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A prospective study of the importance of life goal characteristics and goal adjustment capacities in longer term psychosocial adjustment to lower limb amputation

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Keywords: Amputation; depression; goal importance; goal adjustment; prospective studies

Abstract

Objective: To explore the life goal characteristics and goal adjustment capacities of persons with lower limb amputation on admission to rehabilitation, and to examine their efficacy as predictors of psychosocial outcomes 6 months post-discharge.

Design: Prospective, descriptive.

Setting: Two specialist inpatient rehabilitation facilities in Ireland.

Subjects: A consecutive sample of 64 patients with lower limb amputation.

Main measures: On admission to rehabilitation, life goal characteristics (goal importance, goal disturbance) were assessed using the Goal Facilitation Index and goal adjustment capacities (goal disengagement, goal re-engagement) were measured using the Goal Adjustment Scale. The Beck Depression Inventory-II and the Trinity Amputation and Prosthesis Experience Scales-Revised assessed depressive symptomatology and psychosocial adjustment to amputation at 6 months post-discharge.

Results: The highest average importance ratings were assigned to goals associated with interpersonal relationships, independence, and subjective well-being. Goals related to physical limitations and disruptions in daily activities received the highest hindrance ratings. Goal importance ($\beta = -0.33$) and goal disengagement ($\beta = -0.29$) on admission significantly predicted depressive symptomatology 6 months post-discharge ($p \leq .05$). Goal importance ($\beta = 0.32$), goal disturbance ($\beta = -0.26$), and goal re-engagement ($\beta = -0.21$) on admission significantly predicted general adjustment to lower limb amputation at 6 months post-discharge ($p \leq .05$), while goal importance ($\beta = -0.32$) and goal disturbance ($\beta = 0.30$) significantly predicted social adjustment ($p \leq .05$).

Conclusions: Life goal characteristics and goal adjustment capacities on admission to rehabilitation predicted psychosocial outcomes 6 months post-discharge among individuals with lower limb amputation.

Clinical Messages:

- Life goal characteristics and goal adjustment capacities on admission to rehabilitation predicted psychosocial outcomes among individuals with lower limb amputation 6 months post-discharge.
- Patient-led interventions targeted towards identifying and reducing disruptions in attaining valued goals and promoting goal disengagement could enhance adjustment in this patient group.

Introduction

Individuals with lower limb loss can experience significant disruptions in many important life domains, including mobility (1), occupational status (2), social relations (3), participation (4), and mood (5). The main purpose of rehabilitation is to restore function; its success is often gauged in physical and functional terms only (1).

Adaptation to acquired disability is a psychosocial as well as physical process, however, and it is argued that a more comprehensive biopsychosocial approach to rehabilitation is required (6, 7).

Self-regulation theory provides a useful framework for understanding motivation, affect, and goal-directed activity in rehabilitation contexts (6, 8-10). The central assumption is that human behaviour is organised around the pursuit of goals, which derive from core aspects of the self and are organised in a hierarchical structure.

According to this perspective, goals at higher levels (life goals) relate to the person's roles or personal qualities and are broader and more conceptual in nature than those at lower levels. Goals are thought to give structure, coherence, and purpose to people's lives, and are thus of great significance for psychological well-being (11, 12).

Disturbances in the attainment of valued goals are associated with emotional distress and diminished quality of life (13-17).

In order to restore emotional balance, it may be adaptive to disengage from goals that are no longer attainable and re-engage in alternative, meaningful goals (11, 18). Goal disengagement removes the person from the negative emotional consequences of repeated goal failure and frees up resources for the attainment of other goals. Goal re-engagement establishes new goals to strive towards and returns the individual to being actively engaged in life. A stronger disposition for goal disengagement is associated with lower levels of psychological distress (19, 20), while being more disposed toward goal re-engagement is related to higher levels of positive affect (21, 22) and fewer depressive symptoms (23, 24).

