Factors Influencing Reintegration to Normal Living After Amputation

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This study identified factors affecting reintegration to normal living (RNL) after lower extremity amputation. A questionnaire was used to evaluate RNL at a veterans' medical center and private rehabilitation clinic. The patients were 42 elderly individuals (68 ± 1.5 years). Eighty-eight percent were men and 76% had additional health problems. Unilateral below-knee amputations, unilateral above-knee amputations, and bilateral amputations accounted for 38%, 36%, and 26% of subjects, respectively. Eleven questions were asked to evaluate mobility, self-care, work, recreation, social activities (daily functioning), relationships, social self, and life events (perception of self). The median overall RNL score was 16 of 22 (range, 5 to 22). Poor reintegration occurred in community mobility, work, and recreation. Perception of self questions showed satisfactory reintegration. Examination of variables impacting reintegration showed only additional illness significantly reducing the RNL score. It was concluded that current rehabilitative efforts regarding home mobility and psychological adjustment are satisfactory. More attention to community mobility, recreation, and additional illnesses would improve RNL after amputation.

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Traditional clinical studies of patients with amputation focus on survival information, complication rates, socioeconomic impact, and prosthetic fabrication techniques. These measures apply best to acute illnesses and to conditions for which normal health status is expected to return.

Few reports in the amputation literature focus on quality of life or chronic consequences of amputation such as functional compensation for disability. No study includes an assessment of a patient's skills and ability to reintegrate to normal living (RNL).

Measures of quality of life and functional status lack a standardized conceptual definition of how such global assessments should be measured. Yet, this lack of consensus does not prevent researchers from assessing quality of life issues. There is much research assessing quality of life in patients with chronic diseases, ie, diabetes, end-stage renal failure, cancer, hearing impairment, dialysis, and transplants.

This article describes the investigation of the ability of patients with amputation to RNL levels and the impact of additional chronic illness on this process.

MATERIALS AND METHODS

Patients with lower limb amputations (unilateral below-knee, 38%; unilateral above-knee, 36%; bilateral, 26%) formed the study group. Patient names were obtained from a veterans' medical center surgical log and prosthetic clinic appointment log books. Our study patients were at least 1 year beyond amputation. Of the 46 names obtained from the veterans' medical center surgical log of patients who underwent amputation between 1985 and 1989, 17 (37%) had expired by the time of investigation.

Patients were contacted by telephone, oral consent was obtained, and their oral responses were recorded. All surveys were administered and scored by a single individual (S.J.N.). The survey consisted of demographic data, present health status, reasons for amputation, date of amputation, surgical complications of amputation, diabetic inventory, nursing home status, marital status, and date of last full-time employment.

The patient survey also included a RNL index, developed by Wood-Dauphinee and Williams to evaluate how an individual can resume well adjusted living after an incapacitating illness. The RNL index evaluates eight areas related to activity and daily living: mobility indoors, mobility in the community, mobility out-of-town, self-care skills, daily and work activities, recreational activities, and social and family role measures (daily functions subscale). The RNL index also measures three areas related to perception of self: personal relationships, presentation of self, and general coping skills (perception of self subscale). Thus, a total of 11 questions are asked in the RNL index (table 1).

Previous research demonstrates that this index is internally consistent with reasonably stable scores. The RNL
index questions are phrased concisely and are easily understood. This clarity allows ease in administering a phone survey, enhanced patient comprehension, and more accurate patient responses.

At the onset of the survey, a five-point scale (strongly agree, agree, no opinion, disagree, strongly disagree) was used to score patient responses to the RNL index. However, many patients had difficulty interpreting the scale and discerning the difference between "agree" and "strongly agree." Therefore, the survey scale was changed to a threepoint scale (agree, no opinion, disagree) to increase reliability of responses and to decrease patient confusion. To quantitate an overall RNL index score, a value of 2 was assigned to "agree," 1 to "no opinion," and 0 to "disagree."

Data Analysis

The overall RNL score was considered as a nonnormal variable. Group difference in this RNL score was examined by the Mann-Whitney test. Data concerning the overall RNL score are presented as median plus or minus the interquartile range. Other data are presented as mean plus or minus standard error. The effect of variables potentially impacting RNL was examined both for the overall RNL score and for scores for both the daily functioning subscale and the perception of self subscale. These subscales are associated (Kendall's tau B = 0.41; p < .002), and considering these subscales apart from the overall RNL index did not add information. Data are not shown for these subscales. All statistical calculations use the SAS Institute programs.12

RESULTS

Table 2 lists demographic variables. Our study group comprised elderly individuals (68 ± 1.5 years), of whom 88% were men. Their education level was 10.2 ± 0.5 years, and 62% were married. Patients commonly exhibited additional health problems (76%) with a high prevalence of diabetes mellitus (45%). Unilateral below-knee amputations and unilateral above-knee amputations occurred approximately equally (38% and 36%, respectively). Bilateral above-knee amputations and bilateral above-knee and below-knee amputations occurred equally (9.5%), and bilateral below-knee amputation was the least frequent (7%). Quantitation of patient responses to survey questions is shown in figure 1A (daily functioning subscale) and figure 1B (perception of self subscale). Responses indicate more impairment in community mobility than in personal living quarters mobility and out of town mobility. The score evaluating meaningful work activity (question 5) shows substantial dissatisfaction with work reintegration (59%). However, given the age at amputation for most individuals (60 ± 2.2 years), this result might not be surprising. For the subjects whose amputations occurred during their working years and who are now of the usual employment age (less than 65 years), 8 of 14 (57%) report disagreement with reintegration to satisfactory work. Severe impairment was noted in recreational activity participation. Figure 1B illustrates adequate patient perception of self.

