

Psychological Response to Amputation as a Function of Age and Time Since Amputation

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Summary: Much of what is known about the psychological response to amputation is derived from studies of veterans. Most recent amputees come from a different group; they are typically older and have experienced medical problems prior to their amputation. In order to investigate the effects of age and time since amputation on psychological response, 66 amputees were assessed by the Symptom Checklist-90, Beck Depression Inventory and interviewed. When classified by time since amputation and by age, the results indicate that older amputees exhibited less depression and fewer psychological symptoms: in contrast, younger amputees evidenced increased depression and psychological symptomatology the longer the time since their amputation.

The loss of a limb is mediated by a series of complex psychological responses. While many people successfully utilize these responses to adjust to amputation, others develop psychiatric symptoms (Friedmann, 1978). Caine (1973) has reported that as many as 50 per cent of all amputees require some sort of psychological intervention. Randall *et al.* (1945) found that 40% of the sample of amputees they evaluated had problems in social adjustment after amputation. Additional evidence of the difficulty faced after amputation is reflected in the low rate of employment found among amputees (Hughes and White, 1946; Gingras *et al.*, 1956).

Much of what is known about psychological response to amputation has been derived from studies of veterans (e.g. Dembo *et al.*, 1952; Frank and Herndon, 1974). From these studies, the characteristic response of young men to traumatic amputation has been depicted as an acute affective disturbance. Depression is most marked immediately after amputation and is gradually resolved over time. By the time the patient returns home, the depression is resolved.

In contrast to this picture, Parkes (1975) has noted that the typical post-war amputee is likely to lose his/her limb as a result of arterial disease in later life. This presents a different situation from that faced by the young serviceman who was the object of earlier studies. A long history of medical problems often precedes the amputation and the amputee has frequently undergone several preceding surgeries (an average of 2.6 in Parkes's 1975 study): the amputation

itself may not be as devastating. For example, MacBride *et al.* (1980) reported that 46 per cent of their sample rated the amputation as only a moderate or minor upset. In addition to the loss of limb, the modern amputee often faces financial limitations and problems associated with ageing not faced by young amputees in earlier studies.

While the younger amputees often showed rapid depressive reaction which resolved with time, few of Parkes's older amputees evidenced psychological disturbance in the two months following amputation. However, Parkes noted that older amputees in his sample had more difficulty coping with amputation than young and middle-aged amputees: over one-third of the older amputees showed psychological disturbance 13 months after amputation. Caplan and Hackett (1963) studied a small sample (12) of amputees over 56 years of age and found that 18 months after amputation four were dead, four were depressed and bedridden, and only two were using artificial limbs. Along the same lines, Nichols (1971) noted a higher frequency of reactive depression in older amputees. Mazet (1967) retrospectively reviewed the medical records of a large sample of geriatric amputees and found that, compared to a group of non-amputees, they were more likely to die within one year of their amputation (94 per cent, compared to 67 per cent of non-amputees).

Taken together, these studies suggest that older amputees are at higher risk for long-term psychiatric complications than young post-traumatic amputees.

While depressive episodes appear rapidly in post-traumatic amputees, they also resolve quickly. In contrast, older amputees evidence less initial depression but more difficulty adjusting with time.

In general, these studies have examined amputees shortly after amputation or approximately one year after amputation. This approach provides a picture of response to amputation but fails to examine age-related differences in a cross-sectional sample. Moreover, limiting follow-up to one year or 18 months provides a perspective of psychological sequelae to the operation of amputation but does not provide information about the long-term psychological status of amputees, especially in different age-groups.

The present study was designed to further examine psychological adjustment in a cross-section of amputees. A sample of amputees was assessed with measures of depression and psychological symptoms. The sample was then divided at the median age (65 years) into 'younger' and 'older' amputees. In order to control for differences in time since amputation, the sample was also divided into 'recent' (less than 18 months since amputation) and 'long-term' (greater than 18 months) groups.

Methods

Subjects

Subjects were 66 amputees (45 male, 21 female) who were approached either while they were in-patients on a Rehabilitation Medicine service or when they came for an out-patient clinic visit. They ranged in age from 18 to 88 years: the mean age was 60.6 years (SD 17.2). The majority of subjects were single amputees but 12 had two amputations and 4 of the subjects had three amputations. Figures on age at amputation and interval between amputation and interview are given in Table I.

