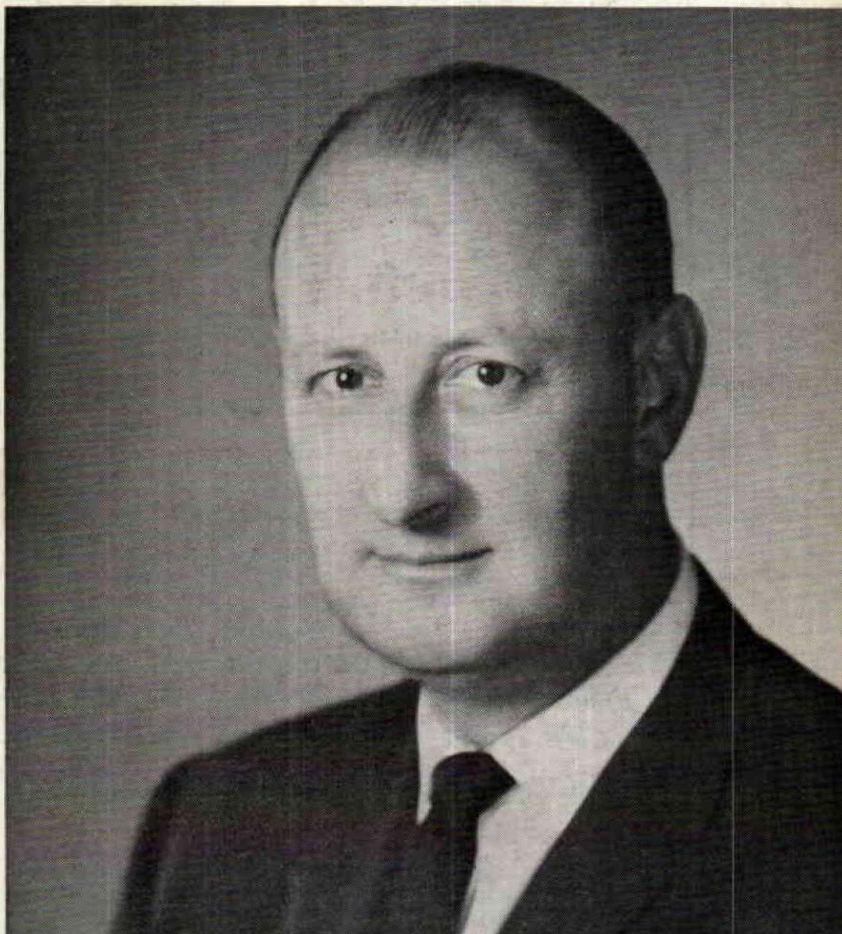
DECEMBER, 1964

ORTHOPEDIC & PROSTHETIC APPLIANCE JOURNAL

The Journal of the Limb and Brace Profession



HERBERT J. HART, C.P.O.

President, 1964-65, American Orthotics and Prosthetics Association

(See pages 307-309)

publisher: American Orthotics and Prosthetics Association

OFFICIAL NOTICE

The 1965 National Assembly of the

American Orthotics and Prosthetics Association

will be held September 1 - 5, 1965

at the Broadmoor Hotel, Colorado Springs, Colorado

FOR PROGRAM DETAILS AND REGISTRATION INFORMATION

write The American Orthotics and Prosthetics Association

919 - 18th Street, N.W., Washington, D. C. 20006

The Assembly is open to all who are interested in the rehabilitation of the orthopedically disabled

REGIONAL MEETINGS OF THE ASSOCIATION FOR 1965

March

March 5-6, Region IV, at Durham, N. C.

March 26, 27, 28, Region VIII, Holiday Motor Inn, Shreveport, Louisiana.

April

April 2, 3 & 4, Region V, Christopher Inn, Columbus, Ohio.

April 9, 10, 11, Region III and POPS, Holiday Motor Inn, Harrisburg, Pennsylvania.

April 30-May 1, Region VII, Kahler Hotel, Rochester, Minnesota.

May

May 6-7, Region I, Charterhouse Hotel, Cambridge, Mass.

May 14, Region II, Americana Hotel, New York City.

June

June 4-5, Region IX, Long Beach, California.

June 11-12, Region X in Northern California.

June 18-19, Region XI at Portland, Oregon.

June 25-26, Region VI, The Flying Carpet, 6465 Mannheim Road, Rosemont, Illinois.

All Your Needs For
ORTHOPEDIC AND PROSTHETIC APPLIANCES
SUPPLIES
Under One Roof

Coutils · Moleskins · Brocades · Elastics
Non-Elastics · Nylon Lacings · Buckles
Tools · Air Foam · Steels · Durane
Vibretta · and the

New concept in fastening

VELCRO®

TRY VELCRO'S SUPERIOR PERFORMANCE ON YOUR ORTHOPEDIC AND PROSTHETIC APPLICATIONS

distributed to the
Orthopedic and Prosthetic Professions
by

L. Laufer & Co.

50 West 29th Street • New York 1, N. Y.

WHEN **only the finest in leather and rawhide will do . . . .** . AMERICAN RAWHIDE MFG. COMPANY

. . . since 1928, specialists in providing that supreme quality of skins required for exacting prosthetic and orthopedic use.

1103 N. NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

you must be satisfied

We welcome the opportunity during this Holiday Season to send our greetings and to thank you for your interest and friendly cooperation. We wish you our very best for your personal well-being and success in your business during the coming year.

Greetings

OTTO BOCK ORTHOPEDIC INDUSTRY, INC.
219 - 14th Avenue North
Minneapolis, Minnesota 55411

Orthopedic and Prosthetic Appliance Journal

(Title registered U. S. Patent Office)

VOLUME 18 • DECEMBER, 1964 • NUMBER 4

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

CONTENTS

LESTER A. SMITH
Editor

STOCKTON V. BANKS
Managing Editor

•

JOURNAL COMMITTEE
William A. Tosberg, Chairman
Herman E. Kraus
Kurt Nelson
R. R. Snell
L. B. Barghausen
Stanley Hedges
Bruce Scott
Lester J. Sabolich
Fred Karg
C. O. Anderson
Robert Horne
Wm. H. Stauffer

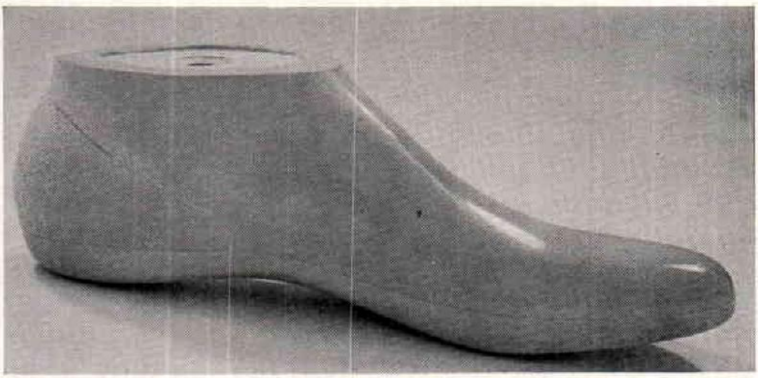
The *Orthopedic and Prosthetic Appliance Journal* is issued in March, June, September and December. Subscription price payable in advance is five dollars a year in the Western Hemisphere, rate elsewhere is six dollars a year. Publication does not constitute official endorsement of opinions presented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

The **Kingsley**

MOLDED

Sach Foot

with Bilt-In quality

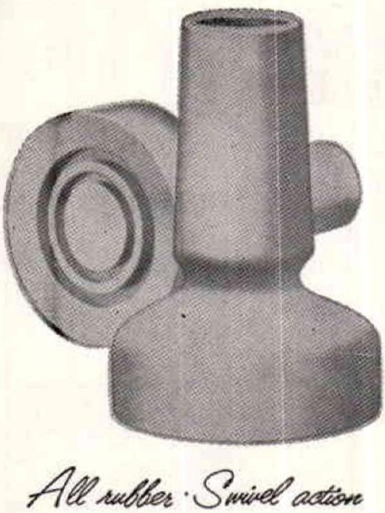


Kingsley mfg, co.

1984 PLACENTIA AVENUE • COSTA MESA, CALIFORNIA

GUARDIAN

SAFE-T-FLEX



SAFETY AND CONFIDENCE FOR ALL WHO USE CRUTCHES

SAFE-T-FLEX — the newest, most advanced design in crutch tips by **GUARDIAN**, a name famous for leadership in quality and design of crutch accessories.

No other crutch tip performs as **SAFE-T-FLEX** — for it *walks with the patient!*

Swivel action of stem on base is one of many exclusive features that provide safe, instant, positive traction. Easy flexion of tip base accommodates angle of crutch shaft eliminating edge rigidity and wear present in conventional tips — makes walking easier for crutch user.

SAFE-T-FLEX virtually eliminates skids or tripping as weight is distributed uniformly over entire contact surface throughout cycle of crutch motion.

No. 404 **SAFE-T-FLEX** Crutch Tip. Base diameter 2 1/2" Height 3 5/8"
Natural tan color. Fits sizes 18 (3/4"), 19 (7/8"), and 20 (1") crutch shafts.

GUARDIAN

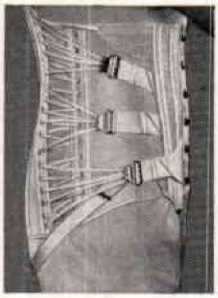
GUARDIAN PRODUCTS COMPANY
8277 Lankershim Blvd.
North Hollywood, California

AOPA COMMITTEE ON ADVERTISING AND SUPPLIES

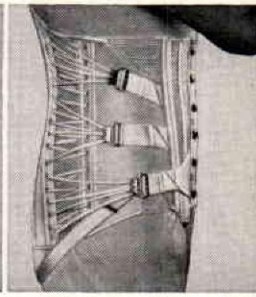
Charles Dankmeyer, Chairman, Baltimore, Md.
Armand Roy, Burlington, Vermont
John Hinnant, Charlotte, N. C.
Howard Reinherz, Kenosha, Wisc.
Lucius Trautman, Minneapolis, Minn.
Charles Kymes, San Antonio, Texas
Edward L. Jachowski, Phoenix, Ariz.
Harold Lloyd, Reno, Nevada
Lenart Ceder, Tacoma, Washington
Norris Menzies, Fredericton, Canada

INDEX TO ADVERTISEMENTS — DECEMBER, 1964

check
this
BEST-SELLER
by
CAMP



with
variations
to fit
any
figure

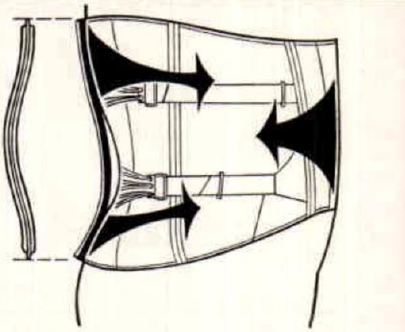


MODEL 267 LUMBOSACRAL SUPPORT—best-selling men's orthotic support in the world. Made of sturdy cream canvas, with triple side adjustment, Magic-Web lacing, convenient snap-button front closing, and four nylon casings for insertion of steels.

MODEL 262
shorter version.

New

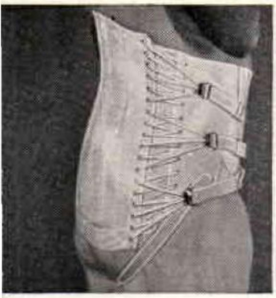
. . . and true to the same tradition of design and manufacturing leadership that has made Model 267 a pace setter in sales:



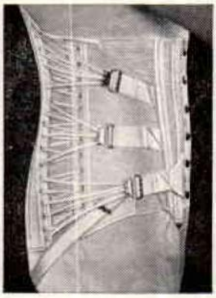
Used with either shaped steels or our reinforced pad, the garment provides a three-point suspension that supports the spine in a flexed position to rest and control it more effectively.

HOW THE CAMP BRAND-NAME .

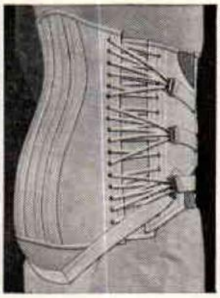
Recognition of the Camp brand-name helps to sell fine men's supports. Doctors, for example, recognize Camp as a leader—nearly 60 years a leader—in research, development, and skillful manufacturing of dependable supports and appliances. This, in part, explains why so many are prescribing Camp. (An independent survey of men wearing supports has shown that 59% wore Camp, as recommended by their doctors.) Another important reason why doctors recognize this brand-name is that Camp keeps them well-informed: Carefully sustained advertising and merchandising programs continually remind them of various products—helpfully,



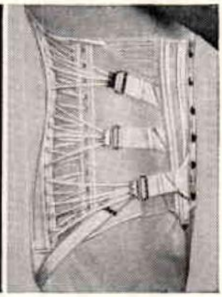
MODEL 263
shorter front and longer back.



MODEL 264
white, cotton warp sateen.



MODEL 265
white, cotton warp sateen; cut to fit fuller hip.



MODEL 9267
white, dacron and cotton mesh.

Model 172—combined sacroiliac, lumbosacral, abdominal support for men.

HERE'S FUNCTIONAL-DESIGN VERSATILITY THAT OPENS UP NEW OPPORTUNITIES FOR MEN'S SUPPORT SALES: **(1)** sturdy canvas panels hug body for correct fit without perineal straps **(2)** cupped front provides excellent pendulous abdomen support, with snap-button center-front closing for convenience **(3)** Magic-Web adjustment assures precise degree of support prescribed **(4)** twin boning provides added support and comfort **(5)** nylon casings for insertion of steels when prescribed by doctor.

HELPS SELL MEN'S SUPPORTS!

authoritatively, convincingly. Still another basis for doctor *and consumer* recognition is Camp product performance, proven countless times. Try to imagine how many times Model 267 must have proven its performance as the biggest-selling men's orthotic support in the world! Doctors, dealers, and consumers alike recognize the superiority of this lumbosacral model. They know, too, that the company creating a support as effective as Model 267 can be trusted in the prescription or purchase of any orthotic support. And that's how the Camp brand-name can help to sell—can help *you* sell—the most extensive selection of men's supports on the market.

CAMP
TRADE MARK

S. H. Camp and Company, Jackson, Michigan 49204

S. H. Camp and Company of Canada Ltd., Trenton, Ontario
S. H. Camp and Company Ltd., London, England
Camp Scandinavia AB, Sundyberg, Sweden
Corset-Scharer, G.m.b.H., Lucerne, Switzerland
Bandage en Corset-industrie BASKO, Amsterdam, Netherlands
Berlei, Ltd., Sydney, Australia
Berlei (NZ) Ltd., Auckland, New Zealand

DOW CORNING

SILICONE RUBBER

and all needed primers,

adhesives, thinners, etc.

for contour-molded limb

prostheses distal pads and liners

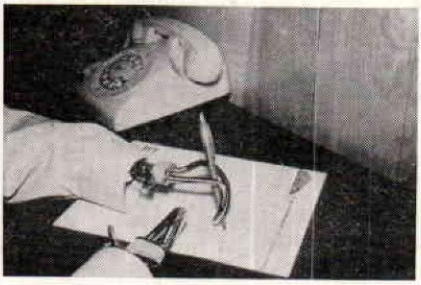
Prompt delivery

A. J. HOSMER CORP.

CAMPBELL, CALIF.
P.O. BOX 37

CINCINNATI, OHIO
P.O. BOX 6117

DORRANCE



Always Ready
to
Serve You
FAST

Telephone: 408-378-4366

D. W. DORRANCE CO., INC.

541 Division St.

Campbell, California 95008

THE RED BOOK

OF ANATOMICAL SUPPORTS

IT'S YOURS FOR THE ASKING...

. . . this fully illustrated reference catalog, with most helpful informative text covering the complete Truform line of

- ORTHOPEDIC APPLIANCES
- SURGICAL SUPPORTS
- ELASTIC HOSIERY
- SPECIALTIES

Write Today for your "Red Book"

Truform . . . available only from the Ethical Appliance Dealer

TRUFORM®

anatomical supports

3960 Rosslyn Drive, Cincinnati, Ohio 45209
Branches: New York, San Francisco, Texarkana

READY TO FIT HAND, WRIST AND FINGER BRACES, CERVICAL BRACES, TRAINING AIDS AND SPECIAL APPLIANCES – PLUS A COMPLETE LINE OF SPINAL AND LEG BRACES CUSTOM MANUFACTURED TO YOUR MEASUREMENTS.

COMPLETE CATALOG AVAILABLE ON REQUEST

C. D. DENISON ORTHOPEDIC APPLIANCE CORP.
220 W. 28th Street – Baltimore, Md. 21211

GIVE YOUR AK AMPUTEE FIVE NEW FREEDOMS WITH THE PROGRAMMED KNEE . . . HERMES®!

FREEDOM TO WALK AT ANY SPEED. The Hermes hydraulic control unit automatically controls heel rise and extension. It selectively controls each part of the swing phase to give an amputee a most natural appearing gait over a wide range of gaits in all kinds of weather.

FREEDOM FROM EXCESSIVE WEIGHT AND BULK. The Hermes weighs less than 12 oz. and is smaller than a normal flashlight. Now you can reduce the overall weight and size of the prosthesis as desired. You can also now more easily fit long stumps, extended almost to the knee bolt, as well as the smaller amputee with thin, short shank.

FREEDOM FROM OIL STAINED CLOTHING. In the Hermes hydraulic seals are isolated from high hydraulic pressures. Mirror-like sealing surfaces are protected from outside contamination (a frequent source of fluid leakage). Remember — only the Hermes gives this freedom!

FREEDOM FROM FREQUENT MAINTENANCE. The high strength of the Hermes and its freedom from fluid leakage provides a dependable, long life.

Even the Hermes uses some fluid in lubricating the piston rod (about 0.0003 oz. per mile) but this need cause no concern as the amputee has ample warning well in advance of any noticeable change in walking characteristics. He can plan a convenient visit to his prosthetist who can have an exchange unit on hand. After all, this is no problem when only a single size is required to fit all amputees and the exchange requires less than five minutes.

FREEDOM FROM INCONVENIENCE. Special silicone fluid and internal Hermes design ignore weather and the amputee doesn't need to adjust his prosthesis every time the thermometer rises or falls.

The Hermes "hydraulic brain" plans for sitting comfort, too. The amputee no longer needs to manually retract his foot after sitting to avoid a traffic hazard. The energy storage spring performs this function for him.

A WINNING COMBINATION . . the Hermes *plus* the Precision Boring Fixture.

The skilled prosthetist enjoys great flexibility in using the Hermes. He may use a factory modified setup. By using the Precision Boring Fixture he may install the Hermes in many existing prostheses; or, he may install it in any compatible setup he prefers.

Selecting the Hermes itself is simple . . . there's only one size. Now the prosthetist can have units on hand for immediate installation.

If you missed us at AOPA write now for free literature!

DUPACO

205 N. Second Ave.
Arcadia/California

Isle FUNCTIONAL SUPPORTS

LUMBOSACRAL—SACRO-ILIAC ABDOMINAL—RIB—HERNIA

A concise line... selected popular numbers... minimum inventory for prescription fittings.

LUMBOSACRAL CORSET

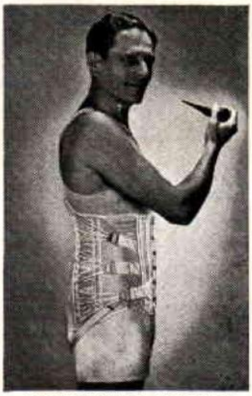
Ladies' Men's

Fine strong fabrics . . .
and workmanship!

Features— • continuous lacing... buckle and strap adjustment
• lumbosacral supports have nylon casings attached and steel bars.

Ask for brochure and price list.
Aids for doctor detailing.

Sold only to Orthotic and Prosthetic Facilities



LUMBOSACRAL SUPPORT

Prosthetic & Orthotic Supplies . . . Distributor
Kingsley • Otto Bock • Sierra • Fillauer
Hallmark • Bauer & Black • Sacro-Ease
Burlington Support Stockings • Comfort Aids

Your orders and inquiries get immediate attention at Knit-Rite

KNIT-RITE

FINEST WOOL STUMP SOCKS

FREE Sales Aids

- ***Price Folders***
- ***Posters***
- ***"Take One" Boxes***

COMFORTABLE . . . Smooth thickness and resiliency to cushion the stump from shock.

SOFT . . . Every Knit-Rite Stump Sock is flawless, smooth, absorbent, downy soft.

DURABLE . . . Knit-Rite Stump Socks retain their elasticity and softness through repeated washings.

KNIT-RITES . . . since 1925 . . . amputee preferred! Sell fresh Knit-Rite Stump Socks for the ultimate in walking comfort.

THE KNIT-RITE *Company*

1121 GRAND AVE. KANSAS CITY 6, MISSOURI
TELEPHONE BA 1-0206

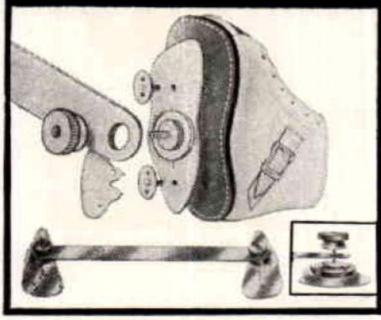
2

SPLINTING IS NOW SIMPLER... ...EASIER...LESS COSTLY

with the

TARSO® SPLINT ADAPTOR by MARKELL

the splint screws on in a minute!



