

# FALLACIES OF ORTHOPEDIC FOOT SURGERY

James L. Bouchard, D.P.M.

## INTRODUCTION

Iatrogenic forefoot deformities are one of the most challenging problems that the podiatric surgeon may face. Unfortunately, many of these conditions are the result of poor preoperative planning or else the selection of inappropriate procedures. A basic understanding of foot mechanics is helpful in choosing the best surgical approach. Obviously, the technical execution of the procedure is important as well.

## PURPOSE

The purpose of this paper is to present several common surgical procedures performed by the general orthopedic community, which in our opinion predictively lead to postoperative complications. Many times the consequences of these procedures can be predicted if one has a general understanding of biomechanics and foot function. The author hopes that this presentation will provide a rationale for alternative procedures to some of the common outdated conventional orthopedic approaches.

Table 1 outlines typical forefoot deformities and specific techniques generally contraindicated due to the predictable iatrogenic deformities which follow.

TABLE 1

### Specific Techniques Contraindicated and their Associated Iatrogenic Deformities

THE PROBLEM	POOR CHOICE	PREDICTABLE COMPLICATIONS
1. Digits-hammertoes	1. Resection of phalangeal base	1. Floating toe
2. Digits-hammertoes	2. Mid shaft phalangeal osteotomy	2. Malalignment, nonunion

3. Digits-hammertoe	3. Amputation of digit	3. Forefoot imbalance, creation of void with associated digital deformity and retrograde effect on adjacent metatarsal heads
4. Hallux abducto valgus (moderate-severe with increased inter-metatarsal angle)	4. Simple McBride procedure	4. Recurrent hallux abducto valgus - hallux limitus
5. Moderate-severe hallux abducto valgus	5. Mitchell procedure	5. Shortening of the 1st metatarsal with associated sub 2nd metatarsal head symptomatology secondary to shortening
6. Establishing normal parabola of the metatarsals	6. Metatarsal shortening of the lesser metatarsals with the false pretense that the 1st metatarsal should be the longest	6. a. Malunion of the metatarsals b. Malunion fore-foot imbalance c. Multiple digital deformities d. Floating toe syndrome
7. Misconception that failure to lengthen the EHL with the McBride procedure causes hallux varus	7. EHL lengthening in the McBride is in most cases not necessary and in most cases does not cause hallux varus post-operatively	7. When EHL is routinely lengthened, there is an increased chance of over lengthening - floppy toe or increased fibrosis with hallux limitus
8. Intractable plantar keratosis	8. Metatarsal head resection	8. Predictably a floating toe syndrome with instability of the digit and associated metatarsalgia under the adjacent metatarsal heads

Table 2 summarizes the recommended procedure for correction of the iatrogenic problem created by the selection of inappropriate procedures.

