JUNE, 1960

ORTHOPEDIC & PROSTHETIC APPLIANCE JOURNAL

The Journal of the Limb and Brace Profession

GLENN E. JACKSON
(See page 33)

publisher: American Orthotics and Prosthetics Association

ORTHOTICS AND PROSTHETICS CALENDAR FOR 1960—
WHAT • WHEN • WHERE

AUGUST	21-28	International Congress of Physical Medicine and Rehabilitation *Mayflower Hotel, Washington, D. C.*
	28	World Congress for Welfare of Crippled Children and Adults Adjourns September 2 *Waldorf Astoria Hotel, New York, New York*
SEPTEMBER	2-6	National Assembly of the American Orthotics and Prosthetics Association (AOPA) *Waldorf Astoria Hotel, New York, New York*
	4-10	International Society for Orthopedic Surgery and Traumatology (SICOT)—Meeting *Hotel Astor, New York, New York*
	6-10	AOPA Trip to Bermuda *Hotel Bermudiana, Bermuda*
OCTOBER	10-12	National Rehabilitation Association—National Meeting *Biltmore Hotel, Oklahoma City, Oklahoma*

INVITATION TO THE 1960 NATIONAL ASSEMBLY

All persons interested in the rehabilitation of the orthopedically handicapped are eligible to attend the 1960 Assembly of the Limb and Brace Profession. This meeting, sponsored by the American Orthotics and Prosthetics Association, will be held at the Waldorf Astoria Hotel in New York City, September 2-6, 1960. Registration forms and additional program information may be obtained by writing to: A.O.P.A., 919 18th St., N.W., Washington 6, D. C.

Exhibit Application Forms may be obtained from any member of the Exhibits Committee, or from AOPA, 919 18th St., N.W., Washington 6, D. C.

Orthopedic and Prosthetic

Appliance Journal

(Title registered U. S. Patent Office)

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The *Orthopedic and Prosthetic Appliance Journal* is issued four times a year—in March, June, September and December. The 1960 subscription price payable in advance is four dollars a year, for delivery anywhere in the Western Hemisphere. The subscription rate elsewhere is five dollars a year. Single copies are one dollar each.

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 (formerly Orthopedic Appliance and Limb Mfrs. Assn.) and of the American Board for Certification. All correspondence should be addressed to the Editor of the *Orthopedic and Prosthetic Appliance Journal*, 919 18th St., N.W., Washington 6, D. C.

A DISCUSSION OF CERVICAL PROBLEMS

There has been and is considerable diversity of opinion among orthopedic surgeons and orthotists as to the proper treatment of cervical injuries, short of actual vertebral fractures. It has been the subject of a great many papers and discussions at the medical meetings; at least one book has been devoted to it. For a time, many such pains and injuries were treated by the same methods as compression fractures, by immobilization in the extended position. With adverse results often being obtained from such procedure, their analogy to low back pains was recognized, as was particularly pointed out by Doctors Williams and Jackson at the national meeting in Dallas. Normal stabilization or the flexed position are often to be preferred and the extended position may actually be detrimental. Dr. Ruth Jackson, in her book "The Cervical Syndrome" recommends the flexed position with the chin tucked in for the majority of cases.

The problems of the orthotist are relatively simple in maintaining extension, the collar or support is simply wedged between the angle of the chin and the sternum, and relatively little support is demanded for the occiput. As he proceeds from extension through normal stabilization to flexion, the possibilities of such wedging become less, and the demand for occipital support becomes increasingly greater; the requirements of the appliance and its fitting are more exacting. As to the flexed position, the collar approved by Dr. Jackson and bearing her name will maintain that position. It demands much of the orthotist in fitting, as that position always will require, but properly fitted is effective and comfortable.

As to normal stabilization, we frankly admit we missed the boat with the original Exo-Static collar. It would do the job, too well; the support was too severe and could not be tolerated by many patients. If you have any such collars, please return them for credit or exchange. The Exo-Static collar has been completely redesigned. It gives gentle but firm support to the chin, occiput and laterally, not only in the extended position but in the normal stabilized position, even to the extent of slight flexion. THE OCCIPITAL SUPPORT AUTOMATICALLY DECREASES AS EXTENSION IS INCREASED, AND VICE-VERSA. The collar is relatively easy to apply.

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Other details on advertising requirements and policies may be obtained from the editor, 919 18th St. N.W., Washington 6, D. C. or from any of the members of the AOPA Committee on Advertising and Supplies:

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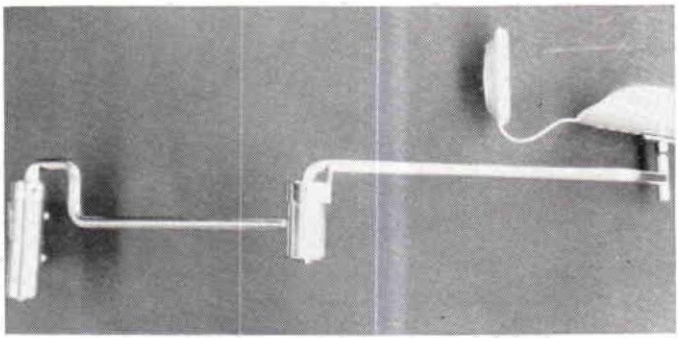

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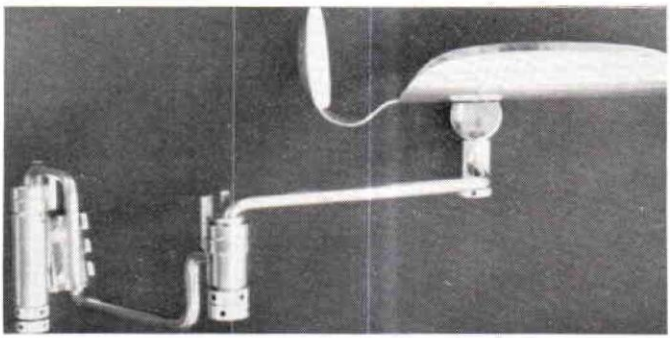

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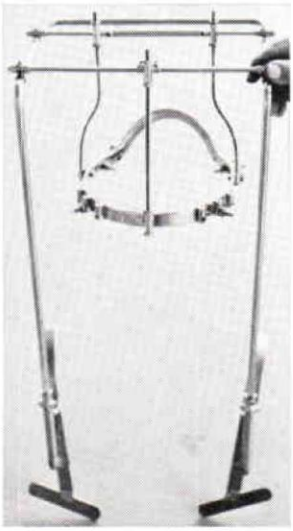

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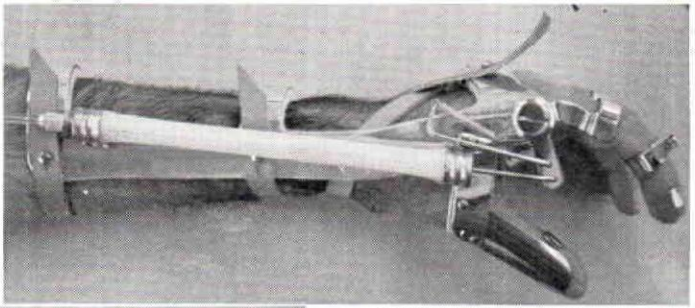

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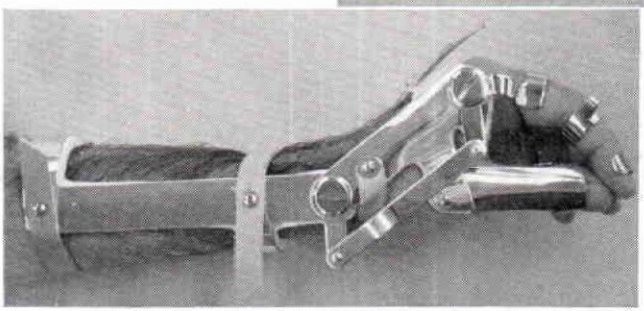

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At Right:
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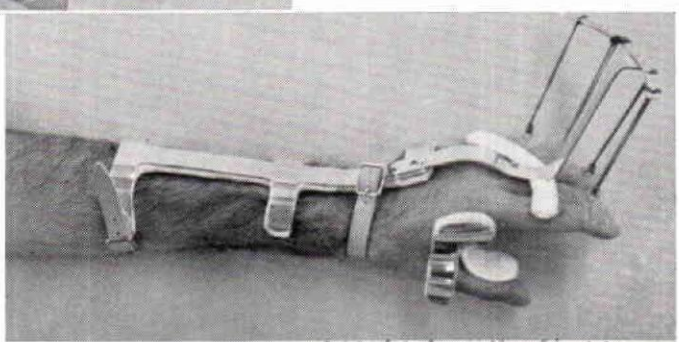

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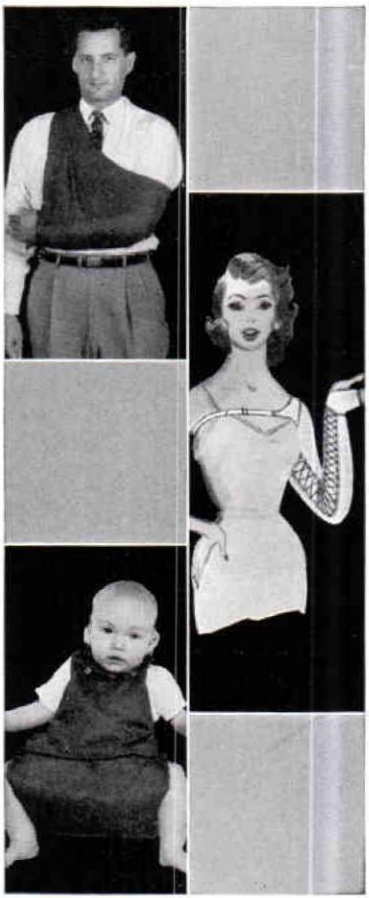

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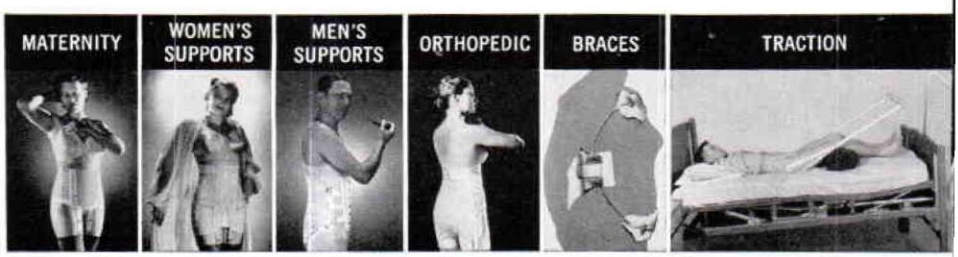

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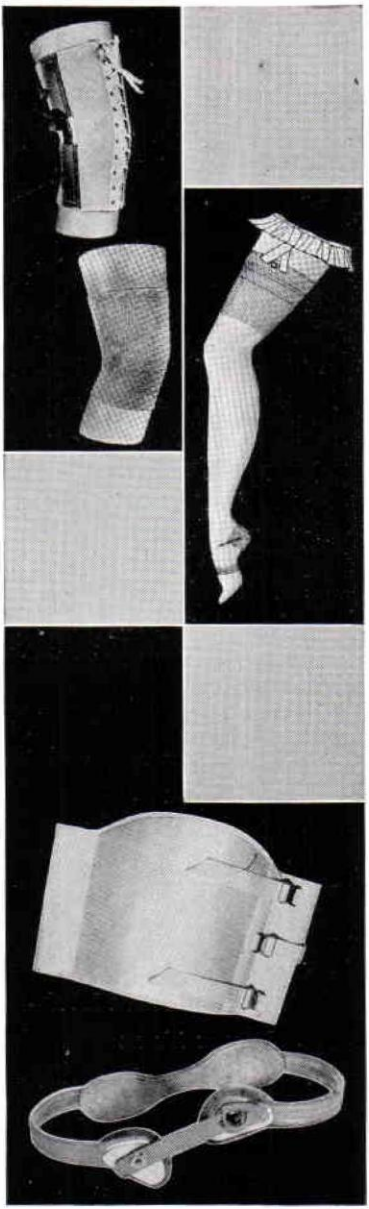

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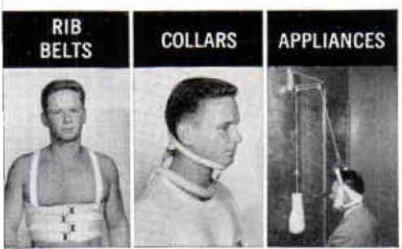

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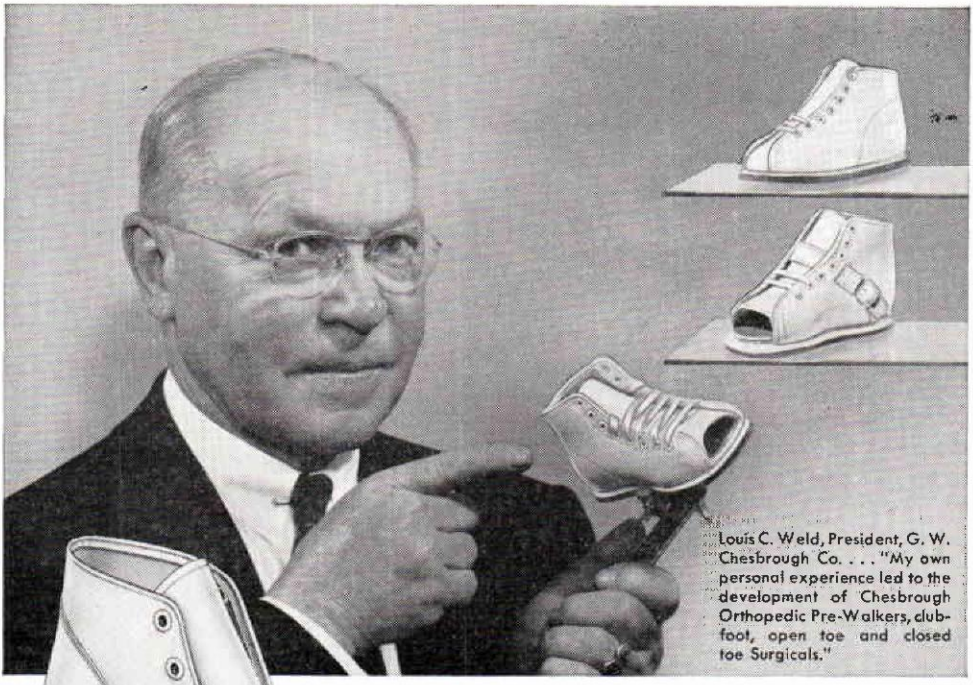

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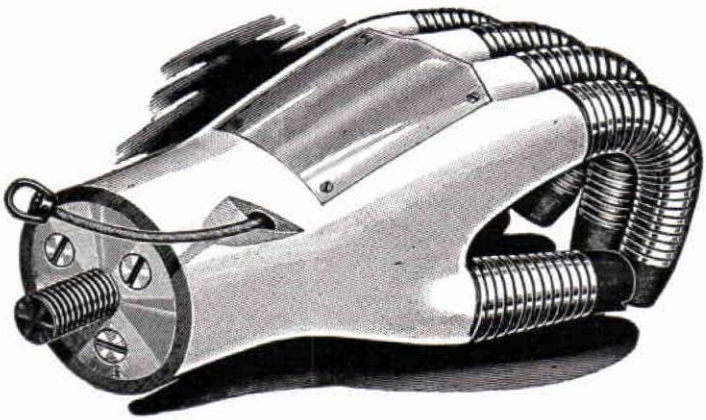

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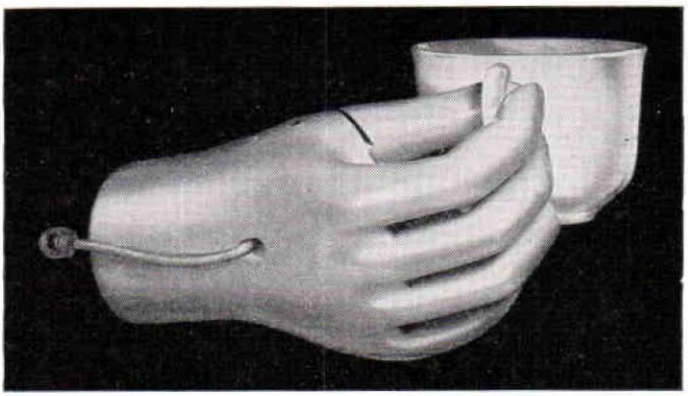

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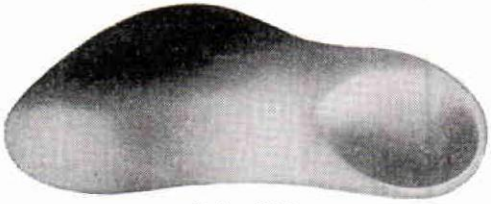

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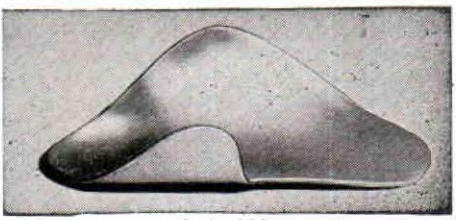

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Your patients can get the proper support for specific varicose conditions from the Kendrick designed line of elastic stockings.

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INVITATION TO THE 1960 NATIONAL ASSEMBLY NEW YORK, SEPTEMBER 2-6

This outline of plans for the 1960 National Assembly is published for the information of readers of the *Journal* and for all who are interested in rehabilitation of the orthopedically handicapped. Additional information and registration forms may be obtained by writing to The American Orthotics and Prosthetics Association, 919 18th St., N.W., Washington 6, D. C.

The final printed Program, available at the Assembly, should be consulted for additional information, including room assignment.

The Dates and the Place

The National Assembly of the Limb and Brace Profession will meet at the Waldorf Astoria Hotel in New York City under the sponsorship of The American Orthotics and Prosthetics Association. The Assembly opens with a reception for members and invited guests Friday evening, September 2nd.

Formal opening of the Assembly session and the Educational and Supply Exhibits is scheduled for Saturday morning, September 3rd. The exhibits will be open from 9:00 to 5:00 P.M., September 3, 4 and 5.

On Tuesday morning, September 6th, there will be a special session for managers of orthopedic and prosthetic appliance establishments. The theme of this session will be "The Efficient Operation of The Limb and Brace Facility." The Assembly will adjourn at noon, September 6th.

Post Assembly Trip

As in previous years The American Orthotics and Prosthetics Association is sponsoring a Post Assembly Trip. The 1960 session will be at the Bermudiana Hotel, Bermuda, and will afford an opportunity for the continuation of the informal discussions and conferences which have proved to be a valuable feature of the Assembly. Information about this trip and reservations may be obtained by writing to Travel Consultants, Inc., 1612 "K" St., N.W., Washington 6, D. C., which is in charge of arrangements for the Bermuda trip.

Who May Attend

Attendance is open to all interested in the rehabilitation of the handicapped. Although the technical sessions are planned for orthotists and prosthetists, many of the sessions will be of interest to physicians, therapists, nurses, members of other para-medical groups and rehabilitation workers.

Registration of Ladies

No registration fee is required of a lady in attendance with a delegate who is registered at the Assembly. The Ladies Auxiliary of The American Orthotics and Prosthetics Association will hold its Meeting in conjunction with the National Assembly. A representative of the Auxiliary will be on duty at the Registration Desk.

Official Meetings of AOPA

The American Orthotics and Prosthetics Association will meet on the mornings of September 4 and 5.

Certification Sessions

The American Board for Certification will sponsor a luncheon Sunday, September 4. Attendance at this luncheon is open to all persons registered at the Assembly. The Business Session of the American Board for Certification will be held at the conclusion of the luncheon.

NEW YORK UNIVERSITY ANNOUNCES 1960-61 COURSE SCHEDULE FOR PROSTHETISTS

New Upper Extremity Prosthetics Courses to be Offered

Prosthetics Education at NYU has announced its schedule of courses for prosthetists for the forthcoming academic year. The schedule, which starts in the fall, includes four two-week courses in Below-Knee Prosthetics; two three-week courses in Above-Knee Prosthetics; and three courses in Upper Extremity Prosthetics. The courses for physicians, therapists, and rehabilitation personnel will be announced later.

Several major changes have been made in connection with the upper extremity courses. After extended discussions with members of the prosthetics profession and others familiar with the field, it has become clear that special courses in upper extremity prosthetics should be made available for those people who do *not* do their own fabrication but utilize centralized fabrication facilities. For this group, the practice of upper extremity prosthetics involves primarily the processes of cast taking and rectification, preparation of the check socket and the setting up of appropriate control systems and harnessing after the arm has been received from the wholesale fabricator. To meet the needs of this group, a two-week course has been planned which will emphasize cast taking, fitting and harnessing, but will not include training and experience in the actual lamination and fabrication process.

For those prosthetists who wish to learn the complete fabrication of upper extremity prostheses, a four-week course will be offered which will include *all* aspects of upper extremity prosthetic practice. In the past, this latter course (No. 746) was of five weeks' duration, but the experience developed since the inception of the course now makes it possible to reduce the length to four weeks. Consequently, two types of upper extremity training will now be available at NYU:

1. a two-week course (7416) for those primarily concerned with cast taking, preparation of check sockets, fitting and harnessing
2. a four-week course (746) for those interested in learning the complete scope of upper extremity prosthetic practice

The schedule of courses for prosthetists during the forthcoming academic year are listed below:

Date	Duration	Course No.	Title
1960			
Sept. 26-Oct. 7	two weeks	7414A	Below-Knee Prosthetics
Oct. 17-28	two weeks	7416A	Upper Extremity Prosthetics Fitting and Harnessing
Nov. 7-18	two weeks	7414B	Below-Knee Prosthetics
Nov. 28-Dec. 16	three weeks	743B	Above-Knee Prosthetics
1961			
Jan. 16-27	two weeks	7414C	Below-Knee Prosthetics
Feb. 6-17	two weeks	7416B	Upper Extremity Prosthetics— Fitting and Harnessing
Mar. 6-24	three weeks	743C	Above-Knee Prosthetics
Apr. 10-21	two weeks	7414D	Below-Knee Prosthetics
May 1-26	four weeks	746B	Upper Extremity Prosthetics—

AOPA TO SHARE IN TEXAS REHABILITATION MEETINGS

The growing interest of insurance companies in rehabilitation lends national importance to a joint meeting to be held at Dallas, Texas, July 21 and 22. The Texas Rehabilitation Association will join with the Texas Employers' Insurance Association in holding a series of joint sessions and workshops.

Mrs. D. E. Hedgecock of Dallas and D. C. McGraw, of Shreveport, are arranging two sectional meetings on Orthotics and Prostheses for the delegates.

In the two-day session members of the two groups will hear such noted authorities as Dr. Donald A. Covalt, W. Scott Allen of Liberty Mutual, and Mr. Jerry Leavy, Vice President of the A. J. Hosmer & Dorrance Companies. Governor Price Daniel will be the speaker at the luncheon meeting July 21.

Mr. Smith Pettigrew, Program Chairman, announces that Dr. Donald A. Covalt will deliver the keynote address to the morning session on "Texas Considers Its Obligations to the Handicapped." Dr. Covalt is Director of the Departments of Physical Medicine and Rehabilitation, New York University College of Medicine.

Ben H. Mitchell, President of the Texas Employers Association, will speak on "The Insurance Carriers Consider Their Obligation to the Handicapped Workmen of Texas."

Dr. Albert O. Loiselle, orthopedic surgeon of Dallas, is in charge of the sectional meetings. These meetings and their speakers include:

Insurance Section—W. Scott Allen, author of the book, *Rehabilitation, A Community Challenge*, will be panel moderator. Serving with him will be Justin Harris, who is Director of the Rehabilitation Advisory Service of the General Reinsurance Corporation.

The Orthotics and Prosthetics Section will feature a demonstration on "Today's Upper Extremity Prostheses in Action." This will be presented by Mr. Jerry Leavy, the Vice President of A. J. Hosmer and D. W. Dorrance Companies. Mr. Paul Ryckoff, a partner in the Hydra-Cadence Inc. Co., will discuss the Hydra-Cadence Knee Unit.

Lester A. Smith, Assistant Director of The American Orthotics and Prosthetics Association, will talk on "Reference Aids in the Orthotics and Prosthetics Field." A special panel on "What Are Your Questions In Orthotics and Prosthetics?" will feature AOPA members and managers of certified facilities in Texas and Region VIII. D. C. McGraw of Shreveport, Director of AOPA Region VIII, will be moderator. Serving on the panel with him will be J. M. McFarlen of Dallas, Texas, Alvin Muilenburg of Houston, Thorkild Engen of Baylor University, and others to be announced.

The Speech and Hearing session will hear Dr. Kenneth H. Shank of the University of Oklahoma discuss "Speech Problems With an Adult." Mr. Frederick J. Artz, Director of Sales and Field Representative of the Zenith Hearing Aid Corporation, speaks on "The Importance of Fitting Hearing Aids." Dr. Marvin C. Culbertson, Jr., Dallas otologist, will speak on "The Importance of Otological Examinations and the State's Mobilization Operation."

INSTITUTE FOR THE CRIPPLED AND DISABLED

Announces

Nine-Month Training Program

For Orthotic And

Prosthetic Technicians

September 12, 1960 to June 30, 1961

FOR ADDITIONAL INFORMATION:

CHARLES R. GOLDSTINE, C.P.O.
Director, Prosthetic and Orthotic Laboratories
Institute for the Crippled and Disabled
400 First Avenue
New York 10, New York, U.S.A.

A TRIBUTE TO GLENN E. JACKSON

By CHESTER C. HADDAN

Editor's Note: Mr. Jackson is retiring as Executive Director of both the American Orthotics and Prosthetics Association and of the American Board for Certification. He will continue active as a Consultant to both organizations.

Glenn E. Jackson, like many other prominent Americans of our time, started his early career as an Iowa farm boy. He was born in the small country town of Gilmore City, Iowa, and spent most of his early life with his parents as a farm boy in Central Iowa. He attended grade school in Des Moines, Iowa, and was graduated from High School at the small town of Logan, Iowa, as an honor student in 1907. He attended Coe College in Cedar Rapids, Iowa, where he graduated with a Bachelor of Science degree in 1913 and later did graduate work at Columbia University in New York City. While in College, Glenn received letters in Football, Baseball, Basketball and Tennis, was Editor of the College Paper and was also Editor of the Junior Annual during his Junior year. He was a member of Beta Theta Pi Fraternity. He earned his entire college expenses except a scholarship and about $300 from his father by waiting tables, firing furnaces, delivering groceries and mowing lawns. In spite of this vigorous schedule, he entered three State Oratorical contests in which he won first prize on one occasion and second on another.

His first job after graduating from College was as Community Work Secretary with the YMCA, in Honolulu, Hawaii, where he remained from 1913 to 1919. He was in the United States Army with Rank of Captain

Mr. Jackson's abilities made National Assemblies significant and successful. Here we see him at the 1952 Assembly in Washington with Lucius Trautman, then President of the Association, Henry Miller, formerly Assistant Chief Counsel of the Federal Trade Commission, and Chester C. Haddan, then President of the Certification Board.

for one year. He again returned to community work as Secretary of the YMCA in Minneapolis, where he remained until 1925. In 1925 he became Secretary of High School Boys Work, National Council YMCA in New York City, where he remained until 1929. It was during this period he first became interested in Association work and he accepted a position as Commissioner for the Funeral Service Bureau of America for one year. Apparently his years with the YMCA were so strongly ingrained in his make-up, that he again returned to YMCA work as Associate General Secretary at Rochester, New York where he remained until 1935. As many of you who read this will recall, in 1935 the United States was in the throes of one of the greatest depression periods in the history of mankind. Because of Mr. Jackson' great interest in social work, he became Deputy Commissioner of the New York State Emergency Relief Administration for two years and was then promoted to Executive Director, Bureau Public Assistance, New York State Department of Social Welfare, where he remained through 1942. In 1943 he became Director of Community Programs for the Federal Office of Civilian Defense. It was shortly after his tour of duty with the Office of Civilian Defense that the author became acquainted with him. Many of you will recall the Federal Trade Commission and the OALMA had worked together developing a set of Fair Trade practice rules covering our profession. A Public hearing for the adoption of these rules was held by the Federal Trade Commission in Chicago, early in the Summer of 1946. Regulations of the Federal Trade Commission made it mandatory that someone not directly associated with the OALMA be obtained to read these rules to all those present, in order that they could be discussed and acted upon. The services of Mr. Jackson were obtained for this task by your author, who was then President of the OALMA. The Officers and Directors of OALMA were impressed with Mr. Jackson's understanding of our problems and his sensible approach towards solving them, and as a result he was hired as Executive Director on a temporary basis in the Summer of 1946.

The Certification Examinations occupied much of Mr. Jackson's time. Here we see him with Dr. Henry Kessler, a founder of the Certification Board in front of the Institute of Physical Medicine and Rehabilitation in New York. Left to right: David E. Stolpe, Dr. Kessler, the late Walter Sievers, and Mr. Jackson.

