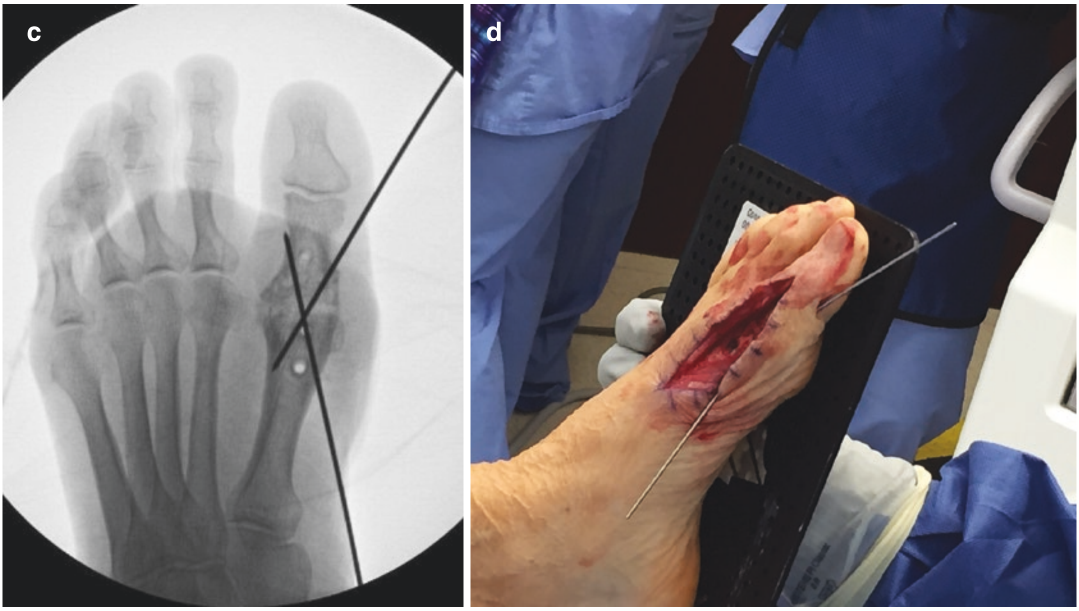

Fig. 1.24 (continued)

Fig. 1.25 Cannulated screw fixation

Fig. 1.26 Final lag screw and dorsal plate fixation

- The post-op splint is changed to a non-weight-bearing short leg cast at the first post-op appointment. Sutures are removed 2–3 weeks post-op, and another non-weight-bearing short leg cast is placed until 6 weeks post-op. At 6 weeks, an XR is taken out of the cast, and the patient is placed into a boot with progressive weight-bearing.
- Final follow-up radiographs demonstrating a healed 1st MTPJ arthrodesis and intact implants (Fig. 1.28a, b).

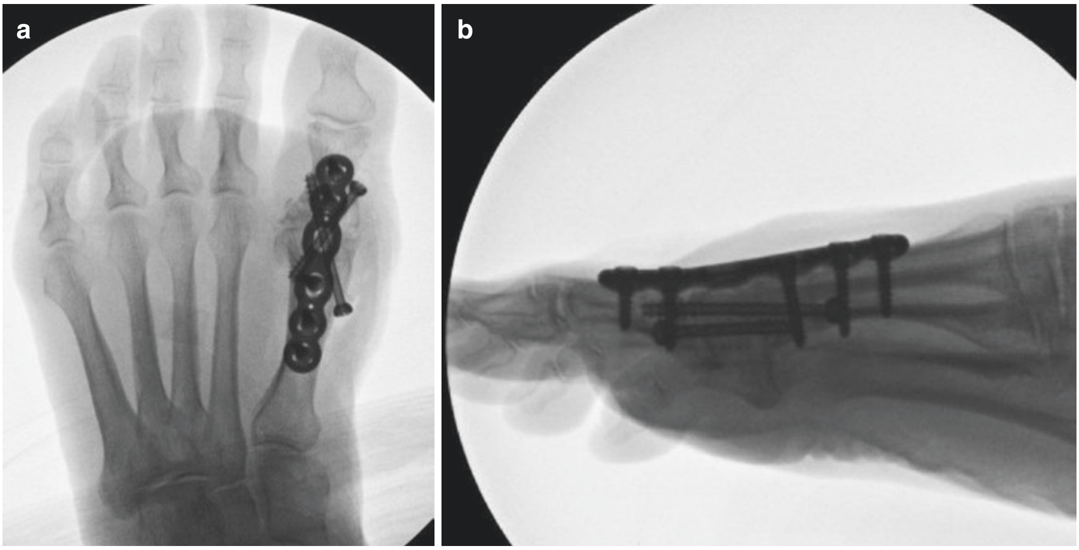

Fig. 1.27 Intraoperative imaging AP (**a**) and lateral (**b**) demonstrating the final fixation construct with crossed lag screw and a dorsal neutralization plate

