

Acquired Hallux Varus and Clinical Tolerability

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ABSTRACT

This retrospective study was undertaken to determine the long-term clinical problems, residual disability, and need for further surgery in patients with iatrogenic hallux varus. Between 1975 and 1985, in 16 (19 feet) of 83 patients who underwent foot surgery for hallux valgus or metatarsus primus varus, hallux varus deformity was noted at 1-year follow-up on dorsoplantar roentgenograms obtained with the patients bearing weight. Thirteen of those patients (16 feet) were reexamined at an average of 18.3 years (220 months) after surgery. The average hallux varus deformity in this group was 10.1°. Eleven patients (12 feet) rated their results as excellent. The average hallux metatarsophalangeal interphalangeal score for all patients was 91.5 points. Only those with extreme hallux varus deformity were dissatisfied or required further surgery.

INTRODUCTION

Iatrogenic hallux varus deformity after bunion surgery is a postoperative condition in which the great toe is oriented in medial deviation in relation to the first metatarsal head. Two types of iatrogenically induced hallux varus after hallux valgus surgery have been described.³ The first is the static or nondynamic type seen after Keller-Brandes, Silver, Mayo, and Hohmann type procedures. These techniques do not disturb first metatarsophalangeal (MTP) muscle balance. The malalignment results mainly from excessive resection of the medial bunion or from joint laxity after resection arthroplasty. The other type is the dynamic varus deformity in which the muscle balance is disturbed. This condition may occur after any procedure that involves the adductor mechanism, such as in release of the adductor muscle, release of the lateral head of the

flexor hallucis brevis, or resection of the lateral sesamoid.^{2-4,8}

The true incidence and significance of this disorder remains poorly delineated. A review of the literature reveals reports of patients whose principal complaint is poor cosmesis or difficulty with shoe fit, rather than pain. In addition, all reports covered patients seeking treatment or those seen in malpractice consultation, rather than reviewing hallux valgus patients as a group.

This retrospective study was undertaken to determine clinical problems, residual disability, and need for further surgery in patients with iatrogenic hallux varus of at least 10 years' duration.

MATERIALS AND METHODS

Of 83 patients with 109 feet who were treated for hallux valgus deformity and metatarsus primus varus between 1975 and 1985, a hallux varus deformity was diagnosed on the 1-year follow-up radiographs in 16 patients (19 feet). The average age in this population was 30.9 years (range, 16-61 years). The index procedure in 15 patients (18 feet) was a basal closing wedge osteotomy in combination with an adductor tenotomy and a bunionectomy. In one case, a Keller-Brandes procedure for hallux rigidus symptoms was added.

Thirteen patients (16 feet) were examined in our office by one author (T.H.-J.) at 168 to 266 months (average, 220 months) after surgery. Three patients could not be contacted despite intensive efforts.

Radiological Assessment

Dorsoplantar (weightbearing) and lateral radiographs were obtained before surgery, 1 year after surgery, and at the time of the final follow-up. The hallux valgus angle, the first intermetatarsal (IM) angle, the congruency of the first MTP joint, and the metatarsal index were measured by the methods recommended by the American Orthopaedic Foot and Ankle Society.⁹ For the measurement of the first IM angle, two straight lines bisecting the head and the base of

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the first and second metatarsals were used as described by Carr and Boyd¹ in 1968. The sesamoid position was evaluated by measuring the position of the medial sesamoid relative to a longitudinal line bisecting the first metatarsal shaft (reference line) and was classified in the following way: grade 0, no displacement of sesamoid relative to the reference line; grade I, overlap of less than 50% of sesamoid relative to the reference line; grade II, overlap of greater than 50% of sesamoid relative to the reference line; and grade III, sesamoid completely displaced beyond the reference line.

Clinical Assessment

At the time of the final follow-up, patients were interviewed and graded using a standardized questionnaire¹⁰ based on the hallux MTP interphalangeal scale of the American Orthopaedic Foot and Ankle Society.⁵ In addition, patients were asked to rate their feet for overall satisfaction; the cosmesis was rated by the patient together with the examiner.

