Development and Validation of a Body Image Assessment for Patient after Lower Limb Amputation—The Chinese Amputee Body Image Scale-CABIS—

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Abstract: Rehabilitation professionals increasingly understand that psychological issue is an important key to achieve rehabilitation goals. Previous studies proved that body image has significant relationship with amputation rehabilitation, however, measurements on body image are not well stated. The aim of this study is to develop a Chinese version of Amputee Body Image Scale (CABIS). In this study, linguistic validity, content validity, test-retest reliability and construct-validity were examined. The 20 items CABIS showed with clear presentation and good content understandability. Expert panel agreed that CABIS covered major constructs in body image for patients after amputation. Moreover, test-retest reliability was found to be good ($\alpha = .857, p < .01$). A three-factor structure can be extracted from factor analysis. These three factors were personal factor, social factor and functional factor. Furthermore, the internal consistency of the three individual factors and the overall CABIS were .852, .826, .636, and .694 respectively. The moderate internal consistency further confirmed that the items within each factor of the CABIS measure the same construct. Some psychometric properties of CABIS were collected. Further research on criterion-related validity and improvement on factor stability are recommended.

Key words: amputation, body image, validation, professional trends

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Introduction

Amputation of a limb may be needed to treat critical ischemia, severe tissue damage due to a trauma, or a life-threatening condition of a limb. Although amputation can be beneficial from a medical point of view, the loss of limb may have a

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considerable impact on patients' health-related quality of life as shown by Van der Schans *et al.* (2002). As shown by the work of Lerner, Esterhai and Polomano (1993) stated that patients after amputation were "mentally scarred", but it was also reported that these subjects showed only limited restrictions in lifestyle and activity. Smith, Horn and Malchow (1995) investigated a group of unilateral below knee amputees, and found that health-related quality of life in amputees was lower than in age-matched controls for the domains "physical function", "role limitation due to physical problems", and "pain".

Body Image can be defined as the picture that one has in his mind about the appearance (e.g. size and shape) of his body, and the attitude that he forms towards these characteristics of his body. There are two components of body image: the perceptual part (how one sees his own body), and the attitudinal part (how one feels about his perceived bodily appearance) as studied by Drench (1994). A negative body image can be in the form of mild feelings of unattractiveness to extreme obsession with physical appearance that impairs normal functioning as discussed by Rosen, Reiter and Orosan (1995). It is also understandable that body image involves perception, feelings, emotions and physical sensation about one's own body, which were summarized by Parker (1975), Price (1990), Van Deusen (1997), Salter (1988), Miller (1991), Moore & Malone (1989). Moreover, body image is not static, but ever changing; and is sensitive to changes in mood, environment and life experience as shown by the research works of Schontz (1990), Breakey (1997), Flannery & Faria (1999), Watanabe, McCluskie and Hakin (1999), Livneh, Antonak & Gerhart (1990). An important factor in the rehabilitation of amputees that is often overlooked is the individuals' responses to amputation, including the change in body image of amputee patients and the extent to which these changes influence functional outcomes. Assisting amputee to be successfully integrated into community necessitates that body image disturbances associated with amputation be addressed in rehabilitation as summarized by previous research works of Newell (1991),

Schultz, Williamson & Bridges (1991), Breakey (1997), Mitchell (1997), Crum *et al.* (1993), The Global Lower Extremity Amputation Study Group (1999), and Whyte & Niven (2001).

Conventionally, amputation rehabilitation service is mainly physically oriented, as physical assessment and ADL trainings are key components of most programs. Though in recent years, more and more psychological elements are incorporated in the program, i.e. counseling and assessment on psychological readiness of both patients and care-givers, however, the ratio is still comparatively lower than physical elements. In a recent study on effectiveness of a body image on amputation rehabilitation, Hanspal (1998) found that assessment on perceived body image is an essential component for amputation rehabilitation program planning and evaluation.

A valid body image measuring instrument is essential for amputation rehabilitation services. The development and validation of a socio-culturally appropriate Chinese Amputee Body Image Scale (CABIS) as shown in Fig. 2 can contribute to enhancement of the existing service standard.