In the Fall of 1946 at the Annual Meeting of the OALMA held in Minneapolis, he was presented to the membership with the recommendation of the Board of Directors that he be hired on a permanent basis. All of you know that he was hired as recommended and that he has been our Executive Director since and will remain our Executive Director until October 31 of this year. He has asked to be relieved of his duties at that time and that a successor be appointed. During the period he served as Executive Director of the OALMA he has engaged in other activities which have brought honor and prestige to the OALMA. He served as Instructor on the subject of "The discussion method, group dynamics" at Institutes for Trade Association Executives at Yale and Michigan State Summer Schools. He served on the American Society of Association Executives Group Insurance Committee of America for eight years. This Committee developed the "model" Retirement Plan for Association Executives which was later adopted by the OALMA. He was a member of the Board of Directors of the American Society of Association Executives in 1956 and a member of its Program Committee from 1957 to 1960.

Mr. Jackson's hard work, sincerity, and dedication to duty won for the OALMA the greatest honors that have ever been awarded a Trade Association. The OALMA was given an Annual Award for Outstanding Services to its members four times, and one of these was the Grand Award. No other Trade Association in America has received such recognition from the American Society of Association Executives.

Glenn and his wife Vesta are known and loved through out the length and breadth of America. I am sure that every member of the Orthotic and Prosthetic Industry, whether they be dues-paying members of the Association or not, will want to join with Glenn and Vesta's friends in wishing them many happy years when they retire from the active and busy life they have lived in Washington.

HONORS FOR HANICKE

Erich Hanicke, C.P.&O., of Kansas City, is winning international recognition for his skill in developing new appliances. *Excerpta Medica*, the International Medical Abstracting Service, has asked him to forward a summary of his article from the September issue of our *Journal*, entitled: "Helpful Devices from the Hanicke Facility."

Excerpta Medica is a nonprofit international organization founded in 1946 to abstract the medical literature of the world. It is located in Amsterdam, The Netherlands.

The abstract service has also requested a summary of the article: "Clamp Device to Aid in Placement of Tunnel Pins of Bilateral Amputee with Cineplastic Operated Prosthesis." This appeared in the December 1959 issue and was written by Miss Muriel E. Zimmerman and Townsend H. Hicks of the Institute of Physical Medicine and Rehabilitation.

"HELPING HAND"

A HYDRAULICALLY OPERATED MECHANICAL HAND*

By ARTHUR J. HEATHER, M.D.

Medical Director, Dept. of Physical Medicine and Rehabilitation, The Eugene Du Pont Memorial Hospital, Wilmington, Delaware

and

T. A. SMITH

Project Engineer, All-American Engineering Company, Wilmington, Delaware

Rehabilitation of the quadriplegic patient is difficult and often discouraging to both patient and physician. Paralysis of the hands resulting from injuries to the spinal cord at the cervical level results in complete helplessness. Many frustrating attempts to design an apparatus to regain functional use of the hands preceded the development of the present hydraulically operated mechanical hand.

First, an attempt was made to determine the number of patients in need of a mechanical device to provide hand function. No such data could be found. We then estimated the total quadriplegic population of the country, based on statistics obtained from local hospitals.

Seven quadriplegic patients are treated yearly in the four general hospitals in Wilmington, Delaware, which serve an area of approximately 400,000 population. Thus, traumatic quadriplegia occurs locally at a rate of 1 in 57,000 population. Assuming this to be average for the entire country, approximately 3,000 persons become quadriplegic yearly. Due to modern methods of treatment, most of them survive for a number of years. This results in an increasing number of such patients. It is then probably safe to assume that several thousand persons could be benefitted by the use of a mechanical hand. The figures quoted above do not include quadriplegia resulting from cervical cord tumors, poliomyelitis, and other diseases.

Having demonstrated the need for a device to regain partial use of paralyzed hands, the idea was presented to the management and engineering staff of All American Engineering Company, Wilmington, Delaware. Project "Helping Hand" was then instituted, and preliminary investigation begun. It was decided that a properly functioning mechanical hand should meet the following specifications:

1. The weight of the complete unit must be kept at a minimum due to weakness and paralysis of the hand and the arm. Total weight should not exceed eight ounces.
2. A three-jaw chuck type grasp was to be provided the patient when the hand was in use. The wrist was to be held in the cock-up or functional position. Figure 1A and B show the hand closed and opened. Figure 1C illustrates the activating mechanism.
3. Operation of the hand should be mechanically simple and require little muscle force by the patient. The activating mechanism was so constructed that it could be placed in various locations depending upon the remaining functional muscle groups, *i.e.*, shoulder adductors or cervical muscles. Figure 2A and B is a palmar view of the closed and opened hand.

* The research on this hydraulically-operated mechanical hand was made possible by a grant from the Easter Seal Research Foundation of the National Society for Crippled Children and Adults, Inc., 11 South La Salle St., Chicago 3, Illinois.

4. The cost of the hand was to be kept as low as possible, using commercially available components that could easily be replaced if worn or broken.
5. The hand must be comfortable and cosmetically acceptable to the patient.

After weeks of study and consultations with plastics experts, metallurgists, and latex engineers, a prototype was constructed, and preliminary testing done. Numerous areas for improvement were found in the first model. These were incorporated into the final hand which we believe will more than meet the specifications mentioned above.

A hydraulic system was found to be most efficient. The use of tap water as the hydraulic fluid lowered the cost and eliminated the hazard of fire inherent in nearly all other hydraulic fluids.

The use of a plastic splint, nylon activating cylinders, and nylon tubing reduced weight and provided long component life. The complete hand, ready for use, weighs six ounces. The portion of this unit attached to the patient weighs only four and one-half ounces: thus, the earlier weight specification was reduced by nearly one-half.

The hand, voluntary opening in type, is held closed by a beryllium alloy C-spring which is chromium plated. The spring after heat treatment will not change shape or lose its holding force and will last a lifetime unless crushed by the application of great force.

The finger grips are made of 0.021-inch thick latex. They are permanently attached to the finger wires with a special cement.

The durability of the hydraulic system was tested in a cycling machine for a period equivalent to 26 years of patient-use. At the end of this test there was no fluid loss, and the cylinder operation was improved in smoothness.

Cosmetically the hand is acceptable to the patient. When used for such activities as writing or working at a desk, only the latex finger grips are exposed. The splint lies on the volar aspect of the forearm and is held in place by contouring its upper end to fit the arm and attaching the lower end at the wrist with a wrist watch strap so arranged that the watch can be worn on the anchoring strap.

A measuring splint (Fig. 3) also was designed for use by the orthotist. The measurements of the patient's hand and arm taken from this splint make possible the rapid fabrication of a well-fitting hand without repeated adjustments. This technique reduces the cost by decreasing the fitting time. Figure 4 illustrates the complete fitting kit with detailed fitting instructions.

Specifications of the Hand Components

1. Weight of complete hand (hydraulic system filled with water)—6 ounces
2. Weight of the unit lifted by patient—4½ ounces
3. Hydraulic cylinders made of nylon
   - Cylinder capacity—5 milliliters
   - Cylinder bore—½ inch
   - Cylinder stroke—1 inch maximum
   - Cylinder leakage prevented by rubber "O" rings
4. Hydraulic fluid—tap water
   - Total volume of water in system—25 milliliters
   - Volume of water moved in maximum operation—5 milliliters
5. C-spring made of special beryllium alloy extruded bar stock
   - Spring specially wound, heat treated, and chromium plated
   - Ball sockets on spring to receive and retain cylinder-end ball joints

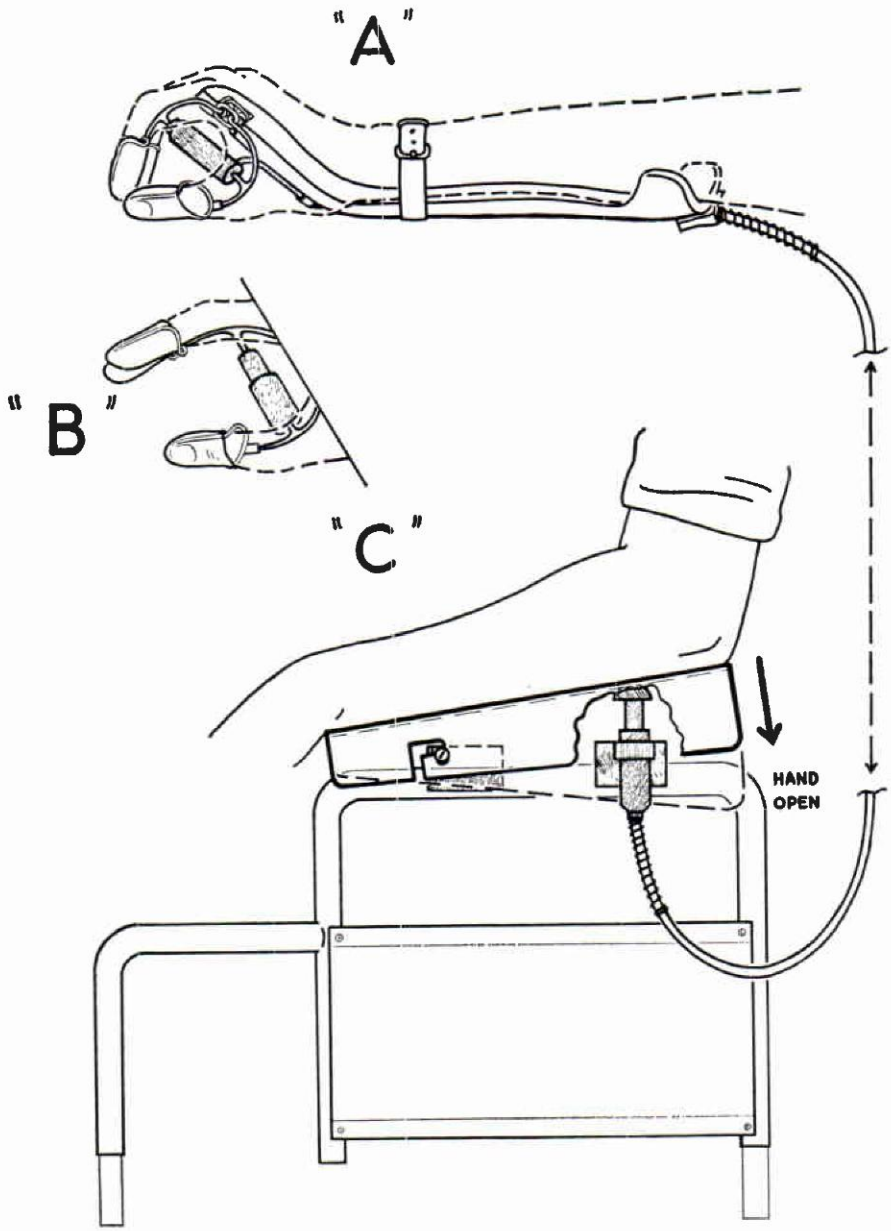

Fig. 1

Hand opened by depressing shoulder or leaning on chair arm.

6. Tubing (nylon)
   Inside diameter—0.125 inches
   Tubing has safe working pressure of 150 pounds per square inch
   Tubing permits flow of 400 milliliters of water per minute
7. Hydraulic System
   The system handles 75-pound forces continually with ease
8. Finger Caps (Latex)
   Thickness—0.021 inches
   Caps attached to finger wires with cement
9. Anchoring Wrist Strap
   Same type as used on wrist watch and so designed that watch can be worn on same strap
10. Splint (Acrylic Plastic)
    Contoured to upper forearm
    Retains shape permanently
11. Sizing Device
    Makes possible correct and speedy assembly of components to fit the patient
    Fits either hand by attaching to right or left hand splint

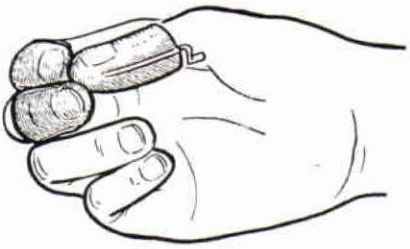

Fig. 2A. Three-jaw chuck grasp.

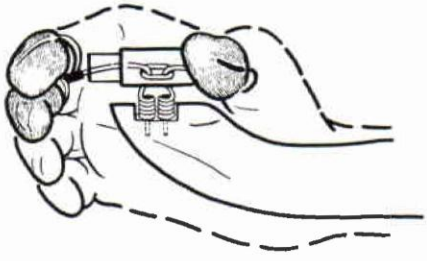

Fig. 2B. Hand open.

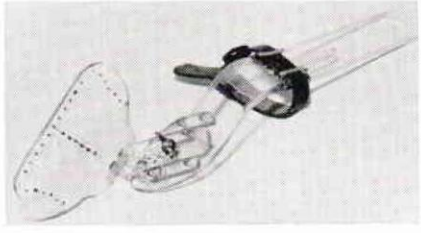

Fig. 3

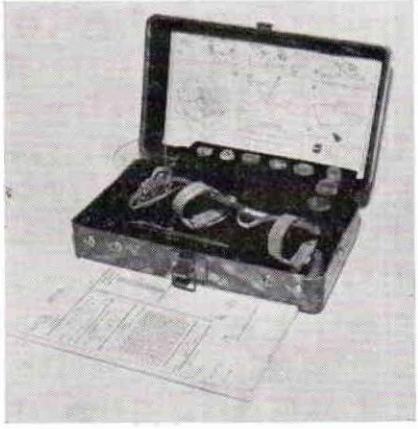

Fig. 4

Summary

A lightweight, hydraulically operated mechanical hand was developed and tested on quadriplegic patients. This apparatus provides the patient with three-jaw chuck type grasp and enables him to perform many activities otherwise impossible. It is recommended that any patient fitted with the "helping hand" receive training similar to that given the upper extremity amputee. This instruction assures maximum benefit from the use of the hand.

The development of the hydraulic hand is an illustration of the improved instrumentation possible from the combined efforts of the engineering and the medical professions.

"REHABILITATION AND WORLD PEACE" THEME OF WORLD CONGRESS

A World Congress with the theme, "Rehabilitation and World Peace," meets in New York City in the Waldorf Astoria immediately before the National Assembly of the Limb and Brace Profession. The Congress is the Eighth to be held by the International Society for the Welfare of Cripples. Its sessions in the Waldorf Astoria Hotel in New York City run from August 28 to September 2. Immediately thereafter the National Assembly of the Limb and Brace Profession, sponsored by The American Orthotics and Prosthetics Association, will open in the same rooms (the World Congress Supply Exhibits will be in the Jade, Basildon and Astor Rooms of the Waldorf Astoria on the third floor and the same rooms will be used by AOPA).

The Congress is open to persons from all the countries who are interested in the field of rehabilitation and wish to attend. The U. S. National Society for Crippled Children and Adults is the host society.

Dr. Howard A. Rusk, President of the World Congress, will preside at the opening session. Other speakers of special interest to the limb and brace profession include Dr. Henry H. Kessler of West Orange, New Jersey, and the Honorable Arthur S. Fleming, Secretary of Health, Education, and Welfare.

Of special interest will be the session on "Industrial Medicine and Rehabilitation," to be held on August 30. Dr. John Lauer of Pittsburgh will discuss "Modern Rehabilitation As Seen By An Industrial Physician." Speakers in other sections include Dr. Michael M. Dasco of New York on "Rehabilitation Program for the Aging."

Advance reservations for the Congress should be sent to the Eighth World Congress, 2023 W. Ogden Ave., Chicago 12, Illinois. ($15.00 per person). Information about exhibits at the Congress may be obtained by writing Mr. Ronald B. Almack, Exhibits Manager, International Society for the Welfare of Cripples, 101 Memorial Hall, Medical College of Virginia, Richmond 19, Virginia.

LIMB AND BRACE TECHNICIAN TRAINING PROGRAM

ICD AGAIN OFFERS BASIC COURSE

Because of the continued world-wide shortage of skilled technicians in the field of orthotics and prosthetics, the Institute for the Crippled and Disabled, a total rehabilitation center in New York City, is again offering a 9-month basic course in limb and brace making.

For many years, the Institute has conducted this program which is the only formal schooling designed to give men adequate basic training in this field in a minimum of time, thereby affording to dedicated men the opportunity of entering into the service of the handicapped.

The student is instructed in the area of prosthetics or orthotics. It is the objective of the course to equip the student sufficiently so that upon the completion of his course he will be a valuable and productive man.

Basic curriculum covers such subjects as anatomy, psychology of the disabled, rehabilitation techniques, and ethical and professional relationships. In addition to these, an introduction to laboratory management, including purchasing, safety practices, and the utilization of power machinery and hand tools are covered. Approximately 20% of the students' time will be devoted to these subjects.

Two graduates of the program are congratulated by Willis C. Gorthy, Director of the Institute for the Crippled and Disabled, and by Martin Durec, C.P., Prosthetics Instructor (at the right).

The orthotic technician (brace maker) will receive instructions in the proper selection and design of materials. He will have actual laboratory experience in the fabrication of a wide variety of appliances. The fabrication techniques as practiced in the Institute utilize the latest developments in pre-fabricated parts and equip the student to design and fabricate specific components for problem cases. The development of plaster cast techniques is a part of the effort devoted to the proper measuring and drawing procedures to initiate orthotic construction. The student will have an extensive experience in fitting patients with braces. In addition he will have an opportunity of observing the functional value of the devices as they are put to use in the Institute's therapy department.

The prosthetic technician (limb maker) will receive the same general type of instruction as the orthotist except that he will be concerned with the lower extremity amputees rather than with bracing. In keeping with modern developments in prosthetic construction, the student will make extensive use of plastics. The fitting techniques used in prostheses utilize the mechanical advantages of adjustable jigs for both the above and below-knee amputees.

The students will benefit from a wide exposure to instructors and facilities. Laboratory instruction at the Institute is under the supervision of certified orthotists and prosthetists. Professional staff members of the Institute, as well as other specialists, contribute to the academic curriculum. Students' curriculum includes a series of visits to leading hospitals and agencies in the greater New York area.

This program is designed to prepare the student for taking the examination offered by the American Board for Certification in Orthotics and Prosthetics, Inc. The effectiveness of past programs has been proven by the extensive service which is being performed today throughout the world by Institute-trained students. Handicapped people in far-off places such as Thailand, South Korea, and the Philippines are receiving modern prostheses and braces from these men, to say nothing of such closer neighbors as Spain, France, and Holland. Graduates who are working in the United States are making no less of a contribution to our ever-growing army of people who are devoted to rehabilitation. These men are contributing as technicians and fitters. Many of them today are proudly holding their certificates of Certification.

The new course will begin September 12, 1960 and end June 30, 1960. Tuition for the entire course is $550.00. Basic pre-requisite for students from the United States is the High School diploma. In order to assure a high level of personal instruction, enrollments are limited.

For further information or application blanks, contact Charles R. Goldstine, C.P. & O., Institute for the Crippled and Disabled, 400 First Avenue, New York 10, N. Y. Inquiries received prior to August 1st, will be given preferential consideration.

SPRING CLIP TUBULAR ORTHESIS FOR THE QUADRIPLEGIC HAND

By ODON F. VON WERSSOWETZ, M.D., F.A.P.C.
And R. N. WITT, C.O.

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An adaptive hand orthesis may have to be used to provide or improve the function in a quadriplegic patient. Such an orthesis must mechanically supplement prehension by some type of holding device. It also must be simple to apply. Most quadriplegic patients experience great difficulty in managing straps and buckles which secure their hand splints in place. Yet as a general rule such orthesis must be removed to permit the patient, if he is able, to wheel himself independently. Then the orthesis must be re-applied to allow him functional activities. This whole process requires considerable dexterity and usually means some outside help from an attendant.

This difficulty has been eliminated by placing on the forearm extension hinged metal clips. These clips are activated by leaf springs incorporated into the hinges, which are so arranged that they will hold them either fully opened or securely closed. The opening is usually placed on the ulnar side, but it can be on the radial side. The clips project slightly on one end. This projection is used to open the clip by pushing under it or by hooking it over an edge of a table, a lapboard or an arm rest of the wheel chair. The clip is closed by depressing it through slight pressure, as by weight of the other forearm, which trips the leaf spring in the hinge. This simple mechanism permits the patient to become quite independent in a number of hand activities. Usually this spring clip splint is provided with a tubular holding device. A tubular holding device will allow the quadriplegic patient, who has very limited dexterity, an easier method of utilization and exchange of various utensils.

The tubular holder consists of a hollow metal cylinder which is usually attached to the above forearm splint. The tube is placed across the palm of the hand so that it will project slightly between the thumb and index finger in the web space. A bracket is placed on the ulnar side to prevent the hand from slipping off the holder. Self-care articles and utensils are modified by attaching to them handles or extensions of metal rods of a size that fit the hollow cylinder of the holder. The free end of each rod is tapered and rounded so that it can be slipped easily into the tube. The rod is held securely in place by a ball spring tension lever which, pushing through a hole in the cylinder, becomes engaged in a small depression on the rod. This creates sufficient friction to prevent the rod from rotating or slipping out. The tension of the spring is so adjusted that it will permit easy removal of the utensil by exerting slight traction such as can be supplied by the weight of the other hand or forearm.

A second shorter tube, called pencil holder, is placed at an optimal angle to the first tube, between the thumb and index finger. This permits

the holding of such objects as pencils, typing sticks, etc. It also provides stability on the radial side.

The specifications for the spring clip tubular splint are:

A. F-Bar .064" x 3/4" x 9 5/8" stabilizer section, with one projection at forearm .064" x 3/4" x 2 1/4" and one projection at wrist .064 x 3/4" x 2 1/4" location 5" from forearm.

B. 2—3/4" Butt hinges, attached opposite projection on F-Bar, with .064" x 3/4" x 6 1/2" strip attached.

C. .040" x 1/2" x 1 3/8" Stainless steel spring attached.

D. One piece Stainless steel tubing 1/2" O.D. x 3/8" I.D. x 5" long.

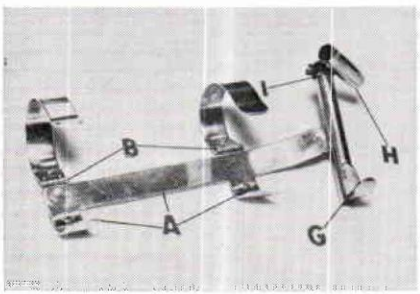
E. Attach to F-Bar with bracket silver soldered on tubing.

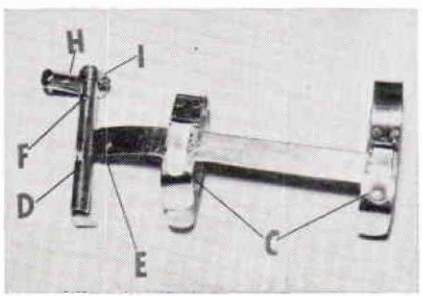
F. 3/16" ball attached to .059" spring. Hole for ball 7/8" from thumb side of tube.

G. Bracket silver soldered to tube on little finger side.

H. Pencil holder, 3/16" ball attachment to .059" spring, hole location 3/8" from end of 2" tube. Tube 3/8" I.D. x 1/2" O.D.

I. Stainless steel clip to attach to pencil holder to palmar section.





It is obvious that the tubular holder is superior to other types of adaptive orthesis because it is easier for the quadriplegic patient who has poor maneuvering dexterity to insert the tapered rod into a round tube than trying to perform this action utilizing flat holding devices.

Because the patient can apply and remove this simple adaptive orthesis he becomes more independent in a number of functional activities of daily living.

The authors would like to thank the staff of the Occupational Therapy Department but particularly Miss Rose Elliott and Mrs. G. Stephens for their valuable assistance.

THE STRIEDE "TIBIAL HAFT PROTHESE"

By LAURENCE PORTEN, C.P., C.O.

Union Artificial Limb and Brace Company, Pittsburgh, Pa.

In my travel report on European Brace and Limb Shops in 1953, which was printed in September 1953 in the *Orthopedic and Prosthetic Appliance Journal*, I had mentioned Striede's Above Knee and Below Knee artificial suction legs.

Actually the late Fritz Striede did not believe in a suction leg as we are accustomed to it as with certain pressure valves, etc., and called his own leg "Muskel Haft Prothese" or "muscle adhesion prosthesis."

He always combatted the old vacuum system which needed valves and claimed they would injure the stump and cause pain. As to the B. K. leg, his idea was that a slight muscular contraction suffices to control the appliance and the latter will be held so firm that a considerable effort is required to detach it from the stump. The skin literally sticks to the interior of the socket and no air gets in.

It is needless to say, in order to secure perfect adhesion by this method the artificial leg must be made perfect to measurements. When good adhesion is obtained, the stump can move within the socket in such a way that a slight muscular contraction suffices to control the appliance. However, when detaching it from the stump the muscles only have to be slightly relaxed.

The construction of the leg is therefore a delicate task, and a plaster cast is not enough to work on. The amputee has to be in the shop when the socket is made. It is the living stump which, with its muscles contracted, acts as a cast for shaping the socket at the upper end and inside of the appliance.

As the "Haftprothese" allows all stump muscles a free development, the blood circulation will improve steadily and prevents atrophy of the stump. As a matter of fact, stumps which had shrunk from the use of conventional artificial limbs— that goes for B. K. as well as A. K. legs—can be developed and strengthened to the point that some almost reach normal size again.

The inside of the "Haftprothese" has about the same pressure as the outside, because no suction is maintained as in a regular suction leg. In some cases Striede had installed a hole in the socket just below the stump end to make it easier for the amputee to insert or remove the stump. However, this hole was always closed again with a rubber stopper to keep the air from penetrating into the socket. It also helps to compensate for pressure differences which can develop inside the socket due to changes from walking to sitting positions.

The fact remains, that a B. K. "Haftprothese" will not get loose in the socket as long as the amputee maintains a certain amount of muscle contraction. It also should be noted that no suspension straps of any sort are needed or used and the amputee is completely free in his or her movements.

Since Striede's Tibial B. K. leg does not employ a thigh corset and knee joints, it is obvious that considerable body weight is distributed over

the patella tendon, the fibula and the condyles. Very little weight is borne at the end of the stump, although the airtightness in the socket creates an air cushioning effect on the bottom and adds to the comfort of wearing the prosthesis.

As far as the foot is concerned, Striede constructed his own pattern which is a jointless rubber foot with a wooden ankle piece, a wooden keel extending towards the toe joint and a big air pocket in the heel part which allows for compression when the heel strikes the floor.

Comparing the Striede foot with our present SACH foot, I would say that both constructions have so much in common—except for the material—that we could call the Striede foot the forerunner of the SACH foot. Some similarity also exists between the tibial haft prothese and our new patella tendon bearing below-knee prosthesis.

In conclusion to my observations of the Striede legs on my European trip, I would like to pay tribute to a man who dedicated his whole life to his profession and his amputees. A tireless worker, he had no private life except for a little skiing in winter, tennis and swimming in summer. He never had time to marry, and his only thoughts and dreams concerned the happiness and comforts of his patients. If he had been given the opportunities to materialize his dreams and ideas which he told me so freely, I know our profession would have gained immensely.

He died too soon and deserves a "Salute."

In Memorium

A. O. Rogers, C.O., C.P., was fatally injured in an airplane accident April 15, 1960. Mr. Rogers, originally a native of California, was a member of the Association, and the facility which he operated at Anchorage was certified in prosthetics and orthotics.

Mr. Rogers attended several National Assemblies, where his stories of Alaskan life and his motion pictures were popular features. An account of his experiences entitled "Alaska Adventure" appeared in the *Orthopedic and Prosthetic Appliance Journal* for September 1957, pages 65-69.

Members of his immediate family who survive include his wife, Mrs. Julia B. Rogers, and three sons. Mrs. Rogers has been active in the firm and will continue operation of what is the only artificial limb and brace establishment in the State.

Otto L. Dilworth, head of the Dilworth Artificial Arm Company of Hartford, Connecticut, died at Hartford Hospital April 6th, at the age of 85. In spite of his advanced age, Mr. Dilworth was active and held a Veterans Administration contract. Mr. Dilworth lost his limb at the age of 23. Dissatisfied with the first artificial limb he obtained, he began work with the Buholtz Artificial Limb establishment in Hartford in August 1908. Mr. Dilworth held several patents on artificial arms and was also the inventor of a special electric coil for stove use. He is survived by his widow, who was treasurer and bookkeeper of the company, and by a sister, Mrs. James O'Connor of New York City.

UNUSUAL ANOMALIES IN THE UPPER EXTREMITY

By ALFRED B. SWANSON, M.D.*

The problem in prosthetic fitting of the upper extremity anomaly is to obtain prehension with mobility, strength, agility, skill, cosmesis, and, if possible, at the same time to retain tactile sensation. Each patient presents a special situation of his own. The main goals should be increased function and continued usage. To obtain this potential requires not only the utmost cooperation of the patient, but of all members of the prosthetic team. Continued experience and experimentation with these patients may modify the prosthetic prescriptions; the goals, however, should remain the same.

