FROM THE ORTHOPAEDIC CLINIC, VANFÖREANSTALTEN, STOCKHOLM. CHIEF: PROF. STEN FRIBERG

REMOVAL OF THE BASE OF THE PROXIMAL PHALANX IN HALLUX RIGIDUS

BY

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Conservative treatment of hallux rigidus, or hallux flexus, as it is also called, will not be discussed here. This paper is concerned with drawing attention to a simple operation for cases of hallux rigidus which can not be treated conservatively.

"De-basing" of the big toe, in other words, removal of the proximal part of the proximal phalanx (see Fig. 8), replaces the stiff, painful, metatarso-phalangeal joint by a painless soft-tissue connection acting as a new joint. The method it not new; it has for a long time been used for both hallux rigidus and hallux valgus, but, as far as I know, there are no follow-up studies to indicate its usefulness.

The material chosen for studying the results of "de-basing" was made up of cases operated upon in the Orthopaedic Clinic,

TABLE I.
The Material.

	Men	Women	Total
Unilateral operation	8	18	26
Bilateral operation	2	3	5
Total	10	21	31
No. of operated toes	12	24	36

Read at the meeting of the *Nordisk Ortopedisk Forening*, June 1947, Stockholm.

Vanföreanstalten, Stockholm, during the years 1938-41. The original material included 33 patients, 10 men and 23 women: of these one woman had died and one could not be found.

Of the remaining 31 patients 26 had unilateral and 5 bilateral operations (Table I). The age at operation varied from 16 to 66 years (Table II). The 36 toes were followed-up 3-8 years after operation; 25 toes (21 patients) were examined clinically and radiographically, and detailed written information was obtained about the remaining 11 toes (10 patients).

TABLE II.

Age at Operation.

Age (in years)	16—20	21—30	31—40	41—50	51—60	61—70	Total
No. of patients	5	9	5	7	3	2	31
No. of operated toes.	7	10	7	7	3	2	36

TABLE III.

Years Between Operation and Follow-up.

Years after operation	3	4	5	6	7	8	Total
No. of patients	4	5	8	7	6	1	31
No. of operated toes	4	7	8	8	8	1	36

At operation the proximal half of the proximal phalanx of the big toe is usually removed through a straight, or slightly curved, medial incision. The long flexor tendon is attached to the plantar surface of the phalanx through the 1st vaginal ligament and must be freed and held aside, otherwise it can easily be damaged. In this material the tendon was twice unintentionally divided during the operation and had to be sutured. Otherwise no complications were encountered. Passive movements were usually begun 5-6 days after operation, and weight-bearing was allowed after an average of 10 days. Usually the patients returned to work from 4 to 8 weeks

after operation, according to whether they had strenuous physical work or not.

The functional results of this simple operation are excellent. Only 1 of the 36 toes is not improved; 4 have marked improvement, and the remaining 31 cases are from the functional point of view symptom-free (Table IV); that is to say, the patient can do his work, even if it is physically strenuous, has no aching or pain in the toe, and can walk, play games and dance without any discomfort.

TABLE IV.

Late Functional Results.

Symptom-Free	Improved	Not improved	Total
31	4	1	36

Fig. 1.

Left Right

No. 4173/39. B. J., ♀, 6 years after operation. Painful crepitations on movement of the left big toe, in which the resected phalanx has a long lateral horn lying against the head of the metatarsal and giving the big toe a varus position. No pain from the right big toe.

The unsuccessful case (Fig. 1) complained, when examined 6 years after operation, of pain at the base of the left big toe when she walked. Both active and passive movements of the toe were accompanied by painful crepitations. The radiograph showed a long lateral horn from the phalanx lying against the deformed metatarsal head. The right big toe had also been operated on at the same time and had perfect function. If

Fig. 2.

Left Right

No. 2203/39. G. A., ♂, 5 years after operation. Right toe completely symptom-free. The base of the left toe gives occasional slight pain on movement. Walks without discomfort.

both sides are compared it is striking how much wider the neoarthrosis is on the right than on the left side (5 compared with 1½ mm.). The patient herself asked at the follow-up for another operation on the left toe. The proximal phalanx was further shortened and trimmed and the symptoms disappeared.

The 4 "considerably improved" toes are given in detail: The first patient (Fig. 2) had a bilateral operation; he complains of occasional slight pain in the left toe on movement, but he can walk without discomfort and can do his work as a typesetter. The second patient can walk six miles and play games without discomfort, but she cannot wear all heights of heel

and is therefore not quite symptom-free, though there has been marked improvement since the operation. Only 1/5 of the phalanx was found to be missing at the follow-up examination, and certainly the de-basing should have been more extensive. The third patient reported that she could not walk more than half a mile without discomfort and was displeased because the toe was short and ugly. The reason for the poor

Fig. 3.