Measures

Overall adjustment and psychopathology were assessed by the Symptom Check List-90 (SCL-90), a 90-item self-report symptom inventory developed to assess symptom patterns of psychiatric and medical populations. In addition to the nine clinical sub-scales, it has three global measures: the Global Severity Index (GSI), a measure of the *depth* of the disorder; Positive Symptom Distress Index (PSDI), a measure indicating the *intensity* of the disorder; and Positive Symptom Total (PST), a count of positive symptoms endorsed (Derogatis, 1977).

Subjects were also given the Beck Depression Inventory, a 21-item self-report measure of depression. The Beck Depression Inventory has been shown to have adequate reliability and validity (Beck, 1973). They were also subject to a semi-structured interview

based on DSM-III criteria for depressive disorders, results of which are reported elsewhere (Kashani *et al*, 1983). (The present study includes one additional subject who had not provided the data necessary for the Kashani *et al* paper).

Procedures

Subjects were approached while waiting for their appointment, or while on the ward, and were asked to participate in a research programme to study the emotional effects of amputation. Two patients refused to participate in the study.

After consenting, each subject was given the SCL-90 and Beck Depression Inventory and was also interviewed. If the subject was unable to read, the SCL-90 and Beck were read to the subject by the experimenter. The procedure typically required up to 60 minutes.

Data analysis

All data were analyzed using the Statistical Analysis System (SAS) (SAS institute, 1979). The general linear model (with Type IV sums of squares) was used for all ANOVA.

Results

Table I summarizes the group's amputation history and results on the Beck Depression Inventory (BDI). Overall mean scores on the BDI were well below the cut-off of 10 generally used to designate depression (Beck, 1967).

Figure 1 presents the mean SCL-90 profile for the entire sample plotted against the norms for non-patient populations (males). As can be seen by examining the figure, the present sample differs little from the norming sample used on the SCL-90.

The sample was then split at the median age into 'younger' and 'older' amputees and the two groups were compared. Lower extremity amputations were more common than upper in both groups (they occurred in 92 per cent of the subjects), and younger

TABLE I
Amputation histories and depression scores for the sample as a whole ($n = 66$)

	Mean \pm SD	Median	Range
Time since amputation (mths)	42.7 \pm 72.0	18.0	0-456
Age at amputation (yrs)	54.9 \pm 21.0	58.0	12-85*
Beck Depression Inventory score	6.5 \pm 6.3	10	0-29

* Three congenital.

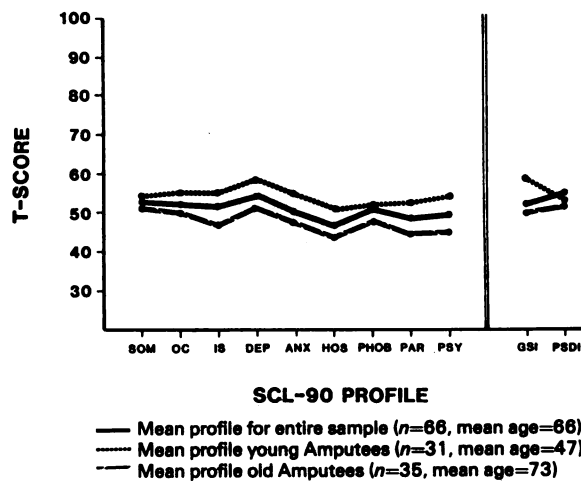


FIG 1.—Mean Symptom Checklist-90 profile for entire sample and for younger and older amputees.

and older amputees did not differ in the frequency of amputations above versus below the knee ($\chi^2 = 0.39$, $P < .65$). Young amputees did not differ significantly from older amputees in the mean number of amputations ($\chi^2 = 0.04$, $P < .85$). Cause of amputation did differ significantly between younger and older ampu-

tees ($\chi^2 = 8.31$, $P < .004$): most older amputees underwent amputation because of vascular disease, while more younger amputees had their amputations because of other causes, often accidents.

