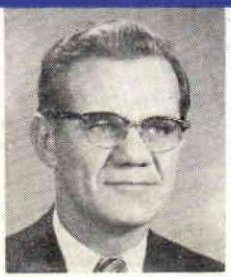
MARCH, 1961

ORTHOPEDIC & PROSTHETIC APPLIANCE JOURNAL

The Journal of the Limb and Brace Profession

TITUS



PETERS

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McGRAW

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GRUMAN

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Directors of the Association

(See page 72)

LANHAM

publisher: American Orthotics and Prosthetics Association

SCHEDULE OF MEETINGS AND EXHIBITS, 1961

SPONSORED BY THE AMERICAN ORTHOTICS AND PROSTHETICS ASSOCIATION

I. NATIONAL ORTHOTICS AND PROSTHETICS ASSEMBLY—Oct. 19-26, at the Eden Roc Hotel, Miami Beach, Florida.

Richard G. Bidwell, C.P., C.O., Program Chairman

Bert Titus, C.P., C.O., Vice Chairman

George H. Lambert, C.P., C.O., Exhibits Chairman

Erich Hanicke, C.P., C.O., Chairman, Special Technical Devices Committee

Program suggestions should be addressed to the Program Chairman, AOPA Headquarters, 919-18th St., N.W., Washington, D. C.

II. REGIONAL MEETINGS

In 1961, the Association will sponsor a series of eleven regional meetings, as shown in the schedule below. Attendance is open to all who are interested in the rehabilitation of the orthopedically handicapped.

Requests for reservations and program suggestions should be addressed to the Regional Director listed below. Consult the Orthopedic and Prosthetic Appliance Journal for additional information about programs, reservations, etc.

1961 Regional Meetings

April 14-16—Region III and Pennsylvania State Society at Harrisburg, Pa. Regional Director: Basil Peters, B. Peters Co., 1127 South Broad St., Philadelphia, Pa.

April 21-23—Region X, at the Sheraton-Palace Hotel, San Francisco. Regional Director: Herbert J. Hart, C. H. Hittenberger Inc., 421 19th St., Oakland, Calif.

April 28-30—Region IX, at Los Angeles. Regional Director: Harvey Lanham, Long Beach Artificial Limb and Orthopedic Co., 1043 Pine Ave., Long Beach, Calif.

May 5-6—Region II, at the Hotel Commodore, New York City. Regional Director: Mrs. Mary Dorsch, Dorsch-United Limb & Brace Co., 109 E. 29th St., New York, N.Y.

May 12-14—Region V, at the Statler-Hilton Hotel, Detroit, Mich. Regional Director: D. R. Coon, D. R. Coon Company, 4200 Woodward Ave., Detroit, Mich.

May 19-21—Region VIII, at Hotel Baker, Dallas, Texas. Regional Director: David C. McGraw, Snell's Limbs & Braces, Inc., 1833 Line Ave., Shreveport, Louisiana.

June 2-4—Region VI, Midwest. Regional Director: Richard G. Bidwell, House of Bidwell, Inc., 535 North 27th St., Milwaukee, Wisconsin.

June 9-11—Region VII, at Minneapolis, Minnesota. Regional Director: Robert C. Gruman, Winkley Artificial Limb Co., 1330 Washington Ave., N. Minneapolis, Minn.

June 16-17—Region IV, at the George Vanderbilt Hotel, Asheville, N.C. Regional Director: Bert Titus, Director, Department of Prosthetic and Orthopedic Appliances, Duke University Medical Center, Durham, N.C.

Orthopedic and Prosthetic Appliance Journal

(Title registered U. S. Patent Office)

VOLUME 15 • MARCH, 1961 • NUMBER 1

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The *Orthopedic and Prosthetic Appliance Journal* is issued four times a year—in March, June, September and December. The 1961 subscription price payable in advance is five dollars a year, for delivery anywhere in the Western Hemisphere. The subscription rate elsewhere is six dollars a year.

Publication does not constitute official endorsement of opinions presented in articles. The *Journal* is the official organ of its publisher, The American Orthotics and Prosthetics Association (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.

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DEPARTMENTS

SUPPLIERS SECTION—INFORMATION ON SUPPLIERS LIMB AND BRACE FIELD

Advertising in the *Journal:* The *Journal* is published March, June, September and December. Advertising contracts for these issues are issued on an annual basis. The *Journal* is supplemented by the AOPA *Almanac* published in the other eight months of the year.

Advertising rates are full page $65.00 per issue—half page $40.00 per issue.

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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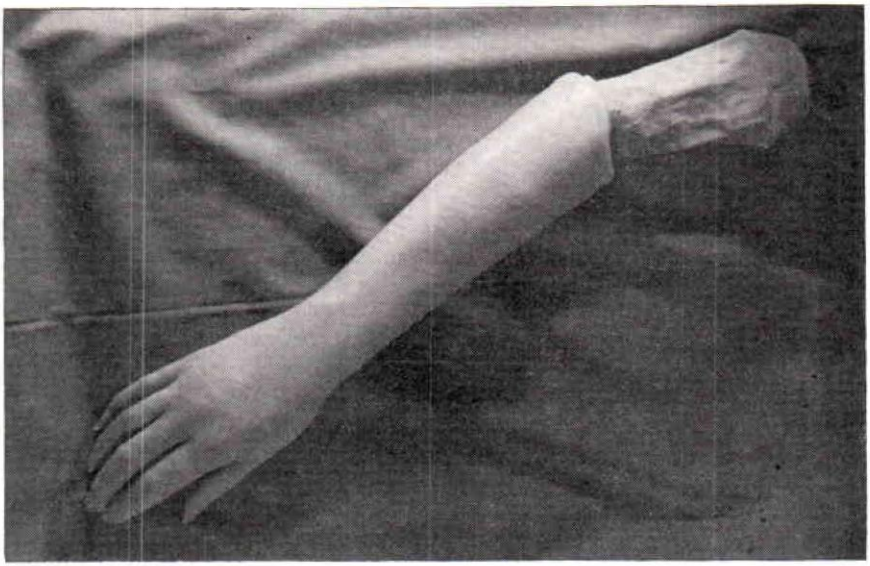
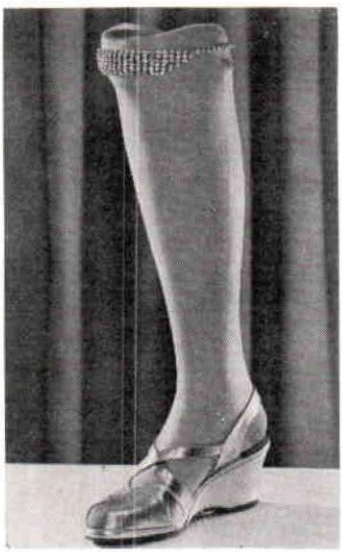
SUPPLIERS INDEX—March, 1961

Realastic®

New Products





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The inexpensive unitized cosmetic restoration shown above.
The REALASTIC F-40. Stiffened forearm prosthesis—lightweight, easily fitted. For long, medium or short B/E amputations and for wrist disarticulation. Can be ordered adapted to your case or by components for assembly. All REALASTIC Production glove sizes.

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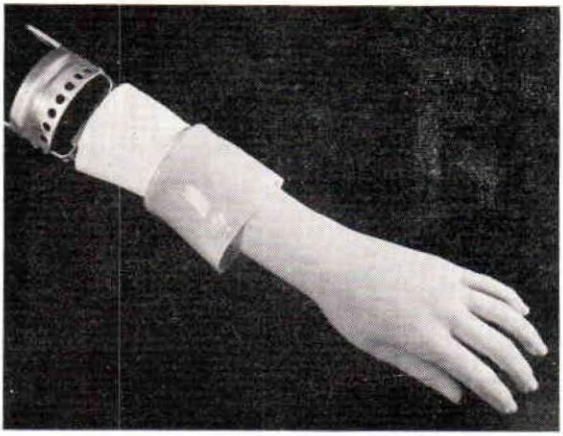

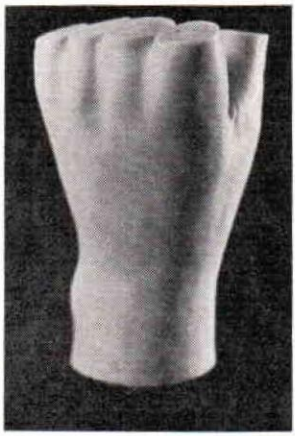

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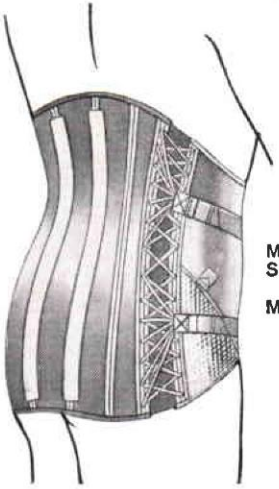

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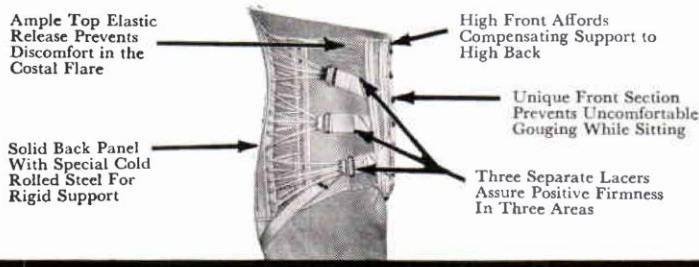

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In 1960 Camp authorized National Family Opinion, Inc., an independent research firm, to make a study of 15,000 families regarding the wear and purchase of health supports by known male and female users. Some of the conclusions of value to dealers are these: 29% of the males purchased their garments at a surgical appliance store; 37% of the male wearers were recommended a specific brand by their doctor and 75% of the male wearers were told by their doctors of a specific place to purchase. Continuous surveys like this one keep Camp and Camp dealers ahead of competition.

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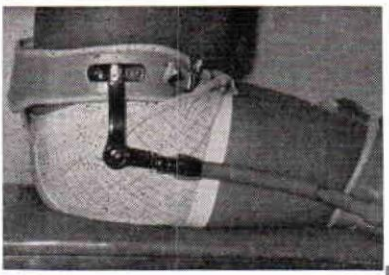

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- BALL BEARING HIP JOINT
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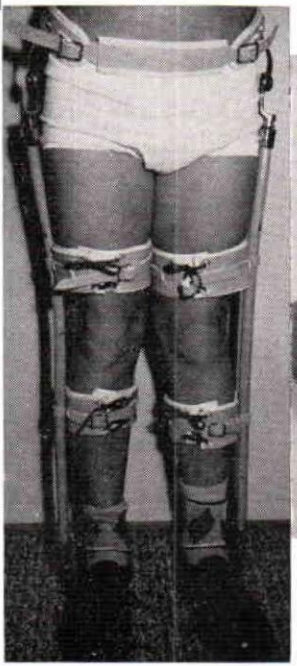

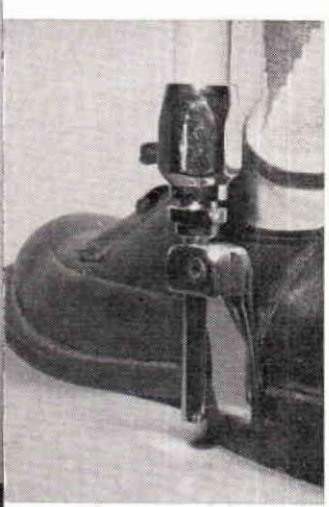

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LENGTH: 1½" required from end of stump to elbow center
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3

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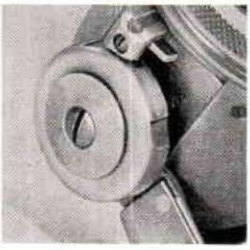

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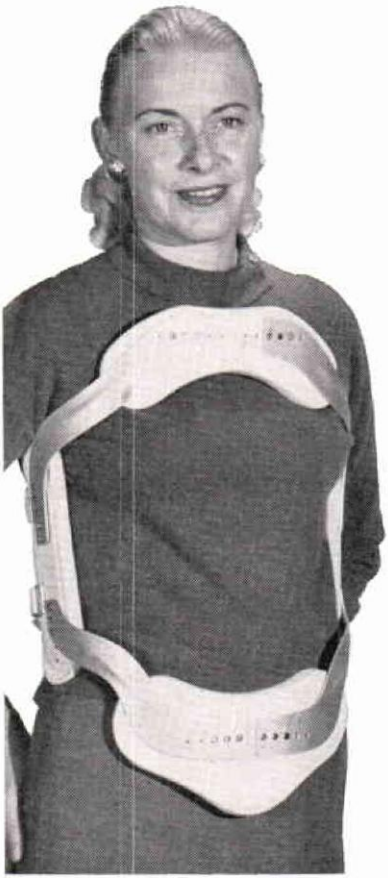

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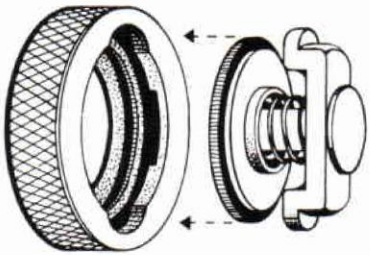

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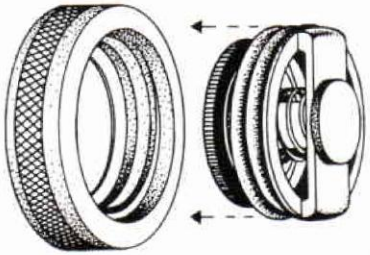

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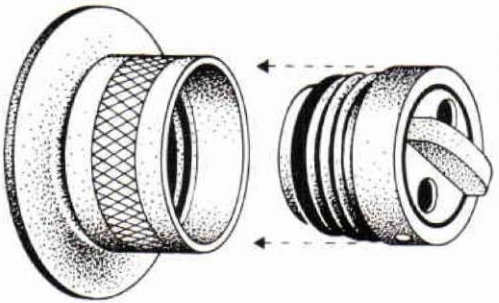

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An Appeal to Prothetists and Orthotists

By HOWARD A. RUSK, M.D.

Director, Institute of Physical Medicine and Rehabilitation, New York University Medical Center and President, World Rehabilitation Fund

Orlando Hector Basilio Gonzales has a long name for an eight year old boy. Long names, however, are not unusual for Chileans. It was in the southern part of Chile which had been devastated by earthquakes that I met Orlando in November 1959. I was visiting a clinic directed by a competent young Chilean physician who had been trained in the United States. Orlando, who is severely disabled from poliomyelitus, was but one of several score of children there. The young doctor turned to me and said, "It's braces and prostheses I need most. What can I do without braces and prostheses?"

He was so right. His appeal reminded me of the same appeal I had heard so many times before throughout the world — in Korea in the last days of the war in 1953; of Sister Joan Margaret at St. Vincent's School in Haiti whose two deaf mute bracemakers have used metal from steel oil drums; of the U.S.-trained physicians in the Philippines, Burma, Nigeria, Bolivia and many other parts of the world.

Throughout the world a network of physicians trained in modern rehabilitation methods is beginning to evolve. In some nations, they number only one, two or three. In no nation, including the United States, is the supply adequate, but the numbers are increasing.

Unfortunately in practically all of the newly developed nations, progress in developing adequate prosthetic and orthotic services has lagged behind the increasing availability of physicians with modern training in rehabilitation.

There are some exceptions. In Korea there are two prosthetic technicians trained in the United States (one is certified by the American Board for Certification) and a number of other competent prosthetists and orthotists trained by U. S. military personnel and Church World Service personnel during and after the Korean conflict. In addition, facilities and individuals in Natal, Southern Rhodesia, the Argentine, Cuba, Haiti, Israel, Korea, Lebanon, Pakistan, Puerto Rico, Thailand, and Venezuela are among the more than 150 foreign subscribers who receive the Orthotic and Prosthetic Appliance *Journal* published quarterly by the American Orthotics and Prosthetics Association.

At the United Nations pilot demonstration project in rehabilitation at the University of Sao Paulo, Brazil, there is an excellent prosthetics program organized by a Danish expert.

Pilot projects supported by the United Nations and World Veterans Federation are beginning to develop modern services in Viet Nam, Burma, Thailand and Indonesia.

With equipment provided by C.A.R.E. and the International Society for the Rehabilitation of the Disabled (formerly the International Society for the Welfare of Cripples) a new brace shop opened in Bolivia with an

orthotist and a physician trained in the United States under a fellowship from the World Rehabilitation Fund. Also, a new prosthetic shop in La Paz will soon be staffed by a prosthetist trained in Puerto Rico and a physician trained at the Kessler Institute for Rehabilitation in New Jersey.

American University in Beirut has just started an amputee rehabilitation program staffed by a physical therapist-prosthetist, husband and wife team. The prosthetist, a Lebanese, was trained at the Institute for the Crippled and Disabled.

In the summer of 1960, a French-speaking Spaniard, who is now in his fourth year of training in prosthetics and orthotics, conducted an eight-week course in basic orthotics at Port-au-Prince for six Haitian trainees. C.A.R.E. has now provided a new orthotics shop for St. Vincent's School in Port-au-Prince where two of his trainees work.

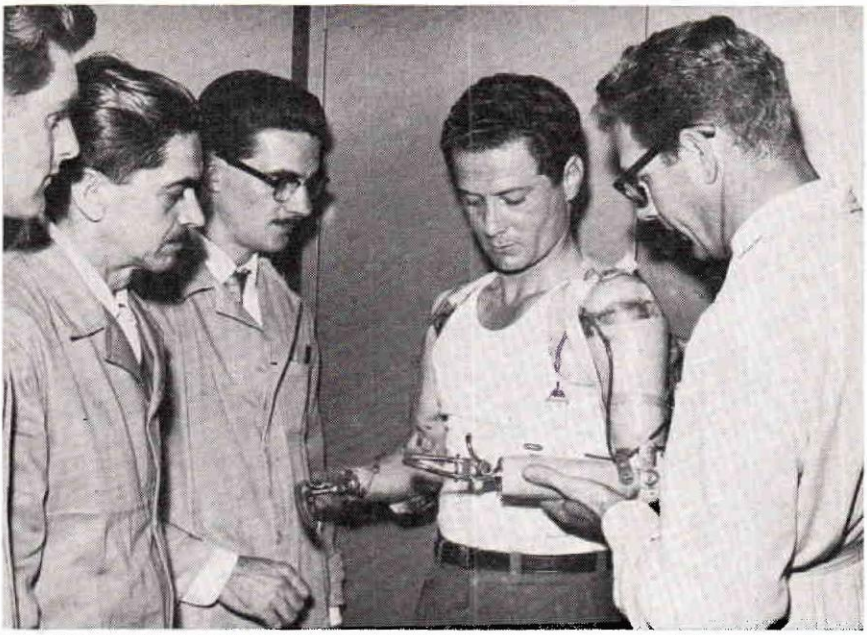
Orthopedic surgeons working in the MEDICO project in Jordan report a Jordanese bracemaker there is making satisfactory orthotic devices.

During the past several years the World Rehabilitation Fund has known of many instances where trained prosthetists and orthotists were available in several nations but general economic conditions within such nations prevented them from being able to import supplies. At such times, the World Rehabilitation Fund has appealed to various groups, usually the Metropolitan Orthopedic Appliance and Limb Manufacturers in New York, for contributions of used braces and prostheses. The response has always been very good.

Through a joint effort of the Committee on the Handicapped, People-to-People Program; Veterans Administration; American National Red Cross, Office of Vocational Rehabilitation and the World Rehabilitation Fund nearly three thousand used but serviceable prostheses were distributed to such nations as Chile, Bolivia, Korea, The Philippines, Indonesia, India, Pakistan and Haiti. One thousand of the prostheses were delivered to Indonesia on the "Hope" ship. The remainder were shipped overseas through the Catholic Relief Services, National Catholic Welfare Conference; C.A.R.E.; and the American-Korean Foundation.

In the spring of 1961, the World Rehabilitation Fund in cooperation with a number of other agencies will conduct a campaign among the prosthetic and orthotic industry to collect used but serviceable orthoses and prostheses. The items contributed will again be distributed to the nations in which there is sufficient trained personnel that these items can be modified and adapted for use. The value of such contributions plus shipping costs will be tax deductible. When the items are delivered to the agency which will use them, appropriate presentation ceremonies will be held with the cooperation of the American Embassies and United States Information Service in those nations to publicize the program as a voluntary effort of the American prosthetic and orthotic industry. With the full cooperation of the industry this can be an extremely significant project, for it will not only bring services to thousands of disabled persons throughout the world, but will re-emphasize throughout the world the value which we in a free society place upon individual worth and human dignity.

For information on how to make contributions of used prosthetic and orthotic supplies, write The World Rehabilitation Fund, 400 East 34th Street, New York 16, New York.



UN PROSTHETIST INSTRUCTS BRAZILIAN STUDENTS—Mr. Erik Jensen, of Denmark, with students at the Institute of Rehabilitation, University of Sao Paulo, Brazil. The Institute, started in 1956 under the direction of Prof. F. E. Godoy Moreira, has been aided by technical assistance from the UN, World Health Organization and International Labour Organization.

SIX HAITIAN ORTHOTISTS RECEIVE TRAINING FROM MR. JUAN MONROS—Seven weeks basic training was given these men at Port-au-Prince where St. Vincent's School for the Handicapped has a new brace shop provided by CARE, but must rely on contributions of used braces for its program.

The Committee on Prosthetics Education and Information

National Academy of Sciences National Research Council—A Report

By HAROLD W. GLATTLY, M.D.
Executive Secretary, Committee on Prosthetics Education and Information

This article is the first of a series of reports concerning the activities and interests of the Committee on Prosthetics Education and Information of the National Academy of Sciences—National Research Council that will appear in the official publication of the American Orthotics and Prosthetics Association, the *Orthopedic and Prosthetics Appliance Journal.* An invitation to become a regular contributor to this periodical was recently addressed to the committee's chairman, Dr. C. Leslie Mitchell, by Mr. Lester A. Smith, the Executive Director of AOPA and editor of the *Journal.* CPEI welcomes the opportunity of establishing communication through this medium with the readers of this organ that include not only the prosthetists and orthotists of this country, but many hundreds of other individuals who have an interest in improving rehabilitation services to amputees and to individuals with other crippling orthopedic disabilities. It is our hope that, by means of these articles, the members of the limb and brace profession will achieve a better understanding of the national effort that is presently being organized in the field of prosthetics and orthotics education and will join with the Committee in the furtherance of its program.

These serial reports will cover the history of CPEI, its mission and objectives, and the activities and projects that comprise its present educational and informational program.

It is a truism to state that education is fundamental to progress in all fields of human endeavor. It is through education that trades and vocations achieve a professional status. A characteristic of any profession that embodies the use of scientific knowledge and an art in its application—as for example the medical profession—is the fact that all of the data and information relating to this vocation have been carefully collected, evaluated, systematized and organized to form the basis for a formal educational program for the training of individuals entering into that profession. During the past fifteen years, the prosthetists of this country have witnessed a profound change in the practice of their profession as a result of the development of an educational program relating to their discipline. It is not too optimistic to believe that during the coming decade a formal education program will be available for the training of those entering the practice of prosthetics. A similar sequence of events will also occur in the field of orthotics. A discussion of orthotics education will appear in a future issue of the *Journal.*

Until the Artificial Limb Program of the National Academy of Sciences was organized shortly after World War II, no comprehensive and systematic study of the problems involved in the rehabilitation of amputees had ever been made. With the support of the Surgeons General of the Army and Navy, and the Medical Director of the Veterans Administration, the Academy developed a program of biomechanical and medical research in the interest of developing improved devices, a better knowledge of the amputee as a patient, and a rational approach to his care and management. This program has

been monitored and coordinated through the years by a series of committees of the National Academy of Sciences—National Research Council that culminated in the formation of the Prosthetics Research Board in 1955. It was early recognized that amputee rehabilitation was a multidisciplinary problem involving the skills of certain physicians, prosthetists, and physical and occupational therapists. This led to the concept of the prosthetics clinic team and this idea has proved to be one of the most effective developments of the Artificial Limb Program. In 1950 the Veterans Administration began the organization of amputee clinics in certain of their medical institutions and these clinics have since served as a pattern for the establishment of specialized facilities for non-veteran amputees. A prerequisite to the formation of these amputee clinics was the availability of specialized prosthetics training for the team members. To this end, the Veterans Administration initiated in 1953, at the University of California at Los Angeles, an experimental educational program consisting of short, intensive courses for physicians, prosthetists, and therapists. A second program of courses was organized at New York University two years later, and a third program was initiated at Northwestern University in 1959. Now supported by the Office of Vocational Rehabilitation, these courses have come to be a permanent part of the Artificial Limb Program.

