Clinical Prosthetics & Orthotics

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S-N-S Knees and the Bilateral A/K Amputee

Gustav Rubin, M.D.*

A.H., an active bilateral A/K ambulator.

We have under our care at VAREC eleven adult male bilateral A/K *ambulators*. Ten of these use Swing and Stance (S-N-S) knees and one, a missionary to a remote area in Africa, was fitted with single axis knees because of the obvious need for simplicity in his special circumstances. Eight of our S-N-S users are active individuals, but two are household and limited community ambulators. As would be anticipated, all of our above-knee amputee ambulators are in good physical condition and strongly motivated. These were important aspects in prescribing prostheses. The S-N-S knees provided the amputees with the smooth gait characteristic of hydraulics, greater security, improved ease in reaching the sitting position, improved opportunity to recover from sudden stops or potential stumbles, better control when descending stairs, and the ability to lock one or both knees for negotiation of stairs. We have also found the S-N-S to be the sturdiest of the hydraulic units.

*FACS Chief, VAREC Special Clinic Team

No one of our amputee veterans demonstrates the potential of S-N-S knees better than A.H., injured in Vietnam at 21 years of age. A. H. was initially evaluated by the VAREC Clinic Team over one year later on Sept. 24, 1970.

A.H. sustained bilateral A/K amputations. The right A/K stump was eight inches in length and multiply scarred. The left A/K stump, partially covered by healed split thickness skin grafts, was seven and one-half inches in length. A.H. also sustained partial amputations of the fingers of both hands. The index and middle fingers of the left hand were amputated; on the right hand, the proximal phalanges of the fourth and fifth fingers and the first metacarpal of the thumb were retained. A.H. demonstrated that he was capable of grasping crutches with both residual hands. On the right he could come within an inch of opposing the first metacarpal to the fourth and fifth proximal phalangeal stumps. Opposition could be achieved on the left.

A.H. was in excellent physical condition, very well motivated, without hip contractures, and with good muscle power of the trunk and residual extremities. He had been working out in his garage, which he had converted to a gym. When seen, he weighed 160 lbs. and indicated that his pre-amputation height was 6 feet, 1-½ inches (a height that was subsequently successfully reachieved at his request).

The VAREC Clinic Team decided to prescribe bilateral A/K partial suction quad sockets with waist belt, rigid uprights and band, multiplex knees (to allow trial of several knee units "in the rough"), and, finally, a trial with first SACH feet, and then single axis feet. The S-N-S knee units and single axis feet were selected on the basis of A.H.'s performance with them.

On May 13, 1971 A.H. walked to VAREC without a cane or crutches. After a subsequent trial with total suction and silesian belts he had to be returned to his original prescription, due to stump scarring.

A.H. had been an accomplished skier prior to amputation and, on January 25, 1974, requested prostheses with which he could ski again. The clinic team notes of that date follows.

"He has been informed that skiing will be dangerous. Nevertheless, he is anxious to try it, and, because of the morale factor and the intensity with which this patient wishes to ski, plus the fact that he was a skier prior to his leg amputations, the prostheses have been ordered." Outrigger ski poles with special adjustments for the hand grips were also prescribed.

The first prescription was determined after another bilateral A/K skier was invited to visit the clinic team with his prostheses. That concept was copied and prostheses were supplied to A.H. with solid knees fixed at 45 degrees and correspondingly dorsiflexed feet. They were rejected shortly thereafter by A.H. since they allowed him to slide down only low slopes.

The prostheses with S-N-S knees and single axis feet however, did allow him to actively ski. It is noteworthy that the most efficient position of his stumps, since he required strong abductor power for skiing, was found to be in sockets set up in almost twenty degees of abduction. Since the neutral position of the feet was more efficient for skiing the feet were not out-toed.

A.H. proved his proficiency on skis (see photo) by winning the handicapped olympics in Norway in 1982. He has competed in numerous events in the U.S. and overseas and he reports that he can negotiate 40 slalom gates in 60 seconds.

He has not been trouble free, however. The most serious of his problems occurred when a spur was removed from his left stump and overlying soft tissue breakdown occurred. Although this healed secondarily, the clinic team advised that the area be covered by adequate soft tissue. This was done and the amputee had no further difficulty. A.H. continues to be active and, in addition to skiing, sails his own boat.

Not all amputees, however, follow the same road to successful ambulation. At one time, the clinic team believed they had two patients who had the potential and motivation to ambulate. The team provided prostheses but the patients became obese and gave up the effort. The rehabilitation of one, a triple amputee (BE on one side) was, unfortuntately, a notable failure.

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Hydraulics and Above-Knee Prosthetics

A. Bennett Wilson, Jr., B.S.M.E.*

Some of the highlights in the history of the use of hydraulic systems in artificial legs might be useful in understanding the present status and influencing the future application of hydraulic principles in lower-limb prosthetics.