Case I, born May 2, 1954, presented bilateral hemimelia (knee disarticulations), right upper partial hemimelia (very short below-elbow), and left upper partial adactylia (ulnar). She was admitted to the Area Child Amputee Program at the age of thirty-two months. Initially her lower extremities were fitted with lightweight wooden sockets, aluminum double uprights, SACH feet and toddler's harness; shortly thereafter, the sockets were changed from wood to plastic. Her present prescription consists of standard knee disarticulation prostheses with SACH feet and toddler's harness. The prescription written for the right upper extremity was a split socket type of prosthesis with Dorrance 10X terminal device and single-control harness system. The left upper extremity revealed a one-finger hand with good wrist motors, but without active motion of the digit. Tendon graft procedures were done to extend the motor power from the wrist muscles to the finger. A partial prosthesis was then used to obtain prehension. This was a simple opposition post attached to a forearm cuff. The patient rapidly obtained bilateral prehensile activity, with a tendency to favor the partial prosthesis because of the tactile sensation present in the finger. This child is now five and one-half years of age; she is living with foster parents and attends kindergarten. She has made an excellent adjustment to her home situation. She is now able to dress herself, including applying her prosthetic appliances without assistance. This case demonstrates the desirability of applying partial prostheses wherever possible, retaining tactile sensation as well as obtaining prehension. (See Figures 1, 2 and 3.)

Case II, born December 18, 1939, was born with bilateral upper amelia (shoulder disarticulations). He was admitted to this Center at the age of seventeen years. At the age of twelve he had a right pectoral cineplasty which, he felt, did not meet his needs in improving prosthetic function. He was not wearing his prostheses when first seen here. In February 1957 this patient was fitted with a ball-and-socket shoulder unit on the right side, and a Hosmer 200 elbow with locking accomplished by the pectoral cineplasty. On the left he had a standard shoulder cap with a Hosmer 200 elbow which was operated by nudge control. (See Figure 4.) He was fitted with a bilateral pulley system to functionalize the terminal devices. In January 1958 the patient desired a perineal strap to operate the right elbow. He later requested that the pectoral cineplasty tunnel be

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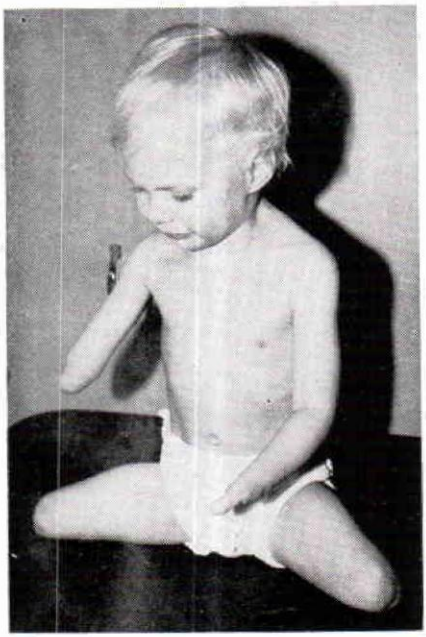

Fig. 1. Patient, thirty-two months of age, presents congenital bilateral lower hemimelia, right upper partial hemimelia and left partial adactylia.

Fig. 2. During early training period: she is fitted with a short below-elbow type of prosthesis on the right and a partial restoration prosthesis on the left. She favors the partial restoration because of the tactile sensation present in the finger.

Fig. 3. Partial prosthesis allows sensation and, with the tendon graft procedure, strong prehension. Patient has been fitted with standard knee disarticulation prostheses; she is able to walk independently.

Fig. 4. Original prosthetic fitting included ball-and-socket shoulder unit on right, with elbow-locking accomplished by pectoral cineplasty; on the left he had a standard shoulder cap, with elbow operated by nudge control.

Fig. 5. Patient demonstrates excellent prehensile activity with his toes, and he is able to apply his prostheses independently.

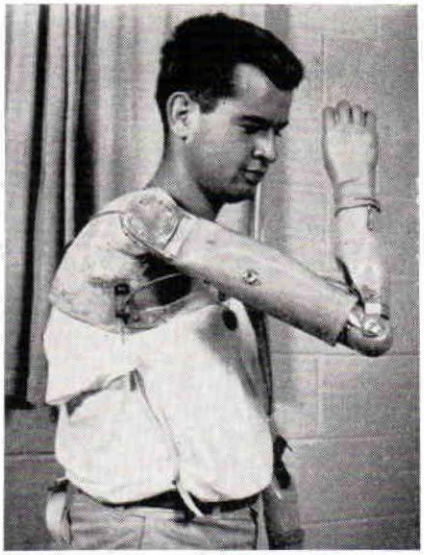

Fig. 6. This shoulder mechanism was designed by Colin A. McLaurin, Northwestern University Prosthetics Research Center. It is a multi-positioned shoulder with a spring detent lock. This mechanism allows a patient with bilateral shoulder disarticulations a greater range of terminal device positioning with positive locking.

Fig. 7. This patient has a clinical diagnosis of bilateral phocomelia, upper extremities. Because of the extreme shortness of her arms, the patient was forced to move close to her work.

Fig. 8. Prostheses enable patient to operate at normal arms' distance from the body. The shoulder caps with open humeral sections allow activation of the elbow locks with patient's anomalous fingers.

Fig. 9. Patient prefers to wear only the right prosthesis for everyday functional activities.

eliminated because it was a constant problem to keep clean and non-odorous. In June 1958 this was done. Previously he had been doing farm work, and he was able to drive a tractor with his feet. He had excellent prehensile activity with his toes and was able to apply his prostheses using his feet. (See Figure 5.) After he had been trained in the use of his prostheses, his range of activities increased tremendously. He was able to clothe himself with a minimum of assistance; he could write legibly, open doors, smoke, play cards, checkers, etc.; he was able to handle all details of toilet care without assistance. Further, he was able to use a dial telephone, although he could not use a pay-phone because of the height of the coin slots. (See also Figure 6.)

Case III, born June 24, 1945, has a clinical diagnosis of bilateral phocomelia, upper extremities. She was first seen in this clinic at thirteen and one-half years of age. She had never been fitted with prostheses. (See Figure 7.) Because of the extreme shortness of her arms, the patient was forced to move close to her work. She was very desirous of obtaining prehension at normal arms' length. She was fitted with shoulder caps with open sections to allow activation of the elbow locks with her anomalous fingers. (See Figure 8.) She was harnessed so that she could wear either bilateral prostheses or the right prosthesis could be worn alone. (See Figure 9.) Because she was not fitted until her fourteenth year, she was slow in responding to prosthetic training; however, she was pleased with the increased range of activity for prehension and the increased strength obtained. She eventually decided to wear only the right upper extremity prosthesis for functional activities. She wears both appliances on social occasions for more satisfactory cosmesis.

Recognition is given to members of the prosthetic team for their helpful assistance in the preparation of this article.

BINDING THE JOURNAL

Headquarters is now negotiating with a Chicago firm about a definite and official binding for various issues of our *Journal.* Howard Reinherz of Kenosha, member of the Journal Advertising and Supply Committees, is talking with the bindery service to see if we cannot arrive at a good arrangement whereby readers can have their issues bound immediately at the end of the year.

Readers who prefer to keep their volumes unbound may be interested in a heavy duty file volume offered by the Jesse Jones Box Corporation, P. O. Box 5120, Philadelphia 41, Pa. Each box is labelled with the name of the *Journal* and will hold up to eight issues. Price is $2.50 each.

BASIC CONSIDERATIONS IN THE PRESCRIBING OF WHEEL CHAIRS*

By SIDNEY Z. BRENT, M.A.

Reprinted from "American Journal of Physical Medicine," Volume 39, Pages 47-50, April 1960, with permission of the author and editor.

Modern concepts of rehabilitation have brought about a significant change in the role of the wheel chair to the disabled individual. In past years, a wheel chair was looking upon primarily as a convenient means of transporting a disabled person from place to place or for changing his position from lying to sitting. Today the wheel chair has become an important instrument in aiding the severely disabled to attain a high level of functional rehabilitation.

Wheel chairs are now used as rehabilitation appliances to give individuals with non-functioning lower extremities the means for independent locomotion and an increased potential for productive living. Special accessories for wheel chairs have been designed for specific needs. When properly selected, these accessories eliminate numerous barriers which restrict activities of daily living for the disabled persons and facilitate a wide range of independent movement for them. The individualized selection of a wheel chair and accessories is important mainly to the more severely disabled individual, such as one with a spinal cord injury with complete paralysis below the waist; one with a neurological disorder with complete or partial paralysis of one side of the body; one with bilateral amputations which preclude the use of artificial limbs; one with severe arthritis with deformity of the joints and contracture of muscles in the arms and legs.

A proper wheel chair and accessories should be selected when such a disabled individual has reached a plateau in his recovery, for only then can his needs be evaluated and resolved. There is one exception to this principle, however. It pertains to the disabled individual with a progressive disease such as multiple sclerosis, where improvement is intermittent and unpredictable. For the disabled individual with a progressive disease, the wheel chair and accessories should be selected to meet his anticipated physical handicaps at the most serious stage of his disease, while still permitting the use of a wheel chair. In all instances, however, the disabled individual should have at least one functional arm with sufficient strength and range of motion to enable him to get out of bed and into the wheel chair and vice versa.

An evaluation of the physical abilities as well as physical disabilities of the disabled individual is necessary, therefore, to determine the proper wheel chair and accessories for him. If he is capable of voluntarily moving one lower extremity as is the situation in the hemiplegic or the remaining segments of the lower extremities as in the bilateral amputee, the individual would be able to position himself in bed and could enter the wheel chair from the front and between the armrests. A wheel chair with stationary or

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*From the Physical Medicine and Rehabilitation Service, Veterans Administration Hospital, Bronx, New York.

non-removable armrests would be indicated for him. On the other hand, if a disabled individual is incapable of voluntarily moving his legs, like the patient with a spinal cord injury, he would be unable to get into the proper bed position to enter the wheel chair from the front, but would have to lift himself into the wheel chair from the side. A wheel chair with removable armrests (see fig. 5) would thus be indicated for him.

The hemiplegic patient with normal arm and leg on the unaffected side would be able to use the standard wheel chair described below in figure 1, providing the height of the seat permits his foot to touch the floor while sitting comfortably in the wheel chair. His unaffected arm would enable him to propel the wheel chair by pushing the large rear wheel, and his unaffected leg would enable him to guide and push the wheel chair with his foot on the floor. However, if the hemiplegic individual does not have the use of a normal leg but does have a normal arm, he would require a "One Arm Drive" wheel chair (fig. 2), which can be guided and propelled simultaneously with only one hand. This type of wheel chair has an additional rim on the large wheel which is connected to the opposite wheel by an axle, thus permitting control of the large wheel on the paralyzed side with the added rim on the uninvolved side.

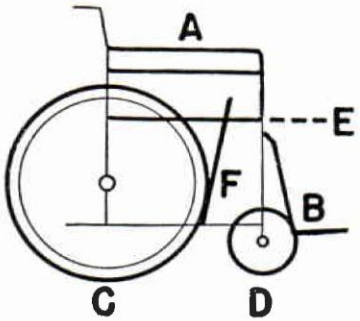


Fig. 1. Standard wheel chair for general medical and surgical patients. A, upholstered non-removable armrests. B, adjustable footrests. C, 24 inch rear wheels. D, 8 inch or 5 inch front casters. E, seat not higher than 19½ inches from floor. F, brakes.

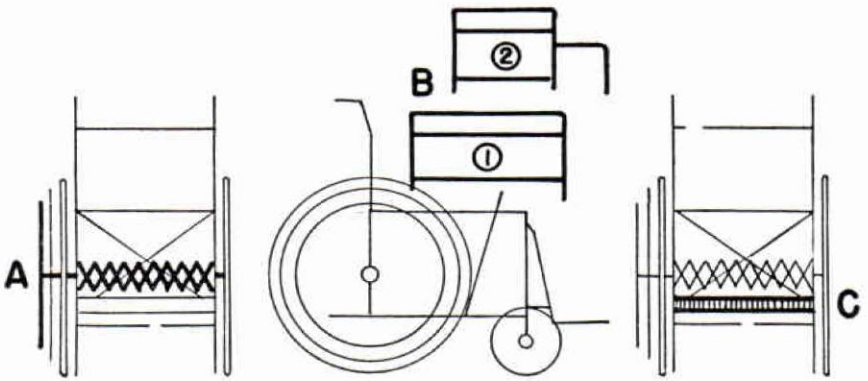


Fig. 2. Wheel chair for hemiplegic and triplegic patients. A, one arm drive component. B, removable regular (1) and desk (2) armrests. C, heel strap.

The bilateral amputee requires a wheel chair with the rear axles and large wheels set back for balance (fig. 3) to compensate for the loss of weight of his missing lower extremities. If such a special wheel chair is not available, the standard wheel chair with a 10 to 15 pound weight (sandbag) fastened on the footrests will serve the purpose. This added weight will shift the center of gravity of the wheel chair and will reduce the possibility of it and the patient toppling backward, which is most apt to occur when going up inclines. In addition, legrests would be required which could be swung away from the front of the wheel chair so as to permit the wheel chair to appose closely to the bed, chair, car, commode or anything else the amputee may wish to use. The standard non-movable legrests would place the bilateral amputee approximately 18 inches away from the object to which he wished to transfer. This would present a serious hazard and require considerable effort to accomplish.

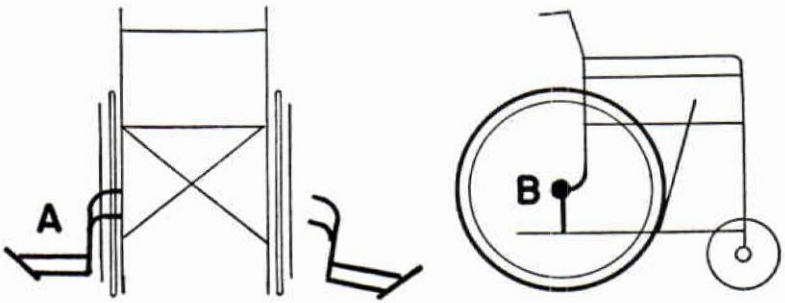


Fig. 3. Wheel chair for bilateral amputee patients. A, swinging and detachable legrests. B, rear axles and wheels offset to rear.

The arthritic individual with frozen knee joints requires adjustable legrests which may be elevated to the most comfortable position for the knees. However, the arthritic person with involvement of the hips or vertebral column requires an adjustable back which may be adjusted to the most comfortable angle for him. Some arthritic individuals with extensive involvement may require both the adjustable legrests and the adjustable back (fig. 4).

The varying types of wheel chairs and special accessories suggested for severely disabled individuals are illustrated in figures 2 through 5. The basic parts of the standard wheel chair are shown in figure 1. Additional accessories should be selected to provide the patient with the greatest comfort and optimal functioning in activities of daily living outside the hosptal. The width of the adult-size wheel chair, which is 24 inches, may present a problem to patients when at home or outside the home. Since some doors are less than 24 inches wide, patients will not be able to pass from one room to another, particularly the bathroom which usually has an even narrower door. This problem, however, may be resolved by reducing the width of the wheel chair either by tightening the heel strap (see fig. 5) or by removing one or both of the outer rims on the large wheels. For the slim or small patient, the junior size wheel chair, which is 22 inches wide, is recommended for negotiating tight places.

The desk type armrests (see fig. 5) are very practical in that they enable patients to roll their wheel chairs 6 additional inches under a table or desk, permitting them to sit in an erect position instead of a forward

leaning position while eating or working. In order to permit the patient in a wheel chair with regular armrests to sit erect, the table or desk would have to be raised 5 inches by placing blocks under the table or desk legs. This will enable the patient to roll his wheel chair under the table or desk. The armrests should be upholstered to make the patient comfortable, which is a very important consideration. (Another item of comfort recommended is a 4 inch foam rubber cushion seat.)

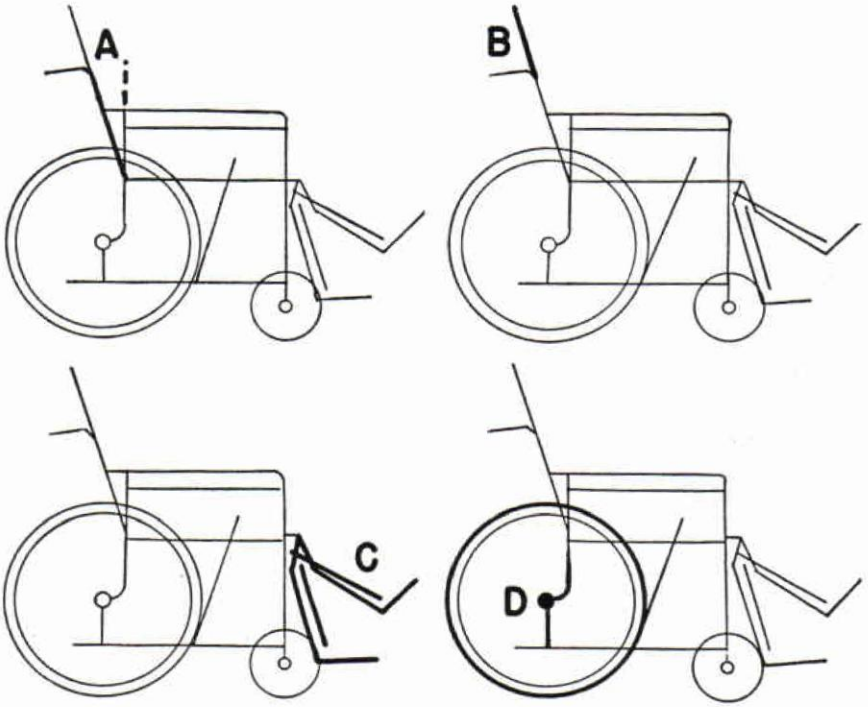


Fig. 4. Wheel chair for arthritic patients. A, reclining back (full or semi). B, 10 inch head extension. C, adjustable legrests. D, rear axles and wheels offset to rear.

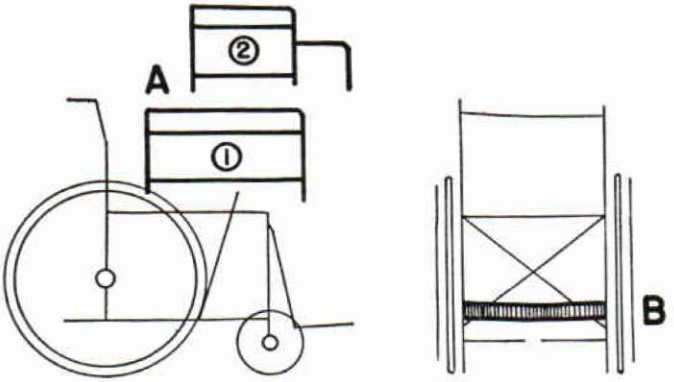


Fig. 5. Wheel chair for paraplegic patients. A, removable regular (1) or desk (2) armrests. B, heel strap.

Although 8 inch wheel casters are used most frequently, some patients may find the 5 inch casters easier to propel, particularly on floors which are covered with rugs or carpets. The 8 inch wheel casters, however, are especially recommended for traveling on rough or uneven ground. Less effort is required in propelling a wheel chair with these casters.

All wheel chairs should be so constructed that they can be folded and opened easily. The paraplegic patient, for example, should be able to fold or open his wheel chair with one hand while supporting himself with the other hand.

Important for efficient and optimal use of wheel chairs, but incidental to the main purpose of this paper, is their proper maintenance, which is covered thoroughly by Cicenia, Sampson, and Hoberman [1]. Another important point is that wheel chairs can be made more functional for certain patients by special adapted devices, such as knobs for outer rims to enable patients with weak or no grip to propel the wheel chairs with their palms or with the web of their thumbs, arm slings and supports for patients with weak upper extremities, and the split back to facilitate movement onto the commode. These adapted devices can be selected from the pamphlet, "Self Help Devices," published by the Institute of Physical Medicine and Rehabilitation, 400 West 34 Street, New York 16, N. Y., and from the catalogues published by wheel chair manufacturers.

The ability of severely disabled individuals to perform activities of daily living is often dependent upon medical applances, such as the wheel chair. Definitively, the wheel chair for many disabled patients represents the difference between bedridden invalidism and rehabilitation. Furnishing these patients with wheel chairs to meet the needs of their specfic disabilities, therefore, is a very important aspect in their rehabilitation. For this reason, physicians, or other individuals specifically trained, should be concerned with the selection of the proper wheel chairs for these patients.

Summary

The principle of individualizing wheel chairs to meet the specific needs of disabled persons evolved from the modern concepts of rehabilitation. Special types of wheel chairs and accessories are advocated for patients with spinal cord injuries, cerebral vascular accidents, bilateral amputations of lower extremities, and extensive arthritis. Prescription wheel chairs should be ordered only when these patients reach the plateau in their recovery. In varied types of wheel chairs and accessories described, the minimal physical requirement for propelling a wheel chair independently is one functional upper extremity. A physician or a trained rehabilitation specialist should be responsible for the selection of a wheel chair and its accessories to insure maximum usefulness to the disabled person.

REFERENCE

1. Cicenia, E. F., Sampson, O. C., and Hoberman, M. *Maintenance and minor repairs of the wheel chair.* Am. J. Phys. Med., 35:206-217, 1956.

CLINIC TEAM PROCEDURES

By HOWARD V. MOONEY, C.P.

The Clinic-team concept for the management of amputees is for the most part well received by the prosthetists. This is shown by a recent survey conducted by the American Orthotics and Prosthetics Association (formerly OALMA), published as Report No. 1 of the Committee on Advances in Prosthetics.* However, the report revealed a number of problems and criticisms in some parts of the country.

These criticisms do not occur in the New England area, which stands firm in the resolve that the rehabilitation of the amputee shall be the most important single purpose in the entire rehabilitation program. Apparently in some other sections of the country clinic team procedure results in such problems as "domineering" clinic chiefs, whose decisions are not influenced by other responsible members of teams; petty jealousies that result in bickering among the prosthetist members of the team; lack of referrals by general practitioners, who, though not qualified to prescribe prostheses, do so rather than refer amputees to qualified clinic personnel, for fear they will lose these patients; and finally, unequal distribution of prosthetic appliance orders to these prosthetic consultants who attend amputee clinic teams regularly.

Howard V. Mooney, C.P., is a native of Lowell, Massachusetts, where he graduated from Burdette Business College. He has been on the staff of the Boston Artificial Limb Company since 1937, and is now manager and a member of the firm. Mr. Mooney received his certification in March of 1949. He has long had an interest in the development of improved prosthetic procedures and is a graduate of the three courses in prosthetics offered by New York University. His colleagues in New England elected him to serve as treasurer, secretary and later President of their New England Society of Orthotists and Prosthetists. Mr. Mooney is a member of the Editorial Committee of the *Journal,* representing the New England States.

*Copies of this report are available from The American Orthotics and Prosthetics Association, 919—18th St. N. W., Washington 6, D. C.

In view of the above I feel that the general procedures used in our area should be made public with the hope that they may serve as a pattern in areas where the present set-up is not attaining the best possible results. To begin with, it is first necessary for an amputee to be referred to the group who will be responsible for his or her rehabilitation—namely, the amputee team clinic. This clinic should consist of at least the orthopedist, as chief, one or more certified prosthetists, a physical and occupational therapist, a medical social worker, and a medical secretary. A rehabilitation counselor would be a very valuable addition to the foregoing when available.

In the New England area it is fortunate that we have doctors who are realistic. They realize that since prosthetics is a specialty, amputees should be referred to those specializing in the rehabilitation of people who have had amputations. I would estimate that at least 75% of all new amputees in New England are referred to an amputee clinic. This of course places a responsibility on the clinic to keep the referring doctor informed of its relations with and recommendations for his patient. The following is a typical letter from an amputee team clinic to the referring doctor:

L.S.D., M.D.
First Street
Haskins, Mass. Re: A. L., Second Street, Haskins, Mass.

Dear Dr. D:

Your patient, A.L., age 48, with a diagnosis of right below-the-knee amputation, was seen for rehabilitation evaluation on May 1, 1959. R.C.H,. M.D., our Medical Director, made the following report of that evaluation:

This patient has not been seen since August of 1958. At the present time, he is in need of a permanent type prosthesis which will be made by the XYC Company. The present preparatory limb is also in need of repair before the permanent limb is obtained. He is to go to Boston to have this repaired and to be measured.

No treatment is considered necessary until he has obtained his limb and seen by the group.

It is our opinion that at the present time Mr. L. needs only prosthetic help, but after the permanent prosthesis has been constructed and delivered he may need some help with his gait.

We will keep you informed of his progress. If you have any questions, please get in touch with us.

Sincerely,
W. E. H., Director

This procedure keeps the referring doctor aware of what is going on and sets his mind at rest, so that he is more than willing to refer future prosthetic cases to the amputee clinic.

In order to operate any type of effective service it is of course necessary to have a set of rules. The following is an outline of the policy adopted by one New England Amputee Clinic. This policy was arrived at as a result of a discussion held at a meeting attended by the Director of the Rehabilitation Center, the Medical Director of the Center and four certified prosthetists representing four different facilities:

1. The Amputee Clinic will be held on the first Thursday of the month unless otherwise specified. Additional Amputee Clinics may be held at the discretion of the director of the Center.

2. At this time the four limb companies represented at this meeting will be the ones who are authorized to make limbs as prescribed at the Rehabilitation Center.

3. If a patient has no choice of the limb company he wishes to make his

limb, he may delegate that selection to the Rehabilitation Center. The Center will select the limb company which in its opinion is best equipped from every standpoint to meet the particular needs of this patient. In the event that there is no basis of selection of one company over another, the selection will be made on a rotating basis to be most equitable to all the limb companies participating in the Amputee Clinics.

4. A patient known previously by a limb company and desiring to continue with the limb company shall continue with that limb company for future prostheses. If the patient is seen at the Rehabilitation Center, he will be checked out on the same basis as any other patient.

5. Permanent prostheses will be used for the most part, and in the case of the prescription of a preparatory prosthesis followed by a permanent prosthesis where the Rehabilitation Center has been delegated to make the selection of the limb company, the permanent prosthesis will be considered in reaching an equitable distribution of prostheses.

6. All costs considered will be the net cost of the prosthesis to the patient or agency.

7. Each limb company will inform the Center Director in writing when the limb is delivered, and the cost as charged.

8. The limb companies authorized to participate in the Amputee Clinic must have a certified and qualified representative in attendance at all Amputee Clinics. Substitutes of lesser qualifications are permissable due to illness or other emergencies, but should not continue for more than three consecutive Amputee Clinics.

9. The limb companies will release the prosthesis to the patient or the Center, depending upon the individual situation and the knowledge of the patient by the Center and prosthetist.

10. If additional certified prosthetists wish to be represented in the Amputee Clinics and meet the qualifications, they may be invited to attend the Amputee Clinics on a regular basis, provided they meet all the requirements as may be prescribed from time to time.

11. Representatives of limb companies are expected to enter into the discussion of the prescription of the limbs made at this Center, giving their opinions of that prosthesis or accessory which is best for the patient.

12. All limbs prescribed at the Amputee Clinic are subject to the approval of the Clinic and must follow the prescription as recommended, except in cases where, in the opinion of the designated prosthetist, specific changes in the condition of the patient's stump have necessitated changes. Such changes should be discussed with the Director or Medical Director.

13. Questions or suggestions for additions to this policy should be directed to the Director of the Rehabilitation Center.

This policy is essentially similar to those under which other Amputee Clinics operate in the New England area with the exception of the Veterans Administration. Our V.A. Clinics are excellent but it is well known that the veteran has his own choice as to who will make his prosthesis.

It would seem to me that if all amputee clinics in every section of the country were to adopt the policies of New England clinics, the only remaining problem would be the possibility of a "domineering" clinic chief. The solution of this problem may not be an easy one. However, it may very well be that if all prosthetists pull together for the sole purpose of the successful rehabilitation of the amputee they may impress the clinic chief with their new attitude so that he may be more inclined to rely on their judgment. He may be only too happy to relinquish the "domineering" role if convinced that the prosthetist members of the clinic are truly a professional group.

PROSTHETICS CLINIC AT PROVIDENCE, R. I.

Members of the Clinic Team at Providence.

Robert W. Flinn, Chief of the Prosthetic and Sensory Aids Unit of the VA of Providence, sends us this note:

"Our clinic at the Outpatient Clinic, V. A. Regional Office, Providence, Rhode Island, is headed by Dr. Samuel W. Bridgham, an orthopedist, and is patterned after the formal V. A. Orthopedic and Prosthetic Appliance Clinics such as that headed by Dr. Eugene Record at Boston, Massachusetts. It is based also upon the concept of the clinic team as taught at courses in Prosthetics for Physicians and Surgeons, Therapists, Prosthetists and Rehabilitation Counselors at the Post Graduate Medical School, New York University.