The composition of younger and older amputee groups did not differ by race ($\chi^2 = 2.01$, $P < .16$) or sex ($\chi^2 = 0.00$, $P < .99$). There was a significant difference between the two groups in marital status ($\chi^2 = 8.73$, $P < .02$): inspection of the cell frequencies indicates that more of the single amputees were in the younger group (10 younger vs 1 older) while there was little difference in the married subjects (21 older vs 18 younger) and the divorced or widowed (9 older vs 6 younger).

Socio-economic status was evaluated by the Hollingshead and Redlich (1958) index. The mean SES index was 3.79 (SD 0.60). Younger and older amputees did not differ significantly in the level at which they were classified ($\chi^2 = 2.10$, $P < .15$). Interestingly, no subjects in either group were classified at the more affluent levels I or II.

Differences between younger and older amputees are also presented in Table II. Significant differences were found on a number of scales, including Interpersonal Sensitivity, Depression, Anxiety, Hostility, Paranoid Ideation, Psychoticism, Global Severity Index and Positive Symptom Distress Index.

A two-way ANOVA (age \times time since amputation) was computed on the Beck Depression Inventory and SCL-90 scores. On the Beck Depression Inventory we

TABLE II
Comparison of younger and older* amputees in terms of demographic factors, depression scores and SCL-90 scores

	Young (n = 31)		Older (n = 35)		T	P
	Mean	(SD)	Mean	(SD)		
Age	47.13	(15.4)	72.66	(1.56)	8.90	.0001
Months since amputation	43.22	(50.00)	47.29	(86.4)	.23	.81
Age at amputation (years)	40.29	(19.73)	68.57	(10.22)	6.92	.0001
Number of amputations	1.19	(.61)	1.43	(.54)	1.67	.10
Beck Depression Inventory score	7.70	(7.50)	5.46	(4.91)	1.46	.15
SCL-90						
Somalization	.51	(.53)	.41	(.40)	.84	.399
Obsessive-compulsive	.68	(.79)	.40	(.57)	1.67	.100
Interpersonal sensitivity	.59	(.76)	.26	(.37)	2.28	.02
Depression	.76	(.78)	.42	(.48)	2.28	.03
Anxiety	.50	(.60)	.20	(.27)	2.69	.010
Hostility	.61	(.87)	.15	(.23)	3.02	.003
Phobic anxiety	.30	(.44)	.18	(.33)	1.27	.20
Paranoid ideation	.61	(.76)	.27	(.47)	2.25	.027
Psychoticism	.37	(.55)	.10	(.14)	2.87	.006
GSI (Global Severity Index)	.59	(.55)	.29	(.29)	2.8	.006
PSDI (Positive Symptom Distress Index)	1.74	(.69)	1.35	(.57)	2.47	.02

* The median age of the sample (65 years) was taken as the dividing-point between younger and older subjects.

found a significant interaction of age with time since amputation ($F(1,62) = 14.55, P < .001$). Figure 2 presents the Beck Depression Inventory scores classified according to age (above or below sample median) and time since amputation (again divided at the sample median: 'recent' amputations were performed in the 18 months prior to the study). Analysis of the simple main effects of the interaction (using Type IV sum of squares) revealed significant Beck scores at both levels of time since amputation, suggesting that the interaction was not accounted for by one level alone.

On the overall SCL-90 this measure (an index of overall level of psychological disturbance) a main effect for age was found ($F(1,62) = 9.18, P < .01$), and examination of Fig 3 indicates that young amputees had higher mean scores than older amputees. Figure 3 also reveals a significant interaction, with younger subjects showing higher GSI scores the longer the time since their amputation and older subjects showing lower GSI scores. An analysis of the simple main effects of time since amputation revealed statistical significance in both cases.