We set two little inconspicuous screw holes into the sole of each Tarso Pronator® and Tarso Medius® open toe boot. Using the screws and wrench that we supply free of charge, you can attach a splint, or remove it, in just about a minute.

This is the Splint Adaptor: It is ideal for intermittent or continuous splint application. Splints don't have to be riveted on, and attachment is easier and stronger than it is with the relatively costly clamp-on splints.

The sturdy inexpensive #140 Tarso Splint is available with drilled-to-fit holes for use with the Splint Adaptor. Steel screws and bushings assure that splints will fit tight and stay tight.

Splint Adaptor shoes are beautifully made of top grain leather and fully lined with soft seamless glove leather. Soles are Goodyear welted for firmness and shape retention. Tongues are semi-detached for wider opening and smoother fit. These shoes are designed to be used for all pre-walker applications. The Splint Adaptor is included in case it is needed, at no additional cost to the patient.

TARSO PRONATOR® Open Toe Boot Mild Abduction Last

#5790

TARSO MEDIUS® Open Toe Boot Straight Last

#1643

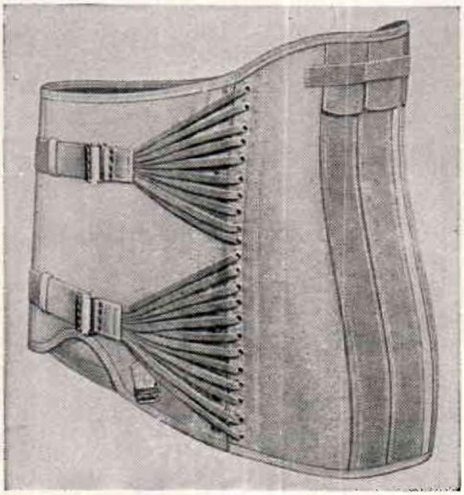
TARSO PRONATOR® Open Toe Boot Full Abduction Last

#1934

Tarso® Shoes by Markell are in-stock and are sold through the finest shoe stores and brace and limb houses throughout the United States and in Canada.

Write for our catalog and price list.

MARKELL SHOE COMPANY, INC.
504 SAW MILL RIVER ROAD, YONKERS, NEW YORK



The Kendrick Sacro-Lumbar Supporter Style No. 0159 with 14" back. Style No. 0160 is identical, with a 16" deep back. Both are available with garters for women.

Designed to Help... Sales

Show your customers how a Kendrick Sacro-Lumbar Supporter can help them regain an active life. Point out the extra long back — 14" or 16" deep — that offers firm corrective comfort to the entire sacro-lumbar region . . . especially important after removal of casts following a back injury. Show them the four wide, curved stays that run parallel to the spine . . . how they are shaped to individual requirements . . . and easily removed for garment laundering. Medial front fastening, with snap fasteners reinforced by hook-eyes.

Tell them how the Kendrick Sacro-Lumbar Supporter is specifically designed to meet demands of leading Orthopedic surgeons . . . and backed by 100 years knowledge and experience in designing and manufacturing corrective garments.

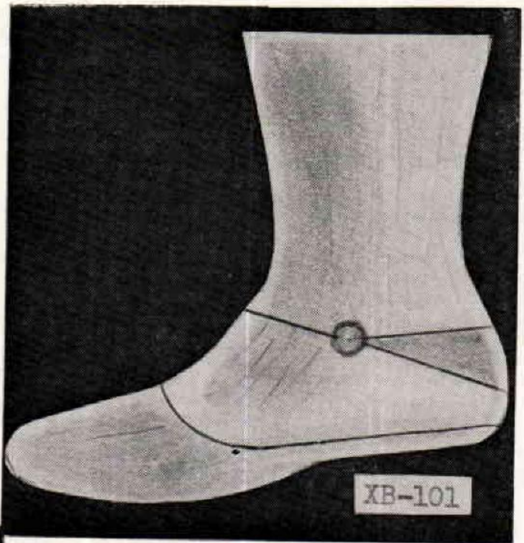
JAMES R. KENDRICK COMPANY, INC.
Philadelphia 44, Pa. New York 16, N. Y.

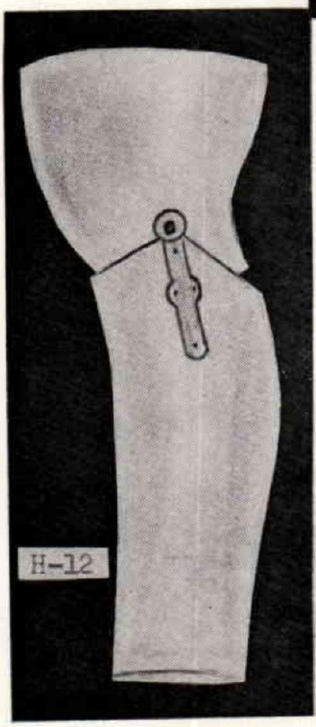
Kendrick
SINCE 1853

TWO NEW ITEMS

SINGLE AXIS FOOT SET-UP with pure gum rubber sole. Ball bearing ankle joint. Unsurpassed for walking comfort.

MEN'S SIZES 6-12





THIS NEW KNEE-SHIN SET-UP

features . . .

- Centerless Ground Knee Bolt
- Plastic Bushings
- New Frictions
- Reinforced Knee
- Five Calf Sizes
- Extension Aid Optional

Complete Suppliers To The Prosthetic Industry:

THE OHIO WILLOW WOOD COMPANY

MT. STERLING, OHIO

Realastic® LEG COVER

FOR ALL YOUR ARTIFICIAL LIMBS

Maximum Protection
Maximum Economy
Maximum Cosmesis

NEW EASY TO USE INSTALLATION METHODS

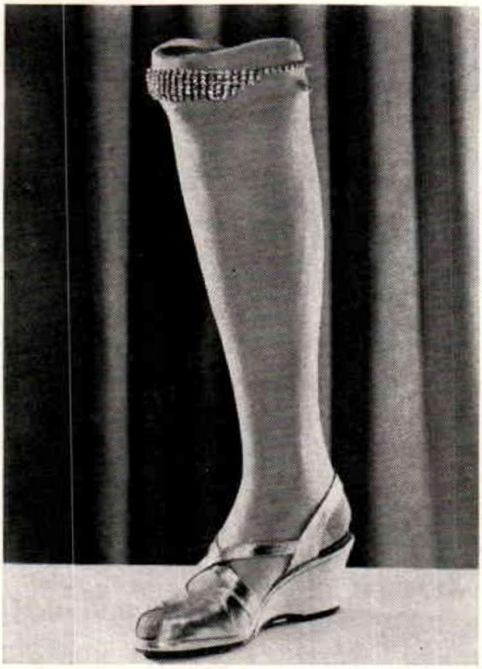
EXPANSION

ROLL - ON

PULL - ON

Cement at Top With

B-Bond
or
B-Tape



Obtainable also from:

The Knit-Rite Co., 1121 Grand Ave., Kansas City 6, Missouri

Pel Supply Company, 4623 Detroit Ave., Cleveland 2, Ohio

PROSTHETIC SERVICES OF SAN FRANCISCO

DO 2-7341

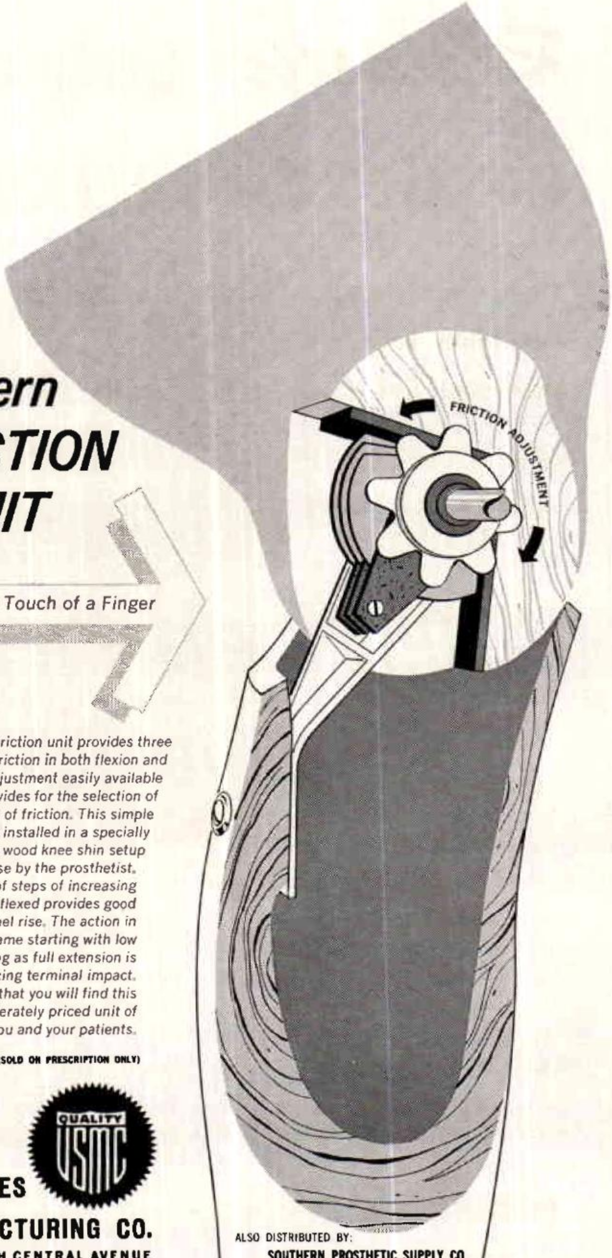
46 SHIPLEY STREET, SAN FRANCISCO 7, CAL.

"LOOKS REAL IT LASTS"

MAKERS OF Realastic® RESTORATIONS

northwestern A/K FRICTION UNIT

Cadence Control at the Touch of a Finger



The Northwestern Friction unit provides three stages of increasing friction in both flexion and extension. One adjustment easily available to the amputee provides for the selection of the overall level of friction. This simple mechanical unit is installed in a specially designed single axis wood knee shin setup ready for use by the prosthetist.

The application of steps of increasing friction as the knee is flexed provides good control of heel rise. The action in extension is the same starting with low friction and increasing as full extension is reached greatly reducing terminal impact.

We feel certain that you will find this high quality moderately priced unit of great benefit to you and your patients.

(SOLD ON PRESCRIPTION ONLY)

QUALITY USMC

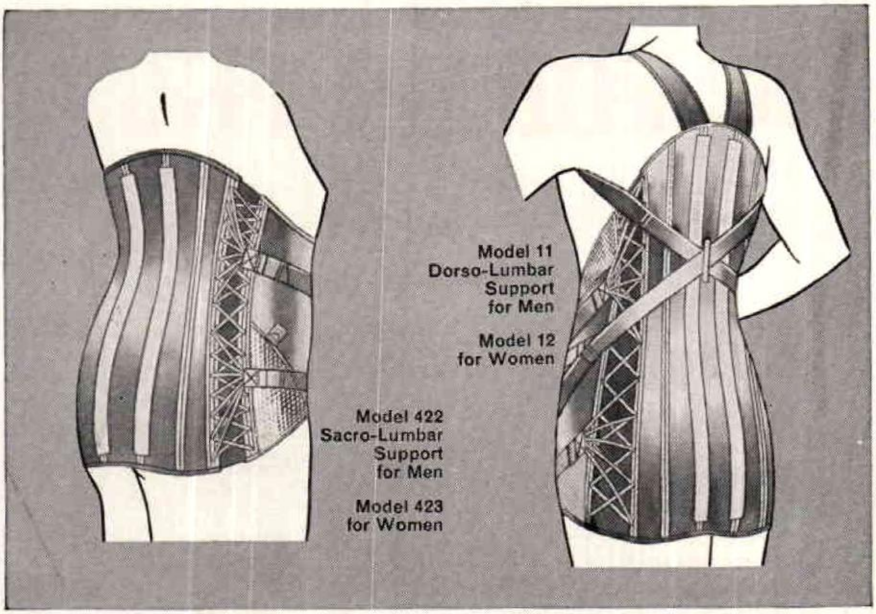
UNITED STATES MANUFACTURING CO.

623 SOUTH CENTRAL AVENUE
GLENDALE 4, CALIFORNIA, U.S.A.

ALSO DISTRIBUTED BY:

SOUTHERN PROSTHETIC SUPPLY CO.
947 JUNIPER ST. N.E. • ATLANTA 9, GA.

MINNEAPOLIS ARTIFICIAL LIMB CO.
410 PORTLAND AVE. • MINN. 15, MINN.



the Quality is Unequalled ...so is the Markup

STOCK ORDERS SHIPPED IN 48 HOURS

You'll find sales features galore in Freeman surgical supports. Low, low dealer prices, too!

Cool, soft velveteen lining and stay covers make these the most comfortable supports yet. Exteriors are available in a wide range of fabrics including canvas, dacron mesh, dacron and brocade. Each support, of course, is always put together with famous Freeman needlework.

Freeman supports have been developed and perfected in 70 years of close association with the medical profession. That's one reason why doctors recommend them.

Always fast delivery. On special request orders will be shipped the same day they are received.

Freeman

SELL
FREEMAN
WITH
CONFIDENCE

WRITE FOR FREE CATALOG — FREEMAN MFG. CO., Dept. 312, STURGIS, MICHIGAN

New! FORMO-PED®

Inlay Shoes

Ideal Footwear for Sufferers from

WEAK ARCHES · BUNIONS · HAMMER TOES · ENLARGED JOINTS
METATARSAL TROUBLES · POST OPERATIVE

A new concept for men, women who can't be comfortable in ordinary stock shoes . . . yet don't require custom-made footwear. Smartly-styled outside, uniquely designed inside for maximum protection and all-day walking ease.

Gives natural support to arches. Has extra roominess that allows absolute freedom and natural movement. Impresol® Cushion guards tender areas. Easy to fit as standard measurement shoes.

REMOVABLE MOLDED CORK INLAY

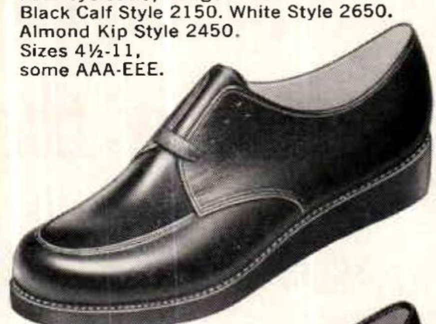
gives correct support, helps distribute weight properly. Can be ground or filed to accommodate abnormalities.

SELF-MOLDING IMPRESOL® CUSHION

cloud-soft, leather covered. Cushions, absorbs shock. Yields to projections, eliminates painful pressure and friction. Shapes itself to bottom of foot. *Like walking in your own foot prints!*

WOMEN'S:

Four-eyelet tie, wedge rubber sole.
Black Calf Style 2150. White Style 2650.
Almond Kip Style 2450.
Sizes 4½-11,
some AAA-EEE.



Wholesale
$16⁵⁰

MEN'S:

Two-eyelet Calf oxford.
Wedge rubber sole. Black
Style 5076. Brown Style 5476.
Sizes 6-15, some A-EEE.

THE SCHOLL MFG. CO., INC.
213 West Schiller Street, Chicago 10, Illinois

Southern **PROSTHETIC SUPPLY COMPANY**

P. O. BOX 7443 · ATLANTA, GEORGIA

History

Southern Prosthetic Supply Co. was founded in 1952, to distribute prosthetic supplies to the South. It is affiliated with the Southern Hanger Companies. Now orthopedic supplies have been added and we offer complete service to the prosthetic and orthopedic manufacturer.

Personnel

Dan McKeever

Howard Thranhardt

Montez Harp

While it takes many people to make up a company we handle management, production and sales. Together we represent more than 60 years of experience in retail and wholesale prosthetics.

Charles White

Location

Atlanta is one of the great distribution centers of the country. A rail center before the Civil War. A highway center and now one of the largest air terminals.

Supplies can be shipped to most points in the East, Mid West and South overnight or by the second day.

Service

Through the experience of our retail affiliations we know what is needed by the orthopedic and prosthetic manufacturer.

All this we can supply

Methods • Materials • Components • Complete Appliances

Biomechanical Considerations in the Design of a Functional Long Leg Brace*

By MILES H. ANDERSON, Ed.D.

Director, Prosthetics-Orthotics Program, School of Medicine, University of California, Los Angeles, California

NOTE: *This is one of the articles reviewed by the Committee on Advances in Prosthetics and Orthotics, Fred J. Eschen, Chairman. The Committee has asked that it be published for the information of orthotists and prosthetists.*

Abstract

A fund of knowledge and experience exists in the field of biomechanics which should provide sufficient foundation for design of a lower extremity brace offering restoration of function for the paralyzed leg. This paper sets forth the rationale through which such a brace and its component parts were developed, and gives a brief explanation of the techniques required for its application.

Introduction

The two primary functions of the lower extremities are to support the weight of the body and to propel the body. If there is functional loss through paralysis, there are many ways of providing support and propulsion —the wheel chair for one example—but the average individual has a strong preference for those methods which most closely resemble normal locomotion. That is to say, he wants to continue to use his legs even though one or both may no longer be capable of support or propulsion. This implies the need for an assistive device—a brace.

Paralysis of the muscles which act to flex or extend the hip, knee, and ankle not only implies the loss of a propulsion motor, but the loss of stable supporting structure as well. Until about two years ago, all methods of getting the paralyzed individual "back on his feet" were aimed at providing stable support and almost routinely sacrificed mobility in order to do this. Stability was provided either through surgical fusion of the joint, or through the mechanical equivalent in a leg brace with a locked knee or ankle. This provided good stability but poor propulsion.

A truly biomechanical approach, rather than a purely mechanical one, would provide both support and propulsion and would not require the sacrifice of one in order to obtain the other. Biomechanical principles from both normal locomotion and above-knee prosthetics were utilized to develop a design for a long leg brace including both the primary functions of the lower extremities.

The Purpose of the Long Leg Brace

In normal human locomotion, the muscles of the lower extremities perform three major functions: They accelerate, decelerate, and stabilize the limb and its various segments. When part or all of the muscles of one

* Reprinted by permission of the author and publisher from *Biomedical Sciences Instrumentation,* Vol. I, published by Plenum Press and the Instrument Society of America.

or both of the lower extremities are paralyzed by disease or trauma there is a decrease in stability, as well as in the ability to accelerate and decelerate the limb segments. In cases where the degree of paralysis is moderate, the patient may be able to walk with a gait adapted to his impediment, as when knee stability is obtained by locking the joint into extension. However, if the impairment is such that gait adaptations and the use of crutches or canes are insufficient to provide stability, the knee joint will collapse and the patient will fall and possibly injure himself if he attempts to walk. These patients must either stay in wheel chairs or wear long leg braces.

Long Leg Brace Compared to Above Knee Prosthesis

The above-knee amputee wearing a well-fitted quadrilateral suction socket prosthesis with hydraulic knee control, if given proper gait training, can walk with a very natural gait and little more consumption of energy than a normal person. The unilateral paralytic wearing a locked-knee long leg brace cannot walk nearly that well, and uses far more energy. It would seem reasonable to believe that some of the biomechanical principles of above-knee prosthetics could be used in the design of a long leg brace so that the paralytic could exhibit a more normal gait pattern with conservation of energy, and at the same time enjoy the advantages of walking with a free-swinging knee and alignment stability.

While the amputee has lost his leg above the knee, he usually retains the use of powerful hip muscles to a large degree, whereas the paralytic may have a completely flail leg from the hip down, with no active muscles at all. Others may be able to flex the hip but not extend it, or vice versa. Others can adduct the hip, but not abduct it, or vice versa. There may be various combinations and degrees of these dysfunctions ad infinitum. The above knee amputee uses his hip muscles to control his prosthesis, so designing long leg braces for paralytics who may exhibit great varieties of combinations of muscle strength is more complex in many ways than the designing of above-knee prostheses. Nevertheless, it is possible to design and build a functional long leg brace for a patient with no active hip musculature and a completely flail leg, and train him to walk with a free swinging knee and greatly improved gait. Such a patient will never walk as well as an active above knee amputee who has a well-fitted prosthesis and is trained in its use, but he will do much better than is possible with a conventional knee-lock long leg brace.

The key problem in both above-knee prosthetics and in functional long leg bracing is to provide adequate knee stability, particularly between heel strike and mid-stance, during which phase of gait a number of factors combine to make the knee joint tend to collapse. In an above knee prosthesis, knee stability is obtained through minimizing resistance to plantar flexion of the ankle at heel strike, through the hip extension force exerted by the amputee, and by the alignment, which is so arranged that the knee center is slightly posterior to the vertical line between the trochanter and the ankle center. All of these factors tend to either reduce flexion forces on, or to actually extend the knee joint, thus preventing it from collapsing.