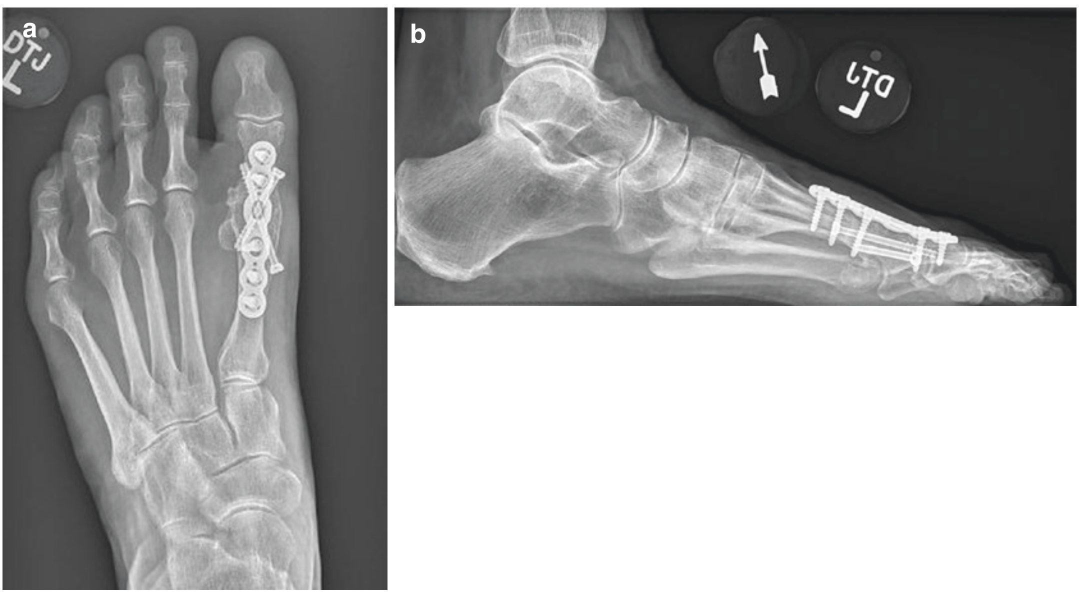

Fig. 1.28 Final follow-up AP (**a**) and lateral (**b**) radiographs demonstrating a healed 1st MTPJ arthrodesis with intact implants

Implants

- Lag screw and neutralization plate construct of choice. This case featured:
  - OrthoHelix 1st MTPJ fusion plate
  - OrthoHelix 4 mm cannulated lag screw

Case 1.4 Nonunion of 1st MTPJ Fusion

History

- 1st MTPJ fusion for hallux rigidus with nonunion (Fig. 1.29a, b)
- Patient with continued pain, nonunion

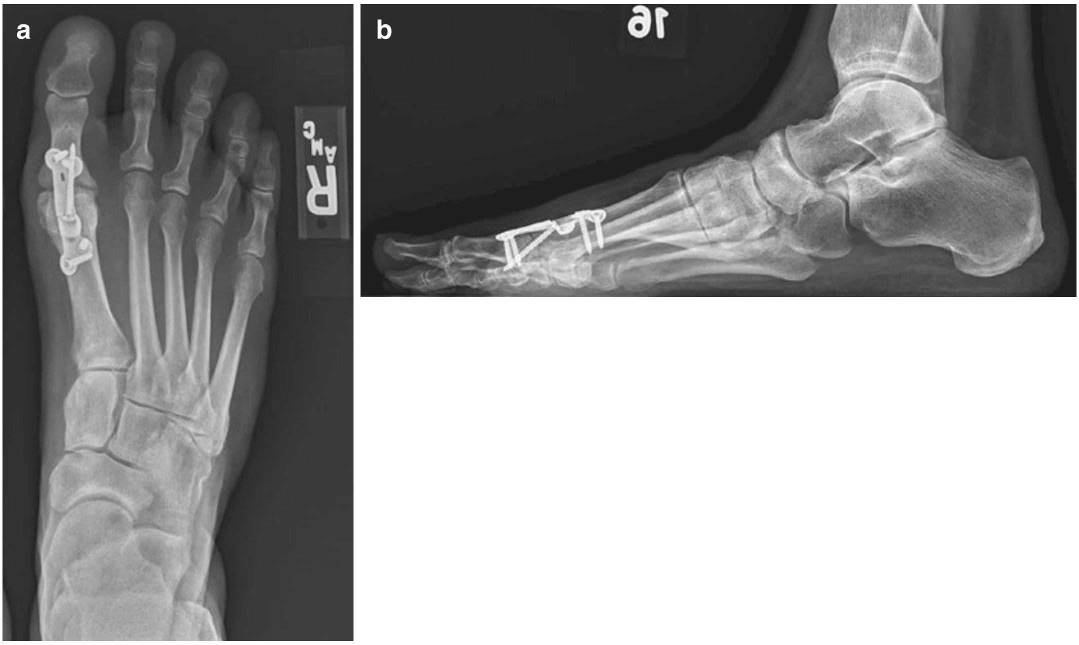

Fig. 1.29 AP (**a**) and lateral (**b**) radiographs of a 1st MTPJ fusion with a slotted plate lag screw technique that has gone on to nonunion

Reasons for Failure

- Poor biology?
- Inadequate fixation?

