MARCH, 1964

ORTHOPEDIC & PROSTHETIC APPLIANCE JOURNAL

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See Story on Page 49

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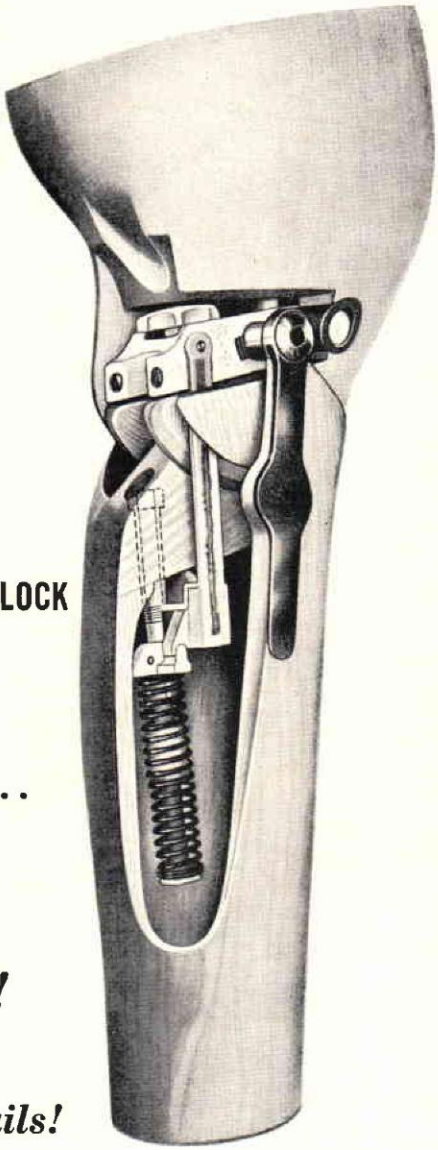

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Orthopedic and Prosthetic

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(Title registered U. S. Patent Office)

VOLUME 18 • MARCH, 1964 • NUMBER 1

Second class postage paid at Washington, D. C., U.S.A.

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The *Orthopedic and Prosthetic Appliance Journal* is issued in March, June, September and December. Subscription price payable in advance is five dollars a year in the Western Hemisphere, rate elsewhere is six dollars a year. Publication does not constitute official endorsement of opinions presented in articles. The *Journal* is the official organ of its publisher, The American Orthotics and Prosthetics Association; and of the American Board for Certification. All correspondence should be addressed to: Editor, *Orthopedic and Prosthetic Appliance Journal*, 919 18th St., N.W., Washington, D. C. 20006. Telephone, Area Code 202, 296-4160.

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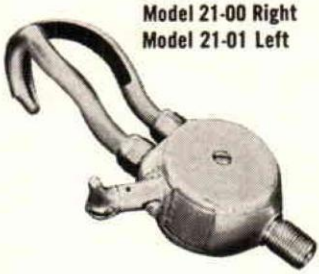

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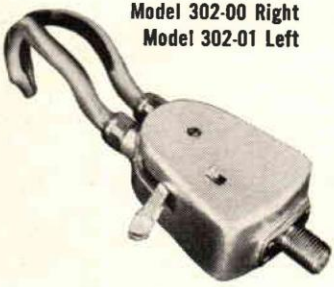

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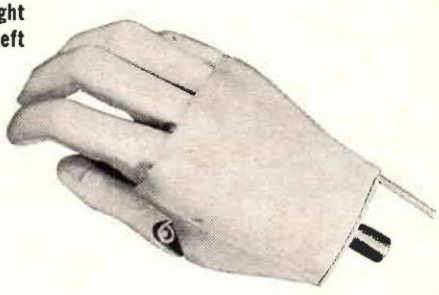

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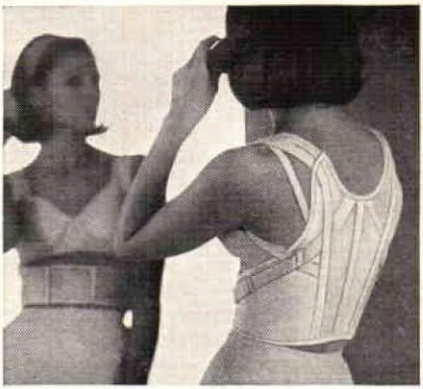

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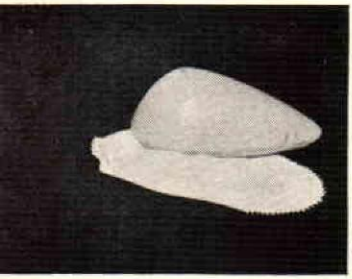

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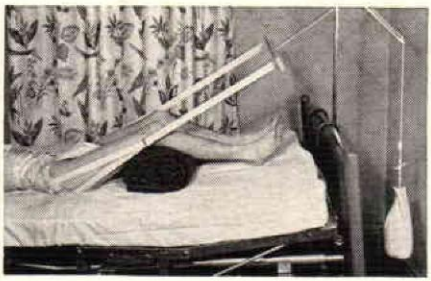

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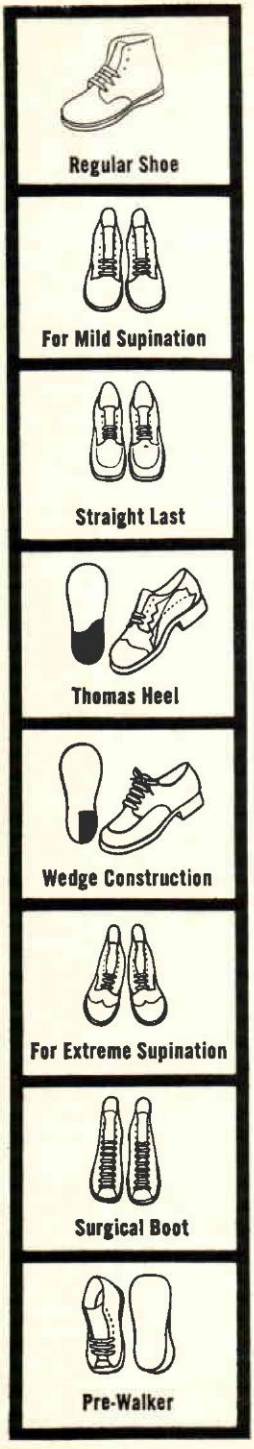

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The Triple "P" Hyperextension Brace

By SIEGFRIED JESSWEIN, C.P.O.

Becker Orthopedic Appliance Company
Birmingham, Michigan

Recently the author of this article was asked to fit a "3" point hyperextension brace to a 70-year-old patient with fracture of D-8. The brace prescribed was the common anterior hyperextension brace having as its major components the usual sternal, pubic, and dorsal pad connected to an adjustable body frame.* Although the patient reacted favorably to the relief received from the placement of the dorsal pad and its applied pressure, her disapproval and complaint about the brace revolved around the confining and depressing discomfort of the sternal pad. The brace was adjusted as well as possible and met every check-out criteria; however, due to the bony area of the sternum and adjacent ribs, and although the sternal plate was padded with ½ inch foam, the pressure over this area was merely tolerable.

Probably every fitter has heard the complaint from his patients, "But this pad on my chest bothers me. It interferes with my breathing." To which many a fitter could only give a sympathetic reply. As a result of this common unhappiness with this particular appliance, it was decided to alter the brace by splitting the superior pressure point and shifting them laterally so as to be located over the lateral aspects of the pectoral muscles. Therefore, the superior part of the brace has in a sense acquired the appearance of the commonly known Cowhorn brace. See figure below. It will be noted that the pressure pads are located approximately ½ inch below the clavicles and slightly medial of the sub-clavicular fossa. The justification for this location is that in sitting the pads will approach the clavicles and that extreme pressure over the anterior thoracic nerves and the thoraco-acromial artery must be avoided. Furthermore, too lateral placement of the pads would interfere with scapular abduction.

The advantages of this brace are threefold. Firstly, it is recognized that the "3" point hyperextension brace is widely accepted for the treatment of fractures of the vertebrae. Due to the high degree of adjustability of the appliance in the directions of width, length, degree of inclination of the pressure pads, as well as the vertical and sagital adjustment of the dorsal pad, it has been favored by the fitter in the past. Secondly, this newer appliance has retained all of the above named characteristics. Thirdly, in addition to these characteristics the subtraction of discomfort over the sternal area has become its major advantage by means of the individually adjustable pectoral pressure pads. It should also be noted that the rigidity of the brace is maintained by the transverse plastic strap connecting the pectoral pads.

---

* Becker "3" point hyperextension brace.

The name Triple "P" Hyperextension Brace has been given to this appliance because it accurately describes the regions in which the pressure pads are found, namely, the *p*ectoral, *p*ubic, and *p*ara-spinal regions of the trunk.

Since an initial fitting of this appliance is usually not possible, a good set of measurements must be taken to assure a well-fitting brace. The measurements as listed below have been found adequate to achieve this objective.

Circumferential:

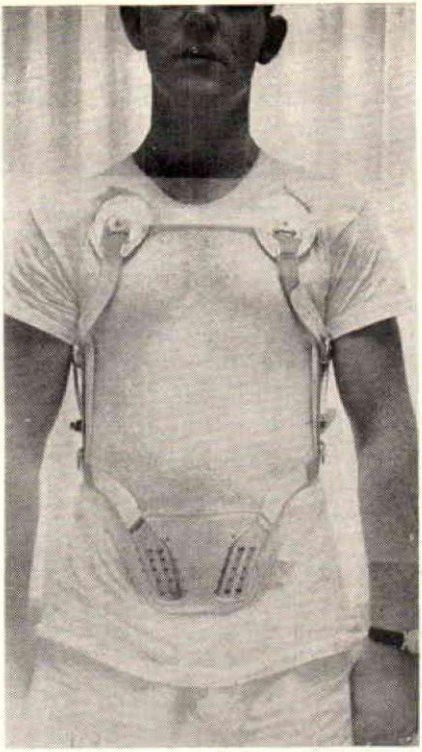
1. Trochanter
2. Iliac crest
3. Waist
4. Chest—2 inches below axillary folds or below breasts

Longitudinal:

1. ½ inch above symphysis pubis to ½ inch below clavicles

Horizontal:

1. Inter sub-clavicular fossa minus one inch
2. Width of crest of ilii
3. Width of chest 2 inches below axillary folds or breasts



The Triple "P" Hyperextension Brace as fitted and checked out on patient with fracture of D-12. Note location of pectoral pad. The effect, adjustability, and rigidity of the brace by means of this arrangement have not been impaired.

This Triple "P" Hyperextension Brace has widened its application. To illustrate this point the following case is given. A 24-year-old male with fracture of D12 was seen. The typical "3" point hyperextension brace was considered. However, due to high sensitivity of the sternum as a result of a previous fracture that particular brace was non-applicable. The Triple "P" Hyperextension Brace was prescribed and very successfully applied. Had this brace not been available braces such as the Cowhorn, Taylor, or Frankel would have needed to be considered.

In as much as the average orthotic facility will find it non-profitable to duplicate the adjustment mechanism of this appliance, information regarding the availability of the Triple "P" Hyperextension Brace may be obtained by writing to Mr. Siegfried Jesswein, Becker Orthopedic Appliance Co., 1776 South Woodward Ave., Birmingham, Michigan.

It is hoped that other orthotists will give this brace consideration because it has been shown that the comfort factor with this type of appliance has been considerably raised.

Silicones in Prosthetics

By FRED HAMPTON, C.P.

Acting Project Director, Northwestern University Prosthetic Research Center

This article includes the report distributed by Dow Corning Corporation, entitled "Silastic Pads for Limb Prostheses," and information on a variety of other uses of Silicones as employed by Northwestern University Prosthetic Research Center in the fabrication of prostheses.

Silastic Pads for Limb Prostheses

Introduction

Clinical work at Northwestern University Prosthetic Research Center and Prosthetic-Orthotic Education, supplemented by field experience, has shown Silastic RTV to be a versatile and useful material in the field of prosthetics.

Silastic RTV is a non-toxic material which has a very low exotherm and gels at room temperature. The set time can be controlled by the amount of catalyst added. The injection of the RTV fluid enables pressures to be evenly distributed over the entire distal end of the stump and makes it possible:

a) To form an intimately contoured distal pad
b) To accommodate any change in stump volume distally
c) To control the amount of pressure at the end of the stump under weight bearing
d) To convert a conventional open end socket to a closed end socket with distal contact

It is obtainable in various densities, thereby affording a broad selection for the different applications as required in A/K and B/K sockets, upper extremity sockets, etc.

Materials

The Dow Corning silicones used for making the limb pads are:

1. Silastic 385 Elastomer for Above-Knee Distal Pads (formerly Silastic RTV 502 or Medical Silastic 382)
2. Silastic 386 Foam Elastomer for Below-Knee Distal Pads (formerly Silastic RTV S-5370 foam)
3. Medical Silastic S-5391 Elastomer. A low viscosity room temperature curing silicone rubber for coating the Foam Silastic to prevent perspiration absorption and provide a tougher surface. Excellent for laminating.
4. Medical Fluid 360, 20 centistokes viscosity for lowering the consistency of the solid elastomer to facilitate injection.

Other silicones recommended by the group at Northwestern include Dow Corning 555 Fluid to assist in releasing the formed pad from the stump (this may or may not be necessary); Silastic RTV 1200 Primer and Silastic 140 Adhesive to bond the formed pad permanently to the prosthesis.

Preparation of Materials

All of the Silastic elastomer formulations are two-component systems comprising a base and catalyst. Directions for combining the ingredients are on the labels. These silicone elastomers must, of course, be catalyzed just prior to use. For best results the catalyst should be added rapidly and be dispersed uniformly throughout the base by vigorous stirring for approximately 30 seconds. Working time can be increased by cooling the ingredients or by reducing the amount of catalyst. It is recommended that the prosthetist prepare two or three small batches before using the materials clinically to get a "feel" for the systems and their reactivity.

The Medical Fluid 360, 20 centistokes viscosity, can be used as a thinner. It can be added to either of the solid RTV systems to lower viscosity and thereby increase flow. Do not use Medical Fluid 360, 20 centistokes viscosity, with the Foam. Addition of up to 10% of the Fluid will not affect the properties of the final product. The Fluid must be added before catalyzing the mixture. Addition of Fluid somewhat extends the working time of the system.

Dow Corning 555 Fluid or a 5 to 10% solution of a household synthetic detergent are recommended as release agents where trouble is anticipated in removing the formed pad from the stump. In most cases no release agent will be needed.

Silastic elastomer systems bond reasonably well to most prosthetic parts if allowed to set up in contact with the part. The use of Silastic RTV 1200 Primer and Silastic 140 Adhesive is recommended where it is desirable to bond the cured pad to the prosthesis. As with any bonding operation, the surface must be thoroughly cleansed for best results. Light sanding followed by a solvent wipe is recommended.

Note

The catalyst used with the RTV systems is somewhat toxic in its pure state. Rinse the area thoroughly with running water if catalyst is dropped on skin.

Although shelf life of the RTV systems is indicated to be six months, normally they will be perfectly OK for much longer times. Material that has not set up or thickened appreciably in the container is satisfactory to use. The catalysts will decrease in reactivity rather rapidly on prolonged exposure to air. Keep containers tightly closed and transfer catalyst to a smaller container when the air space exceeds approximately ¼ of the total volume of the vessel.

The solid and foam Silastic elastomers are compatible with each other and may be combined in various proportions to obtain semi-solid pads of intermediate densities. Foaming under pressure (confined) also results in a pad of higher density.

Equipment

Almost any hand caulking gun of approximately 12-ounce capacity is satisfactory for injecting the solid or foam elastomers. The gun must be of a type that can be assembled quickly because of the short set-up time of the RTV systems. Use a gun with tapered nozzle. An adaptor cut from neoprene is inserted into the valve for the A/K pad when solid RTV is used. The same gun is used for B/K injection.

Stump Preparation

1. Shave all hair from the distal portion of the stump for total contact A/K suction sockets.
2. If foam is to be used, apply household detergent solution to the stump as a separator and allow to dry. Vaseline may also be used.

Socket Preparation

1. Ensure that there is a space of ½" between the end of the stump and the socket. If there is too big a cavity, use ½" rubber foam cut and glued to the socket to reduce the amount of Silastic needed.
2. In the case of a B/K, drill a ⅜" hole just proximal to the distal pad.
3. In a PTB, remove the distal portion of the soft insert if there is insufficient room for foam, otherwise cut a hole in the insert opposite the ⅜" hole in the socket.
4. If an unfinished wood socket is being used, lightly coat the distal part with Vaseline to facilitate removal of the pad.
5. Insert an air bleed tube into the posterior lateral or posterior medial corner of the socket, and ensure that the bottom end is at the same level as the end of the stump. The tube should be small and flexible, with an ID of about 1/16". It can be a short piece of the plastic insulation from #12 copper electric wire. By blowing into the tube, ensure that it is not blocked by the stump.

Fitting Preparation

Where a suction socket is worn, pull the amputee into the socket in the normal manner.

If the amputee wears a stump sock, pull a separator over the stump sock. A tailored sleeve of PVA, capped at the distal end, is satisfactory for B/K stumps or long A/K stumps. Where the A/K stump is short, preform a flat sheet of PVA over a cast and pull this on to the distal end of the socket. Any reliefs needed can be formed with ½" felt, held to the stump sock with friction tape and the PVA separator pulled over all.

