

NEW PUBLICATIONS

BULLETIN OF PROSTHETICS RESEARCH, SPRING 1973 (BPR 10-19), 254 pages, published by the Prosthetic and Sensory Aids Service, U.S. Veterans Administration, and available for \$2.05 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

Following past custom, the Spring 1973 issue of the *Bulletin of Prosthetics Research* consists of individual papers concerned with results of research coupled with reports on the status of research projects in limb prosthetics, orthotics, and aids for the blind and hard-of-hearing.

INSTRUCTIONAL MATERIAL AVAILABLE FROM THE UNIVERSITY OF CALIFORNIA AT LOS ANGELES

Because many young men working in orthotics who are studying for the certification examinations have written to UCLA asking where to obtain manuals and books on orthotics and anatomy that might be helpful to them, especially in preparation for certification, UCLA has prepared the following list:

Manual of Lower Extremities Orthotics, England, Fannin, Skahan, and Smith, 1972, 522 pages, 1,319 illustrations. Covers external shoe modifications, internal shoe modifications, below-knee orthoses, above-knee orthoses, knee orthoses, foot and ankle orthotic devices, and hip orthoses. Per copy, \$19.50

Manual of Upper Extremities Orthotics, Anderson, 1970, 460 pages, 1,013 illustrations. Covers upper-limb anatomy, functional hand splints, arm braces, and special assistive devices. Per copy, \$15.50

Basic Anatomy Series. These spiral-bound, paperback, illustrated texts are self-instructional. Originally designed to teach anatomy and medical terminology to medical records technicians, they have been found valuable by many allied health professions groups as a quick, easy way to learn the fundamentals of human anatomy.

The illustrated text material includes practice exercises and self-tests. The texts are supplemented with tape cassettes that can be played in the portable cassette tape recorders that are very popular and are reasonable in cost. The tape cassettes have proven very valuable in learning medical terminology, as they provide the learner with the correct pronunciation of the words and also enable him to recognize them when he hears them spoken. This ability can mean a great deal to the student orthotist when talking to physicians, therapists, and other medical personnel. The following texts and tape cassettes in the anatomy series are now available:

1. Musculoskeletal System
2. Circulatory System
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5. Digestive System
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Tape Cassette for each system \$4.00

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To obtain the instructional materials you need, mail your request to:

*Division of Vocational Education
Allied Health Professions Research
and Instruction Projects
12016 Wilshire Boulevard
Los Angeles, California 90025*

together with your check or money order made out to "The Regents of the University of California," and they will be forwarded immediately. There is a charge of \$1.50 for postage and insurance.

CHILD AMPUTEES: DISABILITY OUTCOMES AND ANTECEDENTS: PART 1. Initial Follow-up Study of Selected Patients of an In-Patient Service. Final Report—July 1969. G. E. (Ned) Sharples, University of Michigan. (Carried out under Grant Nos. PC-1003 and PC-1003 C1 from the Children's Bureau, DHEW.) 90pp. + 150 tables.

Abstract by the Maternal and Child Health Program, School of Public Health, University of California, Berkeley, August 1973.

This report describes the characteristics of unilateral upper-limb amputees and identifies differences in physical and social outcomes. From records of all unilateral upper-limb amputees examined at the Area Child Amputee Center, Grand Rapids, Mich. (a total of 214 people), 160 people aged 13 or older, who had normal intelligence or better and no significant medical problems other than limb deficiency, were chosen as study subjects. Although the study concerned subjects whose amputations occurred before the age of 21 (thus making them eligible for care at the child amputee center), actual ages of interviewed amputees varied from 14 to 41 years. The majority of respondents were located in upper and lower Michigan.

Six interviewers conducted 2- to 4-hour interviews at the amputees' homes from October 1967 through August 1968. The interview schedules were pretested among amputee patients at the University of Michigan Hospital. In the pretests, respondents were asked to perform those tasks which they claimed to be able to do, and members of the families were asked to confirm responses about physical performance. These pretests demonstrated that respondents understood the items and gave accurate answers. Data were also abstracted from patient records.

Indexes of social and physical performance were developed from the interview items. The final social performance scale included the following items: degree bothered by unwanted help; degree bothered by questions about arm; amount of self-consciousness; highest school grade; education compared to siblings', to father's, to mother's; time spent on recreation; family activities (walks, games, church, visiting friends, outings); type of occupation; chances for a better job; difficulty getting a job; job achievement (general improvement, working conditions,

hours, responsibility, and importance); difficulty changing jobs; social status (home furnishings and dwelling type); and estimated social class.

