

Technical note

Reconstruction for bone tumors of the first metatarsus

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Surgical technique (Figure 1)

The technique proposed applies to local malignant tumors in the proximal and middle portions of the first metatarsus when a partial resection with metatarsophalangeal joint salvage is feasible. If a cuneo metatarsal joint sacrifice is required, a successful reconstruction is still possible.

The resection area is filled with bone cement to maintain the distance between bone segments. A K-wire can be used to keep the distal end of the metatarsus in a correct position. This procedure is particularly helpful in case of massive resection. Cement is applied after the insertion of the K-wire. We recommend waiting until the cement has sufficiently hardened to be easily molded around the K-wire. This procedure will ensure the gradual K-wire removal which is performed within 6 weeks after wound healing and soft tissue repair.

The definitive surgical reconstruction is performed with an autologous cortico-cancellous bone graft from the ilium which is inserted in the defect after cement removal to restore bone continuity. The foot and ankle are immobilized in a cast for 3 months. Increasing weight bearing is allowed after 1 month.

Case 1

A 16-year-old boy complained of a painful swelling along the medial aspect of the left foot and limped. He was admitted to our service. A giant cell tumor was diagnosed after an open biopsy. Plain radiographs and MRI documented the tumor

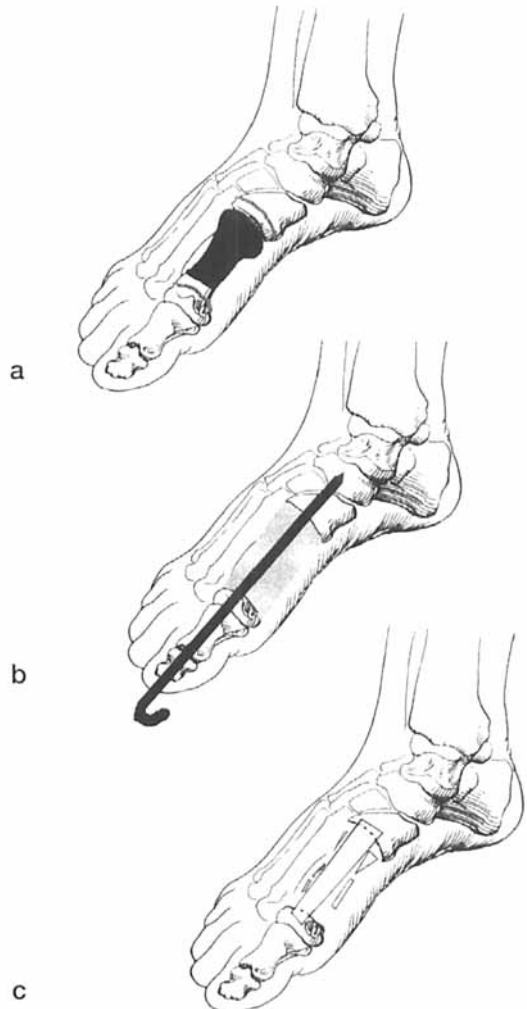
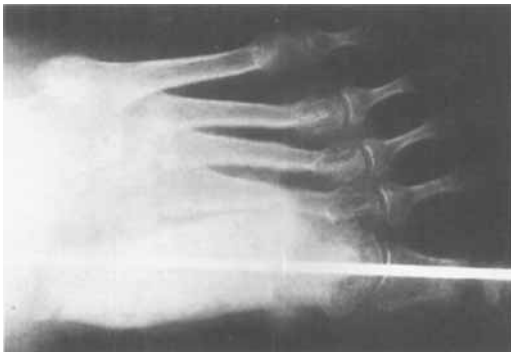


Figure 1. Schematic drawing showing the tumor and the margins of resection (a). Cementing and stabilization with a K-wire (b). Autologous bone graft reconstruction (c).

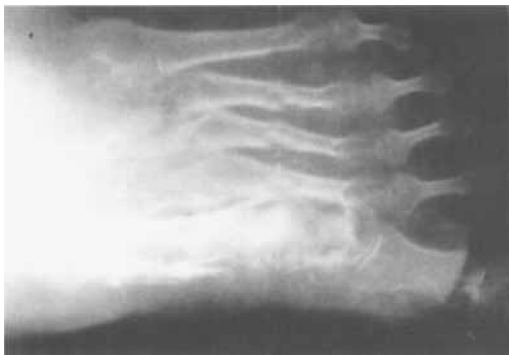
Figure 2. Case 2. 63-year-old woman.



The lesion involving the first metatarsus.



To preserve the length of the first ray and, to perform a correct anatomical reconstruction, a Kirschner wire is introduced and cement was used as a mechanical spacer (c). After removal of the cement, in the absence of a local recurrence, an autologous bone graft was performed 2 years later.



4-year follow-up. Radiographs show a minimal shortage of the metatarsal length due to resorption.

extension. The distal epiphysis was not affected. The patient was treated by intralesional curettage and liquid nitrogen as local adjuvant. The bone defect was filled with cement. Cement was re-

moved 2 years later and an autologous bone graft inserted. The patient could walk without pain and returned to his sport activities after 3.5 years.

Case 2 (Figure 2)

Plain radiographs and MRI of a 63-year-old woman complaining of footache with walking difficulties revealed a massive tumor of the 1st metatarsus. Biopsy showed a low-grade chondrosarcoma. To achieve adequate margins, we had to remove most of the metatarsus. We saved only the distal epiphysis, which was transfixated with a K-wire to maintain its correct anatomical position. Cement was used to reconstruct bone continuity. The K-wire was removed 6 weeks later. 1 year later, no local recurrence was observed and an autologous bone graft was performed after removal of the cement. The patient returned to her social activities with good locomotor ability. No local recurrence occurred after 5 years of follow-up and the patient was satisfied.

Discussion

Bone tumors of the foot are uncommon, accounting for 1–5.5% of skeletal lesions (Casadei et al. 1991, Rosa et al. 1998). Few reports on first metatarsus tumor are available with minimal reference to functional and cosmetic outcome (Döhler et al. 1979, Wiss 1983, Jarde et al. 1991).

Two main factors contributed to the satisfactory final outcome in our patients: the compartmental (1st metatarsus) extension of the lesion and its proximal site. In both cases, we were able to spare the distal end of the metatarsus leaving the metatarsophalangeal joint intact. Salvage of this joint avoids undesirable stiffness of the first ray and makes bony reconstruction easier.

Although vascular supply to the distal end of the first metatarsus is essential (Viladot 1991), we did not observe avascular necrosis even after massive resection. In both cases it was possible to preserve the distal bone segment up to the insertion of the metatarsophalangeal capsule. This procedure permitted the salvage of important bone vessels which might have ensured the final outcome.

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