

VOCATIONAL OUTCOMES ASSOCIATED WITH LOWER EXTREMITY AMPUTATIONS

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ABSTRACT: Lower extremity amputation is a severe disability that affects a person's vocational abilities. Limited information is available that describes this impact. The vocational, amputation, and background histories of 31 persons with a lower extremity amputation were gathered through a structured interview format. The results of the interviews were defined in terms of vocational status and Department of Labor standards on physical demands and working conditions. Background variables were compared to employment status to differentiate between the employed and unemployed subjects. Pre and postamputation employment was compared using the Department of Labor standards. Intervention strategies for vocational assessment and rehabilitation were suggested.

Amputation of an extremity has long been regarded as a complicated disability because of the numerous medical, social, and psychological implications associated with the loss of a limb. There are an estimated 311,000 persons in the United States with a major extremity amputation (Friedman, 1981) and an additional 43,000 individuals have amputations each year (Banerjee, 1982). Approximately 90% of amputations involve the lower extremities and more than half of these are the result of vascular disease (Friedman, 1981).

Many factors play a role in the effectiveness of ongoing rehabilitation efforts that are available for persons with amputations. Success and failure is frequently defined in different ways by the many professionals that come in contact with persons disabled by an amputation. Successful employment in a competitive environment, however, is an outcome that implies mastery of many of the components of a comprehensive rehabilitation effort.

Personal and social adjustment to the loss of a limb, as well as a stable medical status are several of the important considerations which determine success of a rehabilitation effort. Much has been written about these psychological and social aspects. Less has been written about functional abilities following amputations and even less about how all of these factors influence a person's ability to participate in gainful employment. Employability following an amputation is directly influenced by physical skills of the person involved and the corresponding demands of the jobs in the available market. Indeed, vocational counseling, vocational investigation and retraining have been cited as essential components of a rehabilitation program for persons with amputations who are of working age (Kindon and Pearce, 1982).

The most significant factor related to functional ability is the level of the amputation. This

is true for several reasons, including the obvious loss of bone and muscle tissue, heavy prostheses and alterations in body metabolism. Because of these considerations mobility, balance and endurance are factors that may produce limitations on a job. Persons with amputations are encouraged to avoid jobs which require excessive walking, constant standing, climbing, crawling, kneeling and lifting heavy objects (Wright, 1980). The use of a prosthesis is also a source of limitation: prostheses are inherently uncomfortable, do not allow the enclosed stump to breathe and are subject to mechanical malfunctions. Consequently, extremely cold, warm and/or dusty environments are suggested employment places to be avoided (Friedman, 1981).

Little is presently known about actual vocational experience of persons with amputations. Experience reveals that many do not work in sedentary or light jobs even with high school or college educations. Some work in physically demanding jobs as soon as they are medically able, even with over-riding systemic disease symptoms. Experience suggests that present vocational assessment and counseling methods do not adequately address the comprehensive nature of employment of persons with amputations. Only when more information is available that defines what persons with amputations are and are not doing, and what differentiates between those employed and unemployed, will more effective strategies for intervention be developed.

In a recent pilot study an attempt was made to define actual vocational outcomes of 31 persons with lower extremity amputations. The subjects for this study were persons in attendance at the University of Mississippi Medical Center Amputee Clinic during a six week period in 1984. All persons attending the clinic between the ages of 18 and 64 and demonstrating a lower extremity amputation freely consented to participate in the study. Background data and information related to the subjects' vocational and amputation

histories were gathered through a structured interview format.

Results

The median age of the predominantly male subjects was 39 years (range 19-63 years) and the median time since amputation was 3 years (range 1 month - 36 years). The most common cause of the amputation was diabetic related disease and the mean education level of the subjects was completion of the ninth grade. Most of the subjects were independent ambulators and most felt that their personal desire and motivation was their best source of vocational help.

Twenty-six subjects were employed or in school at the time of their amputation. The remaining five were on disability. At the time of the survey six of the subjects were employed full time and two part time. An additional four were not working but had worked since their amputation. The remaining 19 subjects had not been employed in any way after their amputation.

