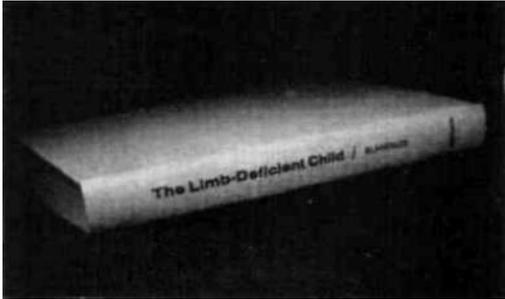


***The Limb-Deficient Child*, a Review**

THE LIMB-DEFICIENT CHILD, edited by Berton Blakeslee, University of California Press, Berkeley 4, California, August 1963. 391 pages. Price: \$8.50



The Limb-Deficient Child is important as the first comprehensive summary of modern techniques in the relatively new field of child prosthetics. For until recent years, the consensus was that prosthetic fitting could wait "until the child is older"—an opinion based on the generally unsatisfactory attempts to care for the child amputee as if he were simply a small adult. The presentation made in *The Limb-Deficient Child* is based on the experience of the Child Amputee Prosthetics Project of the University of California at Los Angeles. The Project was started in 1955 and is supported by grants from the United States Department of Health, Education, and Welfare.

Dr. Milo B. Brooks, who is the Medical Director of the Project, various members of the Project staff, and other persons closely associated with the Project are the contributors to *The Limb-Deficient Child*. The nine chapters of the book cover the role of the medical director, orthopedic considerations, psychosocial problems, preprosthetic evaluations, preprosthetic therapy, child prosthesis design and fitting, training, training the upper-extremity amputee, and lower-extremity training. There are numerous illustrations, the

appendix contains various evaluation charts developed at the Child Amputee Prosthetics Project, and there is an index.

Chapter I, "The Role of the Medical Director," describes the type of information desired from the referring physician and parents, stressing social information concerning the family organization, the child's general physical condition, and the type of amputation presented. A number of charts depict the normal development of children, with heights and weights for given ages. There is some discussion of the growth and development of limb-deficient children, the problems of limb dominance, and psychological adjustment. The etiology of congenital limb deficiencies is briefly discussed, and statistics are presented on cases studied at the Project. The thalidomide syndrome is briefly mentioned.

Chapter II, "Orthopedic Considerations," discusses the relative importance of orthopedic management, the utilization of plaster-of-Paris cast techniques for correction, the use of braces, indications for surgical interference, the problem of scars, and the functional range of joints. Although very brief, the discussion on long bones, osteotomies, the problem of terminal overgrowth of long bones, neuromata, and the judgment and timing of surgical conversion of deficient extremities to more conventional types of stumps will be of interest to the orthopedist.

This reviewer, however, is not in agreement with the attempt made in the discussion of the development of limbs to assign dermatome relationships to the limb buds.

In general, this reviewer agrees with the brief classification of limb deficiencies, although it is incomplete from an anatomical standpoint. Perhaps future modifications may be in

order to produce a more universal nomenclature, understandable to all who are interested in the limb-deficient child. The classification is followed by the prosthetics management of the terminal transverse deficiencies from wrist disarticulation (acheiria) up to amelia or shoulder disarticulation.

Chapter III, "The Psychosocial Problems," gives a realistic discussion of parental guilt feelings and parental cooperation and emotional stability. There is discussion of the role of the physician in attempting to produce an environment of cooperation by the parents, an environment that is essential for success in treating the child amputee. The problems confronting the prosthetics team during the child's preadolescent and adolescent years are discussed, and the role of the social worker is clearly defined. This is an important chapter in the book.

Chapter IV, "Preprosthetic Evaluations," discusses in detail the roles of the occupational therapist and the physical therapist. Reference is made to *The First Five Years of Life*, by Arnold Gesell and others, and it is highly desirable that therapists be well acquainted with this work. Chapter IV briefly describes the progress of motor kinesthetic development from the infant to the toddler. Techniques for determining the range of motion and the functional needs of the child are analyzed carefully. The chapter discusses the self-care needs of the child and relates them to the type of prosthesis indicated.

