

**Physical activity and quality of life:
a study of a lower limb amputee population.**

Article title

Physical activity and quality of life: a study of a lower limb amputee population.

Authors

Sarah A Deans MSc, Angus K McFadyen PhD, Philip J Rowe PhD

Running header

Physical activity & quality of life of those with lower limb amputation.

Keywords

Amputee, QOL, Physical Activity, Elderly

Submission date

01 February 2007

Resubmission dates

01 November 2007 and 22 February 2008

Abstract

This cross-sectional descriptive study was initiated to investigate the relationship between physical activity and perceived quality of life in a lower limb amputee population. The objective was to show which aspects of physical activity were most strongly linked to quality of life factors in this special patient group. The outcome measurements were two questionnaires; a section of the Trinity Amputation and Prosthetic Experience Scales (TAPES) and the WHOQOL-Bref. The former measures activity restriction and has athletic, functional and social subscales. The

latter includes physical, psychological, social and environmental domains and measures the individual's perception of their quality of life.

Two postal questionnaires were sent to 75 male and female subjects with either trans-tibial or trans-femoral amputation who were receiving prosthetic care from a Glasgow-based rehabilitation and mobility centre and meeting the inclusion criteria. All subjects were over 18 years of age, the mean age being 66 years. A total of 25 subjects returned the questionnaires, a response rate of 33%.

Nonparametric correlations deduced the following; eight of the twelve relationships were statistically significant. There was a very strong correlation between the social elements of each questionnaire. Unpredictably, there were less strong correlations between functional and athletic elements of the TAPES questionnaire and the social element of the WHOQOL-Bref questionnaire.

These findings support the need for greater acknowledgement by healthcare professionals involved in the care of those with amputation about the importance of the patient's social relationships with friends and family. Education about importance of increasing and maintaining a level of physical activity conducive to health benefits should be based on the implementation of such within a supportive sociable environment for the patient with lower limb amputation.

Introduction

Amputation is one of the major causes of permanent disability. In addition, amputation can often be associated with anxiety, isolation and depression which may change the social and free time activities of the person with lower limb amputation.

The use of physical activity to prevent and treat disease is an ancient concept, yet only recently has scientific evidence become available to support its many benefits. It is known to be important for healthy individuals as it increases longevity of life and promotes a sense of psychological well-being. Equally, those who face physical or psychological challenges or a combination of these can benefit from physical activity as advocated by many international health communities (World Health Assembly 2004).

A profile of the lower limb amputee population.

General activity trends in the elderly have shown that an increase in physical activity improves health related quality of life. What then is the situation for the lower limb amputee?

Some 82.9% of those with lower limb amputation in Scotland lose a limb due to peripheral vascular disease, with 38.6% of this group having amputation due to diabetes (Callaghan *et al* 2001). Another important factor is the average age of the lower limb amputee population; the Scottish amputee population is predominantly elderly with around 80% of primary amputees over 60 and more than 20% over 80 (Condie *et al* 1996). Davies and Datta (2003) reported on those attending a sub-regional English limb centre, with trans-tibial amputation accounting for 50.5% and

trans-femoral 49.5% of the vascular or diabetic cases (87.5% of the total amputee population). These demographics give an indication of the low pre-operative activity levels likely in this group, and suggest that post-operative activity levels may also be reduced. Following on from this, Pell *et al* (1993) found that physical mobility was the only independent factor which significantly affected quality of life in amputees as measured by the Nottingham Health Profile and when compared with their non-disabled counterparts. Based on this novel research, one can speculate that creation of pre-operative and post-operative personalised activity programmes will ultimately reduce the incidence of amputation by the reduction of metabolic disorders such as diabetes.

This background and an apparent dearth of publications on the combined subjects of physical activity and quality of life led to the initiation of this study.

The purpose of the study

To determine the relationship between quality of life and physical activity restriction in people with lower limb vascular amputation. The hypothesis to be tested was that the higher the physical activity level for a person who had undergone vascular amputation, the greater would be their perception that their quality of life was high.

Methods

During 2006, a cross-sectional, mixed methodology study was conducted with a group of lower limb amputees. A cross-sectional design was chosen so that information regarding the prevalence of physical activity and scores representing quality of life of the population could be elicited.