How the Functional Long Leg Brace Works

The functional long leg brace is made up of the following components: A plastic thigh shell, similar in appearance to the upper portion of an above knee quadrilateral socket; solid bar aluminum uprights to connect the shell to the knee joints; ball bearing knee joints, with one joint lever directly in line with the bearing, the other offset one inch; solid bar aluminum uprights

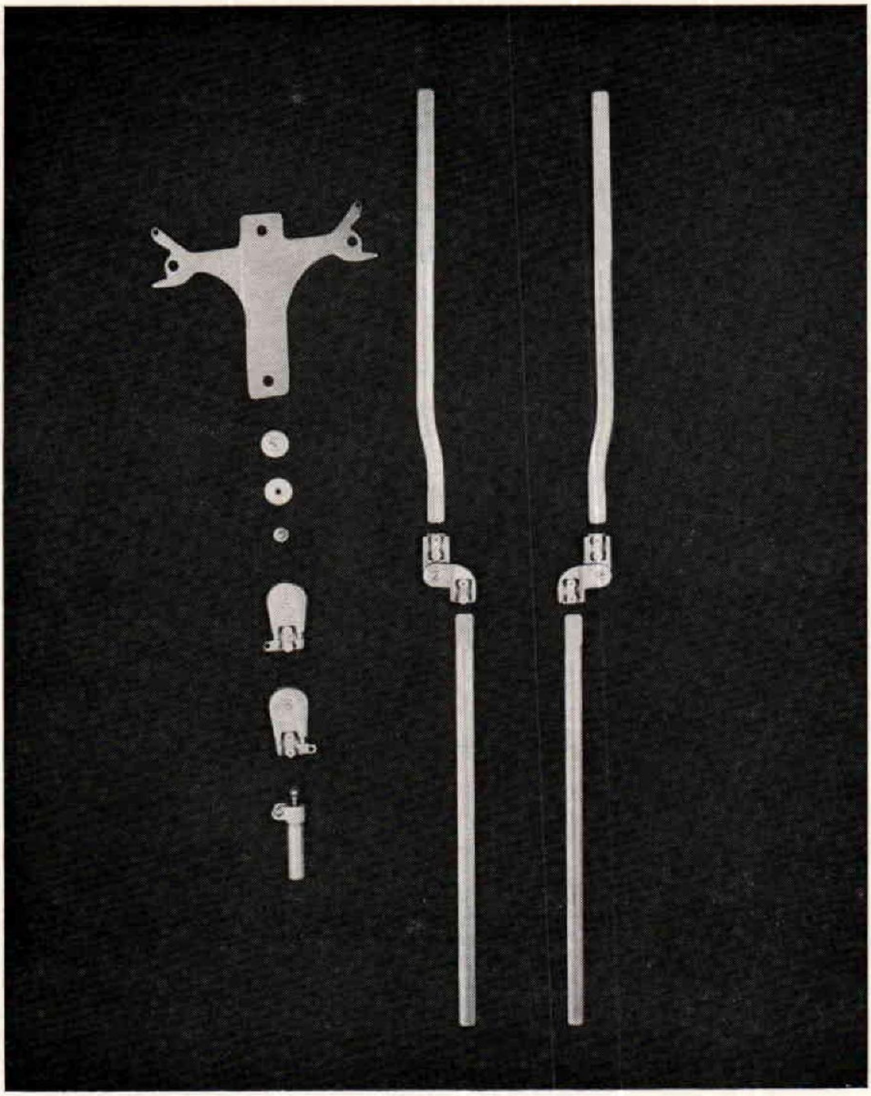


FIGURE 1

to connect the knee joints with the ankle joints; a plastic pre-tibial shell; a dacron pre-tibial cuff with Velcro fastener; heavy duty ankle joints with adjustable stops; a hydraulic damper to provide resistance to ankle dorsiflexion (optional); and a one-eighth inch thick stainless steel foot-ankle section with an anterior extension four inches long and two inches wide. (See Figures 1 and 2).

It will be easier to understand how the functional long leg brace functions if we analyze its action as the patient walks. To do this we have to have some means of identifying the activity we call walking. We will arbitrarily divide a single forward step into five phases, illustrated in Figure 3. The first phase we call "Push-off," shown in "A." Next, the knee and hip flex and the limb swings ahead, so we will call the second phase "Swing,"

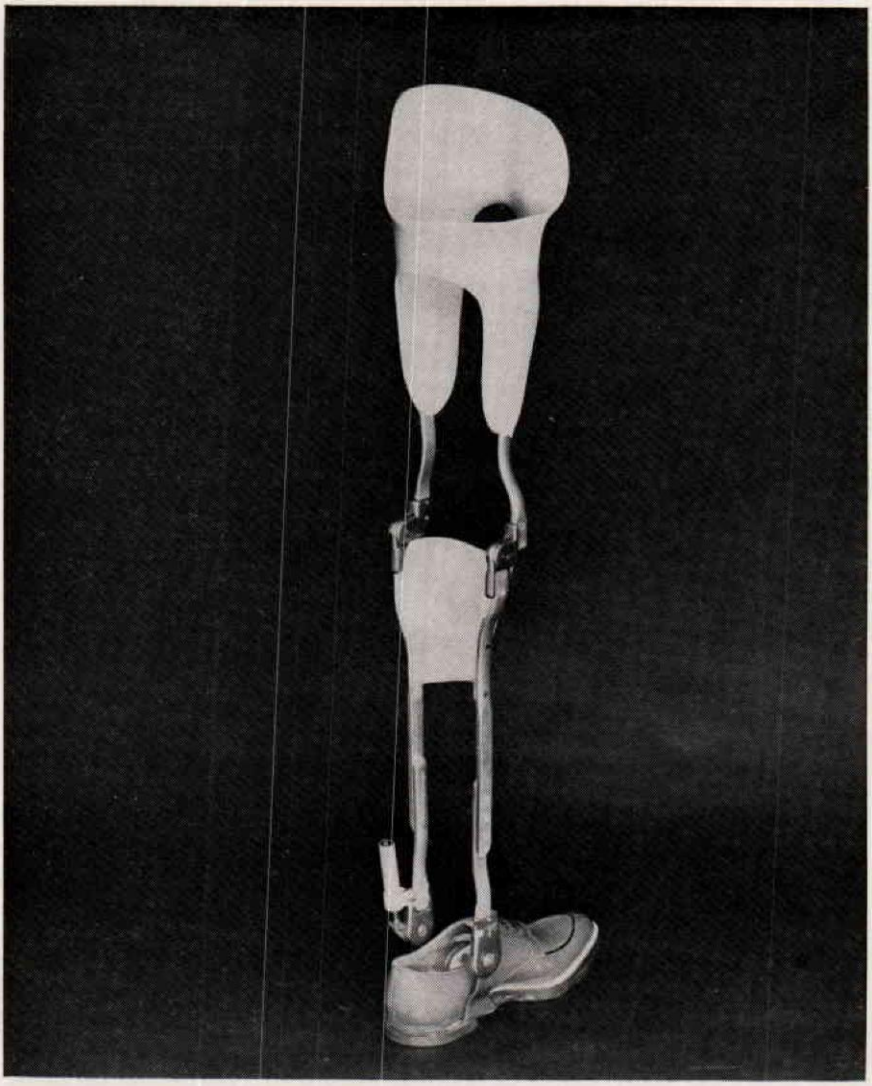


FIGURE 2

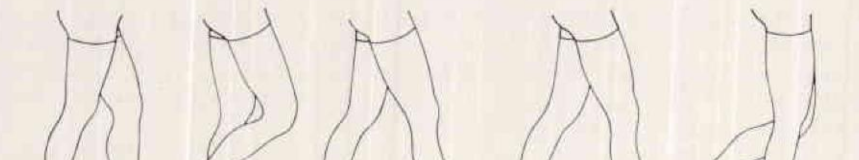


FIGURE 3

shown in "B". At the end of swing, the heel strikes the floor, so we call the third phase "Heel strike," shown in "C". An instant after heel strike the sole of the shoe comes flat onto the floor, so we will call the fourth phase "Foot flat," as in "D". The shank is still not vertical, and the movement to the vertical position from foot flat is the fifth and a very critical phase of the walking cycle. We will call the vertical position of the shank "Mid stance," shown in "E", from which the person goes on to push-off and the cycle is repeated. (This is an arbitrary breakdown of the walking cycle designed for use in describing the action of the functional long leg brace only).

To understand how the brace functions it is necessary to analyze its action in each phase of the gait cycle. At push-off the patient flexes his extended hip to bring the thigh shell forward, causing the knee joint to flex as the entire leg starts to swing forward. If the hip flexors are too weak to initiate this movement, the patient is taught to accomplish it by using his abdominal muscles to raise the hip on the affected side so gravity can cause the leg to enter the swing phase of the gait cycle. This movement, accompanied by pelvic rotation or thrust, which causes the ischial tuberosity to exert a downward force on the ischial seat of the thigh shell, will cause the hip and knee to flex and swing the leg forward. In the illustration, Figure 4, the patient has initiated his stride and is midway between push-off and swing phase. Elevation of the hip at this instant would bring the foot off of the floor and add the force of gravity to the swing of the lower leg.

During swing phase of the gait cycle, because of the inertia of the shank, the knee flexes between 45 and 60 degrees, and thus shortens the effective length of the leg enough to prevent the toe of the shoe from scraping the floor. If the hydraulic damper is used, it prevents the ankle from quickly plantar flexing, which also helps keep the toe from scraping. Of course, the presence of any active ankle dorsiflexor muscles also contributes to the lessening of this problem.

At heel strike the weight of the body on the lever arm between the ankle joint and the heel will cause a torque to develop around the ankle joint which tends to move the shank forward, causing the knee to collapse. To prevent this force from becoming sufficiently great to cause the knee to collapse, it is necessary that the foot move from heel strike to foot flat

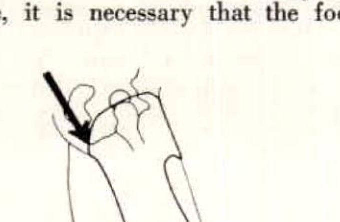


FIGURE 4

FIGURE 5

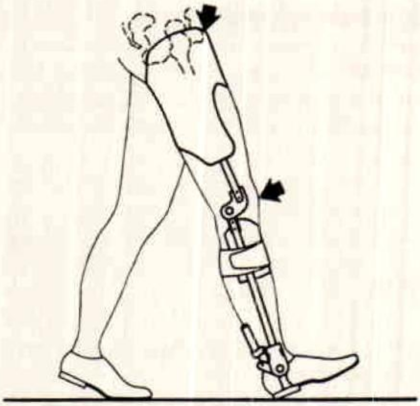


FIGURE 6

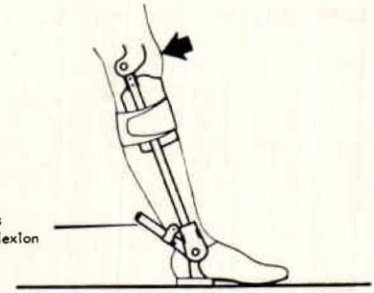


FIGURE 7

with as little resistance to plantar flexion as possible. The amount of plantar flexion with the average patient taking a normal stride is approximately 20 degrees, so the stops on the ankle joints must permit an equal amount of motion or serious knee instability will result. (See Figure 5).

In the absence of active hip extensors, the most significant knee stabilizing force between heel strike and foot flat is provided by pressure of the patient's abdomen and pelvis on the anterior brim of the thigh shell. This force is downward on the anterior brim, and since this is at a point well ahead of the attachment points of the uprights, there is a lever action which tends to force the uprights back, and so hold the knee joints in extension. The effective length of this lever arm is increased by the design of the knee joints, which have one arm offset one inch. This offset places the joint center one inch further posterior, increasing the lever effect between the anterior brim and the joint by that much. (See Figure 6).

If the patient has active hip extensors, knee instability is further minimized between heel strike and foot flat, as the power exerted by these muscles can be used to force his own knee into extension. Many patients need more knee stability during the time the shank pivots forward on the ankle joint from foot flat to mid-stance than can be provided by abdominal pressure on the anterior brim and any active hip extensors that may be present. Additional stabilizing force can be provided by the use of the hydraulic damper unit. The unit consists of a small piston and cylinder assembly so designed that oil is forced through very small orifices when the piston is moved in one direction, thus building up a high resistance. When moved in the opposite direction a check valve opens, allowing the oil to flow freely, thus reducing resistance to a very low value. The unit is mounted between the foot-ankle section and the upright in such a way that ankle flexion forces the piston back and forth in the cylinder. The unit is mounted so it will exert strong resistance to ankle dorsiflexion. As the shank pivots forward on the ankle, the effect of this resistance is to hold the knee in extension and prevent it from collapsing. (See Figure 7, showing hydraulic unit resisting dorsiflexion, causing stabilizing force on knee).

When the patient reaches mid-stance the ankle joints come up against the ankle joint dorsiflexion stops. As he rolls on over the ball of the foot the entire anterior portion of the foot becomes a lever arm through which the weight of the body exerts a torque around the ankle that tends to push the shank back, and thus holds the knee in extension. (See Figure 8, showing toe lever arm causing force tending to push knee into extension). The amount of this stabilizing force on the knee and the timing of its application can be regulated by the contouring of the sole of the shoe. This stabilizing force on the knee continues as the shank pivots forward over the ball of the foot until push-off is reached again, at which point the entire cycle is repeated.

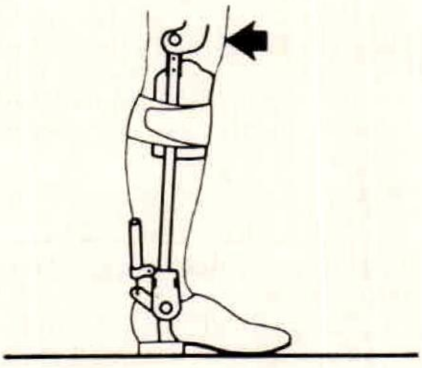


FIGURE 8

When the patient is standing still with weight on the braced leg, a substantial amount of his weight is borne by the thigh shell because of the fact that it is fitted with considerable tension. This weight is fairly evenly distributed in the shell, and is transferred to the uprights with little or no lever action. The advantage of this amount of weight bearing is the stabilizing effect it has on the pelvis. Knee stability is provided by the lever action of the one inch off-set in the knee joints.

It must be clearly understood that this is *not* an ischial weight bearing brace. Any weight on the ischial seat of the thigh shell sets up a force that tends to move the knee forward and cause it to collapse. The only time the patient may ever touch the posterior brim of the thigh shell with his ischial tuberosity is when he initiates hip flexion at push-off, and this is only the case when he has weak flexors.

The stabilizing effect of the brace is achieved through the action of the pre-tibial shell resisting the tendency of the knee to flex. The thigh shell and ankle joints provide the reaction points that make it possible for the pre-tibial shell to prevent the knee from flexing. Most of the patient's weight is borne on his own leg. It is able to do so because if his knee starts to buckle, the brace transmits the force exerted by his knee on the pre-tibial shell to the reaction points at his thigh and ankle. The brace thus serves as a splint to prevent the patient's knee from collapsing when weight is borne on it. During stance phase the brace bears some weight because of the tension of the shell on the thigh. Such weight is evenly distributed and so does not disturb the balance of forces that maintain knee stability.

In addition to its function as the means for exerting the force that stabilizes the knee, the pre-tibial shell also serves a very useful purpose by contributing to the lateral stability of the patient's knee joint. In many cases where the knee tends to bend medially or laterally when bearing weight, a well-fitted pre-tibial shell will hold the limb in line. The shell is shaped so it extends well around the calf on both sides, extends down from the lower border of the patella about one third the length of the shin, and fits the contours of the limb well enough so there is an even distribution of pressure over the entire area. A shell shaped and fitted with care will comfortably accommodate medial and lateral as well as anterior forces. Legs with considerable medial or lateral distortion can be held in the normal position in this way, and after the patient wears the brace for a time the initial discomfort of being held in a new position wears off.

The tibial cuff is attached to the pre-tibial shell, encircling the calf of the leg. It serves mainly to hold the shin firmly in the shell and so prevent abrasion, and to prevent the brace from sliding forward off the leg when the patient sits down. Since it is not required to stand any great amount of force the simple webbing and Velcro cuff is adequate.

Applications for the Functional Long Leg Brace

Every patient with lower extremity paralysis is not a candidate for a functional long leg brace. The patient who is qualified to use this brace can enjoy greater comfort, more natural gait, conservation of energy, and the convenience of no knee locks. However, the patient who is not qualified to use the functional long leg brace will not be able to enjoy these advantages, and any attempt to do so may be decidedly risky.

Some factors to consider when deciding if a patient is able to use the brace are:

1. *Weakness of trunk musculature.* If the patient's trunk muscles have been significantly weakened by paralysis, he will have difficulty walking with the brace, particularly if his leg is completely flail from the hip down.
2. *Bilateral involvement.* If both limbs are partially or completely paralyzed, the functional long leg brace is not advisable in most cases.
3. *Contractures of the knee, hip, or both.* If one or both of these joints cannot be fully extended it is very difficult to achieve alignment stability in the brace. In such cases knee locks should be used.
4. *General debilitation.* Weakness, dizziness, lack of balance, or any other physical or mental handicaps that might contribute to stumbling or falling would make the use of the brace inadvisable.
5. *Ischial weight bearing required.* Where an ischial weight-bearing brace is needed, as in case of fracture or other condition where it is desirable to transfer the weight from the ischial tuberosity directly to the floor, the functional long leg brace as described here is not suitable. The use of the plastic quadrilateral thigh and pre-tibial shells would be advantageous in an ischial weight bearing brace, but knee locks would have to be used as in the past.
6. *Paraplegia.* Paraplegics cannot benefit from the use of the brace for much the same reasons given above for bilaterals.

Because of the functional nature of the brace, the knee and ankle joints and other parts receive much more wear than is the case with the conventional brace. These parts must be made to last a reasonable length of time under conditions of hard use, and so must be made to high standards of quality and strength. Fabrication of the thigh shell and pre-tibial shell of plastic laminate requires the use of costly cast-taking equipment, and must be done to precision standards. Special parts, like the hydraulic dampers, are costly to manufacture. The dynamic alignment of the brace, which is not required with conventional braces, is time-consuming and highly technical. All these factors combine to make the cost of a functional long leg brace much greater than that of the conventional brace. However, those patients who can benefit from the functional long leg brace all agree that the additional function and conservation of energy make the additional cost worthwhile.

Below-Knee Amputation for Gangrene*

By HERBERT E. PEDERSEN, M.D., RICHARD L. LaMONT, M.D., and ROBERT H. RAMSEY, M.D.

Dearborn, Mich.

NOTE: *Members of the American Orthotics and Prosthetics Association, who were active participants in the Amputee Census, will be especially interested in the second paragraph of Dr. Pedersen's article. The statistical information on new fitted cases that was collected in the Census is now being widely quoted in medical literature. Of special significance is the fact that these data have highlighted certain problem areas for future study and investigation.*—Harold W. Glattly, M.D.

Concepts are changing with respect to the variability of arteriosclerotic vascular disease. It is being recognized increasingly that gangrene of a toe does not necessarily mean amputation at a high level. Thus, there is developing a much wider latitude within which amputations may be done.

For many years it has been our impression that there is need for a more widespread, genuine interest in the subject of amputations for gangrene. In spite of the many worthwhile publications upon the subject, few surgeons have firm convictions concerning the criteria which determine the level of amputation, the proper treatment before operations, the important technical details of amputation, the postoperative care and, equally important, the problems of limb fitting and training for ambulation. Several papers recently published attest to the increasing general interest in the below-knee amputation for the treatment of gangrene, but simple criteria for the selection of the levels of amputation are not agreed upon.

The magnitude of the amputation problem has been emphasized recently in a statistical report published by Glattly.[1] An attempt is being made to determine a census of amputees in the United States as a joint project of the Committee on Prosthetics Education and Information of the Division of Medical Sciences, NAS-NRC, and the American Orthotics and Prosthetics Association. In a period of 16 months reports were filed on 8,640 new amputees. A review of these records reveals that most amputations in peace time are performed at the above-knee, or below-knee level in the lower extremities, of elderly patients suffering from peripheral vascular disease. Glattly emphasized that during the period in which there were recorded 1,798 below-knee and 2,520 above-knee amputations, there were only 12 instances in which below-knee amputations performed for disease were converted to above-knee. In a personal communication, Glattly revealed that statistics suggest markedly different policies upon amputation in our major cities. Thus, while there is no reason to suspect much variation in the disease process in neighboring cities, in

* Read before the Section on Orthopedic and Traumatic Surgery, Southern Medical Association, Fifty-Seventh Annual Meeting, New Orleans, La., Nov. 18-21, 1963.

Reprinted from the Southern Medical Journal, Journal of the Southern Medical Association, Volume 57, Number 7, July 1964, Pages 820-825, by permission of the publisher and the author. Copyright 1964 by Southern Medical Association, Birmingham, Alabama.

Philadelphia 68.7% of the amputations reported were above-knee and 31.3% below-knee, whereas in Baltimore there were only 37.7% above-knee and 62.3% below-knee amputations. It is his belief that "a clinical study may be needed that is designed to define better the criteria that bear upon the decision as to the level of amputation in cases of lower extremity vascular disease."

