Acta orthop. scand. 54, 938–942, 1983

DOUBLE OBLIQUE DISPLACEMENT OSTEOTOMY FOR HALLUX VALGUS

RENÉ CETTI & STEEN-ERIK CHRISTENSEN

Orthopaedic Surgery Hospital, Sorø, Denmark

Surgical treatment of adult hallux valgus was carried out in 57 feet using the double oblique displacement osteotomy described by Wilson. Twenty weeks after the operation, no patients had inconvenient problems when walking. The results were classified as excellent in 52 feet. Wilson's operation was found to be a simple, reliable procedure, giving satisfactory correction of the valgus deformity.

Key words: bunion; displacement osteotomy; hallux valgus; Wilson's operation

Accepted 25.v.83

Basically, hallux valgus is corrected by three types of operation: osteotomy, arthroplasty and arthrodesis. Each type of operation has numerous variations, most of which involve osteotomy of the first metatarsal bone (Helal et al. 1974). Most common are the displacement osteotomies described by Hohmann and modified by Thomasen (Mygind 1952, Dovey 1969), by Mitchell et al. (1958) and by Wilson (1963).

Although seemingly simple, successful treatment of hallux valgus can be difficult. Helal et al. (1974) compared eight different surgical procedures (Golden 1961, Joplin 1950, McBride 1928, Mitchell et al. 1958, modified McBride (unpublished), Peabody 1931, Simmons & Menelaus 1960, Wilson 1963) and concluded that the Wilson displacement osteotomy of the first metatarsal bone was the best treatment for adult hallux valgus. The surgical procedure was later modified slightly (Helal et al. 1974). In this later study all patients were younger than 35 years.

The reason for conducting the present study was the impression of an unacceptably high percentage of unsatisfactory results of the Hohmann procedure in our department. As some of the failures were obviously due to technical errors, we looked for an operation which was simpler than Hohmann's somewhat technically difficult procedure.

PATIENTS AND METHODS

From November 1980 to July 1981, modified Wilson's osteotomy was performed on 57 feet in 39 patients. In all cases the indication for operation, as for the Hohmann procedure, was hallux valgus with a painful bunion and associated functional disability. A few patients were operated primarily because of an unacceptable cosmetic appearance. Patients with hallux rigidus, arthrosis and other diseases of the first metatarsophalangeal joint were excluded from the study. All patients participated in the follow-up examinations 6, 8 and 20 weeks after the operation. There were 34 women and 5 men with a mean age of 48 years (range 15–72 years). Thirty-one were operated on the right side, and 26 on the left. Eighteen patients were operated simultaneously on both feet. The symptom period varied from 3 to 30 years (mean 13 years).

The operation is performed in a bloodless field using a tourniquet. The neck of the first metatarsal bone is exposed through a longitudinal dorsi-medial incision. The osteotomy is performed with an oscillating saw, commencing at 45° to the main axis of the bone, just proximal to the exostosis, which if prominent is removed. The saw is directed so that the bone is trans-