Subjects

Selection was made from adult men and women who have unilateral trans-tibial or trans-femoral levels of lower limb amputation, and who were successfully fitted and ambulatory with a prosthesis. The lower age limit was 18 years. There was no upper age limit. Ethical approval was sought and received from both hospital and University committees. Based on the inclusion criteria, recorded details of suitable possible participants were provided from hospital notes so that a random selection could be made from this cohort. All were attending the purpose-built West of Scotland Mobility and Rehabilitation Centre (WestMARC), Southern General Hospital Trust, Glasgow, United Kingdom for prosthetic care. A total of 75 subjects were selected from those living in five postal code areas of West Central Scotland. In order to produce a homogenous sample, adult patients who had lost their limb due to peripheral vascular disease (with or without accompanying diabetes) were selected. This was done to elicit a sample which would have similar physical stamina levels based on their previous pre-amputation pathology status. Subjects with bilateral amputations were not selected for this reason also. Only those who had been discharged for more than two years following amputation were selected.

Postal communication was sent to the 75 subjects selected by the host care organisation. The communication contained several items: a covering letter (explaining the purpose of the mailing and an invitation to participate); a detailed Participants Information Sheet (in order to make clear the purpose of the study and how to complete the questionnaires); a consent form; two questionnaires; and a low-value beverage voucher for redemption at the tea bar of their local prosthetic clinic. A pre-paid postage envelope was also included for the return of the consent form and questionnaires. A reminder letter was sent to each participant one week after the initial mailing in order to encourage return of the questionnaires. Participants were asked to return the completed questionnaires within three weeks of receiving the initial mailing. In order for analysis and compilation of demographics, each questionnaire was marked with coded identification specific to each participant. This ensured confidentiality throughout. All of the subject demographic and questionnaire response data was coded, input to SPSS Version 12 software, checked and analysed.

The measurement tools

In order to measure physical activity, a section was extracted from the Trinity Amputation and Prosthesis Experience Scales (TAPES). The Scales were originally developed as a multi-dimensional assessment of adaptation to lower limb amputation and prosthesis use (Gallagher and MacLachlan 2000 and 2004). The Activity Restriction section was used in which limitations of physical activity were distinct. This ensured a range of possible activities covered whilst excluding items not relevant. There are three Activity Restriction subscales, with four questions in each subscale. Therefore twelve questions were answered in total. The

questionnaire was sufficiently short and simple to use, taking no more than five minutes to complete by participants and to score by researchers.

The activity restriction subscales are:

- Athletic 4 items
- Functional 4 items
- Social 4 items

Some of the 12 items in the Activity Restriction section were based on items from the SF-36 Health Survey (Ware *et al* 1993). The Athletic Restriction subscale refers to limitation of activities that involve more dynamic physical effort, for instance, sport and recreation and running for a bus. The Functional Restriction subscale covers rudimentary functional tasks such as climbing one flight of stairs. The final subscale, Social Restriction, addresses limitation of social activities such as visiting friends and working on hobbies. Items on the Activity Restriction subscales are scored on a 3-point scale ranging from 2 (limited a lot) to 0 (not limited at all). Each subscale consists of 4 items and hence subscale scores range from a minimum of 0 to a maximum of 8 for each subscale. Higher scores are indicative of greater limitation.

Analyses have revealed that the TAPES questionnaire had high internal consistency (alpha reliability coefficients ranged from 0.72 to 0.94) and good face, construct, content, and predictive validity (Gallagher and MacLachlan 2000 and 2004). However, similar analyses have not been carried out on individual subscales of the questionnaire. The questionnaire has been used to measure outcomes in those with both upper and lower limb amputations (Desmond and MacLachlan 2005).

In order to measure quality of life, the WHOQOL-Bref self-administration

questionnaire was used. The World Health Organization (WHO) defines quality of life (QOL) as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. The primary importance of this questionnaire was to seek the perception of the individual. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment.

The WHOQOL-Bref is a comprehensive research instrument containing 26 items rated on a 5-point Likert scale. A maximum score of five indicates a better perception by the person of quality of life issues, while a minimum score of 1 indicates their poor perception.