The relationship between several subject variables and employment status was examined through the use of chi-square statistics. Educational level, age, time since and cause of amputation, ambulation status and perception of vocational assistance were the background variables evaluated. Because of the limited number of subjects in this study (n=31) these background variables were collapsed to offset the chi-square tendency toward observed frequency skewness seen when the expected frequencies of a distribution are very small.

Three variables proved to be significant factors in separating the employed and unemployed subjects: ambulation status, time since amputation, and vocational assistance. The first two factors showed that persons were more likely to be employed if they were independent ambulators (with or without a cane) and if more than 30 months had passed since their

amputation. Persons were also more likely to be employed if they attributed their vocational rehabilitation to intrinsic factors (personal desire and motivation) rather than to external factors, such as help from physicians, therapists, vocational rehabilitation counselors or an understanding employer. The cause of the amputation (traumatic or non-traumatic), educational background (completion or non-completion of at least 10th grade in high school) and age (above or below the median of 39 years) were not significant factors in separating the employed and unemployed subjects.

The final aspect of this study was a comparison of before and after amputation employment. Standardized information, available through the Department of Labor (DOT, 1977, Handbook for Analyzing Jobs, 1977, & Field & Field, 1977) was the basis of this comparison. Seven subjects, those who were employed before and had worked after their amputation, were included in this analysis.

The job characteristics used to describe the subjects pre and postamputation employment included 13 variables. These variables and the frequency distribution of job ratings are listed in Table 1. Only two variables, No.1

(Strength) and No. 7 (In/Outdoors), are defined for every job. The remaining 11 variables are listed for a job only if that factor is a significant part of that job.

Two methods were used to compare the Strength variable before and after amputation. First, the strength categories were ranked in a 1 to 5 interval scale (1 = sedentary, 3 = medium, 5 = very heavy). A t-test for nonindependent groups showed that the pre and postamputation employment strength means of 3.43 and 2.71, respectively, were not significant. The strength categories were also ranked in an ordinal scale with values corresponding to the minimum strength (in pounds) cited in the definition of each category (0 = sedentary, 10 = light, 20 = medium, 50 = heavy, 100 = very heavy). A t-test showed that the pre and postamputation employment strength means of 44 and 20 pounds, respectively, were not significant. Descriptively, four subjects returned to a job requiring less strength, two did not change strength demands and one returned to a job which required more strength?

The remaining Physical Demands and the Working Conditions were evaluated by looking at how each individual's job changed in terms of an addition or a subtraction of an interfering or noninterfering variable. Physical demands No. 2 and No. 3 (climbing and/or balancing; and stooping, kneeling, crawling and crouching) were judged to be interfering vocational variables for the subjects. The remaining Physical Demands (reaching, etc., talking and/or hearing, and seeing) were judged to be non-interfering vocational variables. All of the Working Conditions (except work indoors) were judged to be interfering variables. Postamputation employment differed from preamputation employment in the following ways: three interfering and four non-interfering Physical Demand Variables were no longer significant in the post-amputation jobs, four noninterfering variables became

Table 1
Frequency Distributions of Standardized Job Variables
Associated With Pre and Postamputation Employment

Job Variable	Employment	
	Pre N	Post N
A. Physical Demands		
1. Strength-Sedentary	0	0
Light	2	3
Medium	2	3
Heavy	1	1
Very Heavy	2	0
2. Climbing and/or balancing	3	1
3. Stooping, kneeling, crawling, crouching	5	5
4. Reaching, handling, fingering, feeling	6	5
5. Talking and/or hearing	3	4
6. Seeing	4	3
B. Working Conditions		
7. Indoors	3	2
Outdoors	2	1
Both	2	4
8. Extremes of cold	0	0
9. Extremes of heat	0	0
10. Wet and humid	0	0
11. Noise and vibration	3	2
12. Hazards	1	1
13. Fumes, odors, toxic conditions, dust, poor ventilation	0	1

significant. One interfering Working Condition was lost, one was gained. Five individuals did not change the Indoor/Outdoor/Both rating of their job. One subject's job became more outdoors oriented, one more indoors oriented. Collectively, 60 percent of the changes were accommodating to the amputation, 40 percent were not.