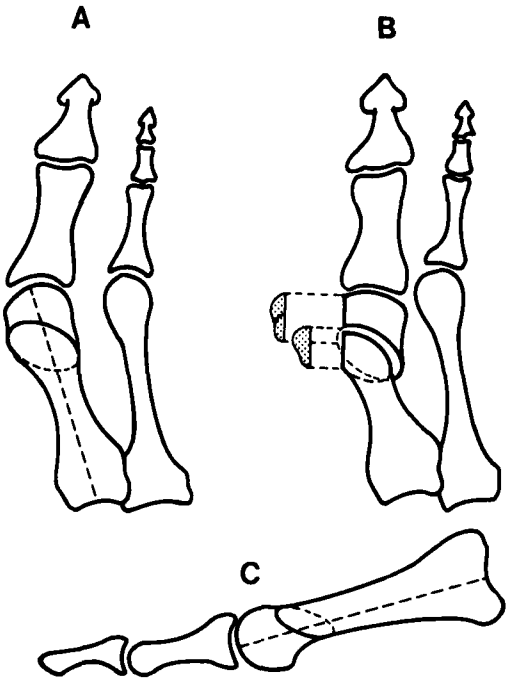
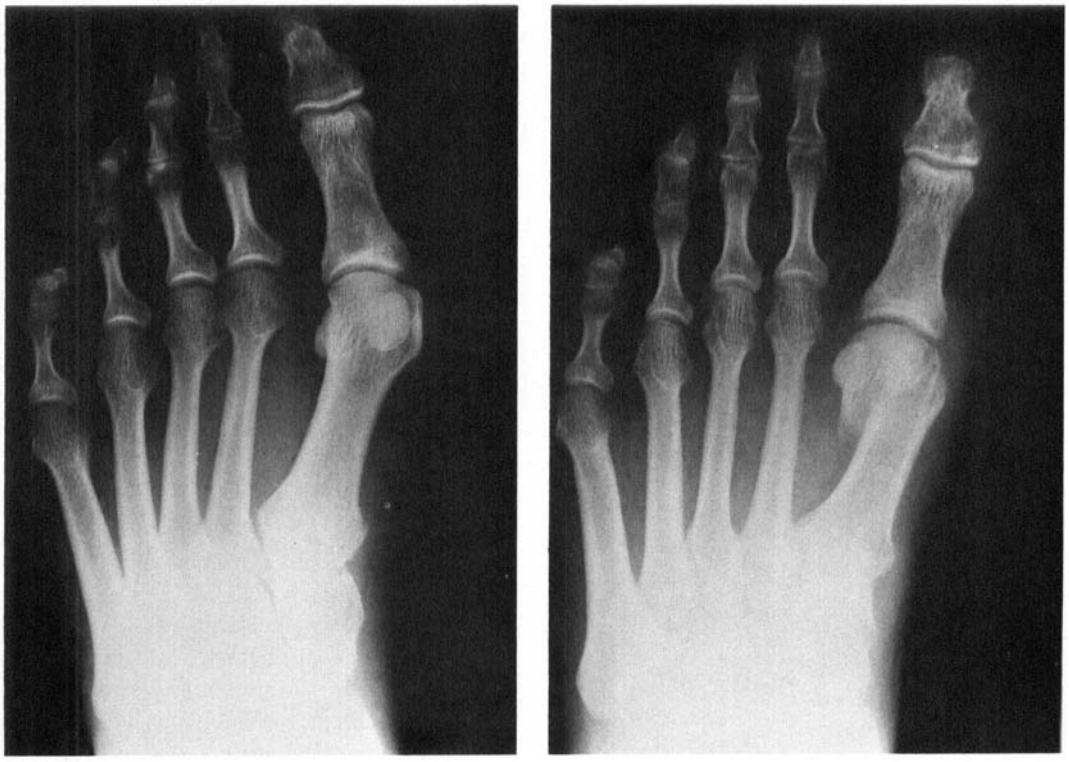


Figure 1. Modified Wilson's oblique osteotomy of the first metatarsal shaft. A: Dorsal view, preoperative. B: Dorsal view, postoperative. C: Lateral view, preoperative. —— Osteotomy plane commencing 45° to the metatarsal axis. ---- Metatarsal axis. The dotted area is cut off during the operation.

sected obliquely plantarwise and proximally from the dorsum (Figure 1). This prevents the dorsal tilting of the distal fragment and also increases the area of contact at the bone ends, enhancing sound union. After displacing the distal fragment laterally, the medial projecting spike of the proximal fragment is cut off to narrow the forefoot further. After closure of the wound and with the toe in the desired position, a below-knee walking plaster is applied for 6 weeks. To maintain the position of the hallux, a plaster bridge is formed between the first and second toe.

The operations were performed by the usual staff of surgeons with varying experience.



a b

Figure 2. A: Preoperative X-ray of the forefoot. B: X-ray of the forefoot 6 weeks after the operation.

RESULTS

At the follow-up, 6 weeks after the operation, all feet were radiographed. Preoperative pictures were compared to those taken after 6 weeks (Figure 2). The angles of the hallux valgus and the intermetatarseal angles were measured (Figure 3). The mean preoperative angle of hallux valgus was 35° (range 12–60°), compared to a mean of 10° (range 2–22°) postoperatively. The mean preoperative intermetatarseal angle was 13° (range 2–27°), compared to a mean of 8° (range 0–16°) after the operation.