Many of our concepts of treatment date back to as recently as 1948 when arteriosclerotic gangrene was looked upon as a surgical emergency. At that time Silbert[2] collected statistics from 22 large metropolitan hospitals and reported a mortality rate of 44 per cent. Mortality rates have gradually declined, however, and are now reported variously from five to ten per cent. It is generally agreed that declining mortality has come about primarily because of our ability to control infection, but also because of improved methods of anesthesia, and the improved management of diabetes, heart disease, and renal disease.

During the period of declining mortality there were many sporadic reports indicating that lower amputations could be successfully performed. Thus, Maes[3] and Smith[4] recommended open amputation through the leg in patients with diabetes and arteriosclerosis. Zierold[5] was among the first to emphasize that amputation was not an emergency procedure and that lower amputation could be performed after preparation by surgical control of infection. Bickel and Ghormley[6] recommended the use of a long posterior skin flap for below-knee amputations in patients with gangrene due to arteriosclerosis. In 1948, Silbert[2] advocated below-knee amputations, stressing that the only contraindication was gangrene following sudden femoral occlusion, where there was no opportunity to develop sufficient collateral blood supply. In 1949, McKittrick[7] published his record of transmetatarsal amputations performed for diabetic gangrene or infection limited to toes. In 1954, Silbert and Haimovici[8] discussed the indications and contraindications for amputations of the lower extremity at the several functional levels. One[9] of us (H.E.P.) published a similar discussion in 1958.

Thus, it has been demonstrated that low amputation can be successfully and safely performed with proper selection of candidates. It has likewise been demonstrated that low amputation is preferable in the rehabilitation process. In spite of marked improvement in the fabrication of prostheses fitting and training, experience in most prosthetic clinics confirms the fact that few elderly amputees walk well with the prosthesis for the above-knee amputation. Practically none walk with prostheses for bilateral above-knee amputations. On the other hand, at any age, the below-knee amputee with a suitable prosthesis should be able to walk without assistance, if he was able to walk prior to amputation. Many elderly bilateral below-knee amputees, with suitable prostheses, walk with little assistance.

Finally, it was once believed that arteriosclerosis is a generalized, relentlessly progressive disease. If so, once gangrene appears in toes, progressive gangrene should be imminent and a high thigh amputation indicated. There is excellent evidence now that there is usually patchy invovlvment of major vessels, and that if these vessels are gradually occluded a collateral blood supply does develop. Therefore the absence of palpable pulsation in the major vessels of an extremity does not necessarily indicate severe ischemia.

In this paper, it is our intention to report evidence supporting our conviction that for the treatment of arteriosclerotic gangrene, the below-knee amputation is the most useful of all lower extremity amputations. It is rarely necessary to amputate above the knee. The following discussion is based on clinical experience obtained in the performance of 152 amputations for gangrene in the years 1950 to 1955 and reported in 1958. It is further supported by a follow-up study in 1959 of 106 below-knee amputations. Finally, it is supported by experience in two active prosthetic clinics.

In the selection of the level of amputation it was the policy to amputate, after gangrene had sharply demarcated and infection was controlled, at the next proximal level consistent with good function, provided skin at that level was warm and showed evidence of good nutrition. This was done regardless of the age of the patient or the presence or absence of palpable pulsation in the extremity, and without regard for rest pain or muscle atrophy. On admission, patients were usually evaluated by a peripheral vascular service with respect to the suitability for arterial surgery or lumbar sympathectomy.

Gangrene and infection were treated preoperatively according to principles laid down by Samuels. Patients were put at rest. The involved part was covered with a sterile dressing. Abscesses were drained early, in addition to the supportive therapy of daily lukewarm foot baths and antibiotics. At the time of operation the most delicate surgical technic was used. The stump was covered with a bulky dressing applying gentle pressure to the entire stump. The anesthesia of choice was spinal and a pneumatic cuff was used for all but six amputations.

Surgical Results

Sixty below-knee amputations were performed on 55 patients. Twenty-eight healed primarily, 22 secondarily, and ten were reamputated at a higher level. There were no operative deaths. Ten patients had Buerger's disease, 16 arteriosclerosis, and 29 diabetes with arteriosclerosis.

In seven cases preparation for definitive amputation included an operative procedure, such as amputation of toes, incision and drainage of abscess, wedge resection of a toe and its corresponding metatarsal, and supramalleolar guillotine amputation. In six patients below-knee amputation was performed following failure of a more distal amputation. In these were included one toe, three transmetatarsals, one midtarsal and one Syme amputation.

Among the 22 cases of delayed healing there were eight wound infections, two hematomas, and five with localized areas of skin necrosis. The other seven patients had combined infection and skin necrosis. Delayed healing was treated by methods similar to those used to prepare the patient for operation. Infection was drained and localized areas of skin necrosis were allowed to separate spontaneously. For both necrosis and infection, sterile dressings and daily stump baths in lukewarm water and pHisoHex were used to promote drainage and spontaneous separation of necrotic tissue. In only two cases of delayed healing was further operation performed. Revision of those stumps after control of infection was followed by primary healing.

In the ten failures of below-knee amputation there was progressive gangrene postoperatively, for which reamputation above the knee was required. Study of those cases revealed no consistent cause for failure. Failure was not related to the use of a pneumatic cuff, the presence or absence of a palpable popliteal pulse, or preoperative lumbar sympathectomy.

In this series 22 patients had 26 lumbar sympathectomies. These patients were evaluated preoperatively by a peripheral vascular service. If any response to sympathectomy seemed likely, lumbar paravertebral blocks were performed. Sympathectomy was then recommended when an increase in peripheral skin temperature followed the block.

Experience with Prostheses

Of the original group of 60 below-knee amputations, 48 of 50 healed stumps were fitted with suitable prostheses. The so-called conventional prosthesis was used. It had a wooden socket, metal hinges and thigh corset. Skin abrasions frequently developed in the area of weight bearing. Weight bearing was then immediately discontinued until healing was complete and adjustments were made in fit and alignment to prevent such local irritation. It was frequently found that patients had less difficulty when the stump was allowed to sink into the bucket and weight was borne on the patellar tendon as well as the flare of the tibia and fibula. Only one patient in the group with a properly fitted limb had to have a second amputation because of recurrent ulceration.

With the devleopment of the newer patellar tendon bearing prosthesis for the below-knee amputation, it was frequently prescribed. It was discovered that while it is an excellent prosthesis for the relatively young and vigorous patient, many difficulties were associated with its use among elderly amputees. The fitting of the total contact socket is critical. Too frequently there was serious evidence of abrasion and break down of the delicate skin on fresh below-knee amputation stumps. It was likewise thought that the elderly patient needed the stability of rigid hinges. The thigh corset added stability as well as an increased area for weight bearing. Finally, the necessary flexed position of the knee in the patellar tendon bearing prosthesis required additional strength and endurance not present in many of the elderly amputees.

Experience in the prosthetic clinic confirms the experience of others that the elderly patient learns to use the prosthesis for the below-knee amputation with relative ease and practically no special training. Most patients using the prosthesis were able to walk without canes, and for whatever distance their daily activities demanded. Many are at work and on their feet full time.

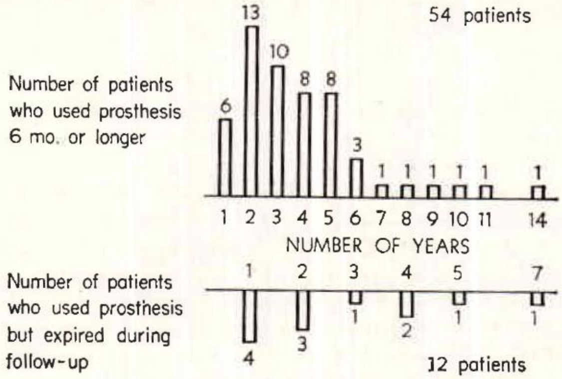
We would like to emphasize that recurrent ulceration is rare, after the initial period of fitting and ambulation. It is striking that the relative ischemia suggested by delayed secondary healing is not followed by repeated ulceration of the stump on weight bearing.

Follow-Up

To get further information on the value to the patient of such care a follow-up study was conducted in 1959. At that time there were records of 106 below-knee amputations performed on 100 patients. Information was gained from charts, personal examination of patients, postcards from patients, and records of limb fitters. Concerning 106 amputations there was proof that 54 used a prosthesis for six months or longer. Seventeen others, after proper healing of the stump, fitting, and training used a prosthesis at least three months before being lost to follow-up. For nine, records were so poor that no information was available. There were 26 failures.

A review of the failures revealed that 13 were surgical failures requiring higher amputation. Nine patients died while still hospitalized, for reasons not necessarily related to operation, such as coronary occlusion, or cerebrovascular accident. Four with healed stumps were never fitted because of senility and general debility.

FIG. 1



The number of patients with the length of time they had successfully used a prothesis as the time of follow-up.

The most instructive follow-up information is found in the analysis of the 54 patients who used the prosthesis six months or longer. Twelve of that group were dead at the time of follow-up but prior to death had used the prosthesis for periods ranging from 8 to 84 months (Fig. 1). The remaining 42, living at the time of follow-up, successfully used prostheses for periods of 6 months to 14 years, and most of them were still walking three to five years after successful fitting (Fig. 1). Only two patients, because of recurrent gangrene, had late conversion of a below-knee amputation to an above-knee amputation.

Discussion

After this study it is our conviction that the below-knee amputation is the most useful of all for the treatment of gangrene. Some patients with limited disease are suitable for single toe amputation, transmetatarsal amputation, or the Syme amputation. Most of the remaining patients presenting with gangrene are suitable for the below-knee, and only rarely is the above-knee amputation required. The nature of arteriosclerosis, and its effect on total blood supply of the limb, is such that most patients with gangrene can and should be rehabilitated by conservative amputation. Mortality and morbidity no longer preclude such care. It has been demonstrated that these patients, once successfully fitted, use the prosthesis long enough to justify the required effort and time.

The criteria for the selection of suitable candidates are few. The patient's general health and vigor should suggest the possibility of ambulation and he should have a good knee without fixed contracture. Few patients whose gangrene follows sudden high thrombosis or embolism are satisfactory candidates. Almost all patients whose gangrene begins distally are good candidates. Distal disease is precipitated by such factors as trauma, excessive heat or cold, localized infection, or minor distal thromboses. When gangrene has demarcated and infection is controlled, below-knee amputation may be performed if the skin at the amputation site is warm and shows evidence of good nutrition. No distinction need be made between patients with and without diabetes since the basic blood vessel disease of atherosclerosis is similar. It should be recognized that results are generally conceded to be better among diabetics because for many diabetics the problem is not one of marked ischemia but their intolerance to infection.

For such an amputation program to be successful other facts must be known. Gangrene and infection do not present as surgical emergencies requiring early high amputation. McKittrick[7] predicted that when we could control infection mortality rates would reach the present low level. Rather than above-knee amputation we recommend early incision and drainage, clove-foot resection, or guillotine supramalleolar amputation as initial procedures to control infection. These are used in conjunction with suitable antibiotics during acute infection, sterile dressings to prevent secondary contamination, daily foot baths to promote drainage, and rest during demarcation to minimize the requirement for increased peripheral blood flow.

We would particularly stress the fact that icing the extremity, with or without a tourniquet proximal to gangrene, is practically never indicated. Once the extremity is cooled, above-knee amputation is mandatory. Cooling usually extends above the knee and results in an increased incidence of marginal skin necrosis and infection after formal above-knee amputation.

Pain *per se* is not an indication for high amputation. Among patients with peripheral vascular disease and gangrene we recognize three types of pain. Intermittent claudication is recognized as benign. Severe rest pain without an open lesion is evidence of at least temporary severe ischemia and is a poor prognostic sign. On the other hand, such rest pain associated with an open lesion and inflammatory change frequently precedes control of infection and successful conservative amputation. This is particularly true among patients with Buerger's disease where an extensive collateral circulation is known to develop.

The value of preoperative lumbar sympathectomy for patients presenting with gangrene is debatable. It is argued by some that some element of vasospasm exists and that lumbar sympathectomy relieves the vasospasm, particularly to vessels supplying the skin. We agree that vasospasm is a factor in the clinical picture of the patient presenting with gangrene, and that skin is the critical tissue in determining success or failure of amputation. For that reason, when below-knee amputation is selected on the basis of the skin condition, the finding of ischemic muscle at the time of operation is not considered a just cause for changing the level of amputation to the above-knee. In this group of patients, and in series presented by others, there is no evidence that in the presence of gangrene, lumbar sympathectomy limited the extent of gangrene or made possible a lower level of amputation. We do think that an accurate appraisal of skin circulation cannot be made until the process of spreading gangrene and infection is stabilized and proximal vasospasm is relieved. Not infrequently it has been noted that after complete wound healing proximal skin temperature, color and nutrition have markedly improved.

Since skin is the critical tissue and we are frequently dealing with a delicate balance between the available and the required local blood supply, the amputation should be planned to preserve skin vessels and to utilize that skin with the best blood supply. At the Dearborn Veterans Administration Hospital, the amputation producing the best stump for prosthetic fitting has been a plastic procedure utilizing equal anterior and posterior skin flaps. Unfortunately, with a limited blood supply there was a high incidence of ischemic necrosis of skin flaps, particularly in the lateral portion of the anterior flap. It has been frequently demonstrated that in the leg the blood supply in the anterior flap is not as good as in the posterior flap. We now recommend a simple, atraumatic amputation using a long posterior skin flap, with as little elevation of skin flap as possible. Muscle bundles are cut in one stroke, with the amputation knife. To do this safely, a pneumatic cuff is usually used on the thigh. In this series of patients there is no evidence that the cuff used has contributed to complications in the wound.

In any conservative amputation program, wound complications are frequent, and the program cannot be successful unless both patient and physician are prepared to deal with these. Ischemic necrosis of wound margins, with or without infection, can usually be controlled by methods similarly used to prepare the patient for operation. Infection is drained, sterile dressings are used to prevent secondary contamination, and stump baths are used to promote drainage and spontaneous separation of necrotic from viable tissue. A strong plea is made to resist daily debridement of the wound. Any removal of necrotic tissue associated with bleeding results in an extension of necrosis and progressive gangrene which may require high amputation. Allowing spontaneous separation of necrotic from viable tissue, progressive granulation will usually result in satisfactory wound healing in three to four months, without secondary closure or skin grafting. On rare occasions secondary closure is indicated for wide open, clean, granulating wounds.

Finally, no amputation program can be successful unless the surgeon is concerned with the total rehabilitation of the patient. He must have a satisfactory knowledge of the available prostheses, their advantages and limitations, and the problems of fitting and training. While this is all the surgeon's responsibility the best results are usually found in prosthetic clinics utilizing the combined talents of surgeon, physiatrist, prosthetist, physiotherapist, occpuational therapist, and social worker. The goal is not merely survival of a patient, but the return to society of a useful, independent citizen.

References

1. Glattly, Harold W.: A Preliminary Report on the Amputee Census, Artificial Limbs 7:5, 1963.
2. Silbert, Samuel: Mid-Leg Amputations for Gangrene in the Diabetic, Ann Surg 127:503, 1948.
3. Maes, Urban: The Surgery of Diabetes as it Concerns Gangrene of the Lower Extremities and Carbuncles, Surg Gynec Obstet 51:700, 1930.
4. Smith, B. C.: Amputation Through Lower Third of Leg for Diabetic and Arteriosclerotic Gangrene, Arch Surg 27:267, 1933.
5. Zierold, Arthur A.: Gangrene of the Extremity in the Diabetic, Ann Surg 110:723, 1939.
6. Bickel, W. H., and Ghormley, R. K.: Amputations Below the Knee in Occlusive Arterial Disease, Proc Mayo Clin 18:361, 1943.
7. McKittrick, L. S., McKittrick, J. B., and Risley, T. S.: Transmetatarsal Amputation for Infection or Gangrene in Patients with Diabetes Mellitus, Ann Surg 130:826, 1949.
8. Silbert, Samuel, and Haimovici, H.: Criteria for the Selection of the Level of Amputation for Ischemic Gangrene, JAMA 155:1554, 1954.
9. Pedersen, Herbert E.: Lower Extremity Amputations for Gangrene, The American Academy of Orthopaedic Surgeons Instructional Course Lectures 15:262, 1958.

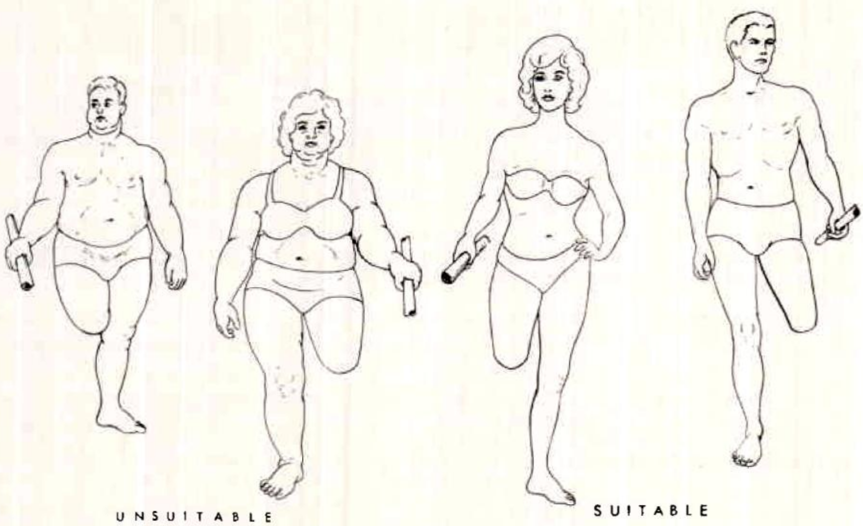
Experience with a Corset Suspension for Above-Knee Amputees

By EDWARD T. HASLAM, M.D. and

EDWARD G. SCOTT, JR., M.D.*

In the course of conducting a prosthetic clinic we encountered a female above-knee amputee, who was wearing a wooden prosthesis about fifteen years old which had been fabricatd by Mr. Henry Louiciani of the McDermott Surgical Instrument Company, Ltd., which no longer provides prosthetic service. The prosthesis was in poor repair but was interesting in that it was suspended by means of rawhide strips attached to a short corset extending from just below the umbilicus to a point midway between the iliac crest and the greater trochanters and passing through outside rollers attached to the socket both medially and laterally. The patient stated that she had always worn this type of suspension and had no complaints relative to it.

At this time we had another patient who was encountering difficulties due to breakdown of a scar in the lower abdomen due to previous vascular surgery from pressure of his pelvic belt, as well as one who, because of weight and stump size changes, was not happy with her suction socket prosthesis. We therefore decided to try a suspension of this type modified to the extent that the rawhide strips were replaced with those made of dacron or elastic shock cord.



* From the Division of Orthopaedic Surgery, Tulane University School of Medicine and based in part on the Senior Thesis of Edward G. Scott, Jr.

With the cooperation of Mr. Tom Maples, C.P., and Mr. Leo Marcotte, C.P., of the J. E. Hanger of Louisiana, Inc., and their orthotists, six patients were fitted with this method of suspension. We have generally limited the application of this method to patients with adequate hips and without protruding abdomens since we felt that this type of patient would be more suitable (Figure 1—A & B). It is possible, however, that with modifications this device could be applied to the group we have considered as being unsuitable.

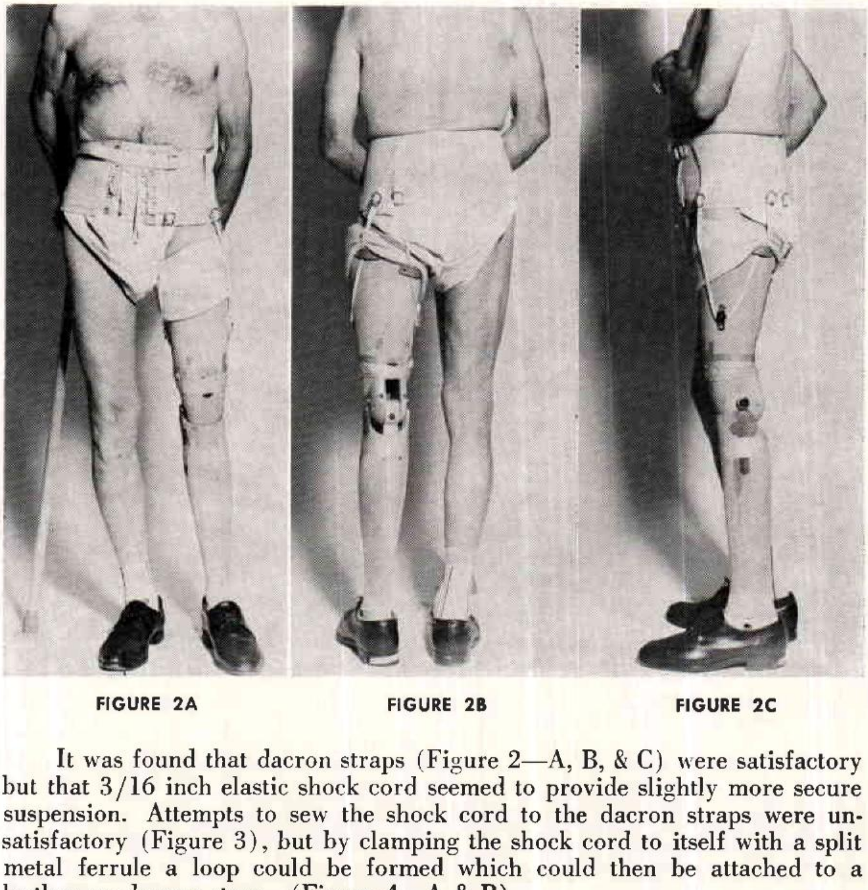


FIGURE 2A FIGURE 2B FIGURE 2C

It was found that dacron straps (Figure 2—A, B, & C) were satisfactory but that 3/16 inch elastic shock cord seemed to provide slightly more secure suspension. Attempts to sew the shock cord to the dacron straps were unsatisfactory (Figure 3), but by clamping the shock cord to itself with a split metal ferrule a loop could be formed which could then be attached to a leather or dacron strap. (Figure 4—A & B).

