Case 8 Burnt thorax

Figure 8.1

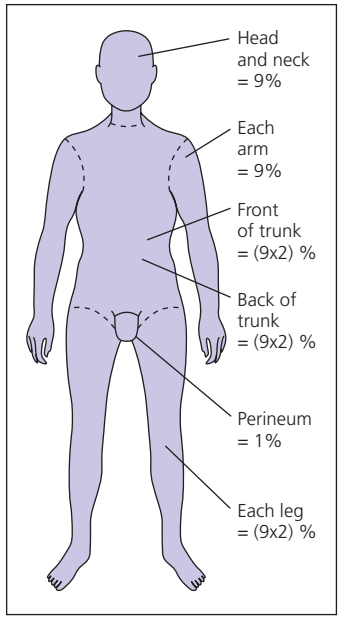


Figure 8.2 The 'rule of nines' – a useful guide to the estimation of the area of a burned surface. (Note also that a patient's hand represents 1% of the body surface area.)

The patient was an industrial worker in his fifties who sustained burns to the back of his chest and upper arms in a factory accident. Figure 8.1 was taken 10 days after the accident.

Can you estimate approximately the area of his body surface that has been affected?

Approximately 14%. The 'rule of nines' states that the

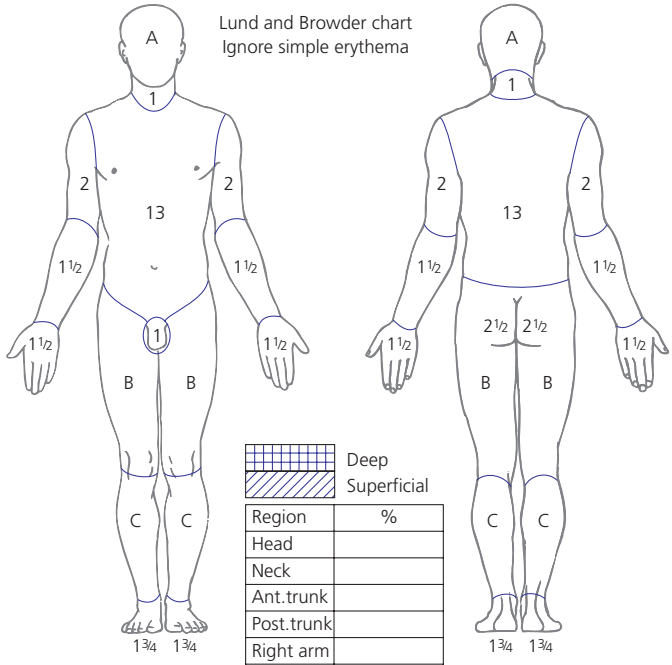
area of the front of the trunk is 2 × 9% of the body's surface area, the back of the trunk 2 × 9%, each upper limb 9%, each lower limb 2 × 9%, the head and neck 9%, and the perineum 1% (Figure 8.2). Using this, we can see that about half the back of the trunk that has been burned, about 9%. Using the patient's hand as representing 1% of the total body area, the scattered burns on the arms can be estimated to make up another 5%, total 14%. An alternative to the rule of nines would be the Lund and Browder chart (Fig. 8.3), which is particularly useful in children.

Why is it important to estimate the area of the burn in planning treatment?

In this patient, the 14% burn area is borderline for intravenous fluid replacement. Intravenous fluid resuscitation is indicated if the area of burn is more than 15% of the body surface in adults (10% in a child). The amount of fluid replacement in the first 24 h is based on the Parkland formula:

Fluid replacement = 4 × weight of patient (in kg)
in first 24 h (in ml) × % area of burn

Half this volume is given in the first 8 h following the burn, and the second half over the ensuing 16 h. This is in addition to the patient's normal daily fluid requirements (3 L of crystalloids in adults under temperate conditions). The fluid of choice is lactated Ringer's (Hartmann's) solution.

