MARCH, 1965

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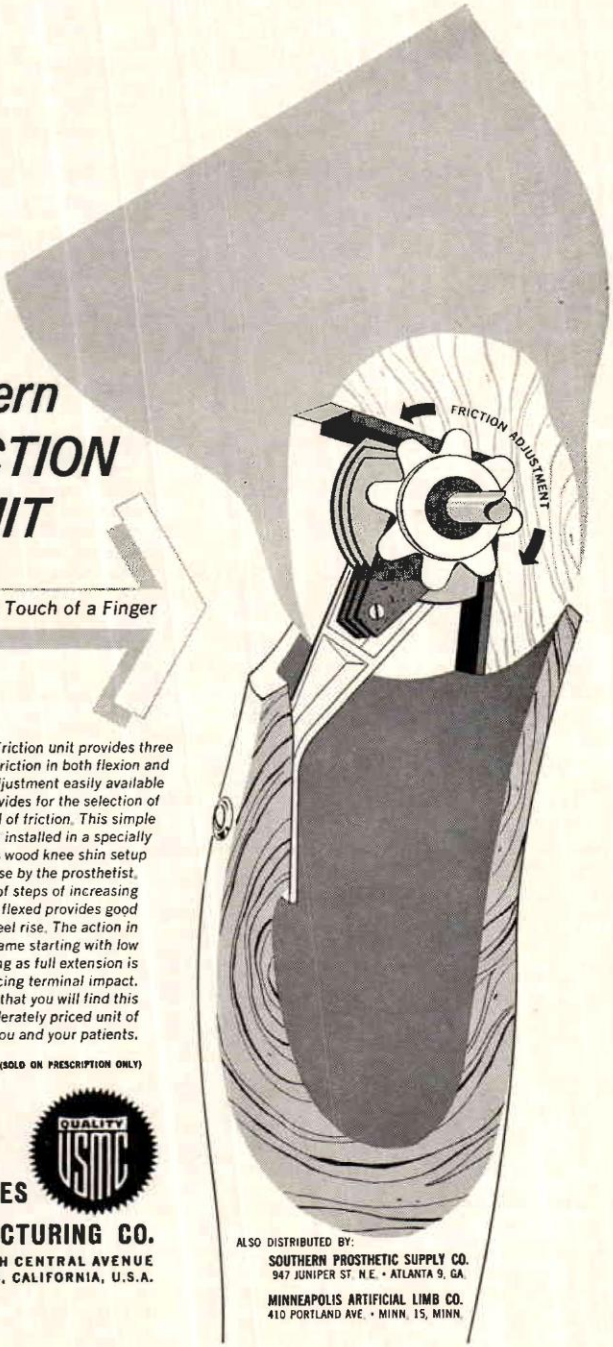

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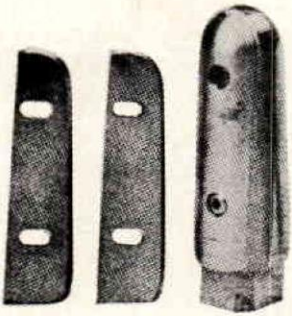

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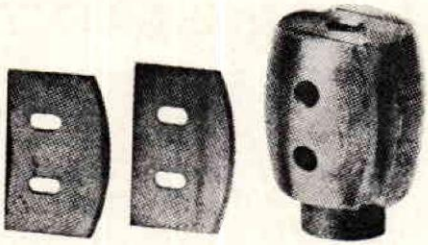

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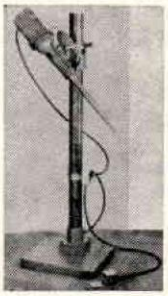

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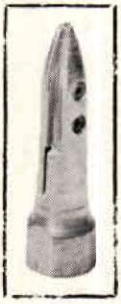

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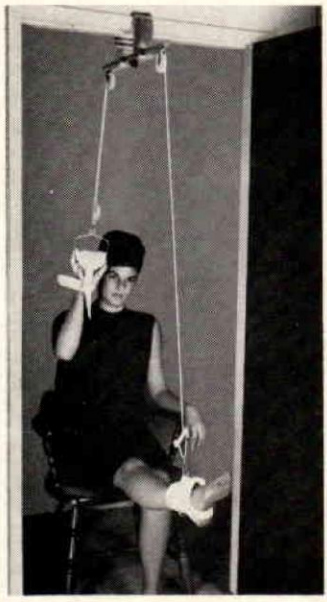

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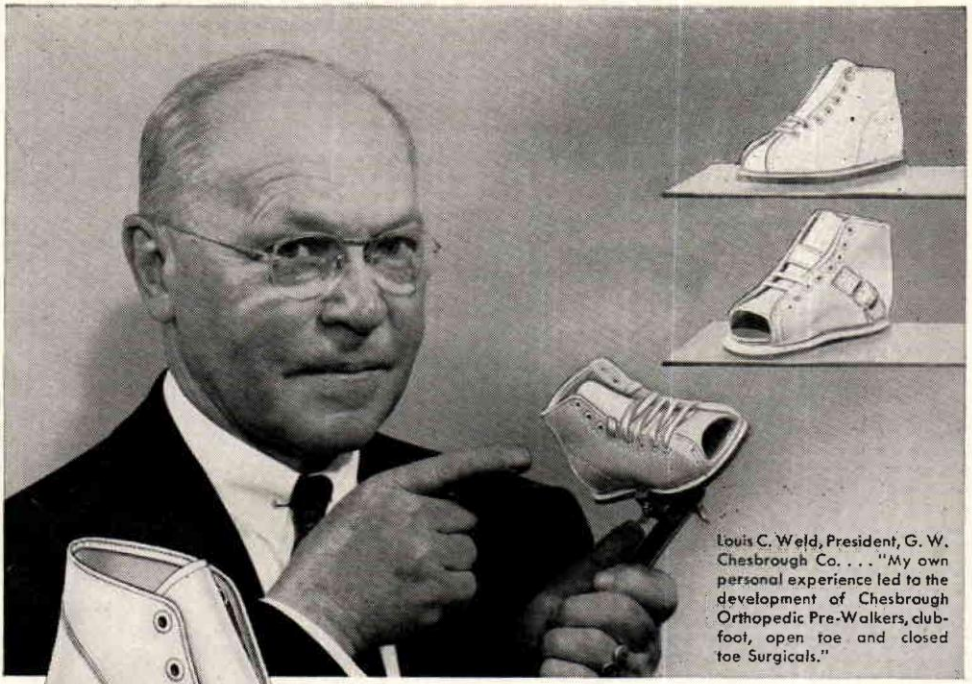

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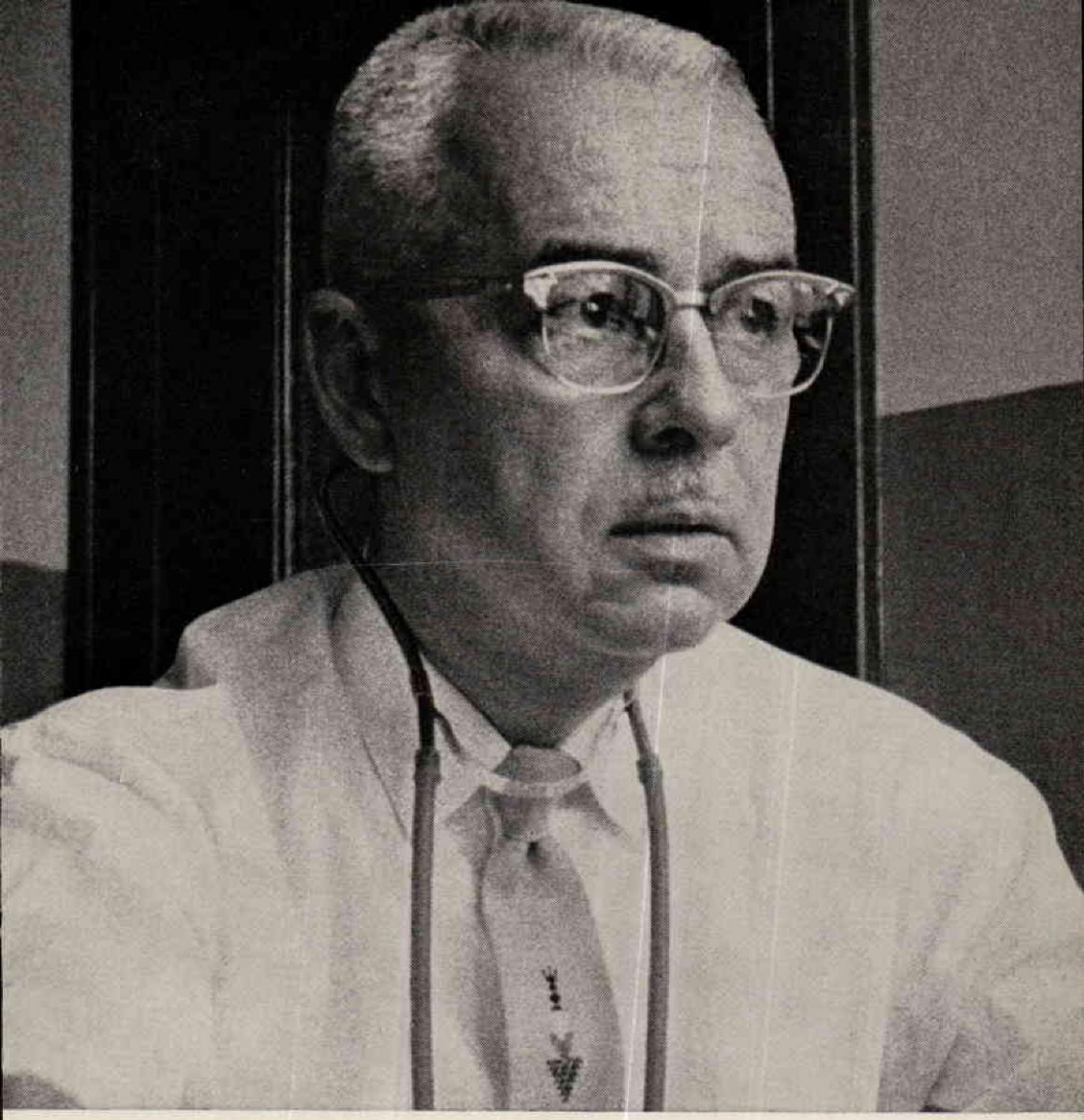

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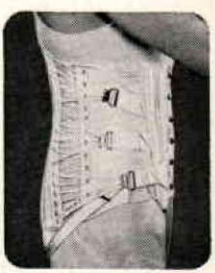

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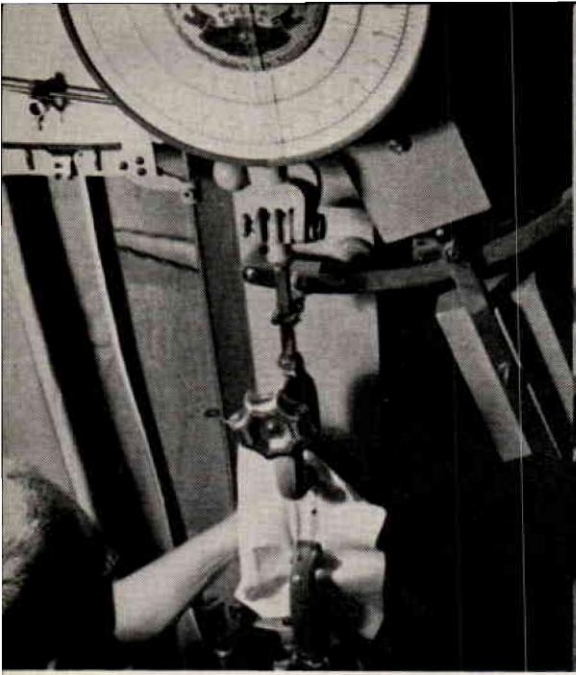

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"The Decline and Fall of the PTB"

With Apologies to Edward Gibbon (The Decline and Fall of the Roman Empire)

By ROBERT G. THOMPSON, M.D.*

In the September, 1962 issue of the Orthopedic and Prosthetic Appliance Journal, I reported on our experience with the use of the new total contact patellar-tendon-bearing prosthesis at the Veterans Administration Regional Office Amputee Clinic in Chicago.[1] We had surveyed the patients with below-knee amputations who had received new prostheses during the period of August 1, 1960 through May 31, 1962. During this approximately one-and-a-half year period, one hundred and twelve below-knee amputees had received new prostheses. Of this group, forty-seven were issued (largely on the patient's request) a standard or "old-fashioned" type of below-knee prosthesis, while fifty-three patients were issued patellar-tendon-bearing prostheses with condylar straps. Four patients were judged to have sufficient stump problems to recommend the use of a corset and side hinges applied at the time of manufacture of the PTB prosthesis. Five patients of this group were issued slip socket prostheses. Of the fifty-three patients fitted with the patellar-tendon-bearing prosthesis, thirty-one were followed for a sufficient period to warrant an end-result evaluation. Four patients were found to have been total failures and subsequently desired to return to their old type prosthesis; of the resulting twenty-seven patients, only sixteen were found to wear their prosthesis full time, while eleven patients were wearing their prosthesis only part-time. At that time, the prescription indications for the PTB prosthesis with condylar strap were: (a) good knee ligament stability; (b) no palpable tenderness of the stump weight-bearing areas; (c) normal sensation in the skin of the stump; (d) no diabetic or severe medical problems; and (e) stumps that were four inches or longer in length. The indications that we arrived at for the prescription of a modified patellar-tendon-bearing prosthesis (with side hinges and corset) were: (a) lack of knee ligament stability; (b) excessive arthritis of the knee joints; (c) excessive tenderness of the stump weight-bearing areas; (d) lack of sensation of the skin of the stump; (e) most diabetic below-knee amputees; and (f) people whose occupation required heavy lifting.

In an attempt to further elucidate our experiences with the patellar-tendon-bearing prosthesis and calling heavily on our previously applied prescription indications, a second group of below-knee amputees were surveyed beginning June 1, 1962 and extending to May 1, 1964. In this period, a total of one hundred and forty-one new below-knee prostheses were prescribed. Of this group, seventy-seven were issued (usually on their

* Assistant Professor, Department of Orthopaedic Surgery, Northwestern University Medical School, Chicago, Illinois.

demand or request) the standard or "old-fashioned" types of prostheses (thigh corset, steel hinges, open end willow sockets and single axis ankle and wood foot). Forty-five patellar-tendon-bearing prostheses with condylar straps were also prescribed as well as sixteen patellar-tendon-bearing prostheses with thigh corsets and hinges. A slip socket prosthesis was prescribed for three patients during this period. The patients who were fitted with the PTB prosthesis were further followed, both in the Amputee Clinic, where they were clinically evaluated, and also by follow-up questionnaire. Of the group of forty-five patients fitted with the patellar-tendon-bearing prosthesis with condylar strap, twenty-seven were able to be followed sufficiently to obtain some valid impressions as to their reactions to this prosthesis. Only thirteen of the twenty-seven patients reported successful full-time wear of the PTB with condylar strap. Of this group, three of the patients would like to change their SACH foot (which up to this point has been an integral part of this prosthesis) to the older single axis ankle and wood foot. One of the thirteen who were successful wearers indicated that a corset addition, however, would improve the comfort of the socket. Fourteen of the group of patients reported only part-time wear, primarily due to an inability to tolerate full weight-bearing on their stump. Several patients of this group also reported adverse reactions to the SACH foot. The patients who did not like them felt that the SACH foot was far too rigid (no matter how aligned) and preferred the freer action of the articulated foot.

SUMMARY

It would appear as though, even after approximately four years of experience in manufacturing the patellar-tendon-bearing socket, and during this time we have encountered a number of modifications and suggestions as to modifications, the private prosthetists supplying the Veterans Arministration Regional Office Amputee Clinic in Chicago, still can only satisfy less than fifty percent of the amputees who, by prescription indications, would seem to be ideal candidates for the use of this prosthesis. We still also have a number of patients who are full-time wearers of the PTB prosthesis, who if they are required to do heavy lifting activities either in their work or around the house, prefer the use of the "old-fashioned" type of prosthesis with thigh corset and hinges. It would thus appear in our hands that the patellar-tendon-bearing prosthesis with condylar strap is a very definite addition to the armamentarium for the below-knee amputee, but is certainly still *not* the complete panacea replacement for all below-knee amputees. I would still urge that the prescription indications be adhered to whenever one is attempting to solve a particular below-knee amputee's problem.

REFERENCES

1. Thompson, R. G., "The Patellar-Tendon-Bearing Total Contact Prosthesis for Below-Knee Amputees," *Orthopedic and Prosthetic Appliance Journal;* 16:238, September 1962.

AUTHOR'S NOTE: I would like to express appreciation to Mr. Edward Tomashewski and Mr. Leonard Pietrasik of the VA Chicago Regional Office Amputee Clinic for their aid in data collection.

ROBERT G. THOMPSON, M.D.

Electric Motorized Feeder Unit for the Severely Involved Patient

By MARJORIE KIRKPATRICK, M.D., R. N. WITT, C.O.,
ESTHER BELL, O.T.R., and CHRISTINE B. STEPHENS, O.T.R.

Texas Rehabilitation Center of Gonzales Warm Springs Foundation
Gonzales, Texas

Many sources of power have been tried for this type of apparatus; Artificial muscle, CO^2, springs, cable controls from some part of body. We have used electric motors which offer many advantages.

Paralysis that occurs as a result of fractures of the cervical region, with severe injury to the spinal cord always cause a greater or lesser degree of involvment of the upper extremities. Most of the quadriplegics who live have some musculature in their upper extremities, even the highest ones who live will at least have a deltoid and biceps. It is very seldom that a quadriplegic would be seen without these muscles and with nothing at all in the upper extremities, not even a trace. However, S.D., an 18-year-old girl did have involvment such as this, with no muscle power in the upper extremities. In attempting to give her some kind of function, we tried, first, with a feeder that she could control using only upper trapezius. This was extremely exhausting and completely impractical. In view of making activities easier, it was decided to use the opposite shoulder and a cable to give outward motion of the feeder, but again this proved too strenuous. The muscles of the neck were used in this girl, not only for activities in the arms and holding the head and neck up, but also were used as accessory respiratory muscles. Again, there was a problem of trying to give her some activity that would not be completely exhausting. With this idea in mind, we devised the electric motor and blow switch apparatus described below.