From all these activities there has come not only an armamentarium of greatly improved prosthetic devices but also an extensive compilation of information relating to the component functions of the human extremities, to the medical problems peculiar to amputees, and to the care and management of the limbless from the child congenital to the geriatric. This material can be used to develop permanent prosthetics educational programs in teaching health centers.

In 1958, it was recognized by the Prosthetics Research Board of the Academy-Research Council that, although the results of the Artificial Limb Program were then available for veteran amputees, the vast majority of our non-veteran amputee population were without the advantages of prosthetics clinic team management. Although a high percentage of the prosthetists in this country had taken the courses offered by UCLA and NYU, only a mere handful of physicians, physical therapists and occupational therapists had received this specialized prosthetics training. The vast majority of the members of the medical profession had been relatively unaffected by this educational program. As a result, the clinic-team concept of amputee management had as yet not gained general acceptance throughout the United States. Many states did not have even one organized clinic for the non-veteran amputees who in consequence were presenting themselves at limb shops without a prescription for a prosthesis. This was true with respect to both rural and metropolitan areas, including even those that are the sites of major medical centers. This situation existed primarily from a lack of information on the part of physicians with respect to the modern concepts of amputee management that stemmed from the Artificial Limb Program.

The Office of Vocational Rehabilitation and the Prosthetics and Sensory Aids Service of the Veterans Administration recognized that the millions of dollars of Federal funds that have been devoted to prosthetics research could be translated into improved amputee rehabilitation services only by a program that would educate, train and inform the members of the relevant medical and paramedical disciplines who are responsible for the care and management of this form of disability. These government agencies therefore requested the Prosthetics Research Board to develop a program to supplement the educational activities of the prosthetics schools.

The Committee on Prosthetics Education and Information was then organized as a committee of the Prosthetics Research Board in the spring of 1958, under the chairmanship of Dr. Alfred R. Shands, Jr. The Committee, as originally constituted, was composed of individuals with national stature in the more important disciplines concerned with the rehabilitation of amputees and cripples of an orthopedic character. The composition of the group is here presented with the picture of the Committee that was taken at the time of their first meeting, March 13, 1958, at the National Academy of Sciences. The following guest speakers participated in this initial meeting of CPEI:

Brig. Gen. F. S. Strong, Jr., Chairman, Prosthetics Research Board;

Miss Mary E. Switzer, Director, Office of Vocational Rehabilitation, Department of Health, Education and Welfare;

Dr. Robert E. Stewart, Director, Prosthetic and Sensory Aids Service, Veterans Administration;

NEW MEMBERS OF CPEI—Pictured during their first meeting, at the National Academy of Sciences in Washington March 13, 1958, are nine members of the newly constituted Committee on Prosthetics Education and Information. Seated, left to right: Col Harriet S. Lee, Chief of the Army Medical Specialists Corps, Office of the Surgeon General, Department of the Army, Washington; Dr. Alfred R. Shands, Jr., Medical Director of the Alfred I. duPont Institute of The Nemours Foundation, Wilmington, Del., and Chairman of the Committee; June Sokolov, Executive Director of the Hartford Rehabilitation Center, Hartford, Conn.; and William M. Bernstock, Assistant Chief of the Research and Development Division of the VA's Prosthetic and Sensory Aids Service, New York City. Standing, left to right: W. Frank Harmon, of the Atlanta Brace Shop, Atlanta; Renato Contini, Research Coordinator for the NYU College of Engineering, New York City; Dr. Herbert W. Park, Professor and Chairman of the Department of Physical Medicine and Rehabilitation at the Medical College of Virginia, Richmond; McCarthy Hanger, Jr., President of the J. E. Hanger Company of Missouri, St. Louis; and Dr. Samuel S. Herman, Chief of the Division of Medical Services and Facilities of the Office of Vocational Rehabilitation, Department of Health, Education, and Welfare, Washington. Absent when the picture was taken were the two remaining members of CPEI, Dr. George T. Aitken, orthopedic surgeon with the Mary Free Bed Guild Children's Hospital, Grand Rapids, Mich.; and Dr. Henry H. Kessler, Medical Director of the Kessler Institute for Rehabilitation, West Orange, N. J.

Mr. Glenn E. Jackson, then the Executive Director, Orthopedic Appliance and Limb Manufacturers Association;

Miss Cecile Hillyer, Chief, Division of Training, Office of Vocational Rehabilitation, Department of Health, Education and Welfare;

Dr. Paul B. Magnuson, Prosthetics Research Board;

Dr. Eugene F. Murphy, Chief, Research and Development Division, Prosthetics and Sensory Aids Service, Veterans Administration;

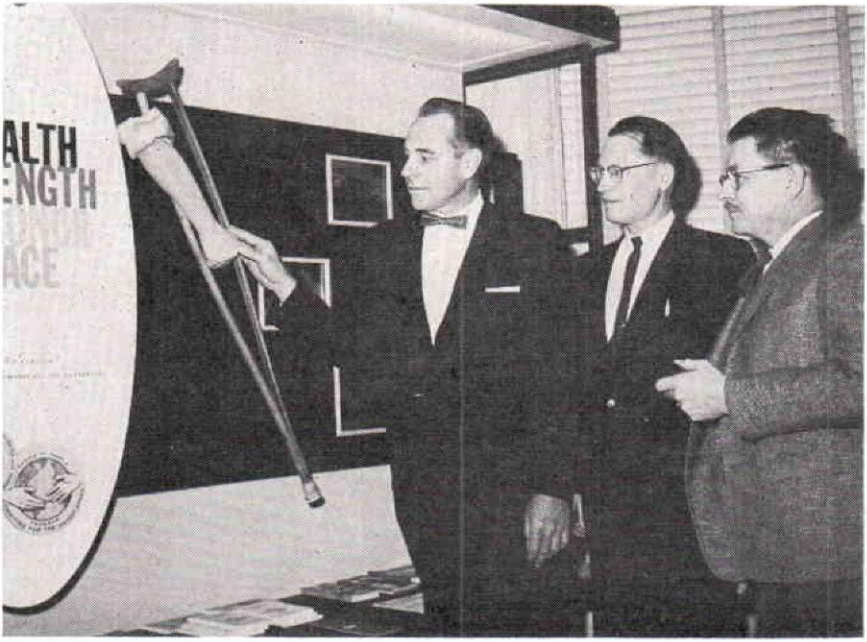
Mr. Louis Jordan, Executive Secretary, Division of Engineering and Industrial Research, NAS-NRC;

Dr. Sidney Fishman, Director, Prosthetics Education, New York University;

Dr. Miles H. Anderson, Director, Prosthetics Education, University of California at Los Angeles.

Both Miss Switzer and Dr. Stewart indicated that their respective agencies had need for an Academy-Research Council advisory committee in the field of prosthetics education, to assist them in discharging their obligations to our amputee population.

The next report will cover certain of the early activities of the Committee on Prosthetics Education and Information and a discussion of the committee's missions.



Charles A. Hennessy meets with Executive Director Lester Smith and Mr. Winfield S. Smith of the Committee for the Handicapped of the President's People to People Program before leaving for South America. **(See page 57).**

An Improved Tenodesis Splint

By ARTHUR J. HEATHER, M.D.
Medical Director, Eugene du Pont Memorial Hospital and Rehabilitation Center, Wilmington, Delaware

and

THOMAS A. SMITH
Project Engineer, All American Engineering Company, Wilmington, Delaware

In the United States approximately 3,000 persons become quadriplegic yearly as a result of cervical spine trauma. The incidence of quadriplegia is further increased by cervical cord tumors, poliomyelitis and vascular and neurologic diseases.

As a result of modern medical, surgical and rehabilitation treatment, most of the cord injury patients now live for many years. Therefore, it is safe to assume the existence of several thousand patients who could be benefited by an orthotic device to restore function to the paralyzed hand.

One of the most disabling losses resulting from spinal cord injury is paralysis of the hands. All quadriplegic patients have some degree of hand and finger paralysis, but many patients retain the ability to extend the wrist. In the latter group, hand function may be restored by the use of an orthesis which harnesses the available tenodesis mechanism to provide grasp. This paper describes a simple device that is so constructed that it provides a three-jaw chuck type grasp when the patient extends his wrist.

Information gained during the development of the "Helping Hand" provided the basic ideas from which the tenodesis splint was constructed. Mr. Thomas A. Smith, a project engineer of the All American Engineering Company, designed the ingenious two-sectioned spring and the ball chain activating mechanism which are mounted on a hinged acrylic plastic splint. This unit is cosmetically acceptable to the patient and provides good functional use of the paralyzed hand.

The "Helping Hand," referred to above, was first described in the June 1960 issue of the *Orthopedic and Prosthetic Appliance Journal*. It is a hydraulically operated orthesis, designed to provide grasp for the patient who lacks wrist extensor function. The simple hydraulic system consists of nylon master and activating cylinders connected by nylon tubing. Tap water is used as hydraulic fluid and the displacement of 5 ml. of water by a one-inch piston movement opens the hand sufficiently to grasp a juice glass.

The activating cylinder is mounted in a beryllium alloy C-spring which holds the hand in the closed or pinch position until the plunger in the master cylinder is depressed to open the hand. The spring has great tensile strength and, after a critical heat treating process, will not change shape. The spring, if bent from its original shape, will return to the prebending configuration due to a "memory" property of the alloy which develops during heat treatment.

Finger wires are mounted on each end of the C-spring and to these wires latex finger boots are attached by the use of an apoxy. The latex is 0.021 inch thick and permits good touch sensation for the patient who has this sense preserved.

The C-spring with its attached finger wires, latex finger grips and activating cylinder is mounted as a unit on a contoured acrylic splint. The splint is held in place by leather wrist watch straps or velcro plastic strips. The hand unit attached to the patient weighs 4 to 4½ ounces, depending on the type of anchoring straps used to hold the splint to the forearm.

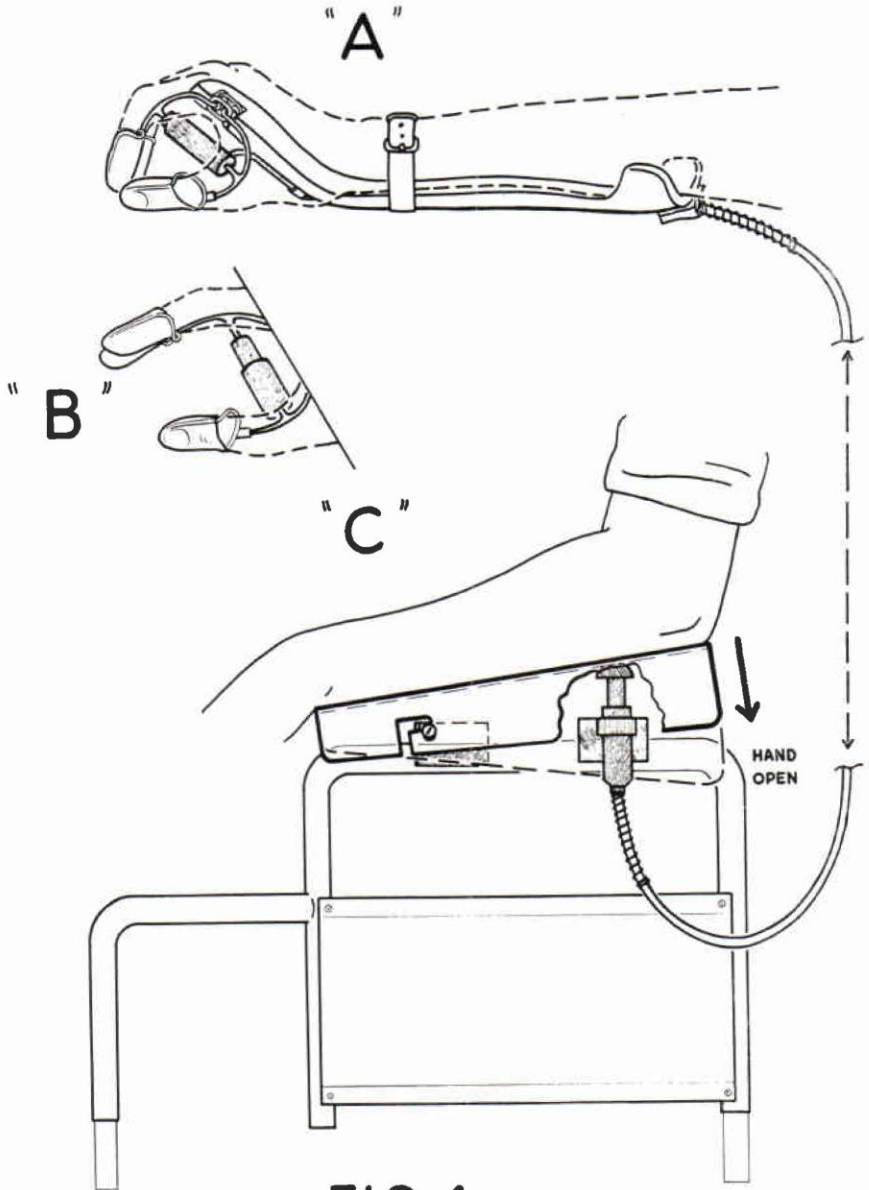


FIG. 1

Figure 1—A, B, and C. A and B show the hand open and closed. C illustrates the activating mechanism.

The wheel chair-bound patient opens the hand by depressing a lever mounted on the arm of the chair (Figure 1 A, B, and C). The ambulatory patient requires a different type master cylinder. Such a patient opens the hand by scapular abduction or shoulder elevation.

Fabrication of presently available tenodesis splints requires custom fitting of each part as the unit is assembled. This entails many hours' fitting time by the orthotist and greatly increases cost. In addition, frequent adjustments are necessary and cosmesis often is poor. A knowledge of these difficulties led us to design and develop a fitting kit and sizing splint from which a properly fitting hand could be assembled from measurements taken in the field (Figure 2). The sizing splint was designed to permit "sloppy" measurements. That is, errors one size greater or less than the ideal size are permitted without interfering with proper fit and function of the orthesis. There is also built into the sizing device a "no-go" gage which instantly alerts the orthotist when custom fitting is required. To date, this situation has been encountered only once in over twenty-five fittings. This patient had an abnormally wide hand and very short, sharply tapered fingers.

Figure 2—Fitting kit and sizing splint used to secure measurements for both the "Helping Hand" and tenodesis splint.

Measurements for fitting the tenodesis splint are obtained by use of the same splint and kit used to fit the hydraulic hand. The new orthesis also makes use of the same type acrylic splint, finger wires, and latex finger

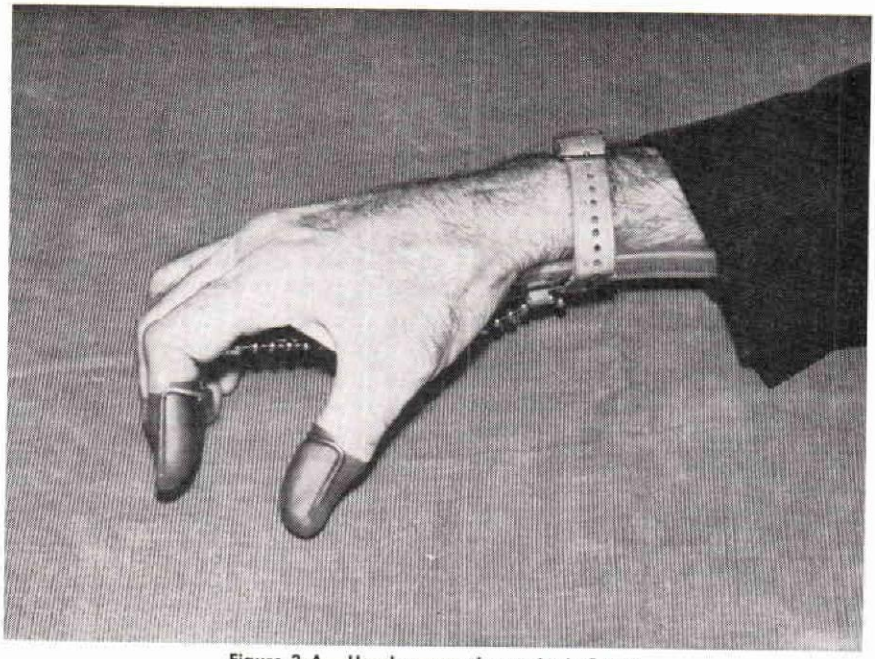


Figure 3-A—Hand opens when wrist is flexed.

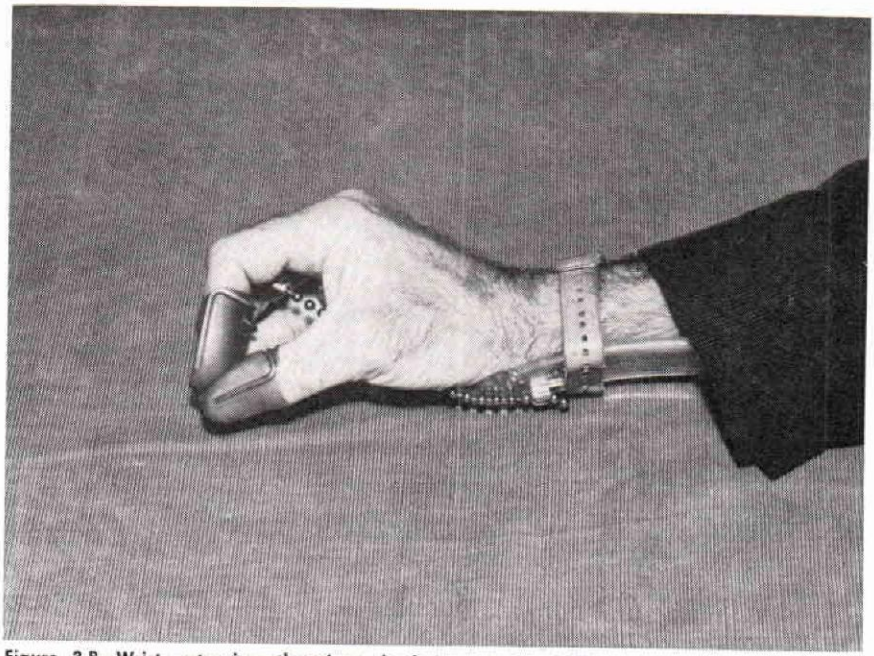


Figure 3-B—Wrist extension—three-jaw chuck type grasp results. Force of grasp depends on degree of wrist extension.

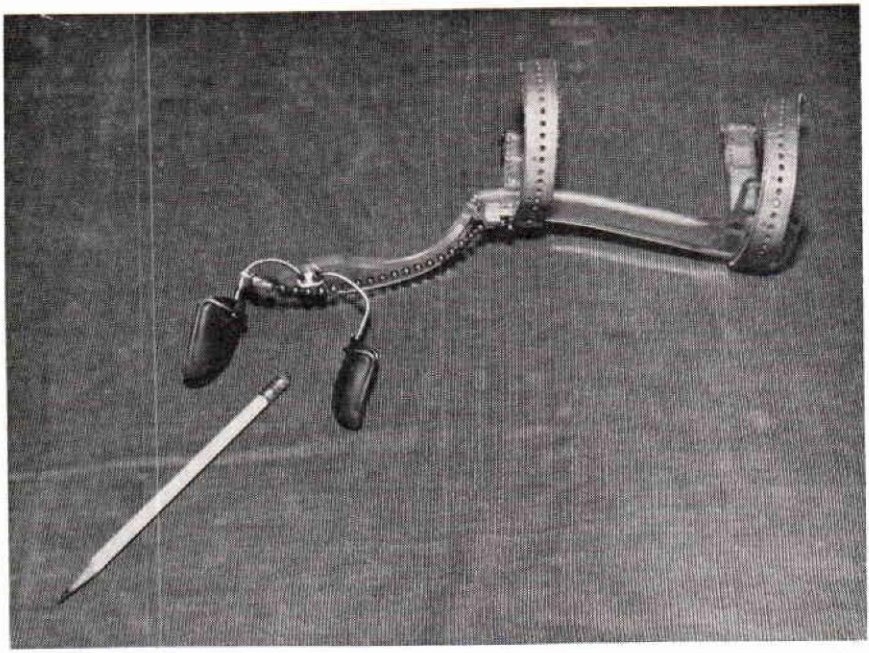


Figure 4-A—Construction details and method of operation (wrist flexion) are illustrated.

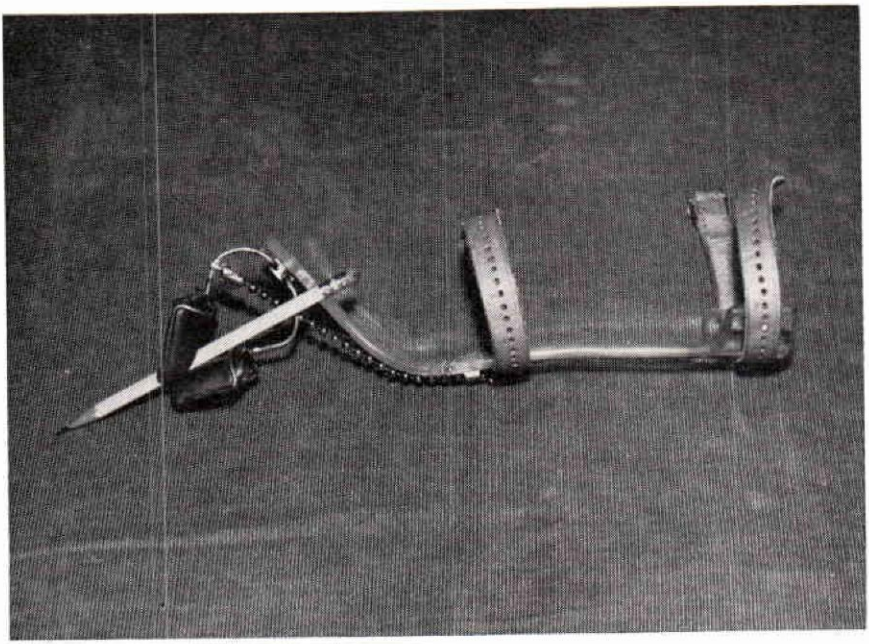


Figure 4-B—Grasp or pinch position resulting from wrist extension.

boots that are used in the hydraulic hand. However, the split is hinged at a point corresponding to the volar crease of the wrist. The hinge contains oilite bushings to assure long life. The spring also differs from the standard C-spring in that it is in two sections and is spring loaded to aid in opening the hand as the wrist flexes. The strength of this spring is varied to overcome any resistance the finger flexors may offer as the wrist is flexed. There is available a light weight snap-on yoke which holds the index and middle fingers in position, should they tend to slide from the latex finger grips as the fingers move during use of the orthesis.

The anterior half of the spring lies between the index and middle fingers and has attached to it a bead chain which is adjustable in length. The other end of the chain is attached to the splint by means of a standard receptacle which is located just proximal to the hinge joint. When the bead chain is shortened, little wrist extension is necessary to produce the three-jaw chuck grip. Conversely, lengthening the chain delays finger closing until the wrist is extended to a much greater degree. The force of grasp is governed by the degree of wrist extension.

The spring mounting mechanism and ball chain assembly are so located that there is no interference with function of the hand. The acrylic splint is contoured to leave the thenar area of the hand free so that it may be used to push the wheel chair. Figure 3 A and B shows the tenodesis splint in use by a patient. In (A) the hand is seen opened by wrist flexion and closed (B) when the wrist is extended. Figure 4 A and B further illustrates the method of action of the orthesis to provide grasp and release by wrist movement.

SUMMARY

A simple, light weight, wrist extension orthesis is described. The unit provides a three-jaw chuck type grasp for the patient with hand paralysis and permits many activities otherwise impossible.

The new tenosesis splint is superior to those now available in that fitting and fabrication have been simplified, and cosmesis and function have been improved.

HENRY BATES

Henry Bates Represents Pope Brace Division

Henry ("Hank") Bates has joined the field staff of the Pope Brace Division and will travel extensively for them, especially in the Middle West. Hank was for many years on the staff of Tru-Form Supports and is deservedly popular throughout the United States. the *Journal* especially appreciates Hank for the excellent pictures he supplies us with. A number of them have appeared in both the *Journal* and the *Almanac*.

Total Contact Restoration Prosthesis For Partial Foot Amputations

By SHERWIN E. LEVY, D.S.C.
Los Angeles, Calif.