Amputee body image scale

The Amputee Body Image Scale (ABIS) as shown in Fig. 1, is comprised of 20 items. The ABIS assesses how an amputee perceives and feels about his or her body experience as research works by Breakey (1997). Subjects have to indicate responses to the questions. This scale produces scores that range from 20–100, with high scores indicating high body image disturbance. Three questions (question 3, 12 and 16) are reverse-scored. This type of measurement scale is considered most appropriate to assess the kind of domain-specific concept of self as mentioned by Maurer & Pierce (1998).

Construct validity was studied by investigating the correlation of the ABIS with other well-known personality scales in the original study. The ABIS showed statistically significant correlation with Index of Self-Esteem (ISE) ($r=.56, p<.01$); Generalized Contentment Scale (GCS) ($r=.64, p<.01$); Clinical Anxiety Scale ($r=.57, p<.01$); Satisfaction with Life Scale

截肢者身體外型量度表

1.	___	我是一位截肢者，身處在社交場合時，我會更加憂慮我的外表。
2.	___	我在公眾場合不會穿短褲，因為免我的義肢外露。
3.	___	我喜歡自己穿上了義肢後的整體外表。
4.	___	失去肢體損害了我的身體機能及影響我的日常生活。
5.	___	我會避免用直身鏡子照鏡，因為我不想看到自己的義肢。
6.	___	我每天都在憂慮自己的外表，因為我是一位截肢者。
7.	___	我感覺到幻肢的存在。
8.	___	我感到有別於社會上健全的觀念，是因為我喪失了肢體，而且我感到困擾。
9.	___	我覺得我失去保護自己遠離危險的能力，是因為喪失了肢體。
10.	___	我會盡量避免在不穿義肢時到某些地方，以逃避別人注視的目光。（例如：避免到社交地方、在游泳池或沙灘上活動和作親密的身體接觸。）
11.	___	我喪失了肢體，使我覺得自己擠身於殘障人士之列。
12.	___	我喜歡不穿義肢時的外表。
13.	___	當我走路時，別人會留意著我有破步的步姿。
14.	___	我會盡量避免在穿義肢時到某些地方，以逃避別人注視的目光。（例如：避免到社交地方、在游泳池或沙灘上活動和作親密的身體接觸。）
15.	___	人們當我是殘障人士看待。
16.	___	我滿意自己餘肢的外觀。
17.	___	我會穿寬鬆的衣服以遮蓋義肢。
18.	___	我覺得四肢健全才會有吸引的外表。
19.	___	義肢的大小必需要與需要裝 義肢的殘肢相配合，就如與其它正常肢體一樣。
20.	___	我不想看到自己的餘肢，所以我會避免用直身鏡子照鏡。

這份問卷的目的是用來量度你對自己身體外型的看法與感受。由於這是一份問卷，這並不是一份測驗，所以並沒有絕對正確或錯誤的答案。請你仔細和準確地回答以下每一項問題，並把適當數字填在每一項問題旁邊的橫線上。

1 = 從來沒有， 2 = 甚少有， 3 = 偶然有， 4 = 大部份時間有， 5 = 每一刻都有。

Fig. 2. The Chinese Ampute Body Image Scale (CABIS)

(SWLS) ($r = -.58, p < .01$). The findings supported the interpretation of ABIS as a kind of instrument that measures personal and social related construct.

Methods

The original English version ABIS was translated into Chinese and backwardly translated by two professional translators respectively. Then, a group of Chinese-speaking people of

various educational levels, ranging from primary to tertiary were recruited to complete a questionnaire to assess the linguistic validity of the CABIS. Respondents were required to rate both the degree of “clear presentation” and content “understandability” of the CABIS, which were presented in a 0 to 10 likert scale by the use of a questionnaire. The mean scores of each question were calculated, and 8.0 was selected as the cut-off score of a clear presentation and good content understandability. Comments from respondents

