September 1981
Volume 35
Number 3

Orthotics and Prosthetics

Journal of the American Orthotic and Prosthetic Association

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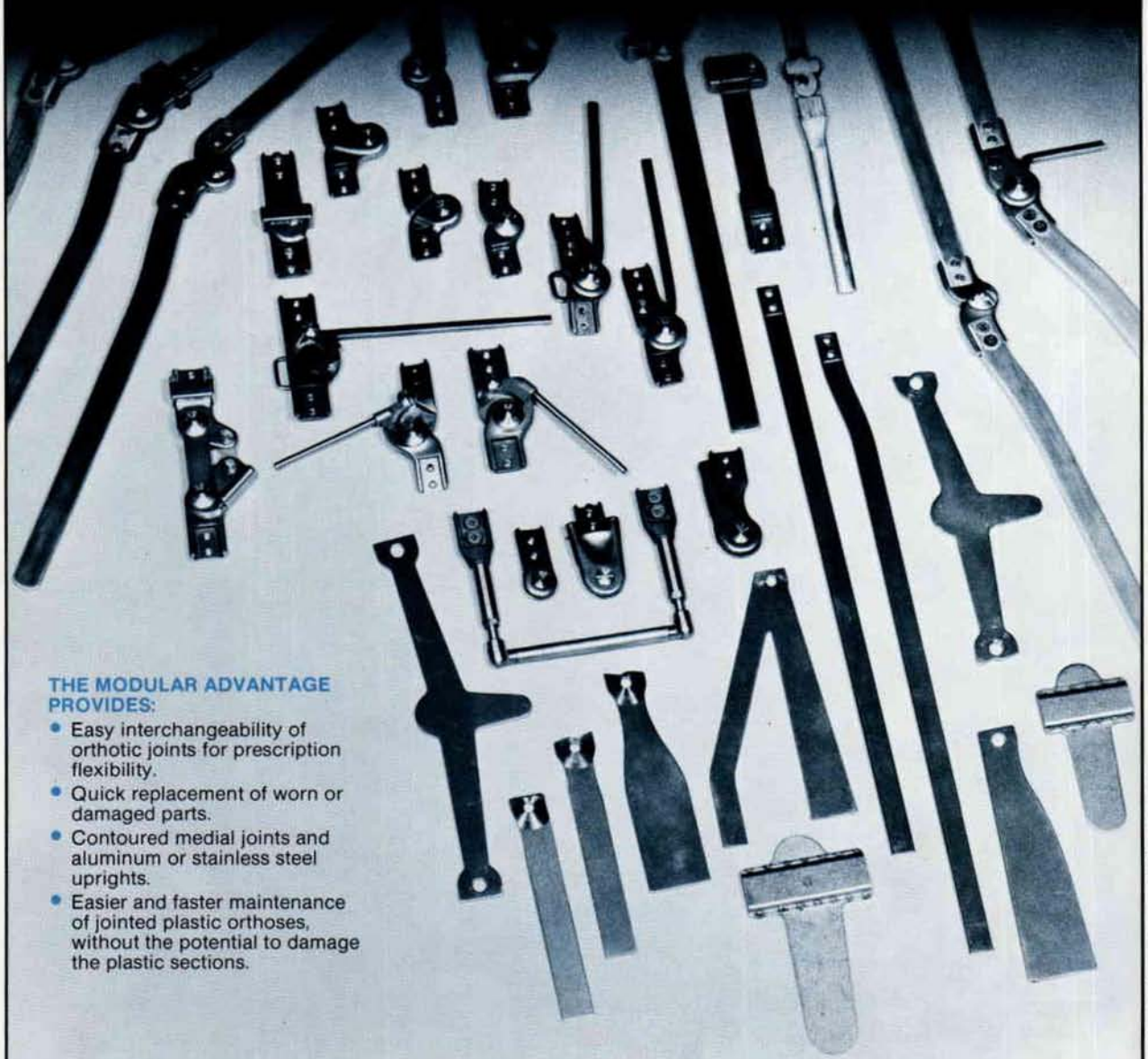

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Orthotics and Prosthetics

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Managing Editor and Design
Barbara Muller

September 1981 Journal **Volume 35, No. 3**

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Meetings and Events

Please notify the National Office immediately concerning additional meeting dates. It is important to get meeting notices in as early as possible. In the case of Regional Meetings, check with the National Office prior to confirming date to avoid conflicts in scheduling.

1981, September 18-19, AAOP Workshop, Houston, Texas.

1981, September 25-26, ABC Technician Registration Exam, Skills Training Center, Quincy, Massachusetts.

1981, October 27-November 1, AOPA National Assembly, Sahara Hotel, Las Vegas, Nevada.

1981, November 21-22, AAOP Seminar, California.

1981, December 10-12, "Current Status of Fracture Bracing" postgraduate course, Sheraton Bel Harbour, Miami Beach, Florida. Contact Dr. Newton C. McCollough, University of Miami School of Medicine.

1981, December 13, AAOP Workshop, Sheraton, Miami Beach, Florida.

1982, February 17-20, AAOP Annual Meeting and Round-up Seminar, Royal Sonesta Hotel, New Orleans, Louisiana.

1982, April 16-17, AOPA Region I Meeting, Marriott Hotel, Worcester, Massachusetts.

1982, April 29-May 2, AOPA Regions VII and VIII Combined Meeting, Alamada Plaza, Kansas City, (Tentative).

1982, May 6-9, AOPA Region IV Meeting, Radisson Plaza Hotel, Nashville, Tennessee.

1982, May 13-16, AOPA Regions II and III Combined Meeting, Caesar's World, Atlantic City, New Jersey.

1982, June 17-20, AOPA Region VI Meeting, Indian Lakes Resort, Bloomington, Illinois.

1982, October 17-24, AOPA National Assembly, Hyatt Regency, Shamrock Hilton, Houston, Texas.

1983, May 12-14, AOPA Region II and III Combined Meeting, Colonial Williamsburg, Williamsburg, Virginia.

1983, May 9-21, AOPA Region V Annual Meeting, Stouffer Dublin Hotel, Columbus, Ohio.

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A New Ankle Foot Orthosis With A Moldable Carbon Composite Insert

Carlton Fillauer, C.P.O.[1]

SUMMARY

INTRODUCTION

THE ADVENT of thermoformed Ankle Foot Orthoses (AFOs) brought the demand to fit all patients with the latest mode; weight reduction, cosmesis, and greater control are the usual benefits derived, however, when ankle motion must be eliminated the outcome is not always completely satisfactory. Dorsiflexion cannot always be totally restricted by either altering the material, or by changing the trim lines. Any increase in bulk to add rigidity only adds to the problem.

Metallic reinforcing struts have been applied to the lateral and medial sides of the AFO (1) resulting in a dramatic improvement in resistance to dorsiflexion by a factor of four plus. Perhaps the inconvenience of forming a close-fitting metal insert has deterred the general use of this approach. Hopefully, the introduction of a new moldable high strength hybrid composite described here will open the way for wide spread application of the improved design concept.

COMPOSITE MATERIALS

Composite materials are a family of high performance materials consisting of a matrix reinforced with a fiber. The matrix can be a thermosetting resin such as an epoxy, polyester or polyimide, or a thermoplastic resin such as nylon or polysulfone. The reinforcement can be carbon fiberglass, Aramid, or boron fibers. The combination of a resin and a fiber results in properties of a quite different character than either constituent. These unusual properties are a result of the fiber being characterized by single crystal properties which are five to fifty times greater than those of the same material in polycrystalline form.

Composite materials are ideal for structural applications where high strength-to-weight and stiffness-to-weight ratios are required. The advantage of composites is that they usually exhibit the best qualities of their constituents and often some qualities that neither constituent possesses. The advantageous properties include:

- strength
- stiffness
- corrosion resistance
- weight
- fatigue life
- temperature-dependent behavior
- thermal insulation
- thermal conductivity
- acoustical insulation

Naturally, not all of these can be optimized at the same time.

APPLICATION TO ANKLE FOOT ORTHOSES

Generally the trim line of an AFO is near the lateral mid-line of the ankle but often it is moved further anterior in an attempt to achieve ankle stability. The frequent result is continued bulging from buckling of the sides at terminal stance and some loss of cosmesis from the increased bulk, especially when the copolymer plastic is used. When this is unacceptable we can resort to using a thicker *polypropylene*, with little benefit. It is obvious that if we are to block ankle motion we must introduce a stiffener in the area from proximal to the ankle to the arch area of the foot on both the medial and lateral sides.

The carbon composite insert has made a dramatic impact in solving all of the above problems. Without changing trim lines or increasing thickness, almost complete ankle rigidity can be achieved by including a pair of crescent shape composite inserts in the thermoform. A hybrid composite of glass and carbon fibers in a thermoplastic resin matrix was chosen as the ideal combination for the stiffness qualities and dimensional stability desired. A two ply 40% carbon fiber panel 3/32" thick is used for light duty requirements and a three ply 43% carbon fiber panel, 1/8" thick is used for the medium and large size patients.

When the ankle angle is in the normal range of about 5° to 10° of plantar flexion one

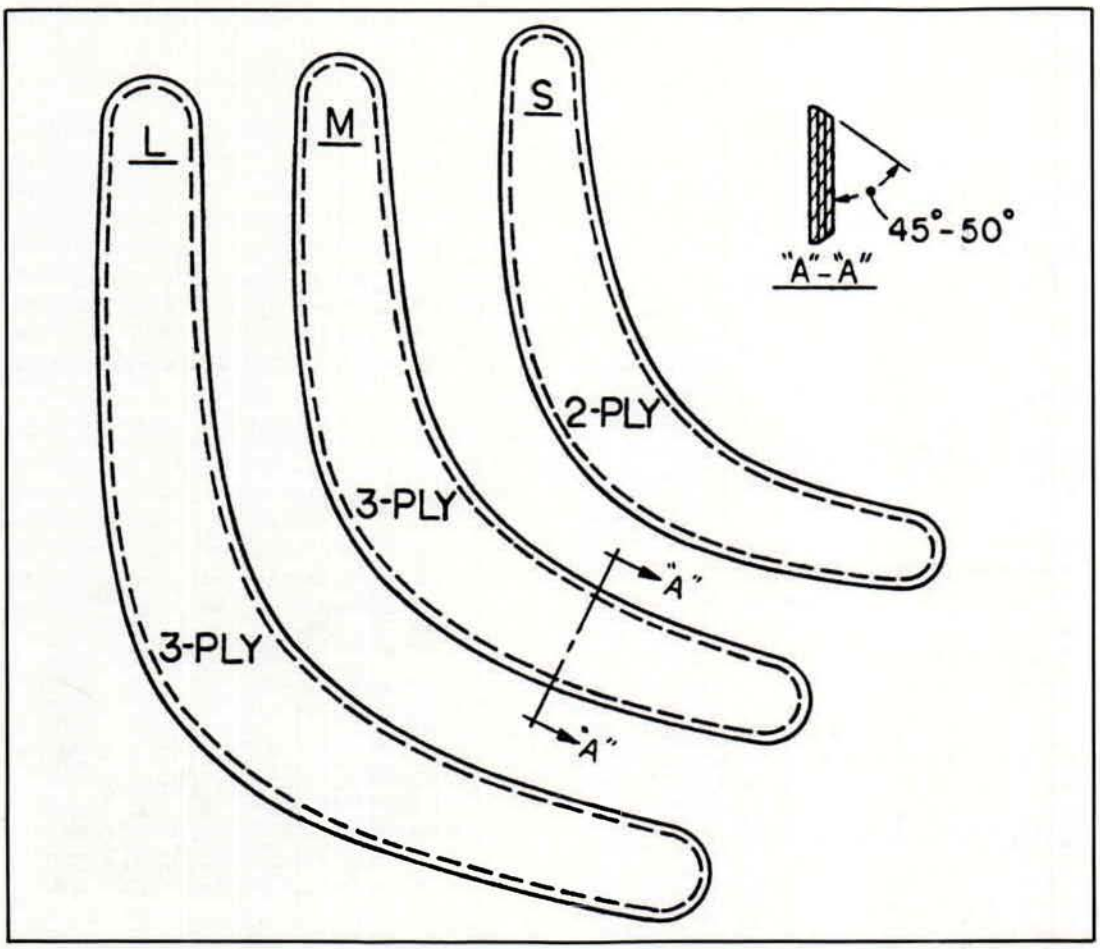


Figure 1. Patterns used for carbon composite inserts. Note the beveled edges, which allow the thermoplastic to lock the insert in during the vaccum forming process.

of three sizes of precut inserts are selected (Fig. 1). The patterns are designed to fit just posterior to the usual trim line, beginning about three to four inches proximal to the malleoli, passing posterior to the ankle prominence and extending into the foot area, terminating near the junction of the plantar surface with the medial and lateral walls. This minimizes flexing in the foot insert and bulk in the shoe.

