

# Newsletter...



## Prosthetics and Orthotics Clinic

Vol. 2, No. 4 / 1978

Winter (Issued Quarterly)

### • Commentary •

In this issue, we are presenting an interesting article on the type of Immediate Post Surgical Fitting techniques being employed today in one particular area of the Country. We concur with the author, who indicates that after the heavy concentration of I.P.S.F. techniques applied some years ago, there are many areas where the procedure is no longer used. It should be noted we are referring to the total procedure as outlined in the Veterans Administration Manual TR10-5 (Apr. 1967), "Immediate Postsurgical Prosthetics in the Management of Lower Extremity Amputees" by Burgess, Traub, and Wilson.

From talking to physicians and prosthetists throughout the Country, we believe that numerous clinics may also have modified the original procedure to better suit the specific conditions found at the local level. We further suspect that the original procedure, with its very early weight-

bearing and ambulation, is still employed at certain institutions.

It is, therefore, the goal of the Newsletter to update the general information available to clinics on the current state of the art in I.P.S.F. techniques. Naturally, we can not do this without your support. We urge you to write to us, describing in detail, the procedures being currently used at your clinic. If the procedure, or any variations thereof, is not used at all, please tell us why.

Since there would not be enough space on our questionnaire for this information, we request that a separate letter be used and returned to "Newsletter", AAOP, 1444 N Street, N.W., Washington, D.C. 20005.

Joseph M. Cestaro, C.P.O.  
Editorial Board

## Up-Date on Immediate Post Surgical Fittings

I would like to express some thoughts regarding the use of the technique of immediate post-surgical fittings of prostheses for below-knee amputees.

Nearly all of us certainly agree that there are definite advantages to the patient in the use of prosthesis immediately after amputation, especially in the case of the BK amputee. However, the I.P.S.F. technique is not being used as standard practice in many areas. Perhaps one of the reasons is the lack of continuing education courses dealing with immediate post-surgical procedures.

When the concept of immediate postsurgical fitting was first intro-

duced approximately fifteen years ago there was a heavy concentration to the point of saturation on the application of prostheses in the operating room. This was good, because it gave us all an opportunity to be educated in such a revolutionary technique of treatment. However, today, there are many people entering the field involving amputation and amputee care every year, surgeons and prosthetists and in most cases they have only a limited knowledge of the I.P.S.F. techniques.

Obviously, and for good reason, most surgeons are reluctant to use a technique with which they themselves are not familiar. It then becomes the

role of the prosthetist to educate and encourage the use of I.P.S.F. and, ideally, apply the concept himself.

Another reason for lack of use of I.P.S.F. is the inconvenience created by scheduling between doctor, prosthetist, and operating room. Often hours of valuable time are wasted when things are not proceeding on schedule, which is the norm rather than the exception.

Another reason why I.P.S.F. techniques are abandoned is that when a surgeon and prosthetist first attempt this technique, they sometimes use a patient whose probability of healing is marginal under the best of circumstances. And sometimes ambulation

is attempted too early, causing stump breakdown. The result is a surgeon convinced that this technique is not for his patients.

Still another factor that discourages use of the I.P.S.F. concept is the application of a poorly fitting weight-bearing cast by individuals not fully trained. There have been individuals who, after reading an article or hearing a thirty-minute lecture on I.P.S.F., attempted to apply a weightbearing cast. Some of the more skilled are able to do this, but most have problems. If a cast is intended to bear weight, it must fit well, have proper relief areas and distal padding to provide relief if the patient should atrophy and settle in the socket.

It is my opinion that no weight-bearing cast at all is better than a poor application of one that is supposed to bear weight. Please note, I said "weightbearing cast" and not a rigid dressing, which is and should be more readily applied immediately after the operation and does not require the same precision as does the weight-bearing cast. This will be taken up later.

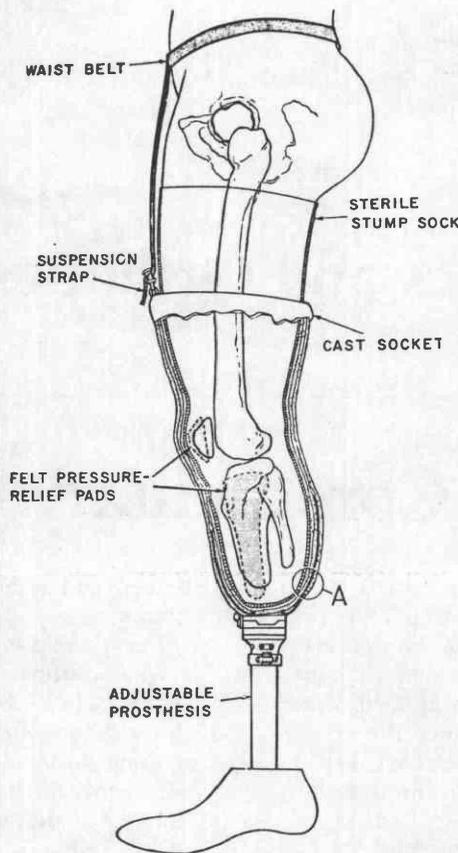
Now that we have discussed some of the problems that may have discouraged the utilization of I.P.S.F.—and I'm sure there are many more—let's constructively consider a couple of approaches that seem to work well.