An off and on blow switch is operated by the patient so that the feeder can be stopped at any point. The motor we have used makes 7 R.P.M. We attach one end of the cable to the motor arm and the other end to the feeder.

A spring attached from the back feeder arm to the wheel chair offers the return from the cable pull of the motor. The motor is removable from the lapboard. The patient can be set up for eating in less than a minute.

Advantages in a set-up of this type is that the motor is readily available and the cost of the set-up is much less than any other set-up known to the authors. There are probably many other ways of adapting this economical power source to the patient's needs.

We anticipate the observation that the patient will be limited to electrical power source and would not be able to use this set-up universally. However, the function that can be expected of these people is very limited and we feel

this not a contra-indication, but a factor to be weighed against the disadvantages of more cumbersome and expensive mechanisms, and more extensive preparatory set-up by an assistant.

Basic functions expected are eating and other fixed range activities.

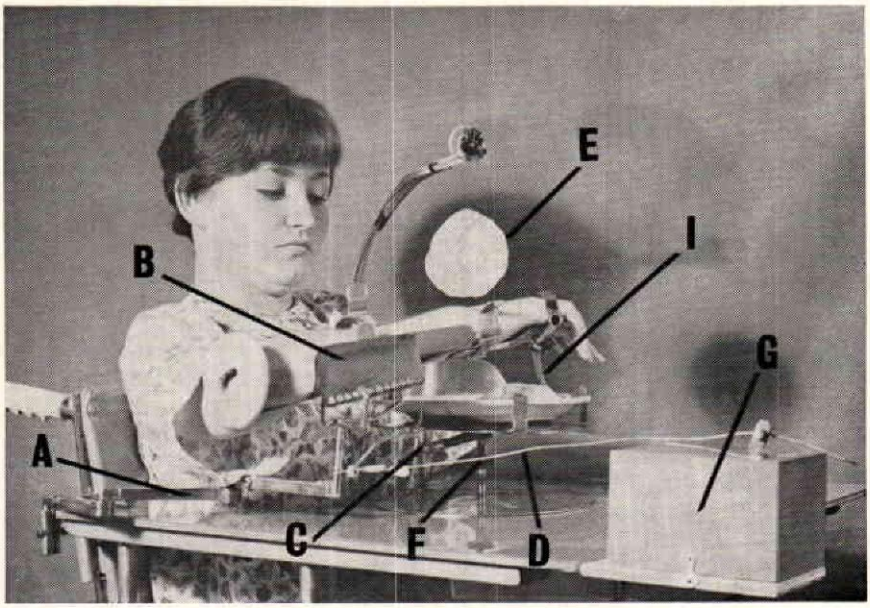


FIG. 1

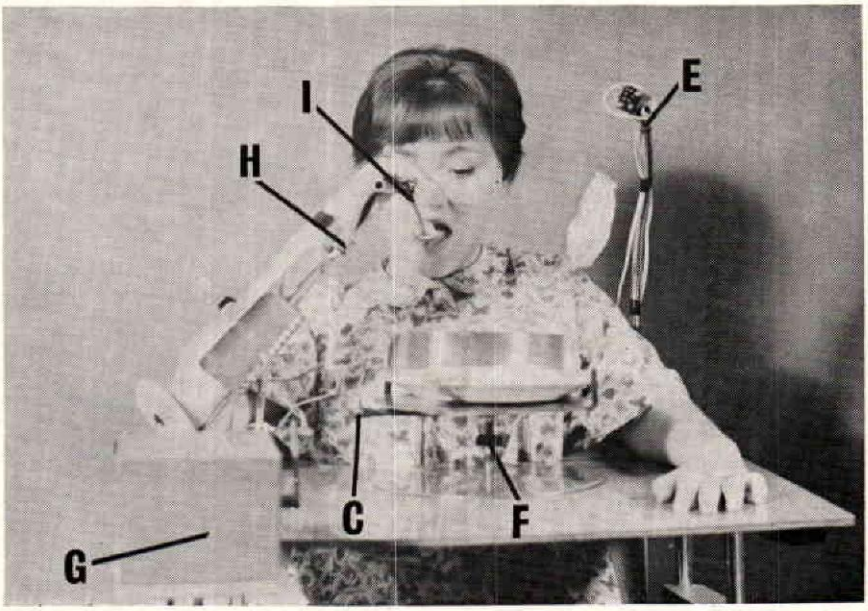


FIG. 2

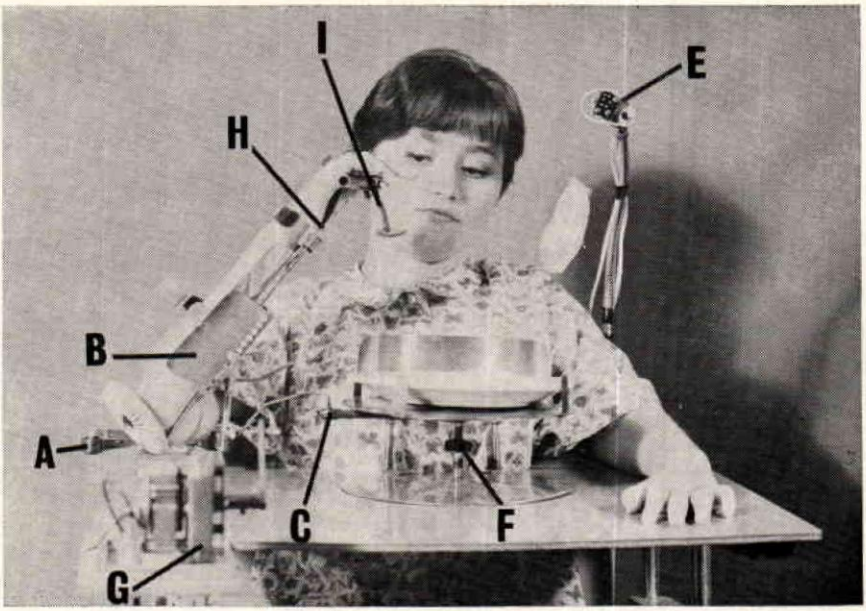


FIG. 3

Feeder Components: (See Figures 1-3)

A. Swivel Bars and return spring and stud.

B. Swivel Feeder and Gravity Bar.

C. Hook from swivel bar to ratchet on rotary plate stand.

D. Cable to motor.

E. Blow switch and connecting linkage.

F. Friction disk on rotary plate stand.

G. Motor.

H. Tubular splint with swivel spork.

I. Swivel spork picking up food and going to mouth.

CERTIFICATION EXAMINATION DATE ANNOUNCED

The 1965 Board Examinations will be conducted by the American Board for Certification October 12 through 14, 1965, in Cleveland, Ohio. The deadline for submission of Application is July 1, 1965.

Psychological Considerations in Bracing

By JOAN L. BARDACH, Ph.D., *Chief, Psychological Services,*

Institute of Physical Medicine and Rehabilitation, New York University

The finest orthotist in the world can fail in his task, in the sense that the patient may not use optimally the device built especially for him, if psychological factors are not taken into account. It is important that one be aware of such psychological considerations as emotional, intellectual, and perceptual factors.

The kind of person the patient was, his emotional and physical resources to deal with his tragedy all come into play in his adjustment to the rehabilitation process, of which bracing is an important accompaniment. Although these various factors will be discussed separately, actually they all interact with one another and the patient's behavior is the resultant of this interaction.

One of the major, but unobvious, problems that confronts a disabled person has to do with what psychologists call "body-image" or "body-schema." These terms are used to indicate the notions a person has concerning himself and his body. Abt (1) writes that body-image refers to the picture an individual has of himself as a person "extended into space, a person . . . who comes into contact with other spatially-extended bodies . . . Normally, among non-handicapped individuals . . . there is no discrepancy between the physical body of the individual and his conception of his physical body . . ." (p. 18). For instance, a nondisabled but very short woman reported that she could judge accurately just by looking whether or not she could reach an object on a high shelf. Others frequently misjudged the distance for her being sure either that she could or could not reach it. They were using their own body-schema as a reference point and hence misjudged.

For a patient to be able to use any brace effectively, it must become incorporated into his body-image. The problem appears to be similar to that of individuals driving a car. When a person starts to drive a car that is new to him, he usually has a feeling of unfamiliarity. He probably says something like, "I don't know where my fenders are yet." When he does know, the car, as a unit extended in space, has become incorporated into his body-schema.

We know some of the factors that are involved in assimilation of a non-body part into the body-image. The work of Held and Freedman (3) concerning motor-sensory feedback may be relevant here. They have performed a series of rearrangement experiments in which a subject has to make a motor-response to displaced visual or auditory cues. For instance, if an experimental subject wears prisms that displace the visual field ten degrees to the left and then is asked to touch the experimenter's raised finger, he adapts very quickly, but he does so much more rapidly if he touches the finger in a series of rapid thrusts than he does if he touches the finger more slowly. If he wears the prisms for the first time and the experimenter randomly

holds his finger up now here and now there, the subject will have much more difficulty adapting. Two notions suggest themselves from this line of work. One is the importance of providing sensory feedback to enable a person to make motor-adaptations and the second is the importance of consistency in fostering such adaptations. Another aspect of this problem has been touched upon by Abt (1). He pointed out that negative attitudes toward a prosthesis are detrimental to incorporation into the body-schema whereas positive attitudes are favorable. Training procedures appear to be of major importance in helping a patient to incorporate his prosthesis into his body-schema. They should take cognizance of the sensory feedback that the patient is or is not receiving, and they should certainly be consistent. Training is also very important in helping a patient to do away with negative attitudes. As Abt (1) has pointed out, training can be "a very helpful procedure for doing away, or partially doing away, with negative attitudes" (p. 19). It can be a great aid in the resolution of feelings of social rejection, for instance. The training process provides the opportunity of creating for the patient a positive experience, which makes for far more lasting learning than does just telling him.

A sense of equilibrium is also an important component of body-image. Body-symmetry seems to be a significant, but not altogether necessary, component of a sense of equilibrium. The wearing of a brace can increase a feeling of body-asymmetry, but it can also add a sense of balance. The feeling of being balanced frequently overcomes the sense of asymmetry from the added weight of the brace. A feeling of being balanced, then, can foster positive attitudes toward the brace which, in turn, fosters incorporation of it into the body-schema. On a psychological level, bracing, then, can be a major factor in reconstituting a body-image shattered by the disability.

Besides factors like body-image that reside within the patient, there are other factors that may be operating during your interaction with the patient, factors that may make the difference between success and failure. It is likely that one of your motivations in choosing your vocation is that you want to help people. It is appropriate, therefore, to explore the concept of help. As Dembo and her colleagues (2) have pointed out, help is seen as positive by the person who is giving it, but by the person receiving it, it is often seen as a mixture of good and bad. To the patient, to be fitted for braces may mean that he can get about much better than before; it may also mean that you do not care about him but you are just doing your job; it may mean that he is permanently disabled; it may mean that he is a burden to others; it may mean that he is relegated to a position of dependence. Abt (1) has pointed out still other meanings that arise when a non-disabled person helps a disabled one. It may mean that you pity him, even if you do not show it; it may mean that you are not emphasizing his abilities enough. It is possible for a disabled person simultaneously to hold many of these views of being helped. There are probably still other meanings, but the important point here is for you to be aware that your view of helping the patient is different from his. If you take the trouble to learn what the patient's views of help are, you will then know how to act toward him.

Implicit in these varying concepts of help is the question of values. Somers (4) has written that now that the person is disabled, he still looks at himself the way he looked at disabled people before he became handicapped. Dembo (2) has pointed out that acceptance of loss from a disability frequently requires that the patient change some of his values. She

names three kinds of values, which are determined by various attitudes that a person takes. The first kind of value she calls *possession* values. Owning a painting can be a possession value. In possession values, devaluation of the *person* cannot take place. The second kind of value Dembo calls *asset* values. Asset values are a personal characteristic, as for example, being able to play the piano. To play the piano is good in itself—the player enjoys it, for instance. The value of it is in no way dependent upon comparing himself with others. A patient can take the attitude that he is not less of a person because he needs a brace in order to walk. The third kind of values Dembo calls *comparative* values. Here, a person's sense of worth is dependent upon his position in relation to others. Often, adjustment to a disability requires that the patient shift his system of values. The patient will suffer less from feelings of worthlessness if he can be led to feel that his loss (of either an actual part as in an amputation or a loss of function as in a paralysis) is not essential to his value as a person. This change can come about if the scope of the patient's values is enlarged to include other personal characteristics. For example, you can behave toward the patient in such a way that you convey to him that though he has difficulty in walking, he is intelligent or a nice person or whatever assets he has that can be genuinely brought to his attention. Feelings of worthlessness can be overcome when the value lost comes to be regarded as an asset value rather than a comparative one. It is a good thing to be able to walk without a brace, but I am still a worthwhile person anyway. Another way of diminishing comparative values is, by your manner, emphasizing satisfactions in the present rather than past satisfactions.

The work of Existential psychologists has called attention to another aspect that is useful to consider and that aspect is *time.* Does the patient live primarily in the past, present, or future? By emphasizing the satisfactions in the present, one can sometimes guide a patient to a belief in his future. Here is a place where there may be a discrepancy between you and the patient. Training procedures and your own orientation are geared toward the future. A very depressed patient, for example, may be oriented toward his happier past. If you take too long a look into the future, your depressed patient may not be able to follow you, but if you emphasize immediate satisfactions, gradually he may come to see that he has a future.

A person who customarily uses a system of comparative values not only continually compares himself with others, but, if he has become disabled, he keeps comparing his former undisabled self with his present disabled self. Such an individual is apt to emphasize his disability at the expense of his remaining abilities. In your contacts with patients you can enlarge the areas the patient thinks about and in so doing help to focus his attention on other roles in life he plays besides that of a patient or a disabled person. Sometimes merely an interested inquiry concerning a family member is sufficient to start the patient on the road to thinking of himself as, for instance, a husband or father in addition to a disabled person.

Many patients have been acutely ill just prior to their starting rehabilitation. They have recently struggled with the profound problem of life and death. Whether or not their physical condition was actually that grave, they frequently feel that it was. If the patient does not cooperate with you, he may be feeling that you do not know how precarious his life is. He believes that if you coax him into activity you may well be killing him. A hemiplegic patient was heard recently telling his daughter that he did not

want to participate in ambulation class because of his heart. Even though the daughter told him that the physician had said that ambulation would not harm his heart, the patient persisted in his belief. Though it was not true of this man, some patients with such beliefs might find fault with their brace rather than indicate overtly what their beliefs were that made them unwilling to participate in certain of their classes.

Besides the problem that the patient has concerning his reactions to his disability, he often has to contend with the reactions of his family to him. It is important for you to realize that the people who are emotionally close to the patient share his tragedy and have to make analagous adjustments to it. They, too, cannot be expected to adjust to the loss immediately. Dembo and her colleagues (2) have pointed out some factors that are useful when we try to understand the reactions of family and friends toward the disabled person. They write of a disability as seen as a *misfortune.* They point out that if a person has a need to hold to this view, then one of two consequences is apt to result. Such a person may insist that the individual he considers unfortunate is suffering and that he ought to suffer, or such a person may devaluate the unfortunate person because he ought to suffer but does not. Such attitudes may increase the difficulty the patient has in adjusting to his handicapped condition. The reaction of family and friends toward him is an important consideration in understanding your patient. Interpretation to family members of the brace, its use, care, and what it is designed to do either by you or the patient, is sometimes of help. If you want family members to be on your side, then to some degree you have to let them join the rehabilitation team.

As Sullivan (5) has pointed out, listening to a patient and understanding his point of view is almost as helpful as specific therapeutic measures. Patients do carry over toward staff various ways they handle family members. It is rare that a patient malingers. Hostility on the part of patients usually covers fear, feelings of discouragement, dissatisfaction with themselves, and anxiety. When a patient complains about his brace, it is natural for the orthotist to respond inside with defensive anger. These, then, are some factors other than your competence as an orthotist for your consideration. You now have other questions to consider as the possible reasons for the complaints. Hopefully, these other possibilities will reveal avenues that prove fruitful to explore in your efforts to resolve the problems at hand.

BIBLIOGRAPHY

1. Abt, L. Some psychological factors in our service to the handicapped. *Orthopedic and Prosthetic Appliance J.*, Autumn 1948, 17-27.
2. Dembo, Tamara *et al.* Adjustment to misfortune, a problem of social psychological rehabilitation. *Artificial Limbs,* 1956, 4-62.
3. Held, R., & Freedman, S.J. Plasticity in human sensorimotor control. *Science,* 1963, 142, 455-462.
4. Somers, B. J. The complexion of misfortune; psychological observations on the meaning of loss to the disabled. *Orthopedic and Prosthetic Appliance J.*, June 1957, 17-20.
5. Sullivan, J. D. Psychiatric problems of interest for the physiatrist. *Archives Physical Medicine and Rehabilitation,* June 1953, 353-358.

Immediate Post-Operative Prosthetic Fitting

Correspondence between William A. Tosberg, C.P.O., and Dieter Mozer

INTRODUCTION

By WILLIAM A. TOSBERG

Technical Director, Prosthetic Services,
Institute of Physical Medicine and Rehabilitation,
New York, New York

There is intense interest in the immediate post-operative fitting of prostheses. A considerable number of amputees have been fitted in the United States utilizing the technique as originated by Prof. Marian Weiss of Konstancin, Poland.

Through personal correspondence with Mr. Dieter Mozer, an outstanding technician from Sweden whom I have known for many years, I have been aware of the work which has been carried on at Centrallasarettet, Boras, Sweden. Docent Dr. F. Stahl, Chief of the Orthopedic Division, and Mr. Dieter L. Mozer, Chief Prosthetist and Orthotist, have done a number of immediate post-operative fittings. In the June 1964 issue of the *Orthopedic and Prosthetic Appliance Journal*, pp. 105-109, a translation of his initial report was published. At that time Mr. Mozer supplied information on nine cases. Since these nine covered a fairly wide range of patients, I became very interested in their technique and have carried on fairly extensive correspondence, requesting details of their procedure not only from a prosthetic but also from a surgical point of view.

Following are translations of Mr. Mozer's answer and also the translation of a letter from Dr. Stahl, concerning surgery. Mr. Mozer's letter of August 18 supplies data on sixteen patients, and his letter of September 3 indicates the time of discharge from hospital on temporary prostheses. It is significant that, even for patients of advanced age when amputation was the result of peripheral insufficiency, this time does not exceed four weeks.