Four domains are scored comprising the following items:

- Physical health 7 items
- Psychological health 6 items
- Social relationships 3 items
- Environment 8 items

The remaining two items cited at the beginning of the questionnaire (coded Q1 and Q2) ask specifically about the subject's rating of their quality of life and satisfaction with their health. Cronbach alpha values for each of the four domain scores range from 0.66 to 0.84, demonstrating moderate to good internal consistency. Test-retest reliabilities range from 0.66 for physical health to 0.87 for environment. In addition, the domains were integral to the assessment of quality of life, indicating good content validity. Because of its brevity, it is ideal for use in large-scale surveys, and

in some clinical situations e.g. palliative care, where use of a longer questionnaire is not practicable (WHOQOL Group 1993 and 1998). Both questionnaires are included in Appendices I and II.

Data analysis

Each of the three subscales of the Activity Restriction section of TAPES and each of the four domains of the WHOQOL-Bref instrument were summarised using appropriate descriptive statistics. Summary statistics were calculated (mean, standard deviation etc). As a result of the non-normality of several of these scores and the small sample size, the nonparametric correlations between each of the subscales and each of the domains were assessed using Spearman's Rank correlation. The level of significance was set at 5% for all testing. All analysis was performed on SPSS Version 12.

Results

Twenty-six subjects returned the questionnaires from the 75 subjects invited to participate. One questionnaire was discarded due to incomplete data. Therefore, 25 of the 75 questionnaires were analysed, the return rate being 33%. Table I details the subjects profiles.

Table I: Profile of the subjects: gender, amputation level, amputation side and age.

	Male	Female	Total
Amputation level			
Trans-tibial	17 (68%)	5 (20%)	22 (88%)
Trans-femoral	3 (12%)	0	3 (12%)
Age			
Trans-tibial			
≤ 60	3	2	5
>60	14	3	17
Trans-femoral			
≤ 60	0	0	0
>60	3	0	3
Amputation side			
Trans-tibial			
Right	8	4	12
Left	9	1	10
Trans-femoral			
Right	1	0	1
Left	2	0	2
Education			
Secondary	14	4	18
Tertiary	6	1	7
Marital Status			
Married	17	2	19
Widowed	3	3	6
TOTAL (n=25)	20	5	25

Table II: Summary statistics of subscales (TAPES) and domains (WHOQOL-Bref).

Questionnaire	Summary Statistics					
TAPES Subscales	n	Range	Minimum	Maximum	Mean	St. Deviation
Athletic	25	3.00	5.00	8.00	7.24	0.88
Functional	25	5.00	3.00	8.00	5.88	1.83
Social	25	8.00	0.00	8.00	3.44	2.50
WHOQOL-Bref Domains						
Q1 - QOL	25	3.00	2.00	5.00	3.68	0.85
Q2 - Health	25	3.00	2.00	5.00	3.40	0.91
Physical	25	75.00	19.00	94.00	56.32	18.70
Psychological	25	75.00	19.00	94.00	64.72	17.93
Social	25	69.00	31.00	100.00	62.24	19.09
Environmental	25	81.00	19.00	100.00	72.20	15.19

For the TAPES subscales, a higher mean score was achieved for the Athletic subscale (7.24, sd=0.88) and the lowest for the Social subscale (3.44, sd=2.50). Similarly, the lowest mean score was achieved in the Physical domain of WHOQOL-Bref (56.32, sd=18.70), and highest for the Environmental (72.20, sd=15.19).

The relationships between the TAPES subscales and WHOQOL-Bref domains were investigated and all results are shown in Table III.

Table III: Nonparametric correlations (r_s) between subscales (TAPES) and domains (WHOQOL-Bref) questionnaires.

n=25	WHOQOL-Bref Domains			
Tapes Subscales	Physical	Psychological	Social	Environmental
Athletic	-0.424 *	-0.264	-0.197	-0.049
Functional	-0.423 *	-0.356 *	-0.419 *	-0.209
Social	-0.649 *	-0.678 *	-0.702 *	-0.674 *

*Correlation significant at the 0.01 level (1-tailed)

