

Burn Morbidity:

A Followup Study of Physical and Psychological Disability

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Fifty-one burn patients were studied in a retrospective manner to determine the effects of the burn injury on their ability to return to their pre-burn physical and social status. The results of this study indicate that: 1) 79% of the patients were able to return to work or school, though 45% required a change in work and 25% were not able to continue with their peer groups in school; 2) the average time of disability was 6 months; 3) there was a significant psychological morbidity as demonstrated by self-confessed depression, juvenile delinquency and divorce. There is a need for awareness of these problems so that proper counseling can be offered to the burn patient and his family both during his hospitalization and after discharge.

NUMEROUS STUDIES concerning the acute care of the severely burned patient are available in the literature. However, these studies have emphasized the problems related to in-hospital care; namely evaluation, resuscitation, debridement, topical antimicrobial therapy and skin grafting.^{5,6,13} The psychological aspects of burn injury have been recorded during hospitalization^{4,6-11,14,15} but the long-term outcome of the burn patient's physical and social adjustment has not been well documented. Because of the current lack of information in this area, the burn patient is subjected to the stress of uncertainty during his early management which commonly affects his physical and psychological recovery. This problem is of particular importance in view of the improving survival statistics as a result of more sophisticated burn care.

It is the purpose of this study to document the duration of disability and the physical and psychological impairment resulting from burn injury. An attempt will be made to compare these results with the per cent of body surface burn and specifically with burns of the hands and face.

Methods and Materials

The existing files from the burn service at the University of Utah Medical Center during the years 1970-

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1974 were used. Data concerning the patient's age, sex, pre-burn work at school status, injury, hospital course and duration of hospital stay were extracted.

Fifty-one patients and/or one of their immediate family members were either personally interviewed by the investigators or responded to a mailed questionnaire. The questionnaire was constructed with four basic sections included in attempt to assess the physical and psychological changes. They were: 1) confirmatory data about the injury itself including degree, thickness, area and cause which had already been extracted from the patient's medical record; 2) the pre-burn status of the individual including job or school level, tendency towards depression, alcohol and drug use; 3) the post-burn status of the individual, again including job or school, depression, alcohol and drugs; 4) a comparison of the person's life activities prior to the injury with his activities since the injury. This included emotional comparison with regard to job or school work, family association, social life and physical disabilities. Evaluation also included before and after comparison of shyness, withdrawal to self and from others, marital status change and psychiatric help.

The sample included 37 males and 14 females ranging in age from one to 88 years with the distribution as demonstrated in Fig. 1. The average percent body burn was 31.2% with the frequency demonstrated in Figure 2. Table 1 reveals a breakdown of the special areas of involvement compared with total body surface burns. Fifty-seven per cent (29/51) of the patients in this study had involvement of the hands and/or face. The depth of burn was second-degree in 28% of the patients, third-degree in 15% and mixed second and third-degree in 57%. The mean duration of followup was 25.6 months post

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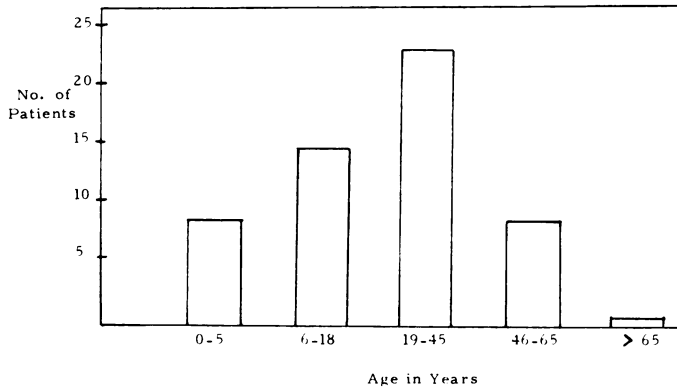


FIG. 1. Age distribution.

