

Construction of a Prosthesis For a Deformed Short Leg

By RAY BUDDIN

*Sabolich Artificial Limb and Orthopedic
Appliance Company, Oklahoma City*

An 18 year old girl with a deformed left leg recently was fitted by the Lester J. Sabolich Artificial Limb and Orthopedic Appliance Company of Oklahoma City. The patient had a congenitally short leg (See Fig. 7) and had been wearing a brace and extension which was unsightly and awkward. The process of fitting this deformity inside a complete prosthesis may be of interest to other members of the profession.

To prepare a mold for the socket, a cast was taken of the short leg when the foot was in full plantar flexion. The posterior surface of the shank portion and plantar surface of the foot portion were laminated with rigid resin (Laminac #4110) and the anterior portion laminated with 85% flexible resin (85% Laminac #4134 and 15% #4110) to provide for expansion when putting on and removing the socket. The cast was modified so that most of the weight could be taken under the arch and heel. The socket is an entirely separate lace-on unit. (Fig. 1)

The distal end of the socket, along the entire plantar surface of the foot, was fitted into a block of wood which serves as a seat for the socket inside of the plastic shank (Fig. 2). For fitting trials, the socket was bonded to the block with micro-balloons along the border of the wood where it flanged up around the foot, and attached to an adjustable leg and SACH foot. (With long stumps, a SACH foot adapter can be used.) The fitting procedure was carried out as with the Patellar-Tendon-Bearing Prosthesis.

After transferring and shaping of the wood section, the micro-balloons were ground off. (They had not been put between the socket and wood so as not to interfere with seating of the socket and also to permit easy separation of the two.) A long screw was then inserted to hold the socket in place till finished, and two $\frac{5}{16}$ " diameter dowels were inserted into the ankle block and the wood seat for better bonding. (Fig. 3)

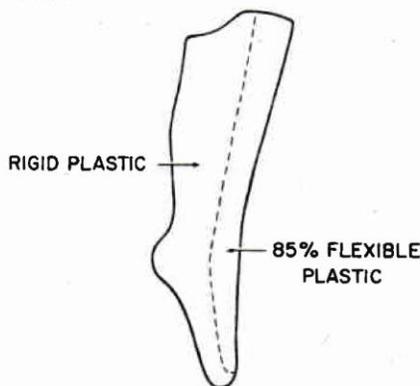


Fig. 1—Socket laminated on cast of deformed leg.

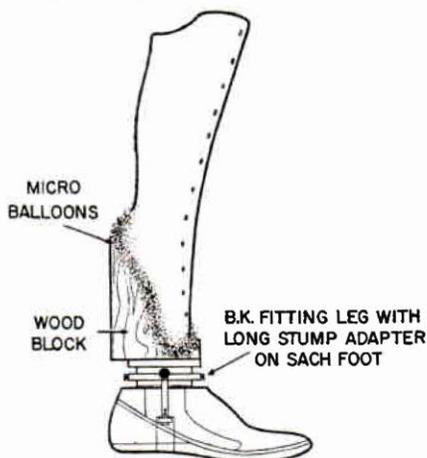


Fig. 2—B/K fitting of leg with stump adapter on SACH foot.

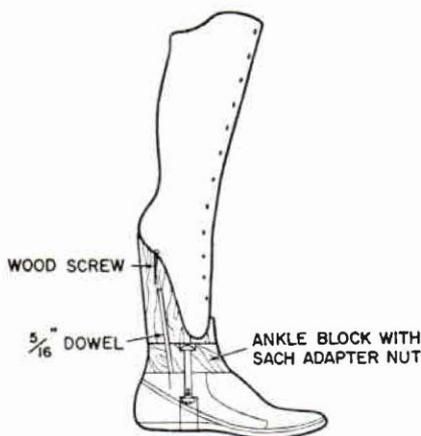


Fig. 3—Fitted prosthesis after transferring and shaping of wood section.