The problems we have encountered have been mainly with fabricating a corset which is rigid enough to withstand the downward pull on one side and which is flexible and comfortable. The tendency for the corset to pull down on the prosthetic side could probably be counteracted by attaching the opposite side to garters attached to long stockings, but this has not been acceptable to our patients. Several different sizes of elastic cord have been tried, and although it is possible that some individuals would do better with a different one, it now seems as if the 3/16″ "hard" cord No. 1784 (Russell Mfg Co., Middletown, Conn.) is the best initial selection. Recent literature from this company does not list this but suggests to us that their 3/16″ shock absorber cord, X867, which has less elongation than their X1736 exerciser cord would be suitable.

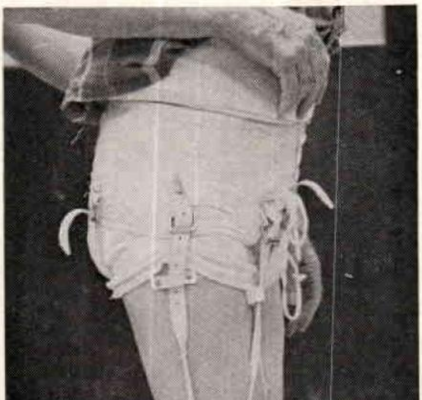


FIGURE 3

Some of the rollers have shown a tendency to cut the covering on the cord, and more study is needed as to the best type of roller. Many problems seem to occur if the rollers do not rotate freely.

The advantages have been many. The corset does not produce a bulge in the person's clothing as does a hip joint and the female patients can wear more closely contoured dresses. There has been less piston action evident with a resulting feeling of greater security on the part of the patient. The previous shoulder harness wearer showed an improvement in gait since he no longer had to elevate his shoulder. The previous suction wearer was pleased with the ability to easily apply and remove the prosthesis and with the ability to compensate for changes in weight and stump size by means of varying the number of socks worn.

A similar device was also used on a bilateral BK who, because of short stumps and obesity, was having difficulties with excessive piston action not solved by other measures. Her figure was not ideal for this method and the results were not as good as in those with favorable physique.

It will be noted in these illustrations that some of the patients had leather or dacron guide straps whereas others either did not have these or did not use them. It is believed by our prosthetists that by placing the lateral outside roller about $\frac{1}{4}''$ ahead of the knee bolt and the medial outside roller a similar distance behind the knee bolt that the tendency of the prosthesis to rotate internally is corrected.

Various factors have prevented significant comparison of the amputee's reaction to this device compared to other suspension systems, or long term follow up on the majority of our patients. However, one case who is being seen periodically for another reason has used this appliance for over two years and does not wish to attempt to return to her previous suction suspension. One previous hip control wearer requested return to his previous suspension. The original patient fitted by Mr. Louiciani was refiitted elsewhere with a hip control belt but subsequently resumed her previous device.

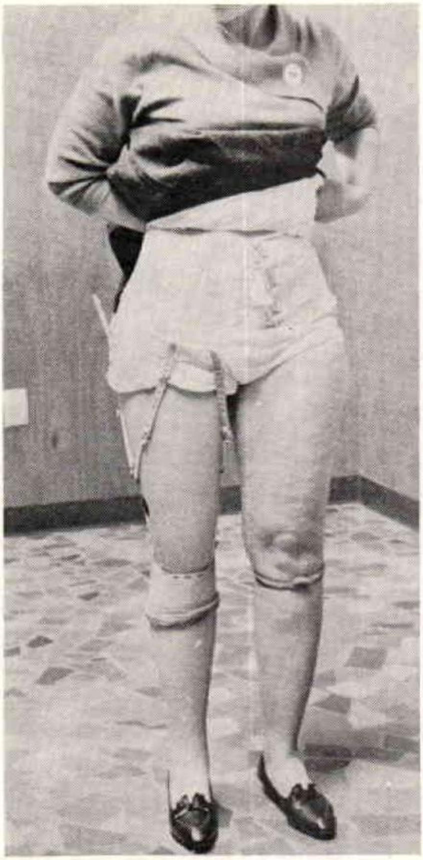


FIGURE 4A

FIGURE 4B

It is recognized that the "favorable" cases are more easily fitted with other types of suspension, and we do not recommend this suspension when suction or hip control belt appear to be a good prescription.

It is our belief that this device has a place in the armamentarium and deserves further study both as to details of construction and criteria for prescription. In the mean time we are continuing to use it on selected cases.

Prostheses for the Lower-Extremity Amputee with Unusual Complications

By JOSEPH P. GIACINTO, C.P.*

The principles taught in modern prosthetics education programs within the United States have resulted in high standards of fitting for the management of amputees commonly seen by the prosthetist. The following report describes the application of these principles in the treatment of three unusual problems.

In the first instance, a 12-year-old boy riding a bicycle was struck by a car with such force as to remove the left half of his pelvis. Small portions of the right pubic rami were surgically removed (Figure 1). A right-sided colostomy and a tender amputation scar made prosthetic fitting difficult. As shown in Figure 2, the prosthesis used was a modification of the Canadian Hip Disarticulation prosthesis. The socket was designed for distribution of some of the weight-bearing surfaces on the lower ribs, and this also provided increased stability. Is was necessary to add shoulder straps to reduce excessive piston action. The prosthesis has proved to be comfortable and functional, enabling the boy to walk with a gait that is cosmetically acceptable. A cane is rarely necessary.

The second problem concerned a 42-year-old woman born with a proximal focal femoral deficiency or an underdeveloped proximal femur, and wore Perthe's type braces for about forty years. She refused a disarticu-

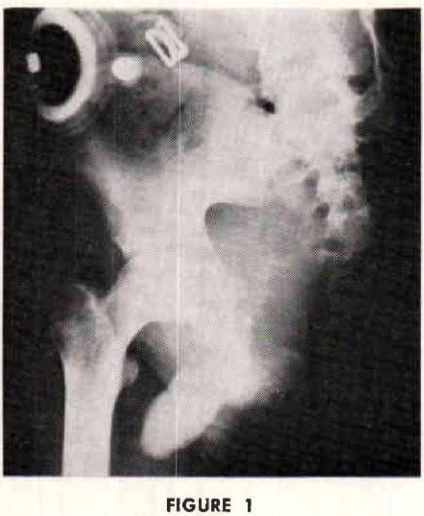


FIGURE 1

* Prosthetic Limb Shop, University of Michigan Medical Center, Ann Arbor, Mich.

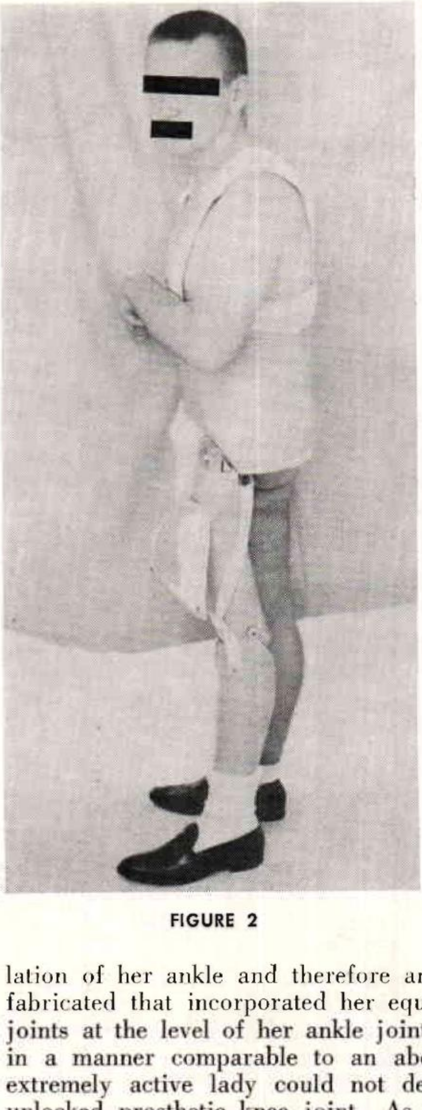


FIGURE 2

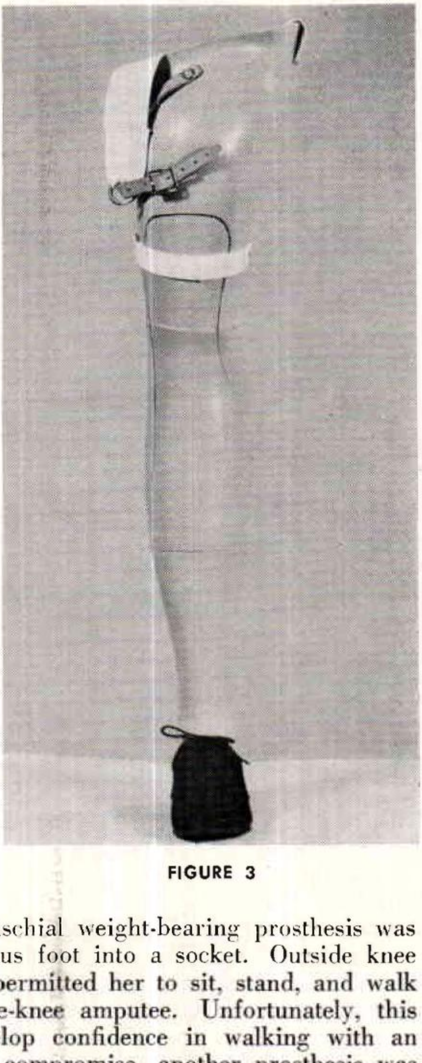


FIGURE 3

lation of her ankle and therefore an ischial weight-bearing prosthesis was fabricated that incorporated her equinus foot into a socket. Outside knee joints at the level of her ankle joint permitted her to sit, stand, and walk in a manner comparable to an above-knee amputee. Unfortunately, this extremely active lady could not develop confidence in walking with an unlocked prosthetic knee joint. As a compromise, another prosthesis was constructed as shown in Figures 3, 4, and 5. It was ischial weight-bearing and without a knee joint. The shin was contoured to conform to the shape of her foot that was held in an equinus attitude. A portion of the shin was cut out anteriorly to make it easier to apply the prosthesis. The cover was retained as a keyed insert, and a Velcro strap retained the superior portion of the cover. A trochanteric joint and pelvic band were unnecessary because the rudimentary femoral head was united to the distal femoral shaft. For this reason a modified Silesian bandage provided adequate suspension and controlled the tendency for internal rotation that is commonly seen in patients with this malformation. Other patients with a proximal focal femoral deficiency have generally preferred a prosthetic knee joint. This lady was given a cosmetic prosthesis simulating a Pylon and has expressed complete satisfaction with it.

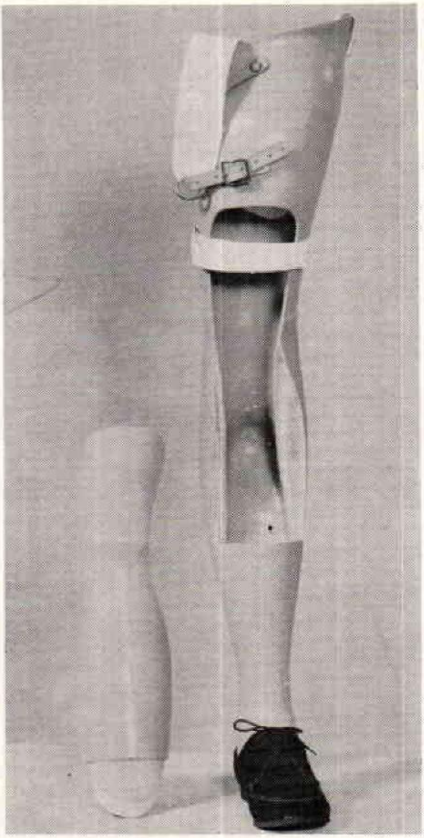


FIGURE 4

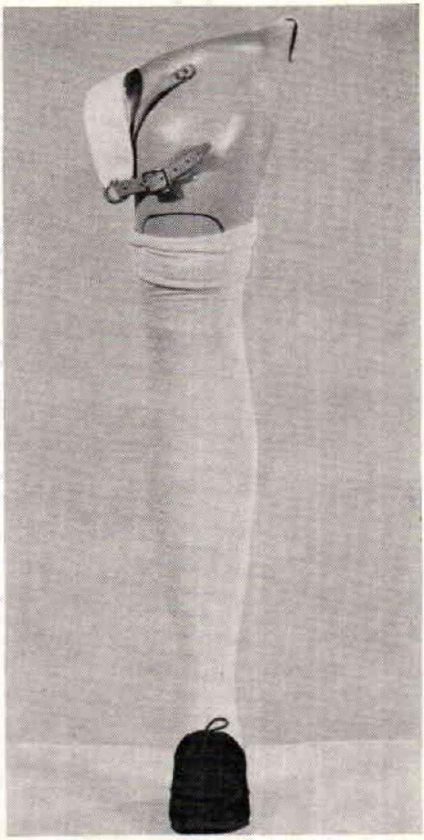
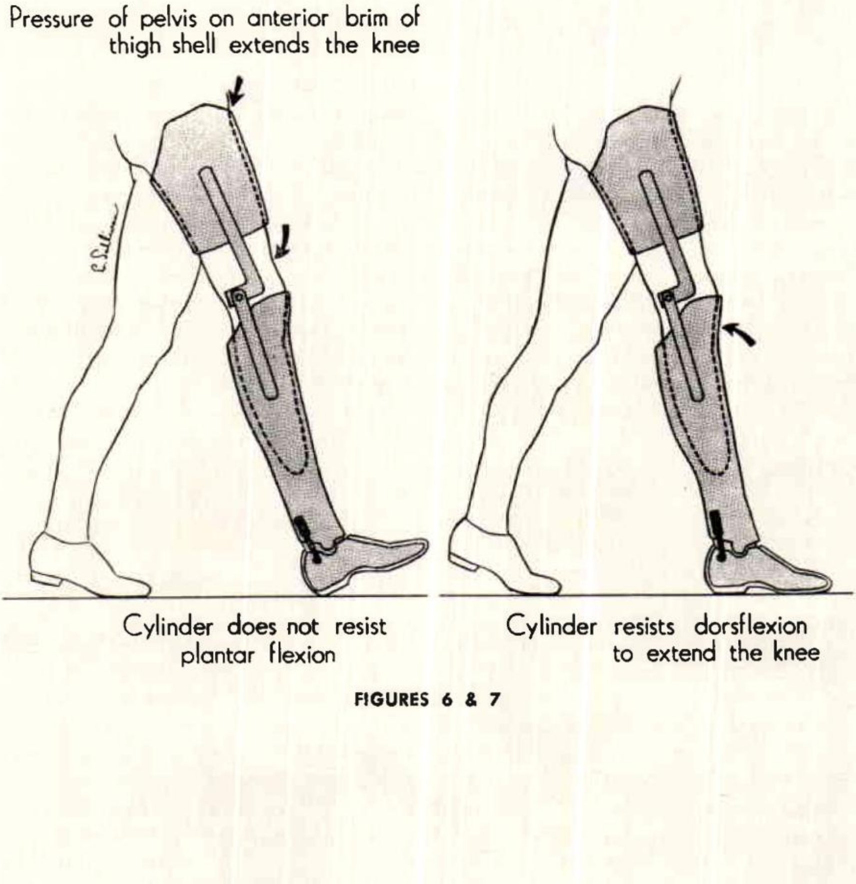


FIGURE 5

In the third case the patient was a girl with congenitally dislocated hips. She acquired poliomyelitis during the convalescent period following the reduction of her left hip at 17 months of age. The entire left leg and hip remained flail. The dislocated right hip was surgically reduced at the age of 5 but was fractured. A Syme amputation of the left flail foot was performed at the age of 12; because the left leg was very short it would not tolerate weight-bearing. When the patient was 15, her conventional below-knee prosthesis with drop locks at the knee was replaced with a total contact socket (Fig. 6). The prosthesis is a modification of the "UCLA functional long leg brace" utilizing the standard single-axis wooden foot, but the knee joints, side bars, and hydraulic damper were produced by the U.S. Manufacturing Co. The plastic thigh shell is similar to the upper portion of a quadrilateral socket, and the below-knee plastic socket has total contact but is aligned in a neutral position. The hydraulic damper is inserted into the distal portion of the shin, and the piston rod of the hydraulic cylinder is attached to the pin in the posterior portion of a single-axis wooden foot. Figure 7 shows the position of the hydraulic cylinder in the prosthesis at heel strike; the arrow indicates the force exerted by the anterior brim of the quadrilateral socket on the patient's abdomen. The force is anterior to the uprights, which results in extension of the knee. Shortly after heel strike, the hydraulic cylinder permits the foot to flex slowly to approximately 20°. Ankle dorsiflexion is strongly resisted by the hydraulic damper, and, this promotes extension of the knee in mid-stance and the heel-off phases of walking. Despite the flail leg, this below-knee prosthesis provides a more normal gait than one with a lock at the knee. The freely-swinging knee also affords ease in sitting and standing.

The prosthetic management of patients described above shows that even in difficult cases, simple modifications of standard techniques of alignment and fitting may be sufficient to produce a prosthesis that is functionally and cosmetically acceptable.



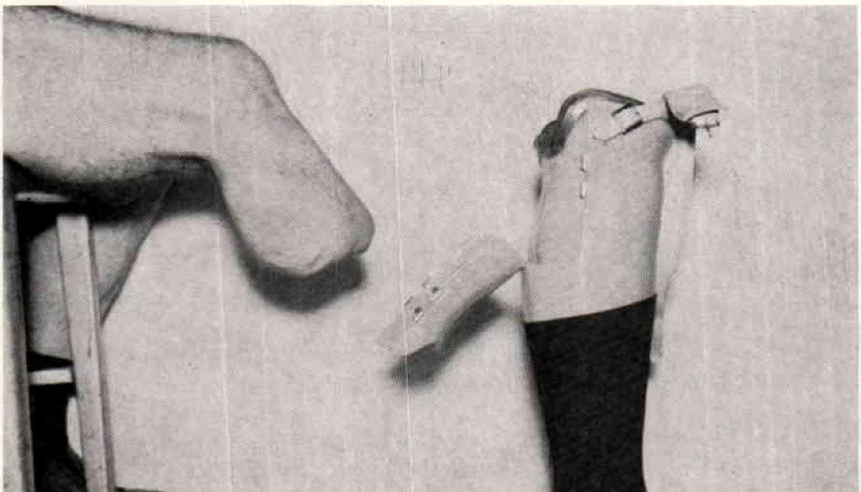
FIGURES 6 & 7

Modification of the PTB Prosthesis to Accommodate Bell-Shaped Stumps

By G. E. SNELL, C.P.O.

Snell Limb and Brace Co., Little Rock, Arkansas

Minor modification of a standard type PTB limb has made possible the successful fitting of an unusually shaped stump. This individual was of an extremely muscular build and amputation of the right leg through the largest part of the calf left a "bell-shaped" stump which has retained this same conformation and firmness in spite of the usual shrinkage over a period of four years. The patient wore a standard PTB limb during this time. With this appliance it was impossible to fully utilize the proper weight bearing surfaces about the knee since the proximal portion of the socket had to be made large enough to permit entry of the substantially larger distal end of the stump into the prosthesis. Because of this situation the stump could not be supported in its proper position and the distal end of the tibia bore heavily against the closed end of the socket, thus producing traumatization of the bone and constantly abrading the skin at this point.

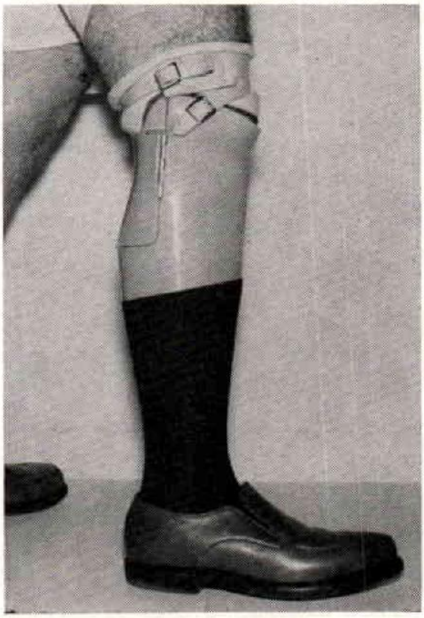


1. Necessity for special modified PTB socket can be plainly seen in this profile view of amputee's stump. Circumference of distal end is approximately 1 1/4" larger than stump at level of patellar tendon and muscle tissues are very firm.