Discussion

Older and younger amputees varied on a number of dimensions. Older amputees, in general, displayed less psychopathology than younger amputees. The picture of the younger amputee which emerges from the present study is of an anxious, sensitized, vigilant person who has difficulty integrating his/her present life. In contrast, older amputees appear less anxious in

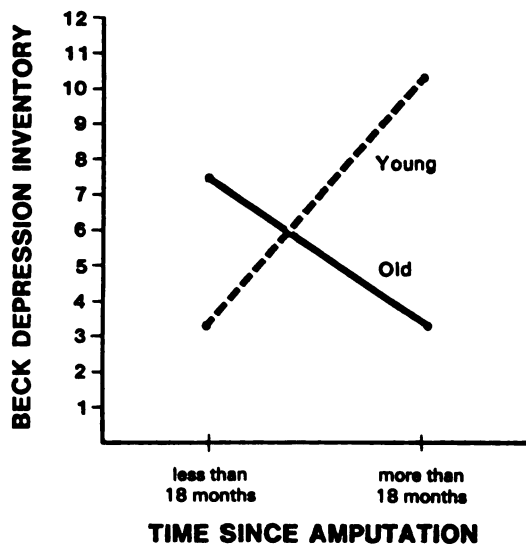


Fig 2.—Score on the Beck Depression Inventory according to age and time since amputation.

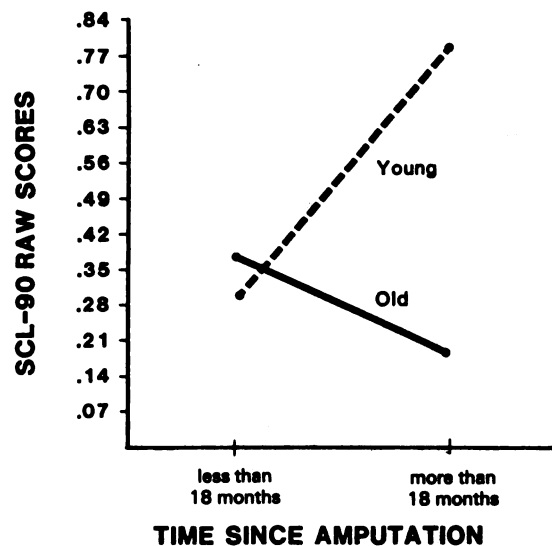


Fig 3.—Score on the Global Severity Index of the Symptom Checklist-90 according to age and time since amputation.

their inter-personal dealings and more psychologically comfortable.

Neither group evidenced significant variations from the norm for the SCL-90: overall, amputees do not appear to be significantly more distressed than the general population on which the SCL-90 was normed.

As a group, the older amputees in the present study differed markedly from those described by Parkes (1975) and other workers. We found that older amputees appeared to cope *more* effectively with their amputations the greater the time since their amputation. It is difficult to account for these differences in findings given the numerous methodological differences between the studies. One of the primary differences is the inclusion of a wider range of older amputees in the present study: Parkes (1975) did not include amputees over 70 years of age and the mean age of his sample was 54 years. This falls between the mean ages of our younger and older groups (47 vs 73 years). Caplan and Hackett (1963) reported the mean age of their 12 subjects as 69—considerably closer to our older subjects, although their sample was small.

The differing trends within the two groups suggest the possibility of continued developmental changes in adulthood. Numerous authors have emphasized the importance of changes in body-image following amputation (e.g. Henker, 1979). However, little attention has been paid to age-related developmental changes associated with body-image. Older amputees may be more prepared to alter their body-images after amputation because of previous adaptation to the ageing process. This hypothesis is indirectly supported by

MacBride *et al.* (1980), who reported on the response of older amputees to their rehabilitation programme: while older amputees evidenced psychological reactions to their amputation, over 46 per cent of the sample rated the amputation as only being between 'a minor' and a 'moderately stressful' experience. When asked to rate concerns, subjects rated fear of phantom pain as the most important, followed by financial concerns, general health and uncertainty about the future. Over 64 per cent of the subjects rated their major concern as 'practical matters' (for example, financial).

Earlier work has demonstrated a high prevalence of depressive disorders among amputees in general (Kashani *et al.*, 1983). The results of the present study suggest that young, non-recent amputees account for a significant proportion of those amputees who are depressed: such people appear to be at risk after they have left the medical system which would ordinarily identify their need for intervention. Clinicians may be advised to schedule periodic contacts with young amputees over quite long periods to identify those in need of psychiatric intervention.

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