Questionnaire items chosen for the physical performance index included: how long cables lasted, how long the harness lasted, how often repairs were needed, amount of time prosthesis got in the way, finding special ways to use prosthesis, whether the prosthesis needed repairs at time of interview, kinds of stump discomforts, wearing the prosthesis to improve appearance only, frequently needing more energy than people with limbs to perform the same tasks, help often wanted that was not given, and specific task performance (cut steak, wash all body, deal playing cards, dress self fully, button all buttons, place heavy box overhead, knit or sew, cut and manicure nails, put on watch or bracelet).

RESULTS

Descriptive Data

Of the people studied, 29.4 percent were adolescents still in school. Housewives also constituted a sizeable proportion (19.0 percent) of those interviewed.

The population studied had various types of amputations. The most common were below-elbow amputations, more than half of the total (56.0 percent). Above-elbow amputation accounted for one-fifth or 20.1 percent of the sample. The remainder were joint disarticulations; 13.8 percent at the wrist, and 4.4 percent at the shoulder. (Wrist disarticulation was the minimum amputation included in the study.) The acquired limb losses occurred most frequently in the autumn and were mainly caused by farm accidents (21.8 percent), gunshot wounds (17.9 percent), and automobile accidents (14.1 percent).

More than 95 percent of all people interviewed had at some time had an artificial limb. Slightly more than 60 percent had a satisfactorily fitting prosthesis at the time of interview. About 40 percent were actually seen wearing their prosthesis at the time they first met the interviewer. The proportion of all amputees who were regularly wearing an artificial limb at follow-up was variously estimated at 40 to 70 percent; the lower figure being the proportion who actually had the prosthesis in place at the beginning of the home interview, and the higher figure being the proportion who claimed to wear their limb "usually" or

"frequently." Use rates among acquired amputees were substantially higher, by all estimates, than among congenital amputees.

Congenital upper-limb amputees did not appear to have more medical problems than amputees with acquired losses. The degree of acceptance of the loss did not differ by etiology. Persons born with a limb deficiency were less likely to retain an artificial limb in operating order, and, if they did, were less likely to use it. People with congenital amputations were more likely to try a limb for a few weeks and never become regular wearers. Clinic records revealed no differences in the frequency of problems with prostheses among congenital amputees compared to acquired amputees. The latter group did report more breakage of major components.

Less than half of all those interviewed were both eligible to visit the Amputee Center in Grand Rapids and were doing so. Almost two-thirds of all persons interviewed were no longer eligible for services at the Center. Among those eligible, almost half were not currently using the Center. Factors which impressed the interviewers as being responsible for nonreturn to the Center were distance, time, costs, disruption of other activities, and the lack of relevant services for nonwearers of prostheses.

Physical Outcome Data

The investigators found that amputees with higher physical-performance scores tended to be older at the time of interview, to have lost the limb at a later age, to have had few talks with the Center's social worker, to wear the prosthetic limb for longer periods of time, and to obtain needed limb repairs within a few days. People with high physical performance scores also seldom changed residences while growing up, were seldom aware of being awkward, and more frequently repaired their limbs at home.

Analysis of the interview data showed the following statistically significant relationships: The physical outcome, as measured by the index developed for the study, tended to be poor if the interviewed subject mentioned other problems with his prosthesis besides those brought up by the interviewer. If he said he sometimes or frequently wanted help and it was not given, if he had specific expectations about what his treatment at the clinic would be like, or if the prosthetic device

frequently got in his way, ultimate physical performance measured lower. In contrast, higher scores were obtained by male amputees whose condition was congenital (as opposed to acquired), amputees who wore their prostheses frequently, who had no socket problems during fitting, whose cables wore out quickly, who had no specific expectations about what their clinic experience would be, had never wanted to avoid others, did not discuss the problem of stopping unwanted help, were rated by interviewers and clinic personnel as accepting their loss very well, and who had a part-time or permanent job.

Social Outcome Data

For high social outcomes, the statistically significant associations were: fewer social-service contacts, fewer problems noted during social-service contacts, repair of prosthetic devices within a few days, satisfaction with present job, going out frequently with spouse, and frequently entertaining at home. The amputee who was seldom self-conscious, whose father worked at a white-collar job, who rarely or never experienced unwanted help, and who made friends of other patients at the clinic typically had high social outcome scores. A post-high-school education, a first contact with the clinic in the summer season, being referred to the Center by an agency rather than by himself, having moved at least once during residence apart from parents, and having had special job training were additional factors associated with successful social outcomes.