The possibility of using a thigh lacer and knee joints on either a PTB or conventional BK was considered but it was felt that snug lacing of the corset would not overcome lack of weight bearing at the knee and would probably impede circulation of the distal portion of the stump.

After careful appraisal of the problems involved it was decided that the PTB socket offered the best possibility of success providing that a method of construction could be devised that would allow weight bearing according to the basic principles of that type of limb. A hinged posterior section satisfied these conditions and proved relatively easy to construct. The soft insert was fabricated in the usual manner and the plastic shell was laminated approximately fifty per cent thicker than normal to provide more rigidity. It was felt that a positive aligning and rigid type of fastener would be required in order to maintain precise shape and dimensions of the socket during weight bearing. Straps with buckles and other flexible fasteners such as Velcro tape were ruled out on this account. Medium sized butt hinges proved adequate for this purpose after the original pins were discarded and new ones of polished steel were fitted so as to slide into place easily. The hinges themselves were set into place with plastic paste and then riveted securely before final finishing of the prosthesis. Beveling the edges of the top hole made insertion of the pins much easier.

In donning the limb, the amputee has the choice of either pulling the insert upon the stump and then inserting both into the plastic shell together or by first positioning the insert in the shell and then pushing the stump into place. In either case the posterior flap is not closed and fastened until the stump is fully in place. An extra accessory which makes it much easier for the amputee to close this flap and hold it up snugly while the pin is



II. L-shaped pins lie flat, can be easily inserted and removed. Metal hinges lock posterior flap rigidly in place and hold entire socket in shape during weight bearing.

III. Note that pivoting hinge is placed above end of stump at point of largest stump circumference. Also that insert does not have hinged section but is solid like standard PTB.

inserted can be fabricated with a 1″ leather strap and a lever type fastener such as is ordinarily used on fisherman's ice chests. It might be possible in some cases to eliminate the cuff suspension strap but here it was necessary in order to avoid excessive piston motion.

In concluding it should be emphasized again that there is no departure from the accepted techniques of PTB fitting. While the particular circumstances of this case will seldom occur, a more frequent occasion for the use of this modification might be found in early fittings of BK amputations, allowing post-operative ambulation before atrophy of muscle tissue reduces the distal portion of the stump enough to permit use of the regular type socket.

Book Reviews

ORTHOPEDIC BRACES: Rationale Classification and Prescription. By Maxwell H. Bloomberg, M.D., Chief of the Brace Clinic, Veterans Administration Hospital, Newington, Connecticut. Published by the J. B. Lippincott Company, Philadelphia and Montreal, 1964. 207 pages, illustrations.

This is the latest book on orthopedic appliances and should be useful to any reader of the *Journal*. In his preface, the author among other acknowledgements thanks AOPA members K. B. Nelson, Ralph Storrs, John Retzler, Sr., and Alfred Schnell.

A comprehensive review of the book will appear in the next issue of the *Journal*.

REHABILITATION MEDICINE: A textbook on physical medicine and rehabilitation. Second edition by Howard A. Rusk, M.D. and collaborators, with the editorial assistance of Eugene J. Taylor. C. V. Mosby Company, St. Louis, Missouri, 1964. 668 pages, $15.50.

This is a useful volume for the orthotic and prosthetic facility. The professional personnel of these facilities will find it a useful reference tool. The chapters on the management of psychiatric problems and on crutches and wheel chairs, for example, give information that is hard to find in print.

SCIENCE AND CANCER: By Michael B. Shimkin, M.D. Published by the National Cancer Institute of the U.S. Public Health Service, 1964. 137 pages. May be purchased from the U.S. Government Printing Office at sixty cents each.

Dr. Shimkin spent twenty-five years in the Public Health Service. He is now engaged in cancer research and teaching at Temple University School of Medicine in Philadelphia.

This is a booklet for the layman. It is clearly written (unusually so for a government document). The report has two purposes: (1) to give the medical aspects of cancer as a practical problem facing all of us today, (2) to tell about some of the efforts now being made by science to protect us against cancer. The report is entirely successful. We urge you to get a copy of this and read it.

The Kolman PTB Casting Clamp

By JOHN L. KOLMAN, C.P.O.

Whittier, California

This successful device for taking PTB castings is unique and yet extremely simple to use. It produces a high quality cast with minimum distortion of the stump and requires vertually no modification of the cast. The pictures and the step by step procedure which follows illustrate the simplicity of the unit and its use.

No. 1—Use a light cast sock applied to the amputee using a 1″ elastic strap around the waist to maintain tension on the cast sock (see Fig. 1).

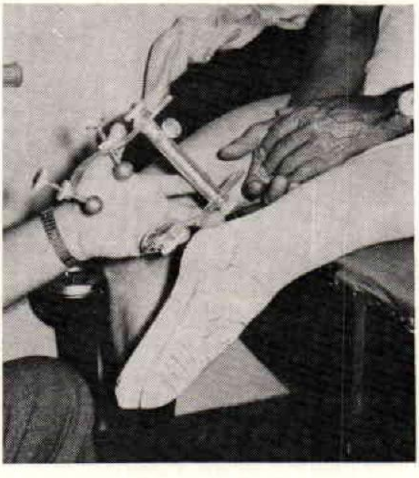
No. 2—Mark all bone prominences using an indelible pencil.

No. 3—Adjust casting clamp to the stump so that the popliteal pad is just lateral of the center of the stump or approximately parallel to the head of the fibula. Maintain the stump at an angle of about 30 degrees of flexion.

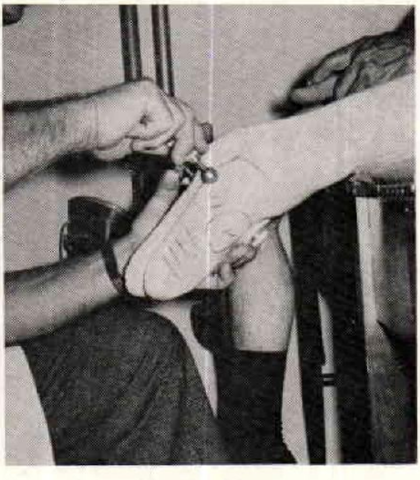
No. 4 (see Fig. 4)—Adjust the patellar buttons so that they fit on each side of the patellar tendon just distal of the patella.

No. 5—Press in anterior adjustable bar to obtain proper compression and set the locks straight. (See Fig. 3). Remove the clamp from the stump and mark the position of the AP adjustment so that it can be replaced in the same position after the cast has been wrapped.

No. 6—Take the cast using a moderately thin bandage so that it will not begin to set before the clamp is placed in position. Make sure that the cast is wrapped sufficiently above the patellar to insure good coverage in the popliteal area. A thin cast is all that is necessary and even distribution of the wrap is also desirable.



No. 1 & 2



No. 3, 4 & 5

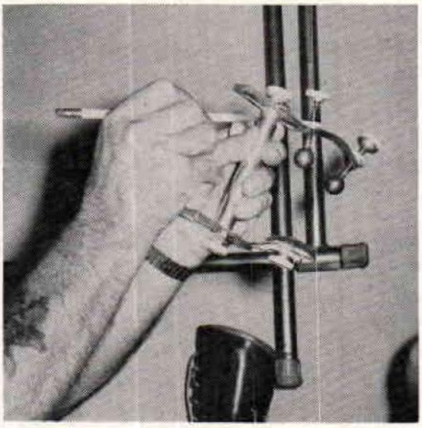
No. 7—Open the clamp and place it in position on the cast in the same position as it was during the test application. If your cast is relatively light, the new position of the AP bar will be within ¼″ of original mark.

No. 8—After the clamp is in place, continue to form the plaster cast to avoid any possibility of hollow spots.

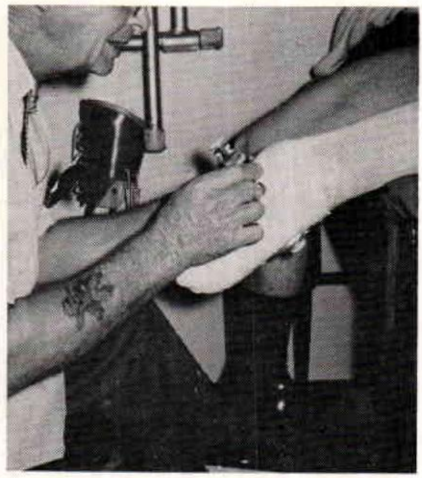
No. 9—After the cast is set, remove the clamp. Mark it according to the normal PTB top shape and trim the cast to your line. When you trim, observe the position of the hamstrings and release accordingly. After the cast has been filled, cut the patellar tendon depression to intersect the top edge of the button marks. Do not go any deeper. No modification will be required in the popliteal area.

As you can see, casting technique is greatly simplified and will produce an excellent result.

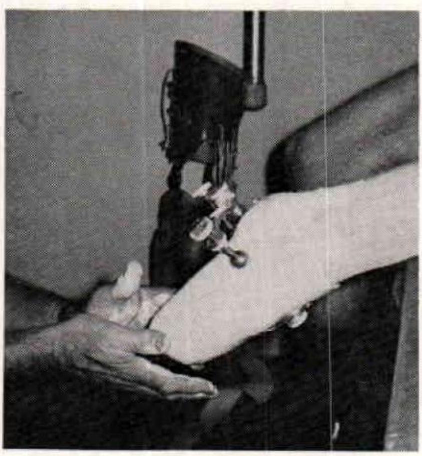
The casting clamp is in production and will be available from Fluid Controls Inc., 623 South Central Avenue, Glendale, California.



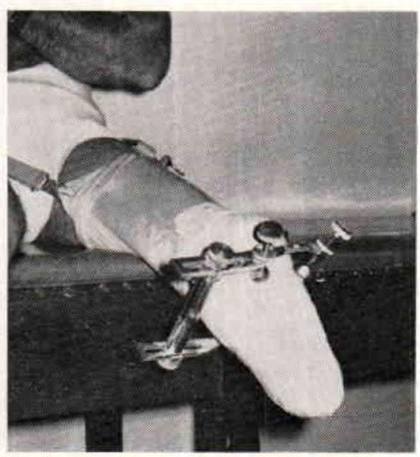
No. 6



No. 7



No. 8



No. 9

Comments on Temporary Prostheses

By HOWARD V. MOONEY, C.P.

Boston Artificial Limb Co.

EDITOR'S NOTE: *The following comments are from a letter from Mr. Mooney to Mr. Bert R. Titus, dated October 26, 1964.*

I have read with interest the article in the September 1964 *Journal* regarding the project study undertaken by Duke University Medical Center entitled, "Use of Temporary Plaster of Paris Pylons Preparatory to the Fitting of a Permanent Above-Knee or Below-Knee Prosthesis." You may be interested in knowing that since 1937, when I became associated with the Boston Artificial Limb Company, I have been fitting so-called pylons or temporary limbs preparatory to the fitting of permanent prostheses. As a matter of fact in 1946 I wrote an article entitled "Rehabilitating Leg Amputees" which was published in the February 1947 issue of the *OALMA Journal.* This article read in part as follows:

> The modern and correct procedure for rehabilitating most leg amputees is to furnish a temporary or preparatory limb 10 to 14 days after the amputation and prior to the patient's discharge from the hospital. This method has both immediate and long-range benefits and its cost is negligible.
>
> The use of a temporary limb allows the amputee to become actively engaged in learning how to walk immediately. The possibility of flexion contractures resulting from inactivity and immobilization is eliminated. The resulting exercise of the stump stimulates circulation and thereby promotes healing. The amputee acquires some experience actually walking on a prosthesis under the supervision of the prosthetist and hospital personnel before returning home. The temporary limb protects the stump from injury and the amputee may learn to walk without ever using crutches. It prepares the stump for the permanent limb by hastening shrinkage and atrophy. Muscular power is developed in the stump, hip and back which is essential to the successful use and control of the permanent limb. In many cases the amputee may return to his occupation on the temporary limb, thereby resuming his earning power much more quickly than otherwise. Finally, this procedure of rehabilitation is a great morale builder. Mental depression over the loss of a leg is perhaps the greatest obstacle the amputee has to overcome. In my experience the activating of an amputee before he has had too long to brood over his "plight" is the best possible course that can be followed. When he sees the possibility of an early resumption of his normal way of living, his outlook for the future brightens 100 per cent.

It is customary to wear a temporary limb until the stump has ceased shrinking and has acquired its final form. This point may be reached in three to four months provided the amputee has worn his prosthesis faithfully and has followed the instructions given him by the prosthetist. In any event, the permanent limb should not be furnished until, in the opinion of the surgeon or prosthetist, the stump has been properly conditioned.

Since the writing of the above article nothing has happened to change my viewpoint regarding the advantages to be gained by the use of the temporary prosthesis. To be sure, we make such an appliance from wood, metal and leather instead of plaster and/or plastic. It takes more than two hours to fabricate one. However, the overall cost is less than attaching a new socket on a permanent prosthesis and since the amputee keeps the temporary appliance it acts as an inexpensive spare in an emergency.

It would be my opinion that the use of plaster and plastic pylons would be comparable in value to the temporary limbs we have been furnishing for over 27 years. I feel sure, however, that to obtain maximum stump shrinkage the pylon must either be adjustable as to socket size or must be changed frequently. Our above-knee and below-knee temporary prostheses have adjustable leather sockets which often do not have sufficient closure to compensate for stump atrophy and require some modification prior to the fitting of a permanent prosthesis.

You will be interested in knowing, I'm sure, that in many cases where it is doubtful that an amputee can successfully wear a prosthesis, Amputee Team Clinics in the Boston area prescribe a temporary prosthesis. This has the dual advantage of giving the doubtful case a chance to show what he or she can do with a minimum of expense. This procedure has produced some surprising results.

Furthermore, the successful use of the adjustable leg or the adjustable coupling must be based on the amputee's ability to walk on a prosthesis. The prior use of a temporary appliance makes the use of these alignment tools of some value when fitting a permanent prosthesis, in most cases.

There are, however, two disadvantages in the temporary appliances which we fabricate. The first is in appearance which is of some concern to the female patient. This problem is usually overcome by counseling or by convincing the amputee to wear slacks for a short period. The second disadvantage occurs in the use of the above-knee temporary prosthesis which utilizes ring-lock knee joints and tends to develop a stiff-legged gait which must be overcome when a permanent prosthesis is obtained. How severe this disadvantage is, has been debated pro and con for quite some time.

In closing, based on my experience and some of the information your study seeks to determine, I would summarize as follows:

1. The use of some kind of temporary appliance will increase the amount of shrinkage and rapidity of shrinkage in both the above-knee and below-knee amputee. It will also allow earlier fitting, better psychological adjustment and improved physical conditioning with earlier return to work or home activities.

2. The use of an above-knee temporary appliance with a non-articulating knee-joint may develop a poor gait pattern.

3. The use of a pylon or temporary appliance should not cause damage to the stump.

4. For the most part, appearance of the temporary appliance should not develop into a serious problem.

5. An adequate fit for the average above-knee or below-knee stump using a temporary device is not only possible but probable.

6. The pylon is very definitely a practical and inexpensive method for determining whether or not certain patients will be able to utilize and tolerate a permanent prosthesis both physically and psychologically.

7. The use of either a pylon or some temporary appliance increases the amputee's aptitude for the adjustable leg.

8. The use of a temporary device will in most instances eliminate the need for an extra socket thereby reducing the overall expenses.

I hope the above may be of some value to you in your study.

ICD Names S. W. Paul as Instructor

Siegfried W. Paul, Certified Prosthetist and Orthotist, has been appointed to the Institute for the Crippled and Disabled's professional education staff as an instructor in the fabricating of prosthetic and orthotic appliances for handicapped persons.

Mr. Paul will be in charge of the annual 10-month practical training course for prosthetists and orthotists which is conducted at the Institute's Prosthetic and Orthotic Laboratories, 340 East 24th Street.

Mr. Paul, whose writings in the fields of orthotics and prosthetics have been published in many countries, was engaged in prosthetic and orthotic work in Chattanooga and Johnson City, Tennessee, prior to becoming associated with the Institute for the Crippled and Disabled. After completing his professional education, Mr. Paul studied at the Free University and at the College for Economics, Berlin, Germany. He is a graduate of special courses at East Tennessee State, Northwestern, and New York Universities. Mr. Paul received his certifications as a prosthetist in 1960 and as an orthotist in 1963 from the American Board for Certification in Orthotics and Prosthetics, Inc.

Mr. Paul resides at 5 Mabel Street, Hicksville, Long Island, with his wife, the former Betty Carter of Kingsport, Tennessee, and their son, David.

New Facilities Certified

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

CALIFORNIA

Berkeley:

JOHNSTON ORTHOPEDIC APPLIANCE CO. — O
2585 Shattuck Avenue — 843-2488
Stewart A. Johnston, C.O.

Sherman Oaks:

VOGUE ORTHOPEDIC APPLIANCE CENTER, INC. — O
4835 Van Nuys Blvd., Suite 115 — 789-0335
Stanley S. Carlton, C.O.

FLORIDA

Tallahassee:

FLORIDA PROSTHETICS — P
1935 Thomasville Road — 224-5035
Richard A. Walker, C.P.

KANSAS

Topeka:

PETRO'S SURGICAL APPLIANCES — O
1119-23 W. 10th Street — FLanders 4-8548
Kelsey H. Petro, President

Wichita:

KANSAS BRACE & LIMB CO. — P&O*
3128 East Douglas — MUrray 5-1268
Darwin J. Buck, C.O.

MARYLAND

Baltimore:

WALTERS-BRUNOS ORTHOPEDICS, INC. — O
907 North Calvert Street — SAratoga 7-7680
Walter Wolfing, C.O.

MINNESOTA

Minneapolis:

NORTHWESTERN ARTIFICIAL LIMB & BRACE COMPANY — P
248 First Avenue, No. — 333-3991
Henry James Niessen, President

NEW MEXICO

Albuquerque:

ALBUQUERQUE PROSTHETIC CENTER, INC. — P&O
2818 Central S.E. — 247-2301
Walter M. Joslin, C.P.

NEW YORK

Brooklyn:

POMEROY COMPANY, INC. — P&O
208 Livingston Street — TRiangle 5-2707
Albert P. St. George, C.O.

Buffalo:

BUFFALO ORTHOPEDIC SUPPLY CO., INC. — P&O**
823 Niagara Street — TT 4-2770
Benedict G. Pecorella, C.P.O.

Schenectady:

LA TORRE ORTHOPEDIC LABORATORY — P&O
55 North Brandywine Avenue — EXpress 3-3794
Richard R. La Torre, C.O.

OHIO

Cleveland:

CLEVELAND ORTHOPEDIC COMPANY — O
3957 Mayfield Road — 382-9700
Moses A. Feigenbaum, C.O.

Lima:

LIMA BRACE & LIMB COMPANY — P&O**
1102 Bellefontaine Avenue — 224-4841
George Rinck, C.P.O.

DOMINION OF CANADA
BRITISH COLUMBIA

Vancouver:

J. A. PENTLAND, LTD. — P&O
2951 Cambie Street — 879-2941
John Armet Pentland, C.P.O.

* Extension of Title to Include Prosthetics
** Reinstatement

Prosthetists and Orthotists Certified in 1964

The Committee on Examinations of the American Board for Certification announces that the following candidates have received Certification as a result of successfully completing the 1964 Examinations of the Board. (The four men listed as Certified Prosthetist-Orthotists had previously received Certification in one of these two fields).

Prosthetics and Orthotics

1. James Fenton
2. Josephus D. Ferguson
3. Jimmy D. Hatch
4. Sanford Kessler

Prosthetics

1. George R. Altman
2. Jacobus Booden
3. Paul A. Dunn, III
4. George H. Fussner
5. Riley Hindman
6. Richard A. McUmber

Orthotics

1. Max Clay
2. Kenneth Coonley
3. Brian E. Cornish
4. Nestor R. Fourroux, Jr.
5. Jerald D. Gillespie
6. Francis R. Hollerbach
7. Albert L. Howe
8. George P. Irons
9. Richard A. Kohler
10. Patrick J. Marer
11. Jack Pearson
12. Daniel G. Rowe
13. Werner P. Schroeter
14. James H. Smith
15. Lloyd A. Tankersley
16. Robert E. Teufel
17. Cramer J. Thompson
18. Leo V. Tippy
19. Donald C. Truesdale
20. Joseph Armand Viau
21. Rupert J. Warner

ABC Announces New Officers

Theodore W. Smith, C.O., of the W. E. Isle Company, Kansas City, Missouri, was elected President of the American Board for Certification in Orthotics and Prosthetics on November 9, 1964. Mr. Smith is a senior member of the Board, having been elected at the annual corporation meeting in Phoenix, Arizona. He has served the Board as an examiner in 1958 and 1959; as a member of the Committee on Facilities, 1960 to 1962; and as Chairman of the Committee on Credentials, 1962 to 1964. This past September, he was of great assistance to examiners and candidates during the annual examinations which were conducted in neighboring Kansas City, Kansas.

