MARCH, 1955

The journal of the Limb and Brace profession

Orthopedic and Prosthetic Appliance Journal

Shoulder Disarticulation

C. H. Davies—A Memoir

Bracing the Paraplegic

published jointly by
Orthopedic Appliance & Limb Mfrs. Association
American Board for Certification

DATES TO REMEMBER — 1955

What • When • Where

APRIL

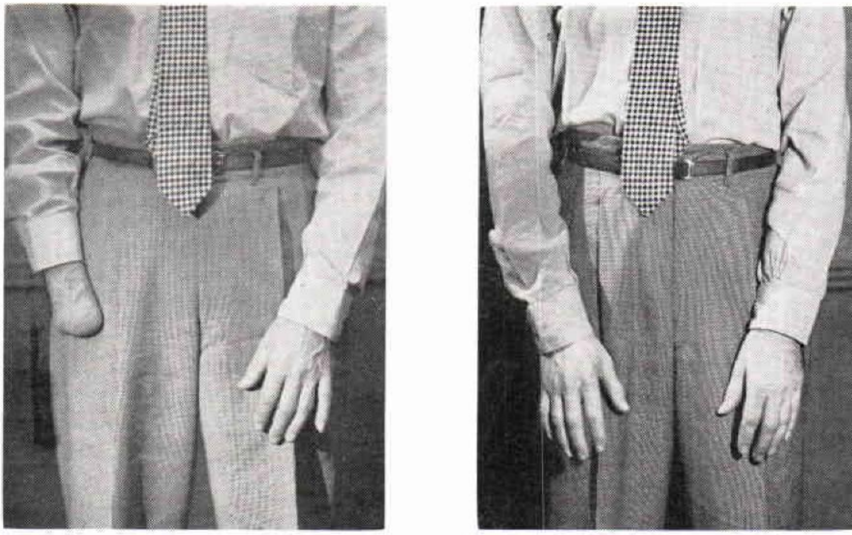
15 - 17	REGION VII—Meeting	*Kansas City, Mo.* *Pickwick Hotel*
22 - 24	REGION II, OALMA AND PENNSYLVANIA ORTHOPEDIC-PROSTHETIC SOCIETY	*Wilkes-Barre, Pa.* *Sterling Hotel*
23 - 24	REGION V, OALMA—Meeting	*Detroit, Mich.* *Sheraton-Cadillac Hotel*
29 - 30	TECHNICAL SEMINAR—Sponsored by MOALMA	*New York City* *Roosevelt Hotel*

OCTOBER

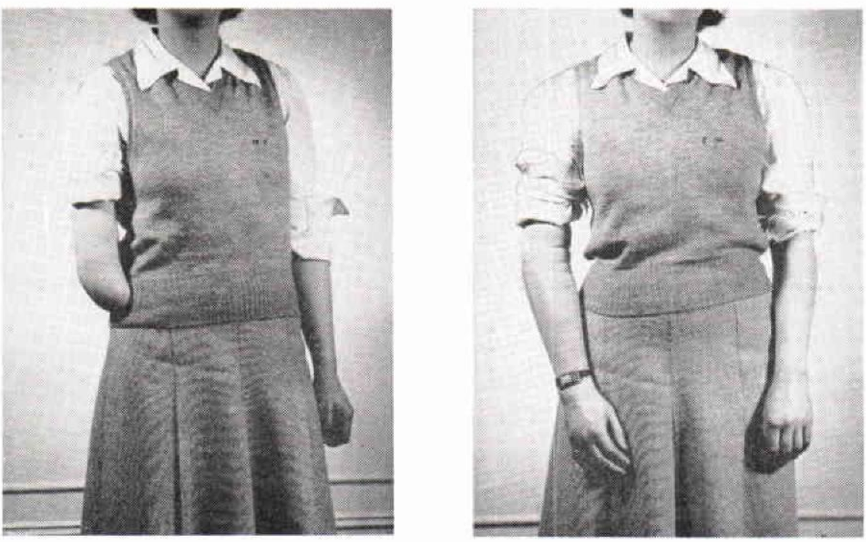
14 - 15	EXAMINATION FOR PROSTHETISTS AND ORTHOTISTS—Conducted by the American Board for Certification. Deadline for applications: August 14, 1955.	*New Orleans, La.*
16 - 19	NATIONAL ASSEMBLY OF THE LIMB AND BRACE PROFESSION	*New Orleans, La.* *Jung Hotel*

NOVEMBER

16 - 18	NATIONAL REHABILITATION ASSOCIATION —Meeting. (Section on Prosthetics to be presented by a panel from OALMA).	*St. Louis, Mo.* *Jefferson Hotel*



PARTIAL HAND PROSTHESIS



SUCTION COSMETIC ARM

Orthopedic and Prosthetic Appliance Journal

(Title registered U. S. Patent Office)

LESTER A. SMITH
Editor

Published quarterly by the Orthopedic Appliance & Limb Manufacturers Association and the American Board for Certification.

Subscription rate — $4.00 a year (subscription payment at the same rate is included in Certification fees and Association dues.)

VOLUME 9 • MARCH, 1955 • NO. 1

Office: 411 Associations Bldg., Washington 6, D. C.

CONTENTS

DEPARTMENTS

A Report from The President of OALMA

I would like to remind everyone that apprentice prosthetists and orthotists should be enrolled in the official OALMA Apprenticeship Program. While many apprentices have been enrolled, I feel sure some have overlooked this step, which is an opportunity for advancement as well as a requirement of the American Board for Certification.

The first step is simple—just write to OALMA, 1145—19th Street, N.W., Washington, D. C. giving the name of the apprentice. They will send you the necessary forms and instructions.

Any one who knows of an apprentice fitter who for some reason might not know about the new program, will do him a favor by advising him to enroll. It would certainly be too bad if some fine young man, who otherwise could easily have been eligible for certification, should complete a long term of apprenticeship and apply to take the certification examination, only to find that he could not take the examination because his apprenticeship program did not meet the requirements of the ABC.

We are now entering a period when many Regional Meetings are being held. I plan to attend the meetings in Memphis, Dallas, and Kansas City. Director Jackson will attend the Dallas, Detroit and Kansas City meetings, and Assistant Director Smith is going to the Wilkes-Barre meeting.

I urge each of you to attend your Regional Meeting if you possibly can.

Sincerely yours,

McCarthy Hanger, Jr.

McCARTHY HANGER, JR.
President

A Report from The President of the Certification Board

So much is happening in the artificial limb and brace field that it is hard to choose the most important subjects for this column. There are four, however, which at this time seem especially important.

The first has to do with the *deadline for sending in an application for the Certification examination*. The examination will be held at New Orleans October 15 and 16, but all applications must be in the headquarters office on August 14, sixty days before the date of the examination.

You may ask, why sixty days? Here is the answer: Each application must have the signature of three physicians—these are checked. Board headquarters contacts former employers—Lists of applicants are sent to the local members of the Advisory Council—Time is taken to verify carefully the statements made in the application. All this takes time—it can't be done in less than sixty days.

My second topic is the *annual meeting of the Certification Board*. This will be held in Washington June 21 and 22. Members of the Board and consultants will carefully review the Certification program, and important plans for its future development will be studied. Your suggestions will be welcomed.

My third subject concerns the *prosthetic schools* which are being planned by the Advisory Committee on Artificial Limbs. I am glad to report that our Past President, Chester C. Haddan, has been made a member of the Committee of Consultants for these schools. Serving with him will be McCarthy Hanger, Jr., who has done so much to advance our training program.

The last item concerns our *exhibit program*. We have just been assigned space in the Scientific Section of the American Medical Association's exhibit at Atlantic City. This means that we will have a unique chance to tell the story of what we're doing through Certification to over 14,000 physicians who will be attending this largest of all medical meetings.

Louis Trautman

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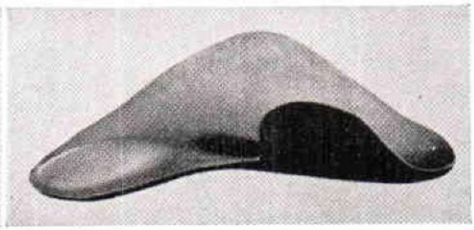

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CHILDREN'S APPLIANCES to be FEATURED at NEW YORK SESSION

Mrs. Mary Dorsch
Program Leader

Dr. Jerome Lawrence
Team Chairman

The growing use of appliances for children is emphasized in the program for the New York Medical and Technical Assembly of 1955. The two-day session, April 29 and 30, is again sponsored by the Metropolitan Association and Region II of OALMA. All sessions including the annual dinner-dance are held at the Hotel Roosevelt.

Among the authorities who will present actual cases are:

- Dr. Henry Kessler, in a demonstration of Orthopedic and Prosthetic Problems among Children.
- Dr. Jerome Lawrence of the Hospital for Special Surgery, who will demonstrate cases with the team approach, including Physical and Occupational Therapists, Prosthetists and Orthotists, and the Medical Social Worker.
- Edward Ford, laboratory supervisor with the Advisory Committee on Artificial Limbs, in a demonstration of new developments for children.
- Dr. George Deaver, of the Institute for Physical Medicine, reporting on Orthopedic Problems of Children.
- Miss B. Herbst, of the Hospital for Special Surgery, leading a panel on Medical Social Workers and the Orthopedic Field.
- Joseph Spievak, presenting a new film on Congenital Defects in Children.
- Dr. Charles O. Bechtol of Yale University, in a Demonstration of Bracing in Cerebral Palsy.
- Dr. Bruce Grynbaum of the New York City Department of Welfare heads a panel of physicians who will discuss Orthopedic Problems in the Older Age Group.
- David E. Stolpe will preside over an extensive demonstration of new devices.

Mrs. Mary Dorsch, committee chairman, reports wide-spread interest in the program, with many inquiries coming in from other parts of the country. Glenn E. Jackson, Executive Director of OALMA will be toastmaster at the dinner.

New Code for Orthopedic Appliance Field
Federal Trade Commission Approves Rules

Trade Practice Rules for the Orthopedic Appliance Industry were promulgated by the Federal Trade Commission in Washington on November 13. The new rules which became legally effective on December 13, are the climax of a successful effort by OALMA, to draft rules which ban unfair trade practices, in binding, written form.

Such rules had long been in effect for the artificial limb industry and had become a model for many other fields desiring to raise standards of ethical business conduct.

The new rules were drawn up in rough draft at a public conference held at the National Assembly of OALMA in Chicago on October 1, 1953. Mr. Lowell Mason, member of the Federal Trade Commission presided and Paul Butz, a skilled attorney of the Commission, conducted the hearing. Among those making the presentation for the orthopedic appliance field were OALMA Director Glenn E. Jackson, and members David E. Stolpe, of New York City, Herbert Hart of Oakland, Karl W. Buschenfeldt of Boston, W. Frank Harmon of Atlanta, and M. J. Benjamin of Los Angeles.

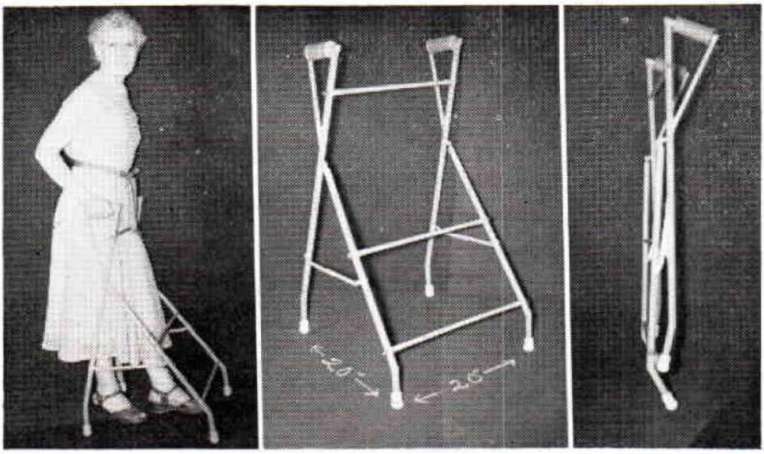
"Kickbacks Prohibited"

Perhaps the most important of the new rules is No. 21, which prohibits allowances or commissions to doctors, in these terms: "It is an unfair trade practice for any industry member to pay or contract to pay anything of value to any doctor prescribing or recommending the use by any of his patients of an orthopedic appliance in consideration of, or for the purpose of inducing or obtaining a referral of the patient by the doctor to the industry for the purchase of any such appliance, or a recommendation by the doctor of the industry member to the patient for the purchase of any such appliance."

Other rules deal with such practices as: Deceptive testimonials or depictions; Deceptive demonstrations; Refusal of an agent to fill orders after supplying other persons with samples or sales literature; Promises or representation that product will "fit", when the promise is not made in good faith or the promiser is lacking the required skill; Misuse of terms such as "custom-made"; Substitution of products without advising the buyer; False invoicing; Defamation of competitors or false disparagement of their products; Procurement of a competitor's confidential information by unfair means; Unfair threats of infringement suits; Misleading use of the word "free"; etc.

Group II of the new rules emphasize these important points: (1) Cooperation with the physician to promote "mutual trust and confidence between the industry and members of the medical profession and the general public (2) Necessity of obtaining a prescription or consultation with the doctor except when the patient wishes a duplicate appliance (3) Necessity of personal fitting, and (4) The sharing of improved techniques.

The new rules have the official endorsement of both OALMA and the American Board for Certification. Along with the Rules for the Artificial Limb Industry, they constitute in effect "a code of ethics," which are binding on member and nonmember alike. OALMA headquarters are now preparing a digest of the new rules which will be available for ready reference.



Harness for Shoulder Disarticulation Amputees*

ROBERT J. PURSLEY, Lt. U. S. A.

Chief, Research Limb Section,
Army Prosthetics Research Laboratory

"What can you do for a shoulder disarticulation case? How do you harness to make the arm work right? What if the poor guy can't seem to get the hang of locking and unlocking the elbow?

Whenever limbfitters get together, that's the first question asked—or the loudest. Not many answers are heard. And no wonder, when the amputee has so little excursion to harness, and the socket itself has to limit that motion to provide stability!

How to operate the elbow lock? The *Manual of Upper Extremities Prosthetics* (1952) mentions nudge control and lanyard control. How can a man pick anything up two-handed if he has to use one hand to operate an elbow lock? *Human Limbs and Their Substitutes* (1954) mentions chin nudge control only. But our patients don't seem to like it much. Where do we go from here?

Not much help can be found in print. To the best of the present writers' knowledge, no other publication gives us any guidance whatever. In fact, before Thomas and Haddan's *Amputation Prosthesis* 1945), the SD (shoulder disarticulation) arm seems to have been dismissed as a mere sleeve-filler. Thomas and Haddan pointed out the real though limited functional value many SD amputees got from their prostheses. The harness they described consisted of a leather shoulder cap and a single, webbing chest strap.

Compare this recommendation with the shoulder amputation arm described by A. A. Marks in the 1898 edition of *A Treatise on Artificial Limbs,* page 232: "The arm is provided with a pad that rests on top of the shoulder, which is held in place by means of straps passing around the body." (The illustrations make clear that the "pad" in question is what we would call a fitted shoulder socket.) The arm "is capable of rotating immediately above the elbow joint. The elbow is capable of flexion and extension, which is controlled by a flexion strap, one end of which is fastened to the interior of the forearm, and the other passes around and under the opposite shoulder. A movement of the shoulders will contract this strap and bring the forearm to a horizontal position, where it is locked by a mechanical device which is concealed in the forearm. The release button to this lock is placed on the underside of the forearm, and easily accessible. Artificial arms for shoulder amputations are made with strict regard to minimum weight, and in order to attain this result the hand is usually attached permanently to the forearm, and the extension strap is dispensed with." Satisfied wearers included "a lady of fashion, frequently seen in society," who said that she had "passed many evenings at balls and receptions without arousing the slightest suspicion that her left arm was artificial."

* The author is indebted to Lt. Col. Maurice J. Fletcher, Director, Army Prosthetics Research Laboratory, and to Marian Price Winston, Editor, Prosthetics Training Center, U.C.L.A., for their assistance and for numerous suggestions in the preparation of this article. The illustrations are by Mr. George Rybczynski.

New Developments

The Army Prosthetics Research Laboratory can now report four new harnessing systems for SDs, all of which have worked successfully at the laboratory and in the field. Each of them does away with the annoying manual or chin-operated elbow lock. Complete descriptions will be found later in this article.

We have also worked out a "block and tackle" cable system that cuts the excursion required in half. Based on one of the principles used in the inertia or velocity lock, this two-to-one excursion step-up can be used on any of the systems described here, as well as on the old dual control with manual lock.

Also presented here is a harnessing method for women SDs which conquers the chest strap problem. Appearance is greatly improved, and the girl can wear all the low necklines she wants without any sacrifice of arm stability.

Before giving you the details of these developments, let us review what we're trying to do, and what body motions we have to work with.

What Must A Harness Have?

A. COMFORT. Put this first because a prosthesis will usually not be worn unless it's comfortable. An arm may be a wonderful piece of mechanism —a real triumph of the limbmaker's art—but if it's hanging in the back of the closet, its functional value is exactly zero. Remembering this, we can, when necessary, sacrifice a bit of function for the sake of the wearer's comfort.

B. FUNCTION. We have to be careful to arrange the system to work with the terminal device prescribed. For example, in a dual control system with a voluntary opening hook, after full elbow flexion an additional 2 1/4 inches of excursion is needed to open the terminal device. This is inherent in the system—it's not because you make a mistake somewhere. So, if our amputee wants a voluntary opening hook and wants to be able to open it at his mouth, we must arrange to give him extra excursion. We might do this by the excursion step-up mentioned above. Or we might go to triple control, described later.