Custom shapes (Fig. 2) are required occasionally for other angles and these can be cut on a metal band saw and the edges smoothed on a sand cone. It is important that the inner edge be undercut on a 45° angle to insure interlocking with the polypropylene wall.

There is no problem if a liner is used; the insert is simply pasted to the liner or the plaster model prior to the thermoforming procedure.

FABRICATION

To form the carbon composite insert to the model it should be heated with a heat gun or in an oven until it is pliable (approximately 300°F.) and then pressed in place with insulated gloves (Fig. 3). Attach the molded insert to the liner or to the plaster cast with Scotch Mounts 1/32" thick (Fig. 4). Scotch Mounts are urethane foam pads with an adhesive coating on both sides. Place three pieces on the insert, one on each end and one in the center, to provide extra spacing away from the liner which, along with the under-cut edge, assist in the encapsulation of the inserts. Use a ventilated foam liner or a nylon hose over the cast to assure complete vacuum forming.

The drape forming procedure is preferred since it assures maximum and uniform material thickness throughout the orthosis. Optimally, the polypropylene shows good forming and definition around the inserts (Fig. 5). If the inserts are not properly embedded in the walls of the plastic a poor result can be expected as they will separate at terminal stance; when this occurs the composite pieces can be salvaged and reused.

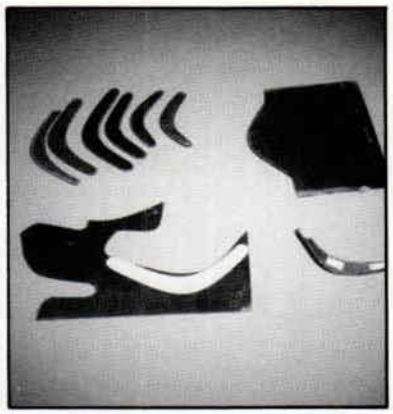


Figure 2. Custom carbon composite inserts can be cut on a metal band saw and smoothed and beveled with a sander.

Figure 3. The carbon composite insert is heated to 300° by using an oven or a heat gun; it is then pliable and is held in place on the mold until it cools.

Figure 4. The insert is held in place on the mold with 1/32 inch thick Scotch mounts; three small pieces above the insert and provide some space under the insert.

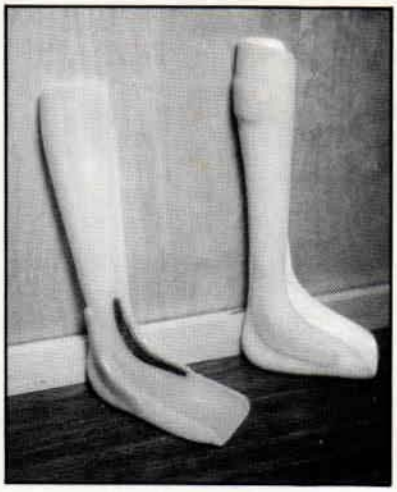


Figure 5. Completed Ankle Foot Orthoses with carbon composite inserts in place.

SUMMARY

Presented here is a simple process added to an accepted conventional laboratory fabrication procedure. It demands no new equipment, skill or time consuming labor yet it adds a new dimension to the function of the AFOs. It consists of three steps:

1. Select precut or custom made inserts.
2. Thermoform inserts to model.
3. Adhere inserts to model.

Several dozen floor reaction type orthoses have been in use for over a year with excellent results and no reported failures. When the inserts of adequate thickness are properly placed and secured in the polypropylene walls, minimum deflection and gapping will occur. We expect this conformable insert concept will find widespread use in many areas of plastic orthoses where increased rigidity is required.

References

1. Vice President, Research and Product Development, Durr-Fillauer Medical, Inc. Orthopedic Division, 2710 Amnicola Highway, Chattanooga, Tennessee.

Footnote

[1] Darrell R. Clark, Thomas R. Lunsford, "Reinforced Lower-Limb Orthosis-Design Principles", Orthotics and Prosthetics, June, 1978.

A Subjective Comparison of Spenco® and R.P.T.™ Soft Tissue Supplements Used in Footgear

Stephen Albert, DPM [1]

SUMMARY

A double blind study subjectively comparing PPT™ and Spenco® innersoles is described. Sixty patients were studied and were asked a series of questions after wearing each insole for one month. PPT™ and Spenco® were found to work equally well in three areas: 1) Amount of time required before relief of symptoms is felt; 2) improvement of skin lesions and 3) innersole inertia, or bottoming out. PPT™ was preferred by the majority of respondents. The author feels that a longer study is required to observe significantly measurable skin changes.

INTRODUCTION

Soft tissue supplements (STS) as referred to in this study are materials of any kind that are soft, resilient and protective and can be placed into a shoe as an innersole or added to any kind of orthosis or prosthesis for the purpose of protecting bony prominences and painful areas on the plantar aspect of the foot.

Several materials meet this definition: Molo™, Plastizote, felt, sponge rubber. One material Spenco® (closed cell neoprene) has proved to be superior to most others in regard to symptom relief, durability and malleability. One reason for doing this study is to *subjectively* determine which soft tissue supplements are most effective since they are frequently used. Checking the frequency of use of soft tissue supplements at the Denver V.A. Medical Center reveals the Prosthetic Treatment Center dispenses approximately 160 soft tissue supplements per year for foot problems alone. Recently Professional Protective Technology introduced a new STS called P.P.T.™, a porometic substance claiming superiority with a slightly lower cost.

The purpose of this study is to subjectively compare Spenco® and P.P.T.™ in regard to their effectiveness as soft tissue supplements in the management of selected foot disorders.

MATERIALS

PPT™ is a trade name for a frothed cellular urethane material which is produced by continuously casting a reactive urethane mixture to a desired thickness. The thickness and density is closely controlled because the urethane is chemically frothed. Special grades of PPT are available for orthotic, prosthetic and podiatric applications. PPT™ is recommended to prevent skin problems associated with shear stress.

PPT is available in thicknesses from 1/16 inch to 1/2 inch, and is blue in color. Nylon covered PPT is used for insoles, but felt covered, uncovered, perforated and smooth skin covered PPT is available.

Uses in the orthotic and prosthetic profession experienced at the Denver Veterans Administration Medical Center include liners in both above knee and below knee prosthetic sockets (1/4 inch material), backing of Plastizote insoles, as PPT does not bottom out, and shoe insoles.

PPT is easily cemented, beveled, is washable and is very durable. Human patch tests were conducted on 25 people by the United States Testing Company, Inc. and the material did not produce skin irritation nor did it appear to be sensitizing.

MATERIALS AND METHODS

Sixty participants were chosen from patients and employees of the Denver Veteran's Administration Medical Center. All participants fit the stated criteria for inclusion in the study (Table 1).

Supplies of each innersole material were obtained directly from their respective warehouses. All innersoles used in this study were 1/8" in thickness and were cut to fit each individual participants shoes. The study was conducted in a double blind manner with only one person collecting data. Each participant was randomly assigned into one of two groups (i.e., P.P.T.$_{TM}$ first or Spenco® first). Each participant wore both innersole materials, with a minimum one month wear time for each material tested. Four questions were asked after the test period for each innersole material, and a fifth question was asked at the conclusion of the study. (Table 2).

RESULTS

Fifty-four participants completed the study, 6 were lost to followup, of those completing the study 41 (76%) were males and 13

TABLE 1
CRITERIA FOR INCLUSION IN THE STUDY

A. Work related foot fatigue

B. Painful or tender feet secondary to:
   1) Atrophied plantar fat pad
   2) Plantar bony prominences
   3) Punctated, nucleated and/or diffuse plantar callosities
   4) Plantar scar
   5) Plantar hyperkeratosis

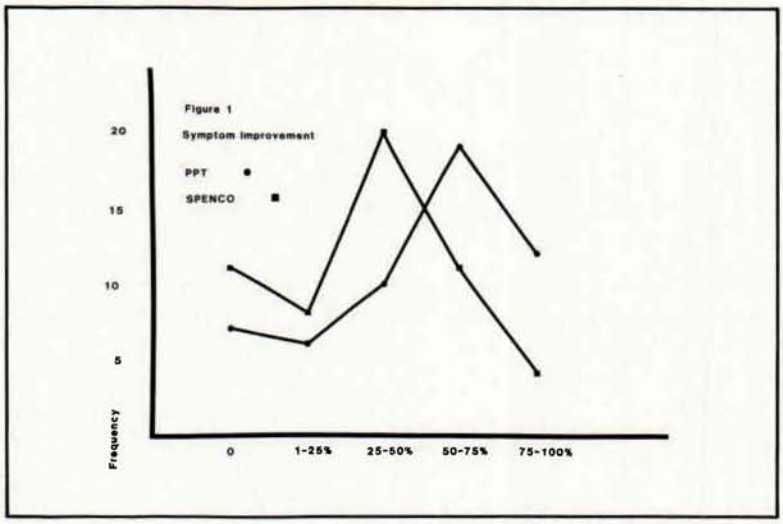
TABLE 2
QUESTIONNAIRE

1. How much improvement in foot pain and/or discomfort has occurred?
   0 (none) 1-25% 25-50% 50-75% 75-100%
2. How long did it take after wearing the material for your feet to improve?
   Immediately Several hours Several days Several weeks Month or more
3. How much improvement of the skin of your feet did you have?
   0 (none) 1-25% 25-50% 50-75% 75-100%
4. Did the material stay in place in the shoe?
   No Rarely Sometimes Usually Almost always
5. Which material gave you the most improvement?

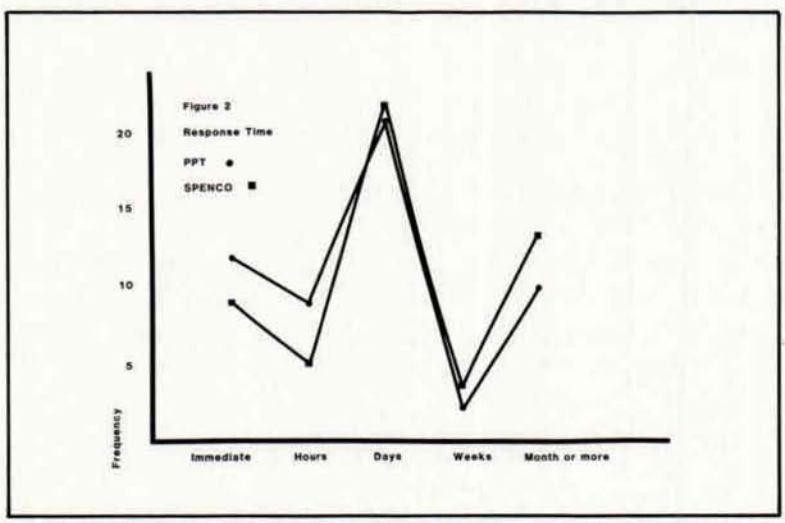
(24%) were females. Participants ages ranged from 24–83 with the average age being 49. Forty-one (76%) of the participants were caucasian, 11 (20%) black and 2 (4%) Hispanic.

