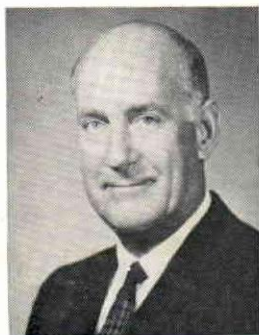


SEPTEMBER, 1964

ORTHOPEDIC & PROSTHETIC APPLIANCE

*The Journal of the
Limb and Brace Profession*

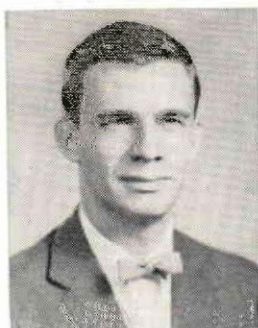
JOURNAL



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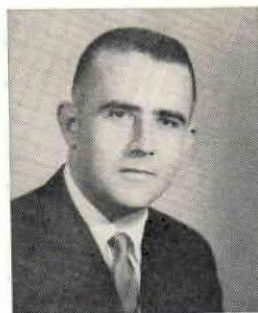
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ASSEMBLY SPEAKERS

See pages 187-191

publisher:

American Orthotics and Prosthetics Association

OFFICIAL NOTICE

**The 1964 National Assembly of the
American Orthotics and Prosthetics Association**

will be held November 8 - 12, 1964

at the Hollywood Beach Hotel, Hollywood Beach, Florida

PROGRAM DETAILS ON PAGES 187-191

FOR INFORMATION

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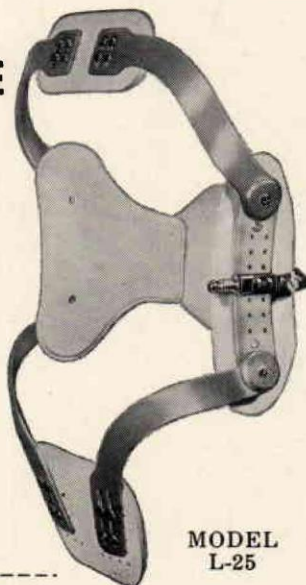
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VOLUME 18

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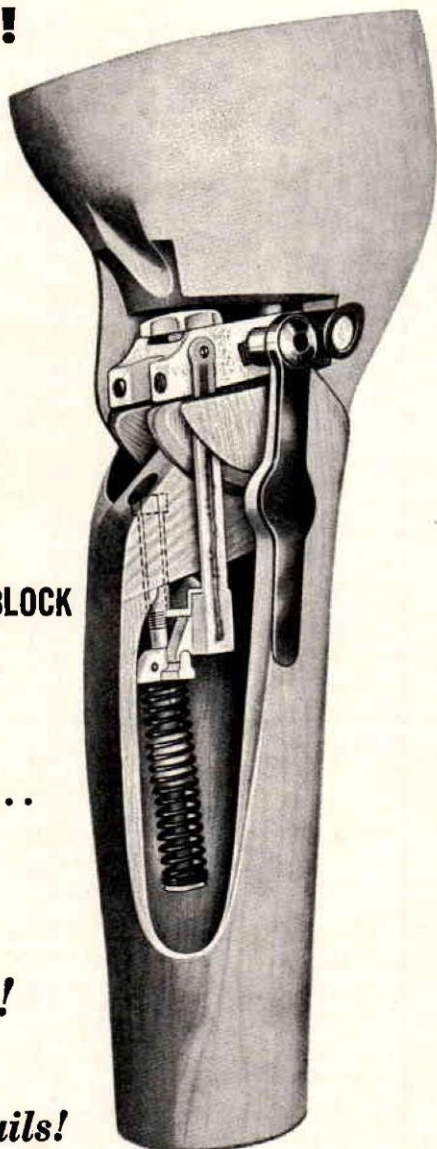
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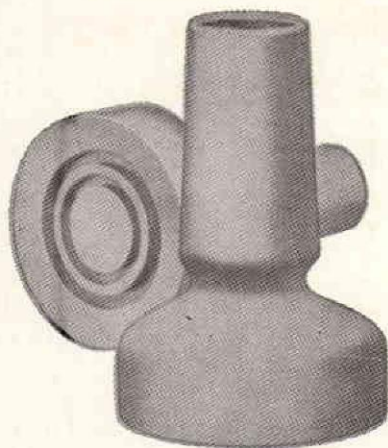
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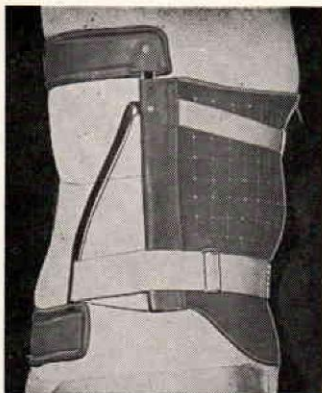
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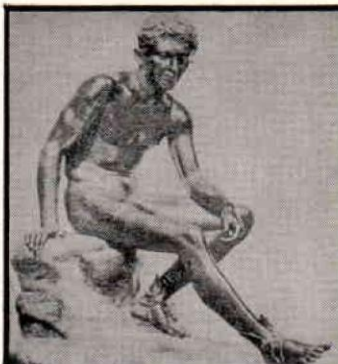
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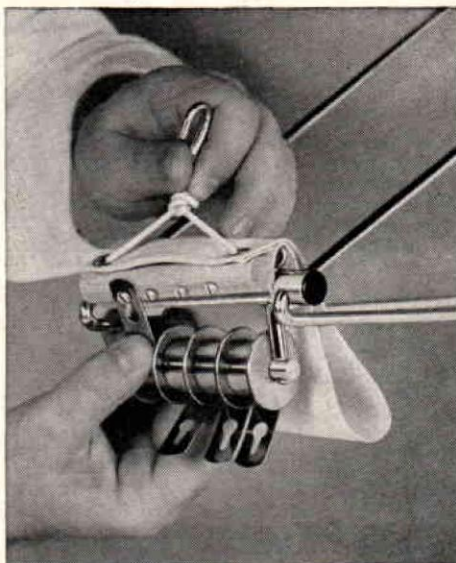
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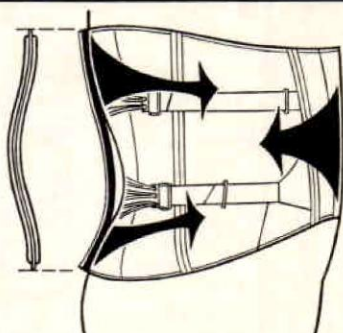
No dangling, jerking, fluctuating weights to create problems; no friction losses through ropes and pulleys to leave prescriptions in doubt. Each Traxion Instrument is lightweight, portable and completely self-contained for easy use (or easy storage when not in use). Check this unprecedented accuracy-plus-convenience offered by Camp-Raymond for cervical, pelvic or lower-extremity traction.



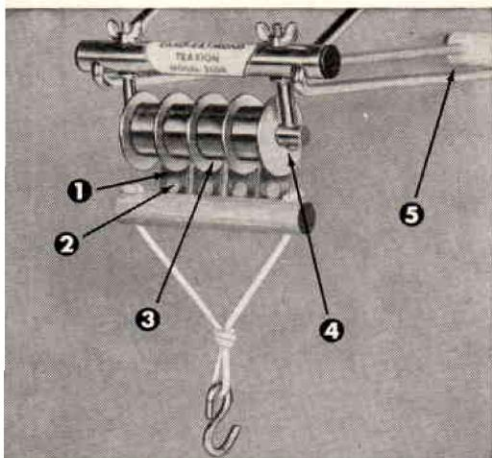
EXACTLY FOUR POUNDS IN FOUR SECONDS—that's how easy each flexible steel tape can be engaged to give **exactly four pounds of steady traction pull.** Total pull depends on number of tapes engaged. Tapes pull downward for various height adjustments, yet tension remains accurately constant at all heights. Durable fabric control cover prevents over-extension of tapes.

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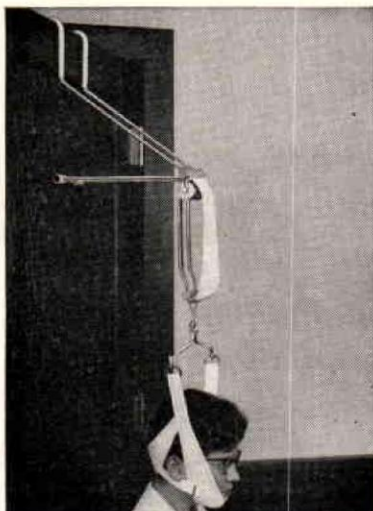
... and true to the same tradition of design and manufacturing leadership that has made Model 267 a pace setter in sales:



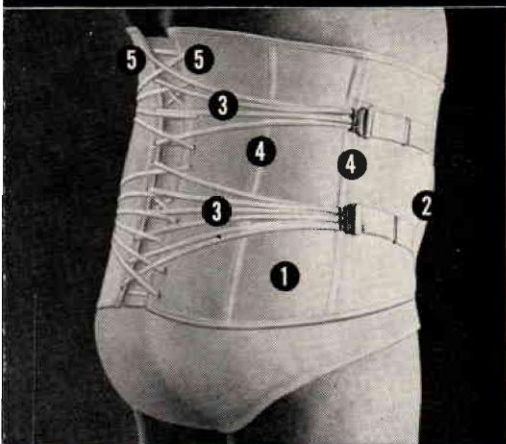
Used with either shaped steels or our reinforced pad, the garment provides a three-point suspension that supports the spine in a flexed position to rest and control it more effectively.



CHECK THESE FUNCTIONAL FEATURES (fabric control cover removed to show detail) ① spools of stainless steel tapes uncoil for steady "spring-steel tension" accurately set at 4 lbs. per tape in applied traction ② steel tapes are easily engaged or disengaged to regulate traction by slipping screw-slots on or off pinbar screws as shown in photo at left ③ four-spool model permits 4-to-16 lbs. of traction according to number of spools engaged ④ durable aluminum and stainless steel construction assures long-lasting dependability; spring-steel tension guaranteed accurate for 5 years ⑤ solid cold-rolled steel door bracket is rubber-padded at pressure points to protect door.



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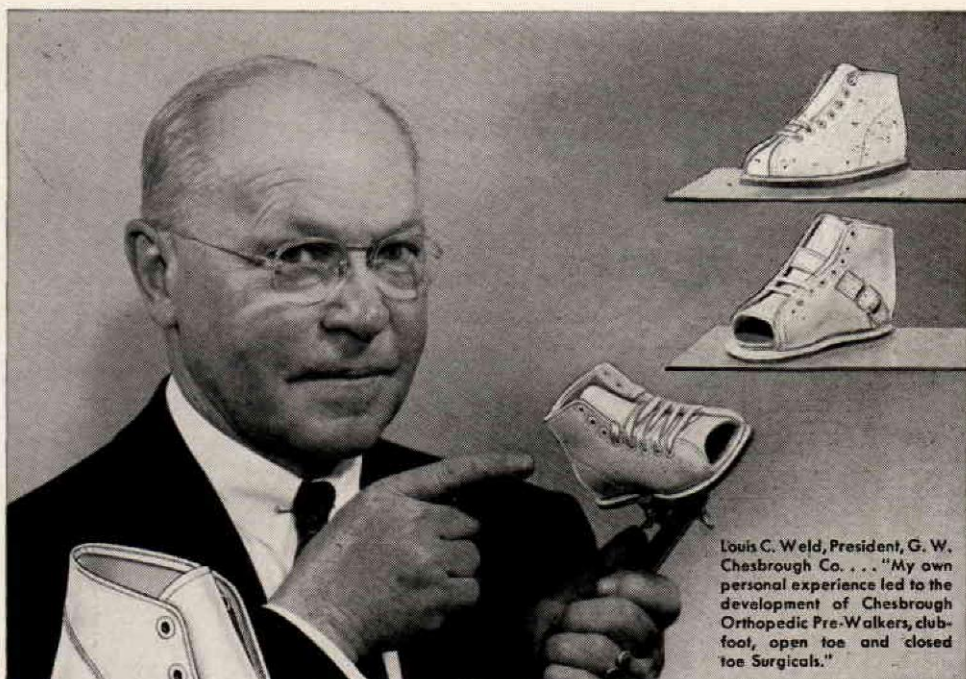
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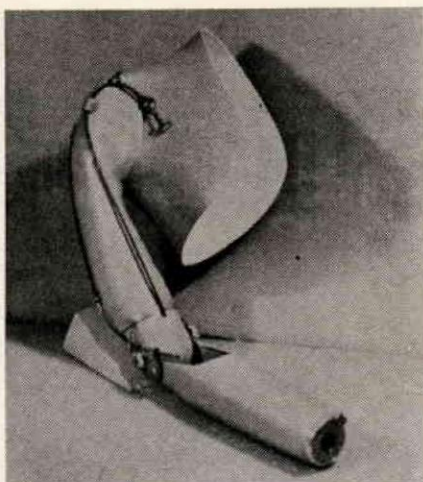
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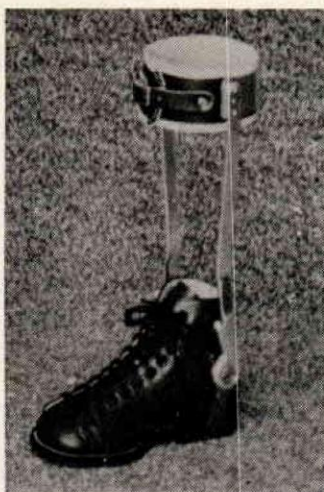
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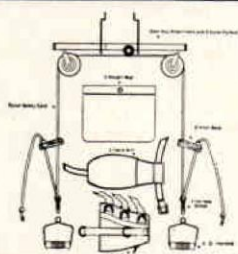
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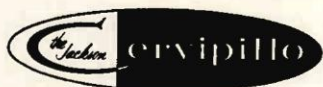
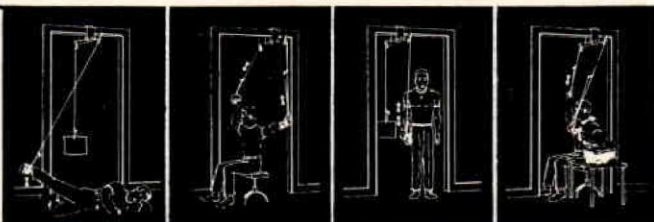
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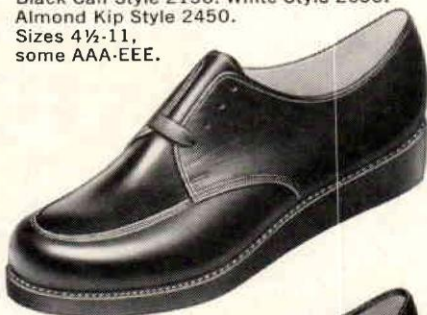
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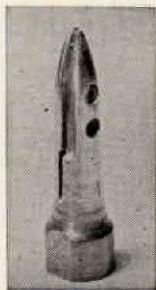


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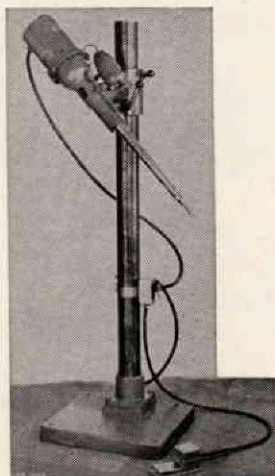


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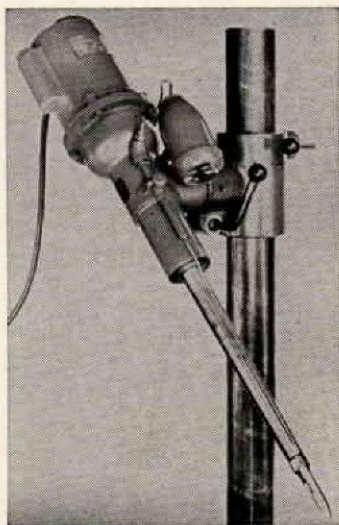
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All persons interested in the rehabilitation of the orthopedically handicapped are eligible to attend the 1964 Assembly of the Orthotics and Prosthetics Profession. This meeting, sponsored by the American Orthotics and Prosthetics Association, will be held at the Hollywood Beach Hotel, Hollywood Beach, Florida, November 8-12, 1964. Registration forms and additional program information may be obtained by writing to: A.O.P.A., 919 18th Street, N.W., Washington 6, D. C.

A.O.P.A ASSEMBLY **PRELIMINARY PROGRAM**

November 8—Sunday

OPENING DAY

10:00 a.m. - 5:00 p.m.—Supply and Technical Exhibits Open.

The Committee on Advances in Prosthetics and Orthotics will meet in the morning (members of the Committee only).

AFTERNOON

Opening Session of the Assembly.

Welcome from PRESIDENT GRUMAN.

The Milwaukee Brace in the Treatment of Scoliosis—Part I

WALTER P. BLOUNT, M.D., RICHARD G. BIDWELL, C.P.O. in charge.

EVENING

Reception and Western Steak Fry.

November 9—Monday

8:00 a.m.—Keynote Breakfast.

EDWARD ANNIS, M.D., will deliver the Keynote Address. Dr. Annis was President of the American Medical Association 1963-64 and of the World Medical Association.

10:00 a.m.—Exhibits Open.

The Milwaukee Brace in the Treatment of Scoliosis—Part II

AFTERNOON

Certification Luncheon—Open to All.

Presiding officer: GEORGE H. LAMBERT, SR., C.P.O., President of the American Board for Certification.

Business Meeting.

Annual Closed Business Meeting of the American Board for Certification.

The Hip Disarticulation Prosthesis—Variations in Prosthetic Practice.

FRED HAMPTON, C.P.O., Northwestern University Prosthetics Research Center, WILLIAM SOBBE, C.P.