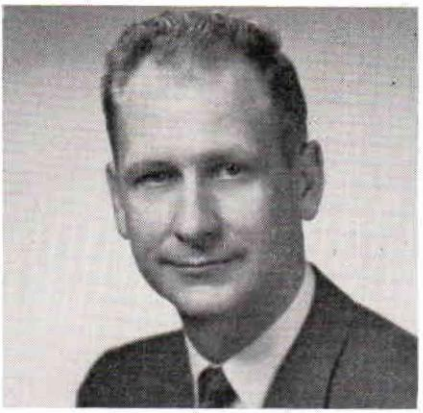
"The team was started at our clinic several years ago to fill a need for passing on to orthotists and prosthetists the wishes of Dr. Bridgham in prescribing and checking out prosthetic and orthopedic devices. We feel that the clinic has worked out well by providing our veteran patients with what we hope is the latest and best in appliances. Dr. Bridgham has attended many of the V. A. and N. Y. U. courses in prosthetics and has a genuine interest in this field and makes full use of this knowledge in his prescriptions. Before our clinic began the physician had to make known his wishes through letters and telephone contacts with our orthotists and prosthetists as relayed through my prosthetic unit. Now we can all consult and talk over the problems of prescription and fitting together at the clinic sessions.

"Any success in our clinic sessions is due in no small part to the aid given us by the brace and limb makers here in Providence and some of the limb dealers from Boston. These technicians have given freely of their time and knowledge and both Dr. Bridgham and I appreciate this very much."

Laboratory and Shop Notes

A Column of Practical Ideas

Contributing Editors, Alvin L. Muilenburg, *Chairman;*
G. E. Snell, C. O. Anderson, Erich Hanicke, Joseph Martino.



ALVIN MUILENBURG, C.P., C.O., of Houston is Editor of this Shop Column.

A convenient and economical item for shop safety has been suggested by *Joseph Martino*, United Limb & Brace Co. It is a protective mask that can be used while grinding wood neoprene or any other material. It is of light weight aluminum with a gauze pad and adjustable elastic. The masks with a couple of refills cost 30c each and the refills can be purchased separately for $2.50 per hundred. Source of supply: Martindale Electric Co. Box 617 Edgewater Branch, Cleveland 7, Ohio.

A helpful suggestion for aid in lamination procedures was received from *Alvin Norell*, Fit-well Artificial Limb Co. Adding a little white pigment to the resin with regular caucasian leg color will eliminate the problem of dark and light areas of wood showing through the lamination.

Mr. Norell also suggests the purchase of used vacumn cleaners to be attached to sanders and grinders. At a second hand store he was able to purchase a half dozen at $2 each. He found it easy to install one on each machine. The vacumn is turned by the same switch as the machine.

Nylon leather coating frequently peels if not properly applied. *James McFarlen*, J. E. Hanger Co., Dallas, states that heating both the leather and the nylon liquid in an oven before applying will eliminate this problem.

Richard Locke, J. E. Hanger Co., Orlando, Fla., offers this very helpful information. Smoothing the edges of a plastic lamination is made relatively simple by using a hard felt cone on a high speed arbor or flexible shaft. Buffing with this cone after sanding the edges will make a very smooth surface. He states that Southern Prosthetics have a cone for this purpose in stock.

Our comments concerning taking a cast of the inside of a socket inspired a suggestion from *Norm Nelson*, Minneapolis Artificial Limb Co. They no longer grease the inside of a socket but use a prophylactic which stretches easily as it is filled with plaster. This is especially helpful when taking a cast of leather sockets and foot build-ups.

These are the contributions we have to date. We hope that we will hear from many of you very soon.

Orthopedic-Prosthetic Idea Exchange

Contributing Committee: Everett J. Gordon, M.D., *Chairman;* Joseph Ardizzone, P.T.; Raymond Beales, C.P.; Victor L. Caron, C.P.; Charles Ross, C.O. & P.

Many of our readers will be happy to learn that the long awaited study of the "Hydra-Cadence" above-knee leg is about to commence. One hundred units have been authorized by the Prosthetics and Sensory Aids Service, Veterans Administration, for field testing at 25 stations throughout the United States. The personnel of each clinic are being intensively briefed by personal visits by Dr. Eugene Murphy, Chief of the Research Division, Prosthetics and Sensory Aids Service, who has an extensive background in the field of prosthetics in addition to his engineering degrees. Dr. Murphy has prepared a complete outline for the investigation which should result in a full evaluation of the device from carefully controlled data. The selection of the above-knee amputees to wear the limb is being left to the discretion of the clinic, as undoubtedly the psychological factors will represent an important phase of the patient's response and evaluation to the new device, as has consistently been noted with previous prosthetic studies.

The new UCB patellar-tendon-bearing, cuff-suspension, below-knee leg is now being ordered in various VA field stations throughout the country. The new UCB below-knee prosthesis should not be confused with the old type Muley leg which generally has an open-end socket as an integral part of the shin, in contrast to the closed-end soft socket insert in a plastic laminated shin in the UCB leg. The initial authorizations will approve only unilateral amputees, until further information is secured from field reports on the new device. In this clinic we have ordered one for an exceptional bilateral amputee with an excellent prosthetic and psychological background, but insufficient time has elapsed to render a progress report. The best candidates for this device appear to be those amputees who habitually do not use a pelvic belt or who do not lace their thigh corset tightly, but merely slip in and out of the laced corset. In addition, it is preferable to select an amputee who has already had some familiarity with the SACH foot, an integral part of the new prosthesis, as we have encountered one or two amputees who preferred the old wood foot. Such candidates would obviously not be preferred individuals for a SACH foot type of prosthesis. We have two patients now using the UCB type of prosthesis and preliminary reports are quite encouraging.

One amputee is not happy with his SACH foot because of an unusual situation which may not be uncommon. He is a short individual with a long foot (size 11½) who finds difficulty in coming up over the toe break in the SACH foot because of its forward location. He expends more energy in passing from the stance to the swing phase than with the old type of conventional wood foot. We are now trying a firmer heel wedge in an effort to throw him forward onto the toe break sooner than with a medium type of heel. It is wondered whether any of our readers have had similar experiences—we would certainly like to hear from them so we can report it to your fellow readers.

One of the unsolved problems of the SACH foot has been curling-up of the toe after prolonged use, especially with those who are "hard" walkers.

We have thought of using a dorsal wedge at the toe break as a method of correction and are now experimenting with this idea. Do you have any suggestions? An interesting observation was made by one of our more ambitious amputees who noted that with the SACH foot he was able to roller and ice skate with more skill, stating he was able to turn easier, because of the additional motion and the springier feeling that he has with the SACH foot. Perhaps we have another point to recommend the SACH foot!

The prosthetic limb shops have long been plagued with disposal of surplus limbs left in their care at the time a new limb is fitted. For many years the amputee has been advised that the limb was worthless and that he should dispose of it as he wished. However, we now have an excellent use for these limbs, as the President's Committee for the Handicapped and the World Rehabilitation Fund are now participating in a program to collect surplus artificial limbs and braces for distribution to underdeveloped countries where materials for fabrication of such appliances are extremely scarce. In contrast to the modern limbs with high standards of fitting and fine adjustments made to promote functional use and protect the amputation stump as now practiced in the U.S.A. and many of the Western European countries, there are no limbs at all or very crude facsimiles of limbs being used in the Far East and Africa. It is the plan to convert limbs which have some useful life into a functional appliance for the many hundreds of thousands of amputees now completely disabled for the lack of such an orthopedic device. This is an extremely worthy project which merits the full cooperation of all members of the limb industry. Amputees and brace wearers are asked to voluntarily contribute their surplus artificial limbs and appliances and deliver them to the nearest VA facility, where they will be collected and shipped by another collecting agency. Incidentally, all surplus property regulations under the Government Surplus Property Act have been waived by the Department of Health, Education and Welfare.

An interesting complication with the use of a lower limb prosthesis has recently been noted in several instances in the Outpatient Department of the Veterans Benefits Office, Washington, D. C., consisting of pain in the posterolateral aspect of the hip on the prosthetic side. Careful clinical examination has revealed trochanteric bursitis, in some instances with calcification present, similar to the condition of bursitis of the shoulder. Improper length of the prosthesis has contributed to this condition in some cases, because of the additional strain placed on the hip with a constant pelvic tilt. Treatment has consisted of adjustment of the prosthesis plus injection of novocaine and hydrocortisone into the inflamed bursa, usually with excellent results. Some of our patients have complained of their pant's leg creeping into the corset when it is laced rather loosely, especially those who insert their stump without unlacing or lacing the corset. We have found the addition of an upward projecting stay on the inner side of the corset to aid in preventing this uncomfortable situation.

Your editor would like to call your attention to two recent articles, published by the Washington area Prosthetic Clinic, one entitled "The Orthopedic and Prosthetic Appliance Clinic Team," published in the February 1960 issue of the *Journal of International College of Surgeons*, and another, "Clinical Application of the SACH Foot," published in the March 1960 issue of the *Journal of Bone and Joint Surgery*. Reprints of these articles are available for distribution by writing to the editor, c/o this *Journal*.

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FABRICATING HIP DISARTICULATION SOCKETS USING THE VACUUM* METHOD

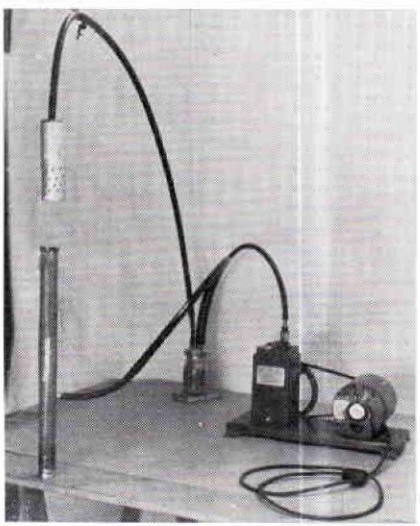
By COLIN A. McLAURIN and FRED HAMPTON
Northwestern University Prosthetic Research Center, Chicago, Ill.

Introduction

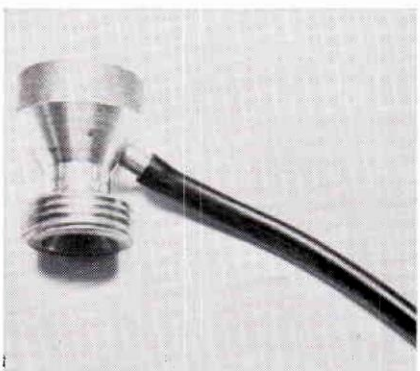
Vacuum laminating techniques have been used successfully in various applications in the reinforced plastics industry. In simpler prosthetic applications, such as arm and below-knee sockets where hand stringing is applied through a PVA bag, there seems to be little advantage in using a vacuum in the ordinary limb shop. However, in the more difficult applications such as hip disarticulation sockets the use of a vacuum prevents accumulation of resin and the formation of voids where large grooves or undercuts are present, and generally results in a more uniform laminate. This report describes one method of laminating hip disarticulation sockets utilising vacuum.

Vacuum Equipment

Photo 1 illustrates a typical equipment lay-out. A standard laboratory vacuum pump is an ideal source of vacuum, but if not available the inlet port of an air compressor may be used. This provides a negative pressure of approximately one half atmosphere. This should not injure a sturdy air compressor but may damage a light duty model not specially designed for this use. The cheapest suction device is a Venturi nozzle that uses water flow from a tap. They are sold in hardware stores for about $2 and are used for sucking liquid fertiliser into a garden hose. This type draws almost as much as a vacuum pump but takes a little longer. The suction pressure can be varied by changing the flow of water. If a short nozzle is used (Photo 2) a short section of hose must be attached to the outlet.



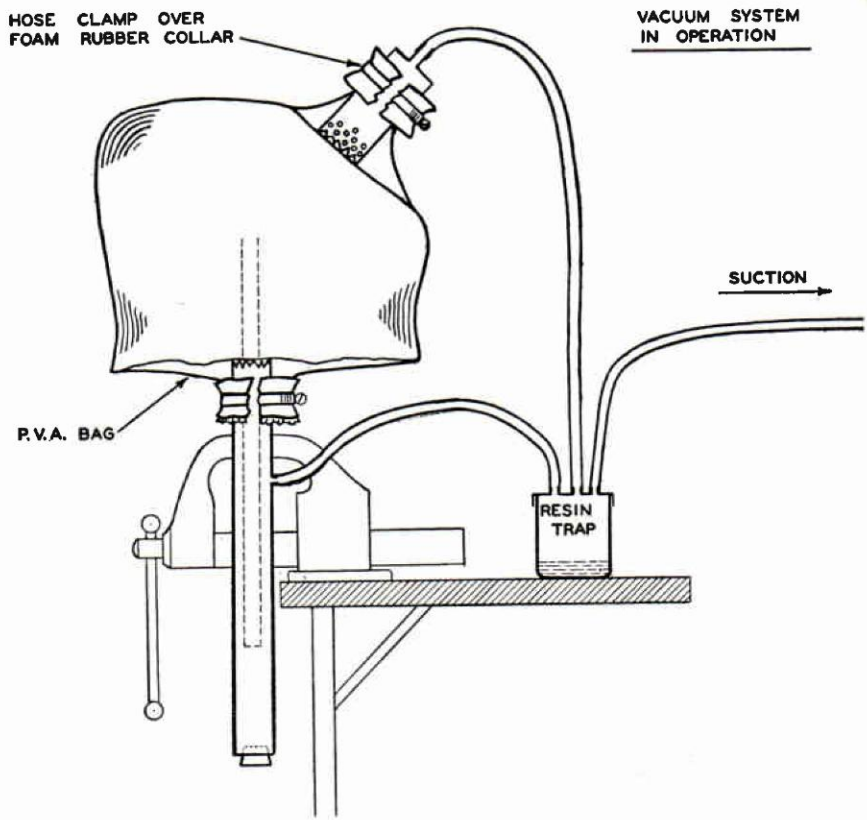
1. The equipment lay-out showing the vacuum pump, resin trap and perforated inlet tubes.



2. The Venturi type suction pump that operates by water flow from an ordinary tap.

* The term "vacuum" is used in this report to describe air pressure between 0 and 7 pounds per square inch ABSOLUTE.

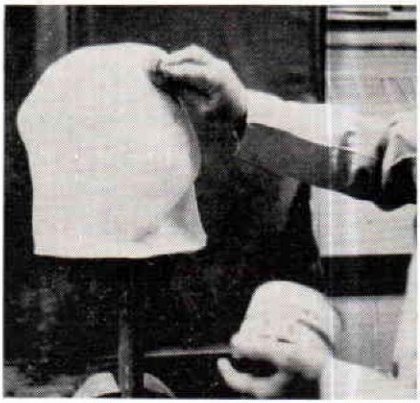
If a pump-type vacuum source is used it is essential to use a resin trap between the resin and the vacuum pump. An ordinary glass jar with three hose fittings is all that is required. The lid must be sturdy enough to prevent buckling under a high vacuum. Any flexible tubing is satisfactory for vacuum lines providing it will not collapse. Small size plastic water pipe is cheap and satisfactory, although not very flexible. The suction is applied through the bag to the laminate via a metal tube of about 2″ in diameter. The tube is perforated or notched so that the air or surplus resin may be drawn off without clogging the line. The bottom tube is clamped in the vise and acts as a receptacle for the pipe or rod supporting the cast. The PVA bag may be sealed off by clamping or taping to the suction tubes. If clamps are used foam padding should also be used to prevent cutting of the PVA bag. The main trap should be kept as close as possible to the lower suction tube since it usually becomes loaded with resin and cannot be re-used. Photo 1 illustrates the vacuum pump and equipment used. The drawing shows a schematic illustration of the vacuum system in operation.



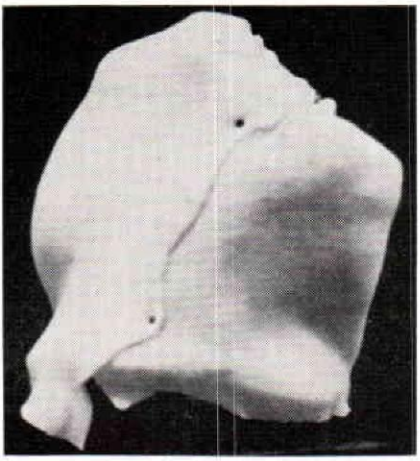
Dry Lay-Up

An effective method for sealing a wet or dry cast before lamination is an application of floor wax followed by a dusting of water ground mica spread lightly by hand. (Photo 3)

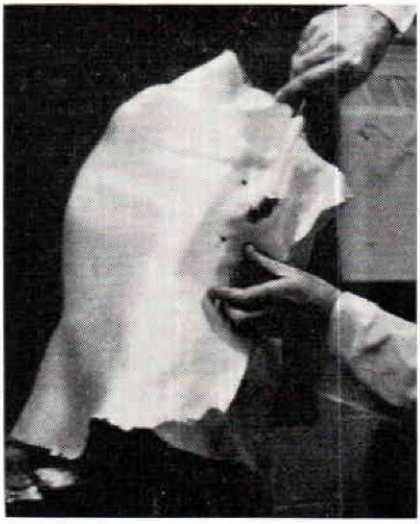
A typical dry lay-up consists of a layer of dacron felt (Photo 4), three layers of fibreglas overlapped to form six layers in the seat area (Photo 5), ten or twelve strands of roving reinforcing the area around the cut out, the back and the seat (Photo 6), an additional layer of fibreglas again overlapped in the seat area, and a layer of nylon stockinette or felt to hold the glass in position (Photo 7).



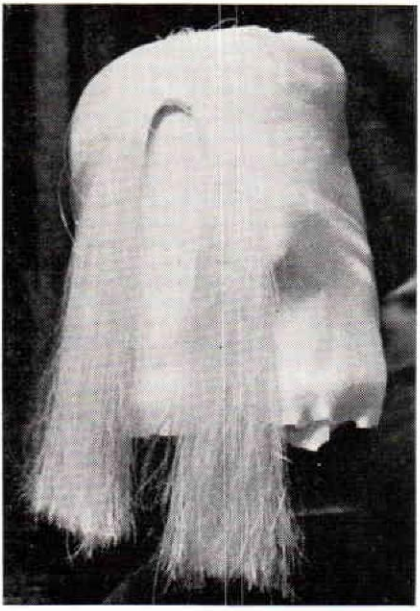
3. Applying wax to the cast.



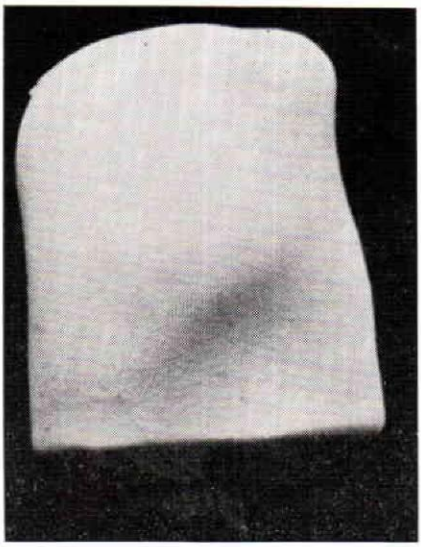
4. The initial layer of dacron felt. Note the section which will be later cut away.



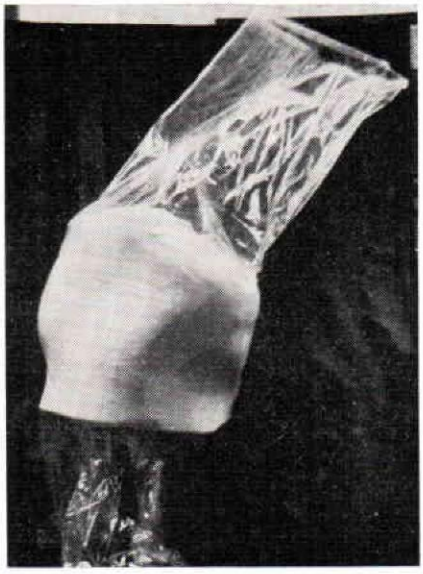
5. One of three layers of fibreglas cloth. Note that the cloth is overlapped in the seat area for double strength.



6. Glass roving reinforcing the lateral cut-out.



7. The final layer of nylon stockinette.



8. The PVA pulled on prior to adding the resin.

The PVA Bag

The PVA bag should be made to fit snugly on the sides with at least a foot (12″) extending beyond both the top and bottom (Photo 8). With these casts the large end may be uppermost; hence, the tapered bag should be pulled up over the cast.

Resins

Either polyester or epoxy may be used. The epoxy is, of course, much stronger but does not cure as readily as the polyester. Approximately nine 6 oz. cups of resin are used in an average socket. The epoxy resin (without hardener) may be heated to 120° F. immediately before using since this cuts down the viscosity, allowing a faster penetration and an accelerated cure time. Araldite 502 with 10% HN951 will gel in about one hour and harden in about 2 or 3 hours if preheated. Without preheating 20 hours may be required. If polyester is used it should be 90% rigid and 10% flexible. About 2% ATC catalyst and ½% Naugatuck #3 promoter will induce gelling in about 20 minutes and hardening in about 2 hours. Pigments prepared for polyester resin should not be used with epoxies. Special pigments may be obtained from the Plastics Colour Corp., 22 Commerce St., Catham, New Jersey. Since no flesh colour is available, red, white, blue and black may be mixed to the appropriate shade.

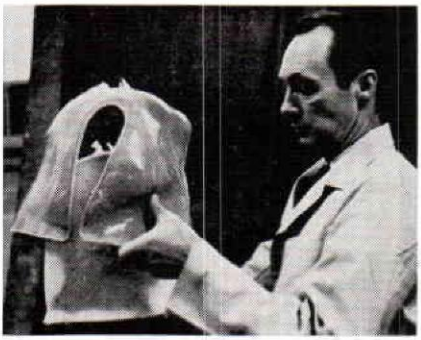
Vacuum Application

Before pouring the resin it is advisable to connect both the top and bottom vacuum lines and apply suction to insure that no leaks are present. The top line and inlet pipe is removed and stopped off so that suction is maintained at the lower end. The resin is then added at the top and strung down until the laminate is fully saturated. The suction at the lower end prevents the trapping of air bubbles during this process. When saturation is complete the upper inlet and vacuum line is inserted and sealed tight. Surplus resin may be expelled by hand pressure from the deep undercuts or grooves and strung up to the top inlet pipe where it can accumulate (Photo 9). The suction should be maintained until the laminate is cured. A heat gun or infra-red lamp may be used to accelerate the gelling. If the gelling process is prolonged the vacuum will tend to draw too much resin from the laminate.

Removing the Cast

The socket should be marked and cut to approximately the final outline before it is removed from the cast. This includes the lateral cut out. A Stryker cast cutter is an excellent tool for this purpose. The socket can then be sprung off without difficulty and without distortion (Photo 10).

9. Stringing the resin after the vacuum has been applied.



10. Removing the socket from the cast.

A METHOD OF TAKING HIP DISARTICULATION CASTS USING HIP STICKS

By COLIN A. McLAURIN and FRED HAMPTON
Northwestern University Prosthetic Research Center, Chicago, Ill.

Introduction

When the Canadian-type hip disarticulation prosthesis was developed at Sunnybrook Hospital in Toronto, the cast-taking procedure was that employed for leather or metal conventional sockets which were suspended with a shoulder strap. The procedure was to apply successive layers of cotton stockinette with wet plaster smeared by hand over each layer. The spine and the crests of the ilium were marked with indelible pencil, but no attempt was made to modify the shape by hand pressure or any other means. Consequently, severe modification of the plaster positive was necessary to achieve a good fit particularly over the ilium. The amount of plaster to be removed was so excessive that a good fit depended almost entirely on the sculpturing ability of the prosthetist.

In March of 1956 Messrs. Foort and Radcliffe of the University of California in Berkeley published a report on the Canadian-type hip disarticulation prosthesis. The cast-taking method described therein employed plaster bandages in two separate stages. First, the waist band was wrapped with the patient lying face up on two tables about 1 ft. apart with the waist portion bridging the gap. Secondly, the stump area was wrapped and weight applied on a firm sponge rubber block before the plaster hardened. The method prescribed had many advantages over the sculpturing technique, but the plaster wrapping with the amputee lying on tables was not considered convenient and without extensive modification the fit over the ilium was rather loose. Since this is a critical area for suspension and since good suspension is imperative for easy toe clearance during the swing phase, attempts were made to obtain a better fit in this area without modifications. In this regard, Mr. Lucius Trautman of Minneapolis employs a string around the waist drawn tightly and downward to define the anterior aspects of the iliac crest. No doubt others have tried similar methods. This report describes the three-step method using hip sticks that has been developed at Northwestern University Prosthetic Research Center.

Socket Functions

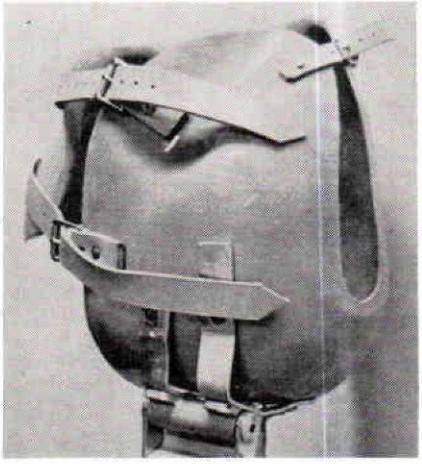
An understanding of the socket functions emphasises the important areas in the fit. There are three main functions. First, it is a seat for weight bearing during the stance phase of walking and for sitting. Second, it must provide lateral stability during the stance phase and for positioning control during the swing phase. Third, it must provide firm suspension so that toe clearance is not seriously impaired during the swing phase. It is difficult to obtain both good lateral support and good suspension in the same socket since compression of the flesh during weight bearing causes a change in alignment. This is minimal if the point of suspension is directly above the prosthesis. If an accurate fit is obtained at the ilium of the amputated side this area will act as the main point of suspension and the leg will hang vertically.

In many shops it has been customary to fit the socket well over the crests of the ilia. This tends to restrict motion and can be uncomfortable when

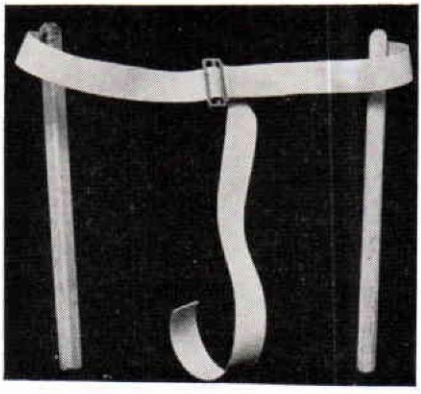
sitting or bending forward. Is has been the practice at Toronto and the Research Center to fit over the ridge of the ilium between the anterior-superior spine and the top of the crest. This area provides a good mechanical grip and is essentially unaffected by torso motion. In defining this area a pair of hip sticks fastened with an adjustable web belt is employed. In addition to forming a ridge for suspension the belt holds the plaster firmly in the sacrum to provide a close-fitting flat posterior section. This is important since pressure is required in this area prior to flexing the knee just before toe-off. The hip sticks properly applied form a shelf over the anterior-superior spine thus protecting it from pressure and abrasion. The fit over the ilium is more easily maintained if a cut-out is made in the lateral wall of the socket as shown in Fig. 1 so that adjustments may be made.

The Three-Step Method of Cast Taking

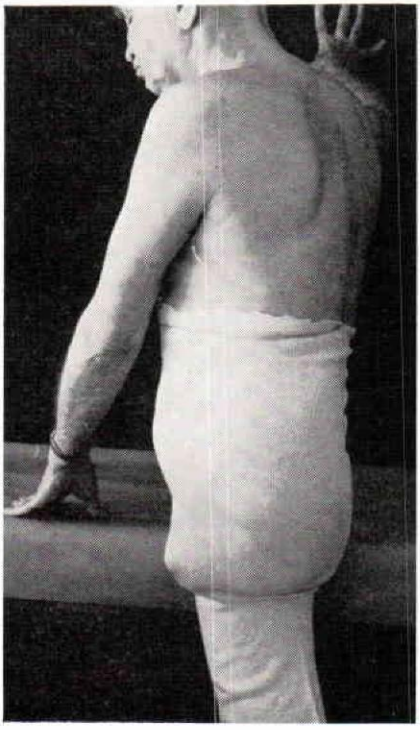
Preparation. The materials required are: examining table, plaster bandages, water, hip sticks (Fig. 2), 1 yd. of stockinette (8″ or 10″ wide) and string. A crutch or overhead bar is an advantage with older patients. With the amputee undressed, the stockinette is pulled on and tied with a string above the waist and at the leg. (Fig. 3.)