It is well to note that Mr. Mozer is very much concerned with prostheses for geriatric amputees, a group of patients which, to an ever greater extent, requires our attention.

One would think that a close cooperation on an international level could greatly improve services available to all amputees and should be pursued wherever possible.

Dieter Mozer to Wm. Tosberg

August 18, 1964

DEAR MR. TOSBERG:

Thank you very much for your letter.

It is interesting to hear that one of your patients had a necrotic scar after removing the cast and that this scar was very slow in healing. Fortunately, we have not had this experience up to now. Curious, and also encouraged by your reports, I could not restrain myself last week from applying a plaster cast in the operating room to a below-knee amputation stump. This was at approximately four o'clock in the afternoon. During the next morning everything was still

fine. The patient felt well while we prepared the foot and the adjustable leg. However, shortly *before* the patient was asked to apply weight to his stump he complained of severe pain along the whole tibia. With a knife I opened a window in the cast over the tibial crest. When this did not relieve the pain and pain-relieving pills did not bring any relief, I removed the whole cast and discovered a massive water-filled blister over the end of the tibia and also a number of small blisters surrounding the large one. These, however, disappeared practically before my eyes within a few minutes. Today I have applied a strong elastic bandage and he is resting. Too bad!

Wherever the mistake lies, I do not know. The surgeon thinks that he might have applied too much tension on the skin while closing the stump. I am of the opinion that I should have provided some relief over the tibial crest as well as over the end of the tibia during the casting. I have just been informed by the surgeon that the patient has fever and we have to wait. The problem in this case might be due to other reasons. I will, however, by all means try a few more immediate casts with future amputations.

Have you ever tried this method on AK amputations? One thing which I have not really been able to understand is the following. Immediately after amputation the stump appears to be swollen already. The plaster cast which you apply in the operating room, therefore, encloses a swollen stump. If you leave the cast on approximately three or four weeks the swelling will never subside because, if it did, the prosthesis would not remain on the stump. Is this based on the fact that the stump, immediately after amputation, is not quite as swollen as it would be during the next day? With the patient I have mentioned in this letter—the one where I applied the plaster cast in the operating room—I had the impression that the stump was swollen already when the surgeon put down the needle. What is your opinion on this?

I am enclosing a list of the patients which we have been fitting up to now.

I am sorry that I could not meet you in Copenhagen to discuss our prosthetic method of immediate fittings. I was most anxious to do this.

I would greatly appreciate hearing from you soon. With best regards,

Yours,

/s/ DIETER MOZER

Most Recent Information about Post-Operative Prosthetic Fittings in Sweden

Patient	Age	Amputation	Diagnosis	Amputation Date
1.	17	BK	accident	10-7-63
2.	18	AK	sarcoma	10-14-63
3.	33	BK	accident	10-21-63
4.	82	BK	peripheral insufficiency	10-22-63
5.	29	BK	chronic osteomyelitis	10-23-63
6.	64	BK	peripheral insufficiency	12-17-63
7.	68	AK	peripheral insufficiency	1-7-64
8.	15	BK	congenital	1-9-64
9.	69	AK	peripheral insufficiency	1-15-64
10.	76	BK	arteriosclerosis	4-24-64
11.	62	BK	peripheral insufficiency	7-13-64
12.	19	BK	accident	7-13-64
13.	66	BK	sarcoma	7-16-64
14.	76	AK	peripheral insufficiency	7-29-64
15.	47	BK	tumor	8-13-64
16.	87	BK	gangrene	8-10-64

William Tosberg to Dieter Mozer

August 28, 1964

Dear Mr. Mozer:

Thank you very much for your letter of August 18, 1964. This information, together with your first report, is so highly positive that I took the liberty of discussing it with Dr. Howard Rusk, Director of our Institute, and Dr. Allen Russek, Chief of our Amputee Service, as well as members of our medical and surgical staff. As I have mentioned in my previous letter, we have undertaken a number of post-operative fittings but our results have not been as good as your reports appear to indicate. Our last two cases were done on young people. One was a young lady with a congenital deformity where a BK amputation was performed. The other one was a young man with a sarcoma which required an AK amputation. Both of these cases healed without any complications, and the patients are now ambulating on their permanent prostheses without problems. In all of our previous cases, however, the amputations were performed for vascular problems, and I do not consider any one of these fully successful.

Since in our opinion immediate post-operative fitting offers many advantages, we would greatly appreciate it if we could have a letter from your surgeon describing the surgical procedures used in an amputation for immediate post-operative fitting. Some of the more specific questions would be:

1. In vascular cases, what is the method of selection for immediate post-operative fitting?

2. What is the optimal length of stump?

3. Are you using myoplastic procedure?

4. What is the placement of the scar?

5. Does an amputation for this procedure vary from generally accepted amputation surgery, and in what areas?

6. Is a drainage tube used routinely, and for how long?

7. What type of dressing and how much is used before the plaster of Paris cast is applied? How often is this dressing changed?

8. Does immediate ambulation affect the healing either beneficially or adversely?

I would personally like to discuss some of the prosthetic techniques, such as suspension of AK prostheses, number of plaster casts used, average time of hospitalization, as well as the average time of ambulation on temporary prostheses, with you.

We would greatly appreciate having the information requested above for discussion with our staff.

Sincerely yours,

/s/ William A. Tosberg

Dieter Mozer to Wm. Tosberg

September 3, 1964

DEAR MR. TOSBERG:

Many thanks for your friendly letter of August 28, I am really surprised that only the last two of your cases, the young patients, could be taken care of without any complications. The reason for this, of course, could have many causes, or be a combination of reasons, but this fact does not make the solution any easier. The Chief of our Clinic and I are very much interested in your results and we are very anxious to be of help in any way possible. Since our material itself is relatively limited it is quite likely that we will run into complications of a similar type and therefore it would be advantageous if we could benefit from your experiences.

I discussed with Dean Dr. Folke Stahl, the Chief of our Orthopedic Division, your specific questions. It is, however, simpler for him to answer these questions not in English and therefore he has asked me to translate these answers. I am attaching his letter.

Now to your questions. Relating to the suspension for AK prostheses. Up to now we have simply attached a 1¾ inch webbing strap to the posterior part of the plaster cast, and run this strap over the opposite shoulder through a movable pad and attached it to a buckle riveted to the anterior part of the plaster socket. Very effective, although not too comfortable for the amputee.

We had to construct three plaster casts, as an average. We never got away with two only. In two or three cases I believe we even had to make four casts.

As it pertains to the time of hospitalization for the patients, I would say that this varies considerably. We have not been able to establish a relationship between this time, the age of the patients, or the cause of amputation. I believe our material is still too limited for this purpose.

PATIENTS' DISCHARGE DATA

1 — 25	5 — 28	9 — 35
2 — 23	6 — 30	10 — 46
3 — 24	7 — 43	11 — 43
4 — 38	8 — 36	12 — 31

I have numbered the list of patients which I sent to you recently, and I am using the same numbers. The second number used indicates the number of days figured from the day of amputation, including the day of discharge with a provisional prosthesis with which he was sent home. This is with the exception of patients 10 and 11, who remained in hospital until their final prostheses were delivered. On the average, the patients received their finished prostheses within three to four weeks after discharge from hospital. We have waited as long as six to eight weeks in exceptional cases where we were not quite sure whether the stump was fully matured. If the patient lives far from our city he is readmitted and is then sent home with his final prosthesis.

May I finally ask a question of a different type? How do you provide for your geriatric AK patients? I am thinking of patients in the 60-70-80 age groups who are provided with their first AK prostheses. In most cases diabetes and vascular problems exist. We find it very difficult to have those patients ambulate without a knee lock. I would say that practically all types of prostheses that could be used and that I know of are not too well suited for those old people. They are too heavy, too rigid, too difficult to apply; and in relation to the few hours that these old patients actually walk or stand, unnecessarily strong and expensive. I hope you do not misunderstand me. I do not have the intention to provide these patients with prostheses of minor value. I feel that the average amputee who

is on an old-age pension puts his prosthesis to an entirely different use than a man in his younger years. Comfort, light weight, and simple handling are the main requirements which a patient who is in a lower physical condition needs. Since this type of patient is very numerous in our country, and is on the increase with the increasing life expectancy, I am very much involved with this problem. Therefore, my question. Do you have a specific prosthesis for the aged which would meet the requirements of this patient group in a greater degree? Or have you ever seen anything of this type during your trips to foreign countries?

This now will probably do for today. I am looking forward with anticipation to your next letter.

/s/ DIETER MOZER

Reply from Dean Dr. Folke Stahl, Chief of Orthopedic Division

As an answer to your letter of August 28 I would like to make the following comments:

1.

The selection of patients with circulatory deficiency who are to be provided with prostheses immediately after amputation is very simply as follows: the general health of the patient should be such that he can still walk independently, even with the help of crutches, shortly before amputation, such as several days or even weeks.

2.

The optimal length of the stump is, according to our judgment, depending upon the prosthetic technical consideration, more so than from the medical aspects. This pertains primarily to AK amputations where the knee mechanism, as well as acceptable cosmesis, require an amputation where the femur is shortened by at least four inches. The best length for below-knee stumps is, as is known, rarely the maximum length which can be preserved at the amputation. Besides the cosmetic problem which is very difficult to overcome in a long below-knee stump, a long stump is quite often bony and hard, tolerates very little weight-bearing, and in addition has the tendency of poor circulation in the distal part. Six to seven inches could be considered as a suitable length.

3.

We do not do any myoplasty operations in our amputations.

4.

The suture line is in the frontal plane of the stump and somewhat posterior to the midline.

5.

The amputation technique used with patients that are provided immediately after amputation with a prosthesis does not differ in any point from the accepted amputation technique.

6.

We always use a drainage tube and remove this the day after amputation.

7.

Before a plaster cast is applied we cover the wound with a light compress, which is changed once or twice daily, depending upon necessity. The whole stump is covered with an elastic bandage of about 40 to 60 inches.

8.

The healing process does not vary in any respect. It is neither improved nor retarded through the immediate initiation of ambulation exercises. The only difference that we have been able to note is that the swelling of the stump disappears faster than normally.

Our experiences in this area will be published in the very near future in the *Acta Orthopaedica.*

A Functional Above-the-Knee Prosthesis For Geriatric Patients*

By SUNG J. LIAO, M.D. and ALFRED SCHNELL, C.O.

Waterbury, Connecticut
From the Department of Physical Medicine and Rehabilitation, Waterbury Hospital, Waterbury

The widely used above-the-knee prosthesis is composed of a quadrilateral muscle-contour, wooden thigh socket, a knee mechanism, a wooden shank, a SACH foot, and a suitable pelvic suspension.[2] This type of prosthesis has met with considerable success in most patients, but it is expensive and not all geriatric patients can wear it.

A so-called temporary limb—a modified long brace with a leather thigh corset, bilateral drop-ring knee-lock, a shank and a foot—is sometimes prescribed under these circumstances, but such a limb has many disadvantages.

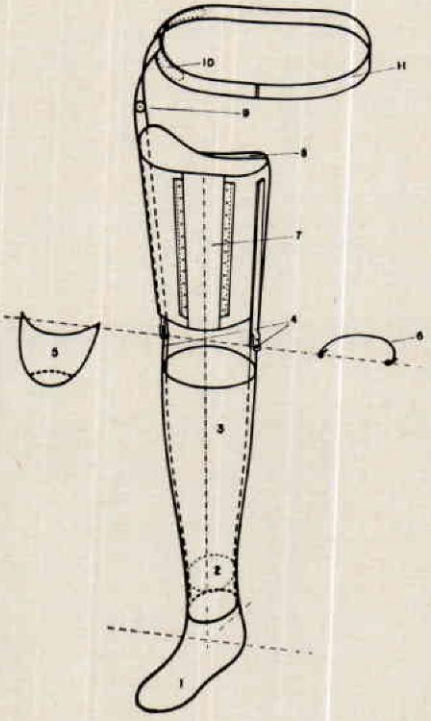


FIGURE 1

Diagram of the functional above-the-knee prosthesis: *1*, SACH foot; *2*, wooden-shank section; *3*, plastic-foam section; *4*, medial and lateral upright bars with cam spring-loaded locks; *5*, plastic laminated kneecap; *6*, posterior handle connecting locks; *7*, leather thigh socket; *8*, hard felt; *9*, free ball-bearing hip joint; *10*, metal pelvic band; and *11*, leather belt.

* Reprinted by permission of the authors and publisher from the *Journal of Bone and Joint Surgery*, Vol. 46-A, No. 6, September 1964, Pages 1292-1294.

Because of difficulty fitting some elderly patients with prostheses we have experimented during the last two years with a new type of prosthesis (Figs. 1 through 3). It has been used on fifty-two elderly patients with universally gratifying results.

This prosthesis incorporated four modifications of the so-called temporary limb.

The first modification is to substitute a double-cam spring-loaded lock, similar to the Swiss lock[1] or bail lock for the usual double-ring drop-lock (Fig. 1, *4*). The cam lock can be unlocked to flex the knee with only one hand (Fig. 1, *6*) or by striking it against the edge of a chair. It locks automatically by full extension of the knee. This is very convenient for a hemiplegic patient when the affected leg has been amputated, although the patient must learn to be careful since the lock may open inadvertently if the handle hits an object.

The second modification is a plastic laminated kneecap on the lower end of the thigh piece (Fig. 1, *5*) with a metal band incorporated inside it to reinforce the two metal uprights. This kneecap fills in the unsightly depression seen when the knee of the usual temporary limb is flexed (Fig. 3). The knee unit with kneecap and cam lock can be prefabricated and kept ready for installation.

The third modification is at the posteromedial aspect of the upper margin of the leather thigh corset, which optionally is built up with a felt pad to provide some ischial weight-bearing (Fig. 1, *7* and *8*). The anterior aspect of the thigh corset is also slightly higher than that of a temporary limb (Fig. 2-A) in order to imitate the well engineered wooden quadrilateral thigh socket.

The fourth modification is the shank which is made of foam plastic with a laminated plastic cover (Fig. 1, *3*). This plastic material is molded by adding a catalyst to a foaming resin. The resulting shank is lighter than a wooden shank.

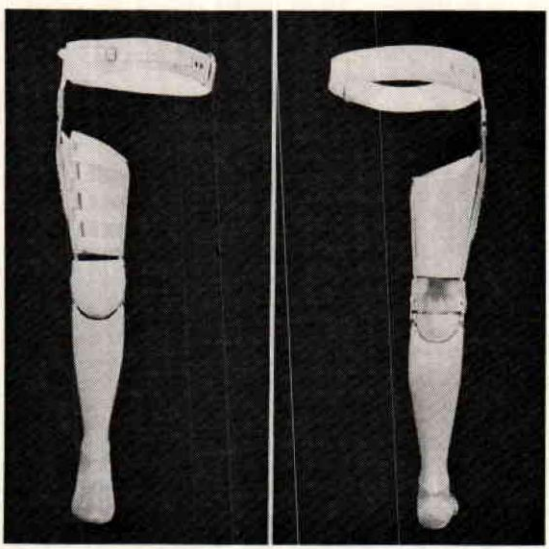


FIG. 2-A FIG. 2-B

Anterior and posterior views of prosthesis

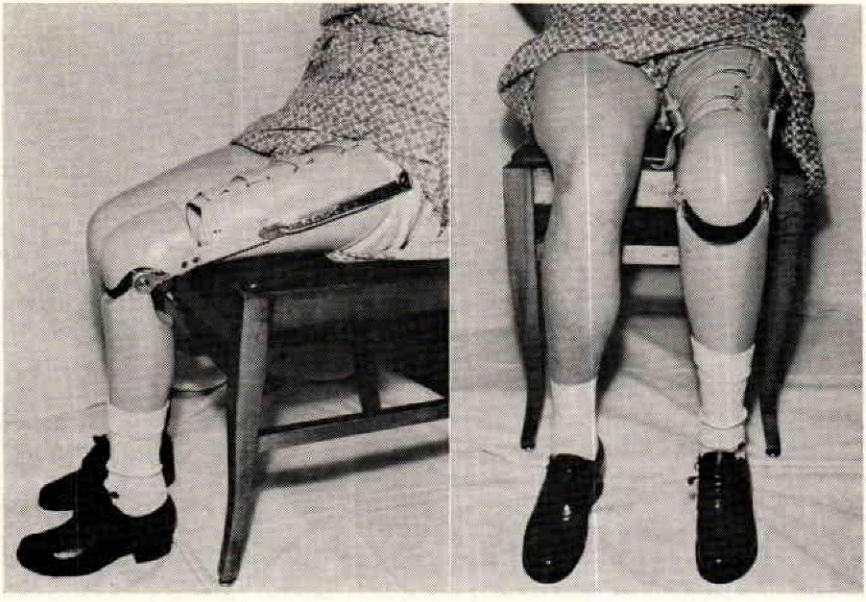


FIG. 3. Patient in sitting position wearing prosthesis

DISCUSSION

The prosthesis produced by these four modifications of a temporary limb has several advantages. The knee lock is much easier to manage, especially for hemiplegic patients. The plastic kneecap gives the knee a more normal appearance and protects trousers or skirt from the sharp ends of the uprights at the knee joint. The limb is light and relatively inexpensive; yet because of its sturdy construction, it can be used permanently. The thigh corset, which is open in front, can be adjusted easily as the stump shrinks. Hence, elderly patients can start walking sooner, without waiting for the precise shrinkage needed before a quadrilateral muscle-contour thigh socket can be fitted properly. The corset also helps to shrink the stump. By not having a rigid ischial-bearing band at the top of the corset, the limb is less expensive to fabricate, easier to fit, and more comfortable for elderly patients to wear.

For patients who have a hip flexion contracture, the thigh corset can be tilted to accommodate the contracture. Early walking with the limb so modified tends to reduce the flexion contracture. Later on, the tilt of the thigh corset can be reset as the contracture decreases, without the extra expense required for such modification of the standard limb.

Because of the simplicity of this new type of limb, the prosthetic training of elderly patients can be accomplished in a much shorter time.

SUMMARY

A comparatively low-cost functional limb is described which consists of a leather thigh corset with fasteners in the front, double-cam knee lock, a plastic kneecap, a foam-plastic shank, a SACH foot and pelvic suspension. This functional limb is designed for senile, fragile, apprehensive patients

who cannot be fitted satisfactorily with a muscle-contour-socketed wooden limb. The new limb is particularly suitable for hemiparetic patients with an above-the-knee amputation of the affected extremity. During the past two years, this limb has been fitted to fifty-two patients. The rehabilitation of these geriatric amputees was expedited and the results were gratifying.