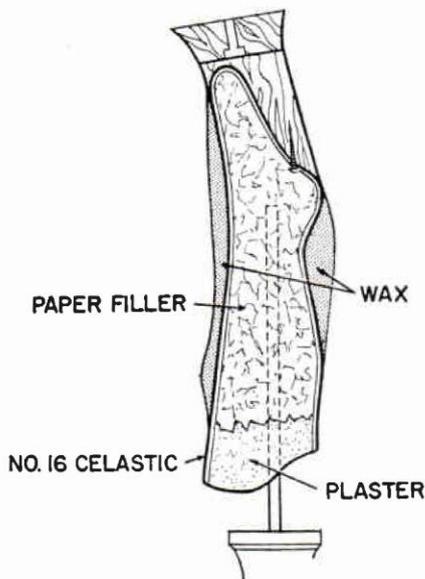


Fig. 4—Wax build-up to match sound limb, ready for lamination.

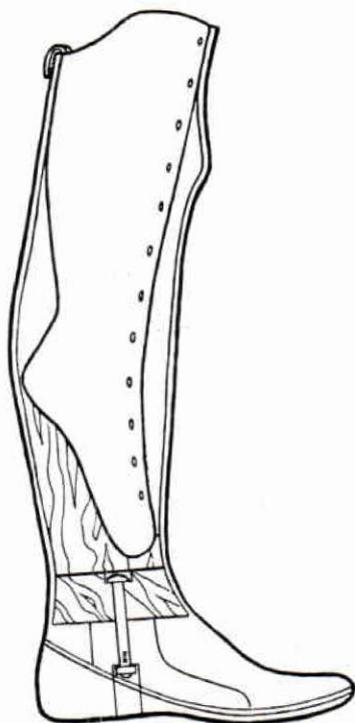


Fig. 5—Innersocket in place within outer plastic shell. Mandle wax and screw removed. Socket is now removable.

The lace opening next was sealed off with #16 Celastic and a half-inch pipe was inserted in the socket, held in place with packing paper to within 6" of the top, and the remaining 6" poured with plaster. (Fig. 4) A wax form was then built up around the socket and contoured to match the sound limb. The wood at the ankle base was protected from the wax with masking tape to insure a good bond when laminated. The proximal area of the socket was coated with silicone and the shank laminated to contact the socket snugly. After lamination with 2 Dacron sleeves and 3 of nylon, the plaster and pipe were removed, Celastic cut along lace opening and the screw removed from the bottom of the socket. The prosthesis then was placed in the oven until the wax began to drip; then the socket was removed and the wax dug out instead of leaving it to melt entirely.

Figs. 5 and 6 show the completed prosthesis. Fig. 7 shows the deformed foot, and Fig. 8 the patient, Miss Cheryl White, wearing the prosthesis.

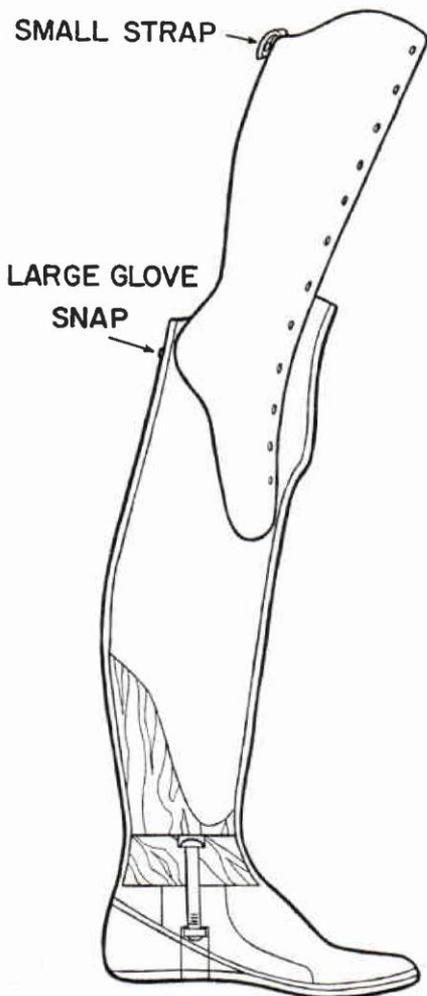


Fig. 6—Socket in relation to shank being inserted or removed.