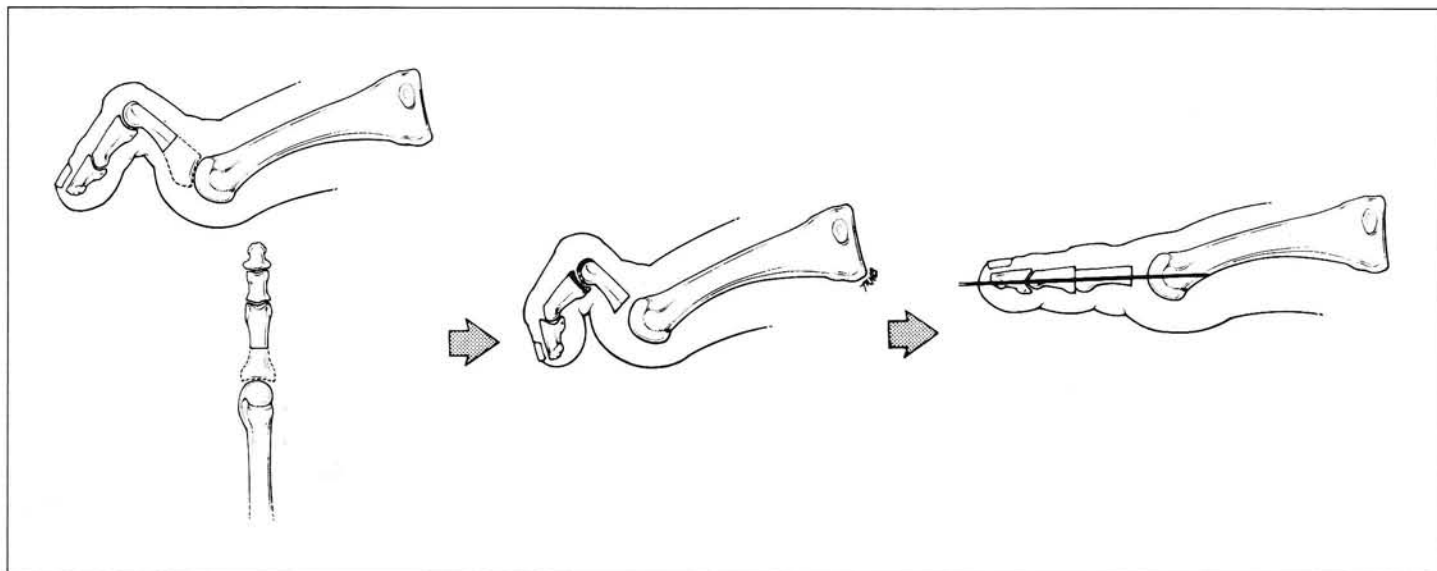
**TABLE 2**

**Correction of the Iatrogenic Problem**

**IATROGENIC PROBLEM      PROCEDURE FOR CORRECTION**

- |   |  |
|---|--|
| 1. Floating toe (Fig. 1)                        | 1. Arthrodesis of the PIPJ to provide rigid lever arm, possible syndactylism (Fig. 1)  |
| 2. Phalangeal malalignment or nonunion (Fig. 2) | 2. Arthrodesis of the digit to prevent forefoot imbalance, possible syndactylism (Fig. 2)  |
| 3. Amputation of the digit (Fig. 3)             | 3. Arthrodesis of the adjacent digits to prevent contraction of the digit and provide a rigid lever arm to prevent retrograde forces on the MPJ (Fig. 3) |
| 4. Failed McBride Bunionectomy (Fig. 4)         | 4. Biplane osteotomy and a base wedge osteotomy (Fig. 4)   |

- |   |  |
|---|--|
| 5. Mitchell bunionectomy (Fig. 5)   | 5. Hallux limitus surgery or implant arthroplasty and consider bone grafting to lengthen 1st metatarsal in severe instances (Fig. 5)   |
| 6. Multiple metatarsal shortening osteotomies leading to floating toe instability and forefoot imbalance (Fig. 6, 7A, 7B)   | 6. Digital arthrodesis 2, 3, & 4 to correct floating toe syndrome. Consider pan metatarsal head resection. Consider isolated bone lengthening on single metatarsals (Fig. 6, 7A, 7B)                               |
| 7. Metatarsal head resection complicated by floating toe syndrome and instability of the digit with associated metatarsalgia under the adjacent metatarsal heads (Fig. 8) | 7. Digital arthrodesis 2, 3, & 4 to correct floating toe syndrome. Consider pan metatarsal head resections or isolated bone lengthening on single metatarsals with lesser metatarsal implant arthroplasty (Fig. 8) |
| 8. Shortened great toe following Keller arthroplasty for correction of hallux abducto valgus with associated hallux limitus or hallux rigidis (Fig. 9)                    | 8. Implant arthroplasty utilizing a hemi or total implant. Alternate procedures which could be employed would include: 1. Cheilectomy or Green-Watermann osteotomy of the 1st metatarsal head. (Fig. 9)            |