Self-regulation theory is relevant to persons with lower limb amputation, as the impact of limb loss on physical and psychosocial functioning is likely to disrupt the attainment of goals in many life domains. This experience may also challenge people's outlook on life, leading to reprioritisation of existing goals and creation of new goals (13). Little is currently known about the types of goals that are most important to individuals with lower limb amputation, or those that are most affected by limb loss. Assessing the importance of different life goals and degree of difficulty experienced in their attainment may help to identify problems in areas of life that are highly valued in this patient group yet not usually addressed in rehabilitation. In addition, examining associations between the life goal characteristics and goal adjustment capacities of

persons with amputation and their psychosocial outcomes prospectively could provide insight into how they may be supported in adapting goals to current abilities and maintaining psychological well-being in the long-term.

The objectives of the current study are: (1) to explore the life goal characteristics and goal adjustment capacities of persons with lower limb amputation on admission to rehabilitation; and (2) to examine their efficacy as predictors of psychosocial outcomes 6 months post-discharge.

Methods

Participants were recruited from two urban hospitals in Ireland that offer specialised, interdisciplinary inpatient rehabilitation programmes for individuals with lower limb amputation. Ethics Committees at both hospitals approved the study protocol. Persons aged ≥ 18 years who were admitted between February 2010 and July 2011 with major lower limb amputation (i.e. above ankle level) for which inpatient rehabilitation services had not previously been provided, and who had sufficient proficiency in English for the demands of the study, were eligible to participate. Patients were excluded if they had severe cognitive impairment, indicated by a Mini Mental State Examination (25) score of < 18 , or were deemed unsuitable due to previous or current history of psychiatric

morbidity. Potential participants were identified by the consultant in charge of the programme in each hospital. Patients were initially approached and given an information sheet describing the study. Those who agreed to take part signed a consent form. Questionnaires were administered by the researcher (L.C.) in a structured interview format. Six months after discharge, questionnaires were either delivered by post for self-completion or administered by the same researcher in the participant's home.

Participants' age, gender, education level, marital status, and living situation were recorded on admission to rehabilitation. Clinical data regarding when the amputation was carried out, cause and level of amputation, presence of co-morbidities, and residual and phantom limb pain were also documented on admission. Average intensity of amputation-related pain was assessed using a single item from the Brief Pain Inventory (26). Participants rated their average pain intensity on a numeric rating scale ranging from 0 ('no pain') to 10 ('pain as bad as you can imagine').

The Goal Facilitation Inventory (27) was completed at both time points. This measure consists of 26 higher-order life goals. Participants firstly evaluated the importance of each goal in their everyday lives on a 5-point Likert scale ranging from 'not at all important' (1) to 'very important' (5). Scores on these items were summed to obtain a

goal importance score. On a scale ranging from 1 ('not at all hindered') to 5 ('completely hindered'), participants then reported the extent to which they were currently hindered in attaining each goal as a result of their amputation. Finally, a goal disturbance score was calculated by multiplying the goal importance score for each item by its goal hindrance score and summing the resulting 26 product scores. This instrument demonstrates good internal consistency (13). Cronbach's alphas were 0.84 for goal importance and 0.93 for goal disturbance in the current study.

The Goal Adjustment Scale (18) was completed at both time points. This scale consists of ten items assessing how respondents typically react if they have to stop pursuing an important goal in their life. Four items assess the tendency to disengage from unattainable goals; six items measure the capacity to re-engage in new goals. Items are rated on Likert scales ranging from 1 ('strongly disagree') to 5 ('strongly agree'). This measure has acceptable reliability and validity (18, 22). In the present study, Cronbach's alpha values of 0.70 and 0.91 were observed for the disengagement and re-engagement subscales, respectively.

The Beck Depression Inventory-II (28), a 21-item self-report measure of depressive symptomatology, was completed at both study time points. Total scores range from 0 to 63; higher scores denote greater depressive symptomatology. This scale has well-

established psychometric properties (29). The Cronbach's alpha value in the present sample was 0.91.