Left Right

No. 4241/39. I. A., ♀, 5 years after operation. Left big toe: Only 8 mm. of the proximal phalanx remains, compared with 28 mm. on the normal side. Flail toe.

function could not be determined since the patient only answered a questionnaire and did not come for examination. The fourth patient (Fig. 3) has a short, ugly, flail toe in a slightly varus position, but can walk about two miles without discomfort, which was not possible before operation. Only 8 mm. of the proximal phalanx (measured on the radiograph) remains, as compared with 28 mm. on the normal side. Obviously too much was removed and the toe lost its stability.

3 of the 5 patients who did not have perfect functional results of the operation show faults which one should be able to avoid with good surgical technique.

The remaining 31 cases (86 %) have, from the practical point of view, normal function. They can walk, dance and play games without any disability, have no aching or pain with reasonable use of the foot, and have no reduction of their

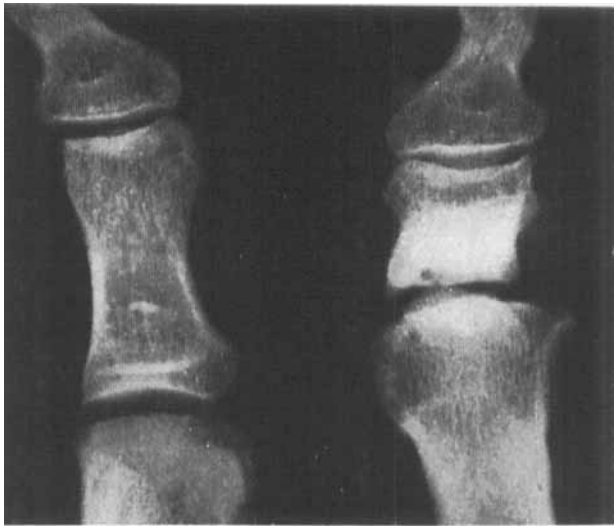

Fig. 4.

Left Right

No. 2258/41. H. J., ♂, 3 years after operation. Right big toe: A little less than half of the right proximal phalanx remains, as compared with the left side (16 and 35 mm.). There is considerable deformity of the head of the metatarsal. Only 10° dorsiflexion, but it is painless. The shortening and painlessness enable the patient to carry out his duties in the infantry.

ability to do such work as that of a shop assistant, waitress, lorry-driver, and miner.

Thus the follow-up study has shown that it is possible, by a simple "de-basing", or removal or the proximal part of the

proximal phalanx, to relieve the patient of the inconvenience of a hallux rigidus.

In most cases, however, one does not restore the normal movement. The pain disappears, but usually considerable stiffness remains with only 10-20° dorsiflexion of the proximal phalanx of the big toe. In spite of the stiffness the patient walks very well. Obviously, the good function is merely due

Fig. 5.
No. 2253/38. E. K. ♀. Right big toe immediately after operation.

to the shortening of the toe (Fig. 4) and the painlessness. But the shortening should not be too great, since then one runs the risk of producing a flail toe. Half or two-thirds of the phalanx should be removed. At first one tends to remove too little; and it is therefore advisable to measure the length of the phalanx on a radiograph and remove a measured piece at operation.

All methods have their advantages and disadvantages. De-basing gives an ugly big toe. It is short and clumsy and is

held in a few degrees of dorsiflexion. The shortening can, of course, not be avoided, since it is just this which improves the foot. On the other hand, the tendency to dorsiflexion can be counteracted by bandaging the big toe in slight plantarflexion immediately after operation. It may seem irrational to treat hallux flexus by fixing the toe in flexion, but experience

Fig. 6.
No. 2253/38. E. K., ♀, 6 years after operation. (Same case as in Fig. 5). A bony outgrowth from the proximal phalanx forces the toe a varus position. Certainly the periosteum had not been completely removed. No complaints.

has shown that in this way the cosmetic result is improved without impairing the function.

When the phalanx is being divided care must be taken to make the osteotomy at right angles to the length of the bone, since otherwise the toe may develop a varus or valgus tendency unnecessarily. It is also important not to remove the phalanx subperiosteally. The periosteum must be removed with the

resected bone. Remaining periosteum can produce unwanted bone-reformation and perhaps a crooked position of the toe (Figs. 5 and 6). One often sees a tendency to a varus position (Figs. 1, 3, 6 and 7). A transverse resection and careful removal of the periosteum reduces the risk of a faulty position after de-basing.