**Fig. 1.** Floating toe syndrome corrected by arthrodesis of the PIPJ

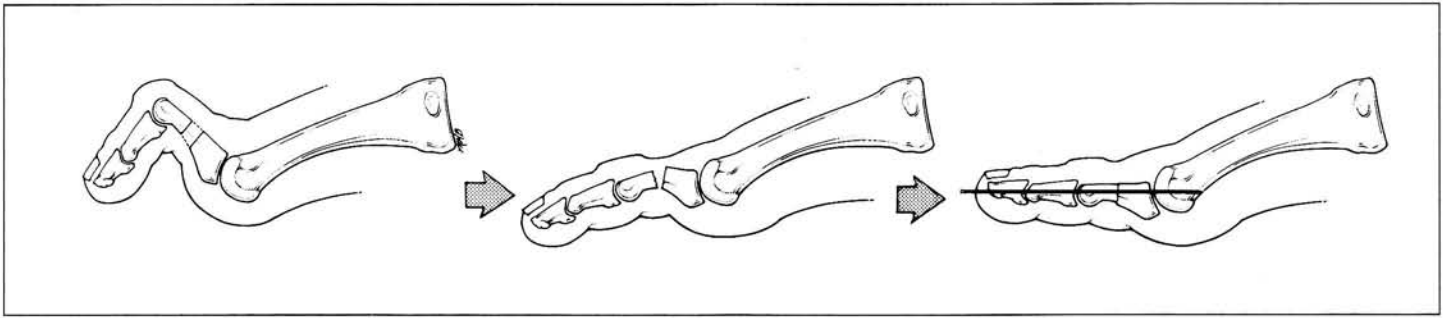


Fig. 2. Phalangeal malalignment corrected by arthrodesis of the digit.

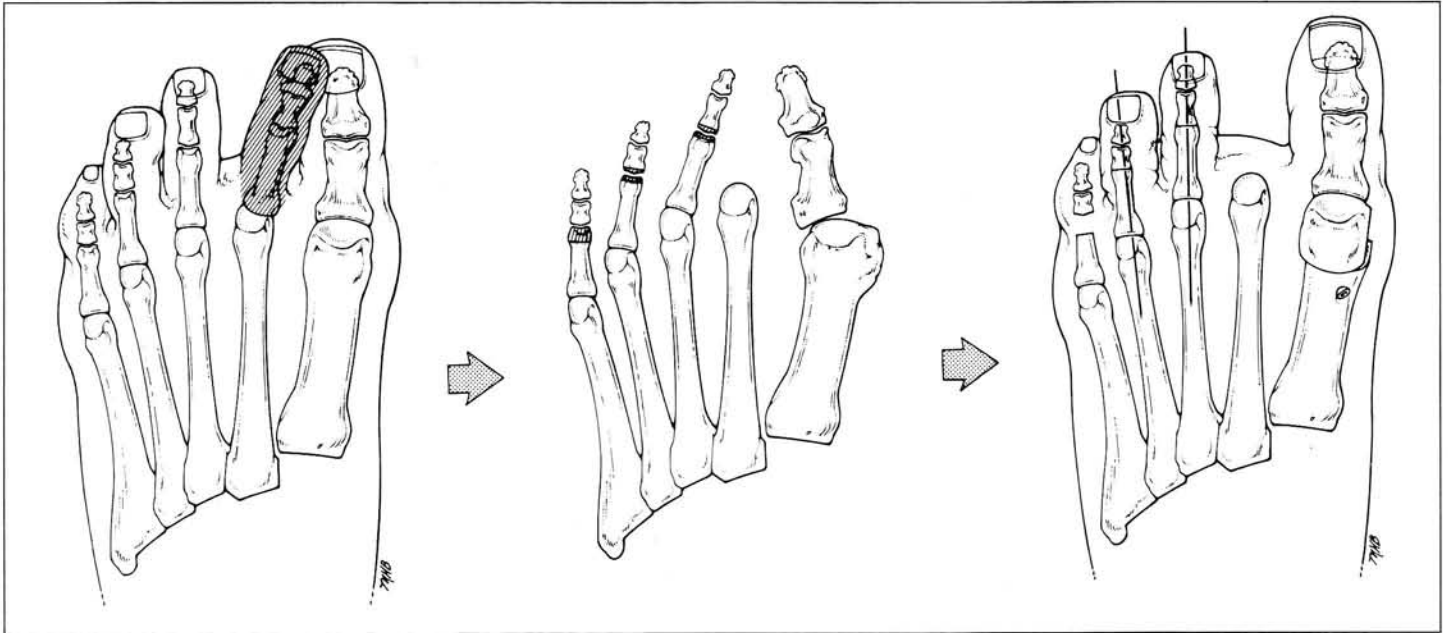


Fig. 3. Void created by amputation of digit corrected by arthrodesis of adjacent digit.