The Trinity Amputation and Prosthesis Experience Scale-Revised (30) is a 64-item multidimensional self-measurement instrument assessing adjustment to amputation and prosthesis use. The psychosocial adjustment scale was employed in the present study; it consists of three 5-item subscales measuring general adjustment, social adjustment, and adjustment to limitations. Items are rated on 4-point scales ranging from 'strongly disagree' (1) to 'strongly agree' (4); higher scores indicate better adjustment. This measure demonstrates adequate psychometric properties (30). In the present study, Cronbach's alpha values of 0.91, 0.96, and 0.81 were observed for the general adjustment, social adjustment, and adjustment to limitations subscales, respectively.

Statistical analyses were conducted using the Statistical Package for the Social Sciences Version 20 (IBM, 2010). Goal disturbance, depressive symptomatology, and social adjustment scores were not normally distributed and were transformed to better meet the assumptions of multiple regression. Marital status (with/without partner), living situation (living alone/with others), and cause of amputation (chronic/acute) were recoded into dichotomous dummy variables. Life goals were ranked in terms of their mean importance, hindrance, and disturbance (importance x hindrance) scores on

admission to rehabilitation. Relationships between predictor and outcome variables were examined using hierarchical multiple regression analyses. Baseline outcome scores were controlled for in the first step. Given the limited sample size at 6 months post-discharge, only sociodemographic and/or clinical variables significantly correlated with the outcomes ($p \leq .05$) were controlled for in the second step. Goal importance and goal disturbance were entered in the third step, followed by goal disengagement and re-engagement in the fourth step. None of the assumptions of multiple regression were violated.

Results

Of the 113 patients eligible to participate, 12 declined to participate and 3 were discharged prior to meeting with the researcher. The remaining 98 patients agreed to take part and completed questionnaires on admission to rehabilitation; 64 (65%) of these participants also completed questionnaires 6 months after discharge. For the final sample ($N = 64$), participants' ages ranged from 28 to 89 years ($M = 63.56$, $SD = 11.96$). Most were male ($n = 53$), married ($n = 33$), had primary ($n = 29$) or secondary ($n = 21$) level education only, and lived with their partner ($n = 32$). Thirty-one participants had below-knee amputations, 28 had an above-knee amputation, and 5 had bilateral amputations. For most participants, the cause of amputation was chronic (i.e., peripheral

vascular disease, diabetes, or cancer) in nature ($n = 50$). Time elapsed since amputation ranged from 6 to 260 weeks, with a median of 20 weeks ($M = 31.56$, $SD = 42.84$). Fifty-four participants experienced at least one comorbid health condition; the most common comorbidities were cardiac problems ($n = 42$) and diabetes ($n = 30$). Forty-eight participants experienced phantom limb pain, and 20 reported residual limb pain. The average intensity of amputation-related pain experienced was 2.30 ($SD = 2.02$). Descriptive statistics for the predictor and outcome variables are displayed in Table 1.

*** insert Table 1 here***

Tables 2-4 display the top ten Goal Facilitation Inventory items ranked in terms of their mean importance, hindrance, and disturbance ratings on admission to rehabilitation. 'Being healthy' was the most important life goal in this sample on average. All 64 participants rated this goal as either 'important' or 'very important'. 'Keeping up my self-confidence' ($n = 63$) and 'treating others fairly' ($n = 63$) were the second and third most important life goals, respectively.

*** insert Table 2 here***

On average, participants reported experiencing the greatest hindrance in ‘having my daily activities run smoothly’. This was followed by ‘experiencing bodily pleasures’ and ‘discovering new things’.

*** insert Table 3 here***

The highest mean goal disturbance scores on admission to rehabilitation were given to ‘ensuring my safety’, ‘being healthy’, and ‘having my daily activities run smoothly’.

*** insert Table 4 here***

Associations between sociodemographic and clinical characteristics and depressive symptomatology, general adjustment, and adjustment to limitations at 6 months post-discharge were non-significant. Social adjustment was significantly associated with presence of residual limb pain ($r = 0.32$), average pain intensity ($r = 0.27$), and education level ($F = 4.70$, $df = 2, 61$, $p = .013$); these variables were controlled for in the second step of the regression model predicting this outcome.

