

A SURVEY OF LOWER-LIMB AMPUTEES: PROSTHESES, PHANTOM SENSATIONS, AND PSYCHOSOCIAL ASPECTS^a

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INTRODUCTION

Periodic evaluation of accumulated data allows not only for the detection of trends, but also for the constant monitoring of quality control of amputee service. Research in prosthetic design is always continuing. Modifications of prostheses to give greater functional ability and improved cosmesis, as well as provisions for recreational prostheses, are often mentioned in the literature. But is the patient satisfied with what has been and is being done for him to achieve maximum function, comfort, and esthetic appeal?

The purpose of this survey was to obtain information which would be helpful in evaluating various services delivered to amputees, and to determine whether the patients felt these services were adequate. An attempt was made to determine the number of patients for whom prostheses were prescribed; the length of time from surgery to prosthetic prescription; how long prostheses lasted; what modifications were necessary; and, most importantly, whether the patient was happy with his artificial limb.

Additional areas of investigation included the nature of phantom pain experienced and its relationship to prosthetic use; patient social readjustment and self-image; and, finally, patient suggestions for prosthetic research.

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MATERIALS AND METHODS

Questionnaires were mailed to 350 patients who had undergone a variety of lower-limb amputations. All patients had been treated with rigid postoperative dressings. The amputations had been performed at several Seattle-area hospitals, including the Veterans Administration Hospital and a children's hospital. Prostheses had been fabricated at a number of private and institutional prosthetic facilities.

Patients were invited to answer all relevant questions, with assurance that the identity of those responding would remain confidential. Personal interviews were arranged for those people who had difficulty understanding the questions.

Patient selection was limited to those who had been discharged from rehabilitation at least 3 months before the questionnaires were dispatched, affording patients adequate opportunity to return to their regular activities and to define their feelings.

In the interest of simplicity, description of amputation level was limited to three categories:

1. Below-knee—to include partial foot, Syme, and below-knee amputations.
2. Above-knee—to include knee-disarticulation, above-knee and hip-disarticulation amputations.
3. Bilateral—to include combinations of the above.

RESULTS

Patient Sample

To the 350 questionnaires mailed, there were 156 responses (45 percent). Twenty-two patients for whom a response was made had expired, leaving a total of 134 reported cases (38 percent of 350) who had undergone 154 definitive amputations.

Of the total sample, 103 (77 percent) were males and 31 (23 percent) females. Age at time of amputations ranged from 3 to 89 years of age, with a mean of 44.6 years and a median of 51 years. Average age of the below-knee group was 47.2 years; above-knee, 43.4 years; and bilateral, 49.5 years. Patients ranged from 6 months to 12 years postamputation at the time of this evaluation. (Fig. 1.)

Etiologies consisted of 10 (7.5 percent) congenital; 11 (8.2 percent) tumor; 48 (35.6 percent) trauma and post trauma; and 65 (48.7 percent) peripheral vascular disease (31 had previous failed vascular surgery, while 22 had diabetes—of these 7 had had failed vascular procedures).