REFERENCES

1. The American Academy of Orthopaedic Surgeons: Orthopaedic Appliances Atlas. A Consideration of Aids Employed in the Practice of Orthopaedic Surgery. Vol. I. Braces, Splints, Shoe Alterations. Ann Arbor, J. W. Edwards, 1952.
2. Klopsteg, P. E., and Wilson, P. D. (Editors): Human Limbs and Their Substitutes. New York, McGraw-Hill Book Co., 1954.

Fabrication of Functional A. K. Prosthesis For Geriatric Patients

By ALFRED SCHNELL, C.O.

West Hartford, Connecticut

EDITOR'S NOTE: *The following description of the fabrication of the functional A.K. prosthesis for geriatric patients has been contributed by Mr. Schnell for the information of* JOURNAL *readers. It was not included in the above article previously.*

Parts used: Sach or Conventional Foot with wooden ankle block; plastic foam for shin-section; Spring loaded double cam locks; leather-thigh-socket with three or four Velcro straps; free Alu-hip-joint, Alu-metal and leather pelvic band; Alu-metal band for reinforcement of knee-cap.

Fabrication procedure: Ankle-block shaped to desired form and circumference, foot with attached shaped ankle-block placed into shoe, cam locks connected with Pope-jig at desired width, bars bent and shaped to form of leg. Determine length of lower and upper bars, then attach lower bars to wooden ankle section. Place paper funnel around shin-section, tape to block, and pour in foam; shape shin to desired form, then laminate. At the same time, have Alu-band laminated over a wooden knee-block form, to obtain knee-cap. Leather thigh socket is given a quadrilateral shape, reinforced with piano-felt in posterior section. Cuff is placed approximately ½" below ischial tuberosity. Rivet on knee-cap just above knee-joint, place in locking handles, shape and weld. Add hip-joint and pelvic band.

Alignment procedure: In general we follow the reference points of the standard A. K. Prosthesis. However, most of our geriatric patients have very little active extension, therefore, more initial flexion is placed in leather socket. Anterior displacement of leather-thigh socket was made in shank-section.

A Treatment of the Below-Knee Stump Having Intermittent Breakdown

By HOWARD V. MOONEY, C.P.

Boston Artificial Limb Company, Inc.

On many occasions we have been faced with the problem of the below-knee amputee whose stump breaks down intermittently and as a result of this has been forced to wear an ischial-weight-bearing below-knee prosthesis. Quite often such a stump will improve to the point where the doctor involved feels that it might tolerate the conventional fit of a standard below-knee prosthesis. In the past we have handled this kind of situation by either converting the existing ischial-weight-bearing below-knee prosthesis to a standard type limb or by providing the amputee with a complete new prosthesis. When the latter course of action has been followed no serious prosthetic problems have developed. If the stump was unable to tolerate the fit of the standard below-knee prosthesis, the amputee still had his ischial-weight-bearing prosthesis available to wear. However, when the status of a stump is doubtful it is somewhat difficult to justify the expense of a new prosthesis to either the amputee or to the participating agency. Therefore, the conversion technique has been followed in most such cases.

When, however, a stump does not tolerate the changeover to the fit of a standard below-knee prosthesis three problems immediately arise. The amputee has no ischial-weight-bearing prosthesis to fall back on. A change back to the ischial-weight-bearing prosthesis involves considerable more expense. The amputee is "grounded" again during this second changeover which can cost him additional money by keeping him from his employment. Recently, because of necessity, we devised a way to avoid these three problems.

Our amputee patient had been wearing an ischial-weight-bearing below-knee prosthesis for over a year because of recurrent stump breakdown. He came to us with a prescription from his doctor who suggested that we provide this amputee with a conventional below-knee fit with a standard thigh corset. The prescription also indicated that the doctor wasn't sure that the patient's stump would tolerate a conventional fit but he thought it "worth the gamble." The amputee had read what the doctor had written and was quite concerned about the "gamble" involved. He wanted to make the conversion but had problems to consider. His financial situation wasn't very healthy although not bad enough to make him eligible for agency assistance. His boss was not the understanding type and too much lost time would likely result in the loss of his job. In view of the multiple problems of this amputee and after much thought we treated the situation in a manner that provided him with the option of wearing his prosthesis as a conventional below-knee limb or an ischial-weight-bearing limb. The conversion from one to the other could be accomplished in minutes.

It is our procedure when fabricating an ischial-weight-bearing below-knee prosthesis to make the socket large enough to permit full freedom of

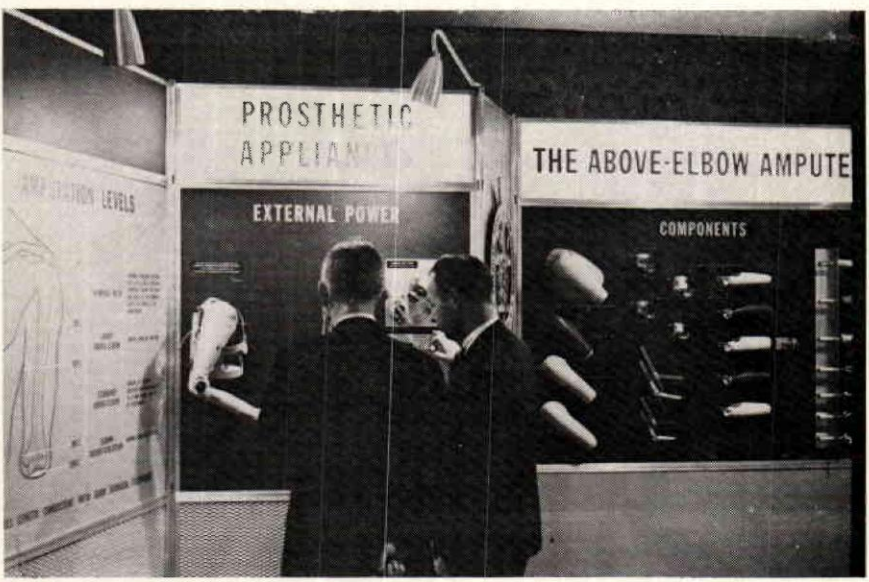
the stump which is used solely to flex and extend the prosthesis. Due to the ischial bearing, therefore, the stump is literally suspended within the socket which is positioned at least ½" lower than normal so that the stump does not make contact with the proximal socket brim. In view of the above technique we were able to convert the overly large socket of the ischial-weight-bearing prosthesis to a conventional below-knee socket by recasting the stump and fitting the resulting new socket within the existing over-sized socket. The design of this new socket included a built up shoulder which conformed to the proximal brim of the larger socket thereby keeping this new removable insert socket suspended at the proper level for a conventional fit.

We removed the ischial-weight-bearing corset and upper joint sections as a single unit. A standard thigh corset with matching upper joint sections was fabricated and installed. This completed the conversion of the ischial-weight-bearing below-knee prosthesis to a conventional below-knee prosthesis with a standard thigh corset.

It is now obvious, surely, that if this amputee's stump should show signs of deteriorating that the conversion back to the ischial-weight-bearing prosthesis would be a simple task and take only a matter of minutes to accomplish. In certain instances the amputee could be instructed in the exchanging of the corsets and joints. The removal or replacement of the insert socket would present no problem.

This technique should be of real value to the comparatively small group of amputees who continually have intermittent stump breakdown. They could change back and forth as circumstances dictated.

AT ACADEMY OF ORTHOPAEDIC SURGEONS MEETING



CERTIFICATION EXHIBIT IN NEW YORK—This display of prosthetic appliances for the above-elbow amputee was shown at the meeting of the American Academy of Orthopaedic Surgeons in New York City, January 9 to 14. The Exhibit Committee was composed of Jack Gold, C.P., Chairman; George Scoville, C.P.; and Walter Pavelchek, C.P., all AOPA members. Devices exhibited were donated by the D. W. Dorrance Company, A. J. Hosmer Company, Sierra Engineering Company, Prosthetic Services of San Francisco and the D. B. Becker Company and by the American Institute of Prosthetic Research and the VA Prosthetics Center.

The Upside-down Flexion Back Brace*

By FRED L. STUTTLE, M.D.

Peoria, Illinois

For a brace to be effective, it must be comfortable so that the patient will wear it. The lordotic low back can be changed to an active flat back by training (Fig. 1, *left* & *center*).

To acquire an active flat back, the role of the abdominals and their deep crease at navel level is important. The lumbar spine from the lumbosacral area upward has a considerable arc range compared with that of the sacrum downward from the lumbosacral center. The lumbosacral area moves backward in space.

The Williams brace (Fig. 2) concentrates on pushing the sacrum forward, pressing round the relatively unyielding pelvis, using the long lever arm for power, not to follow range, and simulating the effect particularly of the gluteus maximus. With a tack in the rear, a firm elastic band round the pelvis can also give active withdrawal from discomfort. There is a pivot point quite high on the Williams brace; it might as well be off the top band directly and does very little moving anteroposteriorly. If a pivot point is located low (Fig. 1, *right*), near the lumbosacral level, it will float backward

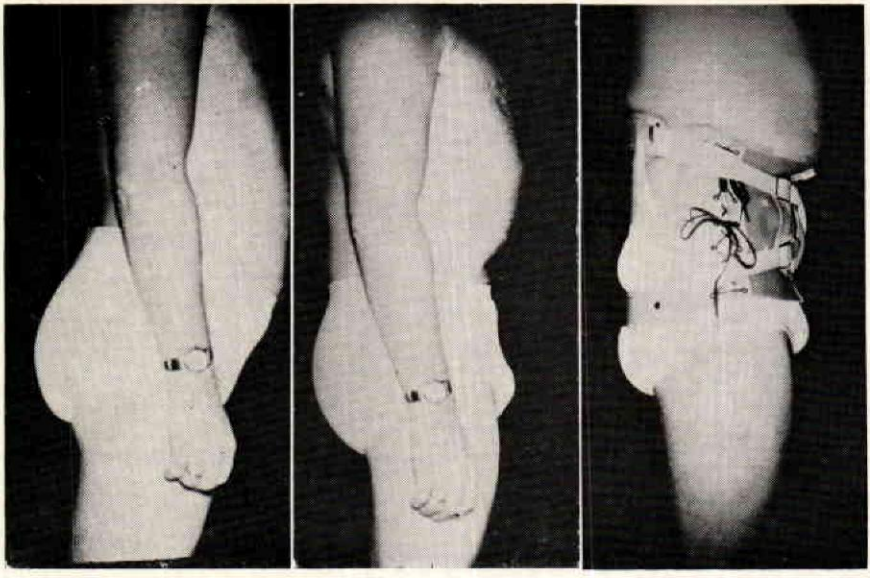


Fig. 1. (Right) Shows the upside-down brace.

* Reprinted by permission of the author and publisher from *Clinical Orthopaedics No. 22.* Copyright, 1962 by J. B. Lippincott Company.

with the flattening lumbosacral area and follow similar nonbinding relations of the back and the dynamic brace parts in the new position. Therefore, the brace should be turned upside down and the pivot moved. The long lever arm, now upward from the pivot, will follow the longer arc made by the lumbar spine upward, and the short lever arm down will follow all the range that the tip of the sacrum can make in back flattening. Experience has shown that a pivot point about 1 inch below the level of the lumbosacral interspace balances the top and the bottom *arcs* of motion and, therefore, controls the band pressures so that there is *no need*, as Williams urges the patient, voluntarily to assume the position of "frontal attack" or lean forward. This is to avoid the appearance that the walking Williams brace gives the patient of being prodded from the low rear, which he is. The frontal pressure application is right where the patient applies it himself, across at navel level. It is not necessary to go into abdominal anatomy to prove that this is a safe and comfortable place to apply pressure; many patients well trained in flexion exercises testify to this.

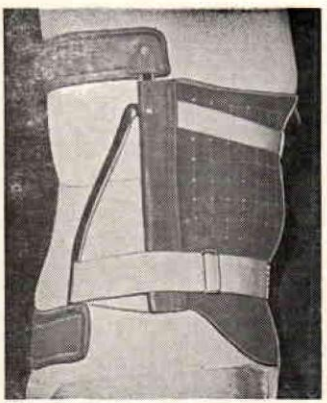


Fig. 2. The Williams Brace, as advertised in The Journal of Bone & Joint Surgery and other medical publications. Made by The Miller Brace Company, Dallas, Texas.

Actually the orthodox Williams brace (Fig. 2) uses a long lever arm for brute power, not for arc range to "grind" the lower sacrum forward a few centimeters. Even then it does not go down to the lower sacral level to gain the greatest advantage mechanically of this leverage. As I use it upside down, the lower band starts down at lower sacrum level for this purpose and then curves upward at its ends to leave the greater trochanter free for abduction of hips. Then the lower belt passes forward below the anterosuperior spine and above the substance of the flexed thigh. It is relatively comfortable here. Any pressure sense in this area is countered best by 2 or more surfaces that can slide on each other, not sponge rubber or the like. A folded handkerchief or a "pancake" powder puff does well, one surface clings to the brace, the other to the body, and a slide occurs between layers. If the powder puff is used only one side of it should be sewn to the brace, and it should be allowed to hang like a bag.

The lower belts in front do not have to be very tight. Their purpose is to control the level that the upper, or navel-level, belts make on the abdomen. The groin pressure problem is lessened at the start, and, with or without compound tincture of benzoin, the patient becomes used to it. For ultimate fit, and for change in body weight, brace size and fit occasioned by use, lacers on the sides with a tongue are practical.

The patient needs training in putting on the brace. *Always* take off 3 belts from leather apron, leaving one on the bottom in place. Then fasten the loose bottom belt in front and check the bottom of the bottom band in rear so that it is at "tail-bone" level. Next, with the *left* thumb and the index fingertips together, cross over in front and push backward on the top end of the *right* (opposite side) loose upright lever arm, and pull that right belt straight laterally from body with the right hand, swing it around forward, maintaining tension against the pulley (a 360° pulley that cannot

really slide well) and, with the now freed left hand, insert belt through buckle and cinch it up tightly. The same procedure is followed on the other side. Have the patient perform the pelvic roll exercise while doing this—maybe with hips (and knees) flexed—and knees against a chair; or it can be done lying in bed. He'll walk away flat backed!

If the top band in rear is too high, the brace can flatten the upper lumbar, expending its force, and leave the lumbosacral area unsatisfied. I think that the top band should cross only at about T-10 level and then curve down slightly so that the top belt lies under the fixed ribs and leaves them free. Considerable side bend of the upper body is permitted, which makes for comfort. Long 11th and 12th ribs can make a "short-waisted" individual and require that the top band be curved down more for this side-rib comfort or come out further toward real sides of the body. It improves the golf score by limiting the back swing to the controllable range.

Lateral roentgenograms without any brace, the patient assuming strong lordosis in both situations, can be superimposed on those taken with the orthodox Williams brace in place. Norton already has proven that, to his knowledge, no brace has had any effect on available lumbar motion.*

From my own studies, such lateral roentgenograms with the upside-down brace in place showed prevention of the (approximate) lordotic half

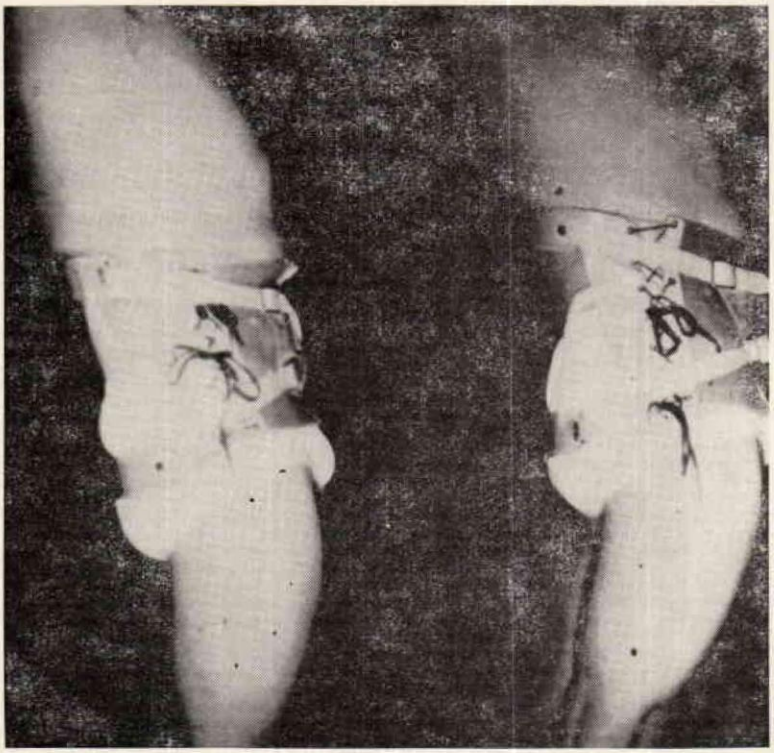


Fig. 3. (Right) Williams' application and (left) upside down, both with active lordosis.

* Norton, P. L., and Brown, Thornton: The immobilizing efficiency of back braces, J. Bone & Joint Surg. 37-A:635, 1955, and 39-A:111-139, 1957.

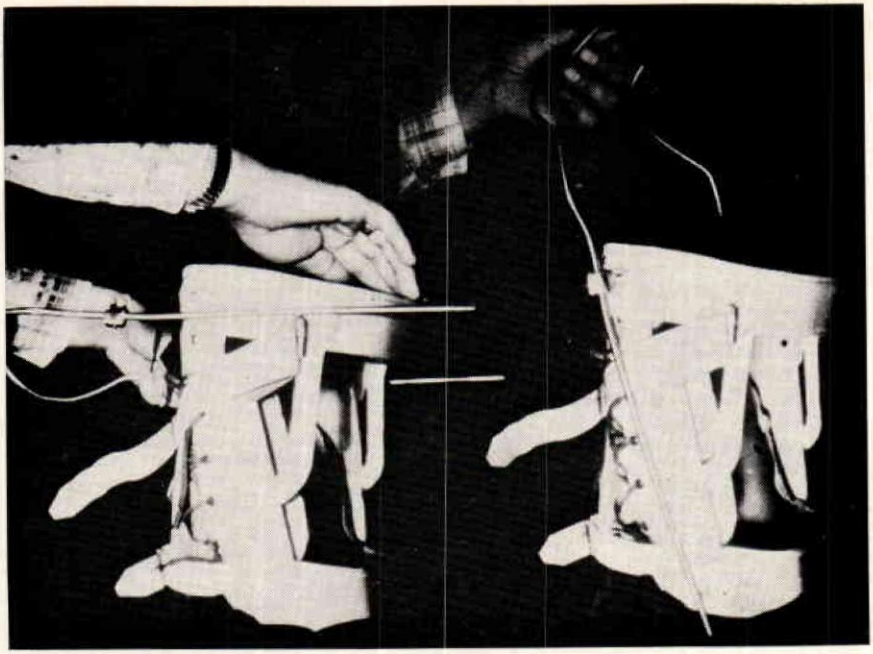


Fig. 4. Flexion low back-extension upper back brace.

of low-back range, or a range from full flat back to about midposition only. I have no volunteers for Norton's pins inserted in spinous processes, with deflection gauges applied. (Fig. 3, *left* [Williams application], compared with Fig. 3, *right* [upside down], both with active effort toward lordosis shows clinical appearance and difference).

