

TABLE II

Percentage of each component supplied  
Supplier #1 Supplier #2 Supplier #3

Prosthetic Knee Component	#1	#2	#3	Mean
Manual knee locks:				
conventional	43	14	6	21
modular	5	9	5	6
Total	48	23	11	27
Safety knee:				
conventional	10	32	45	29
modular	5	15	10	10
Total	15	47	55	39
Polycentric:				
conventional	1	0	1	1
modular	1	1	0	1
Total	2	1	1	2
Free knees (friction controlled):				
conventional	2	8	21	10
modular	0	2	3	2
Total	2	10	24	12
Knees with extension assist:				
conventional	20	6	0	9
modular	5	2	3	3
Total	25	8	3	12
Hydraulic knees:				
conventional	7	9	6	7
modular	1	2	0	1
Total	8	11	6	8

## Guest Editorial

### *Of Prosthetics And 1980*

The survey of prosthetics components shown in this issue yields conclusions mostly related to above-knee amputees, as indicated in the text associated with Tables I and II. Fortunately more lower-limb amputations today are below-knee, so one really cannot tell much about trends in prosthetics practice from these data except to note that the SACH foot is indeed a success. This however should not make us complacent about this design, for

we should never be happy with anything that we have in prosthetics. Our objective should always be constant improvement.

As suggested, data are needed on below-knee fittings to give us a better impression of the state of lower-limb prosthetics today. Surveys of suppliers will show little; needed are data from the fitters of the country.

Many of you know that the support of the VA Research Program

of the University of California at Berkeley and San Francisco many years ago yielded the crucial biomechanical parameters in lower-limb amputee prosthetic service associated with fit and alignment. But never to be overlooked as very significant to service is the "tender loving care" and the training provided to the patient by the emphatic prosthetist. In any case, components although secondary are still important. But clearly

recognized is the need to get the prosthesis properly interfaced and the amputee motivated. Perhaps a survey covering rotators might produce helpful data about how these have been used to reduce fitting problems by the diminution in shear stresses.

The post-World War II education program has been primarily based on the teaching of the biomechanics and techniques of fit, those of alignment and to some extent but a lesser one, teaching about components. Even though these are of lesser importance, have we overlooked some essentials?

### **On Prosthetic Knees.**

We really don't fault the survey, but recognize its limitations. It nevertheless does show that for above-knee knee joints at least there may be some lapses in the teaching of prosthetists, in the teaching of other members of the clinic team and most importantly, in orienting the administrators representing third party payers. Perhaps the low number of hydraulic knees (as a %) can be attributed to the larger percentage of amputees who are geriatric. But aren't these supposed to be mostly below-knee amputees these days?

Not to be overlooked is the value of properly selected hydraulic knee mechanisms for certain cases. The selection of large numbers of "safety" knees is noted; but isn't it that clinic teams seem to get hooked on these, not trying others, or perhaps they have become disillusioned with price or maintenance burdens?

Today, the safety knee is the unit of choice but we wonder whether even these are being used properly. For example, are they in fact being used to exploit the value of the stance phase characteristics in initiation of swing phase? Are the alignments such that one provides more "trigger" for initiation of knee flexion?

The low numbers for polycentric knees bother us. If properly understood, some of the polycentric knee systems can be very beneficial in providing improved function to amputees with very short above-knee residual limbs and those with very weak hip musculature. How about their use in geriatrics?

Are indeed the polycentrics really understood? Are those that are being used being fitted and aligned properly? Do clinicians really understand the real values of the polycentric systems?

The system developed at the Orthopaedic Hospital, Copenhagen for example, can be used not only for end-bearing above-knee amputees but can also be applied for shorter amputation levels. The University of California at Berkeley is now developing other improvements in polycentric systems; we hope to see some of those soon presented through manufacturers.

Unfortunately we sense that clinics tend to adopt particular "pet" knee mechanisms or pet prescriptions. We worry that for various reasons (valid?) the full range of knee mechanisms has not been given a complete trial. Our publications have tried to get the information across about the pros and cons of each system. Perhaps we have failed.

For example, some of the rehabilitation achievements we have been able to make in our own clinic with the hydraulic knees are in fact extraordinary. Alongside the other important factors, the Mauch SNS in particular has been a boon to many of our above-knee amputees, particularly bilateral cases we have had from the Viet-Nam conflict and some Israeli cases from the October (Yom Kippur) War which were referred to us.

### **A Case in Point**

One interesting case from Viet-Nam, a bilateral above-knee amputee, not only now sky dives but snow skis and disco dances on his above-knee prostheses, both with SNSs. This gentleman has personal drive and motivation; he was an athlete before he was wounded, but now and this is important, he has been given the "tools" in those knee mechanisms: tools which can be used by him to achieve activity levels to which some of us nonamputees could aspire. Here, the SNS provided the wherewithal; matching these with the man's motivation and well-fitted sockets properly aligned, we were able to provide what can be considered a maximum degree of rehabilitation.

This is not an isolated case.

There have been many people fitted with the SNS and with others that are spin-offs of this design. We in the Veterans Administration put money into these developments, and we continue to purchase them because we have confidence in them. And our patients do. The problem is that others don't. Perhaps primary cost and maintenance experiences detract. But more so, other third party payers do not or cannot value these units as we do for our service-connected amputees who we believe deserve no less.