Surgical Plan

- Revision fusion with nonstructural graft and rigid fixation

Approach

- The patient is positioned supine on the operating room table with a thigh tourniquet and ipsilateral iliac crest prepped into the sterile field.
- The prior incision is reopened over the 1st MTPJ. The extensor hallucis longus is retracted laterally and capsulotomy performed, exposing the hardware (Fig. 1.30a).
- The plate is noted to be broken at the lag screw slot (Fig. 1.30b). All hardware is removed allowing visualization of the nonunion site, which is grossly mobile (Fig. 1.30c). The nonunion site is debrided.
- No significant longitudinal bone loss was encountered.
- The joint surfaces are prepared with a 1.5 mm wire pass drill and a 4 mm bur back to punctate bleeding bone.
- Iliac crest bone marrow aspirate is harvested and mixed with cancellous or demineralized cortical fiber allograft. This is packed densely into the bone defect.
- The joint is then realigned and held with guide pins that are exchanged for a cannulated lag screws and dorsal neutralization plate construct.
- The tourniquet is released and hemostasis obtained. The wound is closed in layers and a bulky dressing and splint applied.
- The patient is maintained non-weight-bearing until radiographic evidence of healing (Fig. 1.31a, b) and then placed into a boot with progressive weight-bearing.

Implants

- Lag screw and neutralization plate construct of choice. This case featured:
  - OrthoHelix 1st MTPJ fusion plate
  - OrthoHelix 4 mm cannulated lag screw

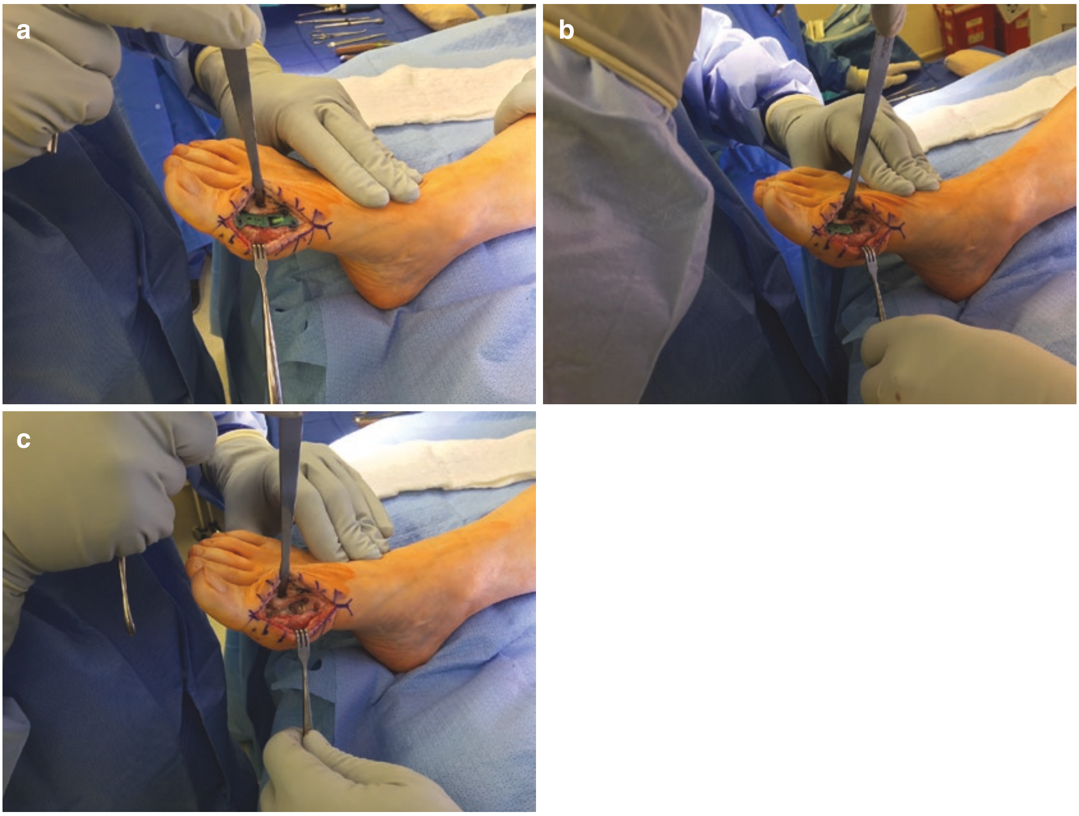

Fig. 1.30 Intraoperative photographs demonstrating the plate and screws (**a**) and location of the broken plate at the lag screw slot (**b**) and the appearance of the nonunion with all hardware removed (**c**)