1	___	Because I am an amputee, I feel more anxious about my physical appearance in social situation than when I am alone.
2	___	I avoid wearing shorts in public because my prosthesis would be seen.
3	___	I like my overall physical appearance when wearing my prosthesis.
4	___	It concerns me that the loss of my limb impairs my body's functional capabilities in various activities of daily living.
5	___	I avoid looking into a full-length mirror in order not to see my prosthesis.
6	___	Because I am an amputee, I feel anxious about my physical appearance on a daily basis.
7	___	I experience a phantom limb.
8	___	Since losing my limb, it bothers me that I no longer conform to society's ideal of normal appearance.
9	___	It concerns me that the loss of my limb impairs my ability to protect myself from harm.
10	___	When I am not wearing my prosthesis, I avoid situations where my physical appearance can be evaluated by others (e.g. avoid social situations, swimming pool or beach activities physical intimacy).
11	___	The loss of my limb makes me think of myself as disabled.
12	___	I like my physical appearance when not wearing my prosthesis
13	___	When I am walking, people notice my limp.
14	___	When I am wearing my prosthesis, I avoid situations where my physical appearance can be evaluated by others (e.g. avoid any social situations, swimming pool or beach activities physical intimacy).
15	___	People treat me as disabled.
16	___	I like the appearance of my stump anatomy.
17	___	I wear baggy clothing in an attempt to hide my prosthesis
18	___	I feel I must have four normal limbs to be physically attractive.
19	___	It is important the size of my prosthesis and remaining anatomy of the affected limb are the same size as the other limb.
20	___	I avoid looking into a full-length mirror in order not to see my stump anatomy

Fig. 1. The original Amputee Body Image Scale (ABIS)

The questionnaire is designed to measure how you see and feel about your body image. It is not a test so there are no right or wrong answers. Please answer each item as carefully and as accurately as you can by placing the appropriate number inside each questions as follows.

1 = None of the time, 2 = Rarely, 3 = Some of the time, 4 = Most of the time, 5 = All of the time

were critically reviewed and questions were modified in syntactical or structural aspects.

Then, a group of bilingual expert panels whom should have at least 5 years of working experience in amputation rehabilitation were

invited to complete a questionnaire, which aimed at evaluating both face and content validity of the CABIS. The questionnaire was designed to study the adequacy, accuracy and ease of understanding of translation, face and content validity of the

CABIS. This questionnaire will be sent together with a covering letter and both CABIS and ABIS for reference. Panel members were invited to judge whether they agreed the translation of each question was accurate or not, by choosing “Agree” or “Disagree”. Qualitative comments for modification of translation were also requested if “Disagree” was rated for that item. The percentage of agreement in each question was calculated, and 85% agree was selected as the cut-off score for accurate translation. Comments from all panels were critically reviewed and descriptive statistics such as percentage of experts’ agreement on the accuracy of translation was also analyzed. Basing on the evaluation by the expert panels, professional translators then further modified and finalized the CABIS.

For test-retest reliability, a group of amputated patients would be recruited. Selection criteria should be below-knee amputated patients aged from 18 to 65, and average time after amputation should be within two months, should

have no previous major trauma history, and without mental function deficiency. They were asked to complete the CABIS on the day after admission and two days after their admission. Such a short interval can ensure there would be no significant difference in their perceived body image. The reliability of the CABIS is determined by intraclass correlation coefficient (ICC) and analyzed by the model of one way random. Through power analysis and effect size estimation, 50 subjects were required. And for further factor structure estimation, sample size of 50 was marginally satisfactory in factor analysis by principal component analysis for construct validation.

Results

Linguistic validity

Twenty Chinese-speaking respondents completed the linguistic validity questionnaire, which aimed at determining both the degree of

Table 1. Mean scores of linguistic validity of the 20 items of the CABIS

Item No.	Clear Presentation	Understandability	Relevancy to Concept
1	*7.85	*7.77	*7.08
2	*7.68	*7.58	8.78
3	*7.58	*7.07	8.90
4	8.47	8.53	8.67
5	8.47	8.53	8.13
6	8.02	8.35	7.83
7	*6.90	*6.88	8.23
8	*6.95	*6.85	*6.96
9	8.73	8.07	8.93
10	8.42	8.88	8.70
11	8.97	8.77	8.42
12	*7.30	*7.32	8.17
13	8.18	8.15	8.05
14	9.00	8.85	8.92
15	8.75	8.22	8.43
16	*7.68	*7.68	8.45
17	8.32	8.13	8.07
18	8.92	8.77	7.10
19	*7.17	*7.90	*7.72
20	*7.93	*7.92	*7.60

*: Mean value of clear presentation and understandability below the cut-off score of 8.00, and items required refinement to enhance questions’ clear presentation and understandability.