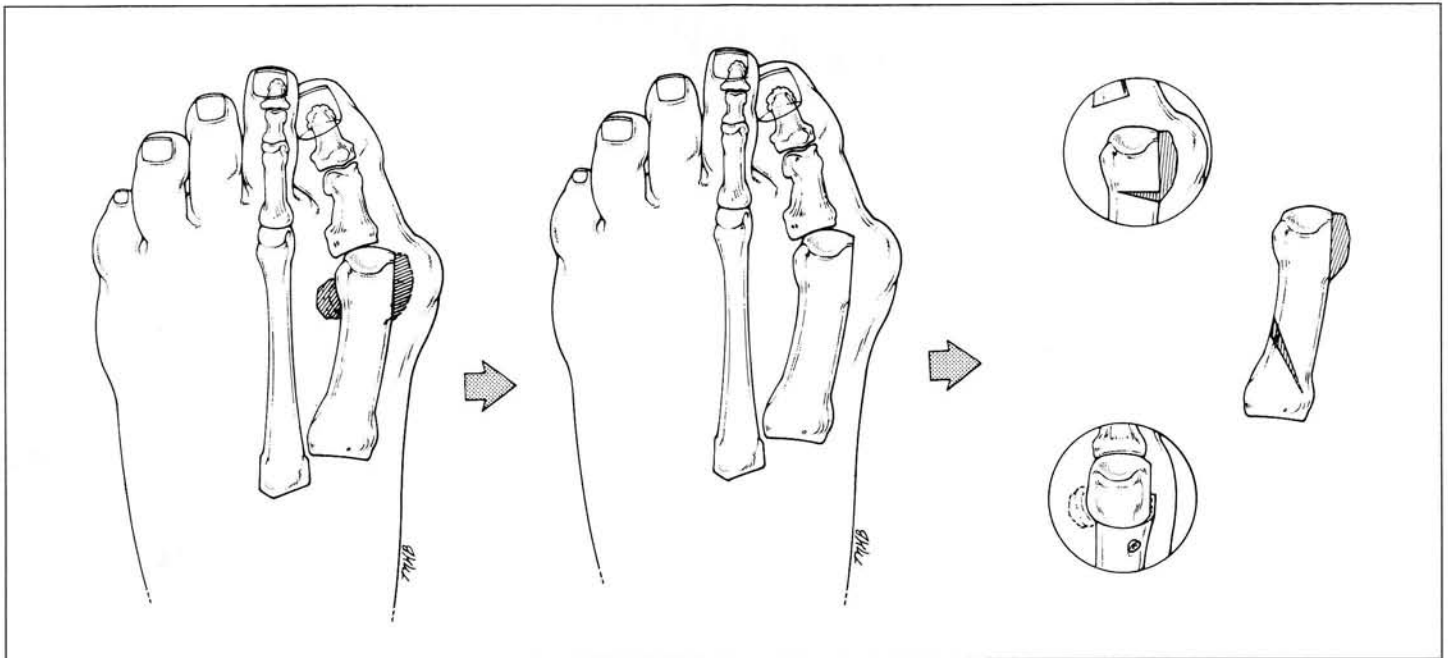


Fig. 4. Failed McBride bunionectomy corrected by distal metatarsal osteotomy and/or base wedge osteotomy.