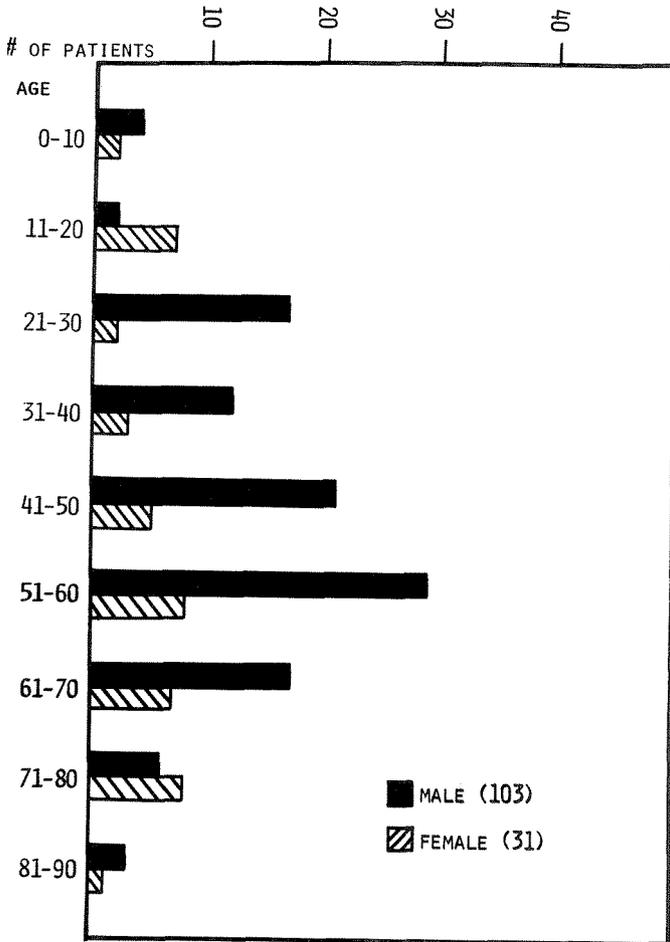


FIGURE 1.—Sex, and age at amputation, of patients whose responses were included in the survey. There were 134 reported cases, who had undergone 154 definitive amputations, in the total sample. In this graph, age at each amputation was plotted separately, as the amputations of most bilateral amputees were performed at different ages.

Below-knee amputations totalled 87 (65 percent); above-knee amputations, 27 (20 percent); and bilateral amputations, 20 (15 percent). (Fig. 2.)

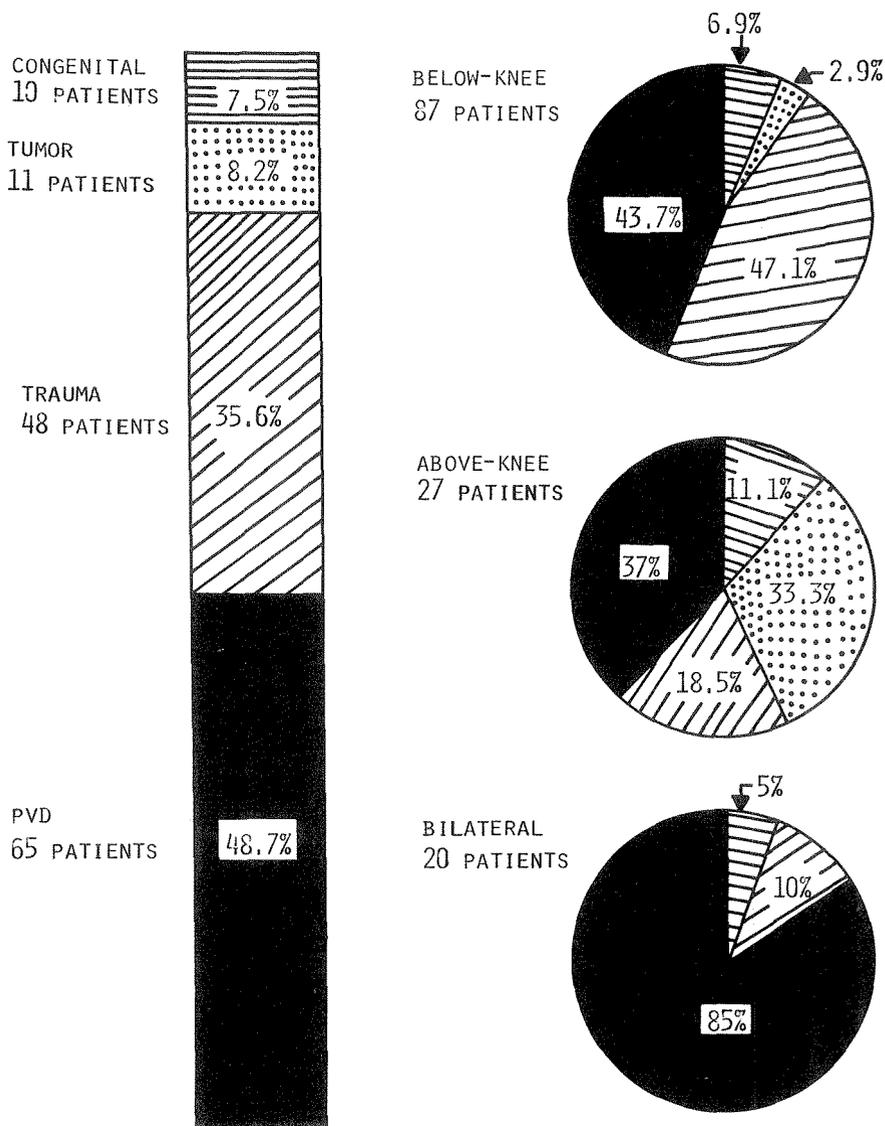


FIGURE 2.—Level and etiology of amputations.

Prosthetic Information

How Many Patients Wore Prostheses?

Of the total sample, 122 patients (91 percent) wore their prostheses; 108 patients wore them all day and the remaining 14 averaged

1 h to 6 h of use per day.