Procedure

1. Mix the Silastic 385 elastomer in large containers and thoroughly spatulate, then pour the contents into the cylinder. Mix the Silastic 386 Foam elastomer in the cylinder of the caulking gun.
2. Push the nozzle of the gun into the neoprene valve adaptor opening and inject the Silastic into the socket. Continue the injection until the amputee feels slight pressure from the fluid. If the pressure is excessive and tends to force him out of the socket, release the plunger and allow excess Silastic to run back into the cylinder. The amputee should stand erect with most of his weight on the prosthesis.
3. Allow the Silastic to set—the time required can be estimated by checking the remains in the cup.
4. Remove the gun and cut the connecting piece of cured Silastic with a knife.
5. When using foam, remove the gun immediately after injection and hold a finger over the hole. If excess pressure is felt, allow some of the foam to escape out of the hole. If pressure is maintained in the socket it will produce a firmer foam.
6. Remove the pad from the A/K socket.
7. At the valve hole, cut a hole in the Silastic pad to allow the amputee to pull his stump into the socket. (Figure 1)
8. Re-insert the plug and cut the protruding piece flush with the outside wall of the pad. The plug may be glued to the valve cap using Silastic Adhesive 140. In this case a small air hole must be made in the plug.
9. If the valve is pre-set to touch the stump under weight bearing, a plug will not be necessary.

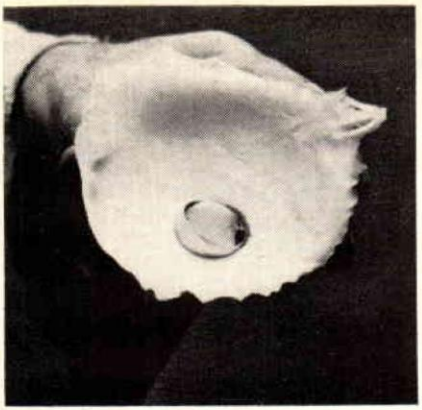


Figure 1

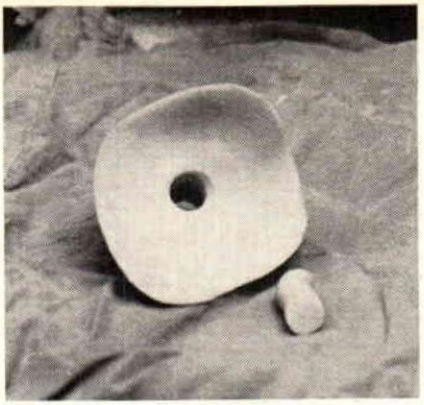


Figure 2

Finishing Process

1. Fill any voids in the pad with the same material.
2. Trim any feather edges that are apt to fold over when pulling the stump into the socket.
3. Remove any prominent ridges formed by the stump with a sanding cone or a burr. (Figure 2)
4. If foam is used, a skin should be formed over the surface to help to prevent absorption of sweat into the pad. A small mixture of S-5391 is prepared and applied thinly to the surface. Smooth the skin before it gels by wiping sparingly with Silastic Medical Fluid 360.
5. Dust with talc to eliminate any tackiness.
6. Test for pressure as the amputee takes a few steps. If pressure is excessive, relieve by removal of rubber from the distal end of the pad or by minor sanding of the proximal surface.
7. RTV may be glued permanently in the prosthesis with Silastic 140 Adhesive and Silastic RTV 1200 Primer.

Laminating Silastic

It is sometimes desirable to fabricate a socket having flexible areas of laminated Silastic as an integral part of the socket. The viscosity of Silastic is much higher than that of polyester and makes complete saturation of the lay-up more difficult. The use of a vacuum system is imperative and greatly helps in overcoming this difficulty. The elastomer generally used is S-5391, diluted if necessary by Medical Fluid 360. Addition of up to 10% of the Fluid will not affect the properties of the final product. Addition of more than 10% will extend the working time and the resultant rubber will be softer. In no case should more than 30% by weight of thinners be added. The thinners should be added to the base resin and thoroughly mixed before the catalyst is added. The set or working time of the Silastic is affected by temperature and humidity. The working time can also be changed by varying the amount of catalyst used.

This application has been used to advantage in fabricating a body socket for a bilateral hip disarticulation amputee. The amputee was a paraplegic with a sensory level of T9 who underwent a right urethrostomy. In addition, he was subject to deep decubiti of the buttock and sacral areas. The upper part of the socket was made of a combination of rigid and flexible polyester to obtain comfortable support from the rib cage. The distal part of the socket was made of an inner Silastic S-5391 laminate with a chamber

between the laminate and the polyester shell. While the socket was still on the cast, Silastic 386 was injected into the chamber under the Silastic laminate, which resulted in a contoured foam seat area. (Figure 3)

The same technique was employed to form a soft distal end in B/K sockets, and also to form flexible anterior and posterior panels in A/K sockets. (Figure 4) While the areas laminated with the Silastic varied as to location, shape and size, the basic technique was as follows:

Determine the thickness required for the flexible laminate (usually two or three layers of nylon stockinette are sufficient). Pull the stockinette over the cast and mark the areas to be flexible, then pull a PVA bag over the lay-up and tape off the areas to contain the Silastic. Pour a mix of Silastic S-5391 into the bag, turn the vacuum on, and work the Silastic into the designated areas. After the Silastic has set, strip off the PVA bag. Apply any further lay-up directly over the Silastic and unsaturated areas of the previous lay-up. Pull another PVA bag over the finished lay-up and proceed with the polyester laminate. The polyester will not adhere or bond to the cured Silastic.

An open weave of stockinette is preferred for laminating. Nylon, cotton and dacron stockinette have been used successfully. An initial layer of banlon and a final layer of banlon improves the finish of the laminate. The thickness of the insert can be controlled by the number of layers in the lay-up. The thicker the insert the slower set time is necessary to allow complete penetration of the Silastic. The resin should also be worked into the lay-up by hand, and a draw of approximately 20 in. Hg. should be maintained until the Silastic has set. String excess resin from undercuts. If coloring of the resin is desired, the polyester color seems to be compatible to the silicones.

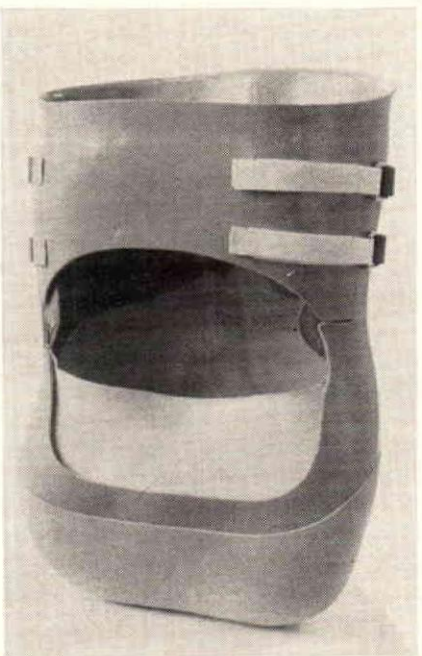


Figure 3

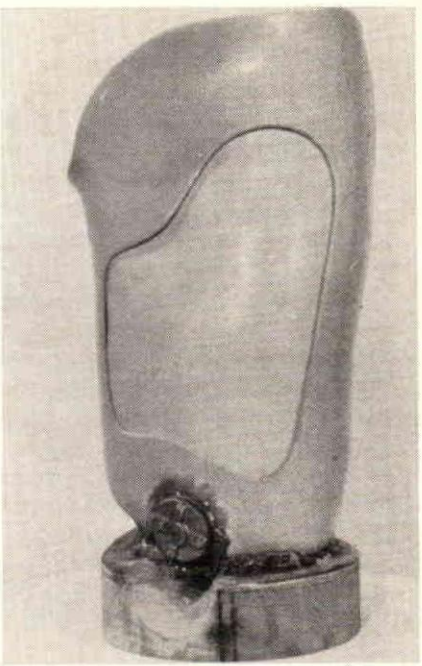


Figure 4

Hip Disarticulation

Silastic 385 has been used to form a pad in the seat area of the hip disarticulation socket. The cast was modified in the normal manner and smoothed. Two coats of Ambroid varnish were applied to the cast and allowed to dry. A thin coat of Vaseline was applied to the seat area. A mix of Silastic 385 (no thinnners) was prepared and spatulated on to the cast in the area selected, allowed to set up and the edges trimmed where necessary. The set of the 385 was accelerated by increasing the amount of catalyst to the mix. No thinners were added to the mix in order to maintain the viscosity of the material. As a result, there was little difficulty due to "running" of the 385 on the cast. The surface of the Silastic was smoothed and controlled by hand. The fingers were kept wet by dipping in Silastic Thinners to prevent pulling of the Silastic during the smoothing operation.

Where the attachment area for the hip joint was formed during lamination of the socket, the cavity formed was filled with 385.

The urethane build-up which located the hip joint placement was removed from the cast and the area was then smoothed and a smear of Vaseline applied as a separator. The socket was prepared by drilling the attachment holes and bolting the inner plate to the socket with two bolts. The center hole was drilled with a 3/8" drill. The socket was replaced on the cast and secured by a web belt or pressure sensitive friction tape.

The 385 was injected through the center hole and allowed to set. Because the cavity was large, a 50-50 mixture of 385 and 386 was used to reduce the weight. The 385 and 386 resins were mixed together and poured in the caulking gun. 4% of the 386 catalyst was added and mixed for 25 seconds. (The resultant foam increases approximately twice its original volume). Set time was approximately three minutes. The pad was glued in place using Silastic 1200 Primer and Silastic 140 Adhesive.

Hemipelvectomy

The build-up of the lateral wall of the cast for joint placement and cosmesis for a hemipelvectomy results in a large cavity to be filled. To avoid adding excessive weight to the socket, Silastic 386 is a good material to use as a filler, provided the surface is reinforced with stockinette. The procedure is as follows:

Remove the urethane build-up from the cast, smooth the area and apply a separator—Vaseline or detergent solution, etc. Stretch a piece of stockinette across the cast covering the area to be foamed and hold with staples. Prepare the socket for injection by installing the hip joint and drilling the center hole with a 3/8" drill, then replace and secure the socket to the cast. Inject the Silastic 386 into the cavity. (Figure 5) Remove the socket from the cast and the pad from the socket. Trim off excess stockinette, coat the surface of the pad with Silastic S-5391, and glue the pad to the socket. Rough the area of the socket to be glued with sandpaper. Coat the roughed area of the socket with 1200 Primer and allow to dry. Shorten the drying time by careful use of a heat gun. Glue with 140 Adhesive. (Figure 6)

Below-Knee

The principal application of Silastic in B/K prostheses has been to obtain distal contact to the stump to prevent or alleviate an edematous condition. This is done by injecting the Silastic into the distal end of the B/K socket with the amputee standing and bearing equal weight on both legs. Silastic 386 is the material of choice; Silastic 385 has had limited

Figure 5

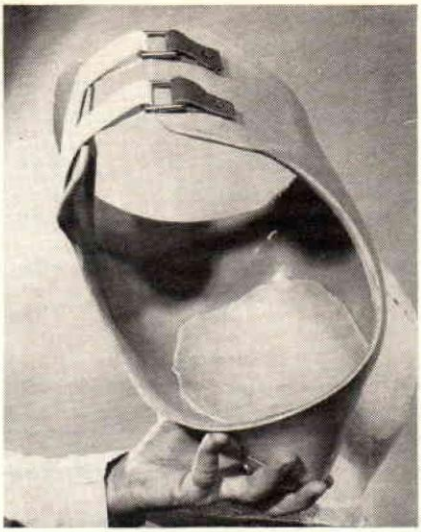


Figure 6

use with satisfactory results. J. Caldwell, C.P. of J. E. Hanger, Orlando, Florida, has recommended the addition of stockinette (preferably banlon) to the contacting surface of the pad, thus enhancing the strength and durability of the foam pad.

The procedure requires a thin stump sock pulled on to the stump, a PVA bag capped at the distal end as a separator over the stump sock, and a sock of banlon tailored at the distal end pulled over the separator. Vent tubes are inserted in the socket and the patient dons the prosthesis. Silastic 386 is injected in the routine manner and allowed to set. The pad is removed from the socket and the banlon is trimmed at the junction of the foam. A skin of S-5391 should be applied to the surface to prevent absorption of sweat into the open structure of the foam. The pad is then replaced and glued if desired into the prosthesis.

Symes

Prior to forming a distal pad, the cast was prepared at the distal end by filling in any deep scar areas and building up any relief areas necessary. The cast was smoothed to eliminate any roughness or pits in the plaster, and coated with Ambroid. The Ambroid was lightly greased with Vaseline.

A cardboard was formed around the distal end of the cast to hold the Silastic. The cardboard form included the whole weight bearing area of the distal stump and any areas anteriorly that required relief. An appropriate amount of Silastic 385 was mixed and poured into the cardboard container. After the Silastic had set, the cardboard and the pad were removed from the cast. The distal edges of the pad were removed with scissors or a sharp knife and these corners radiused on a sanding disc or cone. The pad was approximately ¼" thick at its thinnest part. The pad was replaced on the cast and a separator of PVA was pulled over all.

A laminated Silastic insert for proximal weight bearing Symes may be fabricated using the technique as described by A. Finnieston, C.P. in AOPA *Journal* of June, 1963, entitled "The Patella Tendon-Bearing Below-Knee Prosthesis: Fabrication of a Silicone Rubber Soft Insert."

Partial Feet

A satisfactory gait may be achieved with a good Chopart or Lisfranc amputation without the aid of a prosthesis. It is not unusual, however, for support to be required to help to stabilize the foot in the shoe, to increase the anterior support during ambulation and to assist in preventing buckling of the toe of the shoe. This is sometimes attempted by stuffing the toe of the shoe with rags or old stockings.

Silastic is an excellent material to use as a shoe filler, permitting an intimate fit between the filler and the stump with a minimum expenditure of time or effort. Silastic 385 as a filler adds excessive weight to the shoe; Silastic 386 is a good material to use; a mixture of 385 and 386 in varying proportions will allow any density of foam desired; S-5391 is used as a barrier to prevent absorption of sweat into the foam.

The techniques used at NU are offered as a guide. An insole of cloth (stockinette) is cut and inserted into the shoe. A sock of banlon is tailored and pulled on the stump, the seam line being kept under the foot. A light coat of Vaseline or a silicone spray is applied to the inside of the shoe. 50 grams of Silastic 386 are prepared with 4% catalyst and poured into the toe of the shoe. The amputee immediately inserts his stump in the shoe and stands with equal weight bearing. The operator should lace the shoe. The amputee stands until the foam has set, usually three minutes. The foam and insert are then removed from the shoe. The banlon sock is trimmed at the junction of the foam, a thin skin of S-5391 is applied to the surface of the foam, and the filler is again inserted into the shoe. The banlon imbedded in the foam adds strength to the surface of the foam and prevents cracking and breakdown. Nylon and cotton are effective, but the ribs of the weave produce a coarse finish. Banlon is preferred because of the finish obtained by the fine weave. (Figure 7)

Another technique consists of using the Silastic 386 as a filler for the toe of the shoe. The contacting surface of the foam filler is cut away to a depth of approximately ¼". The cavity produced between the stump and the remaining foam is then filled with Silastic 385 and allowed to set. The resultant surface is helpful in preventing absorption of sweat into the foam and produces a durable surface without adding a lot of weight to the shoe. (Figure 8)

One case presented to NUPRC required a weight bearing filler to accommodate a heel deficiency. (At the time a cork filler was used, but was not satisfactory). A plug of wood was used to maintain the correct height and attitude of the foot in the shoe. The patient was seated and shown

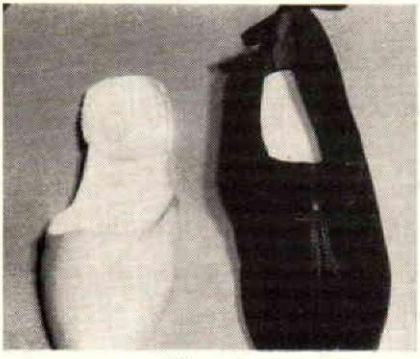


Figure 7

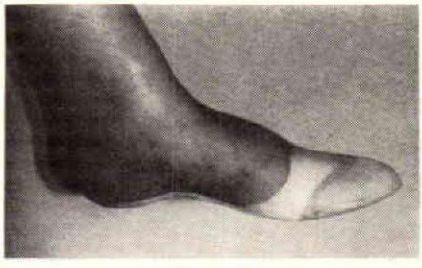


Figure 8

how to maintain the foot in an angle of dorsiflexion. This was necessary to contain the Silastic 385 in the desired area. A mix of 385 was made and poured into the heel of the shoe. The patient put the shoe on and remained seated until the Silastic had set. The pad produced was comfortable and durable and has been in use for approximately ten months.

V. Meadows, of Meadows & Wesela, Grand Rapids, Michigan, has made over 100 pairs of arch supports of Silastic 385 by the following procedure:

An impression is taken of the foot by means of a block of casting foam obtained from Hersco Arch Products Corporation, 137 E. 25th St., New York. A slurry of plaster is poured in the impression and the resultant male mold is modified as required. A container made of cardboard is formed around the cast. Silastic 385 is mixed and poured into the container. Care is taken to allow the Silastic to form up and around the back of the heel. After the Silastic has set it is removed from the mold, then trimmed and ground as necessary. The Silastic formed around the heel holds the support in the proper position and eliminates the necessity for gluing the insole or arch supports to the shoe.