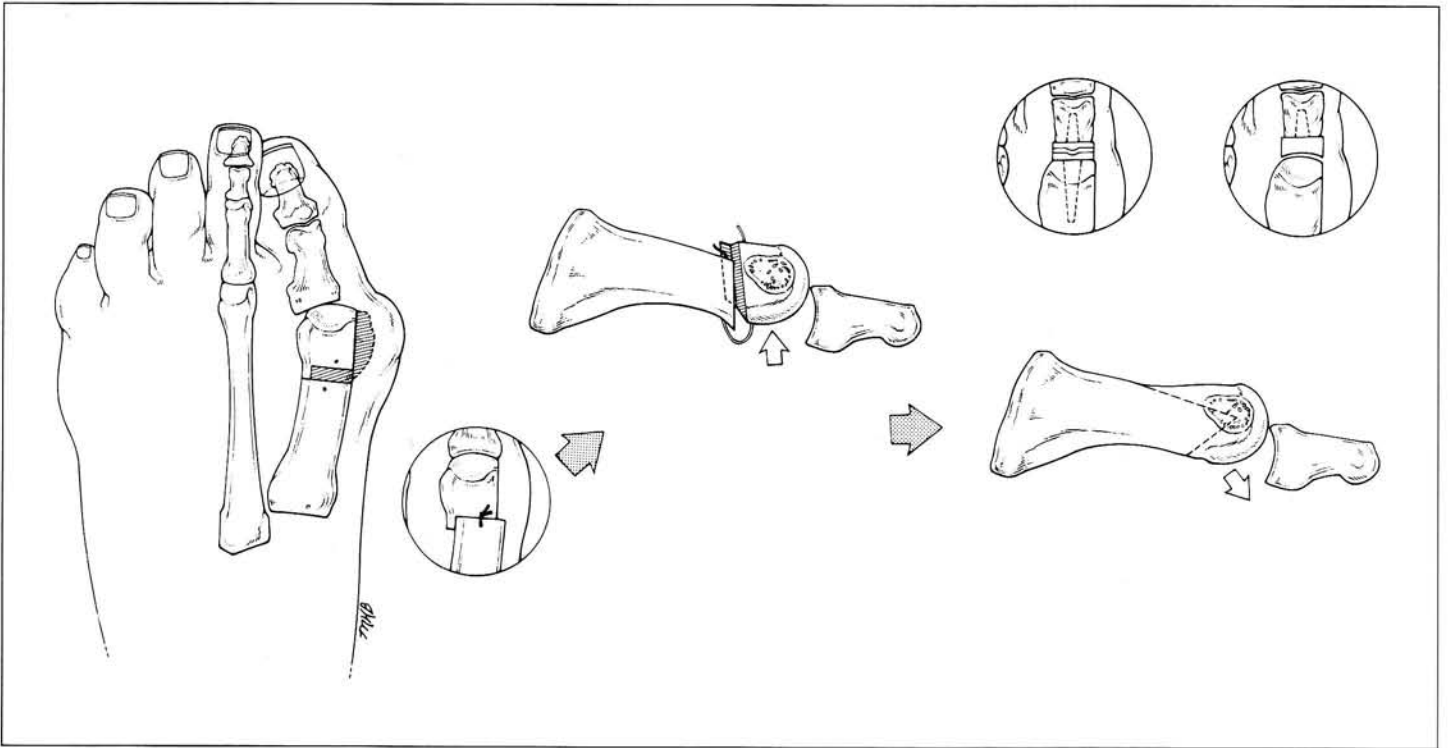


Fig. 5. Failed Mitchell bunionectomy corrected by hallux limitus surgery.