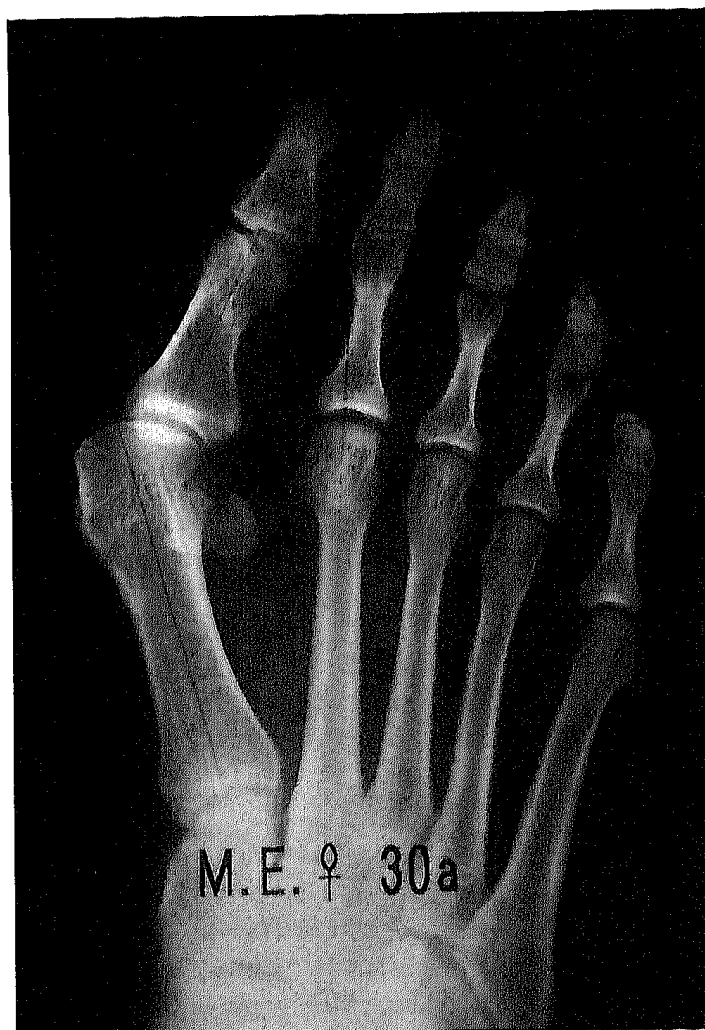


Fig. 1. Patient 9. This 30-year-old woman had a preoperative roentgenogram showing an angle of 42° between the phalanx and the metatarsal bone of the great toe and an angle of 20° between the first and second metatarsals.