Eight of the twelve relationships were statistically significant (* notation). The negative sign on all correlations reflects the fact that a higher score on a TAPES subscale indicates more restriction and hence less physical activity whilst a higher score on a WHOQOL-Bref domain indicates a greater self perception of quality of life. Hence a large negative correlation indicates a strong positive relationship between level of physical activity and perceived quality of life. There were significant relationships between the Physical domain of WHOQOL-Bref and all three subscales of TAPES. There were significant relationships between the Psychological and Social domains of WHOQOL-Bref and the Functional and Social subscales of TAPES, and there was a significant relationship between the Environmental domain of WHOQOL-Bref and the Social subscale of TAPES. Only the Social subscale of TAPES had a relationship with all four WHOQOL-Bref domains. The Environmental domain of WHOQOL-Bref had a statistically significant relationship with the Social subscale of TAPES only.

Discussion

This investigation was initiated with the hypothesis that if higher scores were achieved on the activity restriction subscales of TAPES, correlation would be achieved with lower scores on the WHOQOL-Bref domains. There was indeed statistical correlation between certain TAPES subscales and WHOQOL-Bref domains. Based on previous research stating the strong relationship between reaching recommended levels of physical activity and the accompanying perception of increased quality of life (Brown, *et al*, 2004; Leinonen, *et al*, 2004), the authors expected a strong correlation between the Athletic and Functional subscales of TAPES and the Physical domain of WHOQOL-Bref. These correlations were found and whilst statistically significant they were weak [Athletic $r_s = -0.424$ ($p = 0.017$), Functional $r_s = -0.423$ ($p = 0.018$)]. There are clearly other factors in this amputee population such as gender, age and amputation level which influenced the physical outcome.

Interestingly, there was no relationship between the Athletic subscale of TAPES and the Psychological, Social or Environmental domains of WHOQOL-Bref. This suggests that the subject group failed to acknowledge any participation in functional activity at a high level, thinking more in terms of a level of function based around necessary activities of daily living. Indeed, many of the respondents commented that the athletic items were totally irrelevant to the functional aspects of their lifestyle. For example, being able to carry out vigorous activities like running, lifting heavy objects or participating in strenuous sports was not considered important. This could be due to their pre-amputation pathology and/or their age, and one would have to examine whether a different questionnaire might elicit more relevant answers in this

population group.

The Social subscale of TAPES showed the strongest relationships across all of the WHOQOL-Bref domains. Predictably, the highest negative correlation was between the Social subscale of TAPES and the Social domain of WHOQOL-Bref. Based on these findings, it is suggested that individuals place higher importance on social standing and friendships with family and friends. As part of the ongoing post-amputation rehabilitation process, accomplishing and maintaining social integration is valued much higher than being concerned with physical or even personal psychological well-being. This is certainly supported by the great success of amputee support groups such as The Murray Foundation (www.murray-foundation.org.uk). The creation by this particular group of a Hospital Visitor Scheme and a Visitor Support Network has proved an invaluable aspect of the amputee patient's immediate post-amputation rehabilitation. However, this may not be a supporting method of choice for some who have just experienced amputation (amputee support group participation may not be for all) and skill is required by therapists to recognise this. It is acknowledged that members of the rehabilitation team endeavour to encourage and prepare the amputee patient for the important reintegration into social life as part of their ongoing therapies, and using the complimentary services of groups like The Murray Foundation if required.

At the core of these findings is the desire by an older less active patient group to seek comfort, gain confidence and maintain social standing by prioritising relationships rather than a level of physical functioning they cannot relate to. With the results of this study showing a weaker than expected relationship between physical activity and quality of life, future research could investigate the reasons for this. The

authors can offer some possible reasons. The amputee in post-operative rehabilitation does not necessarily always receive one-on-one gait training in an in-patient or out-patient physiotherapy department and may only receive prosthetic rehabilitation. In group rehabilitation, the amputee can benefit from the social interaction during which they can seek guidance and information from their contemporaries' personal experiences. However, it may be possible that important physical educational and information dissemination may be lost without positive one-on-one reinforcement over several weeks with a therapist. This hypothesis can be supported by citing a pilot study which was performed in Scotland to evaluate the effect of exercise consultation on promotion of physical activity in people with Type II diabetes. By conducting a consultation with the experimental group of subjects, and by providing the control group with an informational exercise leaflet, it was shown that:

“exercise consultation is more effective in stimulating exercise behaviour change in the short term than a standard exercise leaflet currently used to promote physical activity in people with Type II diabetes” (Kirk et al 2001).

