


Reconstruction of a Patient with Severe Craniofacial Burns in a Conflict Zone in Burkina Faso: The Story of the Sole Survivor of a Plane Crash

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Abstract

Introduction: Severe burns to the face pose functional and aesthetic problems. Treatment may be delayed or inadequate when cases occur in unsafe areas. We report a clinical case of a severe burn following a helicopter crash. **Clinical Case:** The patient was a 41-year-old man, the sole survivor of a helicopter crash in a region with a precarious security situation. This patient, with no medical history, presented with multiple 2nd and 3rd degree craniofacial burns and burns to the pelvic and thoracic limbs, with an estimated total body surface area burn of 18%. He was initially treated in a general surgery department, where he underwent several dressings and bandaging procedures, and was then referred to maxillofacial surgery one month after his burns. The examination revealed granulation wounds on the left side of the face, loss of upper eyelid tissue, ectropion and early-stage exposure keratitis. A multidisciplinary approach was adopted, involving ophthalmologists to prevent corneal complications. The surgical treatment was carried out in several stages: full-thickness skin grafting in the facial aesthetic unit, thin skin grafting in the fronto-temporal region, Cutler-Beard flap and glabellar flap for eyelid repair. The outcome was favourable, with good graft integration, eye protection and a noticeable aesthetic improvement. Further procedures are planned to optimise the result. **Conclusion:** This case illustrates the possibility of effective reconstruction of a severe facial burn despite an initial delay, thanks to a multidisciplinary approach and appropriate, innovative surgical techniques.

Keywords

Craniofacial Burns, Insecurity, Sequelae, Facial Reconstruction

1. Introduction

Craniofacial burns are one of the most complex conditions in reconstructive surgery due to the functional and aesthetic density of this anatomical region [1]. When they occur in a context of security instability, the timeliness and quality of initial care are compromised, thereby aggravating the sequelae and complicating subsequent surgical strategies [2] [3]. Far from referral centres, limited resources and the prevailing insecurity force practitioners to delay or adapt standard reconstructive protocols [4]. We report the exceptional case of a patient, the sole survivor of a plane crash in a high-risk security zone, presenting with severe burns to the face. Reconstruction was undertaken late but using a rigorous multidisciplinary approach, employing major surgical techniques, notably the Cutler-Beard flap and the glabellar flap. This case illustrates the adaptability of maxillofacial surgery in extreme conditions and demonstrates the possibilities for functional and morpho-aesthetic restoration even in situations of constraint.

2. Clinical Observation

A 41-year-old patient from a region in eastern Burkina Faso marked by security instability was the sole survivor of a helicopter crash (Day 0). The initial assessment carried out at a peripheral hospital revealed deep second-degree and third-degree burns affecting the left side of the face, the left upper limb and the left lower limb, representing approximately 18% of the total body surface area, estimated according to Wallace's rule of nines. The depth of the injuries was clinically assessed based on the whitish, cardboard-like appearance of the necrotic areas, the absence of capillary bleeding on the scarification test, local insensitivity and the destruction of the appendages. Screening for inhalation injuries was performed clinically and by otorhinolaryngological examination, finding no signs of respiratory tract involvement, and the haemodynamic status remained stable after the initial resuscitation phase. Between days 1 and 30, treatment consisted of repeated surgical debridement followed by ointment dressings applied every two to three days in the operating theatre, as specialised reconstruction was not possible. Due to persistent loss of eyelid substance associated with major ectropion and early signs of exposure keratitis, the patient was referred to our maxillofacial surgery department on day 30 post-trauma. The examination revealed a loss of substance in the upper left eyelid measuring approximately 18 × 12 mm affecting the entire thickness of the skin, lagophthalmos with severe ectropion, areas of facial inflammatory granulation and scarring alopecia on the left frontotemporal region measuring approximately 6 × 5 cm (**Figure 1**, **Figure 2**). The ophthalmological examination confirmed early-stage exposure keratitis without stromal ulceration, prompting coordinated management with the ophthalmology team. An initial operation