The hierarchical regression analyses were significant for each of the outcomes assessed at 6-month follow-up (see Table 5). Goal importance and goal disengagement emerged

as significant predictors of depressive symptomatology, in addition to baseline scores. General adjustment was independently predicted by baseline scores, goal importance, goal disturbance, and goal re-engagement. Goal importance and goal disturbance were also significant predictors of social adjustment, along with baseline scores and having primary level education only. Baseline scores were the only significant predictor to emerge for adjustment to limitations.

*** insert Table 5 here***

Discussion

The most significant finding of the present study was that life goal characteristics and goal adjustment capacities on admission to rehabilitation predicted depressive symptomatology and psychosocial adjustment to limb loss 6 months after discharge among individuals with lower limb amputation. Specifically, higher goal importance predicted fewer symptoms of depression and better general and social adjustment to amputation, while higher goal disturbance predicted poorer general and social adjustment outcomes. A stronger disposition towards goal disengagement predicted lower depressive symptomatology. Contrary to expectations, stronger goal re-engagement tendencies were predictive of poorer general adjustment. Overall, these

findings support many assumptions of self-regulation theory. This perspective offers a valuable account of the processes underlying psychosocial adjustment to lower limb amputation and merits further application to persons with acquired physical impairment.

Certain limitations should be considered when interpreting the results. Participants were recruited from a prosthetic rehabilitation programme and are likely to represent a healthier and more able-bodied sector of this population. Many individuals who undergo amputation never attend formal rehabilitation due to age or ill health (34). Recruiting participants from hospital settings following amputation surgery might have increased the generalizability of findings. Previous authors have highlighted significant challenges in such an approach, however (35). The use of self-report measures leaves open the possibility that response biases may have influenced scores. Qualitative interviews could be employed to bolster questionnaire findings and elaborate interesting issues arising from the quantitative data (36). The timeframe of the study, from rehabilitation admission up to 6 months post-discharge, was limited; more extensive longitudinal studies are required.

This is the first study to examine life goals in people with lower limb amputation. Goals most highly valued on admission to rehabilitation related to subjective well-being (e.g., 'being healthy', 'keeping up my self-confidence'), interpersonal relationships (e.g.,

‘supporting others’, ‘feeling connected to the people around me’), and maintaining independence (e.g., ‘making my own decisions in life’, ‘ensuring my own safety’). This is in keeping with previous studies of individuals with acquired physical impairment; life goals relating to partner/family and personal care tend to be valued above those contingent on physical functioning (16, 17) and given significantly higher importance ratings compared with healthy controls (14, 15). These preferences might reflect the gradual ‘scaling back’ or disengagement from unattainable goals that occurs in adaptive self-regulation (18, 32). Greatest hindrance was experienced in goals indicative of the physical limitations posed by lower limb loss and associated disruptions in independence (e.g., ‘meeting a challenging standard of performance’, ‘fulfilling my duties to others’) and everyday activities (e.g., ‘having daily activities run smoothly’, ‘doing creative things’). This was expected, given that participants had not yet completed their rehabilitation programme. Longitudinal assessment of goal hindrance in this population following rehabilitation is required.

Goal disturbance ratings, which were weighted for importance, indicated that participants were most concerned by disturbances they experienced in goals relating to their independence (e.g., ‘ensuring my safety’, ‘meeting a challenging standard of performance’) and well-being (e.g., ‘keeping up my self-confidence’, ‘feeling relaxed’). These findings highlight the importance of considering patients’ psychological as well as

physical adjustment to limb loss during the rehabilitation process. Interestingly, ‘experiencing bodily pleasures’ did not feature among the top ten goals in terms of goal disturbance ratings, despite its high goal hindrance ranking. This suggests that although participants’ sexual functioning was hindered by their limb loss, this area of their lives was considered of less importance than others on admission to rehabilitation, which may indicate self-protective goal disengagement processes at work (18, 32). Nonetheless, these findings indicate the negative impact of amputation on sexual functioning, and emphasise the importance of education and support in this under-reported domain during rehabilitation (33).