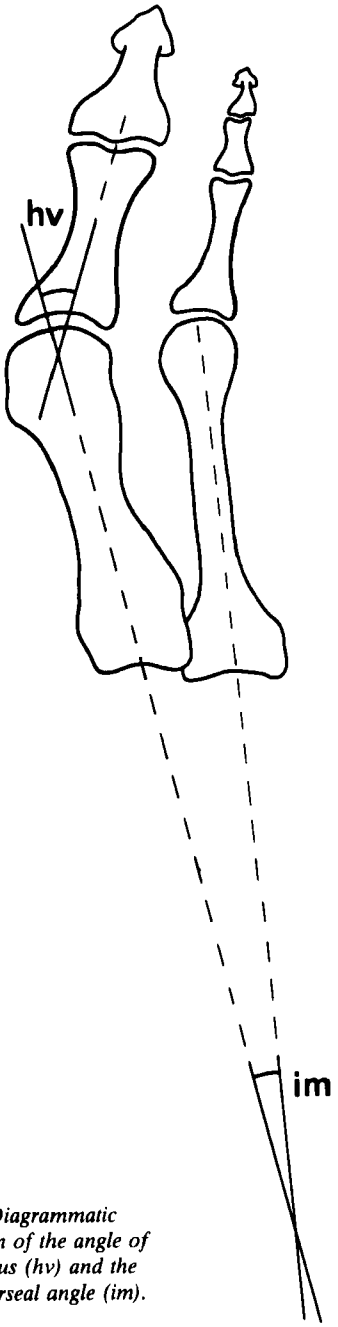


Figure 3. Diagrammatic presentation of the angle of hallux valgus (hv) and the intermetatarseal angle (im).

One patient had radiological signs of non-union at the 6-week follow-up. Weight-bearing was deferred until 8 weeks postoperatively, at which time an X-ray showed initial callus formation. Four patients, including the above-mentioned, had edema in the area of operation. One of these patients had an area distal to the incision with diminished sensibility.

At clinical examination, 8 weeks after the operation, two patients had edema of the hallux. The patient with the disturbance of sensibility had not improved, but the edema had subsided. Four patients, including the two with edema had intermittent pain in the forefoot when walking.

At clinical examination after 20 weeks, all the patients, except the one with disturbance of sensibility, had normal foot conditions and normal gait without inconvenient problems. The patient with diminished sensibility was satisfied and did not need further treatment.

Twenty weeks after the operation, the 57 feet were classified as excellent, good or poor according to the criteria listed in Table 1. Fifty-two were excellent and five were good.

A shortening of the first metatarsal bone was found in 48 cases. The mean shortening was 5 mm, (range 1–12 mm). In addition, all patients had a narrowing of the forefoot postoperatively (Table 2).

DISCUSSION

Wilson's double oblique osteotomy allows correction of the varus position of the first metatarsal head, as well as elimination of the valgus deformity, slackens the conjoined adductor tendon and relaxes other tight structures. Moreover non-union in the oblique section is very seldom seen, as opposed to transverse osteotomy, where it poses a serious problem in some cases (Edgar 1976). The lateral displacement of the distal

Table 1. Criteria for result classification (Bonney & McNab 1952)

Results	Hallux valgus (degrees)	Inter-metatarseal angle (degrees)	Range of movements of the first metatarsophalangeal joint	Symptoms	Function
Excellent	0–20	0–12	Full range	Nil	Full
Good	0–30	0–16	Some limitation of dorsiflexion or active plantar flexion	Occasional ache in the metatarsophalangeal joint. No bunion	Satisfactory
Poor	>30	>16	Marked limitation of movements or no movement	Frequent pain in the metatarsophalangeal joint. Bunion present	Impaired

Table 2. Narrowing of the forefoot after operation in 57 feet

	Number of cases
16–20 mm	1
12–15 mm	9
8–11 mm	31
4–7 mm	9
0–3 mm	7
Total	57

fragment also reduces partly or completely the subluxation of the first metatarsophalangeal joint (Edgar 1976, Gibson & Piggott 1962). Wilson's operation includes a plantar displacement of the first metatarsal head which is necessary to avoid excessive strain on the heads of the lesser metatarsals, a condition often producing metatarsalgia (Mitchell et al. 1958).