was performed on day 35 post-trauma under general anaesthesia, involving a total skin graft taken from the left supraclavicular region measuring approximately 7×5 cm, carefully degressed and fixed with separate stitches using 5-0 nylon skin suture with a greasy compression dressing for the reconstruction of facial aesthetics, as well as a thin skin graft of intermediate thickness (0.3 to 0.4 mm) taken with a manual dermatome from the anterior surface of the right thigh for the scalp coverage, secured with staples and protected by a non-adherent ointment dressing (**Figure 3**). The grafts had completely taken by day 7 without any complications of infection or dehiscence. The second stage of surgery was performed on day 45 post-trauma and consisted of reconstruction of the upper eyelid using the Cutler-Beard technique, with removal of a bipediculated tarsconjunctival flap from the lower eyelid transposed to the upper defect, supplemented by a glabellar flap for eyelid reconstruction (**Figure 4**). Postoperative eye protection combining temporary occlusion, intensive corneal lubrication and prophylactic topical antibiotic therapy was instituted. The Cutler-Beard flap pedicle was detached on day 75 post-trauma after confirmation of tissue viability. At the three-month follow-up, eyelid closure was complete with no residual lagophthalmos, the ectropion was corrected, the exposure keratitis had disappeared, visual acuity was maintained at 10/10 and the grafts remained stable with a morpho-functional result considered satisfactory, with no secondary complications (**Figure 5**).

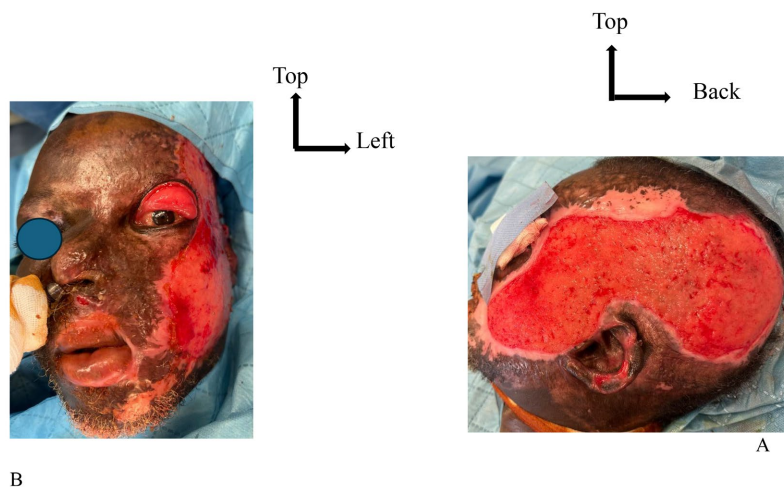


Figure 1. Burn injuries to the face with left eye ectropion.



Figure 2. Burn injuries to the left thigh, left forearm and buttocks.

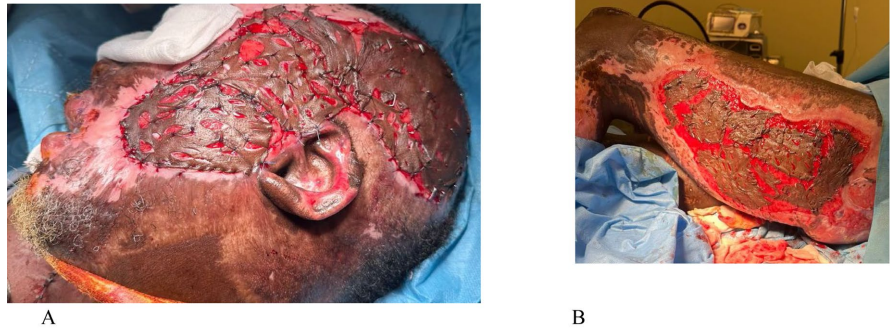


Figure 3. Intraoperatively, GPT on the face and GPM on the scalp (A) and thigh (B).

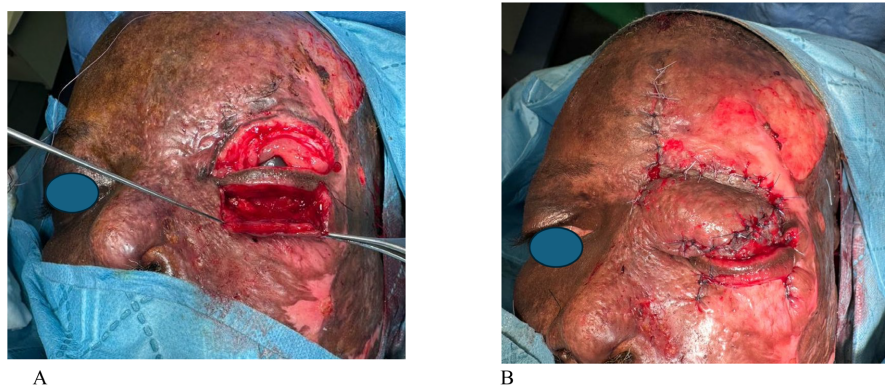


Figure 4. Intraoperative images, lifting of the Cutler flap (A) and glabellar flap after eyelid reconstruction (B).