The suggestion is that the physiotherapy input in the immediate post-operative phases of rehabilitation should encompass the bespoke design and implementation of an individual exercise programme. This would also promote adherence. In these early stages, the idea would be for the amputee to increase their physical activity by participating in something he or she enjoys at an intensity which is sufficient to induce a physiological effect. An improvement in perception of body image, self-esteem, sense of control, competency and success is likely to result.

Another issue is the preoperative training of amputee patients. This issue is of vital importance in order for successful rehabilitation after surgery. Improvement in self esteem can help the patient in the postoperative rehabilitation process and so preoperative assessment can be regarded as a keystone to the rehabilitation process. Formalised liaison with the prosthetic clinical team which examines as many aspects of care which the patient can expect could be carried out prior to amputation.

Finally, this work is evidently different from similar worthy studies carried out by the notable Dublin-based authors mentioned previously. Gallagher and MacLachlan (2004) were interested in the aspects of the prosthetic experience which were most strongly associated with quality of life. Their findings supported the claim that TAPES can be used to evaluate quality of life. Although using the same questionnaires, this work specifically extracted the areas of physical activity and quality of life and examined what the person with lower limb amputation perceived as important. The relationship between physical activity and quality of life was also deduced. This was done with the aim of making recommendations for the tailoring of current prosthetic rehabilitation programmes to include more personal physical activity in a group setting. Further work is intended in order to elicit a change.

In reviewing the methods both the TAPES and WHOQOL-Bref questionnaires initially seemed ideally suited to the study design requiring the use of postal questionnaires. The instructions were easy to understand, the questions clear and concise, and assistance in completion was not required. The questionnaires took on average thirteen minutes to complete by the subjects and around the same time to score.

The WHOQOL-Bref measurement tool has been used in studies investigating low

back pain (Horng *et al* 2005), rheumatoid arthritis (Taylor *et al* 2004), and spinal cord injury (Jang *et al* 2004) and hence is adaptable. It was considered important not to use a disease or disability-specific measure so that the value of the concept of normal quality of life was not diminished. This approach has been advocated by Wade (2003) and as Andresen and Meyers (2000) explain:

“most studies using generic HRQOL [health related quality of life] tools are of groups with specific impairments rather than heterogeneous groups of people with disability.”

On reflection, one must accept that the Athletic subscale questions of TAPES were unrealistic when directed at a population of elderly people with vascular amputation. As mentioned earlier, the complete TAPES questionnaire had high internal consistency and good face, construct, content, and predictive validity. However, similar analyses have not been carried out on individual subscales of the questionnaire. Through personal communication with the authors of TAPES, this work will shortly be commenced making it an option in the future to use population-specific questions from this questionnaire. Alternatively, future research should consider the use of a prosthesis-related quality of life questionnaire such as the Prosthesis Evaluation Questionnaire (Legro *et al* 1998).

The number of subjects initially selected was reasonable, but the response rate was lower than the authors expected. In some research studies a response rate of 25% or higher is considered good while in others it is acknowledged that response rates of over 75% are possible by adopting specific techniques. These include supplying another copy of the questionnaires in the reminder communication or including an

enticement on the envelope for example a comment suggesting to subjects that they may benefit if they open it (Streiner and Norman 1995; Edwards *et al* 2003).

Subjects with trans-tibial and trans-femoral amputation were invited to participate in order to achieve as large a sample as possible on which to draw results. Due to only 12% of the respondents having the TF level this did not influence the results greatly. The assumption was that those with TT amputation would not have the same physical activity levels as those with TF amputation. However it was anticipated that the response rate may be poor and a distribution of physical activity levels was desirable.

Also, The purpose of the study was not to measure cause and effect of comparing people with trans-femoral amputation with those who had trans-tibial amputation. Selection was made by checking patient notes by those with ethical approval to do so. Co-morbidity was not recorded due to the sample not being large enough to take this into account statistically as a co-variant representation of the sample.