Another answer is to change the terminal device instead of the harnessing. If a VC (voluntary closing) TD is used, then the excursion that was used up in flexing the forearm is regained for TD operation at the cost of a slight increase in force to trip the locked cam and thus relax the control cable.

C. SUSPENSION. In most cases, the arm suspension is just another function of the working parts of the harness. We must hold the shoulder socket snugly against the stump to prevent the prosthesis from sliding off.

What Body Motions Can We Harness?

The SD amputee may have lost our classic control motion, humeral flexion, but he still has the use of some of the most powerful muscles in the body. Plenty of force is provided by:

A. OPPOSITE SHOULDER SHRUG—forward rotation of the arm on the non-amputated side (as used in above-elbow lock control) (*high* force available)

B. SCAPULAR ABDUCTION—forward motion of the amputated stump, causing the distance between the shoulder blades to increase. (*high* force available)

C. SHOULDER ELEVATION—lifting of the amputated stump, causing the shoulder girdle to rise. (*low* force available)

Since we have plenty of force available, but little excursion, we must use ways of getting the most out of the excursion we do have. This was discussed above, under "Function." The inertia or velocity lock used with a pectoral cineplasty transmission

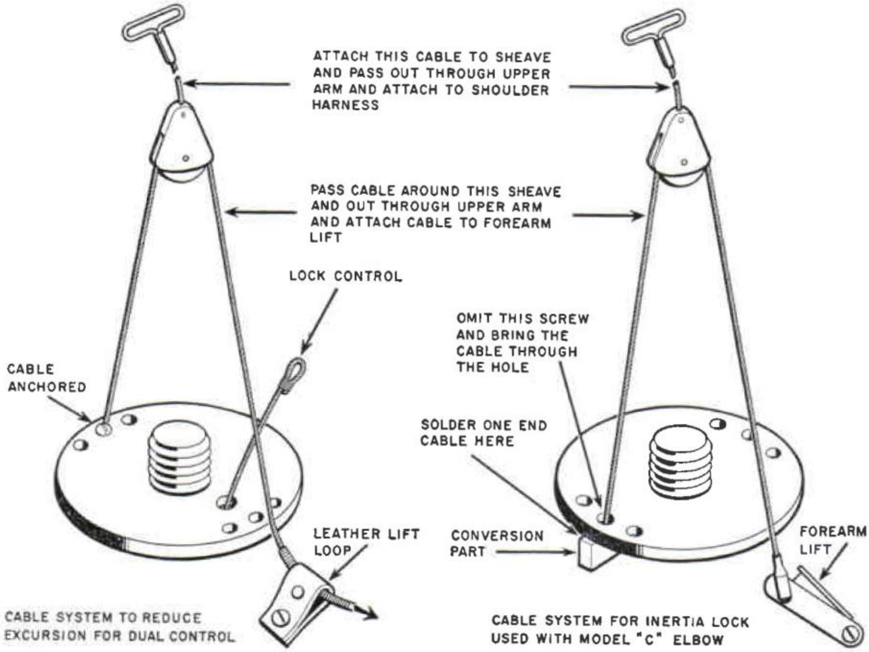


Fig. 1

reduces the excursion needed; now we have used the same idea in simpler form as an excursion step-up for other SD harnesses.

The new cable system is based on a two-to-one pulley, or sheave, and is explained in Figures 1 and 2.

What Prosthetic Controls Must We Supply?

A. Terminal Device Operation —Most commercially available TDs require an average of 2 1/4 inches excursion and 3-9 bs. force for operation. This is a high force requirement for our harness.

B. Forearm Flexion—Normally, 2-3″ excursion and 9-12 lbs. force are required to achieve 135 degrees flexion—another high force requirement.

C. Elbow Lock Operation — Elbow control requirements range from 0.5 to 0.9 inches of excursion, and 2-9 lbs. force. The minimum required force is low.

Three combinations of these controls are now in existence:

1. Triple Control—requires separate body motions for each prosthetic control, one each for forearm flexion, terminal device operation, and elbow lock. Three controls, three body motions.

2. Dual Control—combines two prosthetic controls harnessed to one body motion. At present, TD operation and forearm flexion are the two combined. As far as this writer knows, no one has tried a dual control system that combines other controls except as follows:

3. Inertia Lock—In this system, forearm flexion and elbow lock operation are harnessed to one body motion. Its best application may be found in pectoral cineplasty SD amputees. To operate at its maximum, two high force and high excursion motions must be available. (See Figures 2 and 3).

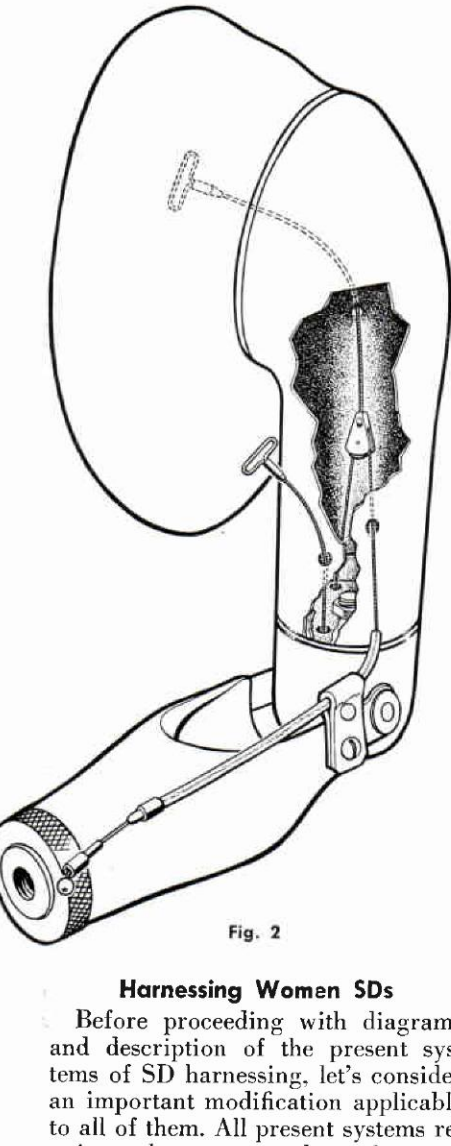


Fig. 2

Harnessing Women SDs

Before proceeding with diagrams and description of the present systems of SD harnessing, let's consider an important modification applicable to all of them. All present systems require a chest strap, and are shown as such in the concluding section.

Since the chest strap is unacceptable to most women, some kind of alternative is usually worked out—something that resembles a neck loop has been seen, and so has an arrangement where an extra waist strap anchors the chest strap and pulls it away from the breasts.

Now a method has been worked out that eliminates the chest strap by combining it with the one piece of harness a non-amputee woman normally wears—namely, the brassiere. As shown in Figure 4, a bra of sturdy material (not chiffon or lace!) is used, and a one-inch width of harness material is sewed around the lower margin (known to bra designers as the "diaphragm band"). For easy adjustment, a buckle is placed at Point "C". A clip type disconnect at Point "D" is necessary for ease in laundering. The elastic suspensor strap is sewed at Point "A" and fastened at Point "B" with a snap type fastener.

If this causes rotation of the brassiere for flat-chested individuals, or if greater stability is desired, the system shown in Figure 5 may be used. Here the bra is used only for suspension and the opposite shoulder loop for function.

Types of Shoulder Disarticulation Harness

The order in which the harness types are given below is as follows: Dual control with Shoulder Elevation Elbow Lock comes first because, in the writer's observations, it is the one most used with the least trouble. Dual Control with Opposite Shoulder Lock comes next, because it is the one shown on most present armamentarium display boards. Triple Control is third, appropriately. Dual Control with Nudge of Manual Lock is not described because, in the writer's opinion, the latter is definitely the least desirable system of all. Inertia Lock is last because it is limited in use to those with a pectoral cineplasty.

For an over-all comparison of the five harness systems, from the viewpoints of terminal device, controls, body control motions, advantages, and disadvantages, see the reference chart at the end of this discussion.

I. Scapular Abduction Dual Control With Shoulder Elevation Elbow Lock

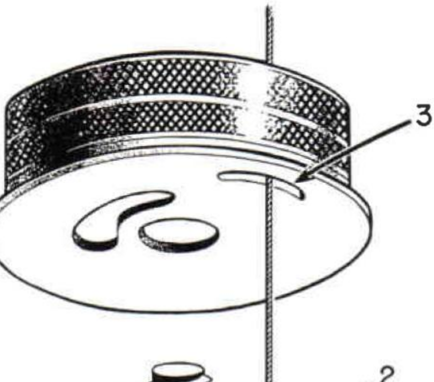


Fig. 3 (at left)

1. Disassemble the elbow and remove the lock lever. Drill a 1/16" hole near the end of the lever. Insert a 3/64" diameter cable and solder the end to hold it securely.

2. Drill a 1/16" hole through the elbow plate directly over the hole you just drilled in the locklever.

3. Cut an arc at least 1 1/4" long directly over the hole you have just drilled in the elbow plate. (Drill a series of 1/8" holes and finish with a file.) Reassemble the elbow. Drill a hole[1] in the front of the socket to allow straight pull of the cable to the forearm lift lever. Drill a hole[2] in the back of the socket to allow straight pull of the cable attached to the control attachment strap. Run the new cable from the lock lever, over the pulley assembly to the forearm lift lever. (Note that a swivel is used with the lift lever.) The new cable should be long enough to allow full forearm flexion. Small fair leads protect the cable as it passes through the holes in the socket. The front fair lead is held in place by a leather keeped, while the back fair lead is held by a retainer and base plate which affords a reaction point. System then appears as in Figs 1 and 2 with exception of dual cable control.

A. *Controls*

1) Dual control with scapular abduction for forearm lift and terminal device operation.

2) Elevation of shoulder on amputated side for elbow lock control.

B. *Discussion* (Fig. 6)

This system is very similar to the one described above. It differs only in operation of the elbow lock. The harness is again reduced to meet the comfort requirement of the amputee.

The elbow lock control is fastened to a waist strap positioned below the rib cage to provide an anchor to oppose shoulder elevation. Shoulder elevation provides an ample amount of both excursion and force for satisfactory elbow locking operation.

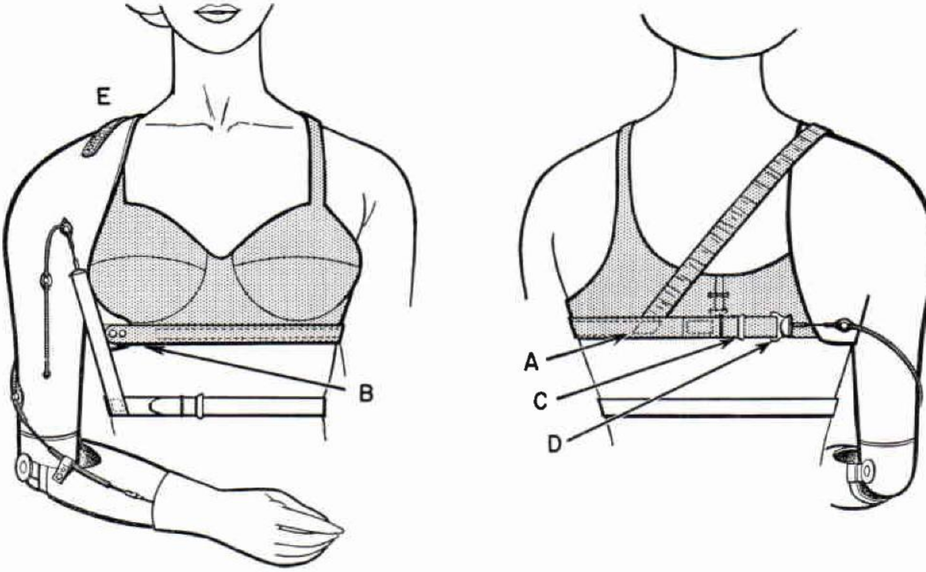
Another way for anchoring the elbow lock control is by attachment to an item of clothing, eliminating the waist strap. For a male amputee, the control may be anchored to a button on the waistband of his trousers near the opening of the fly. This position permits the control to pass out of the shirt between buttons, thus requiring no special opening (see Fig. 9). For female amputees the strap may be attached to a girdle if elimination of the waist strap is desired.

This system offers an advantage over oposite shoulder shrug elbow locking by the removal of involuntary unlocking of the forearm. Training is somewhat simplified and success may be determined at time of fitting.

II. Scapular Abduction Dual Control With Opposite Shoulder Lock

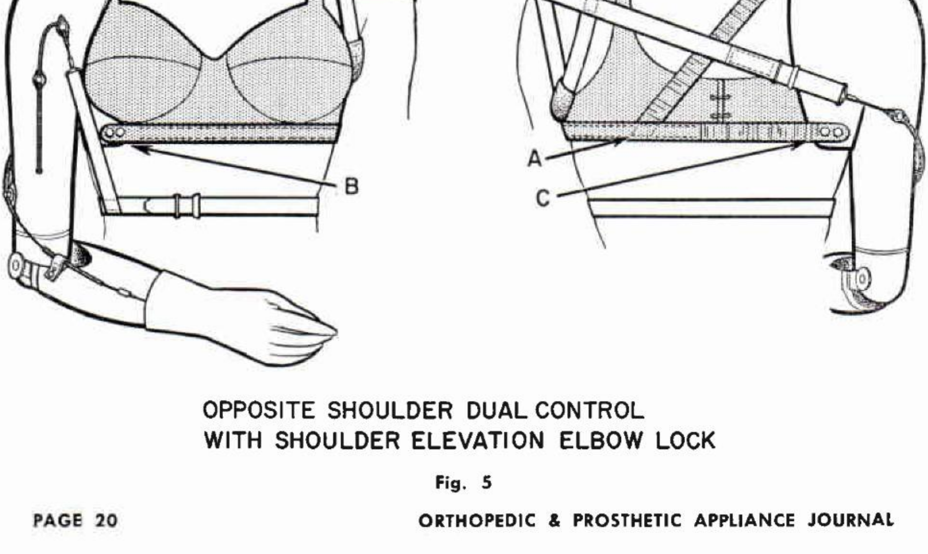
A. *Controls*

1) Dual control with scapular abduction for forearm lift and terminal device operation.



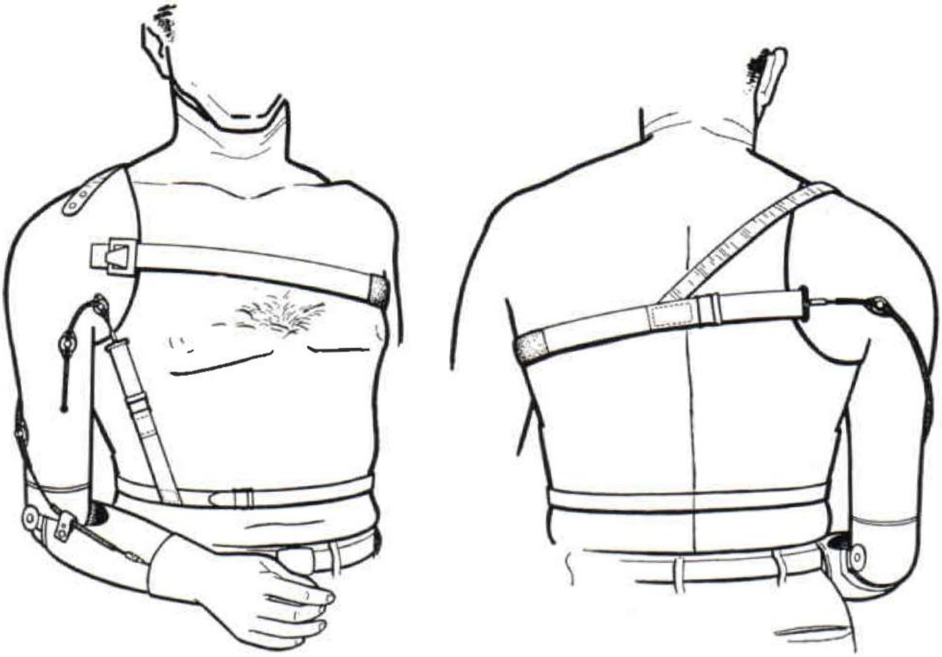
SCAPULAR ABDUCTION DUAL CONTROL
WITH SHOULDER ELEVATION ELBOW LOCK

Fig. 4



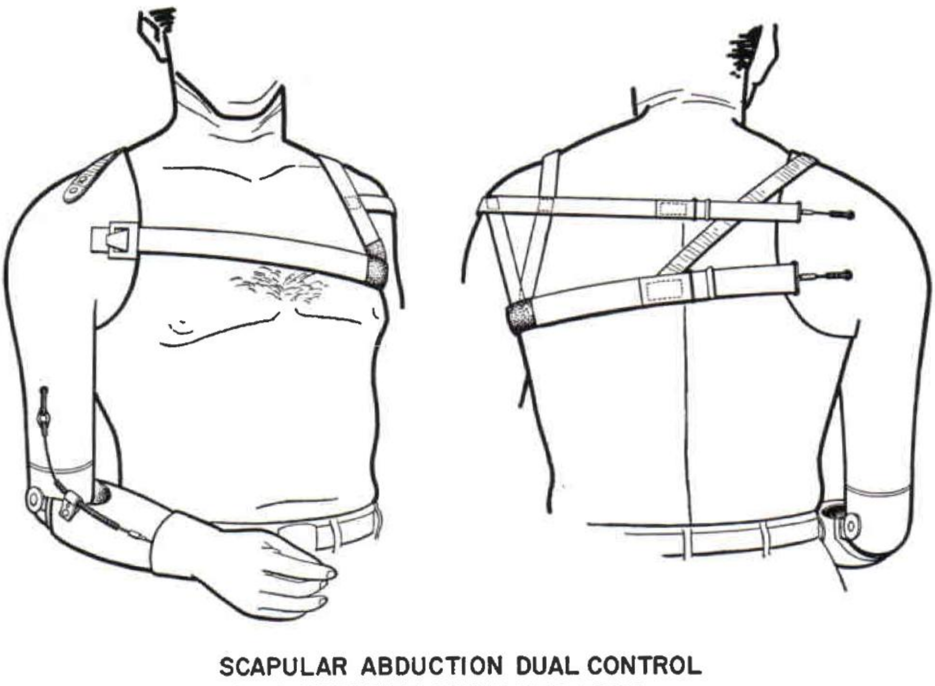
OPPOSITE SHOULDER DUAL CONTROL
WITH SHOULDER ELEVATION ELBOW LOCK

Fig. 5



SCAPULAR ABDUCTION DUAL CONTROL
WITH SHOULDER ELEVATION ELBOW LOCK

Fig. 6



SCAPULAR ABDUCTION DUAL CONTROL
WITH OPPOSITE SHOULDER LOCK

Fig. 7

B. *Discussion* (Fig. 7)

This system reduces the amount of harnessing required to operate the three basic controls for the shoulder disarticulation prostheses. It employs the conventional dual control system for forearm lift and terminal device operation. When the elbow is unlocked, scapular abduction flexes the forearm. When the elbow is locked scapular abduction operates the terminal device.