Fig. 7—The deformed foot.



Fig. 8—Cheryl wearing the finished prosthesis.

She reports that she has learned to dance and do just about anything she wants to do with this new prosthesis, including walking in sand, which she was unable to manage with the brace and extension.

Editor's Note: We quote from letters received from Miss White's father, Mr. Leland White of Chicasha, Oklahoma, for information about Cheryl and for the family's appreciation of Mr. Buddin's work.

"Cheryl walked with a brace and extension at the age of 18 months. She mastered the use of this appliance in one day. At 5 years she rode a large tricycle 14 blocks to school. She rode a horse well by the time she was four . . . She has been an excellent driver since she was fourteen. . .

"Cheryl is co-editor of two school newspapers, on the school annual staff, the class planning committee, and usually holds a class office. She is also active in speech activities.

"She had no difficulty at all in walking on the new leg. It has greatly improved her appearance and her comfort. She looks forward to some day getting a high heel foot too, so she can have her first pair of high heel shoes."

[Ray Buddin tells us he intends to fit a high heel foot to the prosthesis in the near future so she can interchange.]

"Our daughter is very grateful to Mr. Ray Buddin, employed by the Lester J. Sabolich Artificial Limb and Orthopedic Appliance Company, who designed and made the new limb, and regards it as a work of art by a master craftsman," Mr. White concludes.

Review

Selected Papers, *Eighth Annual Workshop, December 4-8, 1959, New York, New York, Conference of Rehabilitation Centers and Facilities, Inc., 828 Davis Street, Evanston, Illinois. Price \$1.00. Reviewed by LeRoy Wm. Nattress, Jr.*

The collection of selected papers published in this brief volume were presented at the 1959 Workshop of the Conference of Rehabilitation Centers and Facilities on "Preparation for Living, a Goal of Rehabilitation."

The major emphasis in this publication is placed on the psycho-social adjustment phase of rehabilitation even in the consideration of vocational adjustment with papers being presented by such well-known psychologists as Dr. Morton A. Seidenfeld and Dr. Harold Chenven. Through our reading we are again introduced to three precepts of rehabilitation:

- (1) Treatment of the individual is always treatment of the whole person.
- (2) The individual who voluntarily seeks assistance makes better use of the assistance provided and the period of his recovery is reduced.
- (3) The relationship between *patient* and *specialist* may be of as much significance as the nature and kind of treatment provided.

The portion of this publication devoted to vocational adjustment leaves much to be desired. Instead of vocational adjustment we are treated to discourses on pre-vocational assessment, personnel in rehabilitation, community resources, Federal programs and research. While the importance of these considerations cannot be minimized, it is disappointing to one who expects a consideration of vocational adjustment to find it lacking.

Before closing this review it seems fitting to include a brief statement about the Conference of Rehabilitation Centers and Facilities, Inc. For this, we quote from the statement on the front cover of "Selected Papers."

"The Conference is an organization composed of institutions in the United States and Canada that specialize in the rehabilitation of the disabled. It was founded in 1952 as the result of the spontaneous recognition by a small group of rehabilitation center directors that the unique problems facing them could be solved more readily by sharing the knowledge and experience of all those in the field.

"The purpose of the Conference is to develop and improve the services of rehabilitation centers and facilities to handicapped and disabled persons by (a) providing for mutual consultation, study and exchange of ideas among such centers and facilities, (b) providing a basis for unity and common action by those centers and facilities, and (c) cooperating with other professional associations and agencies in the advancement of the rehabilitation of handicapped and disabled persons."