In summary, the upside-down flexion back brace more accurately follows changed contours of the lower body as it goes to flat back; it produces arcs of brace motion that correspond to those made by various parts of the back engaging in this change; it utilizes a pivot point to float backward to follow rearward displacement of the lumbosacral area; it does this by even pressure application points that simulate those made actively by the patient in this change of posture. The whole amounts to a clinically comfortable brace, proven by x-ray studies to be more effective. Essentially it "buys" some brace muscles to work immediately while the patient develops by exercises his own active muscle power and particularly the know-how of their use in body control, and helps him to realize more quickly the desired body image. It does not produce as much atrophy as has been a common fear of braces, for any automatic effort made to relieve pressure of the brace is a pelvic roll exercise that unconsciously is done often in the brace. Frequently the patient himself realizes later that he is "better than the brace," and then usually it is reasonably safe to remove it.

In earlier conversation with Paul Williams he stated that he never had used the brace upside down but emphasized that it still was the 3-point principle. With that I heartily agree and even add a fourth: the floating pivot point that is the heart of the dynamic application of anterior force against the lumbosacral level to cause it to move backward.

With a reliable brace to flatten the low lumbar it is a reasonable step to utilize it to accentuate further the exercise program of postural training—

low-back flexion, hold, then upper back extension (Fig. 4). First develop a pivot point near both outer ends of the upper band. Use a rotating padded surface at the upper sternum. A U-shaped 1/4-inch or 5/16-inch round rod, bent just to miss breast and chest from this pad, runs downward to hook onto these pivot points and protrude backward. The lower rod ends now are forced forward to snap over a slightly hooked stud near the lateral ends of the bottom band; or, if the object is simply more elastic postural urge, an elastic strap across the front can be used to pull the lower ends forward—any variability in upper-back extension can be made with the low back held flat. If the pivot point is made like a T, a slotted hole off the extension rod can hook onto it with the upper half of the brace at 90° (horizontal) to the body. Then, when the U-rod and the pad are rotated up to the sternum, this pivot will not jump off accidentally. The late results of a dorsolumbar compression fracture is usually lumbosacral pain, which is created largely by the doctor by his over-all hyperextension brace or cast, plus a vertebra that has just about the same compression on healing that it had on the original roentgenogram. This flexion low back-extension upper back brace is useful in such cases, as well as in adolescent round back and in osteoporosis, for a while at least in those cases with vertebral body compression.

Garters to hold up stockings and hernial pads as a truss can be attached to the brace. One can use the brace instead of a Hessian girdle or other low-torso brace to be attached to lower extremity long-leg braces. I have used it to advantage for 14 years, ever since I was alerted to the arcs and dynamic pivot point by a barrel-bodied farmer who informed me, and demonstrated to me, that he was more comfortable and flattened more effectively by his Williams brace when he wore it upside down.

Construction and Fitting of the "Upside-Down Brace"

By ROBERT R. PLATTNER, C.O. and JACOB C. PLATTNER, C.O.

Peoria, Illinois

EDITOR'S NOTE: *Information on the technical aspects of fitting the brace described in the previous article has been contributed by the Messrs. Plattner. This material was not previously included in the article by Dr. Stuttle.*

Our experience with "The Upside-down Flexion Back Brace" dates back to approximately 1950, when after considerable experimental work, we arrived at a standard for measurement and fitting. We feel that it is the most effective brace to hold the patient in a flat back position.

Procedure

With the patient standing, arms at sides and facing orthotist, take (1) a snug measurement of the hips at the trochanter level. Then (2) a snug

waist measurement at the navel level, and (3) a snug chest measurement approximately 2″ below nipple line.

Then have patient stand with back to orthotist and hands at sides. Take a vertical measurement, starting at level of coccyx up to and including approximately 1¾″ of lower rib margin. This measurement determines the height of back brace. The length of the upper band is determined by approximately ⅓ of the chest measurement minus ½ to 1″. This band has a slight downward curve at either end (from the mid line).

The hip band length is determined by a distance just posteriorly of one trochanter to the other trochanter. This band also has a slight upward curve at either end.

The brace has two straps that are attached at each end of pelvic band and buckle to a plastic belly pad that fits on top of rubber abdominal apron. There are also two chest straps. These are attached to the side bars and go through a D-type slide loop attached to just below the chest band and buckle on the plastic belly pad.

Upon applying the brace, the rubber apron is zipped up, centered on the body and the brace located so the bottom of the pelvic band is just above the base of the coccyx, or level with it.

When removing brace, both chest band straps are completely unbuckled and one lower hip band strap is unbuckled, leaving the other hip band strap buckled on the plastic belly pad. Upon reapplying brace, the second hip band strap is tightened only firmly with plastic belly pad at approximately the bottom of rubber apron, so that both hip band straps are located just under iliac crests or anterior superior iliac spine.

Next the chest band straps are tightened *quite firmly*, pulling each one out, then holding while buckling, achieving the flat back position, preferably with patient doing a pelvic roll—causing a normal flattening of the body across navel level. If brace is properly fitted, the top of the plastic belly pad will be at about the level of the umbilicus.

World Veterans Leader Heads Conference On Handicapped

Norman Acton, Secretary General of the World Veteran's Federation, has been elected Chairman of the *Conference of World Organizations Interested in the Handicapped* (CWOIH).

The purpose of the Conference is to develop cooperation between international non-governmental organizations interested in the handicapped and to serve as a permanent liaison body between such organizations and the United Nations.

Prior to assuming his present post with the World Veteran's Federation, Mr. Acton served for five years as Executive Director of the United States Committee for UNICEF (The United Nations Children's Fund). From 1950 to 1954, Acton was Assistant Secretary General of the International Society for Rehabilitation of the Disabled.

Other officers elected to serve with Mr. Acton were:

John E. Jarvis, Secretary General World Council for the Welfare of the Blind—Vice Chairman.

Miss M. Joyce Neilson, Secretary World Confederation for Physical Therapy—Secretary.

Miss Audrey Moser, Deputy Secretary General International Union for Child Welfare—Rapporteur.

New Stump Correction Technique Developed At St. Vincent's Hospital

By ARMAND VIAU, C.O.

Chief Prosthetist and Orthotist, St. Vincent Hospital's Prosthetic and Orthotic Laboratory, Ottawa, Canada

A frequent problem which many prosthetists encounter in fitting a new above-knee amputee, especially a geriatric amputee, is finding that the stump has not been bandaged, and that a flabby condition is the result. Upon inquiry, the amputee may report that "the bandage would keep slipping off." Or if he has used the figure-eight method with Spica and without proper supervision, he will have developed a flexion contracture.

Under these circumstances, the usual ethical solution is to refer the case to physiotherapy for correction. This course will delay the rehabilitation for several weeks, if not a month. Such delays are very costly both for the patient and for the community, since a hospital bed and the time of the hospital personnel must be in use for the entire period. In such cases we have been able to shorten the time to one half, eliminate the elastic bandage and prevent or correct flexion contracture when it exists.

The method used has been approved and used under the supervision of Dr. Rene Allard, Consultant Physiatrist at St. Vincent Hospital, Ottawa, Ste. Justine Hospital and Hotel Dieu, Montreal. This correction method is most successful when the amputee is relaxed, and when the device is worn even when the patient is sleeping, upon authorization of the attending physician.

Description of Device

As shown in the illustrations (Figures 1-3) this new device consists of:

(A) A waist belt of firm 2″ webbing with a 1″ safety buckle sewed to it anteriorly.

(B) Three 1″ elastic webbings approximately 8″ long, with a safety buckle sewed at the top of one end of the elastic by means of a 1″ webbing.

(C) Three Grip Ends, of a size large enough to thread 1″ elastic webbing through loops.

(D) One heavy woolen stump sock, one or two sizes smaller than stump.

Procedure of Assembly

Sew two elastic webbings (ends with safety buckles) to waist belt, posteriorly over the gluteus maximus muscle and the third one anteriorily, midway between the two posterior ones. Thread each strap through the Grip End buckles attached to the waist belt.

Put the stump sock on the patient, leaving at lease three inches (the part too small for the stump) extending distally below the end of the stump.

Put the waist belt on the patient, and have him stand. Then fasten the two posterior Grip Ends, adjusting so that there is enough tension to perform the extension task.

Fasten the anterior suspender to the stump sock, adjusting this one with very little or no tension, since the purpose of this strap is only to prevent the sock from slipping off the stump. Most favorable results are achieved if the patient wears the belt and stump sock even when he retires. When the patient is sleeping the antagonist muscles are relaxed, and the device is then most beneficial.

The above technique has proven most successful with our patients. The use of conical elastic open-toe socks is being considered for use in the near future.

Figure 1

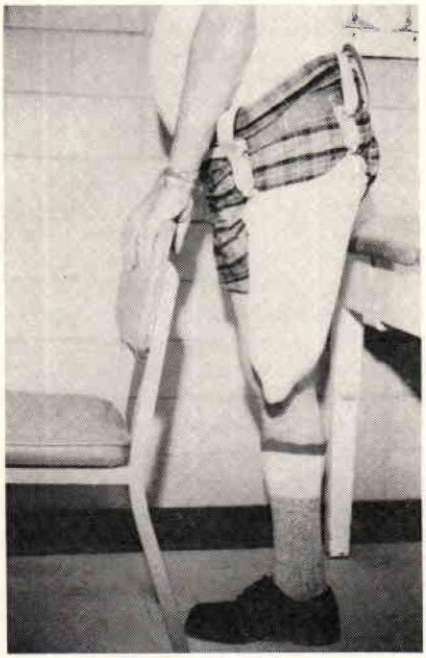


Figure 2

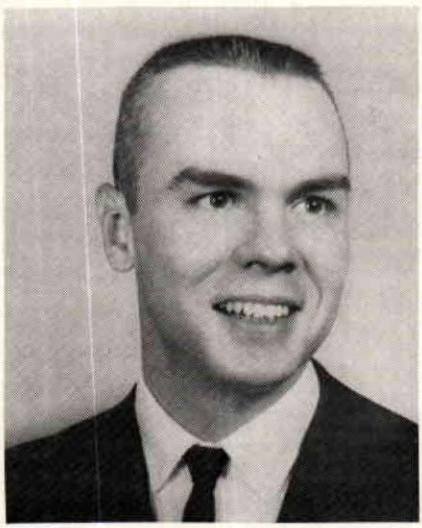
Figure 3

Stump Socks and Amputee Comfort

By WILLIAM B. SMITH, C.O.

The Knit-Rite Company,
Kansas City, Missouri

The only qualified source of information on stump socks available to an amputee is his prosthetist. Consequently, it is the professional responsibility of the prosthetist to exercise every care to see that each amputee is fitted satisfactorily with the proper kind and weight of stump socks. This care begins with the individual considerations in selecting stump socks and extends through instruction in the proper use and care. Occasionally, re-evaluation may be required, due to changes in the stump, a change to a different type of prosthesis, stump sock problems, or even variations in the amputee's weight.



Sources of information for the prosthetist are also somewhat limited. An article, "Stump Socks — Their Manufacture, Use and Care," by Lee J. Fawver and Ted W. Smith appeared in the August, 1951 OALMA Journal.* The manufacturers wholesale stump sock price list covers information required for various irregular and special stump socks. Since many unusual and special cases and problems have already been encountered by the manufacturer, the prosthetist should feel free to consult him on stump sock questions. The comfort of your amputees is of vital concern to all.

Pointers for Better Stump Sock Wear and Greater Comfort

Body weight and shrinkage—Weight fluctuation may, on occasion, tend to let the amputee sink a little deeper into the socket or rise a little out of the socket. A change in the weight or number of stump socks often proves to be an effective remedy. Many times a new amputee is furnished with a quantity of both 3-ply and 5-ply wool stump socks. Beginning with 3-ply, and later changing to 5-ply is helpful in accommodating some shrinkage.

Size—When stump socks are too large, the problem is usually recognized quickly. However, stump socks which are too *small* also may be a problem contributing to discomfort and stump sock damage.

* "Stump Socks—Their Manufacture, Use, and Care" is reprinted in this issue of the *Journal*. See pages 51-56.

In recent years, many amputees have changed from a conventional to a PTB type prosthesis. This change calls for a re-evaluation of stump sock requirements:

Size—Often the length of the stump sock will be reduced considerably, with a corresponding change in the top width, be sure to *check the toe width* for it may not change proportionately, if at all. Special size ranges have been developed for PTB wearers and are listed in the Stump Sock price lists. (Note: there are 3 to 4 toe widths for each top width, and special sizes can always be knitted).

Weight of stump socks—Has the amputee been wearing one or more 5-ply stump socks? Could his requirements be better met by making a change?

DownyWool—Often a PTB wearer will use only one DownyWool (3-ply wool) stump sock. It must be recognized that the sock in such cases will not wear as long as when 5-ply or more than one sock is used. It is helpful to call this to the amputee's attention when the change to a PTB is first made.

Supply—It is particularly important for a PTB wearer to maintain an adequate supply of good stump socks. Enough to enable him to (1) wear a fresh sock each day, (2) store the socks several days after washing and (3) to wear them in rotation. This provides a "resting" period and allows the resiliency and elasticity to return to the wool fibers. The total contact, closed socket has substantially less ventilation than provided in a conventional prosthesis. For this and other reasons, the stump sock is called on to do double duty. Note: Washing instructions are printed on the envelope containing each stump sock.

A callus is likely to cause trouble by cutting through the stump sock and is one of the first things to check for if stump sock damage develops. Similarly, rough areas and concentrated pressure points in the socket can cause stump sock damage. Leather lined sockets tend to reduce stump sock wear because of the greater friction (especially when only one sock is worn).

Movement of the stump in the socket and friction are directly related to stump sock wear and many stump problems. It may be helpful to note that this movement may take place:

(1) between the socket surface and the stump sock,
(2) between the stump sock and the stump.

Heated wax or paraffin, painted on the inside of a PTB or leather lined socket, provides a slick perspiration resistant surface. This slick surface reduces friction, prolongs stump sock life and ofter helps meet stump problems. Note: Heat the socket, both before and after painting, with a heat gun to obtain penetration. A short period of wear by the amputee will result in a smooth, high gloss finish.

The "Reprint Article," mentioned previously, covers other points, such as wearing the stump sock inside-out (that is, the vertical ribs next to the stump). This often helps to reduce stump irritation, particularly in hot weather.

It is difficult to place enough emphasis on the importance of stump socks in amputee comfort, and the role of the prosthetist in insuring the maximum comfort through fitting and instruction in use and care.

Have you encountered any unusual cases or problems regarding stump socks, or found a particular technique helpful? We would like to hear about it, and pass it along to other prosthetists.

Stump Socks—

Their Manufacture, Use and Care

By LEE J. FAWVER, C.P.O. and TED W. SMITH, C.O.

(This article first appeared in the OALMA *Journal*, August 1951, pp. 27-32. Since the *Journal's* circulation at that time was relatively small, and the issue long out of print, we are reproducing it here with the permission of the authors).

In the manufacturing and fitting of the thousands of prosthetic appliances, which are supplied to amputees each year, a better knowledge and understanding of the contribution of stump socks to the comfort of the individuals we serve will assist the prosthetist to more capably care for those who are in need of our services.

The existing and continuing need for suitable stump socks by wearers of prosthetic appliances represents to our profession a considerable volume of business and a need that should be capably filled. It is the desire of the writers of this article to bring out information that will give to the field a better knowledge of the manufacture, use and care of stump socks, by here giving a background of stump sock manufacturing together with notes on what we have learned through years of experience in the proper fitting and care of these important aids to amputee comfort.

It is necessary in most cases where individuals wear an artificial arm or limb to have some means of padding and positioning their stump legs or arms in the appliances which they wear. Stump socks have been developed as the best means of doing this and are worn over the stump in sufficient weight and number to meet their needs. They are carefully knitted of high quality yarns to shapes and sizes which will properly fit the contours of the stump legs or arms.

Materials Available

Available to the manufacturers are two vegetable fibers, cotton and linen, and two animal fibers, wool and silk, together with synthetic or man-made fibers, particularly those that have been developed in recent years. Of these available fibers those used to date in the manufacture of stump socks have been wool and cotton and a mixture or blend of these two. However, the volume of stump socks made from 100 percent cotton yarn or from a mixture of cotton and wool is very limited. About 90 percent of the stump socks produced by The Knit-Rite Company are made from 100 percent virgin wool yarn in five-ply weight.

This would indicate that, as a matter of consumer education and selection, limb wearers have found that 100 percent wool stump socks have given them the optimum of comfort that can be obtained.

Wool has been the noblest of all fibers down through the ages, and probably will remain so for many years to come. Fine wool is not overabundant and the factor of scarcity adds to its value. Science has never been able to produce a substitute that will acceptably replace this fiber.

How Good Wools Grow

Sheep raising was one of man's earliest occupations and was first found in Central Asia. Probably the most significant crossbreeding in history was produced by the North African and the Torrentine sheep of the Romans which was carried on in Spain to produce the Merino strain, which is considered our finest wool today. During early times Spain was most reluctant to let these sheep leave her own soil, but down through the years this strain was smuggled out and crossbred with other flocks until we now have over two hundred main breeds in the world today differing in weight, height, and in structure and also texture of their fleeces. Of this number we have about eighteen important breeds in the United States.