NOTE: The AOPA Conference of Prosthetists will hold its opening session at 5:30 p.m. This group will hold technical discussions and plan programs with representatives of CPOE before and after dinner.

November 10—Tuesday

MORNING

BETTY HANICKE and ALAN FINNIESTON—Coordinators for the day.

8:30 a.m.—Exhibits Open.

Selected films in prosthetics and orthotics. Comments on European films by MAX NADER.

Juvenile Orthotics.

Presentation of patients. ROBERT P. KEISER, M.D. and ALAN FINNIESTON, C.P. A number of braces will be demonstrated on patients suffering from various disabilities. The advantages, the reasons for their use and the shortcomings of the various types of braces commonly used for children will be discussed. Comments and suggestions from the orthotists in the audience will be encouraged. A second film session will precede luncheon.

AFTERNOON

Juvenile Prosthetics.

NEWTON C. MCCOLLOUGH, M.D. and JACK CALDWELL, C.P. Presentation of patients and discussion of prosthetic problems.

Geriatric Amputees.

AUGUSTO SARMIENTO, M.D. and IRVING ENEY, M.D. Presentation of patients and discussion of prosthetic problems.

6:00 - 9:00 p.m.—A O P A - N U BUSINESS COURSE ALUMNI, SESSION I

Dinner Meeting. DR. KENNETH S. JOHNSTON, Assistant Professor of Accounting, Northwestern University School of Business. Review of the budgeting, profit planning, cost control and pricing segments of the course as it now exists. Substantial time will be allocated to discussing participants' operating problems. Registration fee: \$25.00 for both sessions (to be paid to Northwestern University).

November 11—Wednesday

MORNING

8:00 a.m. - 12 noon—Exhibits Open.

Last chance to see the exhibits. They will be open from 8:00 to 12:00 noon and will then be removed from the exhibit hall.

Biomechanics and Foot Deformity as they relate to Orthopedic Appliances and Orthopedic Shoes—Alignment Problems.

CHARLES FRYER, Northwestern University; ERICH HANICKE, C.P.O.

International Activities in Orthotics and Prosthetics.

HOWARD THRANHARDT, C.P.; ANTHONY STAROS, Director of V.A. Prosthetics Center; A. BENNETT WILSON, Technical Director, Committee on Prosthetics Research and Development.

11:00 a.m.—VETERANS DAY OBSERVANCE

Demonstrations on the Fitting Technique for Very Short Below-Elbow and for Partial Hand Amputation.

WILLIAM A. TOSBERG, C.P.O., Director of Prosthetics; Moderator: FRED ESCHEN, C.P.O., Chairman AOPA Committee on Advances in Prosthetics and Orthotics.

AFTERNOON

Round Table on Problems and Current Practices Relating to Total Contact Fitting and the Patellar Tendon Bearing Prosthesis.

BASIL PETERS, C.P.O., Moderator.

Panel: JOSEPH MARTINO, BERT TITUS, CARLTON FILLAUER, ALVIN MUILENBURG and JOHN GALLO.

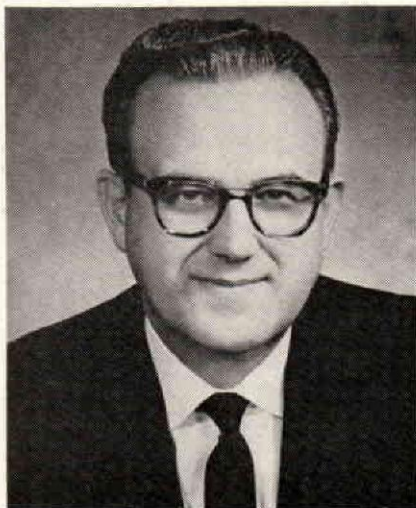
3:30 p.m.—ELECTION OF OFFICERS.

The annual AOPA Business Session and Election of Officers will be held at 3:30 p.m. Meeting open to members only. ROBERT C. GRUMAN, President of the Association, will preside.

EVENING

7:00 p.m.—RECEPTION.

AOPA will entertain followed by the annual Assembly Banquet. PRESIDENT GRUMAN will preside. PRESIDENT-ELECT HERBERT HART, C.P.O., will be formally installed together with the other officers elected for 1964-65.



BANQUET SPEAKER—DR. CARL C. BYERS

Well-known educator and
humorist-philosopher

Sponsored by General Motors Corporation

November 12—Thursday

AOPA Board of Directors will meet in closed session this morning with National Officers and Headquarters staff to review plans for the year ahead.

AFTERNOON

12:00 - 3:00 p.m.—A O P A - N U BUSINESS COURSE ALUMNI, SESSION II.
(Luncheon Meeting). DR. KENNETH S. JOHNSTON.

POST CONVENTION TRIP

The AOPA members and others registering for the Post-Convention conferences in Puerto Rico and the Virgin Islands should be at the Miami airport not later than 4:45 p.m. The party will leave on Eastern Airlines at 5:15 p.m., arriving at San Juan, Puerto Rico at 8:50 p.m.

November 13—Friday

The Role of Orthotics and Prosthetics in Rehabilitation.

This conference in the Sheraton Hotel in San Juan will be attended by members of AOPA and invited members of the medical profession, rehabilitation officials and therapists. This session will be opened by the President of the Association.

DR. J. WARREN PERRY, Deputy Assistant Commissioner of VRA, will speak on VRA's role in rehabilitation programs for the orthopedically disabled.

Demonstration of Upper Extremity Devices.

JERRY LEAVY.

Demonstration of Externally Powered Appliances.

L. BENSON MARSH, C.P.

Question and Answer Session.

A visit to the University of Puerto Rico and a tour of old and new San Juan.

November 14—Saturday

Late afternoon departure to St. Thomas in the Virgin Islands.

November 15—Sunday

Tour of St. Thomas—AOPA Reception.

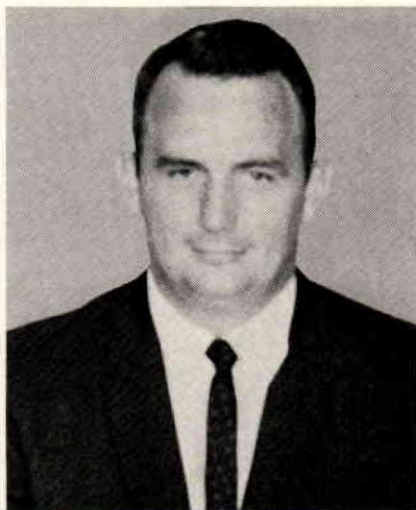
November 16—Monday

Morning Free for Conference.

Return to Miami on Eastern Airlines flight No. 144 leaving 8:25 p.m., arriving in Miami at 10:55 p.m.



ERICH HANICKE
Program Chairman



RONNEY SNELL
Chairman of Exhibits

An Alternative to Amputation for Complicated Fracture of the Tibia

By

FRED W. LOVE, M.D.

Chief, Surgical Service, USPHS Hospital, Boston 35, Mass.

SAMUEL POLSKY

Prosthetist; Manager, J. E. Hanger, Inc., Boston 15, Mass.

H. STUART BARKER, C.P.

J. E. Hanger, Inc., Boston 15, Mass.

PETER C. RIZZO, III, M.D.

Assistant Chief, Surgical Service (Orthopedics), USPHS Hospital, Boston 35, Mass.

Despite the extensive use of antibiotics and the development of new techniques of open reduction and internal fixation, fractures of the tibia continue to present a challenge to the medical profession. A significant number of these severe injuries result in non-union despite repeated bone grafts and others result in useless extremities because of various degrees of osteomyelitis. Historically, in order to permit rehabilitation of individuals with these unusually complicated fractures, the surgeon has resorted to amputation in order to permit satisfactory fitting of a prosthesis. In many of these cases, however, the only restriction in function is that of weight-bearing. Surgical ablation is accepted by the patient reluctantly for cosmetic and psychological factors as well as the cost and worry of undergoing an operative procedure. A patient recently treated by us clearly illustrates these points. We believe that our solution for him may avoid amputation in carefully selected similar cases.

Case Report

A 31-year-old Coast Guardsman was injured in an automobile accident on 1/21/57. He sustained a closed fracture of the upper one-third of the left tibia and fibula, fractures of the transverse processes of L 4 and L 5 on the right, and multiple fractures of the pelvis. He also sustained head injuries and was unconscious for approximately three weeks. Open reduction and plate fixation of the tibial fracture was performed. On 10/18/57 the screw and plate were removed because of delayed union and a heavy cortical bone graft from the right tibia was applied. He progressed to crutch walking with partial weight-bearing, but non-union persisted and a fracture across the bone graft occurred. On May 8, 1959, a repeat open reduction of the fracture of the tibia with a Lottes intramedullary nail and bone graft from the ilium was done. Seven months later the intramedullary nail was removed because of drainage about the upper nail site. Osteomyelitis persisted and on 3/24/60, incision, drainage and debridement of the fracture site was performed. Subsequently, several operative procedures were carried out for the management of the osteomyelitis and by 7/28/60, infection had clinically subsided and the patient was placed in an ischial weight-bearing brace. Non-union persisted and on 2/6/61 open reduction with iliac and fibular bone

grafts were performed with wide resection of the non-union site. He was maintained in a long leg cast, but no union occurred.

On several occasions during the later stages of his therapy, amputation was recommended by several physicians. The patient was adamant in wishing to retain his leg, holding a somewhat forlorn hope of eventual union. It was the unanimous opinion of several surgeons that no further attempts at bone grafts or operative procedures for promoting bony union were justified. Two standard braces proved inadequate.

Figure 1 shows an x-ray of his tibia.

Our dilemma was to fit the patient with a prosthetic device without surgical removal of the flail and useless portions of his lower extremity. This device must allow no weight bearing on the heel but permit wearing a conventional shoe in such a manner as to provide a satisfactory cosmetic appearance. It was necessary to have good support and immobilization of the fracture site, to avoid trauma to the thin and atrophic skin over the areas of the multiple operations and to compensate for the 3" of shortening. It was desirable also to permit an increasing range of motion of the knee. By application of the Patellar-Tendon-Bearing principle, it seemed possible to achieve the desired results in keeping with the physical conditions and medical requirements.

We developed the device shown in Figure 2. Technically, this is an orthosis, but is used by the patient as a prosthesis, and it incorporates principles ordinarily utilized only in a prosthesis. We prefer to consider the device in its functional capacity, and refer to it as a prosthesis.

When the patient improved his quadriceps strength, the thigh corset was removed and a supracondylar strap added (Figure 3.)

At present, the patient has found the prosthesis most satisfactory and has resumed a surprisingly active life.

Prosthetic Considerations

To satisfy the above-mentioned requirements, the prescription included:

- (1) modified PTB Plastic Socket
- (2) brace bars
- (3) uprights with drop locks and thigh corset removable
- (4) foot plate for shoe
- (5) adjustable stirrup extension

Design

The extended PTB Socket was bivalved in the medio-lateral or frontal plane just posterior to the side bars following optimum antero-posterior alignment of the anterior shell as shown in Figure 2.

The popliteal and posterior pad was made adjustable by the use of velcro closure.

The three velcro straps were extended on the lateral side and riveted to the anterior shell, to serve the purpose of a flexible hinged opening.

The side bars were molded to the PTB shell without ankle joints (to minimize the existing limited ankle motion) but with an adjustable stirrup for height adjustment. The steel foot plate with instep and heel straps were included to stabilize the shoe in the correct anatomical position. (Details are shown in Figure 3.)

The uprights and thigh corset were incorporated with drop locks for stability.

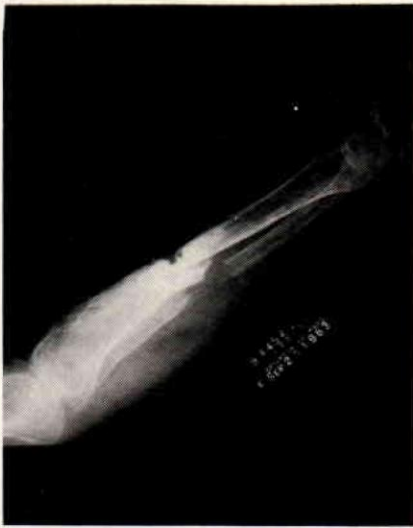


Figure 1: Lateral x-ray view of tibia and fibula showing non-union after multiple operative procedures.

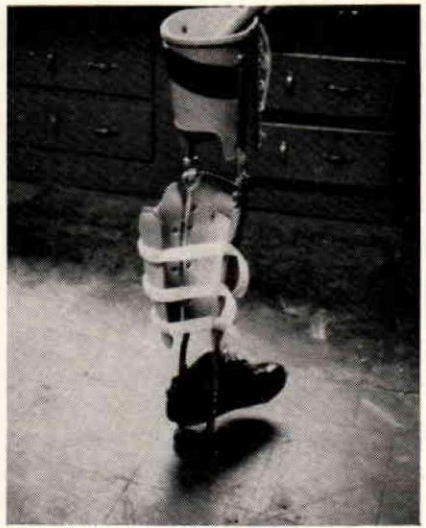


Figure 2: Original prosthesis. Note ease of application and adjustability afforded by the hinged posterior shell using velcro closure.



Figure 3: Patient wearing modification with supracondylar strap. The foot plate is adjusted to avoid weight bearing.

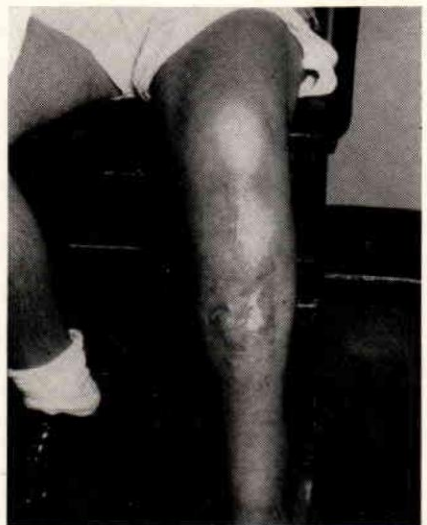


Figure 4: Patient's leg after wearing prosthesis a short time. Note the evidence of proper weight bearing over the patellar tendon.

Fabrication

In casting, the PTB technique was employed with the cast extended to include the lower shaft of the tibia (for good immobilization of the fracture site).

In modifying the cast, extra buildup was applied to relieve the thin and atrophic skin over the affected areas.

The PTB Socket was fabricated in the usual manner. The side braces were molded to the PTB shell and set up with screws.

The foot plate was set up temporarily. At the time of initial fitting, the overall height was obtained by use of the adjustable stirrup type extension. After weight bearing was achieved at the knee and thigh area, the foot plate was adjusted for non-weight bearing.

The velcro closures not only served as a hinge for the posterior shell, but permitted finer adjustment for atrophy. They are easily installed and replaced. Shortly, the drop locks were discontinued. When the supracondylar cuff was installed (Figure 3), it was necessary to modify the posterior pad and velcro closure to minimize tissue pistoning.

Figure 4 shows the weight-bearing area to be similar to that of a patellar-tendon-bearing prosthesis.

Prosthetically, the foreshortened knee-center to floor length in this case was advantageous for non weight bearing (at heel) and roll over and it was not necessary to put a lift on the opposite shoe.

Discussion

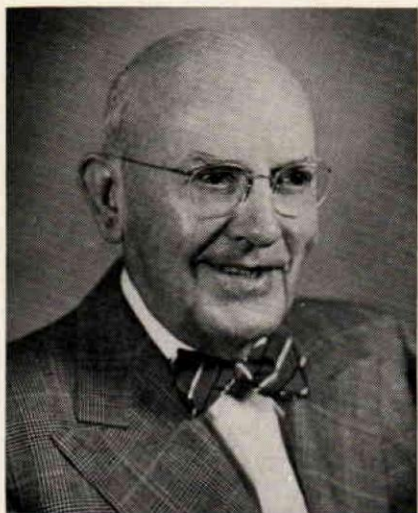
The principle involved in this prosthesis might be applied appropriately in other conditions with slight modification. For example, in certain cases it may be more desirable than a Hessian brace for partial union of fractures of the tibia. In many fractures about the foot and ankle, in various arthritides of the ankle, or in almost any condition where only partial immobilization and/or non-weight bearing is required, this prosthesis may permit earlier and more satisfactory ambulation.

Summary

The application of the patellar-tendon-bearing principle in an orthosis has been found most suitable for a case of complicated fracture of the tibia, where amputation might otherwise have been performed. More extensive utilization of this principle for other type cases shows great promise.

In Memoriam

LUCIUS L. CARR



A TRIBUTE FROM GEORGE LAMBERT, C.P.O.:
"This man was a true friend of the Limb & Brace Profession. He helped a great many of our people and will never be forgotten."

Lucius L. Carr, field representative for S. H. Camp & Co. for 25 years, passed away June 17, 1964, at his home in Brightwaters, L. I., New York.

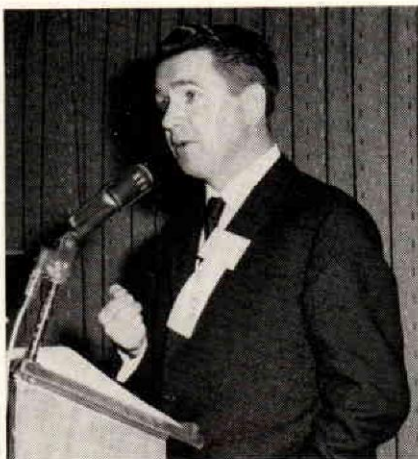
Mr. Carr had been actively engaged in the surgical garment field since he was eighteen. He traveled for the Camp Company in Texas, Oklahoma, Arkansas, Tennessee, Louisiana, Mississippi and Alabama. He was regarded as a dear friend by the AOPA members in his area.