CONCLUSIONS

Examining the pattern of associations listed in "RESULTS," the investigators came to the following conclusions:

1. There were basic differences between the people who had congenital limb deficiencies and those with acquired limb losses. While the degree of acceptance of loss and the degree of self-consciousness were the same for each group, people with congenital losses were less likely to report wanting to avoid other people and more likely to begin dating between the ages of 13 and 16. They reported fewer problems in obtaining jobs. A far greater proportion of congenital amputees (15.1 percent compared to 2.5 percent of acquired loss patients) had experimented with

prosthetic limbs and discarded them.

2. Individuals who discarded their prostheses early in the treatment program were likely to perform well on physical tasks. Amputees who stopped wearing their limb after having a regular pattern of wear were the people likely to score low on physical performance measures later.

3. The meaning of an artificial arm to its wearer may be the single most significant predictor of outcome. This conclusion was supported by the findings that people who found unusual problems with their limbs scored low on physical measures and people who rarely noticed that they were awkward with the limb and who claimed it never got in their way scored high on physical performance measures. Self-consciousness, avoidance of others, and acceptance of loss also affected physical-performance outcomes.

4. The clinic record of broken appointments was not a predictor of performance outcomes. Over 3/4 of all patients never or rarely failed to keep their appointments.

5. Respondents to the interview and questionnaire preferred the terms "amputee" and "patient." They disliked the terms "crippled" and "handicapped."

RECOMMENDATIONS

The data implied that workers with amputees could best improve physical- and social-performance outcomes by emphasizing social factors rather than physical characteristics of patients. The researchers suggested that patient dependence upon the clinic or staff members for identification and/or solution of personal problems be minimized at the same time that amputees were enabled and led to means of dealing with the critical social and psychological implications of being an amputee. One means of doing this might be to group patients into cohorts. That is, certain patients might be admitted as inpatients at the same time and their interaction and mutual teaching abilities and opportunities promoted. Members of this inpatient "class" might then return to the clinic at the same time for their later appointments.

An improvement in the organization of care could be to increase the convenience and decrease the time and cost of transportation of patients to the site of treatment. It is probable that the number of people who could benefit from this

service is far greater than the number who now use the driver employed by the State of Michigan.

The authors concluded that a significant improvement in the outcome for amputees could be attained by providing services to them after age 21.

The frequency with which prosthetic limbs are prescribed should be reassessed, since a large percentage of amputees eventually stop wearing them.

Most unilateral upper-limb amputees were able to reorganize physical tasks normally accomplished by two hands so that the tasks could be accomplished by one hand aided by body pressure from some other limb. The important characteristics of artificial limbs need to be reassessed, starting with the assumption that artificial limbs used by this population may not need to approximate the physical functions of an arm and hand.

Individuals who could be identified at intake as likely to have difficulty attaining maximum performance levels:

- People who are surprised about the nature of the clinic
- People who indicate in any way that they have not accepted their loss
- People with histories of several changes of residence during childhood
- Amputees who tend to depend on others for help, decisions, or other kinds of assistance
- Children of families with low social class, as defined by father's occupation
- Children who have wanted to avoid other people before the age of 10 or after the age of 14.

Individuals who can be identified during the period of active treatment as needing greater attention:

- Amputees, especially those with acquired losses, who do not use many cables and who need few repairs to the limb
- Amputees who experience problems in getting a socket fitting that is comfortable
- People who need to have several harnesses made before one fits them adequately
- Patients who mention prosthesis problems of an unusual and nonroutine nature or who seem unusually concerned with trivial maintenance and repairs
- Amputees who do not get immediate repairs
- Amputees who avoid other people
- Amputees who want help to accomplish tasks of daily living

- Patients who want to discuss unwanted help and the undesirable attentions of others
- Those who are unwilling or unable to attempt minor repairs by themselves
- Those who admit noticing that they are awkward or that the limb occasionally gets in their way
- Those who are extremely self-conscious
- Those who claim that they are frequently helped by others when they do not want to receive assistance
- People known to have social or behavioral problems and to have sought or been contacted by social-work services
- Amputees who are reported by any source to be not fully accepting of the loss
- People who have little social activity
- People who postpone the beginning of dating
- Those who had no job or only irregular jobs during their schooling
- Those who make few visits to the clinic during the early part of their treatment program
- Patients who cease coming to the clinic without giving a reason
- Patients who seek to become close friends with staff members, having repeated extraprofessional and perhaps extraclinic contacts with them.