Wool fibers are unusual in appearance. Under a microscope they are revealed as having a shaft or center construction known as the medulla. Immediately covering this center construction is the cortex which is an interlacing layer after layer of compound cells which adhere closely. Wool is often characterized as being alive and it is because these cells bend, swell, shrink and stretch under normal conditions from changes in atmospheric pressure that this is considered true. Covering the cortex is the outer coating or epidermis resembling scales of a fish or bark of a tree with the scales ranging from 1,000 to 4,000 per inch, which gives the fiber its cohesive quality. So it is with this unique structure that the fibers are able to be stretched thirty percent beyond their length and when released return to their original tension.

Characteristics of Wool

The striking characteristics of wool fibers are great elasticity, high absorbency, ability to hold much moisture without feeling damp, and a high degree of resistance to acids that are a basis of perspiration. When a fiber is elastic the yarn is springy and the resultant fabric will be resilient. Because one of the basic necessities of a stump sock is its padding effect for the protection of the stump, this high resiliency of wool fibers makes it superior to any other fibers.

As wool is the most absorbent of all fibers with a natural moisture content of between twelve and sixteen percent, it will absorb moisture quickly and will hold a large amount. This makes an ideal fiber for stump socks as wool, even when containing a high degree of body moisture, will not have the tendency to wrinkle and stick to the body as will other fibers. While wool is quickly destroyed by strong alkalies, it does have a high degree of resistance to the acids of excessive perspiration from the stump resulting from the wearing of a prosthetic appliance.

In an effort to obtain the maximum of useful characteristics in wool fibers for the specific use of stump socks, through the years we have found that a blend or mixture of domestic and foreign wool fleeces is far superior. From this blend we obtain a higher degree of elasticity, resiliency, and softness of texture, strength, moisture absorption, and greater resistance to shrinkage.

Processing the Wool

A lengthy article alone could be written on the story of wool fibers from the sheep to the spun yarn that is used in the knitting of stump socks. In this article we will only attempt to touch on a few of the facts which we

believe will be of particular interest to our readers. Each clip or fleece from a single sheep is sorted or graded into several different qualities of wool fibers. Wool sorting or grading is a trade learned only by long practical experience and is highly skilled. The wool sorter does the work by observing and handling the wool and his experience enables him to instinctively assign each to its proper grade.

The quality most generally used in the manufacture of stump socks is termed or classified as 64's, which is the U. S. domestic designation of a wool grade. The 64's quality is one of the finest obtainable from a sorting of the fleece. These fine quality virgin wool fibers are spun into a worsted yarn of a suitable count or size for knitting into stump socks. This particular type of spinning is done by the French system. This is a dry method using no oil and differs from the Bradford system in which oil is used. The French system results in a softer worsted yarn and makes up into a much more satisfactory stump sock, with better resiliency and cushion. In the size or yarn count that is used in the knitting of stump socks the average size of stump socks will contain approximately 2,500 yards of virgin wool yarn.

It now becomes our responsibility to take this fine virgin wool yarn which we obtain from our spinner and use it as the raw material which we have to work with in the knitting and manufacturing of stump socks. Although knitting construction is not so widely used for general fabrics as weaving it possesses qualities that make it preferable for certain garments—particularly stump socks. The advantage of stretchability which knitting possesses is an important consideration where fit and comfort are concerned, as is so necessary in stump socks. The insulative air pockets contained in knitted products give a higher resiliency and cushioning effect and greater moisture absorption. The knitting is done on flat bed power machines using a plain knit stitch which is sometimes known as the flat knit or jersey stitch. This type of stitch can be identified by wales or vertical ribs on the outside of the sock and by courses of horizontal stitches on the inside. With this type of stitch more stretch is obtained in width than in length, permitting the sock to better conform to the stump contours.

Hand Finishing Operations

In addition to the knitting there are other necessary manufacturing processes before the product is completed and ready for the limb wearer. As the stump sock comes off of the knitting machine it is necessary for the toe to be hand finished. After this hand operation the stump socks in our terminology are processed. This is more than a washing operation as it is necessary for the socks not only to be cleaned but to be fulled. In fulling, water and chemicals are used at a proper temperature to make the wool fibers interlock and to produce a desired shrinkage or stitch relaxation, resulting from the stretching of the yarn in the knitting operation. This processing also gives the stump sock additional thickness and a firmer, softer texture which is the prime requirement of amputees. In drying, the socks are properly sized and then properly fleeced. They are then ready for inspection and packaging.

Another responsibility that the manufacturers have is to supply stump socks in a range of sizes which will give a suitable selection to meet the requirements of different individual needs, including those of varying sites of amputations. All stump socks are fashioned by being knit to the various

sizes which are to be supplied. They are carefully sized and inspected in order that a consistent standard will be constantly maintained.

Basic Measurements

The three basic measurements necessary for the determination of a size of stump socks are the length, the top, and the end or toe circumference, which is approximately two inches from the end of the sock. However, it is customary to list the top and toe measurements as flat measurements, which are one-half of the circumference.

Five standard widths and lengths of from ten inches to thirty-two inches graduated each two inches has been established, from which it has been our experience that the majority of amputees of lower extremities can make a selection of their required size. For amputees of the upper extremity, a selection of two standard widths in lengths of five inches to twenty inches inclusive gives a selection of size which will take care of most of the requirements of this group. The majority of the volume of stump socks produced are in these two groups of sizes. In addition, the demand for leg socks is principally for five ply weight wool and for arm socks it is four ply weight wool. Within these two groups of sizes and weights, the five widths of leg socks in five ply weight white wool, and the two widths of arm socks in four ply weight white wool, is represented the majority of our demand. They are termed our standard sizes and weights and under normal conditions are carried in stock for immediate shipment. Consequently, they can be ordered by size number 0, 1, 2, etc., and length measurement only.

Special Cases

However, there are amputees who for proper fitting will require stump socks of special size, weight, and under certain conditions stump socks made of material other than white wool yarn. It is necessary for the prosthetist to know the length, the top measurement, and the toe measurement required. These are termed special stump socks and have to be manufactured to order. In the case of amputees with stump legs that have bulbous ends, where a stump sock of an uneven taper is required, these can be made to order.

It is desirable to have a paper pattern the exact size and shape the stump sock is to be made. If this not readily obtainable, a profile drawing of the stump may be made with circumference and measurements noted on the drawing at intervals of approximately three inches. Especial care should be given to measurement at the site of bulbous irregularities in the contour of the stump. Length of finished stump socks should also be stated. These requirements for patterns or profile drawings will also apply to individuals with deformities that are fitted with prosthetic appliances. Stump socks of uneven taper that are made for these two groups are termed irregular shapes. As additional operations are required to make this type of stump sock, it is customary to make an extra charge for this work.

As we have stated above, the five ply weight and four ply weight white wool in the case of leg socks and arm socks respectively represent the majority of the volume of stump socks produced and are termed our standard weights. However, there are individuals who need other weights and/or materials for various reasons. The materials generally available for other selections are Dark Gray Wool, Pearl Gray Wool, fifty percent wool and

fifty percent cotton, one hundred percent cotton, and Silkoline (mercerized cotton). Any of these materials, including white wool yarn, can be made up into stump socks of three ply, four ply, five ply, or six ply weights, which gives a selection of stump sock weight whenever such a need is indicated. Stump socks of these materials and weights have to be made to order.

Exactness Is Necessary

In addition to the proper kind and weight of stump socks, carefully made by the manufacturer, there is another consideration that an amputee must have before he can be assured of having the utmost in stump sock comfort. All prosthetists have experienced that a correctly fitted stump sock will add to the comfort of wearing a well fitted prosthesis and by the same token an improperly fitted stump sock will detract from the comfort of wearing the best fitting prosthesis and can cause a considerable amount of stump difficulty. For the optimum of comfort the individual amputee must have a stump sock that is not too tight nor too loose; one that in the case of below knee amputees will permit proper functional use of the knee, and one of correct length.

The correct manner of wearing a stump sock will contribute materially to the comfort of the individual. For example, The Knit-Rite Company and the W. E. Isle Company have found by experience that if a stump sock is worn outside in, that is with the vertical ribs or wales next to the stump leg, considerable stump irritation can be eliminated, particularly in hot weather.

The horizontal rows or stitches inside of the stump sock can cause irritation due to the piston action of the stump leg in the socket of the artificial limb. This irritation is practically eliminated when the vertical ribs or wales are worn next to the stump leg. It is the general custom to wear the fleeced or napped side of the sock next to the stump leg. The only possible advantage in wearing a sock in this manner would be that the fleece or nap of the inside of the sock would pick up the moisture more quickly from the stump leg. However, a limb wearer will find that it is also true that when the stump sock is worn with the rib or outside next to his stump leg, the moisture of perspiration will evaporate more readily from the stump sock. This is a definite advantage as the wool of the stump sock will pick up moisture more quickly than it can be evaporated.

Prosthetist Is Responsible

The only qualified source that the amputee has for this information is his prosthetist. Consequently, it is the professional responsibility of the certified prosthetist to exercise every care on his part to see that each individual amputee is fitted satisfactorily with the proper kind and weight of stump socks to meet his individual needs.

The importance of being careful in the washing of wool stump socks can never be stressed too strongly. More stump socks are probably ruined through improper washing than from any other one cause. The wearer should understand that more care should be exercised in the washing and storage of wool stump socks than with any other item of clothing. The amputee will be well compensated in the long wearing comfort that he will obtain from his stump socks if they are properly washed and cared for.

Washing the Socks

Wool stump socks should be washed and rinsed in water that is lukewarm, with a temperature of 100 to 110 degrees. By all means the stump socks should never be rinsed in cold water. Any change in water temperature will affect wool adversely. The selection of soap is very important. A soap must be used that will dissolve in water of this low temperature, as well as a kind that contains the least possible amount of alkali. As Ivory soap has a high degree of purity and will dissolve in water of a low temperature it can be recommended very highly for washing stump socks.

Where individuals have a preference in the use of detergents or synthetic soaps they must be careful to ascertain that the particular brand they use is made from cocoanut oil base. The other bases from which detergents are manufactured are petroleum, alcohol, and alkali. Any of these will harmfully affect the fine wool of stump socks. Excessive rinsing and any soaking is not recommended, and in most cases a small amount of soap left in stump socks will act as a lubricant and actually improve the quality of the stump socks. Soapsuds should be squeezed into the stump socks and they should never be rubbed. In washing, avoid lifting the socks out of the water as much as possible. The weight of the water in the sock will distort and stretch the sock if it is lifted out of the water constantly. Excessive wringing and twisting should be avoided as this will felt the socks. To hasten drying one of the best methods is to roll the stump sock in a towel and remove as much of the excess water as possible. Stump socks should be dried at a moderate temperature and never against direct heat or in sunlight. Direct heat dries out the fibers and causes them to become brittle and harsh. Drying outside in cold weather will also have this effect.

The Daily Change

It is our recommendation that every limb wearer should have a sufficient supply of stump socks to permit him to wear a clean stump sock daily, and to allow for the stump socks to be stored several days after washing and before wearing. They should be worn in rotation, as this gives an interval of several days during which the sock is not used, permitting the wool to have an opportunity to rest. This restores the resiliency and elasticity of the fibers.

It is the hope of The Knit-Rite Company that we will have available to us a blend of synthetic fibers and wool that will make up into an improved stump sock; one that will not require such extreme care in washing and which will stand up better under the conditions of stump sock use. Experimentations have been carried out in the past several years in the use of various synthetic yarns, such as Nylon, Fibre V or Dacron, Orlon, etc., together with blends of these synthetics with wool yarns.

While much is to be expected of these synthetic yarns in the immediate future for various uses, so far, the results of our experiments convinces us that at present there is nothing that will surpass or even equal the quality of 100 percent wool stump socks. We are continuing with our experiments with these new yarns, as well as with wool, in the hope that we may sometime be able to obtain a yarn which will make up into an even better stump sock.

A stump sock is a highly specialized item which affects the welfare and comfort of thousands of individuals. The high quality product which we have today is the result of years of study and effort on the part of the manufacturers.

Associate of Arts Degree Program In Prosthetics

Chicago City Junior College - Northwestern University Medical School

Presentation at the American Orthotics and Prosthetics Association National Assembly, November 8, 1964—Hollywood Beach, Florida

Edited by DON E. IRISH, B.S., *Administrative Assistant, Northwestern University Medical School, Prosthetic-Orthotic Education*

Participants: Ralph A. Storrs, C.O., Presiding
Jack D. Armold, Ph.D., Northwestern University, Director, Prosthetic-Orthotic Education
Michael P. Cestaro, Chairman, Committee on Educational Standards, American Board for Certification
Robert C. Gruman, C.P.O., President, American Orthotics and Prosthetics Association
Chester Pachucki, Assistant Dean, Chicago City Junior College
Ralph A. Storrs, C.O., Northwestern University Advisory Committee

Considerable interest has been generated about the proposed Associate of Arts degree program to be offered by the Chicago City Junior College—Northwestern University Medical School. To fully acquaint readers of the Orthopedic and Prosthetic Appliance Journal with this program to date, this article presents the proceedings of the national Assembly in which the degree program was first surveyed. The following text represents the edited introductory remarks and the questions and answers about the degree program.

Mr. Gruman: "Before we begin the formal presentation of the Associate of Arts degree program, I would like to comment briefly about it. In September, 1963, the American Board for Certification sponsored a workshop designed to develop recommendations for training personnel in our field. The recommendations that came out of this workshop have indicated to us that it was necessary to prepare training materials and also necessary for us to encourage programs that would provide training to young people desiring to enter the profession.

"Representatives from the American Orthotics and Prosthetics Association (AOPA) and The American Board for Certification (ABC) have met with the administrative personnel of the Chicago City Junior College and Northwestern University and have been instrumental in the planning to date. We feel that a Junior College is an ideal institution in which people may receive a proper training. It is for this reason that we have wholeheartedly supported the accomplishments to date. Now I should like to turn over this meeting to the Chairman of the section, Mr. Ralph Storrs."

Mr. Storrs: "Mr. Mike Cestaro, Secretary-Treasurer of AOPA, has asked that I read the following statement concerning the program. He regrets that he is unable to attend this session as previously planned.

" 'The Board feels that this program, directed toward the training of prosthetists and orthotists, will meet a very definite need in the field of prosthetics and orthotics. In discussing this with the Board, we found general agreement that the Junior College is an ideal institution in which persons may receive training of the type recommended at this workshop.'

"My role today is dual, representing Northwestern University as well as the industry. I will try to give you just a brief outline regarding the development of this program. We must all recognize that, as of this date, the industry has not developed a program for bringing young people into our profession. It is generally recognized that the short-term courses at the three Universities were not designed for, or are not providing, the satisfactory number of young people in our field.

"There are many figures on the number of young personnel required each year in our profession. I believe it is reasonable to say that one-half of the facilities in this country could, and would be happy to, employ an interested young person who has the background of a two-year Associate of Arts degree program. I am sure we all recognize how much easier it would be for each and every facility to take a man who has received formal education consisting of general education, science, mathematics, basic laboratory courses and then the technical education, as applied to our field, as opposed to a man you hire off the street and train in a basic apprenticeship.

"So I am certain we can all appreciate the potential of the proposed Associate of Arts degree program."

Mr. Pachucki: "The Chicago City Junior College has long favored the plan of expanding its program to include occupational oriented technician type curricula. We have done so in the Health-Science, Business and Engineering Technology areas. The two-year Associate of Arts degree program in prosthetics gives the Chicago City Junior College an opportunity to blend its experiences in health-sciences with that of the engineering technologies to provide the community with this additional, unique educational opportunity.

"The objectives of the curriculum in prosthetics are: 1) to provide professional education for prosthetists who expect to enter directly into this field; 2) to provide the first two years of education for prosthetists who expect to complete a four-year College education; 3) to develop those understandings, skills, values, and attitudes desirable for effective living in a contemporary society by means of well organized programs of general education; 4) to recruit young people in the field of prosthetics; and 5) to partially prepare these young people for national certification.

"By the very nature of the program, the student expects to gain a sufficient background of specialization in this field to become a saleable item on the labor market. The curriculum will include those educational experiences which will provide a rich background in communications, mathematics, science and basic prosthetic concepts. Applications of scientific principles change . . . but the concepts do not.

"I believe the Executive Dean, Mr. Clifford Erickson, summarized well the change taking place in your field as removed from apprenticeship training to an educational program. 'We hope to get out of this a man who will display initiative—someone who would rather stand for his conviction than sit on his aspirations.' "

"The Chicago City Junior College feels, however, that over-specialization is dangerous and the narrow specialist of today may become obsolete tomorrow.

"The United States Department of Labor tells us that a student coming out of high school may, in this age of technological development, change jobs as much as five to six times—prior to this automation revolution it was three times.

'Industry has continually expressed interest in that type of worker who has the potential to grow: In this case, a technician who has acquired formal knowledge of subject matter along with manipulative-mechanical skills in preparation for the job at hand—someone with depth rather than a limited area of specialization.

"Every industry is unique in its method of 'tooling up' to obtain an acceptable end product. These techniques are the result of planning, development, and experience. Industry is willing to provide the experience if the technician has the educational flexibility to participate in the planning and development.

"To offset the specialization, the Chicago City Junior College proposes application. It is felt that by introducing a planned sequence of College level math, science, and laboratory experience, the student will reach a desired level of educational maturity or sophistication. At this point, practical application becomes meaningful. The application that I speak of here is the type that will be offered by the outstanding staff at the Northwestern University Prosthetic-Orthotic Education Center.

"In perparing this curriculum we met with local advisory groups, studied other going and proved programs, visited prosthetic clinics and discussed our aims with certified, qualified personnel, tapped resources at Northwestern and availed ourselves of the breadth and depth of over fifty years of experience in the Chicago City Junior College. We call this our planning period, which started in February, 1964, and ended with a meeting of your national officers, at Northwestern University on October 1. At this meeting, after a period of constructive discussion, the curriculum was adopted.

"Before entering the second phase of the program, which has been designed as a development period, we have to await approval of funds from the Chicago Board of Education and the Vocational Rehabilitation Administration, to complete the educational facilities needed for implementation of this highly specialized, occupational-oriented curriculum.

"The development stage will get under way about the middle of January and run on into August. During this phase: details of the specialized courses of study will be worked out; a laboratory complex will be designed and constructed; materials and equipment will be purchased; and publicity, with a view of recruiting students, will go into effect.

"The third and final phase is one of implementation with students attending their first classes at Southeast Junior College, September, 1965.