Two patients (1.5 percent) did not have definitive prostheses prescribed; one was a 74-year-old diabetic with bilateral above-knee amputations and one an above-knee amputee with hemiparesis. The remaining 7.5 percent (four bilateral amputees and six above-knee amputees) had prostheses but did not wear them. Five of these patients stated that they had poor prosthetic fit; two had sufficient pain in the "normal" limb to prevent ambulation; two were blind diabetics; and one could not afford a new prosthesis.

Time Interval Between Surgery and Prosthetic Prescription

There were 117 responses to this question. The average time interval from surgery to cast and measurements for definitive prostheses was 39 days, with a range of 14 days to 10 months. The 10-month interval was for a hip-disarticulation patient whose body

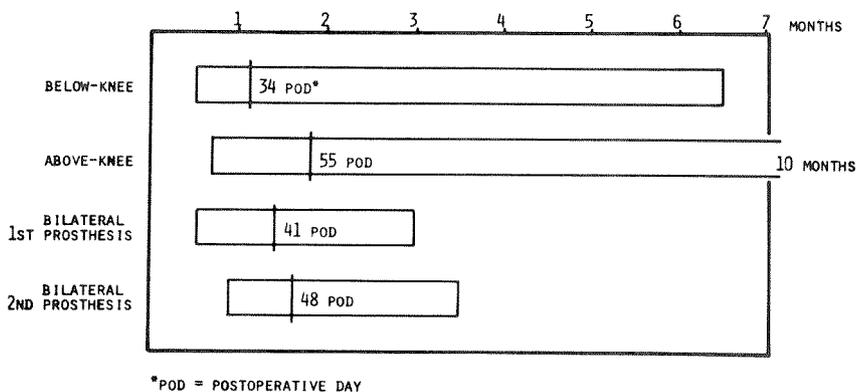


FIGURE 3.—Time interval between surgery and prosthetic prescription. The length of each horizontal bar indicates the range in lengths-of-time reported by patients in that particular amputee group. The vertical cut through the bar indicates the location on the time-scale of the average patient experience in that group: that average figure is the number shown in the bar. Average for all patients reporting was 39 days.

TABLE 1.—Time Interval Between Surgery and Prosthetic Prescription

	Range (Days)	Mean
Peripheral vascular disease	21 to 300	52
Trauma	22 to 193	45
Tumor	21 to 90	42
Congenital	14 to 36	25
0-30 year age group	14 to 193	37
31-55 year age group	14 to 300	55
56-years-and-up age group	21 to 180	46

weight had fluctuated widely due to kidney failure. (Fig. 3 and Table 1.)

Types of Prostheses Prescribed

In the below-knee group, one patient wore a partial-foot shoe filler and the five Syme amputees wore closed Syme prostheses. The remainder of the 87-patient below-knee group wore the following types of prostheses:

1. 29 patients (33.3 percent); PTB hard socket, of which 27 patients had cuff suspension;
2. 19 patients (21.8 percent); PTB socket with soft insert and cuff suspension;
3. 13 patients (14.9 percent); PTB with side joints and lacers;
4. 11 patients (12.8 percent); PTS socket with soft insert and built-in wedge, of which 2 had cuff suspension;
5. 9 patients (10.3 percent); PTS hard socket with wedge suspension, of which 5 had additional cuff suspension.

Twelve patients (14 percent of the below-knee group) used muscle contraction as a means of auxiliary suspension.^b

Twenty-nine patients (33.3 percent) used waist belts as necessary added suspension. (This group included approximately 33 percent in each group of patients who wore either a PTB hard socket, PTB socket with soft liner, or PTS hard socket with wedge, and 76.9 percent of those patients who wore side joints and lacers. One patient used a shoulder harness with his PTB socket, soft liner, and cuff suspension prosthesis.^c)

Of the 27 above-knee amputees, 12 patients (75 percent) used full suction, and the remainder used semi-suction sockets, (i.e., semi-suction incorporates a suction valve and one stump sock). Knee mechanisms included 10 hydraulic, 4 mechanical, 1 pneumatic, and 1 manual knee lock. (All patients using hydraulic knees had full suction suspension.) The mean age of the patients wearing hydraulic knees was 31.8 yr; mechanical knees, 62.3 yr. Age of the patient wearing a manual knee lock was 68 yr and the patient using a pneumatic knee, 63 yr.

The 33 percent of the patients who used full suction required auxiliary suspension, while 50 percent of those patients with semi-suction sockets needed additional suspension; i.e., eight Silesian bandages and two shoulder harnesses.

^bThese patients were encouraged by a physical therapist to use their muscles by doing isometric exercise.

^cThis patient was a 49-year-old male with a history of epilepsy who felt he needed this type of suspension as a safety precaution.