Upper Extremity Sockets

Silastic 386 has proved to be a valuable material in helping to obtain or maintain an intimate fit in the upper extremity sockets. It has also been useful as a means to provide padding for relief of bony prominences such as the distal end of the radius or ulna in a wrist disarticulation prosthesis. A contact fit distally in an A/E socket obtained by the use of Silastic 386 can relieve pressure from the socket under the axilla, and may also, in the case of a short A/E, allow the reaction point of the harness to be lowered on the socket with undue discomfort to the end of the stump. The technique used at NU is as follows:

Pull the stump sock on the stump and a PVA bag over the stump as a separator. To reinforce the foam, pull a light stump sock of either banlon, stockinette, etc. over the PVA bag. Insert a bleeder tube into the socket to allow air to escape during the foaming process. Weigh an appropriate amount of Silastic 386 and 6% catalyst in separate containers. Where possible, the harness should be worn, leaving the socket free. Mix the Silastic in the socket for 25 seconds, then insert the stump into the socket and support the socket during the foaming process. Remove the formed pad from the socket and trim off excess stockinette. Apply a thin coat of S-5391 to the surface of the foam as a vapor barrier. Clean the socket and rough the area to be bonded with sandpaper, then apply a coat of 1200 Primer and dry. Apply Silastic 140 Adhesive to the socket around the proximal edge of the pad and insert the pad.

In the case of a short A/E, it is not always feasible to pull a PVA bag over the stump as a separator, in which case it is necessary to remove any hair from the stump and under the axilla. A 5% solution of household detergent, such as Vel or Tide, in water makes an excellent separator when applied to the stump and allowed to dry.

In a partial hand prosthesis, a comfortable fit was achieved by forming a pad of Silastic 386 between the distal end of the socket and the bony prominences of the stump.

The intimate fit and the insulating qualities of the foam do create a problem concerning sweat. The skin of Silastic S-5391 is helpful in preventing absorption of sweat into the foam. The amputee should wear a clean stump sock and clean the socket with a solution of baking soda and water, or soap and water, household detergent, etc.

Experimental

Other applications of Silastic have been tried experimentally. These innovations are mentioned, not as completed techniques, but as items of interest.

1. S-5391 as coating for cotton webbing in harness applications.
2. S-5391 as coating for the inner surface of plaster splints.
3. S-5391 as a laminated cover for the shank of a prosthesis.
4. S-5391 or 385 to make molds to reproduce parts.
5. 386 as build-ups for body contours (shoulder build-up for forequarter).
6. The viscosity of the 385 may be increased to a paste consistency by the addition of an inert filler to the elastomer. The filler used was sulca flox.
7. To separate Silastic from itself, paraffin dissolved in Xylene is recommended.

Dr. Lawrence W. Friedmann Appointed To Top Medical Post at Institute for Crippled and Disabled

Lawrence W. Friedmann, M.D., a specialist in physical medicine and rehabilitation and an authority on low back injuries, has been named Director of Medical Services at the Institute for the Crippled and Disabled by James N. Burrows, the Director of the rehabilitation center. The Institute is located at 23rd Street and First Avenue in New York City.

Dr. Friedmann is Instructor in Physical Medicine and Rehabilitation at the College of Medicine, New York University, with which the Institute for the Crippled and Disabled is professionally affiliated. He holds appointments as Assistant Attending Physician at New York University Hospital; Assistant Visiting Physician in the Department of Physical Medicine and Rehabilitation at City Hospital, Elmhurst, Queens, New York; and as Clinician for the Corona Stroke Project, New York City Department of Health.

Since joining the Institute's staff in 1962, Dr. Friedmann has held a series of increasingly responsible positions, the most recent being that of Associate Medical Director. In his new post, he is in charge of providing handicapped persons of all ages and with many types of disability with a broad range of medical services including orthopedics, neurology, internal medicine, physical and occupational therapy, and special programs for amputees.

He is a graduate of Syracuse University and received his medical degree at the Howard University College of Medicine, Washington, D.C. While a resident in physical medicine at the New York University Institute of Physical Medicine and Rehabilitation, Dr. Friedmann served on the Institute for the Crippled and Disabled's staff. For two years, he was a medical officer with the United States Air Force, and before that he was a resident at the Bronx Municipal Hospital Center of the Albert Einstein Medical College.

Acceptability of a Functional-Cosmetic Artificial Hand for Young Children *

By

SIDNEY FISHMAN, Ph.D.
Senior Research Scientist, Project Director

HECTOR W. KAY, M.Ed.
Senior Research Scientist, Associate Project Director

INTRODUCTION

I. *History*

The need for a functional and cosmetically-acceptable hand for juvenile amputees has existed for many years. In 1958 the Army Prosthetics Research Laboratory attempted to fill the void by developing a child's voluntary-opening hand, denoted as size No. 1. The Sierra Engineering Company contracted to manufacture this hand, and two other companies (Kingsley Manufacturing Company and Prosthetic Services of San Francisco) were enlisted to manufacture suitable cosmetic gloves.

Following preliminary testing of a prototype model, modifications to eliminate certain shortcomings were incorporated in 50 production models. A field test was initiated in April 1960, with evaluation of the cosmetic gloves included as an integral part of the study. Preliminary findings based upon experiences in fitting 20 children were reported in October 1960 (1). The results indicated that the hand was acceptable cosmetically and provided satisfactory function in the activities typically performed by the children. The general workmanship and cosmesis of the gloves provided by both manufacturers had also achieved a satisfactory level, after certain initial fabrication difficulties. However, several problems had been identified during this phase of the study, the most serious of which was a lack of glove durability. Ridges and sharp edges on the exterior of the hand apparently contributed to rapid glove damage.

It was decided to modify the original production-model hands and then refit them to the subjects in the study. These modifications included the elimination of glove-cutting edges, strengthening of the floating-finger attachments and the spring mechanism of the thumb, and raising the cable exit. In November 1960 "old" hands revised in this manner began arriving at New York University-Child Prosthetic Studies and in April 1961 the manufacturer produced a series of new hands which incorporated all of the above modifications.

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* Copies of the report here summarized are available from the Child Prosthetic Studies, Research Division, College of Engineering, New York University, 252 7th Ave., New York 1, N. Y.

(1) "Interim Report, Field Test—APRL-Sierra Child Size Model No. 1 Hand (Right)," Child Prosthetic Studies, Research Division, College of Engineering, New York University, N. Y. C., October 1960.

PLATE I
Child Wearing Artificial Hand and Glove

An Interim Report (2), summarizing the results of the field study to mid-May 1961, was prepared for the Subcommittee on Children's Prosthetics Problems and the results reinforced earlier findings concerning the acceptability of the hand and gloves. The APRL-Sierra Child Size Model No. 1 Right Hand was accepted as satisfactory for general use by child amputees on the basis of this report, and the study was terminated in the latter part of 1961.

Following the generally successful outcome of the No. 1 Right Hand evaluation, manufacture of the No. 1 Left Hand was initiated. In May 1961, NYU-Child Prosthetic Studies reported the results of a preliminary examination of two units manufactured by the Sierra Engineering Company (3). The hands appeared to be of excellent quality and workmanship, with minor exceptions, and in June 1961 the manufacture of 55 additional left hands for field test purposes was authorized.

During September and October 1961 NYU-Child Prosthetic Studies received two shipments totaling 40 hands from the manufacturer. These were found to be unacceptable because of manufacturing deficiencies and all were returned for modification. It was not until February 1962 that 37 hands were finally accepted for use in the field study. Another 14 hands submitted later were also found to be suitable, for a total of 51.

Another Interim Report (4) on the status of the field study was submitted at the October 1962 meeting of the Subcommittee on Children's Prosthetic Problems. It was reported that the APRL-Sierra Model No. 1 Left Hand was considered to be essentially satisfactory both mechanically and functionally, although more rigid quality control in manufacture and assembly was desirable. The recommendations of this report—that the hand and cosmetic glove be approved for commercial distribution—were accepted by the Subcommittee and the study was terminated in January 1963.

II. *Purposes of the Study*

The APRL-Sierra Child Size No. 1 Hand (both Right and Left) was developed in order to provide the juvenile upper-extremity amputee with a cosmetically acceptable terminal device, which would closely resemble the normal hand in size, shape and coloring. Maximum function, commensurate with cosmesis, simplicity of operation, strength considerations and reasonable cost, was a concomitant objective.

Since the field study of the Left Hand was essentially an extension of the Right-Hand Study, the general goals of both evaluations were identical:

1) to introduce the hand into clinical use;
2) to corroborate findings of laboratory studies;
3) to determine the acceptability, utility, application, and durability of the production-model hand and glove;
4) to investigate indications and contraindications for prescription.

In the light of the experience gained in the prior Right-Hand Study, three considerations were given closer attention in the Left-Hand evaluation:

1) Performance differences between the experimental hand and the

(2) "Interim Report, Field Test—APRL-Sierra Child Size Model No. 1 Hand (Right)." Child Prosthetic Studies, Research Division, College of Engineering, New York University, N. Y. C., May 1961.

(3) "Memorandum Report: Preliminary Considerations of the APRL-Sierra Child Size Model 1A (Left) Hand," Child Prosthetic Studies, Research Division, College of Engineering, New York University, N. Y. C., May 1961.

(4) "Interim Report, APRL-Sierra No. 1 (Left) Hand," Child Prosthetic Studies, Research Division, College of Engineering, New York University, N. Y. C., October 1962.

hooks previously worn were investigated in greater detail than was the case in the Right-Hand Study.

2) The short wear-life of the cosmetic gloves used in the Right-Hand Study presented a definite and challenging problem. In the course of the study the exterior of the experimental hand was extensively modified to eliminate sharp edges which might contribute to glove damage. The effectiveness of these changes was of particular interest in the Left-Hand Study.
3) The effect of hand wear on the child's school behavior was a planned aspect of the Right-Hand Study. Little data was secured on this significant subject, however, since the study overlapped two school years. With the earlier commencement of the Left-Hand Study (February 1962) these data were obtained for a limited number of children fitted during March and April 1962.

III. *Description of Hand*

The APRL-Sierra Child Size Model No. 1 Hand, both right and left, consists of a metal handshell and two movable fingers (index and middle) which articulate at the inter- and metacarpo-phalangeal joints. This type of articulation is designed to permit maximum finger travel without undue distortion of the cosmetic glove. The thumb may be set manually in two positions, with two finger-opening dimensions possible: with the thumb in the "small-opening" position gripping of objects 0 to 1⅜" (minimum) should be possible, while the "large-opening" thumb position should accommodate objects ⅝" to 2" (minimum). Foam or silicon rubber floating fingers (ring and little finger) are attached to the handshell with an insert pin and are non-functional.

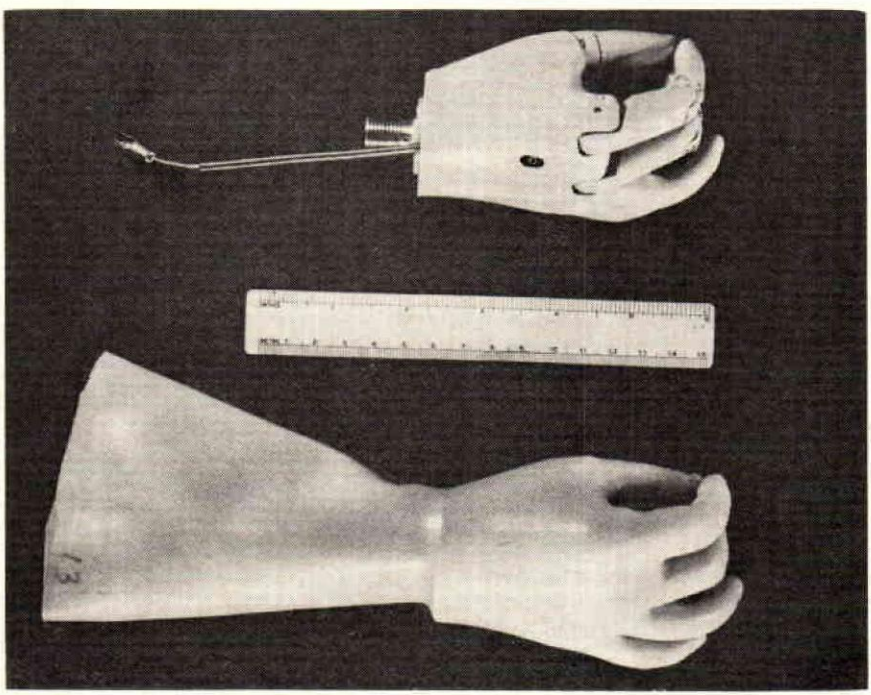

PLATE II

APRL-Sierra Child Size Model No. 1 Hand

Hand function is of the so-called "voluntary-opening" type, i.e., a pull on the control cable opens the fingers against a spring force which closes them when the cable is relaxed. The hand mechanism provides a pinch force of approximately two pounds at the fingers and requires about ten pounds of force to open the fingers fully. Incorporated in the mechanism is a "following" lock or "Bac-Loc," which prevents the fingers from opening when a force or load up to a maximum of ten pounds is applied against them.

The hand is designed to be of life-like proportions and shape, so that a realistic appearance is attained when it is covered with the appropriate cosmetic glove. The specified overall dimensions of the hand are:

length (with fingers closed)	3-5/8″
length (with fingers extended)	4-3/4″
width (at metacarpo-phalangeal joints)	2-3/16″
thickness (at metacarpo-phalangeal joints of index finger and thumb)	2-1/16″

Further details concerning the structural and functional characteristics of the No. 1 Hand may be found in the APRL Specifications Report 2-61 (5) and referenced publications.

SUMMARY

The findings from the study of the APRL-Sierra Child Size No. 1 (Right and Left) Hand are presented in this report. The experiences of 77 children are described, including 38 subjects fitted unilaterally with the right hand, 38 fitted unilaterally with the left, and one child fitted bilaterally. All children discussed in the report wore the experimental hand for a minimum of four months, except for seven subjects who rejected it prior to completion of the wear period planned for the study.

The overall age range of the sample (at the time of fitting) was from 4 years to 12 years 4 months. All levels of upper-extremity amputation (prosthetic type), from wrist-disarticulation to shoulder-disarticulation were represented. The one child fitted with both right and left hands was a bilateral below-elbow amputee.

Although the Right- and Left-Hand portions of the study were not conducted concomitantly, for the most part the findings were consistent and may be summarized jointly. They were:

I. *Overall Acceptance*

Less than 10 percent of the children in the study rejected the No. 1 Hand completely. The response of the remaining 90 percent ranged from highly enthusiastic to lukewarm. Actual (and planned future) wear of this majority group varied from exclusive full-time wear to part-time use primarily for social occasions. Cosmesis was the prime factor influencing the generally high level of acceptance. However, in the majority of instances cosmetic appeal was supplemented by an adequate degree of function.

Weight reduction and an improved operating efficiency (ratio of pull-to-pinch forces) would doubtless add to the acceptability of the No. 1 Hand. Both these improvements should be feasible.

II. *School Behavior*

Evidence from teachers, parents and children emphasized the importance of the school environment to the child. The school milieu emerges as perhaps the most critical social setting in which the child functions.

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(5) Riblett, V., and Hodge, J. W., Jr., "Tentative Standards, Hand, Mechanical, for Upper Extremity Amputees, Size 1," U. S. Army Prosthetics Research Laboratory, Walter Reed Army Medical Center, Washington, D. C., Specifications Report 2-61, June 1961.

Wearing the No. 1 Hand brought no revolutionary changes in school attitudes or behavior. Nevertheless, there was evidence that hand wear made a generally positive although variable contribution to the child's self-confidence and to the acceptance of the child by his peers and/or his teacher.

III. *Appearance of Hand*

A. *Hand Design*—The children participating in the study (and their parents) were almost unanimous in expressing a high measure of satisfaction with regard to the shape configuration of the No. 1 Hand.

B. *Hand Size*—The size of the No. 1 Hand was satisfactory, or at least acceptable, to the majority of the children in the study. It was too large for very few children, but too small for a larger number, either initially or as a result of normal growth. This problem of undersizing, however, would be obviated by the availability of a larger hand (No. 2) to provide a size continuum.

Children whose normal hand size approximated that of the experimental item, or came within acceptable limits, typically fell into the 4- to 8-year-old bracket.

IV. *Gloves*

In a number of individual instances, mismatching of shades was evident. In general, however, the coloring, tones, texture and fit of the cosmetic gloves used in the study were received enthusiastically by children and parents.

V. *Function*

The precise extent of usefulness of the No. 1 Hand in tasks typically performed by the children in the study was somewhat obscured by "halo" effects. However, the total evidence indicates that:

1. The No. 1 Hand provides less total function than the equivalent (Dorrance #10X) Hook worn by this age group of children.
2. The No. 1 Hand provides function equal to that of the appropriate hook for numerous activities.
3. The function of the hand was superior to that of the hook for some of the children in the performance of certain specific tasks.

VI. *Durability*

A. *Hand*—Although the No. 1 Hand does not appear to be excessively fragile, malfunctions and breakages occurred with sufficient frequency in the course of the study to be cause for concern.

It appeared that in some instances causes of breakage could be reduced or eliminated by manufacturing measures. It was obvious, however, that a great deal of the damage was attributable to the activity habits of the wearers. Thus, it would be anticipated that if hands were used on an unrestricted basis, a fall or some other violence done to the hand, the entrance of dirt and/or water into the mechanism, etc., would result in ultimate breakage or malfunction.

B. *Glove*—The lack of durability of the gloves used in the No. 1 Hand Study was the prime negative feature in the entire investigation. It was apparent that the gloves available for the hand were not strong enough for the treatment meted out to them. Deficiencies in stain and discoloration resistance presented lesser problems.

VII. *Conclusions and Recommendations*

The APRL-Sierra No. 1 Hand combines excellent appearance with a considerable degree of function. For many children, the hand's superior appearance offsets any functional inferiority to a hook.

Prescription of the No. 1 Hand may be considered for all unilateral, upper-extremity amputation levels from wrist-disarticulation to shoulder-disarticulation when the normal hand size does not exceed 6-1/4" in circumference at the metacarpal-phalangeal knuckles (excluding thumb) and length (radial styloid to thumb tip) does not exceed 3-7/8". This is true for both males and females.