In medical literature there are numerous references to substitution parts for amputated portions of the body. Throughout these publications there are only a few references to partial foot amputations, such as the statement by Daniel.[1] "After long experience and extensive investigation, it is seldom found that an artificial substitute can be worn after these partial foot amputations with any degree of comfort or satisfaction. Furthermore, the records of these cases show that over fifty per cent, sooner or later, submit to reamputation. Often it is after losing several years of time, with the attendant financial expense of securing one foot after another, and after much suffering and many disappointments, that reamputation is found necessary."

Since World War II much medical research has been directed toward the development of functional and cosmetic substitution parts for amputated portions of the body. During this extensive development program, no improved method over what was available before World War II has been made for the substitution of a partially amputated foot, although every other type of prosthetic has been improved upon.

The situation regarding prostheses for partial foot amputations can best be summed up in the statement by one prosthetic authority, Thomas,[2] who wrote, "The strain on any artificial appliance for partial foot or ankle joint amputation is severe and presents a formidable problem to the prosthesis maker. It is very difficult to make an appliance that is strong enough to withstand the strain to which it is subjected without making it so bulky as to be prohibitive from an aesthetic standpoint. Amputees, as a result, expect a great deal more from these foot appliances than it is possible for the limb maker to give them, therefore they are rarely satisfied with them. As a result, some of the most prominent limb makers in this country, rather than have dissatisfied customers, refuse to make these foot appliances at all."

Low level amputations of the extremities have become more common due to the use of antibiotics, recent research in vascular surgery and improved surgical techniques. The incidence of high level amputations has been greatly reduced, resulting in many cases of amputations of the most distal portion of the affected extremity. With the increase of partial amputations of the foot, the need for rehabilitating these patients with an adequate functional prosthesis has become increasingly imperative. This study was instituted to develop a functional and restorative prosthesis for the partially amputated foot, regardless of the shape or level of the stump.

The most common substitution for partial amputations of the foot in use today is a filler in the shoe. The filler in no way restores the amputated portion of the foot, since it merely fills the shoe and assumes the function of the shoe. The shoe and the filler then act as one unit and rub on the end of the stump, causing pressure and sometimes ulceration on the distal end of the stump. Eventually the toe of the shoe points upward and becomes distorted and makes the amputee and the people with whom he associates aware of his deformity.

*Reprinted by permission of the author and the editors from the *Journal* of the American Podiatry Association, Vol. 50, No. 11, November, 1960.

In some instances, a technique is utilized where a steel arch support with a toe extension, and a high laced anklet is laced around the stump and attached to the heel of the arch support. This is an improved method over that of the filler since it is somewhat attached to the extremity and to a limited degree, functions as part of the extremity. There are many disadvantages to this method. It is bulky and heavy, because of the materials used. It has poor conformity to the stump, and because of its weight, it is constantly pulling away at the heel. Its bulkiness necessitates a special shoe to be constructed. Constant repair is needed because it is essentially a rigid support and weight is being transferred from the heel to its forepart which concentrates pressure on the fulcrum of the appliance. This concentration causes a cracking or bending of steel which necessitates frequent replacement. The patient is never completely satisfied with this prosthesis. The most that can be hoped to be accomplished is that the patient will learn to live with it. Consequently, fifty per cent of these amputees submit to a higher level amputation and have a prosthesis with a full foot constructed.

Purpose

This study was designed to create a prosthesis which more adequately restores the amputated portion of the foot and returns the greater part of the foot's functional ability. The purpose of the prosthesis is to establish a weight-bearing area similar to that of the normal foot, so that the trauma of weight bearing will not be concentrated on just the resultant stump. It is important the amputee be able to utilize the restoration in the dynamic phases of gait, as well as in the static position of standing.

Materials and Methods

The materials and techniques that were utilized to construct this foot restoration prosthesis necessitated a complete departure from any previously employed method of constructing partial foot prostheses. This produced a flexible, light weight, total contact restoration prosthesis that accurately conformed to the remaining portion of the foot and the inside dimensions of the shoe.

Examination

The stump is carefully examined for areas of scarring, since allowances will have to be made for these areas in the construction of the prosthesis. Areas of excessive weight bearing are also noted. In a Lisfranc's amputation, the patient usually develops excessive callous formation under the cuboid. In patients where prostheses were not fitted early, there is plantar flexion of the stump with a contraction of the tendo-achilles, resulting in a postural shortage of the unamputated extremity. Some type of accommodation is necessary for these inequalities in leg length.

The patient's gait is closely examined since the old amputee will abduct the amputated foot while walking to create a wider weight-bearing surface. Allowances will have to be made for this abduction of the remaining portion of the foot.

It is important that the appearance of the shoe be acceptable to the patient. The psychological rehabilitation is as important as his physical rehabilitation. The patient is advised to purchase a shoe which fits well on his unamputated foot, has a leather sole, rubber heel and a high vamp. This eliminates a loafer and a low boy shoe, but the patient will usually be able to wear an oxford. The shoe should have at least five eyelets and have fairly good conformity around the heel. If the partial foot amputation is

bilateral, the patient should select a shoe the size he previously wore. In most instances, the shoe salesman will tend to fit the bilateral amputee short, if the previous size is not known. In children with bilateral amputations, an estimation of their shoe size from their height and weight will have to be made, and cannot be accurately determined by fitting the stump alone. The patient is advised to purchase an established brand of shoes in a popular last, that has a wide pattern of shoes so that the prosthesis will fit various styles of shoes made over the same last. In women, a Miller shoe with a walker last seems satisfactory. This study, to date, has not included total contact restoration prostheses for high styled women's shoes.

Shoe Modifications

Shoe modifications are necessary for a Lisfranc's amputation or higher. If this type of prosthesis is to be constructed, the shoe modifications must be completed first, since the modifications place pleats in the shoe in a slightly different position than they would be normally. To add the necessary rigidity to the shoe, a steel spring, approximately one and one-half inches in width, is placed between the insole and the outsole of the shoe, from approximately the medial anterior border to the lateral posterior border of the shoe. The exact position is determined by the abducted gait of the patient. The steel spring can be placed in the shoe by merely opening a small section of the shoe at its medial anterior aspect and slipping the spring back between the insole and the outsole. The reason for the spring being in this position in the shoe is so that it will be in relation to the amputee's gait and his weight force will roll over the spring from lateral to medial during ambulation, and thus he will learn to use the steel spring in the take-off phase of gait. There is no outward appearance of the steel spring and it is in no way touching the patient's foot. The spring is very light and the additional weight is not apparent to the patient, as would be a full steel plate.

The shank will have to be reinforced since in a Lisfranc's and Chopart's amputation or higher, the patient's weight is concentrated on the shank of the shoe. A level bar, one and one-half inches in width, is placed longitudinally between the heel and the sole. This bar does not extend below the level of the heel or the sole, and creates a narrow wedge which reinforces the shank. The wedge is made of leather with a strip of rubber soling to prevent slipping. The shank reinforcement prevents deformity of the shoe and the forcing of the steel spring, by the stump, through the bottom of the shoe.

Impression and Model

The areas of scarring and callous formation are marked on the stump with gentian violet. The level of the amputation determines the height of the impression over the stump. If the amputation is at the metatarsal phalangeal joints, it is extended to just below the ankle. If the amputation is transmetatarsal or higher, the impression includes the ankle. The extent of the prosthesis in its total contact attachment to the stump is dependent on height of the impression. The higher the prosthesis grips the stump, the less slippage there is at the heel. A plaster impression of the stump is made with the use of six inch lengths of plaster of Paris, rather than using the entire lengths. Better conformity of the plaster to the stump is accomplished with short plaster splints. After the plaster of Paris splints have been applied to the stump, the plaster is split over the extensor surface of the stump and molded smooth. The stump is inserted into a plastic bag, and the shoe is

then slipped onto the stump. The patient is instructed to take a few steps, and then stand in place on both feet, until the plaster of Paris sets. When the plaster sets, the impression is removed. Upon removal, the split portion is quickly remolded to the exact shape of the stump.

When the impression has completely dried, it is ready for the pouring of the plaster positive, the model. Dental stone is preferred to plaster of Paris, because plaster shrinks in proportion to the amount of water added. Dental stone, when mixed in a fairly hard consistency, has an expansion of one-tenth of one per cent and this compensates for the shrinkage of the latex. When the dental stone is ready to set, a steel rod is inserted, which aids in handling the positive during prosthetic construction.

Impression of the Void Area of the Shoe

The inside of the shoe is lined with saran wrap. Dental stone is mixed to a fairly thick consistency. The dental stone is then poured into the shoe. While it is still wet, the model of the stump is placed inside the shoe, to obtain the exact relationship between the model of the stump and the void space of the shoe.

Construction of the Mold

To accurately duplicate the void space of the shoe, a three-part mold will have to be constructed from the impression of the void area of the shoe. This is constructed in three steps so that the dental stone accurately encompasses the positive impression.

Dental stone is mixed in a firm consistency and poured into a puddle. The impression of the void of the inside shoe is pressed into the puddle and the dental stone is allowed to harden. Another small batch of dental stone is mixed and placed against the proximal portion of the impression and allowed to dry. A third batch of dental stone is mixed and poured over the remaining portion of the impression of the inside of the shoe and allowed to dry. After removal of the impression, a three-part mold is completed.

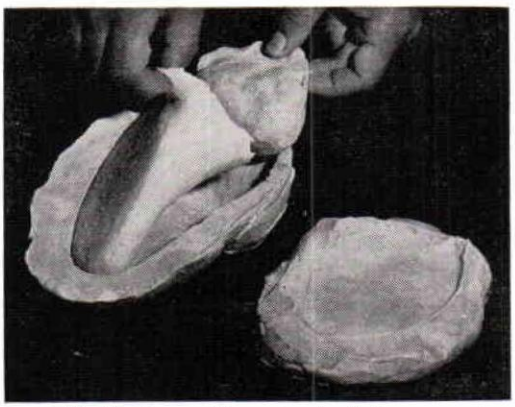


Fig. 1—Foam rubber extension being removed from three-part mold.

Construction of the Forefoot Extension

The three-part mold is now ready to receive the liquid foam for the construction of the forefront extension. The liquid foam is made by mixing seven ingredients, as outlined by the manufacturer.[3] The manufacturer does

not reveal the nature of the ingredients, but gives code numbers to the ingredients. The foam rubber can be made in different degrees of hardness or softness, by following the manufacturer's instructions. When the ingredients have been thoroughly mixed, they are poured into the three-part mold and placed in an oven at two hundred degrees for three hours. The rubber hardens to the degree desired. The foam rubber extension of the prosthesis is now completed (Fig. 1).

Preparation of the Stump Attachment

If desired, chamois can be placed over the model of the stump. This is not always necessary since some patients prefer to use a light stump sock. Zippers are placed on the model, behind the medial malleolus for a Lisfranc's amputation prosthesis or higher. The zipper can be sewn into either the chamois or the nylon that is used to reinforce the latex (Fig. 2). Tape is placed over the teeth of the zipper to protect it from the latex. The positive impression of the stump is dipped in latex approximately five times, allowing it to dry after each dipping.

Aligning the Forefoot Extension With the Stump

The foam rubber extension and the latex-covered model of the stump are placed in the shoe. When proper alignment in the shoe is obtained, two lines

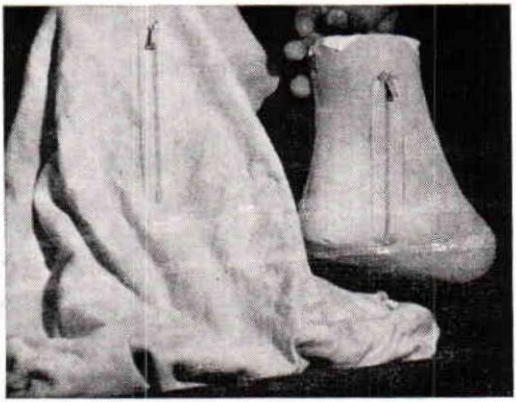


Fig. 2—Zipper sewn into chamois on stump model.

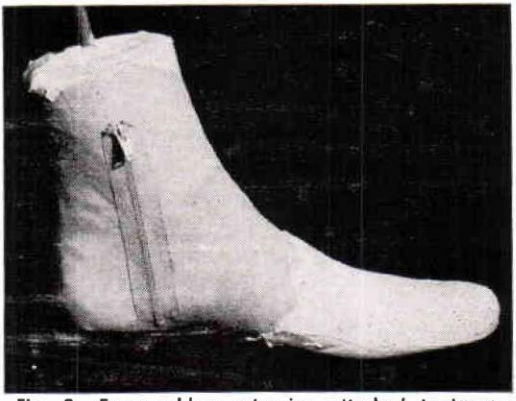


Fig. 3—Foam rubber extension attached to latex-covered model of stump.

are drawn from the foam rubber extension onto the stump to record the alignment. The foam rubber extension and the latex-covered models are removed from the shoe. If there are areas of scarring on the distal end of the stump, the proximal portion of the foam rubber is hollowed out in these areas to prevent trauma to these scars. Rubber cement is placed on the distal end of the latex-covered stump and the proximal portion of the foam rubber extension. The two pieces are placed together in proper alignment by matching the previously drawn lines (Fig. 3).

Completion of the Prosthesis

With the forefoot extension fixed to the cured latex surrounding the stump, the entire prosthesis is dipped into liquid latex approximaely five times. Nylon reinforcement is placed over the entire prosthesis for durability, during the dippings in liquid latex. If there are areas of excessive weight bearing on the plantar of the stump, sponge rubber paddings are placed between the layers of latex for protection.

After the latex is cured, the completed prosthesis is removed by trimming the excess latex liquid from the proximal portion of the stump. If a zipper is incorporated into the prosthesis, the latex is cut in this area and the protective tape is removed (Fig. 4). The prosthesis is fitted to the patient and usually no adjustments will be necessary due to the exactness of the casting technique employed. The patient is instructed to wash the prosthesis only in mild soap, such as ivory or woolyn, never in a strong detergent, and never allowed to soak. The prosthesis should be washed, rinsed, dried and allowed immediately to air dry.

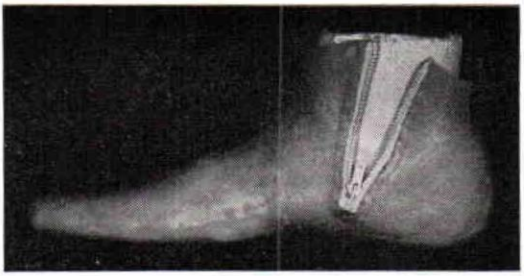


Fig. 4—The completed prosthesis.

Discussion

This study has developed a total contact restoration prosthesis which fits firmly and exactly around the remaining portion of the foot and provides an extension of the stump. This extension becomes a restoration and replacement of the amputated portion of the foot and assumes the greater portion of its function during weight bearing.

The materials used in this prosthesis are soft, resilient and light weight and do not place excessive pressure on the unamputated portion of the foot. The patient wears this prosthesis directly over his entire stump. A standard sock is then slipped on over the prosthesis and the stump. When the patient has his shoe off, it is not apparent that an amputation exists and consequently a good cosmetic result accompanies a good functional result. The patient can slip off his shoes, wear flexible footgear, such as slippers, and have some of the function that a normal foot might have, and the general appearance of a normal foot.

The construction of this prosthesis is such that it fits very accurately into the void space of the shoe and eliminates unsightly creases and wrinkles across the vamp of the shoe. These and other distortions of the shoe have in the past brought about a poor cosmetic result for those patients fitted with partial foot prostheses. The lightness and freedom of action of the total contact restoration prosthesis enables the patient to learn to use it during ambulation with a high degree of stability. In many instances, the amputee functions so well with the prosthesis that many gait problems are eliminated.

The materials used in the construction of the total contact restoration prosthesis are primarily latex and foam rubber which are relatively inexpensive. Once the initial prosthesis is constructed it is very simply and inexpensively replaced, by utilizing the original plaster models and molds.

Many patients with low level amputations seem to manage well at first with no prosthesis whatsoever. As the patient's gait accommodates to the missing portion of the foot, gait variations develop, which lead to severe muscular strain. These usually resolve themselves in some type of postural imbalance. The amputee should be fitted as soon as the stump is ready to receive the prosthesis.

Case No. 1

This 59-year-old white male, with a diagnosis of diabetes mellitus, dating back to 1937, was admitted to Wadsworth General Hospital on November 29, 1956, with cellulitis of the left foot and gangrene of the second and third toes. Radiographic examination revealed no bone involvement.

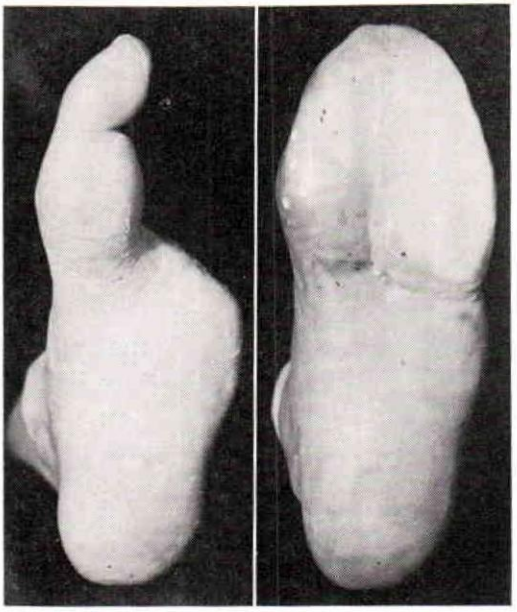


Fig. 5—Case No. 1.

The patient was seen by the orthopedic service on December 5, 1956, and it was their opinion that below-knee amputation probably would be required. The patient was treated with saline soaks and antibiotics, and on February 28, 1957, the left second and third toes were amputated. The wound healed

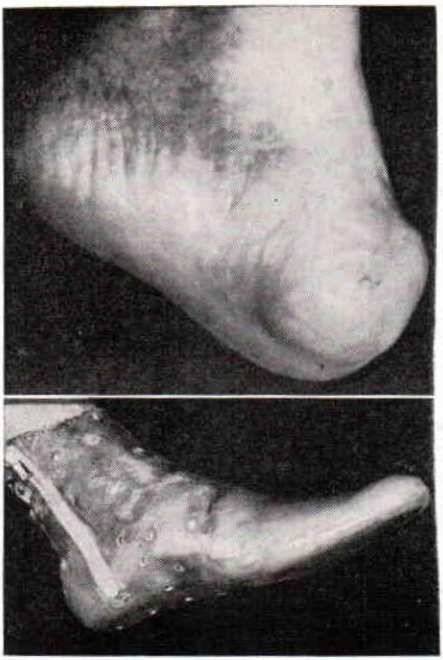


Fig. 6—Case No. 2.

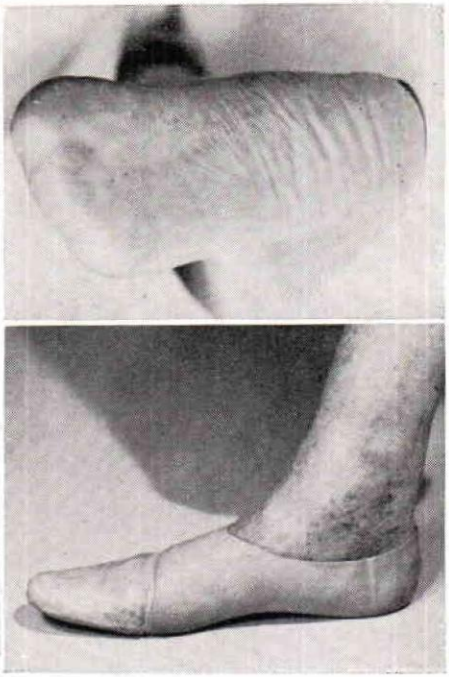


Fig. 7—Case No. 3.

well. Subsequently, the patient developed gangrene of the fourth and fifth toes. On March 26, 1957, these two toes were amputated along with a portion of each of the lesser metatarsals. The patient was discharged to the domiciliary on May 14, 1957. On July 15, 1957, a total contact restoration prosthesis was dispensed. The patient was immediately able to perform all ambulatory functions comfortably in a standard stock shoe with no apparent gait changes or outward visual evidence of the patient's deformity.

Comment: The ability of this restoration to conform to an irregular stump provided the patient's foot with a means to return to almost normal function and appearance and the prevention of a subsequent amputation at a higher level.

Case No. 2

This 66-year-old white male was first seen on August 3, 1959, at which time he presented a history of an industrial accident in 1936, which resulted in crushing of the forepart of his left foot and also a head injury, for which he was hospitalized for six months. The patient stated that the foot "spit out" small pieces of bone for a long time. Four years following the accident a Choparts' amputation was done. Following the amputation a steel plate was placed on the entire outsole of the patient's shoe and was covered by an additional outsole and a felt filler was placed inside the shoe. At the time the patient was seen, he complained of foot and leg fatigue and pain in his hips, especially the left hip, after short periods of ambulation. During ambulation there was a noticeable dip to the left side. On October 19, 1959, a total contact restoration prosthesis was dispensed.

The patient was re-examined on November 4, 1959, at which time his limp was practically undetectable. The hip pain had subsided and he was

able to ambulate for long periods without fatigue. The patient was seen on January 20, 1960, at which time he complained of moisture around the stump. Ventilation holes were placed in the prosthesis. On January 28, 1960, the patient's stump was re-examined. Ventilation appeared adequate and there was no evidence of maceration of the stump.

Comment: The patient's gait was markedly improved with the disappearance of the associated pain and fatigue by removing the filler and the heavy steel plate and adequately restoring the foot.

Case No. 3

This 56-year-old white male was involved in a train accident in 1941, resulting in an amputation of all five toes of the right foot at the metatarsal phalangeal articulations. The patient was hospitalized for six months and was walking within two months. Since the amputation the patient had been wearing canvas shoes. He had not been able to wear any stock leather shoes because the wrinkle in the upper would irritate the stump. The patient had been provided with three pairs of custom shoes by the orthopedic shoe shop. Of these, he was only able to wear one pair, which contained a steel plate inside the shoe plus a filler. The patient was seen on April 3, 1956, at which time he complained of recurrent callous formations on the stump which required debridement at three-week intervals. On April 17, 1956, the patient was fitted with a total contact restoration

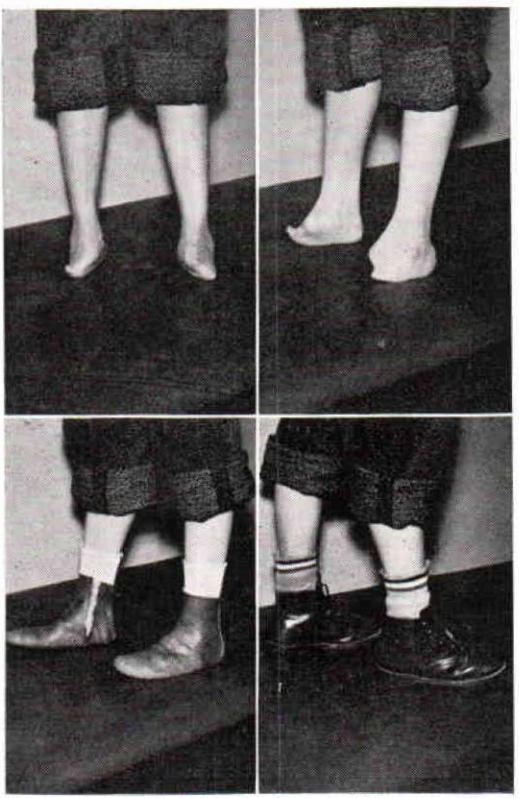


Fig. 8—Case No. 8.

prosthesis in a standard stock leather shoe. No shoe modifications were necessary.

The patient has been followed for the past four years and requires debridement of the callosities at five-month intervals and replacement of the prosthesis approximately every year.

Comment: Stabilizing the foot in the shoe with an adequate restoration retarded the callous formation and allowed the patient to wear any standard stock leather shoe. This is the lowest level of amputation for which a total contact functional restoration prosthesis has been constructed.

Case No. 4

This 6-year-old white male was first seen on April 5, 1957. Congenital absence of both forefeet with accompanying minor oral and ocular deformities were present. The parents gave a history of the child being examined at the Mayo Clinic at the age of 5 months, and no definitive treatment was undertaken. The patient started walking at the age of 18 months with hard sole surgical shoes. At the age of 3 years, a filler was placed in the shoe. Six months later this was discontinued, since the doctor whose care the child was under felt that it was unnecessary. The patient apparently ambulated well with a surgical shoe until the age of five and one-half. From this time on the patient would severely run over new shoes within two weeks. It was then that the parents began to seek further advice.

On examination, it was noted that the patient was wearing shoes which are approximately four sizes shorter in length than he should be wearing in comparison to his physical development. The parent stated that the child was frequently asked questions about his feet by his playmates, such as "Why are your shoes so small?"