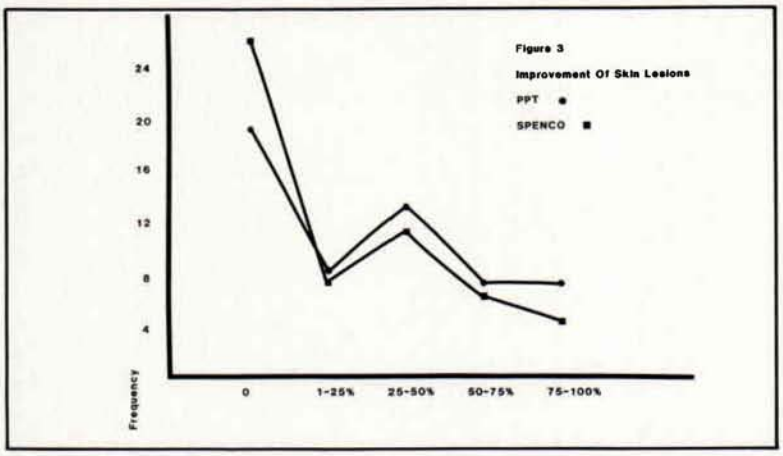
DISCUSSION

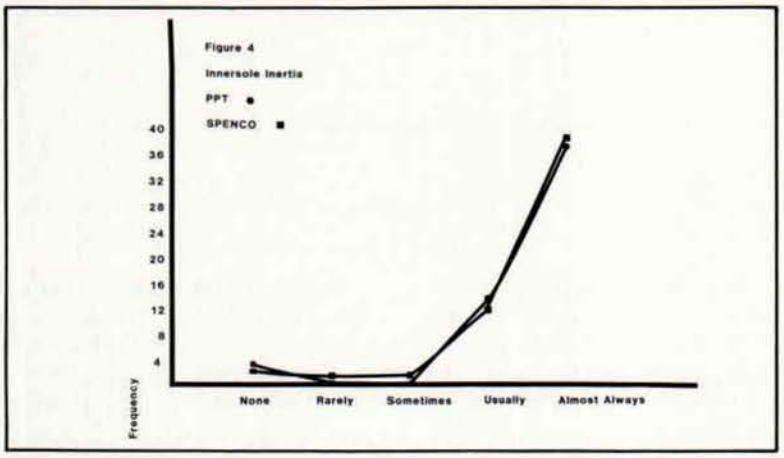
Symptom improvement (question 1) is plotted graphically in figure 1. The data suggests that a larger number of respondents felt PPT_{TM} provided 50% or greater improvement in symptoms and fewer respondents felt PPT_{TM} provided 50% or less improvement in symptoms as compared to Spenco®. This result is statistically significant at the 95% level of confidence (P = .05).



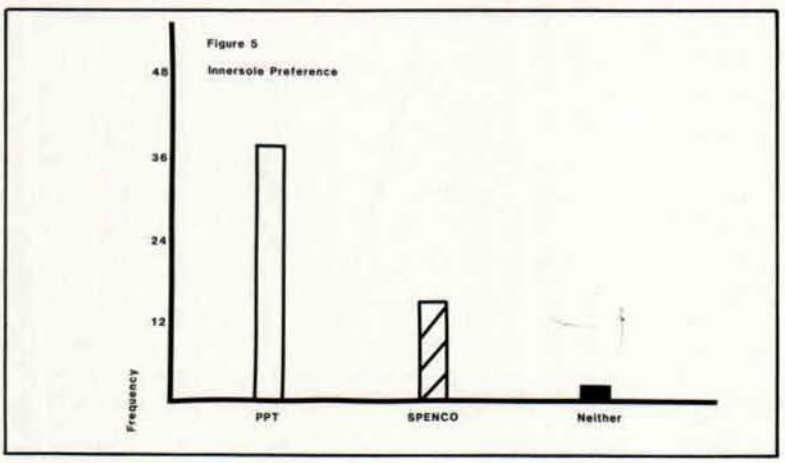
Response time, improvement of skin lesions and innersole inertia (questions 2–4), seem to be equal for both materials, although it is this investigators opinion that significantly measurable skin changes would take longer to occur than the one month trial period this study allows.







Innersole preference (question 5) plotted by the bar graph (figure 5) clearly indicates a preference for PPT_{TM}. This is statistically significant at the 99% level of confidence ($P = .01$).



CONCLUSION

PPT_{TM} and Spenco® seemed to function equally well in three of the areas studied. In the area of patient preference PPT_{TM} innersoles were preferred by patients by a more than 2 to 1 ratio, and the effectiveness of PPT_{TM} as measured by symptom improvement was superior to Spenco® by a statistically significant margin.

ACKNOWLEDGMENTS

The article was prepared with the assistance of Larry Imes, CPO, John Hayes, CP and Andy Wolf of the Prosthetic Treatment Center, Denver Veterans Administration Medical Center.

FOOTNOTE

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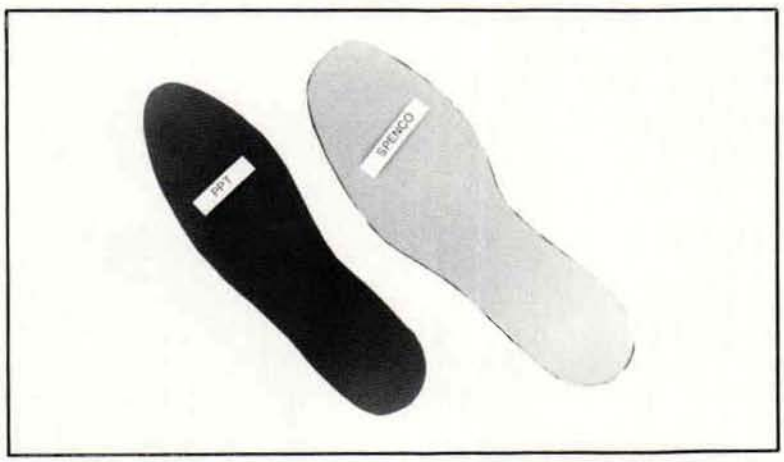

Terminal Transverse Congenital Limb Deficiency of the Forearm

Donald G. Shurr, LPT, MA[1]
Reginald R. Cooper, MD[1]
Joseph A. Buckwalter, MD
William F. Blair, MD

INTRODUCTION

Although many investigators have studied congenital anomalies of the upper limb, few have focused their attention on complete congenital limb defects. These patients share certain problems with those having traumatic amputations or surgical amputations for neoplastic or infectious disease. However, the patient with a congenital limb defect has additional problems and different needs. Proper attention to identification of these differences is critical in providing the best possible care.

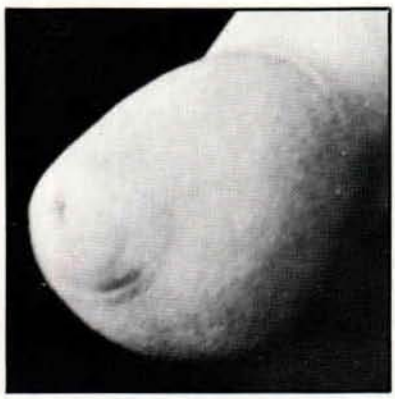

Fig. 1—Classic TTCLD Forearm Shurr, Cooper, Buckwalter & Blair Terminal Transverse Congenital Limb Deficiency of the Forearm

PURPOSE

The purposes of this study are: (1) to examine patients with terminal transverse congenital deficiency of the forearm, (2) to describe prosthetic care for these patients, and (3) to describe the attitudes of patients and parents toward prosthetic treatment.

METHOD

Patient records for 2527 patients have been classified in the files of the University of Iowa Congenital Hand Project. A review of the records of all patients with congenital forearm amputations was made (Fig. 1) and a standardized list of questions established. All available patients were evaluated during an outpatient clinic visit. All information from both the patient and parent(s) was obtained by the senior author. Some patients in this series have been lost to follow-up and appear only in the incidence section of this report.

REVIEW OF LITERATURE

Birch-Jensen (3) examined records of over four million patients to determine the incidence of the below elbow amputation. In this classic study (Fig. 2) a total of 161 patients were identified as congenital below elbow

OCCURENCE OF CONGENITAL BELOW ELBOW AMPUTATIONS

	Shurr (1980)	Birch-Jensen (1949)	Aitken & Frantz (1955)	Aitken & O'Rahilly (1961)
Number of Patients	48	161	49	331
Male (%)	19 (40)	69 (43)	22 (45)	156 (47)
Female (%)	29 (60)	92 (57)	27 (55)	175 (53)
Left (%)	35 (69)	108 (67)	37 (76)	212 (64)
Right (%)	16 (31)	53 (33)	12 (24)	119 (36)

Fig. 2 – The Slide of All Studies Shurr, Cooper, Buckwalter & Blair Terminal Transverse Congenital Limb Deficiency of the Forearm

amputees. 69 were male, 92 female; 108 occurred on the left and 53 occurred on the right. Aitken and Franz (1) reported a total of 49 patients; 22 males and 27 females, 37 lefts and 12 rights. In a series published by Aitken and O'Rahilly (2) a total of 331 cases were reviewed. Of these, 156 were male, 175 female; 212 were lefts and 119 were rights. The data in each of these studies agrees in terms of relative incidences, indicating a predominance of females and a left to right ratio of nearly 2:1.

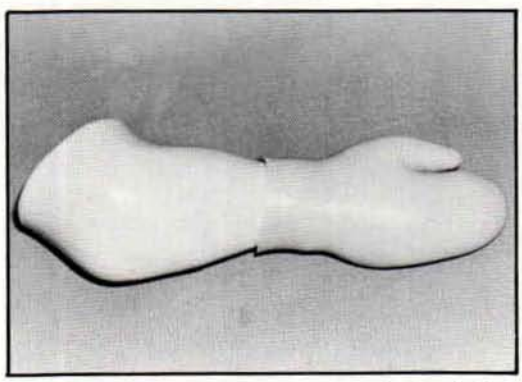

Fig. 3 – B.E. with Paddle Shurr, Cooper, Buckwalter & Blair Terminal Transverse Congenital Limb Deficiency of the Forearm

RESULTS

Forty-eight patients with below elbow amputations were identified (Fig. 2). These patients were placed into two groups: Group 1—unilateral below elbow congenital amputees, and Group 2—patients with associated anomalies, to include bilateral below elbow congenital amputation. There were four bilateral upper extremity amputees. There were 19 males and 29 females. To complete the series, one patient with a below elbow amputation also had a contralateral elbow disarticulation, making a total of 52 amputations in this series. Of 51 below elbow amputations, 35 were on the left and 16 were on the right.

Infants seen by the University of Iowa Department of Orthopaedics in recent years are are fitted with a plastic below elbow socket, suspension strap, and a passive paddle, as early as age five months (Fig. 3). Physical therapists instruct the parents as to evaluation of proper fit, means of donning and doffing, how to assist the child in using the device, what to expect functionally, and how to check the skin for signs of an ill-fitting prosthesis or tight harness. Attention is given to the subject of prosthetic tolerance. It is recommended that unilateral below elbow amputees wear their prostheses all day from an early age on. Return visits are scheduled to follow the child and answer questions of concerned parents.

When the child outgrows the initial prosthesis, usually at the age of one and one-half to two years, a new socket is made and a split-hook Dorrance terminal device is introduced (Fig. 4). Care is taken to educate the parents to the body motions needed to power

Fig. 4 – B.E. withSplit Hook Shurr, Cooper, Buckwalter & Blair Terminal Transverse Congenital Limb Deficiency of the Forearm

the voluntary opening terminal device. The timing of the first split-hook prosthesis allows about one year for the family to become accustomed to the child's amputation and to the future use of a prosthetic hook. In America, we live with the negatives associated with the fictional pirate, "Captain Hook." Few families will accept a split hook for a prosthesis for their six-month-old child, even if it could be functional.

A successful wearer may be defined as a person who wears the prosthesis most of the waking hours. Using this definition, many successful wearers were fitted prior to age one. Parents of successful wearers expressed satisfaction in the aggressive, early fitting approach. Most are eager to talk to other parents and relate how quickly their child used both limbs, once the fitting of the below elbow prosthesis occurred. Parents also report that functional milestones are often delayed, including dressing independence and tying one's shoes. Most parents comment about the improved function of their child with the use of the device. This is difficult to measure objectively, since no controls exist and since a comparison with a normal limb would be unfair. However, successful wearers are not necessarily successful users and, as demonstrated by one farmer who wore his arm only for certain tasks, a successful user may not always be a successful wearer. Concerning the appearance of the prosthesis, parents often describe it as "cold," "clunky," "ugly," or "noisy," but most of these same families admit that their child looks "naked without it."

Questions concerning deficiencies in the prosthetic device or hook indicated most successful wearers and their families feel the devices are adequate. Many refer to the day in the future when a prosthetic hand will be as practical and useful as a hook. In contrast, many teenage children, who frequently are concerned about their appearance, report discontinuing use of a prosthesis through the ages of 13 to 20, only to return to prosthetic use at a later age.

DISCUSSION

An unsuccessful wearer seldom wears the prosthesis. The unsuccessful wearers can be categorized as those who were fitted after the age of five, and some after the age of 10. Drastic changes in wearing history appear to be rare. Charts reviewed from the 1940s commonly revealed references to late-childhood or even adolescent-age fitting as the recommendation of choice.

Children with both arm and leg deficiencies present a particularly interesting problem. Early lower limb fitting appeared to be

based on the chronology of motor skill development, but the philosophy of fitting upper extremity amputations was not based on the child's motor development.

