Prosthetics and Orthotics International, 1981, 5, 2–6

THE KNUD JANSEN LECTURE

The operative treatment of congenital limb malformation—part II, case study

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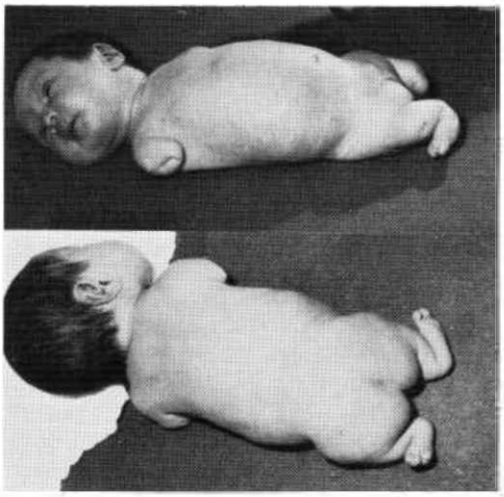
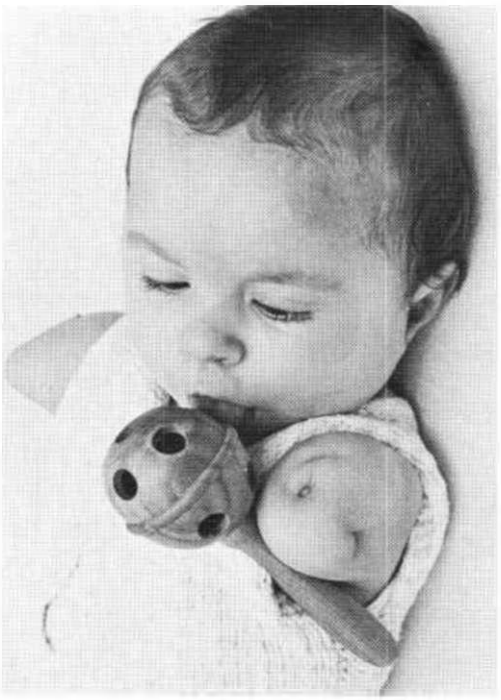
The patient was born on 13 May 1965 with bilateral transverse upper arm ⅓ deficiency. Malformations of the lower limbs consisted of bilateral longitudinal femur subtotal deficiencies, bilateral fibula total deficiencies and bilateral ray (metatarsal and phalangeal) IV and V deficiencies. She suffered recurrent incidents of osseous overgrowth of the humerus on both sides and between 1969 and 1973 six reamputations were performed for this reason. Stump capping procedures employing autogenous cartilage-bone transplants were successfully carried out on each humeral stump in 1974.



1. The newborn child showing the congenital scar at the end of the short above-elbow stump and extreme pes valgus. Left and right sides are almost identical.



2. The lower limbs were placed in a plaster of Paris cast; an orthosis was fitted at the age of three months. During this time the child used the stumps, chin and mouth for touching and grasping.

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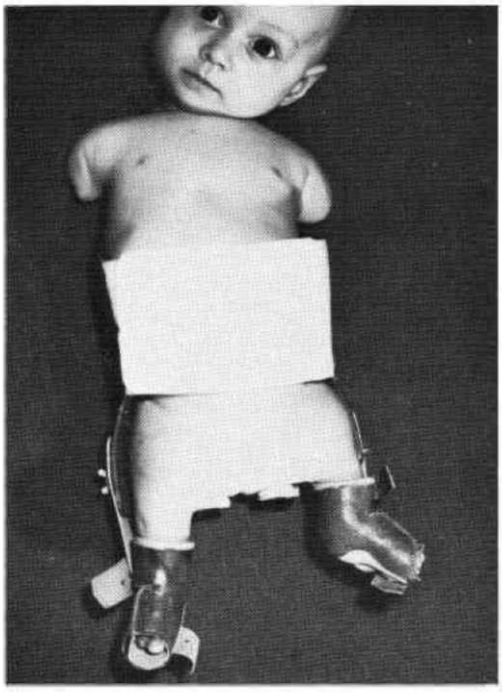
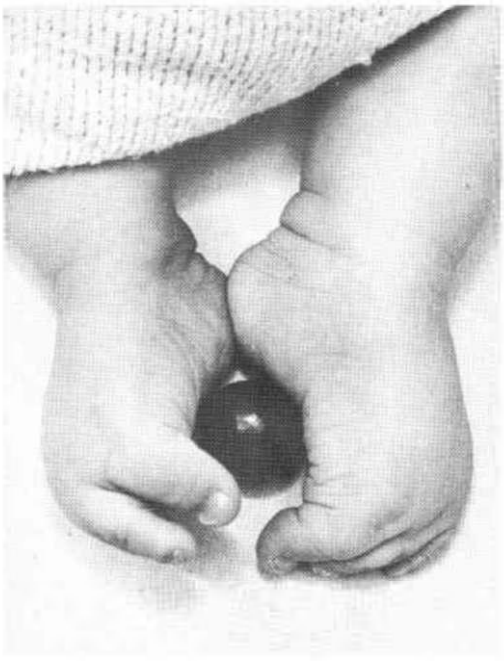
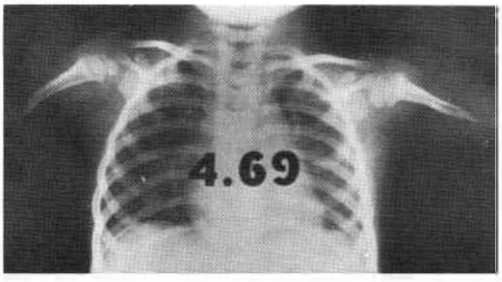