The No. 1 Hand-and-Glove are relatively costly items. The initial cost, plus the expense and inconvenience of glove replacements and hand repairs, will undoubtedly tend to restrict purchase of the item. Manufacturing care to reduce potential breakage of hand parts and intensified efforts to develop a markedly more durable glove are recommended.

Because of possible limitations on hand usage related to glove and/or hand durability, it is recommended that concurrent prescription of a hook as a "spare" or "play" device be routinely considered.

Based on the results of the study, the No. 1 Hand definitely merits a place in the "armamentarium." Prior Interim Reports have recommended that steps be taken to make the No. 1 Hands, both right and left, generally available to prosthetic clinics. These recommendations are reaffirmed.

Dr. Warren Perry Named to New Post

Promotion of J. Warren Perry, Ph.D., to the newly created position Deputy Assistant Commissioner for research and training in the Vocational Rehabilitation Administration has been announced by Miss Mary E. Switzer, VRA Commissioner. Dr. Perry was formerly assistant chief of the training division.

Miss Margaret M. Ryan also has been promoted from the position of training consultant in social work to take Dr. Perry's former job.

Dr. Perry's major responsibility under the supervision of Assistant Commissioner James F. Garrett will be to serve as top consultant in planning and developing a nation-wide research and training program in the field of artificial limbs and braces for amputees and crippled persons.

Under the VRA research and training program in general, grants totaling millions of dollars are made annually.

Research grants are awarded to private, nonprofit groups, State and rehabilitation agencies, and other public organizations to pay part of the cost of activities to advance knowledge and methods for improving the rehabilitation of mentally or physically handicapped persons.

Teaching grants and traineeships go principally to university graduate schools, graduate students, and State rehabilitation agencies to reduce materially the shortage of professional workers in vocational rehabilitation.

Immediately prior to joining the staff of the Vocational Rehabilitation Administration, Dr. Perry was director of prosthetics education and assistant professor of neurology and psychology at Northwestern University Medical School. Previously, he was assistant professor of psychology at the University of Illinois and a lecturer in the department of psychology at the University of Chicago.

Dr. Perry was born in Richmond, Indiana, and received a B.A. degree from DePauw University in 1944. After a year of graduate work at Harvard University he obtained a Master's degree in psychology at Northwestern and completed his education at the same institution in 1955 by taking a Ph.D. degree.

Report on a Tour of European Prosthetic Centers

By HERBERT E. KRAMER, C.P.

Research Prosthetist, Prosthetic & Orthotic Studies, New York University

In mid-August of 1963 I accepted an invitation extended by the Ex-Servicemen's Association of Finland to conduct a two-week course of prosthetic instruction in Helsinki. The course was to be held in the shops of the two major prosthetic firms serving the area, and I was asked to demonstrate and teach the most advanced prosthetic techniques now current in the United States. With this assignment as a base, it seemed a good idea to expand my trip to include additional prosthetic centers in Europe. Arrangements were therefore made through the New York University Prosthetics and Orthotics Education for me to visit centers in England, Demark and Norway. This trip proved to be a most illuminating and valuable experience, with numerous opportunities for the interchange of ideas on prosthetic practice. Concepts and techniques which I found of particular interest in each of the centers visited are presented in this article.

ENGLAND

On August 23, I visited the Roehampton Limb-Fitting Centre in London. Activities at this center include rehabilitation programs, limb-fitting services, and prosthetic research studies, under the sponsorship of the British Government. I was conducted through the center by Brigadier Norman Swettenham, with whom I had a most profitable exchange of information. We discussed the three major techniques used in America for fitting total contact above-knee sockets, and their advantages and disadvantages.

An experimental fitting method used at Roehampton for above-knee total contact sockets entails the following procedures:

The stump is inserted into a pre-shaped metal container which is several inches longer than the stump and is perforated with small holes (about the diameter of a pencil). The patient bears weight on the brim of the metal "socket" and the stump is checked through the holes. The holes distal to the area of stump and container are then closed off and a light mixture of plaster-of-paris is introduced distally by means of a tube. The hole nearest the distal stump is left open until the plaster reaches this level. This hole serves as an escape opening for the air trapped within the socket and assures good distal contact.

After the plaster sets and the patient removes his stump, a cast duplicating the contour of the metal socket and mold is made. A total contact socket is then fabricated from this model.

With the introduction of the Patella Tendon-Bearing Prosthesis in England, considerable emphasis has been placed on finding a plastic material which would be a suitable replacement for the horsehide leather insert liners used in America. Apparently, the English climate causes leather to deteriorate

even faster than it does in this country. An effort is also being made to develop a plastic material for use as a check socket.

An interesting research program being carried on at Roehampton concerns the study of a cast magnesium ankle, which utilizes a ball-and-socket joint. The item is designed to be laminated into a plastic shank. Many of the features originally incorporated in the United States Navy Functional Ankle are provided in this experimental ankle. A number of pilot wearers are currently testing this device.

In the upper extremity studies section of the research center, the efficacy of externally powered prostheses is being investigated.

DENMARK

My next stop, on August 28th, was Copenhagen. At the Copenhagen Orthopedic Hospital, I was asked to demonstrate the use of the New York University flexible casting brim in the fabrication of lower extremity prostheses. The staff, under the direction of Messrs. Linquist and Kastrup, observed and assisted in the application of this method to the casting of a leg socket for one of their patients. Following this session, a critique was held in which the cast modification and fabrication techniques were analyzed. The University of California, Berkeley, brims have been used successfully at this hospital for some time. The Patella Tendon-Bearing Prosthesis is also fitted on a routine basis there. Altogether, the sophisticated level of prosthetics at this center is noteworthy. It is probably attributable in part to the influence of the various international symposia held in Copenhagen.

FINLAND

I was in Helsinki from September 1st to the 15th as a guest of the Ex-Servicemen's Association of Finland, who sponsored my trip, with arrangements handled by Mr. Johannes Reitamo, Secretary of the Association. My stay in Helsinki was a tremendously rewarding experience. It afforded me a chance to become acquainted with and to enjoy the gracious hospitality of the Finnish people, as well as giving me the experience of sharing with them the knowledge that we in America have acquired through our various research programs.

The number of amputees in Finland is quite large in relation to their total population, primarily because of their heavy involvement in the Second World War, and secondarily because of their climate which is conducive to frostbite, with subsequent amputation. The Finns take a particular pride in showing regard for their disabled citizens. I noticed that when a disabled person walks down the street other pedestrians open a path for him. On one occasion I saw a driver bring his car to a halt to allow an amputee to pass safely by.

During my stay I was given living quarters in the rehabilitation center that the Ex-Servicemen's Association provides for the benefit of its members. This gave me an excellent opportunity to observe the operation of this unique establishment. The Association is dedicated to the continuing well-being, both physical and emotional, of disabled ex-servicemen. To this end, the program of the rehabilitation center provides for a periodic two-week stay for its members, during which time the patient participates in a formal rehabilitation schedule and receives full attention to his prosthetic needs. The physical program is quite rigorous, covering such activities as swimming, basketball, soccer, and body-building exercises. Two therapists are always in attendance. One administers prosthetic training, and whatever therapeutic

treatments are required, to upper and lower extremity amputees. The other supervises the program of physical activities. Each day's program ends with the traditional (and delightful) *Sauna*—the bath in steam formed from water thrown on heated stones, accompanied by brisk strokes from a cedar or birch bough.

Many of the veterans must travel long distances for satisfactory prosthetic service. This is not only time-consuming, but would often impose a serious financial burden. This two-week respite allows each man time for physical and mental rejuvenation. The cost of this all-encompassing program is borne by the government, with no charge at all to the individual veteran.

Three Finnish prosthetics firms participated in the planned program, each sending two qualified prosthetists as active students in the course of instruction in American prosthetic techniques. Their names were:

Edward Hannula	Edward Ahlblad
Kurt Orlikott	Mikael Bernikoff
Martti Santala	Kauko Nicklen

In addition, four other prosthetists were given permission to observe:

Sven Gustafsson	Esko Oksa
Kalervo H. Tanner	Helmer Jenstrom

The two-week program which was planned with the assistance of Dr. Sidney Fishman of N.Y.U. who was present for the inauguration of the course, consisted of a work schedule of approximately seven hours a day for six days a week. In conducting the course, I emphasized above-knee total contact fittings, and the use of porous laminates in below-knee and upper extremity prostheses.

The course was conducted alternately in two major shops in Helsinki. The first day of instruction covered the external finishing of prostheses, and was for my Finnish students an introduction to the use of polyester resins and polyvinyl alcohol sheeting. The materials customarily used for external finishing in Finland are epoxy resins and polyvinyl chloride sheeting.

The level of prosthetics in Finland has risen markedly with the introduction and use of the patella tendon-bearing below-knee techniques. Generally, American prosthetic techniques are in widespread use. Above-knee prosthetic practices, however, are strongly influenced by German open-end socket techniques, which typically employ heavy gluteal bearing construction with a medial sloping posterior wall, and a lowered medial wall. The patients I observed who were fitted in this way were generally quite pleased and comfortable with their sockets, although examination revealed some evidence of adductor rolls. I discussed this finding with the Finnish prosthetists, who told me that the American technique of a horizontal posterior socket wall had generally not been successful because of their patients' difficulty in tolerating concentrated pressure on the ischial tuberosity. In view of their experience with the horizontal posterior socket wall, it did not seem practical to attempt to force this change on patients who had been satisfactorily fitted for long periods with a different technique. I therefore modified our usual above-knee fitting technique by increasing the gluteal support and allowing for a slightly sloping posterior wall. From this experience, I gained the impression that the technique of providing greater gluteal-bearing construction deserves further investigation.

During the two-week period of the course, we fitted nine upper and lower extremity patients with a total of 15 sockets: eight above-knee sockets; five patella tendon-bearing below-knee limbs; one below-elbow porous laminate socket; one below-knee porous laminate socket.

The major problems in the field of prosthetics in Finland are the shortage of skilled prosthetics workers, and the lack of training in anatomy and the medical aspects of prosthetics on the part of the practicing prosthetists. There is also a lack of communication between medical and prosthetic personnel. Those concerned with the field recognize these problems and are taking steps to correct them. Plans are under way to inaugurate a joint medical-prosthetics course of study, which should go a long way toward improving prosthetic practice.

In summary, I found the group to be forward-looking, intelligent and industrious students, and it was a great satisfaction to work with them.

NORWAY

On September 16 and 17, I visited the Sophies Minde Orthopedisk Versksted, in Oslo, at the invitation of Mr. Norloff, the shop supervisor. Here I was asked to give instruction in the use of the N.Y.U. flexible casting brim for fabricating total contact above-knee sockets. Four prosthetists participated in this orientation session. Major emphasis was placed on demonstrating the basic casting technique with only one socket completed and fitted to a patient. This patient was an above-knee amputee who could not be accommodated comfortably with a wood suction socket. He was a difficult case because of extreme sensitivity in the distal area of the stump and an invaginated scar in the adductor longus region. Nevertheless, we did succeed in fitting him satisfactorily with a total contact socket.

The Norwegians had not made any above-knee total contact sockets prior to my visit, and were concerned about distal stump contact. Practical experience in the fabrication of above-knee total contact sockets is one of their greatest needs.

SUMMARY

Without exception, in the countries that I visited, the American influence was extensive, as seen in the widespread use of the patella tendon-bearing prosthesis. However, their chief criticism of this technique concerns the relatively short life span of the rubber insert and liner. To cope with this problem, most of these prosthetic centers routinely fabricate two liners at the outset, and store the lamination cast for future use.

The above-knee fittings that I saw in some of the Scandinavian countries differed from the typical quadrilateral above-knee sockets made in the United States. The posterior lateral corner has a broad flare to accommodate considerable gluteal bearing. The posterior wall slopes medially with a slight dip or pocket for the ischial tuberosity. The medial wall tends toward roundness rather than toward the straight and square shape that we commonly see in the United States. The medial brim is approximately $\frac{1}{4}''$ to $\frac{3}{8}''$ lower than the posterior brim. The anterior region exhibits a rather shallow Scarpa's triangle and blends into the channel of the rectus femoris. The sockets are of an open end type.

Overall, I gained the impression that the organized research and development programs in the United States have furnished great impetus in advancing prosthetic knowledge and practice well beyond the shores of our land. However, there is no doubt that continuing need exists in every country for further prosthetic development and education. This trip demonstrated to me in a very graphic manner how the exchange of prosthetic information and ideas helps us to work more effectively for the betterment of disabled people all over the world.

Address by George T. Aitken, M.D.

Chairman of the Committee on Prosthetics Research and Development

at the

AMERICAN ORTHOTICS AND PROSTHETICS ASSOCIATION ASSEMBLY BANQUET

New Orleans, La., November 6, 1963

President Fillauer, distinguished guests, ladies, and gentlemen:—

You represent the membership of a large association dedicated to the fabrication and fitting of prosthetic and orthotic devices. As such, you should be vitally interested in research and development, education, current and future medical needs, and the attitudes of national groups involved in these endeavors.

As an orthopedic surgeon, a member of that surgical specialty that is a prime user of your devices and skills, I would like to explore some of these areas with you.

Medicine and surgery are changing. A new era is evolving, characterized by more precise understanding of disease and its causes, with a resulting more precise and direct attack on cause rather than symptoms. This, plus the near eradication of some conditions through improved prevention or treatment techniques, has changed the character and frequency of some portions of medical and paramedical practice. Not too many years ago, poliomyelitis or "infantile paralysis" was an endemic disease with recurrence at intervals of epidemic proportions. This most severe of the neuromuscular disorders produced a nearly endless variety of extremity deformities and malfunctions. Such problems taxed the ingenuity of surgeons and orthotists to devise methods of external support that would improve function. From this stimulus developed the pantheon of braces that were a large part of the treatment armamentarium for this disease. Now—and thankfully so—this disease is a relative rarity because of induced immunity.

Not too many years ago, bone and joint tuberculosis was a common lesion. This disease also required external bracing as an adjunct to therapy. Now the chemotherapeutic treatment has nearly eradicated the bone and joint lesions, and the need for braces in this group is a minor one.

The bow legs of rickets have declined with the use of vitamins.

The previously large demand for braces in fracture treatment has at least been reduced by improved primary treatment techniques.

Such are a few examples of the changes in medicine. Changes, peculiarly enough, have always been the rule, and not the exception. Disease entities are found, studied, and, in some instances, either prevented, eradicated or else mastered. History teaches, though, that there seem always to be other equally formidable disease entities ready to present themselves with equally difficult treatment problems.

In the areas which are the greatest challenge to us, we are now seeing the evolvement of some of these *new* problems. They should be recognized, evaluated, and the challenges they present must be studied and eventually overcome.

Because there are drugs that prevent death from intercurrent infection, many of our severe congenital and post-traumatic para- and quadri-plegic problems are surviving to need the assistive devices necessary for even the most marginal rehabilitative techniques. This group of patients has only quite recently emerged as a serious challenge. Their needs are great and numerous. The solution will require a "new look" at the entire field of orthotics. In this group of unfortunate patients, weight of materials, fit, alignment, reduction of friction at joints, external power, and the whole problem of suspension and control assume a different magnitude of importance. To these people, support, mobility, and assistive function become a prime consideration. In the past we have thought of braces as primarily devices to prevent or limit motion and produce support.

The cerebral palsy cases present another major brace challenge. This group (too long relegated to secondary consideration) requires a kind of controlled mobility that has not previously been demanded in brace design and fabrication. Unnecessary, uncontrolled, explosive motions must be so braced that they are restricted and channeled into functional patterns. This requires freedom of motion in pre-determined ranges. Some solutions have been found, but much remains to be done.

Because medical methods and practices have made it possible for people to live longer, there is an increasing segment of our population called "geriatric." This group presents the problems of aging. Peripheral vascular disease is a major feature in this group. In spite of improved vascular surgery there is developing an ever-increasing volume of geriatric amputees. These are nearly all lower-extremity cases. Because of age, failing circulation, sometimes lagging hearts, and nearly always the reduced muscular vigor and the unsteadiness that characterize age, this group (if they are to have prostheses) requires something better than what we now offer. This is not to imply that what we have is poor—it is simply to emphasize that what we have was designed for a different type of patient. The geriatric group needs a prosthesis that solves its particular problems; not a prosthesis that fits them, as conceived for a young, vigorous adult.

In the geriatric group there is yet another problem that requires your assistance: the bracing of the post-cerebral vascular accident patient. Here we have a type of cerebral palsy, but the problem exists in an aging adult, not in a growing child. In the past, the short life expectancy of this type of patient deterred the extensive use of rehabilitation techniques. This is now changing. More and more, we are called upon to develop ambulation and improved arm function in these patients. In our practice we have been using devices and techniques that originally were devised for other problems in a different group of patients.

Lastly, in an area of particular interest to me, there is the problem of prostheses for children. Recent experience has conclusively demonstrated that prosthetic application in certain limb deficiencies in children is superior to classical surgical reconstructive techniques with or without braces. This has developed in spite of the fact that we have only a few specially devised components for this group of children. A great deal remains to be done for this large group of otherwise competent children. Here the introduction of external power is as important as it is in the bracing techniques for quadriplegics.

Brief as this survey has been, it should be evident that the changing face of medicine does in no way exclude or lessen your place. Quite the contrary; it demands a greater contribution from prosthetists, orthotists and engineers.