Services that should be added to the clinic program:

- A cost-free trial period for prostheses, so that those who discard their limbs could do so more economically
- Instruction in the maintenance and repair of prostheses
- Counseling for acceptance of their loss, avoidance of others, dating and social activities, awkwardness, how to answer strangers' questions, how to get a job, and how to keep the limb out of the way
- Promote job satisfaction
- Promote peer group friendships.

Practices that should be avoided:

- Patients coming to the clinic without previous orientation.
- Time delays in the adequate fitting of the socket and harness and in repairs
- Personal friendships with staff
- Self-referrals to vocational rehabilitation agencies.

Personal advice to be given to the amputee:

- Encourage holding a regular part-time job during school
- Encourage participation in social activities
- Encourage self-repair of limb.

What should be done for patients who are no longer eligible for the Center:

- Clinic should establish sources of limb repair for the patient by referring the patient to a prosthetist and by training him in limb repair.
- Patients might be referred to organizations which will help the amputee become socially active in recreation, entertainment, or other spheres.
- Referrals should be made to other agencies such as vocational rehabilitation services.
- A prosthesis repair kit for amputees should be developed.

CHILD AMPUTEES: DISABILITY OUTCOMES AND ANTECEDENTS: PART 2.

A Long-Term Follow-up Study of Child Amputee Patients, Final Report—December 1972. G. E. Sharples and R. L. Crawford, University of Michigan. (Carried out under Grant Nos. PC-1003 C2,3 and MC-R-260044-05,06.) 121 pp. + 248 tables.

Abstract by the Maternal and Child Health Program, School of Public Health, University of California, Berkeley, August 1973.

This is the second study of the outcomes of amputees who as children had been eligible for treatment at the Area Child Amputee Center, Grand Rapids, Michigan. Subjects of the first study were unilateral upper-limb amputees. Subjects of this study were patients with lower unilateral and patients with upper bilateral limb amputations. Only patients 13 years old or older, of normal intelligence, residing in the continental United States, and having no additional physical problems besides the amputation, were selected.

As in the previous study, data were collected through home interviews which lasted from 2 to 4 hours. Each subject also received a self-administered questionnaire prior to the personal interview. Abstracts of clinic records also provided data. The interview and questionnaire were used

to construct scales of physical and social performance similar to those used in the first study but adapted for use with bilateral upper-limb or unilateral lower-limb amputations.

The physical performance items designed for bilateral upper-limb amputees recorded degree of ability to: (1) tie own shoes, (2) cut meat on a dinner plate, (3) carry a full bag of groceries, (4) shuffle playing cards, (5) dress self completely, (6) button all buttons, (7) comb/brush own hair, (8) lift a heavy box over head, (9) wash hair, and (10) use a camera.

The items dealing with lower-limb function recorded degree of ability to: (1) run one-half block, (2) climb stairs which have no railing, (3) walk on an icy sidewalk, (4) walk in deep mud, (5) stand and work for 4 hours, (6) stand and work for 8 hours, (7) walk without making any noise, (8) kneel on both knees and rise without use of hands, (9) carry full suitcase 1 city block, and (10) carry a full suitcase 8 city blocks.

Physical performance items common to both conditions were: (1) any athletic or exercise activity, (2) need to expend no more energy than people with limbs for the same task, (3) does not describe self as limited, (4) does not mention additional difficult tasks, and (5) is satisfied with physical abilities.

The social performance index items were: (1) has employment, (2) not bothered by questions about the amputation, (3) currently self-conscious, (4) not bothered by unwanted help, (5) frequency of visiting in homes of friends, (6) frequency of visits by others in respondent's home, (7) ever refused a job because of amputation, (8) ever left a job or wanted to because of amputation, (9) feels amputation affects chances of getting a given job, (10) feels amputation decreases chances for advancement, (11) feels amputation affects relations with co-workers, (12) feels amputation affects relationship with superiors/supervisors, (13) satisfaction with job, (14) frequency of attendance at informal entertainment outside the home, (15) interviewer's rating of home furnishings, (16) housing space and size, (17) interviewer's estimate of respondent's social class, (18) highest school grade completed, (19) education achievement compared to mother, (20) education achievement compared to father, (21) education achievement compared to nearest sibling, (22) amount of recreation, (23) attendance

at religious activities, and (24) interviewer's assessment of condition of home.