To operate the elbow lock the opposite shoulder shrug is harnessed by attaching the elbow control to the posterior wall of the shoulder cap using resular cable and housing (see Fig. 8). If the alternator spring in the elbow is not strong enough to return the control cable to the relaxed position, an additional spring may be added on the inside of the upper arm section. This will often make it easier for the amputee to separate opposite shoulder shrug from scapular abduction, thus preventing involuntary locking and unlocking of the elbow.

The involuntary locking and unlocking, inherent in this system, is the most serious disadvantage. However, if care is taken to separate the two operating body motions by keeping the chest strap at least mid-scapula and the opposite shoulder loop as high as possible these motions can be separated with proper training. Also, if the lock control loop is adjusted to require somewhat of an extreme shoulder shrug the separation of control will be made easier. Experience has shown that it is difficult to determine the success of the system as applied to an individual case at the time of fitting.

III. Triple Control Sholder Disarticulation Harness

A. *Controls*

1) Opposite shoulder shrug to operate terminal device.

2) Scapular abduction to operate forearm flexion.

3) Elevation of shoulder on amputated side for elbow control.

B. *Discussion* (Fig. 9)

Prosthetic Devices Study, Research Division, College of Engineering, New York University, Field Technical Report No. 1, reports this method being used successfully in the field.

The controls for the three basic functions are harnessed separately employing the triple control system. (Figure 9). The separation of terminal device operation from forearm flexion offers improved control of prehension since no excursion or force that affects the terminal device operation is introduced during forearm flexing. This advantage may be used very successfully with cases in which a voluntary opening terminal device is indicated or with a voluntary closing device to eliminate involuntary opening as found in dual control.

Again this system, as in the scapular abduction dual control with shoulder elevation elbow locking, overcomes the difficulty of separation of the body motions operating the controls. The result is, of course, simplified training and the determination of success at time of fitting.

The following description and illustrations are quoted from the previously mentioned NYU report:

a) *Chest Strap for Forearm Lift*

The control cable enters the shoulder cap at a posterior-inferior aspect to connect with a pulley on the inside of the upper socket. Another cable attached to the turntable (see Fig. 2) passes through the pulley sheave and exists on the lower end of the upper socket passing in front of the elbow center. This cable terminates on a metal forearm lift.

b) *Axilla Loop for Terminal Device Operation*

The control strap from an axilla loop crosses the seventh cervical vertebrae (or just below it) connecting to a cable which enters the shoulder cap on its posterior-superior aspect.

This cable passes through the upper socket and exits at its lower end above the elbow and is guided to the terminal device by a retainer plate on the forearm.

c) *Shoulder Elevation for Elbow Lock Control*

The control cable runs from the top of the elbow turntable inside the upper socket and leaves the shoulder cap on the anterior side. This cable is guided by cable housing and a retainer plate toward the nipple line and attaches to a control strap which fastens to the fly button or (girdle.)

The system, as presented, employs the two-to-one pulley system for reducing elbow lift cable excursions as described earlier in this report. Note that this, as in the foregoing system may be used with external cable routing if it is indicated.

IV. Inertia Elbow Lock With Pectoral Cineplasty Terminal Device Control

A. *Controls*

1) Scapula abduction for forearm lifting and elbow locking.

2) Pectoral cineplasty terminal device operation.

B. *Discussion*

The inertia lock, as shown in Figure 10, employs the same body motion to lift the forearm and operate the elbow lock. The initial cable excursion lifts the locking bar from the locked position thus allowing the continuing force and excursion to lift the forearm. Upon quick relaxation of the lift control the locking bar engages with the forearm eliminating a separate control for this function.

The terminal device is connected to the pectoral tunnel using the Bowden cable load housing. Care should be exercised to prevent internal rotation of the arm socket. The

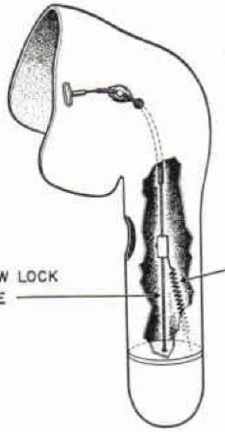


Fig. 8

line of pull should be on approximately the same level as the shoulder joint. Excess friction shoud be avoided, especially about the elbow pivot joint.

While the inertia lock has been very successfully used for short above-elbow and shoulder disarticulation cineplasty cases, at present it is *not* recommended for the conventional shoulder harness prostheses. Separation of body motions control has been the major shortcoming in non-cineplasty cases.

V. Nudge and Lanyard Control

This system is described in detail in Section 7.7—7.9 of "The Manual of Upper Extremity Prosthetics." Since this method should be employed only as the last possible choice it will not be discussed in detail but will be covered in the summary.

VI. Summary

A general discussion of the shoulder disarticulation control requirements and the accompanying necessary body motions is offered for reference. Experience has shown that the dual control system, when employed with a voluntary opening terminal device, usually exceeds the excursion available thus limiting full opening at mouth. Careful consideration of excursion required with respect to the terminal device indicated and excursion available, should be used to select the harness method offering the greatest potential.

Basically, three body motions are used in the systems previously discussed, and with proper attention to locating reaction points and control straps the motions may be harnessed to obtain the desired results. These motions are defined for the purpose of discussion.

When the operating excursion exceeds the amount available, a system using a two-to-one pulley is explained and illustrated, both for conventional and the inertia ebow locks. Also described is brassiere suspension for women SDs.

Previously, "The Manual of Upper Extremity Prosthetics" has recommended the nudge or lanyard control exclusively. In addition to this manually operated elbow lock, four other combinations of control are offered to operate the prosthesis without aid of the normal hand. These combinations vary the application of the body motions to the prosthesis control using four separate possibilities. From an analysis of the described system the Shoulder Disarticulation Reference Chart is offered the prescription team. (Fig. 11).

REFERENCES

Manual of Upper Extremities Prosthetics (1953), Univ. of California at Los Angeles.

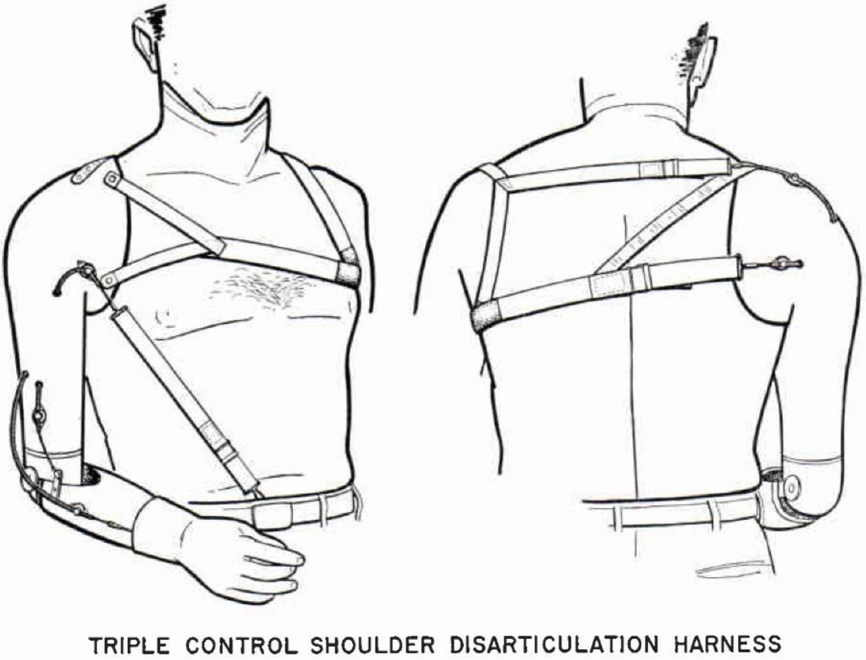
Human Limbs and Their Substitutes (1954), Advisory Committee on Artificial Limbs, National Research Council.

Amputation Prosthesis (1945), Thomas and Haddan.

A Treatise on Artificial Limbs (1898), A. A. Marks.

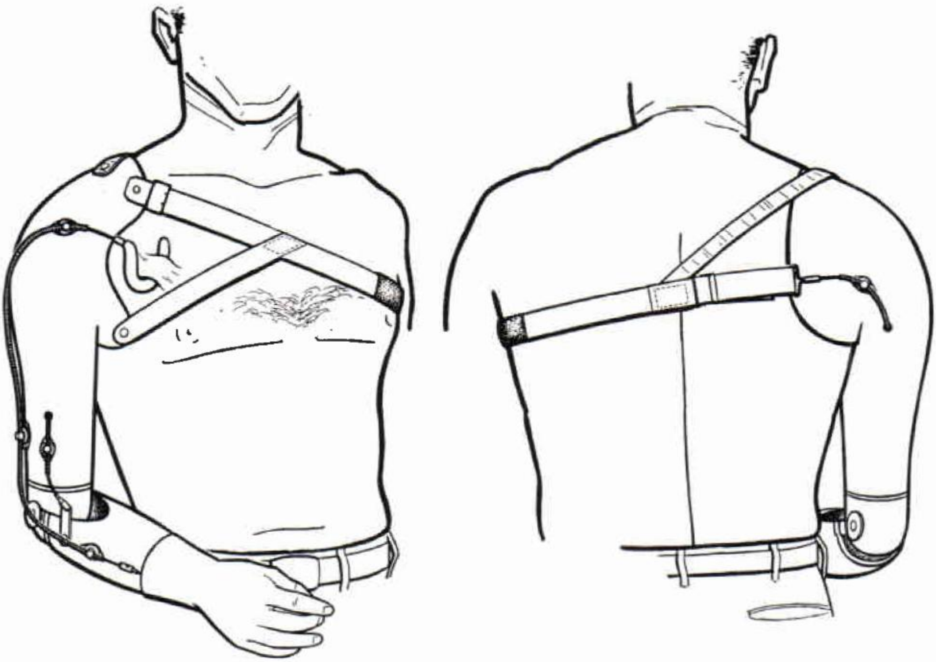
Prosthetic Training Center, Teaching Note No. 12 (1953) University of California at Los Angeles.

Army Prosthetics Research Laboratory—Technical Report No. 5433 (1954) Robert J. Pursley.



TRIPLE CONTROL SHOULDER DISARTICULATION HARNESS

Fig. 9



INERTIA ELBOW LOCK WITH PECTORAL CINEPLASTY TERMINAL DEVICE CONTROL

Fig. 10

SHOULDER DISARTICULATION REFERENCE CHART

CABLE SYSTEM AND HARNESS ARRANGEMENT	RECOMMENDED TERMINAL DEVICE	REQUIRED HARNESS CONTROLS	BODY MOTIONS REQUIRED	ADVANTAGES	DISADVANTAGES
SCAPULAR ABDUCTION DUAL CONTROL WITH SHOULDER ELEVATION ELBOW LOCK	VOLUNTARY CLOSING	• CHEST STRAP • WAIST STRAP OR CLOTHING ATTACHMENT	• SCAPULAR ABDUCTION • SHOULDER ELEVATION	• NO EXCESSIVE HARNESS • GOOD SEPARATION OF CONTROLS • SUCCESS CAN BE DETERMINED AT TIME OF FITTING • NO TRAINING PROBLEM	• CLOTHING ATTACHMENT OR WAISTBAND REQUIRED
SCAPULAR ABDUCTION DUAL CONTROL WITH OPPOSITE SHOULDER LOCK	VOLUNTARY CLOSING	• CHEST STRAP • OPPOSITE SHOULDER LOOP	• SCAPULAR ABDUCTION • OPPOSITE SHOULDER SHRUG	• HARNESS ONLY ABOUT THE SHOULDER GIRDLE	• POOR SEPARATION OF CONTROLS (e.g. INVOLUNTARY LOCKING AND UNLOCKING OF THE ELBOW) • TRAINING PROBLEM • UNABLE DETERMINE SUCCESS AT TIME OF FITTING
TRIPLE CONTROL SHOULDER DISARTICULATION HARNESS	VOLUNTARY CLOSING VOLUNTARY OPENING	• CHEST STRAP • WAIST STRAP OR CLOTHING ATTACHMENT • OPPOSITE SHOULDER LOOP	• SCAPULAR ABDUCTION • OPPOSITE SHOULDER SHRUG • SHOULDER ELEVATION	• SELECTION OF EITHER TYPE TERMINAL DEVICE • MAXIMUM AMOUNT EXCURSION AVAILABLE TERMINAL DEVICE REGARDLESS POSITION OF FOREARM	• MAXIMUM HARNESS REQUIRED • PATIENT MUST HAVE ALL 3 GOOD BODY MOTIONS
INERTIA LOCK WITH PECTORAL CINEPLASTY TERMINAL DEVICE CONTROL	VOLUNTARY CLOSING	• CHEST STRAP • CINEPLASTY TRANSMISSION	• SCAPULAR ABDUCTION • PECTORAL CINEPLASTY	• MINIMUM HARNESS • GOOD PREHENSION CONTROL	• RECOMMEND FOR CINEPLASTY ONLY • TRAINING REQUIRED FOR INERTIA LOCK CONTROL
NUDGE OR LANYARD LOCK CONTROL WITH DUAL CONTROL CABLE SYSTEM	VOLUNTARY CLOSING	• CHEST STRAP • NUDGE OR LANYARD CONTROL	• SCAPULAR ABDUCTION • CHIN NUDGE OR MANUAL LOCK OPERATION	• NO TRAINING PROBLEM • GOOD FOR BILATERAL S/D CASES	• MANUAL OPERATION • COSMETICALLY OBJECTIONABLE

Fig. 11

the ROBIN-AIDS Functional Hand

• ordering . . .

When ordering ROBBIN-AIDS FUNCTIONAL HAND order by size number taken from Size Matching Chart.

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Principles of Bracing in the Rehabilitation of the Paraplegic*

ARTHUR S. ABRAMSON, M.D.

(EDITOR'S NOTE: *The major part of this article is reprinted by permission from the Bulletin of the Hospital for Joint Diseases, Volume X, Oct., 1949. For this Journal, Dr. Abramson has added the Addendum on Training and Functional Exercises).*

WITHIN recent years it has been commonly accepted that crutch-and-brace ambulation forms an integral part of the rehabilitation of the paraplegic. It is necessary to develop a proper orientation to the subject as a whole and specifically to discuss the methods of attainment of maximal function with minimal bracing.

Four points of view have developed, concerning the degree to which this ambulation can be carried out. There are those who believe that the paraplegic must develop the use of crutches and braces to the point of total ambulation. Some think that the use of the wheelchair as the sole means of locomotion is sufficient. A third group feels that a combination of both of these methods is best. The fourth group, which fortunately has not put its concepts into practice, has suggested that paraplegics would be better off and more adept at handling themselves if both legs were amputated. It would be well, at this point, to analyze all these opinions and to understand the advantages and disadvantages of each.

The last group can be quickly disposed of. It has been the experience of almost all who have worked with paraplegics that in most cases the retention of the lower extremities does not form an insurmountable barrier to the ability of the paraplegic to become self-sufficient. Furthermore, those paraplegics that we have seen, in whom the lower extremities had to be amputated for other reasons, did poorly in comparison to those with similar neurologic lesions who retained their lower extremities.

Ambulation by means of crutches and braces as the sole method of getting around, has proven feasible in a limited number of cases. Generally, these people are slim, athletic and have either conus or cauda equina lesions. This lower motor neuron type of lesion spares the abdominal and back muscles and permits the legs to remain flaccid following spinal shock. There is also a large loss of weight, due to the almost total muscle atrophy occurring in the lower extremities. However, in heavy, spastic individuals who have high lesions there is a limit to the development of muscle power in the upper normal part of the body, and the lower extremities remain heavy and bulky. Crutch-and-brace walking as a total means of ambulation in these cases become a goal almost impossible to attain with any any great degree of efficiency, and is usually accompanied by frustration.

The sole use of the wheelchair as a form of locomotion has definite drawbacks. The paraplegic will require a considerable amount of aid to mount stairs, curbs or other obstacles. There are small areas which are restricted for the paraplegic in a wheelchair; the chief one being the bathroom. The constant use of the wheelchair would

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favor the formation of flexion contractures. And the complete loss of weight-bearing would mean the loss of the most important stimulus for the formation of protein bone matrix. As a result calcium would pour out from the bones, and osteoporosis, urinary calculi, soft-issue ossifications, and even pathological fractures might result[1]. Unrelieved sitting may also produce ischial decubiti.