We have adopted the philosophy of early fitting, recognizing that this approach results in successful wearers. In reviewing the children fit as adolescents, successful wearers were few. One patient felt her skills with just the elbow crease and normal hand were equal to her abilities with a prosthesis. Others feel that the prosthesis gives the appearance of a "handicapped person," and going without anything is more satisfying to their self image.

No patients have been fitted with myoelectrically controlled electric hands, although the Muenster design socket is the socket of choice in the adult below elbow wearer. For those adults who desire to lift heavy loads, such as farmers, more conventional socket and harnesses are used.

CONCLUSIONS

The congenital below elbow terminal transverse amputation appears to be a distinct entity, well defined in its unilateral presentation. It occurs in our series more often in females (29 versus 19) and more often on the left (35 versus 16). Early, aggressive fitting of prostheses at about six months of age is well accepted by both parents and children. This approach yields a functional prosthesis, at a very young age, and appears to lead to successful adult wearers.

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Current Theories and Treatments Related to Phantom Limb Pain

Robert S. Feldman, C.O.[1]

Editor's Note: This article is a term paper which the author wrote while a student at the Northwestern University Prosthetic-Orthotic Center. The quality of the paper is an attribute to the new generation of orthotists and prosthetists. More articles written by students will be published in this journal in order to encourage students to excel in written communication, and because many of these articles are a real contribution to the literature in this profession.

INTRODUCTION

Since the great French military surgeon Ambroise Paré first described what was to become known as phantom limb sensation, in 1554, the presence of phantom limb has been reported almost universally. Phantom limb sensation may be defined as the conscious feeling that a limb is still present after amputation. This "conscious feeling" was the topic of a recent study by P.L. Carlen et al, in which seventy-three amputees were interviewed in order to determine exactly what their sensation felt like. It was discovered that nonpainful phantom sensations were described as the normal feeling of a healthy limb in 22% of the cases, 18% felt a mild pins and needles or prickle feeling, and the remaining 60% described sensations from a mild constant electrical current to tickling. Since these patients were in no distress, and it is well known that most phantom sensations decrease in time, no treatment was necessary. However, included in this group of seventy-three patients were a number of amputees who experienced phantom limb *pain*.

Phantom limb pain may be defined as the conscious feeling that a very painful limb is still present even after amputation. In Carlen's study, 50% of those patients complaining of pain described it as constant knife jabs or a strong electrical current, 12% felt as though the limb was on fire, and others described sensations such as crushing and bad cramps.[1] Phantom limb pain is estimated to be experienced in three to five percent of the amputee population.[2] Since these patients are usually in extreme distress (some have been known to commit suicide), it is of paramount importance that its mechanism of control be understood and an effective cure discovered.

This paper will first discuss the history of the term phantom limb, and then attempt to tie together some of todays more popular theories and treatments.

As previously stated, the presence of phantom limb sensation can be traced in the literature as far back as 1554 in the notes of Ambroise Paré. However, credit for the term "phantom limb" goes to the 19th century author S. Weir Mitchell. In an article written for the Atlantic Monthly in 1866, Mitchell wrote about Mr. George Dedlow, a fictitious quadrilateral amputee who took part in a spiritual seance in Stump Hospital, Philadelphia. The story states that a Sister Euphemia, acting as the medium, received a message from the spirit world which she tapped out on the table; the taps spelled out "United States Army Medical Museum, Nos. 3486, 3487" which happened to be the numbers given to

Dedlow's legs. After this occurrence, Dedlow began to feel "re-individualized" and to the amazement of everyone present, arose and staggered across the room on *limbs invisible*. Many people who read this story apparently thought it was a true account and sent donations to Stump Hospital on behalf of the fictional George Dedlow. This response prompted Mitchell to write another magazine article titled "Phantom Limbs" to set the record straight.[3]

THEORETICAL CASES OF PHANTOM LIMB

Today there are three main theories which attempt to describe the mechanism behind S. Weir Mitchells phantom limbs. They are the Central or Gate theory, the Peripheral theory, and the Psychologic theory.

GATE THEORY

The Gate theory of pain, published in 1965 by Melzack and Wall, has received much attention. This theory proposed that the dorsal horns in the spinal cord act much like a gate, being capable of modifying somatosensory input before perception and response occur. Melzack and Wall suggest that the altering of input by this neural mechanism is determined by the activity of A-beta, A-delta and C fibers (motor neurons), the whole being under the control of descending impulses from the brain, which act to inhibit the neural mechanism. Melzack wrote that the loss of sensory input after amputation would decrease the inhibition from the brain and therefore increase the self-sustaining neural activity of the gate, thereby causing pain.[4] The actual location of the neural mechanism is a rather large controversy among neurosurgeons today. It is from this theory that treatments such as electrical stimulation, dorsal column stimulation, and various drug treatments have originated.

PERIPHERAL THEORY

The peripheral theory of phantom limb pain is much less developed and therefore much less accepted when compared to the gate theory. Stated simply, the peripheral theory proposes that persisting sensations from nerve endings in the stump are assigned to those parts originally innervated by the severed nerves. This is also called referred or projected pain. Projected pain results from the fact that a stimulus applied to a peripheral nerve anywhere along its axon, causes impulses that are indistinguishable from those that originate at the receptors formed by fibers of that nerve. Unfortunately, complete analgesia of the peripheral nerve, or even posterior rhizotomies, in patients with phantom pain have not given satisfactory results in curing the pain, which if the peripheral theory were true, one would not expect to happen.

Another version of the peripheral theory credits phantom pain to possible changes in the central nervous system resulting from peripheral nerve injury. This faction theorizes that the phantom may result from the partial deafferentation and disordered reinnervation of spinal cord cells.[5] As this concept contradicts wallerian degeneration, more research in this area is needed.

PSYCHOLOGIC THEORIES

Psychologic theories all tend to relate phantom sensation to "wish fulfillment" which results from the denial of the loss of a part, and phantom pain is described as resulting from denial of affect associated with the loss. Lawrence C. Kolb, a psychiatrist, has done much work with amputees suffering from phantom pain. He states, "the chronic painful phantom limb represents an emotional response to the loss of an important body part that is significant in the patient's relationship with others. Hostile feelings, with resulting guilt, develop toward those with whom the patient identifies as mutilating or mutilated and also toward those on whom he is dependent and whose rejection he fears. Pain may result from punishment for such hostile and guilty emotions.[6]"

Parkes, also a psychiatrist who has worked with amputees complaining of pain, views the phantom limb as part of a mourning syndrome—"Just as the widow finds it hard to believe that her husband is dead and often has a strong sense of his presence, so the amputee has difficulty in accepting the loss

of his limb and he continues to feel it is present.[7]"

Part of the mourning syndrome is fantasy. Amputation arouses fantasies of personal mutilation (of the removed limbs) that are overcome by repression. An example of how repressed fantasies can cause phantom limb pain is illustrated by the case of a 14 year old boy who suffered severe phantom pain following amputation of a lower extremity due to osteogenic sarcoma. During an interview with a psychiatrist it was learned that the boy heard, from one of his school teachers, a story of a man in whom stinging pain had developed in a phantom limb. The man was informed that his amputated leg was being devoured and stung by ants. The pain stopped when the ants were removed. When asked what the boy thought had happened to his leg, he stated he thought it had been burned up. After being assured otherwise, his complaints of pain subsided.[8]

Schurmann states that because all attempts at neurosurgical treatment ultimately fail, the solution to the problem of phantom limb pain lies with the psychiatrists and psychologists. This rather narrow-minded statement is followed with a quote from Ronald Katz, an anesthesiologist who has also devoted most of his life to the study of pain, "Each physician finds what he is trained to find, and the psychiatrist will find psychologic problems in all patients. Whether or not such findings help in the treatment of the patient is another matter.[9]"

METHODS OF TREATMENT

NEUROSURGERY

Since pain is associated with one or more aspects of the nervous system, surgeons for many years have been destroying different parts of the nervous system from peripheral nerve to cerebral hemisphere in an attempt to decrease phantom pain. Destruction of the nervous system has two major setbacks as a form of pain treatment; first, it provides only temporary relief of pain as it always returns; and second, this type of surgery carries the inherent risk of permanent neurological incapacity. Due to these shortcomings and to the relatively new theories on phantom pain, treatments have been developed which are less invasive and at least as effective as surgical procedures.

ELECTRICAL STIMULATION

The Gate theory has lead to the development of several treatments. Electrical stimulation is one such procedure which is designed to stimulate peripheral nerves lacking sensory stimuli due to the amputation. According to the Gate theory this increase in stimuli should increase the inhibitory effects of the brain thus decreasing the hyperactive neural mechanism causing pain. In the past, electrical stimulation has shown only marginal results, with most researchers achieving approximately a 50 percent success rate.

In 1977 John Miles and Sampson Lipton decided that patient selection for this form of treatment by diagnosis alone provided too unreliable a guide. They therefore devised a battery of tests which are given to each subject to determine the patients suitability for electrical stimulation treatment. The tests include: (1) pharmacological assessments to withdraw addictive drugs and determine the patients existing analgesic regime. (2) psychiatric assessment in order to determine if any psychoneurotic disturbance existed; and (3) physiological tests to determine the integrity of the sensory system.[10]

After assessing twenty patients, twelve were determined suitable for stimulator implant into the peripheral nerve. Results show seven obtained excellent relief of pain such that they no longer require analgesics, three patients obtained partial relief of pain and require only occasional analgesics, and two patients received no relief of pain.[11] The authors go on to explain that at a later time the two failures were discovered to be nonsuitable after all, and should not have passed the physiological tests due to ipsilateral cord injury.

DORSAL COLUMN STIMULATION

Dorsal column stimulation is another treatment developed since the publication of the Gate theory. It is similar to electrical stimulation except rather than stimulating the

peripheral nerve, the dorsal columns of the spinal cord are stimulated.

Nielson et al, has treated 129 patients with dorsal column stimulation. A formal study has not been published, however Nielson has published preliminary case reports on five patients who have achieved good results. These results have been successful for up to two years of follow-up, thus permitting "cautious optimism" for this form of treatment.[12] It is obvious that not much more can be said for dorsal column stimulation until the full results are available.

PHARMACOLOGICAL TREATMENT

Fanciullacci et al, have been treating their patients with the drug Lysergic Acid Diethylamide (LSD-25). They base their treatment on the belief that some amputees may benefit from an increase in the neurotransmitter serotonin. Serotonin is thought to be one of the most important neurotransmitters in central modulation of pain, and there is evidence that deficient serotonin increases sensitivity to painful stimuli.[13] LSD-25 is known to potentiate levels of serotonin, therefore when administered to individuals deficient in serotonin and experiencing phantom limb pain, the pain should cease.

In Fanciullacci's study, seven subjects were given low doses of LSD-25 every day for eight weeks; results were based on the observation of the daily use of analgesics. Results show that in five patients LSD-25 produced improvement in pain and reduction in use of analgesics. Two of these five patients no longer require their pain medications. In the other two patients, LSD was ineffective and analgesic use remained unchanged.[14]

Unfortunately LSD-25, even in non-hallucinogenic doses, has side effects which include psychic reactions and perceptive distortion. It is also believed to be addictive in nature.

BIOFEEDBACK TREATMENT

The use of biofeedback in the treatment of phantom pain is based partly on the peripheral theory and partly on the psychologic theory. Advocates feel that phantom limb pain may be the result of the anxiety—muscle tension—pain cycle. They base their treatment on the idea that amputees suffering phantom pain may have spontaneous muscular hyperactivity in their residual limbs (as a result of high anxiety levels) which are irritating the cut ends of the peripheral nerves. Biofeedback is a system by which these muscle contractions are made audible to the patient via electrodes. This feedback signal stops when an appropriate decrease in muscle tension is reached; thus the patient learns to relax his musculature and relieve pressure on the peripheral nerves.