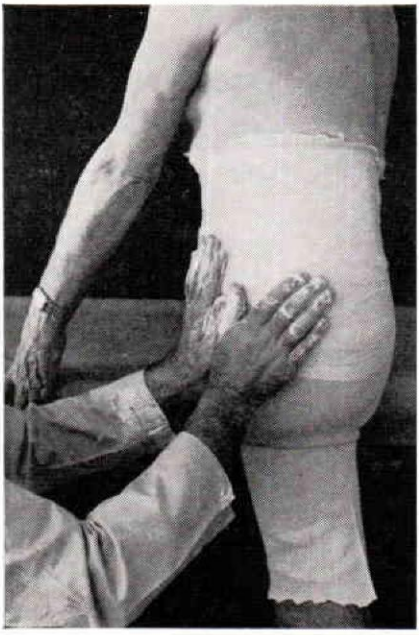
1. The Socket Read for Trial Fitting.



2. Hip Sticks.

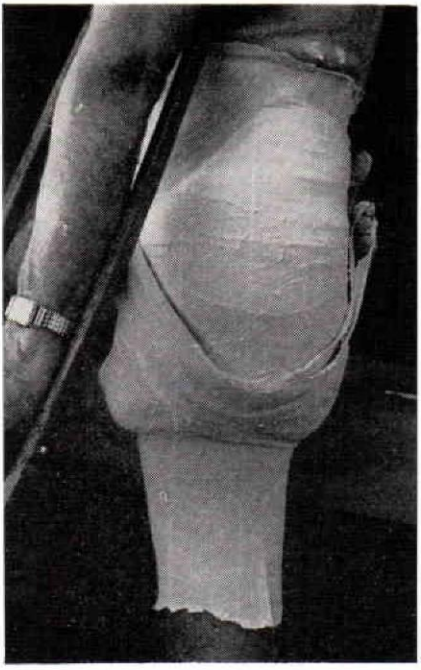


3. Cotton stockinette pulled over the stump area prior to cast taking.

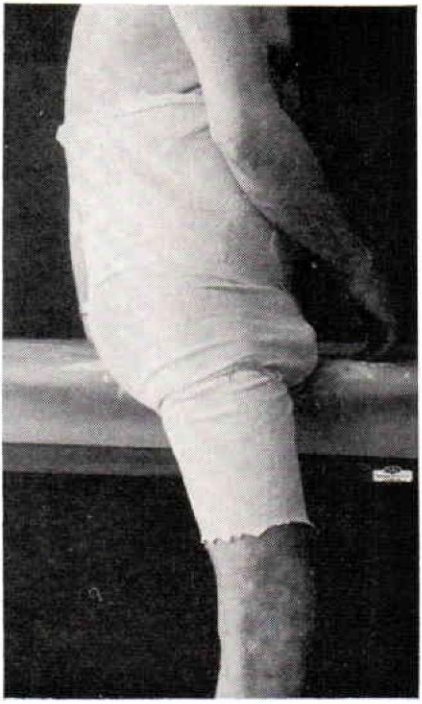


4. The waist area is wrapped with plaster bandages.

5. The hip sticks are used to define the crests of the ilia.



6. Wrapping the seat area.



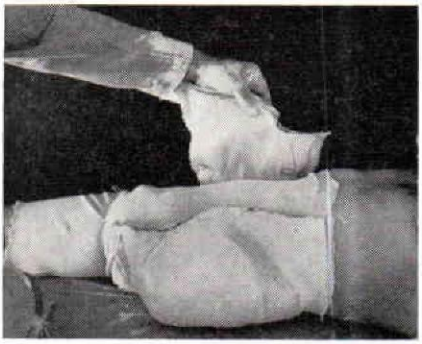
7. Forming the seat area by sitting on a table and pushing back with the good leg.

Step A. Waist Band

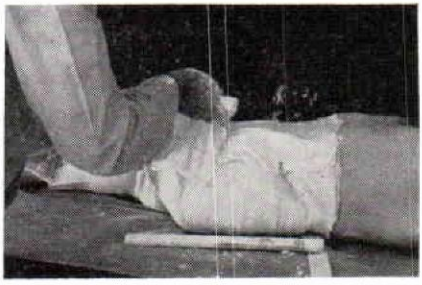
Before starting to wrap with bandages the hip sticks should be tested and the belt adjusted as necessary. While the sticks are held with one hand the area is palpated to ensure that the sticks are fitting over the ridge of bone. This is more difficult with overweight persons. The angle at which the sticks are held should be noted. (A typical case is shown in Fig. 5.) The waist area is wrapped with 2 or 3 6″ plaster bandages from about 2″ above the crests of the ilia to about 2″ below the level of the trochanter (Fig. 4). The bandages must not be pulled too tightly lest ridges in the cast occur. Before the plaster begins to harden the hip sticks are applied in the same position as in the trial and are held until the plaster is set (Fig. 5).

Step B. Seat Area

The seat area is wrapped using 2 or 3 4″ bandages with a back to front direction and the waist band is overlapped several inches to ensure a bond. (Fig. 6) Before the plaster is set the patient bears his weight on the edge of the examining table and pushes back with his good leg. (Fig. 7) This causes the gluteal muscle mass to be forced under towards the ischium providing a better seat pad and ensuring a snug fit in the posterior seat area. This position is maintained until the plaster is hard.



8. Cutting out the front section.

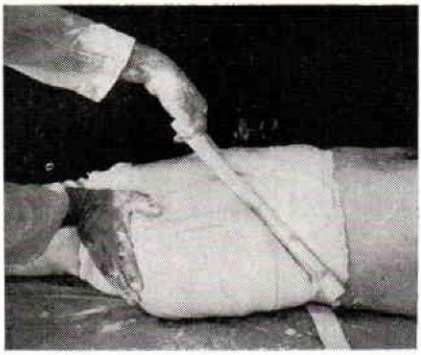


9. Laying up the front panel.

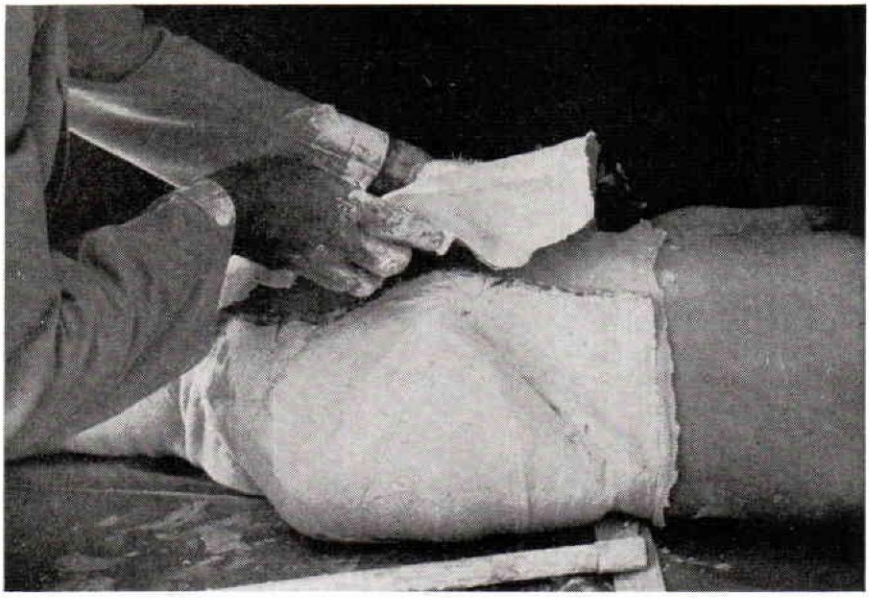
Step C. Anterior Panel

With the patient lying on his back on the table the gap that appears between the cast and the abdomen is noted. The entire front area is marked and cut out with plaster shears or a Stryker cast cutter, excluding the impression caused by the hip sticks. (Fig. 8) Vaseline is applied to the cast about 3" along the edges of the cast. Using 2 or 3 4" plaster bandages a panel is laid across the opening overlapping the original cast. (Fig. 9) Before the plaster hardens again the hip sticks are again used in the same position to draw in the cast and hold the position while the anterior distal stump area is pushed in with the other hand. (Fig. 10) The procedure is easier if an assistant is available. The new panel is keyed into the opening where the hip sticks are applied. When the plaster is hardened the front panel can be lifted off (the vaseline prevents bonding) and the rest of the cast may be removed after slitting the original stockinette from top to bottom. (Fig. 11)

The three steps outlined above require about 45 minutes to complete. Unless there are unusual scar areas or sores it is not necessary to make any marks on the stockinette or cast. Some relief may be necessary for a prominent back bone and this can be accomplished by applying a strip of felt (with thin edges) to the area before drawing on the stockinette.



10. Holding the cast securely while the front panel hardens.



11. Removing the front panel.

Pouring and Finishing the Plaster Positive

After removal from the patient the front panel is refitted to the main cast and secured with string and plaster. The stockinette is not removed, but draped over the top edge and pulled across the opening at the bottom. The bottom is further reinforced with plaster and stockinette or bandages before the positive is poured. (Fig. 12) Figure 13 shows the plaster positive after stripping the cast.

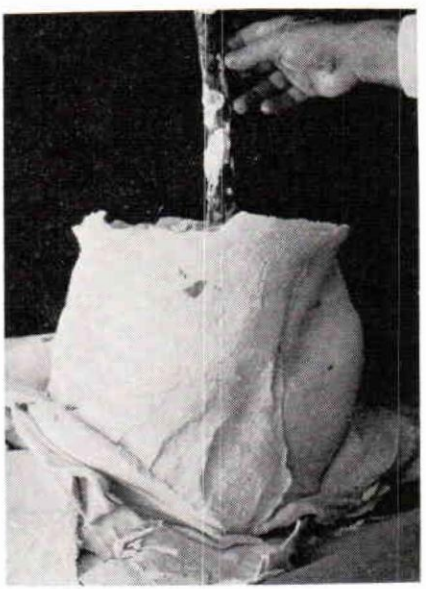
Before beginning the laminate it should be necessary only to smooth the irregular areas with wire mesh or a knife and to remove the sharp edges at the top and bottom. The webbing in the hip sticks should provide a shallow concave groove in the plaster positive. The ridge formed at the bottom edge of the groove should be removed leaving the back flat except for the concave upper edge which provides a slight flare for the top of the socket. Figure 14 shows the cast ready for laminating.

Some smoothing is usually required at the areas where the hip sticks are attached to the webbing.

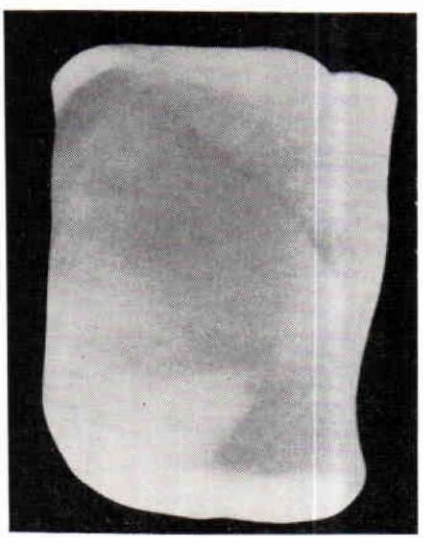
If it is desired to laminate while the cast is still wet, two layers of paste floor wax may be applied followed by a dusting of water ground mica lightly over the wax.

Figure 1 shows the socket ready for fitting.

12. The cast tied and plastered together.



13. The plaster positive after removal of the cast.



14. A lateral view of the plaster positive ready for laminating.

Hemipelvectomies

The preceding method can be applied to hemipelvectomies with only three important differences. Hip sticks are applied in the same way even though no bone structure is present. The keying action provides improved

suspension. The lateral cut-out is also made. The procedure differs as follows:

1. In wrapping the seat area the bandages are extended to include the gluteal area of the sound leg.
2. Before the plaster in this area is hard the amputee is asked to sit on the edge of a table with the stump area and the ischium of the sound leg both resting on the able. To do this it is necessary to push back on the sound leg as with the hip disarticulations. The position assumed is essentially an erect position with the back to the table but turned about 30° toward the amputated side.
   In making the socket this gluteal or ischial shelf is left protruding as far as possible and is trimmed back after fitting.
3. The cast and the socket are extended up to the rib cage so that the soft flesh in this area will not tend to extrude when weight is borne on the yielding stump. It is usually advisable to make the top edge of hemipelvectomy sockets flexible to avoid discomfort in the area of the rib cage.

Veterans Administration Uses Troy Blanket Mills' Non-Woven Synthetic Reinforcing Fiber for Better Socket and Stump Fitting in Artificial Limbs

Fred Cipolla, VAPC technician, measures and trims a length of Dacron Fiber blanket, to the dimensions of standard b/k leg mold. The blanket is then stitched to form a "sleeve."

For the past year-and-a-half, the Veterans Administration's Prosthetics Center has been using Troytuf, a mechanically interlocked Dacron fiber blanket, which makes its reinforced plastic prosthetic devices structurally stronger, easier to prepare or modify, and better fitting.

"In artificial limbs, the socket area is the most critical section because it comes in contact with the skin," points out Anthony Staros, the Center's chief. "For the sake of his comfort and the good psychological effect a wearer gets from a clean, natural appearance, the ease with which sockets can be modified and returned to their original finish is all-important. Prior to our use of this new material, we were having difficulties with laminate fillers, sometimes in their preparation, but more often when we made changes and then tried to get them back to their original finish."

NELSON GADGETS

By K. B. NELSON, C.O.
Nelson Orthopedic Co., Pittsburgh, Pa.

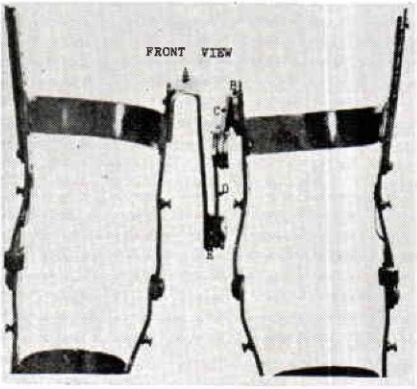
GADGET NO. 4—NELSON SPREADER

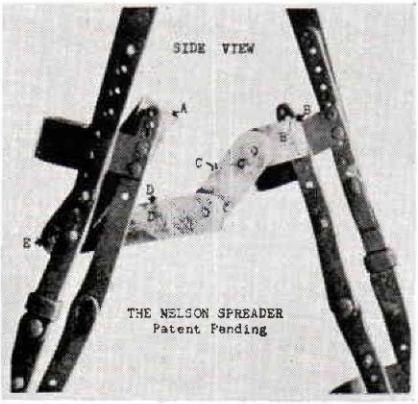
The Spreader shown here was designed to control adductor tension in cerebral palsy or polio bracing when attached to bi-lateral long leg braces. The reports we have from other orthotists who are using it are most gratifying. It serves its intended purpose well. It does not protrude, it does not rotate, it does not interfere with the clothing and it may be opened at "E" for treatment or exercise of the patient. With smoth ball bearing action, it prevents uncontrolled unnaturally long steps, yet it permits walking with knees locked or unlocked. The Spreader has been tested for many years and has proven a welcome solution to the scissoring problem.

Additional advantages of the spreader may be cited. When hip joints are necessary, they need not be heavy nor do they require ball bearings when the spreader is used. The control area is high enough to be effective against adductor tension, and the device does not rotate or lock in walking.

The Spreader is easily attached to any brace by means of four screws.

This article is published by special request and the author will furnish further information to anyone interested.





THE STORY OF BRETT CUNNINGHAM

H. P. Barghausen Reports Successful BK Fitting of 14 Month Old Boy

Herman Barghausen, of the J. E. Hanger Company of Pittsburgh, has sent us a very interesting account of fitting a 14 month old boy, Brett Cunningham, with a below-knee prosthesis. We feel sure our readers will be interested in the details of the case, and will be pleased to know how successfully Brett has adapted himself to using the prosthesis.

Brett's case was a referral for rehabilitation by Dr. William S. Donaldson of Children's Hospital in Pittsburgh. A copy of Dr. Donaldson's letter to Mr. Barghausen states:

> "My examination revealed there is approximately 1⅜" of tibial shaft extending distially from the medial tibial plateau. Also has full flexion and extension of the knee with sufficient muscle control in both flexion and extension of the knee to control a BK prosthesis. Obviously range of motion of both knee and hip are sufficient."

Brett's amputation, Mr. Barghausen writes,

> ". . . is a congenital case having at the most 1⅜" of stump from the center of knee to the end. After discussing the type of prosthesis with the doctor, it was decided to furnish a BK prosthesis, fitting the stump up to the patella. The leather corset was coated with nylon coating and lined inside with naugahide for obvious reasons.
>
> "You will note we did not furnish a foot with this prosthesis because the shoe size would change too rapidly. Instead of a foot we finished the end of the prosthesis with a ⅜" neoprene crepe rubber.

"To eliminate taking the prosthesis from the child for lengthening, we furnished the parents with three oblong disks and instructed the father to remove the crepe rubber and screw the disks against the bottom or end of the prosthesis and then to cement the cushion to the end of the prosthesis.

"This method of lengthening the prosthesis was acceptable to the doctor as it eliminated the costs of lengthening the prosthesis in the shop."

To complete the story of Brett Cunningham, Mr. Barghausen asked for further details from the Home for Crippled Children where the boy received therapy. The Home is a voluntary, non-profit corporation providing rehabilitation services for one hundred children. It recognizes no restrictions because of race or creed, nor for monetary reasons. Mr. Ted Hipkins, Executive Director, and Miss Whitfield, P.T., give the following detailed and interesting description of Brett's therapy at the Home:

"Brett was admitted to the Home for Crippled Children on October 4, 1959, with a congenital below knee amputation of the right leg. The patient was fitted with a below knee type of prosthesis and gait training was ordered by the doctor. Since the patient had never worn any type of appliance before, the first step consisted of building up a tolerance for the prosthesis. He began by wearing the leg daily for an hour in the morning and afternoon in addition to a half hour during his therapy period. Because the child was so young it was important to protect the prosthesis from periods of incontinence, prevent his tampering with the leg and maintain it in a securely fastened position. This was achieved by covering the prosthesis with a piece of 3 inch stockinette sewed at one end and pinned to the diaper both front and back. The patient was then placed in a playpen for morning and afternoon periods wearing the leg. In the matter of a few days he began to pull himself to a standing position and bear weight on the prosthesis. He adapted so well to the prosthesis that he was permitted to wear it all day. In therapy, training started with teaching the patient to crawl. In a week he was pulling his prosthesis through as well as his normal leg in an effective reciprocal pattern. The patient had also begun to pull himself to a standing position with the aid of gym furniture such as stall bars and graduated steps.

"Brett became quite skillful at manipulating his prosthesis to get up and down from the floor. Starting from a kneeling position, he held on to something, put his normal leg ahead, and then straightened up, pulling his prosthesis up after him. To get down he would bend the prosthesis at the knee, place it on the floor, and then place his other knee on the floor beside it.

"After about 10 days of practicing crawling and pulling to a standing position, he was placed in the parallel bars. Up to this point the only steps he had taken were side steps around furniture and in his playpen. With some prodding, such as presentation of a toy, he would take three or four steps forward. In addition to this he was walked back to his room after every therapy period with the therapist beside him holding on to his hand. The patient learned to use his prosthesis well considering his age. When taking a step he would bend the knee of the prosthesis and then transfer his weight to the prosthesis, bringing his left leg through. In order to encourage the patient to practice walking as much as possible he was given a toy baby carriage weighted with 10 pounds to prevent tipping. He held on to the handle bar and pushed the carriage up and down the halls. This worked quite well.

"The patient was discharged on November 20 after a month of training. Home instructions were given his parents. They were told to have the patient continue to wear the prosthesis and to encourage him to walk as much as possible. The idea of the baby carriage was recommended to them. It is hoped that as he continues to become more adept in the use of the prosthesis he will eventually walk alone."

The latest report on Brett's progress comes from a letter from Mr. Barghausen, dated February 24, 1960.

"At this date little Brett is pushing anything with wheels on it and is doing quite well in handling his prosthesis."

Our congratulations to Mr. Barghausen and to all concerned in the rehabilitation of this 14 month old youngster. And our thanks for his making the report available to us—we need more of these case histories in our literature.

HOSMER CORPORATION OPENS EASTERN OFFICE IN CINCINNATI

The A. J. Hosmer Corporation recently announced the opening of their new Eastern Division in Cincinnati, Ohio. Mr. Ray Crowell, formerly with Truform, has joined the Hosmer Organization and will manage the new Division.

The new facility will be known as the Hosmer Eastern Division. All stock items shown in Hosmer's new 5th Edition Catalog will be carried in stock. Lloyd Brown, president of Hosmer, says the main reason for this Eastern Division is the opportunity to better serve the many Hosmer friends who are located at great distances from the California plant. Considerable savings in time and transportation costs will be realized by Hosmer customers located East of Denver.

The Hosmer home office and complete manufacturing facilities will continue operations at Santa Clara, Calif. Fabricating jobs and requests for other special manufactured items should be directed to the main plant at Santa Clara. All orders for standard cataloged items should be sent to the division closest to your operation.

The mailing address for the new Hosmer Eastern Division is P. O. Box 117, Cincinnati 6, Ohio. Street address is 615 East McMillan St., and the telephone number is AVon 1-8872.

RAY CROWELL

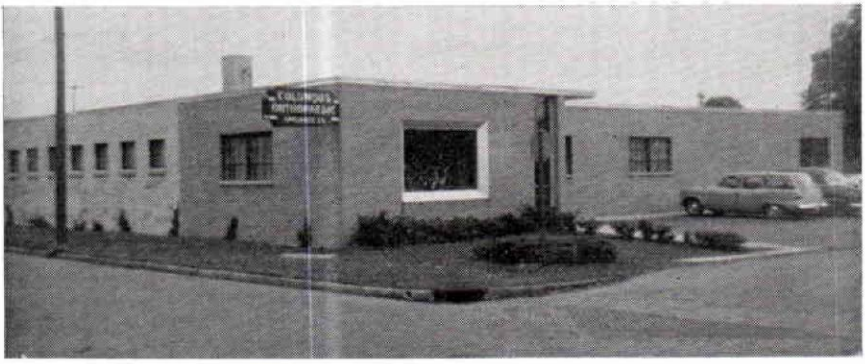
BUILDING A NEW FACILITY; A REPORT ON THE PLANNING

EDITOR'S NOTE:

Several members of The American Orthotics and Prosthetics Association are planning new buildings for their certified facilities; other members have recently occupied new quarters or are engaged in planning and remodeling of old quarters. Because of this interest in construction and rebuilding we have asked some experienced orthotists and prosthetists to tell us their suggestions and advice. Those interested in pursuing the subject will also find some helpful hints in the article, "Planning Orthopedic Shops; Layout Suggestions," Thomas P. Galbraith and Peter N. Jensen, in the December 1958 issue of this Journal, pages 65-69.

PLANNING FOR EFFICIENT PRODUCTION

By CHARLES W. ROSENQUIST, C.O.



The new building of the Columbus Orthopaedic Appliance Company.

The Columbus Orthopedic Appliance Company is now settled in its new and enlarged quarters at 588 West Gay Street. Behind and preceding this move I spent many hours in preliminary planning. This and the actual building brought with it many headaches but a satisfying sense of something accomplished. I hope this account of our move will be helpful to other establishments which are planning to build or rebuild.

Everyone who has started any type of business has tried to anticipate all the aspects involved and attempted to keep the costs within reason. The orthotist and prosthetist must do the same in building or rebuilding for their facility. They first think of location. This does involve price. Then they must figure how much room is needed, what the city codes say on light manufacturing plants, etc. The thought still remains: *Make it near medical activity, on a main street, easy to find, and where it will be seen.*

After the business is established and is well known to those who use its services, there are other factors that become important. Good service may no longer be possible in the old set-up, or it is not efficient to operate. Parking for both the patients and the employees becomes a source of irritation. This is when you begin to visualize a facility built, or properly modified, to take pride in. Improvements also give the handicapped person or child the opportunity of being treated in a clean, cheerful, and progressive atmosphere.

As transportation has changed to the automobile, the location does not have to be in close down town, but rather in a relatively convenient location where space is available at not too high a price. Also, it is not too difficult to have a building built as an investment, with the chance of purchasing it when and if it's profitable. The rapid expansion of services we all experienced from 1946 to 1956 may never repeat itself to force us to expand so often to meet the demand. However, we do have to take careful stock of the extent and also the limits of service when building a new facility.

In our case, we wanted to serve both orthotic and prosthetic patients of all ages and conditions. Service was our product and it should be easy to obtain.

We tried to plan a layout that would have a neat, conservative and professional appearance to the patient, much like any medical service. Enough room was planned to allow sufficient space for their convenience. We tried to position the business part of the office so that it would be available to the reception room and the shop area, and still have enough privacy to operate apart from any confusion. The shop area had to be planned to save steps in relation to the fitting rooms and to keep most of the noise away from this and the office area.

As a basic square building is the most economical to build, our first venture was one roughly 87 ft. x 80 ft. on a lot 99 ft. x 100 ft. with head-in parking on the 87 ft. wall. When we had to move due to highway construction, we had to allow more room for head-in parking to permit backing out and making the turn off the street proper. This, on the same size property, forced us to elongate the building to more of a rectangle.

Our basic plan was still the same, with the reception room on the corner, the fitting rooms along the short wall, the business and private offices and the storage room and metal stock racks along the long wall at right angles to the fitting room corridor. On the opposite side of this corridor are located the utility units and the plaster room, to centralize the plumbing. This leaves the shop area much the same shape as the building itself.

The land area determined the extent we could go in size. Using cement block construction on concrete slabs, with metal truss and flat roof, the rest was flexible. We started from the end where the fitting rooms were side by side; allowed for the length, then the width of the corridor, and the depth of the lavatories and employees' dressing rooms.

Then we put the reception room on one end, wider than the depth of the booths and a corridor, and ran the office back wall in line with the reception room wall. At the other end of the corridor we put the walking training room for prosthetics. All the fitting table, desk, chair, and cabinet sizes we laid out on paper to scale.

This gave us waiting chairs for ten people, fitting rooms for eight patients, desks for four office girls and two extra desks for the orthotists and prosthetist to write up their orders. The private office has two desks and a large layout table. There is direct access from both these offices to the shop.

The plant layout started with the sewing and leather section and the final assembly and check out space, which is placed closest to the office with a direct corridor to the fitting area. A twelve-foot cement block wall

divides the corset part of this area from the prosthetic section, which opens into the walking training room; but still leaves direct opening to the leather part. The shoe working area acts as the end of the prosthetic section and is adjacent to the leather working area. This gives the prosthetic work the use of all the shoe and leather equipment and assistance. A low wall about six feet high divides the leather department from the back of the shop which is all metal layout, stock, and fabrication.

Here again, by knowing each piece of equipment and machinery to be used, we were able to judge the space and allow adequate passage and workroom along with the proper electrical outlets and amount and type of power needed. The lighting is all overhead string florescent to eliminate shadows. Metal working, shoe, and prosthetic benches are back-to-back away from walls with the machinery off to one or both sides, Most of the power equipment, expect drill presses, is along the walls. The shoe machine, welding tables, and lathes are in toward the middle of the shop area, accessible to all.

The control desk in the plant is in easy reach of the office and the leather and metal areas. The stockroom and stock area are just back of the control desk. An effort was made to relate everything to each other in degree of importance, to make the best use of the existing equipment and space. We tried to produce a feeling of *openness,* so that everyone might work together as a team.

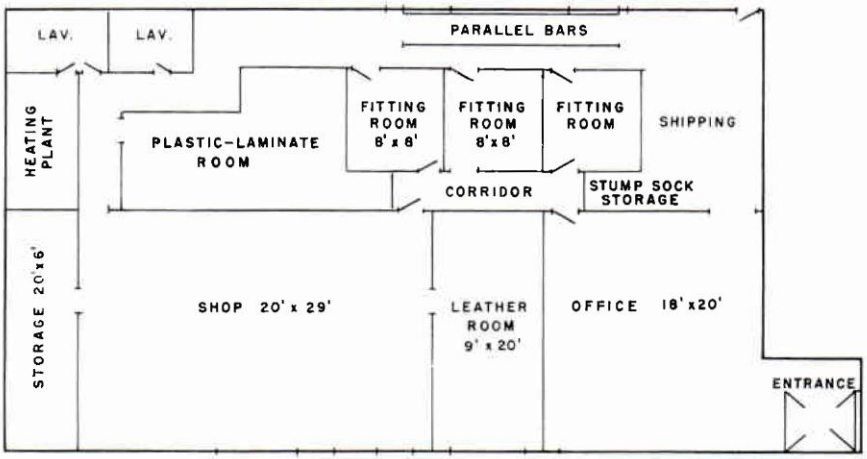
The shop staff for the past five years has consisted of two corsetieres and corset makers, three leather workers and finishers, three prosthetists, three shoe men, and five metal workers. The office has three and a half girls and there are three certified orthotists and a prosthetist plus the custodian.

In the last move, two years ago, we enlarged our prosthetic section only and now find some extra space in the metal work section due to the lack of polio cases. The increase in corset work, general brace repair, and back bracework has kept the leather section in demand for their space.