Plaster impression casts of both stumps were taken on April 24, 1957. The prostheses were dispensed on May 20, 1957. No shoe modifications were necessary. The patient immediately accepted the prostheses. The gait improved to a point where there was no noticeable limp and the wear pattern of the shoes became normal. A clavus present on the distal end of the right stump completely disappeared within four weeks after wearing the prostheses. The parents observed a personality improvement in the child and there was no longer an apparent psychological problem in regard to his foot deformities.

The patient was seen at intervals of four months, at which time adjustments were made in the prosthesis for growth. Three subsequent prostheses were made at intervals of approximately every nine months with re-casting and construction of molds necessary for each prosthesis. Re-casting will be necessary for each prosthesis until the patient reaches maturity, at which time the prostheses can be constructed on an adult basis.[4]

Comment: The psychological rehabilitation of this patient was accomplished largely through the replacement of the missing body parts which enabled the patient to ambulate normally.

Case No. 5

This 51-year-old white male was involved in a hunting accident in 1952, at which time a shotgun was discharged into his right foot. The patient was hospitalized for six weeks. During this time the greater portion of his foot was amputated, leaving only a portion of the calcaneus and talus, so that the leg appeared similar to a "peg leg," with an end weight-bearing stump. Following the amputation, the patient was fitted with a Syme's type amputation prosthesis that enveloped the small remaining portion of the foot

and the lower leg to just below the knee. The prosthesis was heavy and bulky, being constructed primarily from molded leather and stainless steel.

The patient was first seen on October 2, 1959, at which time he complained of the uncomfortable prosthesis and the shoe deformity. He stated that the weight of the prosthesis tired him out, to a point where he ambulated frequently at home without the prosthesis. On October 23, 1959, the patient was fitted with a total contact restoration prosthesis. The steel spring was inserted into the shoe in a direct anterior posterior manner, since there was no forefoot and there did not appear to be external rotation of the extremity. A one-fourth inch lateral wedge was necessary on the shoe to prevent inversion of the prosthesis. The patient was immediately ambulatory and felt a greater freedom of movement and lightness.

On November 20, 1959, the patient was re-examined and it was noticed that there was no distortion of the shoe. The patient was not as conscious of his deformity and he was able to ambulate for longer periods.[5]

Comment: With very little of the patient's foot remaining, a prosthesis was constructed that restored most of the funcion of the foot and prevented any shoe distortion that would bring attention to the patient's disability. The difference in weight between the two prostheses was eighteen pounds. This is the highest level of partial foot amputation for which total contact restoration prosthesis has been constructed.

Summary

1. The literature was reviewed regarding methods of restoring lost portions of the foot.

2. The foot appliances in general use for partial amputations of the foot and the advantages of the prosthesis developed by this study are discussed.

3. An inexpensive method for construction of total contact restoration prosthesis for partially amputated feet is described in detail.

4. A total of fifteen patients have been treated. The average follow-up is four years, during which time the gait has been satisfactory and no further complications have developed.

5. Five case histories are reported to illustrate some of the various types of partial amputations of the foot.

6. The prosthesis described more adequately restores the lost portion of the foot and returns most of the foot's functional ability so that below-knee amputations will not be necessary in cases where only the disabled portion of the foot need be amputated.

Veterans Administration Center
Wadsworth Hospital

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Adjustable Knee or Elbow Extension Orthosis: A New Orthotic Development

By THORKILD J. ENGEN*

New materials, modern technology, and skill combined with a better understanding of the multiple problems confronting the Orthotist contribute toward constant improvement of present equipment and consequently lead to new designs of orthotic devices. With this concept in mind, the author of this article will describe the demand, the design, and application of an "Adjustable Knee or Elbow Extension Orthosis".

Successful and ideal rehabilitation of the severely disabled patient demands the close attention of a co-ordinated team headed by a qualified physician. The Orthotist plays an important part on this team because through him the patient obtains the custom made orthotic devices needed to further the program leading toward maximum functional restoration.

Flexion contractures of the knees or elbows is a complex problem in patients suffering from rheumatoid arthritis and paraplegics with reflex muscle spasm. Treatment of the progressive deformities in these patients requires continuous attention of the rehabilitation team. The therapeutic achievement of these patients stimulated the development described here.

Figure 1 shows a 33-year-old white female who suffered from rheumatoid arthritis. Since the onset of her disease in 1954, she has been confined to a bed or wheel chair. Because of pain, major joint flexion contractures developed in the convalescent stage of the disease. She was first seen in our rehabilitation screening clinic in June, 1960. The first four months of the therapeutic program in the hospital included lower extremity compound traction with periodical inter-articular injection of procaine and hydro-cortone and daily physical medicine. Bilateral opponens orthoses with corrective finger extensor assists were used.

Figure 2 graphically illustrates a goniometric record of joint motion during treatment. These measurements were taken at monthly intervals during a seven month comprehensive hospital care. Once correction of flexion contractures of the knee had reached a point where the femoral condyle and tibial plateau articulating angle was within the weight bearing functional limit, the necessity for a special orthotic device became obvious. This was designed and applied after three months of hospitalization. The principle of the extremity extension assist is based on a three point adjustable force which can be easily increased or decreased by a simple strap arrangement as shown on Figure 3. This device allowed the progression of a functional standing and walking program to begin. Due to the contractures of the elbows, special crutches (Figure 4) with forearm troughs and finger grips were made to give her adequate stability when ambulating.

Figure 5 shows the patient after a seven month rehabilitation program. Her posture and ability to move about are still improving. The physician's

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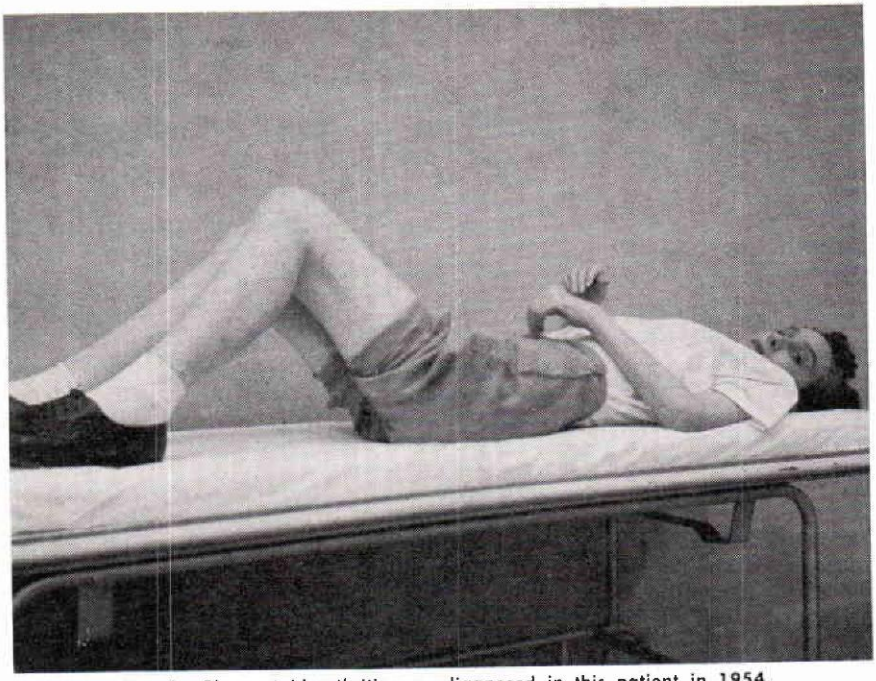


Fig. 1—Rheumatoid arthritis was diagnosed in this patient in 1954.

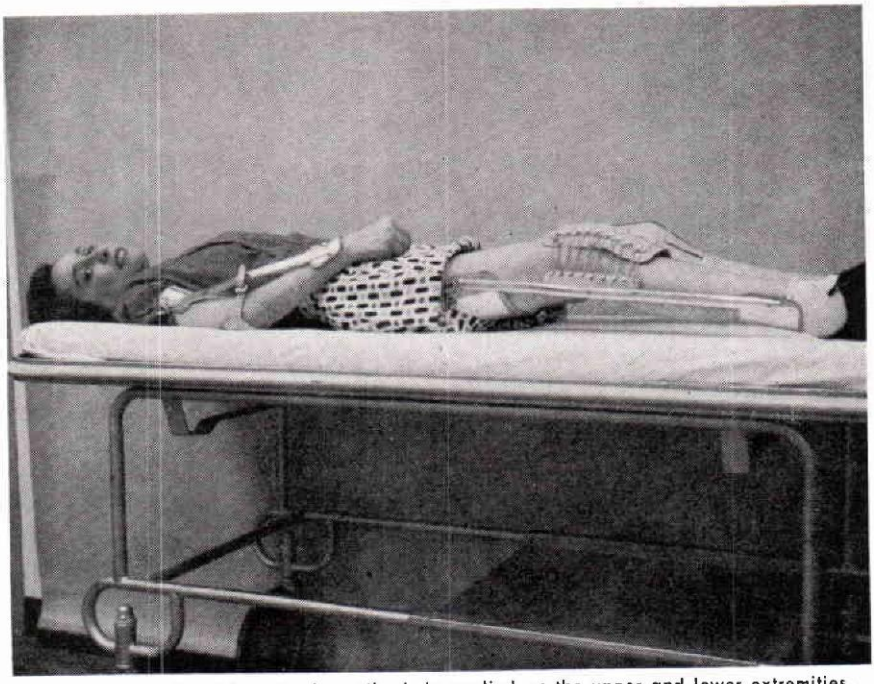


Fig. 3—An adjustable extension orthosis is applied on the upper and lower extremities.

prognosis at this point is that she may discard all her supportive equipment in a few months.

Figure 6 shows a fifteen-year-old white male who has been diagnosed as spina bifida since birth. He has increased muscle tonus of the right upper extremity, mild sensory loss, and multiple skeletal deformities. He was first seen in our screening clinic December, 1960. Extensive therapeutic treatment along with the application of the extension orthosis on the right upper extermity was prescribed for this patient. On initial examination, the patient had a 30 degree flexion contracture of the right elbow. The last evaluation revealed a limitation of only 10 degrees from complete extension. He is still receiving treatment on an out-patient basis.

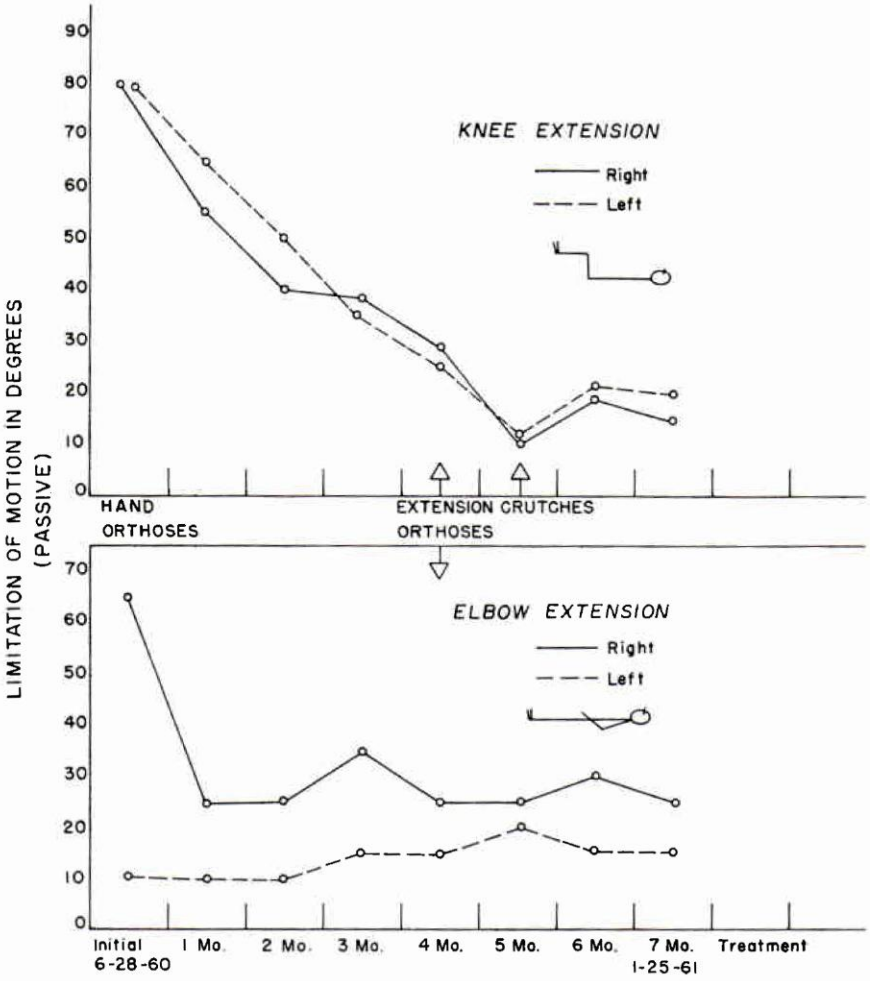


Fig. 2—Goniometric record of joint motion during 7 months of comprehensive hospital care.

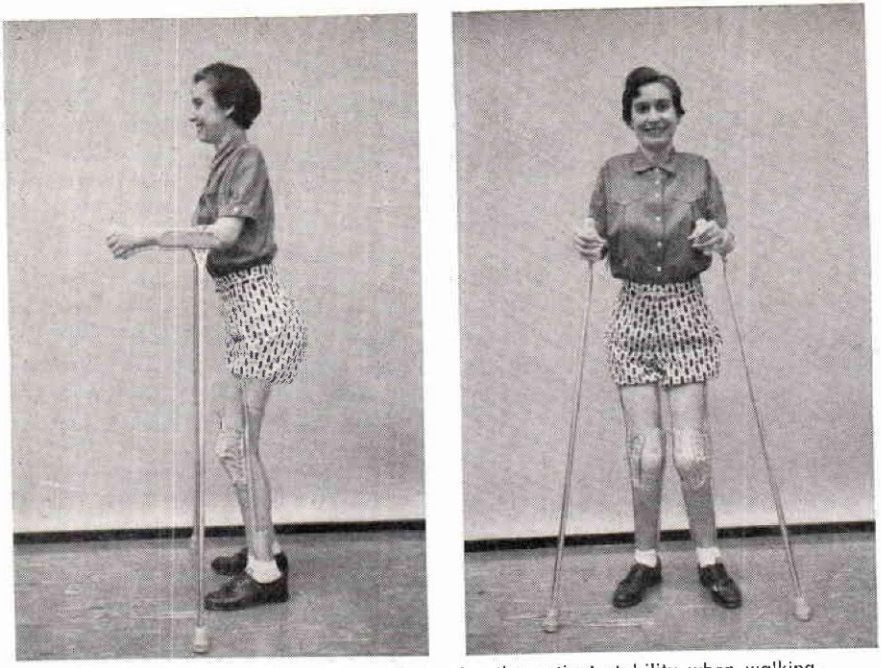


Fig. 4—Special crutches were made to give the patient stability when walking.

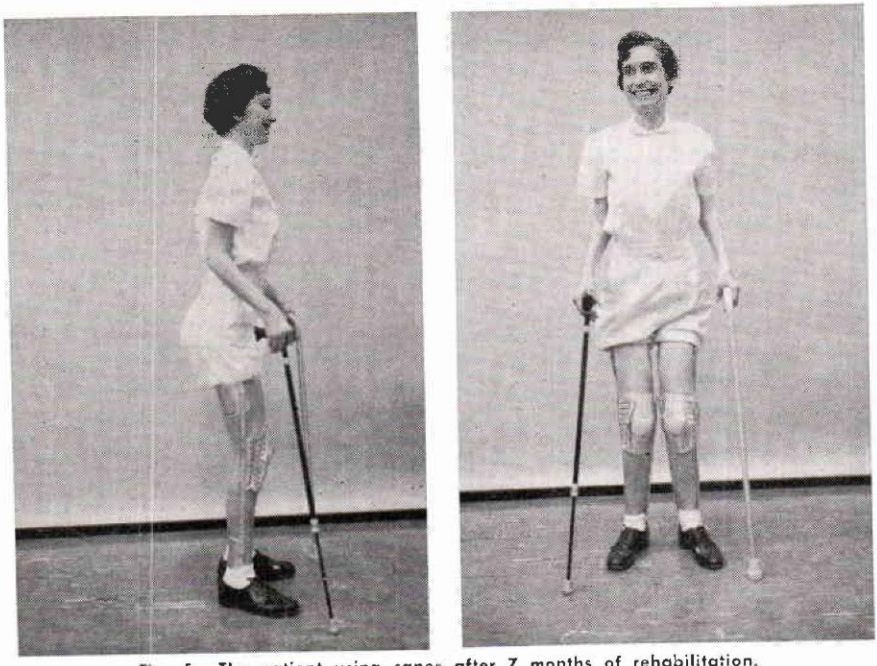
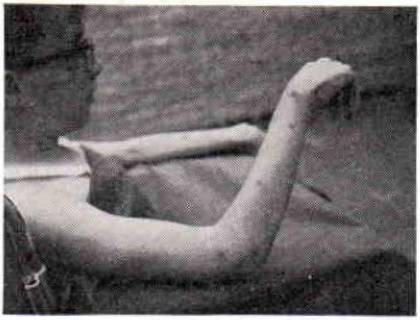


Fig. 5—The patient using canes after 7 months of rehabilitation.



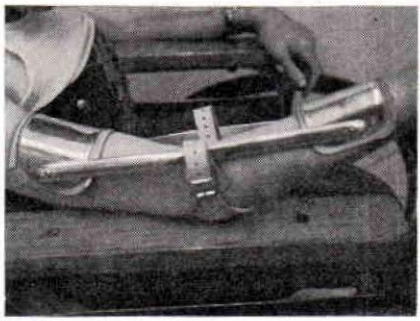


Fig. 6—This patient had 30 degrees flexion contracture of the right elbow. In two months it was improved to 10 degrees from complete extension.

Construction

The orthosis consists of two ½" half round aluminum extrusions made adjustable in length. These are attached to an upper and lower aluminum band with a 3/16" monel rivet on each side so that the bands will swivel freely and follow the contour of progressive extension of the extremity.

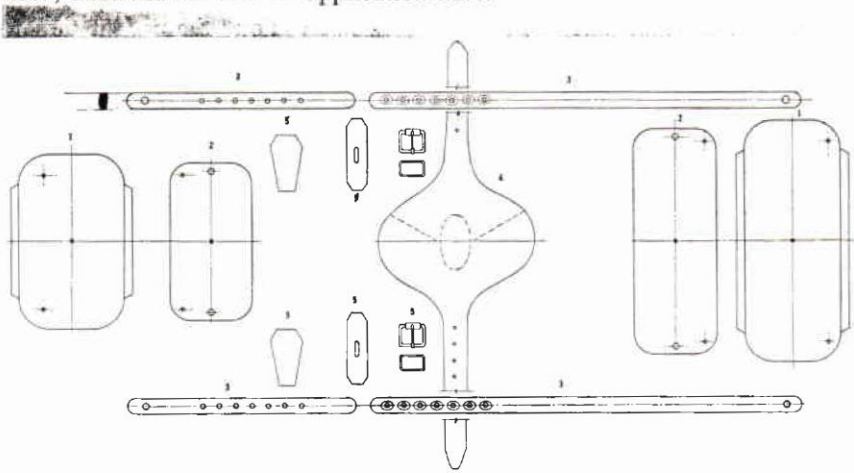
An adjustable leather pad made to fit the knee or elbow joint is attached on the side bars between the swivel bands. The bands are finally lined with leather and napa.

Figure 7 shows the drawing of the finished orthosis and a view of the parts involved. A list of numbers corresponding to each part is listed below.

Part #1) Leather lining for upper and lower swivel metal band.
Part #2) Upper and lower swivel metal band. O.72 20-24 ST. Alum.
Part #3) ½" Half round aluminum extrusion made adjustable. 8/32" screws.
Part #4) Elbow or Patella strap.
Part #5) Buckle assembly.

Discussion

Five adjustable extension orthoses have been applied to major joint contractures. This equipment has assisted in completing the total rehabilitation program of the patient. The designer of this device has described the need, construction and its application here.



ACKNOWLEDGEMENT

I wish to express my appreciation to Miss Geraldine Midgley, P.T., Mr. L. F. Ottnat, C.O., and the staff of the Physical Therapy Department for their contributions to this project. Photos by Miss Billye Bailey, R.T. Drawings by Mr. Ralph Pettitt.

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COMMENTS

In every severely involved chronically diseased patient with deformities, the question of rehabilitation is primary. The ultimate restoration of maximum function must include physical, sociological and psychological goals. The physical restoration must proceed first. The success of the total program lies in the accomplishment of this first objective. The Orthotist can play a very important role in this most critical phase of rehabilitation medicine.

*Paul R. Harrington, M.D., F.A.C.S.

In the treatment of those patients with flexion contractures of the knee or elbow that are not reversible by the usual program, we have found this adjustable knee or elbow extension orthosis very successful in their rehabilitation. The orthosis has several factors that the physiatrist considers important; that is, easily adjustable, simple in construction but very effective in action; can be applied by any member of the team or of the family; good skin tolerance; dynamic in action, and still allows the patient to continue many activities of self-care.

Flexion contractures involve the musculo-tendinous structures of the involved extremity and joint and increases in range of motion are often slowly acquired by physical therapeutics. This orthosis maintains such gains, as well as assists in increasing extension daily as the patient acquires the tolerance of wearing the orthosis several hours each day. This orthosis can be applied with equal success to many other patients with flexion contractures of varied etiology.

Those of us responsible for the rehabilitative care of patients always welcome the initiative and originality of new orthotic equipment and the active participation of the orthotist in the team.

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Constant Tension Springs on Long Leg Braces to Assist the Quadriceps Femoris

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and
FREDERIC J. KOTTKE, M.D., Minneapolis

Patients with weakness or paralysis of the extensors of the knee, especially when this is associated with weakness or paralysis of the hip extensors, have great difficulty standing and walking. Many devices have been designed to support the knees, ranging from simple gutter splints, plaster splints, and nonjointed bars to jointed knee braces with knee locks. Ambulation with a stiff knee is difficult for a person who has normal strength and is a great problem for a person with paresis or other disabilities. For this reason many attempts have been made to design a brace which allows flexion during sitting and flexion and support during walking. A knee joint allowing 2 to 4 degrees of extension beyond 180 degrees offers fairly good support to the patient with moderate weakness in both hip and knee when he is standing or walking, but it requires active muscular force, either in the knee extensors, themselves or in the hip extensors, to extend the knee.

Where there is weakness of somewhat greater degree in both of these groups of muscles, such a brace becomes less satisfactory, and the patient often resorts to using the mechanical knee lock on the brace to obtain stability. More than 50 years ago mechanical knee extensors in the form of rubber bands or springs appeared, but they have been of limited use [1] because the contractile force of rubber bands and coil springs diminishes linearly with shortening, so that at full extension of the knee (the point at which the patient would like maximum extensor force) these devices offer their least resistance to flexion. If the tension is increased at full extension, the patient becomes unable to flex his knee.[2]

Prosthetic equipment research [3] has recently turned attention to the use of constant-tension springs [4] in many devices.[5] This report concerns the design and manufacture of long leg braces with constant-tension knee-extension supports for patients who are unable to stand and walk because their quadriceps are too weak when the knees are extended.

Construction

The brace itself (fig. 1) is a light double-bar long leg brace with high and low thigh bands and a high calf band. The ankle joint is prescribed to compensate for the disability of the specific extremity. In several of our cases a freely moving ankle joint with no stops or springs was adequate. In others, posterior stops or dorsiflexor springs were necessary because of weakness of the dorsiflexors of the ankle. The knee joint is a freely mov-

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From the Department of Physical Medicine and Rehabilitation, University of Minnesota Medical School.

Read before the Section on Physical Medicine at the 108th Annual Meeting of the American Medical Association, Atlantic City, June 11, 1959.

ing nonlocking joint, allowing extension to about 183 degrees. Both thigh bars are extended 2 to 3 in. below the knee joint. A constant-tension spring is mounted on a ball-bearing pulley at the end of each extension arm, and the end of the spring is attached to the bar of the lower leg section to provide a constant tension extending the knee joint. It is necessary to keep the extension arm of the brace as short as possible, since the projecting points will limit flexion inside a trouser leg and may damage clothing.