One of the prime objectives of the designers of artificial legs for above-knee amputees is control of the knee joint, and, thus, the shank to provide the amputee with the means to stand and walk safely, efficiently, and gracefully. Sporadically since 1918, and possibly before, hydraulic principles were proposed as a means for locking or braking the knee to enhance safety, but none of these ideas seem to have reached a practical stage until after World War II.

When the National Academy of Sciences (NAS) initiated a research program in limb prosthetics in 1945 at the request of the Surgeon General of the Army, surveys of amputees indicated that the above-knee amputees felt that their greatest need was a knee lock that would prevent stumbling. This "finding" prompted a number of designs in the United States that used hydraulic systems to provide knee locking or braking on demand. Concurrently, a team in Germany, Ulrich Henschke, a physician, and Hans Mauch, an engineer, developed a leg prototype that used a hydraulic lock activated by motion of the abdominal wall. After Dr. Henschke and Mr. Mauch moved to the United States at the invitation of the United States Air Force, they were encouraged by their host to continue development of their design, and they became active in the NAS Artificial Limb Program.

During the 1940's, Mr. Jack Stewart, an AK amputee and inventor, devised, to meet his own needs, an above knee leg which used a hydraulic system to not only provide knee locking, but also to provide shock absorption at the heel, co-ordinated motion between knee and ankle joints, and adjustability of the height of the heel. Swing phase control was provided by hydraulic fluid being forced through a single orifice, a serendipitous sort of circumstance.

About 1951, leaders in the research program came to the conclusion, based on data developed at the University of California, that perhaps, more important than control in the stance phase, is control during the swing phase. Mr. Mauch was requested to give high priority to the design of a mechanism that would provide control of the knee during swing phase so that the amputee could vary cadence without changing the friction control setting. At about the same time it was recognized that the characteristics of a fluid flowing through an orifice had the possibility of providing automatically the change in resistance to knee flexion and extension needed to compensate for changes in the walking cadence.

Using many of the same parts designed for the stance-control system as well as data provided by the University of California Biomechanics Laboratory concerning knee movements during swing phase, Mr. Mauch produced a unit with a number of orifices arranged to provide changes in resistance to rotation at the knee corresponding to the "normal." This design, known as the Model "B," after some years of testing and field use, was combined with the stance-control system to produce the Model "A," which when modified was marketed as the Henschke-Mauch S'n'S (Swing and Stance) knee unit. During the development of the Henchke-Mauch units several less complex hydraulic and pneumatic units were also developed by others and marketed commercially with some degree of success.

During the early 1950's 18 units of the Stewart design known as the Stewart-Vickers Hydraulic Leg were evaluated by a team at New York University, who found good amputee acceptance, and recommended that the locking feature be eliminated since the cost could be reduced appreciably and the test subjects didn't seem to make use of that feature. This recommendation was followed by Mr. Stewart, who a short while later sold all rights to U.S. Manufacturing Co., who manufactured and marketed it as the Hydra-Cadence Leg. The Hydra-Cadence Leg has been a commercial success, but in spite of a great deal of experience no one can be sure of the relative importance of its many features.

The development of hydraulic mechanisms for artificial legs has been plagued by leakage and breakage, which is only natural in an effort that tries to arrive at the optimum compromise between cost, weight, and function. Whether or not this optimum has been achieved is not yet known. We do know, however, that active above-knee and hip-disarticulation amputees appreciate the swing-phase control function afforded by hydraulic mechanisms and that the present day costs are not prohibitive for a substantial number of amputees. No definitive studies have been made that would delineate the efforts of the various factors and features involved, singly or in combination. With the availability of 4-channel 24-hour physiological surveillance systems and other sophisticated instrumentation, such studies seem to be quite feasible now and certainly should be considered.

For at least thirty years the need for voluntary control of the knee joint has been recognized, but until the advent of the microcomputer it was difficult to conceive of a practical method to accomplish this. When microcomputers became available, the first reaction of some designers was simply to add the microcomputer to present hydraulic systems, but these efforts failed most probably because the systems available were not designed for control by computer. At any rate, it would

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seem that the weight alone of present systems would make voluntary control impractical, and thus any project in this area should begin anew.

At present, very little work seems to be going on in the area of voluntary control systems. Some work at the Massachusetts Institute of Technology has been reported for nearly a decade. More recently, the REC at Moss Rehabilitation Hospital started a project where pattern recognition techniques are used to obtain subconscious control of a knee mechanism by EMG signals about the hip joint, which shows a good deal of promise.

Perhaps what we need most at this point is more information concerning the contribution of each variable, such as swing-phase control, stance-phase control, ankle action, weight, and weight distribution, singly and in combination, for designers of the next generation of above-knee legs. With the technology now available to us, this appears to be possible as well as practical.