The median overall RNL index score was 16 ± 5 of a possible 22 points (range, 5 to 22 points). We examined the impact of several variables on RNL scores (fig 2). The only impact variable found to significantly reduce the overall RNL score was health problems in addition to amputation (p < .05).

DISCUSSION

Reintegration to a patient's previous lifestyle is a primary goal for both health care professionals and patients after lower extremity amputation. RNL may be defined as "the reorganization of physical, psychological and social characteristics of an individual into a harmonious whole so that one can resume well-adjusted living after an incapacitating illness." Reintegration may include mechanical devices,
patients with chronic disease and amputation would have less than satisfactory RNL scores. We speculated that patients with the daily burdens of chronic disease might be overwhelmed with the additional impairment of an amputation. Our results confirmed this impression and should reaffirm the concept of holistic rehabilitative efforts.

Analysis of the 11 statements of the RNL index showed inability to participate in recreational activities as the most restricted aspect of patients' RNL profiles. This indicates a further need for rehabilitation teams to teach better adaptive skills or enjoyable substitutes for recreation. Examples include ambulating skills needed for walking on uneven ground as needed for hunting and fishing, better shoe soles for prostheses when walking on ice, and trial and error with various prosthetic fabrication models to facilitate ambulation.

Physicians need to increase their awareness of the importance of recreational activities when obtaining a patient's social history. A patient's recreational activity level in postsurgical and prosthetic follow-up care should be monitored frequently.

Recreational therapists may need to spend more time helping patients find acceptable, alternative recreational activities or adaptive means to continue previous recreational favorites.

The RNL index also assesses patient mobility in various settings: in their own living quarters, in the community, and on out-of-state trips. The RNL survey results indicate that most patients with amputation report adequate mobility in their own living quarters and on out-of-town trips. However, patients report the most impairment with ambulation in the community. With current rehabilitation efforts, patients usually have an adaptive home floor plan, adaptive equipment, and additional assistance in their own living quarters to augment their mobility. On out-of-town trips, patients may have extra personal assistance, and traveling out-of-town does not necessarily require walking any added distance. In contrast, patients' decreased mobility accepting and tolerating disability, adjusting to unpleasant side effects, and personal assistance through family members or health care professionals.\(^\text{13}\)

We examined numerous variables that could potentially alter RNL (fig 2). Of these, only illnesses in addition to amputation demonstrated an impact on RNL. Most patients with additional health problems had multiple medical problems (84%). Other additional health problems named by patients included rheumatoid arthritis, chronic stump pain, chronic stump skin breakdown, obesity (creating added difficulty to ambulate well with prosthesis), degenerative joint disease, angina, kidney transplant, chronic obstructive pulmonary disease, stroke, hearing impairment, chronic heart failure, and diabetes mellitus. Diabetes mellitus, although the most prevalent additional illness, did not in itself alter patient perception of RNL. This is somewhat surprising as the additional burdens of care and management of diabetes are substantial.

It is not surprising that additional debilitating health problems in patients with amputation significantly affected RNL score. We hypothesized at the start of this study that

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Fig 1—(A) Patient response to RNL, daily functioning subscale. Question 1. Moving in living quarters; question 2. moving in community; question 3. moving on trips; question 4. comfort with self care; question 5. work activity; question 6. participation in recreation; question 7. participation in social activity; question 8. role assumed in family. (B) Patient response to reintegration to normal living, perception of self subscale. Question 9. comfort with relationships; question 10. comfort with social self; question 11. ways of handling life events. (□) agree; (□) no opinion; (□) disagree.

Fig 2—Median reintegration score. The effect of variables of potential influence on RNL, DM, diabetes mellitus; HEALTH, additional illness; MAR, marital status; NH, nursing home residence; MALE, gender; AMP REV, amputation revisions; VET, veteran. *p < .05

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within the community may be caused by insufficient handicapped adaptations. Other potential factors include less readily available personal assistance, decreased ability and endurance to ambulate for long distances, unpredictable terrain, and lack of proper community social service networks.

Reintegration to work activity is unsatisfactory for 57% of patients who are in their usual working years. Correcting this patient perception is difficult because the amputations tend to occur at the end of careers (average age at amputation for subjects in their working years: 49 ± 4 yr). For those whose work required extensive mobility, retraining may prove difficult. This factor further emphasizes the importance of appropriate recreational activities for satisfactory readjustments.

Demonstration of satisfactory perception of self and perception of the patient's role in family and personal relationships is a gratifying result from the study. This implies that current psychologic and social rehabilitative efforts are successful and should be continued.

The patient characteristics limit the generality. The rural nature of our population constrains most patients to small towns that may not have the adaptive or rehabilitative facilities (both physical and social) of urban areas. Because most patients in the veterans' medical center were men, we consciously attempted to evaluate women from a local clinic. Although only five women were surveyed, there was no indication of a gender-based difference. Interestingly, site of amputation (above-knee vs below-knee) or the addition of bilateral amputation did not alter the overall RNL score.

CONCLUSION

Comparison of the results of this study with those documented in the literature indicates that patient adjustment after amputation is comparable to other chronic illnesses. However, analysis of specific issues of reintegration indicate areas of satisfactory adjustment and areas needing improvement. Although amputation adversely influences RNL our results indicate that this adverse adjustment can be improved by specific rehabilitation efforts.

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References