Mr. Forrest I. Yeakey, President of Camp, spoke of the many years of service Lucius had given the company, and how greatly he would be missed by all his associates and acquaintances.

Funeral services were conducted from the Episcopal Chapel in Brightwaters and attended by representatives of the Camp Company.

Prosthetics in Denmark

By ERIK LYQUIST



*An Address Delivered at the Meeting of Region IX
American Orthotics and Prosthetics Association, April 26, 1964*

Since fitting and fabrication techniques are largely based on the same principles as used in this country, I shall not be concerned with technical principles, but concentrate on information about Financing of Prostheses, The Danish Association of Prosthetists and Orthotists, The Education Program, How Our Workshops Are Organized, and How We Evaluate and Adapt Ideas from Other Countries.

Evaluation of the information will to a certain degree depend on some knowledge of Denmark. I would therefore like first of all to give you a very brief introduction to my country. Denmark is the smallest of the Scandinavian countries. It covers a territory, excluding the Faroe Islands and Greenland, of 43,000 sq. km., or about 16,800 sq. miles. If we compare the territory of Denmark with the territory of California, we will find that California is approximately nine times bigger. The population is well over 4½ million; California has, as you know, about three times as many. Approximately 25% of the population live in Copenhagen, the capital of Denmark, well known to American tourists for its main attractions—Tivoli, The Little Mermaid and (not to forget) thousands of young blond girls on bicycles.

Denmark has insular climate. Some 100 days a year the temperature is below the freezing point, but fortunately, as I had to explain to a little girl in the neighborhood the other day—we have no polar bears walking around in our streets.

Compulsory education covers seven years. Nearly all children receive their general education in municipal or state schools and the instruction is free. Advanced education at universities and most other institutions of higher education is also free.

It might also be of interest to you to know, that for every 1000 inhabitants there are 10.5 hospital beds; 3.5 nurses; 1.3 doctors and 0.008 certified Prosthetists and Orthotists.

Rehabilitation work is carried out by different agencies: by a number of public bodies, by the handicapped themselves through their organizations and by other voluntary organizations and agencies. It covers widely different fields, such as nursery schools, schools, medical treatment, industrial rehabilitation, vocational training, employment services, and residential care.

In Denmark, social security is largely regarded as the responsibility of society, a view that has met with wide political agreement. The social security schemes which have been developed in this country have more and more assumed the character of public services and facilities, which in principle are available to the entire population regardless of the financial conditions of the individual person. At the same time, the principle of prevention has received increasing attention, and there has been a shift of emphasis from the mere payment of allowances to the handicapped towards efforts of rehabilitation.

National health insurance is available to the entire population granting free hospital treatment to all insured persons. Free medical care is granted to all persons under a specific income level, while persons above that level are reimbursed for a substantial portion of their expenses. Subject to a very few exceptions, hospital service is a public service.

The Disability Insurance Court has been an important factor in the development of rehabilitation services. The first Disability Insurance Act, which was passed in 1921, provided for assistance by the Disability Insurance Court for training of disability pensioners. In 1927 the Disability Insurance Act was amended so as to comply, in a larger measure, with the principle of prevention, but still only insured persons were eligible for payment of training allowances, etc. The Rehabilitation Act of 1960 has no provision at all requiring the claimant to be insured against disability in order to qualify for rehabilitation services. Any Danish citizen who is in need of special care or medical, vocational or social rehabilitation is eligible for such assistance, subject to no formal conditions. The type of assistance depends on the circumstances of the individual case. It may consist in, for example, provision of a prosthesis or brace. If a person becomes an amputee, he will have the right to be fitted with a prosthesis without any costs to him. Maintenance also is paid for. If the amputee is able to work and thereby support or partially support himself and perhaps a family, he will be entitled to two prostheses of which one is considered a spare. A housewife with a family to take care of is also entitled to two prostheses.

A new prosthesis can be prescribed for any amputee as soon as the surgeon and the prosthetist agree that further repairs or refitting of the old one no longer is economically sound. Although no citizen of Denmark will be considered a non-prosthetic candidate due to problems of financing, of course the physical condition of the amputee might lead to such a conclusion.

The trade of fabricating artificial limbs and braces cannot be followed further back historically than to the middle of the nineteenth century, where we meet Camillus Nyrop. The firm, which Nyrop founded in 1838 as a combined surgical instrument and prosthetics-orthotics shop, still exists and is now the largest private enterprise in Denmark in this field. In Nyrop's workshop, the apprentices learned how to fabricate artificial limbs and braces, although fabrication of surgical instruments was the main portion of their work. It should be mentioned that Camillus Nyrop acquired the title of professor at the University of Copenhagen in 1860.

In the middle of the nineteenth century several other orthopedic workshops were founded throughout the country and some of them still exist.

In 1872 "The Society and Home for Cripples" was founded by the Rev. Hans Knudsen but not until the beginning of this century did the Society and Home for Cripples make itself notable as far as manufacturing of Prosthetics and Orthotics were concerned. At this time the trade became separated from the trade of surgical instrument making and furthermore was divided into two areas; the orthopedic mechanics and the orthopedic leather worker each with an apprenticeship time of five years (later reduced to four years).

The men who carried out the work with patients and doctors were normally chosen from among the best of the craftsmen, but the men had no special education in, for example, anatomy, except what they could gain by working with doctors and from self-study.

At the end of World War II, we had a group of highly skilled craftsmen, but the education of the men, who had to take care of the patients and work with doctors, still had a long way to go.

Communication between the leaders or owners of the different workshops was poor. However, in 1946 a group of people met to try and form an association of prosthetists and orthotists. After several meetings the association was founded in the autumn of 1947 and was named "The Association of Prosthetists and Orthotists of 1947" (in Danish "Bandagistsammenslutningen of 1947"). Besides the skilled leading orthopedic technicians, who all had experience in working with patients, owners or managing directors of the firms were admitted.

The primary task of the Association has been to lay out rules for education and to revise these rules when needed. We are aware that our educational program as it is today, after the latest revision which took place in 1955, is still not perfect. At present a committee is working on a new revision. I had the honor of serving on this committee until I left Denmark in November of last year—and at the same time served on a Scandinavian committee, which was formed to investigate the possibilities of establishing common requirements for the education of prosthetists and orthotists in the Scandinavian countries.

After the latest revision our training plan is as follows:

Article I:

Qualifications required for being admitted as a trainee.

- a) Education: General certificate, "O"—level
- b) Practical foundation:
Complete apprenticeship, terminated by a journeyman's test, as a locksmith or as a saddler, in either case with orthopedic work as the specialty. In addition, the applicant must have worked for two years as a journeyman in his trade.
- c) The applicant must have completed his 22nd year.
- d) The journeymen in kindred trades: In addition to fulfilling the requirements set out under (a) and (c), the applicant must have worked for three years as an orthopedic mechanic or orthopedic leather worker and have passed a special test before the Association of Prosthetists and Orthotists of 1947, corresponding to the journeyman's test in the trade in question.

Article 2:

An applicant who has served his apprenticeship as a mechanic or saddler, respectively, (c.f. Article 1) must work for six months in an or-

thopedic leather workshop or an orthopedic mechanical workshop, respectively, in order to acquire supplementary knowledge of the trade.

The Association has in the past in cooperation with the Society and Home for Cripples arranged several follow-up courses which have been extremely important for furthering the cooperation between colleagues. Furthermore the Association has awarded to many of its members short or relatively long study tours to Germany, Britain, Italy and the United States. The Association has proved to be useful to the government authorities. Today no prosthesis or brace will be paid for by the authorities unless it has been made under the supervision of a prosthetist/orthotist, who fulfills the requirements for membership of the Association (i.e. has completed the training program) although he does not need to be a member.

Today the Society and Home for Cripples is the leader in prosthetics and orthotics in Denmark. The Society has eight orthopedic workshops spread over the country and produces about 80% of all prostheses and braces manufactured in Denmark. The largest of these workshops is located in Copenhagen at the Orthopedic Hospital, which has 250 beds in addition to an out-patient clinic which receives some 200 patients a day. The prosthetic/orthotic workshop has some 70 employees including prosthetist/orthotists, orthopedic technicians and administrative personnel.

The prosthetist/orthotist is actually the supervisor of the orthopedic technicians and does not do production work himself. To further explain his work, let us follow, for example, a Patellar-Tendon-Bearing Below-Knee Prosthesis. The prescription is made by the doctor in cooperation with the prosthetist and other members of the prosthetic team. The cast is taken by the prosthetist, who does as well the cast-modifications and fitting and aligning. All of the procedures in between will be done by the orthopedic technician, and not involve the prosthetist's time.

Since all kinds of amputations and orthopedic diseases are seen at the Orthopedic Hospital in Copenhagen (for example since 1957 some 40 Canadian Hip Disarticulation Prostheses have been fitted) it is only logical that training of prosthetists/orthotists takes place in this hospital. However, since the number of trainees is rather small it is difficult to plan the training in a rational way.

Some years ago, the managing director of the Society and Home for Cripples, Mr. Poul Stockholm, conceived the idea of establishing a Scandinavian School for education of prosthetists/orthotists. The possibilities are being investigated by the committee previously mentioned, but I believe there will still be a long way to go until this idea can be realized.

It is evident that to a small country like Denmark international cooperation is very important. We have been very fortunate that the International Committee on Prostheses, Braces and Technical Aids, a subcommittee of the International Society for Rehabilitation of the Disabled, has its headquarters in Copenhagen with Dr. Knud Jansen, M.D., as chairman.

The Society and Home for Cripples has as a consequence been host to four international courses—three on prosthetics and one on braces. In 1963 the Society was host to the 9th World Congress of I.S.R.D.

These international activities have given us a chance to meet outstanding persons whose work relates to prosthetics and orthotics. Our benefit from these courses has been enormous, but at the same time we feel that we also will have to assume the responsibility of being up to date at any time. As one of the means to do so, a new department of the orthopedic workshops was established in 1960 and I had the privilege to become the technical head of it. It is the responsibility of this department to keep in contact with as

many prosthetic/orthotic centers in the world as possible and to adapt ideas, evaluate and teach the results to our prosthetists/orthotists as well as to members of the Association. Furthermore, the same department does some research work of its own, but unfortunately the effectiveness has been limited due to lack of personnel. In 1962 we were fortunate in having Professor C. W. Radcliffe, University of California, Berkeley, working with us for almost a year. The result of Professor Radcliffe's stay with us was an important step forward and I am sure that my stay at the Biomechanics Laboratory for a period of two years will add another forward step.

I think I can conclude that the prosthetic situation in Denmark is good. Due mainly to the International Committee on Prostheses, Braces, and Technical Aids, which has its headquarters in Copenhagen, we have contact with many of the most important prosthetic centers in the world. In addition the administrative leaders have proven their readiness to invest money in education of prosthetists/orthotists as well as other members of the prosthetic team and thereby keep the door open for further progress.

This of course has been a brief orientation about prosthetics in Denmark, but I hope you will now have an idea about what has been done in my country in order to keep up with the standards in other countries.

Acknowledgements:

In preparation of this paper information from the following publications has been used.

- 1) "Rehabilitation and Care of the Handicapped in Denmark."
Published by International Relations Division, Ministries of Labor and Social Affairs, Copenhagen. Edited by Eugenie Engberg and Carl Lange.
- 2) "Bandagistfaget i Danmark" (The trade of prosthetists and orthotists in Denmark) by K. K. Kristensen (Published in Danish only).
- 3) "Orthotics and Prosthetics in Denmark" by W. Kragstrup.
Published in "Prostheses, Braces and Technical Aids," issued by: International Society for Rehabilitation of the Disabled, Committee on Prostheses, Braces and Technical Aids.

In Memoriam



MICHAEL STONE

Michael Stone, Vice President of R & G Orthopedic Appliances, Inc., of Washington, D. C., died suddenly June 7, 1964, in Washington.

Mr. Stone was born in 1912 and began his apprenticeship in orthotics and prosthetics in Hungary at the age of 15. He came to the United States in 1949, and was certified in orthotics in 1953, holding Certificate Number 324.

Mr. Stone is survived by his widow and a son and a daughter.

Mr. Charles Ross, head of R & G Orthopedic Appliances, paid tribute to Mr. Stone as a skilled orthotist and prosthetist and a loyal partner. AOPA was represented at the funeral services by Executive Director Lester Smith.

Isolated Paralysis of the Serratus Anterior Muscle

By J. T. H. JOHNSON, M.D., and HENRY O. KENDALL

Baltimore, Maryland

From the Department of Surgery, Division of Orthopaedic Surgery, Johns Hopkins University School of Medicine, and the Department of Physical Therapy, Children's Hospital School, Baltimore

Introduction

Isolated paralysis of the serratus anterior is an entity that should be more widely understood. Early recognition, followed by treatment that is comparatively simple, although prolonged, usually leads to a satisfactory outcome. The purpose of this paper is to present information pertaining to the clinical picture, anatomy, etiology, and treatment of the condition and to discuss our experience with twenty cases.

Less than 250 cases of isolated paralysis of the serratus anterior have been presented in the literature since Velpeau's first report in 1837. Only two series of more than seven cases have been collected^{1, 2}. Fully thirty methods of treatment, many of them surgical, have been advocated. Prognosis has varied from very good to very poor. The explanations of the etiology have differed widely. The sole aspect that many descriptions have in common is the clinical picture.

Clinical Picture

Paralysis of the serratus anterior may come on immediately after a hard blow or after a chronic strain of the neck and shoulder regions. Frequently it may appear insidiously and sometimes even painlessly. In general, however, there is first noted an aching or "burning" discomfort of varying degrees of severity in the neck and shoulder, localized vaguely in the region of the scaleni. The pain may radiate down the arm or around toward the scapular area. This is followed, perhaps a day or two later, by inability to raise the arm properly and by winging of the scapula. After the weakness has been well established, the patient complains of a fleeting ache relieved by rest, inability to elevate the arm satisfactorily, and rapid tiring, as well as the deforming effect of a winged scapula.

The fully developed case of paralysis of the serratus anterior shows the classical picture of posterior winging of the scapula. This is usually accompanied by an inability to abduct the arm beyond 90 degrees (Fig. 2-A). During attempts to do push-up exercises or efforts to perform other exercises which require strong anterior scapular fixation to the chest wall, the winging becomes very marked. Generally the shoulder is displaced forward and droops to some extent. There is frequently secondary weakness of

EDITOR'S NOTE: This article is reprinted by permission from the Journal of Bone and Joint Surgery, Vol. 37-A, No. 3, pp. 567-574, June 1955. For this reprinting, we are adding a brief supplement by Mr. Walter Wolfing, C.O., who began work on the brace in 1950 and has worked with the authors since then.

some protagonist muscles, particularly the inferior portion of the trapezius, often accompanied by a tightness, sometimes painful, of certain antagonist muscles such as the rhomboids and pectoralis minor.

Anatomical Considerations

The syndrome is well explained by the anatomy of the long thoracic nerve and its relationship to the serratus anterior. The long thoracic nerve or external respiratory nerve of Bell is almost unique in that it arises directly from the spinal nerve roots, carries no known sensory fibers, and goes to a single muscle of which it is the sole innervation of consequence. It originates from the anterior branches of the fifth, sixth, and seventh cervical roots, except for a few minor variations of this pattern described by Horwitz and Tocantins⁴. The upper two branches of origin pass through the scalenus medius and unite with the third branch just below this point. The nerve then descends under the brachial plexus and down the anterolateral aspect of the chest wall, giving off on its way branches to the serratus digitations.

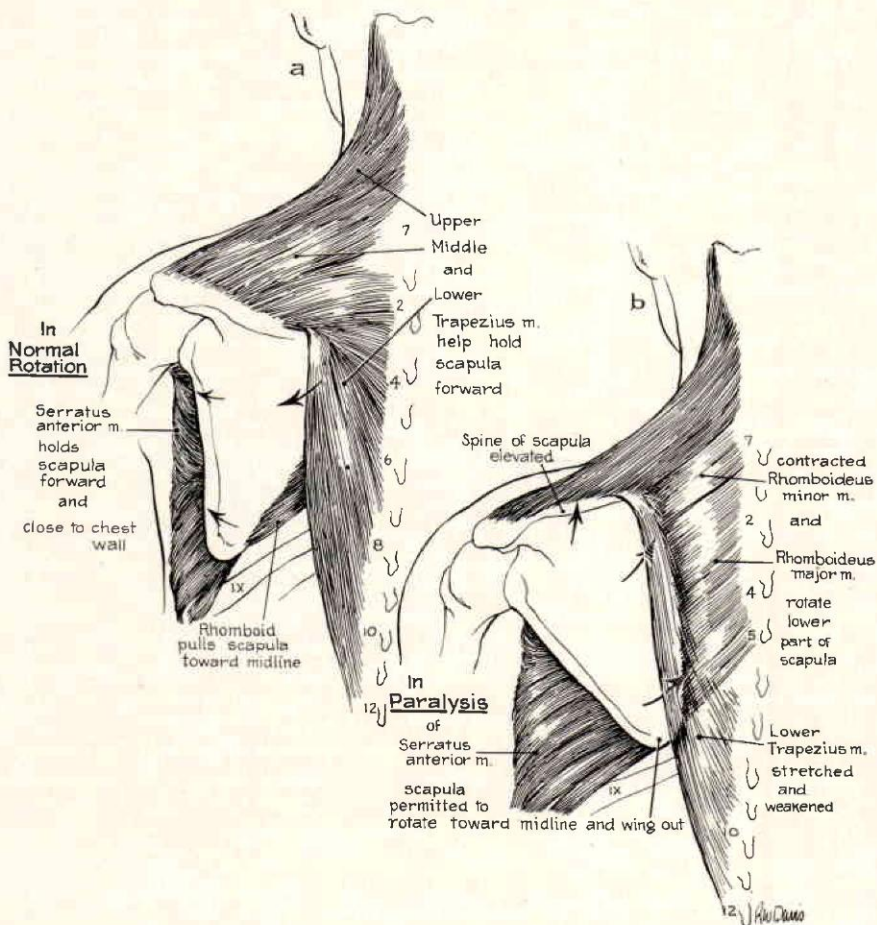


FIGURE 1

Fig. 1, a: Normal position of the scapula at rest. b: In serratus weakness the inferior angle of the scapula rotates backward and upward, stretching the lower fibers of the trapezius. The rhomboids are shortened and contracted.