"The Southeast Campus of the Chicago City Junior College has an enrollment of 890 full time and 2,057 part time students. This total of 2,947 is made up of college age students and adults with varying interests and needs. To fill these varying educational objectives, this campus offers a program of 236 courses scheduled from 8:00 a.m. to 10:00 p.m. throughout the week.

"In its original context, technical education was deemed *terminal* for those who chose its pursuits. Educators soon realized that the connotation of terminal was not only a stigma but also a deterrent to the status-seeking technician. Some alert educators went far beyond semantics and made an

honest effort to really upgrade the program. They made those changes in the curriculum that would permit a graduate of the program to continue his education while productively employed. *Ours (CCJC-NU) is not a dead-end curriculum—for a dead-end program can only attract dead-end kids.*

"Finally, we would like to round out the technicians' background with an enrichment of selective general education experiences.

"We all recognize that the technician must continually communicate with members of the prosthetic team. Here, ideas and data must be transmitted from doctor, prosthetist, technician, craftsman, and, of course, the patient. Precision with words as well as precision in design and development are expected of the technician. Our program contains three college level courses in communications: 1) English composition; 2) technical report writing; and 3) fundementals of speech.

"Incidentally, the Chicago City Junior College is made up of eight campuses with a total enrollment of over 33,000 students.

"Of special interest, perhaps, would be a comment about the occupational-oriented programs mentioned previously. The goal here is to produce a highly specialized worker in an area deemed critical by the United States Office of Education; a person with sufficient background in mathematics, engineering, science and general education to be able to assist the engineer or scientist in technical routines associated with development, research, or production.

"The curriculum in prosthetics gives the Chicago City Junior College the opportunity of providing the community with new and advanced educational services that enable our citizens to earn a better living—and live a better life.

"With that, I digress from my formal presentation to discuss the subject matter of the curriculum.

CURRICULUM IN PROSTHETICS

FIRST YEAR

English 101	3	Biology 112	4
Mathematics 103	3	Physics 221	4
Biology 111	4	Mathematics 104	3
Prosthetics 101	3	Prosthetics 105	3
Art 143	2	Prosthetics 111	3
Orientation	1	Physical Education	1
Physical Education	1		
	17		18

SECOND YEAR

Physics 215 CCJC	3	English 107	2
*Prosthetics 201	4	Speech 101	2
*Prosthetics 203	3	CCJC	
*Prosthetics 205	3	*Prosthetics 209	4
*Prosthetics 207	4	*Prosthetics 211	4
*Psychology of Disabled	1	*Prosthetics 213	4
		*Business Management	1
	18		17

* To be offered at Northwestern University.

QUESTION AND ANSWER PERIOD

"We will now entertain questions from the floor concerning the program."

Q: *"How will the program be financed?"*
Mr. Pachucki:

A: "Northwestern students who are residents and taxpayers in Chicago pay a general service fee which amounts to $10.00 and also laboratory fees. Students living in the State of Illinois are assessed about $9.00 . . . The other half of the tuition is paid by the State of Illinois. Fees for non-residents of the State of Illinois would be about $365.00 or, shall we say, $400.00. Dr. Armold, would you please comment on the Northwestern costs?"
Dr. Armold:

"The A.A. program will be jointly financed by the Vocational Rehabilitation Administration, Chicago City Junior College, and Northwestern University."

Q: "As I understand it, this course with two years of study at Northwestern, would be equal to the first two years at another University except that you are placing a little more stress on prosthetics. *Would this program supplement the New York University program?*
Dr. Armold:

A: "Yes, the New York University program is a four year degree program. A student could receive two years of education in the Chicago City Junior College program and then, if he wants to go on for his Baccalaureate degree, he can do so at another four-year University such as NYU. The Northwestern University program offers a flexibility in that it can be considered a terminal or a transfer program of education."

Q: *"Would there by any provision for students who are not able to furnish their living costs?*
Dr. Armold:

A: "We feel that students in the Chicago Metropolitan area will not be concerned with additional living costs. Application has been made to the Vocational Rehabilitation Administration for financial assistance for the non-Chicago students."

Q: *"Will this program partially prepare men for the ABC exams?"*
Dr. Armold:

A: "The American Board for Certification has not given any ruling on this, but it is under consideration and, as has been stated, they have cooperated with us on the development of the program and curriculum."
Dr. Armold:

"In conclusion, every available means should be used to recruit young competent people into our highly specialized industry, which is little understood by the public."

"Private industry, federal, state, and city agencies must provide the necessary funds to develop and implement this two-year educational program. Both general education and specialized education should join forces for maximum individual development and preparation for work. Finally, quality prosthetic-orthotic educational programs can only be developed when a new program for teacher preparation is implemented. Thank you."

Orthopedic Appliance Cases

Served by Flint (Michigan) D.V.R. Office 1961-2, 1962-3

A research report by ELMER R. AKERS, M.A.
Flint, Michigan, D.V.R.

Since World War I, the replacement of lost limbs or other parts of the body has developed into the science of *prosthetics.* The great debt owed to the science of prosthetics by orthopedically handicapped people, and the immense reliance on it by people and agencies who assist in restoring the orthopedically handicapped to employability will be reflected in this paper.

We have undertaken to portray the record of the Flint area office of the Michigan Vocational Rehabilitation Division in rehabilitating this group of clients during fiscal years 1961-2 and 1962-3. We will relate the following types of information:

Numbers of cases
Sex breakdown of the total number
Breakdown of disabilities as indicated in appliances provided
"Repeats," *i.e.*, numbers of cases in which previous appliances were used
D.V.R. "repeat" appliances, dates provided, and other previous D.V.R. services
Limb life of prostheses and wheel chairs provided
Employment at closure of cases rehabilitated

In the two fiscal years 1961-2 and 1962-3, we provided appliances to 247 people. These included leg and arm prostheses, leg and back braces, hearing aids, dentures, glasses, etc. Of the 247 clients, 127 were orthopedic cases and 120 were nonorthopedic—mainly heard-of-hearing.

We will portray in the following the services rendered the 127 orthopedic appliance cases.

The sex distribution of these 127 people for whom we provided appliances is: 109 men, 18 women—a ratio of approximately 6 to 1.

A breakdown of the cases into disabilities indicates the following limb extremity and other body parts distribution:

One leg amputated A/K, B/K or foot—66;
Both legs amputated—4;
One arm amputation A/E, B/E, or hand—28;
Both arms—1.

Persons provided braces were:

One leg brace—12 cases;
Braces on both legs—2;
Back braces and lumbo-sacral corset supports—9;
Wheel chairs—13;
Orthopedic shoes—4;
Work boots—1;
Metatarsal pads—1.

These appliances add up to 141. One hundred twenty-seven persons were involved as recipients, and so it is indicated by subtracting 127 from 141 that 14 of the 127 clients were provided a second appliance within the two-year period 1961-2 and 1962-3.

Most of the appliances were purchased from three or four of the dozen or more limb-making firms in Michigan, or which have branches here. From the two top firms we purchased, respectively, 49 and 42 limbs, costing approximately $15,500 and $14,000. There were in the neighborhood of twelve firms and/or agencies from which we purchased one each. The total cost of the appliances during each of these two years was approximately $20,000.

New limb wearers almost always need assistance in acquiring good habits of limb use in order to achieve comfort, naturalness of use, and the best service function. In some of these cases our agency provides or buys "gait-training" along with purchase of the appliance. The gait training is secured from some agency other than the prosthesis firm from which the limb is purchased—University Hospital, Ford Hospital, and others. A count of these cases shows that 13 of the new limb wearers were provided gait training. Since there were 23 new limb wearers, it is to be noted that the other ten secured gait training assistance either at the client's expense or upon assistance from some other agency. Always the coordinator sees to it that this initial help toward acquiring the skills of using the prosthesis is provided from one or another source.

As all workers in vocational rehabilitation in Michigan know, we secure participation of clients in defraying costs, if warranted on the basis of financial information in the case file and if client's agreement is secured, although this is done much more frequently in securing hearing aids. During these two years, eight of the orthopedic clients contributed a total of $650.

Participation in defraying service costs cannot often be secured from orthopedic appliance clients because in most cases they are unemployed and because of the disablement are unable to work until after provision of service. Hard-of-hearing clients, on the other hand, very frequently are continuing work while they are being processed for replacement of hearing aid. They may have families to support, bills to be paid, etc.; they may simply be unable to accumulate the necessary $250 to $300 for the hearing instrument, but sometimes find it possible to contribute one quarter or one half the cost.

Among the more urgently sought answers in this study of orthopedic appliance cases were those indicating "repeat" services. How many of the clients had worn one or more leg or arm prostheses, or whatever the appliance, previously? Also, had Vocational Rehabilitation provided previous appliances?

We found that 77 of the 141 appliances provided these 127 clients were "repeats." Some of the 77 clients had had more than one previous appliance—several, four or five. This is to be expected, of course; say, for example, in the case of a man now 54 years of age who lost his leg in childhood.

The likelihood of the matter is that this man has been able to secure his own prostheses during his working prime, but at 54—unless he is a skilled worker—he may find it necessary to apply for vocational rehabilitation service in order to qualify for whatever employment he can, with D.V.R. help, find.

Next, we broke down the life of the D.V.R. "repeat" appliances. In other words, how many years had the various prostheses provided by our agency lasted?

The following table will show this, although it is not complete since our records do not in all cases give definite information as to just what the life of the previous prosthesis has been. The table shows the "life" of 42 of the 89 leg and arm prostheses:

10 limbs	2 years	2 limbs	8 years
4 limbs	3 years	3 limbs	9 years
7 limbs	4 years	1 limb	10 years
6 limbs	5 years	1 limb	13 years
3 limbs	6 years	2 limbs	15 years
2 limbs	7 years	1 limb	17 years

The life of the wheel chairs previously provided by D.V.R. for nine of the 13 wheel-chair clients is shown in the following table:

3 wheel chairs were used 3 years
4 wheel chairs were used 2 years
1 wheel chair was used 1 year
1 wheel chair was used 11 years

Most wheel chairs are repaired more or less extensively one or more times during their life, and for this reason it is difficult to ascertain the length of usage in some cases.

We felt it would be interesting to investigate the sources, or originating causes, of the disabling orthopedic conditions of our rehabilitants. Our findings reveal that the primary causes and/or sources of the main disabilities of these 127 persons were:

Traumatic	77
Disease	36
Congenital	14

Of the 77 traumatically disabled, 22 were victims of employment accidents. Among the 22 employment accidents were: 9 farm machine—cornhusker, cornshredder, *et al.;* 4 train accidents cases—involving mainly railroad employment situations; 4 factory employment; one each—saw mill, mowing machine, etc. Traffic accidents, including both vehicle driving and pedestrian situations, accounted for 26 of the 77 traumatic accidents; motorcycle accidents, 6; gunshot wounds, 6. Among the many other originating sources of disabling of the 127 clients were: injuries from falling; disease such as diabetes, poliomyelitis, arterial disorders, osteomyelitis, tumors, infections; second, third, and fourth-degree burns. A review of the sources and/or causes of orthopedic disabilities are some involving accidents in the home—such as falls of children, burns, efforts to make and operate a home-made gun, etc.

After provision of an orthopedic appliance, sometimes along with this service, we often provide vocational training in order to get the client started in a suitable field of employment. However, if no further cost service is needed, there still remains the necessity for seeing the client into employment.

In many cases, of course, the client already has a job to return to, and, with his new appliance, he now can do so. If he needs assistance in finding suitable employment we provide this in one of the many ways we, with our accumulated information on personnel needs and current hiring practices, can use.

Of the 127 orthopedic appliance cases of this study, 34 were not yet closed employed, but were in active status at the time of our investigation,

that is, they were in one of the several stages of vocational rehabilitation involved in preparing the client for employment. Some of the 34 had been provided a prosthesis, a brace, a wheel chair or other appliance, but were still undergoing vocational training—which would mean in the terminology we are using in Michigan that the individual clients were now in status 5. There are several other statuses, but these should exemplify the steps in our work with disabled people. Nearly half of the 34 cases in active status, fifteen to be precise, were in status 7, which means they were working and ready to be closed out from our records.

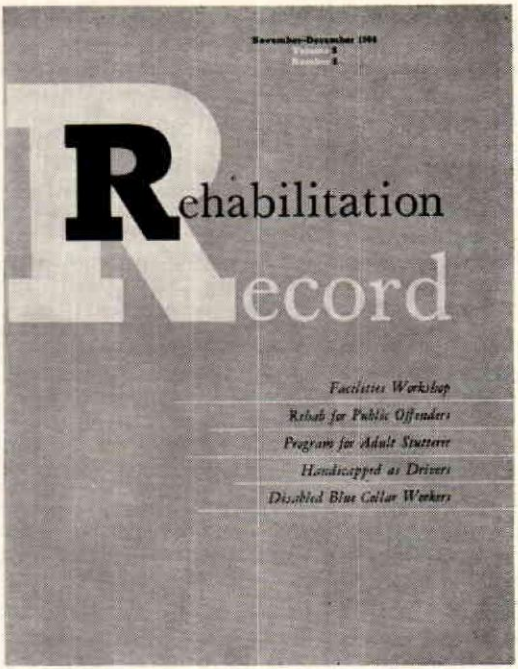
Ninety-three clients had been closed status 12, employed. We have made a breakdown of the types of employment at closure which these 93 ex-clients as we now call them, were following. It would be pointless to attempt a listing of all types of jobs, but a partial listing will, we believe, support our statement that they become, to all intents and purposes, a cross-section of workers.

There were 15 factory workers, 7 service station attendants, 7 salesmen and sales clerks, 5 auto mechanics, 4 bookkeepers, 4 day workers, 4 farmers and/or farm laborers, and smaller numbers each in the following: laundries, teaching, shoe repair, bar tending, cab driving, carpentering, housepainting, waitress work, furniture repair, stock-handling, and many others.

We should observe in concluding this brief study of orthopedic appliance services that this is only one chapter in the chronicle of the more or less successful utilization of machinery in the human body. In this age of increasing automation the human body is not excepted from mechanical encroachments.

Crutches have been used for millennia; glasses have assisted human eyes for centuries; hearing aids for decades; and now human heart block victims can be restored to approximately normal functioning and longevity by having their hearts wired to an electrical timing device or pacer embedded inside the body—3,000 of them in this country, alone, it was reported a few months ago. Sections of large blood vessels have been replaced by plastic tubing in many people.

Wooden, metallic, and plastic appliances are used to replace human limbs, to supplement, to amplify, to cosmetize—if we may venture a neologism—many human body parts. And perforce we must suppose this curious thing is only begun.



Rehabilitation Record—The First Five Years

December 1964 marked the fifth anniversary of Rehabilitation Record, a periodical published by the U.S. Vocational Rehabilitation Administration in Washington, D. C. This bi-monthly publication averages forty pages an issue and subscriptions at the rate of $1.75 a year in the United States may be sent to the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.

Miss Dorothy Rigdon is the Editor of Rehabilitation Record which in its five years has established itself as a valuable aid to those who want to be informed on all aspects of vocational rehabilitation and related subjects. A number of orthotic and prosthetic facilities have found it a useful and attractive addition to the Journals kept in their waiting rooms for patients to read.

The magazine is far from being restricted to information about government supported programs. For example in the 1964 issues, articles appeared on the 1964 Housing Act for Disabled Persons, the rebuilding of Alaska's rehabilitation program after the earthquake and artificial limbs for amputees abroad, and the handicapped as automobile drivers.

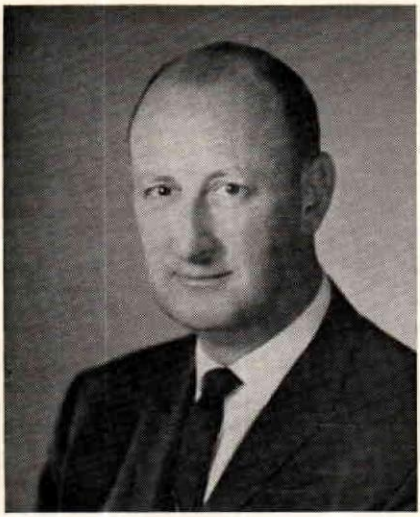
One of its most useful features is the announcement of new publications concerning rehabilitation.

As the Record enters its sixth year, the Orthopedic and Prosthetic Appliance Journal extends best wishes and a word of appreciation to the editorial staff for their helpful cooperation in years past.

Education at the "Grass Roots" Level

The Regional Meetings Sponsored by AOPA

By HERBERT J. HART, *President*



In the spring of each year, the American Orthotics and Prosthetics Association conducts a series of eleven regional meetings throughout the United States and the Dominion of Canada. These are carefully planned and presented by the Association as a service to orthotists and prosthetists and others interested in care for the orthopedically disabled.

These meetings require a great deal of careful advance planning and hard work to be successful. They are the prime responsibility of the eleven Regional Directors of AOPA. These men put in a great deal of effort for the benefit of other members and readers of the *Journal.* For this reason and as a very minor recognition of their work, we are publishing their pictures on the cover of this issue of the *Journal,* and I should like to use my column in this issue to pay tribute to them and to call attention to the sessions they are planning.

Two sessions will have been held by the time this month is over: On March 5 and 6, William McElduff, Director of **AOPA Region IV,** presided over the sessions at Durham, North Carolina. Region IV covers an area roughly equivalent to the old Confederacy. It includes AOPA members in the states of Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida and eastern Louisiana. Mr. Bert Titus was Program Chairman for this meeting which brought together over 120 individuals and guests from this region and other regions. Your President was honored by being asked to be Guest Speaker at the Region's Banquet.

Region VIII held its meeting at Shreveport, Louisiana, March 26-28, with AOPA President-Elect David McGraw as Program Chairman and Charles Kymes, Regional Director, presiding. Region VIII covers the states of Texas, all of Louisiana except New Orleans, Oklahoma, Arkansas and New Mexico. Guest Speaker at the session was Mr. Porter S. Garner, President of the Texas Rehabilitation Association.

AOPA Region V. This region will meet April 2, 3 and 4 at the Christopher Inn at Columbus, Ohio. Mr. Bart Crowley of Akron is Regional Director for this area which covers the states of Ohio, West Virginia and Michigan. He has named Mr. Robert Fannin of Columbus, Ohio, as Program Chairman.