Of the 4 hip-disarticulation patients, 3 wore Canadian hip-disarticulation prostheses, and one wore an endoskeletal system (an Otto Bock modular system with flexible plastic socket and free-swinging knee).

In the 20-patient bilateral group, all symmetrical amputees were wearing the same type of prosthesis on both sides. There was no majority of one type of prosthesis over another: 3 patients wore PTB hard sockets; 2 wore PTBs with soft liner; 2, PTS hard sockets; 4, PTSs with soft liner; and 1, PTBs with side joints and lacers.

Forty-six percent wore waist belts for auxiliary suspension.^d

Among the patients evaluated, the number of stump socks worn ranged from 0-25 ply, with an average of 6-ply. (The patient wearing 25-ply stump socks was a 42-year-old male who stated that he had lost 40 lb of body weight. He also stated that he was "too busy" to visit the limb company to be measured for a new limb.)

Recreational Prostheses

Patients were asked if they used any special adaptations or special prostheses for recreational activities. While 82 patients (61.2 percent) were active in a variety of sports (the most common were fishing and swimming), only 5 of them used special prostheses or assistive devices; i.e., swim fins for scuba diving, and special outriggers for snow skiing.

Modifications to Prostheses

The question concerning prosthetic modifications done by patients themselves yielded several answers. A total of 16 percent said they had made their own adjustments, including 18 percent of below-knees, 7 percent of above-knees, and 25 percent of bilaterals. Although patients were not asked why they chose to make their own modifications rather than go to a prosthetic facility, one patient did volunteer that he thought repair costs were excessive. Modification materials included foam rubber, felt, carpet fabric, and paper wedges. Several patients sanded "high spots" to decrease irritation. One patient claimed he reduced the weight of his prosthesis by 2 lb but did not explain how. Another patient drilled 21 holes in the socket and liner for ventilation—and had to resort to a waist belt for auxiliary suspension. Several patients removed straps which they considered unnecessary.

^dA bilateral Symes amputee wore two closed Syme prostheses with removable liners. An AK-BK amputee was wearing a PTS hard socket with wedge suspension and a partial suction quadrilateral socket with a pelvic band and a mechanical knee unit.

How Long Did Prostheses Last?

One hundred and twenty prostheses which had been replaced as worn out were evaluated to determine durability. (Patients still wearing their original prosthesis were not included.) The length of time ranged from 1 month to 12 years, with an average of 3 years. The prosthesis which lasted 1 month was a PTB with soft insert and cuff suspension for a 69-year-old male. The 12-year-old prosthesis, a PTB with side joints and lacers, had been worn by a 70-year-old male.

Syme prostheses had lasted from 6 months to 7 years with a mean of 2.91 years; below-knee prostheses from 2½ months to 9 years with a mean of 2.66 years; and above-knee prostheses from 3 months to 4 years with a mean of 1.87 years. Standard deviation for Syme prostheses data was 2.51; for below-knee prostheses, 2.05; and for above-knee prostheses, 1.17.

When prosthesis durability was evaluated by age group, the 0-30 age group had prostheses which lasted from 3 months to 7 years with a mean of 2.07 years; the 31-55 year group, from 3 months to 9 years with a mean of 3.23 years; and the 56-years-and-over group, from 2½ months to 5 years with a mean of 2.13 years.

Prosthetic Comfort and Satisfaction

Patients were asked if their prosthesis was comfortable (Table 2), and 25 percent of the group said they found it uncomfortable.

TABLE 2.—*Was Prosthesis Comfortable?*

	Below-Knee	Above-Knee	Bilateral	Total
Yes	58 (67%)	13 (59.1%)	9 (69.2%)	80 (65.6%)
No	22 (25%)	8 (36.4%)	—	30 (24.6%)
Moderate	7 (8%)	1 (4.5%)	4 (30.8%)	12 (9.8%)
	87	22	13	122

Patients were also asked if they were satisfied with the overall results achieved from surgery, prosthetics, and physical therapy. Of 131 responses, 21 patients had complaints about surgical results, i.e., adhesions, neuromas, and pain. The 12 complaints about physical therapy concerned only one point: they felt they were not treated for an adequate period of time. (Patients reported receiving physical therapy for periods ranging from “no treatment” to 4 mo with an average of 6 wk.) There were 42 complaints about prosthetists and prostheses. Dissatisfaction was most predominant among the above-knee amputees (Table 3). One patient described wearing his prosthesis as like “standing in a giant fiberglass teacup.”