Many years ago, your techniques and skills were learned and developed in the traditional apprentice, journeyman, and master-craftsman type of process. The changing face of our society and the competition of an industrialized civilization have altered this approach to prosthetics and orthotics education. Currently you must compete for manpower and you cannot obtain the quality that you desire through such an apprenticeship plan. It has become necessary to formulate both prosthetic and orthotic device assembly, fabrication techniques, and the skills of fit and alignment into formalized patterns of instruction so that comparable results may be obtained by a wide variety of technicians simply by adherence to rather rigid formulae. Such a structuring of direction, plus the utilization of well-designed, modern teaching techniques in the hands of competent instructors, has produced our current University-sponsored prosthetics schools. This program has been of value and most of you are, I feel certain, in one way or another dependent upon the continuation of such a program. Unfortunately, an identical program has, as yet, not developed in orthotics. There is a great need for this, and this need is recognized by knowledgeable persons in this field. Pilot courses that have surveyed the current state of the art have been developed. From these and other endeavors in orthotics research and development will develop a fully structured program of orthotics education.

Your dynamic response to current prosthetics and orthotics education endeavors has been an important part of its success. Your continued enthusiasms will be necessary to develop an equally effective orthotics program. If the four-year degree program is to continue and expand, your enthusiasms and encouragement will be very necessary.

In the areas of research and development in orthotics and prosthetics there is much going on and much planning is being done to make this an even more effective program, particularly in the field of orthotics.

As many of you are well aware, government, as represented by the VRA, the VA, and other agencies, is intensely interested in prosthetics and orthotics research, development, and education. If it were not for the available federal funds, these programs would be much more modest and less effective. Because of the needs in prosthetics that were occasioned by the inflated amputee population following World War II, the emphasis by government in these fields was initially on prosthetics. Slowly but steadily, there has been increasing funding in the areas of orthotics.

The Vocational Rehabilitation Administration has a broad interest in this area. With their matching funds, they assist States in purchasing service in prosthetics and orthotics for their clients. At another level, they make grants that assist in developing schools of prosthetics and orthotics and further fund these schools to the extent that student expenses can be defrayed in part if such is necessary. At still another level, there are grants to pursue many types of research. This includes basic research, the development of devices and techniques, and finally they support efforts to make clinical application of new devices and techniques in order to evaluate their worth. VRA became interested in the brace problem early and has funded several of the pioneer basic research and development activities in this area.

The Veterans Administration was and continues to be a major supporter in research and development in prosthetics and orthotics. By virtue of this agency's responsibility to veterans, an initial emphasis on prostheses was necessary. Basic research and device and technique development, followed by clinical and laboratory testing, formed the broad scope of their activities.

As progress in the prosthetics field has been made, time, energies, personnel, and monies have been made available for orthotics research.

The Children's Bureau, like VRA a division of the Department of Health, Education, and Welfare, has also actively and continually assisted the overall development of a prosthetics program. Since, by law, this agency is unable to fund research directly, they have contributed their sponsorship to service programs. These programs have made it possible through care of patients to collect data at a clinical level relative to prosthetic management of children. From this endeavor have come a large number of design criteria which have guided development laboratories.

The National Institutes of Health has assisted also in this program through sponsorship at CPRD level. Funding here has assisted in publications, educational conferences, and has made possible some preliminary attempts to enter into the international prosthetics and orthotics activities.

Such is, in brief, the current status of federal participation in this broad bioengineering field. I may add that there is continuing enthusiasm and rapport at this level.

The Committee on Prosthetics Research and Development as currently constituted is vitally interested in this problem. At present there is being planned an evaluation program, specifically limited to orthotic devices and techniques. This is envisaged as a field or clinical test of devices and techniques so controlled and instrumented for data-collection that the validity of developers' claims may be evaluated. If this program does develop, it will evaluate new devices arising in development laboratories, and some non-research items that have seemingly worked well in certain regional areas, but have never had widespread use. The development of such a program will require that fabrication and fitting and alignment techniques be so formulated that they may be transmitted to new technicians. The prescription criteria and indications must also be defined so that the purpose, as conceived by the developer, may be communicated to other clinicians. Such an evaluation program will eventually produce not only an opinion concerning the worth of the device or technique, but will also lead to the preparation of the basic manuals that are so necessary to good educational programs.

As current Chairman of CPRD, it is my pleasure to assure you that there is an intense enthusiasm on the part of the Committee to increase the emphasis on orthotics. Research and development are being encouraged. The orthotics workshop sponsored by CPRD in 1962 was a great stimulus in this direction, and the results of that conference have been of assistance to sponsoring agencies in focusing attention on the needs and priorities in this field.

Over the years since it was established in 1954, the program journal, *Artificial Limbs*, has given wide dissemination to new developments in the Artificial Limb Program. *Artificial Limbs* has a regular distribution of more than 4,000, and it goes to just about every country in the world. The journal is now a joint undertaking of CPRD and the Committee on Prosthetic-Orthotic Education. Future issues of *Artificial Limbs* will contain articles on orthotics as well as prosthetics.

There is a considerable volume of orthotics research currently being sponsored. Practically all of the traditional prosthetics research groups have some orthotics research going on, and there are some additional laboratories doing very creditable basic and device research. Many of these items need current evaluation. It is believed that this may be accomplished in the near future.

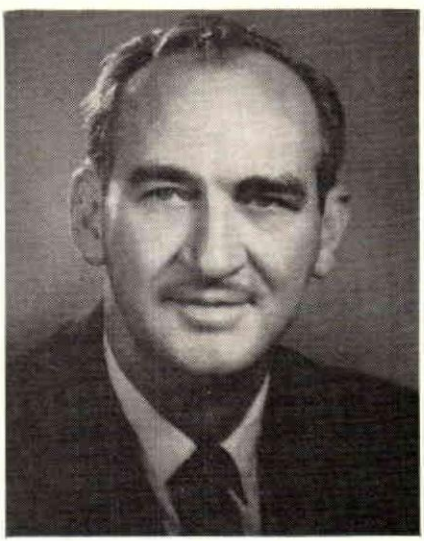
I hope this has not been too rambling or too discursive a survey of our fields of mutual interest. I have tried to say that as a surgeon it is my belief that you as prosthetists and orthotists are entering a new and challenging era. Some of your old problems are becoming less pressing and may disappear—but you are faced by many new and more difficult ones that will be equally challenging and rewarding to solve. As one interested in prosthetics and orthotics education, I have attempted to encourage you to support education and be patient with the growing pains of our newcomer: orthotics education. Remember, one can't teach something one doesn't understand. As our knowledge increases, our ability to transmit that knowledge will keep pace. As Chairman of CPRD, I have tried to indicate the Committee's continuing focus on the end product of research and development: improved patient care.

Personally I would like to take this opportunity to congratulate you members of AOPA on the tremendous efforts that you have exerted in the development and continuation of this multi-faceted program. Many of you have given generously of your time and substance serving on committees, attending meetings, working on new techniques, attending schools and willingly doing research-type fittings in order to make some of these dreams realities. You have been one group of the pioneers in the development of the interdisciplinary "team" approach to the solution of medical problems.

Do not rest on your laurels. Much remains to be done. You who know the needs and the inadequacies must enter into the plans of needed research and development. Some day your growing association may well develop your own non-profit research program so that you may more directly focus one aspect of clinical feedback on prosthetics and orthotics research.

W. B. SWAYZE NEW VR DIRECTOR FOR LOUISIANA

W. B. Swayze, former Assistant Director, has recently been appointed Director of Vocational Rehabilitation for Louisiana. He succeeds the late Mr. Seid W. Hendrix who had been Director for a number of years.



Writing to Mr. Swayze to congratulate him on his appointment, AOPA Executive Director Lester Smith stated, "Vocational Rehabilitation in Louisiana has set high standards and encouraged members of this Association to pursue advanced training and offered the best in service to their patients. Since you were Assistant Director during the administration of Mr. Hendrix it is good to know that this tradition of excellence in Louisiana is to be continued."

The Association joins Mr. Smith in offering warm congratulations to Mr. Swayze.

Nelson Gadget—No. 9

By KURT B. NELSON, C.O.
Pittsburgh, Pa.

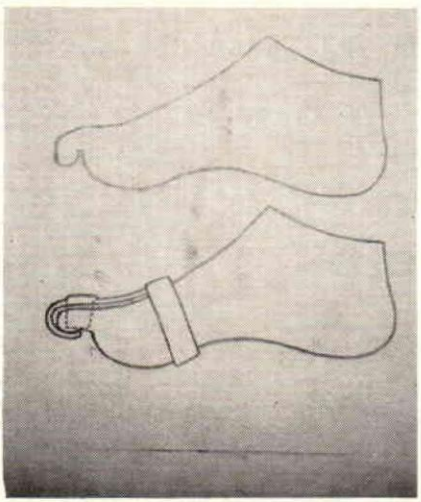
The problem of hammer toes has given all of us a great deal of trouble. Here, we are showing a simple and inexpensive dorsal night splint that really works. It can also be used for contracted fingers.

The pictures shown are drawings of the longitudinal cross section through the third toe of a foot. The first picture is a normal position of a tightly contracted toe; the second picture is the same toe with the splint in place after it has been used for some time (actual case).

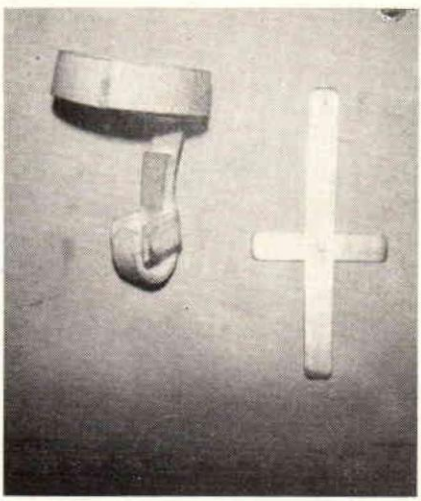
To attach the splint, hold it in a vertical position, hook it under the toe then fold it back onto the upper part of the foot and fasten strap. The front hook on the splint must cover the entire plantar facet of the distal joint and a counter pressure pad of foam rubber must cover the dorsal portion of the toe at the joints. The sides of the splint serve to keep the toe lined up. Care must be taken to start the correction slowly at first and gradually bend the hook up as the tension of the toe eases. The process actually stretches the tendon. The splint must be worn regularly every night.

The details below are for making a third toe splint on a size ten foot (large). It is made of half-hard, 1/16" aluminum, ½" wide strips riveted to form a cross. From rivet to the front is 2½", from rivet to back is 3" and the cross piece is 2½" long. Bend the sides down sharply and shape front hook to lift toe allowing clearance for the nail and end of toe. Attach ¾" webbing strap at opposite end. We use Velcro fastener. Cover the splint all over with moleskin adhesive (this can be replaced by the wearer). Now place a strip of adhesive foam rubber inside splint to ease pressure on the upper surface of the joints. Caution: If the webbing strap is drawn too tight, it may cause some irritation to the web between the toes. It will stay on the toe without being worn tight.

This splint is made in three sizes (small, medium, large) according to size of foot or hand. The same splint is interchangeable for all toes, right or left.



Sketch showing longitudinal cross section of foot with and without brace



FINISHED BRACE ALUMINUM FRAME

Baby Walking Harness

By LAURENCE PORTEN, C.P.O.

Union Artificial Limb & Brace Co.
Pittsburgh, Pa.

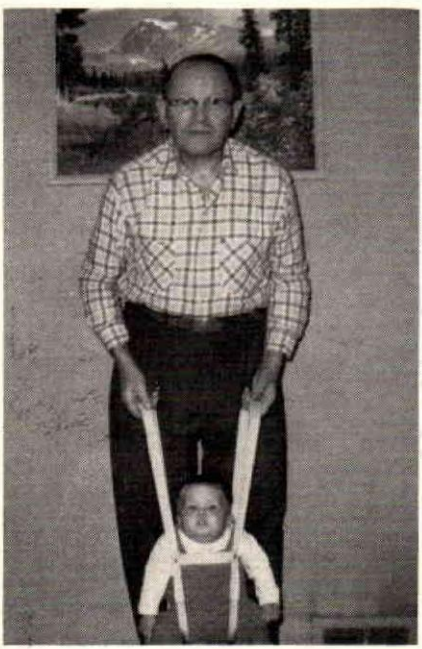
The walking harness here described is designed to help in the walking-training of small infants who have a natural urge to use their legs in locomotive movements, in short—want to walk.

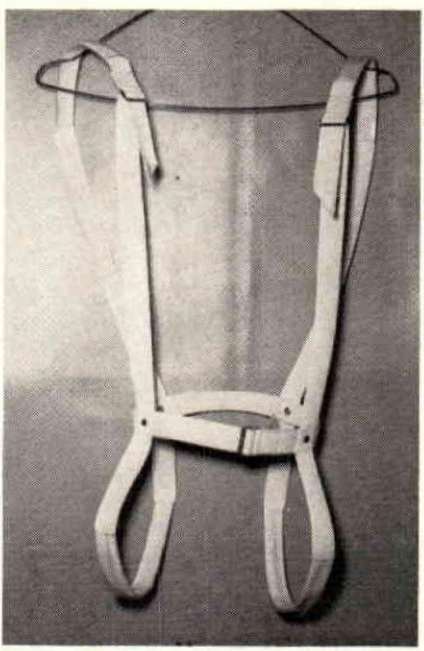
There are some gadgets and toys already on the market in which the toddlers can sit or stand and propel themselves forward or can be pushed or pulled.

However, these walking gadgets are too cumbersome for small households and for the children and helpers. Furthermore, they cannot be taken along on trips because they require too much space in cars.

Out of necessity and experience, I designed a harness which is easy to apply to small children and can be carried in a hand or shopping bag and is ready for use at any time or occasion.

It consists of two long web straps which fit between the legs in weight carrying loops and continue over both shoulders in loops again which can be adjusted for proper length. Both straps are connected with an adjustable chest strap which secures the harness on the toddler and even allows one to lift him up from the floor.





After the halter is applied and adjusted for length and security the parent will hold one shoulder loop in each hand for guidance. Lifting and guiding first one and then the other leg forward causes the infant to assume walking motions which it soon will adopt and carry out almost by himself.

The weight of the child is completely carried and controlled by the harness held by the parent or babysitter and the baby's feet rest lightly on the floor and move easily.

There is no stooping or twisting necessary by the guide and the walking-training can be done in upright position without tiring efforts.

This harness has proven itself very valuable during the time children are trying to walk or stand up but cannot do so because the body is too heavy and the legs too weak.

With the assistance of the walking harness muscle power will develop very fast and enable the child to stand up and walk much sooner.

The harness allows the child complete freedom of arm movements and the loops which fit between the legs are well padded for comfort with plastic tubing.

The shoulder loops are adjustable for length and also padded with plastic tubing to provide a good hand grip.

BOOK REVIEW

BRIM CASTING MANUAL REVIEWED

New Manual "A Flexible Casting Brim Technique for Above-Knee Total Contact Sockets." Published January 1964 and copies available from: Prosthetics and Orthotics, New York University, Post Graduate Medical School, 252 Seventh Avenue, New York 1, New York. Thirty-three pages, numerous illustrations. 28cm.

The publication of this manual was announced in the AOPA *Almanac* of March 1964 in which it was pointed out that the Prosthetic and Sensory Aids Service of the Veterans Administration will issue a supplement to the artificial limb contract which will approve this New York University casting brim technique.

The writers of this manual are Dr. Sidney Fishman, Norman Berger, H. Richard Lehneis, C.P.O. and Ivan A. Dillee, C.P.

The authors have fully achieved their stated purpose to give the practicing prosthetist detailed directions for the making of a total contact above-knee plastic socket, using the New York University casting brim.

The manual is designed and has its best use as a text in courses of instruction in this technique. The prosthetist attempting to make sockets on the basis of this manual alone may have difficulty unless he has additional assistance.

The original design of the Flexible Casting Brim is the work of H. Richard Lehneis. It has been demonstrated at several Regional meetings of the American Orthotics and Prosthetics Association. Several refinements in the design and procedures have been added by Norman Berger and Ivan A. Dillee. Other prosthetists who have contributed to the development of this include Carlton Fillauer, Herbert Hanger, Hector Kay, Herbert Kramer, Basil Peters and Bert Titus.

Code of Ethics for the Artificial Limb and Brace Profession

The Federal Trade Commission has approved fair trade practices for the field of artificial limbs and for orthopedic appliances. Both codes have been adopted by the American Board for Certification as a guide for the Certified Prosthetist and Orthotist. The full text of the codes may be obtained from the Board's Headquarters. The following digest is printed for ready reference.

It is an unfair practice:

(1) To deceive purchasers or prospective purchasers as to any of the qualities of a prosthetic or orthopedic appliance, or to mislead purchasers or prospective purchasers in respect to the service of such appliances.

(2) To infer an artificial limb is equivalent or nearly equivalent to the human limb, complies with any government specifications, or has the approval of a government agency unless such be wholly true or non-deceptive.

(3) To fail to disclose to a purchaser, prior to his purchase of a prosthetic appliance, that the degree of usefulness and benefit will be substantially dependent upon many factors, such as the character of the amputation, condition of the stump, state of health, and diligence in accustoming oneself to its use.

(4) To promise that any product will be made to fit unless such promise is made in good faith and the facility is possessed of the ability to fulfill such guarantee. A prosthetic device or an orthopedic appliance is not to be considered as fitting unless properly shaped for the body member to which it is applied, and in proper alignment and conformity with the physique of the person who will wear such a product, and affords the optimum of comfort and use on the part of the wearer.

(5) To deceive anyone as to his authority to represent and make commitments in behalf of a facility unless such be fully true.

(6) To use any testimonial or use any picture which is misleading or deceptive in any respect.

(7) To demonstrate any appliance in a manner having the tendency or effect of creating a false impression as to the actual benefits that may be reasonably expected from it.

(8) To use any guarantee which is false or misleading.

(9) To represent that any appliance conforms to a standard when such is not the fact.