Alan Finnieston of Miami, Florida, opens this program with a session on *Functional Long Leg Bracing and Application of the Quadrilateral Plastic Ring,* followed by discussions on *Newer Techniques for Patella Tendon Bearing Castings and Modification with the Use of the Silicone Rubber Liner* and *Use of Wax Check Sockets for Above Knee Prostheses.*

Dr. Robert B. Larrick will discuss *Birth Defects Bracing—When, Why, How Much.*

The Immediate Post Operative Fitting of Prostheses is very much a matter of discussion at this time and this region will hear Bert Titus in a presentation of the pros and cons. Mr. Titus is Director of Prosthetics at Duke University Medical Center.

Region III, April 9, 10 and 11. For a number of years Region III of this Association has met jointly with the Pennsylvania Orthopedic-Prosthetic Society and this custom is continuing this year, at Harrisburg, Pennsylvania. Mr. Herbert Dankmeyer of Baltimore is Regional Director and Mr. Eugene Watters is Program Chairman. Of special interest to physicians will be the orthotics seminar presented by Mr. Charles Fryer, instructor of orthopedic surgery at Northwestern University Medical School and the report on the Muenster (Hepp-Kuhn) Below-Elbow Prosthesis by Robert Burtch and Hector Kay of New York University. Mr. Lester A. Smith, Executive Director of the Association, will be the luncheon speaker.

This region covers the states of Pennsylvania, Maryland, the District of Columbia and Virginia.

AOPA Region VII. This region will meet April 30 to May 1 at the Kahler Hotel in Rochester, Minnesota. Mr. Donald Bohnenkamp of Omaha, Nebraska, is Regional Director and he has named Mr. Lucius Trautman of Minneapolis, a former President of the Association, as Program Chairman.

The meeting was scheduled at Rochester in order to take advantage of the specialists at the Mayo Clinic in Rochester. This is our largest region, stretching from the Canadian border to the Oklahoma line and includes the states of North Dakota, South Dakota, Minnesota, Wyoming, Nebraska, Iowa, Colorado, Kansas and Missouri (excluding St. Louis, which is in Region VI).

AOPA Region I—New England States. Region I will meet again at the Charterhouse Motel in Cambridge, Massachusetts, the scene of last year's meeting. Mr. Howard Mooney is Director of this region which draws from eastern Canada in addition to the New England states.

This meeting, scheduled for May 6 and 7, will include seminars and presentations on *A Functional AK Prosthesis for Geriatric Amputees* by Dr. Sung J. Liao and AOPA member Alfred Schnell of Hartford, Conn.; *Hydraulic Mechanisms* and *New Developments in Lower Extremity Orthotics* by Werner Greenbaum and William McElmurray of the VAPC; *The Muenster (Hepp-Kuhn) B/E Prosthesis* and the *NYU Orthotic Evaluation Program and the Orthotic Measuring Board* by Richard Lehneis and Robert Burtch of New York University; and a report on work of the Committee on Advances in Prosthetics and Orthotics by AOPA Vice President Fred Eschen.

AOPA Region II and MOALMA. For many years Region II of AOPA has met with the Metropolitan Orthopedic Appliance and Limb Manufacturers Association. Continuing this practice, the two organizations will hold a joint meeting on May 14 at the Americana Hotel in New York City. Mr. Jack Gold of New York is President of the Metropolitan group and Mr. Benedict Pecorella of Buffalo is AOPA Regional Director. The region covers the states of New York and New Jersey.

AOPA Region IX. This region covers the states of Arizona and Southern California. Its meeting this year will be in the Lafayette Hotel in Long Beach, California. Mr. Leroy Noble of Whittier, California, who is Director, has named Mr. Stanlay Carlton of Sherman Oaks as Program Chairman. Although limited geographically, from the standpoint of members, this is AOPA's leading region. Region IX will meet June 5-6.

AOPA Region X. Region X covering the states of Nevada, Utah and Northern California will meet at the Palace Hotel June 11 and 12. The Palace Hotel was the scene of the AOPA National Assembly in 1956. Several previous regional meetings have also been held there.

Mr. Earl Cummings of Sacramento is Regional Director.

Mr. Ted W. Smith, President of the American Board for Certification, attended this meeting.

AOPA Region XI. This region covers the states of Washington, Oregon, Idaho, Montana and the Province of British Columbia. Mr. William Bartels of Portland, Oregon, is Regional Director and Morris Dodge of Seattle is Program Chairman. The National AOPA will be represented by Mr. M. P. Cestaro, Secretary-Treasurer of the Association, at this meeting in Portland, Oregon on June 18-19.

AOPA Region VI. Region VI is the last of the eleven regions to hold their annual meeting. This is later than usual but the region graciously re-arranged its schedule so that there might be no conflict in dates with any of the other regions.

Mr. John DeBender of Chicago is Regional Director and his area covers the states of Illinois, Indiana, Wisconsin and St. Louis, Missouri. The Flying Carpet, 6465 Mannheim Road, Rosedale, Illinois is the site of the region's meeting June 25-26.

Driver Heads Veterans Administration

William J. Driver, selcted by President Johnson to be the Administrator of Veterans Affairs, is the first career Federal employee to hold that post.

He has been with the agency since February, 1946, with the exception of an interval of two years during the Korean Conflict when he returned to active military service.

He served in the Contact and Administrative Services, the Compensation and Pension Service and then later directed the entire benefits program as Chief Benefits Director before becoming Deputy Administrator.

He holds the Veterans Administration's two highest awards, the Exceptional Service Medal and the Meritorious Service Medal.

Mr. Driver has been principally responsible for many of the important achievements that have occurred in the Veterans Administration in recent years. These include the Veterans Pension Law (P.L. 86-211); the work measurement and performance standards program to improve operations; effective planning to anticipate and meet organizational problems; and large scale application of automatic data processing and establishment of a new Department of Data Management.

BOOK REVIEW

Stump Edema, by Gilbert Barnes, M.D., and S. William Levy, M.D. Available from The American Orthotics and Prosthetics Association, Washington, D. C. 20 pages. Illustrated in color. 25¢ each. Reviewed by Carlton Fillauer.

Among the many problems faced by the prosthetist with a new amputee, the foremost in frequency and aggravation is the presence of post-operative edema. To begin with, most of the general surgeous place too little importance in proper bandaging or even in the need for bandaging. Ofter prosthetists have to "second guess" when the stump is at a practical state to be measured. Increasing the amputation to prosthetic fitting time is not the solution nor is it in the best interest of the older amputee. Yet in the presence of edema, a socket made from a premature casting of a stump will lose its initial fit within a matter of days. Only by complete understanding and full appreciation of the mechanics of edema and its effect on the stump, can the prosthetist, surgeon, therapist and patient cope with and "weather through" the period of stump shrinking. The current quest for an immediate post-operative fitting technique is directly related to this specific phenomenon.

I recommend to all parties concerned the booklet *Stump Edema* for it describes and illustrates the ABC's of this circulatory problem and its relationship to socket fit from amputation on throughout the prosthetic life of the stump. The major areas discussed are: Source of Edema, Early Signs, Secondary Changes, Late Complications, Specific Factors including Physical Condition of Amputee and External Factors.

Since post-operative edema is only one segment in the overall picture, examples of causes for recurrence are given. These may be from physiological or from external factors related to the prosthesis. When the prosthetist, through thorough familiarity with the subject, is able to recognize the early symptoms he and the patient may be spared hours of remedial treatment, socket adjustment and even disuse of prosthesis.

Stump Edema will be a "best seller" because it is apropos to the amputee at any stage in his "prosthetic life."

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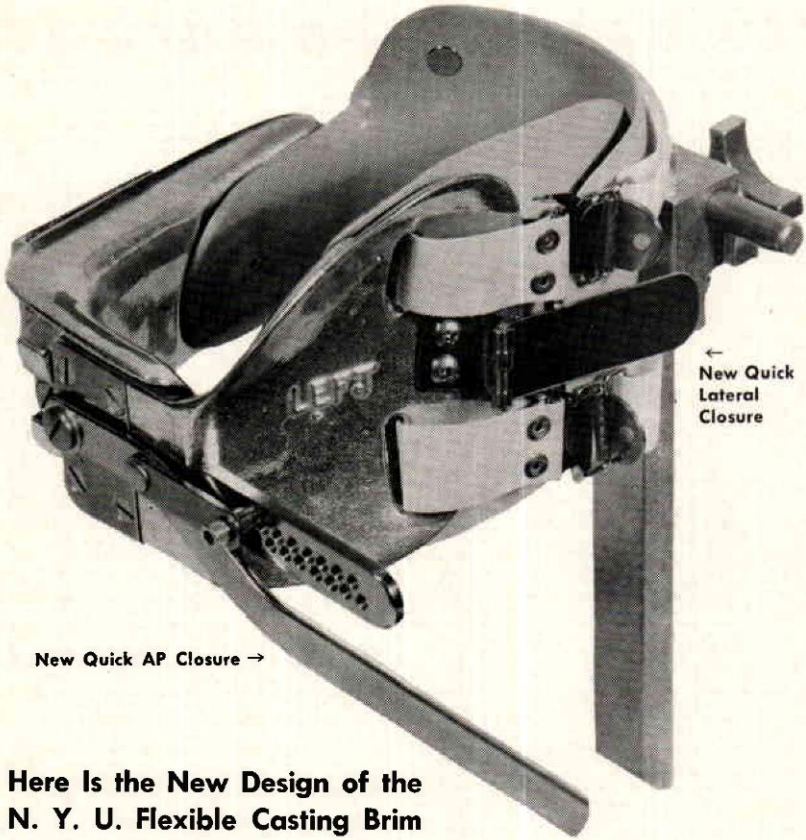

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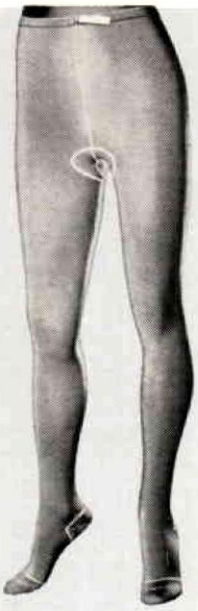

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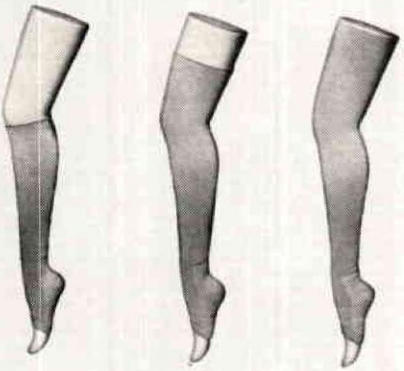

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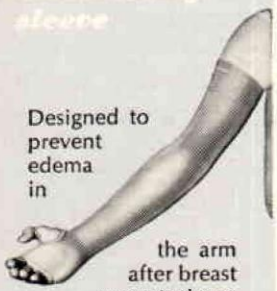

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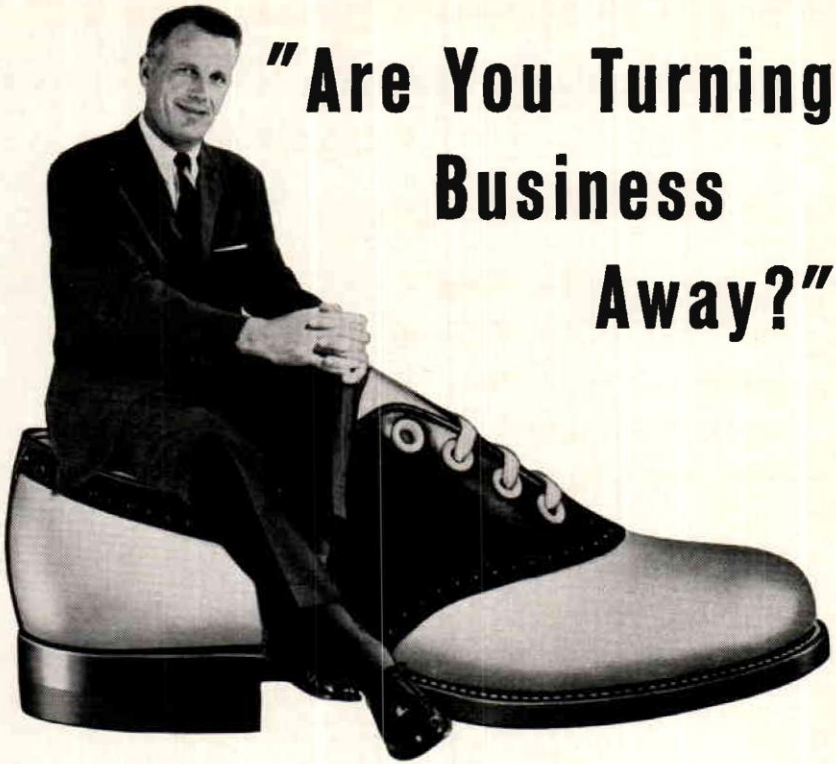

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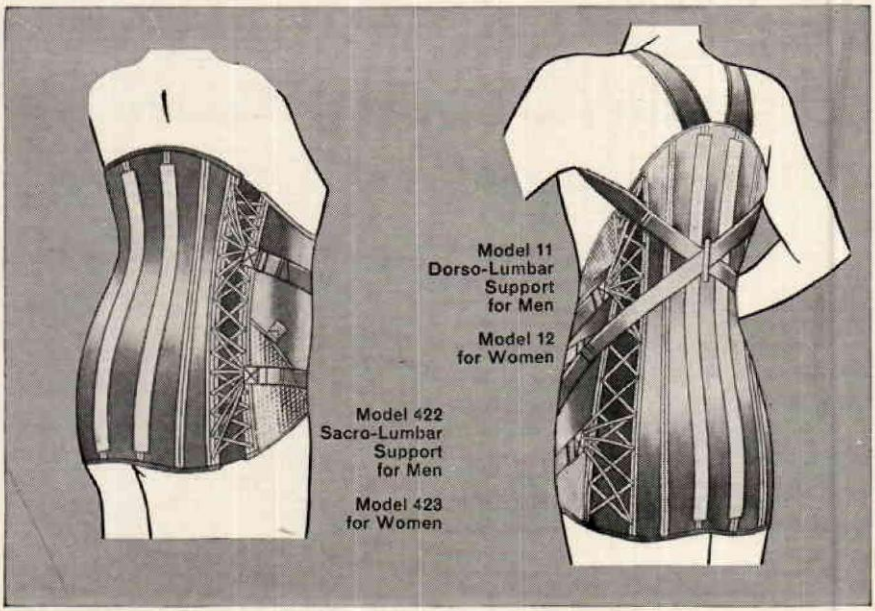

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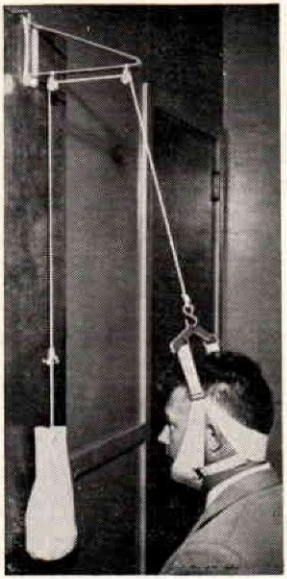

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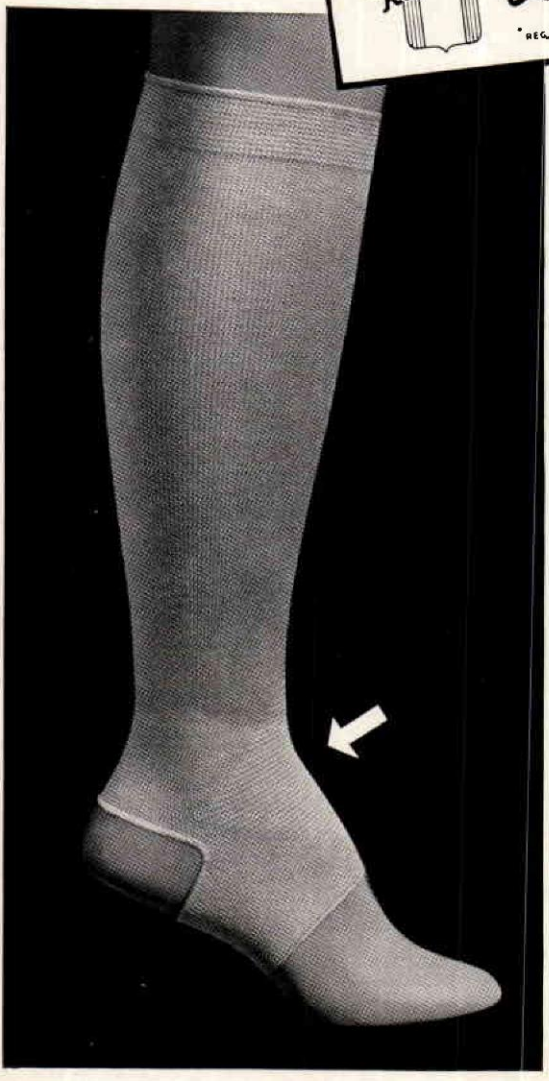

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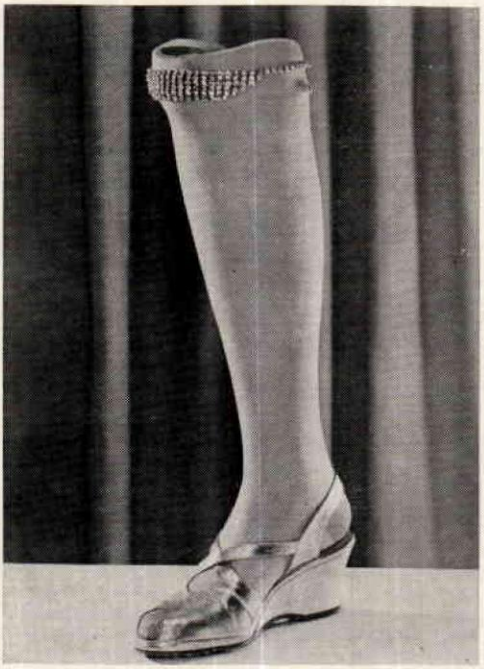

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No. 1305B, Child, length 21" to 28"

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Adds extended "mileage" to life of cuff.

2 PLASTIC BUSHING
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Prevents rattling common to conventional crutch.

4 PLATED SCREW AND WASHER
Secures grip to prevent rotation.

5 PLASTIC COATED PUSH-BUTTONS
Adjustment is easy . . . wear is minimized . . . no more rattle.

6 RETAINING RING IS ALSO PLASTIC
Silences last usual rattle source.

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Out wears all other crutch tips . . . and is safest possible with vacuum base.

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