Results of studies on the effectiveness of biofeedback in decreasing phantom limb pain are very similar to the results shown for all previously described treatments. Advocates state the reason for their small failure rate is the fact that some patients can not learn to relax, and have strong psychological needs for their pain.[15]

PSYCHOLOGICAL MANAGEMENT

Pasnau and Pfefferbaum, two psychiatrists, propose a three-phased strategy in the psychologic management of the amputee. Phase one is prevention. In this phase an attempt is made to address the healthy coping mechanisms in each patient. This includes thorough discussions with a psychiatrist on the fears each patient (and the patient's family) may have. Phase two is crisis intervention. Here they consider the development of pain in the postoperative period an emotional crisis. Rapid intervention is therefore required in the form of psychiatric assessments of personal strengths and assets with the goals of alleviating anxiety, reassurance, and restoring coping mechanisms. The final phase includes psychotherapy and behavioral therapy. It is their belief that many chronic pain patients use pain for secondary gain in terms of medication, disability payments, or in other ways in their family or marital relationships. These pain personalities pose extremely difficult treatment problems and therefore require behavioral or psychotherapy.[16]

CONCLUSION

Electrical and dorsal column stimulation, drug treatment, biofeedback, and psychologic care are the major non-surgical forms of treatment for phantom limb pain. Because the mechanism of phantom pain is still unknown, a definitive treatment which cures all patients is not yet available. It is possible that there exists several different mechanisms, some involving the nervous system, others involving psychologic problems, and perhaps some involving both. This would explain why each treatment described totally cures some patients and yet has no effect on others. Miles and Lipton (electrical stimulation treatment) are perhaps moving toward this concept since they run each patient through a battery of pharmacological, psychological, and physiological tests to determine suitability for their form of treatment. It is the opinion of many medical authorities that when considering treatment for patients with phantom limb pain, each case should be thoroughly examined, neurologically and psychologically, in order to determine the best course of action.

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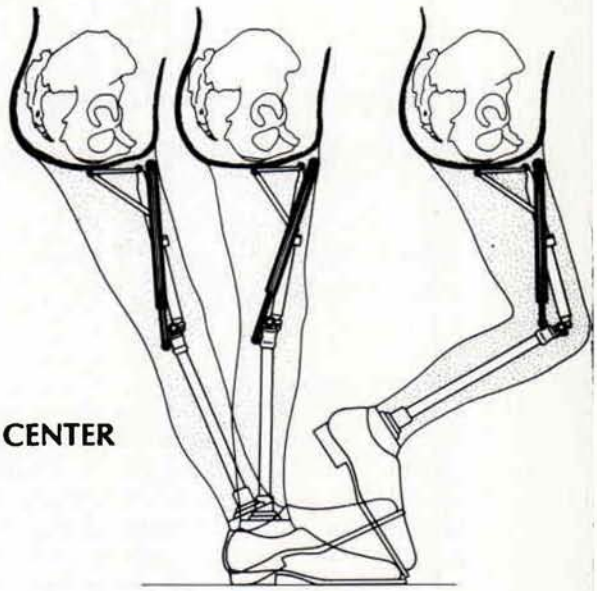

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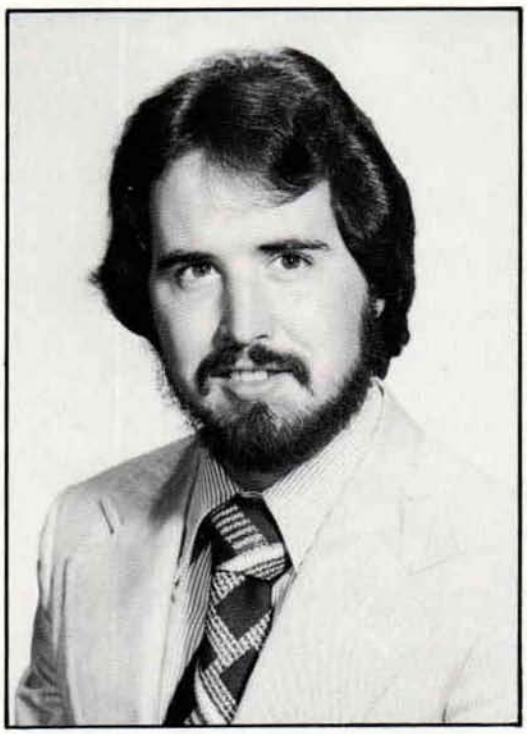


Mike Quigley, CPO, editor of the *Orthotics & Prosthetics Journal,* and the National Office staff have initiated an "Author Assistance Program" to assist new authors in the preparation of *Journal* articles. The purpose of the program is to generate new articles for the publication.

If a practitioner has an idea for an article, he would contact Mike or the National Office. Mike or the National Office staff would assist the practitioner in developing an outline and abstract to be reviewed by the Editorial Board. Upon approval of the abstract, the practitioner would receive assistance in the preparation of the article. This assistance would include tips on taking photos or providing other illustrations, general organization of the article, grammar and style. Upon completion of an article, the Editorial Board would conduct a final review before approving it for publication.

This program will provide many practitioners who have developed procedures; developed or adapted prosthetic/orthotic device(s) and/or their components, but are unsure of writing, with a means to contribute to the *Journal* and to share their valuable knowledge and experience. With the abstracts reviewed by the Editorial Board, a practitioner who is uncertain of his idea would have an answer before spending the time and effort writing an article. The result is more articles published in the *Journal,* thereby increasing the technical information pool from which all practitioners may have access and learn, and increasing the professionalism and prestige of the publication.

If you would like to take advantage of the program, please contact Mike Quigley, CPO, Oakbrook Prosthetics & Orthotic Services, Medical Arts Center, 1634 S. Ardmore St., Oakbrook Terrace, Illinois, 312-620-5333 or the National Office.

1981 National Assembly Las Vegas

October 27—November 1 Sahara Hotel

Las Vegas, a town of glitter, lights, gambling and great music, will host the 1981 AOPA National Assembly, October 27 — November 1. Very interesting and educational scientific sessions, and a day and a half business seminar will highlight the program.

Jon Leimkuehler, CPO, chairman of the Business Procedures and Data Committee (BPDC) 1981 Assembly program, along with Larry Bradshaw have planned an outstanding seminar. The half day portion of the seminar, Wednesday, October 28, will feature topics such as New AOPA Medicaid Guide; Information on Medicare Hearing Procedures; a discussion on Key Office Personnel in O & P Facilities; and Current Information on the VA Contract.

The BPDC has secured three professional speakers for its full day portion of the seminar, Thursday, October 29.

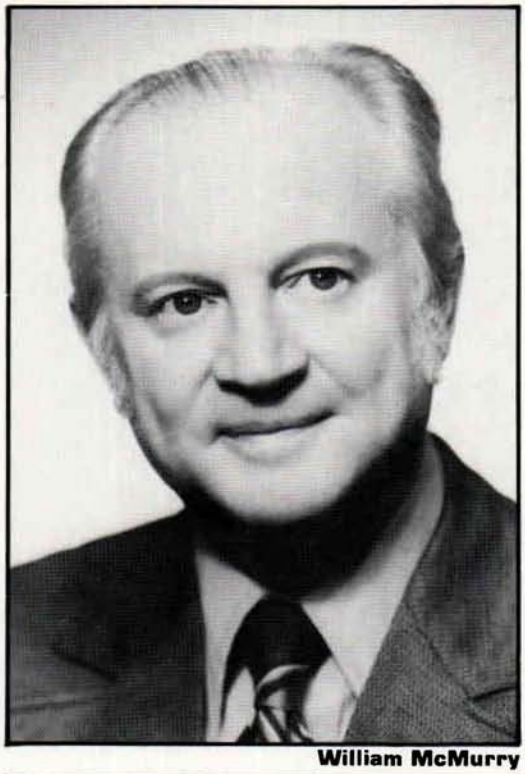
Thomas C. Miller will present "Social Style Awareness — Yourself in Selling Professional Services and Products." For the past 25 years, Tom has been deeply involved in the Washington, D.C. business community; four years with the FBI, 18 years as one of the top producers with a major investment firm and the last three years as director of recruiting and training for Financial Services Associates.

Tom is also very involved in the community. He was a founder of the Bethesda, Maryland Boys Club in 1969 and has served as a director, officer, coach and fund raiser. He has served as a commissioner of basketball for the Capital Beltway League since 1973. A member of the governor of Maryland's Council for Physical Fitness, Tom coaches winning football and baseball teams.

Of his presentation Tom says, "In a very short period of time, one can learn a great deal about their own 'Social Style' and how to recognize and deal with the 'Social Style' of others. This session in 'Style Awareness' will improve your effectiveness in dealing with people on all levels and in every conceivable circumstance, including your profession, your family and your social life. Each participant will have an immediate, usable tool to greatly improve all interpersonal relationships. We train and entertain."

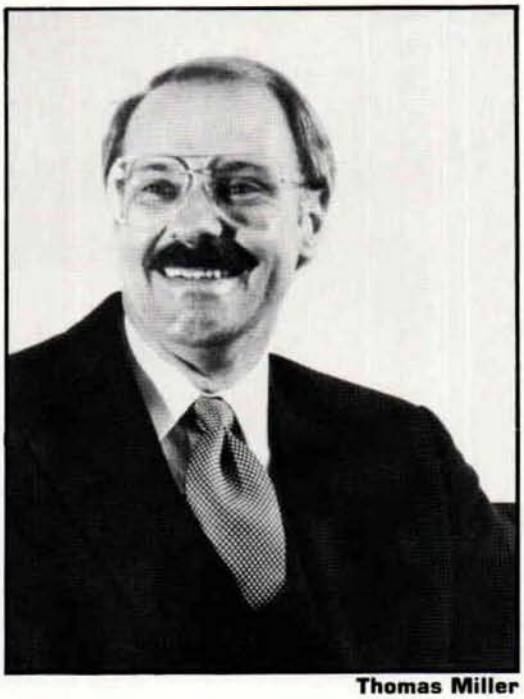
William F. McMurry, president of Financial Planner, Inc., will present "How To Hold On To More of the Money You Make." When describing his presentation McMurry says, "We find that the wives also attend these sessions where they might not be interested in the technical aspects of a national meeting.

Most of our audiences are sole proprietors, partnerships and closely held corporations. These people work very hard, but then end up giving most of their money to the government, because they have not had the time to research those sections of the internal revenue code which would allow their businesses to



William McMurry

Kay Baird



Thomas Miller

acquire investment and insurance products and services at a lower cost, and often with a tax deduction. Taxes are so high as you well know, that most audiences are extremely interested in how to use company money to their advantage, often with preferential tax treatment."

In 1946, McMurry became an officer of one of the nation's largest banks. He joined Mutual Benefit Life Insurance Company as an agent in 1953, and after three years, he joined the home office in Newark, New Jersey where he rose to director of sales development. He is the author of seven books on insurance, selling skills and business insurance. He has personally trained over 11,500 agents, account executives and registered representatives.

McMurry earned his Charter Life Underwriter designation in 1963 and in 1974 he received his designation as a Certified Financial Planner. He was appointed by the governor of New Jersey to the New Jersey Department of Banking and Insurance Advisory Council and served as chairman.

Kay S. Baird, CFP will co-chair the Thursday morning session with Bill

McMurry. Baird will also present "Maximizing Your Company Profits" in which he will further enlighten and complement the theme of higher profits through the use of tax oriented investments.

Currently, Kay is president of Baird & Williams, Inc., a financial planning company. He has also worked for Financial Service Corporation as a regional director and vice president. Kay is on the board of directors of the International Association of Financial Planners and has served as president of the North Texas chapter of the association which he helped organize.

Those on the BPDC feel this seminar will be of a real interest and benefit to all those attending the Assembly. The seminar is geared to a mixed audience, and to that end the BPDC has and does encourage everyone to attend.

Joseph Cestaro, CPO
Chairman, BPDC

International Flavour Highlights Scientific Sessions

In conjunction with the International Year of Disabled Persons, the scientific program will provide an international flavour by presenting representatives from countries around the world, in addition to an outstanding roster of American presenters.

Noted speakers from Canada, Great Britain and Mexico will share their ideas about the orthotic and prosthetic field, expounding on the new and different techniques employed by practitioners in their respective countries. Efforts are being made to contact and secure speakers from Japan and Germany as well. The gathering of these speakers and members should prove to be the example of the true essence of the Assembly where representatives of the field from around the world come together to share ideas and thoughts about the vocation which ties them to one another.

Many ideas will be dicussed, such as new and unique techniques and materials. Some examples of these topics include a clear plastic being used now as the check socket and the final socket; shadow photography which is employed to pick up the curvatures in the spine. A grid has been designed which can be placed on the shadow photograph enabling the practitioner to determine the degree of curvature. Other topics such as traction for the treatment of back disorders; new knee braces and their effectiveness; and a new and popular area of study, sports medicine, will also be on the program.

The final Scientific Program and the tentative overall Assembly program follows:

Scientific Program

Wednesday, October 28, 1981

1:00 p.m. **INTRODUCTION and WELCOME**
Robert E. Fannin, C.O., Gene Lambert, C.P.O. and John Eschen, C.P.O./Pres. of AOPA

1:15 p.m. **PROFESSIONALISM OR WHAT?**
John Sabolich, C.O., O.R.T.