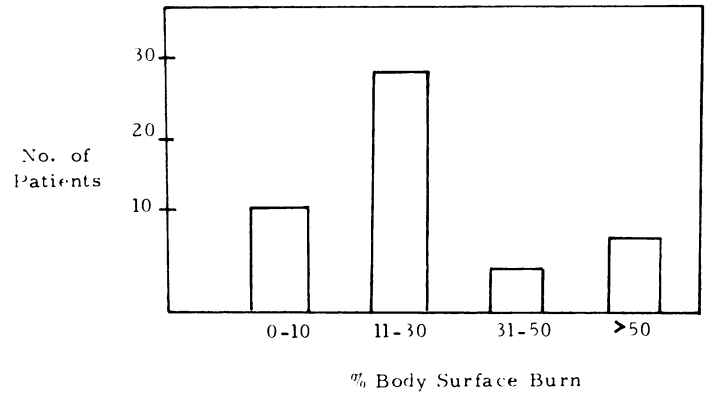


FIG. 2. Distribution by per cent body surface burn.

burn. ($\bar{X} = 25.6$; $S = 12.37$; $n = 51$). The initial hospital stay was 38.7 days ($\bar{X} = 38.7$; $S = 34.01$; $n = 51$).

Initial therapy followed the guidelines set down by the Committee on Trauma, The American College of Surgeons³ and consisted of resuscitation using Ringers Lactate solution, but adjusted according to the patient's hourly urine output, pulse, blood pressure, central venous pressure and mental status.

Topical therapy was used with a variety of topical antimicrobial agents such as Sulfamylon Acetate, povidone-iodine (Betadine) and silver sulfadiazene (Silvadene). Hydrotherapy was instituted on a daily basis usually by the third post-burn day. Split thickness skin grafting for the areas of full-thickness burn were performed after eschar debridement and when the recipient areas were deemed ready to accept a graft. During the first three years of the study, the patients were located on a surgical ward but during the last year of the study the patients were all treated within the Burn Unit.

Results

Eight patients were not working or attending school because they were either too young or were unemployed. The results related to work or school status will therefore be based on 43 patients, 34 (79%) of whom had returned to work or school at the time of this study.

Duration of Absence from School or Work. The mean time of absence was 6.0 months. The duration of absence when correlated with per cent body surface burn is demonstrated in Figure 3 and with area of involvement in Figure 4. It should be noted that patients with burns of the face and hands had twice the per cent body surface involvement as compared to those without (Table 1).

Work Status. There were 23 patients employed at the time of their injury. Twenty-two had returned to work at the time of this study. However, of those who returned to work a significant number (10/22) required a change in their jobs (Table 2). Twenty-five per cent of those burned on the face and 37% on the hands required a change in their jobs. Of those patients without hands or face burns, 25% also required a change in their jobs.

School Status. There were 20 patients in this group ranging from kindergarten to college. Of these 20, 4 (20%) were able to continue their education with their pre-burn peer group immediately upon discharge from the hospital. In addition, 11 out of 20 (55%) were not able to return to school upon discharge from the hospital but were able to progress with home tutoring. The time required for tutoring varied from one month to two years. Therefore of the total group, 25% were unable to progress with their peers. The average per cent body surface burn of the latter group was higher than the others as demonstrated in Table 3. This subgroup was too small to determine the significance of areas of involvement.

Juvenile Delinquency. In the 6 to 18 age group, the delinquency rate was 2 out of 14 (14%). Both were male patients. This is higher than the Utah State average of 5.2% for a similar age group,¹⁶ but is not statistically significant in this small sample size.

Divorce. Of the 19 patients who were married at the time of their injury, 5 out of 19 (26%) were divorced at the time of this study. These results are highly significant since the expected value for a similar normal population during this period of time is .71 of 19.¹⁷

Depression. Another striking finding of the study involved depression. Table 4 gives the results of depression change compared with the areas of burn involvement. The figures show that patients with burns of the face and/or hands have an increased incidence of depression after injury. Those without burns of the hands or face also had an increased incidence of depression but this increase was not statistically significant.