Table 2. Percentage of agreement by panel expert in the translation of 20 items of the CABIS

Item No.	Agree (number of panel member)	Disagree (number of panel member)	% of Agreement
1	7	0	100
2	6	1	85.7
3	6	1	85.7
4	7	0	100
5	6	1	85.7
6	6	1	85.7
*7	5	2	71.4
8	6	1	85.7
*9	5	2	71.4
10	6	1	85.7
11	7	0	100
*12	5	2	71.4
13	6	1	85.7
14	7	0	100
15	7	0	100
*16	5	2	71.4
*17	5	2	71.4
18	7	0	100
19	6	1	85.7
20	6	1	85.7

*: level of agreement in accurate translation below 85% of agreement, and these items need further modification by professional translator.

clear presentation and content understandability of the CABIS. A stringent mean score of 8.0 was selected as the cut-off score of a clear presentation and good content understandability. The results were summarized in Table 1, 9 questions in the CABIS (1, 2, 3, 7, 8, 12, 16, 19 and 20) showed with mean score of clear presentation and understandability below the cut-off score, which required refinement to enhance questions' clear presentation and understandability.

After those questions were linguistically refined by the translator, all 7 expert panels (4 were male and 3 were female; including 4 occupational therapists, 2 physiotherapists and 1 nurse working in a rehabilitation hospital) agreed the modification can increase the degree of clarity, comprehensiveness, and comprehensibility of the CABIS.

Content validity

Table 2 showed the level of agreement of the panel members on the translation of items of the CABIS, with ranged from 71.4% to 100%. As 85% agree was selected as the cut-off score for accurate translation, 5 questions (question 7, 9, 12, 16 and 17) with only 71.4% agreement in the CABIS were considered as not accurate enough, and needed to be further modified by professional translator.

For content relevancy, CABIS was evaluated to see whether the questions were relevant to body image for patients after amputation. As summarized in Table 3, results showed that panel members agreed that all items were relevant to the content area. The percentage of agreement ranged from 85.7% to 100%, and the median scores were ranged from 4 to 5 in the items. The 20 items in the CABIS can be regarded as good items. The content representativeness of the CABIS was

Table 3. Results of content relevancy of the CABIS

Item	% of Agreement			Measurement Median*
	Agree	Neutral	Disagree	
1	100	0	0	4.5
2	100	0	0	4.5
3	100	0	0	4.5
4	100	0	0	4
5	85.7	14.3	0	4
6	85.7	14.3	0	4.5
7	85.7	14.3	0	4.5
8	85.7	14.3	0	4
9	100	0	0	4.5
10	85.7	14.3	0	4.5
11	85.7	14.3	0	4
12	100	0	0	4.5
13	100	0	0	4.5
14	100	0	0	5
15	100	0	0	5
16	100	0	0	5
17	100	0	0	4
18	85.7	0	14.3	4
19	100	0	0	4
20	100	0	0	4

*: Degree of clear presentation and content understandability of the CABIS.

Table 4. Results of content representativeness of the CABIS

Items 1–20	% of Agreement			Median
	Agree	Neutral	Disagree	
	100	0	0	4

100% agreement was achieved in the content representativeness of the CABIS.

examined in terms of the 20 items as a whole to the measurement of body image for patients after amputation. The result was summarized in Table 4. The percentage of agreement was 100% and median score was 4, which indicated all panel members agreed that these 20 items cover the major constructs and could represent a person's perception on body image.

Test-retest reliability

In testing for the test-retest reliability, a group of 50 subjects (40 male and 10 female) were recruited by convenient sampling. Their age

ranged from 35–75 (with mean age 62.3). All were below-knee-amputated patients, and the time from amputation to first interview ranged from 1.32 to 1.48 months (with mean 1.42 months). They were asked to complete the CABIS on the day after admission (pre-data) and two days after their admission (post-data), and these pre-and-post CABIS data were collected for reliability testing. Reliability of the CABIS was determined by Intra-Class Correlation coefficient (ICC) and analyzed by the model of one way random. After statistically operation by SPSS 10.0, the test-retest reliability coefficient of CABIS was .857.