As we still feel that convenient and good service is our best selling factor, along with a good product, we try to have adequate space and staff to meet this demand without such restrictions as scheduled appointments unless it is convenient for all concerned. The area Columbus serves as a medical center extends fifty miles to the west and north and a hundred miles or more to the southeast, so we have the larger percent of our patients coming from out of town areas on a referral basis by our local doctors. We are just a cog in this overall medical machinery, but it is our privilege to act as a smooth-running part of it.

ANTHONY & WILLIAMS OPEN NEW FACILITY

EDITOR'S NOTE: *Anthony and Williams, a certified prosthetic facility recently moved from Boston to new and modern quarters at 36 Spring Street, Watertown 72, Massachusetts. Because of the interest in new and improved facilities throughout the country, we asked Mr. Theodore G. Williams, C.P., for the following account of his building.*



Floor plan of the New Facility of Anthony & Williams, 36 Spring Street, Watertown, Mass.

Mr. Anthony and I have tried to incorporate in this facility the features of efficiency and convenience that a modern prosthetic plant should have.

We looked for a place on the western side of Metropolitan Boston, on or close to a main highway, in a good neighborhood, with ample parking space and direct access from the sidewalk to the facility. The one-story building at 30 Spring Street, Watertown, satisfies these requirements.

The building is rectangular in shape, 70 feet long and 40 feet wide. Large windows along both long sides provide good light and ventilation. There are two toilets with new fixtures. The space was unpartitioned, so we were not hampered in arranging the floor plan. The basic idea of the floor plan is to insulate the public areas—office, three fitting rooms, toilets—from the noise and dust of the work areas. This is accomplished in several ways: By placing the leather-fabricating room between the office and the main shop; by partitioning a passage between office and shop, with a door at either end; and by placing the fitting room doors along the opposite side of this corridor. Each fitting room has another door opposite the corridor, opening upon a gait-training ramp.

The office, the corridor and the fitting rooms have been professionally decorated. Each fitting room has a mirror, a picture, a coat hanger, a clothes brush, a shoe brush, a waste basket, a table and two chairs.

We have resumed full production. Our clients seem pleased with what we have done. For our part, we are now in a position to conduct business more efficiently, in more pleasant surroundings, and with more room for expansion, than before.

A QUESTIONNAIRE SURVEY OF JUVENILE TO YOUNG-ADULT AMPUTEES WHO HAVE HAD PROSTHESES SUPPLIED THEM THROUGH THE UNIVERSITY OF ILLINOIS DIVISION OF SERVICES FOR CRIPPLED CHILDREN

By CLAUDE N. LAMBERT, M.D., and JEAN SCIORA, R.N., B.S.P.H.N., R.P.T., Chicago, Illinois

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The purpose of this survey was to obtain information which would be helpful in evaluating various services to juvenile and young-adult amputees. The term juvenile amputee is used by us more broadly than in the usually accepted definition, as the Division gives service to amputees from the time of referral until they are twenty-one years of age. The age groups were evaluated as preschool (under five years old), young school-age, and pre-adolescent (six to twelve years old), adolescent (thirteen to seventeen years old), and young adult (eighteen years old and over). The amputees under discussion were under the medical supervision of clinics throughout the State. The interest of the orthopædists and their training in amputee rehabilitation varied widely. In general, the personnel within the various disciplines (orthopædists, physiatrists, pediatricians, therapists, psychologists, nurses, medical social workers, prosthetists) with whom we got in touch agreed that the most effective approach to the rehabilitation of amputees is an integrated program involving psychological preparation of the juvenile amputee and his parents; surgery as needed, with aftercare of the stump preparatory to the prosthetic fitting; selection of and fitting of the prosthesis most suited to the amputee's needs; training in the use of the prosthesis; and follow-up evaluation of the patient's ability to adjust to daily living function and to undergo eventual vocational rehabilitation. The questions in this study were therefore designed to obtain information regarding these factors. The questionnaire (see appendix) was sent out in April 1955 to parents of juvenile amputees who had been fitted with prostheses by the University of Illinois Division of Services for Crippled Children from July 13, 1945, to March 9, 1955. The latest recipient of a prosthesis had had it for two months and two days at the time of the questionnaire. A total of 363 questionnaires were sent: 197 were returned, but 15 were not used in this report because of meager or incomplete replies. The number not returned was 121; 45 were returned undelivered. In evaluating the results of these questionnaires an attempt was made to determine whether or not we had improved the juvenile amputees' adjustment to life, guided them toward as full independence as possible, and helped them as individuals to find their places in our whole society.

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Statistical Study

This study included 182 amputees with 198 amputations of whom 124 (68.1 per cent) were male and 58 (31.9 per cent) were female. The greater number of male amputees is due to a higher incidence of traumatic and congenital amputations as well as to a higher incidence of amputations caused by disease (infections and arterial insufficiency) among males in this series. Of the amputations, 94 (51.65 per cent) were traumatic; 71 (39.01 per cent) were congenital; 10 (5.5 per cent) were due to malignant growths; and 7 (3.85 per cent) were due to disease. In the group of 124 male amputees, 73 amputations (59 per cent) were traumatic; 41 (33 per cent) were congenital; 5 (4 per cent) were due to disease; and 5 (4 per cent) were due to malignant neoplasms. Of the 58 female amputees, 30 amputations (52 per cent) were congenital; 21 (36 per cent) were traumatic; 5 (9 per cent) were due to malignant growths; and 2 (3 per cent) were due to disease.

Among the patients with amputations caused by trauma, there were 73 (77.7 per cent) male patients; the amputations were: 10 below the elbow, 19 above the elbow, 29 below the knee, 11 above the knee, and 4 were multiple. There were 21 (22.3 per cent) female patients; the amputations were: 1 below the elbow, 3 above the elbow, 9 below the knee, and 8 above the knee.

Among the patients with congenital amputations there were 41 (57.7 per cent) male patients; the amputations were: 10 below the elbow, 3 above the elbow, 16 below the knee, 5 above the knee, and 7 were multiple. There were 30 (42.3 per cent) female patients; the amputations were: 12 below the elbow, 1 above the elbow, 8 below the knee, 7 above the knee, and 2 were multiple.

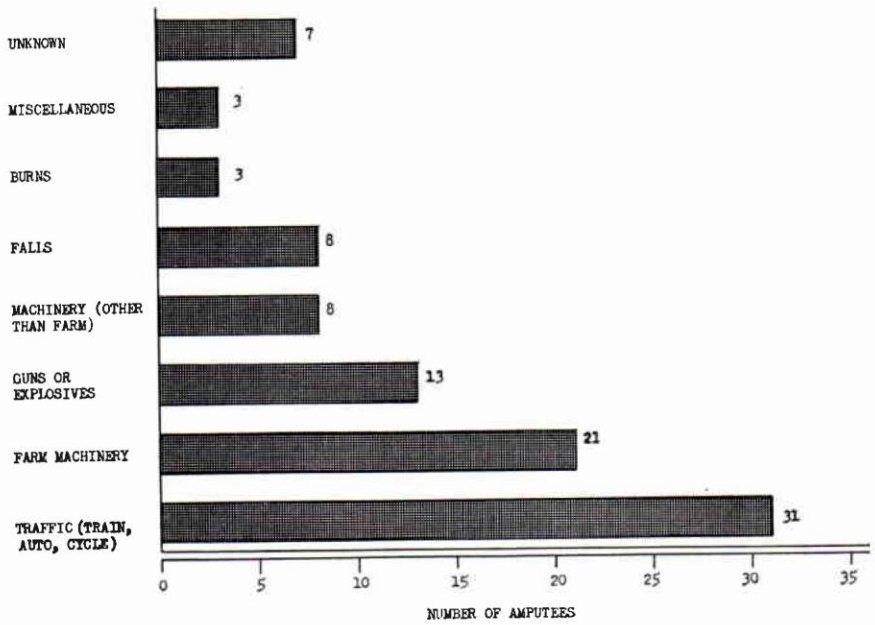

Chart I—Causes of 94 traumatic amputations.

In the group of patients with amputations resulting from disease, there were 5 (71.4 per cent) male patients; the amputations were: 4 below the knee and 1 above the knee. There were 2 (28.6 per cent) female patients; the amputations were: 1 each above and below the knee.

In the group of patients with amputations required because of malignant neoplasms, there were 5 (50 per cent) male patients; the amputations were: 1 below the knee and 4 above the knee. There were also 5 (50 per cent) female patients; the amputations were: 1 below the elbow, 1 below the knee, and 3 above the knee.

When the number of patients having amputations due to both neoplasms and disease were combined, there were 10 (58.8 per cent) male and 7 (41.2 per cent) female patients.

The types of amputations in this series were classified rather simply as being either above or below the elbow in the upper extremity or above or below the knee in the lower extremity. More technical studies indicate the size of the stump in inches or designate the stumps as short, medium, or long, or above or below a joint. Further classification, in regard to the upper extremity, may specify shoulder, elbow, or wrist disarticulation, and partial hands; in regard to the lower extremity it may specify hemipelvectomy, hip, knee, or ankle disarticulation, and partial feet. We did not believe that such distinctions could be made in this type of study, and the questionnaire was incomplete in this respect.

The greatest number of amputations—94—were due to trauma; the causes are listed in Chart I. It is evident that more emphasis is needed on educational measures to prevent accidents caused by automobiles, trains, motorcycles, farming, and firearms. Immediate care of even supposedly minor injuries is also indicated. For example, two amputations in this series were necessary after one youngster crushed his finger in a door and tetanus and gas gangrene developed and after another youngster cut his foot on a can in a fall and a chronic osteomyelitis developed.

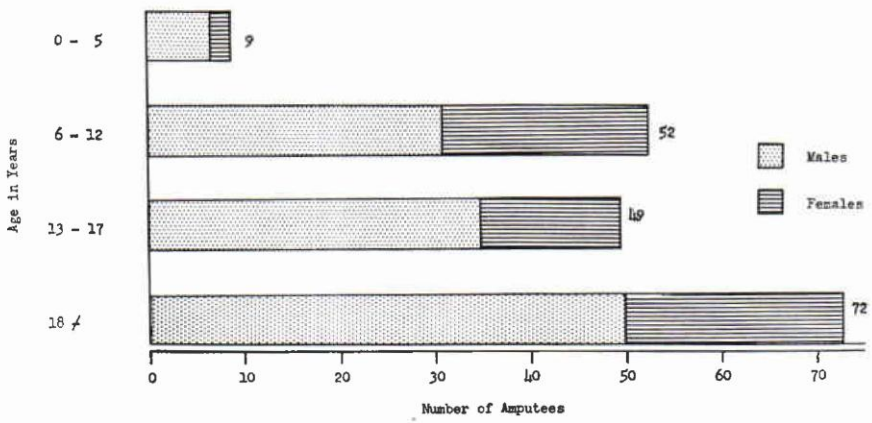

Chart II—Age of the amputee when the questionnaire was sent.

These accidents occurred at ages which ranged from 1½ to 19 years. The group 6 to 12 years of age was the most vulnerable to accidents leading to amputations, since 40 (42.55 per cent of all accidents) occurred in this age group. The preschool group was next with 24 (25.53 per cent). The teen-age group (13 to 17 years) was a close third with 22 (23.41 per cent). This indicates the need for more intensive programs in safety education and

accident prevention, closer supervision by parents or other responsible adults, and the removal of so-called attractive nuisances.

In the group of 71 congenital amputees were included 39 youngsters born with an amputated extremity; 27 who had an anomalous extremity leading to a conversion amputation of whom 2 also had a true amputation; and 5 with a congenital defect of the vascular or lymph system which led to surgical amputation. Of the congenital amputations, those below the knee occurred most frequently, followed in order by those below the elbow, above the knee, multiple, and, lastly, above the elbow. Here it seems that in congenital amputations, the right side is more likely to be involved, since, in 62 patients with unilateral congenital amputations, 40 (64.5 per cent) had right-sided involvement as against 22 (35.4 per cent) with left-sided involvement.

The 10 amputations for malignant growths were because of: liposarcoma, carcinoma, sarcoma, fibrosarcoma, neurofibroma, and Ewing's sarcoma. The 7 amputations due to disease were because of: osteomyelitis, Potts's disease, and emboli.

The greatest number of referrals, which was 112, to this Division were from doctors or ancillary medical services; 53 were from the family physician; 34 were from the public-health nurse; 1 was from the surgeon; 24 were from the hospital staff; 30 were from the limb-manufacturing companies; and 32 were from some other source (school staff, social or welfare agencies, friends, and the like). In 8 instances this question was not answered.

Age Distribution

At the time of this study the age distribution was 18 months to 27 years (Chart II). As stated earlier, this questionnaire was sent to all the juvenile amputees who were fitted with prostheses by the University of Illinois Division of Services for Crippled Children between July 13, 1945, and March 9, 1955. Only about one-fourth of the amputees in this study were under the care of the University of Illinois Amputee Clinic, which was established in 1952. About one-third of the amputees were first fitted with prostheses at 12 or more years of age, which accounts for the high upper-age limit at the time the questionnaire was sent.

The age at which the youngsters were first fitted with prostheses ranged from 9 months to 20 years. Seventy-four patients (40.66 per cent) were fitted with 80 prostheses in the group 6 to 12 years old; in the group 0 to 5 years old, which was next, there were 56 patients (30.77 per cent) fitted with 58 prostheses; in the group 13 to 17 years old, which was third, there were 41 patients (22.53 per cent) fitted with 45 prostheses; in the group 18 years and older, which was last, there were 11 patients (6.04 per cent) fitted with 11 prostheses. In all age groups, the majority of amputees who were fitted with prostheses had acquired amputations except in the group 0 to 5 years old, where the majority had congenital amputations.

In the group with below-the-knee amputations, the greatest number were fitted with prostheses in the age group 0 to 5 years old followed, in order, by the groups 6 to 12, 13 to 17, and 18 and over years old. The youngest below-the-knee amputee was fitted with a prosthesis at 9 months of age. In the group with above-the-knee amputations, the greatest number fitted with prostheses were in the group 6 to 12 years old followed, in order, by the groups 0 to 5, 13 to 17, and 18 and over years old. The youngest above-the-knee amputee was fitted with a prosthesis at 13 months of age. Some lower-extremity amputees were fitted with pylons when they were less than 9 months old.

The 60 patients with unilateral upper-extremity amputations were first fitted with prostheses when they were from 3 to 20 years of age. In the group with amputations above the elbow and in the group with amputations below the elbow, the majority were first fitted with prostheses in the age group 6 to 12 years old followed, in order, by the age groups 13 to 17, 0 to 5, and 18 years and over. The youngest below-the-elbow amputee was fitted with a prosthesis at 3 years of age; the youngest above-the-elbow amputee, at 5 years of age.

Surgical Procedures

With acquired amputations, reconstructive or reparative surgery may be required, either initially or for revision of the stump. It is important for the surgeon to keep in mind the fitting of the prosthesis at the time of surgery, whether it be the initial surgery or revision of the stump [5,6]. Surgical problems of juvenile amputees differ from those of adults [7]. In this study no definite conclusions could be drawn concerning the results of the surgery. The question concerning this was not only poorly worded but also failed to cover the various aspects of this subject. Some of the patients or their families or both thought that this question related only to surgery being necessary after the child was referred to this Division for a prosthesis. Several interesting factors were noted: the younger the child at the time of the initial amputation, the greater was the likelihood of one or more revisions being necessary; and the below-the-knee amputees, followed by the above-the-elbow amputees, had more revisions than those in other groups. Some youngsters had as many as three revisions. We did not find a single below-the-elbow amputee who had a revision because of over-growth of one or both of the forearm bones at the distal end of the stump.

The surgical procedures on most of the lower-extremity congenital anomalies were performed to convert a deformed extremity to an amputation. Most of these amputees had had other treatment previously, including casts, braces, built-up or extension shoes, and other surgical procedures such as subtrochanteric osteotomy, bone grafts, growth arrest of the normal leg, and surgical correction of a chronic dislocating patella. Three below-the-knee amputees with short femora were treated by arthrodesis of the knee and were then fitted with above-the-knee prostheses. There were fewer stump revisions in this group of amputees than in groups whose amputations were owing to other causes. Rarely, except in congenital lymph hemangiomata and arteriovenous fistulae, is a congenitally deformed upper extremity amputated. Surgery—such as the removal of rudimentary nubbins, the correction of other deformities (such as webbed fingers), and derotation osteotomies—was done in the upper-extremity amputees. Some parents refused to allow the recommended amputation because they lacked understanding of the child's deformity. Other parents preferred to wait until the child could make the decision. One child in this study was 19 years old before he requested surgical treatment.

Systematic stump hygiene is important [8,9]. The doctor, nurse, and therapist should give definite instructions. The following is suggested: the stump should be cleansed daily with a mild soap (in specific instances a germicidal soap may be recommended), dried thoroughly by patting rather than rubbing, and aired at intervals, especially in cases of excessive perspiration. Stump socks, if they are worn, should be clean (it is important to give instructions as to the care and laundering to keep them soft and to reduce shrinkage). Cleaning the sockets of the prostheses is especially important if stump socks are not worn. Close watch for redness or break in skin or any

other signs of irritation is essential so that prompt treatment may be given as necessary.

According to the replies to the questionnaire, 75 amputees or parents had received some instructions, whereas 26 had had none, and 4 misunderstood the question and gave answers concerning the care of their prostheses. In 77 instances the question was unanswered. Several amputees or parents indicated that their only instructions were given to them by the prosthetists. It is fortunate that skin problems are not common in juvenile amputees. Many of the amputees in this series had amputations prior to their referral to this Division. This does not excuse the failure to give these patients instructions in stump care or to at least review them. It may be that instructions were given but not sufficiently stressed. Perhaps they need to be repeated several times. The answers to this question emphasize the need for the responsible personnel to review the instruction in stump care more completely with the amputees or their parents, or both.

Attitudes of Parents

The education of the family is of the greatest importance since the parents supervise the child's total care, and the child interprets his defect according to what it means to his parents. Once the parents have insight into the total program of habilitation, or rehabilitation, as the case may be—just being reconciled to the defect is not enough—a plan can be worked out for the child [1,2,3]. Of the 182 replies, 165 persons said that they understood the findings and recommendations of the clinician and the other members of the clinical staff as to plans for their children; 3 said that they needed more interpretation; and 14 did not reply. From these replies, it would seem that most of the families have had no problems from this standpoint, but that this obviously was not so was indicated in replies to other questions. In 29 instances the parents said that they felt the need for more time at the clinic (some of them had previously said that they understood what had been said to them). The parents of above-the-elbow and above-the-knee amputees felt this need more than parents of the other amputees.

Most of the parents replied to the third part of this questionnaire concerning how the staff might be more helpful. Some parents said that the clinicians expected too much from the children. Other parents stated that the clinicians did not expect enough and could get the children to do more. Many wanted to know how to help the child overcome his self-consciousness.

All but 1 parent indicated that their children had accepted the idea of being fitted with a prosthesis. The replies to the two subsections of this question revealed, however, that the children (or perhaps the parents themselves) had not accepted the idea of a prosthesis. For example, although only 1 parent said that his child did not accept the idea of a prosthesis, 52 parents replied to part (a) of question 5, and of these, 33 said that they had discussed this problem with the clinic staff. Many parents explained in part (b) of this same question how they helped their children's attitudes toward prostheses. Some said that they compared prostheses to false teeth. Others said that their youngsters were too young to know and therefore accepted the prosthesis. Some complained that the prostheses were recommended too early (in the cases of upper-extremity amputees only). Many urged amputees to be fitted with prostheses as early as possible. Some asked for pointers on how to explain the usefulness of the prostheses to the child.

Several parents gave information regarding the assistance that they gave their youngsters in dealing with the curiosity of, and teasing by, others. Some parents suggested that other amputees visit their youngsters to see how much could be accomplished. Some parents (of congenital amputees only)

suggested that parents' clubs be formed. It would seem from this that these parents feel a greater need for this type of group therapy. Classes for parents of congenital amputees have been found helpful at the Kessler Institute for Rehabilitation [4].

The parents of patients with acquired amputations accepted the defect and the use of a prosthesis more readily than the parents of the congenital amputees. Several parents of children with upper-extremity amputations (both congenital and acquired) were more interested in hiding the deformity than in function. Some believed that the prosthesis made the deformity more obvious. Several parents of upper-extremity amputees stated that they had not cooperated in helping their children use their prostheses but would do so in the future. Many parents of children with lower-extremity amputations (congenital and acquired) stated that very few outsiders knew of their child's amputation. Some parents were very hostile toward society. A few suggested issuance of inexpensive, informative pamphlets.

There seemed to be a definite correlation between the parental acceptance and the child's adjustment to not only his amputation and prosthesis, but also to his general adjustment in his daily activities. Some parents encouraged a variety of activities; others suggested how parents might introduce new activities for their youngsters; and still others asked to have their youngsters excused from certain activities in school or other group activities.

Prosthetic Fitting and Adjustment

A prosthesis should not be prescribed unless the child is physically ready and the parents are mentally, emotionally, and socially ready for it. The child's readiness is strongly dependent on the readiness of his parents. Sometimes it is necessary to delay prescribing a prosthesis if the amputation is done for a malignant growth. The child should be checked periodically, both clinically and by roentgenograms, for the presence of metastases. Six months is the usual period allowed to lapse before prosthetic prescription. The periodic check-ups for metastases should continue after the prosthesis is provided.

In this study, the interval between the surgical amputation and the prosthetic fitting varied from 1 month to 11 years after operation, excluding the cases with malignant growths. Most were fitted within a year after operation. Some of the upper-extremity amputees were not fitted for several years, particularly those patients seen prior to 1951, principally because of the types of prostheses available at the time. After 1951, the latest developments in upper-extremity prostheses were made available to us.

A total of 182 amputees were fitted with 194 prostheses. In 65 amputees with 73 amputations (26 above the elbow, 34 below the elbow, and 5 multiple) the patients were fitted with upper-extremity prostheses and the following terminal devices: hooks only, 34; hands and hook, 27; and hand only, 4. In many instances, the hooks and hands were provided at the same time. Prior to 1951, only cosmetic or dress hands were provided. After 1951, APRL hands became available and were supplied to 9 amputees in this study. The current practice at the University of Illinois Hospitals Amputee Clinic is to provide an APRL hand (if the child's natural hand is near the size of the currently available APRL hand) only after he has learned to use his hook well and is wearing his prosthesis regularly. Cosmetic or dress hands are seldom recommended, and therefore an amputee usually is in his teens before he obtains a hand. Some parents bought dress hands for their children.

Of the 65 amputees with 73 amputations, 32, of whom there were 29 with unilateral amputations (14 above the elbow and 15 below the elbow) and 3 with multiple amputations, wore their prostheses all day; 13 amputees (5 with above-the-elbow and 8 with below-the-elbow amputations) wore their prostheses for five to eight hours; 8 amputees, of whom there were 7 with unilateral (1 above the elbow and 6 below the elbow) and 1 with multiple amputations, wore their prostheses for three to four hours; and 12 amputees, of whom there were 11 with unilateral (6 above the elbow and 5 below the elbow) and 1 with multiple amputations, wore their prostheses for less than three hours.

Of the 65 amputees with 73 amputations who were fitted with upper-extremity prostheses, 26 (40 per cent) had complaints: pain in the stump or skin irritation in 12; poor fit of the socket in 1; shortness of the stump, making the limb hard to use, in 1; and dissatisfaction with the appearance or no functional benefit in 12. For these youngsters, the functional value of the prostheses in many instances was not sufficient to overcome the discomfort. Regardless of whether the discomfort was organic or emotional, the youngsters did not wear their prostheses regularly.

The extent of the use of upper-extremity prostheses was graded as good, fair, and poor. Good use, which implies that the amputee uses the prosthesis consistently in a diversity of activities as a hand strongly supportive to the natural hand, was reported in 36 instances. Fair use, which implies moderate but active and consistent use within certain areas of activity, was reported in 8 instances. Poor use, which implies that the prosthesis is seldom worn or worn merely as an added appendage, the amputee performing primarily one-handedly, was reported in 21 instances.

A close correlation was found between the length of time that the prosthesis was worn daily and the extent of use. Of the 32 amputees who wore their prostheses all day, 30 had good use and 2 had poor use. Of the 13 amputees who wore their devices for five to eight hours, 5 had good use; 6 had fair use; and 2 had poor use. Of the 8 amputees who wore their devices for three to four hours, 1 had good use (he had a claw hand and wore a hand terminal device for cosmetic purposes only, as he had his own "hook"); 2 had fair use; and 5 had poor use. All 12 amputees who wore their prostheses for less than three hours had poor use.

To the question, "Could the amputee do things faster with the hook terminal device?" there were 43 replies from 65 amputees: 12 replied "yes"; 14 replied "no"; and 17 replied "sometimes." Thus, 29 (67.4 per cent) of these 43 amputees could do things faster either sometimes or regularly when using their hook terminal devices. It is interesting to note here that not one amputee with poor use of the prosthesis answered "yes," and only 3 with poor use answered "sometimes." All except one of the amputees with good use of their prostheses answered "yes" or "sometimes."

The ratings of the amputees as to the usage of the prosthesis were compared (Chart III). In 27 amputees who were fitted with hook and hand terminal devices there were 13 (48.1 per cent) with good usage; 4 (14.8 per cent) with fair usage; and 10 (37.037 per cent) with poor usage. In 34 amputees who were fitted with hooks only, there were 20 (58.8 per cent) with good usage; 4 (11.764 per cent) had fair usage; and 10 (29.4 per cent) had poor usage. These figures indicate that the providing of hands, as well as of hooks, did not improve the children's adjustment to their prostheses; the more basic psychological needs were not met.

The sex of the child with upper-extremity amputations did not seem to

be a significant factor in his adjustment. The cause of the amputation, the dominance of the hand, and the interval between amputation and fitting with the prosthesis seemed to have no specific effect on the adjustment of the child with amputations above the elbow.

Training seemed to be important among children with amputations above the elbow. Of the 11 who had "use" training (by trained professional per-

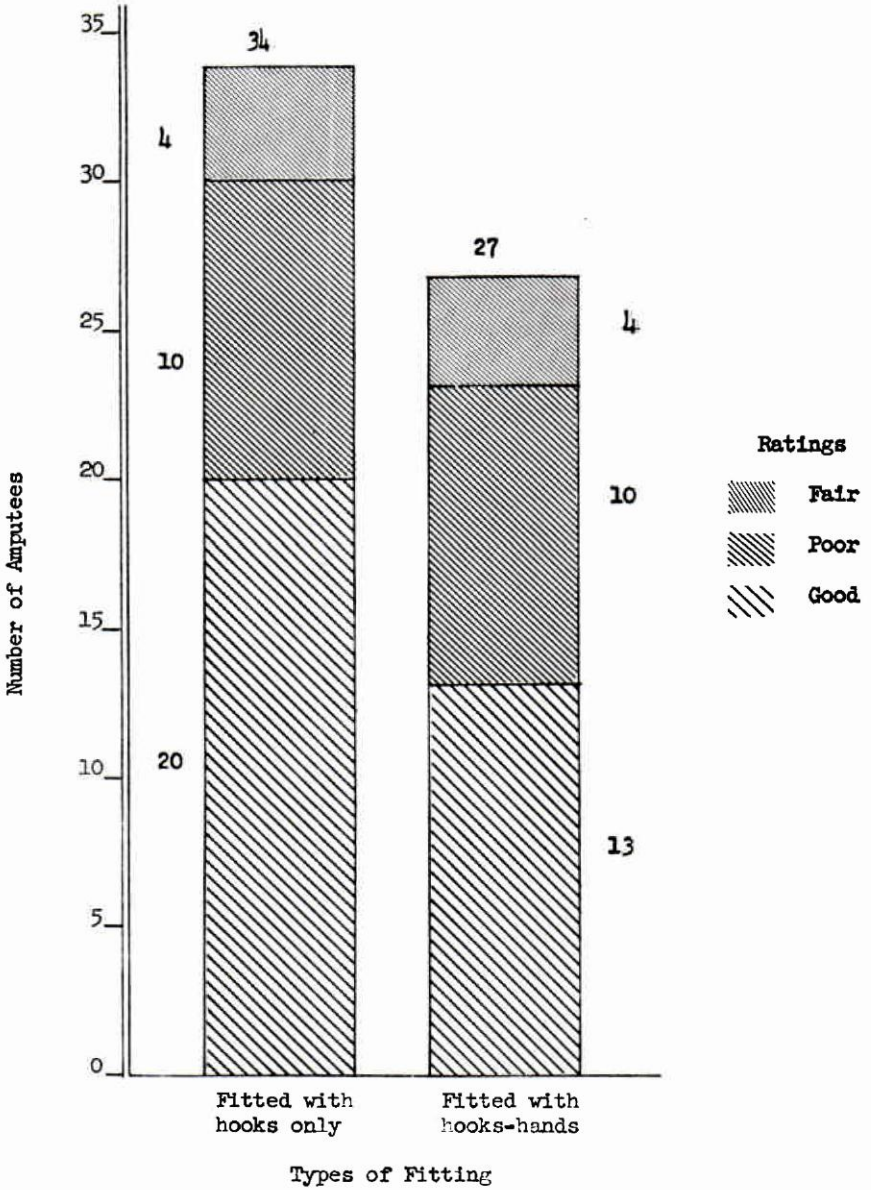

Chart III—Comparison of the ratings of the use of prostheses by 34 upper-extremity amputees fitted with hooks only and 27 fitted with hooks and hands.

sonnel), 7 wore their prostheses all day; 1 wore his for five to eight hours; 1 wore his for three to four hours; and 2 wore theirs seldom or not at all. The 2 children who had "controls" training (by the manufacturer), both wore their prostheses all day. Of the 13 children who had no training, 5 wore their prostheses all day; 4 wore theirs for five to eight hours; and 4 wore theirs seldom.