The strength of the springs to be used can be estimated easily by applying a scale or strain gauge [6] to the brace at the proposed point of attachment of the springs and noting the force necessary to extend the lower leg with its brace and shoe when the patient is seated. When the patient has some strength in his knee extensors, he should assist in this process, thus lowering the necessary spring strength. A spring which can exert one-half of the necessary force is mounted on the freely moving pulley on each of the extension arms (fig. 2). The knee joint of the brace is centered at the center of flexion of the knee but lies posterior to the line of the thigh bar and its extension arm so that the knee joint can extend slightly beyond 180 degrees.

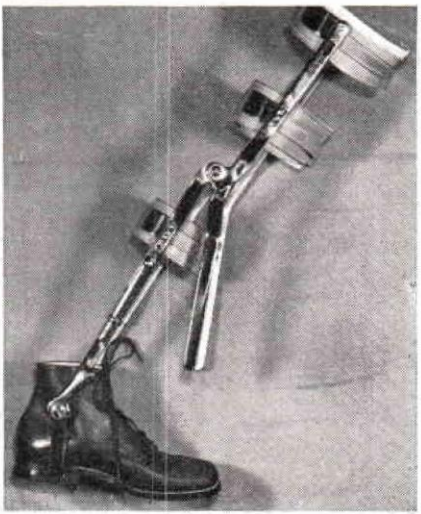

Fig. 1.—Brace before attachment of springs.

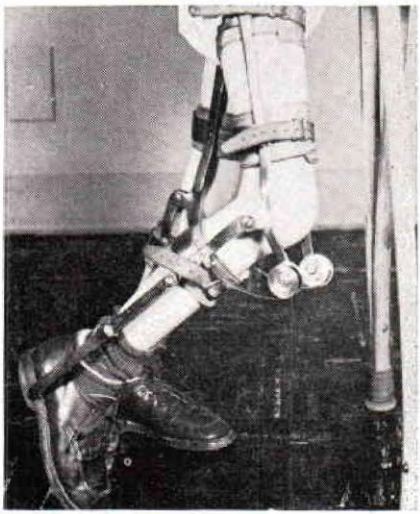

Fig 2.—Brace completed.

Report of Cases

CASE 1.—A 6-year-old boy with moderately severe general weakness due to amyotonia congenita was able to walk five or six steps without braces with Kenny sticks. He was fitted with lightweight long leg braces with spring-extension knee joints in December, 1957. He found that he could stand and balance immediately. Within one month he was able to walk with a 4-point gait and to walk up and down small stairs unassisted, with the braces and Kenny sticks. For the past six months he has been able to walk using sticks, but no braces, and attend public school. His gait continues to improve.

CASE 2.—Another 6-year-old boy had extreme weakness of the left leg as a result of having poliomyelitis in the fall of 1957. He was originally fitted with a long leg brace with a drop lock, but he was unable to walk with the knee unlocked in spite of several months of physical therapy and

gait training. In July, 1958, he was fitted with a brace with spring knee extensors. By January, 1959, he was able to walk quite well without the brace and, at the time of this writing, walks with an almost normal gait without the brace or sticks.

CASE 3.—A 60-year-old man with weakness due to compression of the spinal cord at L-3 and L-4, with weak hip extensors, no quadriceps action on the right, and fairly good action on the left, was fitted with two long leg braces with knee extensors in November, 1957, and was able to walk 60 ft. using a 4-point gait in December. Because he has not become stronger, he has continued to use the braces but can walk without assistance.

CASE 4.—A 3-year-old child with nonprogressive muscular atrophy which caused general weakness, most marked in the hip and knee, was unable to stand or walk without support. He was able to walk 100 ft. with gutter splints[7] and Kenny sticks.[8] In May, 1958, he was fittted with two long leg braces with knee extensors. He was able to walk with knee flexion and extension almost immediately after the braces were applied and now walks without assistance, using Kenny sticks for a swing-to and a 4-point gait.[9]

Two other patients have been fitted with similar braces too recently for a progress report.

Summary and Conclusions

A brace with constant tension throughout the range of knee motion has been described. Proper tension allows the quadriceps to participate in walking where residual strength is present, and thus the muscle can become stronger through use. Patients require less hip-hiking (elevating the pelvis on the affected side as the leg is swung forward) for walking and walk with a more normal gait. The freely flexed or extended knee joint offers greater ease in sitting and standing. In two patients, ambulation with braces developed quite rapidly and the braces were soon discarded, although both had had unsuccessful gait training directed at independent ambulation previously. Two patients continue to use these braces because of persistent weakness.

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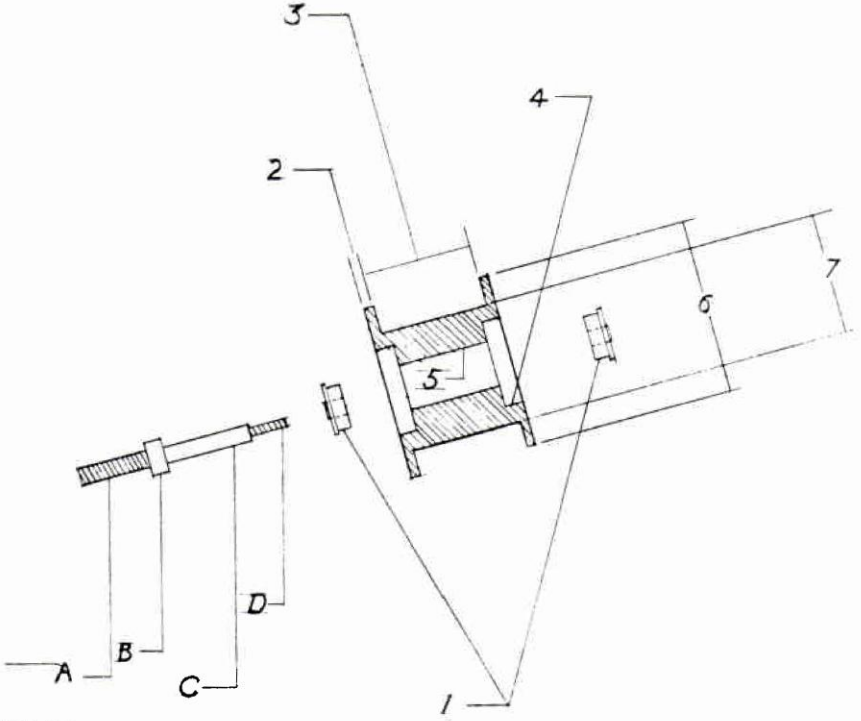
Technical Notes on Manufacture of Long Leg Braces to Assist the Quadriceps Femoris

By CLARENCE MEDCALF
Buchstein-Medcalf Company
Minneapolis, Minnesota

Figure 1—Pulley and bearing for 5.3 lb. Hunter Negator spring (No. 12H3K). The pulley is made from 1.250 aluminum round stock, the flange outside diameter is 1.250, the flange width is .040. The outside drum diameter of pulley is .950. The width between flanges is .775.



Key No.

1. Two SS518FCHH bearings from Miniature Precision Bearing, Keene, New Hampshire.
2. Bearing housing—ream .3125 for outside diameter of bearing.
3. Outside diameter of flange determined by outside diameter of Hunter spring plus .125.
4. Flanges .040 width.
5. Width of pulley between flanges, width should be .025 plus the width of Hunter Spring used.
6. Inside diameter of Pulley determined by inside diameter of Hunter spring plus .062.
7. Ends of pully counter bored .125 deep x .625 diameter.

Axel construction—carbon steel drill rod ¼ in. diameter x 1½ in.

Key Letter

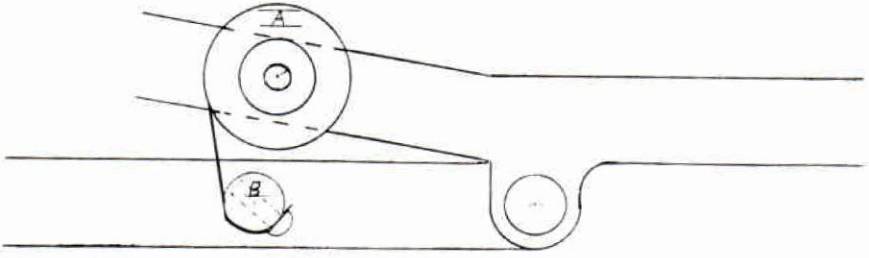
A. Machine to .125 diameter, ½ in. length, thread 5-40.
B. Shoulder ¼ in. diameter, .125 width.
C. Bearing shaft. .125 to .1245 diameter. Length determined by size of pulley with bearings in place measured with micrometer.
D. Machine to 0.89 diameter, ¼ length, thread 2-56.

The knee joints of the brace are set posterior to the upper side bars to allow hyperextension to approximately 183°. The upper side bars are extended three to four inches beyond the center of the knee joint. This extended arm will have to be longer for large patients than for smaller patients in order to provide adequate torque. The extension has been limited to four inches for adults and can be reduced to two and one-half inches for small children. To each of these extensions is fastened a spindle mounting a ball bearing pulley (Figure 1). Attached to the lower side bars an equal distance from the center of the knee joint are two spindles to which the Hunter Negator spring is attached. Care should be taken when aligning the brace to be sure that the spindles on the upper and lower bars are parallel on the horizontal and perpendicular planes to diminish twist and stress on the springs. It has been found that a five-eighths inch diameter aluminum spindle on the lower side bars reduces the stress and the rate of breakage of the spring at the point of attachment. Nevertheless, since these springs have a life of approximately 10,000 cycles, the rate of fatigue and fracture is relatively rapid and springs will have to be replaced every week or two.

The spring is punched with a sheet metal punch and attached with a screw to the spindle on the lower side bar. Since the spring usually cracks adjacent to the spindle on the lower side bar, it can be cut off, repunched and re-used several times before replacement with a new spring.

The torque provided by the springs should not exceed the torque due to the weight of the lower leg and foot with the brace on. Otherwise the patient cannot bend his knee when sitting. At this Rehabiliation Center an attempt has been made to achieve the torque of the lower leg through the combined use of the spring plus the residual strength of the quadriceps. However, it has been found in several cases that considerably less torque than this was needed to provide a stable knee which allowed nearly normal knee motion during walking. Springs larger than the 5.3 lb. spring (#12H3K) have not been used because of the bulk. However, these springs can be laminated by interwinding to double or treble the tension required.

This brace works most effectively when there is slight hyperextendability of the knee and will not work successfully if knee extension is limited to 175° or less. The patient, when walking, can bend his knee as he swings his lower extremity forward but must lock his knee on heel strike rather than allowing knee action for shock absorbtion. He can sit and rise without inconvenience. The greatest asset of the brace is that it requires additional muscular participation in the normal manner for locking the knee and consequently assists in building muscular strength where possible.



Pulley Attachment

A. Install proper Hunter spring and pulley approximately 2½ inches from knee joint on bar attached to upper leg brace.

B. Mount piece of ⅝ diameter aluminum round on lower leg brace same distance from center as spring pulley. Springs are available from: Hunter Spring Co., 17 Spring Ave., Lansdale, Pa.

Committee on Prosthetics Research and Development—A Report

By A. BENNETT WILSON, JR.

Committee on Prosthetics Research and Development, National Academy of Sciences

Toward the end of World War II, the Surgeon General of the Army requested the National Academy of Sciences to investigate the feasibility of applying some of the latest technology toward the improvement of artificial limbs. Accordingly, the Panel on Amputations of the Division of Medical Sciences under the chairmanship of Dr. Philip D. Wilson arranged for a meeting of surgeons, engineers, and prosthetists. At this meeting, held at Northwestern University January 30-February 1, 1945, it was recommended that a research program be developed by a technical committee to be established within the framework of the National Academy of Sciences. Funds were made available to the National Academy of Sciences, who made subcontracts with various universities and industrial laboratories to carry out certain phases of the program. In keeping with the policy of the Academy, the original Committee on Artificial Limbs, feeling that it had initiated a stable program, recommended that the Government agencies involved assume responsibility for the various contracts for research and that the Committee be reorganized so that its primary function would be that of advising the Government agencies in the conduct of the program and correlating and disseminating results. The new group was designated the Advisory Committee on Artificial Limbs and assumed its duties July 1, 1947.

Although there have been changes through the years in operational procedures to meet best the needs of the program, the National Academy of Sciences continues to serve those Government agencies responsible for the welfare of amputees, and in recent years has assumed responsibilities in the area of orthotics. The present group within the Academy, responsible for research and development in prosthetics and orthotics, is known as the Committee on Prosthetics Research and Development and operates within the Division of Engineering and Industrial Research of the National Research Council. It is supported by the Veterans Administration, the Office of Vocational Rehabilitation, and the National Institutes of Health.

The committee meets normally three times a year, or as often as there is need for review of program matters. When detailed studies are indicated, *ad hoc* committees are appointed. A Subcommittee on Child Prosthetic Problems considers problems peculiar to the juvenile amputee. A small staff carries on day-to-day activities. In addition to committee meetings, CPRD also sponsors conferences on specialized subjects when indicated. Research results are published in *Artificial Limbs* and in special reports.

Members of the Committee and staff are:

Howard D. Eberhart, *Chairman*; Professor of Civil Engineering, University of California (Berkeley)

C. Leslie Mitchell, M.D., *Vice-Chairman;* Surgeon-in-Charge, Division of Orthopedic Surgery, Henry Ford Hospital

George T. Aitken, M.D., Orthopedic Surgeon, Mary Free Bed Guild Children's Hospital

Charles O. Bechtol, M.D., Chief, Division of Orthopedic Surgery, University of California Medical Center (Los Angeles)

R. C. Doolittle, Capt., MC, USN, Director, Navy Prosthetics Research Laboratory, U. S. Naval Hospital (Oakland)

Herbert Elftman, Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University

Sidney Fishman, Project Director, Prosthetic Devices Study, New York University College of Engineering.

Chester C. Haddan, President, Gaines Orthopedic Appliances, Inc.

Verne T. Inman, M.D., Professor of Orthopedic Surgery, University of California Medical Center (San Francisco)

Fred Leonard, Chief, Plastics Development Branch, Army Prosthetics Research Laboratory

Anthony Staros, Chief, Veterans Administration Prosthetics Center.

Augustus Thorndike, M.D., Chief Surgeon, Department of Hygiene, Harvard University

Howard Thranhardt, Partner, J. E. Hanger, Inc. (Atlanta)

Tonnes Dennison, Executive Director

Earl J. Murphy, Executive Secretary

A. Bennett Wilson, Jr., Staff Engineer

As a result of the Research Program there have been introduced many new devices and techniques for the management of amputees. The suction socket for above-knee legs, the Bowden cable and simplified harness designs, the use of plastic laminates, the so-called UCB fitting and alignment principles for the above-knee cases, and the patellar-tendon-bearing prosthesis are but a few. However, there exist in both prosthetics and orthotics many problems which present real challenges. The Committee welcomes new ideas or suggestions and stands by ready to help in the development of any devices and techniques which offer promise.

A Bennett Wilson, Jr.

Hennessy on Prosthetic Mission in South America

Mr. Charles A. Hennessy, past president of the Association and at present consultant on prosthetics to the Prosthetics and Sensory Aids Service of the Veterans Administration, is in Caracas under the auspices of the Department of State to demonstrate and lecture on prosthetic development. He has been most warmly received, as shown by a half dozen illustrated newspaper articles forwarded to us via the Veterans Administration and the Committee for the Handicapped. Of these six articles, only two are in English, and the other four in Spanish. One three-column picture shows Mr. Hennessy with Dr. Tomas J. Isray, an AOPA member in Caracas.

One of the chief purposes of Mr. Hennessy's visit is to fit a Caracas youth, Edgar Gonzales, with artificial hands to replace those he lost in a battle with a shark. Casts of the stumps, which were made immediately on his arrival, were sent to Washington, D. C., by diplomatic pouch. The casts were then forwarded by air to A. J. Hosmer in Los Angeles, for manufacture of the prostheses. After completion of his lecture tour to La Paz, Santiago and Vina del Mar, Mr. Hennessy fitted Gonzales with his new hands and began training him in their use.

Service Test Report

PATELLA-TENDON PROSTHESIS FOR BELOW KNEE AMPUTATIONS

By S. L. BAIRD*

1. I have worn a left BK prosthesis since February 1949. All during this period I became increasingly convinced that there must be a better prosthesis from the standpoint of comfort, gait and wearability than the standard BK prosthesis with laced thigh corset, knee joints, belt and fork-strap. I was also convinced that improvement in appearance, maintainability and reduced weight, plus ease and simplicity in putting the leg on and taking it off could be achieved.

2. I discussed these convictions with Mr. Stanley Hedges, President of the Indianapolis Artificial Limb Company and he described the new patella-tendon concept of fitting a BK prosthesis. Upon learning that his company had not acquired experience with this new concept I volunteered to service test such a leg. Mr. Hedges agreed and insisted on a conservative approach. My standard leg was modified to provide for end bearing to determine toleration. Beginning with light pressure in approximately two months I was able to comfortably tolerate approximately 40 percent end bearing. I also noticed an immediate improvement in the condition of the skin of the bearing surfaces, with only a slight thickening of the skin at the terminus of the stump.

3. A cast was taken over two stump socks and a closed end socket was fabricated of plastic material. The socket is approximately 2½ inches longer than the stump to provide for end-bearing cushioning. The socket encloses the lower half of the patella and extends on the sides well up on the condyles of the femur. The socket was temporarily fastened to an aluminum pylon to check for fit and alignment. It was then fitted into the shell or shank which was contoured as closely as possible to the good leg. A Sach foot with a medium heel was attached and a light leather knee harness riveted through the shell proved to be completely adequate to retain the leg in place without the use of a belt and fork-strap.

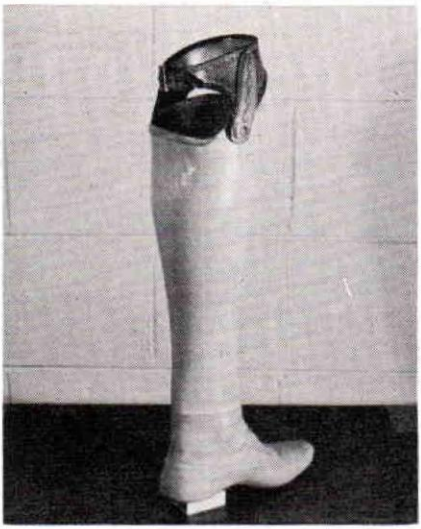
4. Only a slight amount of relieving was required around the top edge of the socket, mainly along the sides of the knee cap. Thin foam rubber pads covered with chrome horsehide were glued in place in the knee cap area and on the lateral and posterior aspects of the socket to provide for a firm fit. Sufficient foam rubber pads were used in the closed bottom of the socket to provide cushioning for end bearing.

5. I have worn the leg continually for five months and I believe the following conclusions can be safely reached:

a. The prosthesis weighs 3¼ pounds without a shoe as compared to my standard willow limb which weighs 7 pounds.

b. I am comfortably tolerating approximately 60 percent end bearing without complications. A calloused area the size of a fifty cent piece at the terminus of the stump is apparently normal and not bothersome.

Editor's Note: We are indebted to Stanley Hedges for this article, written by a prosthetic wearer in his neighborhood, who compiled the report entirely on his own initiative.



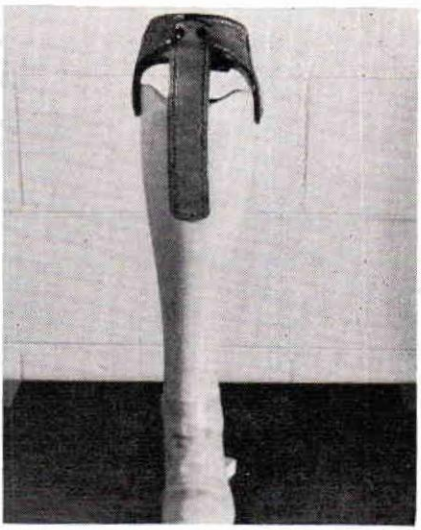


Fig. 1—The light leather harness employs only one buckle. The sides of the harness have light aluminum stiffeners, covered with leather to prevent sagging. The Sach foot is covered with a latex cover.

Fig. 2—A light leather strap can be snapped in place to prevent trousers or skirt from catching in the slight gap between the knee cap and the socket when walking or on windy days.

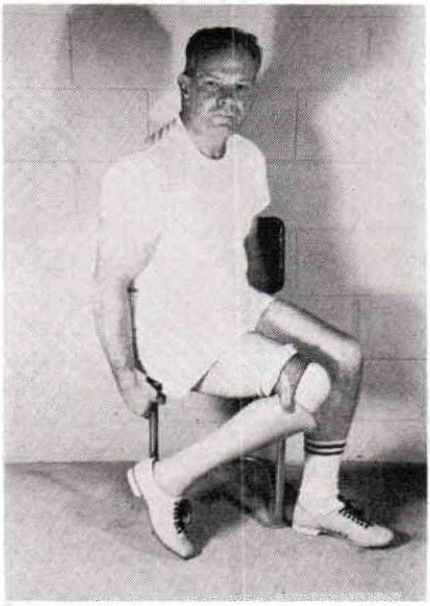


Fig. 3—Note the great amount of knee flexion possible.

c. There is no edema of the stump and no skin irritation whatsoever. I estimate that circulation has improved considerably because the thigh corset has been eliminated.

d. The prosthesis is more comfortable than the standard prosthesis, particularly when sitting. (Note the great amount of knee flexion possible).

e. The prosthesis was worn throughout the hot summer months and in spite of the closed socket I have had no heat rash or chafing. Apparently the slight piston action within the closed socket provides a greater amount of air circulation than a standard prosthesis. I have played 18 holes of golf in 90 degree temperatures without discomfort.

f. The prosthesis can be put on or removed in five seconds. Only one buckle is used.

g. Appearance is vastly improved (note the extremely neat fit around the knee). This consideration would be important to female amputees.

h. The prosthesis is virtually maintenance free due to the absence of any working parts. The Sach foot eliminates the necessity for an articulated ankle. It is also virtually water proof.

i. I have no discernable limp and I am an habitually fast walker.

j. Muscle tone of the thigh muscles has vastly improved with an increase in circumference of 1½ inches at mid-thigh.

6. These conclusions are strictly the result of this personal service test. I do believe, however, that on a selected basis any BK amputee with a normal, well healed stump even as short as 4 inches, would be equally well pleased with the patella-tendon leg. I also wish to express my appreciation to Mr. Stanley Hedges and his associates of the Indianapolis Artificial Limb Company for their expert prosthetic knowledge and technique and for the opportunity to participate in this service test.

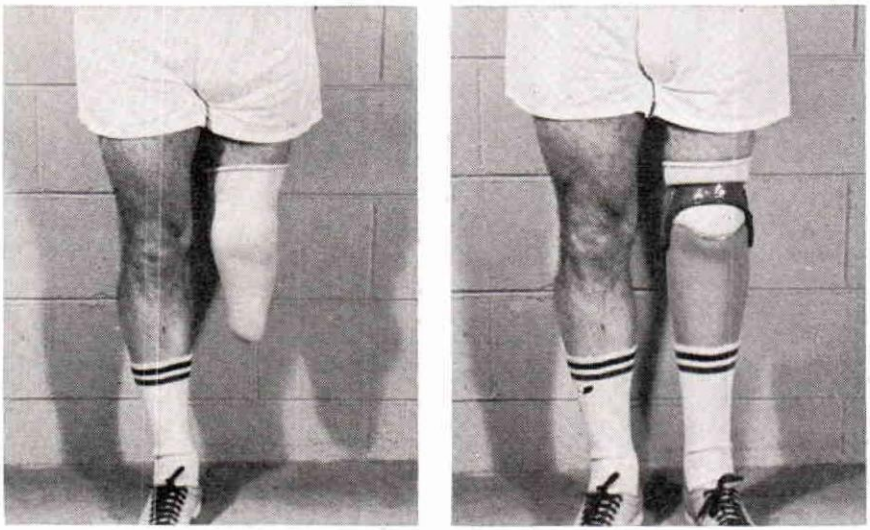


Fig. 4—The leg is remarkably neat. The close fit at the knee would be especially desirable for female amputees. In such cases a full length latex cover can be pulled up over the knee and fastened to a strap and light belt, thereby eliminating the leather knee harness.

Construction of a Prosthesis For a Deformed Short Leg

By RAY BUDDIN
Sabolich Artificial Limb and Orthopedic Appliance Company, Oklahoma City

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

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

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

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

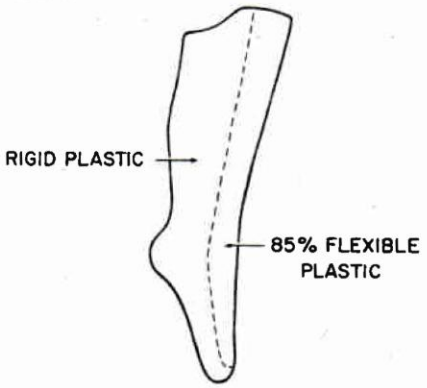


Fig. 1—Socket laminated on cast of deformed leg.