Table 5. Initial statistics for each factor of CABIS

Items	Communality	Factor	Eigenvalue	% of Variance	Cumulative %
1	.580	1	7.424	37.119	37.119
2	.384	2	2.197	13.985	51.104
3	.404	3	1.330	9.153	60.257
4	.541	4	.989	4.255	64.512
5	.500	5	.949	4.143	68.655
6	.500	6	.829	4.120	72.775
7	.289	7	.714	3.569	73.344
8	.393	8	.673	3.365	79.709
9	.555	9	.621	2.584	82.293
10	.561	10	.562	2.808	85.101
11	.392	11	.552	2.262	87.361
12	.624	12	.452	2.111	89.472
13	.515	13	.422	1.929	91.401
14	.636	14	.386	1.800	93.201
15	.485	15	.360	1.640	94.841
16	.712	16	.328	1.531	96.481
17	.652	17	.306	1.261	97.742
18	.309	18	.252	1.084	98.826
19	.647	19	.217	1.023	99.849
20	.477	20	.175	.151	100.000

3 factor structure was shown to have optimal eigenvalue, % of variance and cumulative %

Bartlett's test of sphericity: 925.18 ($p=.000$).

Kaiser-Meyer-Olkin Measure of Sampling Adequacy: .735.

Extraction method: Principal component analysis.

Factor analysis and construct validity

Factor structure of CABIS was examined by factor analysis. The result of the Bartlett's test of sphericity was 925.18 ($p<.000$), and the value of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .735. The Bartlett's test of sphericity can be used to test the hypothesis that the correlation matrix is an identity matrix. That is, all diagonal terms are 1 and all off-diagonal terms are 0. The current study obtained a value of 925.18 for the test of sphericity. Since the value is large and the associated significance level of 0.000 is small, it is unlikely that the population correlation matrix is an identity. If the hypothesis that the population correlation matrix is an identity cannot be rejected because the observed significance level is large, one should reconsider the use of the factor model (Norussis (1985)). The good Kaiser-Meyer-Olkin value obtained and the highly significant level of the test of sphericity,

were both very comfortable indications that the given set of data were adequate for factor analysis.

These good values supported further application of factor analysis to explore the latent structure of the CABIS. Principal component analysis method of factor extraction was used in this study. Table 5 reported the statistics of principal component analysis. In the initial analysis, a total of three factors could be extracted with the eigenvalue greater than 1.00. In terms of total variance, the three factors accounted for 60.26% of total variance, which can be considered as a reasonable factor number. Furthermore, the scree plot in Fig. 3 showed that the curve straightened out at the three factors. Therefore, the fitness of three-factor solution could be identified.

In the rotation phase of factor analysis, it aimed at achieving simpler and theoretically more meaningful factor solutions. Oblimin rotation was employed in further investigating the factor

Fig. 3. Scree plot of the factors of the CABIS

The graph for the scree test is presented in Fig. 3. The scree diagram of the factors of the CABIS justifies the three-factor solution to the data. 3-factor structure was shown to have optimal eigenvalue as shown in this scree plot.

loadings. The result was summarized in Table 6. The three factors were labeled according to the items' nature of construct. Factor 1 was personal factor; factor 2 was social factor; and factor 3 was functional factor. The value of factor loadings was the criteria to group the items in different factors respectively. Personal domain included 9 questions, i.e. question 3,5,6,7,12,16,17,18 and 20 (e.g. question 3: I like my overall physical appearance when wearing my prosthesis). Social domain included 7 questions, i.e. question 1,2,8,10,11,14 and 15 (e.g. question 1: Because I am an amputee, I feel more anxious about my physical appearance in social situation than when I am alone). Functional domain included 4 questions, i.e. question 4,9,13 and 19 (e.g. question 4: It concerns my that the loss of my limb impairs my body's functional capabilities in various activities of daily living).

