

Head and Neck Reconstruction

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KEYWORDS

• Burn • Face • Neck • Head • Reconstruction • Treatment

KEY POINTS

- Acute treatment of head and neck burns involves treatment, first, of life-threatening injuries, optimizing nutrition, assessment of burn depth, local wound care, and eye protection.
- It can be difficult to differentiate between a second-degree burn of the head and neck that can be managed expectantly versus a third-degree burn that should be treated operatively.
- Postoperative splinting and therapy are paramount to decrease the rate of debilitating postburn contractures.
- Head and neck burn reconstruction is complex and can involve anything from skin grafting to free flap reconstruction.
- The goal of head and neck reconstruction following burn injury is to restore a balance of aesthetics and function.

ACUTE MANAGEMENT OF FACIAL BURNS

Initial Management of Facial Burns

Initial assessment of all facial burns should start by ruling out inhalation injury and need for intubation.

A history of burns occurring in an enclosed space is a risk factor for inhalation injury. As such, inhalation injury must be ruled out when signs such as expectoration of soot, wheezing, and singed nasal vibrissae are present. If intubation is necessary, care should be taken to secure the endotracheal tube in such a fashion that prevents pressure necrosis. Insertion of a feeding tube should be performed in all patients being intubated and those with burns on greater than 20% total body surface area. This should be secured in a way as to prevent pressure necrosis of the columella. The authors prefer to place a Dobhoff tube in a postpyloric position, when possible, and to secure this with a nasal bridle. Any patient with periorbital burns must have a corneal examination by means of a Wood's lamp. If injury to the cornea is suspected, an ophthalmology

consult for further workup and management is ascertained.¹ Aggressive lubrication of the eyes is considered routine burn care and should be started immediately as part of the initial management of any facial burn.

Once initial assessment of the facial burn has been performed and any airway issues have been addressed, burn wounds of the head and neck should be cleansed with an antibacterial soap. Removal of debris and debridement of any blisters in which the epithelial covers have been disrupted is essential to proper cleansing. Hair-bearing areas of the scalp and face involved in the burn injury should be shaved frequently with electric clippers to keep short. Topical antimicrobials should be placed over the clean burn wound every 6 hours to keep it moist.

Topical Antimicrobials

Following cleansing of the wound, topical antimicrobials should be used as first-line care in burn wound management for prevention and control

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of wound infections. In choosing a topical antimicrobial agent, the decision should be for an agent that is easy to apply and remove with gentle cleansing, lacks tissue toxicity, is broad spectrum, and has adequate eschar penetration.² Creams and ointments are generally preferred to solutions in this area of the body because of the contours of the face and ease of its application.

Silver sulfadiazine cream 1% is effective against gram-positive and gram-negative bacteria, and fungus. It is applied twice daily. The use of silver sulfadiazine cream, however, is limited in facial burns, especially in children younger than 2 years of age, secondary to its potential damaging effect on the eyes and toxicity if ingested.²

Mafenide acetate is also highly effective against both gram-positive and gram-negative bacteria. It also has good eschar penetrance, which makes it a good topical antimicrobial for exposed cartilage in full-thickness burns to the ears and nose. Unfortunately, inflammation and pain with application make it a less favorable option for wound care to the rest of the face.²

Bacitracin ointment, effective against gram-positive bacteria, is the authors' topical antimicrobial of choice for burns to the face and scalp and is applied every 6 hours. Bacitracin is less irritating to the eyes, has minimal to no systemic effects, and is easy to remove between applications. Placement of a nonstick dressing, such as a petroleum jelly-impregnated gauze, over the bacitracin between applications is highly effective at providing a moist healing environment for both partial-thickness and full-thickness burns. Mupirocin is useful in patients known to be MRSA colonized.

Management of Partial-Thickness Burns of the Head and Neck

Determining the depth of injury can be very difficult immediately following a burn to the head and neck. Because of the rich vascularity and high density of skin appendages, the face and scalp generally heal quickly with decreased risk of infection and scarring.³ Burn wounds to the head and neck should be managed expectantly unless they are clearly full-thickness in nature, at which point, early tangential excision and grafting should proceed once the patient is medically able to undergo such an operation.⁴ Partial-thickness burns should be reassessed for healing potential around 10 days postburn. Partial-thickness burns usually show significant signs of healing, if not healed, by 14 days following initial injury. This helps to differentiate these wounds from full-thickness injury.⁵

Nonoperative Management of Partial-Thickness Burns

Treatment of partial-thickness burns was historically mostly nonoperative in nature. Frequent dressing changes and daily washing allowed for superficial debridement of the wounds and provided a moist environment for healing. Such nonoperative treatments are still routinely used for partial-thickness burns to the face and scalp with the various topical treatments (see previous discussion). Another approach to the management of partial-thickness burns is by mechanical debridement and the application of skin substitutes.

Skin Substitutes in the Management of Partial-Thickness Burns

Debridement of partial-thickness wounds by tangential excision can result in loss of undamaged skin appendages critical to re-epithelialization. Dermabrasion, using traditional metal burrs on a rotating electric motor or a manual simpler electrocautery scratch pad, is a reliable tool for in the treatment of partial-thickness burns. The use of this technique allows for controlled removal of damaged cells, while protecting underlying intact structures necessary for re-epithelialization. This is especially useful in head and neck reconstruction given the contours of the face, which make tangential excision more difficult than in other areas of the body. Another useful tool for debridement of partial-thickness burns of the head and neck is the water-jet system, which allows for precise and rapid debridement with simultaneous removal of debris.⁶ Once this damaged tissue has been removed, a more reliable assessment of burn depth and healing potential can be ascertained.

Following debridement, skin substitutes may be used because their ability to adhere and integrate to the contours of the face decrease the number of dressing changes required during the course of a hospitalization. This, in turn, decreases patient pain and discomfort. In addition, skin substitutes promote rapid re-epithelialization and decrease the risk of infection when compared with conventional topical treatments and dressing changes, and reduce evaporative losses of water, protein, and heat. Skin substitutes that have been well studied for their advantages in healing of partial-thickness facial burns include porcine xenograft, human allograft, human fibroblast-derived temporary skin substitute (TransCyte, Advanced Tissue Sciences, La Jolla, CA, USA), other collagen constructs, and amniotic membranes.⁶⁻¹¹ Allogenic skin has also been shown to not only increase the rate of re-epithelialization but also decreases

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