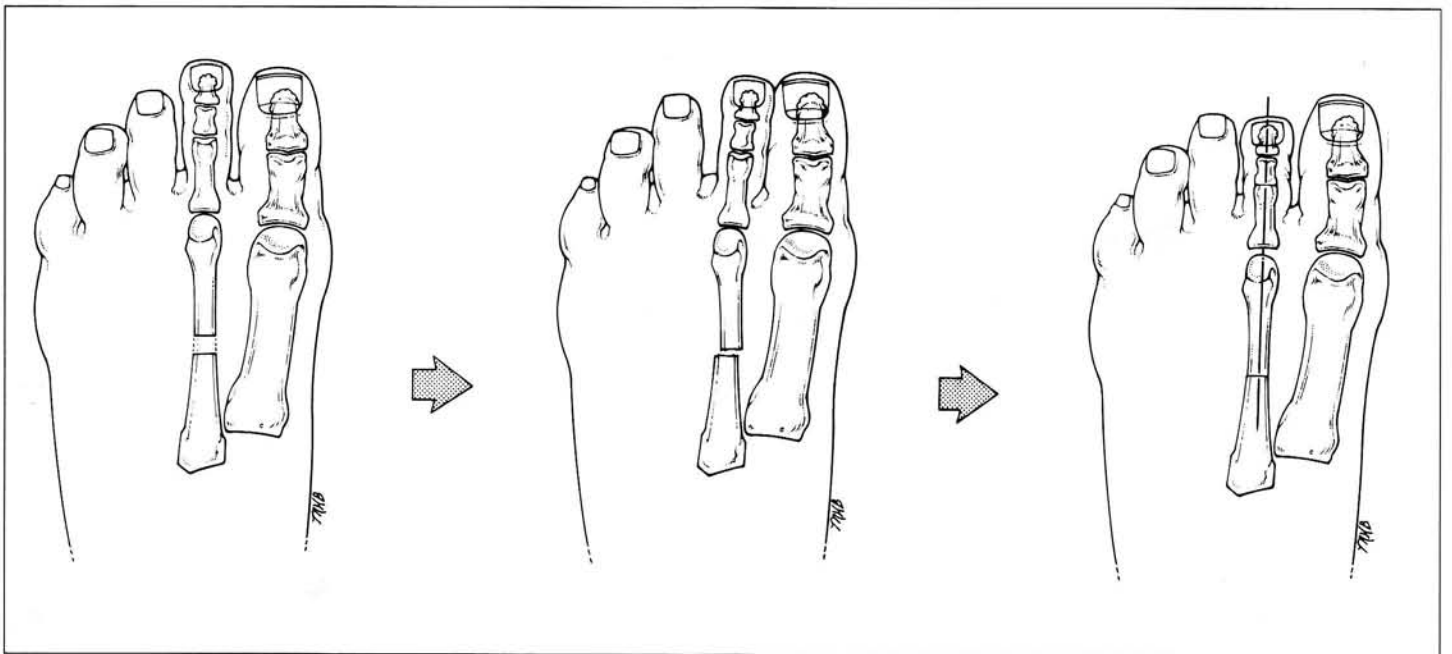


Fig. 6. Failed metatarsal shortening osteotomies corrected by digital arthrodesis procedures