Physical Therapy and Hydraulic Knee Units

Bernice Kegel R.P.T.*

Without a thorough understanding of the principles of operation and functional benefits engineered into the sophisticated hydraulic knee mechanisms, the therapist will be unable to help the amputee gain maximum benefits and to use the system effectively. It is important that the prosthetist ascertain that the therapist knows what adjustability is incorporated into the prosthesis. Much of the adjustment will be done during dynamic alignment at the prosthetic facility, but modifications will need to be made as the patient gains confidence and his ambulation pattern improves.

An understanding of the fundamental differences between hydraulic control and mechanical friction will help in training the amputee to take full advantage of the flexibility of hydraulic mechanisms. Amputees can walk over a wide range of cadences instead of being limited as with mechanical friction. There are two reasons for this. First, hydraulic friction increases with speed to just balance the increase in kinetic energy of the prosthesis while mechanical friction remains essentially constant. The programmed hydraulic characteristics give little frictional resistance during initial extension and flexion, but build to a peak at terminal flexion and extension. This helps to provide a natural appearing gait regardless of cadence. The stability of hydraulic systems permits alignment nearer the trigger point and thus results in less energy expenditure required for walking. If a patient has previously used a mechanical knee, he needs to be reminded that no exaggerated residual limb motion is necessary to gain adequate flexion and extension of his hydraulic prosthesis.

For purposes of brevity I will limit my discussion to gait training with one knee unit—the Mauch S-N-S (Figure 1). The Mauch S-N-S knee unit can be set to provide 3 functions:

1. Swing and Stance phase control.
2. Swing phase control only.
3. Manual knee lock.

A stirrup shaped lever near the top of the piston rod operates as a selector switch. When the lever is in the down position, swing and stance control are both operative. This would be the adjustment chosen for normal walking. The major advantage of stance control is that it offers the patient stumble recovery. If

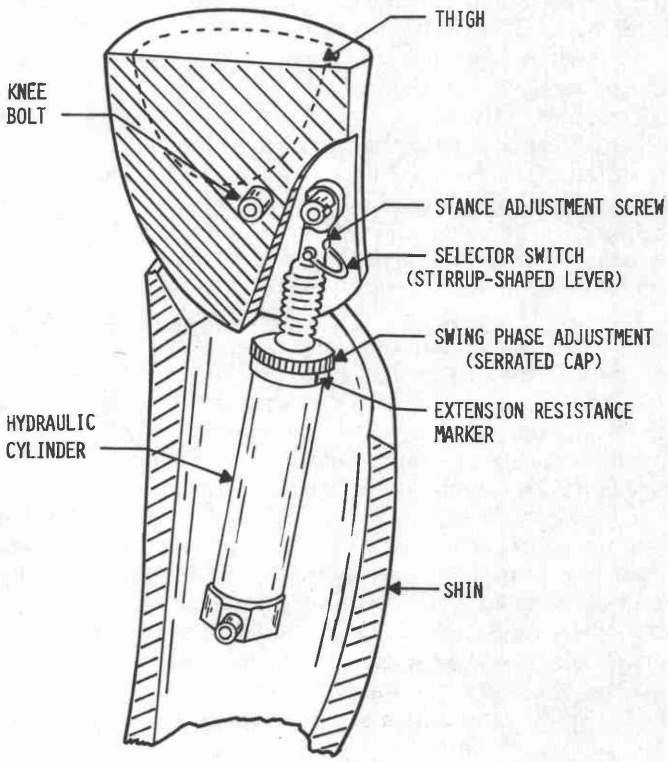

Figure 1. Cutaway diagram of the Mauch Unit

the prosthetic knee buckles, it will give way slowly enough that the patient should be able to regain his balance before falling. When training a patient with a conventional knee unit, he is taught to forcefully contract his hip extensors late in swing phase to accelerate the shank forward (with resulting terminal impact) to ensure extension of the knee at heel strike. Amputees wearing fluid-controlled mechanisms need not do this. The amputee should be instructed to swing his thigh forward, decelerate it, and end the movement with the residual limb pointing to the point on the ground where the heel should strike. The shank, aided by the built-in extension bias will swing forward smoothly, and at heel strike will be in

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full extension. With the stance phase control engaged, the prosthetic knee will be stable in the initial portion of stance phase without forceful extension of the hip musculature being necessary. The feature makes gait training markedly easier.

It is extremely important during the end of stance phase on the prosthetic side that the hip be ahead of the knee and weight on the ball of the foot. This hyperextension moment is necessary to disengage the stance phase control momentarily and allow the knee to bend freely in swing phase. If the amputee does not exert this hyperextension for 1/10th of a second, he might experience difficulty in flexing the knee to begin swing phase. When walking on soft ground, it is even more important to exert this hyperextension moment.