The serratus anterior is broad and flat; it arises in the form of multiple digitations from the upper eight or nine ribs in the anterior axillary line, and attaches to the deep surface of the scapula along its vertebral border. Its primary function is to draw the scapula forward. This action causes the entire shoulder to be brought anteriorly by a movement at the sternoclavicular joint. The movement of stretching forward, as in fencing, is due to this action of the muscle. Furthermore, by its relation to the inferior angle of the scapula, the serratus anterior causes, along with the trapezius, a rotation of the scapula, which results in a tilting upward of the glenoid cavity, thus facilitating the upward movement of the arm above the head (Fig. 1, *a*).

Etiology

It is difficult to understand how a single muscle extending over such an extensive area and so well protected could be completely knocked out of action by direct trauma without considerable involvement of its neighbors. In an analogous situation, trauma or other irritation to any or all of the three nerve roots, or to the spinal cord, could hardly have such a selective action on only one particular nerve. Therefore, it is reasonable to assume that the pathological condition underlying this lesion is located in the long thoracic nerve itself. The cause of this condition, however, is another and far more difficult matter to explain.

Some cases are indisputably traumatic in origin, beginning immediately after a severe blow, fall, or sudden malforming twist and strain which force the shoulder downward and backward. Others follow more sustained or chronic traumata, such as prolonged carrying of a heavy knapsack, arduous shoveling, strenuous games of tennis, and the like. The marked preponderance of cases occurring on the right side in this series, coupled with the 83 per cent preponderance of those cases in the literature in which the side was noted, may be statistically significant and could provide some clue to the etiology. In a number of cases the condition developed gradually several days or more after operative or obstetrical procedures, perhaps because of cramped positions of physical strain while the patient was under the relaxing effects of anaesthesia. In others it has been reported as toxic in origin after certain infectious or viral diseases. In some it has even followed injection of sera, vaccines, and the more common antibiotics and has been regarded as a sequel to an allergic reaction.

Of 111 cases reported since 1925, thirty-five were attributed to acute trauma, sixteen to recurrent trauma, thirteen to postinfectious conditions, eight to injections, six to postpartum and seven to postoperative complications. Thirteen were of unknown etiology. In addition, Hansson ascribed thirteen cases to exposure to cold. These diverse predisposing factors are very similar to those held responsible for the development of Bell's facial palsy and other single nerve palsies such as those of the radial, peroneal, and axillary nerves. This fact, combined with the similarity of the clinical pictures, recovery patterns, and anatomical relationships, seems to indicate a common pathological picture of nerve trauma or non-specific "neuritis" which links these varied isolated paralyses with isolated paralysis of the serratus anterior.

Examination

The value of a careful muscle examination can hardly be overemphasized, not only in arriving at a proper diagnosis, but in differentiating isolated paralysis of the serratus anterior from other conditions which may resemble it superficially. The clinical picture has already been touched upon. Since the most striking feature is winging of the scapula, tests must be made to

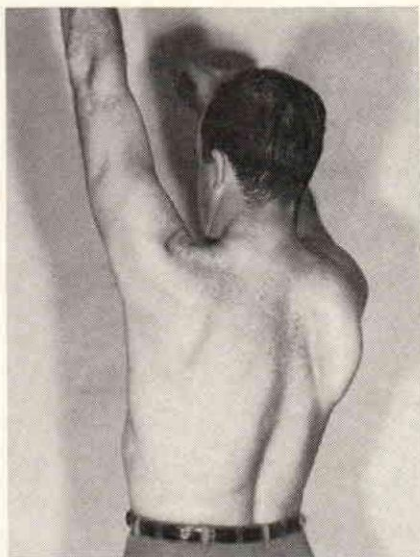


FIGURE 2-A

Fig. 2-A: Paralysis of the serratus anterior on the right. Note the winging and rotation of the scapula. There is inability to abduct the scapula and hence inability to abduct the arm.

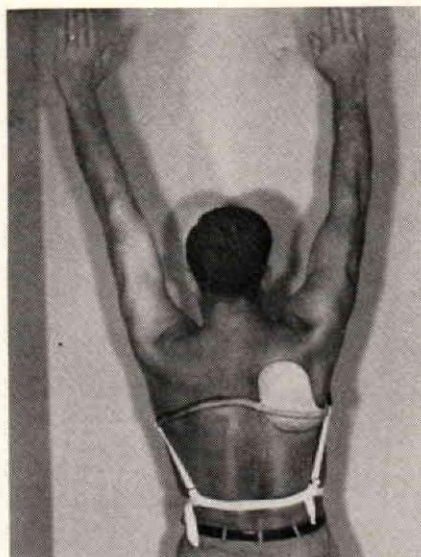


FIGURE 2-B

Fig. 2-B: The brace holds the lower portion of the scapula in forward rotation and abduction and presses it against the chest wall to limit winging; almost complete abduction of the arm is possible.

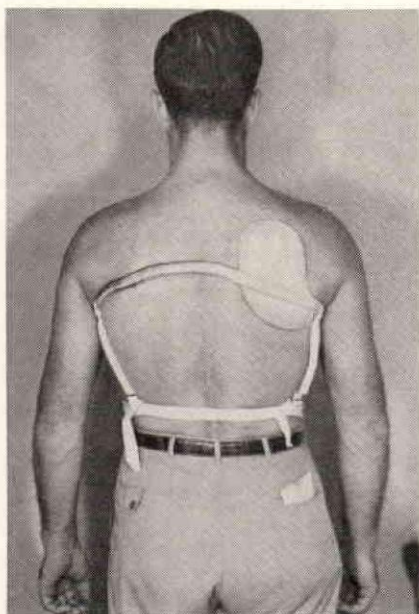


FIGURE 2-C

Fig. 2-C: Photograph showing the brace in a position of rest. The cup fits snugly over the lower two thirds of the scapula, holding it in a position of abduction and preventing drooping of the shoulder or chronic stretch of the serratus anterior.

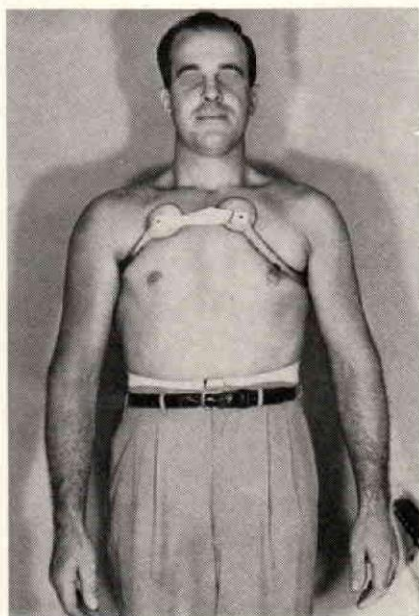


FIGURE 2-D

Fig. 2-D: View of the brace from the front. By counterpressure against the chest wall, the padded disks give firm stabilization of the scapular cup posteriorly.

evaluate the integrity of the serratus anterior and its power to abduct the scapula, to rotate its inferior angle forward against the chest wall and, secondarily, to assist in raising the arm. The simplest method of testing this muscle is to have the patient standing and facing a wall. The arms are outstretched and the palms of the hands are placed against the wall at shoulder level, or slightly above, with the elbows straight, and are pushed hard against the wall. If the muscle is paralyzed, the winging of the scapula will be instantly apparent. There are other confirmatory tests, made with the patient supine and sitting, as described by Kendall and Kendall.

Differential Diagnosis

Differentiating isolated serratus anterior palsy from other conditions requires the taking of a detailed history, and careful muscle check of at least the whole shoulder girdle. Careful examination with an understanding of the pathology of this entity will eliminate neurological disease which has attacked the cord or nerve roots, because in such conditions other weaknesses and neurological changes will be found which conform to characteristic anatomical patterns. Generalized involvements, such as anterior poliomyelitis, combined sclerosis, the dystrophiae and atrophiae, will present spotty or more extensive weaknesses not compatible with secondary adaptation to involvement of a single nerve and a single muscle. A number of the patients herewith presented were referred with erroneous diagnoses ranging from subacromial bursitis to Guillain-Barre syndrome. One patient had had a scaleniotomy and a cervical laminectomy. One of our own cases was at first believed to be unrecognized poliomyelitis, because of the associated weakness of a stretched lower segment of the trapezius. Another patient, on the other hand, was originally considered to have a bilateral serratus anterior syndrome until a more careful muscle check revealed the lesion to be an early muscular dystrophy of the scapulohumeral type.

Treatment

As has been stated, fully thirty methods of treatment, many of them surgical, have been recommended. When the diagnosis has been made and the anatomy of the condition is understood, treatment should follow rational lines. The long thoracic nerve will recover spontaneously in the great majority of cases in from three to six months. Therefore, during this period, therapy should be directed toward guarding the serratus anterior and its protagonists from overstretching, and toward strengthening these muscles as rapidly as possible. Similarly the contracted and often painful antagonist muscles should be stretched to prevent scapular fixation in the abnormal position.

The use of a shoulder spica, as advocated by Berkheiser and Shapiro, or the elevation and derotation brace method as described by Horwitz and Tocantins are sound procedures but rather severe, as they incapacitate the patient for a number of months. The scapular cup devised by Wolf and used by us in several cases seemed theoretically to be the best ambulatory treatment, as it allowed freedom of both arms. However, we found this brace quite difficult to fit satisfactorily and many patients would not tolerate it. After a number of alterations, a brace has been evolved (Figs. 2-B, 2-C, 2D, and 3) which is light, comfortable, and gives better scapular support than any we have previously used. Its main virtue is that the patients like it and wear it constantly. With it they can lead a normal life, provided that heavy use of the affected arm is not required, yet they seem to get as good support as from a shoulder spica and the results are as good. Its use

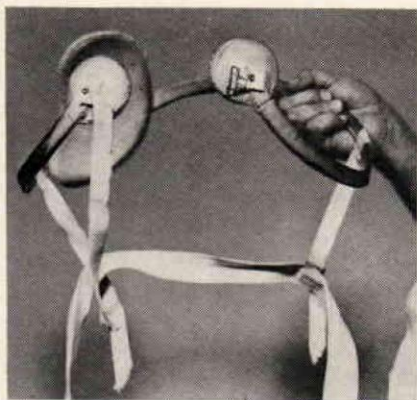


FIGURE 3

The brace itself weighs little over a pound. It is made of tempered, slightly springy brace steel, three-sixteenths of an inch thick and five-eighths of an inch wide. The padded steel cup and the disks are covered by leather. The cup is fitted to the individual scapula, with the patient's arm lying in full passive abduction.

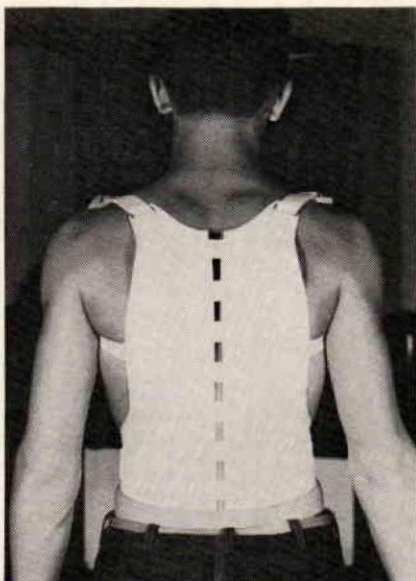


FIGURE 4

Fig. 4: Photograph of the canvas shoulder brace. Heavy steel stays on each side of the back and tight straps across the chest hold the scapula next to the chest wall. The buckle on top of the shoulder can be tightened and tends to derotate the scapula. Adduction of the scapula is not prevented.

is also recommended in other conditions, such as poliomyelitis, in which serratus anterior weakness is a major factor.

Before the brace was perfected we used a reinforced canvas shoulder brace (Fig. 4) in some of the cases with milder involvement; we still recommend its use for the later stages of the condition when tests of the serratus show only slight weakness. This canvas brace partially limits the winging and rotation of the scapula, but obviously cannot prevent the adduction in cases in which the serratus anterior has been severely weakened.

The indications for operation seem meager in a condition in which there is such a relatively good prognosis on a conservative regimen. Some of the cases reported in the literature in which operation was performed seem to have been inadequately or impatiently treated. The fact that several of our patients were seen a year after the onset of symptoms indicates that failure to provide protection will frequently prevent recovery, while institution of protection will promote recovery even at a late date. Many of the good results attributed to operations, such as fascial fixation or muscle transplantations, have been due, it is believed, to the mere reinforcing of a muscle the function of which was already returning. On the other hand, operations seem indicated when there is proved irreparable damage to the long thoracic nerve, when a thorough and adequate conservative course of treatment has failed, or sometimes when the serratus anterior palsy is part of another disease, such as poliomyelitis.

Enthusiasm for conservative treatment is not to be understood as a condoning of inadequate treatment. Admittedly the course of therapy is long and arduous and requires specialized care. Although only one muscle is originally and primarily involved there is produced a definite effect upon its an-

tagonists and antagonists. Antagonists, such as the rhomboids, relieved of the duty of balancing the normal serratus pull, become contracted and excessively strong. The trapezius, especially its lower and middle thirds, although a competitor as an adductor, is an assistant in the complex rotatory control of the scapula (Fig. 1) and tends to become stretched and weakened. However, it is possible to strengthen the trapezius sufficiently to resist this stretch (Fig. 5) and even to compensate partly for a weak serratus anterior in obtaining full abduction. This strengthening of the lower fibers of the trapezius is one of the major aims in therapy and does much to minimize the continuous elongation of the serratus anterior which so delays its recovery. Patients are cautioned to forego any strenuous activity which abuses the weakened structures. Careful stretching of contracted and often painful antagonist muscles, such as the rhomboids and the pectoralis minor, completes the plan of treatment.

The outline of treatment here presented is a combination of physical therapy and brace protection, which has proved satisfactory in our more recent cases.

Outline of Treatment

For complete paralysis of the serratus anterior: The brace should be worn day and night. Exercises should consist of muscle-setting, exercising the serratus anterior in its function as a forward rotator of the scapula: With the patient supine, the arm is placed overhead, resting on a pillow, and the patient is asked to press the arm down on the pillow (in the direction of completing arm-raising overhead). The tendency will be to press the elbow down toward the table, adducting the scapula. *This should be avoided.* Emphasis must be on bringing the hand and forearm down toward the pillow in the direction of completing shoulder flexion. The patient should be made aware of trying to bring the inferior angle of the scapula forward during this movement and should be encouraged to palpate the serratus anterior with his opposite hand during this exercise. Although abduction of the scapula is a function of the serratus anterior, exercises involving abduction of the scapula are avoided because of the frequency of associated trapezius weakness.

For moderate weakness of the serratus anterior: The brace should be worn during the day, but not necessarily at night. Exercise: With the patient supine, the therapist flexes the arm slightly beyond 90 degrees, the patient is instructed to continue to elevate the arm and at the same time

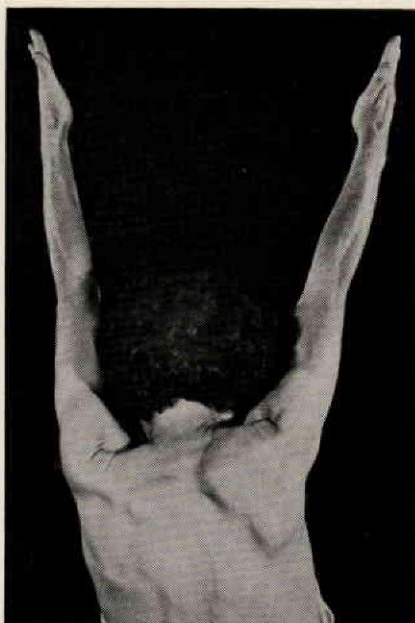


FIGURE 5

Fig. 5: Photograph of a patient with serratus anterior palsy but with strong lower trapezius fibers which prevent backward rotation of the lower border of the scapula on abduction and allow full movement. (Reproduced by permission from "Muscles, Testing and Function," by Henry O. Kendall and Florence P. Kendall, p. 127, Baltimore, The Williams and Wilkins Co., 1949.)

press it toward the table against slight resistance. The amount of resistance should be dependent upon the ability of the patient to bring the inferior angle of the scapula forward in the normal rotation action of the serratus anterior. This exercise also helps to strengthen the lower fibers of the trapezius. (If the superior angle of the scapula rotates backward instead of forward, the resistance is too great.)

For slight weakness of the serratus anterior: Weakness may be considered slight when the patient is able to raise the weight of the arm in movements requiring scapular fixation, but is unable to take resistance or to lift any additional weight. The canvas brace or the metal brace should be worn during any activity which requires lifting a weight with the affected arm. Exercises are done in a sitting or standing position, the weight of the extended arm being raised forward in flexion through full range to complete overhead elevation.

For tightness of shoulder adductors: With the inability to raise the arm through a full range of motion, the problem of adaptive shortening of the shoulder adductors may be encountered. If examination reveals a limitation of motion in passive raising of the arm overhead, treatment should be directed toward maintaining normal length of these muscles. Heat and massage should be applied to the shoulder adductors. Passive stretching of the arm in overhead elevation should be done by the therapist to avoid strain on the weak serratus anterior, and it is preferable that the patient be supine on the treatment table in order to keep the scapula braced against the table and to avoid winging of the scapula.