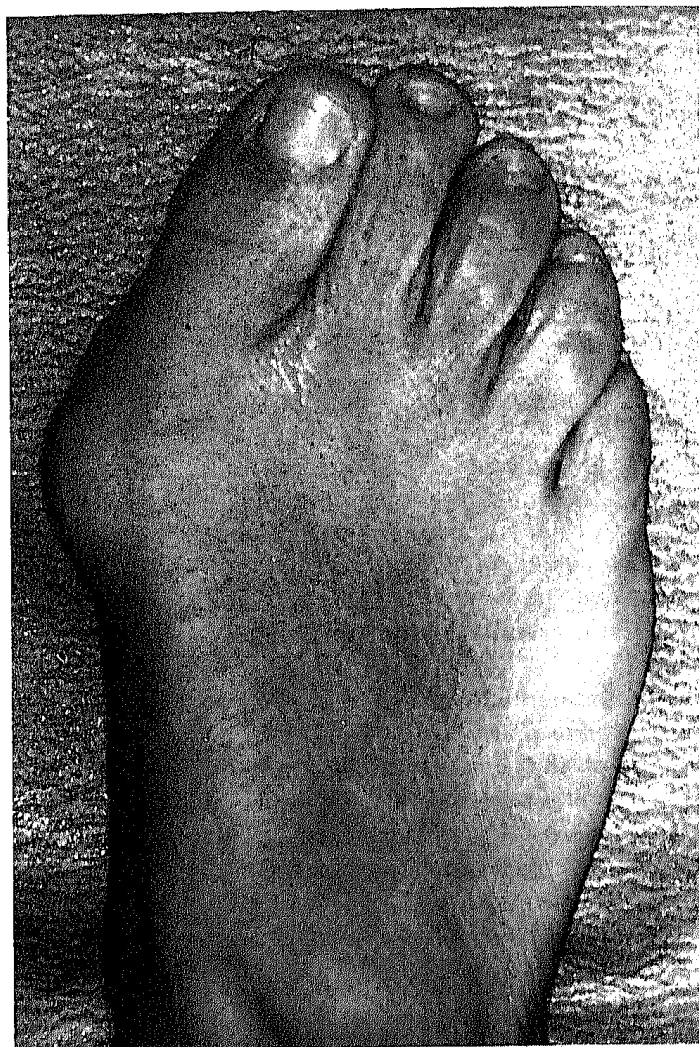


Fig. 2. The preoperative clinical appearance of patient 9.

RESULTS

The radiographic results revealed an average preoperative MTP angle of 35.7° (standard deviation [SD], 7.6° ; range, 26° to 46°) (Figs. 1 and 2). At long-term follow-up, the average hallux varus angle was 10.1° (SD, 7.6° ; range, 2° to 24°). The average preoperative first IM angle was 15.8° (SD, 2.7° ; range, 12° to 20°). At long-term follow-up, there was a negative angle between metatarsals 1 and 2 in four cases, whereas the average IM angle of the other feet was 4° (Figs. 3 and 4).

The sesamoid position was corrected from an average grade of 2.5 before surgery to 0.4 after surgery.

The clinical questionnaire revealed complete satisfaction in 9 patients (12 feet); the average hallux MTP interphalangeal score was 91.3 points. Three patients, one with a hallux varus angle of 24° , one with a hallux varus angle of 17° and one with a hallux varus angle of 16° , were dissatisfied, primarily because of the cosmetic appearance of the great toe. One patient with a hallux varus deformity of 28° was dissatisfied, and a salvage procedure with medial capsule release was

TABLE 1

Patient No.	Age (yr)	Follow-up (mo)	HV		Patient satisfaction	HMIS ^a	Pain	Complications
			Preop	Postop				
1	42	119	31	-5	Excellent	95	No	
2	18	241	N.A.	-3	Excellent	100	No	
3	21	168	35	-3	Excellent	95	No	
4	28	197	N.A.	-4	Excellent	100	No	
4a	28	197	N.A.	-2	Excellent	100	No	
5	38	N.A.	30	-5		Unknown stay		
6	16	241	29	-16	Dissatisfied	83	No	
7	32	162	42	-2	Excellent	100	No	
8	17	240	32	-4	Excellent	93	No	
9	30	216	42	-10	Excellent	88	No	Metatarsalgia
10	61	160	46	-18	Excellent	100	No	Metatarsalgia
11	32	N.A.	27	-12		Unknown stay		
12	32	185	47	-24	Dissatisfied	49	Moderate	Metatarsalgia
13	30	241	40	-15	Excellent	87	No	
14	27	251	46	-8	Excellent	100	No	
15	37	N.A.	38	-8	Unknown stay			
16	25	266	36	-12	Excellent	100	No	
16a	25	266	41	-28/-4 ^a	Dissatisfied/ excellent ^a	49/95	No	After salvage procedure 9 years after index procedure, metatarsalgia ^a
17	36	265	26	-17	Dissatisfied	95	No	Metatarsalgia

^a Hallux metatarsophalangeal interphalangeal scale (AOFAS; see Ref. 5).

performed 154 months after surgery (Fig. 5). At the final follow-up 266 months after the primary hallux valgus surgery and 112 months after the salvage procedure, the patient was totally satisfied with the result (Figs. 6 and 7). Eleven patients rated the clinical appearance of their great toe as satisfactory despite radiological measured hallux varus deformity between 2° and 17°. In one patient who was 76 years old at the time of the long-term follow-up, in whom a Keller-Brandes procedure was added to the basal closing wedge osteotomy, a hallux varus deformity of 18° was measured. She was completely satisfied with the procedure; the hallux varus deformity was not so obvious because of the short great toe after the Keller-Brandes procedure.

Fifteen patients were pain-free, and one patient (24° hallux varus) complained of moderate to severe pain around the first MTP joint and the medial side of the great toe, particularly with shoe wear and metatarsalgia. This was also the only patient who complained of restriction of activities. Six patients complained of metatarsalgia underneath the lateral metatarsal heads; the average hallux varus angle in those patients was 14.6° (range, -4° to -24°).