The benefits of stance control are also used when walking down stairs and ramps in a step-over-step manner. This ability to walk down steps in a step-over-step manner rather than one step at a time or by jack-knifing is one of the key advantages of the Mauch knee unit. The patient needs to be taught to place his prosthetic heel on the lower step with the forefoot extending beyond the edge of the step (Figure 2). He is then told to flex his hip forward while simultaneously putting weight on the prosthetic leg. This will cause a controlled bending of the prosthetic knee. As the prosthetic knee yields, the sound leg is brought forward and placed on the lower step. If the patient has to wait for the prosthetic knee to bend, then stance phase resistance is too high and should be reduced. This activity is probably the most difficult to teach an amputee, expecially if he has used a conventional knee unit in the past. This same technique is used for going down ramps. When walking up steps and ramps the same techniques are used as in conventional training.

Figure 2. Correct placement of the prosthetic heel

When sitting down in a chair, the patient can either use the weight bearing resistance of the S-N-S unit to control the rate of sitting, or release the stance phase control and use the sound leg to control sitting rate in the same fashion as with a conventional knee unit.

How quickly the knee bends under weight is determined by the stance adjustment screw, which is turned with a 22mm Allen wrench (Figure 3). The adjustment is *extremely* sensitive with a range of only 120 degrees. Slowest bending and maximum stability is obtained with a full clockwise adjustment. Most patients like to start with a high degree of stability.

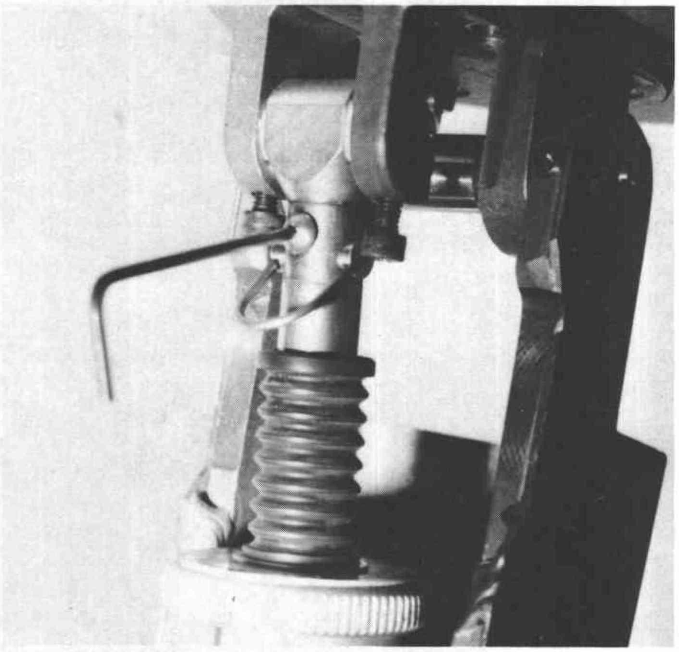

Figure 3. Allen wrench inserted into the stance adjustment screw.

To eliminate stance phase control the patient is told to stand with his prosthetic leg behind his sound leg. With weight on the toe of his prosthesis, he pulls the selector switch lever up (Figure 4). This mode would be used for bicycling and other activities needing a free swinging leg. Swing resistance is adjusted by moving the serrated cap. The verticle black line under the serrated cap is the extension resistance marker. When the black line is all the way to the right (4 o'clock) extension resistance is lowest, and all the way to the left (8 o'clock) is the maximum setting. A good resistance for beginning walking would be at 5 o'clock (Figure 5).

The same serrated cap that adjusts extension resistance also adjusts flexion resistance. When the "H" in the word HYDRAULIC is over the line marker (regardless of the position of the line marker), flexion resistance is lowest. "K" over the marker indicates maximum resistance. A good resistance for beginning walking is at the "D" position (as shown in Figure 5).

Figure 4. Eliminating the stance phase control.