### **How about Modular Systems?**

We are concerned about the low percentage of modular systems used. Less than one in four are shown. But these, in this survey, are directly linked to above-knee and higher amputations. Again, the geriatric amputee experiences and thus the more common below-knee amputation levels are not reflected. For these, modular or endoskeletal systems may be used most commonly, more than the rugged, heavier crustacean systems of wood and the like. We hope at least that more and more lightweight below-knee prostheses either using endoskeletal systems or polypropylene would be used to the benefit of this group of amputees.

### **Finally, on Research and Development**

The component survey also doesn't really indicate anything about the needs for research and development. Inferred are some gaps in our link with the prosthetist and the clinic team mainly in the channels of information flow about all kinds of hardware. But one cannot draw too many conclusions.

We are pleased to inform you that the National Amputation Foundation with the assistance of Dr. Jerome Siller of New York University has now nearly completed for the VA Prosthetics Center a nation-wide survey of 900 service-connected veteran amputees. Provided from this survey will be data about prosthetic, medical, surgical, employment and psychosocial experiences and statuses of veterans from all wars since and including

World War II. We expect the investigators to give a report at the 1980 World Congress of ISPO to be held in Bologna, Italy. From this, we expect to have some significant directions for research and development.

On this matter of research and development, it seems to us that as soon as you become extremely successful with a particular item you might look at it again to see what you can do to improve on it. Besides more durable SACH feet more functional types of foot-ankle systems seem needed. Are there ways, for example of achieving the same function with less complexity than presented in the current "universal" ankle joints?

There appears to be no need to focus again on knee joint development; we would seriously worry about a further proliferation of new knee mechanisms. A few research groups are working on EMG control of valves on hydraulic knees, to produce voluntary control of knee function. This we can accept as long-range.

You should also know that Federal support of research and development in prosthetics and orthotics (our own Center's deemphasis is an example) has been decreased to some extent. We do assist in evaluations; we do a little bit of development, primarily as a result of case presentations in our clinics, but we offer no great effort in prosthetics and orthotics development at this time; we have diverted scarce resources to attack the problems of the very severely handicapped: the spinal cord injured, the blind, the non-vocal, and the cumbersome complexities of the debilitated aged.

So there'll be no mistake, know that we're still involved in prosthetics and orthotics, but we honestly believe that prosthetics and orthotics development has come a long way. We in the VA believe we have done much to contribute to this process, especially in funding projects around the country. We have also had our own laboratories involved. But now with a mature profession in place, these responsi-

bilities can be carried primarily by the professional with the Government only assisting when necessary. The manufacturers as a group are certainly participating in development, evaluation, and even in training. Outstanding examples are several in the United States and those from Europe who have done an extremely good job in making the quality and function of components of high quality. And the competition among them has been welcomed by us.

We think that the prosthetics (and orthotics) professional especially when it comes to process and device development is contributing enormously. Therefore the Government can turn its attention to that which the private sector cannot economically handle. But we always will be ready to help.

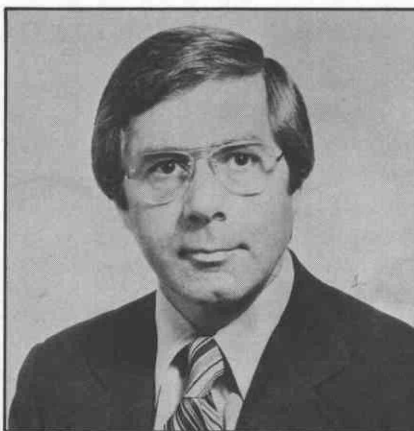
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## AAOP Presidents Letter

I welcome this opportunity, as president of A.A.O.P. to write in the Academy Newsletter.

First, my congratulations to the editor, H. Richard Lehneis, and the Newsletter editorial board and staff for a fine job in developing a truly professional and informative publication. The Newsletter exemplifies the Academy's growth and maturity. Edited and published by academicians, with a completely orthotic-prosthetic format, open to technical and professional innovations and presentations as well as to inter-discipline dialogue, as has been recent issue content. I congratulate this and prompt future contributions from the rank of academicians.

Along with the Newsletter, the Academy Research program, the educational programs, and membership development, also parallel the Academy's growth and maturation.



Edward P. Van Hanswyk

We have reached a surprising level of development and maturity after only 10 years and should recognize our accomplishments.

The "Acrylic Latex Prosthetic Skin" Research Evaluation project,

a joint effort by the A.A.O.P. and the VA was conducted last year utilizing the facility and experience of the Academy. The product resulted in a complete evaluation of this technique through patient application and trial. The procedure has been written, published and presented for profession-wide consideration and use. As academicians we can be proud of this very successful initial effort.

The research evaluation committee has already submitted a proposal for a second A.A.O.P. - VA project, an evaluation of the "ultralight prosthesis," and this effort is expected to be more encompassing than the first.

The 1980 A.A.O.P. annual meeting and roundup seminar recently held in Newport Beach, California is an example of successful educational programming. The seminar was attended by over 250 participants and faculty, and was