DISCUSSION

Causes of hallux varus after hallux valgus surgery include removal of the fibular sesamoid, excessive medial capsular reefing, removal of an excessive

amount of the medial eminence, overcorrection of the IM angle, excessive plantar lateral release, and excessive postoperative bandaging; these have been described in the literature.^{2,3,8} Various treatment modalities have been advocated.^{2,4,6-8}

Analyzing our cases, a nondynamic type of acquired hallux varus deformity after a Keller-Brandes procedure was noted in one foot. In 10 feet, the varus deformity could be related to excessive resection of the medial eminence. In 4 of these 10, we observed overcorrection of the IM angle because of removal of an oversized wedge. Excessive medial capsulorrhaphy was the cause for the acquired varus deformity in eight feet. Severe deformities of $\geq 15^\circ$ varus deformity were only noted after excessive resection of the medial eminence. Therefore, excessive resection of the medial eminence should be avoided in any kind of hallux valgus surgery.

The incidence of acquired hallux varus after hallux valgus surgery varies from 4% to 13%.^{2,4,6} We defined the presence of hallux varus deformity if the hallux valgus angle was less than 0° on dorsoplantar weight-bearing radiographs. Therefore, the incidence of hallux varus in our series of basal closing wedge osteotomy was 17% with an average degree of deformity of 10.1° (2° to 24°). In eight cases, there was a minimal hallux varus deformity of less than 8°. Our average deformity is less than that described by Johnson and Spiegl,⁴ who measured 18° (6° to 45°), or Skalley and



Fig. 3. Nineteen years after primary surgery, patient 9 had a varus deformity of 10°.

Myerson⁸ who measured 23° (10° to 45°). However, they included only patients who required salvage surgery.

Should the diagnosis of hallux varus be based on radiographic or clinical appearance? Edelmann² stated, in 1991, that the diagnosis of hallux varus is primarily based on clinical observation. We believe that, while reviewing the results of hallux valgus correction procedures, one should define every hallux valgus angle less than 0° measured on dorsoplantar weightbearing radiographs as varus deformity.

What degree of varus deformity is well tolerated clinically? Mann et al.⁹ stated that in their series of 13 varus deformities after 109 procedures for hallux valgus correction, a mild degree of varus angulation did not seem to bother the patients. Analyzing our results, we were able to confirm this statement. Only two patients were dissatisfied with the results. Both had a varus angulation of >15° (16° and 24°), and with this degree of angulation, both patients had difficulty putting on their shoes. However, 15° is not an absolute