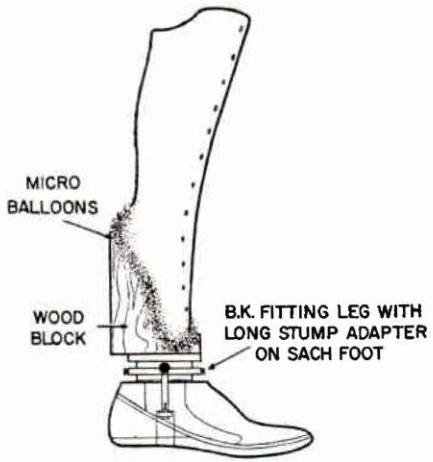


Fig. 2—B/K fitting of leg with stump adapter on SACH foot.

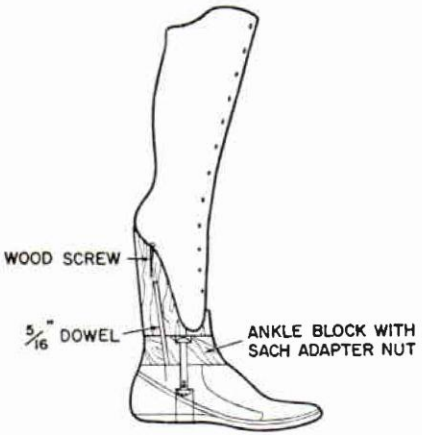


Fig. 3—Fitted prosthesis after transferring and shaping of wood section.

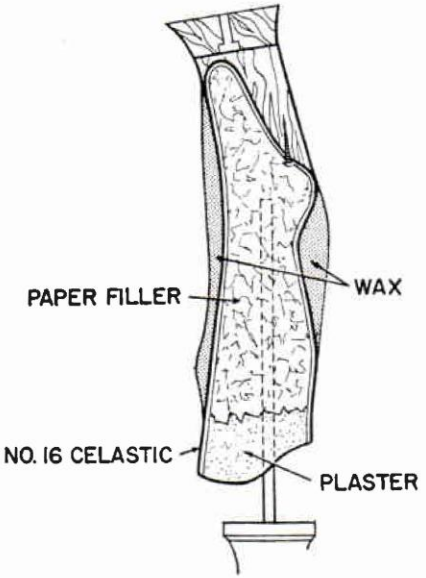


Fig. 4—Wax build-up to match sound limb, ready for lamination.

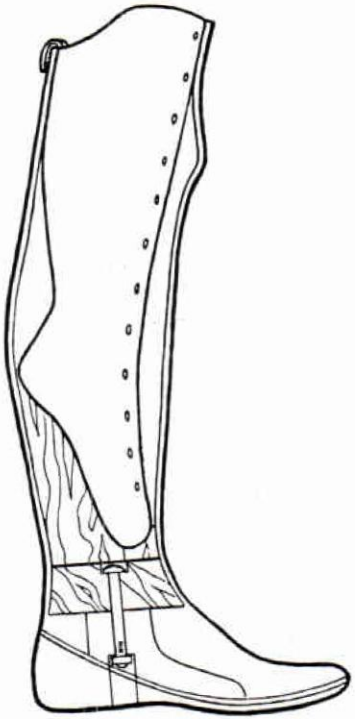


Fig. 5—Innersocket in place within outer plastic shell. Mandle wax and screw removed. Socket is now removable.

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

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

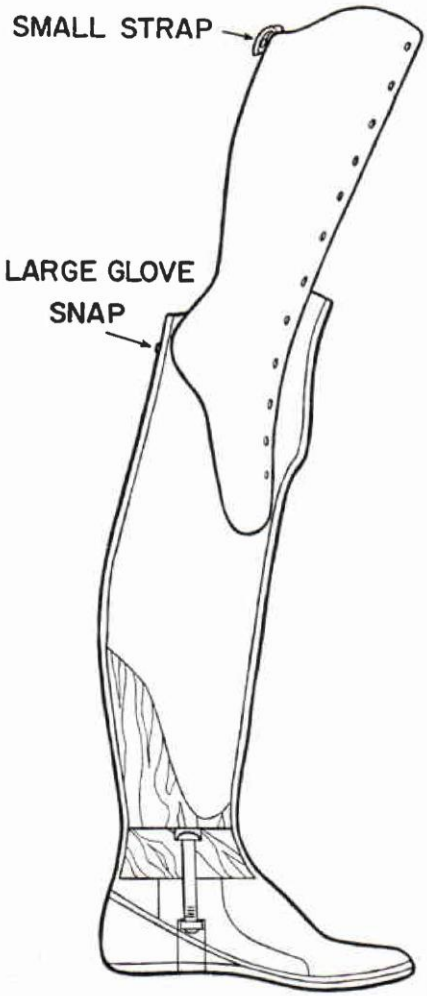


Fig. 6—Socket in relation to shank being inseated or removed.

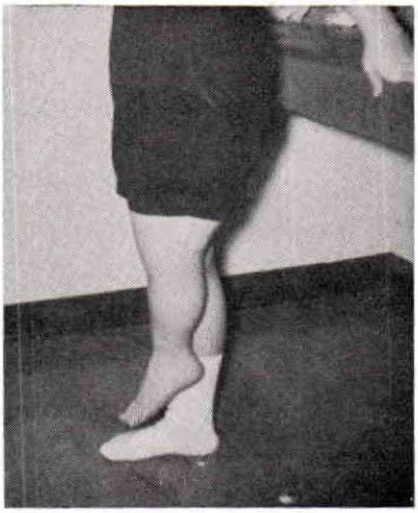


Fig. 7—The deformed foot.

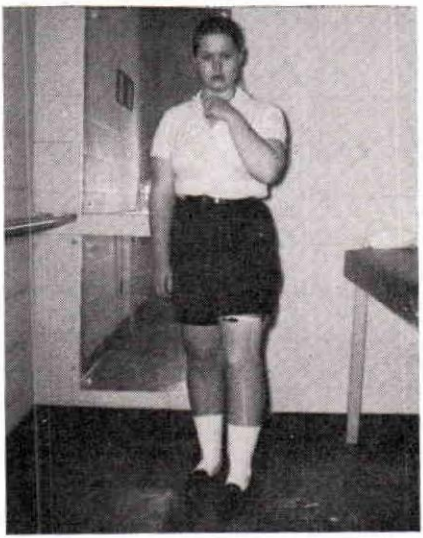


Fig. 8—Cheryl wearing the finished prosthesis.

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

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

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

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

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

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

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

Review

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

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

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

(1) Treatment of the individual is always treatment of the whole person.

(2) The individual who voluntarily seeks assistance makes better use of the assistance provided and the period of his recovery is reduced.

(3) The relationship between *patient* and *specialist* may be of as much significance as the nature and kind of treatment provided.

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

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

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

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

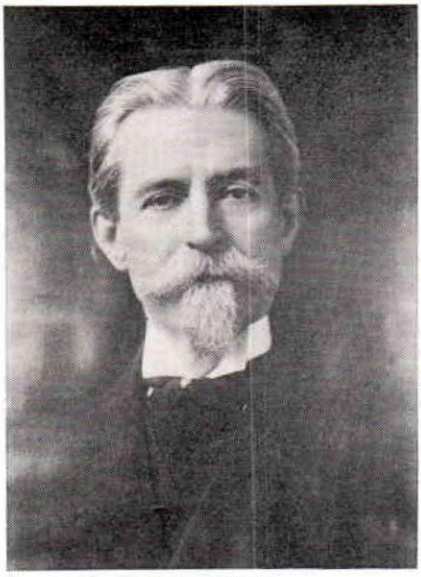
Hanger Celebrates Centennial

By STOCKTON BANKS
Assistant Editor, *Orthopedic and Prosthetic Appliance Journal*

The year 1961 marks one hundred years of service in the field of prosthetics for the Hanger Organization. This well known group of companies had its beginnings in Richmond, Virginia, in the first months of the Civil War.

James Edward Hanger, its noted founder, was himself an amputee at the age of 18—the victim of two unfortunate firsts. He was a casualty of the first land battle of the War Between the States, and the loss of his leg was the first amputation of that war. This is attested by a bronze marker at Philippi, West Virginia, which reads in part:

> "First Land Battle of the Civil War
> "From this spot on the morning of June 3rd, 1861, was fired the first cannon after Fort Sumter . . .
> "Casualties
> ". . . James E. Hanger, of Churchville, Virginia, was wounded in the leg by a cannon ball and his leg was amputated by Dr. Robinson of the 16th Ohio Infantry. This was the first amputation of the War. . . ."



J. E. HANGER

J. E. Hanger had entered Washington and Lee University in the fall of 1859. After the loss of his leg the engineering training he had begun in college helped him to devise an artificial leg for his own use, as well as limbs for several comrades in Richmond. His success led him to devote his life to this work, and he received a commission from the State of Virginia to manufacture limbs for Confederate veterans. His firm began business in

Richmond in 1861 and moved its headquarters to Washington, D. C., in 1888. Mr. Hanger was granted two patents by the Confederate States of America, and later patents were issued to him by the United States Patent Office. A copy of one of these, dated 1891, is on file in the Association's headquarters.

Mr. Hanger's six sons followed him into the artificial limb business, and expansion followed rapidly. Hanger facilities are now in operation in many of the principal cities of this country and Canada. The group of J. E. Hanger companies have been active members of the Association since the days of the old Artificial Limb Manufacturers Association. McCarthy Hanger, Sr., the late president of J. E. Hanger, Inc., of Missouri, served as ALMA's president in 1924-25 and again in 1930-32. His son, McCarthy Hanger, Jr., who is now president of the Hanger facility in Missouri, was OALMA's president in 1954-55 and was vice president of the American Board for Certification in 1957-58. M. P. Cestaro, president of J. E. Hanger, Inc., of Washington, has served untiringly as treasurer of the Association for the past ten years. Daniel A. McKeever, treasurer of J. E. Hanger of Georgia, was OALMA president in 1949-50 and also has served as president of the American Board for Certification, and Howard R. Thranhardt, secretary of J. E. Hanger of Georgia, is now president of ABC.

As the Hanger organization begins its second hundred years of service to the disabled, the *Journal* offers its congratulations on past accomplishments, and its best wishes for continued achievements.

McCARTHY HANGER, SR.

McCARTHY HANGER, JR.

A Surgeon Comments

By EVERETT J. GORDON, M.D.
Washington, D. C.

The problems of rehabilitation of our crippled population are receiving increased attention with each passing month. Most of our state and federal agencies have stepped up their programs for both medical and vocational rehabilitation, and much more money is now being spent to return handicapped people to useful functions in society. Part of the National Conference on Aging held in Washington in January was devoted to the medical rehabilitation of patients fitted with artificial limbs and braces. The focusing of a well-publicized national spotlight on this problem will certainly add impetus to the entire program, and facilitate the prescription of up-to-date limbs and appliances for needy cases.

The National Orthopaedic Hospital in nearby Arlington, Va. has announced plans for an ambitious program for an entire building devoted to industrial rehabilitation of the crippled and handicapped. The unique idea retains the well-established vocational training of handicapped individuals, but at the same time contract work will be performed by them for commercial companies, thereby providing a source of income for both the patients and the vocational facility. Plans call for an entire building of machine shops, leathercrafts, carpenter and paint work, sheet metal and lathe shops, etc.

The PTB below knee prosthesis has lately encountered unforeseen problems. Several of our amputees who initially were very pleased with their new prosthesis and had made remarkable progress, including one bilateral amputee fitted with two PTB prostheses, have recently developed painful, sometimes ulcerated areas on their stumps. X-rays of the amputation stump have revealed bone spurs of considerable size which had not previously caused any difficulty with conventional sockets without total contact fitting. Several of these amputees have been forced to revert to their old prostheses and will require surgical excision of their bone spurs before they can again use their PTB prostheses. It would appear that routine x-rays of the amputation stump should be ordered before fitting with a PTB prosthesis to determine the presence of exostoses (bone spurs). Large spurs must be removed or will have to be considered as a contraindication to fitting with a total contact socket. The spurs are usually located at the lower extremity of the amputated bone and therefore cause no problems with the conventional type of prosthesis in which the fitting contact is above, at knee level on the tibial tuberosities.

The use of a shoulder harness in the older amputee sometimes is followed by other problems, particularly discomfort in sitting if the web belt is too tight. The insertion of an elastic section in the web belt relieved this problem in a 72 year old man who had been using a shoulder harness for forty years. Incidentally, he was also fitted with a Bock knee which gave him great stability and which pleased him immensely. It was quite rewarding to note how quickly he adapted to his new type knee, as the usual slow adaptation and resistance of the "oldster" to new devices was anticipated.

Edema of the stump can sometimes be controlled by the use of the ordinary shrinker stocking beneath the stump sock. In one case of repeated

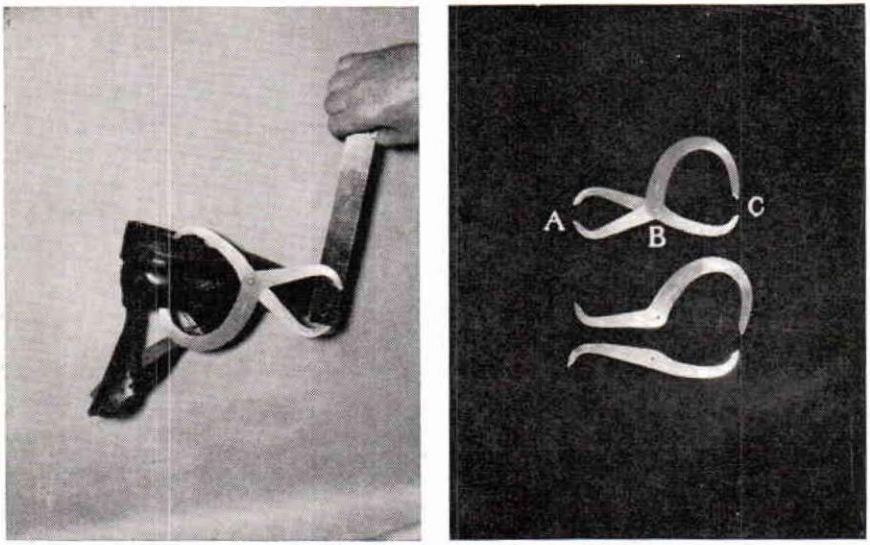
swelling in a BK amputee this worked quite successfully to control the swelling while wearing his prosthesis. Perhaps our readers have other ideas or innovations to cope with such a problem.

A well-known problem with the use of lower limb appliances in our senior citizens is the rapid shrinkage of the stump because of the large proportion of subcutaneous fat and diminished vitality of the stump musculature. The use of liner inserts for proper fit should not be long delayed or the amputee may be discouraged and stop using the limb.

Please let us hear of your recent experiences with the PTB prosthesis. Have you encountered many spur problems? This is a very important point, which, if recognized, may prevent the needless expense and discomfort of replacement of wrongly prescribed total contact sockets.

Nelson Gadgets

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



GADGET NO. 6—Double Caliper

Courtesy of Ben Pecorella, C.P. & O., Buffalo, New York

For measuring the elevation of a shoe or the thickness of a wall, such as a limb, etc., there is nothing as effective as this Double Caliper. As shown in the illustration, you close the one end over what you want to measure and with a ruler take a reading on the other end. The opening on one end is always the same as the other end.

The size and shape of this caliper is entirely optional. The only important factors are: No. 1, the distance from center "B" to jaw "A" and from center "B" to jaw "C" must be exactly the same, No. 2, both Jaws "A" and "C" must close at the same time. The model shown here is 8½" long and we have found this size and shape very handy around a brace shop. It is made from 16 guage hard aluminum. For center, we use a ⅛" rivet with a thin leather washer under the head.

CERTIFICATION—
Are Your Credentials in Order?

By ALVIN MUILENBURG
Chairman, Committee on Credentials, ABC

During last year's meeting of the Committee on Credentials of the American Board for Certification 111 Applications for Examination were reviewed. The Committee rejected 50 of these. Because of this high percentage of rejection, the Board and the Committee felt that the process of handling these Applications should be printed where it would be accessible to those desiring Certification.

Applications for Examination should be submitted no later than June 1st of the year in which Certification is desired. A fee of $10.00 must accompany each new Application. A late Application will be considered if accompanied by an additional $10.00 late Application Fee and received before June 16th. Application Fees are used to meet the expense of handling the Applications and are *not returnable.*

When an Application is received by the National Office it is reviewed by the Executive Director of the American Board for Certification. If deficiencies are noted he will notify the applicant by letter. We must stress that it is the *responsibility of the applicant* to see that his Application is filled out completely. Most common deficiencies are: no Application Fee; no High School Diploma; lack of adequate fitting experience; lack of first fitting dates for each type of appliance. When there are irregularities from the general requirements the applicant should explain in detail. This is especially true when experience time is short or when there are some unusual circumstances regarding education or fitting.

After June 1st reference forms are mailed to the physicians, the fitting supervisors and the former employers listed in the Application. The first of July follow-up letters are written to those references who have not returned their forms. (It is our suggestion that the Applicant contact the physicians and other references to be sure that they have returned their forms on time.) At this same time a list of the Applicants is mailed to all Certifees to give them an opportunity to comment.

When completed and documented, the Applications are referred to the Committee on Credentials which usually meets early in August. This is a standing committee of the Board, appointed by the president. The members consist of from 2 to 4 Certified Orthotists and Prosthetists and one physician. The Chairman of the Committee is a member or past member of the Board. The duties of the Committee are to pass on the eligibility of all Applicants for Certification Examinations and to review and recommend action on appeals made by those failing the Examinations.

When the Committee meets, the Applications are reviewed individually by each member of the Committee. The Executive Director is present to answer questions pertaining to his previous review of the applications. After the Committee has evaluated each Application individually, each is discussed by the entire Committee. No Applicant is rejected unless it is the *unanimous decision* of the Committee.

The importance of filling out the Application for Examination completely and correctly cannot be overemphasized. Many Applications are received which give the impression that the Applicant fills out what he feels is important and sends it in expecting the Committee to have some magical insight as to what the rest of his qualifications are. An explanation should be made if any blanks are not filled in. Interpretation of material in credentials is a matter of weighing the factors of time, training, experience and references. Lack of information in any one of these categories may make the difference between acceptance or rejection. The forms list minimum requirements. Additional information given by the applicant may very well work to his advantage.

The Applicant must furnish proof that he has completed a High School Course. Until June 16, 1962 a High School Equivalency Certificate may be presented in lieu of a diploma or certificate of completion. Each year several Applicants ignore or neglect to include this requirement with their Application. It is then necessary for our Executive Director to request that this requirement be met before the Committee meeting. In two cases this past year Diplomas or Equivalency certificates were never received. It is important to note here that high school diplomas given by correspondence schools are not considered equivalency certificates but are considered the same as a high school certificate. (see foot note)

All College, University and other short- or long-term residence courses are valuable aids in determining eligibility. Correspondence courses and seminars at National and Regional A.O.P.A. meetings should be listed. At present the courses in prosthetics and orthotics at UCLA, NYU, and NU are not required for Certification, but they do carry considerable weight, especially in borderline cases. Methods of fitting as taught at these Universities have been accepted throughout the United States. The examinations are based on much of the material they teach. Anyone not familiar with the material in these courses would have difficulty passing the examination.

Any applicant who has completed his course of study equivalent to High School in a non-English speaking school is required to submit evidence of his ability to speak, read and write English. This is necessary because in the past men have failed in the examination not because of their lack of knowledge or technical competence in Prosthetics and Orthotics, but because they could not understand the questions asked and, therefore, could not show what they actually knew. The Committee requires that these Applicants submit profiles of scores on the "General Education Development Tests" and the "Nelson-Denny Reading Tests for Colleges or Senior High Schools" (form A or B). Arrangements for taking these tests should be made locally through the Superintendent of Schools, Vocational Rehabilitation Office, University Counseling Service or Veterans Testing Service. Our Executive Director can be contacted for assistance in obtaining these tests.

The responsibility for interpretation of references with regards to character and integrity rests heavily with the Credentials Committee. There is no examination to further test the Applicant concerning his ethical and professional attitude. The decision must be based on references submitted by past employers, physicians and personal acquaintance. One poor reference is seldom sufficent for rejection. If only one individual expresses a poor opinion of the Applicant and all the rest are very favorable there is still a very good chance for him to be accepted. Some Applicants have

Footnote: The International Correspondence Schools through their local representatives will gladly review previous education of an individual and set up a program for him to pursue in completing this diploma.

blamed former employers for poor references that caused their rejection. The former employer may have been one deciding factor but those that have been rejected had other poor references, either from Certifees or physicians or did not meet other requirments of the Board. In order to be as fair as possible the Board and the Committee never closes the door to anyone whose Credentials have not been approved. If an Applicant can furnish sufficient proof as to his good character and integrity he should certainly re-apply. It is the responsibility of Certifees and physicians to give a true account of the Applicant's present conduct. Un-ethical practices in the past could be overshadowed by good professional conduct at present. In order to clarify some difficult cases the Committee may request additional references from other individuals who know the Applicant. The decision is based on all reference letters combined with education and experience. We cannot divulge the name of anyone who may have given a good or a bad reference, but we do inform the Applicant, on request, of the categories in which he was weak so that he may prepare himself for re-Application.

The Applicant must obtain permission from the physician whose name he sends in to be contacted by the Board. In several cases we received reference forms from physicians stating that they did not know the man; or, equally as bad, "His employer says he is a good man but I haven't met him". These answers do not help the Applicant.

Last year many Applicants were rejected because they fell short of the two year requirement for fitting all types of appliances under a Certified supervisor. This requirement is especially adhered to for those entering the field during the last four years. Those who have been in the field prior to four years ago can be approved for Certification if their fittings have been supervised either by a person now Certified, a physician, or a person who has sufficient experience and background to offer this supervision. It is very important that all Applicants for Examination record 1st fitting dates of various appliances. To assist in this a person who desires Certification should notify our Executive Director of his intent to be Certified early during his training. Information concerning educational material, formal courses available and Applications will be mailed to him. The Application can be used as a work progress form. Anyone who obviously has specialized in one type of prosthetic or orthotic appliance and has not had courses of study or experience in others will not be accepted. His rejection is necessary not only because of the requirements of the Board but also because it would be unfair to him if he were allowed to attempt an examination which he, by experience, was not prepared to pass.

From this discussion we sincerely hope that future Applicants will have a better understanding of what is expected of them. An Applicant who realizes what a professional career requires is not a problem for the Committee on Credentials. He is the one who has taken all the educational courses available. His shop and fitting experience is not minimum but more than required, and his references show that he has made a special effort to personally contact the physician whose patient he is fitting. This man submits his Application after he is sure that he is able to fulfill all the requirements. He realizes that his career is his own individual responsibility and not the responsibility of his employer. He wants to be Certified because he knows he is qualified to give professional service and not for what he can get out of it. He realizes that Certification is merely the end of the beginning and not an end in itself. He is the man who is professional and who should be Certified. He is the man who will be accepted by the Committee on Credentials.

The President of AOPA Reports on the Association's Regions

The front cover of this issue bears the photographs of ten men and Mrs. Mary Dorsch — eleven orthotists and prosthetists of the United States. These ten men and Mrs. Mary Dorsch are the members of the Board of Directors of the American Orthotics and Prosthetics Association. They are Regional Directors chosen by ballot by their colleagues. Each is responsible for an important part of the Association's activities in a group of States.

The eleven regional directors, with four national officers elected at the annual Assembly of the Association, are the governing body of the American Orthotics and Prosthetics Association. They are responsible for the operations of the Association, they select the Executive Director, approve the annual budget of the Association and designate the city in which the National Assembly will be held.

Their responsibilities are especially heavy in the spring of each year when the Association sponsors a series of Regional meetings open to all who are concerned with rehabilitation of the orthopedically handicapped. For this reason, I believe that the readers of the *Journal*, many of whom are not members of the Association, will be interested in a report on these regions, the programs and the directors in charge.

Region I—The New England States—Joseph Martino, C.P.O., Boston, Regional Director

Region I holds monthly meetings at Boston, usually at the Liberty Mutual Rehabilitation Center. Their local organization is the New England Society of Orthotists and Prosthetists. Joseph Martino, head of the United Limb and Brace Co., is now in his third term as director of the Region.