For tightness of the rhomboids: The rhomboids, being direct opponents of the serratus anterior, tend to shorten. There may be pain in this region, associated with the muscle tightness. Heat and massage should be applied to the rhomboids. The arm should be raised passively overhead while pressure is applied along the vertebral border of the scapula, bringing the inferior angle of the scapula through the normal range of forward rotation.

Material and Results

Twenty cases of isolated paralysis of the serratus anterior are herewith presented and analyzed. Of these, seventeen have had the benefit of complete examination of the muscles of the involved shoulder girdles and arms and twelve have had repeated muscle examinations. The right side was involved in eighteen cases, the left side in two cases. The ages of the patients ranged from nine to fifty years, the average being 32.7 years. The sex distribution was evenly divided. The duration of symptoms at the first visit was from one week to one year, the average being seventeen weeks. The etiology, in so far as it could be determined, was recorded as follows: acute trauma, two; chronic trauma, five; postpartum complication, one; postinfectious complication (generally diagnosed as "virus"), three; postinjection complication, four (tetanus antitoxin, two; penicillin, two); and no known cause, five.

Strength of the serratus anterior at the first visit ranged from 0 to 30 per cent., with an average of 10 per cent.; at the third month, it was from 45 to 60 per cent., with an average of 50 per cent., in eight recorded cases; at the sixth month, strength of the serratus anterior was from 70 to 100 per cent., with an average of 85 per cent., in ten recorded cases. In seven cases, follow-up was incomplete or the lesion was too recent for evaluation.

The associated trapezius strength was as follows: upper trapezius fibers, average 100 per cent.; middle and lower trapezius fibers, average 65 per cent.

Associated rhomboid and pectoral tightness was noted in thirteen cases and was not mentioned in seven.

Treatment was by the scapular cup type of brace in eleven, by canvas shoulder brace in six, and by physical therapy and sling alone in three.

At six months the relation of treatment to the end results could be evaluated as follows: In six patients treated with the scapular cup type of brace, the average serratus anterior power was 90 per cent.; in two patients treated with the canvas brace, the average serratus anterior power was 80 per cent.; and in two patients treated by physical therapy alone, the average serratus anterior power was 85 per cent.

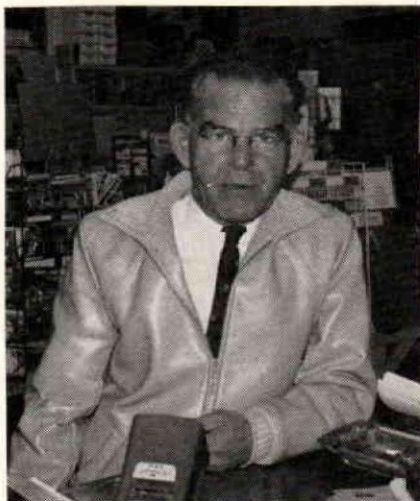
NOTE: The authors wish to acknowledge with gratitude the technical assistance of Mr. Walter Wolfing in the construction of the scapular cup type of brace.

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Addendum

Comments on the brace by WALTER WOLFING, C.O., Baltimore, Maryland



WALTER WOLFING, C.O.

My experience with this Serratus brace dates back to 1950 when I made the first one at the Children's Hospital School in Baltimore. It was developed because we had found that attaching a scapular pad to a conventional back brace did not hold the scapula in place.

The brace is composed of a metal band around the thorax, one scapular pad (unless there is bilateral involvement), two sternal pads, a webbing waist band, one or two webbing straps from the thoracic band to the waist band, and a strap between the sternal pads.

The thoracic band is made of spring steel 3/32 by 9/16. The scapular pad is made of 0-64 semi-hard aluminum, and is padded only with quarter-inch felt. The sternal pads, also made of aluminum, are two inches in diameter, and well padded with foam rubber and quarter-inch felt. The entire brace is covered with horsehide. Plastic is not used because it is slippery and will not adhere to the skin.

Measuring and Fitting the Brace

With the patient standing with arms down at his sides, the scapula on the affected side will usually protude somewhat and the outline of the scapula can be seen quite easily. If not readily seen, ask the patient to put his hands on his hips.

With the patient in this position, cut a paper pattern of the scapula, allowing about 3/4" extra width along the vertebral border. This extra width will allow for cupping the finished metal pad over the vertebral border.

After the aluminum pad is made from the pattern it is necessary to change the position of the arms before molding the pad into its final contour. The arms are now placed overhead, clasping arms by grasping the opposite forearm and resting the forearms on top of the head. This position of the arms brings the scapula into a position of abduction and outward rotation of the inferior angle. In this position the thoracic band is measured and molded in order that freedom of the scapula will be permitted for arm raising. The thoracic band must fit snugly in order to keep the scapula firm against the posterior rib cage. The scapular pad is molded to conform to the body contour. Before attaching the pad to the thoracic band, the brace fitter passively (that is, no help from the patient) lowers the affected arm very slowly and observes the moment the scapula begins to protrude. The arm should be stabilized in this position while the pad is placed on the thoracic band and marked for attachment to it. Finding this position of the scapula is necessary in order that the cupping over the vertebral border will grip the scapula and keep it from slipping back in adduction and inward rotation. The felt padding acts to carry the scapula slightly forward from this position and into more abduction and outward rotation.

The sternal pads must offer sufficient counter-pressure to maintain the scapular pad and scapula firm against the rib-cage. For this reason, these sternal pads must be large enough and well enough padded to avoid the soreness which otherwise would result from the localized areas of pressure.

We have made the brace over the past fourteen years and now average from four to five braces a year. Orthotists who are interested in any additional details are invited to communicate with Mr. Walter Wolfing, Walters Brunos Orthopedic Appliances, 907 North Calvert Street, Baltimore, Maryland 21202.

Protective Cover for Hydraulic Ankle Brace Cylinder

By EDWARD T. HASLAM, M.D.*

Our early experience with the functional leg brace was complicated by the tendency of a ten-year-old boy to unscrew the hydraulic cylinder, thereby rendering the device inoperative and voiding the warranty. Assistance was requested and it was suggested that a plastic cover be constructed to prevent tampering with this mechanism.

The cover was designed and fabricated by Mickey Warner and Dorsey Hildebrand of J. E. Hanger Company of Louisiana, Inc. The hydraulic cylinder was removed from the unit and pressed into a block of "Presto Cast Foam." Plaster of Paris was poured into the impression to form the male mold. Five layers of nylon stockinette were then tailored to the male cast and impregnated with 4110 laminac resin.

It is our impression that this is somewhat more heavily constructed than it needs to be and that two or three layers of stockinette might be sufficient. However, the device (Figure 1) does not add materially to the bulk of the apparatus (Figure 2 and 3) and has so far solved the problem of the young brace wearer destroying the hydraulic cylinder.

It is suggested that it might be advantageous for the factory to supply a protective cover, which undoubtedly could be produced in quantity more efficiently, possibly by some other method.

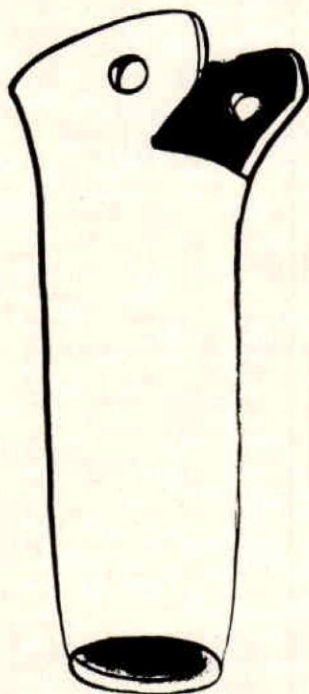


FIGURE I

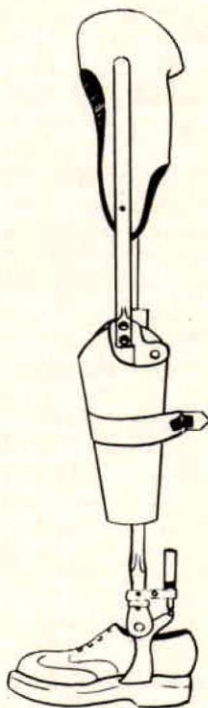


FIGURE II

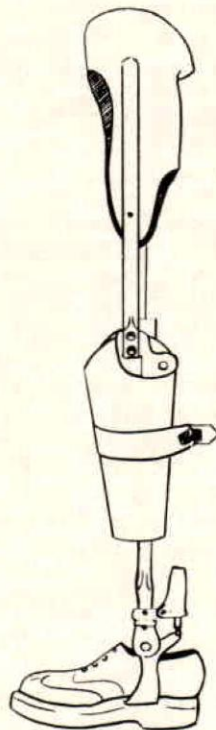


FIGURE III

* From the Division of Orthopaedic Surgery, Tulane University School of Medicine.

Business and Professional Ethics In Prosthetics and Orthotics

By JACK ARMOLD, PH. D.

Director, Prosthetic-Orthotic Education, Northwestern University

INTRODUCTION

The story of Oedipus in ancient history reveals the main focus of this article. Oedipus, who had been abandoned by his father, returned to Thebes, the city of his birth, after growing up in the wilderness. He found the city harassed by the Sphinx, a monster having a lion's body, wings, and the head and bust of a woman, who challenged travelers with a riddle. Those travelers who could not answer, were devoured by the Sphinx. When confronted by the Sphinx, Oedipus guessed the riddle, the Sphinx slew herself, and Oedipus became king of Thebes. The riddle: What creature walks in the morning upon four feet, at noon upon two, at evening upon three? The answer: *Man*, as a baby on hands and knees, later on his feet, and in old age with a staff.

Man as he relates to other men and his environment is the main concern of ethics. In this article we are concerned specifically with man in his business and professional relationships. Many have left the study of ethics to the philosophers, but ethics deals with practical questions of human behavior, which lie within the power of all men to discuss. Science does not admit to general discussion because the subject matter of science is based upon verifiable general laws or the operation of general laws.

The universality or popularity of ethical discussions may be seen in businesses and professions other than prosthetics and orthotics.

Ethics has always played a significant role in the professional lives of physicians. American technology has retooled itself with an eye toward moral, social, and ethical values. The world of financial investments has struggled in an upward move to practice loftier codes of professional and business ethics which would protect investors. Finally, there is a current rush of Senators to support a code of ethics for Senators and Senate employees as a result of the Bobby Baker scandal.

Importance of Ethics

Why study ethics? In the first place, men in business and professions should study ethics because it is *economically sound*. Judge Edwin B. Parker, Chairman of the Committee on Business Ethics, stated in the pamphlet issued by the United States Chamber of Commerce:

Business has formed and is forming habits of straight thinking and right acting because they are in the last analysis economically sound habits . . . Enlightened self-interest should prompt each class of persons in business to deal fairly with others, because to do so ultimately pays.¹

Secondly, the study of ethics is *practical*. This reason is illustrated succinctly by the story about the business man who had been deaf to all

reasons for having an annual audit of his company's books. He suddenly changed his mind about the audit when he saw his new cashier wearing a new fur coat!

The third, and most important, reason for the study of ethics may be found in the statement of Socrates, the Grecian sage and teacher: "*The unexamined life is not worth living.*"²

A look at the birth of philosophy, reason, and ethics provides one with a background, or a frame of reference, for studying ethical questions in prosthetics and orthotics.

The ancient Greeks showed man how to use his mind. Modern thinkers, striking out alone on what they believe are untrodden paths, nearly always sooner or later encounter the ghost of some ancient Greek returning from the same solitary journey. The Greek's creed is found in the famous dictum: MAN BY NATURE DESIRES TO KNOW. Giorgio de Santillana, Professor of History and Philosophy of Science Department of the Massachusetts Institute of Technology, wrote, in *The Origins of Scientific Thought*, "The two greatest thinkers, Plato and Aristotle, between them, laid the ground for worlds of thought as far apart as ethics and nuclear physics."³

Definitions: Ethics and the Ethical Man

Ethics is the study of moral values and deals primarily with a choice involving human action, character, and ends. "Choice" is a key word in this definition because of our primary concern with business and professional relations. Wayne A. Leys, an expert on business ethics, contends that business and professional persons should "practice the habit of always seeing an alternative, of not taking the usual for granted, of making conventionalities fluid again, and of imagining foreign states of mind."⁴

A study of ethics helps in making wise choices. Business and professional persons often have the impression that they are making important decisions, but wonder privately whether they really know what they are doing. An awareness of ethics will provide one with systems which stimulate proper questioning when analyzing actual cases and issues. The practical importance of ethics may be seen in the fact that decisions determine action—with major consequences or a long series of related actions.

Having defined ethics, we have yet to characterize the *ethical man*. The ancient philosophers considered him to be a man of character, competence, and good will.

Character may be defined as the result of the way in which a man exercises his capacities. The emphasis here upon "man exercising his capacities" makes this definition extremely relevant to a study of "public ethics." This study looks "horizontally" at man as he relates to others and his surroundings. On the other hand, "private systems of ethics" are chiefly concerned with man looking introspectively at himself; thus he may be characterized as "vertical."

Business Counselor Merrill C. Meigs states that success begins and ends with character. He writes:

To succeed, one must first build his character on sound fundamentals—honesty, loyalty, unselfishness. Then he must set his sights on a goal. If he attains it on that foundation—no matter what the goal, no matter what the monetary rewards—he is a success.⁵

Competence is the second characteristic of the ethical man. A prosthetist or orthotist, for instance, fulfills this requirement when he demonstrates that he has had the special skills, knowledge, and ability necessary to meet the needs of the patient. The competence of the prosthetist or orthotist will be judged by the patient and other professionals.

Good will, the third characteristic of the ethical man, is that quality which goes beyond skills and knowledge. It is that quality which is best typified by the Greek word, *agape*, a sense of concern as an expression of one's being, humanness, and need to reach out beyond one's individual isolation to touch the spirit of others.⁶

Business and Professional Considerations

The history of the professions is an excellent practical object study for anyone interested in plotting the possible course for prosthetics and orthotics towards higher ethical standards. For example, the medical profession worked itself through various stages of charlatanism and low commercialism. It is not so far advanced today that it does not still have to struggle with some of its legacies of the past. It, too, has its problems of competition and of consumers' rights closely paralleled to those in other business and professional fields. Therefore, one concerned about the "old saw," business v. professionalism, should consider what the best members of the medical profession have done and are doing to move their ethical standards and practices upward.

An excellent definition of a *profession* appears in the *Canadian Bar Review*:

A profession is a self-selected, self-disciplined group of individuals who hold themselves out to the public as possessing a special skill derived from education and training and who are prepared to exercise that skill primarily in the interest of others.⁷

Note the words, "the public" and "the interest of others." These words help to further clarify the nature of a "public" ethical system which is an integral part of any profession.

Historically, there were three professions—*theology*, *medicine*, and *law*. Their origins arose out of a need for competent individuals, acceptable by the community, to administer to the spiritual and physical needs of the individual and to regulate the practice of the community.

From the very beginning, the *university* was considered as an integral part of the preparation of men for the professions. The central creed of the university has been summed up by the Greek phrase—*STRIVE FOR EXCELLENCE*.

The role of the university has always been vital to the professions because it traditionally has been in the best position to organize a body of knowledge and transmit it by systematized instruction to its students. Three general purposes of the university are: (1) the conservation of knowledge through libraries and collections; (2) the dissemination of knowledge by teaching and publishing; and (3) the addition to knowledge through scholarship and research.⁸

The University of California at Los Angeles, New York University, and Northwestern University are today, partially responsible for the preparation of candidates for full professional acceptance by their colleagues and the American Board for Certification in Orthotics and Prosthetics, Inc.

While the university has always been central to professionalism, many professionals have made outstanding contributions to society through *private study* and *practice*. For example, Abraham Lincoln, Charles Goodyear, Henry Ford, and Thomas Edison had little formal education but their achievements are well known today.

Professionals are *workers*. Dr. McKinley H. Crabbe, of the State Medical Boards of the United States, said:

The licensed physician regards work as the fulfillment of personality.

He is usually overworked, worried and conscientious about some patient. He often has more patients than he can see properly. When work becomes an end, the drudgery leaves work. This is the mark of a professional person.⁹

The professional person must also act according to *written and unwritten codes of ethics*. Prosthetists and orthotists have written a code of ethics and use this code as a measure of professional and ethical behavior. However, there are large grey areas where the written codes do not apply. All codes are blank in some areas. In the context of the first professions the candidate was required to show evidence of measuring up to an unwritten code of being a gentleman before being allowed into a profession. The implication of acceptable sociability and taste are still a requirement for professional conduct.

Finally, a profession is entered for its inherent value and not first for individual profit. The *motive of service* must be greater than the motive of service to one's self and one's own.

In short, professionalism adds up to: (1) the pursuit of excellence, (2) hard work, (3) written and unwritten standards of conduct, and (4) a high motive of service.

ETHICAL SYSTEMS

The organizing ideas of the philosophers, the thinkers of all times, complement the fact-hugging insights of business and professional men when ethical standards are expressed as questions. Standards must be stated as questions because ethics is an inexact study. Intelligent questioning may best be described by the word, "deliberation," which is taken from the Latin root, "libra" (scales).

A study of various ethical systems provides a means of weighing questions of practical human conduct. In listing some of the leading systems of ethics, the practical reader may not see their immediate relationships to every day problems of the business and professional world. Students of philosophy may accuse the writer of oversimplification. However, recognizing the dilemma, an attempt will be made to improve and systematize practical judgments by finding out whether the right questions are being asked when making decisions. The systems will raise questions which will serve as pointers and direction finders. The following systems of ethics turn our gaze to values in our situation which we might not otherwise see:

<i>Type of Ethical System</i>	<i>Name</i>	<i>Highest Good or Ethical Goal</i>
<i>Individual:</i>	Platonism	Moral Idealism
	Stoicism	Rationality
	Cynicism	Virtue
	Epicureanism	Pleasure
	Casuistry	Precedents
<i>Group:</i>	Utilitarianism	Public Utility
	Pragmatism	Practical Consequences
	Historical "Logic"	Economic Equality
	Semanticism	Understanding
<i>Critical:</i>	Golden Mean	Moderation

Platonism, or moral idealism, asks: Can you bring various approved practices under a general rule? The ethical or Good Life is achieved when one lives by moral absolutes. E.g. Do unto others as you would have them do unto you.