Since the inception of I.P.S.F., most of us have changed our thinking for some very solid reasons. One of the primary problems arose in the attempt to have the patient weightbearing and often ambulating within forty-eight hours postoperatively. We have learned that, in most cases, this concept is a disadvantage rather than an advantage and can be the cause of

*"there are definite advantages to the patient in the use of prosthesis immediately after amputation."*

stump breakdown. If we agree that early ambulation is not intended, we may apply an immediate rigid dressing with the appropriate snugfitting sterile stump sock.

When the rigid dressing is not intended for weightbearing, most surgeons will make the application since they need not be concerned about felt pads for relief over pressure areas. The



Schematic lateral view of method first recommended in the U.S. for immediate post surgical fitting of below-knee prostheses. From "Immediate Postsurgical Prosthetics in the Management of Lower Extremity Amputees, Ernest M. Burgess, Joseph E. Traub, and A. Bennett Wilson, Jr., Veterans Administration, TR 10-5, April 1967.

initial rigid dressing can be left on for approximately two weeks. During this time we have:

1. Protected the wound by
  - a. Keeping external contaminants out
  - b. Preventing injury to the stump
  - c. Protecting the posterior flap from undue pressure
2. Maintained the size of the stump, preventing edema, which alleviates pain
3. Made the patient more comfortable and able to move about without fear of injury to the stump
4. Prevented knee flexion contracture
5. Greatly reduced complaints of phantom limb

After two weeks the initial rigid dressing is removed; or, in some cases,

the surgeon will remove the sutures and wait for an additional week or two. At the end of the two-week post-operative period, the prosthetist is called in to apply an early post-surgical prosthesis usually with a plaster socket and a pylon with a SACH foot.

In the fabrication of our plaster sockets, we strive to keep the plaster high up over the condyles to the mid thigh area. We find this is beneficial in eliminating knee flexion contractures and, most importantly, eliminating piston action within the socket, a very hazardous condition, especially in the early stages of fitting.

I know attempts are made to trim plaster to a P.T.B. level for increased knee motion. The advantages of enclosing the knee offset the short time needed for patients to regain knee motion. I also use a waist belt and fork strap for added suspension. This temporary prosthesis is worn for approximately six weeks.

The very thin patient may not need a cast change before the end of six weeks, but more muscular and fatty tissue will require cast changes according to the amount of atrophy.

After the patient has been ambulating for approximately six weeks, the plaster socket is bi-valved and a negative mold is taken for the definitive prosthesis. The plaster socket is then put back on the patient and closed with plaster or tape. The plaster socket and pylon stay on the patient until delivery of the definitive prosthesis and removed as needed for fittings. When minor changes in stump size occur, stump socks may be added while using the plaster pylon prosthesis.

To reduce some expense to the patient, the hospital can inventory sev-

*"hopefully this will stimulate everyone to respond with other approaches"*

eral pylon assemblies suitable for temporary use. We also supply various sizes of used SACH feet that can be used temporarily. The patient is then charged only for the professional services of the prosthetist, thus saving the considerable expense of components.

I hope that some of my comments may be of assistance to others who would like to employ more immedi-

ate postsurgical prosthetic care for patients, and hopefully stimulate others to respond with other approaches so that we may all benefit.

I would like to acknowledge Dr. Elmer Franseen, from whom I have used references many times in this

paper. Dr. Franseen is an Orthopedic Surgeon at Baystate Medical Center, Springfield, Mass. I am sad to say that Dr. Franseen is retiring this month, and I will miss working with this truly professional man. In the past fifteen years of working with Dr. Franseen, I

have witnessed him employing I.P.S.F. on all of his B.K. amputees and only on rare occasions was a revision necessary.

Robert F. Hayes, C.P.