A combination of crutch-and-brace walking, and wheelchair locomotion is acceptable and practical in a majority of cases because of the following facts:

1. It enables the individual to get into restricted places and to mount stairs and curbs by means of crutches and braces.
2. Ambulation done for several hours a day supplies an excellent form of maximal functional exercise to the normally innervated parts of the body and applies pressure to the lower extremities with concomitant beneficial results on the metabolic processes.
3. Ambulation undoubtedly has a beneficial effect upon spasticity, if it is done religiously.
4. Most vocations require a considerable amount of rapid moving about, and the use of the wheelchair is a distinct timesaver. It also frees the hands to accomplish work.
5. The rapidity and distance which the individual can travel via the wheelchair gives a greater sense of freedom.

The disadvantages of this combined form of locomation are that crutches must be carried on the wheelchair, and the wheelchair may not be available when the paraplegic wants to sit down. The first of these problems may be solved by the use of collapsible crutches which can be stored easily on the wheelchair. The second, however, is a drawback for which the paraplegic himself must find the solution.

It would seem from this analysis that rehabilitation should definitely include at least partial brace-and-crutch walking. With this in mind it is clear that braces should be fitted to

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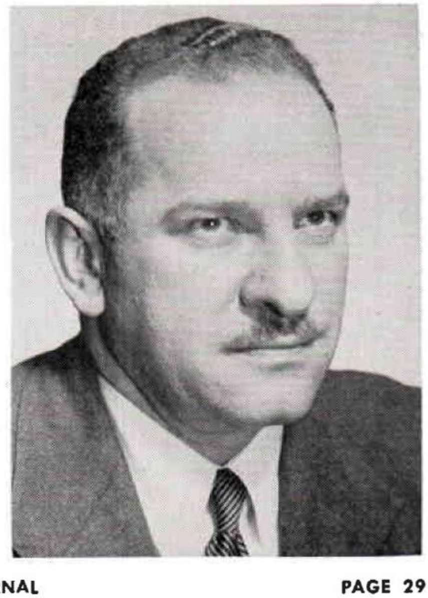
Dr. Abramson, a disabled veteran of World War II, is Clinical Professor of Physical Medicine and Rehabilitation at New York Medical College. He serves also as Chief of the Physical Medicine Rehabilitation Service at the VA Hospital in the Bronx. Dr. Abramson is a Fellow of the American College of Physicians. He is consultant to the Kessler Institute for Rehabilitation, the Muscular Dystrophy Association of America, and the Jewish Chronic Disease Hospital of Brooklyn. Visitors to the 1954 Assembly sponsored by MOALMA and Region II of OALMA, will recall Dr. Abramsan's report on "Paraplegics and Their Problems in Bracing."



every possible case of paraplegia. Such braces must act purely as splints and should not have any weight-bearing function. Weight bearing braces may produce ulcers due to pressure on anesthetic areas over bony projections, such as the ischial tuberosities, and should not have any weight-bearing function of the bones themselves.

Most publications mentioning the use of braces in paraplegia are of recent origin. The reason for this is obvious, since at no time in the past have paraplegics in large groups lived as long and as healthfully as those produced by the Second World War. In many cases the decision for bracing made by the physician is not accompanied by an interest in their fabrication. Generally, this practice results in excessive and inefficient bracing.

Most frequently long leg braces with a pelvic band or a body brace attached are prescribed. The use of the body brace or pelvic band is objectionable because they are clumsy, are put on with difficulty, consume excessive time, add weight to carry and unless the joints are made with the greatest precision and of special design cannot fit as well sitting as when standing.

Let us consider first the disturbances which these appliances are supposed to prevent. Chief among these is "Jack-knifing" or spontaneous flexion of the hips while standing, due to hip instability or spasticity of the hip flexors. Then there are lateral instability of the hips, outward rotation of the lower extremities and excessive lumbar lordosis. Such lordosis occurs in a paraplegic because in order to be stable in the standing position the hips must be locked against the anterior pelvifemoral ligaments in a strained extended position. Finally, there is also a psychological aspect in the use of these appliances because of the sense of support they give.

With injuries of the upper thoracic region, and even occasionally in lower cervical lesions, there still remain some very important and potentially powerful muscles which are normally innervated and lie below the lesion level. These muscles, the latissimus dorsi and the lower third of the trapezius, if made strong enough by training, can adequately control the stability of the hips by substitution. This can occur when the normal hip stabilizing muscles are paralyzed as long as the lower extremities are splinted.

The latissimus dorsi has its insertion in the upper end of the humerus and its origin from all the spinous processes from D6 down, the sacrum and from the posterior rim of the ilium. The innervation of this muscle comes from C6-7-8 through the brachial plexus and by way of the thoracodorsal nerve. Here is a muscle almost totally below the level of such a lesion in which voluntary motion is retained. The lower third of the trapezius, which also lies below such a level, has its origin from about the 6th to the 12th dorsal spinous processes. Its insertion is the outer end of the scapular spine. Its innervation, being C3-4 through the spinal accessory nerve, by-passes a high lesion. These muscles, when properly trained, can in most cases remove the necessity of using the pelvic band or the back brace.

The latissimus dorsi under ordinary circumstances will adduct, extend and internally rotate the humerus. Were the shoulders to be fixed, the mobilizing end of the muscles would be transferred to the origin. Trapeze artists who fix their shoulders use the latissimusdorsi muscles as a sling to pull the trunk forward and upward[2]. If the feet were fixed to the ground and the knees stiffened this action would actively extend the hips. The paraplegic can perform this action by clamping the axillary rests of the crutches between

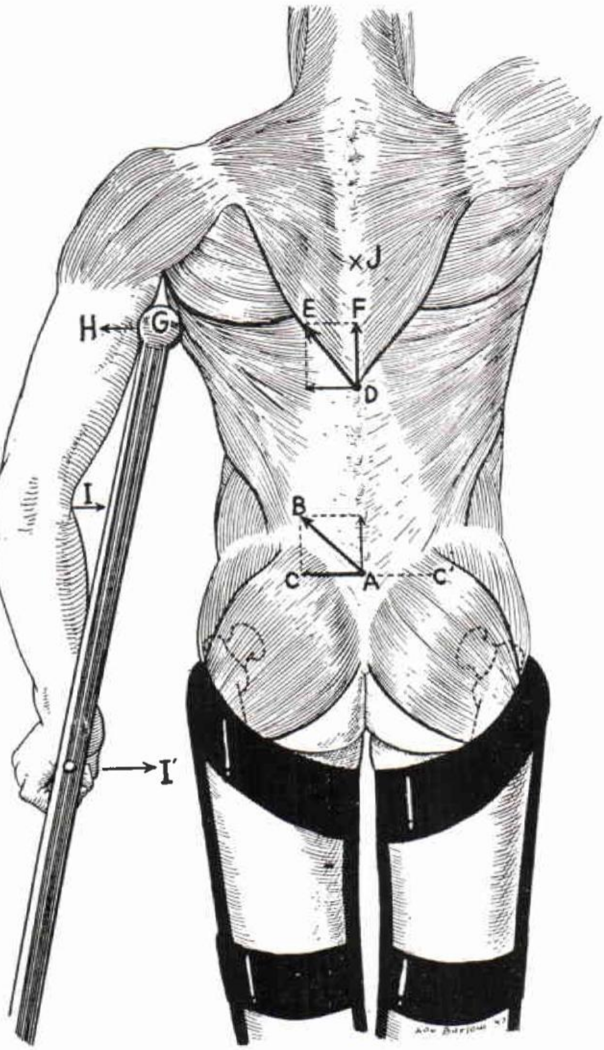


Fig. 1. Resolution of pulling Forces of the lower third of the trapezius and latissimus muscles with fixed insertions show Forces AC and AC[1] which counterbalance each other and produce lateral stability.

humeri and the body thus fixing the shoulders (Fig. II). Besides this forward pull, these muscles have equal and opposite lateral pulls as long as the axillary rests of the crutches are held with equal pressure on both sides. The swaying of the hips from one side to the other can be easily controlled by tensing one shoulder and then the other (Fig. I). We now have active extension of the hips, locking of the hips in extension by means of the anterior pelvi-femoral ligament and lateral stability of the hips. The lower third of the trapezius will follow the same general rule. With fixation of the shoulers the scapulae are fixed. The mobilizing end of this muscle is now transferred to its origin. This muscle can apply an upward pull from the region of the 12th dorsal vertebra or, in other words, from the

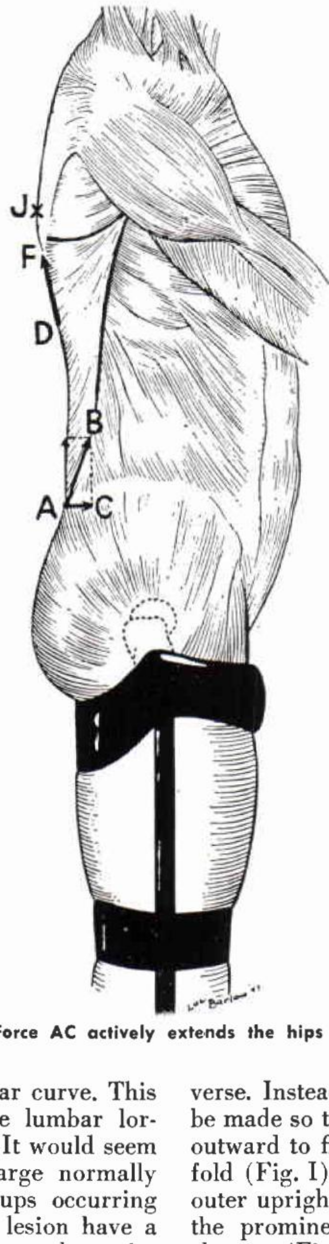


Fig. II. In lateral view Force AC actively extends the hips and Force FD can straighten the lumbar curve.

upper end of the lumbar curve. This pull can straighten the lumbar lordosis (Figs. I and II). It would seem then that these two large normally innervated muscle groups occurring below the level of the lesion have a very powerful influence on the maintenance of posture and stability. This leaves the external rotation of the lower extremities as the sole disturbance to be accounted for.

Many of the braces made for paraplegics have upper posterior thigh bands which are almost transverse. Instead, the thigh band should be made so that it curves upward and outward to fit loosely into the gluteal fold (Fig. I). This can be done if the outer upright is carried to just below the prominence of the greater trochanter (Fig. II). Now when the leg and brace rotate externally, the gluteal mass acts as a soft tissue block to the rotation of the brace. If bracing is so arranged that the foot is kept flat on the ground, much of this external rotation can be prevented purely by friction. In calipers, the

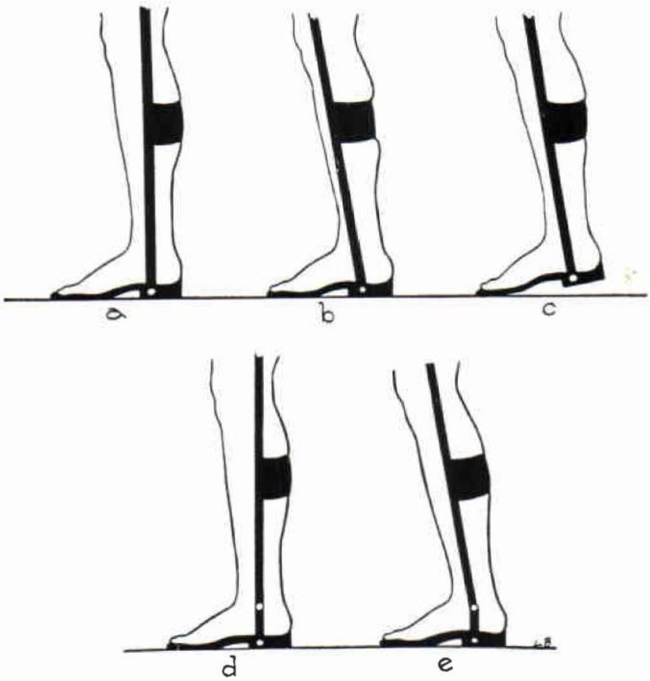


Fig. III. Mechanics of the caliper and stirrup

ankle joint of the brace is placed into the heel, an extremely unphysiological position. Since the paraplegic generally stands leaning forward slightly, the axis of the brace moves forward in relation to the axis of the leg, thus tightening the posterior calf band. Since the calf can give only in a limited fashion to this pressure, the heel must came up thus permitting pivoting to occur on the sole (Fig. III). The stirrup, on the other hand, has the ankle joint of the brace placed at the ankle joint of the lower extremity, a physiological position. Thus, on leaning forward, the axis of the brace moves forward precisely to the same extent as the axis of the leg. There is no tightening of the calf band and no raising of the heel. A combination of a stirrup and a curved upper posterior thigh band is preventive of external rotation. Except for the infrequent cases of internal rotation which do require a pelvic band for prevention, all other reasons for the pelvic band and the back brace seem to be invalid.

There are certain other points to consider in the fabrication of these braces. They should be made so that they can be put on easily and quickly. In order to accomplish this, a minimum amount of cuffs and lacing should be required. A well fitting knee cap can adequately replace all anterior cuffs and straps, except one single narrow anterior strap on the upper end of the brace to prevent the brace falling off the leg when the knee is unlocked. This is in accord with the universal three-point principle with which all braces are manufactured. A point of pressure at the knee and two points of counter pressure, one at the upper posterior thigh band and the other at the posterior calf band or the counter of the shoe can fulfill this principle most efficiently. The knee cap should be loose enough so that the knee, when weight-bearing, should have about five degrees of flexion.

This has been found to reduce the amount of stimuli coming from stretched calf and hamstring muscles in spastics. A heel raise will also reduce the amount of stretch of the calf muscles. Tightly fitting shoes may stimulate the reflexogenic areas of the feet and increase spasticity. Thus shoes should at least be roomy and preferably made of soft leather.

Using these principles, it has been possible to remove all pelvic bands and all back braces from those who had been wearing them for a long time, occasionally for years. And we never attached them to the braces of a new paraplegic. No disturbing results have been observed and the contribution to the paraplegic's efficiency and sense of freedom has been great.

While the picture presented has been that of the paraplegic with the complete anatomical or physiological lesion, the principles elaborated are probably applicable to the incomplete lesion with modifications as necessary. Such modifications should always be in the direction of decreasing the amount of bracing to be used.

CONCLUSIONS

(1) Total or partial crutch-and-brace walking is an integral part of the rehabilitation of the paraplegic.

(2) Pelvis bands and back braces attached to the leg braces are rarely, if ever, necessary.

(3) The latissimus dorsi and the lower third of the trapezius should be trained to replace the functions of these appliances.

(4) The posterior upper thigh band should be curved to fit loosely into the gluteal fold in order to prevent external rotation.

(5) Stirrups, instead of calipers, should be used exclusively.

The author wishes to express his thanks to the Medical Illustration Service of the Bronx Veterans Administration Hospital, Bronx 63, N. Y., for the preparation of the plates. He also wishes to thank Mrs. Helen Mahoney for her aid in preparation of the manuscript.

ADDENDUM: TRAINING AND FUNCTIONAL EXERCISE

Besides the latissimus dorsi and trapezius muscles, all other muscles of the shoulder girdle play their roles in stablilizing the trunk of the parapegic. For example, when these muscles are contracted, the pectoralis and serratus anterior muscles tend to pull the upper part of the trunk backward as the latissimus tends to pull it forward. While the integrated action of all of the muscles of the shoulder girdle are potentially capable of stabilizing the trunk of the paraplegic in the absence of the pelvic band or back brace attached to the long leg braces, only proper training will permit them to act efficiently in this fashion. This training is best obtained in the functional position. The patient stands between parallel bars wearing long leg braces holding the bars in front of him. He repeatedly pulls himself from the hip flexed position to the upright position. This is done by tightening the shoulder girdle muscles while maintaining the elbows at a fixed angle and the position of the shoulders unchanged in space. Under these conditions the shoulder girdle muscles, especially the latissimus dorsi, do the work of bringing the trunk to the upright position. This work is gradually increased by progressively increasing the resistance to the movement by using the maximum-weight low-repetition method of Delorme.

The technique of training is shown in Figure IV. The apparatus is simple, consisting of a padded belt around the pelvis attached to a cable carry-

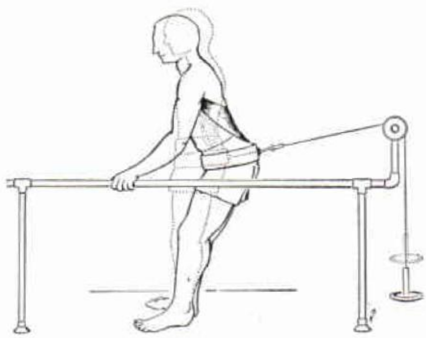


Fig. IV

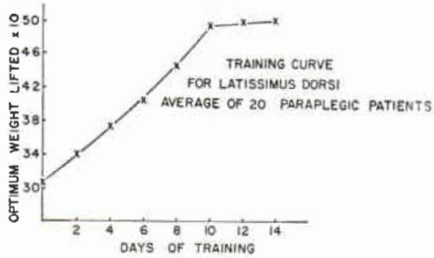


Fig. V

ing weights over a pulley at the end of the parallel bars. The progress of training can be measured by daily observing the maximum weight that the patient can carry ten times from the flexed to the upright position. Figure V shows the progress of the average performance of twenty consecutive cases. Maximum strengthening of the movement can be accomplished within two weeks in a well motivated patient.