Stoicism believes in keeping integrity by using reason as the measure for all decisions. The belief in Universal Reason above a society is central to stoicism. The stoic asks: Can you rationally follow your principles to point of sacrifice?

Cynicism is anti-materialistic. The cynic believes that virtue and freedom should be the object of man's pursuits. Since wealth is often equated with evil, a question might be raised: Is profit making wrong?

Epicureanism is diametrically opposed to cynicism, stoicism, or Platonism. Pleasure, not idealism, rationality or virtue, is the true measure of happiness. The epicurean asks: Does man work to be able to afford the thing he wants?

These four systems are labeled "individual" because they involve man looking at himself. The next five may be considered "group ethical systems" because they reflect man looking "outside himself."

Casuistry, which takes its name from the Latin word, *case*, makes decision on the basis of precedents and law. In weighing questions of human action, the casuist asks: What are the authoritative rules and precedents, the agreements and accepted practices?

Utilitarianism made "public utility" the main criterion of the rightness or wrongness of human actions. The worth of philosophic thought is to be measured by its fruitfulness in productive operations and techniques. The utilitarian asks: How many people would benefit from the alternative proposals?

Pragmatism William James' famous book (1907), was subtitled "A New Name for Some Old Ways of Thinking." James claimed that the ancient Greek thinkers, Socrates and Aristotle, and the British philosophers, Locke, Berkeley and Hume, were forerunners of modern American pragmatism. The term "pragmatic" is derived from a Greek word which refers to practical affairs and actions. James made practical consequences the test of truth of moral and religious ideas. Ideas and theories, in this view, must make a difference in actual experience, otherwise they are empty and barren, and hence, meaningless. The pragmatist is not so worried that many commonly think of the practical or expedient as the not-so-ethical means of achieving riches, power, or pleasure. The pragmatist might ask when trying to improve the relevance of older systems: Will the policy work?

Historical "Logic" has been embraced by many liberal political economic thinkers. Marx, for instance, thought that all ethical problems related to economics and self-interest. Economic equality and classlessness should be the goals of every society. Related to the business world, he might ask: Are pay, prices, and profit at the base of all business and professional problems?

Semanticism upholds the idea that most ethical problems result from confused, inaccurate, and emotional language. The semanticist seeks proper meaning and understanding. He asks: Has the problem been confused by loaded language and verbal trickery?

Many kinds of investigations have been called ethics. No one should pretend that he can systematize all of the varieties with one organizing idea. Common speech is no more consistent in the meanings assigned to ethics than it is in the meanings assigned to hills, fishes, and laws. So far, our listing of ethical systems has revealed a great spread in the value systems: moral idealism, rationality, virtue, pleasure, precedents, public utility, practicality, economic equality, and understanding. Each system turns our attention to values which are involved in most questions of conduct and expediency. These questions no more admit of hard and fast rules than questions of health.

In the business and professional world, a "critical" system of ethics is needed when deliberating about or weighing the alternatives of each question. The ancients called the system the "golden mean." It has been popularized by expressions like: "Moderation in all things," and "Nothing in excess." We will attempt to define the golden mean by looking at the word, "happiness." If for the sake of illustration, we could agree that the end for which all men more or less consistently strive is happiness, our differences in behavior would become immediately apparent because we have different notions of what happiness is. Whatever the definition of happiness might be, or the ethical system one follows to achieve it, his state and character should cause him to choose a mean of conduct between an excess and a defect. Either, excess or defect, would involve him in wrongdoing and eventual unhappiness. Justice, for example, is a fair balancing of claims between contending parties.

In short, the *golden mean*:

- (1) Is the point between extremes,
- (2) takes both into consideration in matters of practical human behavior,
- (3) is neither too much nor too little; and,
- (4) is not the same for everyone.

For example, let us consider our attitude towards property:

Prodigality - - - - - Liberality - - - - - Greed

Prodigality involves extravagant waste; greed is stinginess. We apply the term "greed" to people who care more than they should for property; the term "prodigality" we refer to people who are intemperate and spend their money in extravagant living. For most people, "liberality" would sum up the golden mean as it represents a point between waste and stinginess.

A final example of the golden mean will be used before making a direct application to prosthetics and orthotics. America is currently faced with a difficult problem which affects all business and professional persons. Example:

Complete Socialization - - - - - Unrestricted Personal Freedom

If, on the one hand, the American society moves toward the extreme of complete socialization there will be an inevitable restriction of personal freedom; if, on the other hand, the choice is for the opposite extreme of unrestricted personal freedom there would be a reluctance to enter the sphere of social planning. The extremes of these divergent paths are undesirable for the majority of Americans, rooted as we are in the Greek philosophy respecting the dignity and worth of the individual. In both extremes, the individual is sacrificed.

If there is a middle course, a golden mean, it does not lie with all-powerful government ultimately stifling all-important areas of personal and professional freedom. Also, if there is a middle way—a golden mean—it does not lie in the unrestricted power of business enterprisers to whom the burden of the distribution of social services becomes an intolerable restriction of profit.

The golden mean for most Americans would be found at *varying points between the extremes*. While the golden mean varies among individuals, such as Republicans, Democrats, and Independents, the importance of critically weighing the alternatives becomes immediately apparent in any consideration of business and professional ethics.

ETHICAL QUESTIONS IN PROSTHETICS AND ORTHOTICS

Having defined terms and discussed various ethical systems, we will now turn our attention to their application to prosthetics and orthotics.

Professional Relationships

A profession must first practice policies of social responsibility and secondarily seek professional recognition. Recognition cannot be a cause; it can only be a result of professional service to others. Professions exist for people and not for professionals. Society supports a profession because it looks upon professional persons as contributors to human welfare.

In professional relations, an ethical question arises when an association, such as The American Orthotics and Prosthetics Association, seeks to gain professional recognition and at the same time project the image of social responsibility.

Professional Recognition - - - - - Social Responsibility

If the prosthetic-orthotic profession, either through a drive for status among professions or through a preoccupation with its own internal structure and politics, reduces the effort it can invest in research, teaching, and practice, it cannot best meet its first responsibility—service to the disabled.

A profession needs an association in order to function well. Prosthetists and orthotists should belong to the American Orthotics and Prosthetics Association, contribute to the benefit of other members, participate in meetings, and share information. However, too much organization is non-functional. So is too much concern for position in that organization. The golden mean is located at points between too much and too little organization.

An inter-professional spirit among men of different competencies engenders the understanding that the other man is working hard on an interesting and worthwhile job without knowing what the details may be. Carl Taeusch wrote: "The confidence which arises from membership in a recognized and dignified profession will contribute vitally to that sort of contentment and happiness which alone can be justified in an ethical society."¹⁰

Standards

Standards have the effect of making prosthetic and orthotic practice a career of distinction. Emphasis upon professional conduct and standards makes the practice honorable and dignified. The development of a professional morale has led to the founding of all professional societies.

The ancient Greeks felt that man could only discover his own humanity, his true self, when he strained every resource to the limit. This relentless will to pursue excellence helps account for the wonders the Greeks accomplished. It was also the source of their sufferings. Standards should be striven for, but they should not lead to despair. One ethical question which a standard-setting body, such as the American Board for Certification, must continually consider is:

Realistic Standards - - - - - Absolute Standards

If one begins at the extreme of current practice and education, he will automatically lower standards in an effort to satisfy the realities of the current practice of prosthetics and orthotics and the actual educational achievement of practicing prosthetists and orthotists. If, on the other hand, one goes to the other end of the continuum and sets absolute standards of achievement, he will exclude many candidates for certification because of the arbitrary standards of measurement.

As discussed in the section on ethical systems, the Platonist would favor the absolute standard or ideal because it would result in the best

qualified personnel and superior care for the disabled. The pragmatist and utilitarian however, would probably lean more toward "realistic" standards which take into consideration current practice and education of prosthetists and orthotists. They would contend that realistic standards bring a greater supply of certified personnel into the field and more patients would be served.

Certification in prosthetics and orthotics is dynamic and growing. As it continues to change and develop, the difficult question of excluding some applicants for certification by maintaining and elevating high standards of achievement will be raised by certifees and non-certifees in years to come. The golden mean takes into account both the realistic and absolute goods and attempts to choose standards which would have the beneficial results of offering quality care for the disabled and of encouraging prosthetists and orthotists to strive for achievement levels which do not lead to despair.

Education

As stated earlier, the development of professional responsibility had its birth in the university. Every professional person should have opinions about the role of education in his professional development. In prosthetics and orthotics, there is a change from apprenticeship training to educational programs. The apprentice learns by practical experience under skilled workers. The student learns by principles and practice through systematic instruction and supervised work projects. Leaders in the profession and educators are currently trying to organize educational programs which will meet the needs of the student and the industry-profession. The alternatives under consideration are:

Specialized Education - - - - - - - - General Education

Specialized education contains those experiences which are clearly related to technical skills, professional competence, and economic considerations which future prosthetists and orthotists will need in the industry-profession. General education will develop those understandings, skills, values, and attitudes desirable for responsible living in a contemporary society.

Specialized education is occupationally oriented and it is practical in nature; general education follows the liberal arts tradition and is theoretical in nature. The historical "logicians" and pragmatists might favor training which directly relates to job requirements. The traditional cynics and stoics would contend that the total man should be educated first, then his hands. The golden mean suggests that educational programs which meet the highest objectives of practical education and general education should be developed. To select either one and not the other would be a defect.

The four-year Bachelor Degree program and the two-year Associate in Arts Degree programs are modern attempts in our field to combine the extreme goods of a practical and general education. The curricula include specialized courses in prosthetics and orthotics as well as general education courses in the arts and sciences.

Cost

The supreme purpose of a profession is to make available to society, without reservation as to quality or any question as to remuneration, the very best services needed. The very difficult question in the business and professional world—the price that society, either collectively or individually, should pay for services—requires much more deliberation than space will allow here. However, since our main objective is to raise pertinent ethical questions in our field, it seems proper to discuss financial considerations here.

The services of the prosthetic and orthotic profession should be finan-

cially accessible to the public, but society at the same time should properly reward that motivation of service to it. The following continuum suggests the problem:

Accessibility to the Public - - - - - Remuneration to the Profession

No health profession should ever become so exclusive that all individuals, regardless of income, do not have access to the necessary health services. Historically, the professional person received not a salary nor a fee, but an honorarium. Until early in this century, physicians in England did not submit a statement of fees but were paid by their patients on a voluntary basis that reflected the financial status of the patient rather than the service rendered. And today in spite of the generality of the fee-for-service basis of professional claims, there is a tacit understanding that neither the quantity nor the essential quality of the service is limited by the size of the fee.

Of greater importance than the technique of remuneration, whether by fee or salary, is this essential condition: *the motivation of services to society, the hallmark of a true profession, should be properly rewarded.* In 1961, the *Rockefeller Panel Reports* said:

We must recognize that one important factor in the unwillingness of youth to undertake certain critical tasks is due to a rather severe imbalance in our current system of incentives. The skills which we need most critically today are not those which we reward most highly.¹¹

Too often dedication to society has resulted in extreme personal sacrifice. Many prosthetists and orthotists have invested material goods, time, ability, experience, and education in businesses without success. Their contributions, including risk, must be considered a part of the total investment to dedication.

One corrective to the question of the method and amount of remuneration to the professional prosthetist and orthotist is the maintenance of high professional standards of service and a strong professional organization. The American Orthotics and Prosthetics Association should encourage its members to make their services accessible to all who require them, but, at the same time, its members can rightfully expect to receive a relatively equivalent return for services offered.

CONCLUSION

In this article, we have: (1) defined ethics and professionalism as well as related terms; (2) described briefly classical and popular systems of ethics; and (3) related these systems to a few ethical questions in prosthetics and orthotics. Our main objective has been to raise pertinent questions relating to practical human conduct; we have suggested the "answer" is a critical system of ethics which establishes a golden mean by considering the alternatives when making decisions.

Prosthetics and orthotics is as strong as its best practitioner and as weak as its worst. In ethical questions of professional relationships, standards, education, and cost, the prosthetists and orthotists should be free to commit responsibilities to a large measure in ways dictated by their own best wisdom and ethical systems. They must be free to act in accordance with their best considered judgment, provided these acts do not run counter to the human values embraced by the profession. The integral government of a profession must lie within its own membership, and it should be on the broadest possible democratic basis.

It is the duty of the government to see that that power is not abused but is used wisely and fairly in the interest of the patient and of society in general. It is not within the power of government to exercise this power within

itself. Outside restraint will not be necessary in prosthetics and orthotics as long as its practitioners are able to demonstrate and regulate the dangers of extravagant notions and practices. The "critical" system of ethics, or the golden mean, suggests that professional organizations, such as the American Orthotics and Prosthetics Association and the American Board for Certification, become a bulwark against the invasion of individual freedom and public responsibility.

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Albert Provini and Morton Levy of New Jersey, and Allison Eagles of New Brunswick, Canada, 1964 graduates of the Institute for the Crippled and Disabled's prosthetic/orthotic training course, show examples of their work to Eugene J. Taylor, left, secretary-treasurer of the World Rehabilitation Fund, as James N. Burrows, right, the Institute's director, looks on. A total of 76 prosthetic devices made by the trainees were presented by Mr. Burrows to the fund for destitute handicapped persons in 22 countries throughout the world.

Orthotists Eligible to Attend Closed Circuit TV Program on Milwaukee Brace Slated By College of Surgeons

Chicago area doctors, para-medical workers and orthotists will have an opportunity next month to attend a closed-circuit television program on the Milwaukee Brace when the Orthopaedic Department of the Marquette University School of Medicine will present an hour and a half program at the Clinical Congress of the American College of Surgeons on Friday, October 9, from 3:30 to 5 p.m.

Individuals or groups identified by Dr. Walter P. Blount may attend this session on a complimentary basis without registration. Those wishing to attend should write before October 6 for an identifying letter which will admit them to session in the Great Hall of the Pick-Congress Hotel in Chicago. Requests should be addressed to:

Dr. Walter P. Blount, M.D., F.A.C.S.
Professor and Chairman of the Orthopaedic Dept.
Marquette University School of Medicine
8700 W. Wisconsin Ave., Milwaukee, Wisc. 53226

Dr. Blount will act as demonstrator for the session, and Dr. William T. Green, Professor of Orthopaedic Surgery at Harvard University, will serve as moderator. Panel members will include Dr. Harold A. Sofield of Chicago, Dr. Philip D. Wilson, Jr., of New York and Dr. Charles A. Frantz of Grand Rapids.

The telecast will originate at the Milwaukee County Hospital and will be screened in the Great Hall of the Pick-Congress Hotel in Chicago. Two-way audio-visual communications between the moderator and the panel in Chicago and the demonstrator and his assistants in Milwaukee will permit the answering of written questions from the audience and the interchange of information between participants.

CORRECTION

The author has called our attention to a change which should be made in the captions in "Brace Alignment Considerations" which appeared on pages 110-114 of the June 1964 *Journal*. Figure 1 on page 110 and Figure 6, on page 114, should be transposed. The editors suggest that subscribers may wish to note this change in their copies of the *Journal*.

Project Study Undertaken by Duke University Medical Center

By BERT R. TITUS, C.P.O.

The Duke University Medical Center has received a three-year grant from the Vocational Rehabilitation Administration for a research project titled "Use of Temporary Plaster of Paris Pylons Preparatory to the Fitting of a Permanent Above-Knee or Below-Knee Prosthesis." The project director is Dr. J. Leonard Goldner. Assistants are Dr. Frank W. Cloppinger, Dr. Donald McCollum, Bert R. Titus, C.P.O., Robert O. Gooch, C.P., and Grace Horton, R.P.T.

The three-year study of the use and construction of plaster and plastic pylons is directed toward the following goals:

1. To obtain more specific information about temporary plaster or plastic pylons while they are being used by patients prior to construction of a permanent prosthesis in both above-knee and below-knee amputees.

2. To determine if it is possible to develop a rapid, inexpensive method for making above-knee and below-knee plaster pylons. At the present time, a physician member of the amputee clinic teams requires about two hours to construct an ordinary plaster pylon. We will attempt to reduce this time to approximately thirty minutes, thereby making it possible to make pylons for more patients and to obtain more pertinent information.

3. To determine if it is possible to increase the amount of shrinkage and the rapidity of shrinkage in both the above-knee and below-knee amputee. If this is possible it will then allow earlier fitting, better psychological adjustment and improved physical conditioning with earlier return to work or home activities.

4. To provide information in the below-knee amputee concerning a transitional prosthesis used between the conventional limb and transfer to a patellar-tendon-bearing prosthesis with the primary purpose of obtaining stump shrinkage prior to construction of the permanent below-knee prosthesis.

5. To evaluate use of the total contact plastic pylon as an inexpensive, light prosthesis prior to application of an adjustable limb and prior to final fitting with a permanent plastic prosthesis.

6. To determine the feasibility of utilizing available metal shins and Sach feet on plaster pylons and below-knee plastic pylons.

7. To determine whether or not the current criticisms directed toward the use of pylons are correct or can be disproven, i.e.:

- (a) Poor gait pattern
- (b) Damage to the stump with pylon
- (c) Psychologically not desirable because of appearance
- (d) Adequate fit not possible
- (e) Too much time necessary to make an appropriate pylon

8. To determine whether a pylon is a practical, inexpensive method of determining whether or not certain patients will be able to utilize and tolerate a permanent prosthesis both physically and psychologically.