We found that the child with a congenital amputation below the elbow was not so good about wearing his prosthesis as the child with a traumatic amputation below the elbow.

Of the 22 children with congenital amputations, 7 (31.8 per cent) wore their prostheses all day; 7 (31.8 per cent) wore theirs for five to eight hours; 5 (22.7 per cent) wore theirs for three to four hours; and 3 (13.6 per cent) wore theirs for less than three hours. Of the 11 children with traumatic amputations, 8 (72.7 per cent) wore their prostheses all day; 1 (9 per cent) wore his for five to eight hours; 1 wore his for three to four hours; 1 wore his less than three hours.

Only 9 of the 22 children with congenital amputations below the elbow made good use of their prostheses, whereas 10 of the 11 children with traumatic amputations made good use of theirs. We wonder if this situation could be due to the greater time interval between the congenital amputation and the fitting of the prosthesis. Eight children (the majority) with traumatic amputations were fitted with prostheses 1 year or less after surgery, 2 children were fitted later but less than 2 years after surgery, and 1 child was fitted 11 years after surgery (he had had a partial hand amputation). The youngest of the children with congenital amputations below the elbow was fitted with a prosthesis at 3 years of age; the majority of the children in this group were fitted when they were between 6 and 12 years old. Some parents of the children with congenital amputations below the elbow said that the children did not wear their prostheses because they had learned to do everything with one hand; other parents said that the prostheses were in the way.

The suggestion was made that if the amputees had been fitted prior to 1951 they would have received so little training that they would be reluctant to use their prostheses. It was found, however, that 15 of the 22 children with congenital amputations below the elbow had been fitted after 1951, and from a review of the records it was obvious that the preparation of the parents or amputees, or both, had been inadequate.

The statistics also indicated that the earlier a child with a congenital amputation below the elbow is fitted with a prosthesis, the more likely is he to be a good prosthesis wearer. Children first fitted up to 5 years of age were the best wearers, those from 6 to 12 years old were the next best, and those 13 to 17 years old were the poorest wearers.

The side involved seemed to have some effect on the adjustment of the child with an amputation below the elbow. In this small series it appeared that a child with a congenital amputation below the elbow was a better prosthesis wearer if the left hand, which should have been the supportive hand (as judged from the statistics on handedness in the general population), rather than the right, or dominant, hand was involved. In contrast to this finding, the child with a traumatic amputation below the elbow seemed to be a better prosthesis wearer when the dominant hand was involved.

In this study it was found that children with traumatic amputations below the elbow were good prosthesis wearers whether or not they had had training, whereas children with congenital amputations below the elbow were

not good wearers even though more of them had training. The dexterity of those who had received little or no training could not be evaluated.

All but 1 of 119 children (109 with unilateral and 10 with multiple amputations) who were fitted with lower-extremity prostheses wore their prostheses all day. The one exception was less than 1 year old and wore the prosthesis during all the time he was awake.

Of the 119 children with lower-extremity prostheses, 10 (8.4 percent) complained of either pain in the stump or skin irritation, and 1 complained of poor fit of the socket. Nevertheless, they still wore their prostheses all day.

The extent of use of prostheses by the 109 children with unilateral lower-extremity amputations was graded according to the child's participation in activities.

Above-average use of the prosthesis implies that the child either participates in a wide variety of activities or does not object to the prosthesis or stump being exposed, or both.

Average use of the prosthesis implies that the child participated in a fairly wide variety of activities but preferred not to engage in any in which the prosthesis or stump would be exposed.

Below-average use of the prosthesis implies that the child participated in few activities and would not engage in any in which the prosthesis or stump would be exposed. Either the child or his parents asked for his excusal from the activities.

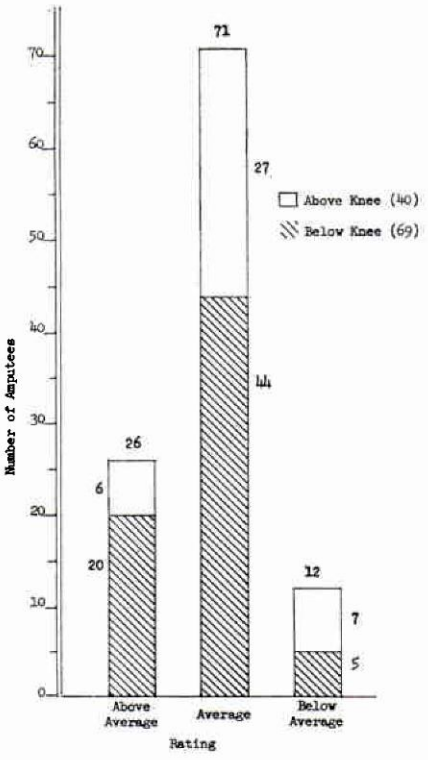

Chart IV—Extent of use of lower-extremity prostheses.

The extent of use of lower-extremity prostheses is shown in Chart IV. It was noted that the child with an amputation above the knee is less likely to participate in activities in which his stump or prosthesis is exposed.

The sex of the child, etiology, the side involved, the training, the age when he was fitted with the prosthesis, and the interval between the amputation and the fitting seemed to have no effect on the way in which the child with a lower-extremity amputation adjusted to the prosthesis. Gait, balance, posture, and the like, however, could not be evaluated.

Training

Training by a qualified therapist in the use of the prosthesis is essential in the rehabilitation of the amputee [5,6,10,11,12]. The training must be adequate to be effective. The amount of training that is adequate varies according to the type of amputation, the prosthetic fitting, the age of the patient, the attitude of the amputee and of the parents, and the amputee's general muscle tone and coordination. The objective of therapeutic exercises and training in the use of a prosthesis is to get maximum effective function of the prosthesis under normal daily living conditions. When a prosthesis is replaced it is considered good practice to review functions, activities, and care with the patient, but usually additional training is not necessary unless a new type of component has been added. Checkout of a new prosthesis to determine whether or not it meets with certain standards is a part of this training. The occupational therapist or the physical therapist, or both, may be involved in the training program.

Gait training, posture, and balance are the usual goals for a patient with an amputation of the lower extremity. The training of the juvenile patient with an amputation of the upper extremity is more difficult. The guides for activities of daily living for adult-amputee training are helpful. Many therapists use the findings of research on the development of children as guides in the training of the juvenile amputee. In general, training starts with play and self-care, followed by various activities leading up to as full independence as possible and eventual educational or vocational rehabilitation, or both. If the child has a hand terminal device as well as a hook, additional training may be needed.

Some of our teen-age patients with traumatic below-the-elbow amputations have become adept in the use of their prostheses in 3 days of training on an in-patient basis. Patients with other types of amputations and younger amputees take an average of about 10 days of training on an in-patient basis. The youngsters who have multiple needs or have complicated fitting problems require longer periods of hospitalization. During this time, the nurses help to carry on the training suggested by the therapists in the daily care and play activities of the patient. Out-patient therapy extends over a longer period of time. Some amputees are able to come in daily, whereas others come three times a week. Gradually, these visits become less frequent. Here again, the type and duration of therapy depend on the individual needs of the amputees. The amputees are expected to master certain functions before training is discontinued.

In the replies to the question concerning training in the use of the prosthesis there was some confusion, in a few instances, with vocational training. The following data, however, were obtained: of a total of 182 amputees fitted with prostheses, 90 said that they had had training; 83 said that they had had none; and 9 did not reply. Of the 90 who said that they had had training, 61 had had "use" training (training by professional therapists) in hospitals, special schools, or treatment centers; 19 had had "con-

trols" training (training by limb manufacturers); and 10 indicated that they had had training by only answering "yes." Of the 42 parents (or patients) who thought that more training would have been helpful, 35 thought that more training was needed to make the patient more independent and able to take better care of the prosthesis. Some respondents said that more encouragement was needed, and others felt the need of a review.

The parents of several children with upper-extremity amputations who had received no training stated that if the children had had training they would have made better use of the prostheses. Parents of children with lower-extremity amputations also stated that if the children had received training they would have walked better or would have better posture, or both. Thus, the comments of many parents indicated that they realized the importance of training. Several parents, who apparently believed that the therapists who had trained the children were inadequate, stated that all therapists should have training with amputees.

Generally, additional training (called "keep-up training" by several parents) as such is not necessary after the child has received adequate training. Usually, an amputee who has been adequately trained in the basic functions quickly learns to apply this training to other activities.

Most of the amputees who had poor use of their prosthesis (poor wearers) and their parents need considerable help in developing better personal relationships. For instance, the child needs to feel loved and wanted, and the parents should express such emotion toward the child and help him to develop greater independence. Both the parents and the amputees need more interpretation of their own feelings about the defects, the injuries, and the prostheses.

The duration, quality, and adequacy of the training, or whether it was on an in-patient or out-patient basis could not be critically evaluated. However, prior to about 1951, plans for training were not routine, and there were few therapists trained in working with amputees. Often, training was not recommended as some of the clinicians seemed to feel that the instructions available from the manufacturer were adequate.

Now, plans for training are arranged as needed. Wherever resources permit, arrangements are made for out-patient training. It has been our feeling that hospitalization should be reserved for the seriously ill child or one needing surgery. In-patient training is arranged if there are such factors as large families, illness in the family, long distances to travel, if the prosthetic problem is a complicated one, and if intensive training is needed. The amount of time varies with the patient and his specific needs. The parents are included in this training program and are instructed in the care of the prosthesis, in training in its use, and in ways to encourage the youngsters to use their prostheses in additional activities. The very young amputees (less than 12 months) are usually not given formal training as such; their training amounts to functional play therapy and help in the development of balance and the ability to get about at will, as the needs may indicate. Instruction of the parents is especially emphasized during visits for occupational or physical therapy. In-patient therapy may be arranged for the very young amputee if necessary.

Follow-Up

Fitting the child with a prosthesis and teaching him to use it expertly does not necessarily mean that he will make good use of his prosthesis. He needs to be seen periodically not only to check his use of it in every-day activities but to encourage him in additional activities.[10,12] The length of the time interval between clinic visits varies—it may be as often as once a

month during the period of rapid growth, after the first fitting with the prosthesis, or in the event that a difficult fitting problem is encountered. Parents and patients are advised to feel free to get in touch with the clinic or field staff earlier, if necessary. On these clinic visits: the family may be given further instructions in the care of the stump if skin irritations have arisen, a stump revision may be found necessary, repairs or adjustments of the prosthesis may be made, a new prosthesis may be ordered, bad habits in the use of the prosthesis may be prevented or corrected, and the family may be given further suggestions regarding the use of the prosthesis.

Of the 136 persons who replied to the question about clinic recheck examination, 68 (49.9 per cent) stated that they return to clinic every 6 months; 29 (21.3 per cent) return to clinic every 3 months; 26 (19.1 per cent) return yearly; and 13 (9.5 per cent) return at various intervals. It was also found that the non-wearers and the poor users kept clinic appointments in about the same fashion as the good wearers.

Repairs and adjustments (to which there were 114 replies) were needed at intervals ranging from 3 months to more than 1 year. The cost of upkeep is therefore an important consideration. The repairs most frequently needed were: replacements of straps, leather and rubber parts, and screws and bolts; new joints; new washers; new feet (for the below-the-knee more often than for the above-the-knee amputee); new pelvic belts for above-the-knee amputees; repair of fingers; and new cables and new harnesses. The below-the-knee amputees needed the most repairs; next came the below-the-elbow amputees, then above-the-knee amputees, and, finally, above-the-elbow amputees. The families contribute toward the cost of repairs according to their ability to pay. The need for repairs (unless due to neglect or abuse) is an indication that the amputees are using their prostheses. Because the cables break frequently two cables, or cable units, are now supplied to the upper-extremity amputees. When one breaks, the spare is applied, and parents are advised to replace the broken one as soon as possible so that a spare will always be available.

There were 98 replies to the question as to how long the first limb had remained satisfactory (59 amputees in this study had been fitted with their initial prosthesis only). There were 30 (30.6 per cent) who had used their limbs for 3 years; 30 (30.6 per cent) for 2 years; and 26 (26.5 per cent) for 1 year, and 12 (12.6 per cent) whose limbs lasted for various periods. The problem of a limb that is outgrown before it is outworn is ever present, and every effort is made to cope with it. On an over-all basis, however, the cost per amputee is one of the lowest expenditures, and the results, in most instances, more than justify the outlay of funds.

The questions did not consider other aspects of follow-up care. Clinic follow-up is supplemented by home visits, school visits, and conferences with other persons or agencies concerned with the patient's adjustment. The community nurse is the key person in integrating the total care of the juvenile amputee. State and local agencies for education, public health, and social welfare, both voluntary and government, the amputee's family physician, pastor, school counselors or other school personnel, the local public-health nurse, the caseworker, local therapists, psychologist, or some fraternal group—in fact, almost anyone who is needed to help in the child's and the family's adjustment—may be involved in the rehabilitation of amputees. Acceptance at home alone will not suffice. The child must have happy group experiences.

Social Acceptance

An important factor in the juvenile amputee's adjustment is his acceptance by various individuals and groups outside the home, such as neighbors and church, school, and recreational groups. Problems concerning children with lower-extremity amputations are rare. Considerable prejudice against children with upper-extremity amputations exists, however, and this seems to increase when the child is fitted with a hook prosthesis. A recent survey indicates the need for further study of social influences on amputees.[13] A close correlation has been found between the degree of acceptance of the child with upper-extremity amputations in these outside relationships and the development of a satisfactory attitude toward the handicap and the prosthesis by the child and the family. Both the parents and the child may need help in their approach to others so that it enhances rather than aggravates the situation when the youngster meets other people.

In many instances, of course, social prejudice is a product of ignorance and superstition. Education of the public is the answer here as it is with other problems of prejudice. This educational process needs to be continuous to be effective.

There is a trend to send these youngsters, unless severely handicapped, to regular school, although this trend has not yet been generally accepted. Schools frequently accept the youngsters, but the parents, however, want the child to attend a special school. Free transportation to and from special schools seems to influence some parents.

Of the 133 amputees who answered the question concerning whether or not they wore their prostheses to school, all but 14 replied in the affirmative. Of these 14, 1 had multiple amputations, 5 had above-the-elbow amputations, and 8 had below-the-elbow amputations. It is interesting that in this study not one parent said the school would not permit the child to wear the prosthesis.

Of the 121 who replied to the question concerning activities permitted in school, 100 said that they were permitted to wear their prostheses in all activities. The activities prohibited by some schools were swimming, gymnastics, baseball, and football. (Swinging was not permitted for some children with upper-extremity amputations.) All activities except sports and all sports except football, basketball, or gym were permitted if the child did not wear his prosthesis. In our questionnaire we failed to consider whether the child attended a hospital school, special school or room, or a regular school. Moreover, even in a regular school, there is a difference in activities, so that saying that a child participates in all activities in one school does not necessarily mean that this school has more understanding than others in which the activities are "limited."

Some youngsters in this study are in the Little League or Pony League; however, we have noticed that many of them do not play bimanually. There has been some question as to whether or not these youngsters are as well adjusted as appears on the surface.

One very important fact which was mentioned several times was that these youngsters would like to participate in games for which sides are chosen. In several instances, mention was made that other children did not like to touch the hook, as, for example, in such games as crack the whip and other hand-holding games.

Information based on how the parents thought that their children were accepted by school personnel, children, and neighbors was tabulated and graded as follows:

Above-average acceptance by the school, community, and children implies that the child is well accepted as one of the group. The child is helped toward greater independence, and his situation is often interpreted to others.

Average acceptance implies that the child participates as one of the group in activities.

Below-average acceptance implies rejection from the group and its activities or acceptance only as a handicapped and dependent person. Of the 129 respondents to the question on the attitudes of the principals and teachers, 51 specified above-average acceptance; 74 specified average acceptance; and 4 specified below-average acceptance. Of the 132 respondents concerning the attitude of the school children, 37 specified above-average acceptance; 91 specified average acceptance; and 4 specified below-average acceptance. Of the 138 respondents to the question of attitudes of neighbors and friends, 35 specified above-average acceptance; 96 specified average acceptance; and 7 specified below-average acceptance. It is interesting to note that of the 15 children who were reported to have below-average acceptance (all types of amputation), 7 had amputations below the elbow; 3 had amputations below the knee; 2 had amputations above the knee; 2 had amputations above the elbow; and 1 had multiple amputations. Apparently, the child with amputation below the elbow seems to have the most difficulty in social acceptance.

Several parents said that their youngsters did not wear their prostheses during play for fear of hurting themselves or others. Instances in which children with prostheses accidentally hurt themselves or others have been rare, and the injuries were no more than minor bruises. Deliberate use of a prosthesis as a weapon has rarely occurred. Nose-pinching with the hook terminal device has caused parents of playmates concern and has definitely impeded the amputee's acceptance. It is wise for children with upper-extremity amputations not to wear their prostheses in body-contact sports or games.

Several parents and amputees brought out the problem of finding jobs. Many told of successful job placement and job accomplishments, household care, and care of babies. It is especially important that prospective employers be reached so that when the patient becomes employable, a job suitable to his training and ability is open to him, since our ultimate goal is a well adjusted, independent individual. The Division of Vocational Rehabilitation is active in this area, and several amputees in this study had had, or were having, job training or higher education through this agency. Besides governmental activities in this field there are many voluntary agencies and fraternal clubs active in this work.

Summary

Although this questionnaire did not cover the various facets of rehabilitation as well as had been hoped for, it revealed some interesting findings.

Greater stress should be placed on prevention, since the largest number of amputations were on a traumatic basis.

Definite conclusions could not be made about surgical treatment. However, the need for further study of growth patterns was definitely indicated. It was noted that although the greatest number of revisions were in the children with amputations below the knee, most of these were done for the acquired amputations due to trauma, malignant growth, and disease; very few revisions were done in the below-the-knee conversion amputations of congenitally anomalous lower extremities.

After the necessary surgery, aftercare of the stump is very important. Physical therapy to maintain, or obtain, full range of motion in the remaining

joints is often started before surgery. Bandaging the stump to reduce induration and edema and to shape the stump is recommended. This study reveals the need to stress and to review instructions in stump hygiene with the patient and parents.

More investigation is needed as to the age when a child should be fitted with a prosthesis and the age when training should begin. Most physicians associated with amputee services recommend that a prosthesis be fitted at the earliest possible age, providing that the child is physically, emotionally, socially, and mentally ready. All agree that when a child with a lower-extremity amputation is ready to walk, he is ready for a prosthesis. If the amputation is acquired, the youngster should be fitted with a prosthesis as soon as the stump is in good condition.

There seems to be no universal agreement as to what is the earliest possible age for an upper-extremity prosthesis to be fitted. Passive prostheses have been put on children at about 4 to 6 months of age to teach them to hold or push an object against the normal hand and gross grasping, such as holding a nursing bottle; to have the child become accustomed to the added length of the stump; to encourage the youngster to tolerate an appliance; and to help in functional activities. Recommendations for fitting with a prosthesis depend on the child's development rather than his age.

Further investigation of the influence of the hand which is dominant seemed to be indicated.

The child with amputation above the elbow is as good a prosthesis wearer and user, within the limits of his increased handicap, as the child with below-the-elbow amputations.

The fitting of children with upper-extremity amputations with a hand terminal device did not improve their adjustment to the prosthesis. It has been our experience, with rare exception, that the anticipation of getting a hand is greater than the realization.

Children with lower-extremity amputations and those with traumatic amputations below the elbow wore their prostheses whether or not they had had training. However, training was very important to the adjustment to the prosthesis of the child with amputations above the elbow. Children with congenital below-the-elbow amputations were the poorest prosthesis wearers. This is not meant to imply that training is not important to all groups. Rather, it points out that some types of amputees find their prosthesis helpful to them whether or not they have had training. The initial preparation did not seem to be adequate for children with congenital below-the-elbow amputations. Perhaps they need a different approach or a different method of training. It may be that earlier fitting with a prosthesis, as is now done, may resolve this problem. It was definitely found that this group of children showed the best results when fitted with a prosthesis before they were 5 years of age.

The child's evaluation of himself, his parents evaluation, and the attitude of the whole population were brought out repeatedly in these questionnaires as being very important factors in his rehabilitation.

The study also revealed the need for greater dissemination of the available information to the many disciplines concerned with the rehabilitation of the child amputee.

NOTE: A special acknowledgment is due to Roland Zook, Social Research Analyst, University of Illinois Division of Services for Crippled Children, for his help with the statistical analysis and the charts. Sincere appreciation is expressed for the assistance of the following rehabilitation centers: The Rehabilitation Institute of Chicago; The Liberty Mutual Insurance Company Rehabilitation Center in Chicago; The Institute for Crippled and Disabled, New York, N. Y.; The Kessler Institute for Rehabilitation, Pleasant Valley

Way, West Orange, New Jersey; The Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center; and, especially, to the Michigan Crippled Children Commission's Area Child Amputee Program, Grand Rapids, Michigan.

It would be difficult to list individually the many persons of various disciplines who were helpful, not only with the questionnaire, but also with our criteria, but we would especially like to express our appreciation to Dr. Sidney Fishman, Project Director, and other staff members of the Prosthetic Devices Study, Research Division, New York University, College of Engineering, Research Division. We also wish to express our appreciation to other personnel of the University of Illinois Research and Educational Hospitals and Clinics and of this Division for their assistance with this study.

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A QUESTIONNAIRE SURVEY OF JUVENILE AMPUTEES

APPENDIX

UNIVERSITY OF ILLINOIS
DIVISION OF SERVICES FOR CRIPPLED CHILDREN
1105 South Sixth Street
Springfield, Illinois

ARTIFICIAL LIMB STUDY

NAME_____ BIRTHDATE_____ CASE NUMBER_____
ADDRESS _____
(Street) (City) (County)

1. (a) What part or parts of the body are involved?
   Right arm: Above elbow_____ Below elbow_____
   Left arm: Above elbow_____ Below elbow_____
   Right leg: Above knee_____ Below knee_____
   Left leg: Above knee_____ Below knee_____
   (b) What was the cause of the amputation:
   (1) Born that way_____
   (2) Accident _____ What kind?_____
   (3) Disease_____ What? _____
   (4) Tumor or growth _____
   (c) Was an operation necessary before getting the limb(s)?_____
2. (a) At what age was your child fitted with his first limb?_____
   (b) Did you or another agency buy a limb for your child before he was referred to this Division? Yes_____ No_____ Name of agency?_____
   (c) If (b) was answered "yes," who prescribed that limb?_____
   (d) Did he have any training in the use of the limb at that time? Yes_____ No_____ If "Yes," where did he get the training?_____
3. Who referred your child to the Division of Services for Crippled Children? (Circle)
   (a) Your family physician?
   (b) Your public health nurse?

(c) A limb manufacturing company?
(d) Someone else? Who?_____

4. (a) Did you understand what the doctor and other clinic staff said to you and your child at the clinic? Yes_____ No_____
   (b) Did you need more time at the clinic? Yes_____ No_____
   (c) How do you think the clinic staff might have been more helpful to you in understanding your child's needs?_____
5. Did your child accept the idea of being fitted with a limb? Yes_____ No_____
   If he didn't:
   (a) Did you discuss this with the clinic staff? Yes_____ No_____
   (b) What did you do to help your child's attitude toward getting the limb?
6. (a) How old was your child when he was fitted with a limb by this Division?_____
   (b) After your child was fitted with this limb:
      (1) Did he have any training in its use? Yes_____ No_____
      (2) If he had training, where did he get it?_____
      (3) Do you feel it would have been helpful if he had more training? Yes____ No_____ If yes, why?_____
      (4) What instructions were you given on the care of the stump?_____
7. (a) How many hours a day does your child wear the artificial limb(s)? (Circle)
   (1) 1 hour (2) 2 hours (3) 3-4 hours (4) 5-8 hours (5) All day
   (b) If he attends school, does he wear the limb at school? Yes_____ No_____
   (c) Is he permitted to wear it in all school activities? Yes_____ No_____
   If no, in what activities is he not permitted to participate?_____
   If no, in what activities does he participate but is not permitted to wear the limb?
   (d) If not worn routinely, why? (Circle those that apply) Because of:
   (1) cosmetic appearance (2) pain in stump (3) poor fit of socket
   (4) it is not permitted in school (5) skin irritation of stump (6)
   Other reasons (state)_____
   (e) What is the attitude of the principal and teachers?_____
   (f) What is the attitude of the school children?_____
   (g) What is the attitude of neighbors and friends?_____
   (h) Does he like to play with other children? Yes_____ No_____
   (i) Does he prefer to stay at home? Yes_____ No_____
8. If your child was fitted with an arm and hook prosthesis:
   (a) List activities he does with its help.
      (1) Dressing and personal care (Examples: opening toothpaste tubes, pulling on socks, lacing shoes.)
      (2) Eating (Examples: use of knife and fork, use of bottle or can opener.)
      (3) Work (Examples: hammering nails, using spray gun, putting clips on paper, carrying three or more packages.)
      (4) Social (Examples: wearing of hook or hand to various social activities, opening wallet or purse.)
   (b) Which of these you listed is he able to do without the hook? (List)
   (c) Does he do these faster with the hook? Yes_____ No_____ Sometimes____
9. If your child has an artificial hand as well as a hook:
   (a) How many hours a day does he wear the hook?_____
   (b) How many hours a day does he wear the hand?_____
   (c) Does he wear the hand only for dress occasions such as church, parties, etc.? Yes_____ No_____
10. (a) Have you purchased another limb since the Division made one available? Yes_____ No_____ When?_____ Why?_____
   (b) Have you purchased extra parts for the original limb? Yes_____ No_____
   If "yes," What?_____
   (c) If you changed to another limb, give reasons why?_____
      (1) Is present limb: (Check or circle)
         a. Better than b. As good as c. Not as good as original
11. How often does your child return to clinic for re-check examinations? (Circle)
   (a) Every 3 months (b) Every 6 months (c) Every 9 months
   (d) Every year (e) Over a year
12. How often has the limb required repair or adjustment for length?
   (a) Every 3 months (b) Every 6 months (c) Every 9 months
   (d) Every year (e) Over a year
13. If your child has had his first limb replaced, how long did the first limb remain satisfactory?
   (Circle) (a) 1 year (b) 2 years (c) 3 years (d) Other (state)_____
14. How do you think we can be more helpful to children like yours?

THE RETIREMENT OF THE EXECUTIVE DIRECTOR AND THE SELECTION OF A SUCCESSOR

A report by Paul E. Leimkuehler, President of AOPA, and by Howard Thranhardt, C.P., president of the American Board for Certification.

This memorandum to readers of the *Journal* is a condensed report regarding the recommendations to the Boards of Directors of both AOPA and Certification from the Special Committee, concerning the retirement and replacement of the Executive Director, Glenn Jackson.

First of all, let us explain why the Special Committee was established.

Glenn Jackson, Executive Director of both AOPA and ABC, announced in January 1960, his desire to retire as of October 31, 1960. This decision was referred first to the AOPA-ABC Joint Finance Committee for the following reasons:

Mr. Jackson was originally employed by AOPA (then called OALMA) in 1946. Then, when ABC was organized in 1948, Mr. Jackson was employed also as its Executive Director. It was decided that the two organizations could and should utilize the same offices and the same staff. This resulted in the necessity of forming a Joint Committee which would deal with important matters affecting both organizations.

Mr. Jackson's salary, for instance, has been paid 50% by AOPA and 50% by ABC. Similarly, the salaries of the other members of the staff, the cost of rent, cost of supplies, furniture, etc., have been divided, as seemed fair, by decisions made by this Joint Committee.

The Joint Committee, by original action of the two Boards, has consisted of the two presidents, the Secretary-Treasurers (originally each had its own treasurer—now they have one treasurer for both) and the Executive Director without vote.

In effect, this Joint Finance Committee has been the only official "bridge" between the two organizations. This explains why Mr. Jackson's retirement was first referred to this Joint Finance Committee.

That Committee met and decided that the matter should be referred to a meeting of the two Executive Committees. This Joint meeting of the two Executive Committees was held in Washington on March 8, 1960. Our first thought was to refer the matter to a joint meeting of the two Boards of Directors; but this would entail a meeting of some twenty people and cost several thousand dollars. It was also felt that more than one meeting would be necessary to come to any definite decision. (The fact that the Special Committee has held three meetings, plus phone conferences, has born out this prediction.)

The Joint Executive Committees decided that it was best to create a Special Committee of five, to make a thorough investigation of the situation, and to present their report to the two Boards for approval.