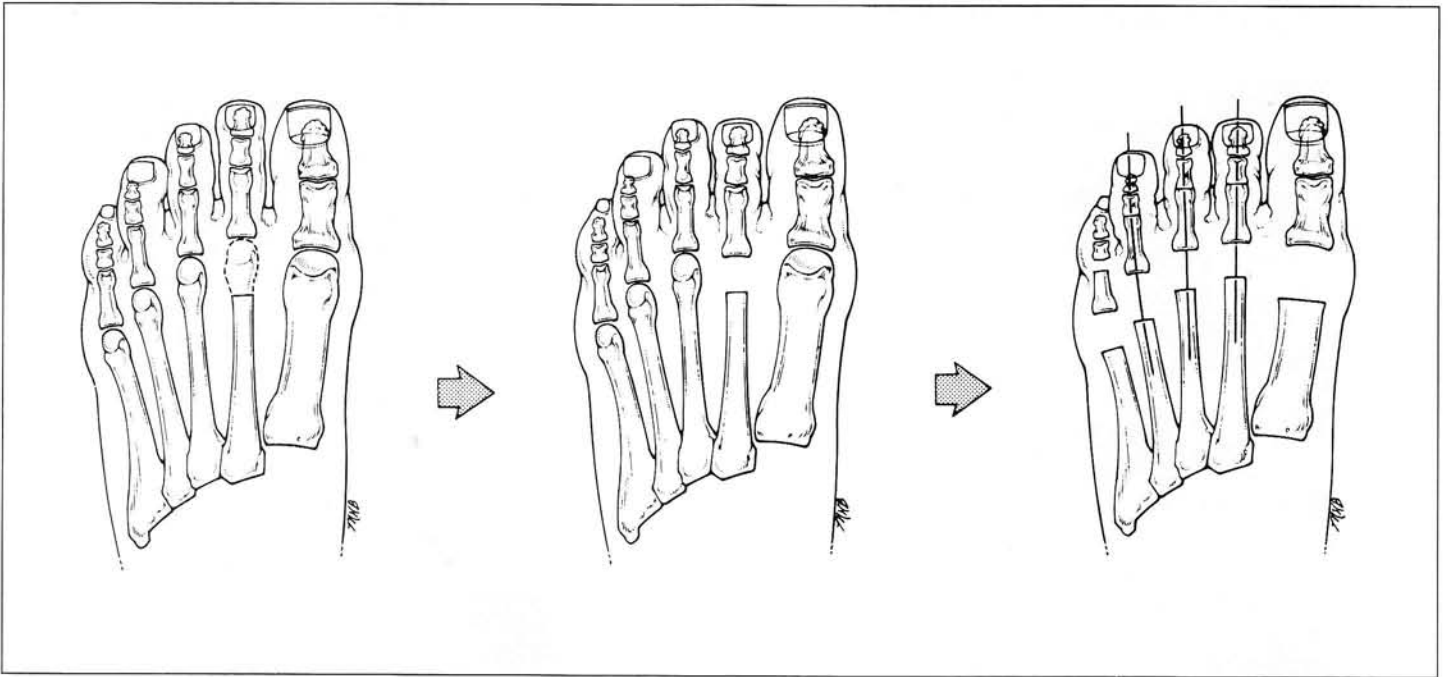


Fig. 7A. Clinical x-rays, preoperative

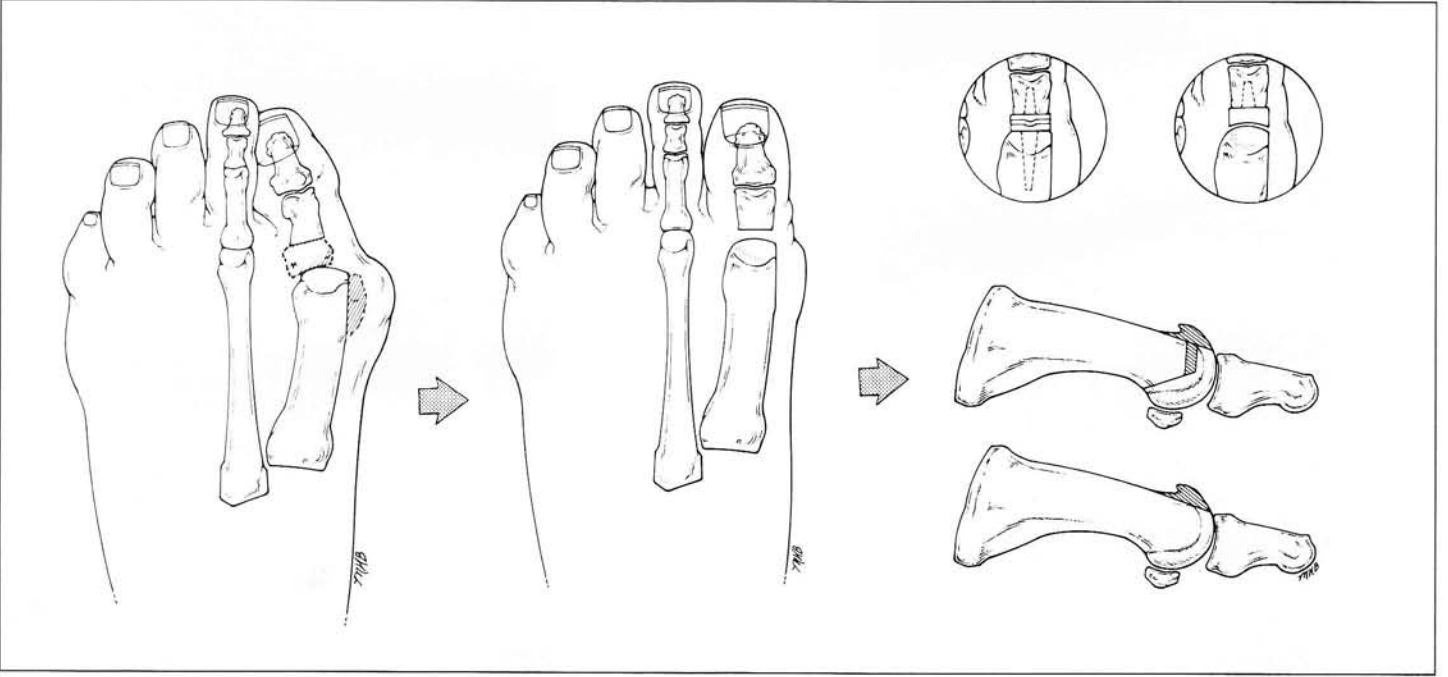


Fig. 7B. Clinical x-rays, postoperative





**Fig. 8.** Failed metatarsal head resection with floating toe syndrome corrected by digital arthrodesis to provide rigid lever arm and forefoot stability combined with pan metatarsal head resection.