The shortening of the first metatarsal bone in our study compares to the results following other osteotomies (Mitchell et al. 1958, Gibson & Piggott 1962, Søjbjerg & Sommer 1980). The narrowing of the forefoot is also in accordance with other reports (Helal 1981).

Eighteen patients were operated simultaneously on both feet. The double below-knee plaster did give some extra walking problems, but all patients were able to walk with crutches. Bilateral operation had no influence on the end result.

The relatively short observation period in our study revealed excellent results in 52 of 57 feet. Other distal osteotomies have excellent or good results in 73–92% (Mitchell et al. 1958, Gibson & Piggott 1962, Wilson 1963, Dovey 1969, Glynn et al. 1980, Helal 1981). We can conclude that the Wilson osteotomy as a treatment for adult hallux valgus has the same indications as the Hohmann procedure.

Helal (1981) stated that the more complex the operative procedure, the worse the results. Wilson's osteotomy is classified as the simplest among eight different operations (Helal 1981). We too found it very simple to perform. It offers an optimal treatment of hallux valgus for patients without arthrosis of the first metatarsophalangeal joint or hallux rigidus.

In our opinion, this operation, which is fairly common in some countries, deserves a higher priority than seen today.

REFERENCES

Bonney, G. & McNab, I. (1952) Hallux valgus and hallux rigidus – critical survey of operative results. *J. Bone Joint Surg.* **34**-B, 365–385.

Dovey, H. (1969) The treatment of hallux valgus by distal osteotomy of the first metatarsal. *Acta Orthop. Scand.* **40**, 402–408.

Edgar, M. A. (1976) Hallux valgus and associated conditions. In: (Ed. Klenermann, Leslie). *The foot and its disorders.* Blackwell Scientific Publications, Oxford, London, Edinburgh, Melbourne.

Gibson, J. & Piggott, H. (1962) Osteotomy of the neck of the first metatarsus in the treatment of hallux valgus. *J. Bone Joint Surg.* **44**-B, 349–355.

Glynn, M. K., Dunlop, J. B. & Fitzpatrick, D. (1980) The Mitchell distal metatarsal osteotomy for hallux valgus. *J. Bone Joint Surg.* **62**-B, 188–191.

Golden, G. N. (1961) Hallux valgus, the osteotomy operation. *Br. Med. J.* **1**, 1361–1365.

Helal, B. (1981) Surgery for adolescent hallux valgus. *Clin. Orthop.* **151**, 50–63.

Helal, B., Gupta, S. K. & Gojaseni, P. (1974) Surgery for adolescent hallux valgus. *Acta Orthop. Scand.* **45**, 271–295.

Hohmann, G. (1921) Symptomatische oder physiologische Behandlung des Hallux Valgus. *Münch. Med. Wochenschr.* **33**, 1042–1045.

Joplin, R. J. (1950) Sling procedures for correction of splay foot, metatarsus primus varus and hallux valgus. *J. Bone Joint Surg.* **32**-A, 779–785.

McBride, E. D. (1928) A conservative operation for bunions. *J. Bone Joint Surg.* **10**, 735–739.

Mitchell, L., Fleming, J. L., Allen, R., Glenney, C. & Sanford, G. A. (1958) Osteotomy-bunionectomy for hallux valgus. *J. Bone Joint Surg.* **40**-A, 41–58.

Mygind, H. (1952) Operations for hallux valgus. *J. Bone Joint Surg.* **34**-B, 529.

Peabody, C. W. (1931) The surgical cure of hallux valgus. *J. Bone Joint Surg.* **13**, 273–282.

Simmonds, F. A. & Menelaus, M. B. (1960) Hallux valgus in adolescence. *J. Bone Joint Surg.* **42**-B, 761–768.

Søjbjerg, J. O. & Sommer, H. (1980) Follow-up investigation of 148 operations for hallux valgus by Hohmann-Thomasen's method. *Ugeskr. Laeg.* **142**, 2893–2895.

Wilson, J. N. (1963) Oblique displacement osteotomy for hallux valgus. *J. Bone Joint Surg.* **45**-B, 552–556.

Correspondence to: René Cetti, Hulkærvej 28, 2860 Søborg, Denmark.