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## Prostheses, Pain and Sequelae of Amputation, As Seen By the Amputee\*

*The War Amputations of Canada, Ottawa, Ontario*

### Abstract

Results of a survey of 19 organizations belonging to World Veterans Federation indicate that major complaints of amputees include; poor fitting, poor dissemination of knowledge to doctors and amputees regarding new prostheses, lack of opportunity for "input" from amputees at research level and inadequate measures to deal with phantom and stump pain. Suggested improvements by amputees; decrease in weight of prostheses, reduction in maintenance for swing and stance-phase control units, development of recreational prostheses, more frequent checks through use of X-ray and film techniques, particularly during the "break-in" of a new appliance. Older veterans showed increasing concern in regard to development of consequential disabilities arising from amputation; premature arthritic changes in spine and remaining limb, circulatory problems and gastro-intestinal problems due to ingestion of drugs to control pain.

### Introduction

With the co-operation of the World Veterans Federation, information was requested from 19 veteran organizations in 14 countries. Replies were received of varying significance from all. The enquiries were based on a questionnaire, the basic elements of which were:

#### *Legs*

Weight of the prosthesis.  
SACH feet versus articulated feet.  
Wearing of rubber-soled shoes.  
Cosmetic appearance.

Soft socket versus hard socket, below-knee.

Plug socket versus quadrilateral socket, above-knee.

Swing phase control units, above-knee.

Modular versus standard limb.

#### *Arms*

Munster fitting versus harness.

Myo-electric hands.

Cosmesis—hands.

Wearing of prosthesis, above-elbow.

#### *Adjustment*

Do you see yourself in your dreams as an amputee?

Psychological effect of dismemberment.

Sequelae (medical) of amputations.

Recreational limbs.

The replies to the questionnaire were, in the initial stages of review, sent to a computer firm for analysis. It was evident, however, that the response could not be measured in terms of "yes" or "no" and it was recommended that an attempt be made to obtain a "feeling" from the replies which might be useful. Therefore, this survey should not be considered as a fully accurate statement of response and the views herein must be seen in this light.

#### *Fitting*

It seems possible to draw a startling conclusion from the replies concerning comfort. It appears that many amputees were prepared to accept an uncomfortable fit as "part of the game".

A significant number of amputees suggested that use should be made of X-ray and film techniques and of bio-mechanical devices in measuring the accuracy of a prosthetic fit.

#### *Information on new prostheses*

The amputees seemed to be overwhelmingly of the opinion that there was a lack of information on the part of medical doctors in this area.

It was evident also that, with certain exceptions the amputees themselves were poorly informed on new prostheses. Understandably, a number of amputees commented that they knew far more about the new models of automobiles than about the new models of limbs.

#### *Input at the research level*

The respondents stated they were unaware of any concerted effort to obtain opinions from amputees concerning the types of research which should be done to improve prostheses. To be fair, some replies indicated that "amputee input" may be going on but they did not know about it. Significantly, however, they felt that there should be more liaison at the "user" level with the researchers.

#### *Pain*

Universally, phantom limb pain appeared to be a significant problem and the amputees felt that very little was being done to develop remedial measures. A review of the replies indicated that the usual advice was to take aspirin and a hot drink. Obviously this has not been effective and the amputee is looking for something more concrete.

Many amputees complained also of stump pain, as separate from phantom limb pain, stating that massage, heat treatments and sometimes surgery had been successful in its elimination.

#### *Weight of prostheses*

There were two distinct "camps" in the replies, some 62 per cent wanted lighter prostheses but 12 percent stated some weight was essential and felt that good hardware should be used, despite additional weight.

#### *Feet*

No trend was evident on the question concerning SACH versus articulated feet. There was, however, a small but dedicated group of amputees who sincerely believed that an articulated foot was much superior. This group described the SACH foot as "too springy" or "unstable".

#### *Rubber-soled shoes*

By far the majority of leg amputees preferred rubber-soled shoes for stability and heel strike.

#### *Cosmetic appearance*

This did not appear to be a factor. However, the respondees were all war amputees whose average age would be 60 which is perhaps significant.

#### *Sockets*

By far the majority of below-knee amputees preferred a soft socket for reasons of comfort.

The question on the plug versus quadrilateral socket for the above-knee amputee elicited the information that, for the most part, the quadrilateral socket users were well aware of the advantages, stating them as being "better circulation", "more comfort", "easier standing", "taking the weight on the ischium", etc. Tragically, perhaps, many plug socket users were unaware of the difference between the two types.

#### *Controls*

The question concerning swing phase controls elicited a very high response, indicating that a large proportion of the amputees were not familiar with these devices. (We had not dared ask for information on stance phase controls as we were reasonably certain that the concept is not

known to the majority of amputees.) It would seem, from the replies, that many more amputees would be prepared to try these devices if they knew of their existence!