9. To determine if the pylon increases the amputee's aptitude for the adjustable limb.

10. To determine if the pylon decreases the now frequent necessity of making a new socket for the patellar-tendon-bearing amputee within a year after the original prosthesis has been provided.

11. To determine the efficiency of the Veterans Administration Prosthetics Center casting jig for making both the above-knee and below-knee plaster pylons.

12. To determine the effect of increased work associated with use of a plaster pylon on the patient's circulatory system as well as his general well being. No detailed studies of the field of work physiology are planned for this particular aspect of the program, although a natural outgrowth of this initial study could be observations using work physiology methods to determine the effort required to use the pylon as compared with the adjustable limb and the permanent prosthesis. This study would be included in a new Clinical Research Unit, now in the final planning stage.

The proposed study is a research project. The information obtained may be applied directly to most amputee patients being seen by the Amputee Clinic Team for examination and preliminary treatment prior to prescription for construction of a permanent prosthesis. This study may lead to improved preparation of patients who are converting from a conventional limb to a patellar-tendon-bearing limb, or from a conventional above or below knee socket to a total contact socket. Presumably, less expense will be involved in providing artificial limbs by eliminating the extra socket, and physical function of the patient might be improved as evidenced by good gait pattern and greater endurance attained because of a more constant fit if shrinkage of the stump can be done rapidly and a plateau reached quickly. Psychological benefits would accrue to most patients, but particularly the geriatric group, who might not be considered candidates for a conventional prosthesis, but who might well be managed with a temporary plaster pylon for a long enough period of time to determine whether such pylon with appropriate extensions could be used. The study is primarily research, in that data obtained by observation, questioning, and observation of performance, along with photographic records, will be utilized.

During the first five months of study 22 unilateral BK patients, 2 bilateral BK patients, 11 unilateral AK patients and one AK-BK patient have been fitted. Three of the unilateral BK's are now wearing their permanent PTB prostheses and two of the unilateral AK amputees are wearing plastic total contact suction sockets. The patients are both men and women, and range in age from 18 to 82 years of age.

The VAPC casting jig has been used for part of both the AK and BK pylons, and the UCB total contact casting stand and the NYU flexible brim casting technique for part of the AK pylons. An evaluation of which of these systems is the most efficient is not possible at the present time.

All patients have been started out on plaster pylons with the exception of the two bilateral BK amputees. Because of the weight and strength factors these patients were started on plastic pylons made over a plaster cast using the PTB technique but without the use of Kemble liners. These were made as total contact hard PTB sockets.

Some of the other BK amputees also have been switched to plaster pylons as the second pylon, to better distribute the weight as the stump approaches condition and size for fitting with a permanent prosthesis. These were all made as total contact hard sockets without Kemble liners. A number of the AK amputees also have been fitted with a plastic socket as their second pylon, partially because of the lightness of weight and better control of the fast distal shrinkage of the stump.

The study will continue and further reports will be made by members of the project.

Growth and Achievements of the Association

By ROBERT C. GRUMAN, C.P.

*President, American Orthotics
and Prosthetics Association*



PRESIDENT GRUMAN

This has been a year of growth and accomplishment for the American Orthotics and Prosthetics Association. Since many of the readers of the *Journal* are not members of the Association, I'd like to take my column this month to give them a brief report on the Association's activities.

Educational Programs—The Association's activities in the United States and Canada are carried on through eleven geographical regions. Each of these conducts a technical session in the spring of the year. Over 1200 prosthetists and orthotists registered for these meetings. The meetings have several benefits: In addition to the technical programs and demonstrations there is opportunity for informal discussion of problem cases with colleagues. Suppliers are on hand to report on new products and components.

The Association is continuing its cooperation with the three universities now offering courses in this field: Northwestern University, Chicago; New York University; and the University of California, Los Angeles. In the year ahead we will be actively pursuing cooperative plans with Cerritos Junior College at Norwalk, California, with our AOPA Region IX serving as liaison. Similar programs are being studied with the City Junior College in Chicago, headed by Dr. Chester Pachuchi. Here we will benefit from the advice of Dr. Jack Arnold.

The preliminary work has been done on two manuals to be used for training technicians. Mr. Basil Peters is chairman of the Prosthetics Manual Committee; Mr. Charles Rosenquist is chairman of the Orthotics Manual Committee.

National Assembly—Details of the program of the National Assembly will be given elsewhere in this issue. These professional and technical reunions of orthotists and prosthetists have been growing in importance in recent years. Over 500 attended last year's meeting at New Orleans including representatives from the Dominion of Canada and several Latin American nations. As in previous years the Association will once more offer members of the medical profession a complimentary registration to the technical sessions.

Publications—This *Journal* is only one of several publications of the Association although it is the oldest and largest with a circulation of 4000. Copies go all over the civilized world. The Association is preparing a comprehensive index for the *Journal* which will go back to Volume I published in 1946.

"What Everyone Should Know About Orthotics and Orthotists" is the latest publication of the Association. It was inspired by the success of a similar bulletin issued by the American Academy of Orthopaedic Surgeons. Over 8000 copies have been distributed. A companion booklet devoted to Prosthetics and Prosthetists is scheduled for the coming year.

Other publications of the Association include *Hygienic Problems of the Amputee and Maintenance and Care of the Prosthesis*.

The *Almanac* is the monthly news bulletin edited for the management of member establishments. Since it appears monthly it serves as a valuable means of communication.

Conference of Prosthetists—This has been established by AOPA to work with the Committee on Prosthetic-Orthotic Education of the National Research Council on various projects. Currently the Conference is developing a standardized report form to be used by prosthetic facilities in recording the cases they handle. This form is being developed to assist the Clinical Study Project of the Committee on Prosthetics-Orthotics Education. However, it should be useful in prosthetic establishments throughout the world.

Research: Research in Orthotics and Prosthetics is of fundamental importance to our field. Our own Committee on Advances in Prosthetics and Orthotics (CAPO) is an expression of this interest. Mr. Fred Eschen is chairman of this committee which works closely with the VA Prosthetics Center in New York City and with the Committee on Prosthetics Research Development of the National Research Council.

Business Management—The Association has continued to cooperate with the Northwestern University School of Business in the development of business aids for orthotic and prosthetic facilities. These aids are intended to promote the efficiency of prosthetic and orthotic establishments, thus promoting improved efficiency in the care of the handicapped.

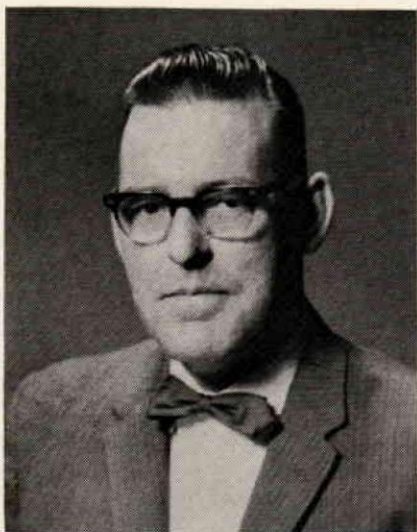
Information Center—The AOPA Headquarters and Committees function as an information center on prosthetic and orthotic care. In this endeavor, they work closely with the Committee on Prosthetics Research and Development of the National Research Council, with the U. S. Veterans Administration, with the Vocational Rehabilitation Administration and other agencies, both public and private.

Although the Association is the organization of orthotic and prosthetic establishments, it endeavors to cooperate with all who are genuinely concerned with the rehabilitation of the orthopedically handicapped. The Association is grateful for the continued cooperation of the medical profession, and the various agencies in this country and abroad which share its concern with the amputee and the brace wearer.

Sincerely,

ROBERT C. GRUMAN,
President

BIOGRAPHICAL SKETCHES OF NEW AOPA MEMBERS



GEORGE ANDERSON

George Anderson, of Anderson's House of Orthopedic Appliances in Winnipeg, Canada, first entered the limb and brace profession in 1945 when he was employed in the Deer Lodge Veterans' Hospital as an apprentice in the Orthotics and Prosthetics Division. He had previously served in the Canadian Army and had been active in the Sicily Campaign, where he suffered severe second and third degree burns. After long hospitalization he received a medical discharge in 1944.

In March 1953 Mr. Anderson became a partner in the American Splint and Brace Co., Winnipeg, and in January 1955 opened his own business, the present Anderson's House of Orthopedic Appliances. The firm now has nine employees, six of whom have disabilities.

From 1961 to 1963, Mr. Anderson attended five of the prosthetics courses

at Northwestern University, and received Certification in September, 1963. He is married and has two sons, aged 18 and 14.



AMIN K. HAJJ

Amin K. Hajj is Chief Prosthetist and Orthotist at the American University Hospital in Beirut, Lebanon. He writes as follows:

"I am enclosing a circular put out this week by Mr. Nelson Evans, Hospital Director, showing the different types of prostheses and braces made during my first three years. An interesting thing is that the total contact socket has been well received. I am now to begin work on a hemipelvectomy. I wonder if anyone is doing a plastic ischial seat for the non-weight-bearing brace prescribed for Perthes' disease. I find that they are very good and when the child

outgrows the socket it is very easy to make a new one."

In the report by Mr. Evans which Mr. Hajj enclosed, the Hospital Director comments on the impressive variety of prostheses and braces which have been prescribed and fitted for patients in the hospital. He lists those available, and adds that the work of the Prosthetic and Brace Department will be enlarged to better serve the needs of the Middle Eastern area when the Hospital moves into its new facilities.

Martin Orihopedic Appliances, Inc.

Edward F. Martin writes that his firm has been in the orthopedic brace field since 1944, and is now engaged in manufacturing spinal braces on the wholesale level for ethical dealers. Since 1960 the firm has operated primarily in the eleven western states, but now is planning to expand for national distribution. Mr. Martin attended the 1963 Assembly in New Orleans, and is planning to be with us this November in Hollywood Beach.

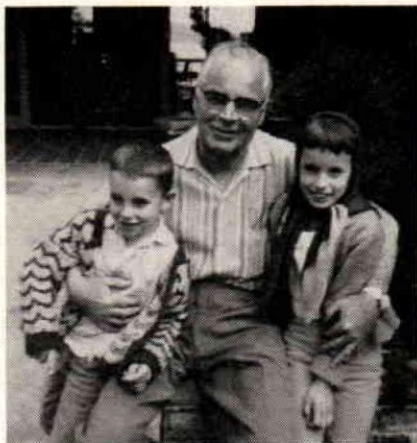
Rochester Limb Company

Three well known prosthetists in upstate New York have purchased the Rochester Artificial Limb Company and will expand its operations.

The new owners of the company are Mr. Kurt Marschall, C.P., President; Mr. Robert O. Nitschke, C.P., Vice President and Mr. Albert W. of T. & D. (Shirley).

Tindall, C.P., Secretary and Treasurer.

The company is located at 275 Central Avenue, Rochester, New York. The new owners took over operations as of July 10.

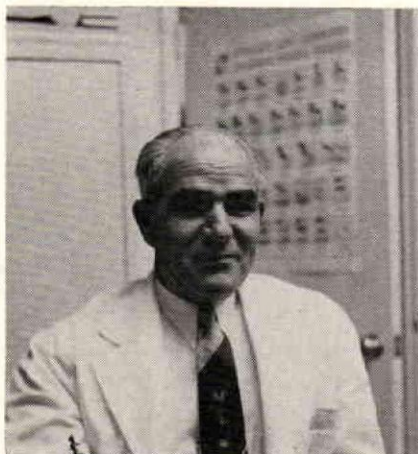


CHARLES C. CULLEN—"My latest picture with two of my grandchildren."

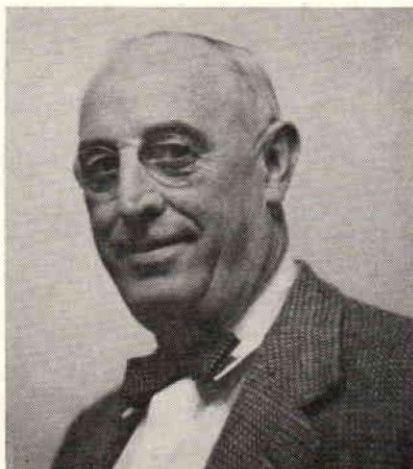
Charles Cullen Company

This firm, Mr. Cullen writes us, started in 1931 with three employees, and engaged in the manufacture of artificial limbs as well as surgical appliances. Later the limb shop was sold, and the firm devoted all its efforts to the surgical and orthopedic appliance business. Recently a separate corrective shoe store in the same building which the firm occupies in downtown Seattle has been added. At the present time a work force of twenty-two people, including young, specially trained men with a financial interest in the company, indicate the success of the strict prescription business which has been developed, Mr. Cullen states.

NEW AFFILIATE MEMBERS



D. L. Dickson, C.O., is manager of the C. H. Hittenberger facility at San Mateo, California. The firm is a new Affiliate Member of AOPA.



Eugene F. (Gene) Kiley, District Manager for S. H. Camp & Co., located at 6433 Woodcrest Ave., Philadelphia, Pa. 19151. Gene is a new Affiliate Member of AOPA.



ASSOCIATE IN ARTS DEGREE STUDIED—Representatives of the AOPA Advisory Committee to Northwestern University, Prosthetic-Orthotic Education, are here pictured at a meeting called to discuss the N.U. Associate in Arts Degree Program. Seated, left to right, are Advisors William Scheck, C.P., and Richard Bidwell, C.P.O., Director Jack D. Arnold, Ph.D., and Advisor Ralph Storrs, C.O. Standing are Chester Pachucki, M.A., representing the Chicago City Junior College System, and Don E. Irish, B.S., Administrative Assistant, N.U. Prosthetic-Orthotic Education.

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*:

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Wilmington:

AMSTERDAM BROTHERS, INC.

700 West 4th Street

Arthur J. Amsterdam, President

P

OLympia 2-0300

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Herbert Schulze, C.P.

P&O

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Indianapolis:

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1618 North Illinois Street

Miles A. Hobbs, C.O.

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William L. Bartels, C.O.

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222-5855

TEXAS

San Antonio:

ORTHOPEDIC BRACE SHOP

Wilford Hall USAFB Hospital

Lackland Air Force Base

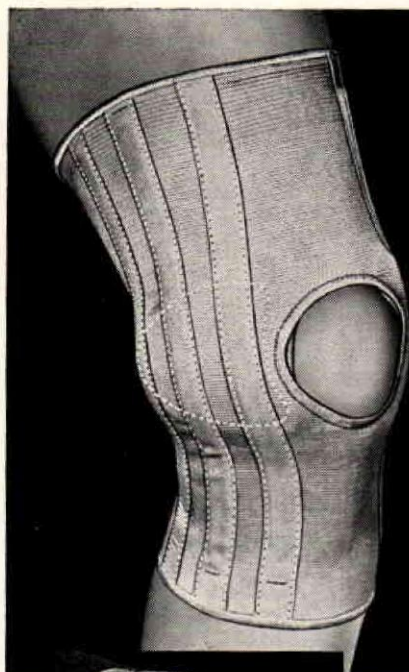
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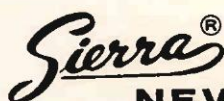
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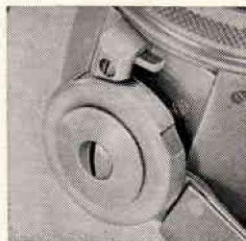
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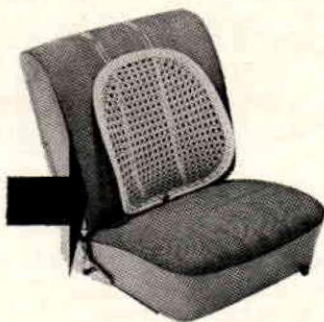
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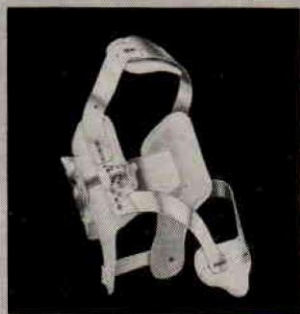
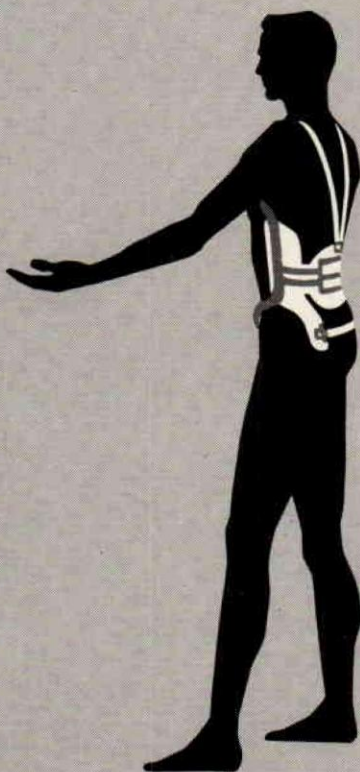
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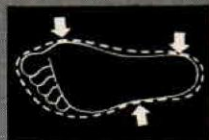