Supporting President Smith during the 1964-65 year will be Richard H. Jones, M.D., Minneapolis, Minnesota, Vice President; and Durward R. Coon, C.P.O., Detroit, Michigan, Secretary-Treasurer. Chester C. Haddan, C.P.O., Denver, Colorado, and Michael P. Cestaro, Washington, D. C., will serve as Consultants to the Board.

At the annual meeting of the Corporation William E. Brownfield, C.P.O., Boise, Idaho; Edward T. Haslam, M.D., New Orleans, Louisiana; and Bert R. Titus, C.P.O., Durham, North Carolina, were elected as Directors of the Board for a three year term. These new Directors replace retiring Directors Michael P. Cestaro; Cameron B. Hall, M.D., Los Angeles, California; and George H. Lambert, Sr., C.P.O., Baton Rouge, Louisiana.

The remaining member of the current Board of Directors, Claude N. Lambert, M.D., Chicago, Illinois, was unable to attend the Florida meetings due to illness.

Following his election, President Smith made these appointments:

George H. Lambert, Sr., C.P.O. and Michael P. Cestaro, Co-Chairmen, Committee on Educational Standards

Durward R. Coon, C.P.O., Chairman, Committee on Credentials

Bert R. Titus, C.P.O., Chairman, Committee on Examinations

William E. Brownfield, C.P.O., Chairman, Committee on Facilities

Chester C. Haddan, C.P.O., Chairman, Committee on Ethical Practices

HERBERT HART ASSUMES PRESIDENCY OF ASSOCIATION

New Officers Installed

Herbert J. Hart, C.P.O., who has served for the past year as President-Elect, was formally installed as President of the American Orthotics and Prosthetics Association on November 11, 1964, at the Banquet which concluded the Annual National Assembly. Out-going President Robert C. Gruman, C.P., presented Mr. Hart with the President's Pin and the official Association gavel, (see above) and in return President Hart tendered to Mr. Gruman an engraved Certificate of Appreciation for his outstanding service. President Hart pledged his best efforts for the Association in the year ahead.

Installed with Mr. Hart as new officers of the American Orthotics and Prosthetics Association were David C. McGraw, C.P.O., Manager and co-owner of Snell's in Shreveport, Louisiana, as President-Elect; Fred J. Eschen, C.P.O., Vice President of John N. Eschen Company of New York City, as the new Vice President; and M. P. Cestaro, President of J. E. Hanger, Inc., Washington, D. C., who was reelected Secretary-Treasurer.

Outstanding Assembly

Valuable programs, films and presentations on developments in the field of orthotics and prosthetics attracted a record-breaking number to the 1964 Assembly at the Hollywood Beach Hotel in Florida. Congratulations go to Erich and Betty Hanicke, Co-Chairmen for program arrangements, to Ronny Snell, Exhibits Chairman, and to the outstanding speakers who made this year's program such a success.

Thanks go also to the supplier members of the Association who contributed many useful and valuable prizes for the golfers, for costumes at the Reception and Western Steak Fry, and as daily door prizes. The Association appreciates these gifts.

Special Projects for 1964-65

At the Board of Directors Meeting a number of projects for the coming year were approved, and funds allocated to implement them. These projects are:

I. *Translation and Abstract Service for Members*

This project would provide members with abstracts or reports on important articles concerning orthotics and prosthetics from medical and paramedical journals in the United States and abroad, and with translations of foreign language articles which bear directly on orthotics and prosthetics.

This proposal is based on the recommendation of the Chairman of the Committee on Advances in Prosthetics and Orthotics, the Chairman of our Journal Committee and the Secretary-Treasurer of the Association.

II. *Public Relations Kit for Members*

This is based on the suggestion of President Hart and other members. It would provide members with such items as:

1. Prepared speeches on our field for their use when lecturing to paramedical groups, residents, Civic Clubs, etc.
2. List of films and slide collections which may be borrowed.
3. Reference lists and bibliographic aids relating to our field, for members who wish to do additional reading or to advise physicians or counselors.
4. Sample press releases to be adapted by the member for local use.
5. Other public relations information of value.

III. *"What Everyone Should Know About Prosthetists and Prosthetics"*

A companion booklet to "What Everyone Should Know About Orthotics and Orthotists."

IV. *Long-Range Planning Conference*

This would provide funds for AOPA representatives and officers to prepare a long-range program of activities and procedures for the Association; to review the By-Laws; and to consult with legal counsel and other authorities on steps to be taken to further the interests of our field and our members. It is anticipated that AOPA members named to this conference would meet as needed with representatives of the American Board for Certification.

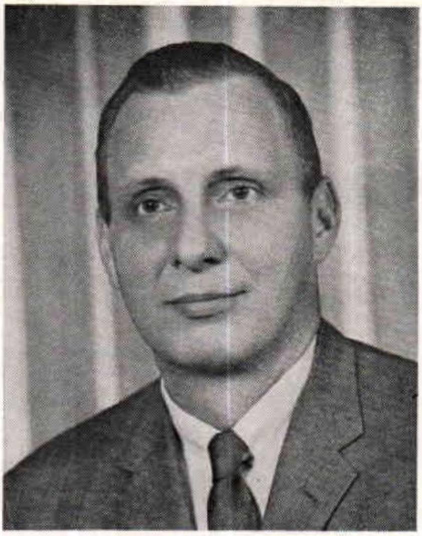
HERBERT J. HART

President Herbert J. Hart, Vice President and Manager of C. H. Hittenberger's Inc., of Oakland, California, served as Vice President of the Association 1962-63 and as President-Elect 1963-64. Regional Director for Northern California, Utah and Nevada for over ten years, he has also served as Program Chairman for both the 1956 Assembly at San Francisco and the 1962 Assembly in Phoenix. He has served on the Board of Directors of the American Board for Certification and has been a lecturer on orthotics and prosthetics at the University of California and Mills College.

THE ASSOCIATION'S NEW OFFICERS

DAVID C. McGRAW, C.P.O.

President-Elect David C. McGraw, C.P.O., was Vice President of the Association 1963-64. Manager of Snell's in Shreveport, Louisiana and co-owner of that firm for the past ten years, Mr. McGraw was Director of the Association's Region VIII from 1957 to 1963. He has also acted as Exhibits Chairman for the 1959 Assembly in Dallas. His wife, Mrs. Bobbye McGraw was President of the Ladies Auxiliary in 1959-1960.



FRED J. ESCHEN

Vice President Fred J. Eschen has served the Association for a number of years, acting as Regional Director of the New York area from 1958 to 1959. He is currently Chairman of the Committee on Advances in Prosthetics and Orthotics, and has been a member of this committee since 1958. He also has contributed articles to the *Journal*, including "Planning Regional Meetings," March 1953; "Ischial Weight-Bearing Brace with Quadrilateral Wood Top," Sept. 1958; and "Prosthetic Fitting of the Older Age Patient," March 1959.

M. P. CESTARO

Secretary-Treasurer M. P. Cestaro, President of the J. E. Hanger Co., Inc., in Washington, D. C., has held his present office since 1950. He has also served as Secretary-Treasurer for the American Board for Certification in Orthotics and Prosthetics. He is the author of "Business Management," *Journal of OALMA*, July 1950 and "Economics of Prosthetic Service," August 1951.

In Memoriam

Guy Butler of Atco Surgical Supports

Guy Butler, West Coast representative for Atco Surgical Supports, died suddenly of a heart attack on November 24. The Association offers its sincere sympathy to Mr. Butler's family and to his host of friends.

A native of Iowa, Mr. Butler joined Atco's sales organization in May, 1961 and had been an affiliate member of AOPA since December, 1962. He had attended the recent Hollywood Beach Assembly as the winner of the Atco Sales Contest in which all Atco sales representatives exceeded assigned sales quotas, Denis B. Nock, President of Atco, reported. Guy led the group with a 42.3 per cent territory increase over the same sales period of 1963, and won an all-expense trip from the firm to the Hollywood Beach Assembly November 8 to 11. Mrs. Butler accompanied her husband to the Assembly.

AOPA President Herbert J. Hart and Theodore Sierakowski of Sunnyvale, California, represented the Association at the services for Mr. Butler.

Mrs. Joan Beitman Gold

Mrs. Jack Gold, the daughter of Mr. Arthur Beitman of Newark, N. J. and the wife of Mr. Gold, Manager of the Beitman firm, died suddenly on October 19, 1964. Sincere sympathy is extended to all the members of the family.

Mr. Gold is President of MOALMA and Mr. Beitman is President of Arthur A Beitman, Inc., 44 William Street, Newark, N. J.

Mrs. Ethel Peterson

Mrs. Peterson, whose late husband, Frank Peterson, had been Treasurer of the Association and active in its work, died on October 12, 1964. She had been active for a number of years in the Ladies Auxiliary of AOPA.

John Kolman, Richard Fadely and Jack Volmer represented the Association and the Society of Orthotists and Prosthetists at the services on October 15 in Santa Monica, California.

Simon J. Shea, C.P.

Mr. Simon J. Shea, who had been associated with R & G Orthopedics in Washington, D. C., died on October 28, 1964. Mr. Shea had been certified July 31, 1952, and had been with the Veterans Administration for many years, first in New York and later in Los Angeles. He also had been in business with a partner for a two-year period before coming to R & G in 1952. He served in the brace shop at Gorgas Hospital in the Canal Zone from 1955 till 1960, when he returned to R & G Orthopedics.

Mr. Shea is survived by his wife, Jacqueline and two sons and two daughters. Speaking of Mr. Shea, Mr. Charles Ross described him as a very valuable associate who will be greatly missed, an excellent mechanic and a real gentleman in the truest sense of the word.

In Memoriam

JOSEPH GITLIN

Officers and members of AOPA are saddened to learn of the death on September 30 of Joseph Gitlin, Vice President and Treasurer of the Minneapolis Artificial Limb Co. of Minneapolis, Minnesota and Vice President and Secretary of Trautman Specialities, also of Minneapolis.

Joe Gitlin had long been active in the affairs of the Association and was held in high esteem by those who worked with him. He served as Director of Region VII 1957-1958 and more recently was one of the planners who attended the pilot session of the Northwestern University Business Course December 3-7, 1962.

President Robert Gruman represented AOPA at the services held Monday, October 5.

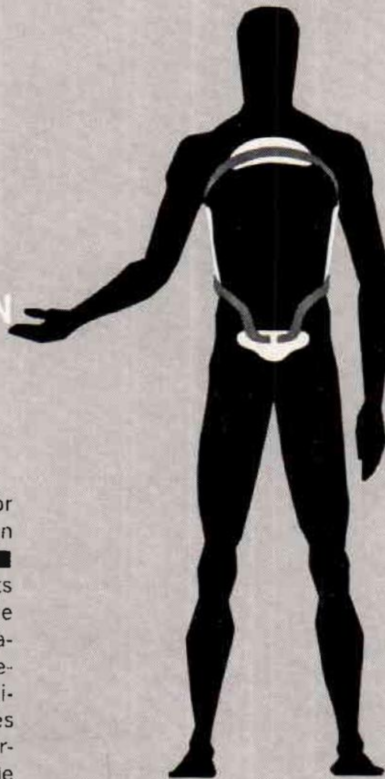
PLANS UNDER WAY FOR FIRST 1965 REGIONAL MEETING

The 1965 schedule of Regional Meetings will begin March 5-6 with the meeting of Region IV at Durham, North Carolina. President Herbert J. Hart has already accepted an invitation to be guest speaker at the Region's banquet.

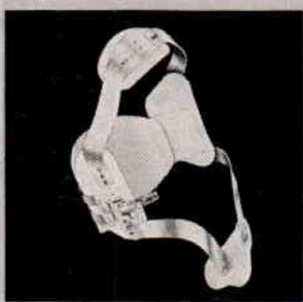
Still in the planning stage, but promising to be a highlight of the meeting, is a live television showing of an amputation from the operating room of Duke University Medical Center, and an immediate post-operative pylon procedure. Following this an Amputee Clinic is planned which will show patients wearing temporary pylons and give case histories. In addition there will be at least two programs on orthotics, with exact titles to be announced later.

(A schedule of the Regional Meetings for 1965 appears on the inside front cover of this issue of the *Journal.*)

JEWETT
HYPEREXTENSION
BACK BRACE



. . . prescription therapy for uncomplicated compression fractures T-6 through L-4 ■ Five simple measurements assure effective comfortable fit for children through extra-large adults ■ Braces delivered assembled to specifications ■ Stock sizes available ■ Same day service ■ Price and trade protected.



F B C

FLORIDA BRACE CORPORATION

601 Webster Avenue • Box 1366 • Winter Park, Florida 32790 •
Ph. (305) 644-2650 • cable address: FLABRACE, Winter Park, Florida

In the BEST interest of your little patients—

You can prescribe the

BEST SHOE and the BEST BRACE...

ONE-PIECE NO-SEAM SOFT TOP

Sabel

EQUINO-VARUS, SURGICAL

Sabel Equino-varus and Surgical shoes keep the foot in the exact position the physician has obtained. The open toe and floating tongue lets you see that the foot is in the proper position, that the heel is well down in the shoe. The heavy oak sole stays flat under pressure of any type of night splint. Sabel uppers and all materials used are of the finest quality.

Fillauer

NEW OFFSET SPLINT

The re-usable offset splint features a smooth hex-nut, recessed and protected by the offset in the bar. Doesn't catch and tear bed clothing. The child can stand on the flat bar surface. The re-usable splint can be used over and over again, reducing cost

...at the BEST combined PRICE!

Sabel . . . the original name in orthopedic shoes . . . plus Fillauer splints offer you the finest in quality and performance at the lowest cost to your patients.

SABEL'S

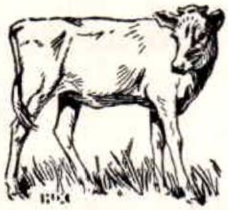
EQUINO-VARUS

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

R. J. POTVIN SHOE CO., BROCKTON, MASS.

NO LEATHER LIKE JONES LEATHER

For Appliances and Artificial Limbs



Specially Tanned So Color Will Not Fade Off and Soil Under Garments

Buckles, Rivets, Plastics, Webbings and other items

WRITE FOR SAMPLE CARDS AND PRICES

THE JOSEPH JONES COMPANY

186 WILLIAM STREET **NEW YORK 38, N. Y.**

for YOUR ORTHOPEDIC-PROSTHETIC-SURGICAL MATERIALS

- COUTILS
- BROCADES
- MOLESKIN
- BONING
- SPINAL STEELS
- BUCKLES
- ELASTIC AND NON-ELASTIC WEBBING
- GARTERS
- FELT
- RIVETS
- FOAM RUBBER
- ARTIFICIAL LIMB WEBS
- NYLON CORDS
- EYELET AND LACE TIPPING MACHINES
- ARTIFICIAL LIMB BUCKLES
- COTTON AND NYLON STOCKINETTE
- COTTON
- NYLON
- SILK THREAD

"Order with Confidence from

FEINER BROS.

381 PARK AVE. SOUTH
NEW YORK 16, N. Y.

CATALOGUE ON REQUEST

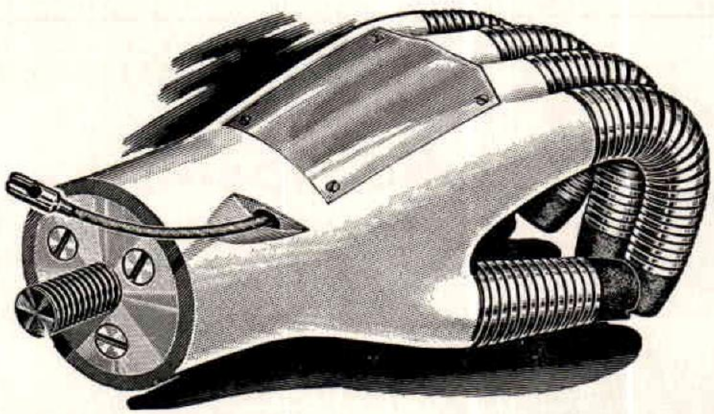
We Know Your Requirements"

You Can Depend On The Famous Becker LOCKGRIP Hands To Give The Amputee The Best In—

A Positive Locking Hand — Precision Control — Smooth Action to a Full 4-in. Opening — Adjustable Spring Tension — Full 5 Finger Action, Easily Controlled — Natural in Movement and Appearance. Can be Worn with All Makes of Cosmetic Gloves.

Model B

Same Action as the Lockgrip with 4 Finger Opening with Rigid Little Finger Anchored Into Base of Hand.



Plylite — The Laminated Wood Hand with the Fibre Cored Fingers Locking or Nonlocking Thumb. Lockgrip — Model B — Plylite Built in Sizes from 6 to 9½.

D. B. BECKER CO.

152 W. Stevens St. St. Paul 7, Minnesota

ANY TYPE **ANY STYLE**

Special Orthopedic Shoes
MADE TO ORDER

Send us the negative casts, we make the Shoes to your or your Doctor's specifications.

WE SPECIALIZE IN EXTREME CASES.

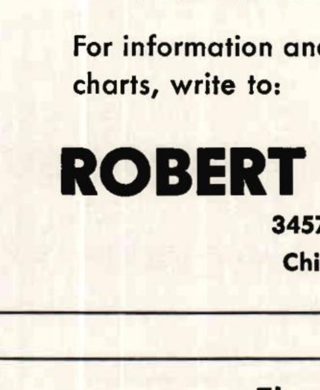
For information and price list, also free measuring charts, write to:

ROBERT O. PORZELT

3457 Lincoln Avenue
Chicago 13, Illinois

The "ORIGINAL"
WILLIAMS Lumbo-Sacral Flexion Brace

(Designed by Dr. Paul C. Williams)



"To reduce the lumbo-sacral lordosis and thus lift the weight from the posterior vertebral structures. Permits free ant. flexion of the lumbar spine but prevents extension and lateral flexions."

Measurements:

1. Chest (about 4" below nipple line)
2. Waist (at navel line)
3. Pelvic (1/2 distance between greater trochanter and crest of ilium)
4. Seventh cervical spinous process to the prominence of Coccyx.

ALL ORTHOPAEDIC APPLIANCES

Orders filled at the request of members of the profession only

MILLER BRACE & SURGICAL SUPPORT CO.

P. O. Box 26181
3902 Gaston Avenue Dallas, Texas

Filkote

- A new urethane coating developed especially for Orthopedic and Prosthetic work.
- Filkote combines chemically with leather—forms non-toxic, flexible, glossy surface.

Filkote eliminates perspiration problems

Fillauer

ORTHOTIC SPECIALTIES
LOWER EXTREMITY BRACE PARTS

Only Fillauer offers a source of supply
for
ADJUSTABLE STAINLESS STEEL BRACES
for growing children

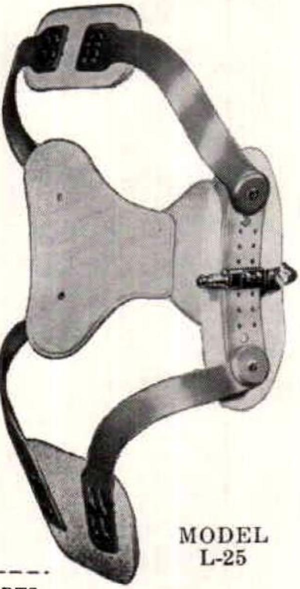
Low Profile—
Drop Lock Knee Joint
Adjustable Ankle Joint Bars

Write for catalog

Fillauer SURGICAL SUPPLIES, INC.
Established 1914

P. O. BOX 1678
CHATTANOOGA, TENN.

Becker ADJUSTABLE HYPEREXTENSION BRACE



- Quick release, snap-out attachment
- Adjustable, self aligning posterior pad
- Rotating adjustment for sternal and pubic pads
- Vertical and horizontal sliding adjustments
- Bi-lateral worm gear traction bands
- Plastic water resistant pad covers
- Constructed of 24 ST aluminum

MANUFACTURERS OF PRECISION-MADE BRACE PARTS

BECKER ORTHOPEDIC APPLIANCE COMPANY **24 Hour Service**

1776 South Woodward • Birmingham, Michigan

A world of experience at your service!

Dr Scholl's ORTHOPEDIC SHOES MADE-TO-ORDER

We have the most complete Custom Shoe Department, staffed by fully experienced orthopedic shoemakers. Special last turning machines.

Shoes entirely produced by hand for:

SHORT LIMBS · DEFORMITIES · CLUB FEET
POLIO · ENLARGED JOINTS · AMPUTATIONS
UNUSUAL SHAPE FEET · CONTRACTED TOES

Made from your plaster casts and weight-bearing measurements, or doctors' prescriptions. Special lasts, special patterns, cork build-ups, etc. Also special factory-made shoes for men and women with leathering or build-up of standard Dr. Scholl's lasts.

For information, write: **Dr. Scholl's ORTHOPEDIC DEPT.**
213 W. Schiller St., Chicago 10, Ill.