The relationships of these three factors were examined in terms of item description, internal consistency and correlation. Cronbach's alpha was used to measure the internal consistency of the CABIS. In these three factors, the ranges of item-total correlation were .556 to .786, .348 to .653, and .482 to .658 respectively. They indicated a fair relationship of the questions to their respective

Table 6. Factor loadings of items of the CABIS after oblimin rotation

Items	Factor 1	Factor 2	Factor 3
5	.908		
6	.828		
3	.815		
12	.697		
20	.642		
7	.628		
17	.586		
18	.579		
16	.500		
14		.836	
8		.779	
2		.751	
1		.701	
10		.610	.467
11		.541	
15		.505	.358
4			.625
9			.619
19			.599
13			.395

Note. Extraction method: Principal component analysis.

Rotation method: oblimin rotation.

Remark: Only showed factor loadings above .35

factors. The internal consistency of the three individual factors and the overall CABIS were found to be .852, .826, .636, and .694 respectively as shown in Table 7. The moderate internal consistency implied that the questions within each factor and the factors of the CABIS measured the same construct. Pearson correlation coefficients among the three factors were presented. As shown in Table 8, all factors were found to have good correlation with one another (ranged from $r = .532$, $p < .000$ to $r = .652$, $p < .000$). The factor 1 "Personal factor" and factor 2 "Social Domain" had the highest relationship ($r = .652$, $p < .000$). The

Table 7. Internal consistency of factors in CABIS

	Cronbach's Alpha	Alpha of CABIS if deleted
Factor 1–Personal Factor	.852	.432
Factor 2–Social Factor	.826	.597
Factor 3–Functional Factor	.636	.623
Overall CABIS	.694	

Table 8. Correlations among factors in CABIS

	Personal Factor	Social Factor	Functional Factor
Personal Factor	—	$r=.652$ $p<.01$	$r=.532$ $p<.01$
Social Factor		—	$r=.545$ $p<.01$
Functional Factor			—

reliability coefficients of ICC among three factors were .914, .900 and .800 as shown in Table 9, which was good and adequate evidence to substantiate the use of CABIS across different time.

Discussion

In this study, a number of modifications were made to questions in CABIS. The reasons for the necessity in modification of questions could be broadly classified into 5 categories: 1) use of specific terms in body image measures; 2) use of generic terms was difficult in psychosocial measurement of Chinese patients; 3) inaccurate translation from English to Chinese version; 4) sensation structure difference between ABIS and CABIS; 5) clarification of meaning in psychosocial construct and 6) grammatical reason in understanding.

When validating the ABIS to CABIS, factor structure between “Personal” and “Social” factors of CABIS might be different from the original study. It was possibly due to cultural difference between Western and Chinese, which created a different point of view on perceived body image.

Table 9. Reliability coefficient of factors in CABIS

	Reliability Coefficient
Factor 1–Personal Factor	.914
Factor 2–Social Factor	.900
Factor 3–Functional Factor	.800
Overall CABIS	.857

For example, the importance of social importance would be much more important than personal acceptance, potential overall estimation on the difficulty in social acceptance, personal characteristics such as acceptance in newly acquired body image and believe in fate and natural arrangements are often the Chinese patients’ concern rather than outcomes. Moreover, Chinese patients showed more concern over the “functional” aspect rather than “personal” importance after amputation was also a major factor for further consideration.

Further validation work was recommended to incorporate more “functional” related questions, to correlate if functional improvement could substantially improve body image and to cross-validate with other psychosocial instrument or quality of life measures for patients after amputation.

Conclusion

The CABIS was developed to assess a person’s perceived body image. The content relevancy and representativeness had been investigated with a high level of agreement. The test-retest reliability was estimated to be good in terms of ICC. The construct validity was analyzed by factor analysis. A three-factor structure was extracted. The factor loading of items was ranged from .395 to .908. The names of three factors were personal factor, social factor and functional factor. A moderate internal consistency was found between items, and the correlations between factors were considerably to be good. A confirmatory factor analysis across different subject groups was recommended in further study to increase the clinical utilities of CABIS.

