

A case of short metatarsal bones lengthened by callus distraction

Takumi Wakisaka, Natsuo Yasui, Haruo Kojimoto, Makoto Takasu and Yutaka Shimomura

Bilateral congenitally short fourth metatarsal bones were osteotomized subperiosteally, held in neutral position for 3 weeks by a small external fixator, and then subjected to slow axial distraction (0.25 mm/12h). The overall treatment time was 11 weeks, and the final increase in length was 14 mm for the left and 12 mm for the right metatarsal bone.

Congenital brachymetatarsia causes minor disability in daily life. However, patients suffer cosmetically; and often demand correction of the deformities when they reach adolescence. We report on a 14-year-old girl in whom bilateral short metatarsal bones were lengthened by distraction of callus formed after diaphyseal osteotomy. Progressive axial distraction was carried out using a dynamic external fixation device.

Case report

A 14-year-old girl had bilateral symmetric deformities of the fourth toes. Although she had no functional disability, she worried about cosmetic problems. The fourth toes were short and located in the web space between the third and fifth toes (Figure 1). The great toes were also short, but did not disturb her. Radiography confirmed congenital shortness of the fourth metatarsal bones. There was no heritable, infectious, or traumatic history.

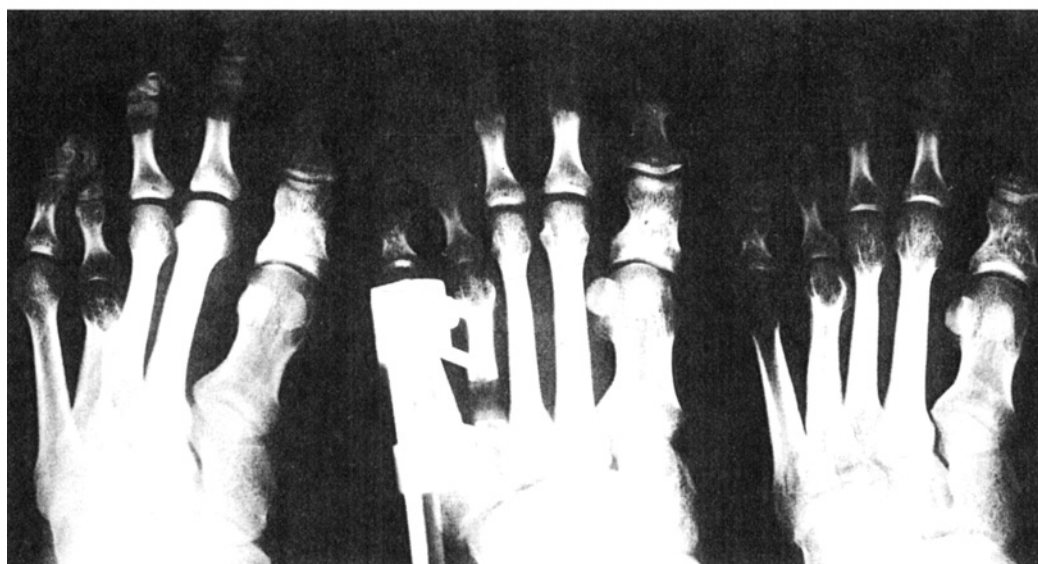
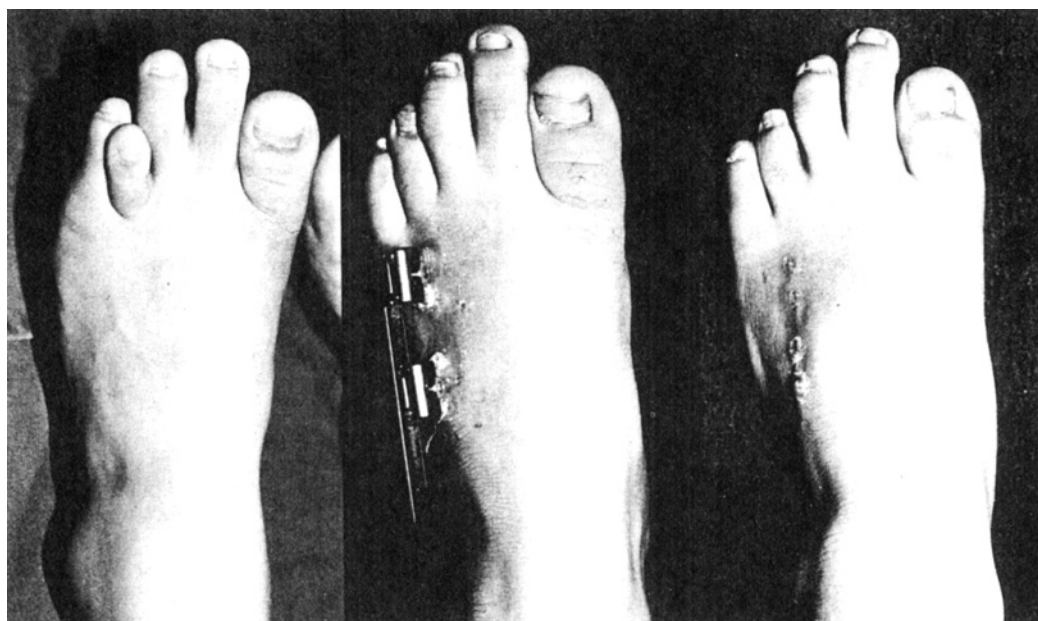
At surgery the entire length of the fourth metatarsal bone was exposed by a dorsal approach. The periosteum was carefully retracted and four self-tapping 45 mm screws were inserted in the diaphysis using a special screw guide. Transverse osteotomy was carried out between

the second and third screws. The proximal and distal fragments were held in the original position by clamping the screws to a unilateral external fixator (Orthofix M-100). The operation was completed by suturing the periosteum, releasing the extensor digitorum brevis tendon, and Z-elongating the extensor digitorum longus tendon.

Partial weight bearing on crutches was allowed immediately after the operation, and the girl was discharged from the hospital 5 days later. Distraction was started 3 weeks after the operation. A screw on the fixator was turned by the girl herself to give lengthening of 0.25 mm every 12 hours. Callus formation around the osteotomy gap was checked radiographically every week. Distraction was continued until the fourth toes were in normal position between the third and fifth toes (Figure 1). The final increase in length was 14 mm in the left and 12 mm in the right metatarsal bone. The external fixators were removed after bony consolidation. The overall treatment time was 3 months. The girl returned to sports activities and was satisfied in terms of function and cosmetics.

Discussion

Callus distraction is a unique method for elongating long bone by progressive, axial distraction of diaphyseal callus formed after osteotomy. The method was first described by Ilizarov et al. (1969), and several cases of successful limb length-



A

B

C

Figure 1. A 14-year-old girl with congenital brachymetatarsia.

A. Before osteotomy.

B. During distraction.

C. After treatment.

ening using this technique have been reported (Ilizarov et al. 1972, De Bastiani et al. 1987). For lengthening short metatarsal bones, the method seems preferable to other procedures requiring bone grafts (Kaplan and Kaplan 1978, Urano and Kobayashi 1978, McGlamy and Fenton 1983) or to artificial implants (Mah et al. 1983, Yonenobu et al. 1986). The increase in length of the metatarsal bones was adequate for correction of the deformities, and the strength of the elongated

bones was sufficient to withstand normal sports activities. There were no signs of bone resorption or reshortening. The rigid unilateral external fixators permitted early weight bearing and short hospitalization. The controlled distraction was carried out as an outpatient procedure. We believe that the described method can be used to treat not only congenital brachymetatarsia, but also traumatic shortening of digits.

References

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