For the stability of the trunk to be maintained during ambulation, the lessons learned between the parallel bars must be carried over to crutches. The intermittent elevation of ambulation is done by the piston-like action of the trunk through the shoulder girdle, the elbows being kept at a fixed angle. Throughout this procedure, the muscles are never completely relaxed.

REFERENCES

[1] ABRAMSON, A. S.: Bone disturbances in injuries to the spinal cord and cauda equina (paraplegia). Jour. of Bone and Joint Surg., 30-A: 4: 982-987, Oct, 1948.

[2] GRANT, JOHN C. B.: Method of anatomy, Descriptive and Deductive, 3d ed. Williams & Wilkins, 1944. 822 pp.

"What's New(s)"

• Alfred Denison has been named manager of the Chicago office of the *J. E. Hanger Co.* He succeeds the late J. H. Mathis.

• C. E. Yesalis, Sales Manager of *S. H. Camp & Company* is one of several key executives who have bought ownership of the company from the estate of the founder, Samuel Higby Camp. F. I. Yeakey, President and C. B. Clemons, Vice President are among the new owners.

• Paul Deak has bought the *New Haven Surgical Company*, New Haven, Conn., from the former owner, J. A. Ganzke. Mr. Ganzke has retired and is now living in Florida.

• Joseph Spievak of the *Youngstown-Spievak Limb Company* sends word that William Kaiser, Certified Prosthetist, has rejoined his staff after an absence of six years.

• The *B. Peters Company* is now occupying enlarged quarters with new and modern facilities at 1127 S. Broad Street in Philadelphia.

• The *L. Laufer & Company* has been named sole Eastern distributor of Naugalite. The company also offers 1/8″ Kemblo and all nylon stockinette, in addition to Naugahyde, which has been approved by the Navy for use in soft sockets.

WELCOME

The firms listed below have been elected to membership in the Orthopedic Appliance and Limb Manufacturers Association.

Champlin's Orthopedic Appliances, Maurice E. Champlin, Owner, 1000 Pajaro Street, Salinas, California.

Modern Orthopedic Appliances, C. Richard Fadely, President-Manager, 1923 Santa Monica Blvd., Santa Monica, California.

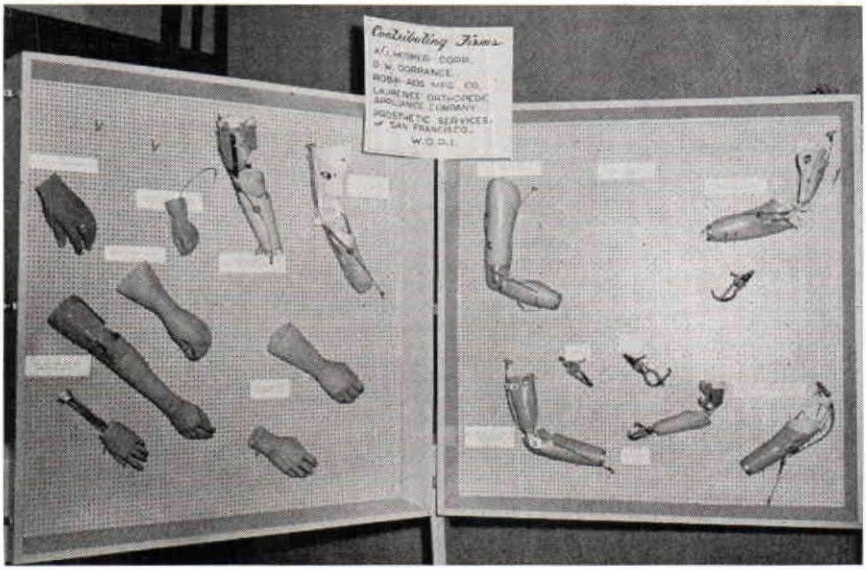
Modern Prosthetic Appliances, Kenneth L. Dodd, President, 1923 Santa Monica Blvd., Santa Monica, California.

J. R. Pava Orthopedic Laboratory, J. R. Pava, Owner, 21 West Micheltorena, Santa Barbara, California.

Tru-Fit Company, Walter J. Robberson, Owner, 38 Pontiac Avenue, Providence, Rhode Island.

Woodruff Brace & Limb Company, Lucian L. Woodruff, Owner, 173 Clifton Street, Rochester 11, New York.

EXHIBIT BY REGION X (Northern California)



Shown above is the new display of industry products which Region X of OALMA has brought together to show the contribution of OALMA in developing improved appliances. The exhibit was one of the features of the Medical and Technical Assembly in Los Angeles March 12 and 13. In commenting on the Exhibit, C. O. Anderson who was largely responsible for its design, said:

"We in Region X have always felt that there was something being left unsaid in the tremendous effort on the part of the Industry and its related suppliers, to elevate itself and its services. It became our feeling that what each of us had to say could best be expressed in an exhibit of what we believed our accomplishments—items of our own development that we felt had merit in them for the Limb Industry, in upper extremity, only. In all humility and sincerity, we would like to present to this Symposium what we hope will be taken up by and embellished on by the national organization itself, the Region X Industry Exhibit Board."

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All custom made, with or without zipper, sleeve extending about 6 inches above the wrist. The REALASTIC glove is engineered for a perfect fit — each category and type hand has its own special mold from which it is made. There is no wrinkling, no impediment to the hand's movement. All pigmenting is permanently cured into the glove — additional tinting is possible through the use of external colorants. Hair, that may be obtained from the amputee himself, is ventilated right into the glove for a natural effect.

Becker Lock-Grip There have been a dozen *Realastic* molds developed for this make of hand, alone. For the newly revised Lock-Grip, XL-13, XL-14, XL-15 and XR-13, XR-14 and XR-15 are designed to cover the 7½, 8 and 8½ left and right, respectively. The manufacturer has narrowed the coil springs, lengthened the rubber finger pads and has accentuated the knuckles so that a much more natural and pleasing appearance is now possible. The woman's size Lock-Grip is accommodated with *Realastic* molds XL-8 and XR-8. Also still available are 4 molds used for the old type hand.

Becker Plylite This hand is noted for its lightness and natural modeling. *Realastic* molds XL-11 and XR-11 are used for men's sizes 8, 8½ and 9. There has been no specific mold developed for women's sizes but the X-8's can be used and the X-7's make a very nice appearance, too.

Trautman Real and SLTH The outward shape and appearance of these two good-looking hands are identical, the difference being that the 4th and 5th digits of the Real are flexible. *Realastic* molds XL-5 and XR-5 were originally developed for this hand but the X-10's were also found to do a good job of fitting without distortion. In the women's sizes, molds XL-7 and XR-7 were designed especially for this make.

Pecorella *Realastic* molds XL-12 and XR-12 were engineered for this very different hand. A pleasing and symetrical appearance has been obtained without interfering with the ideas of the appliance's designer. In one size, only.

• What is a mold?

A mold in the sense that it is used here, is a die for producing cosmetic gloves. REALASTIC Hand molds are made of metal (for permanence and for optimum cure of the material) and in two pieces to permit the "locked-in" type of coloring. REALASTIC pigments can neither be washed off, nor worn away by action of the appliance underneath.

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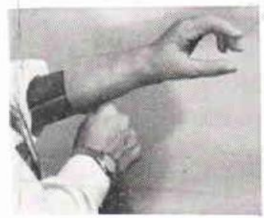
Hand Appliances — Some New, Some Old, Some Tremendously Improved — No matter which make, gloves for them are available in REALASTIC'S 48 New, Natural Colors.

REALASTIC gloves are applied to the hand appliance by means of the zipper opening. No stretching, no special equipment is necessary. In an emergency, even the amputee can mount the glove as shown with the Miracle Hand in the accompanying photograph.



Miracle Molds XL-6 and XR-6 are designed for the H-1 Friction hand and one size of the wood dress hand, as well. As can be noted in the two photographs the hand and glove make a very life-like appearance. Two smaller size dress hands are covered by the X-10's and the X-7's. Both the mechanical and the dress appliances are finely sculptored.

APRL The Sierra 4-C is the research hand and a precision instrument. Because the utmost precaution must be taken that the cover permits full freedom in operation, all *Realastic* gloves for the APRL are checked out on one of the hands. XL-10 and XR-10 are the molds that were developed for this appliance. Soon to be commissioned are two additional adaptations which will feature more accentuated skin detail and characterizations.

Robin-Aids The newest manufacture of hands is taken from *Realastic's* own standard molds, which are modeled from life. Available now are child's sizes, 5-7 year molds, EL-4 and ER-4 and woman's sizes about #7, HL-2 and HR-2. Soon to follow will be the establishing of E-5's for 7-10 age group and E-6's for 10-13. A second woman's mold, the H-3's will also be developed. The manufacturer designs the hands after completion of the glove molds for a more natural shape.

Miscellaneous Carnes, wood hands of all descriptions, felt hands, foreign makes, etc, are also covered by *Realastic* although it is best that the dealer send the appliance to the laboratory for adapting.

OF SAN FRANCISCO

Realastic*

"Looks REAL—It LASTS"

***Trade-Mark**

• Ordering:

REALASTIC gloves may be ordered directly from Prosthetic Services or for greater convenience, from the appliance maker at the same time as purchasing the hand. Three things should be borne in mind:

1. *Where there are various sizes of the hand available, allowance for the glove should be made. Order ½ size smaller to compensate.*
2. *Unless the paint used for the hand appliance is a baked-on-metal type, it should be removed.*
3. *Give diagram and measurements of forearm Prosthesis so that sleeve of glove will fit accurately.*

Observations on Failures of Back Checks on Artificial Legs

By FRANCIS L. SMITH, Fellow,
With JOHN L. YOUNG, Ph.D., Senior Fellow

The Sarah Mellon Scaife Foundation's Multiple Fellowship
on Orthopedic Appliances
at Mellon Institute, Pittsburgh, Pennsylvania

I. INTRODUCTION

About a year ago[1] we described an improved design for a back check on artificial legs. Subsequently, a number of persons brought to our attention the fact that no mention was made of the problem of impact on the back check. This occurs at the end of the swing phase during walking just prior to the time the patient's weight is put on the artificial leg. These prosthetists believed that the impact was severe, and if back check breakage occurred it was primarily due to the impact at the end of the swing phase.

The authors, and several bracemakers who wear above-knee artificial legs, believed, on the other hand, that the maximum load on the back check would occur at the step-off phase of walking. This would be especially large while walking up-hill or doing anything that puts the center of gravity of the patient forward of the knee-bolt. Accordingly, we decided to determine just what loads are imposed on a back check with the hope that this information might help not only in designing improved back checks, but with other parts of the artificial legs as well.

II. Experimental Procedure

A type A-5 SR4 bonded wire strain gage was mounted on the back of an aluminum back check and used in conjunction with a Brush amplifier and oscillograph to measure the load. (See Figure 1). We used the usual precautions in employing shielded wire, grounding, and checking the instruments for each run. The entire setup can be thought of as a kind of complicated bath room scale used to measure the number of pounds acting on the back check while in use.

The system was calibrated statically using dead weights. The artificial leg was mounted in a horizontal position and lead weights suspended from the center of gravity of the shin. The shin weighed 4.82 pounds including the shoe and the center of gravity was located 12 inches below the knee bolt. The bumper was located two inches below the knee bolt. The system was calibrated to read directly the number of pounds force on the back check.

As a preliminary test the artificial leg was mounted in a vertical position fastened by the wooden socket in a sponge rubber lined vise. The shin was lifted to the 45 and 90 degree positions and allowed to drop. (See Figure 2).

Three different materials were tried for the bumper. The original leg had a bumper made of hard felt covered with leather. Bumpers made of plastisol with a Durometer A2 reading of 32, and bumpers made of rubber with a Durometer A2 reading of 52 were used.

Although there may be a significant fabricating difference in these three bumpers, it did not seem to influence the load on the back check to any great amount. The reason is that too much energy is absorbed elsewhere

[1] Smith, Francis L. and Young, J. L., *Orthopedic and Prosthetic Appliance Journal*, Pages 23-24, March, 1954 issue.

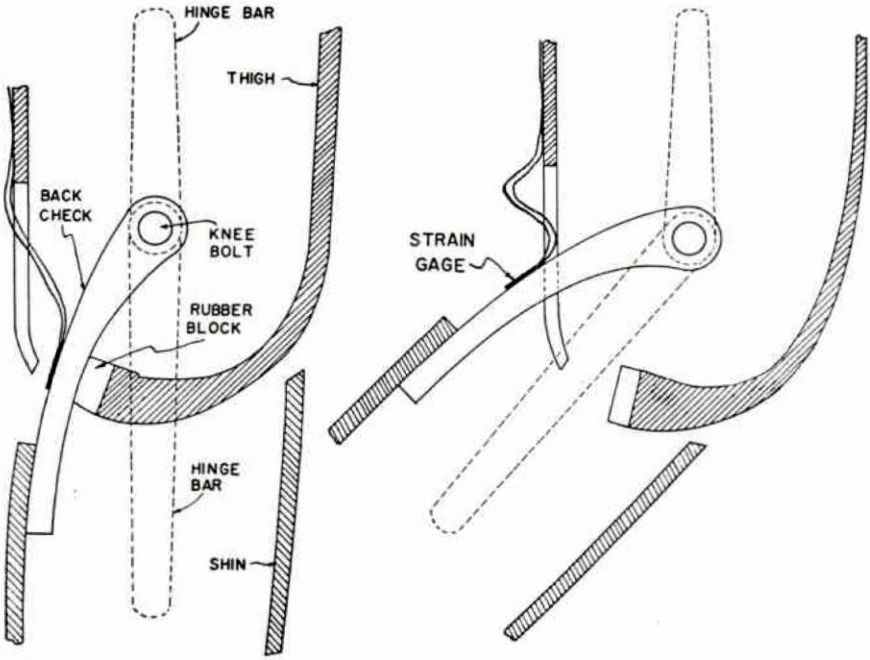


Fig. 1

in the leg, so the amount absorbed by the bumper is small in comparison.

The artificial leg we tested has a knee friction device that could be adjusted from no friction to enough friction to lock the knee.

With the friction device set for no friction, the average load on the back check was 127 pounds from the 45 degree position and 329 pounds from the 90 degree position.

With the friction device set in the normal position of a slight amount of friction, the average load was 61 pounds from the 45 degree position and 261 pounds from the 90 degree position. (See Table I).

The writer believes that the values obtained from the 45 degree position probably correspond to the values obtained during use of the leg, and expressed this opinion in a letter to at least one person who inquired about the impact load at the end of the swing phase.

The only sure proof of how much load is imposed on a back check is by actually testing a leg worn by a patient. This was done by installing the same back check in an above-knee artificial leg worn by Mr. B., an experienced bracemaker from Pittsburgh, who weighs 200 pounds. Mr. B. has been regularly wearing an artificial leg with one of our experimental aluminum back checks. He had broken several malleable cast iron back checks prior to wearing the aluminum model. His leg has a knee friction control built in and he uses this friction control.

Tests were conducted with the patient walking normally, walking very fast, walking up a 10 degree slope, and carrying a 75 pound weight in his arms.

Ordinary walking put a 37 pound load on the back check due to the impact at the end of the swing phase. The push-off phase gave 260 pounds for the first step and then settled down to 185 pounds after three or four steps.

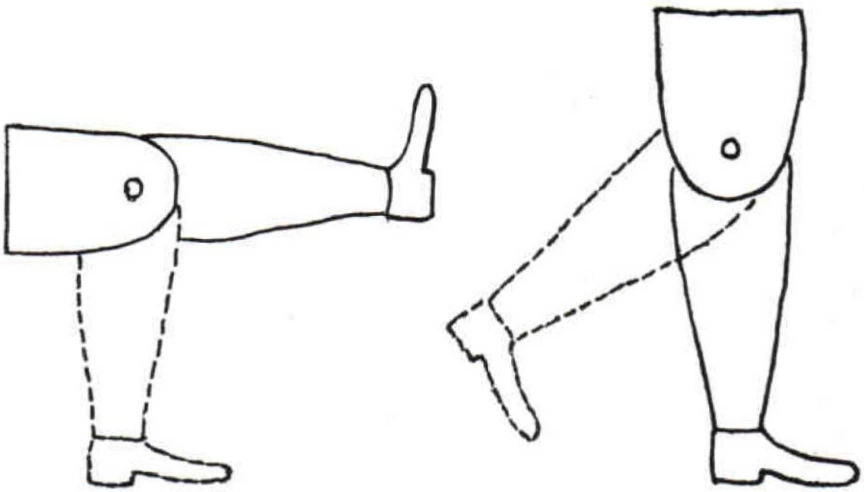


Fig. 2. Left: 90° Shin Drop. Right: 45° Shin Drop

Fast walking put a 74 pound load on the check due to the impact at the end of the swing phase and a 224 pound load due to the push-off phase after three or four steps. The initial step caused a 335 pound load due to the push-off phase.

Walking up a 10 degree slope caused a load of 444 pounds during the push-off phase. There was no load due to impact at the end of the swing phase.

Carrying a 75 pound weight cradled in the arms resulted in a 370 pound load on the push-off for the first step, reducing to 225 pounds after a few steps. The load due to impact at the end of the swing phase was 37 pounds.

During the test the patient walked about ten steps in one direction and then turned and walked the opposite direction. The process of turning around placed a load of 300 pounds on the back check.

While walking normally, the patient gave the shin an extra hard kick to see how much load would result at the end of the swing phase. The load was 112 pounds. The patient also stood on his good leg and deliberately whipped the artificial leg back and forth. This resulted in a 370 pound load. The noise from the impact was quite loud, and no leg would take much of this kind of mistreatment, although the back check itself could easily withstand much higher loads.