The importance participants afforded their goals on admission to rehabilitation predicted level of depressive symptoms and extent of general and social adjustment to amputation 6 months post-discharge. This corresponds with cross-sectional studies in which higher goal importance was associated with less emotional distress and greater life satisfaction in people with chronic illness and disability (13, 15-17). These findings support the assumption that life goals, particularly those that are highly valued, are closely linked with people’s sense of self and imbue their lives with meaning and purpose (11). In addition, higher goal disturbance scores on admission were predictive of poorer general and social adjustment at 6-month follow-up, which provides further support for the notion that disruptions in goal attainment have affective consequences (13-16).

Having a stronger disposition toward goal disengagement on admission to rehabilitation predicted fewer depressive symptoms 6 months after discharge. This is in keeping with previous studies of goal adjustment capacities in different patient groups (19, 20), and supports the notion that adverse affective consequences associated with illness and disability can be reduced if people disengage from goals that are no longer attainable (11, 18). Contrary to expectations, higher goal re-engagement on admission to rehabilitation was predictive of poorer general adjustment at follow-up. This finding diverges from the literature; goal re-engagement has repeatedly been linked with greater positive affect (21, 22) and fewer symptoms of depression (23, 24). It is possible that goal re-engagement is acting as a suppressor variable in this analysis, as its correlation with general adjustment was non-significant ($r = .07$). Suppressor variables improve prediction of outcome variables due to their correlations with other predictor variables, despite low correlations with the outcome variables themselves (31).

Setting and achieving goals is an essential component of the rehabilitation process (37). Patients are more likely to engage in rehabilitation if treatment goals are personally meaningful and relevant (8), yet they are often excluded from the goal selection process (38), even though their valued goals may differ significantly from those of the rehabilitation team (39). The present study indicates the potential value of assessing the

life goal characteristics of persons with lower limb amputation early in the rehabilitation process. This information could be used not only to screen for individuals at risk for poor psychosocial outcomes in the longer term, but also to identify areas of life in which they are experiencing difficulties that may not have been considered by the rehabilitation team. Indeed, the goals that received the highest importance ratings in this study are rarely considered in the rehabilitation process, which focuses on physical aspects of recovery (16, 39). Greater involvement of patients in the goal setting process is associated with decreased anxiety (10), increased self-efficacy (40), greater adherence to treatment (41), and greater maintenance of therapeutic gains (42), and might also allow patients to develop more realistic expectations concerning recovery (7).

Self-regulation theory might prove valuable in guiding patients' participation in goal setting (8, 9). Sivaraman Nair (8) argues that coping with loss of valued goals and refocusing on more attainable goals are essential for successful rehabilitation, and proposes that the rehabilitation process should begin with identification of the patient's goals, followed by the step of distinguishing achievable from unachievable goals. Rehabilitation goals can then be set so that the patient is enabled to work on achievable goals and to attempt to restructure or deal with the loss of goals that no longer seem attainable.

Administration of a measure such as the Goal Facilitation Inventory (27) could aid in this process. Alternatively, a goal elicitation procedure such as identity-oriented goal training

could be employed (9, 43), in which patients select a person they aspire towards being like and use this 'role model' as a means of stimulating thought about their own personally valued goals. Self-regulation theory might also usefully guide the development of rehabilitation-based interventions to promote long-term psychosocial adjustment to amputation. The implementation of existing interventions such as goal management training (9, 44) or Acceptance and Commitment Therapy (45) might help to reduce goal disturbance by enabling patients to strive towards their valued goals or disengage from those that are no longer attainable, thus promoting adjustment.

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Table 1. Descriptive statistics for predictor and outcome variables.

Variable	Possible range	Minimum value	Maximum value	<i>M</i>	<i>SD</i>
1. Goal importance	26-130	79	130	102.39	10.28
2. Goal disturbance	26-650	95	386	180.30	72.26
3. Goal disengagement	1-5	1	4.75	2.85	0.85
4. Goal-re-engagement	1-5	1.83	5	3.58	0.81
5. Depressive symptomatology	0-63	0	37	8.85	8.84
6. General adjustment	1-4	1.8	4	3.20	0.57
7. Social adjustment	1-4	1	4	3.38	0.62
8. Adjustment to limitations	1-4	1	3	1.91	0.55

Note: The means and standard deviations presented for goal disturbance, depressive symptomatology and social adjustment were calculated prior to transformation.