1:35 p.m. **COPING WITH BURNOUT**
Joseph Wanchik, C.O., O.T.R.

1:55 p.m. **PHOTOGRAPHIC PRINCIPLES OF USE TO THE ORTHOTIST AND PROSTHETIST**
William W. Eversman, M.D.

2:15 p.m. **COFFEE BREAK**

2:35 p.m. **WHAT'S HAPPENED TO VAPC? THE RELATIONSHIP OF THE VA REHABILITATION ENGINEERING CENTER TO AOPA, ABC, AAOP**
Anthony Staros, Engineer, Administrator

2:55 p.m. **FABRICATION OF A LIGHTWEIGHT COSMETIC WATERPROOF BELOW KNEE PROSTHESIS**
Edmond E. Koester, C.P.

3:15 p.m. **A NEW PROSTHETIC FOOT FOR ACTIVE SPORTS...PRELIMINARY STUDIES**
Shirly M. Forsgren and Earnest M. Burgess, M.D.

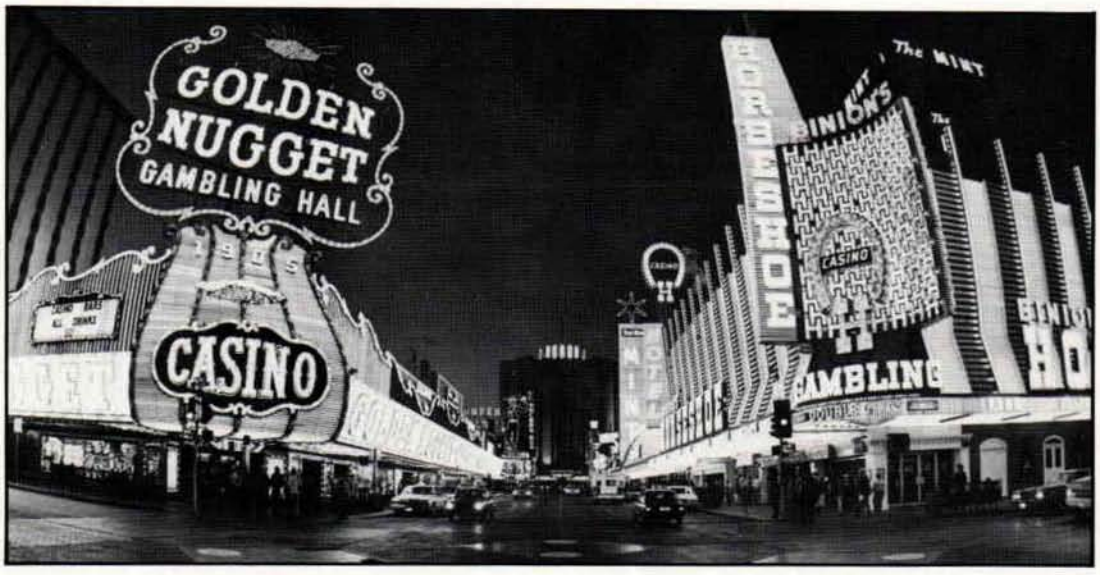
3:40 p.m. **IS THERE DME IN YOUR FUTURE?**
Jack R. Milbourn, C.O.

4:00 p.m. **METHODS OF SEATING FOR THE HANDICAPED**
Kenneth D. Driver, C.O.

4:20 p.m. **USE OF A MODIFIED BOSTON BRACE FOR BACK INJURIES IN ATHLETES**
M.E. Miller, C.O.

Friday, October 30, 1981
International Day

9:00 a.m. **THE CANADIAN PHYSIOLOGICAL KNEE STABILIZING ORTHOSIS**
Peter Paul Kraft, COP, Canada



9:30 a.m. **IMPROVED TECHNIQUES ON CUSTOM MADE FOOT ORTHOSES**
Stan Reed, England

10:00 a.m. **COFFEE BREAK**

10:30 a.m. **A NEW APPROACH IN THE CONSERVATIVE TREATMENT OF SCOLIOSIS WITH MIDDLE THORACIC CURVES USING A MODIFIED T.L.S.O.**
Manuel Ruiz, M.D., Mexico

11:00 a.m. **A COSMETIC SCOLIOSIS WEDGE**
Stanley Reed, England

11:30 a.m. **THE USE OF CLEAR THERMOPLASTICS SOCKETS AS CHECK AND PERMANENT SOCKETS**
Marlo Ortiz Vasquez, P.O., Mexico

12:00 p.m. **LUNCH**

1:00 p.m. **CLINICAL METHODS IN ORTHOTIC-PROTHETICS A NEW CANADIAN SCHOOL**
Guy Martel, C.P.O., Canada

1:20 p.m. **CONTINUING EDUCATION IN PROSTHETICS AND ORTHOTICS AT WESTPARK HOSPITAL**
Karl Ruder, C.P.O., Canada

1:40 p.m. **PROSTHETIC FITTING OF KD, AK, AND HD AMPUTEES RELATED TO TYPE OF KNEE MECHANISM. A SURVEY IN SWEDEN**
Lars Hagglund, Research Engineer, Sweden

2:05 p.m. **JAPANESE APPROACH TO LIGHTWEIGHT AND MODULAR PROSTHETICS. JAPANESE SYSTEMS AND MODIFICATIONS**
Eiji Tazawa, C.P.O., Japan

2:30 p.m. **LIGHTWEIGHT MYO ELECTRIC HAND**
Robert Taylor, England

Saturday, October 31, 1981

9:00 a.m. **FEMORAL AND HUMERAL FRACTURE ORTHOSIS**
Wm. Crotwell, M.D.

9:30 a.m. **INITIAL REPORT ON THE JOUSTO FOOTBRACE**
George W. Vitarius, C.O. and Peter H. Stern, M.D.

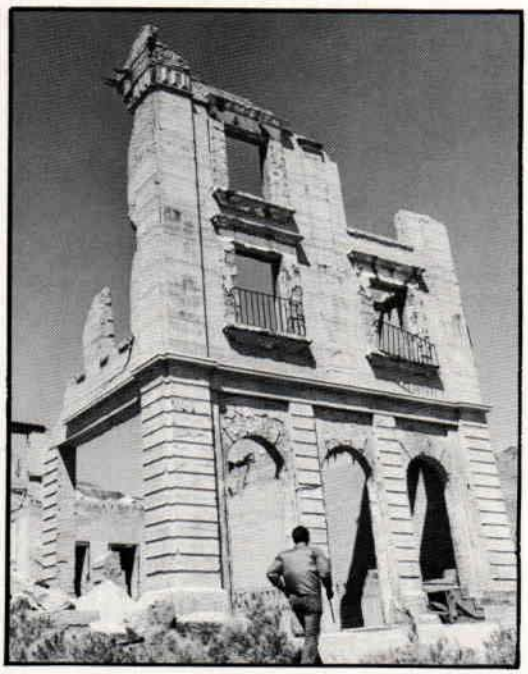
10:00 a.m. **COFFEE BREAK**

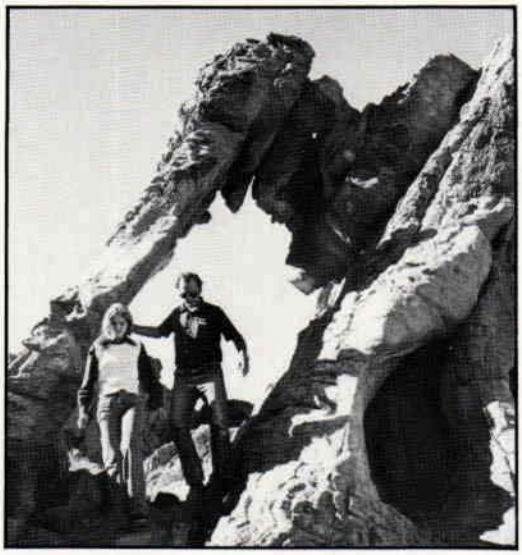
10:20 a.m. **MULTICENTRIC KNEE ORTHOSIS**
James H. Tyo, C.O.

10:40 a.m. **THE BIOMECHANICS OF IDIOPATHIC SCOLIOSIS AND ITS TREATMENT**
J. Martin Carlson, M.S. C.P.O.

11:05 a.m. **MOIRE' TOPOGRAPHY IN ORTHOTICS**
James H. Tyo, C.O.

11:30 a.m. **LUNCH**





1:30 p.m. **STRING CASTING TECHNIQUE FOR PROSTHETICS AND ORTHOTICS**
David Varnau, B.S. C.P.O.

1:50 p.m. **CLINICAL EXPERIENCES WITH BILATERAL ABOVE KNEE AMPUTEES**
Timothy B. Staats, M.A.C.P.

2:10 p.m. **UTILIZATION OF PRACTICAL LIGHTWEIGHT PROSTHETIC SYSTEMS FOR UPPER AND LOWER LIMB PROSTHESIS**
Dan Haney, C.P.

2:30 p.m. **COFFEE**

2:50 p.m. **THE QUIET HOSMER NYU ELECTRIC ELBOW FOR ENDOSKETAL USE**
Wally Sumida C.P. and Wesley Prout, Engineer

3:10 p.m. **FABRICATION OF AN ADJUSTABLE MEDIAL WEDGE IN PTB/SP HARD AND SOFT SOCKETS; PROSTHETIC APPLICATIONS OF PPT FOAM**
Robert L. Hrynko, B.S. Ed., C.P.

TENTATIVE ASSEMBLY SCHEDULE

Monday, October 26

8:30 a.m. — 12 noon
AOPA Executive Committee

1:30 p.m. — 5:00 p.m.
AOPA Board of Directors Workshop

Tuesday, October 27

8:00 a.m. — 9:30 a.m.
AOPA Executive Committee

9:00 a.m. — 5:00 p.m.
Exhibit Set-Up

9:00 a.m. — 5:00 p.m.
Business Procedure and Data Committee

9:00 a.m. — 5:00 p.m.
AOPA Board of Directors

9:30 a.m. — 5:00 p.m.
Registration

2:00 p.m. — 5:00 p.m.
Hospitality Room

7:00 p.m. — 8:00 p.m.
Early Bird Reception (In Exhibit Hall)

Wednesday, October 28

8:00 a.m. — 5:00 p.m.
Registration

8:30 a.m. — 10:30 a.m.

8:00 a.m. — 10:30 a.m.
Exhibit Hall Opening — with coffee and danish

11:00 a.m. — 12:30 p.m.
Ladies Auxiliary Meeting

12:30 p.m. — 5:00 p.m.
Luncheon/Fashion Show at Jubilations

1:00 p.m. — 5:00 p.m.
Scientific Session

1:00 p.m. — 5:00 p.m.
Business Seminar

6:00 p.m. — 11:30 p.m.
Las Vegas Downs Greyhound Racing outing (includes transportation, dinner, VIP seating, reduced cash bar)

Thursday, October 29

8:00 a.m. — 5:00 p.m.
Registration/Hospitality

8:30 a.m. — 12:00 Noon
F-19 Committee Meeting

9:00 a.m. — 5:00 p.m.
Exhibits
Business Seminar

1:30 p.m. — 5:00 p.m.
COPE/UCOPE Meeting

2:00 p.m. — 4:00 p.m.
AOPA Suppliers Meeting (Invitation Only)

6:30 p.m. — 8:30 p.m.
President's Reception

Friday, October 30

8:00 a.m. — 5:00 p.m.
Registration/Hospitality

8:00 a.m. — 10:00 a.m.
Editorial Board Meeting

9:00 a.m. — 12 Noon
Las Vegas Tour (Includes Liberace Museum, Chocolate Factory, Private Residence)

9:00 a.m. — 1:00 p.m.
Exhibits

9:00 a.m. — 2:30 p.m.
Scientific Session

10:00 a.m. — 12 Noon
JEC Meeting

12 Noon — 2:00 p.m.
AOPA Past Presidents Lunch

1:00 p.m. —
Exhibit Tear-down

1:30 p.m. — 5:30 p.m.
Free Shuttle Bus to view Fashion Show Mall

3:00 p.m. — 5:00 p.m.
AOPA Annual Business Meeting

6:30 p.m. — 8:00 p.m.
Exhibitors Meeting (Invitation Only)