TABLE 3.—*Prosthetic Satisfaction*

	Below-Knee	Above-Knee	Bilateral	Total
Yes	64 (75%)	10 (38%)	12 (67%)	86 (66%)
No	20 (23%)	16 (62%)	6 (33%)	42 (32%)
Moderate	3 (2%)	—	—	3 (2%)
	<u>87</u>	<u>26</u>	<u>18</u>	<u>131</u>

Phantom Sensation/Pain

Several questions were asked in an effort to determine the extent of phantom sensation and/or pain. Twenty-four patients (18 percent) experienced no phantom sensation, while 17 patients (13 percent) required medication for control of pain (Table 4). The patients who used pain suppressants constituted 13 percent of the male population and 13 percent of the females; 11.5 percent were below-knees, 18.5 percent were above-knees; and 10 percent were bilateral amputees. According to etiology, 17 percent of the patients had peripheral vascular disease, 6 percent had traumatic injuries, and 27 percent had tumors.

TABLE 4.—*Analysis of all Patients Requiring Pain Medication*

AGE	Level	Sex	Cause	Work
(44) ¹ 52 ²	BK	M	PVD	Retired
(65) 74	BK	M	PVD	Retired
(61) 70	BK	M	PVD	Retired
(48) 53	BK	M	PVD	Unable due to amp.
(67) 72	BK	M	PVD	Retired
(77) 80	BK	M	PVD	Retired
(47) 50	BK	M	PVD	Retired
(38) 40	BK	F	Trauma	Unable due to amp.
(33) 34	BK	M	Trauma	Unable due to amp.
(68) 71	BK	M	PVD	Yes, but changed
(70) 79	AK	M	PVD	Retired
(60) 67	AK	M	Trauma	Retired
(65) 71	AK	M	Tumor	Retired
(61) 63	AK	F	Tumor	Part time work
(72) 74	AK/AK	F	PVD	Retired
(53) 61	HD	M	Tumor	Retired
(51; 52) 56	BK/AK	F	PVD	Unable due to amp.

¹ Age at time of amputation

² Present age

When describing phantom sensation, results were divided into two groups, those patients wearing prostheses and those not wearing them (Fig. 4). Of those patients wearing prostheses, 10 percent required medication, whereas, 42 percent of those not wearing prostheses used medication for pain control. Less than 20 percent

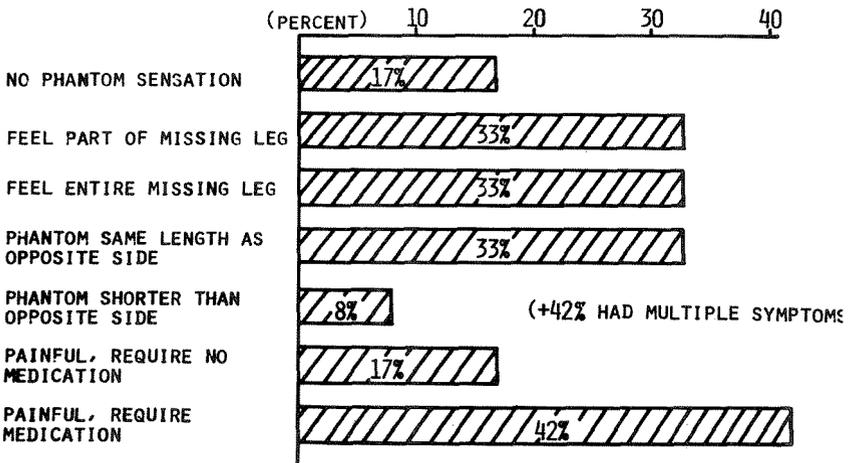
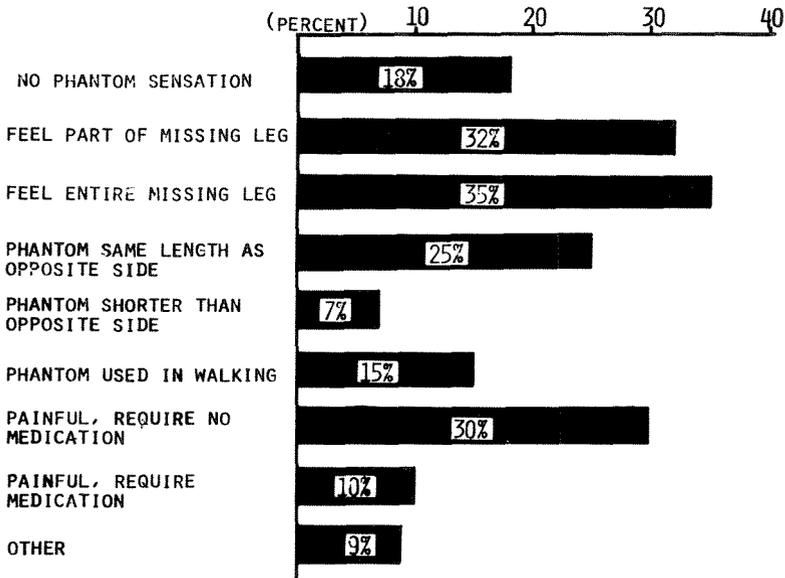