TABLE 1. Area of Involvement vs. Ave. % Body Surface Burns

Areas of Burn	Patients	Ave. % BSB
Face & Hands	19	33%
Hands	7	32%
Face	3	20%
Without Face & Hands	22	16%
Total	51	

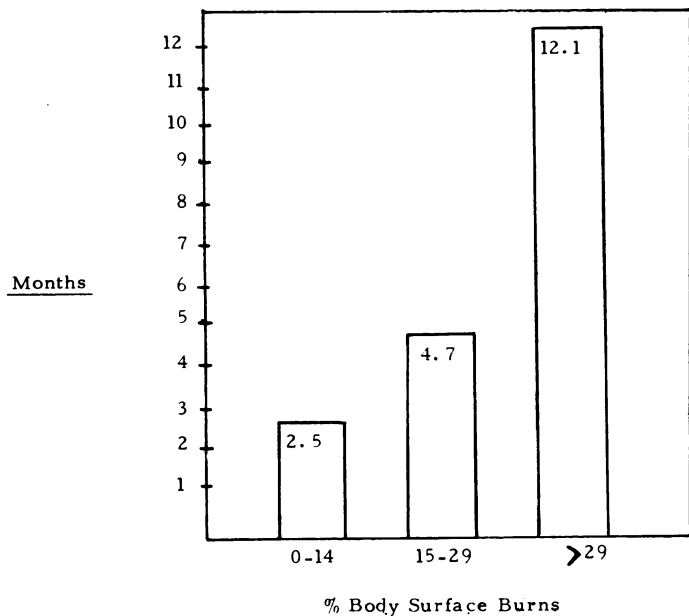


FIG. 3. Average absence from work or school versus per cent body surface burn.

Discussion

Evaluation of physical disability in burn patients may be quite difficult because of the variety of factors that contribute to this form of disability. For example, burn scar contractures may limit motion and hinder return to work. However, medico-legal considerations and other incentive factors related to secondary gain may also prevent or hinder a patient's return to his pre-burn work status. In spite of this, some attempt was made in this

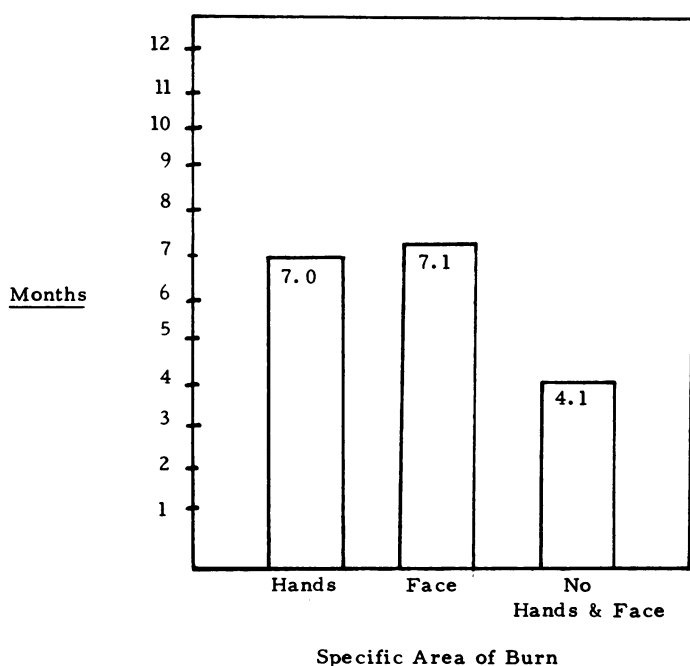


FIG. 4. Average absence from work or school versus specific area of burn.