Caution should be taken when generalising the results of this study since the subjects were all recruited from a specific West of Scotland locale. Further research could encompass nationwide subject groups in order to achieve more generalised findings. In addition, a larger sample size could enable examination of the possible effects of gender, age location etc.

Concession is invited for these issues in reading the findings of this paper, and future research will draw on a population with the same level of amputation and therefore similar functional abilities and expectations, and steps will be taken to produce a higher response rate.

Conclusion

The relationship between physical activity and quality of life in an amputee population has been examined. A weaker than expected relationship between the two was observed. Healthcare professionals should understand the importance the amputee patient places on their relationships with family, friends and those in their peer group. A social support network is also important to them. The study supports increasing physical activity in this patient group so long as social interaction is not compromised. Ways of encouraging increased daily physical activity of a kind conducive to health benefits and combining this with peer group interaction should be investigated. Creating and positively reinforcing awareness within the rehabilitation team about the importance of the amputee patient's social network reintegration is paramount and should not be overlooked.

References

- Andresen EM, Meyers AR. 2000. Health-related quality of life outcomes measures. *Arch Phys Med Rehabil*, 81, Suppl 2, December: S30-45.
- Callaghan BG, Sockalingham S, Treweek T, and In. 2001. A post-discharge functional outcome for lower limb amputees: Test-retest reliability. SPARG, ed. E Condie, 11-12. NCTEPO, Glasgow.
- Condie E, Treweek S, Jones D, Scott, H. 1996. A one-year national survey of patients having lower limb amputation. *Physiotherapy*, 82, no. 1: 14-20.
- Davies D, Datta D. 2003. Mobility outcome following unilateral lower limb amputation. *Prosthet Orthot Int*, 27: 186-90.
- Desmond DM, MacLachlan M. 2005. Factor structure for the Trinity Amputation and Prosthesis Experience Scales (TAPES) with individuals with acquired upper limb amputations. *Am J Phys Med Rehabil*, 84: 506-13.
- Edwards P, Roberts I, Clarke M, DGuissepi C, Pratap S, Wentz R, Kwan I, Cooper R. 2003. Methods to increase response rates to postal questionnaires, by The Cochrane Database of Methodology Reviews. Chichester, UK: John Wiley & Sons, Ltd.
- Gallagher P, MacLachlan M. 2000. Development and psychometric evaluation of the Trinity Amputation and Prosthesis Experience Scales (TAPES). *Rehabil Psychol*, 45: 130-54.
- Gallagher P, MacLachlan M. 2004. The Trinity Amputation and Prosthesis Experience Scales and quality of life in people with lower-limb amputation. *Arch Phys Med Rehabil*, 85: 730-36.
- Hornig, YS, Hwang YH, Wu HC, Liang HW, Jang Y, Twu FC, Wang JD. 2005. Predicting health related quality of life in patients with low back pain. *Spine*, 30, no. 5: 551-55.
- Jang Y, Ching-Lin H, Yen-Ho W, Yi-Hsuan W. 2004. A validity study of the WHOQOL-Bref Assessment in persons with traumatic spinal cord injury. *Arch Phys Med Rehabil*, 85 (November): 1890-95.
- Kirk AF, Higgins LA, Hughes AR, Fisher BM, Mutrie N, Hillis S, MacIntyre PD. 2001. A randomized, controlled trial to study the effect of exercise consultation on the promotion of physical activity in people with Type 2 diabetes: A pilot study. *Diabetes*, 18: 877-82.
- Legro MW, Reiber GD, Smith DG, Del Auila M, Larsen J, Boone D. 1998. Prosthesis Evaluation Questionnaire for persons with lower limb amputations: Assessing prosthesis related quality of life. *Arch Phys Med Rehabil*, 79: 931-39.

Pell JP, Donnan PT, Fowkes FG, Ruckley CV. 1993. Quality of life following lower limb amputation for peripheral vascular disease. *Eur J Vasc Surg*, 7: 448-51.

Streiner DL, Norman GR. 1995. *Health Measurement Scales*, 3, 195. New York: Oxford University Press

Taylor WJ, Myers J, Simpson RT, McPherson KM, Weatherall, M. 2004. Quality of life of people with rheumatoid arthritis as measured by the World Health Organization Quality of Life instrument, short form (WHOQOL-Bref): Score distributions and psychometric properties. *Arthritis Rheum*, 51, no. 3: 350-57.

