

## Crutch Walking and Functional Grasp in the Congenital Triple Amputee

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The purpose of this report is to describe our experience in management of the child with congenital absence of both legs and the left forearm and hand. In the treatment program it was difficult to reconcile independent crutch walking with functional grasp and the modifications of the prosthesis which made this possible are useful and of interest.

### Case Report

F.R. is a ten-year old child born of a normal pregnancy. There is no history of maternal illness, injury or drug ingestion. At birth he was found to have a complete bilateral lower-limb amelia with a congenital absence of the left forearm and hand (Fig. 1). He was neurologically intact.

At eight months of age he was provided with a "bucket" prosthesis and allowed to stand. At sixteen months, pylons were attached to the bucket and at six years of age, after the pylons had been lengthened several times, he was provided with knee joints. Since that time, he has worn a bilateral hip-disarticulation socket with free hip joints, manual locking knees and Sach feet (Figs. 2 and 3).

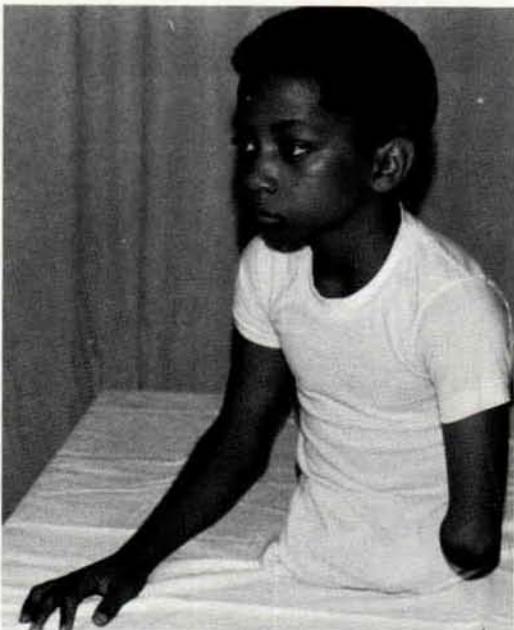


Fig. 1. Photograph of the patient showing the extent of the complete amelia of both lower limbs and the congenital absence of the left forearm and hand.

The problem arose in reconciling the dual functions of weight-bearing on the left upper limb during use of a crutch and grasp of the hook.



Fig. 2. Photograph of the patient standing in the hip-disarticulation socket using a conventional crutch in the right hand and the "pylon" crutch attached to the left elbow-disarticulation prosthesis.

The patient was taught to ambulate with a swing-through gait with two crutches, one of which is held in his right hand while the other is secured in the el-



Fig. 3. Front view of the patient clothed and ambulating with a four-point gait using prostheses and crutches.

bow disarticulation arm (Fig. 3). While walking he carries the Dorrance hook inside the forearm of the prosthetic limb. When he is in the sitting position, he can unscrew the crutch and insert the hook into the arm. After attaching the cable, he can activate the terminal device for functional grasp (Figs. 4 and 5). At the age of ten and one-half years he has been



Fig. 4. In the seated position, the patient is able to remove the "pylon" crutch which is inserted as a terminal device for the elbow-disarticulation prosthesis. The standard hook is kept in the hollow forearm of the prosthesis. The heavy duty outside-locking elbow is used. A small Allen-head wrench needed to lock the hook in place is taped to the forearm unit.



Fig. 5. The patient is able to assemble the terminal device and attach the cables without assistance. He has excellent function with a standard child-size hook.

"mainstreamed" into regular classes and attends the fifth grade with normal children.

### Discussion

Relatively few reports have dealt with the rehabilitation of the congenital triple amputee with lower limb amelia and absence of a forearm and hand. The bilateral hip-disarticulation socket prosthesis has had prior application for this type of malformation but ambulation in such patients is difficult particularly when there is only one functional upper limb (1, 2). In the case of the patient described in this report the problem was solved by providing the individual with two interchangeable terminal devices. The patient

became adept at their use possibly because of their application very early in life. With an increase in weight and activity, modification of the elbow and the upper limb prosthesis became necessary to prevent frequent breakdown and time away from active use of the prosthesis.

### Footnotes

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### References

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