(10) To publish any false statements as to financial conditions relative to contracts for purchase of appliances.

(11) To engage in any defamation of competitors or in any way to disparage competitors' products, prices, or services.

(12) To use the term "free" to describe or refer to any product which is not actually given to the purchaser without cost.

(13) To *wilfully* entice away employees of competitors, with the purpose of injuring, destroying or preventing competition.

(14) To take part in any concerted action with other members to wilfully fix prices.

(15) To promote the sale of any appliance to any person who can not be expected to obtain reasonable benefit from such appliance.

(16) To refrain from giving every assistance to doctors before and after amputation or crippling condition, or to fail to do everything possible to promote mutual trust and confidence between members and the medical profession.

(17) To undertake to supply an artificial limb by mail-order specifications without personal fitting thereof unless conditions are such which make an exception desirable, and in any case, no misrepresentation shall be made as to fit.

(18) To unduly exploit features of appliances less important than proper fit and alignment.

(19) To fail to recognize that the interest of the amputee and the handicapped is the first concern and therefore any failure to make available to all of its members and the general public any improved technique that may be used as to making, fitting, aligning or servicing products shall be an unfair trade practice.

(20) To pay anything of value to any doctor for the purpose of obtaining a referral of a patient by the doctor.

Further, the prosthetic and orthotic professions desire to be active and cooperative in all progressive developments of improved techniques that will contribute to the welfare and comfort of all who use their services.

AOPA's Regional Directors and Their Work

By ROBERT C. GRUMAN, C.P.
President of AOPA

PRESIDENT GRUMAN

The cover of this issue of the *Journal* contains the photographs of the eleven Regional Directors of the American Orthotics and Prosthetics Association. Their hard work and creative service to orthotics and prosthetics are well known to members of the Association. However, since many readers of the *Journal* are not members, I would like to take this occasion to introduce these eleven individuals to our *Journal* readership.

Howard V. Mooney as Director of Region I represents the six New England states and the adjacent maritime provinces of the Dominion of Canada. He works closely with the New England Society of Orthotists and Prosthetists. Mr. Mooney, a Certified Prosthetist, is Manager and Director of the Boston Artificial Limb Company at Burlington, Massachusetts. The annual meeting of AOPA Region I will be held May 3 and 4 at the New Charterhouse Motel in Cambridge, Massachusetts. The program and the exhibits will be of interest not only to orthotists and prosthetists but to physicians and others interested in the orthopedically handicapped. Mr. Mooney also calls attention to the monthly meetings of the New England Society the last Monday of each month usually in the Boston area. These monthly meetings are intended for practicing orthotists and prosthetists.

Mrs. Mary S. Dorsch, one of the two ladies who serve on our official board, directs the affairs of the Association in the states of New York and New Jersey. She also works closely with the New York City organization which is known as the Metropolitan Orthopedic Appliance and Limb Manufacturers Association (MOALMA). The annual meeting of this region held in connection with MOALMA will be at the Americana Hotel in New York City on May 22-23, 1964. Mrs. Dorsch, a Certified Prosthetist, is head of her own company, Dorsch-United Limb Company, and is well known for her work in prostheses for children.

Mr. C. H. Dankmeyer of Baltimore, Maryland, a Certified Prosthetist and Orthotist is responsible for Region III covering the states of Pennsylvania, Delaware, Maryland, Virginia and the District of Columbia. This Regional Meeting will be held April 10-11 at the Lord Baltimore in Baltimore, Maryland. Meeting in conjunction with Region III will be the Pennsylvania Orthopedic-Prosthetic Society which is headed by Gene Watters of Harrisburg, Pennsylvania.

Region IV of AOPA is another region headed by one of the outstanding women in orthotics and prosthetics. This is Mrs. Louise Hammond of Pensacola, Florida who heads her own firm. This region will meet May 7 and 8 at Callaway Gardens and at the Warm Springs Foundation, Warm Springs, Georgia.

Bart J. Crowley, a well known Orthotist of Akron, Ohio, is head of AOPA Region V which covers the states of Michigan, Ohio, and West Virginia. The Regional Meeting will be at the Cleveland Hotel, Cleveland, Ohio April 17-19, 1964. Mr. Crowley is President of the Akron Orthopedic Brace Manufacturing Company and a former President of the Ohio Orthopedic Association.

William Scheck of Oak Park, Illinois is head of AOPA Region VI which covers the states of Illinois, Indiana, Wisconsin, and Eastern Missouri. This region will meet June 19-21 at the Pheasant Run Lodge and Country Club in St. Charles, Illinois on the outskirts of Chicago. Mr. Scheck, a Certified Prosthetist, is President of Scheck & Siress Prosthetics, Inc. of Oak Park, Illinois. He also serves as a member of the AOPA Advisory Committee to Prosthetic-Orthotic Education at Northwestern University.

Donald R. Bohnenkamp of Omaha, Nebraska heads one of the largest AOPA regions. This extends from North Dakota and Minnesota in the north and includes the states of Iowa, Western Missouri, Kansas, Nebraska, South Dakota, Colorado, and Wyoming. This region will meet May 15-17, 1964 at the Ambassador Hotel, Minneapolis, Minnesota. Mr. Bohnenkamp, a Certified Orthotist and Prosthetist, is President of the Missouri Valley Brace Company of Omaha, Nebraska.

AOPA Region VIII covering the southwestern states of Texas, New Mexico, Oklahoma, Arkansas, and western Louisiana will hold its 1964 meeting at San Antonio, Texas March 13-15. Mr. Charles Kymes, Regional Director, is a co-owner with Harold Prescott of the Lux Artificial Limb and Brace Company of San Antonio, Texas. He is a member of the AOPA Committee on Advertising and Supplies and is certified in prosthetics.

Leroy E. Noble, a Certified Orthotist, is Director for Region IX covering southern California and Arizona and southeastern Nevada. This region will meet April 25-26 at the El Mirador Hotel in Palm Springs, California. Mr. Noble is head of the Universal Orthopedic Appliance Company of Whittier, California and works closely with the Society of Orthotists and Prosthetists of which he is a Past President.

Frank Moos, a Certified Prosthetist and Orthotist, is Director of AOPA Region X covering northern California, Utah, and northern Nevada. This region will meet April 3-5 at the El Rancho Hotel in Sacramento, California. Mr. Moos is Vice President of Miller Orthopedic Appliance, Inc., at San Jose, California.

Region XI will have an historic first this year. It will be the first region to hold a meeting outside the continental limits of the United States. The place will be Vancouver, B.C., Dominion of Canada and the dates are June 12-13. This region covers the states of Washington, Oregon, Idaho, and Montana and the province of British Columbia in the Dominion of Canada. Mr. William Bartels, a Certified Orthotist, is Director of this region. He is President of the Prosthetic and Orthopedic Supply Company and the Bartels Orthopedic Appliances, Inc., both of Portland, Oregon.

The V.A. Publishes a Study of the Hydra-Cadence Above-Knee Prosthesis

By LESTER A. SMITH,

Executive Director, AOPA

CLINICAL APPLICATION STUDY: *A technical report issued by the Research and Development Division, Prosthetics and Sensory Aids Service of the U. S. Veterans Administration (TR-2).*

This 34-page report is being widely distributed by the U. S. Veterans Administration to prosthetic facilities. Since many readers of the *Journal* would not normally see it, we are giving below some of the important sections with our comments. Copies of the complete report may be received by writing the Research and Development Division, Prosthetic and Sensory Aids Service, U. S. Veterans Administration, 252 Seventh Avenue, New York, New York.

William M. Bernstock, who is Assistant Chief of the Research and Development Division, PSAS of the U. S. Veterans Administration, served as project director of this study and it reflects admirably his thoroughness and wide knowledge of prosthetic services.

Some 60 facilities, for the most part members of the American Orthotics and Prosthetics Association, cooperated in the study (see table one which follows for their addresses and the number of cases fitted).

Description of Unit—The Hydra-Cadence set-up offered to the public by Hydra-Cadence, Inc., a member of the Association, is composed of a single-axis knee with hydraulic resistance mechanisms, with piston rod pivoted behind the knee axis, hydraulically-controlled ankle, wooden foot, cosmetic cover and hardware necessary to attach the unit to any socket. Six sizes are available. Four models, A, B, C and D, are currently being worn by amputees. Information about the latest models may be obtained from Hydra-Cadence, Inc., 623 South Central Avenue, Glendale 4, California.

Design of Study—The basic intent of this study was to provide field participants with instructions, test forms, a fitting manual and other descriptive literature and then to receive and evaluate data submitted by the field on the experiences of amputees with the Hydra-Cadence prosthesis. An orientation visit was made to the Clinic Teams to familiarize them with the conduct of the study, test forms and the features of the hydraulic system.

A thorough study of the subject's performance on his conventional prosthesis was followed by five evaluations over a period of a year's wear of the Hydra-Cadence prosthesis. In the interest of economy and randomness of sample, selection was limited to the unilateral above-knee or hip disarticulation amputee veterans who would normally be eligible for a new prosthesis.

Table 1

COOPERATING STATIONS AND PROSTHETIC FACILITIES

STATION *	PROSTHETIC FACILITY	NO. OF CASES
VARO, Atlanta, Ga.	J. E. Hanger, Inc.	2
VAC, Boise, Idaho	Brownfield's Artificial Limb and Brace Shop	2
VAOPC, Boston, Mass.	Anthony and Williams, Inc.	1
	Boston Artificial Limb Co.	1
	J. E. Hanger, Inc.	1
	United Limb & Brace Co., Inc.	1
	Massachusetts Limb & Brace Co.	1
VAH, Buffalo, N. Y.	The Winkley Artificial Limb Co., Inc.	2
VAH, Chicago, Ill.	American Limb & Orthopedic Co., Inc.	1
	Bardach-Schoene Co.	1
	J. E. Hanger, Inc.	1
	Merrick-Hopkins Co., Inc.	2
	Scheck & Siress, Prosthetics	1
VAH, Cincinnati, Ohio	J. E. Hanger, Inc.	2
	Fidelity Orthopedic	2
VARO, Cleveland, Ohio	Paul Leimkuehler, Inc.	3
VAH, Dallas, Texas	J. E. Hanger, Inc.	1
	Hedgecock Artificial Limb & Brace Co.	1
	Rupley Artificial Limb Co.	1
VAH, Denver, Colo.	Gaines Orthopedic Appliances, Inc.	2
	Long's Limb Shop	1
	Scott Surgical, Inc.	2
VAC, Des Moines, Iowa	Winkley Artificial Limb Co.	2
VAH, Detroit, Mich.	D. R. Coon Co.	1
	E. H. Rowley Co.	1
	Wright-Filippis	1
VARO, Honolulu, Hawaii	C. R. Newton Co., Ltd.	1
VARO, Houston, Texas	Muilenburg Artificial Limb Co.	2
	The Texas Artificial Limb Co.	3
VAOPC, Los Angeles, Calif.	Adroit Prosthetic Manufacturing	1
	Alpha Orthopedic Appliance Co.	1
	Kolman Prosthetics	1
	Lanham Orthopedic Service	1
	Karg Prosthetics	1
	Peerless Prosthetics Co.	1
VAH, Memphis, Tenn.	Snell's Limbs & Braces, Inc.	3
	Tri-State Limb & Brace Co.	2
VARO, New Orleans, La.	J. E. Hanger, Inc.	2
	Snell's Limbs & Braces	1
VARO, Philadelphia, Pa.	J. E. Hanger of Philadelphia, Inc.	2
	Modern Limb & Brace Co.	1
	B. Peters Co.	1
VAH, Phoenix, Ariz.	Phoenix Limb Shop	3
VARO, Pittsburgh, Pa.	J. E. Hanger Co.	2
	Union Artificial Limb & Brace Co.	1

* VAC—Veterans Administration Center
VAH—Veterans Administration Hospital
VAOPC—Veterans Administration Outpatient Clinic
VARO—Veterans Administration Regional Office
VBO—Veterans Benefits Office

Table 1 (continued)

STATION	PROSTHETIC FACILITY	NO. OF CASES
VARO, Portland, Ore.	Artificial Limb & Truss Co.	1
	Coast Orthopedic Co.	1
	K. E. Karlson Co.	1
	Oregon Artificial Limb Co.	1
VARO, St. Louis, Mo.	J. E. Hanger, Inc. of Missouri	2
VAC, St. Paul, Minn.	George H. Botko Co.	2
	Ray Trautman & Son, Inc.	3
VAH, Salt Lake City, Utah	Fit-Well Artificial Limb Co.	2
	Intermountain Limb & Brace Co.	2
VARO, San Francisco, Calif.	Aunger Artificial Limb Co.	1
	C. H. Hittenberger, Inc.	2
	R. E. Huck Co., Inc.	1
	Miller & Sierakowski	1
VAH, Seattle, Wash.	Dodge & Lundquist Co.	2
	Lundberg's, Inc.	1
	Tacoma Brace & Limb Shop	2
VBO, Washington, D. C.	J. E. Hanger, Inc.	2
	Dankmeyer Prosthetic Appliances	1
	R&G Orthopedic Appliances	1
	Universal Artificial Limb Co.	1
VAH, Wilkes-Barre, Pa.	Modern Limb & Brace Co.	1
	Scranton Artificial Limb Co.	1
	James E. Sweeney Limb Co.	1
TOTALS:		
Cases		100
Clinic Teams		27
Prosthetic Facilities		68

Attitudes towards Conventional Prosthesis—The study found that the conventional prosthesis which had been worn by the amputees before the beginning of the study were in general serviceable. Eleven of the amputees rated their old prosthesis as excellent, 32 very good, 39 good, 13 fair and only one poor.

Amputee Reactions—Considered in this section are the significant responses of 92 reasonably continuous and long-term users: the 88 above-knee and three hip disarticulation subjects who completed the test period and the one subject who rejected the unit after six months of wear.

Probably the most significant response has to do with whether each of the test wearers decided to continue using the experimental device on a routine basis at the termination of the test period. Eighty-six elected to continue wearing the unit while six did not.

Eighty-two of the subjects, including the three H/Ds, were of the opinion that the unit improved their ability to vary length of steps. Regarding ability to vary over-all walking speed, 81 subjects, including the three H/Ds, considered this feature improved with Hydra-Cadence. The manufacturer's claim that the toe pick-up is beneficial to amputees appears to be confirmed, at least subjectively, by the test wearers' responses. Seventy-nine of the amputees, including three H/Ds, felt that the toe pick-up action helped. Each subject was asked which prosthesis required more effort to use. Sixty-seven, including two H/Ds, stated that the conventional limb required more effort, 15 that they were the same, and ten, including one H/D, that the experimental unit required more effort.

Fifty-nine of the wearers, including one H/D, stated that they experienced less fatigue with the new unit. Twenty-three, including two H/Ds, did not discern any difference while ten felt more fatigued using the new device.

Many (80 cases) of the wearers felt that the Hydra-Cadence device improved the way they walked at slow and fast speeds, on ramps (77 cases) and on various types of terrain (71 cases). A lesser number (24 cases) indicated that the device improved their performance on stairs.

Not all features of the Hydra-Cadence unit were well received. Negative feelings centered about foot slap and cosmesis. Fifty-six wearers who completed the one-year test period, and the one case who rejected the unit after six months wear, indicated that the toe slapped immediately after heel contact. It is significant to note that 50 of the 92 subjects felt that gait training had been helpful in reducing toe slap. The use of the newer style foot with neoprene crepe sole and toe appears to reduce the noise of foot slap by the additional cushioning action at "foot flat."

With respect to cosmesis, 56 of the subjects considered the prosthesis to be poorer cosmetically than their old leg, 13 did not think there was any difference, and 23 thought that cosmesis was improved.

Each subject was asked to comment on disadvantages of the experimental prosthesis. Thirty-seven subjects cited the following disadvantages:

Foot slap	17
Cosmesis	8
Mechanical breakdown	4
Foot size and shape	6
Weight	4
Difficulty on stairs	4
Stiffness in cold weather	4
Effort to use	3
Clothing wear	3

Clinic Team Reactions—The highly favorable opinions of most of the subjects toward the new prosthesis were shared by the Clinic Team members. In 81 cases the Clinic felt that the Hydra-Cadence prosthesis provided functional benefits to the amputee. Of the 11 subjects who, according to the Clinic Team, did not derive any functional benefits from the device, five subjects returned to the use of a conventional limb.

Table 29

FUNCTIONAL BENEFITS ATTRIBUTED BY CLINIC TEAM TO HYDRA-CADENCE

(N= 84—includes 3 H/D)

BENEFIT	REPORTED INSTANCES
Improved gait (including function and appearance)	*61
Stability	*52
Decreased fatigue or less effort	38
Improved shock absorption	17
Improved maneuverability	22
General improvement	*15
Able to walk faster (presumably for long distances)	3
TOTAL	208

* Includes 1 H/D.

In addition to the functional benefits cited in Table 29, for 82 subjects, the Clinic Team members indicated in responses to specific questions that they believed the Hydra-Cadence prosthesis improved the *appearance* of the gait. In 72 cases, they felt that the amputee was able to sustain, for 100 feet, a higher maximum speed (feet per minute) than was possible with the previous conventional prosthesis. For 13 subjects, they felt that there had been no change and in only seven cases did they feel that maximum speed had decreased. Six of these subjects had rejected the Hydra-Cadence unit.