Normal walking was at an average rate of 80 steps per minute and fast walking at an average rate of 100 steps per minute.

III. Conclusions

The results of the tests were as we had expected. The load caused by the impact at the end of the swing phase was low in comparison to the loads caused by the step-off phase.

The amount of energy involved in the swing phase of walking would probably be enough to eventually damage the back check by a combination of impact and fatigue if all of this energy were absorbed by the back check. Fortunately, so far as the back check is concerned, most of the energy is absorbed by other parts of the leg and by the stump of the person wearing the leg.

The amount of energy that a body absorbs depends upon its volume, its material and the amount it is stressed. The larger the volume the more energy a body can absorb. If the body is made of a material that is easily deflected, it will absorb more energy than one made of material harder to deflect. The wooden shin

TABLE 1

BUMPER MATERIAL	POSITION OF SHIN	KNEE FRICTION DEVICE	MEASURED LOAD (POUNDS)
FELT	45°	FRICTION	94
FELT	90°	FRICTION	260
FELT	45°	NO FRICTION	150
FELT	90°	NO FRICTION	300
PLASTISOL	45°	FRICTION	38
PLASTISOL	90°	FRICTION	242
PLASTISOL	45°	NO FRICTION	112
PLASTISOL	90°	NO FRICTION	334
RUBBER	45°	FRICTION	50
RUBBER	90°	FRICTION	280
RUBBER	45°	NO FRICTION	120
RUBBER	90°	NO FRICTION	353

has a large volume in comparison to the back check and wood deflects easier than aluminum. Even if the shin were made of aluminum, its volume would be larger than the back check and its deflection would be larger than the comparitively short, stiff back check.

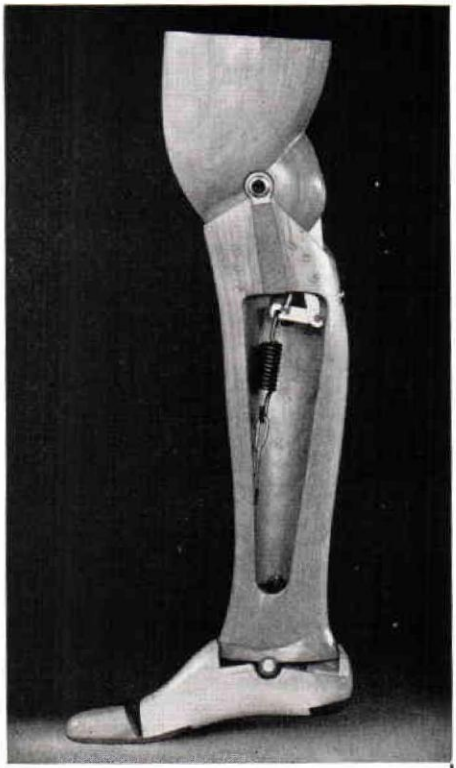
The standard Engineering Handbooks list different materials and how much energy a certain volume of each material can absorb. These tables show that a good grade of steel can absorb more energy than aluminum, and that aluminum absorbs more energy than wood. This is true because the allowable stress is higher for steel than for aluminum, and higher for aluminum than for wood. What must be realized is that these tables show *capabilities* of absorbing energy; no material absorbs energy unless it is stressed. The supports for the back check deflects enough that the back check is not stressed very much and so does not absorb much energy, even though it is capable of absorbing more than it does. Thus, if a bar of aluminum is supported at each end by blocks of steel, a weight dropped on the aluminum may break it. If the same bar of aluminum is supported at each end by large blocks of rubber, the same weight dropped on the aluminum will not break it. The rubber supports will absorb most of the energy.

This is quite similar to the soft tires, soft springs and soft seat cushions in a car absorbing energy so the passenger will not receive sharp jolts when a car hits a bump.

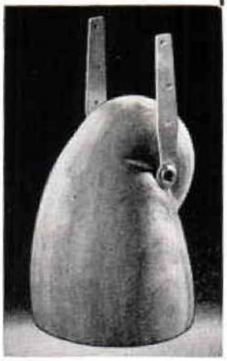
One other engineering fact keeps the impact load on the back check low, and that is the location of the center of percussion of the shin piece. This can be explained without defining the actual "center of percussion" by comparing the shin piece to a baseball bat. To be a good solid hit the ball must strike the bat at the center of percussion, located out on the thick part of the bat. If the ball hits the bat on the handle, a weak hit results and the hands sting. Similarly, the center of percussion of the shin piece is located down near the ankle. The back check and rubber bumper hit up near the knee bolt, resulting in a weak hit on the back check and a jolt on the knee bolt.

Because the distance from the knee bolt to the bumper was two inches and the maximum load measured on the back check was 444 pounds, the maximum moment at the knee was 888 inch-pounds while walking up a 10 degree ramp. Ordinary walking produces a 370 inch-pound moment at the knee. These tests give some indication of the loads on a back check and the moment at the knee. The loads vary with people, depending upon body weights and walk.

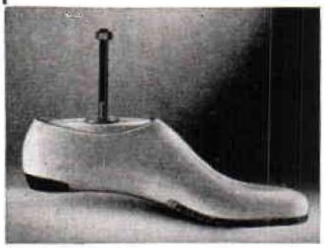
A T L A S



KNEE SET-UP

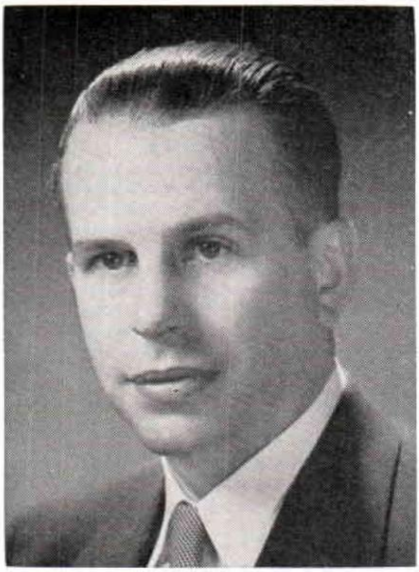


FOOT SET-UP



Leimkeuhler Named Program Chairman for 1955 National Assembly

If Paul Leimkuehler of Cleveland has that "Louisiana Look" these days, there's a reason: He has been picked by President McCarthy Hanger to head up the Program Committee for the 1955 Assembly.



Paul Leimkeuhler

This annual convention will be held at the Jung Hotel in New Orleans, October 16 to 19. As in previous years it will be preceded by the annual examination conducted by the American Board for Certification. Qualified technicians who wish to become certified as prosthetists or orthotists should file application with Board headquarters in Washington on or before August 14 for permission to take these comprehensive tests.

Chairman Leimkuehler reports that this year's Assembly will stress professional relationships for the brace and limb technician. Special sessions will be held on management problems, education on the college level, and new developments in braces and limbs.

Mrs. Ruth Finlay of Milwaukee, President of the Ladies Auxiliary, is planning an entertainment program which will make attendance at the Assembly a recreational as well as a professional experience. While the details are being held in reserve at present, we understand that "A Pirate's Evening in Old New Orleans," is under consideration.

"What's New(s)"

• Dr. Howard L. Boyland has resigned his position as Medical Director of Truform Anatomical Supports and has opened his own retail appliance store known as "Boyland Hospital Supply" at Lafayette, Indiana. However, Dr. Boyland will continue to serve as a medical consultant to the Truform organization and will conduct a training class in Surgical Appliance Fitting at Cincinnati May 2-11. Inquiries for registration to this training class should be addressed to Mr. I. M. Pease, Truform Anatomical Supports—3960 Rosslyn Drive, Cincinnati 9, Ohio.

• Prostheses designed and fitted by William E. Brownfield of the Chester Artificial Limb Company, are shown in an article "Rehabilitation of a Bilateral Above-knee Amputee." The article which appeared in the June, 1954 issue of *Northwest Medicine* has been added to the OALMA headquarters library.

• The December, 1954 issue of "*Medizinische Technik*" contains an article by Alfons Glaubitz, certified prosthetist of Elizabethtown, Penna., on a brace fitting chart.

CROSS-COUNTRY REPORT
What the Regions are Doing

MID-WEST (REGION VII) TO MEET AT KANSAS CITY

Region VII holds its annual meeting at Kansas City, Missouri, April 15-17. The Pickwick Hotel is convention headquarters for this get-together of OALMA's largest Region, which includes all States in the belt from Kansas north to the Canadian border. Regional Director Ted Smith, extends a cordial invitation to all OALMA members to join with their Midwestern brethren for this reunion at Kansas City. The program he has planned for them includes:

- Amputation Training in Rehabilitation Centers, by Mrs. Vivian Shepherd, Director of the Kansas City Rehabilitation Institute.
- Medical Indications for Orthopedic Appliance, by E. Stewart Gillmor, M.D.
- Today's U/E Prostheses in Action, by Jerry Leavy, Vice President of the A. J. Hosmer Corporation.
- The $'s and Sense of Vocational Rehabilitation, by Joy O. Talley, Missouri Director of Vocational Rehabilitation.
- Our Educational and Apprenticeship Program, by McCarthy Hanger, Jr., President of OALMA.
- Business Management and Public Relations, by Robert C. Gruman and John H. Hendrickson of Minneapolis.
- New Developments, Gadgets and Processes, discussed by Paul Dillon and L. H. Madsen.
- What Certification Means to the Individual, by Lucius Trautman, President of the Certification Board.
- What Would You Do? A discussion of industry problems led by Glenn E. Jackson, OALMA Executive Director.

Mrs. Vivian Shepherd and Ted Smith Plan Mid-West Session

REGION IX—SOUTHERN CALIFORNIA AND ARIZONA

Although the year is still young, Los Angeles has already been host for two sessions of national interest:

The first was the annual meeting of the American Academy of Orthopaedic Surgeons held at the Statler Hotel January 29 to February 3. For the first time, the Scientific and Educational Exhibits included a booth presented by the American Board for Certification. Board members M. J. Benjamin and Dr. Robert Mazet were in charge of the display and were assisted by the following certified technicians: A. A. Tilton, Robert Benjamin, Robert Angelich, Fred Quisenberry, Kenneth Dodd, Carl Woodall, Roy Snelson, John Bray, Charles Hennessy, and Charles Neal. Attendance at the orthopedic meeting was estimated at 2,000.

The second event was the Medical and Technical Assembly on Prosthetic-Orthotic Devices, held in the Hotel Statler in Los Angeles on March 12 and 13, ably chairmanned by Robert V. Bush. The program featured:

ORTHOPEDIC SURGEONS SEE CERTIFICATION EXHIBIT

The Certification exhibit was one of the features at the annual meeting of the American Academy of Orthopedic Surgeons in Los Angeles Jan. 29-Feb. 3. Shown above left to right are: Harvey Lanham, OALMA Regional Director for Southern California; M. J. Benjamin, member of the Certification Board; Lee J. Fawver, Past President of OALMA; Dr. Henry Kessler, a Founding-member of th Board; Dr. Charls O. Bechtol, Assistant Professor of Orthopedic Surgery at Yale University; Carlton Fillauer, a member of the Board; and Charles Hennessy, Vice President of OALMA.

- Cineplasty—Surgery and Rehabilitation, by Charles O. Bechtol, M.D.
- Cerebral Palsy—Diagnosis, Treatment, Bracing and Rehabilitation, by Kenneth B. Jacques, M.D., Roy Snelson, Bernice Ringman, R.P.T.
- Functional Bracing of the Upper Extremity—Poliomyelitis and Cerebral Palsy, by George B. Robinson.
- Suction Sockets for Everyone?, by Jack J. Vollmer.
- Problem of Pain of the Amputee, by Verne T. Inman, M.D.
- Today's Upper Extremity Prosthesis in Action, by Jerry Leavy.
- Surgical Corsets and Their Application to Bracing, by Stanley Carlton.
- Prescribing the Bracing for the Poloimyelitis Patient, by Ve'non L. Nickel, M.D.
- Bracing the Poliomyelitis Patient, by John A. Metzger, C.O.
- The Canadian Type Hip Disarticulation Prosthesis, by Charles Radcliffe.
- The Veterans Administration Clinic Team in Action, by Charles G. Hutter, M.D., Edward Ruzika and Herbert Rosoff, Veterans Administration Prosthetic & Sensory Aids Unit.
- Gait Training, by Virginia Badger, R.P.T.
- Lower Extremity Prostheses for Children, by Charles L. Lowman, M.D.
- Cosmetic Aspects of the Upper Extremity, by C. O. Anderson, Manager of Prosthetic Services of San Francisco.
- Physical Therapy, Bracing and

SOUTHEAST HEARS PRESIDENT SMITH OF NRA

J. Hank Smith, President of the National Rehabilitation Association was guest speaker at Region IV's meeting in Memphis. Shown above left to right are: George H. Lambert; OALMA President McCarthy Hanger, Jr.; Glenn E. Jackson; President J. Hank Smith; Bert Titus; Ralph D. Snell, Program Chairman; Moody Smitherman; James M. Bonds; and Vice President Frank Harmon.

Rehabilitation of the Paraplegics, by Charles Magistro, R.P.T.

- Splinting of Dysplasia and Congenital Dislocations, by Frederic W. Ilfeld, M.D. and Hy Christensen, C.O.
- Prosthesis For Amputation of the Foot, by L. Benson Marsh, C.O.
- Vinylaire and Its Application to Braces and Prosthetics, by Kenneth L. Dodd, C.O., C. Richard Fadley, C.O.
- Progress Report of New Developments, by Maurice Fletcher, Col. U.S.A., Army Prosthetics Research Laboratory.

Charles A. Hennessy, President of the Society of Orthotists and Prosthetists, presided at the luncheon sessions and introduced the speakers, Dr. Paul E. McMaster and Miles H. Anderson, Director of the Prosthetics Training Center.

The Annual Awards banquet of the Assembly was held March 12. The Award for "Orthotist of the Year" was conferred on Roy Snelson, and for "Prosthetists of the Year" on Charles Hennessy. Citations for help in employing the handicapped were given to Air Research, Hughes Aircraft and Douglas Aircraft.

REGION IV—THE SOUTHEASTERN STATES

Ralph Snell reports a large attendance for the eighth annual meeting of Region IV at Memphis, March 17 to 19. J. Hank Smith, President of the National Rehabilitation Association, headed a star-studded speakers' list which included McCarthy Hanger, Jr., President of OALMA, and Glenn E. Jackson, Executive Director. Mr. Jackson and Mr. Smith in a joint discussion brought out our relationship to the new rehabilitation program.

Among the topics ably handled were:

- Paraplegics and Proper Bracing, presented by Dr. D. M. Street of the Veterans Administration.
- Coating and the Chemical Treatment of Metals, Bob Blair.
- Upper Extremities, Dr. Marcus J. Stewart, Associate Professor of Orthopedics at the University of Tennessee and Staff Professor of the Campbell Clinic.
- Checking Construction of L/E Amputations, by Drs. W. L. Whittemore and G. B. Higley. Miss Aline Bletcher, Chief Physical Therapist of the Campbell Clinic joined with Miss Nan Rice, Chief Occupational

Therapist of the Kennedy Hospital to discuss the follow-up on cases.

- Use of Rubber Materials, by Carlton Fillauer.
- A Presentation of New Gadgets and Devices, by Bert Titus.

Summing it all up, Program Chairman Ralph Snell declared it to be a highly successful reunion and expressed his thanks to the speakers and committee members whose work made it possible. Next year's meeting has been scheduled for Birmingham with Moody Smitherman and R. M. Locke in charge.

BY JEEP, BOAT AND ON FOOT

Glenn Jackson and JOURNAL Editor Smith are guided through Northern California by Regional Director Matt Laurence.

THE NEW ENGLAND STATES

Joseph H. Martino of Boston is the new *President* of the New England Regional Council. Elected with him at the annual meeting February 28, were this group of experienced members: John F. Buckley of Providence, R. I., *Vice-President;* Joseph C. Arnold of Fall River, Mass., *Secretary;* and Eric O. Klahr of Randolph, Mass., *Treasurer.*

The Council is now in the middle of a very successful year which got off to a fine start last fall with a social evening at the Hotel Bradford in Boston. In October, the members heard a report by Mr. and Mrs. Eric Klahr, who had spent the summer in Germany. In December, C. N. Waterhouse gave a talk on various kinds of hides, tanning processes, and the application of these hides to braces and limbs.

REGION VIII (TEXAS, OKLAHOMA, WESTERN LOUISIANA, ARKANSAS, NEW MEXICO)

The Southwest (Region VIII) held its annual spring session at the Hotel Travis, in Dallas on March 26 and 27, with Regional Director Jim Snell directing a program of unusual practical interest. Two sessions were given over to discussions from the floor—one on the U/E Prosthesis in actual use, and the other on problems arising from the new Vocational Rehabilitation program.

Featured speakers included:

- Jerry Leavy, Vice President of the Hosmer Corporation, Inc., in a demonstration of the new U/E appliances.
- Dr. Odon F. von Werrsowetz of the Gonzales Warm Springs Foundation, reviewing Orthopedic Appliances for Children.
- Ted W. Smith, of the Knit-Rite Company, discussing Stump Socks.
- Alvin Muilenburg, reporting on the latest UCLA training in U/E fitting.

Guest of honor included J. J. Brown, Texas Director of Vocational Education, who is a past president of the National Rehabilitation Association, and Glenn E. Jackson, Executive Director of OALMA.

James D. Snell will head the Regional Council for the coming year, and will preside at the 1956 session to be held at Shreveport, Louisiana.

PEL WALK-AID RAILINGS

Portable • Lightweight
Self-Supporting • Stationary

These Walk-Aid railings provide safety and stability without fastening to floor. During the rehabilitation of amputees, parplegics, polio cases and pre-crutch training or fracture patients, Walk-Aid Railings provide the security necessary to build complete confidence.