TABLE 2. Burn Injury vs. Return to Work

	Pts.	% BSB
Total	23	
Unable to Work	1	
Returned to Work	22	
a) Same Job	12	26%
b) Different Job	10	30%

study to obtain objective data relating to duration of disability and ability to return to the patient's pre-burn school or work status. We were able to document that the duration of disability was directly related to the per cent body surface burn and not specifically with areas of burn. Initially we had hypothesized that patients with burns of the face and hands had increased physical disability, but this was not confirmed in this study. The mean duration of absence from work or school for an individual with 30% body surface burns was 6 months. This was of course considerably greater in patients with burns over 30%. It was surprising to note that patients with relatively minor burns, i.e. less than 14% body surface area, had an average disability of 2.5 months. In patients who were employed at the time of their injury, it was found that 95% were able to return to work. However, 45% of these patients required a change in their jobs. Half of these patients changed their jobs directly because of their burn injury. Burns of the hands or face did not appear to influence their ability to return to work.

School progression in our 20 patients indicated that 75% of the patients were able to continue with their peer groups. However, it was noted that the majority of these patients did require special tutoring in the hospital and at home so that they could re-enter school with their peer groups. The remaining 25% were significantly set back by their burn injury and, in spite of tutoring which frequently occurred at a later date, re-entered school behind their peer groups.

The social and psychological adjustments to the burn injury were the most interesting aspects of this study and revealed significant morbidity in these areas. Juvenile delinquency was noted in two out of the fourteen burned children who were between the ages of 6 and 18. This was higher than the state average for children in a similar age group. It was interesting to note that neither child had a past history of juvenile delinquency. However, both of the children came from homes in which their

TABLE 3. School Progression vs. Per cent Body Surface Burn

	# of Pts.	Average % BSB
Continued with Peers (without tutoring)	4	19%
Continued with Peers (with tutoring)	11	24%
Behind Peers	5	37%

parents were separated. Both patients felt rejected by their peers upon return to school and were unable to tolerate the numerous questions and teasing to which they were subjected. These two patients had relatively small burns and specifically did not have burns of the face or hands.

Divorce following the burn injury was noted in 5 out of the 19 patients (26%). Four of the 5 patients had burns of their face. However, the patients who remained married also included significant number with burns of the face (8/14). It was difficult to determine whether the burn injury was the only factor involved. For example, two of the five divorced patients stated that their marriage was deteriorating at the time of the injury. Whatever the cause, our burn patients during this brief period of followup did have a significantly higher incidence of divorce than the population at large. Our results are in contrast to Andreasen's findings in which he reported no divorces among their 20 patients.¹

Depression was a very common finding in our patients and was noted particularly in those with involvement of the hands and face. It started at various times during the hospital course and extended for approximately one year post-burn. This was usually related to the awareness of their disfigurement, duration of hospitalization and chronicity of pain. Pre-occupation with the physical aspects of the patient's care during his hospitalization was noted in our chart reviews though occasionally concern was directed towards the psychological manifestations. However, in spite of the in-hospital activities, the major emotional adjustment occurred after the patient left the hospital. At that time he was no longer under the constant reinforcement of the doctors, nurses and therapists but was confronted with the realities of his disability. This usually led to withdrawal, shyness and seclusion. Based on these findings, emotional support in some form should be given on a regular basis both during and after hospitalization. It was also felt that counseling should be directed towards family members and that perhaps this would have some influence in decreasing the incidence of juvenile delinquency and divorces. It should be noted, however, that the majority of patients reported a decrease in their depression at approximately one year post-burn and were able to resume their pre-burn social activities. This was also observed by Andreasen, et al. in their study.²

Although a relatively small sample was surveyed, certain trends were evident from this study. Physical disability appears to be correlated to total per cent body surface burn and not to specific areas of injury. Social adjustment (juvenile delinquency and divorce) does not appear to correlate with per cent body surface burns or

TABLE 4. *Depression Change After Burn Injury*

	Greater	No Change	Less	
Face and Hands	24	5	0	P < 0.001
Not Face and Hands	14	0	8	n.s.
	38	5	8	P < 0.01

specific areas of involvement. Perhaps pre-burn personality traits are more important in influencing social adjustment. Post-burn depression does correlate with duration of disability, per cent body surface burn and specific areas of involvement. Unfortunately the small group studied does not allow separation of the direct influences of each of these three variables. However, burn patients indeed have varying periods of disability which may interfere with their physical and social adjustments to the people and world around them.

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