FIGURE 4.—Phantom sensation and pain, as reported by the 122 patients who wore their prostheses (solid bars), and by the 12 patients who did not wear prostheses. (Percentages refer to the distribution of a particular symptom among the patients in a group. Note that among patients in the group wearing prostheses, 48 percent had multiple symptoms; in the group not wearing prostheses the percentage with multiple symptoms was 42.)

of each group experienced no phantom sensation. Symptoms in both groups were very similar—i.e., in each group, 33 percent were aware of only part of the missing leg; another 33 percent were aware of the entire missing leg; 25 to 33 percent felt that the phantom limb was the same length as the opposite side; and less than 10 percent considered the phantom side shorter than the “normal” side.

Of the patients wearing prostheses, 15 percent actually used phantom sensation for ambulation.

Psychosocial Aspects of Amputation

Steensma (1) stated “The problem is not entirely solved by our providing adequate surgery, excellent postoperative care, expertly fitted modern prostheses, and the latest training techniques. It would seem that a careful investigation of the psychological and social factors involved is essential.”

Questions related to this premise were asked of the patient to determine how he felt about himself and how he perceived that other people responded to him.

1. *Do You Feel Handicapped?*

An important determining aspect of an amputee accepting his condition is whether or not he feels handicapped in leading a “normal” life. This question was phrased in a “yes” or “no” fashion, but also providing space for explanation (Table 5). The majority of people did not feel handicapped.

TABLE 5.—*Do Patients Feel Handicapped?*

	Below-Knee	Above-Knee	Bilateral	Total
Yes	23 (28%)	10 (38%)	12 (60%)	45 (35%)
No	60 (72%)	17 (62%)	8 (40%)	85 (65%)
	83	27	20	130

Some of the more notable responses were as follows:

“If you have a good prosthetic fit, you can lead a full and normal life.”

“I can adjust and do anything; pain is the only limiting factor.”

“I lead a normal life, but get frustrated and disgusted with the canes and the pain.”

“The biggest problem of formerly active amputees is one of frustration . . . how to sublimate . . . what now are my assets . . . where should I now emphasize my efforts?”

“You are only handicapped or deprived if you want to be. The

public labels us as being handicapped; therefore, we have to 'prove' ourselves."

"My clothing and physical activities are markedly restricted."

"No one will employ me."

"Can't go shopping or to church. Have to rely on the radio for church services."

"Cannot travel freely."

"No problems with everyday living, but I have to hire help for anything extra."

"Can't do anything—no women, no drinking."

"Feel like I delay others when invited on outings."

"Don't feel relaxed in crowds."

2. *How Do You Feel Family, Friends, and the Public Respond To You?*

Interpretation of limb loss transfers from family, friends, and the public to the amputee, creating either negative or positive feelings with respect to his own self-concept.

The majority of patients in this sample stated that no change in relationships occurred after amputation. Of those patients who did notice a change, terms most commonly used were "curiosity, sympathy, overprotectiveness, indifference, consideration, and amazement." Some interesting responses were as follows:

"They think I am better off now than before amputation."

"Treated like an invalid, except by my wife."

"Treated like everyone else; just because crippled is no reason for pity."

"Some people feel sorry for me—I don't like that."

"They have been wonderful. No one has made 'exceptions' and our relationships have not changed, rather they have grown."

"Very well, they have given me confidence so that I can do almost anything."

"Sometimes sympathetic, most not caring or glad its not them."

"They respond to a person. I do not feel public owes me anything."

"Women tend to mother me; men feel frustrated and turn away."

3. *Suggestions from Patients*

Patients were asked to suggest how conditions could be improved for future amputees. There were wide-ranging responses.

Of 66 suggestions received there were 34 requests for better communication. These included the following: "Rap groups" either with staff or with other amputees; more parental and vocational counseling; greater distribution of written resource materials;

improved communication between prosthetic facilities and research centers; greater utilization of engineers in prosthetic design; greater patience and understanding from prosthetists; and more home visits from physical therapists because "therapists often have ideas for conquering 'everyday garbage.'"