Easily Assembled • 9½ feet long.

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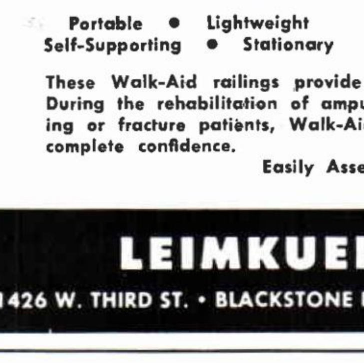
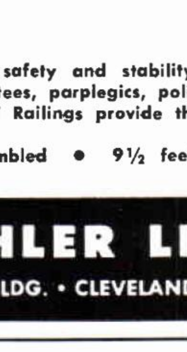
SABEL'S OPEN TOE PRE-WALKER CLUB FOOT SHOE FOR INFANTS



Right



Left

This latest Pre-Walker Club Foot shoe will allow for closer fittings. It will enable you to see that the toes are in correct position, and that the heel is well down in the shoe.

The "PRE-WALKER" Club Foot shoe is made in white Elk over the PRE-WALKER Club Foot Last which carries a decided outward flare to the forepart and strap and buckle as shown by illustration. Bottom construction includes a flat steel plate extending from heel to toe, as illustrated. Single sole, flat bottom, no heel.

Sizes 00, 0, 1, 2, 3 and 4; width Narrow and Wide. Also size 000, width Narrow Only.

EXCLUSIVE MAKERS — **THOMPSON BROS. SHOE CO.** — BROCKTON, MASS. — **FINE SHOEMAKERS**

DR. COMPERE HONORED

Dr. Robert Mazet, Jr. and M. J. Benjamin, members of the Certification Board, are shown with Dr. Clinton L. Compere (right) at the recent Arms School graduation. Dr. Compere, who served on the Board for three years, and is now a member of its Committee on Facilities, received a Certificate of Appreciation for his services.

OALMA REGION III TO MEET WITH STATE GROUP

Region Three of OALMA will again join with the Pennsylvania Orthopedic and Prosthetic Society in a joint session. The meeting opens the evening of April 22 at the Sterling Hotel in Wilkes-Barre and will continue through Sunday morning, April 24. The program will feature two round tables—one on orthopedic appliances, and the other on artificial limbs.

Karl J. Barghausen, Director of OALMA Region III, reports that E. A. Warnick is in charge of local arrangements. An illustrated program of the meeting is in preparation.

The Pennsylvania Orthopedic and Prosthetic Society is headed by Walter B. McCarty of Philadelphia as President. Other officers include: Basil Peters, Vice President; and Karl J. Barghausen as Secretary-Treasurer.

PUBLICATIONS RECEIVED

(Note: Anyone of these items may be borrowed from the OALMA Headquarters Library for a period of two weeks).

Photoelastic Analysis of the Experimental Aluminum Knee Lock, No. 4, by *Clyde H. Darrall*, July, 1954. 20 pages, plates and charts. (A supplement to the summary report of Sarah Mellon Scaife Foundation, Fellowship No. 332-A, Veterans Adm. Contract No. V 1001M-4497).

Construction, Fitting and Alignment Manual for the U. S. Navy Soft Socket Below Knee Prosthesis. *Captain Thomas J. Canty, M.C., U. S. N., Chief Amputee Service, U. S. Naval Hospital*, Oakland, Calif. 1953. 130 pages, incl. photos. and drawings.

Personal Recollections of Charles H. Davies, 1890-1944

By J. A. DUCKETT, Montreal, Canada

(EDITOR'S NOTE: *We are indebted to J. A. Duckett of Montreal for this interesting sketch of an important figure in the history of prosthetics. Joseph Spievak of Youngstown, Ohio, has contributed some interesting memories of Mr. Davies.)*

Although he has been gone from our midst for more than a decade, many of us recall affectionately the late Charles H. Davies, founder of the C. H. Davies Co., of Philadelphia.

Mr. Davies was born September 25, 1890, near Nanticoke in the hard coal region of Pennsylvania. He lost his limb at the age of ten in an accident in a coal mine, located in the hard coal region near Wilkes-Barre, Pennsylvania. In those days small boys were permitted to work in the mines as slate pickers, and when the day's work was over, they hitched a ride on the coal cars that were taking the mined coal out to the surface. In those days, the cars were drawn by mules, and this day one of the mules was frightened and bolted, with the result that the small boy hitching a ride was thrown under the wheels of the other cars. He was taken to one of the Company hospitals where his limb was amputated.

Fortunately, young Charles, being thus disabled at an early age, decided to go to school and further his education with the result that he finally reached Bucknell University in the Engineering School.

One of the unusual experiences of his college days which he afterwards told with some relish occurred at one of the class dances. On that occasion some roommates with a robust sense of humor nailed his artificial limb to the floor.

Mr. Davies did not graduate from Bucknell University since at that time he left to work in the steel

Charles H. Davies

plants at Bethlehem, Pa., where they were making shells and war supplies for World War I. He decided that if they would not take him as an enlisted man on account of his disability he would work in the steel mills to help further the war effort.

During those early days in the hard coal region, Charles Davies bent every effort to complete his education since he knew that certain fields of work were closed to him as a result of his accident. During this period he often visited his father who was an opera singer known as the "Welsh Tenor." From him he got a glimpse of the enthralling world of show business.

After his college training he worked first in the construction business and then shortly afterwards found himself interested in the mechanical operation of the artificial limbs which were then available. His study of engineering suggested to him the use of metals and machines to produce and improve devices. This led to the opening of his own business which was known first as the Penn Capital City Limb Company. In 1932 the name was changed to the C. H. Davies Company.

Mr. Davies pioneered in many important developments of the artificial limb field, among them: (1) the use of the automatic reproducing lathe in making artificial limbs without the use of any chisel, (2) elimination of the ankle bushing and (3) the use of precision ball-bearings in the ankle and the knee. Mr. Davies is said to be the first person in the United States to promote the use of aluminum limbs exclusively. In 1932 he introduced the special plastic socket known as "Composocket." Mr. Davies was the first to make all-metal Symes and Choparts and the first to invent and make seamless aluminum shins and thighs by the internal liquid die method. Most of all, his name is associated with the "Airplane Metal Limb." All in all, he had eight patents issued on the construction and development of the Davies Metal Limb.

An inveterate traveller, he visited 22 countries, both in Europe and South America. Always eager to know of new ideas and innovations in the prosthetic field, he visited the leading orthopedic establishments and insisted on talking shop.

This interest of Mr. Davies in foreign countries led him to expand operations overseas. In September, 1938, he was pushing to completion a large branch factory at Konigee, Germany, where he intended to install the full Davies system. It is now history, that events in that part of the world, interrupted any continuance of this project.

However, more success attended his expansion into the South American field. This was the opening of a modern limb establishment in Buenos Aires, Argentina, the "Paris of South America." This branch of the Davies Company is located in the heart of Buenos Aires and has been in continuous operation for the past 17 years.

During his lifetime Mr. Davies was the recipient of many honors from the Argentine Government. His successful venture there was perhaps inspired by an exciting experience on his first trip to Buenos Aires. After sailing 7,000 miles from New York City, immigration officials refused to admit him into Argentina on the grounds that since he had an amputation he was classified as a "cripple." Argentine law at that time prevented the admission of cripples. Naturally, Mr. Davies took offense at this classification. He protested so loudly that a high official of the Argentine Government heard about his plight and came to his rescue, because—you've guessed it—the official was an amputee, too!

During all these active years, I was happy to be one of Mr. Davies' close friends, to have a share in the pioneer development of the Davies Metal Limb. There were four of us who became known as "the 4-D's" because we were so often seen together when limb manufacturers held their meetings. The "4-D's" included: the late George Dorsch, the late Joe Dube, in addition to Mr. Davies and the author of this sketch. I am the only one living now, and we four spent many happy hours going over the details of the aluminum limb. Many innovations were dreamed up in the late hours of these meetings.

On my invitation to Mr. Davies, he came to Montreal and lectured to the doctors and orthopedic surgeons on the subject of *Save The Knee*, punctuating his instruction with moving pictures, charts, case histories, and his own excellent demonstrations of the various activities possible with an extremely short below the knee stump. He jumped from a chair, ran, pivoted, danced an imaginary tango and suggested again to our eminent doctors that the most advantageous site of amputation was below the knee. Our campaign to plead with the surgeons to select the best site of election began in earnest some 20 years ago and I am very encouraged to see that such strides have been made in this direction in the past few years.

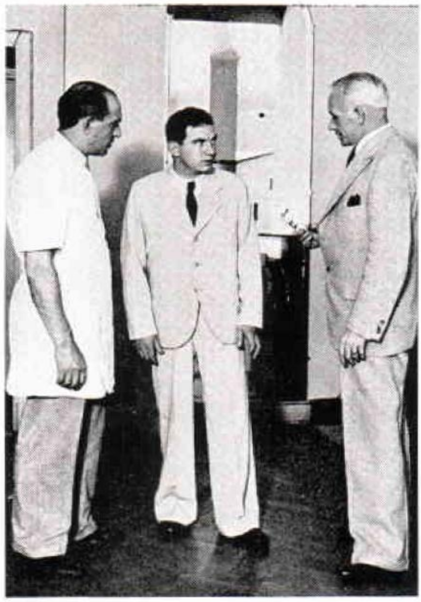
This lecture followed the pattern set by many lectures in the United States before the graduating classes of leading hospitals in Philadelphia and various other cities, as well as his presentations before the leading surgeons and orthopedic specialists.

Always a pioneer in new ideas and methods, Charles invited mechanics to his factory in Philadelphia and spent time in training them in the patented system of constructing Davies Metal Limbs. He helped train over 150 mechanics in the process of the manufacture and fitting of Davies Metal Limbs.

A past Vice President of the Old A.L.M.A., he supported the organization heartily and enthusiastically presented his displays and exhibits for the approval of the distinguished members.

Joe Spievak of Youngstown, Ohio, has given us some fascinating anecdotes about Charlie Davies and the early days of the Artificial Limb Manufacturers Association. His first contact with Charlie Davies was in 1932 during the depths of the depression. There was a heated discussion with the late McCarthy Hanger, Sr., who was the President of the Association. Joe recalls that after the heated session he sat on a fire plug on a street to continue the discussion with Mr. Davies. This eventually led to Mr. Davies and his 72 distributors joining the Association en bloc.

When the Association held its annual convention at Cleveland in 1936 Mr. Davies was determined to put on a private display of his products. However, after discussing this with officers of the Association he decided that it would be better to hold the exhibit as an official part of the meeting. Characteristically he took the lead in this, engaged the largest space and encouraged the suppliers, including John J. McCann, William Arbogast, W. E. Isle, Max Ross Dider and others to join in exhibiting.



The Buenos Aires' Office. Mr. Davies (right confers with Sr. Martin Bardella, his Chief Technician, and Sr. Federici.

The following year the Association met in the La Salle Hotel in Chicago. Mr. Davies stopped the show by bringing with him an Airdale dog who had lost a leg and had been fitted with one artificial foot (metal, of course). Mr. Spievak pays tribute to his old friend in these words: "Charlie Davies had much to do in promoting the old A.L.M.A. and I pay my sincere respects to the help he gave me and the other officers during his active life. We did not see eye to eye on occasion but once his word was passed he never failed to go through with it."

Charlie Davies was a delightful host, enjoying good fellowship and good stories. The dinners and parties given by him and the stories he told from his background of travel and experience, are still remembered. Perhaps his most dramatic experience which he described occurred in his own factory during a fire. With the deadly fumes of cellulose nitrate seeping up the steps, escape was cut off. He was rescued just in time by one of Philadelphia's athletic firemen.

The close of this vigorous and helpful life came on December 8, 1944. He left behind a fine heritage in the operations of the C. H. Davies Co. of Philadelphia. His daughter, Mrs. Virginia Rohe, is President of the Board of Directors of the Company. Arthur E. Birdsey is Vice President and Manager and R. L. Rohe is Secretary of the Company, which has been located at 1136 West Girard Avenue in Philadelphia for the past 25 years. The Company has provided some 52 service centers in the United States and foreign countries.

As I look back, the road was long and the going was hard for both of us, but we fought together for many ideas which have now become realities. That in itself is compensation.

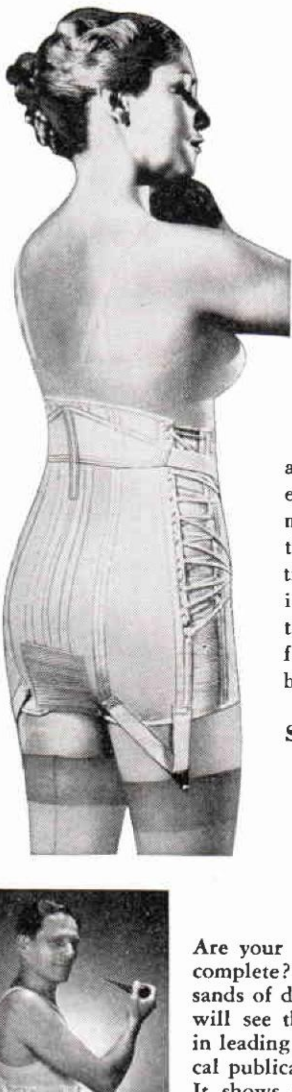
GRAND AWARD FOR OALMA

Honorary Award to OALMA

The 1954 Grand Award of the American Trade Association Executives has been presented to the Orthopedic Appliance and Limb Manufacturers Association "for having rendered outstanding service to the industry which it represents as well as to the American Public." Using as its material the story of the Suction-Socket Training Schools for prosthetists and orthopedic surgeons, OALMA won out over the entries of almost 60 other trade associations. The Honorable Sinclair Weeks, United States Secretary of Commerce, served as Chairman of the Jury of Awards.

OALMA WINS HONOR—George W. Robbins of the University of California faculty presents award to Glenn E. Jackson. Harvey Lanham, Regional Director of OALMA for Southern California, looks on.

The Suction-Socket Schools constitute a unique example of cooperation between an industry association and the Federal Government. Initiated in 1947 by OALMA and the U. S. Veterans Administration, with the active help and encouragement of the National Research Council working through the Advisory Committee on Artificial Limbs, the courses are intended to provide better technical service to the leg amputee.



REVIEWS

TRANSACTIONS OF THE INSTITUTE OF BRITISH SURGICAL TECHNICIANS, INC.
(Issued July, 1954)
Reviewed by David E. Stolpe, Consultant on Examinations to the American Board for Certification.

The Institute of British Surgical Technicians was founded and established in 1936 by H. Guy Radcliffe Drew, Esq., F.I.B.S.T. "for the purpose of according and maintaining a professional status to those engaged in the Surgical Instrument and Surgical Appliance Industry."

A review of the May, 1953 "Transactions of the Institute" appeared in this *Journal* (September, 1954), wherein was stated the Ethical Code, Rules of Conduct, Qualifications for Membership, the Educational Scheme adopted by the Council, and General Rules of the Institute.

The July, 1954 issue re-states these items, and also records the following:

Minutes of the Annual General Meeting (1953).

"The Dawn of Surgery" by Sir Reginald Watson-Jones, F.R.C.S.

"Scoliosis" by J. I. P. James, Esq., M.S., F.R.C.S.

"The Principle of the Lever in Orthopedics" by Dennis J. Browne, Esq., F.R.C.S.

"The Development of Peroral Endoscopy" by C. Gill-Carey, Esq., F.R.C.S.

"Plastics and their Uses in Surgery with Special Reference to Orthopedics" by Dr. John T. Scales, M.R.C.S.

"Intercranial Angiomata and Aneurysms" by Wylie McKissock, Esq., O.B.E., M.S.

"The History of Splinting" by J. G. Bonnin, Esq., F.R.C.S.

Prize-giving to Apprentices by Professor Sir James Paterson Ross, K.C.V.O.

Dental Section—Objects; Qualifications for Membership.

It is pointed out that new recruits in the Surgical Instrument and Surgical Appliance Industry can make but little progress without an understanding of anatomy, physiology, techniques of the various operations, and correct interpretation of the language of the medical profession.

Emphasis is placed on the need for knowledge of mathematics, physics, metallurgy and the other elementary sciences which are employed in this craft.

It is interesting to note that among the requirements recommended for entrance examination are problems in mathematics and a short essay. Included in the final examination are both an Oral and a Practical test.

Theoretical knowledge without practical work is of little value. Therefore, a degree is not granted until the member has fulfilled a prescribed Course of Education, plus having earned a Certificate from a recognized technician stating he has practiced for a stated period and is a practical and efficient person. A Certificate to the same effect must be produced from a registered medical practitioner for whom he has worked.

A branch of the Institute is being formed in Australia. South Africa reports that the Medical Auxiliary Bill will possibly be put through Parliament this year . . . so only qualified men will be registered and allowed to practice.

In the Report of the Ethical Committee an observation worthy of note

and commendation is the statement that "everyone is carrying on in an ethical manner."

Report was made that the OALMA had provided the Institute with a copy of the training scheme for Orthopedic and Artificial Limb Makers in America. The Institute has agreed to exchange information with the OALMA.

Full details of the Course of Technical Education is found in this volume, which may be borrowed from the Headquarters Library of OALMA and the American Board for Certification by any member of OALMA or a Certified Facility.

HUMAN LIMBS AND THEIR SUBSTITUTES

By Paul E. Klopsteg, Ph.D., Sc.D., Philip D. Wilson, M.D., et al. Published by McGraw-Hill Book Company, New York, Toronto, London, 1954. 844 pages $12.00

(Orders for this book should be sent to: Health Education Dept., McGraw-Hill Book Co., 330 W. 42 St., New York, N. Y.)