For 227 eligible respondents, 185 interviews were reported (81.4 percent). Comparison of respondents to nonrespondents using data available from clinic records showed that nonrespondents tended to be older than respondents. On those clinic records where the emotional status of the patient was noted, nonrespondents were seen as having more emotional problems than respondents. The sample of interviewed people was broken down as follows:

29 upper-limb deficiency

24 congenital

5 acquired

156 lower-limb deficiency

41 congenital

115 acquired

Since only 5 upper-limb amputees had acquired losses, statistics were not computed for this group.

RESULTS

The measurements and the impressions obtained by interviewers indicated that most amputees had the ability to perform the wide variety of tasks required in daily life, to maintain homes and to function normally in job settings, with the same degree of success as nonamputees of similar background. In general the impact of limb deficiency seemed to be that it delayed achievement rather than depressed it.

Use of Artificial Limbs

Nearly all of the lower-limb amputees wore their artificial limbs (98 percent of those with congenital deficiencies and 94 percent of those with acquired losses). Four out of 5 upper bilateral amputees with acquired loss were wearing prostheses; one-third of the upper bilateral congenital amputees were using their artificial limbs, and one-third of all bilateral amputees who tried artificial limbs discarded them.

Sources of Medical Care

General health care was obtained by most individuals from a general practitioner. Fourteen percent of lower acquired amputees had consulted osteopaths. A large number of amputees (85.7 percent) reported having visited a doctor within the last 2 years. Amputees went most often for

limb care to the Area Child Amputee Center, Grand Rapids. The lower acquired amputees were atypical in making more use of limb shops as their primary source of limb care.

Problems and Unmet Needs

General health was self-reported as an important problem by 13.0 percent of those with lower acquired amputations. This was the group in which progressive disease was most likely, and it included several cases of amputation for carcinoma (14.8 percent). Phantom limb sensation was reported by less than 15 percent of the congenital amputees with upper-limb involvement, by 42 percent of those with congenital deficiency of a lower limb, and by 83 percent of those with acquired limb loss. Nearly 3/4 of all individuals with lower-limb prostheses reported having had blisters, sores, ulcerations, and rashes associated with wearing a prosthesis.

About 10 percent of the lower-limb amputees experienced chronic malfunction of their prostheses. These people indicated the artificial limb was in proper operating condition less than half of the time. Among congenital and acquired lower-limb amputees, 29 percent reported that their limbs malfunctioned more than 10 percent of the time. Frequent problems occurred in the operation of joints, terminal devices, sockets, and the harnesses. Between 1/4 and 1/2 of each group also had fitting needs at time of follow-up interview. The time required for repairs to prostheses was not a problem for most individuals; same-day service was obtained by most. Only about 1 in 7 individuals indicated dissatisfaction with the quality of prosthetic work done at limb shops. Almost all (82.5 percent), however, indicated that their prostheses could be improved. All groups combined placed comfort as the first priority, appearance as a second priority, and function as a third consideration. Durability and more realistic characteristics (including tactility, odor, noise) were also mentioned as desirable features.

The lower-limb acquired amputees appeared to have the greatest difficulty accepting limb loss. About 28 percent of these amputees indicated on the Gurin Psychological Adjustment Scale that they were significantly psychologically impaired (scoring less than 65 points). The rate for lower-limb amputees with congenital loss was 24.4 percent, and for upper bilateral amputees with con-

genital deficiencies the rate of serious psychological problems was 21.7 percent.

Self-consciousness was a recurrent problem among all amputees. Half or more of each group indicated self-consciousness at some time in their lives. Only half of each group indicated they were not self-conscious at the time of interview.

Physical Performance

Statistical tests showed that the following variables were associated with high scores on the physical performance index:

- Site of the amputation (people with longer limbs remaining performed better)
- Wearing the prosthesis 14 hours or more a day
- Incidence of phantom limb sensation (people without phantom limb do better)
- The feeling that the amputation had no effect either on choice of occupation or choice of spouse
- Frequency of visits to Center (lower-limb amputees who in their first year of limb care had 3 or more visits to the Center did better than those with fewer visits)

Factors associated with lower levels of physical performance for all amputees were:

- Doing fewer household chores than most children
- Feeling that the childhood was unhappy
- Believing that parents advised limiting career goals
- Being self-conscious
- Avoiding awkward tasks
- Dating less frequently because of limb
- Feeling that prosthesis has negative impact on dating
- Strong and specific dislikes of aspects of their prostheses, particularly among upper bilateral amputees

Factors associated with lower levels of physical performance among lower acquired amputees only were:

- Concern about the difference in appearance between a prosthesis and a normal limb
- Losing a limb due to disease
- Losing a limb late in childhood (after age 16)
- Lasting negative reaction to loss
- Fitting problems with prosthesis.