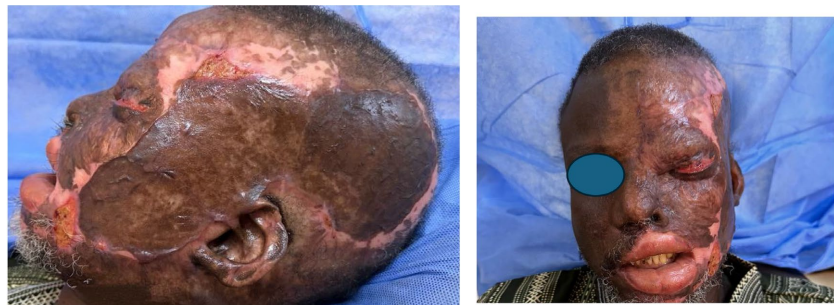


Figure 5. Photo of the patient, results at 3 months.

3. Commentary

The surgical treatment of severe craniofacial burns remains a major therapeutic challenge, at the crossroads of functional, aesthetic and psychological imperatives [1]. When these injuries occur in a context of poor healthcare and security instability, they pose additional difficulties related to the absence of specialised technical facilities, the lack of advanced surgical resources and prolonged delays in transfer to referral centres [3] [4]. The reported case illustrates these constraints, as the patient was initially treated in a non-specialised general surgery department, without the possibility of appropriate reconstruction. This delay in specialised care resulted in increased loss of skin substance and an increased ophthalmol-

logical risk, particularly in the absence of eyelid coverage. The spontaneous progression of the lesions, without early reconstructive surgery, contributed to local tissue disorganisation and progressive deterioration of facial function and appearance. Upon admission to maxillofacial surgery, the urgency was therefore no longer solely related to morphological repair, but also to preserving visual functions and preventing irreversible corneal complications. In this context, a multi-stage surgical plan was required, based on a gradual strategy prioritising eye protection through eyelid restoration and the progressive restoration of the aesthetic features of the face. The full-thickness skin graft allowed for satisfactory restoration of the skin covering the half of the face, with a cosmetic result superior to that expected with a thin graft, which is often prone to hyperpigmentation and secondary retraction. In addition, a thin graft on the scalp prevented more extensive alopecia, paving the way for possible secondary hair reconstruction. Eyelid reconstruction was the central focus of the second stage of surgery. The Cutler-Beard flap, traditionally reserved for extensive eyelid tissue loss [5] [6], proved to be appropriate. Its combination with a the glabellar flap provided stable coverage of the peri-orbital tissues and a lasting correction of the ectropion. It should be noted that other techniques could be used, such as the orbicularis oculi muscle flap technique with skin grafting [7] and reconstruction using the anterior lamella of the eyelid with simultaneous full-thickness skin grafting and amniotic membrane grafting [8].

This approach is fully in line with recommendations for post-burn facial reconstruction in resource-limited settings, which favour full-thickness skin grafts and robust local flaps, techniques that are reproducible and do not require advanced technical facilities. The surgical schedule and the combined choice of full-thickness skin graft/thin-flap Cutler-Beard graft adopted in our case are in line with these validated principles, reconciling functional requirements and contextual feasibility [9] [10]. The corneal protection obtained, combined with close monitoring by ophthalmologists, prevented the development of irreversible keratopathy. From an interdisciplinary perspective, the early involvement of ophthalmology and ENT teams is essential in all cases of facial burns [11]. This case illustrates the possibility of effective reconstructive treatment despite unfavourable initial conditions. It highlights the importance of an adaptable surgical approach, structured around proven technical principles and multidisciplinary coordination. The prioritisation of functional priorities, the reasoned choice of surgical timing and mastery of flap techniques remain essential for optimising results. This type of experience reinforces the value of developing specific treatment protocols for resource-limited contexts.

4. Conclusion

The treatment of craniofacial burns in precarious circumstances requires constant adaptation to technical and logistical constraints. This case highlights the importance of a well-thought-out surgical strategy based on a multidisciplinary approach and the timing of operations. Finally, it serves as a reminder that satisfactory results

can be achieved when rigour, collaboration and technical expertise are combined in just the right measure.

Ethical Approval

The patient's consent was obtained.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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