

PROSTHETIC FITTING OF UNUSUAL ANOMALIES OF THE LOWER EXTREMITY

By JAMES A. MacDONELL, M.D.

Consultant, Area Child Amputee Center
Michigan Crippled Children Commission
Grand Rapids, Michigan

During the past ten years we have had the opportunity to evaluate over five hundred child amputees. Since 1955 we have observed and evaluated eighty-two unusual anomalies of the lower extremity.

The normal gradient of ambulation in a child occurs at fifteen to eighteen months of age. Standing balance is obtained at twelve to fourteen months. By the time a child is twenty-four months of age he normally has a very adequate gait pattern. Children with congenital malformations of the lower extremities, because of their inequality of leg lengths, present a delay of six to twelve months in this normal period of ambulation unless they are fitted with appliances. It is the author's observation that as soon as the child has reached his normal level of locomotor development he should be fitted with a brace or modified prosthesis so that he can progress to activities of walking, running and playing comparable to the normal child of his age.

The philosophy of converting anomalous extremities to standard amputation types has evolved in the treatment of unusual anomalies. This philosophy is *not* conceived for the purpose of fitting *all* unusual anomalies; rather,

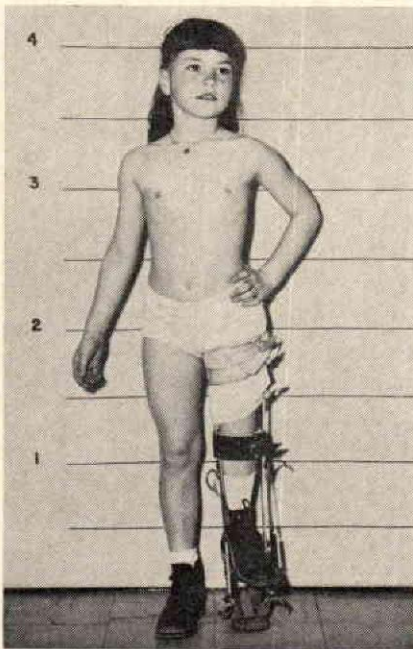


Figure 1



Figure 2

approximately 15 per cent of upper extremity anomalies and 65 per cent of lower extremity anomalies lend themselves to this type of procedure. Wearing of braces is, in our minds, a means of initiating ambulation. However, conversion by surgical means obtains a satisfactory end result in the future progress of the patient. Also, cosmesis subsequently becomes a prime consideration as the child reaches the age of reason.

The following illustrative cases serve to demonstrate our management of some unusual anomalies:

Case I, born February 11, 1952, was first seen at two months of age with congenital coxa vara and shortening of the left lower extremity. At nine months of age she was fitted with an ischial-bearing caliper brace on the affected side. The patient utilized this type of appliance until seven years of age (See Figure 1). At that time the parents agreed to surgical conversion, and a Syme type of amputation was performed. She is now fitted with a modified Syme prosthesis with SACH foot (See Figure 2). Patient and family are well pleased with the increased functional and cosmetic gains.

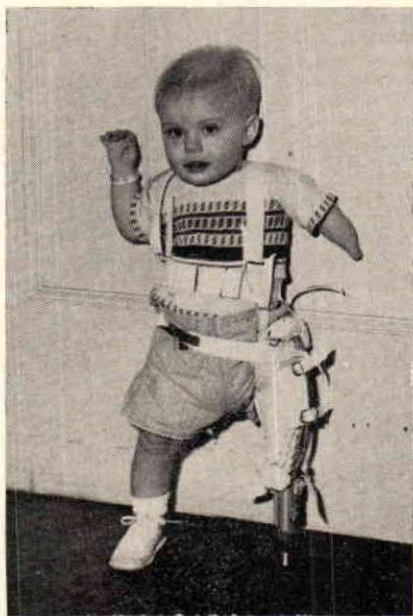


Figure 3

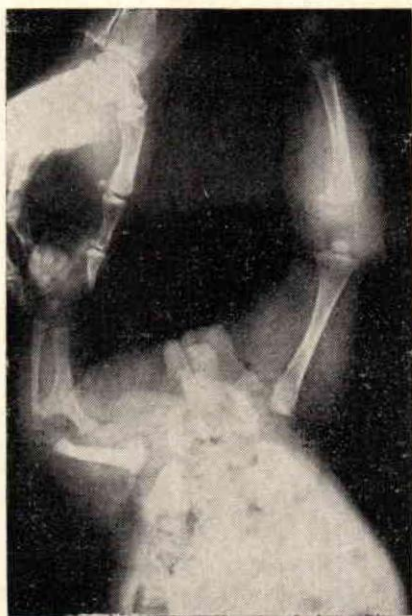


Figure 4

Case II, born August 5, 1956, was first seen at three months of age. He presented congenital left radial paraxial hemimelia, and intercalary phocomelia, left lower extremity. (See Figure 3). At eleven months of age he was fitted with a modified plastic bucket for pelvic support, with metal uprights terminating at a crutch tip. This type of fitting was continued until the patient was fifteen months of age, at which time he was fitted with an ischial-bearing brace with molded leather lacer thigh-cuff, double uprights and crutch tip (See Figure 4). He continued in this type of appliance until three years of age; at that time the foot was disarticulated. Present prescription consists of a "pipestem" type of socket, single pivot knee, plastic shin-piece, SACH foot and toddler's harness.

Children who present complete absence of the lower extremities necessarily are not candidates for surgical procedures. They do, however, present unusual problems when fitted with prostheses.

Case III, born August 14, 1957, was initially examined at this clinic at ten months of age. He was born with absence of both lower extremities (congenital amelia, bilateral). Initial fitting consisted of a plastic pelvic bucket which was attached to a platform with small casters. The patient learned to move about the room in this apparatus by moving his torso from side to side. At two years of age the prescription was changed, and the patient was fitted with a pelvic bucket with immobile "legs" and rocker-type feet. His height was commensurate with a normal child of his age. (See Figures 5 and 6.) His next prescription will be a pelvic bucket, "legs," Canadian type hip-locks, and SACH feet. He will be taught to use a swing-to and swing-through gait with the aid of crutches. (See Figure 7.)

In summary, evaluation of these children following conversion of anomalous lower extremities so as to provide fitting with conventional prostheses has demonstrated definite basic advantages. A study of the behavior patterns in these children prior to surgical conversion reveals that they become regressive in their socialization with children in their age group. Parents of these children, recognizing the disability presented by their child, have been most receptive to conversion amputation. The child is able to ambulate with equal lower extremities that are functional and cosmetically acceptable. The physical, mental and social problems manifested by these children prior to conversion are markedly lessened after this final definitive surgery has been performed.

The fitting of children with anomalies of the lower extremities presents a special individual problem in prosthetic fitting, and prescription therefore cannot be standardized.

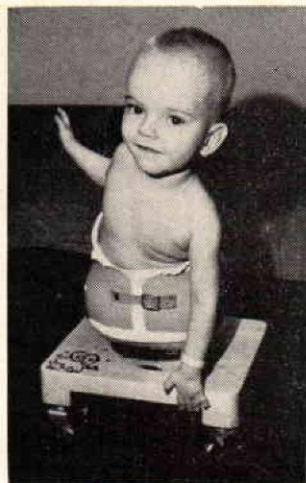


Figure 5



Figure 6



Figure 7