When this *Journal* appears, Mr. Martino will just have concluded presiding at the annual educational session of Region I. This was held March 3rd in Boston. The two technical presentations were: "Congenital Prosthetic and Orthotic Problems" by Dr. Cameron Hall and Mr. Joseph Traub, C.P., of the University of California, Los Angeles; and, "Functional Bracing of the Upper Extremity" by Mr. Joseph Traub, University of California, Los Angeles, and Mr. Roy Snelson, head of the Orthotic Department at Rancho Los Amigos Hospital, Downey, California.

Region II—New York and New Jersey—Mrs. Mary Dorsch, C.P., New York City, Regional Director.

Mrs. Mary Dorsch, C.P., is the second woman to serve on the Association's Board as a Director. (The first is the beloved Mrs. D. E. Hedgecock of Dallas, Texas). Mrs. Dorsch has long been a leader in prosthetic-orthotic circles, and has been active in planning the annual seminars of the Metropolitan Orthopedic Appliance and Limb Manufacturers Association. The annual meeting of Region II will be held in New York City at the Com-

modore Hotel, May 5 and 6. William Spiro of Hempstead, Long Island, New York, is Program Chairman and has arranged for these sessions: "Ethics" by Dr. Claude Lambert and Mr. Blair Hanger of Northwestern University; "Gait Factors and Alignment" by Mr. John Bray and Mr. Donald Colwell of the University of California at Los Angeles; and, "Porous Laminates" by Mr. Ivan Dillee, New York University, and Dr. Fred Leonard of the Army Prosthetics Research Laboratory.

Region III—The Middle Atlantic States—Pennsylvania, Delaware, Maryland, District of Columbia and Virginia—Basil Peters, C.P.O., Philadelphia, Regional Director.

Mr. Basil Peters, the Regional Director, has arranged for a joint session with the Pennsylvania Orthotics and Prosthetics Association this spring. This will be held at the Penn-Harris Hotel, Harrisburg, Pennsylvania. The Program Chairman is Mr. Alfons Glaubitz, C.P.O., head of the Brace Department, State Hospital for Crippled Children, Elizabethtown, Pennsylvania. Mr. Glaubitz and Mr. Peters have arranged for these sessions: "Functional Bracing of the Upper Extremity" by Mr. Roy Snelson and Mr. Joseph Traub, University of California, Los Angeles; and, "Patellar Tendon Bearing and Quadrilateral Sockets in Orthotics" by Mr. Thomas Pirrello, VA Prosthetics Center.

Mr. Peters heads his own company and is also an instructor in prosthetics at New York University. His wife is a former president of the Woman's Auxiliary of the Association.

Region IV—Southeastern United States—Regional Director Bert Titus, C.P.O., Department of Prosthetic and Orthopedic Appliances, Duke University Medical Center, Durham, North Carolina.

Mr. Titus, as Regional Director in his second term, will be in charge of the meeting to be held June 16 and 17 at the George Vanderbilt Hotel in Asheville, North Carolina. He has arranged for two special presentations: "The Shoe in Lower Extremity Bracing" by Izidore Zamosky, and "Plastics Application in Orthotics" by Mr. Thomas Pirrello, both of the V.A. Prosthetic Center, New York City.

Region V—Ohio, Michigan and West Virginia—D. R. Coon, C.P.O., Detroit, Regional Director.

Mr. Coon has arranged for a Regional meeting to be held at the Statler Hotel in Detroit, Michigan, May 12 to 14, 1961. There will be two presentations: "Advanced Above Knee Prosthetics" by Mr. John Bray and Mr. Donald Colwell, and "Congenital Prosthetic and Orthotic Problems" by Dr. Cameron Hall and Mr. Joseph Traub. All program participants are from the University of California, Los Angeles.

Region VI—Wisconsin, Illinois, Indiana and Eastern Missouri—Richard G. Bidwell, C.P.O., Milwaukee, Regional Director.

Mr. Bidwell is currently serving as Program Chairman for the National Assembly in Orthotics and Prosthetics (he was Exhibits Chairman for the 1960 session held in New York City).

For the 1961 Regional Meeting to be held at the Pick-Congress Hotel in Chicago June 2 to 4, 1961, he has arranged for these presentations: "Congenital Prosthetic and Orthotic Problems" by Dr. Cameron Hall and Mr. Joseph Traub, University of California, Los Angeles; "Lower Extremity Orthotics" by Dr. Edward Peiser and Mr. Charles Fryer, New York University; and, "The Shoe in Lower Extremity Bracing" by Izidore Zamosky, VA Prosthetic Center, New York City.

Region VII—Wyoming, Colorado, North and South Dakota, Nebraska, Kansas, Minnesota, Iowa and Missouri—Robert C. Gruman, C.P., Minneapolis, Regional Director.

Mr. Gruman served as Program Chairman for the 1957 meeting in Washington, D. C. of the Association, and is currently in his second year as Regional Director.

He has scheduled a Regional Meeting for Minneapolis on June 9 to 11, 1961 with these presentations: "Upper Extremity Prosthetics" by Mr. Blair Hanger and Mr. Colin McLaurin of Northwestern University; "Advanced Above Knee Prosthetics" by Mr. John Bray and Mr. Donald Colwell of the University of California, Los Angeles; and, "Congenital Prosthetic and Orthotic Problems" by Dr. Cameron Hall and Mr. Joseph Traub, University of California, Los Angeles.

Region VIII—Southwestern States: Texas, Northern Louisiana, Arkansas, Oklahoma and New Mexico—David C. McGraw, C.P.O., Shreveport, Louisiana, Regional Director.

Mr. McGraw was Exhibits Chairman of the 1959 National Assembly held in Dallas, Texas. Mr. McGraw is now in his third year as Regional Director and has arranged for a session to be held at the Baker Hotel in Dallas, Texas, May 19 to 21, 1961. The presentation includes: "Ethics" by Dr. Frederic Vultee and Mr. Alvin Muilenburg, Northwestern University; "Advanced Above Knee Prosthetics" by Mr. John Bray and Mr. Donald Colwell, University of California, Los Angeles; and, "Plastics Application in Orthotics" by Mr. Thomas Pirrello, VA Prosthetic Center, New York City.

Region IX—Southern California—Harvey Lanham, C.P., Long Beach, California, Regional Director.

Mr. Lanham has been active in prosthetics in Southern California for many years and has trained a number of individuals in this field. He was one of those instrumental in the early educational activities in our field of prosthetics in Southern California.

As Regional Director, he scheduled a meeting at the Statler Hilton Hotel in Los Angeles April 28 to 30, 1961, featuring these presentations: "Ethics" by Dr. Frederic Vultee and Mr. Blair Hanger of Northwestern University; "Lower Extremity Anatomy" by Mr. John Bray of the University of California; and, "Patellar Tendon Bearing and Quadrilateral Sockets in Orthotics" by Mr. Thomas Pirrello of the VA Prosthetic Center, New York City.

Region X—Northern California, Nevada and Utah—Herbert Hart, C.P.O., Regional Director.

Mr. Hart, manager of C. H. Hittenberger in Oakland, California, has long been active in the Association and is currently in his fifth term as Regional Director. He served as Program Chairman for the 1956 National Assembly held in San Francisco, California, and is completing a term as a member of the American Board for Certification.

Mr. Hart has scheduled a Regional meeting for April 21 to 23, 1961 with these presentations: "Functional Bracing of the Upper Extremity" by Mr. Roy Snelson and Mr. Joseph Traub, University of California, Los Angeles; and, "Ethics" by Dr. Claude Lambert and Mr. Blair Hanger of Northwestern University.

Region XI—Northwestern States—Washington, Oregon, Idaho and Montana—August Pruhsmeier, C.P.O., Portland, Oregon, Regional Director.

Mr. Pruhsmeier has arranged for a session in the Benson Hotel, Portland, Oregon, March 10 to 12, 1961, which will be underway by the time this article appears in print. For this session, Mr. Pruhsmeier has scheduled: "Plastics Application in Orthotics" by Mr. Thomas Pirrello of the VA Prosthetic Center, New York City; and, "Congenital Prosthetic and Orthotic Problems" by Mr. Joseph Traub, University of California, Los Angeles.

New Members of AOPA

JOE BOWMAN

Joe L. Bowman, owner of Bowman's Oklahoma Brace and Appliance Company of Oklahoma City is a new member whom we welcome to the Association. His facility is located at 1111 North Lee Pasteur Building, Room 6, Oklahoma City 3. The telephone is CE. 5-1665. The facility, which has five full time employees, specializes in braces and arch supports, tailored corsets, and orthopedic shoe service.

Mr. Bowman began work in 1924, before he finished high school, in the Oklahoma Surgical Appliance Company, owned by Dr. Earl D. McBride. On his graduation six months later he began full time work in the facility, and in 1928 became supervisor of the shop. Dr. McBride also established the Bone and Joint Hospital and the McBride Clinic with a brace shop in the hospital building.

In 1947 Mr. Bowman established his own shop and in 1950 had the honor of having his facility chosen by a group of leading doctors of Oklahoma City to occupy the space which had been reserved for a brace shop in the new Pasteur Medical Building which was then under construction. The building, into which the facility moved on its completion in November, 1951, is occupied by many of the leading doctors of Oklahoma City.

Prosthetic Education Program, Northwestern University

The Prosthetic Education Program of the Northwestern University Medical School in Chicago, is a welcome member of the Association. The project's headquarters are at 401 East Ohio Street, Chicago, 11. (Telephone: DElaware 7-0777.)

Prosthetic Education at Northwestern University Medical School is in its second year of courses for prosthetists, physicians and surgeons, therapists, and rehabilitation counselors. Northwestern's courses, which operate under a training grant from the Vocational Rehabilitation, have been running with a capacity number of students in all sections of its classes.

In addition to the standard courses in A/K, B/K, and U/E prosthetics, Northwestern has offered the pilot course for the Management of the Child Amputee for physicians and therapists and a Special Prosthesis course in which training has been given in the fabrication of the hip-disarticulation and Symes prostheses.

The 1960 certification examinations for the American Board of Certification were held in the Prosthetic Education's facilities, and many of the national committees dealing with rehabilitation already have held meetings at this Mid-West facility. Northwestern has offered prosthetic orientation work for senior medical students as well as for graduating students in its Physical Therapy school.

Prosthetic Research and Education, New York University

The Prosthetics-Orthotics Research and Education Program at New York University, directed by Dr. Sidney Fishman, is conducted by three major schools of the University: the research activities are primarily within the College of Engineering, while the educational program is offered through the Post-Graduate Medical School and the School of Education. The Association is happy to add the University's Program to its list of new members.

A number of separate studies dealing with the biomechanical, engineering, medical and psychological aspects of the prosthetic and orthotic problem are in progress. These studies focus attention to the problems of the juvenile, adult and geriatric patient. The research dealing with prosthetcs is under the direct supervision of Mr. Hector Kay and that dealing with orthotics is under Dr. Edward Peizer.

The knowledge developed from these research activities, as well as from studies at other institutions throughout the country, is taught to physicians, therapists, prosthetists, orthotists and other rehabilitation personnel through the educational program which is under the immediate direction of Mr. Norman Berger. Both short term post-graduate courses, as well as a four-year undergraduate curriculum in prosthetics and orthotics are offered.

Alfred John Schraven

Alfred John Schraven is the vice president and operating head of a new member of the Association, operating under an historic name in New York City. This is the establishment that was originally founded by Conrad Hoehler and it is located at 100 E. 96th Street, New York 28, N. Y. (Telephone: LEhigh 4-5125).

Mr. Hoehler remains as an adviser to the new management.

Mr. Schraven, who is still in his forties, has had years of experience in orthotics and prosthetics. A native of Essen, Germany, he began his apprenticeship at the age of fourteen, training with firms in Essen, Muenster and other cities.

In 1949 he took his examination and received his diploma as an orthopedic technician master. In June, 1956, Mr. Schraven entered the United States and was first associated with the John N. Eschen Company, New York City. He was later associated with Mr. Reinhard Wurth at the Eastern Orthopedic Hospital School in Schnectady, New York.

Mr. Schraven is also a member of the Metropolitan Orthopedic Appliance and Limb Manufacturers Association.

A REPORT TO *JOURNAL* READERS FROM THE PRESIDENT OF THE AMERICAN BOARD FOR CERTIFICATION

It is my pleasure and privilege to announce the 1961 committee appointments for the American Board for Certification. The men listed below are willingly devoting their time and energy to our program. They deserve a vote of thanks from each certified person and the management of each certified facility.

Committee on Credentials

Alvin L. Muilenburg, C.P.O., Chairman, Houston, Texas
Roy M. Hoover, M.D., Roanoke, Virginia
Charles Rosenquist, C.O., Columbus, Ohio
William E. Brownfield, C.O., Boise, Idaho
Robert Gruman, C.P., Minneapolis, Minnesota

Committee on Examinations

Howard R. Thranhardt, C.P., Chairman, Atlanta, Georgia
George T. Aitken, M.D., Grand Rapids, Michigan
Jack Faatz, C.P.O., Lakeland, Florida
William J. McIlmurray, C.P.O., Brooklyn, New York
John Glancy, C.O., Brighton, Mass.
Bert Titus, C.P.O., Durham, North Carolina

Committee on Ethical Practices

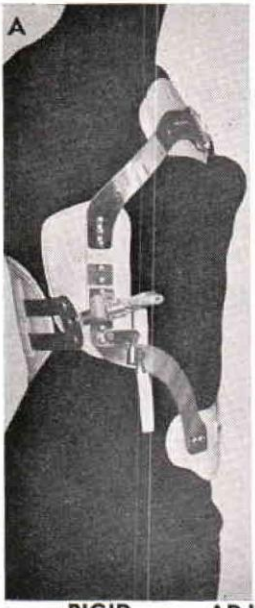
Charles A. Hennessy, C.P.O., Chairman, Los Angeles, California
Eugene E. Record, M.D., Boston, Massachusetts
Richard G. Bidwell, C.P.O., Milwaukee, Wisconsin
Cameron B. Hall, M.D., Los Angeles, California
Lucius Trautman, C.P.O., Mineapolis, Minnesota

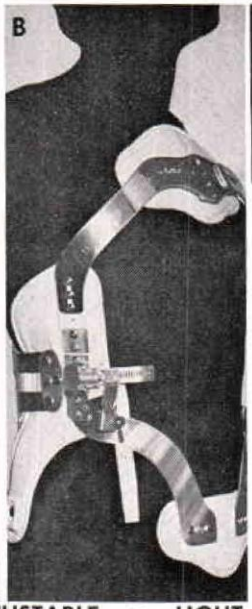
Committee on Facilities

Herbert Hart, C.P.O., Chairman, Oakland, California
Durwood R. Coon, C.P.O., Detroit, Michigan

The Board is looking forward to the Regional Meetings of Certifees which will be held during each meeting of the eleven AOPA Regions. We hope to see each certifee represented there.

HOWARD R. THRANHARDT, *President*
American Board for Certification





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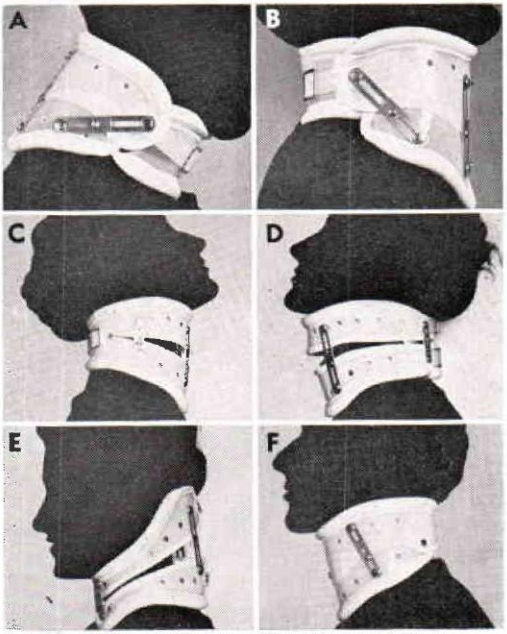
WASHABLE
ADJUSTABLE



A & B THE EXTENSION-FLEXION COLLAR—A universal cervical collar, extremely versatile and adaptable for extension, flexion, or stabilization.

C—The MYO-VENT—A one-piece extension collar with ventilated adjustability.

D—The CER-VENT Extension Model. A one-piece collar with ventilated adjustability. Easy to put on, complete support.

E—The CER-VENT Flexion Model. A one-piece collar with ventilated adjustability. Easy to put on, complete support.

F—The MYO-CERVICAL. A one-piece extension collar with overlapping adjustment. Catalog and Order Blanks upon request.

*FLORIDA BRACE CORPORATION

601 Webster Avenue, Post Office Box 1366
Winter Park 5, Florida, Telephone Midway 4-2650

To The Ladies:
FROM AOPA'S AUXILIARY

Mrs. Pearl Leavy
President

Mrs. Margaret Brownfield
Vice President

Mrs. Lorraine Scheck
Secretary-Treasurer

Mrs. Margaret Peters
Past President

Hello to all once again.

Here we are well into another year with the holiday behind us and the plans of the coming months ahead.

We certainly hope everyone had an enjoyable holiday season and may the year ahead bring good things to all.

Its not too early to be thinking of our trip to Miami Beach in the Fall. Let's all turn out and make this a record year for the auxiliary.

With the regional meetings beginning soon let's all concentrate on attending in our own region as our support is needed there, as well as the National.

Any news of interest to the women coming out of the regionals would be a big help in keeping us all in touch throughout the year.

As the months go by plans are in the making for Miami that we hope will stimulate sufficient interest to bring all of you out in October.

We hope to report on these plans in the next *Journal* and in the meantime if there is anything of special interest any of you would want in the way of social activities, please let me know.

Until next time, so long.

Pearl Leavy.

FAIR VALUE at a FAIR PROFIT

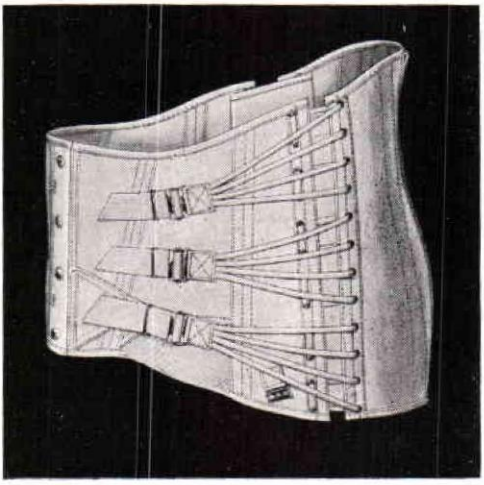
It's unwise to pay too much, but it's worse to pay too little.

When you pay too much, you lose a little money—that is all.

When you pay too little, you sometimes lose everything, because the thing you bought was incapable of doing the thing it was bought to do.

The common law of business balance prohibits paying a little and getting a lot—it can't be done.

—John Ruskin



Three pull straps control traction in Model 430-EHS lumbo-sacral support pictured . . . two rigid steels.

When you buy Truform . . .

you know you're getting full value at a fair price. Anatomically correct supports, quality-made, backed by an educational and sales-help program that is an integral part of Truform value.

When you fit Truform . . .

you know your customer is going to receive maximum therapeutic effect, properly carrying out the physician's wishes. Both patient and physician will be well satisfied with the Truform value you supply.

Truly, the best is worth a fair price to your customer and a fair profit to you. These things you can count on from Truform under its policy of "Serving Only the Ethical Appliance Dealer."

Write for "Truform Red Book," the fully illustrated reference catalog of Surgical Supports and Hose.

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TRUFORM The Professional Line ANATOMICAL SUPPORTS

Orthotics and Prosthetics—Worldwide

Planning the National Assembly

COMMITTEE MEMBERS MEET WITH PRESIDENT STORRS AND EXECUTIVE DIRECTOR LESTER SMITH—This group met recently to plan the 1961 Assembly of the American Orthotics and Prosthetics Association to be held at the Eden Roc Hotel, Miami Beach, October 19 to 26, 1961. The Assembly will be open to all persons interested in the rehabilitation of the orthopedically handicapped. Left to right: George Lambert, Exhibits Chairman; Richard Bidwell, Program Chairman; President Ralph Storrs; Bert Titus, Assistant Program Chairman; William Scheck, Assistant Exhibits Chairman; and Executive Director Lester Smith.

Saemann Heads Orthopedic Equipment Company

John S. Saemann was elected president of Orthopedic Equipment Company, Bourbon, Indiana, at a recent meeting of the board of directors. He succeeds Franklin I. Saemann as active head of the company. Mr. Franklin Saemann moves up to the newly-created position of chairman of the board of directors, where he will devote his attention to market and plant expansion, and to new product development.

Other administrative officers of the company include Gustav S. Dimberg, vice-president and sales; I. H. Minton, secretary-treasurer; and R. M. McDowell, controller.

J. H. Bennett Purchases Waco Brace Company

J. H. Bennett is now the sole owner of the Bennett Orthopedic Brace and Limb Company, formerly known as the Waco Orthopedic Brace and Limb Company.

Mr. Bennett has had twelve years of experience in artificial limbs and braces. He received his training in limbs and braces in Pittsburgh and is a veteran of World War II. He wears a brace as a result of that "late unpleasantness."

The Bennett Orthopedic Brace and Limb Company is located at 1700 Colcord Avenue, Waco, Texas. (Telephone: PLaza 2-7071.)

Walter Schweckendieck New Supervisor at Harmarville Rehabilitation Center

Walter G. Schweckendieck, of Pittsburgh, has recently accepted the position vacated by Manuel De La Torre, and is now Supervisor of the brace shop at the Harmarville Rehabilitation Center at Harmarville, Pennsylvania.

Mr. Schweckendieck formerly was affiliated with the Nelson Orthopedic Company of Pittsburgh, and is a Certified Orthotist.

SMITH PETTIGREW

Dr. Smith Pettigrew, of the Texas Employers Association, will be guest of honor and will address the 1961 Meeting of Region VIII at Dallas. The meeting, scheduled for May 19 to 21, will be under the direction of David C. McGraw of Shreveport, Louisiana, Director of Region VIII.

Dr. Pettigrew was General Chairman of an important rehabilitation session last summer — a joint meeting of the Texas Rehabilitation Association and the Texas Employers Insurance Association. Both groups are active in rehabilitation work in the state.

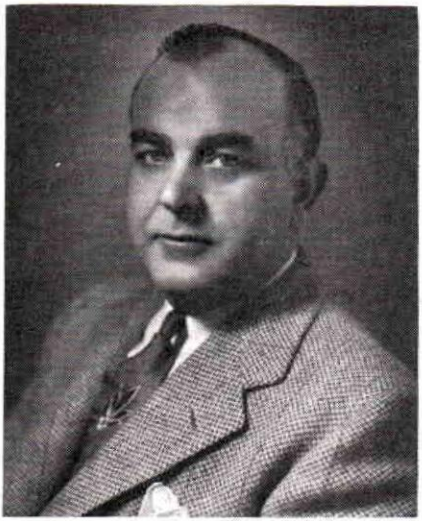
New Line Offered by Knit-Rite

The Knit-Rite Company announces the addition of Isle Functional Supports and Traction Equipment. Isle Functional Supports offer models most in demand for the facility soliciting physician's referrals.

Isle Traction Equipment for hospital or home use is practical and easy to use. This equipment is versatile for head or pelvic traction requirements.

This outstanding line will be sold only to orthotic and prosthetic facilities. Catalogs and full information available upon request.

IN MEMORIAM



Otto K. Becker

Otto K. Becker, President of the Becker Orthopedic Appliances, Birmingham, Michigan, died at the age of 52 on December 19, 1960, following a heart attack. The Company which he founded is continuing its operations under the direction of his widow, Mrs. Lucille M. Becker.

Otto Becker trained in Germany and was a master technician. It is a real tragedy that much of his skill and knowledge was lost with his passing but his influence lives on both in the operations of his company and in the many men whom he trained who now have their own facilities in other parts of the country.

The brace parts which he developed were outstanding — they attracted considerable attention when exhibited again this year at the Academy of Orthopedic Surgeons' meeting.

Mr. Becker was on the supplies and advertising committee of the American Orthotics and Prosthetics Association. He had formerly served on the Exhibits Committee.

Vernon Murka

Vernon Murka, C.P.O., died December 30, 1960 at the age of 59. He was president and founder of the Fidelity Orthopedic Co., a certified facility of Dayton, Ohio, which is being continued under the direction of his nephews, Heinz and Gerhard Murka.

Survivors include his wife, Charlene, and three sisters in Germany.

Mr. Murka received his orthopedic and prosthetic training in Stargard, Germany, and spent several years working in different cities in Germany. He had lived in Dayton for the past thirty-eight years.

Mr. Murka took an active interest in the development of his profession

and was responsible for the planning of several regional meetings. He and Mrs. Murka were delegates to the OALMA Technical Seminar held in Mexico City in October, 1959.