In Chapter V, "Preprosthetic Therapy," the principles of joint motion, the correction of contractures, techniques of bandaging for shrinkage, the proper use of crutches, and skin care are elucidated and beautifully illustrated by photography.

Chapter VI, "Child Prosthesis Design and Fitting," presents the important consideration of the growth of the child as contrasted to the adult. Materials for prostheses, such as plaster and polyester and epoxy resins, are discussed. The choice of terminal devices appropriate to the age and size of the child is clearly stated and well illustrated. Techniques for harnessing are demonstrated by photography. In addition, there are shown nonstandard types of prostheses for fitting upper-extremity phocomelic

children. Unusual methods for operating elbow locks, by the phocomelic limb, buried in the humeral section of the prosthesis, are given special attention. The problems of upper-extremity amelia, both unilateral and bilateral, are discussed and shown in photographs, including cable systems and the various methods of hook-ups for the transmission of power. The problem of fitting a multihandicapped child is covered, together with some of the frustrating problems of finding power for terminal-device operation that is adequate in terms of the amount of energy expended. Stages of fitting lower-extremity amelic children from a small stationary bucket up to two prostheses are shown.

In Chapter VII, "The Training Period," the training of the limb-deficient child is stressed, and rightly so. The child must know what the prosthesis will do for him. The chapter also emphasizes that one cannot go beyond the child's capabilities or his kinesthetic development for his years. One must not expect too much too soon in the avenues of function. There is a practical and well-illustrated discussion of clothing needs and modifications for ease of application. Illustrations also show how to reduce friction from the system through proper alignment of the cable-control assembly. Techniques to be employed by the unilateral and the bilateral amputee in applying and removing the prosthesis are excellently illustrated. The lower extremities are dealt with briefly with respect to the fitting of the socket, proper application—especially the fitting of a suction socket—and the problems involved with a patellar-tendon-bearing prosthesis and bilateral lower-extremity prostheses.

Chapter VIII, "Training the Upper-Extremity Amputee," is well illustrated and goes into considerable detail. The environmental situation is discussed, and the necessary equipment is illustrated. In this reviewer's mind, there is some question about the discussion of training infants, because it is debatable whether one actually trains an infant or simply exposes him to experience in motor fields. There is discussion of the desirability of the presence of parents during training periods. Techniques for activating the components in stages by the young child are clearly presented, and action

photographs show the functional capabilities of youngsters of various ages, both unilateral and bilateral types. Activities (aids to daily living) are well documented and very practical. This chapter should be especially interesting to occupational therapists.

Chapter IX, "Training the Lower-Extremity Amputee," is much shorter than the preceding chapter. It gives a brief description of the progress of a youngster from infancy to an erect standing posture. Three phases of training are discussed with respect to the lower-extremity amputee. Comfort, fit, and skin tolerance are important during the first phase, with frequent inspection of the skin and prosthesis alignment. Independent ambulation is achieved during the second phase. During the third phase, faster ambulation, stair climbing, and walking up and down ramps and over uneven ground are mastered. This training is clearly illustrated by excellent photographs.

Judging by its title, one would expect *The Limb-Deficient Child* to be a textbook on all facets of the child amputee. It is not such a text. It is a well-written presentation of the experiences of the Child Amputee Prosthetics

Project of the University of California at Los Angeles. The problems of the limb-deficient child are much more far-reaching than this volume indicates.

But the book is important as the first of its kind and should serve as a reference for physical and occupational therapists and for prosthetists. It is a clear and very adequately illustrated narrative, with excellent photographs of children in action during their training periods, and photographs of prostheses. Harnessing patterns and cable operations are clearly depicted. There is much material here that should be of great assistance to therapists and prosthetists, particularly those who have broad experience with adult amputees. For with this text they can translate their past experience into the area of child amputees, especially those with congenitally malformed limbs.

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