Discussion

Three variables proved to differentiate between the employed and unemployed subjects in this study. The ability to ambulate independently (with or without a cane) was a significant variable and suggests that mobility is a key factor for employment. Of course, ambulation status may actually be indicative of a more general state of health and hence influence employability from a broader base. If mobility itself is the key however, efforts toward increasing accessibility of the work place to wheelchairs (and increasing wheelchair acceptability in employers' minds) would be an effective intervention to improve return to work rates for persons with lower extremity amputations.

Time since amputation was also a significant factor and suggested that as more time passes from an amputation (exceeding 30 months) the more likely the individual will be employed. This result is in conflict with the widely held view that the longer an individual is out of work, the less likely he/she is to return. There were several subjects in this study who were interviewed very soon (less than 6 months) after their amputation and medically may not have been able to work at that point in their recovery. This influence may have unfairly skewed the result of this evaluation. The key factor that influenced this return to work variable appears to be expectation. Expectation appears clearly related to time and the more time that passes from employment the less

the expectation is of returning to work.

The personal perception of source of vocational assistance was another significant factor in differentiating between the employed and unemployed subjects in this study. Those individuals who cited intrinsic factors as opposed to external agents were more likely to be employed. This result is in accordance with the growing awareness of the limitations of the medical model of illness management. The entire issue of employment with a severe disability such as an amputation is too broad and encompassing to be "taken care of" by an extraneous force. Unfortunately, most members of this society are not taught to be responsible for their own health. Instead, they are encouraged to allow professionals to make the decisions and solve the problems associated with their bodies. If this attitude holds in light of a severe disability, frustration, anger and resentment can be the only result. This perspective of personal responsibility toward care following an amputation holds great promise as a counseling tool.

Assisting an individual to take responsibility for their own future can provide direction and focus for that future. Further research exploring the concept of locus of control and employment following amputation is clearly indicated.

Age, cause of amputation, and education were not significant variables in differentiating between employed and unemployed subjects in this study. This evidence serves as a reminder that older, less educated individuals do have employment potential and should not be slighted in any type of rehabilitation program. This perception may appear obvious to rehabilitation professionals, but everyday practice too often conforms to other forces that do not enjoy this insight. Efforts need to be made to conscientiously apply this principle in practice.

The final aspect of this study compared employment characteristics, pre and postamputation. The Department of Labor provides a vast array of standardized information to assist with this type of evaluation. The nationwide applicability of any results using this data makes it a tool of great importance. For example, the results of this study suggest that lifting and carrying abilities are not significantly reduced for persons with lower extremity amputations. Individual differences did show a tendency toward engaging in lighter work, but a firm cut off for the capacity was not suggested. Also, the evaluation of the remaining physical capacities and work conditions suggested a similar relationship.

Individual accommodation was made toward the amputation but no general point of conformity was suggested. Undoubtedly, the limited nature of this study does not warrant absolute guidelines. However, if the physical and environmental characteristics of jobs that represent successful employment for persons with amputations can be identified and defined in terms compatible with Department of Labor data, a more effective vocational assessment device will result. Indeed, all standardized job information available through the Department of Labor, e.g. job temperaments and interests, can be viewed in this same manner. Much research is needed in this area so the present tools of vocational assessment can be more fully utilized.

Summary

Lower extremity amputation is a disability that has a definite impact on a person's vocational life. This study attempted to define that impact in terms of change in employment status and employment characteristics seen with an amputation. Many factors appear to be significant including ambulation status, expectations and perception of source of vocational assistance. Educational and age did

not appear to be as important in predicting employability as might be expected. Department of Labor standardized information was used as a tool to evaluate pre and postamputation employment. This extensive tool has not been utilized to its fullest capacity as a vocational assessment instrument. It has the potential to provide valuable information about physical capacities and environmental conditions in the work place. Any results or guidelines developed using this tool have nationwide applicability.

There is a gap between the realities of present vocational rehabilitation techniques and the experience of having a lower extremity amputation. The two are compatible and further research is needed to bring them together.

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