Hydraulic Resistance—Knee mechanisms which are designed as fluid-controlled or hydraulic mechanisms are adjustable as to the amount of resistance to swing above a fixed minimum. This minimum resistance is made up of the mechanical resistance of the moving parts and the resistance which is present as the fluid flows through the passages even with the friction-adjusting valve fully open. In general this minimum value is higher than the resistance of a purely mechanical system designated as a "free knee." Because of these factors, it has often been suggested that long-term wearers of a "free knee" might not be able to wear successfully a hydraulic system. This hypothesis has *not* been substantiated by this study. Twenty-six of 84 test wearers, including three of the hip-disarticulation cases, who completed the study and for whom we have complete data, wore mechanical friction units using minimal resistance prior to being selected for this study. Twenty-three of these subjects were among those who elected to continue wearing the hydraulic device at the end of the study.

At the time of the selection interview, the Clinic Team was asked to estimate the amount of resistance being used on the conventional leg. They were then requested to estimate the resistance which would be needed with the hydraulic mechanism. As was expected, because of the marked differences between mechanical and hydraulic resistances, the estimates were in most instances inaccurate. In fact, it is surprising that accurate estimates were made in as many as 14% of the cases. Ratings of the hydraulic resistance used, based on evaluation of prosthetic function by the Clinic Team, were in most cases either "slight" or "moderate" and in only a few cases were there estimates of "none" (10 cases), "substantial" (10 cases), or "heavy" (1 case).

Design Changes—The study has already had an important result. As a result of the information obtained, the manufacturer has made a number of changes which are incorporated in the current production manual. The modifications are also made to all units returned to the manufacturer.

Summary—In the opinion of the reviewer, this study is a good example of a thorough going objective test of a device. One hundred male veterans with unilateral amputations above the knee were used. The opinions of the amputees, the findings of the survey and the comments of the Clinic Team as they arose during a one-year test period were used to help in determining whether or not this device should be used for routine issuance to veteran beneficiaries. It is noteworthy that only six subjects rejected the device and returned to the use of a "conventional type" prosthesis (since then one subject has requested and been issued a Hydra-Cadence prosthesis).

Conclusion—The Hydra-Cadence Above-Knee Prosthesis was well received by most of the subjects in the study as well as by the Orthopedic and Prosthetic Appliance Clinic Teams who supervised their progress. However, the system should be selectively prescribed and should not be considered as the prescription of choice for all amputees.

The most significant finding of this study reflects the superiority of fluid-controlled mechanisms as devices for controlling the swing of above-knee prostheses.

BOOK REVIEWS

GLIEDMASSEN FEHLBILDUNGEN DER OBEREN EXTREMITAETEN, Deformities of the Upper Extremities, Published 1963 by Bundesfachschule fur Orthopaedie-Technik, Frankfurt am Main. Mimeographed. 65 pages. Reviewed by Carlton Fillauer, C.P.O. and Siegfried Paul, C.P.

This publication from the leading German research center fills the vacancy in the German publications about the latest developments in upper extremity prostheses for the congenitally handicapped.

Although it was written for the technician as an instruction booklet, it should be highly valuable to the orthopedic physician.

Clear, concise, adequately illustrated, it is an introduction to the preprosthetic care of the infant and continues on through the follow-up of the growing child. The reader will become well acquainted with the medical terminology and the latest technical features of mechanisms powered by carbon dioxide (CO_2).

The first part of the booklet is devoted to the definition of medical terms and a brief history of the congenital deformity. Terms like Hemimeliac, Phocomeliac and Peromeliac are used internationally. However, Dr. Lindemann uses the term "Ectromeliac" for the large group of Hypoplastics and Aplastics.

One chapter describes details of the preprosthetic care of the infant, e.g., the training of existing hands, fingers, etc. It is emphasized that the muscles of the back should be well developed. This can be done by placing the infant on a board equipped with straps for the fixation of the pelvis. This applies especially to the Phocomeliac. Brief remarks directed to the education of the parents represent valuable tips. The parents have to learn to raise the child as a normal individual. Special clothes should be worn to allow full motion of the existing hands, etc., and the child should be encouraged to use them as much as possible.

The mechanical principles in the use of CO_2 are described in detail. With no less thoroughness, the author outlines the technique of the application and the present components of the various prostheses in the largest chapter of this publication. These sections alone would justify the book. The first application of a prosthesis is made as early as the age of 8 months on strong infants. However, this first prosthesis is passive. Functional components are introduced at the age of 1½ years. An example is given in the case of a bilateral Ameliac. The first application, at the age of 8 months, consists of bilateral shoulder caps with passive shoulder, elbow and wrist joints and infant hands (Mitts).

At the age of 1½ years the CO_2 driven motion of simultaneous medial rotation will be applied to accomplish a grasp action (Patty cake motion). A fundamental change of the components of the prosthesis will be made at the age of 3 or 4 years.

The side preferred by the child will be supplied with a passive, single axis shoulder joint, active upper arm rotation unit with lock, a passive friction elbow unit, an active child wrist unit with quick disconnect and a pneumatic hook. The other side should have either a rigid connection to the shoulder part or a passive single axis unit. The rotation and elbow unit are the same used

on the other side. The wrist unit consists of a passive friction unit and a pneumatic or Dorrance #10P hook which can be operated with the foot or by the Mother. At the age of 5 or 6 years a chin operated pneumatic powered elbow can be added.

The plastic shoulder caps should be replaced after approximately 1½ years. Other components are reusable except the hooks which should be changed according to the age and efficiency of the child.

A much more thorough, detailed application description than we can make in this brief review is given for the most common upper extremity deformities.

A translation of this booklet would be most useful and desirable, especially since only a few physicians and technicians have the opportunity to become well acquainted with the latest developments in this specialized field.

The Europeans, recognizing the immense task with which they have been confronted through the great surge of congenital amputees, have made notable advances in this area in a short period of time. This book testifies to these accomplishments.

REHABILITATION CODES: Published by Rehabilitation Codes, 1790 Broadway, New York 19, New York. Special Project RD-788, Office of Vocational Rehabilitation. Reviewed by LeRoy Wm. Nattress, Jr.

This is the progress report of five years of work toward establishing standard nomenclature for the recording of the rehabilitation process. The end result will, doubtless, take a form that will be readily applicable to the use of computers in keeping medical records.

The breakdown of communication between those interested and involved in rehabilitation is cited as one of the primary reasons for undertaking this project.

In order for this code to be of use, common terms must be translated into numbers.

For the prosthetist and orthotist this code will offer little assistance in his day-long endeavors, but to the researcher and medical record librarian it will do much to simplify a difficult and cumbersome task.

EXPERIMENTS IN SURVIVAL, by Edith Henrich and Leonard Kriegel. Association for the Aid of Crippled Children. New York. 1961. 199 pages. $3.50. Reviewed by LeRoy Wm. Nattress, Jr.

Thirty-three disabled persons write about what it is like to live with a physical impairment. They tell of their fears, hopes, disappointments and problems as they learn to survive in a society geared to the able-bodied.

The keynote that is struck again and again in this book is, "The handicapped person must live in the world of non-handicapped people, and, regardless of how successful his adjustment, his life hinges largely on the response he inspires in others. In the eyes of society, his handicap is as much a part of him as the color of a Negro's skin is a part of him; his handicap becomes both his badge of honor and his brand of shame, and frequently it is both at the same time."

If this book provides nothing else, it makes one realize that people, all people, are different, whether they are disabled or not. While I must disagree with the thoughts expressed by some of the writers, I feel that I have a greater respect and understanding of their point of view. This is particularly true for those who have suffered a sensory disability.

Harold Yuker, "a victim of cerebral palsy," to my mind makes the best statement in the book. "The question, 'What does it feel like to be a disabled person?' is a difficult one to answer . . . Most of the time I don't feel like a disabled person, I just feel like a person."

New Facilities Certified

By action of the Facilities Committee of the American Board for Certification, the following Facilities have been granted Certification since the publication of the 1964 *Registry of Certified Facilities and Individuals:*

CALIFORNIA

Oakland:

NAVY PROSTHETIC RESEARCH LABORATORY — P&O
8750 Mountain Boulevard — LOckhaven 9-8211
(Private Patients not Accepted)
Charles C. Asbelle, C.P.O.

Palo Alto:

PALO ALTO ORTHOPEDIC COMPANY — P&O
441-443 Waverley Street — 325-6741
Wallace H. McMills, C.O.

GEORGIA

Macon:

C. H. MARTIN COMPANY — O
646 Arch Street — 742-4331
George B. Counts, C.O.

NEW JERSEY

Trenton:

JOHN R. COCCO, INC. — P&O*
333 Chambers Street — EXport 3-5939
Anthony R. Cocco, C.P.O.

NORTH CAROLINA

Asheville:

W. A. McELDUFF COMPANY — O
251 Biltmore Avenue — ALpine 3-9301
William A. McElduff, Owner

WEST VIRGINIA

Wheeling:

STARK ARTIFICIAL LIMB COMPANY — P
1925 Market Street — 232-8808
Charles E. Hixenbaugh, C.P.

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* Extension of Title to Include Prosthetics.

Announcement by the President of the American Board for Certification

PRESIDENT LAMBERT

The following statement is given here for the information of readers of the *Journal*, many of whom are either Certified or are advising others who hope to become Certified:

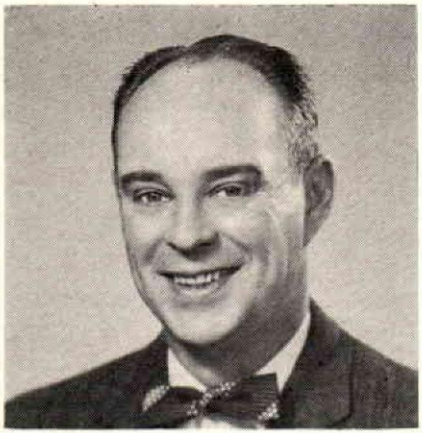
1. *Application deadline for the 1964 Examinations.* The applications for permission to take the 1964 examinations in Orthotics or Prosthetics should be on file not later than June 1, 1964. They should be mailed to: The American Board for Certification, 919 18th Street, N.W., Suite 130, Washington 6, D. C.

Persons desiring applications and information about how to fill out the application should write to the American Board for Certification at the above address.

2. *Location and Dates of 1964 Examinations.* The examinations will be given September 1, 2, and 3, 1964 at the University of Kansas Medical Center, Kansas City, Kansas.

GEORGE H. LAMBERT, SR., C.P.O.
President of the American Board for Certification in Orthotics & Prosthetics

In Memoriam



Richard M. (Dick) Locke, 1916-1963

A Tribute by Jack L. Caldwell

It was my privilege to know Dick Locke for almost a third of his short 47 years. Into that lifetime he crowded more accomplishments than many men of twice his age.

Dick was always known for his willingness to help anyone who was in need, as well as for his good humor and quick wit. In our travels together throughout the country I discovered an aesthetic side of Dick's personality—an appreciation of the goodness and beauty of the world—that was not commonly known. He was esteemed for his friendliness, his kindness and his sincere interest in every wholesome endeavor.

Dick was born in Mobile, Alabama, and educated in the elementary and secondary schools in Atlanta. In 1941 he joined the Navy where he rose from an enlisted man to Lieutenant JG. In 1941 he married Doris Coleman of Atlanta, a daughter of one of the founders of the Hanger organization of the Southeast. Following his service he joined the J. E. Hanger organization in 1947 in New Orleans. In 1950 he was made manager of J. E. Hanger of Alabama, and in 1958 became vice president of J. E. Hanger of Georgia. He attended all of the available prosthetic courses offered by the universities, and in 1959 moved to Orlando, Florida, to head the Hanger organization in that state.

He is survived by his wife Doris, a daughter, Donna, and his sister, Mrs. Frances Goodwin of Danville, Indiana.

To carry on the good qualities Dick always stood for, we who survive him must determine to carry on the work that he did so ably during his lifetime, both as a prosthetist and as an individual.

William "Mack" Jones, C.P.

William "Mack" Jones, C.P., Owner of Long Beach Orthopedic Service, died December 28 at the age of 45.

Mack, who was Certified in 1951 and held Certification Number 95, had been in business for himself since 1954, and had been active in prosthetics work since 1947. He was a member of AOPA and S.O.P.I., a local organization, for many years.

Mack was a World War II Veteran and held the Purple Heart Medal, World Victory Medal, American Theater, Asiatic Pacific Theater, with one Bronze Star and Combat Badge.

Long Beach Orthopedic Service will continue to operate under the direction of Mack's wife, Mrs. June E. Jones, and his son, Charles L. Jones, C.P. Other survivors are his mother, one sister and a brother, four sons and seven grandchildren.

Mrs. Vesta L. Jackson

The Association has been saddened to learn of the death of Mrs. Vesta Lucinda Jackson, the wife of Glenn E. Jackson, Executive Director of the American Orthotics and Prosthetics Association from 1946 until his retirement in 1960. The Jackson's many friends in AOPA and in the Certification program will share his sorrow, and offer their sympathy.

Mrs. Jackson died very suddenly on March 5 at her home, 2525 SE First Court, Pompano Beach, Florida, where she and Mr. Jackson had lived for the past three and a half years. In addition to Mr. Jackson, survivors include a son, Robert, of Boonton, N. J.; two daughters, Miss Eleanor Jackson of Pompano Beach and Mrs. Ralph DeVries, of Loudensville, N. Y.; five grandchildren; and two brothers and two sisters.

Gaston Heitz, C.O.

Gaston Heitz, C.O., of the Schwarz Orthopedic Appliances, Inc., died on January 16 at the age of 61. He had been a member of that firm's staff since 1956, except for one year during which he was with the Institute for the Crippled and Disabled. During that time he attended the first course for Orthotists at New York University.

From 1945 to 1956 Mr. Heitz was on the staff of the Veterans Administration Brace Shop in New York City. He served at the Brooklyn Navy Yard during World War II, and had been associated with Jack Schwarz at the Brace Shop of the Hospital for Joint Diseases from 1937 to 1942. Mr. Heitz held Certification number 106.

Otis Lynn Vaden, M.D.

The Association has learned with deep regret of the untimely death of Dr. Otis Lynn Vaden, Medical Director of The Gottsche Rehabilitation Center in Thermopolis, Wyoming. Dr. Vaden was killed in the crash of his private plane in Colorado on January 18, 1964.

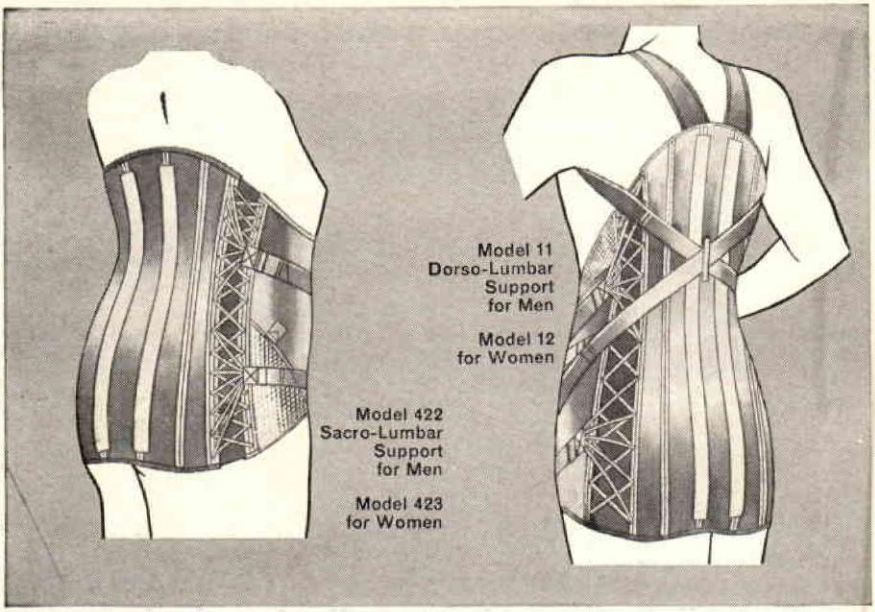
Charles M. Smith, president of the Gottsche Foundation, said, "The Center is in mourning for the ill-fated death of Dr. Vaden, his wife and child. It is a blow to all of us who knew him and his work as Medical Director at the Gottsche Rehabilitation Center. All of the patients and staff will miss him greatly."

Dr. Dacso Appointed to NYU Faculty

The appointment of Michael M. Dacso, M.D., as professor of physical medicine and rehabilitation at New York University Medical Center has been announced by Dr. Saul J. Farber, acting dean of the New York University School of Medicine and deputy director of the Medical Center. Prior to this appointment, Dr. Dacso was associate professor of physical medicine and rehabilitation.

Since 1949, Dr. Dacso has been chief of Physical Medicine and Rehabilitation Service of Goldwater Memorial Hospital (NYU Division). He is also on the staff of Bellevue Hospital Center and University Hospital of New York University Medical Center.

Born in Tovaros, Hungary, Dr. Dacso is a graduate of the Royal Hungarian University of Budapest, 1934. He is a diplomate of the Hungarian Board of Physical Medicine, 1939, and the American Board of Physical Medicine and Rehabilitation, 1953.



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To The Ladies

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Vice President

Mrs. Shirley Sobbe
Secretary-Treasurer

Mrs. Elinor Bohnenkamp
Past President

DEAR AUXILIARY MEMBERS:

On January 9, 1964, I received acknowledgment and thanks from Dr. Shands for the Auxiliary's contribution to the Orthopaedic Research and Education Foundation. The following is a copy of Dr. Shand's letter:

"As Chairman of the Development Committee and former President of the Orthopaedic Research and Education Foundation (OREF), I am writing to thank you and the Ladies Auxiliary of the American Orthotics and Prosthetics Association for the contribution of $200.00 to the Foundation. I have been the OREF fund raising chairman for the last eight years, and it is contributions from organizations such as yours which have cheered us all and made this whole effort seem so worthwhile and, at the same time, making it possible.