Reviewed by: Clinton L. Compere, M.D.

This book, *Human Limbs and Their Substitutes,* has been long awaited by all who are actively participating in the surgical care and prosthetic fitting of amputees. Each of the thirty contributors to the volume is an expert in his subject. The preparation of the material for publication was difficult, as research is continuing with the development of new view points and ideas from day to day.

The book opens with an excellent introductory chapter on the amputee and the problem, by Doctors Klopsteg and Wilson. It is divided into five major sections with a total of twenty-five chapters. All important aspects of surgical preparation of the stump, measurement, and fitting for the upper extremity amputee are covered in detail. It may seem that a disproportionate per cent of the book deals with the upper extremity amputation. This is true only because of the critical need for improvements in design and function of the upper extremity prosthesis, and research attention has been focused toward the accumulation of knowledge with regard to the upper extremity prosthesis and terminal devices. Although I have been active in the research programs for several years, the chapters in the book contain dozens of facts, with clear explanation of techniques, that are new and interesting.

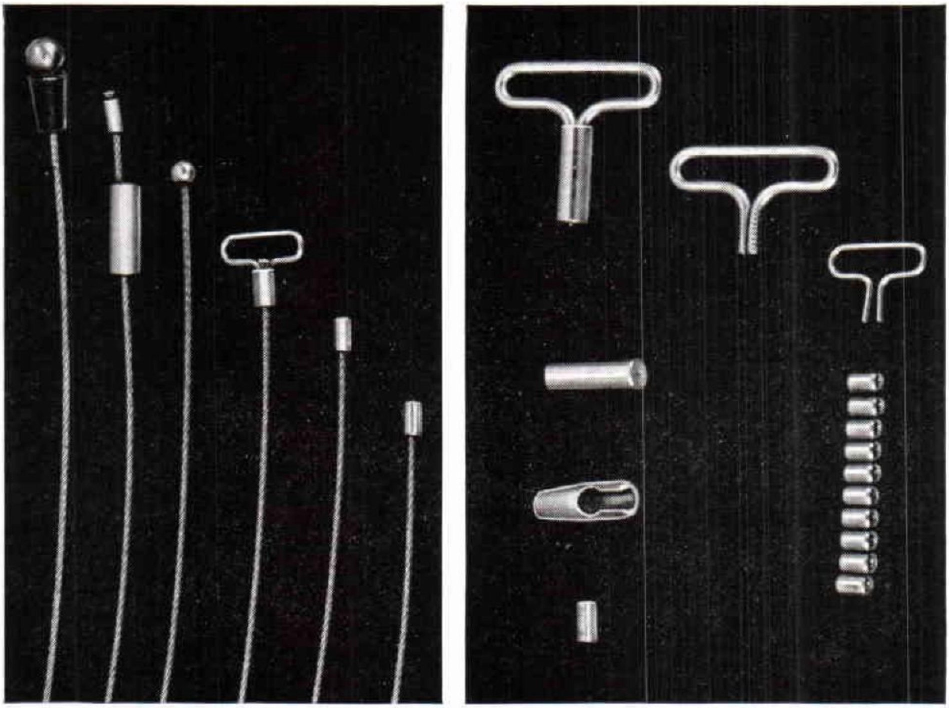
The volume is an excellent reference for prosthetists and surgeons alike. The several chapters covering muscle mechanics, locomotion, and functional structure present scientific data that is essential for a basic understanding of the amputee problem. Certain of the sections, as for instance the one covering the knee joint for above-knee prostheses, present little of value for immediate practical application. The information contained, however, is of direct interest for evaluation of commercially available products and for use in further research development. There has been no effort to cover in detail the special problems that arise with certain categories of lower amputees. The suction socket is covered briefly but completely.

The final chapter of the book describes the evaluation procedures which have been useful in actual practice with the various research projects throughout the United States.

The book as a whole is a monumental compilation of a vast amount of knowledge that has been obtained through hard research effort and the expenditure of large sums of money. Each and every physician, therapist, or prosthetist who treats amputee patients should have this book for study and for use as a reference.

NOTE: *Other book notices will be found on page 71.*

NEW LOW PRICES MAKE SALVAGE of OLD FITTINGS UNNECESSARY



ACCO's new low prices for the Finest Stainless Steel Terminals and Fittings, such as those pictured, make it unnecessary and uneconomical to reclaim old fittings on repair jobs

Now limb shop operators can save time and money, and do a much better job by swaging instead of soldering cable fittings.

Swaging is best . . . it provides 100 per cent bond between cable and terminals . . . there is no acid to corrode the cable and no heat to weaken it.

Swaging is easy to do with the precision swaging tool furnished with ACCO's TRU-LOC Prosthetics Kit.

We have provided precision fittings and assemblies for many years to aircraft and automobile manufacturers. In fact, we pioneered the swaging of fittings to greatly improve assemblies.

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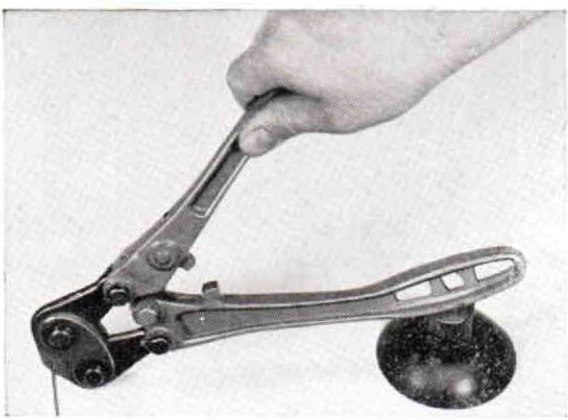
Complete kit contains precision swaging tool with suction cup stand . . . stainless steel cable . . . cable assemblies with ball fittings attached . . . complete line of terminals to be swaged in place at fitting or repair of limbs . . . hangers . . . connectors . . . thumb hook cable assemblies . . . all parts standardized and interchangeable for your convenience.



With this precision swaging tool, it is easy to make the best cable assemblies. The job is simple. There is no fuss or muss . . . no acid or heat to corrode or weaken cable. Complete instructions are printed inside the cover of the TRU-LOC Kit. Adjustments are easy to make. For complete information write to—

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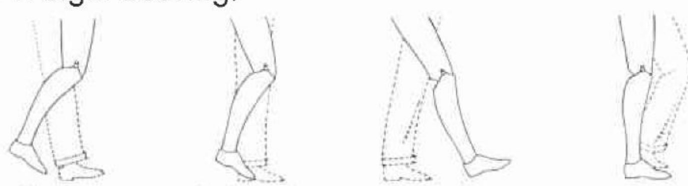
NOW a finished, light weight knee mechanism with Automatic Variable Cadence Control, and Knee Stability on Weight Bearing.



Flexion Control	Automatic Kicker	Extension Damper	Knee Brake
Controlled Swing Phase			Stability on weight bearing

The new Vari Gait Knee provides the above desired characteristics defined by basic research. The Vari Gait was designed and is produced by an Orthopedic Engineer for Fillauer. Already in use by thousands of persons the Vari Gait has been proven to combine practicability with cosmetic design.

Complete range: 3 knee diameters, 8 leg sizes

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Manufacturers of Orthopedic Supplies ESTABLISHED 1914
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ORTHOPEDIC APPLIANCE & LIMB MANUFACTURERS ASSN. MEMBER

REACH FOR THE SKY

By Paul Brickhill. Published by W. W. Norton & Co., New York, 1954. Reviewed by Tom Rhys.

REACH FOR THE SKY is the story of one man's successful fight against the overwhelming difficulty of the loss of both legs at the beginning of a full and promising life. The man is Douglas Bader, who became one of Britain's top air aces in World War II.

This book is a biography which reads like an adventure story. Mr. Brickhill, the author, wields his pen with ease and produces a book which is hard to put away. No punches are pulled and the maudlin sympathy which is so often found in books of this type is entirely lacking. The story is written as it occurred; hard, fast, and moving. This reader was sorry that it ended.

Douglas Bader lost his legs in an air crash in the early thirties at a time when rehabilitation processes were in their infancy. Men who suffered such losses were relegated to a life of semi-invalidism and acceptance of such pensions as governments were willing to bestow. Mr. Bader was not about to accept such a fate. He had always been active athletically and in every other way, and he was determined that he was going to continue. The narrative produces a gripping picture of his fight to succeed in his determination, from the time of the amputation to the culmination of his service as an R.A.F. officer. It is extremely difficult for one who does not know personally of such handicaps to really understand this sort of struggle, yet this book comes close to putting the reader in that position. It seems as if you know Doug Bader personally, and go through every triumph and defeat with him, as you would a member of your family.

Bader's experiences would be more than enough for the ordinary man, let alone one who has lost both legs. He wangled an appointment to an active fighter squadron during the Battle of Britain. During the war he was responsible for the destruction of thirty enemy airplanes. He was shot down, interned in a German concentration camp, escaped twice, was recaptured, and finally sent to Colditz prison.

Mr. Bader is now married, flying his own plane for an oil company around the world to places of company interest, together with playing golf (in the sixties with a handicap of four) and visiting veteran's hospitals whenever possible to give inspiration and help to others in similar circumstances.

The story has all of the prerequisites of a good novel; humor, adventure, sadness, and happiness, and unlike many biographies does not picture the subject as all sinner or all saint, but a man trying to hold his own in life, with faults and virtues, even as you and I.

PUBLICATIONS RECEIVED

Braces, Crutches, Wheelchairs—Mode of Management, by George G. Deaver, M.D. and Anthony L. Brittis, M.D. 61 pages, illus. Published in 1953 by the Institute of Physical Medicine and Rehabilitation, New York University, 400 East 34 St., New York City. Cost $1.00 (NOTE: The preface includes a note of thanks to *John Retzler* and *William Bechtold*, Certified Orthotists, for their helpfulness in supplying braces and technical information).

The Rehabilitation of Industrial Hand and Arm Disabilities; a Series of Papers at the Conference for Compensation Insurers and Physicians, April 1953. Published by the Institute for the Crippled and Disabled, 400 First Ave., New York City. 47 pages. Cost $1.00. NOTE: Among the papers is one on "The Importance of Proper Fitting of an Artificial Appliance" by *Charles Goldstine.*

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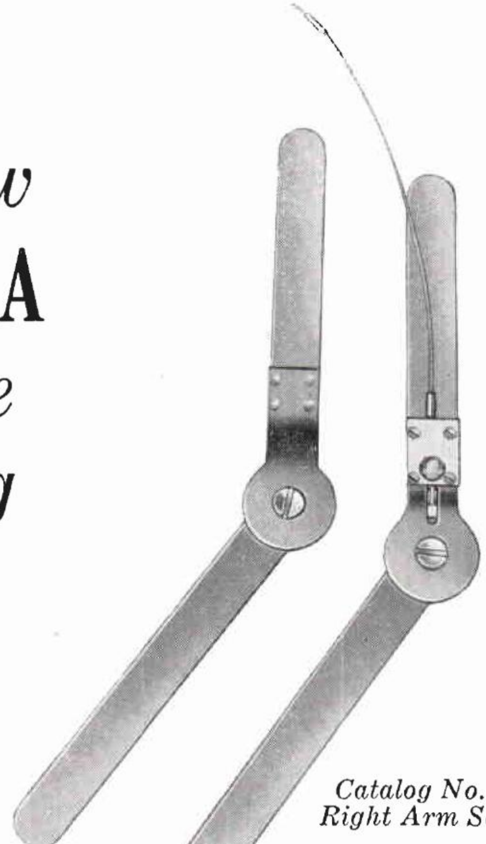

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Right Arm Set

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Left Arm Set

Developed expressly for elbow disarticulation and above elbow cases where there is insufficient room for conventional elbows, the new Sierra Outside Locking Elbow Hinge offers several distinct advantages to the amputee. The Hinge also may be used as functional bracing for flail arms and may find use as a substitute for larger elbow units in the fabrication of children's and women's prosthesis. 5 locking positions, providing maximum strength. Only ¼″ cable excursion to lock or unlock.

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In Memoriam

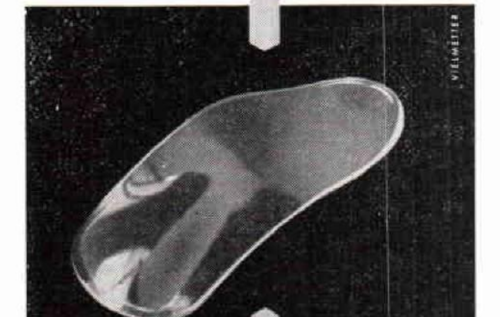
MRS. DOROTHY FAWVER, wife of OALMA Past President, Lee Fawver, died March 13, at her home in Kansas City at the age of 43. Mrs. Fawver was a member of the OALMA Ladies' Auxiliary and was widely known among the membership of OALMA. Funeral services were held March 16 with Mr. and Mrs. Erich Hanicke serving as official representatives of OALMA and the Certification Board.

RAY TRAUTMAN, president of the Minneapolis Artificial Limb Company and pioneer member of the industry, died January 18, at Minneaplis, at the age of 74, after a week's illness. A native of Sleepy Eye, Minn., Mr. Trautman founded his own company in 1914. Under his vigorous leadership, it soon became one of the largest in the world. Mr. Trautman became nationally known for his efforts on behalf of the handicapped, which found practical expression in hiring men who wore artificial limbs, to prove that the men could rehabilitate themselves. He was one of the founders of a Minnesota rehabilitation society which lead to creation of the National Rehabilitation Association, of which he was a life member. Survivors include his wife, Jennie, his son, Lucius, who is vice president of the Trautman organization and now president of the Certification Board; two brothers and a sister. Funeral services were held January 21 with A. P. Gruman and C. E. Medcalf, present as representatives of OALMA and the Certification Board.

A. R. LOFSTRAND JR., Secretary-Treasurer of the Lofstrand Company of Rockville, Maryland, died March 8 in Washington, D. C. at the age of 42. Mr. Lofstrand started the Lofstrand Company with his father in 1936. The plant made a variety of products including the lightweight arm type of aluminum crutch. The company is an Associate member of OALMA.

WILLIAM D. MATHIS, Vice President, of J. E. Hanger, Inc., of Illinois, died January 18, 1955 at the age of 64 after a major operation. Mr. Mathis, a native of Georgia, had been Manager of the Chicago office of J. E. Hanger, Inc. for the past four years. He was fitted with his first artificial limb in 1919 following a railroad accident. Mr. Mathis had a successful business career in spite of his handicap. He had been connected with the artificial limb industry since 1936, when a conversation with Joseph Best of Indianapolis drew his attention to the appliances manufactured by the Hanger organization.

Word has been received of the death June 18, 1954 of JOHN COUCH, pioneer prosthetist. Mr. Couch entered the artificial limb field in 1909 with the E. H. Rowley Company in Pittsburgh, serving that company for many years in Pennsylvania and Ohio. In 1946, he joined the Lehman and Leigh Company, remaining with the firm when it became the Leimkeuhler Limb Company. His employer, Paul Leimkeuhler, praised him as a faithful and hardworking employee. He is survived by his wife Anna, his son Anthony, and his daughters Clara, Elinore and Louise.



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Foot troubles can best be cured by foot supports. For successful orthopedic treatment, however, foot supports should meet special requirements. Besides matching smoothly the outer shape of the foot, they must give the foot the particular support so important for the static-mechanical functioning of the foot bones. ROHADUR can be cut and hot shaped very easily. The plastic being tough yet highly elastic activates the foot continuously. It does not tire the foot, stain the stockings or wear out the shoes. Easy to wash, not subject to corrosion by perspiration, will not break. Let your patients enjoy the wonderful feeling walking on supports made of ROHADUR.

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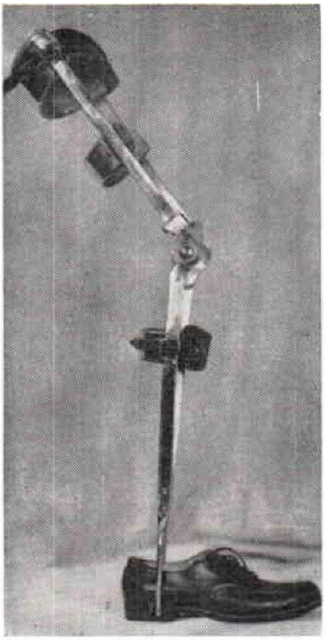
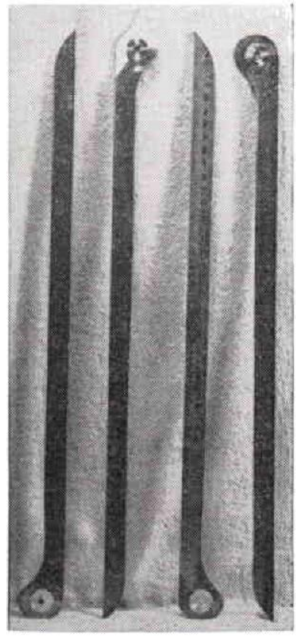


THE FINISHED BRACE



SUPPLIERS SECTION; PAGE INDEX

Our Code of Fair Trade Practices

Below is a digest of the rules governing fair trade practices as promulgated by the Federal Trade Commission, April 1946 and adopted by the American Board for Certification in August 1948.

It is an unfair trade practice:

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

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

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

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

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

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

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

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

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

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

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

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

(13) To wilfully entice away employees of competitors.

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

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

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

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

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

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

Further, the industry desires to be an active and cooperative factor in all progressive developments of improved techniques that will contribute to the welfare and comfort of all who wear its products.