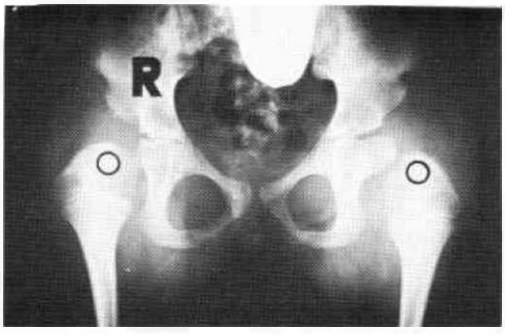
3. The orthosis showing the orthopaedic leather shoes and metal foot supports. The orthosis could be extended while maintaining the feet in the optimum corrective position.



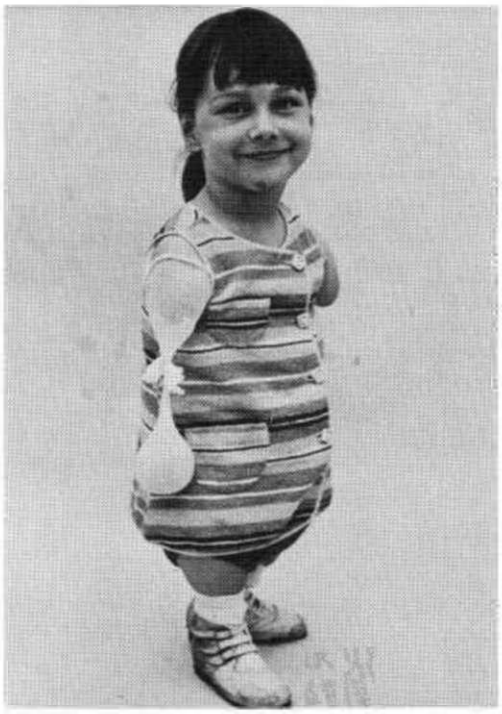
4. The active use of both feet for play and motivated exercise is very important for the correction of deformity and the development of foot function.



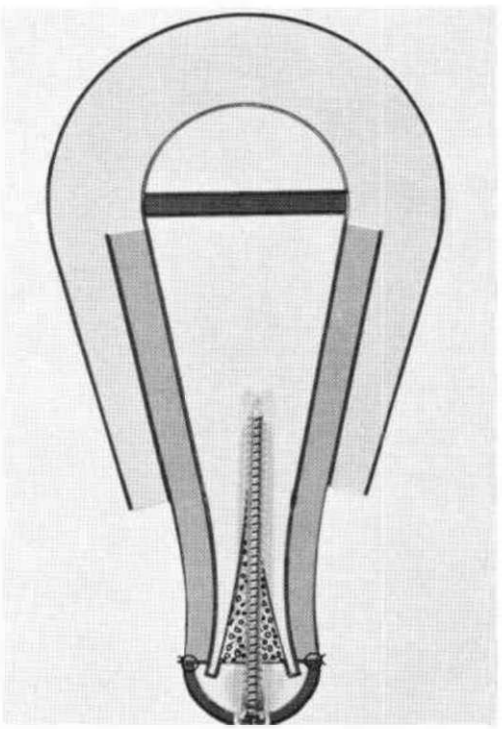
5. The X-ray of the upper limbs shows osseous overgrowth in this congenital case which is identical to that seen in children following traumatic amputation.



6. The X-ray of the pelvis shows a rudiment of the femoral head in each hip joint and femoral elements in the form of a cap in synostosis with the proximal tibia bilateral. The fibula deficiency bilateral, is complete. The circled areas indicate the sites used for the cartilage-bone transplants.