Table 2. Top ten goals in terms of mean goal importance ratings on admission to rehabilitation ($N = 64$).

	Mean	<i>SD</i>
1. Being healthy ($n = 64$)	4.69	0.47
2. Keeping up my self-confidence ($n = 63$)	4.53	0.53
3. Treating others fairly ($n = 63$)	4.48	0.53
4. Making my own decisions in life ($n = 63$)	4.47	0.59
5. Ensuring my safety ($n = 61$)	4.36	0.68
6. Fulfilling my duties to others ($n = 61$)	4.30	0.61
7= Feeling relaxed ($n = 58$)	4.27	0.72
7= Supporting others ($n = 60$)	4.27	0.67
9. Feeling like I belong here ($n = 59$)	4.25	0.67
10. Feeling connected to the people around me ($n = 58$)	4.23	0.71

Note: Numbers in parentheses represent the number of participants who rated the goal as 'important' or 'very important'

Table 3. Top ten goals in terms of mean goal hindrance ratings on admission to rehabilitation ($N = 64$).

	Mean	<i>SD</i>
1. Having my daily activities run smoothly ($n = 38$)	2.28	1.30
2. Experiencing bodily pleasures ($n = 32$)	2.22	1.43
3. Discovering new things ($n = 37$)	2.17	1.18
4. Meeting a challenging standard of performance ($n = 33$)	2.14	1.22
5= Fulfilling my duties to others ($n = 32$)	2.11	1.20
5= Experiencing excitement ($n = 35$)	2.11	1.20
7. Doing creative things ($n = 32$)	2.02	1.22
8. Ensuring my safety ($n = 31$)	2.00	1.14
9. Doing things better than others ($n = 28$)	1.92	1.23
10. Being healthy ($n = 29$)	1.91	1.14

Note: Numbers in parentheses represent the number of participants who rated the goal as 'hardly hindered', 'partly hindered', 'very hindered', or completely hindered'

Table 4. Top ten goals in terms of mean goal disturbance* ratings on admission to rehabilitation ($N = 64$).

	Mean	<i>SD</i>
1. Ensuring my safety	9.39	5.15
2. Being healthy	9.31	5.49
3. Having my daily activities run smoothly	8.58	5.24
4. Keeping up my self-confidence	8.56	5.27
5. Discovering new things	8.36	5.45
6. Meeting a challenging standard of performance	8.34	4.89
7. Fulfilling my duties to others	8.27	5.02
8. Doing things better than others	8.23	5.71
9. Doing creative things	7.80	5.09
10. Feeling relaxed	7.78	3.93

* goal disturbance = goal importance x goal hindrance

Table 5. Summary of hierarchical regression analyses predicting depressive symptomatology and psychosocial adjustment.

Variable	Depressive symptomatology		General adjustment		Social adjustment		Adjustment to limitations	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1		.450***		.397***		.284***		.178***
Baseline outcome scores	0.57***		0.55***		-0.35***		0.43**	
Step 2		-		-		.157**		-
Education (primary)	-		-		0.45***		-	
Education (secondary)	-		-		0.17		-	
Residual limb pain	-		-		0.11		-	
Average pain intensity	-		-		0.11		-	
Step 3		.058*		.081*		.109**		.002
Goal importance	-0.33***		0.32**		-0.32**		-0.01	
Goal disturbance	0.10		-0.26*		0.30**		-0.01	
Step 4		.076**		.036		.034		.015
Goal disengagement	-0.29**		0.04		0.13		0.12	
Goal re-engagement	0.05		-0.21*		0.15		0.02	
Adjusted R^2		.548		.472		.515		.125

Note: An inverse transformation was performed on social adjustment, and the direction of scores for this variable should be reversed before interpretation. * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$