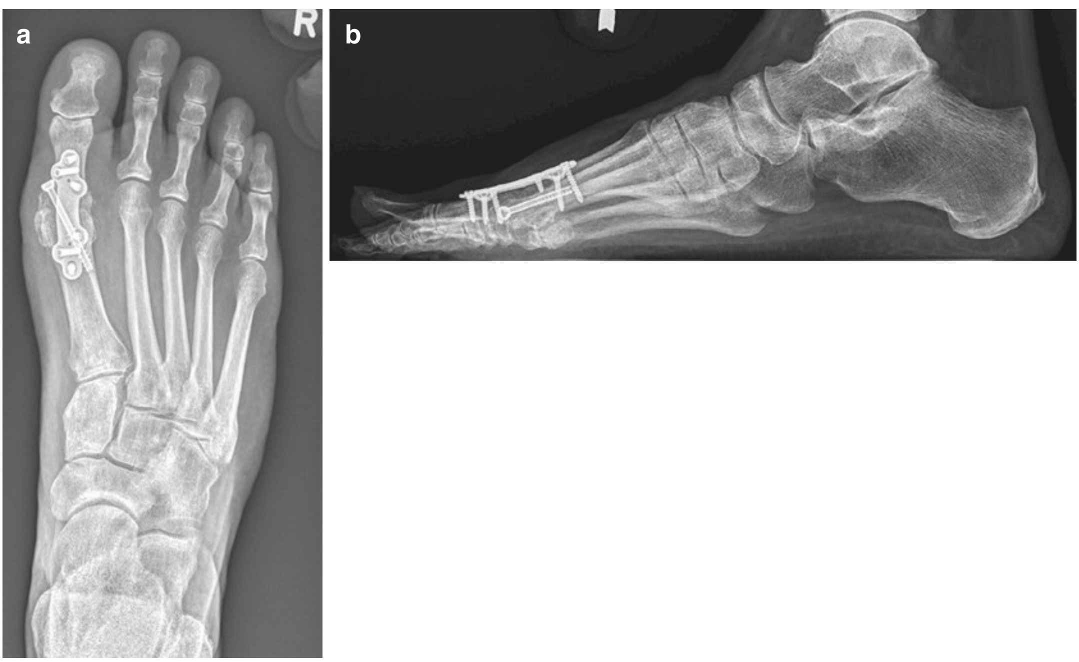

Fig. 1.31 Follow-up AP (**a**) and lateral (**b**) radiographs of a healed 1st MTPJ arthrodesis with an independent lag screw and dorsal plate construct

Summary

Salvage arthrodesis continues to be a technically challenging but successful long-term option for 1st MTPJ fusion failures. Constructing a stable 1st ray with a balanced metatarsal cascade is vital to reestablish an even forefoot weight-bearing pattern. Attention should be paid to positioning a plantigrade 1st ray, to maintaining or restoring 1st MT length, and to addressing lesser metatarsal or claw toe deformities as needed. Consideration should be given to the use of biologic adjuncts (bone graft) and the establishment of rigid fixation. In the setting of revision arthrodesis, and especially with the use of interposition bone-block arthrodesis, prolonged immobilization should be considered until radiographic union is achieved.

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2 Management of Failed Hallux Valgus

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Key Takeaway Points

- The initial surgery preceding a recurrent hallux valgus deformity is often retrospectively found to have been inadequately powered for the initial deformity.
- Excessive dorsiflexion and shortening of the first metatarsal are the most frequently encountered hallux valgus malunion deformities, often leading to transfer metatarsalgia symptoms.
- Nonunion is a relatively uncommon complication; however, an infectious etiology must always be ruled out.
- Avascular necrosis in the pre-collapse phase is difficult to differentiate from expected clinical and radiographic findings following hallux valgus surgery.
- Hallux varus may be effectively treated with tendon transfer procedures if the deformity is flexible; however, arthrodesis is most reliable when there is underlying arthrosis or stiffness.

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Introduction

Regardless of the etiology, a failed hallux valgus correction presents a frustrating and often challenging scenario for both the patient and surgeon. Although hallux valgus correction surgery is a commonly performed procedure, complications are not infrequent. Rates are estimated to range from 10% to 55% [1]. There are several reasons that a hallux valgus surgery may result in failure. General surgical complications such as infection, neuroma, symptomatic hardware, stiffness, and painful scarring may occur. Complications more unique to hallux valgus corrective surgery include recurrence, malunion, nonunion, avas-

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