**Fig. 9.** Failed Keller bunionectomy with shortened great toe corrected by implant arthroplasty. Alternative nonimplant options would include Watermann/Green and modified Cheilectomy procedures.

## CONCLUSION — SUMMARY

The optimal surgical result following surgical correction of the deformed foot can only be obtained by the surgeon who has a thorough understanding of the biomechanics and pathomechanics of foot function as it relates to human locomotion. With an appropriate diagnosis and proper selection of surgical procedures most of these iatrogenic deformities can be prevented.

### Bibliography

1. Banks AS, Bouchard JL: Reconstructive Surgery of the Forefoot, in McGlamry ED (ed.) *Reconstructive Surgery of the Foot and Leg Update '87*, pp. 75-78, 1987.
2. Battey MA: The Lesser Metatarsal Stress Fracture as a Complication of the Keller Procedure, *J Am Podiatry Assoc* 70:182-186, 1979.
3. Brahm S, Gerbert J: A Potential Cause of Hallux Adductus in Bi-correctional Austin Bunions, *J Am Podiatry Assoc* 73:155-157, 1983.
4. Edmonson AS, Crenshaw AH: *Campbell's Operative Orthopaedics*, 6th ed Vol. 1, C.V. Mosby Company, 1980.
5. Fenton CF: Postoperative Management Following Digital Surgery, *J Am Podiatr Med Assoc* 75:36-41, 1985.
6. Fishman SA: Diabetic Osteomyelitis: Long-Term Attempts at Salvage with Eventual Mortality, *J Am Podiatr Med Assoc* 27:310-315, 1988.
7. Fox IM, Pro AL: Lesser Metatarsophalangeal Joint Implants, *J Am Podiatr Med Assoc* 26:159-163, 1987.
8. Grace DL: Metatarsal Osteotomies: Which Operation?, *J Am Podiatr Med Assoc* 26:46-50, 1987.
9. Hodor L, Dobbs BM: Pan Metatarsal Head Resection, *J Am Podiatry Assoc* 73:287-292, 1983.
10. Iannucci AJ, King PL, Channell RW, Farrell DJ: Spontaneous Fractures of the Lesser Metatarsals Secondary to an Amputated Hallux and Peripheral Neuropathy, *J Am Podiatr Med Assoc* 26:66-71, 1987.
11. Inman VT: *DuVries' Surgery of the Foot*, III ed, Mosby Company, Saint Louis, 1973.
12. Kelikian H: *Hallux Valgus, Allied Deformities of the Forefoot and Metatarsalgia*, W.B. Saunders Company, 1965.
13. Kuwada GT: A Retrospective Analysis of Modification of the Flexor Tendon Transfer for Correction of Hammer Toe, *J Am Podiatr Med Assoc*, 27:57-59, 1988.
14. McGlamry ED: *Comprehensive Textbook of Foot Surgery*, Vol. 2, Williams & Wilkins, Baltimore, Maryland, 1987.
15. McGlamry ED: Floating Toe Syndrome, *J Am Podiatry Assoc* 72: 561-568, 1982.
16. Martin WJ, Mandracchia VJ, Aiken S: A Preliminary Analysis of Fibular Sesamoidectomy in the McBride Bunions, *J Am Podiatr Med Assoc* 73: 577-580, 1983.
17. Raney RB, Brashear HR: *Shands' Handbook of Orthopaedic Surgery*, VIII ed., C.V. Mosby Company, 1971.
18. Schlefman BS, Fenton CF, McGlamry ED: Peg in Hole Arthrodesis, *J Am Podiatry Assoc* 73:187-195, 1983.
19. Seligman RS, Trepal MJ, Giorgini RJ: Hallux Valgus Secondary to Amputation of the Second Toe: A Case Report, *J Am Podiatr Med Assoc* 76:89-92, 1986.