#### *Modular versus exo-skeletal*

Here again the majority of the amputees replying (approximately 60 per cent) did not know the difference. There were, however, a dedicated group of modular users who recognized the advantages of alignment, light weight and cosmesis who were "sold" on modulators. Here again, a conclusion can perhaps be drawn regarding the necessity for the dissemination of more information.

#### *Munster versus harness fitting*

The answer was predictable. The below-elbow amputee is very partial to a light fitting for a passive hand. Alternatively, he seems to have a passionate love affair with his hooks and harness when he wants to do heavy work or engage in recreation. This was an area in which the amputee seemed to be fairly well satisfied, except as brought out below.

#### *Myo-electric hands*

There was a distinct feeling among World War II veterans that they had been passed over by the myo-electric stage. Many had apparently been told that they were too old to adjust to myo-electric fittings. The majority of the replies stated "yes" to the question of whether they would like an opportunity to be fitted with a myo-electric hand.

#### *Cosmesis*

The replies on cosmesis (or lack of it) for hands contained comments such as "disgusting" and "lack of sensitivity". Surprisingly, many hand amputees appeared to have no knowledge of the cosmetic skins and stated they were wearing either brown or black leather gloves over their passive hands.

#### *Wearing of prosthesis, above-elbow amputees*

The rejection rate was predictably high. Some farsighted individuals (amputated one side only) suggested that they should get used to wearing a prosthesis in the event that they developed medical difficulties in their other arm, arising from strokes, arth-

ritis, etc. The second part of this question indicated there was little knowledge of lighter prostheses now available through the use of modular designs.

#### *Dreams*

The question on dreams was thrown in only for general interest. The respondees seem to divide 50-50 as to whether they visualize themselves as amputees in their dreams or not.

#### *Psychological effect*

Perhaps surprisingly, a large number of war amputees describe their feelings about the loss of their limb in terms of being "grief stricken", "lost my best friend", "embarrassed", etc. It should be remembered that this survey asked for truthful answers. Psychological effect is perhaps an area which we tend to ignore as it could be interpreted as indicating a lack of machismo, etc. The Adolph Meyer school of psychiatric thought may be of interest on this subject should any one wish to develop it further, that is, depression can follow from a physical disorder such as amputation.

#### *Sequelae*

Most of the replies indicated consequential disabilities. Leg amputees; bad backs, arthritis in the remaining leg and foot. Arm amputees; cervical pain, headaches. Both; gastro-intestinal problems which were believed due to ingestion of drugs as well as "inner tension" associated with the continuing discomfort of amputation. The respondees were careful to suggest they were not trying to prove their case, but felt that more study should be done upon the medical after effects and side effects of amputation.

#### *Recreational limbs*

This question resulted in possibly the most significant response. There were requests for special legs for swimming, golfing, skiing, tennis, rowing and motor sports. The arm amputees were almost frightening in their requests for the development of special prostheses for fishing, playing baseball, cricket (for holding bats), golf, tennis and rowing.

#### **Conclusion**

It must be said that the information presented in this paper was not

the subject of any strict statistical treatment. In this sense this is not a "scientific paper". This highlights the problem of communication in this field between the consumer on the one hand and the professionals involved on the other. However, it is essential that such communication be fostered if energies and resources are to be channelled in the most fruitful direction. It is hoped that against this background the views contained herein will prove useful, highlighting as they do the opinions of a substantial number of patients.

H. C. Chadderton

## Notice of Technical Meetings and Seminars.

1979, Jan. 25-27, AAOP Round-Up Seminar, Konover Hotel, Miami Beach, Florida.

1979, May 22-26, Orthopaedic-Technik 79, International, Exhibition Center/Convention Building, Nuremberg, Germany.

1979, August 26-31, Interagency Conference on Rehabilitation Engineering, Atlanta Hilton, Atlanta, Georgia.

1979, September 26-30, AOPA National Assembly, Washington Hilton, Washington, D.C.

1980, September 28-October 4, Third World Congress (ISPO), Bologna, Italy.



## Vacuum Forming

In an article I wrote in 1974 on vacuum forming of sheet plastics<sup>1</sup> I erred in stating that the first reference to vacuum forming of sheet plastics in orthotics and prosthetics was a paper by Gordon Yates in 1968<sup>2</sup>. I should have remembered that Dana Street presented this concept in Volume 1 of the Orthopedic Appliances Atlas<sup>3</sup> for the fabrication of cervical orthoses. This is certainly an excellent example of how long it takes to get a technological development from the idea stage to fairly widespread application.