Saturday, October 31

8:00 a.m. — 1:00 p.m.
Registration

9:00 a.m. — 11:30 a.m.
ABC Board of Directors Meeting

9:00 a.m. — 3:00 p.m.
Scientific Session

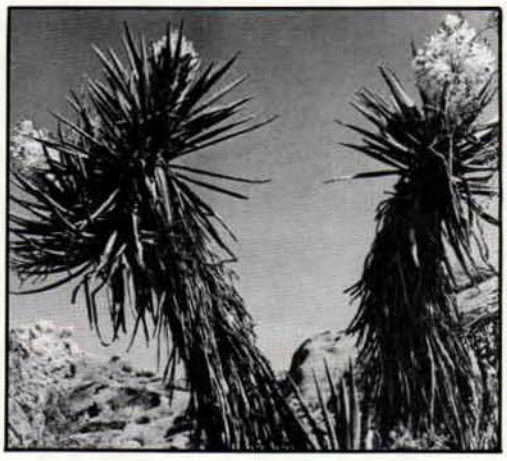
9:00 a.m. — 5:00 p.m.
Hospitality

10:00 a.m. — 1:00 p.m.
Ladies Auxiliary Breakfast Meeting (with photographs)

11:30 a.m. — 1:30 p.m.
ABC Report Luncheon

2:00 p.m. — 3:00 p.m.
AOPA New Executive Committee Meeting

6:30 a.m. — 11:30 a.m.
Concluding Banquet



Exhibitors' List
as of September 1, 1981

Camp International, Inc.
Tru-Hold Shoes, Inc.
Goliger Leather Company, Inc.
Washington Prosthetic Supplies
Durr-Fillauer Medical, Inc.
Pel Supply Company
Roloke Company
Ohio Willow Wood Company
Hosmer Dorrance Corporation
Knit-Rite, Inc.
Orthomedics
Accu-Back, Inc.
Orthotic Systems, Inc.
Davis-Grosse, Inc.
M.J. Markell Shoe Co., Inc.
Orthopaedics International, Inc.
Southern Prosthetic
Sabel Shoe Company
Feiner Brothers-Elkay Orthopedic Supply
Atco Surgical Supports Company
Sutton/Landis Shoe Machinery Company
P.W. Minor & Sons, Inc.
Jobst Institute, Inc.
La-Cal Surgical Supplies, Inc.
Comfort Stump Sock Manufacturing Company
Anita Imports, Inc.
Kingsley Manufacturing Company
Becker Orthopedic Appliance Company
Orthopedic Prosthetic Laboratory Service, Inc.
Lehde-Brown Orthopedic Company
Alden Shoe Company
Rolyan Medical Products
Scott Orthotic Labs., Inc.
Medical Center Prosthetics, Inc.
Freeman Manufacturing Company
Bell-Horn
Acor Orthopaedic
Pope Brace
Mentor Corporation
C.P.R. Laboratory
Variety Village Electro Limb
Maramed Precision Corporation
Otto Bock Orthopedic Industry, Inc.
Florida Brace Corporation
Westlake Plastic Company
Therapeutic Recreation Systems, Inc.
Apex Foot Products Corporation
U.S. Orthotics, Inc.
DAW Industries, Inc.
Truform Orthotics and Prosthetics
United States Manufacturing Company
Safety Travel Chairs, Inc.
Corth Plastics
Otto Bock Orthopedic Industry, Inc.
House of Kraft, Orthopedic Institute Ltd.
Truform Orthotics and Prosthetics
DAW Industries, Inc.
Physical Support Systems, Inc.
CASH Manufacturing
Northeast Paramedical Industries


HOUSTON, Texas
Make Plans Now
For the
1982 AOPA
National Assembly
Shamrock Hilton
Houston, Texas
October 17—24, 1982

CLASSIFIED ADVERTISEMENTS

In order to properly calculate the number of words in a classified advertisement according to the method used by AOPA, the advertiser should take the following steps: * Add up every character including periods, commas, hyphens, etc. * Divide the sum by five (we estimate a word to consist of five characters) to figure the total number of words. * Subtract 35 from the total number of words since those first thirty-five words are included in the flat fees which are as follows: * MEMBERS—First 35 words $24.00. Each additional word $1.00. * NON-MEMBERS—First 35 words $36.00. Each additional word $1.50. Responses to AOPA Box numbers are forwarded unopened at no charge. Classified Advertisements are to be paid in advance; checks should be made payable to AOPA. Send to: AOPA, 717 Pendleton street, Alexandria, VA 22314. No classified ads will be taken by phone.

Prosthetist—Certification Not Necessary. Some orthotic experience preferred. Benefits. Immediate position. Send resume of training and experience to: American Limb & Orthopedic, 806 W. University Ave., Urbana, Il 61801.

Certified Prosthetist: Immediate opening. Extensive benefits. Advancement based on ability. Send resume in confidence to—Jan J. Stojosa, CP, Clinical Director, Institute for the Advancement of Prosthetics, 4424 S. Pennsylvania Avenue, Lansing, MI 48910.

Orthotist—Certified or Eligible. Excellent opportunity to work in a medical center. Benefits include retirement plan, 3 week paid vacation/year. Send resume to: Franklin T. Hoaglund, M.D., U 471, University of California, San Francisco, San Francisco, CA 94143. Telephone: (415) 666-1166. Affirmative Action, Equal Opportunity Employer.

Orthotist/Prosthetist. Immediate opening for Orthotist/Prosthetist to supervise the operation of an orthotics/prosthetics and wheelchair repair facility. Candidate must have well-rounded experience with emphasis on orthotics, establish good working relationships with fellow employees, and be willing to provide instruction. The Institute's primary focus is in the area of orthopedics with daily contact with all ages, types, and levels of disability. This is a truly challenging but rewarding opportunity for a motivated, energetic professional. Send resumes to the attention of: Mel Stills, C.O., Dallas Rehabilitation Institute, 7850 Brook Hollow Road, Dallas, Texas 75235, (214) 637-0740.

Certified Prosthetist/Orthotist — Immediate opening for C.P.O. in new developing department in an expanding rehabilitation hospital. Excellent salary and benefits package. A chance to use your creative ability as you enter into the development of this program. All replies confidential. Send resumes to Rehabilitation Hospital Director, Good Shepard Rehabilitation Hospital, 6th and St. John Sts., Allentown, PA 18103.

Certified Prosthetist—Excellent opportunity to grow with a new facility in Tallahassee, Florida. Patient consideration and quality of work stressed. Opportunity for training in orthotics, salary plus profit sharing, fringe benefits and educational advancement. (Florida State University) subject to performance. Send resume and references to Rehabilitation Engineering, Inc., P.O. Box 13328 Tallahassee, Florida 32308.

Florida—Orthotic/Prosthetic Assistant for progressive O & P Practice utilizing 95% plastics with Central Fab. Individual must have patient handling, plaster, adjustment and organizational abilities. Call toll free, Alan Finnieston, 1-800-327-7354.

Orthotist—An excellent opportunity to work in a modern facility. Certified Orthotist needed to attend clinics, fit patients; must know all facets of fabrication and fitting. Pediatric only. Excellent fringe benefits. Send written resume to Orthotics Department, 2222 Welborn St., Dallas, Texas 75219.

Prosthetic and Orthotic Tech—Expanding Branch Office in Richmond, Virginia needs

personnel to grow with the firm. Suberb Southern location. Excellent work conditions and full company benefits. Reply in confidence to: J.M. Cestaro, J.E. Hanger, Inc. 40 Patterson St., N.E. Washington, D.C. 20002 Area Code (202) 789-0052.

C.P., C.O. or Board Eligible Practitioner – Our Ultra-Modern facility offers a dynamic progressive hospital setting with exposure to a wide variety of Prosthetics and Orthotics. We offer a competitive salary and benefits package. Employees have active involvement in patient management, fabrication, clinic activity, research and other professional aspects of the field. Equal Opportunity Employer. Contact: Bill Brelsford, Director of Orthotics & Prosthetics, Lakeshore Hospital, 3800 Ridgeway Drive, Birmingham. AL 35259, (205) 870-7900

Orthotist/Prosthetist – Immediate opening in large firm for a Certified or Board Eligible orthotist/prosthetist. Must be well experienced in all aspects of fabrication. Room for advancement. Salary commensurate with experience. Send resume to: Floyd Brace Co., Inc. 243 Calhoun St., Charleston, SC 29401.

Orthotist, Prosthetist, Technician or Assistant – experienced preferred. To work in well established facility in Bergen County, N.J. Fabrication and fitting of all types of prostheses and orthoses. Patient contact and some clinic work. Benefits include holidays, paid vacation, pension plan, and dental plan. Salary commensurate with experience. Please contact Stephen Rinko, Rinko Orthopedic Appliances, Inc., 25-09 Broadway, Fair Lawn, NJ (201) 796-3121.

Director – New Orthotics/Prosthetics BS Program. Tenure track; attractive opportunity. School of Allied Health Sciences, U. of Texas Health Science Center, 5325 Harry Hines, Dallas, TX 75235 AA/EOE.

C.P.O. with excellent professional background desires challenging position. All geographical areas considered. Request strict confidence. Please contact AOPA, Box 88111, 717 Pendleton St., Alexandria, VA 22314.

Certified Orthotist – University of Kansas, College of Health Sciences & Hospital is seeking a certified orthotists or person with equal qualifications. Excellent opportunity to work in a medical center with good physician-practitioner relationships. Benefits include: Vacation, sick time, holidays and retirement plan. Send resume to Employment Office, 39th and Rainbow Blvd., Kansas City, KN 66103. An Equal Opportunity Affirmative Action Employer.

Director-Prosthetics & Orthotics – Applications are being solicited for the faculty position of Director, Division of Prosthetics & Orthotics, Department of Rehabilitation Medicine, University of Washington School of Medicine. The academic training program offers the B.S. degree in Prosthetics and Orthotics. The clinical service program serves three University affiliated hospitals. Applications and Vitae will be accepted immediately by Walter C. Stolov, M.D., Chairman, Prosthetics-Orthotics Search Committee, Rehabilitation Medicine RJ-30, University of Washington, Seattle, WA 98195. The University of Washington is an equal opportunity employer.

Certified Prosthetist – New Rehabilitation Engineering Facility seeks an experienced CPO or CP with Orthotics experience. Salary commensurate with experience, full benefit package. Position would include responsibilities of Assistant Facility Director. Send resume and salary requirements to Camp International, Inc.; PO Box 89, Jackson, MI 49201. Equal Opportunity Employer.

Certified Prosthetist/Orthotist – Philadelphia—Our progressive rehabilitation hospital is seeking an experienced individual. Position requires direct patient contact and offers an excellent opportunity to grow. Salary and benefits are excellent. Qualified applicants should forward a resume to Mr. Thom Rossi, Personnel Director, Moss Rehabilitation Hospital, 12th & Tabor Rd., Philadelphia, PA 19141. EOE.

Certified Orthotist or Board Eligible. Salary commensurate with experience. Send resume and salary requirements to Green Prosthetic, Inc., 2814 W. 8th St., Erie, PA 16505.

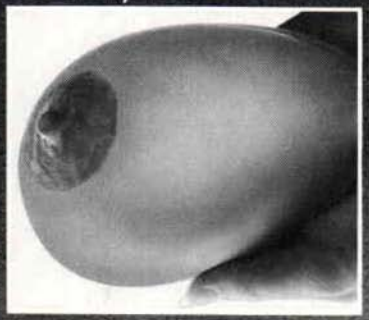
Ass't. Supervisor – Willing to train qualified person. Assist in shop supervision, perform Orthotic operations; patient contact. 40 hr. week. Excellent benefits. ABC certified. Resume (confidential), University of Rochester Personnel Dept., 260 Crittenden Blvd., Rochester, New York 14642. EOE-M/F.

Southern California Beach Location – Orthotist needed for O & P facility. Any prosthetic experience a plus. Certification not required. Shop fabrication and patient contact. Excellent salary and fringe benefits. Reply: AOPA Box 108103, 717 Pendleton Street, Alexandria, VA 22314.

Prosthetist and/or Orthotist – Excellent opportunity for qualified individual in a growing modern New Jersey facility. Pleasant working conditions, fringe benefits, salary neg., all inquiries confidential. Reply: Modern Limb & Brace Company, 916 Somerset St., Watchung, NJ 07060. Call collect: 201-757-2702.

Give her back her femininity...

The totally natural look of Thyself®



After the mastectomy, she still wants to feel and look like a woman. Truform knows that... and offers the Thyself® 100% silicone breast prosthesis and areola-nipple for that special woman.