Wade DT. 2003. Outcome measures for Clin Rehabil trials. *Am J Phys Med Rehabil*, 82, Suppl: 26-31.

Ware, JE, Snow KK, Kosinski M, Gandek B. 1993. *SF-36 Health Survey: Manual and Interpretation Guide*, The Health Institute. New England Medical Centre.

WHOQOL Group. 1993. Study protocol for the World Health Organisation project to develop a quality of life assessment instrument (WHOQOL). *Qual Life Res*, 2: 153-59.

WHOQOL Group. 1998. Development of the World Health Organization WHOQOL-Bref Quality of Life Assessment. *Psychol Med*, 28: 551

World Health Assembly. 2004. Global strategy on diet, physical activity and health. Fifty-Seventh World Health Assembly, vol. WHA57.17. Geneva: World Health Organization.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks**. For example, thinking about the last two weeks, a question might ask:

		Not at all 1	Not much 2	Moderately 3	A great deal 4	Completely 5
	Do you get the kind of support from others that you need?					

You should circle the number that best fits how much support you got from others over the last two weeks. So you would circle the number 4 if you got a great deal of support from others as follows.

		Not at all 1	Not much 2	Moderately 3	A great deal 4	Completely 5
	Do you get the kind of support from others that you need?					

You would circle number 1 if you did not get any of the support that you needed from others in the last two weeks.

Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you.

		Very poor	Poor	Neither poor nor good	Good	Very good
1(G1)	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2 (G4)	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3 (F1.4)	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4(F11.3)	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5(F4.1)	How much do you enjoy life?	1	2	3	4	5
6(F24.2)	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7(F5.3)	How well are you able to concentrate?	1	2	3	4	5
8 (F16.1)	How safe do you feel in your daily life?	1	2	3	4	5
9 (F22.1)	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moderately	Mostly	Completely
10 (F2.1)	Do you have enough energy for everyday life?	1	2	3	4	5
11 (F7.1)	Are you able to accept your bodily appearance?	1	2	3	4	5
12 (F18.1)	Have you enough money to meet your needs?	1	2	3	4	5
13 (F20.1)	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14 (F21.1)	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very Poor	Poor	Neither poor nor good	Good	Very Good
15 (F9.1)	How well are you able to get around?	1	2	3	4	5

The following questions ask you to say how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16 (F3.3)	How satisfied are you with your sleep?	1	2	3	4	5
17 (F10.3)	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18(F12.4)	How satisfied are you with your capacity for work?	1	2	3	4	5
19 (F6.3)	How satisfied are you with yourself?	1	2	3	4	5
20(F13.3)	How satisfied are you with your personal relationships?	1	2	3	4	5
21(F15.3)	How satisfied are you with your sex life?	1	2	3	4	5
22(F14.4)	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23(F17.3)	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24(F19.3)	How satisfied are you with your access to health services?	1	2	3	4	5
25(F23.3)	How satisfied are you with your transport?	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things in the last two weeks.

		Never	Seldom	Quite often	Very often	Always
26 (F8.1)	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

Did someone help you to fill out this form.....

How long did it take to fill this form out?.....

Do you have any comments about the assessment?

.....

.....

.....

THANK YOU FOR YOUR HELP

Appendix II Trinity Amputation and Prosthetic Experience Scales

Activity Restriction Subscale

This set of questions concerns activities one might do during a typical day and whether having an artificial limb limits one in these activities and if so, to what extent.

Response options are *Yes, I am limited a lot, I am limited a little, and No, I am not limited at all.*

Please put a cross through the answer which best describes you.

Vigorous activities such as running, lifting heavy objects, participating in strenuous sports	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Climbing several flights of stairs	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Running for a bus	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Sport and recreation	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Climbing one flight of stairs	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Walking more than a mile	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Walking half a mile	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Walking 100 yards	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Maintaining friendships	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Visiting friends	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Working on hobbies	Yes, I am limited a lot	I am limited a little	No, I am not limited at all
Going to work	Yes, I am limited a lot	I am limited a little	No, I am not limited at all