In the time since my article was published in "Orthotics and Prosthetics" vacuum forming of sheet plastics has been used more and more by private practitioners in both orthotics and prosthetics.

Although the educational programs, with a few exceptions, seem to have been very slow in teaching vacuum forming techniques, use of the technique seems to be expanding, owing in part to the several workshops sponsored

by the American Academy of Orthotists and Prosthetists.

Every process and system has its limitations, and we all recognize that each design in orthotics and prosthetics represents a compromise, but as time goes on the gaps that engender compromise are narrowed as experience is gained.

Although the "Orthotics and Prosthetics Clinic Newsletter" has discussed several aspects of vacuum forming in the relatively recent past, in view of what seems to be a rapidly expanding program it seems appropriate that another survey be made concerning the uses of and problems encountered by the private practitioners.

A questionnaire on this subject is included in this issue. It will be appreciated greatly if each recipient will complete the enclosed form and add any comments he or she feels that will be helpful in improving service to patients.

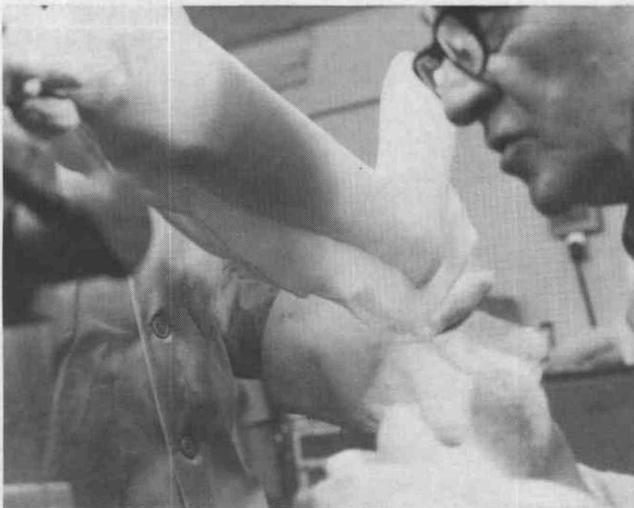
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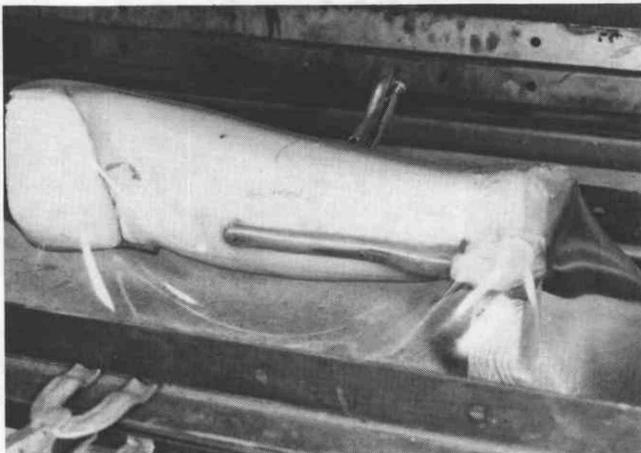
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Vacuum-forming a shank for a below-knee prosthesis using the hand-drape.



Vacuum-forming thigh section of knee-ankle-foot prosthesis using automatic machinery.

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Ben Wilson



Vacuum-forming a below-knee socket with use of a platen and form for holding plastic sheet.

# Newsletter Questionnaire

Return to AAOP, 1444 N Street, N.W., Washington, D.C. 20005

1. Do you use vacuum-forming of sheet thermoplastics in your practice?

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2. If so, what type of equipment do you use?  
(Manufacturer, if appropriate)

- Machine with integral oven*   
*Machine without integral oven*   
*Hand drape with suction through plaster model*   
*Other (please specify)*

3. What plastic materials do you use?  
(Please indicate uses for each material listed)

| Material              | yes                      | no                       | Uses |
|-----------------------|--------------------------|--------------------------|------|
| <i>Poly-propylene</i> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| <i>Poly-ethylene</i>  | <input type="checkbox"/> | <input type="checkbox"/> |      |
| <i>Poly-carbonate</i> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| <i>other</i>          | <input type="checkbox"/> | <input type="checkbox"/> |      |

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4. What Problems do you have in use of thermoplastic Materials?

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## Immediate Postsurgical Fitting Techniques

*(please use separate letter)*

1. Describe in detail the procedure being currently used at your clinic.
2. If the procedure, or any variations thereof, is not used at all please tell us why.

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