"The Foundation, with its 112 grants for research and education, has progressed a long way since it was founded in 1955. In this modern day period of medical practice, we orthopedic surgeons could not adequately care for our patients without the able and conscientious assistance of the hundreds of brace and limb makers over the United States with whom we constantly work. What helps orthopedic surgery, I am sure, helps the field of orthotics and prosthetics. Many of the OREF financed research projects have been and are concerned with metals and plastics. The results of these investigations undoubtedly will help directly or indirectly the work of the prosthetist and orthotist.

"Please express my personal thanks and the appreciation of the OREF Board to the members of your Ladies Auxiliary for their thoughtfulness and kindness in making this gift to our Foundation."

I just wish to add to the above, for those of you who are not aware of the fact, that over seventy of our own facilities have contributed to OREF.

Bob Gruman and Les Smith have asked me to assist Erich Hanicke in planning the entertainment and recreational activities for not only the Auxiliary but for the whole Assembly. So you can see I will be a very busy gal. More about the Assembly later.

In closing, let me remind everyone who has not already done so, to send several of their favorite recipes to Rose Snell, 2761 Barret St., Shreveport, La. Perhaps we can make a fund-raising project out of the resulting Cook Book for our Auxiliary.

Sincerely yours,
ESTHER C. PAVA

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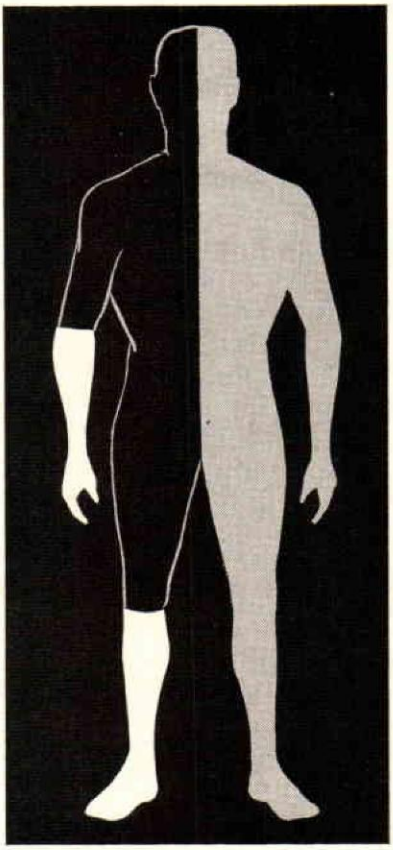
* U.S. APRL Technical Report 6204 "Porous Laminates," January 1962.



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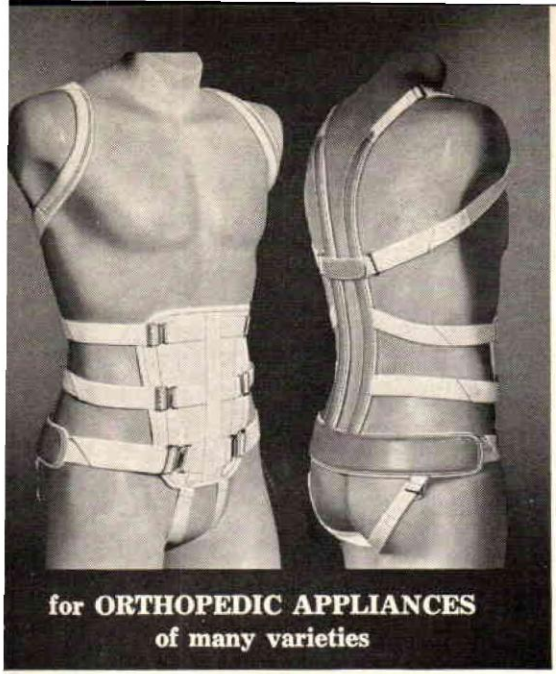

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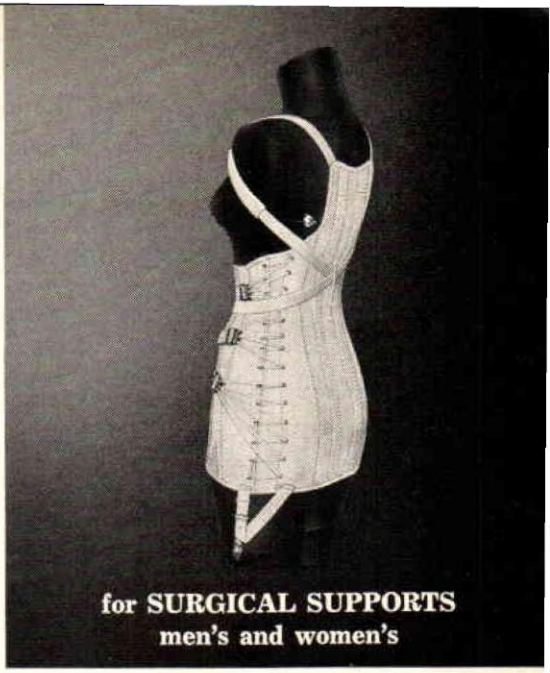

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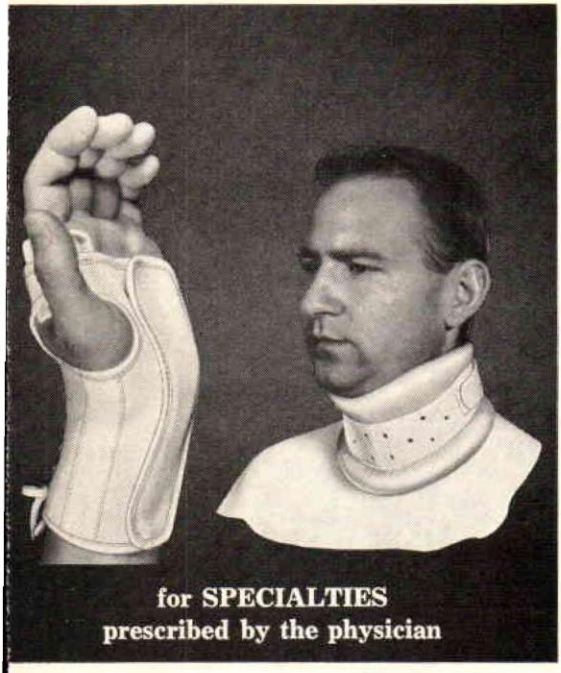

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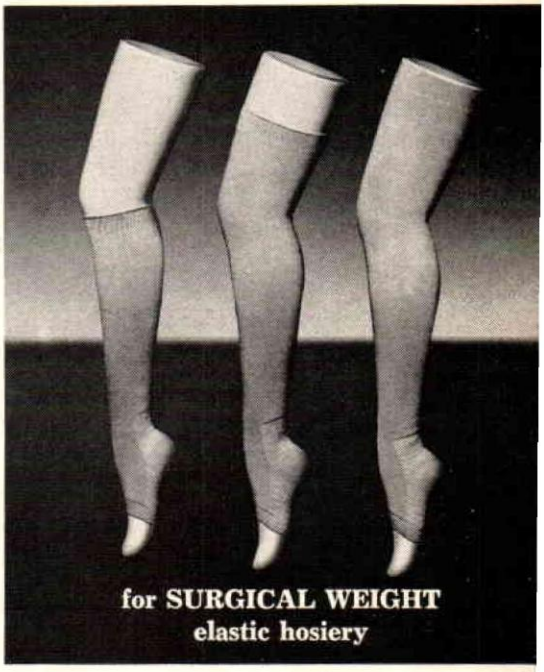

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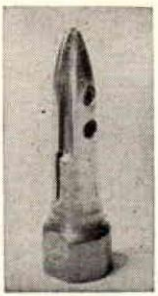

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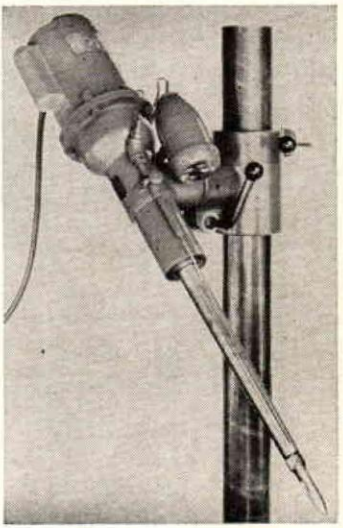

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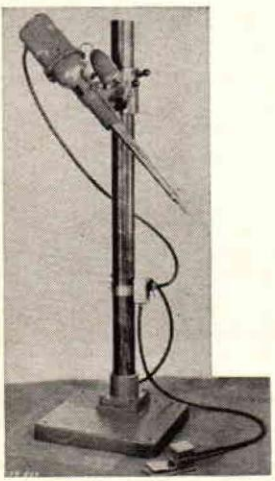

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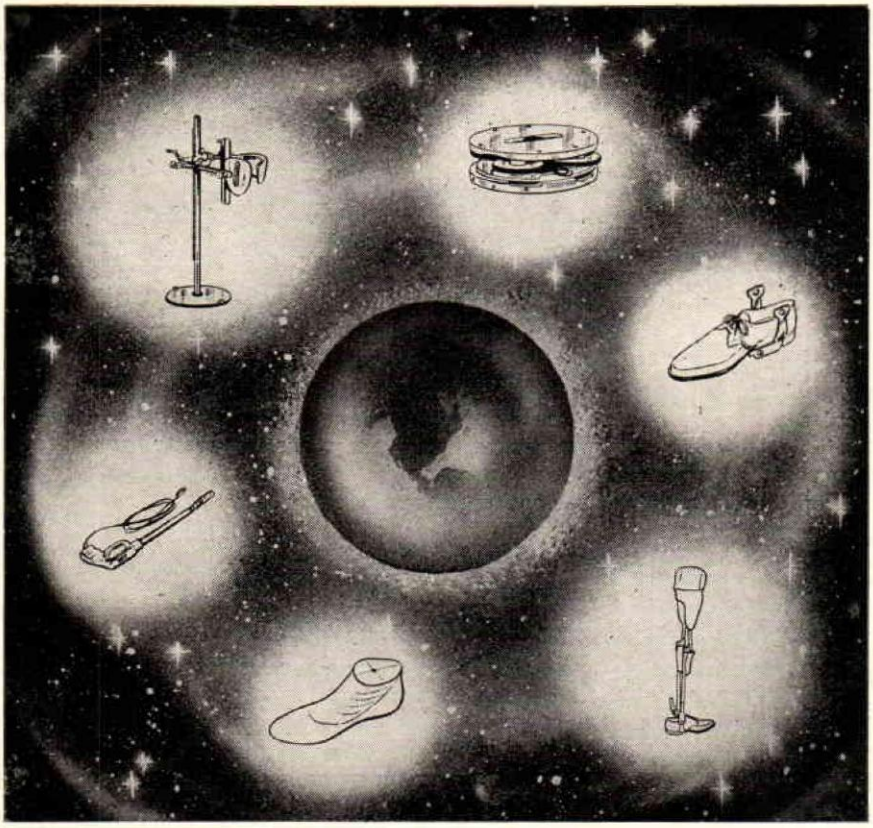

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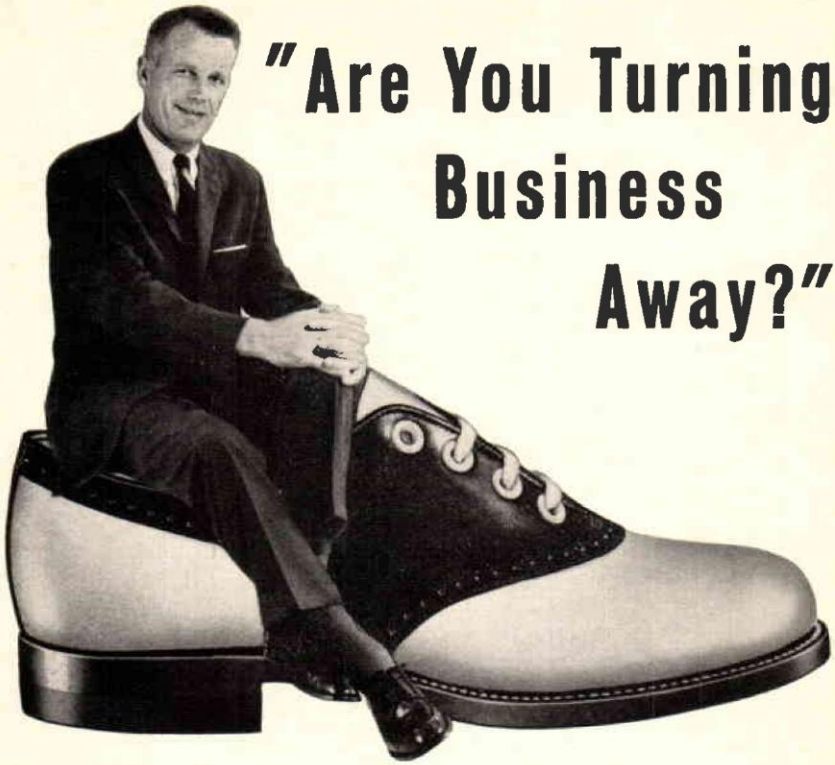

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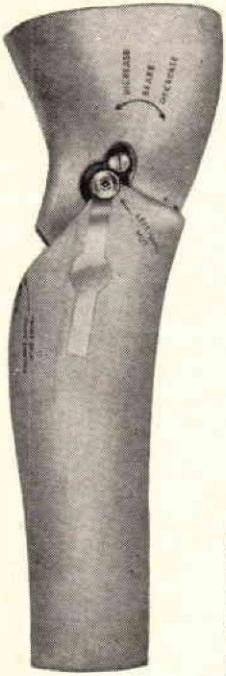

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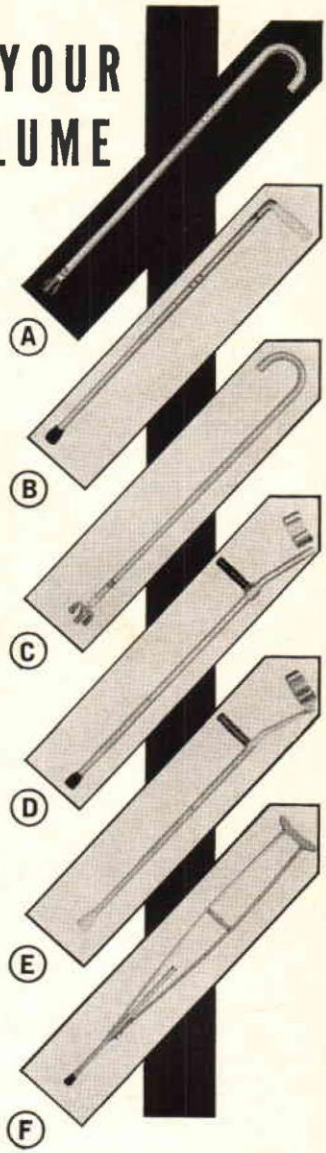

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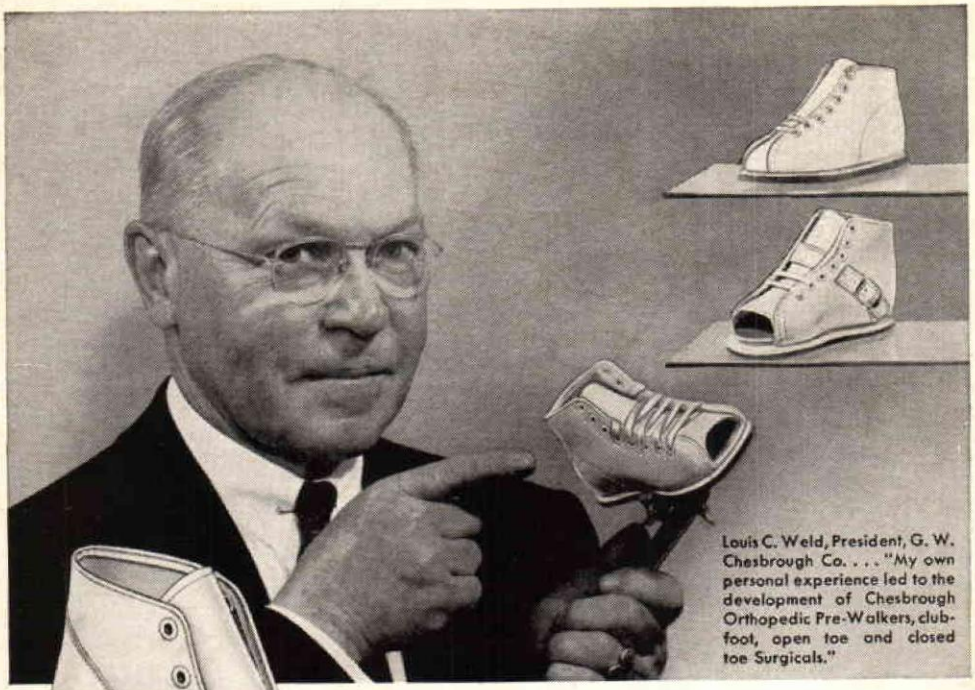

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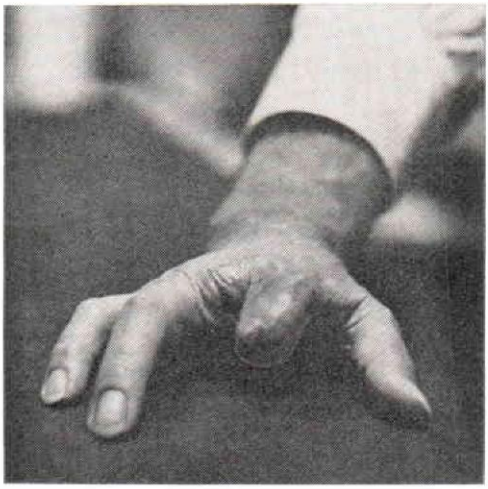

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