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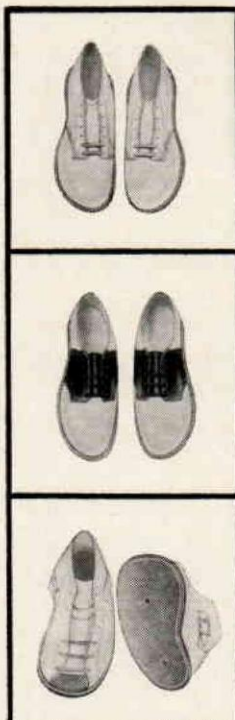
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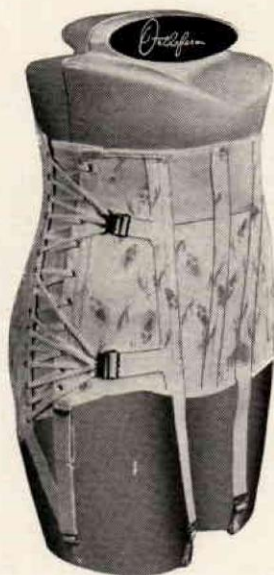
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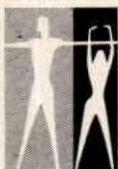
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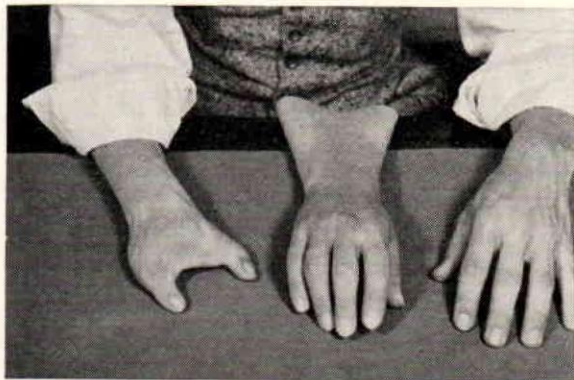
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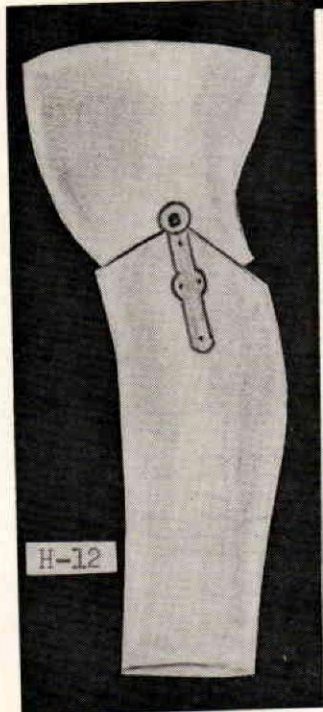
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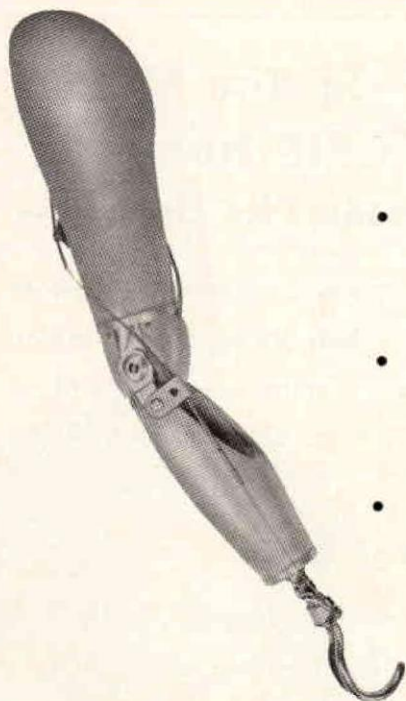
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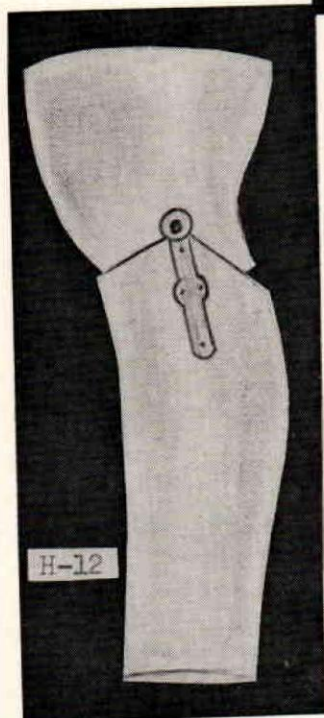
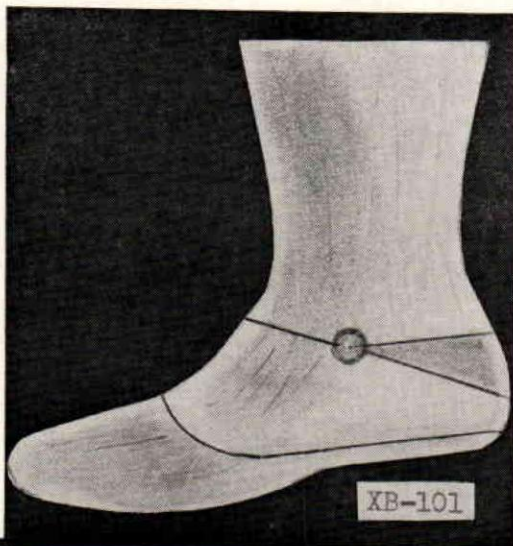
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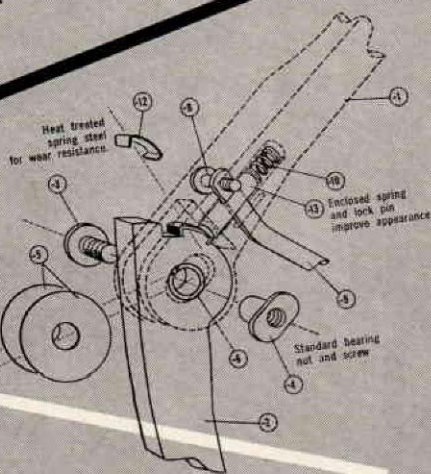
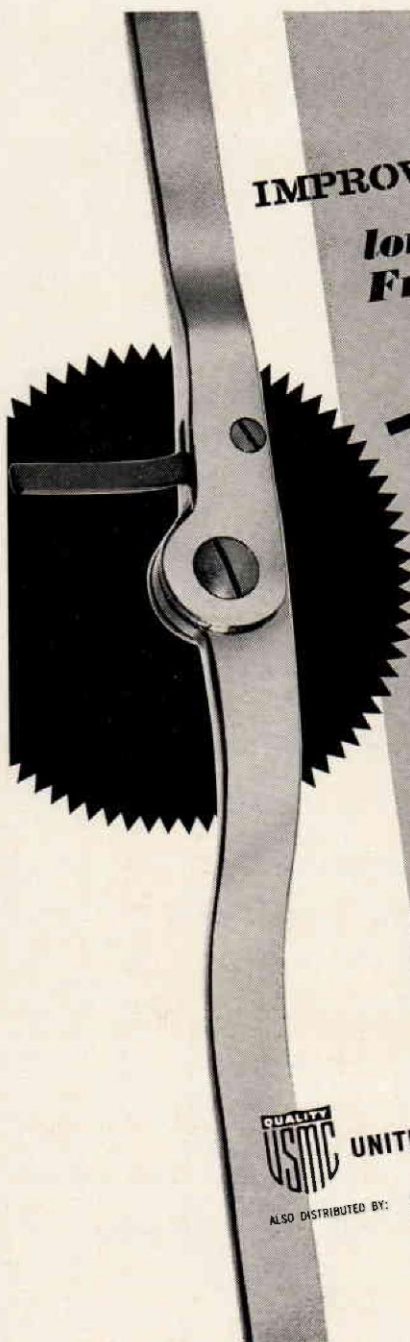
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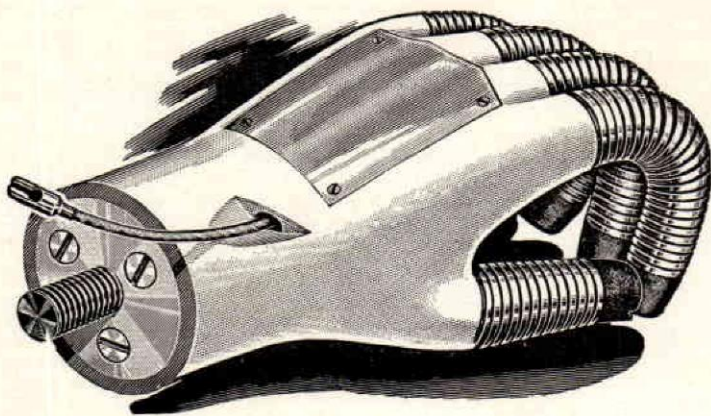
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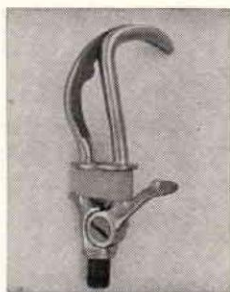
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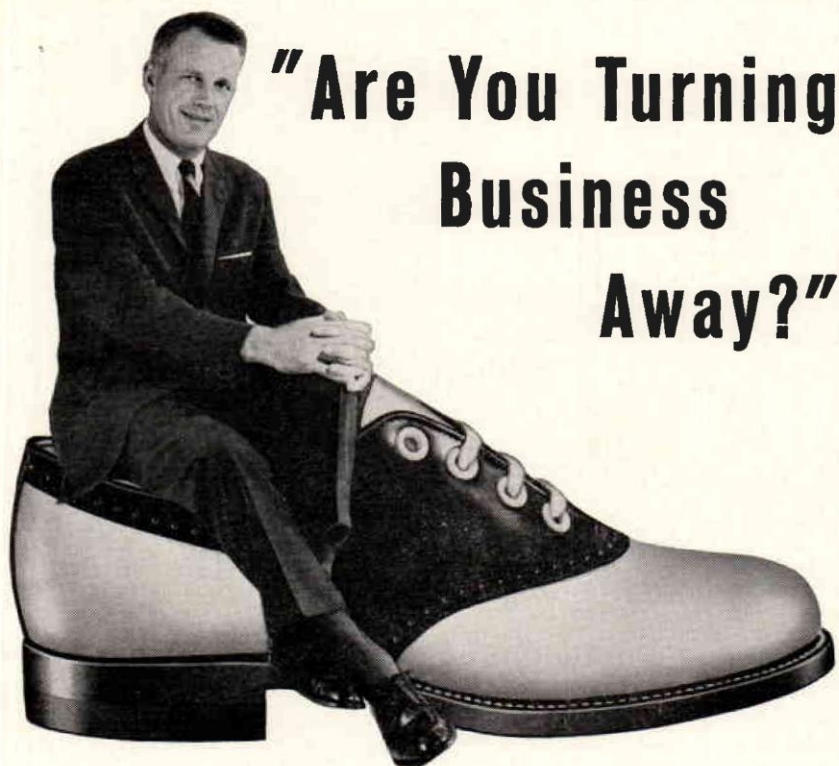
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DuoFlex

For Custom Fit Without Special Order

Meet the latest addition to the Kendrick line of elastic stockings . . . the all new Duo-Flex, a two-way stretch, surgical weight elastic stocking. Designed for the more severe varicosities, Duo-Flex offers the firm circular pressure of one-way stretch construction plus the comfort and fit afforded by two-way stretch stockings.

With this balanced construction of circular pressure and longitudinal stretch, you'll find a "custom fit" stocking that can be sold over the counter. This time-saving convenience is geared to customer satisfaction, and more sales and profits.

The Duo-Flex is of double knit construction, with Durene cotton on the inside for absorbency and comfort, and nylon on the outside for better appearance and longer life.

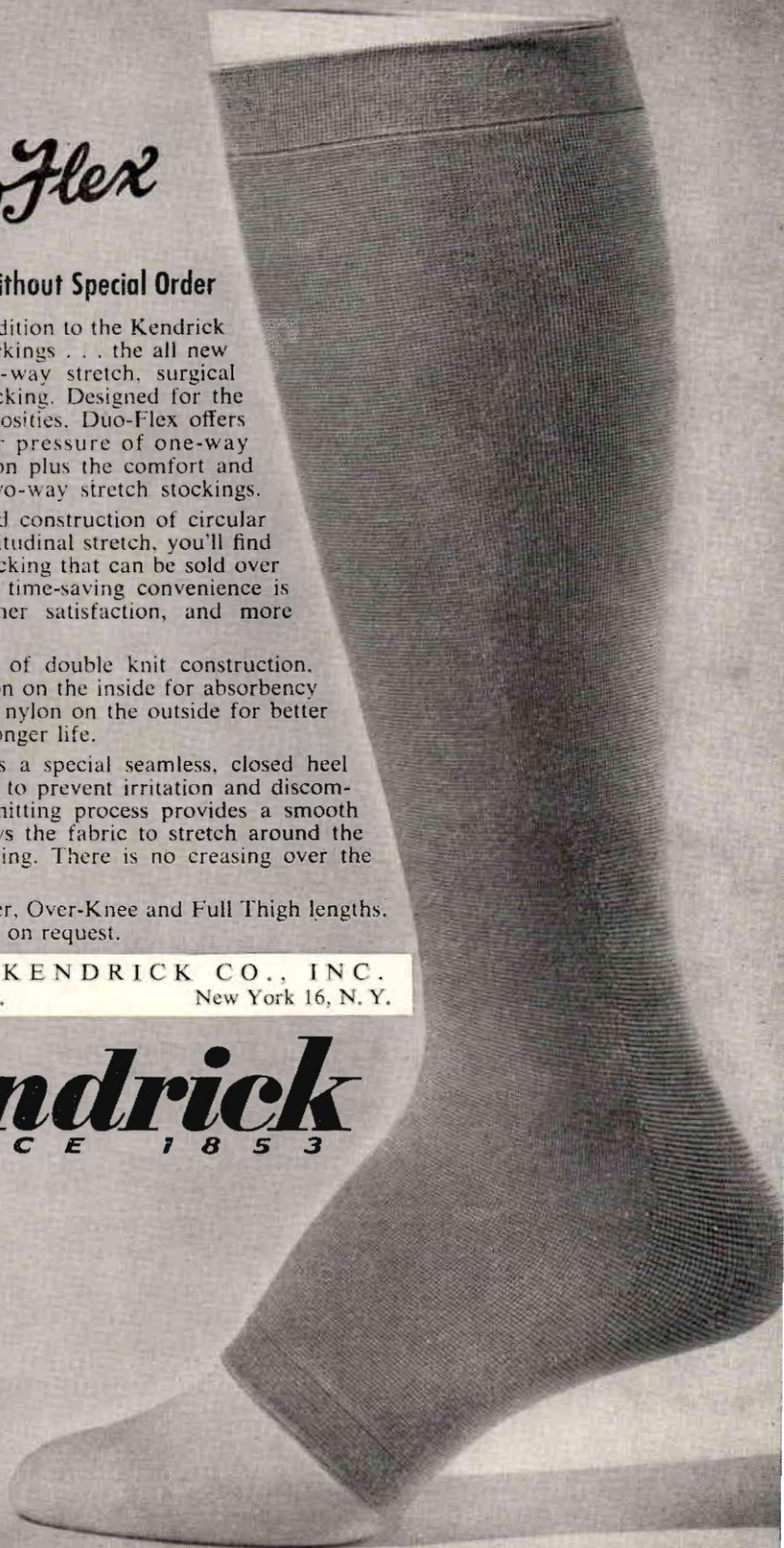
Duo-Flex features a special seamless, closed heel which is designed to prevent irritation and discomfort. A unique knitting process provides a smooth even fit and allows the fabric to stretch around the heel without binding. There is no creasing over the instep.

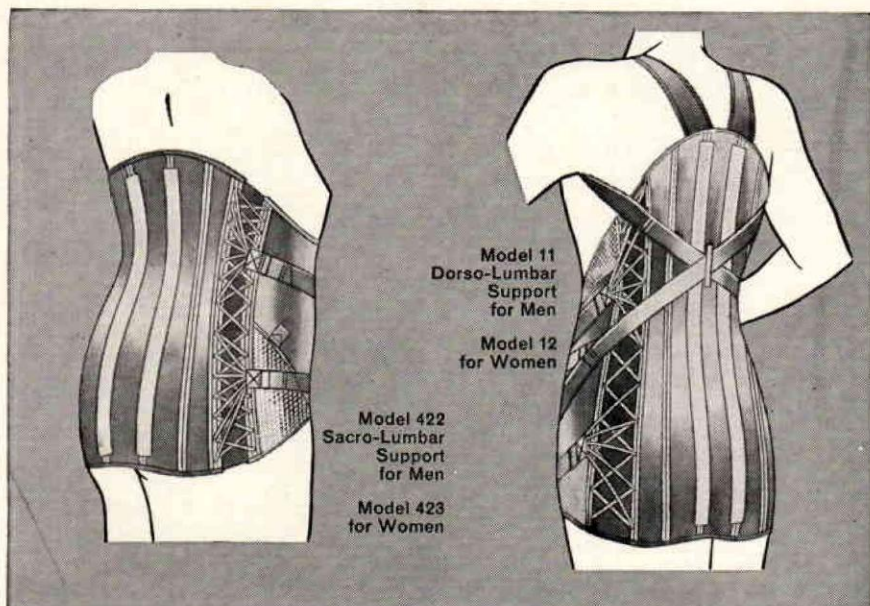
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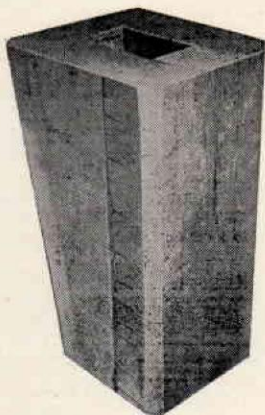
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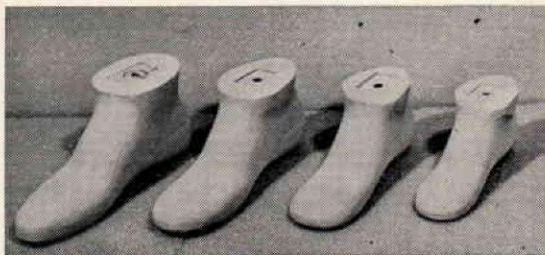


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