Patients felt they should have been warned about the following:

1. Everything will not necessarily be wonderful after amputation.
2. Amputation does not remove peripheral vascular disease.
3. There are possible complications from surgery.
4. They will endure physical and mental fatigue.
5. Phantom sensation is normal.
6. The prosthesis will fall off occasionally; i.e., loss of suction when doing twisting actions.
7. Seating in restaurants is often inadequate due to confined spaces, chairs without arms, and restrooms a flight of stairs away.
8. Not everyone in society will view them fairly.
9. Society will often label them handicapped.

4. *Direction of Research*

Finally, patients were asked in what direction they felt personnel in the prosthetics research field should concentrate their efforts.

A small number of patients requested more investigation into the disease processes themselves, into the nature of phantom pain, and the possibilities of limb transplants. Further research on the use of Controlled Environment Treatment was encouraged by three patients.

There were 43 patients who asked for more research in the fabrication and design of prostheses; 9 patients wanted lightweight prostheses; 2 wanted more durability; 1, a better knee mechanism; 8 wanted better ankle; 4, less cumbersome prosthetic material; and 4, better cosmesis.

Two patients would have liked soft, less-shiny outer coverings. One patient felt "the SACH foot should become obsolete; when sitting in a chair, I cannot stretch my legs out because the toe sticks up in the air."

One woman asked why the suction valve on an above-knee prosthesis had to be red; "How can you wear short dresses with the red dot sticking out like a sore thumb?" A covering on the prosthesis to decrease hosiery damage was another suggestion. Seven patients wanted "a leg that breathes in the summer."

Further investigation into determining whether a hard socket or a socket with a soft insert is best was indicated by four patients.

Two people suggested teaching patients to make or repair their own prostheses. Several patients felt there was a definite need for price-control legislation for prostheses.

Regarding water sports, two patients wanted waterproof legs for swimming, and one man wanted a wetsuit that would fit around his prosthesis.

Last, but not least, five patients wanted research into bionic limbs.

DISCUSSION

Several matters of major interest have emerged from this study. The patient sample, although small, was comparable in terms of sex distribution, level of amputation, and etiology for amputation to that of the well-known "Amputee Census" of Glattly (2). The mean age at time of surgery for this sample was, however, slightly lower.

Lambert and Sciora (3) in a survey of 182 juvenile amputees, determined that the time interval between surgical amputation and prosthetic fitting varied from 1 month to 11 years, with most patients having been fitted within one year. Davies, et al. (4), in a study of 8,323 amputees found that the median period to prosthetic delivery was 6 months, and that the median time lapse was 5 months for the below-knee prostheses and 6 months for all other levels. Congenital amputees received prostheses in a median time of 3 months postsurgery, while patients in the disease category waited the longest period of time, 6 months. The results presented here showed the same trends, but time intervals were *considerably* reduced. These improvements may be related to two factors; i.e., increased number of prosthetic facilities, and greater utilization of Immediate Postsurgical Prosthetic Fitting as a mode of postoperative treatment.

Chapman, et al. (5), in a survey of 51 geriatric amputees, found that 44.7 percent of the patients were never fitted with a prosthesis. Walters (6) had 15 patients (20 percent) in his study who were advised against using a lower-limb prosthesis by the institutional staff. In the present study, only 1 percent of the patients did not receive definitive prostheses.

Of those patients who did have prostheses prescribed, 91 percent of the present sample were actually wearing them, as opposed to 70 percent reported by Kihn, et al. (7). Where several below-knee amputees in Kihn's study rejected their prostheses, none in the present study did. Of the 10 patients not wearing their prostheses, 6 had either prosthetic problems or difficulties in meeting costs,

while 4 had other medical problems not related to their amputation.

The only other survey describing type of prostheses prescribed was that done by Davies, et al. (4). Below-knee prostheses were similar for both studies. A question often asked in amputee clinics is whether or not to make a soft liner for the socket. The present study showed a very slight preference for hard sockets. Pelvic bands as a means of suspension in above-knee prostheses were used by 56 percent of the patients in Davies's study—that was a definite contrast with the present study where all patients used either total or semi-suction sockets, and, if auxiliary suspension was necessary, a Silesian bandage was used. The most frequently used knee component reported by Davies was a mechanical knee; the present study revealed a greater utilization of hydraulic mechanisms, probably due to greater knowledge and availability of devices.

Only a very small percentage of patients used special equipment for recreational activities. Several patients were not aware of available adaptive devices. The extra cost of ski legs (not covered by insurance) presented a problem to one patient. Most people did not know that prostheses could be made of waterproof material. There appears to be a definite need for greater dissemination of new information about recreational prostheses both for patients and health care professionals.