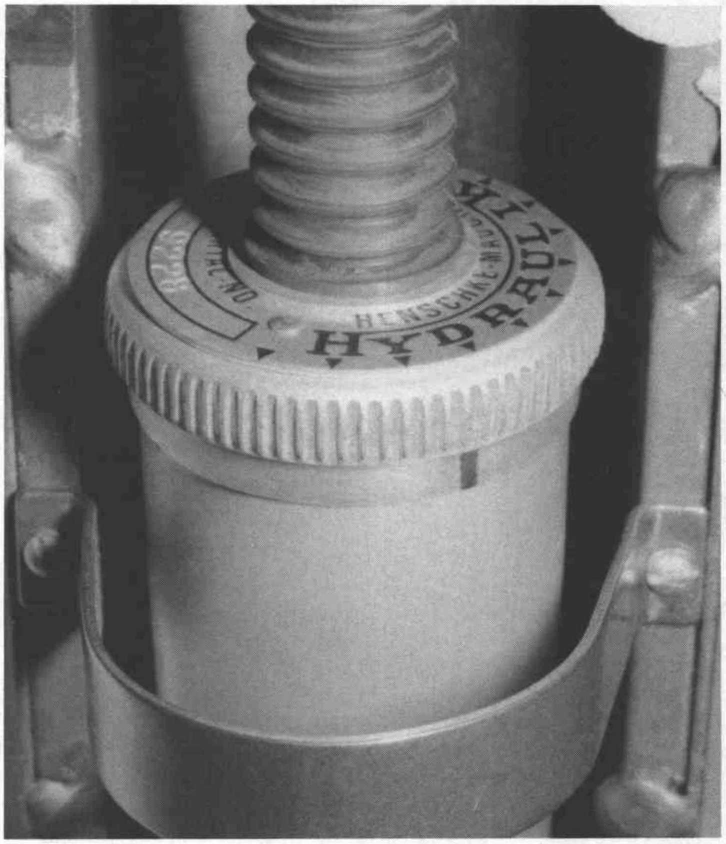

Figure 5. Good resistance settings for beginning walking.

Figure 6. Engaging the knee lock.

To engage the knee lock, the selector switch is pulled into up position with the knee flexed and bearing no weight (Figure 6). The knee may now be extended from this flexed position, but increased flexion is not possible.

A right-legged amputee might choose to lock the prosthetic knee while driving and pressing the pedal by a forward motion of the hip. For standing at work for any length of time or while standing on a bus, the amputee could be taught to lock his knee.

The Mauch S-N-S units have also been successfully used by bilateral amputees. The two units are likely to be adjusted differently because different residual limb lengths call for different resistance settings.

The patient should be taught that the hydraulic unit may require servicing every one to two years. He should also be told that small amounts of air in the hydraulic system are no reason for concern. An automatic selfbleeding feature will eliminate the air after he walks a few steps, or if he bends the knees several times before applying the prosthesis. The leg should be stored upright with the knee fully extended so that air does not enter the hydraulic spaces.

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Hydraulic/Pneumatic Knee Control Units A Prosthetist's Point of View

Charles H. Pritham, CPO*

As Mr. Wilson has demonstrated, the use of hydraulic and pneumatic control units had its genesis in the post World War II R & D effort. The objective, of course, was to fit the returning veteran AK amputee with the best prosthesis technology could provide. Such amputees were young and physically fit, prime candidates to benefit from the advantages of advanced control units. The prime advantage, usually cited, is cadence responsiveness. As the patient walks at different rates, the control unit automatically adjusts to control heelrise and terminal swing impact. Constant friction knees can not duplicate this feature. All hydraulic and pneumatic units provide this feature and one, the Mauch S-N-S, provides stance phase control as well. This means that the unit provides enhanced knee stability in the early portion of stance phase to increase the patient's safety.

In this mode, the S-N-S unit can be said to function in a fashion analogous to that of a conventional safety knee. In another mode, the function of the S-N-S can be likened to that of a simple manually locking knee. Two other knee control units, variants of Kingsley's Hydranumatic and USMC's Dynaflex, function in a similar fashion.

The Hydracadence, in addition to swing phase control, also provides heel height adjustability and toe pick-up. Otto Bock has recently introduced a modular knee that includes a hydraulic swing phase control.

As can be seen then, these are just a few of the variations available to the prosthetist and his patient. The principle advantages claimed for such control units are enhanced cosmesis and performance, and lower energy expenditure. Against these advantages the disadvantages must be weighed. Bulk, size, and weight of some of the units preclude their use by many patients. The considerable expense of most, if not all, hydraulic and pneumatic control units rules out others. Moreover, the control units have shown to be unreliable. Some patients derive satisfactory service from their units while other patients using the same brand unit are constantly having them replaced and repaired. As most of the units need to be factory serviced, the delay and expense of maintaining a unit under such circumstances can engender considerable frustration.

Given these circumstances, the pool of available amputees for whom such advanced control units are suitable is a small proportion of the total AK population, and most closely resembles the patients for whom they were originally developed: young traumatic males; i.e. veterans. It must be borne in mind that this pool today represents a less important proportion of the amputee population than it did some 25 years ago. Statistics demonstrate that the majority of civilian amputees in the Western World are geriatrics who lose a leg due to arteriosclerosis and are as often as not female. Indeed, the very amputees who were originally provided hydraulic units by the VA are not getting any younger. The day will come for each of them when they, and the clinic teams who attempt to address their needs, must make a reappraisal of their prescription. So, the use of hydraulic/pneumatic control units for a considerable portion of the amputee population can be ruled out. Not only that, but it is possible to be very skeptical in considering the suitability of such units for patients for whom it is theoretically ideally suited.

Young, active traumatic amputees are probably, children aside, the hardest on their prostheses. Given the expense of purchasing and maintaining such a unit, does it make sense to fit an amputee with one if he is going to have more than average maintenance problems? Can he afford the time lost from work, interruptions in his daily life, and expense of repairs? Given the disproportionately rising cost of health care today, can society? Gait studies demonstrate that AK amputees walk slower than normal subjects and BK amputees because of increased energy expenditure. If this is so, is the prime advantage cited for hydraulic/pneumatic units, cadence response, relevant and worth the additional expense and problems? In another vein, given the aging nature of the population should further effort and money be devoted to developing newer and more sophisticated knee control units?

