

# Contact burns from hair straighteners: a new hazard in the home

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This series highlights a previously unreported hazard for children within the home, hair straightening irons. Thermal injury is a common reason for presentation at the emergency department. Contact burns from domestic irons and hair curling tongs are well documented in the literature. We have become aware of this new hazard in the home, which has resulted in several presentations to our department with deep partial thickness or full thickness burns.

Thermal injuries are common in pre-school children worldwide.<sup>1</sup> In our hospital, thermal injuries accounted for 366 attendances (1.2% of total attendances) over the past 12 months. Of these, 174 (47%) were due to scalds, 173 (47%) were due to contact burns, and the remainder due to sunburn, chemical, flame, and firework related burns (unpublished data). The majority of these injuries are superficial in nature with few requiring surgery.

## PATIENTS

Recently we have seen several episodes of severe contact burns from hair straightening irons that may result in considerable permanent disfigurement. Two cases required formal excision and split-skin grafting. A summary of the patients and management is found in table 1. Patients' consent has been obtained for the publication of this article and reproduction of the images included.

In all of these cases, the possibility of non-accidental injury was considered and thought to be unlikely. The burns were reported promptly and the injuries documented were considered consistent with the mechanism of injury reported.

## DISCUSSION

Hair straighteners are becoming a commonplace household appliance in the UK. They are used to straighten hair in much the same way that an iron is used to take the creases out of clothing. The basic design is of two arms connected at one end and housing a hotplate at the other to be clamped over hair and drawn along its length. The hotplates are made of either bare metal or ceramic, and are designed to heat up to temperatures of 180–220°C. They heat up rapidly, but it takes time for the heat to dissipate once the electricity supply has been turned off. The resting position often leaves the hot plates exposed. This compromises safety and is a design fault that could potentially be addressed by manufacturers with a design modification.

Unlike domestic irons and heaters, hair straighteners have two hotplates, and frequently these both contact the skin, resulting in two injuries on adjacent parts of the body, which may be of equal severity (fig 1).

Although minor superficial burns of ears and fingers are a recognised hazard of using hair straighteners (personal

communication), they are not recognised to cause severe burns through normal use.

The potential for a substance to cause thermal injury on contact with human skin depends on the heat capacity and temperature of the substance and the duration of contact with the skin. The upper temperature limit for an accidental contact of 1 second with an uncoated metal surface is 70°C. This rises to 86°C for a ceramic surface. Temperatures greater than these or contact durations of greater than 1 second will cause burns. These figures are for adult skin, and significantly lower limits can be applied when considering the skin of children and the elderly.<sup>2</sup>

Young children are not only at greater risk of severe injury through contact with a hot surface, but are unaware of the risk on approach, and are further disadvantaged by their natural curiosity. During their second year, most children have started walking and can gain access to places previously out of reach. It is important for parents to recognise this and be more vigilant in applying general safety rules when using hazardous appliances.

The injuries reported were all considered accidental in nature. They predominantly involved the upper limbs of male children in their second year. This is consistent with typical accidental burn patterns.<sup>3 4</sup>

Domestic irons are the most common cause of contact burns presenting to the emergency department.<sup>5</sup> The profile of the burns sustained are very similar to those documented here, and many strategies have been suggested to reduce the incidence of iron burns. We believe the same emphasis should now be placed on preventing burns from hair straighteners.<sup>4</sup>

## CONCLUSION

Contact burns from hair straightening irons are characteristically of partial to full thickness and may result in significant permanent disfigurement. Like domestic irons, hair straighteners have the potential to cause great harm. Often they are not handled with the care and attention required to prevent this harm. This could be addressed by a public health campaign to raise awareness of the problem and improved packaging warnings for these products. Manufacturers may be able to modify the design of their product, having the hot plates protected when in the resting position.

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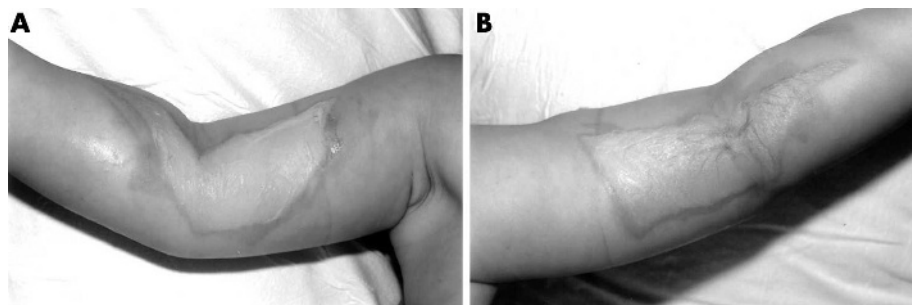
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**Table 1** Details of four children with burns secondary to contact with hair straighteners

Age of patient (months)	Sex	Status of irons	Site of burn	No. of burns	Size of burn(s)	Depth of burn	Management
16	Male	On	Right upper arm	2	2 burns of 35×60 mm	Full thickness	Excision and grafting
23	Male	On	Right upper arm	2	40×20 mm; 70×40 mm	Partial thickness	Conservative
19	Male	Off	Plantar aspect left foot	2	50×30 mm; blister on dorsum	Partial thickness	Conservative
14	Male	On	Left thumb web space	1	20×20 mm	Full thickness	Excision and grafting



**Figure 1** Full thickness hair straightener burn to medial (A) and lateral aspects (B) of the right arm in a boy aged 16 months. This injury required excision and split skin grafting. Written consent for reproduction obtained.

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