As a patient becomes more dependent on his prosthesis for protection of his residual limb and for return to a more normal status, the prosthesis approaches becoming a part of him. Thus, it is very important that the patient's limb be comfortable and that he be satisfied with it, both functionally and esthetically. Present results revealed that 25 percent of the sample were extremely uncomfortable, while an additional 10 percent were moderately comfortable, and 33 percent of the patients were dissatisfied with their prosthesis. The only comparable statistics available were those of Lambert and Sciora, who in their study of juvenile amputees reported that 26 upper-limb amputees (40 percent) were dissatisfied with their prostheses, while 10 lower-limb amputees (8.4 percent) were dissatisfied. The state of the art has improved considerably over the years, but there is still a definite need for more innovations, and for concern about patient comfort, especially for the above-knee amputee.

In an analysis by Jolly, as quoted by Gillis (8), of 2700 primary amputations, he found a painful phantom limb in 13 percent, a painless phantom sensation in 67 percent and no phantom in 20 percent of the patients. Pisetsky (9) made a rather extensive literature review on phantom sensation and noted that 86 patients in his series (95 percent) had phantom sensation and that 14 patients (15

percent) complained of pain. He also quoted Baily and Moersch whose study had 43 patients (86 percent) complaining of phantom sensations. Gallinek (10) stated that he had not seen an example of a phantom limb in a congenital amputation or a congenital absence of a limb because the cortical image of the missing limb had never been present. Kolind-Sorenson (11) stated that phantom pain was more common in above-knee patients than in below-knee amputees.

Results in the present study showed similar trends in percentages of patients experiencing phantom sensation and pain, as well as the lack of phantom pain in congenital amputees. In agreement with Kolind-Sorenson, more above-knee than below-knee patients had pain. It was interesting to note that gender had no effect on determining whether patients required pain medication or not. The information obtained did support a clinical observation that patients wearing prostheses have less phantom pain than those who do not.

Morgenstern (12) felt that age was a contributing factor in determining whether patients will have severe phantom discomfort. In his study, patients under 35 years of age experienced none. The youngest patient in the present study experiencing severe phantom discomfort was 34 years old, and the mean age of this group was 62 years. (The mean age for the total sample was 44.6 years.)

Another clinical impression is that diverting the patient's attention to a suitable occupation or avocation allows for less time to focus on phantom sensations. This impression was borne out by the present study, where only two, of those patients using pain suppressors, were employed.

Suggestions from patients included dissemination of information, better communication between hospital staff and patients, and improved prosthetic design. Several comments by Fishman (13) and Foort (14) on how amputees feel about amputations are reiterated in results shown here.

Surprisingly, there were no requests for elimination or improvement of stump socks. There were also no complaints about the use of assistive devices, i.e., canes, crutches, etc.

SUMMARY AND CONCLUSIONS

One hundred and thirty-four amputees, who were anywhere from 6 months to 12 years post amputation, were evaluated by means of retrospective questionnaire surveys. Patient population was similar to that of the classic "Amputee Census" in terms of sex, level, and cause of amputation; average age was slightly lower than that in most investigations.

Great improvements appear to have been made in the number of patients who receive prosthetic prescription as well as in the length of time between surgery and delivery of the prosthesis. On the average, younger patients were fitted sooner, while patients with peripheral vascular disease required a longer rehabilitation time.

Only a small percentage of patients rejected their prosthesis, and most wore it all day. Because there is little available material on special adaptive devices for the amputee, only a very small number of patients used any for sport activities. While most amputees were happy with results achieved from surgery and physical therapy, approximately 33 percent of the patients were dissatisfied with their prostheses, especially the above-knee amputees.

A contributing factor in determining whether patients will experience phantom pain appears to be whether or not they wear a prosthesis. In this small sample, a smaller percentage of patients who wore a prosthesis had pain than those who did not wear a limb. Of the patients who used pain medication, a greater number were not working. Older patients had more severe phantom pain.

Reactions and psychological adjustments to amputation were highly varied. Most patients stated that they did not feel handicapped.

There were strong indications for more psychological and vocational counseling, greater dissemination of available information, and considerably more work in prosthetic design; i.e., improvement of function, cosmesis, and comfort. Interest in bionic limbs and limb transplants was suggested by several patients.

While a greater number of amputees appear to be receiving prostheses rapidly than in the past, there are still many uncomfortable and dissatisfied patients. Perhaps now is the time to let the patient verbalize his complaints and to have the professionals attempt to remedy them. Much attention in the past has been directed at making limbs so that patients can walk. Obviously this is not the only activity an amputee performs during the day. Education may now need to be directed at facilitating more extensive recreational activities, either by research into better prostheses, or by improved training methods.

From the results of this study, wearing a limb for control of pain alone may be indicated. More extensive studies need to be done comparing pain in patients wearing or not wearing prostheses.

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