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In any event, it can be said that a prosthetist in attempting to formulate a solution to his patient's problems is confronted with a number of questions and a wide variety of devices all intended to perform the same function. It is also true that the prosthetist has little more than personal experience, hearsay, and the competing claims of the manufacturers to aid him in making his decision. The natural tendency on the prosthetist's part is to provide his patient with the most sophisticated unit possible, for all of us gain considerable satisfaction from doing so and from working with such units. The patient also wants the best prosthesis possible. The fact remains, however, that such tendencies must be resisted and both prosthetist and patient must make a realistic appraisal of the situation and logically weigh the pros and cons.

Questionnaire

The Clinical Prosthetics and Orthotics—C.P.O. *editorial board believes that two-way communication will aid the growth of the profession. The Academy provides a forum, within this publication, through which practitioners can let their voices be heard on significant issues. Please take the time to complete the questionnaire on professionalism and return to: Charles H. Pritham, CPO, Editor,* Clinical Prosthetics and Orthotics, *c/o Durr-Fillauer Medical, Inc., Orthopedic Division, 2710 Amnicola Highway, Chattanooga, TN 37406.*

1. For what percentage of your AK amputees would you consider hydraulic/pneumatic control units relevant?

   0–20% ______ 60–80% ______
   20–40% ______ 80–100% ______
   40–60% ______

2. Of those for whom you consider such units suitable, what percentage are using them?

   0–20% ______ 60– 80% ______
   20–40% ______ 80–100% ______
   40–60% ______

3. Are you and your patients satisfied with the units?

   Yes ______ No ______

4. Do you think further R & D is justified and necessary?

   Yes ______ No ______

5. Name the hydraulic/pneumatic control unit most frequently used in your practice.

   ____

6. Additional comments:

   ____
   ____
   ____
   ____
   ____

Results from the Questionnaire on Cervical Orthoses

There were 13 respondents who answered as follows:

1. Do you feel there exists a need for further research in cervical orthotics?

   Yes—12 No—1

2. Do you feel such research would affect your practice?

   Yes—9 No—4

3. Do you feel there exists a need for a non-invasive halo?

   Yes—9 No—2 Question—2

4. Do you as an orthotist currently participate in the application of Halo-Vests?

   Yes—5 No—7

   One respondent, a physician, indicated the question was not applicable. This same individual indicated that the cervical orthosis he used most frequently was a Halo, followed by the S.O.M.I. and Philadelphia Collar, in that order.

5. List, in order of frequency, the three most commonly used cervical orthoses in your practice.

Orthosis	Total no. of times mentioned	Frequency Listed 1st	Listed 2nd	Listed 3rd
1. Philadelphia Collar	10	3	5	2
2. S.O.M.I.	10	3	4	3
3. Soft Collar	6	3	1	2
4. Halo	5	2	0	3
5. Four-Poster	3	1	1	1
6. Plastic Cervical Orthosis	2	0	1	1
7. Thomas Orthosis	1	0	1	0
8. Dennison Two-Poster	1	0	0	1
9. Modified Florida Orthosis	1	1	0	0

As always with so small a sample, it is impossible to draw any meaningful conclusions. The answers to questions one through four pretty well speak for themselves;

although, considering the near unanimity with which question (1) was answered (12 out of 13) it is interesting to consider the fact that only nine said yes to question (2). Presumably the other four respondents were prepared to ignore the results of any research or expected it to confirm their personal experience.

In considering question number (5) it is interesting that the three most frequently utilized orthoses were mentioned a total of 26 times while all others were mentioned a total of 13 times. It is also worth noting that the S.O.M.I. or the Philadelphia Collar were first or second in all three places.

It is also interesting to consider the answer to question number (3) in light of the fact that such orthoses as the Dennison Two-Poster and the Guilford Orthosis are used with such low frequency (by number of the sample) despite evidence cited in the editorial as to their effectiveness.

Additional Comments: The following are samples of opinions and comments from the respondents.

1. I have questions about mandibular and articulation deformities if worn for long periods, also MTJ problems.
2. I like the idea of a non-invasive halo, just so it fits my Halo vests.
3. Research should not stop in any field of endeavor.
4. There is a need to educate physicians on the proper use and fitting of cervical orthoses.
5. Cervical orthoses are dispensed most frequently by people other than orthotists. As a result, the private practitioner seldom acquires the expertise needed to initiate a program of change.

The Editor

LETTERS TO THE EDITOR

Dear Editor,

I have followed with interest the debate of what to call a leg or arm that has had a portion removed.

I can understand some people's concern with "stump." I can understand concern with each alternative suggestion, residual limb, partial limb, remnant limb. I feel all of these are less than appropriate.

