Acute Surgical Management of Hand Burns

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A hand represents 3% of the total body surface area. The hands are involved in close to 80% of all burns. The potential morbidity associated with hand burns can be substantial. Imagine a patient carrying a pan of flaming cooking oil to the doorway or someone lighting a room-sized pile of leaves and branches doused with gasoline. It is clear how the hands are at risk in these common scenarios. Not all burn injuries will require surgical intervention. Recognizing the need for surgery is paramount to achieving good functional outcomes for the burned hand. The gray area between second- and third-degree burns tests the skill and experience of every burn/hand surgeon. Skin anatomy and the size of injury dictate the surgical technique used to close the burn wound. In addition to meticulous surgical technique, preoperative and postoperative hand therapy for the burned hand is essential for a good functional outcome. Recognizing the burn depth is paramount to developing the appropriate treatment plan for any burn injury. This skill requires experience and practice. In this article, we present an approach to second- and third-degree hand burns. *(J Hand Surg Am. 2014;39(10):2075–2085.*

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Hand exposure to the environment makes it vulnerable to burn injuries that have a high potential for morbidity. In addition, differences in the natural history of second- and third-degree burns are important in their surgical management. Second-degree burns heal with minimal scarring whereas deeper wounds develop thick restrictive scars if not treated surgically. Excision and grafting of burn wounds also has the potential to create restrictive scars. Surgical intervention on a superficial burn may create a poor result where observation would not. This difference in the healing process highlights the need for accurate recognition of second- and third-degree burns, a skill that requires clinical experience.[1]

A large burn is life-threatening and the hands assume lower priority during treatment. Preserving hand function in these situations requires hand therapy during the resuscitation and burn wound debridement phases and the use of skin substitutes or allograft to cover the wounds until donor sites have healed. Edema management through limb elevation, orthosis fabrication, and dressings is an important adjunct in this process. This highlights the critical function of the occupational therapy service in the management of hand burns.[2–4]

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SURGICAL ANATOMY

Skin has 2 distinct layers: the epidermis and the dermis. These layers measure 0.05 to 1.5 mm for the epidermis and 0.3 to 3.0 mm for the dermis. Hair follicles are present in varying concentrations, their base is in the deep dermis, and they have an epithelial lining. Sebaceous glands and sweat glands lined with epithelium reside in the dermal layer also. Glabrous

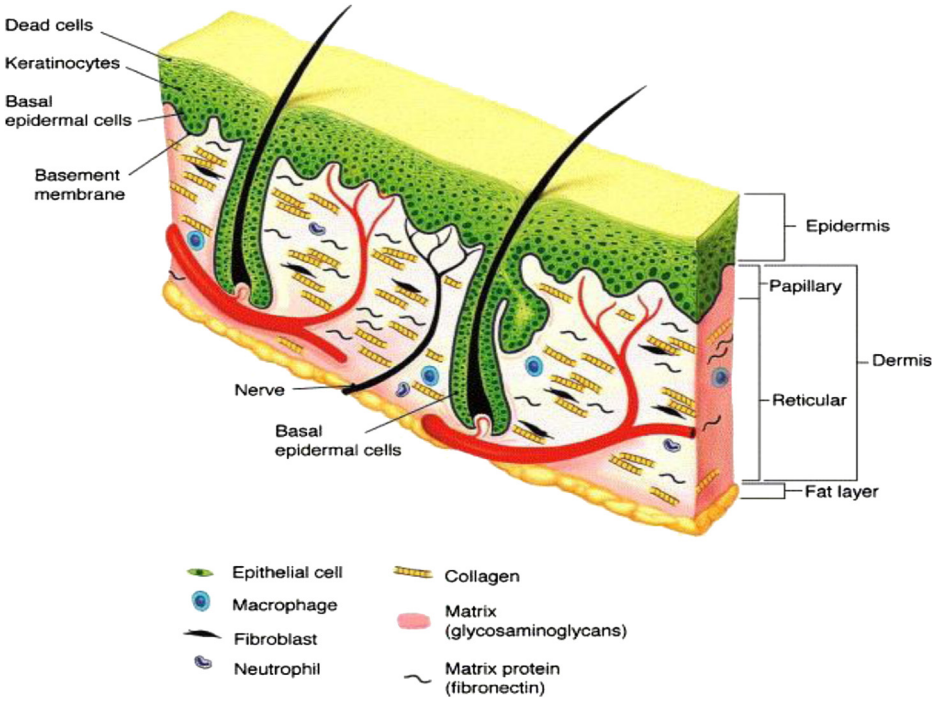

FIGURE 1: A cartoon representing the structure of intact skin. Notice the dermal capillary bed and nerve endings, which figure prominently in differentiating second- and third-degree burns. Also note the epithelial lining of the hair follicles and sweat glands, which allow for rapid healing of superficial burns. (Reprinted with permission from Duffy BJ, McLaughlin PM, Eichelberger MR. Assessment, triage, and early management of burns in children. *Clinical Pediatric Emergency Medicine*. 7(2):82–93. Copyright © 2006 Elsevier, Inc.)

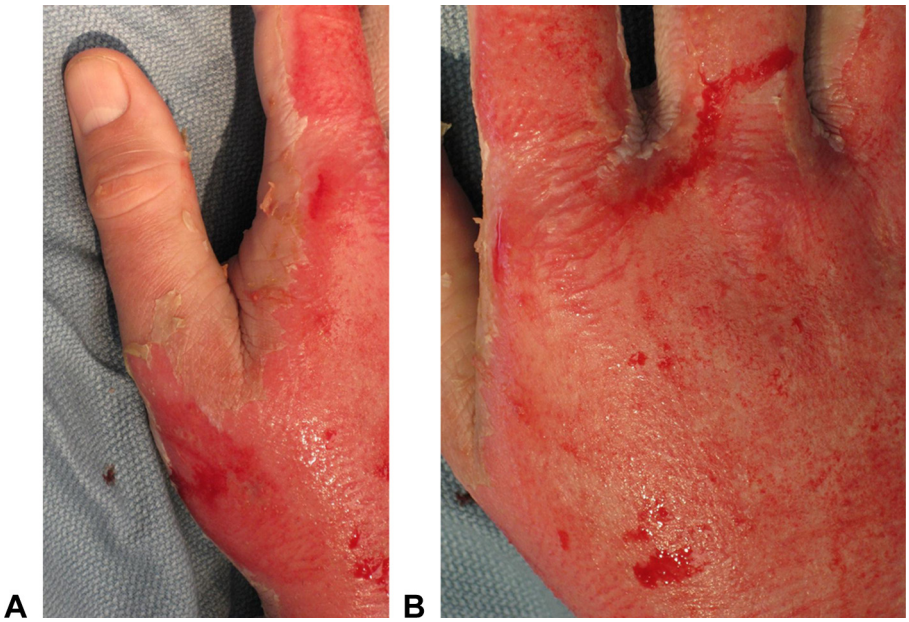

FIGURE 2: A superficial second-degree hand burn. **A** The wound bed is moist and painful and blanches when compressed. **B** The blisters have been removed and the wound bed is bleeding after minor debridement.

skin is naturally hairless and covers the palms and soles (Fig. 1).

Recognition of burn depth is exceptionally difficult. Unevenness in burn injuries, skin pigmentation, discoloration from soot, adherent clothing, blisters, dressings, and topical treatments all change the appearance of burn wounds, confounding the accurate identification of burn depth. In addition, burn wounds tend to progress and demarcate over 24 to 48 hours, adding uncertainty to the initial evaluation.