It was decided that the Committee should consist of the two current presidents and three carefully selected past presidents. (We felt the past presidents had been through the mill and understood the National Office procedures.)

The Special Committee selected consisted of:

Paul Leimkuehler—Current President, AOPA.
Howard Thranhardt—Current President, ABC.
Chester C. Haddan—Past President, AOPA and ABC.
Frank Harmon—Past President AOPA and Director of ABC.
D. A. McKeever—Past President, AOPA and ABC.

The Committee was directed to select its own chairman. When the Committee met on April 6, 1960, in the Statler Hotel, Washington, D. A. McKeever was elected as chairman.

The Committee felt that more than just a replacement for Glenn Jackson was necessary. AOPA and ABC have had growing pains over the past ten years, and we should consider the past and future of both organizations. Following are some of the aspects of the future, which the Committee felt should be taken into account:

1. We are headed into a field of increasingly complex relationships.
2. Our people have made a good start toward becoming a profession. This start must be continued with emphasis upon the conditions which obtain in a true profession.
3. The big emphasis must be upon education—including seminars, courses and four-year college curriculum.
4. We recognize the importance of research and the need to continue as an active participant; and finally, as the prime user of all good products and procedures.
5. We recognize the need for ever improving our physical facilities, equipment, and the business management aspects of all local facilities.
6. We need to complete the National Survey and to secure the maximum value from its findings.
7. We need to emphasize the significance of Certification. This means an expansion of the "public relations" side in order to impress upon doctors, agencies, and the public the values of supporting the certified facility.

Out of the discussion came the feeling that our association needed a good "front man"—an organizer and friendly leader. Our Certification movement and education activities needed a talented educator.

At this point, the Committee was thinking of a strong Director with assistants in each organization. We had no preconceived ideas as to who it would be. We decided to leave no stone unturned and consider many applicants.

We received applications from the present staff, from members of the American Society of Association Executives, and the Association of Medical Society Executives. Some of our members and members of related organizations were suggested, but when contacted, they did not wish to be considered. Others were suggested; but when contacted, we found their pay was already higher than we could afford. In all, some thirty applications were received and considered. After careful appraisal of the remaining candidates, three of the "outside" candidates and the two members of our staff were asked to appear before the Committee in Washington on May 25, 1960. During the search for candidates, much informal discussion with members was carried on. Many letters and phone calls were received by the Committee from the Regional Directors.

The interviewing of the five candidates—three from outside our staff and our two present staff—served to crystallize one conviction. It was that, while each of the three outside men had certain valuable assets to commend him, only one seemed qualified. He spoke well and had an excellent background; but he would have to learn to know us as individuals and as a profession and industry. In contrast, our two staff members each possessed this background and each had special talents which could be important to our future.

How could we best utilize these talents and values? *Would it not be possible and wise to separate the two organizations so far as executive leadership is concerned?* The Committee then examined this possibility.

From the very start, the two organizations have been organically separated. One is a trade association; the other is a standards-making organization.

The AOPA does all the things that are proper in a trade association and consisting of a wide variety of programs and services to its members. The ABC devotes itself to certifying of individuals and facilities, which means the handling of applications, developing and giving examinations and generally, seeing to it that all certified persons and facilities live up to the code and rules of the Board.

There would seem, therefore, that there are good reasons for considering that each of the two organizations should have its own executive. Moreover, the special strengths of the two staff men, Lester Smith and Lee Nattress, appear to fit the special requirements respectively of AOPA and ABC.

Accordingly, the Special Committee came to the conclusion that the best solution was, and it so recommends:

1. That AOPA and ABC each have its own Executive using joint facilities and office staff as far as practical.
2. That Lester Smith be appointed Executive Director of AOPA with the principal responsibilities for all operations relating to trade association matters, and to disseminate information and implement procedures.
3. That Lee Nattress be appointed Executive Director of the ABC with the principal duty of examination and certification but with specific responsibility for the survey of the Industry Project for OVR and indirect responsibility for the Education Program of AOPA.
4. That Glenn Jackson be retained as a Consultant, with specific responsibility to represent the joint organization with OVR on the Survey Project and such other matters as may be specifically requested at a later date.

The Committee recognizes that its recommendations may not be a "perfect" solution. But we believe it is the best plan available under all the circumstances. The plan faces some possible hazards. It will require the coordination of the two executives and the office staff. We feel that a bridge is necessary between the two organizations, and that possible expansion of the Joint Finance Committee to a Joint Planning Committee would be the answer.

The Special Committee feels a continuing responsibility and is willing to "stand by" until the new set-up is working.

By the time you read this condensed version of the Committee's recommendations, your Regional Directors will have received a ballot, an official report of the Special Committee, and data on each of the three "outside" candidates interviewed. They will also receive copies of a report describing the desired qualities of a good Executive Director, and a memorandum outlining Glenn Jackson's present duties. From this information, it is hoped your Regional Directors will be able to vote for the best interest of both organizations.

In conclusion, we feel that the Special Committee has done a superb job. We have never worked with a more democratic and free-thinking group.

PAUL E. LEIMKUEHLER, *President*
American Orthotics and Prosthetics Assn.

HOWARD THRANHARDT, *President*
American Board for Certification

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CROSS COUNTRY REPORT

What's New in the Brace and Artificial Limb Field
Meetings - AOPA - Suppliers - Certifees

REGION IX HONORS SPEAKERS

A unique feature of Region IX's Meeting at Los Angeles May 7, was a presentation of Testimonial Plaques to the technicians who had presented outstanding sessions. In the picture above, left to right, we see: AOPA Vice President Fred Quisenberry, Ivan Dillee of N.Y.U.'s Prosthetic Devices Study, Thomas Pirrello, Jr., and Isidore Zamosky, from VAPC, Norman Berger, Assistant Director of NYU's Prosthetic Education Program and AOPA Regional Director Harvey Lanham, whose idea it was to create these plaques—mementoes of a highly successful meeting.

SNELL'S FACILITY MOVES TO NEW AND LARGER QUARTERS IN NASHVILLE

Snell's Limb and Brace Company has moved to new quarters in Nashville, Tennessee. The new address is 1729-31 Church St. The telephone number remains CHapel 2-6483. This news prompts the editor to request that when a firm does move to a new location that they send to the editor a photograph of the new building and a sketch of the floor plan. We are building a reference file of such plans and sketches for the information of other firms which may be planning a new building.

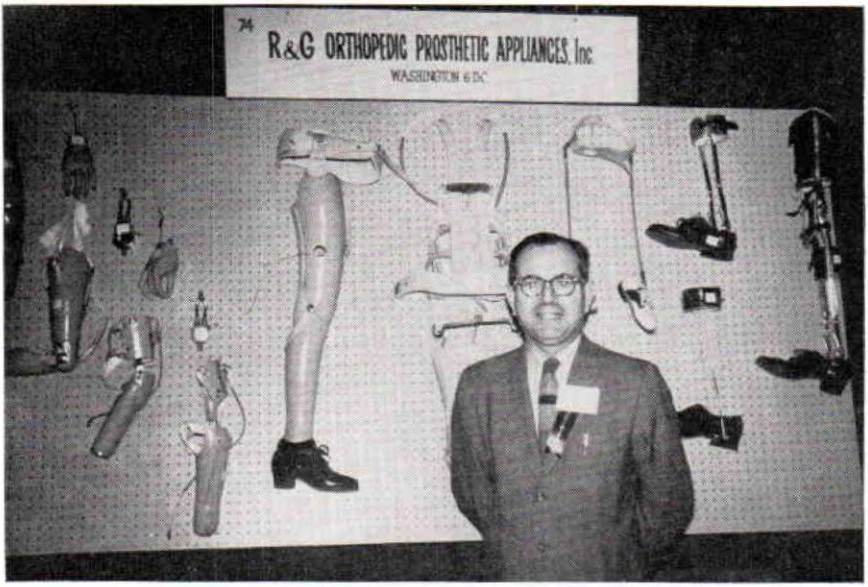
REMOVAL ANNOUNCEMENT

Prosthetic Services of San Francisco announces the removal of its laboratory to 46 Shipley Street, San Francisco 7. The firm now has its own building and floor space of approximately 8,400 square feet.

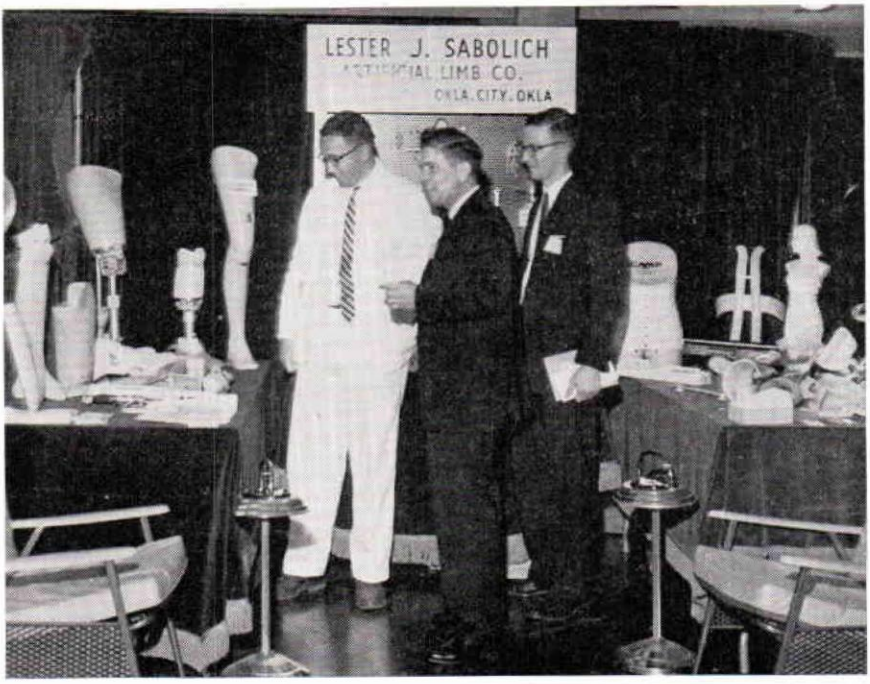
The location is about a quarter of a mile from its former location in downtown San Francisco, but more into the industrial area. C. O. Anderson, president of the corporation, states that there will be many advantages. The principal one, of course, is space will now be available for the development of new products in the prefabricated line, which have proven so popular. Working conditions and facilities will be considerably improved and the service should now become better than ever.

Mr. Anderson states that he wants to thank all customers for their patience on orders during the removal, when production was temporarily paralyzed.

AOPA MEMBERS EXHIBIT AT MEDICAL MEETINGS



Charles G. Ross with his display which attracted wide attention at the District of Columbia Medical Society Meeting.



Lester Sabolich shows his display to two physicians at the Oklahoma Medical Association meeting.

WORTHWHILE PROGRAM AND FUN FEATURED AT THE ANNUAL MEETING OF THE PENNSYLVANIA ORTHOTIC AND PROSTHETIC SOCIETY

The Pennsylvania Orthotic and Prosthetic Society is better known as "POPS."

The 1960 get-together of this group was held at the Lycoming Hotel in Williamsport, Pennsylvania, April 22-24.

Allen Jones, State Area Supervisor of Rehabilitation, was the principal speaker. His subject was "Rehabilitation of the Handicapped in Pennsylvania." Basil Peters and Charles Wright of Philadelphia teamed up for a presentation and discussion of the new patellar tendon bearing "B/K" limb.

In the annual Business Session Mr. Tom Coggins, head of the firm of Nulty, Coggins of Philadelphia, was elected to membership. Les Smith of Washington Headquarters reviewed plans for the 1960 Assembly and brought greetings from the national A.O.P.A.

Members picked Harrisburg as the city for the 1960 Meeting and chose this slate of experienced officers: Eugene Teufel was chosen President, and Alfons Glaubitz was chosen Secretary-Treasurer. Both are residents of Elizabethtown, Pennsylvania, and were formerly partners. Mr. Glaubitz is now head of the Brace Department at the State Hospital there.

Anthony R. Cocco of Philadelphia was elected Vice President and Nunzio Pulizzi of Williamsport is Public Relations Officer.

The Executive Committee of the Society includes Miles Stump of Feick Brothers in Philadelphia, Karl Barghausen, Gerald Zielke, Edward Sulima and Past President E. A. Warnick.

The Meeting concluded Sunday with a reception and brunch at the Certified Facility of the Williamsport Orthopedic Company. Here the Pulizzi ladies were hosts. Mrs. Louis and Mrs. Nunzio Pulizzi and Mrs. Philip Pulizzi are famous for the table they set, and they outdid themselves on this occasion.

This Annual Meeting of the Pennsylvania Society is always a reunion of old friends. This year it was especially nice to see again Mrs. Andrew Pope, widow of the founder of the National Limb Company of Pittsburgh, arriving with her daughter and son-in-law, Mr. and Mrs. Joel Kalas. And Rich Greene of Erie, Pennsylvania was there with his son, Rich, Jr. F. S. Dillon of Meadville, Pa. was on hand and received many compliments about his fine Florida tan. The suppliers were represented by John McCann, Jr., and by Lou Hirsch.

Mr. Kurt Nelson of Pittsburgh, Director of Region III, reviewed the plans for the Region's meeting at Bedford Springs, Pennsylvania.

BEN WILSON REJOINS RESEARCH PROGRAM

Mr. A. Bennett Wilson, Jr., has resumed full-time his former position as Staff Engineer to the Committee on Prosthetics Research and Development. Mr. Wilson has long been interested in prosthetics research and was formerly Executive Secretary of the Advisory Committee on Artificial Limbs. Most recently he has served as Secretary to the Committee on Advances in Prosthetics (CAP) of the American Orthotics and Prosthetics Association. In announcing his departure and his resignation from AOPA, Carlton Fillauer, Chairman of CAP, declared that "Our Association has gained from his stay with us. His departure is a loss but I understand that he will be available for consultation."

To the Ladies:
FROM OALMA'S AUXILIARY

Mrs. Margaret Peters
President

Mrs. Gertrude Buschenfeldt
Vice President

Mrs. Pearl Leavy
Second Vice President

Mrs. Margaret Brownfield
Secretary

Mrs. Lorraine Scheck
Treasurer

Dear Reader:

I am taking this opportunity on behalf of the Auxiliary to wish the recently wed Mr. and Mrs. Richard L. Gottheiner and Mr. and Mrs. James D. Snell every happiness in the years ahead. Agnes Gottheiner has already joined our Auxiliary and I look forward to Rose Anna Snell becoming a member.

Only three more months until we will have the pleasure of seeing each other again at the Convention in New York City. I only hope we will have time to get caught up on all our news. Beverly Eschen of New York City, our Program Chairman, is planning a busy and exciting time for the Auxiliary. As soon as plans have been completed, we will send them on to you.

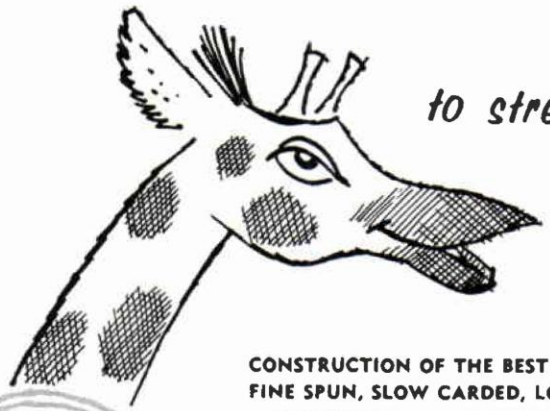
Have you seen the travel brochure and itinerary on the post-Assembly trip to Bermuda? Who can resist it?

This is a short letter this time, but then we will all be seeing each other shortly in New York City, so until then,

Sincerely,
MARGARET PETERS

GRANT FOR EXTERNALLY-POWERED U/E ORTHOSES

The Department of Rehabilitation of Baylor University College of Medicine in conjunction with the Orthotics Department of the Texas Institute for Rehabilitation and Research, and the Division of Biophysics, Department of Physiology of Baylor University College of Medicine have recently received a Grant from the Office of Vocational Rehabilitation for the purpose of research in design, application, and control of externally powered upper extremity orthotics.



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AOPA WELCOMES ASSOCIATE MEMBER FROM THE REPUBLIC OF MEXICO—DR. RODOLFO MARTINEZ HERREJON

Dr. Rodolfo Martinez Herrejon, an Associate Member of the American Orthotics and Prosthetics Association, is only 42 years old, but he has won distinction in two fields—as a prosthetist and as a physician. Dr. Martinez entered the artificial limb field in 1935 as an assistant to his father, Rodolfo Martinez, Sr., who had an artificial limb establishment in Mexico City, and has continued his interest in prosthetics to date. At the present time he manages two separate establishments in Mexico City—one devoted to artificial limbs and the other to orthopedic appliances.

Always anxious to increase his knowledge, Dr. Martinez spent the year 1946-1947 at the famous Canadian War Veterans Hospital now known as "Sunny Brook." He returned to Mexico City to resume the management of his firms, and also to begin attendance at the famous Medical School of the National University of Mexico, Mexico City. He served his internship at Jaurez Hospital in 1950-1951, where he is now a member of the medical staff. For the next four years he was in the Traumatic and Orthopedic Service at Colonia Hospital of the National Railways of Mexico. In 1952 he received his Degree in Medicine.

Since 1954 Dr. Martinez Herrejon has been a member of the staff of the Primavera Orthopedic Clinic in Mexico City, where he is a professor in the Postgraduate sessions in Orthopedics. He is also a member of the Medical Staff of the Lions Club Hospital and a Teaching Professor at the "Adela Ann de Yglesias" School of Physiotherapy at The American-British Cowdray Hospital in Mexico City. This year he opened the Prosthetic Clinic of The Colonia Hospital of the National Railways of Mexico.

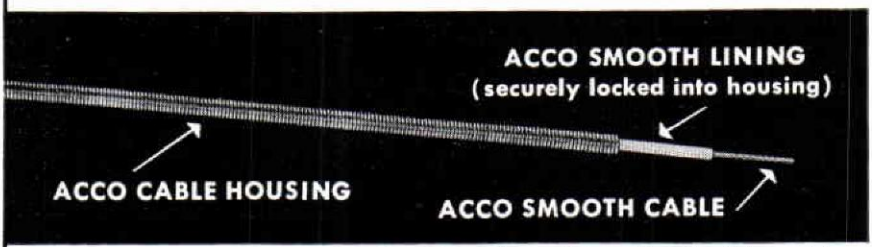
Dr. Martinez is a founder-member of the Mexican Rehabilitation Association and the Medical Association of the Primavera Orthopedic Clinic, of which he is a Director.

Dr. Martinez Herrejon has many friends in the United States. He is a graduate of the Prosthetics Course at the University of California at Los Angeles. Many members of the Association had the privilege of meeting Dr. and Mrs. Martinez and their charming daughters last October, when the Association was co-sponsor of a Prosthetics Seminar at the Mexican Rehabilitation Center. Mrs. Martinez, who was educated at the University of Chicago, will accompany Dr. Martinez Herrejon to the National Assembly in New York City September 2-6.

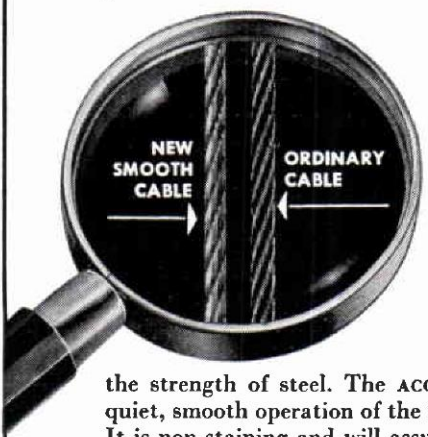
ACCO Lined Conduit and Smooth Cable

provide Quiet, Easy Operation

A complete line of ACCO Tru-Loc cables and fittings is available to help improve prosthetics and limb shop practices. Recommended by the Committee on Prosthetics Research and Development, the various ACCO assemblies feature reclaimable and re-usable major fittings as well as the unique new ACCO smooth lining and smooth cable.



This exclusive ACCO combination of tough conduit, nylon-lined for minimum friction, and smooth cable assures quiet, smooth operation and exceptional service life. The nylon lining prevents squeaks, grunts, and jerks. Army Prosthetics Research Laboratory swaged fittings available.



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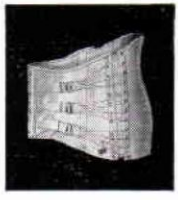

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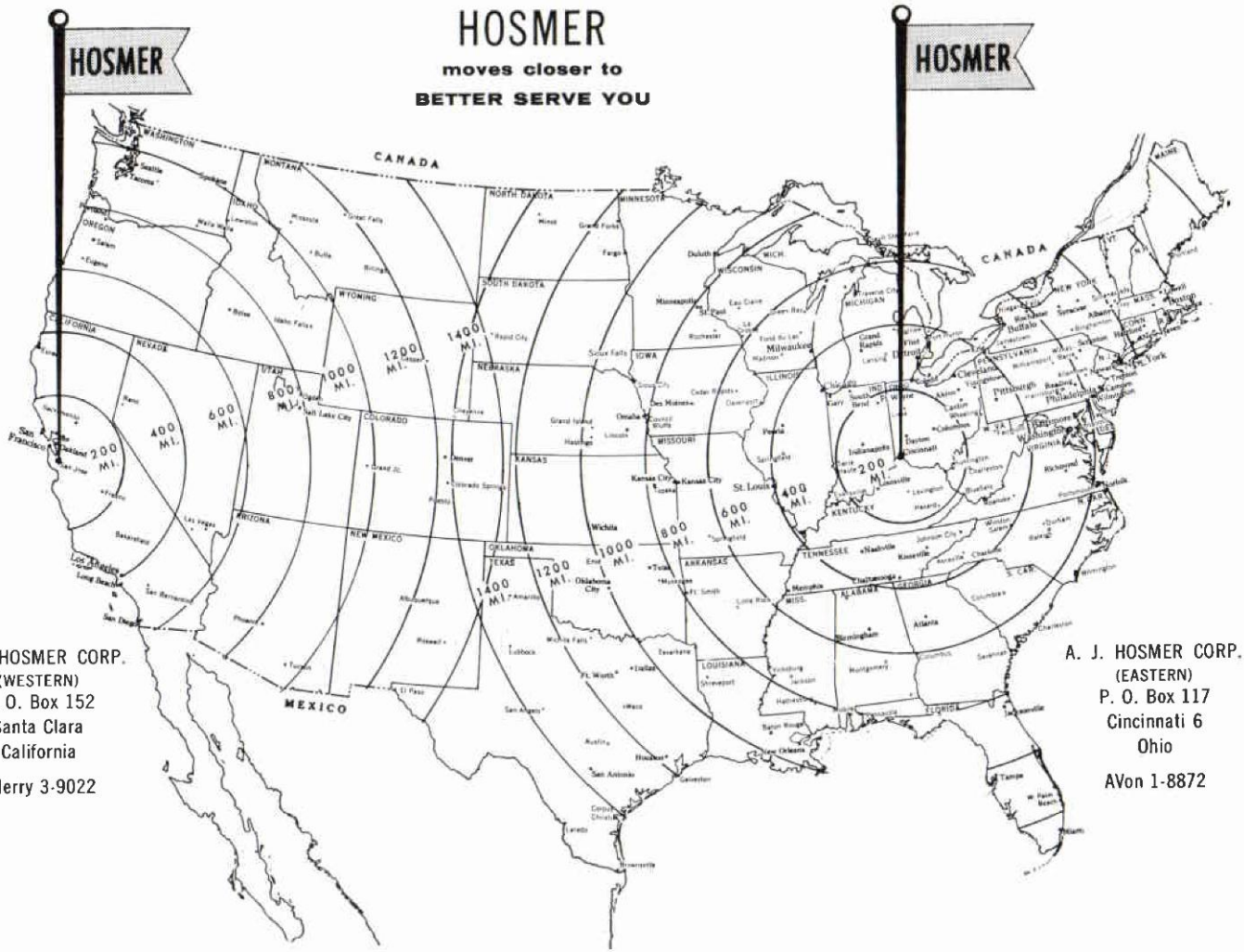

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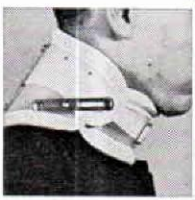

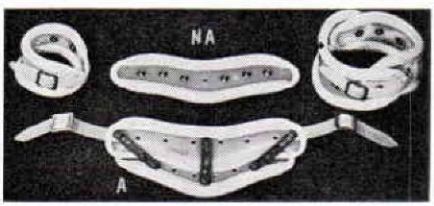

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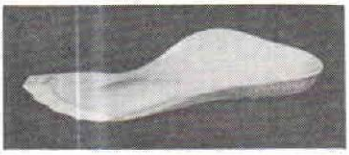

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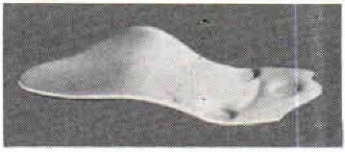

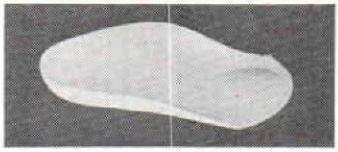

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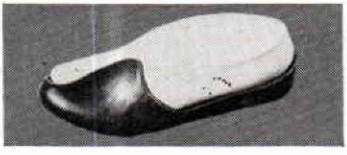

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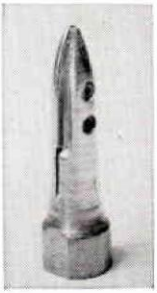

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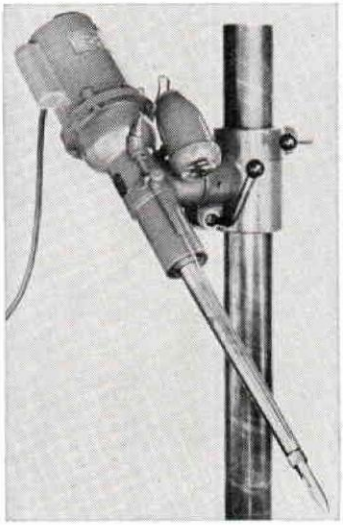

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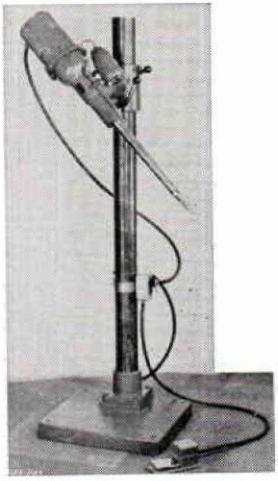

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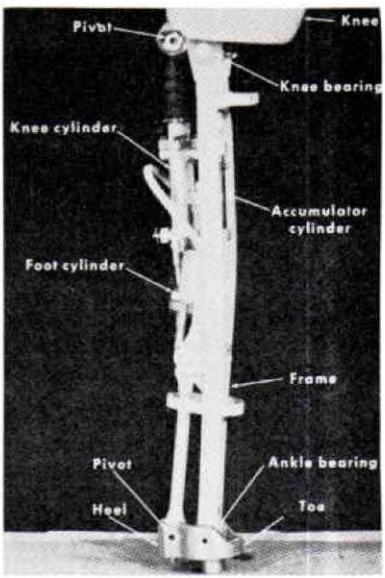

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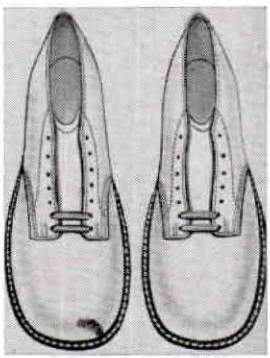

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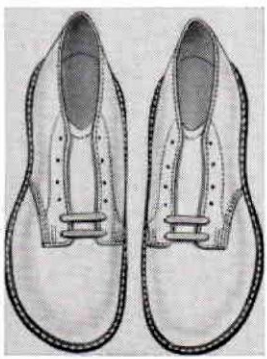

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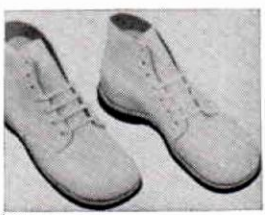

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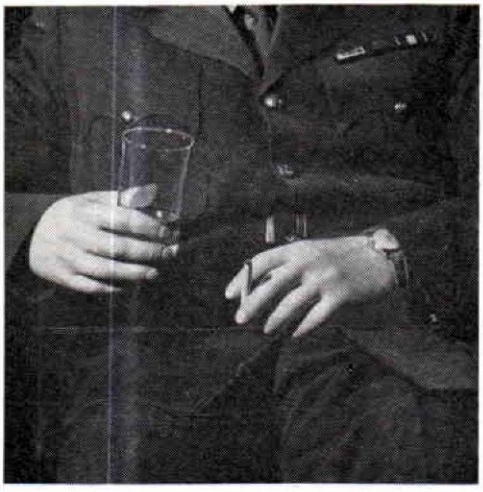

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