References

- Breakey, J. (1997). Body Image: The lower-limb amputee. *J. Prosthe. Orthotics*, **9**(2), 58–66.
- Crum, R.M., Anthony, J.C., Bassett, S.S., & Folstein, M.F. (1993). Population-based norms for the mini-mental state examination by age and education level. *J. Am. Med. Assoc.*, **269**(10), 2386–2391.
- Drench, M. (1994). Changes in body image secondary to disease and injury. *Rehab. Nursing*, **19**, 31–36.
- Flannery, J.C., & Faria, S.H. (1999). Limb loss: alterations in body image. *Journal of Vascular Nursing*, **17**(4): 100–106; quiz 107–108.
- Hanspal, M. (1998). Body image and patients with amputations: does the prosthesis maintain the balance? *International Journal of Rehabilitation Research*, **21**, 355–363.
- Lerner, R.K., Esterhai, J.L., & Polomano, R.C. (1993). Quality of life assessment of patients with posttraumatic fracture nonunion, chronic refractory osteomyelitis and lower extremity amputation. *Clinical Orthopaedics*, **295**, 28–36.
- Livneh, H., Antonak, R.F., & Gerhart, J. (1999). Psychosocial adaptation to amputation: the role of sociodemographic variables, disability-related, factors and coping strategies. *International Journal of Research*, **22**, 21–31.
- Maurer, T.J., & Pierce, H.R. (1998). A comparison of likert scale and traditional measures of self-efficacy. *Journal of Applied Psychology*, **83**, 324–329.
- Miller, K. (1991). Body-image therapy. *Nursing Clinics of North America*, **26**(3), 727–736.
- Mitchell, A. (1997). Body Scheme Theory. *Physical and Occupational Therapy in Paediatrics*, **17**, 5–23.
- Moore, W.S., & Malone, J.M. (1989). Lower extremity amputation. Philadelphia: W.B. Saunders.
- Newell, R. (1991). Body image disturbance; cognitive behavioural formulation and intervention. *Journal of Advanced Nursing*, **16** (12), 1400–1405.
- Norussis, M. J. (1985). SPSS-X advanced statistics guide. New York: McGraw Hill.
- Parker, C.M. (1975) Psycho-social transitions: comparisons to loss of a limb and loss of a spouse. *British Journal of Psychology*, **127**, 204–210.
- Price, B. (1990). A model of body image care. *Journal of Advanced Nursing*, **15**(5), 585–593.
- Rosen, J.C., Reiter, J., & Orosan, P. (1995). Cognitive-behavioral body image therapy for body dysmorphic disorder. *Journal of Consulting & Clinical Psychology*, **63**(2), 263–269.
- Salter, M. (1988). *Altered body image*. John Wiley.
- Schultz, R., Williamson, G.M., & Bridges, M. (1991). *Limb amputation among the elderly: psychosocial factors influencing adjustment*. Washington D.C.: AARP Andrus Foundation.
- Shontz, F.C. (1990). Body image and physical disability. Cash, T.F., & Pruzinsky, T. (eds.), *Body images: development, deviance and change*. New York: Guilford.
- Smith, D.G., Horn, P., & Malchow, D. (1995). Prosthetic history, prosthetic charges, and functional outcome of the isolated, traumatic below-knee amputee. *Journal of Trauma*, **38**, 44–47.
- The Global Lower Extremity Amputation Study Group (1999). Epidemiology of lower extremity amputation in centers in Europe, North America and East Asia. *British Journal of Surgery*, **87**(3), 328–337.
- Van der Schans, C.P., Geertzen, J.H.K., Schoppen, T., & Dijkstra, P.U. (2002). Phantom pain and health-related quality of life in lower limb amputees. *Journal of Pain and Symptom Management*, **24**(4), 429–436.
- Van Deusen, A.J. (1997). Body image of non-clinical and clinical population of men: a literature review. *Occupational Therapy in Mental Health*, **13**, 37–55.
- Watanabe, Y., McCluskie, P.J., Hakin, E. Asami, T., & Watanabe, H. (1999). Lower limb amputee patients' satisfaction with information and rehabilitation. *International Journal of Rehabilitation Research*, **22**, 67–69.
- Whyte, A.S., & Niven, C.A. (2001). Psychological distress in amputees with phantom limb pain. *Journal of Pain and Symptom Management*, **22**(5), 938–946.