I have, over the years, always used a very unique term—"leg" or "arm." The remaining segment is still the leg or arm the person has always had and the name does not need to experience a change due to amputation.

When I say "Let me see your leg," the patient immediately shows me his amputation rather than sound limb. After all, that is what he comes to see me about.

Yours very truly,
H.E. Thranhardt, CPO

Dear Editor,

After reading the "Analysis of the Results from the Questionnaire on Metal vs. Plastic Orthoses," *(Clinical Prosthetics and Orthotics,* Vol. 7, No. 3, 1983) I would like to mention some additional comments.

As Manager of an orthotics and prosthetics department, which has been fabricating plastic orthoses exclusively for the past 13 years, I have some strong feelings for the use of plastic A.F.O.'s. We have found (as early as 1971) that we could use plastic A.F.O.'s on almost all (with rare exceptions) of our patients requiring an A.F.O., and provide a better fitting, more cosmetic, lighter weight, and almost maintenance free orthosis.

In response to Mr. Donald G. Shurr, L.P.T., M.A. who, in his Editorial entitled "Metal vs. Plastic A.F.O.—A Therapist's View," *C.P.O.* Vol 7, No. 1, 1983, asked if H.R. Lehneis, Ph.D., CPO and John Sarno, MD still have the same feelings about plastic A.F.O.'s in 1983 as they did in 1971, let me present this. After speaking recently (August 1983) with Dr. Lehneis and Dr. Sarno, both men agree that their feelings are stronger today for plastic A.F.O.'s than they were in 1971. The availability of new plastics development and the addition of a Hemi-P.L.S. Blank have only served to reinforce those feelings.

In *Newsletter—Prosthetics and Orthotics Clinic* Vol. 4, No. 2, 1980 (H.R. Lehneis), there are tables listing various types of plastic A.F.O.'s. Also listed are their indications for need and contraindications. This should serve as an excellent guide in choosing the correct type of A.F.O. for the individual patient. However, the correct type of plastic must also be chosen. Result #4 (*C.P.O.*, Vol. 7, No. 3, 1983), "Most Significant Disadvantage, Most Commonly Indicated Factors," shows as number one (1), inability to adjust dorsiflexion/plantarflexion. This has not been a problem for us. Our Posterior Leaf Spring and Hemi-Posterior Leaf Spring Blanks are made of "Ortholen" which can be hammered and shaped in a cold state, and can be formed over a modified cast in a heated state. The cold state workability allows for adjusting the plantar or dorsiflexion to a more than reasonable degree.

I believe the picture becomes very cloudy when the discussion takes place without differentiating between prefabricated, pre-molded, and custom molded A.F.O.'s.

1. **Prefabricated.** It is my understanding that a prefabricated A.F.O. is taken from the shelf and with minimal time, effort, and adjustment, is delivered to the patient.
2. **Pre-Molded Blanks.** The pre-molded A.F.O. Blank requires more labor, time, and skill. It must be cut down to appropriate size, thinned out, heated and molded to a properly modified positive cast of the individual patient, fitted, and completed with a strap.
3. **Custom Molded.** The custom molded A.F.O. requires many of the same steps as the pre-molded A.F.O. with the design and trim line designation as added features to be resolved by the orthotist for the individual disability and patient.

I don't believe it is fair to lump all types of A.F.O.'s together and give them a general critique, whether it be good or bad. The individual orthosis should be judged with regard to proper type of orthosis, fit, and correct choice of material. The improper choice of material can in one case be overbracing, and in another case be underbracing. This choice is often critical and should be made wisely.

Sincerely,

Donald Fornuff, CP
Manager
Orthotics & Prosthetics Department
Institute of Rehabilitation Medicine
New York University Medical Center
New York, New York

Lehneis on ISPO Exec Board and NBCs Today Show

H. Richard Lehneis, CPO, Ph.D., Immediate Past-President of the Academy, was among the many U.S. academicians who attended the International Congress of ISPO held September 5–9 in London. In recognition of his involvement in furthering the cause of orthotics and prosthetics in this country and abroad, Dr. Lehneis was elected to the Executive Board of ISPO.

During the same period, an interview with Dr. Lehneis appeared on NBCs Today Show. Aired on Wednesday, September 7, the interview focused on myoelectric prostheses. As the director of orthotics and prosthetics at the New York University Medical Center's Institute of Rehabilitation Medicine, Dr. Lehneis is one of the leaders in myoelectric research.

The following is enclosed as a courtesy to the author. It is hoped that the readership will take the time to assist him in his inquiries.
The Editor

Continuing Education: A Chance to Make a Difference

Bruce P. McClellan, CPO*

In the Summer 1982 issue of *C.P.O.*, Charles Dankmeyer submitted a very timely and succinct article regarding continuing education and the issues surrounding it. Certainly, continuing education is a necessary and vital component of any progressive profession, and thus it is with ours.