The world's foremost bio-engineers of silicones have scientifically designed the Thyself for maximum comfort and durability. Thyself is made with a new, non-oily high performance silicone gel encased in a smooth silicone elastomer skin. A base seam assures dimensional stability . . . most important in a natural, weighted prosthesis. Eight years of clinical testing have shown that a seamed breast prosthesis is less likely to roll away from the chest wall, mold improperly, collapse in the bra cup or lose its shape.

The Thyself approximates the normal human breast in contour, softness and mobility. It is made to the same weight and specific gravity as normal breast tissue. A wide range of sizes are available that correspond to actual weights of the human breast.

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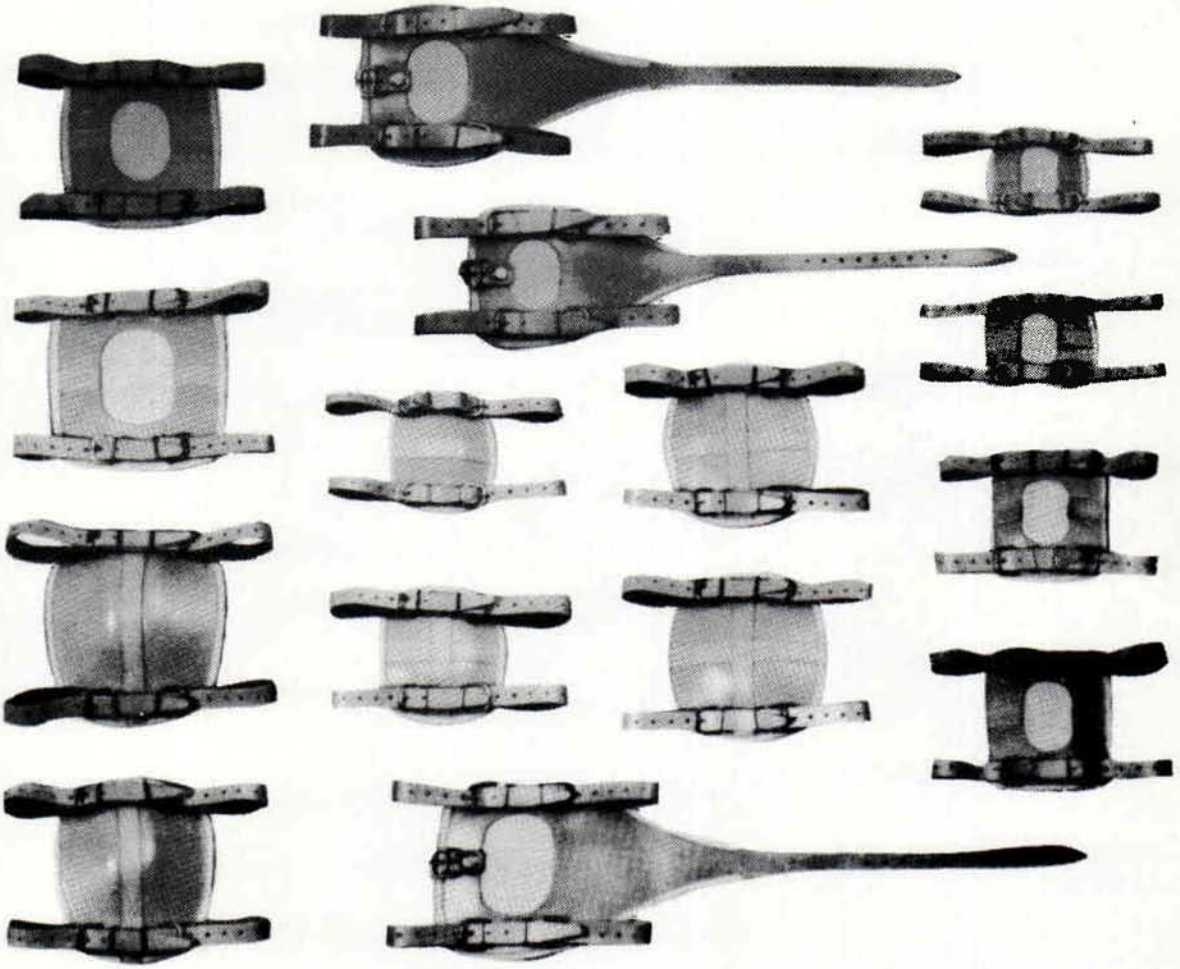

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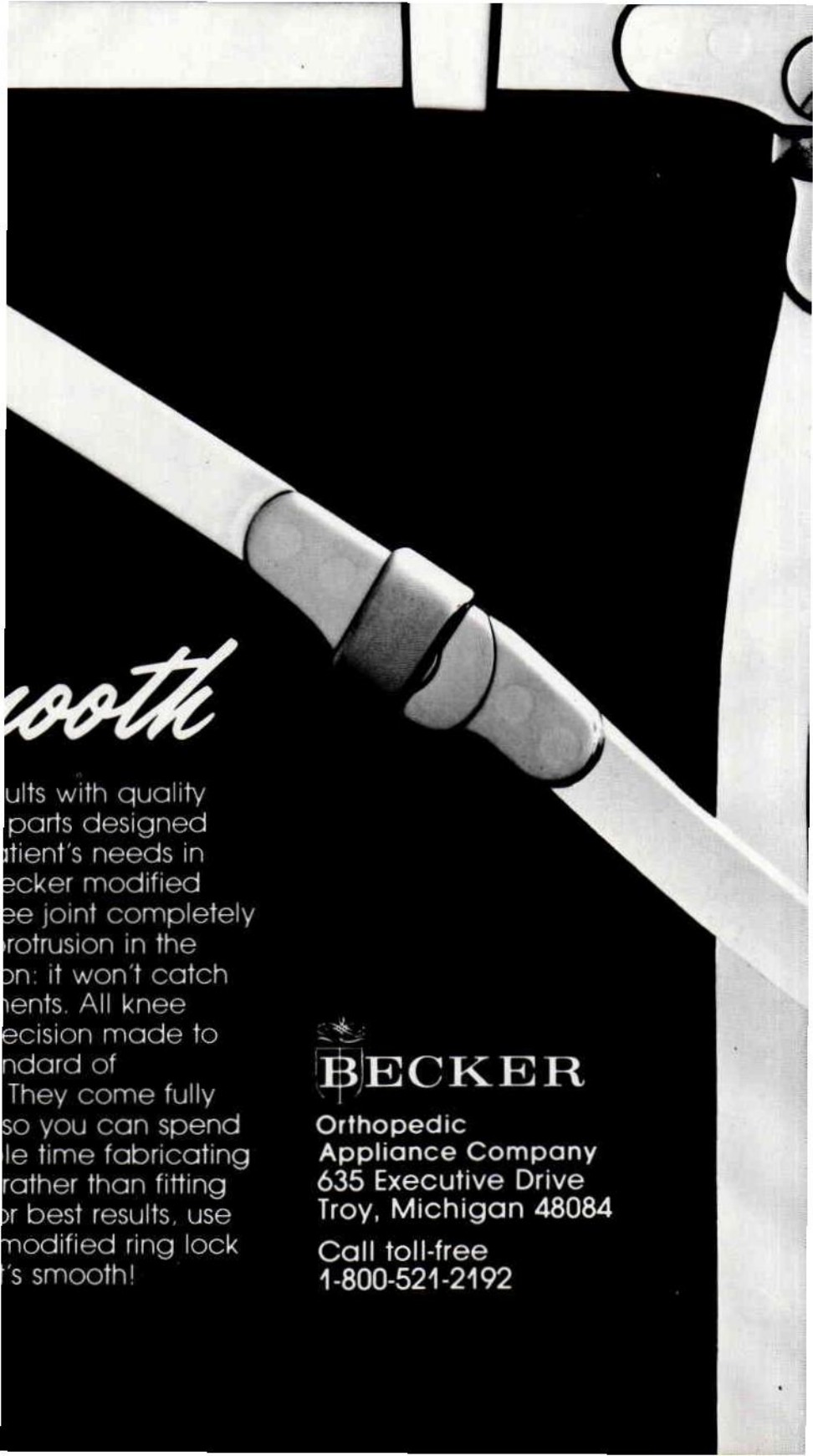
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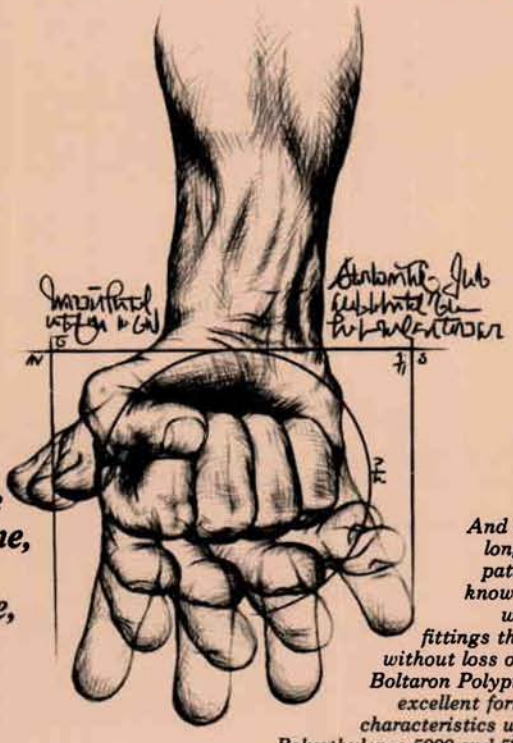

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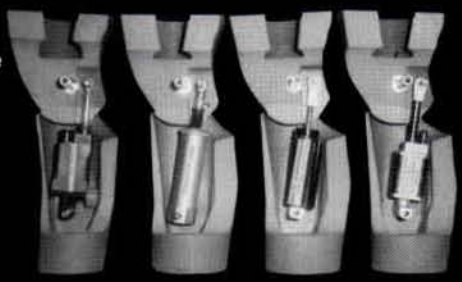

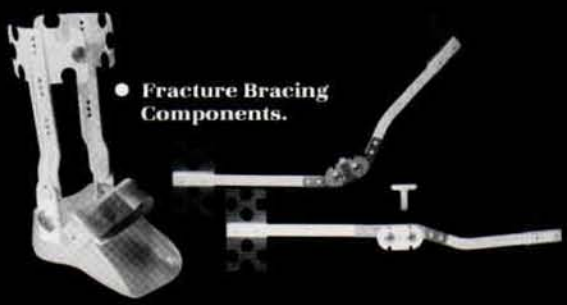

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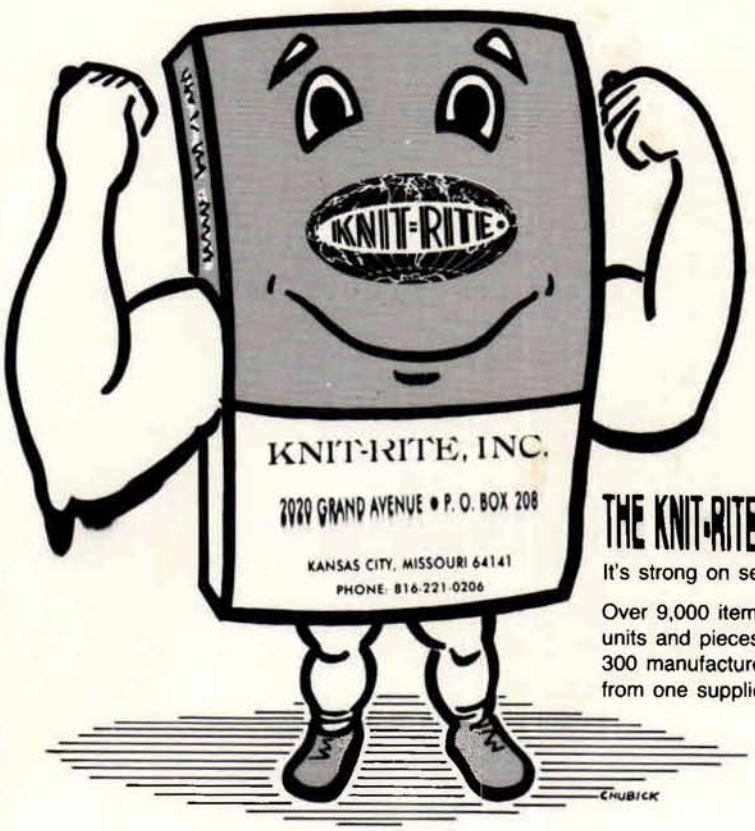

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