TRU-EZE

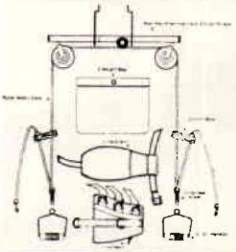
REVOLUTIONARY NEW

TRU-EZE

DW-17 Rehabilitation Exercise Set

with Illustrated Exercise Booklet

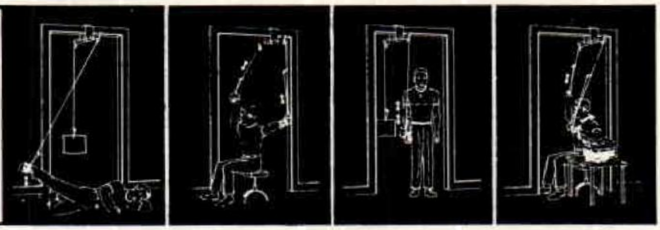
Ideal for use where there is framing but no doors, or have sliding doors.



PACKAGE CONTENTS

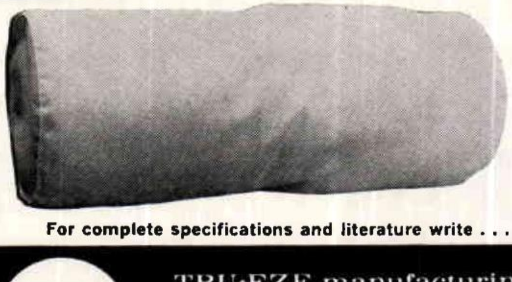
Door-Way Attachment with 2 Nylon Pulleys
Nylon Safety Cord
2 "D" Handles
2 Harness Snaps
2 Hitch Bars
1 Hand Mitt
1 Foot Boot
1 Weight Bag

Illustrated Exercise Booklet



The Jackson Cervipillo

For the treatment and prevention of painful neck conditions



For complete specifications and literature write . . .

TRU-EZE

TRU-EZE manufacturing co., inc.
Traction Specialties
P. O. BOX 855 • BURBANK, CALIFORNIA

"Are You Turning Business Away?"

This year more than 167 orthopedic appliance shops reaped "extra profits" because they made Child Life shoes available to prescribing doctors and their young patients.

Child Life — the nation's largest producer of special purpose shoes for children — knows that shoe retailers in many communities are not providing the specialized needs of doctors and their young patients.

Here's an opportunity that's yours for the taking. It's estimated that *one* doctor recommending *one* new patient weekly to your shop results in over $1600 additional annual sales of Child Life Arch Feature shoes. Your potential new market is $1600 times the number of doctors you now work with who prescribe children's shoes. Why turn this business away?

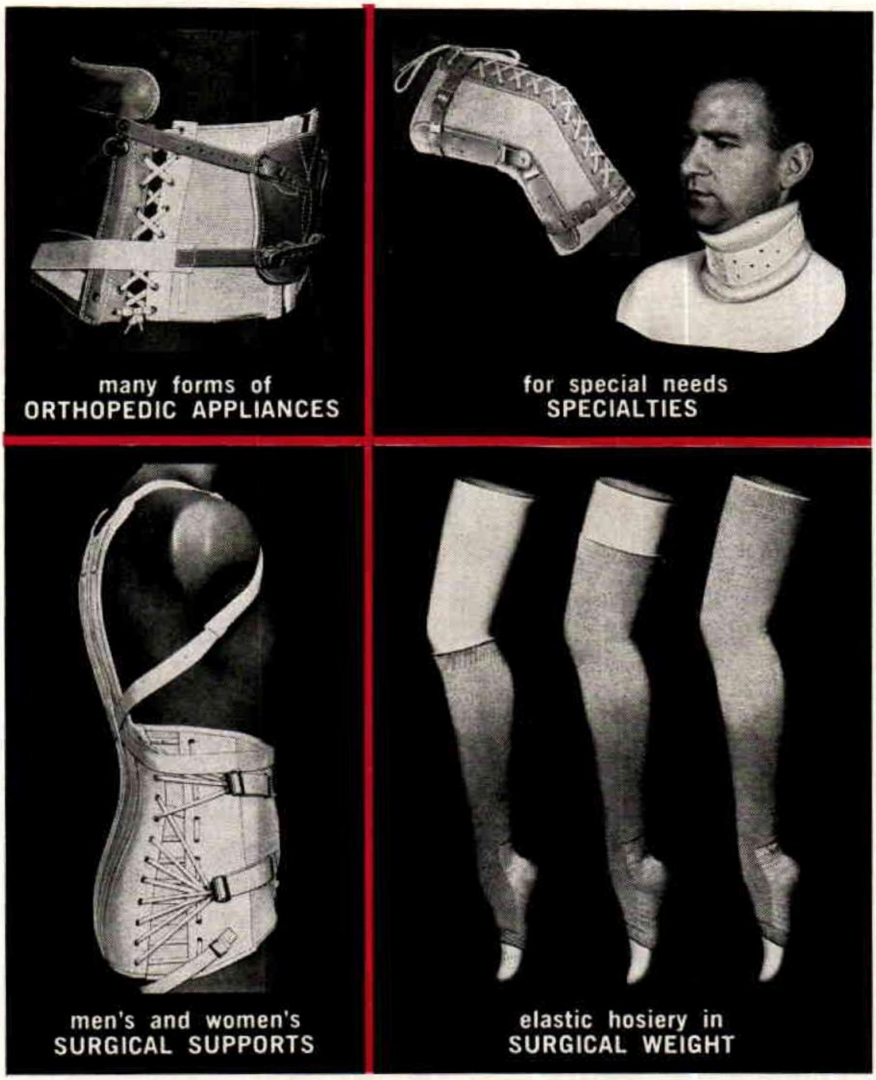
Child Life shoes have proven themselves in bracing situations. Quality is undisputable — a line of shoes and services the most complete in the industry. Many members of your profession have already taken this profitable step. How about you? Your inquiry will get immediate attention.

Child Life
SHOES

If product or performance defective · Good Housekeeping · Guarantees · Replacement or refund to consumer

HERBST SHOE MANUFACTURING CO.

Box 2005 Milwaukee, Wisconsin 53201



TRUFORM . . . when anatomically correct support is needed. Available only from the Ethical Appliance Dealer.

THE RED BOOK

WRITE for "Truform Red Book," fully illustrated reference catalog.

TRUFORM

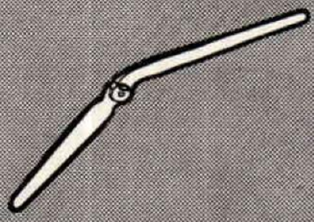
anatomical supports

3960 Rosslyn Drive, Cincinnati, Ohio 45209
Branches: New York, San Francisco, Texarkana

UNDER NEW MANAGEMENT!

SPRACKLEN JOINT WORKS

ACE HIP JOINTS



SUCCESS BELOW KNEE JOINTS

ACE BELOW KNEE JOINTS

TOTAL CONTACT SUCTION SOCKET VALVES

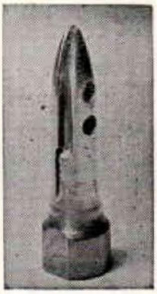
DIVISION OF

ORTHO-PNEUMATIC

3045 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA 94609

New Helps for your

TRAUTMAN CARVER



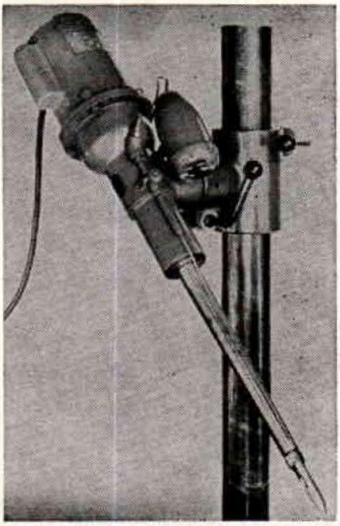
MIDGET CUTTER—No. 2100H

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

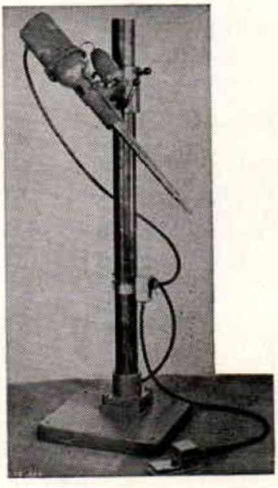
Air Attachment for

Trautman Carver

No. 2100J



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



FOOT SWITCH

(For the Trautman

Carver 2100K)

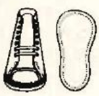
We've had requests for a foot-operated switch, and this is the answer. It can be attached in a matter of minutes to any Trautman Carver. Designed so that if the operator wishes to use the hand switch instead of the foot pedal, all he has to do is remove the motor plug from the receptacle on the column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

TRAUTMAN SPECIALTIES, INC.

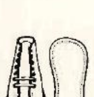
410 Portland Avenue, Minneapolis, Minnesota

Your major selling point . . .
Doctors Prescribe CHESBROUGH Orthopedic Pre-Walkers

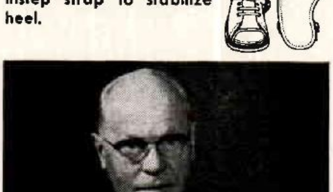
No. 1400 OPEN TOE
Straight-line symmetrical last, firm heel, no back seam. Adaptable to Denis Browne Splints.



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



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



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

This is the reason Chesbrough Orthopedic Shoes have had such spectacular success in five short years. Orthopedic surgeons in 49 states and many foreign countries are now prescribing them. This large referral business continues to grow and we invite you to share in it.

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

This problem was brought home to Chesbrough's president, Louis C. Weld, a few years ago, when a child in his own family needed such a shoe. Recognizing the need for orthopedic shoes at an economical price, Chesbrough put their 65 years of shoemaking experience to work and Chesbrough Corrective Pre-Walker Shoes were born.

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

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

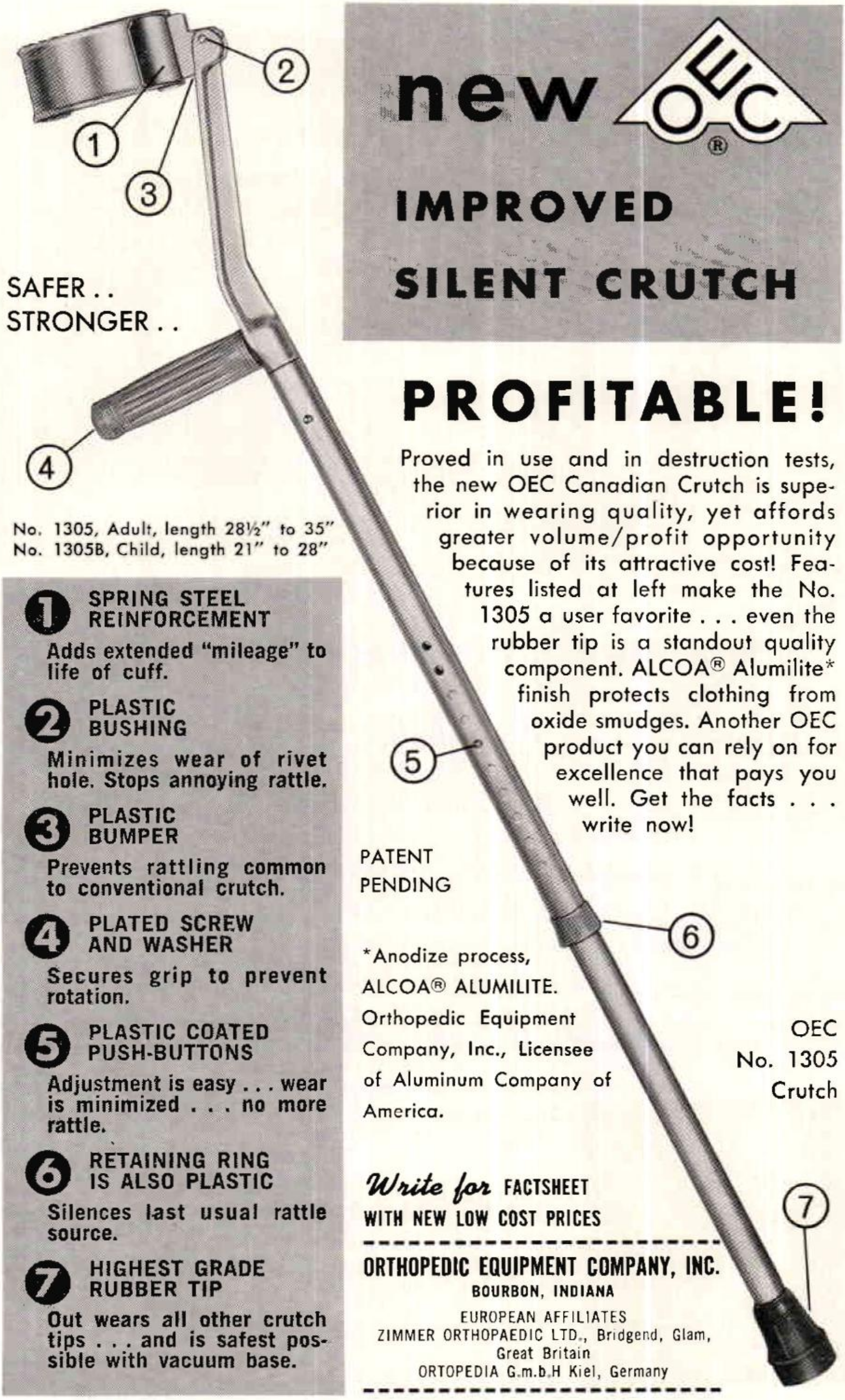
MAIL COUPON FOR SAMPLES

G. W. CHESBROUGH CO.
797 Smith Street, Rochester 6, N. Y.

NAME ____________________

ADDRESS ____________________

CITY ____________________ STATE ____________________



new OEC
IMPROVED
SILENT CRUTCH
SAFER . .
STRONGER . .
PROFITABLE!
Proved in use and in destruction tests, the new OEC Canadian Crutch is superior in wearing quality, yet affords greater volume/profit opportunity because of its attractive cost! Features listed at left make the No. 1305 a user favorite . . . even the rubber tip is a standout quality component. ALCOA® Alumilite* finish protects clothing from oxide smudges. Another OEC product you can rely on for excellence that pays you well. Get the facts . . . write now!
No. 1305, Adult, length 28½" to 35"
No. 1305B, Child, length 21" to 28"
1 SPRING STEEL REINFORCEMENT
Adds extended "mileage" to life of cuff.
2 PLASTIC BUSHING
Minimizes wear of rivet hole. Stops annoying rattle.
3 PLASTIC BUMPER
Prevents rattling common to conventional crutch.
4 PLATED SCREW AND WASHER
Secures grip to prevent rotation.
5 PLASTIC COATED PUSH-BUTTONS
Adjustment is easy . . . wear is minimized . . . no more rattle.
6 RETAINING RING IS ALSO PLASTIC
Silences last usual rattle source.
7 HIGHEST GRADE RUBBER TIP
Out wears all other crutch tips . . . and is safest possible with vacuum base.
PATENT PENDING
*Anodize process, ALCOA® ALUMILITE. Orthopedic Equipment Company, Inc., Licensee of Aluminum Company of America.
OEC No. 1305 Crutch
Write for FACTSHEET WITH NEW LOW COST PRICES
ORTHOPEDIC EQUIPMENT COMPANY, INC.
BOURBON, INDIANA
EUROPEAN AFFILIATES
ZIMMER ORTHOPAEDIC LTD., Bridgend, Glam, Great Britain
ORTOPEDIA G.m.b.H Kiel, Germany

Now Available:

HYGIENIC PROBLEMS of the AMPUTEE

The American Orthotics and Prosthetics Association announces the publication of *Hygienic Problems of the Amputee,* by S. William Levy, M.D. and Gilbert H. Barnes, M.D.

Orders for this illustrated pamphlet, in quantities of 100 or more, should be addressed to AOPA, 919 18th Street, N.W., Washington, D. C. 20006.

100 to 499 copies . . . 15¢ each

500 copies or more . . . 10¢ each

ADVERTISING DATA FOR AOPA PUBLICATIONS

Orthopedic and Prosthetic Appliance Journal

A Quarterly Publication

Which Includes in Its Mailing List Many

PHYSICIANS, SURGEONS, HOSPITALS, MEDICAL AND REHABILITATION CENTERS

As Well as Members of the Limb and Brace Profession

AOPA Almanac

A monthly bulletin for members of the Association which carries Trade News from its advertisers and is sent by first class mail to insure quick delivery.

RATES PER ISSUE:

Two-Column (7½" by 4½")	$90
Two-Column (3¾" by 4½")	$55
Directory Box	$15
Double Directory Box	$30

Closing Dates: 10th of Month Preceding Issue

JOURNAL INDEX FOR 1964

Part I—Subjects

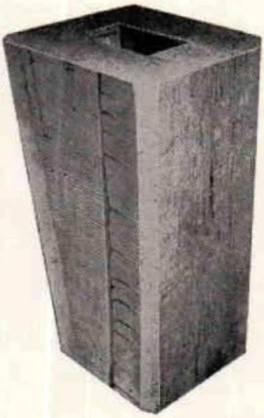
Part II—Authors & Titles, Including Obituaries and Biographical Sketches

SOUTHERN PROSTHETIC SUPPLY CO.

POST OFFICE BOX 7443

947 JUNIPER STREET, N.E. • ATLANTA, GA. 30309

QUADRILATERAL SOCKET BLOCKS



Size	Top
Small	6" x 7½"
Medium	7" x 10"
Large	7½" x 11"
Extra Large	9" x 11"
Super	10" x 11"

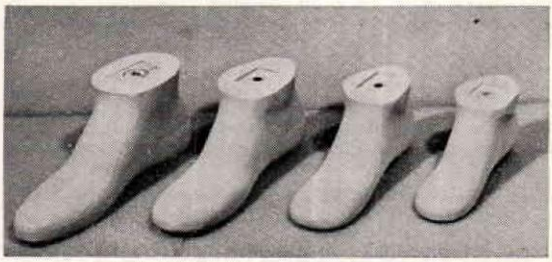
All blocks 18" long

SPS LAMINATED SACH FEET

Blanks

Shaped

Special



KINGSLEY MOLDED SACH FEET

VA Approved

"Everything for the Prosthetic Manufacturer"

MINNEAPOLIS ARTIFICIAL LIMB CO.

410 PORTLAND AVENUE • MINNEAPOLIS, MINN.

THE AMERICAN ORTHOTICS AND PROSTHETICS ASSOCIATION

(Formerly the Orthopedic Appliance and Limb Mfrs. Assn.)

919 18th Street, Washington, D. C. 20006

Area Code 202-296-4160

OFFICERS

Herbert J. Hart, President
Oakland, California

David C. McGraw, President-Elect
Shreveport, Louisiana

Fred J. Eschen, Vice President
New York, N. Y.

M. P. Cestaro, Secretary-Treasurer
Washington, D. C.

Robert C. Gruman, Past President
Minneapolis, Minnesota

STAFF

**Lester A. Smith, Executive Director
Washington, D. C.**

Stockton V. Banks, Managing Editor and Public Relations Assistant

Bertha A. Meiers, Annette Aub, Carol Laing

REGIONAL DIRECTORS

Region I—**Howard V. Mooney
Burlington, Massachusetts**

Region II—**Benedict Pecorella
Buffalo, New York**

Region III—**Charles H. Dankmeyer
Baltimore, Maryland**

Region IV—**William A. McElduff**
Asheville, North Carolina

Region V—**Bart J. Crowley**
Akron, Ohio

Region VI—**John A. DeBender**
Chicago, Illinois

Region VII—**Donald R. Bohnenkamp**
Omaha, Nebraska

Region VIII—**Charles Kymes**
San Antonio, Texas

Region IX—**Leroy E. Noble
Whittier, California**

Region X—**Earl Cummings**
Sacramento, California

Region XI—**William L. Bartels
Portland, Oregon**

AMERICAN BOARD FOR CERTIFICATION IN ORTHOTICS AND PROSTHETICS, INC.

Theodore W. Smith, C.O., President
Kansas City, Missouri

Richard H. Jones, M.D., Vice President
Minneapolis, Minnesota

Durward R. Coon, C.P.O., Secretary-Treasurer, Detroit, Michigan

William E. Brownfield, C.P.O.
Boise, Idaho

Edward T. Haslam, M.D.
New Orleans, Louisiana

Bert R. Titus, C.P.O.
Durham, North Carolina

Claude N. Lambert, M.D.
Chicago, Illinois

M. P. Cestaro, Consultant
Washington, D. C.

Chester C. Haddan, C.P.O., Consultant
Denver, Colorado

George H. Lambert, Sr., C.P.O., Past President, Baton Rouge, Louisiana

STAFF

**LeRoy Wm. Nattress, Jr., Executive
Director, Washington, D. C.**

Aileen Quinn and **Judi Engquist**

"PLASTISKIN" Perfection

**"Color stability is good, permanence is satisfactory—
resistance to soiling is substantially superior—
are much easer to keep clean."**

"Human Limbs & Their Substitutes," sponsored by
Committee on Artificial Limbs, National Research Council.

Tenenbaum, Prosthetics

463-469 East 142nd Street, New York 54, N. Y.