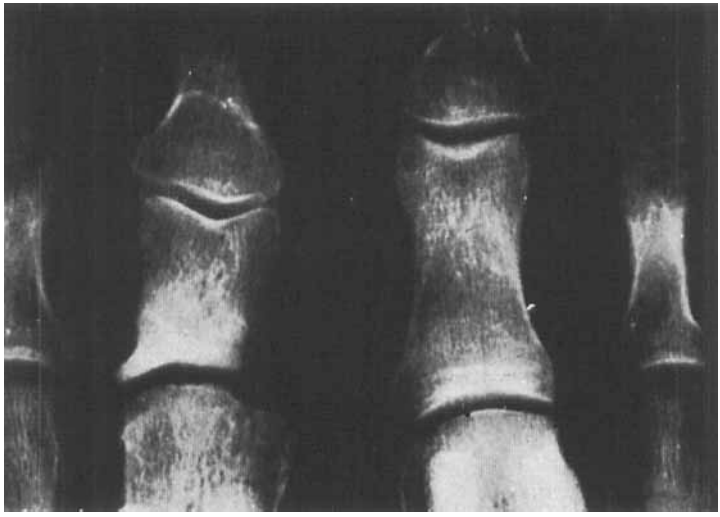

Fig. 7.

Left Right

No. 3502/37. B. L., ♀, 7 years after operation. Left big toe: a small proximal and lateral outgrowth of bone from the proximal phalanx gives the toe a few degrees of varus position. No complaint.

In advanced cases the head of the metatarsal is usually deformed by exostoses which one must remove at the same time as de-basing the phalanx. Certainly it is not of great importance for the heel-toe movement of the foot, but many patients are troubled by the soft tissues on the dorsum of the foot being squeezed between the exostoses and the upper leather of their shoe. But the metatarsal head must not be shortened beyond reducing it to its correct size medially, dorsally, and a bit laterally. One of the big advantages of the method is that

the important weightbearing part of the foot, which consists of the plantar surface of the metatarsal head, is not disturbed.

If it is easy to do one can lay a soft tissue flap over the resected surface of the phalanx; but this is not necessary.

The author recommends the following technique for the operative treatment of hallux rigidus: Through a longitudinal

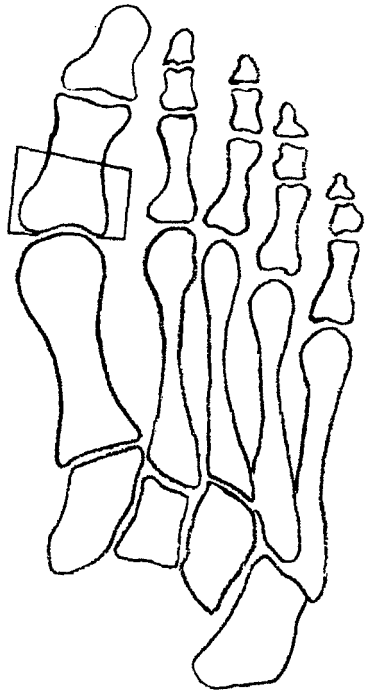

Fig. 8.
For de-basing of the big toe at least ½, at most ⅔ of the proximal phalanx is removed.

incision on the medial side of the toe, at least ½ and at most ⅔ of the proximal part of the proximal phalanx is excised. The osteotomy is made at right angles to the phalanx. No periosteum is left behind in the area of resection. The surface of the metatarsal head is trimmed, except on the plantar surface. A small soft tissue flap is turned in over the resection surface of the phalanx. The toe is bandaged in

neutral position except for a few degrees plantarflexion. Movements are begun on the fifth day. Weightbearing is allowed from the tenth day.

SUMMARY

Thirty-six cases of hallux rigidus treated by de-basing of the proximal phalanx have been followed-up for between 3 and 8 years after operation. The results are: no improvement in 1 case; the remainder, improved or symptom-free. The method's main characteristic is that the toe is shortened without altering the weight-bearing of the first metatarsal. The operative technique is discussed.

RESUME

36 cas d'hallux rigide traités par l'enlèvement de la phalange proximale ont été suivis sur une période variant entre 3 et 8 ans après l'opération. Les résultats obtenus ont été améliorés ou ne présentent plus aucun symptôme. La caractéristique principale de cette méthode, c'est de raccourcir l'orteil sans altérer la faculté de port du premier métatarse. Il est discuté de la technique opératoire.

ZUSAMMENFASSUNG

36 Fälle von Hallux rigidus, die mit Entfernung der Basis der proximalen Phalanx behandelt waren, wurden eine Zeit von 3 bis 8 Jahren nach der Operation hindurch verfolgt. Die Ergebnisse sind: Keine Besserung in 1 Falle; die übrigen Fälle gebessert oder symptomfrei. Das Hauptcharakteristikum der Methode ist, dass die Zehe verkürzt wird, ohne dass die Tragfähigkeit des ersten Metatarsalknochens geändert wird. Die Operationstechnik wird erörtert.