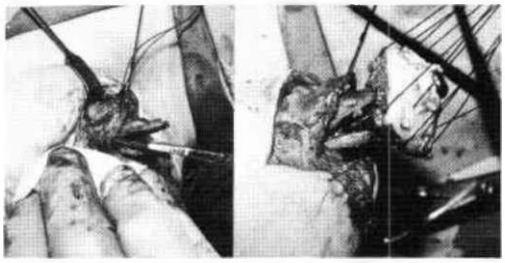


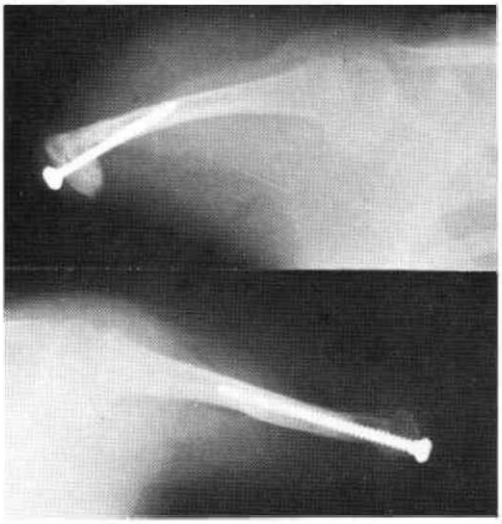
7. Between 1969 and 1973 the patient endured six reamputations because of osseous overgrowth. The illustration shows a simple method of skin traction to prevent further perforation prior to the stump capping procedure. At this stage she was fitted with cable controlled upper limbs and lower limb extension prostheses.



8. Sketch of the stump capping procedure using a cartilage covered cap. The distal end of the humerus is split into two pillars which are fitted into corresponding holes in the cartilage-bone transplant. Fixation to the humerus is by a screw (in some cases by two Kirschner wires) and the musculoperiosteal flaps are attached to the transplant. Cancellous bone graft is packed between the split ends of the humerus.

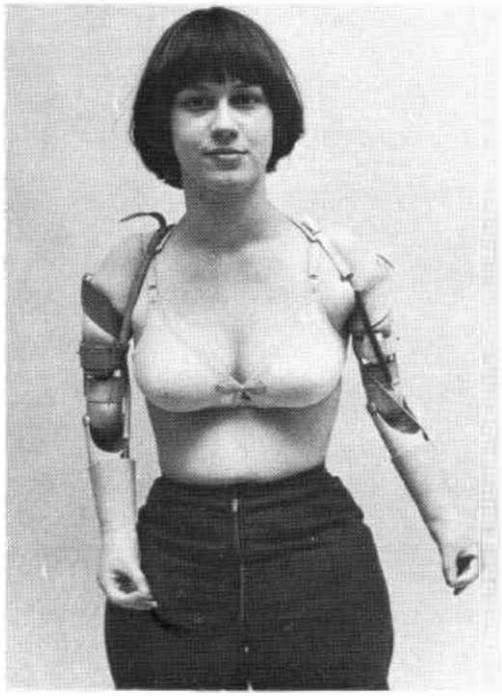
9. Stages during the stump capping operation. The pictures show the procedure carried out on the right side in March 1974. The same procedure had been performed successfully on the left side in January 1974. Left, the end of the humerus is split and the musculoperiosteal flaps prepared for fixation to the transplant. Right, the transplant is fixed by a screw. In this case the pillars proved to be too long and the transplant was removed. The pillars were shortened by about 1 cm, the transplant was replaced and the musculoperiosteal flaps could then be attached to the transplant.



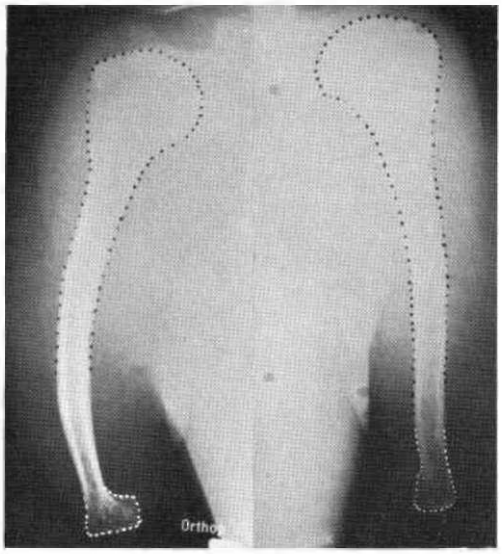


10. Right humerus (top) and left humerus (bottom) in December 1974 just prior to removal of the screws. The transplant on the right side has been fashioned to provide better prosthetic fixation. Thickness of the cartilage is indicated by the distance between the distal end of the screw and the bone.

11. Daily end-bearing training is essential after the stump capping procedure to stimulate normal development of the humerus and to prevent osseous overgrowth.



12. It is also essential that the patient be encouraged to make daily use of active prostheses. Those shown are body powered with open socket construction to accommodate the bulky stump end. The length of the arms is a compromise; the patient's height varies as she does not always wear her extension prostheses.



13. The patient was last X-rayed in 1976; the pictures demonstrate good growth of both humeral stumps amounting to 3·4 cm on the right side and 3·2 cm on the left since December 1974.

14. The capping procedure has prevented a recurrence of osseous overgrowth and produced almost normal development. Note the pterygium and the absence of axillary hair on the right side.
In the case of a patient who had not suffered perforation of the bone through the skin and reamputation, the incision for the stump capping procedure would be proximal to the stump end to provide a scar-free end bearing area. However up to November 1980 the patient has experienced no problems with her stumps.

Part III will be published in the August 1981 issue of Prosthetics and Orthotics International.