With this in mind, much has been done to create an atmosphere conducive to the pursuit of quality educational seminars. The Academy and ABC, in conjunction with many individuals and groups, have in recent years striven to upgrade the profession by initiating and organizing workshops and programs. The importance of continuing education to the field was underscored in 1981 when the Academy membership voted to make the existing informal system a mandatory one. Still, attendance in the different seminars varies from excellent to very poor. Too often, well planned quality educational programs have suffered through low attendance or been cancelled altogether for lack of interest. Not only is this discouraging to those people who have worked to organize the seminar, but it also takes a financial toll due to advanced advertising, mailing and brochure costs. Still worse, those persons who have registered for the seminar lose their opportunity to benefit professionally when a course is cancelled.

The reasons behind the success of one educational program and the failure of another are not always apparent. It is imperative, therefore, to identify those elements which appeal to the individual practitioners across the country who are the targeted audience.

In an effort to accomplish this, a form is herewith provided to give you, the practicing professional, direct influence on the type, scope, and location of future continuing education programs.

The information obtained from your responses will be used in planning educational forums based upon your recommendations. In this manner, more successful seminars should result for both the sponsors and the participants. Please take the initiative and indicate your preferences on the form provided. Your input is valued and will help to strengthen the continuing education process, and thereby improve the quality of care to the communities you serve.

When planning workshops and seminars, it is helpful to know those topics you, as practitioners, feel will best meet your continuing education needs as well as the factors influencing your attendance.

1. Please rank the following six factors in the order of their importance in your decision (number one being most important).

   ____ topic of presentation
   ____ institution sponsoring
   ____ workshop/seminar faculty
   ____ amount of registration fee
   ____ travel/hotel prices
   ____ geographical location

2. List the month(s) when you prefer to attend workshops. ____________________

*Assistant Professor and Director
The University of Texas
Prosthetics and Orthotics Program
The University of Texas Health Science Center at Dallas
Dallas, Texas

3. Below is a list of general prosthetic/orthotic areas. Under each general topic is a space provided for specific suggestions related to that topic. Please rank these areas in order of your interest from 1–12 (number one being of most interest).

ORTHOTICS

____ Upper Limb Orthotics

____ Lower Limb Orthotics

____ Spinal Orthotics

____ Spinal Cord Injury Management

____ Thermal Plastic Fabrication

____ Fracture Management

PROSTHETICS

____ Upper Limb Prosthetics

____ Below Knee Prosthetics

____ Above Knee Prosthetics

____ Myoelectric Control

____ Temporary Post Amputation Devices

____ Endoskeletal Systems

4. Do you prefer topics to be ( ) specifically or ( ) broadly presented? (check one)

5. Please list other specific topics of interest related to above areas.

Please return completed forms to:
The University of Texas Prosthetics and Orthotics Program
6011 Harry Hines Blvd.
Suite 555
Dallas, TX 75235

Meetings and Events

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

1983

October 25, "Current Status of Orthotics and Prosthetics," a symposium sponsored by the United States Members Society of ISPO, Hyatt Regency Phoenix, Phoenix, Arizona.

October 25–29, AOPA National Assembly, Hyatt Regency, Phoenix, Arizona. Contact: AOPA National Headquarters, 703-836-7116.

November 11, "Seating and Mobility Systems," Gillette Children's Hospital, St. Paul, Minnesota. Contact: Brett Day, Continuing Education Dept., Gillette Children's Hospital, 200 E. University Ave., St. Paul, Minnesota 55101, 612-291-2848.

November 12–13, Seating Symposium, Northwestern University, Chicago, Illinois. Sponsored by the Academy Midwest Chapter. Contact: Robert Picken, CP Educational Chairman, Academy Midwest Chapter, 345 East Superior, Room 1723, Chicago, Illinois 60611, 312-649-8006.

November 15–18 (tentatively), Seventh Annual International Rehabilitation Film Festival, New York, New York. Contact: Rehabfilm, RIUSA, 1123 Broadway, New York, New York 10010.

December 9–11, "Surgery and Rehabilitation of Complex Problems of the Upper Limb," Sheraton Bal Harbour, Miami Beach, Florida. Presented by the Department of Orthopaedics and Rehabilitation, University of Miami School of Medicine. Contact: JoAnn Harris, Coordinating Assistant, Department of Orthopaedics and Rehabilitation, P.O. Box 016960, University of Miami School of Medicine, Miami, Florida 33101.

December 12–13, UCLA Seminar, "Amputation Surgery Immediate Post Surgical Prosthetic Techniques for Physicians/Prosthetists." Contact: Peggy Colton, Program Coordinator, UCLA P.O.E.P., Rm. 22-46 Rehab. Center, 1000 Veteran Ave., Los Angeles, CA 90024.

Clinical Prosthetics and Orthotics . . . C.P.O.

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