

## Case report

# Failed treatment of congenital pseudoarthrosis of the tibia—a case of Ilizarov-transportation of proximal tibia with arthrodesis to talus

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An 11-year-old boy was admitted because of failed surgical treatment of a congenital pseudoarthrosis of his right tibia. Neurofibromatosis had been diagnosed 8 years before, and an open wedge varus and extension osteotomy was performed to correct anterolateral bowing of his right tibia. Nonunion of the osteotomy site was treated unsuccessfully a year later by bone grafting and intramedullary nailing with a Rush pin. 2 years later, a third attempt was made with an autograft and Wagner external fixation. After 6 weeks, the external fixator had to be removed because of a pin-tract

infection. Two attempts to heal the pseudoarthrosis by a vascularized fibular graft failed.

On admission, his right leg was 10 cm shorter, and radiographs showed pseudoarthrosis of the tibia with a small osteopenic distal fragment (Figure 1).

During the operation, the distal remnant and all scar tissue were excised and the talar dome was shaved, so that a 4-cm long gap between the proximal tibia and the talus was created. Two Ilizarov rings were mounted on the distal femur and the proximal tibia below the knee, a third ring was mounted proximal to the excised area, and a 3/4 ring onto the talus. A corticotomy of the proximal tibia was then performed. A Steinman pin was inserted through the calcaneus to the transported bone (Figure. 2). The bone was transported at a rate of 1 mm a day, achieving a total transport distance of 5 cm, after 10 months. At that time, the arthrodesis seemed united, thus we did not perform a bone grafting procedure at the tibiotalar docking site. The Ilizarov frame was removed 10 months after the operation.

24 months after the operation, the boy now aged 13, walked with a brace. His right leg was 9 cm shorter and there was radiographic union of the tibiotalar arthrodesis (Figure 3). We plan to lengthen the leg.

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Figure 1. The right leg has a shortened tibia, marked deformation of the distal tibia and ankle and pseudoarthrosis in the distal third of the tibia. The fibula is missing after attempted vascularized transfer.

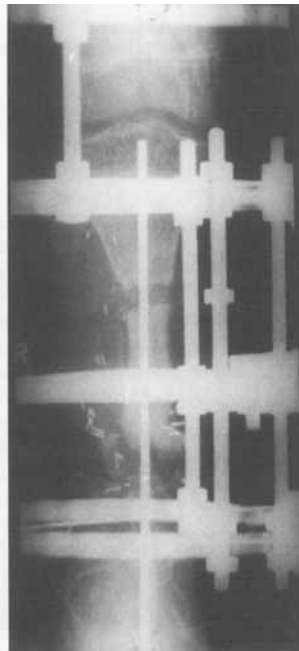


Figure 2. Postoperatively, an Ilizarov frame applies compression on the tibiotalar arthrodesis site. Distraction is applied on the corticotomy site at the proximal tibia for bone transport.

## Discussion

Several treatments for congenital pseudoarthrosis of the tibia have been described, such as bone grafting (Farmer 1952, Lloyd-Roberts and Shaw 1969, Morrissy et al. 1982), internal fixation (Umber et al. 1982, Paterson and Simonis

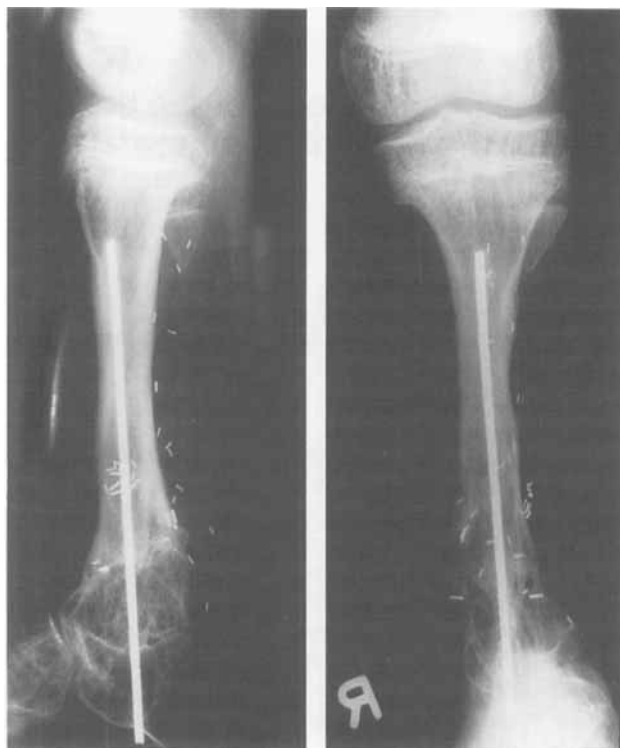


Figure 3. 24 months after surgery. The Ilizarov frame has been removed and there is a solid union of the arthrodesis with acceptable alignment of the leg.

1985), free vascularized fibular grafts (Hagan and Buncke 1982, Pho et al. 1985, Weiland et al. 1990), electrical stimulation (Bassett and Schink-Ascani 1991) and, recently, external fixation (Paley et al. 1992, Boero et al. 1997, Ghanem et al. 1997, Guidera et al. 1997). Amputation remained a treatment option because success rates remained extremely low (Paterson 1989). With the Ilizarov method (Paley et al. 1992), 15/16 cases united, after the first treatment, and the remaining case after a second procedure, compared to about half the cases reported with other methods (Morrissy et al. 1981, Hagan and Buncke 1982, Paterson and Simonis 1985, Pho et al. 1985).

The emotional and physical burden of repeated surgery on the child and family make it doubtful whether the functional outcome is justified, as compared to early amputation (Morrissy 1982). Sofield (1971), however, suggests that every effort is justified to save the limb. Others consider that failure to achieve bony union after 3 operations, limb-length discrepancy more than 5 cm, development of a deformed foot distal to the pseudoarthrosis and functional deficit due to prolonged treatment and hospi-

talization indicate an amputation (McCarthy 1982). In our case, amputation was refused by the parents. Transportation of a segment of the tibia and arthrodesis to the talus was the only way to save the limb.

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