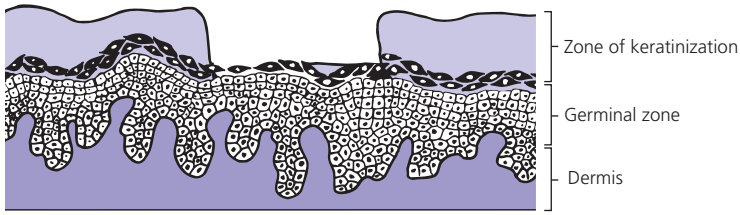


Region	%
Head	
Neck	
Ant.trunk	
Post.trunk	
Right arm	
Left arm	
Buttocks	
Genitalia	
Right leg	
Left leg	
Total burn	

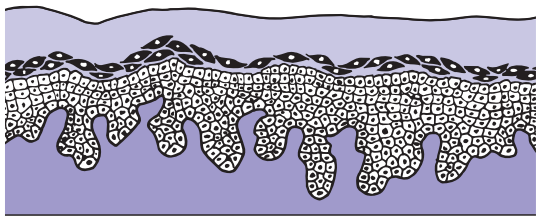
Figure 8.3 The Lund and Browder chart allows more accurate estimation of burn surface area and is particularly useful in children. The extent of the burn is marked on the chart. The areas of burns on the head, thighs and lower legs (A, B and C on the chart) are calculated and multiplied by the age factor in the table.

Relative percentage of body surface area affected by growth surface

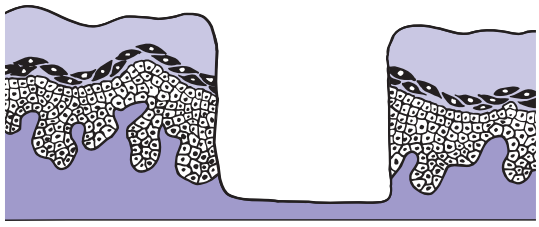
Area	Age 0	1	5	10	15	Adult
A = 1/2 of head	9.5	8.5	6.5	5.5	4.5	3.5
B = 1/2 of one thigh	2.75	3.25	4.0	4.5	4.5	4.75
C = 1/2 of one leg	2.5	2.5	.2.75	3.25	3.25	3.5



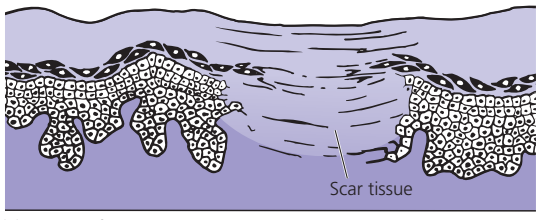
(a) Partial thickness burn



(b) Healed partial thickness burn



(c) Full thickness burn



(d) Healed full thickness burn

Figure 8.4 A partial-thickness burn (a) leaves part or the whole of the germinal epithelium intact, so complete healing takes place (b). A full-thickness burn (c) destroys the germinal layer and, unless very small, can only heal by dense scar tissue (d).

How deep are these burns?

The burns over most of the back are partial thickness. The underlying germinal layer of the skin has remained unharmed, has proliferated, and healing can be seen to be taking place. As the scabs of superficial layers of the epidermis flake off, healthy new pink epithelium can be seen. The burns over the arms and the area over the right scapula, however, are full thickness. Here the germinal layer has been involved and the overlying coagulum of dead epithelium is adherent to the underlying granulation tissue (Fig. 8.4).

What further treatment will be necessary for these areas of full thickness burns?

These areas were excised the following day and covered with split-skin grafts taken from the thigh (see Case 9, p. 22).

What local treatment should be given to these burns immediately, as a first aid measure, and then on admission to hospital?

- First aid comprises stopping the burn process at once. The patient must immediately be removed from danger – the source of the burn – his clothes removed (they retain heat), and the burns cooled with cold running water.
- In hospital the burns can be treated by the closed technique, using silver sulphadiazine (flamazine), covered by thick layers of sterile dressings. Alternatively, if only the anterior or, as in this case, the posterior aspect of the body, or the face, are involved, the open technique (or exposure method) may be used. Here the area is left open and a dry scab rapidly forms.