James I. Dickerson

James I. Dickerson, a certified prosthetist employed by the J. C. Lloyd Artificial Limb Company of York, Pennsylvania, died suddenly on January 28, 1961. Mr. Dickerson had been active in prosthetic work since 1936, and had been affiliated with J. E. Hanger of Washington, The Winkley Company of Columbus, the J. E. Hanger Company of Columbus and the Keystone Artificial Limb Company.

Mr. Dickerson is survived by his widow, Mrs. Mildred Dickerson. He was 43 years of age.

William M. McDonald

William M. McDonald, Certified Orthotist at the Crippled Children's Hospital of the University of Oklahoma Medical Center, in Oklahoma City, recently died suddenly. He was 69 years old, and had been affiliated with the Crippled Children's Hospital since 1947 in a supervisory capacity. He was certified in San Francisco in 1956.

Mr. McDonald had been active in orthopedic work since 1918. While connected with the Crippled Children's Hospital Mr. McDonald designed certain appliances which carry his name and are listed with the Crippled Children's Commission appliances.

Willis C. Gorthy

Willis Charles Gorthy, Director of the Institute for the Crippled and Disabled at 23rd Street and First Avenue in New York City, and a world authority on the rehabilitation of the handicapped, died December 4, 1960, after a short illness, at his home in Scarsdale, New York. He was 52 years old.

Mr. Gorthy was widely known throughout the world for his work in the application of modern management methods to the establishment and operation of rehabilitation centers.

Michael J. Winterkorn

Michael J. Winterkorn, Certified Orthotist, President and Founder of the Winterkorn Orthopedic Appliance Company of New York City, died on November 8, 1960. Mr. Winterkorn, who held Certificate No. 137, was certified in 1950. He came to this country from Hungary in 1912, served with the United States Army in World War I, and established his firm in 1919. Mr. Winterkorn's son, John Retzler, Sr., is now manager of the firm.

John G. Cranford, C.P.

The sudden death, on November 24, 1960, of "Johnnie" Cranford, came as a shock to his many friends, for his relation was that of friend to both amputees and professional associates. As a part of his activities as Vice President and Manager of J. E. Hanger, Inc., of Virginia, he was prosthetist for the Woodrow Wilson Rehabilitation Center, Fishersville, Virginia, and an invaluable member of the prosthetic team. Because of his store of prosthetic knowledge and experience, his part in the functioning of the team was especially important. The prosthetic team has attended prosthetic schools as a group and worked together as an integrated team.

Johnnie, as he was always called, had the unfailing good humor, patience, tolerance, prosthetic ability and knowledge, to make him one of the profession's best prosthetists. His wide background of experience was especially important in our team, because in the nature of our work, we have a very high proportion of complicated and difficult cases.

In his passing, we have lost not only a prosthetist of the highest order, but a good friend to associates and amputees alike.

Roy M. Hoover, M.D.
Director of Medical Services
Woodrow Wilson Rehabilitation Center
Fishersville, Virginia

Rehabilitation Conference Planned for July 10-15 At Indianapolis

The National Tri-Scientific Rehabilitation Conference will be held at the Indiana University Medical Center July 10-15, 1961. This includes the "Association for Physical and Mental Rehabilitation," the "American Association of Rehabilitation Therapy" and the "National Association of Physical Medicine Directors and Coordinators." This group will also include special nursing, psychology and social service groups, and leaders in the field of rehabilitation.

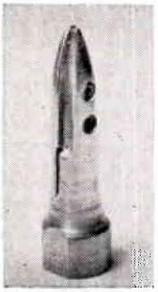
This conference will feature specialized training courses as it applies to the field of Physical Medicine in Adapted Physical Education, Nursing, Psychology, Social Service, Manual Arts Therapy, Educational Therapy and a special course for physiatrists. The area of prosthetics will be covered in the training areas.

Individuals working in the prosthetic area can definitely benefit by these training courses that will give them a broad knowledge of the field of rehabilitation and be helpful in their working relationships in the rehabilitation field . It will also be an important area where you can bring up your problems and become acquainted with the leaders in the field and doctors with whom you work.

You are cordially invited to attend this conference. For your reservation, notify Mr. Paul E. Roland, Conference Chairman, 1481 West 10th Street, Indianapolis.

New Helps for your

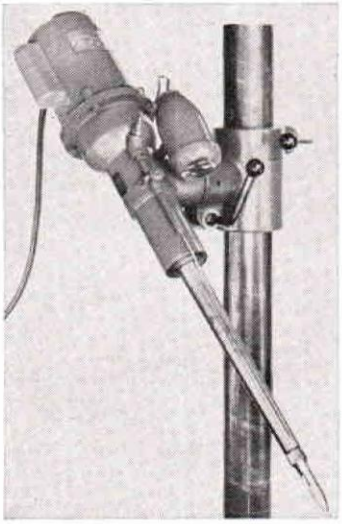
TRAUTMAN CARVER



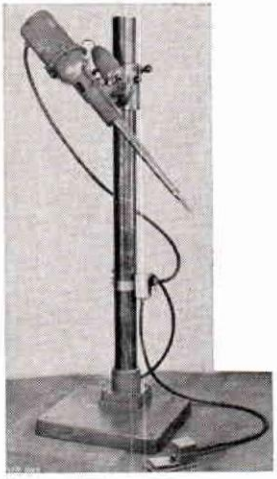
MIDGET CUTTER—No. 2100H

A new single blade cutter to help you pull small children's sockets—and to route out corners for all quadrilateral fittings. $25.00 including an extra blade.

Air Attachment for Trautman Carver No. 2100J



Another tool to help you get ultimate efficiency from your Trautman Carver. This is a blower attachment which gently blows sawdust and chips away from the cutting tool. This enables you to see at all times exactly where and how you're cutting. Comes complete with airhose fitting—can be plugged into any standard airline. Flow of air can be regulated. Attach in minutes with screwdriver only tool needed. Cost $10.50.

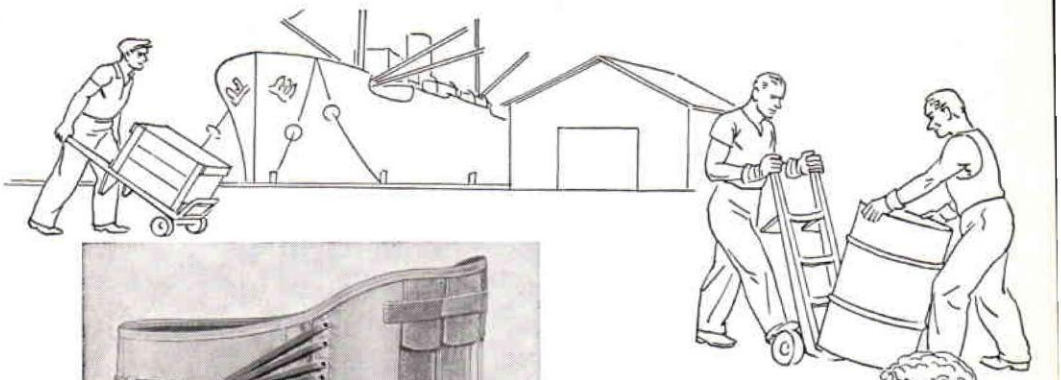


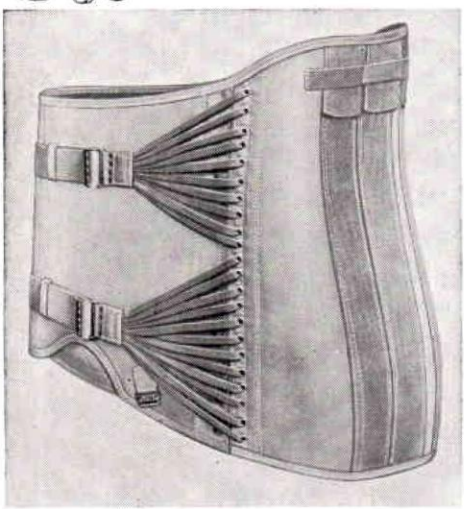
FOOT SWITCH (For the Trautman Carver 2100K)

We've had requests for a foot-operated switch, and this is the answer. It can be attached in a matter of minutes to any Trautman Carver. Designed so that if the operator wishes to use the hand switch instead of the foot pedal, all he has to do is remove the motor plug from the receptacle on the column of the Carver and then plug it directly into the power supply. Does not affect the Carver's normal operation. Cost $22.65.

TRAUTMAN SPECIALTIES, INC.

410 Portland Avenue, Minneapolis, Minnesota





Kendrick Sacro-Lumbar Supporter Style 0159 with 14" deep back. Style No. 0160 available with 16" deep back.

If you're talking about back support

The Kendrick Sacro-Lumbar Supporter meets the specifications of leading Orthopedic surgeons for relief of severe back strain. Featuring an extra long back — 14" or 16" deep, it offers firm, corrective support after severe strain to the sacro-lumbar region. Gives the proper support after removal of casts following back injury.

Four strong, resilient steels run parallel to the spine. Steels are curved to brace the back and are easily removed for shaping to individual requirements and for laundering of the garment. Medial front opening with snap fasteners reinforced with hooks and eyes. Garter-style for women. Write us for details.

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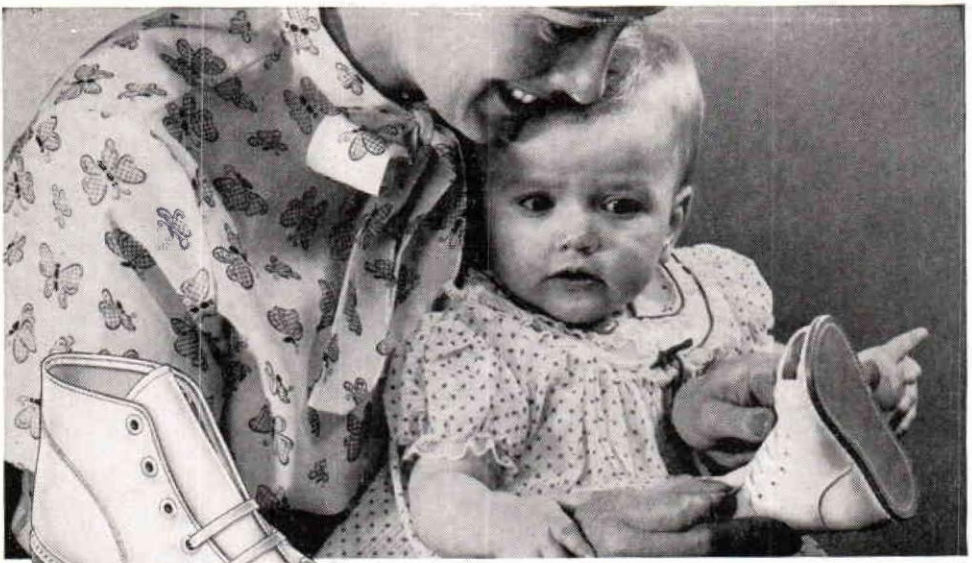
Philadelphia 44, Pa. New York 16, N. Y.

Kendrick
SINCE 1853



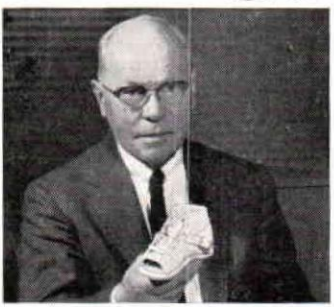
Your major selling point . . .

Doctors Prescribe CHESBROUGH Orthopedic Pre-Walkers

No. 1400 OPEN TOE
Straight-line symmetrical last, firm heel, no back seam. Adaptable to Denis Browne Splints.

No. 1300 CLOSED TOE
Lace-to-toe design permits snug, gentle fit. Perfectly smooth inside.

No. 1700 CLUBFOOT, OPEN TOE
Special outflare last, sturdy instep strap to stabilize heel.



Louis C. Weld, President of G. W. Chesbrough Co. . . . "My own personal experience led to the development of the new Chesbrough Shoe."

This is the reason Chesbrough Orthopedic Shoes have had such spectacular success in three short years. Orthopedic surgeons in 45 states and many foreign countries are now prescribing them. This large referral business continues to grow and we invite you to share in it.

Any parent whose child requires orthopedic correction will tell you the expense is great, as frequent purchase of new shoes is required.

This problem was brought home to Chesbrough's president, Louis C. Weld, three years ago, when a child in his own family needed such a shoe. Recognizing the need for orthopedic shoes at an economical price, Chesbrough put their 60 years of shoemaking experience to work and Chesbrough Corrective Pre-Walker Shoes were born.

Here is a shoe of highest-quality workmanship and fine leathers, made to sell at a moderate price.

All shoes in unlined white elk, sizes 000 to 4, narrow and wide. Available in full pairs, split pairs or single shoes (no extra charge for half pairs).

MAIL COUPON FOR SAMPLES

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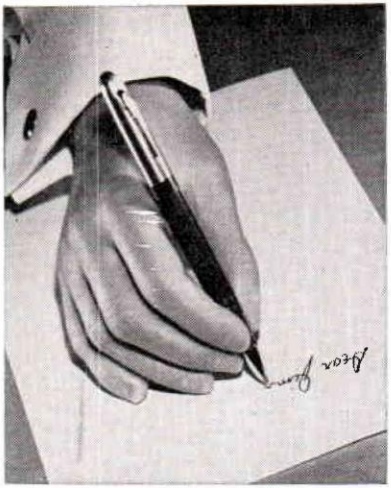

A. P. R. L. COSMETIC GLOVE

Available In Several Styles

Six Caucasian

Six Negro Shades

SACH FEET

FOR MEN

FOR LADIES—in all normal Heel Heights

FOR CHILDREN

IN BLANK SIZES OR FITTED TO SHOE

WRITE FOR DETAILS—INCLUDING:
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KINGSLEY'S

KOVER KOTE—THE SACH FOOT PAINT

COSMETIC LEG COVERS FOR WOMEN

BOOTIE SOX FOR SACH FEET

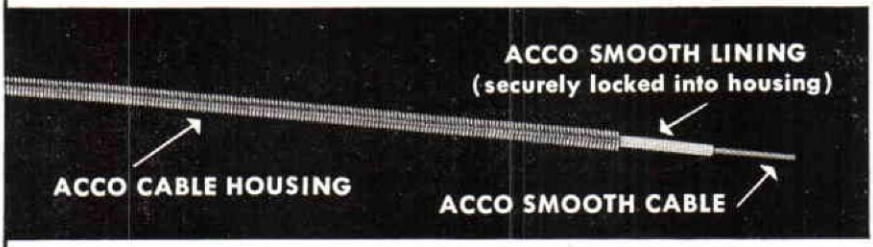
KINGSLEY MFG. CO.

1984 PLACENTIA, COSTA MESA, CALIFORNIA

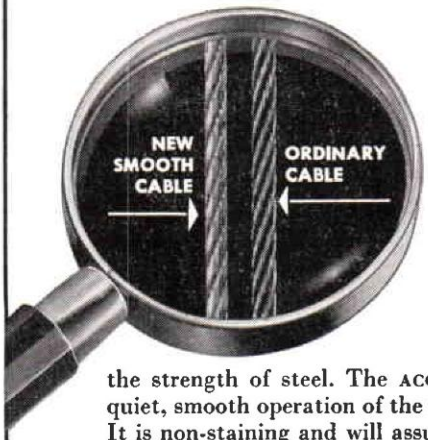
ACCO Lined Conduit and Smooth Cable

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.



You can SEE the Difference WITH New ACCO Smooth Cables

ACCO cables are completely processed to a smooth finish. They operate as smoothly as a silk thread, but retain the strength of steel. The ACCO lubricating stick complements the quiet, smooth operation of the nylon-lined conduit and smooth cable. It is non-staining and will assure easier operation with all cable and conduit systems.

***Write** for complete information on the ACCO prosthetics kit, featuring a complete line of reclaimable and re-usable fittings and smooth cable*

Automotive and Aircraft Division

AMERICAN CHAIN & CABLE

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CEREBRAL PALSY BRACES

MADE TO ORDER

DELIVERED COMPLETED

READY TO FIT

rigid pelvic band and hip sections for positive abduction and adduction control

sealed radial and lateral thrust ball bearing joints used throughout

rigid full length shanks in shoes for positive foot control

many special features available for individual patient requirements

catalogue available on request

no parts, except replacements for original orders

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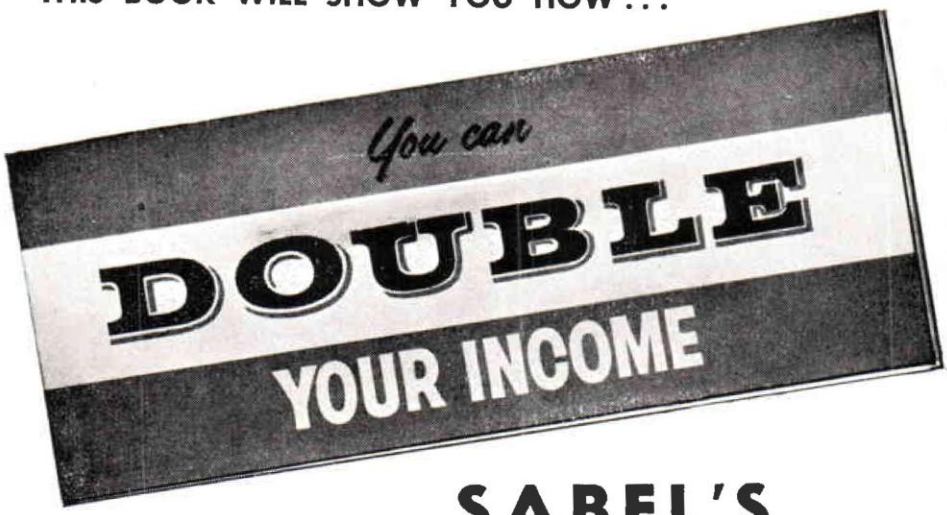
Orthotists . . . Prosthetists

THIS BOOK WILL SHOW YOU HOW . . .



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. . . with **BASIC SHOES**

TRADE MARK REG. U. S. PAT. OFF.

"Besides the profit from shoe sales, we are able to get our work out much faster by having Sabel shoes in stock. I don't see how we ever managed without them. There is no substitute for these wonderful shoes."

That's how one brace shop feels about the Sabel program. Are you missing easy extra profits in your business? Write for the Sabel booklet today.

Equino-varus, Surgical and night splints.

Plumb-line, outflare and Surgical boots.

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ALL STYLES IN-STOCK FOR IMMEDIATE DELIVERY

Over 1300 Agencies Throughout the United States and Canada

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ORTHOPEDIC STOCKINETTE

CONSTRUCTION OF THE BEST QUALITY, FINE SPUN, SLOW CARDED, LONG STAPLE

COTTON OR DUPONT NYLON

This excellent grade of BESSCO Orthopedic Stockinette of double thickness has a close-knit elastic rib stitch. It is used in the manufacture of prosthesis . . . under plaster casts, producing a firmer, smoother cast and compensating for plaster shrinkage . . . for dressings . . . for skin protection during operations. It is also invaluable as wristlets on Surgeons' Gowns . . .

BESSCO Orthopedic Stockinette meets all United States Government requirements and specifications . . . BESSCO Orthopedic Stockinette is available in:

Tubular & Bias Cut, 100% Virgin Natural Cotton
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SUPERIOR AMPUTEE STUMP SOCKS

Your customers will appreciate the completeness of the BESSCO Amputee Stump Sock line. It includes socks of 100% Virgin Natural Zephyr Wool, 100% Virgin Natural Cotton and 100% Virgin White Dupont Stretch or Staple Nylon and many other fabrics . . . All are durable, soft and seamless . . . and are laboratory tested periodically to insure uniform top notch quality and perfect fit . . .

Your customers will appreciate also their low cost . . . the lowest in the industry, effected because BESSCO makes nothing but surgical knitware . . .

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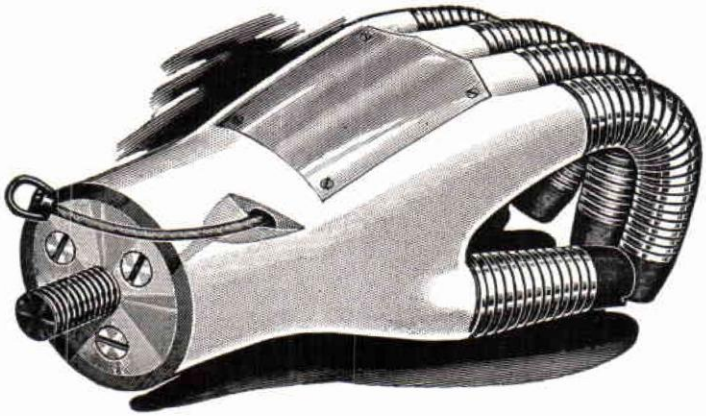
BESSCO

SEE THE NEW LOCKGRIP HANDS



WITH improved finger lineup, enabling the thumb to grasp between 1st and 2nd fingers.

WITH naturally shaped and molded rubber finger tips.

WITH Finer gauged and stronger flat finger spring wire, adding to the jointed fingers flexibility.

NEW Realistic cosmetic gloves exceedingly lifelike in sizes 7½—8—8½.

A lighter, stronger and the most useful of all mechanical hands, in sizes from 6 to 10, all wrist styles.

ALSO THE LAMINATED WOOD HAND WITH FIBRE CORED FINGERS **PLYLITE**

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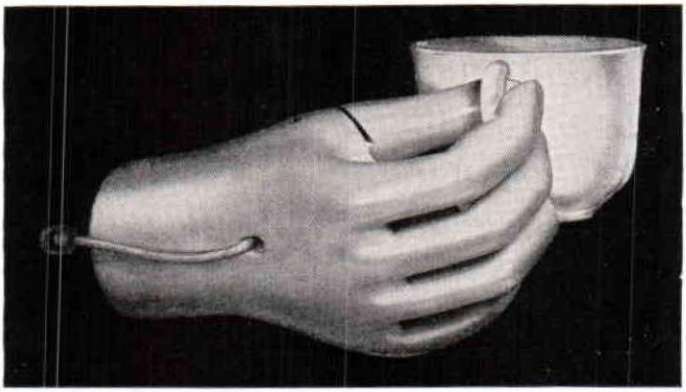

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D. B. BECKER CO.

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VARI GAIT
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***VARI-GAIT V100 (Illus.)**

The Quality knee providing
Knee Stability at low cost

***VARI-GAIT V200**

Friction knee with swing phase

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Economy Friction Knee

COMPLETE LINE OF PROSTHETIC SUPPLIES

Knee Shank Assemblies
Abachi and Pappel Quadrilateral Thigh Blocks
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Plastic Materials and Resins

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NIGHT SPLINT

DETACHABLE — DENIS BROWNE

*Fits any shoe

*Different settings

*All sizes — 6" to 30"

*Attractively finished in color

Fillauer SURGICAL SUPPLIES, INC.
Manufacturers of Orthopedic Supplies ESTABLISHED 1914
Box 1678, CHATTANOOGA, TENNESSEE

The Ruth Jackson Collar

The Ruth Jackson collar, providing maximum occipital support, will maintain, with a high degree of comfort, the flexed position with chin tucked in, recommended by Ruth Jackson, M.D., F.A.C.S., in her book "The Cervical Syndrome."

Clinical experience discloses the analogy between the cervical and lumbar spines as to pains originating from pathological conditions or trauma without actual vertebral fracture. Often treatment with extension or hyper-extension may be actually detrimental and stabilization in the normal or in the flexed position may be indicated. In all positions except full extension, failure to provide support, not only to the chin, but also laterally and to the occiput will result in inadequate stabilization.

The Exo-Static Collar

The Exo-Static collar, while it may be adjusted for full extension, may also be lowered to a point of slight flexion and provides stabilized support, not only to the chin, but laterally and to the occiput, *automatically adjusting to the proper occipital height corresponding to the extension required.*

FLORIDA MANUFACTURING CORPORATION

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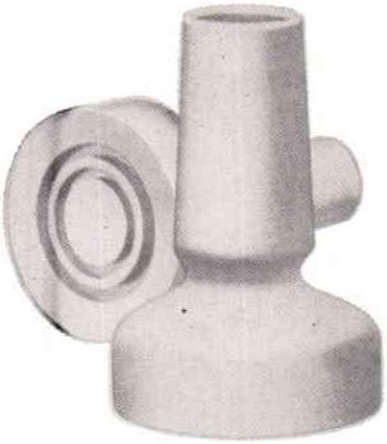
Reprint from Chapter on Treatment in "Cervical Syndrome" available on request



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