Many factors had no demonstrable effect on physical performance outcomes. Health and weight of respondents, use of a prosthesis, patient satisfaction with the facility where they obtained care, special schools or classrooms for handi-capped children, difficulty in finding a job, participation in teenage activities, amount and kind of parental concern and protection, socioeconomic status, age, sex, and urban-rural status did not differentiate between amputees with poor physical performance and those with high physical performance.

Social Performance

The authors concluded that the social performance index was a more sensitive indicator of amputees' well-being than the index of physical performance. The physical performance scores were spread across a relatively narrow range, with most respondents clustered closely around an adequate level of performance. Few had poor or inadequate scores. In contrast, the overall distribution of social performance scores was more widely spread and showed a range from outstanding social function to pathological states of withdrawal and psychopathology (as measured by the Gurin Psychological Test).

A second conclusion regarding social performance was that it was consistent over time. Individuals who had low social performance scores on the interview were very likely to have been rejected by their peers as children, unpopular as teenagers, and unable to maintain stable, supportive relations with their families or to succeed in prototypical social institutions such as school. By contrast, individuals who were happy, accepted, and successful in their early years had a high probability of continuing to do well as young adults.

Social class emerged as an influential determinant of social function outcomes. The effects of differences in stimulation experience, contacts, opportunity motivation, and other class-linked factors appeared to be so strong that the authors concluded an amputee from a lower class background had distinctly less chance of adequate social performance, while children raised in higher socioeconomic surroundings were much more likely to function well socially. At the same time, the findings showed no association between social class and physical performance. No other

demographic factors were found to be closely associated with social performance.

Diagnostic characteristics associated with social performance included:

- Bilateral upper amputees more frequently had low levels of performance
- Congenital lower amputees more frequently scored at high levels
- Amputations due to disease were associated with low scores
- Amputations occurring in middle childhood years were associated with low scores.

As in the earlier study, prosthesis experiences (such as wearing habits, non-use, the condition of prostheses) did not influence social performance outcomes. Individuals, especially congenital lower-limb amputees who expressed concern about the realistic appearance of their prostheses, often had low social performance scores.

Factors which were associated with a poor social outcome were:

- Broken homes or parents who got along poorly
- Moving frequently during childhood
- Being raised in large families—for bilateral upper amputees
- Being an only child—for acquired lowers
- Excesses in parental attention or child-rearing techniques, as self-reported by amputees
- Being rejected and taunted in childhood play
- Unpopularity as a teenager
- Not being invited to social functions
- Difficulty getting dates
- Not being able to obtain or hold a satisfactory job
- Sheltered workshop experience
- Perceiving self as very different from others
- Having an uncomfortable phantom limb (especially for acquired lowers)
- Poor prosthetic awareness, as measured by confusion about limb position, inability to judge distances, and not remembering that the limb is shorter than normal
- Feelings of self-consciousness
- Being bothered by unsolicited assistance

Factors associated with a good social outcome:

- Follow-up by the treatment facility—particularly clear for unilateral lower amputees
- Receiving social services (except for congenital lower amputees, who performed better socially when they needed no counseling)

- Feeling that clinic services only slightly improved physical function (except congenital lowers, who showed no association at all with this factor. Bilateral uppers who felt that they had greatly improved in physical function scored on the low end of the social performance scales)
- Friendships with staff or other patients (bilateral uppers did not show this association)

Being able to obtain and hold a satisfying job, to get along with others on the job, and to learn sufficient income were associated with high levels

of social performance. Individuals who saw themselves as similar to nonhandicapped people on the Attitudes Toward Disabled Persons Scale (ATDP) frequently scored high on the social performance index. Engaging in physically active recreation, voluntary groups, and hobbies also typified high social performers to a greater extent than those with poorer social function. As in the earlier study, a principal conclusion drawn from these data was that social and psychological factors play a greater role in determining physical and social outcomes than do physical factors, or factors relating to the design of prostheses.