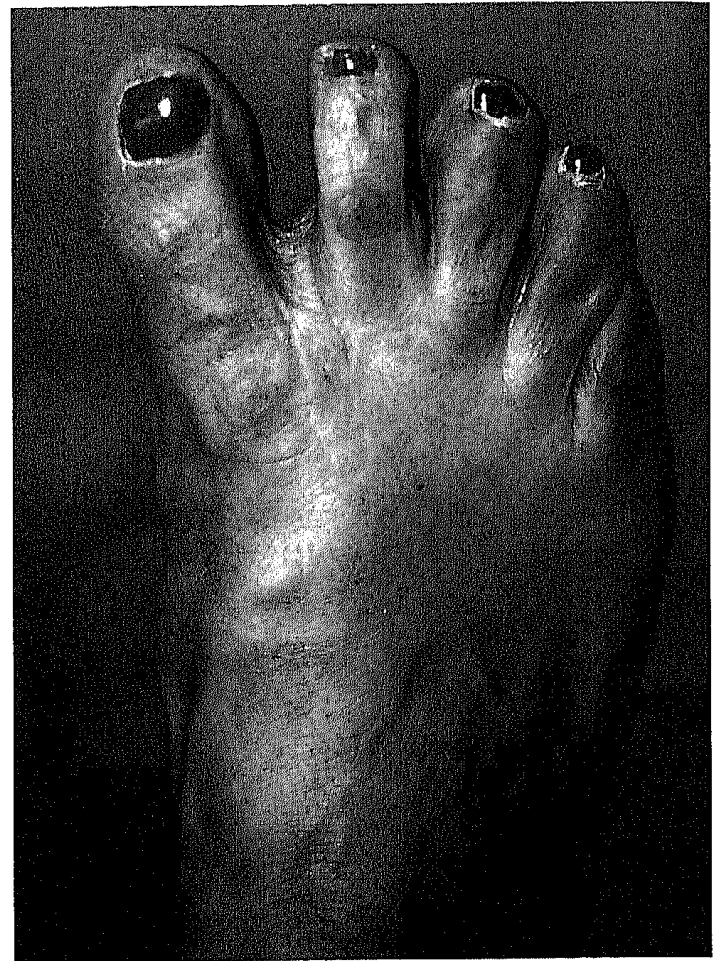


Fig. 4. The clinical appearance of Patient 9 is shown 19 years after primary surgery. The patient was very satisfied with the result.

cutoff, because there was also a patient with 17° hallux varus deformity who was totally satisfied with the result of the procedure for hallux valgus deformity.

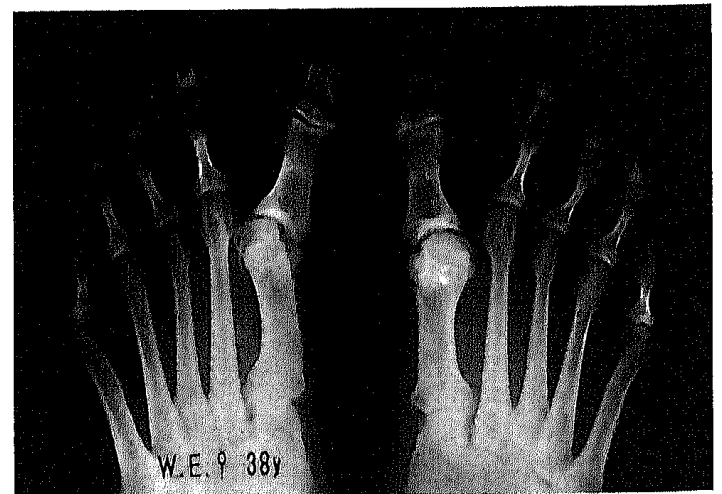


Fig. 5. Patient 16. Radiographs were obtained 13 years after surgery. Hallux varus deformity was seen on both sides, with a 28° hallux varus deformity on the left side. The patient was dissatisfied, and additional surgery was planned.

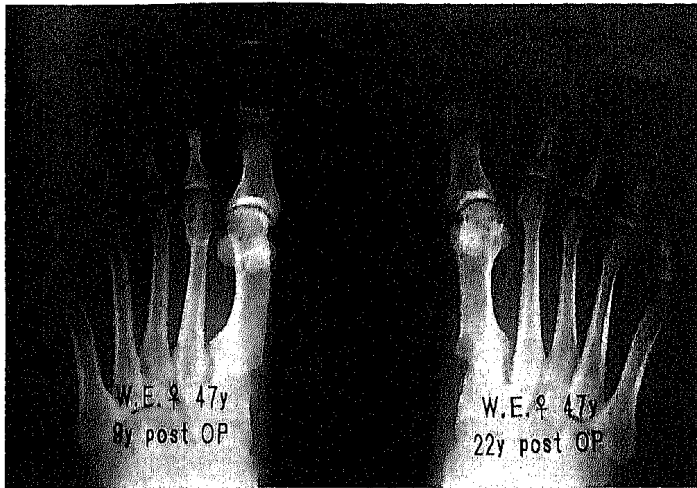


Fig. 6. Patient 16. Radiographs were obtained 22 years after primary surgery and 9 years after correction on the left side. There was a varus deformity of 12° on the right side and 4° on the left side.



Fig. 7. Patient 16. The clinical appearance is shown 22 years after primary surgery and 9 years after correction on the left side. The patient was very satisfied with the result.

She was pain-free around her first MTP joint and was able to wear fashionable shoes.

CONCLUSION

Only a higher degree of hallux varus deformity (16° to 24°) is clinically troublesome; a small hallux varus angle on radiographs does not have any clinical relevance. A high degree of hallux varus angle that is symptomatic may require salvage surgery.

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