

# Repair of Complex Post-Traumatic Facial Dislocations: Indications, Therapeutic Difficulties and Results at Treichville University Hospital, Abidjan, Cote d'Ivoire

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## Abstract

**Introduction:** Complex post-traumatic facial disfigurements are caused by civilian or ballistic trauma. Their repercussions are functional, aesthetic and psychological. The initial emergency or secondary management of facial damage is difficult. The objective is to report, through the clinical observation of three patients, the results of the management of complex facial dislocations in a context of limited technical resources. **Patients and methods:** Three complex post-traumatic facial dislocations were managed between May 2006 and June 2017. **Results:** Primary treatment and secondary repair were established on a case-by-case basis. Local autoplasty was the indication of choice. Multidisciplinary management resulted in satisfactory functional and cosmetic outcomes. Two of the patients were lost to follow-up before the end of treatment. **Discussion:** The complete management of facial dislocations remains difficult and complex, in an extreme exercise situation. In an emergency, the priority is to save the life of the injured person. Several factors are involved in the therapeutic decision: the choice of the maxillofacial reconstruction technique, the availability of the technical platform, the financial capacity and the psychological state of the patient and his entourage. Sequential and multidisciplinary treatment gives satisfactory results in terms of morphology, function and aesthetics, despite the limited technical resources available. Psychological support is an essential complement for successful socio-professional and family reintegration.

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## Keywords

Dislocation, Face, Complex, Difficulties, Treatment

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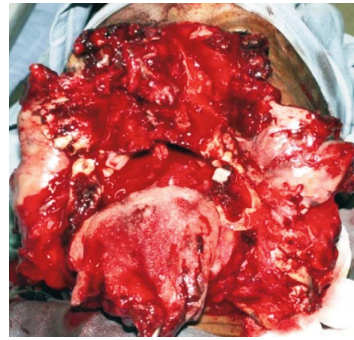
### 1. Introduction

Facial dislocations are serious injuries that affect one or more tissues or even organs of the face. These deep lesions affect the cutaneous-mucosal and musculoaponeurotic covering planes, the vascular-nervous and glandular elements, and lead to continuity solutions of the facial skeleton, and are known as complex [1]. The etiologies are road traffic accident in peacetime and ballistic accidents in wartime [2]. Facial dislocations are responsible for serious mutilating lesions, with vast losses of osteo-myocutaneous substance causing orbito-nasoethmoid-frontal dislocation, which is very difficult to repair. These injuries constitute emergencies that put at risk the vital, functional and aesthetic prognosis. Treatment involves increasingly complex rehabilitation procedures, leading to constantly improving functional and cosmetic results [3]. The aim of the repair is to restore the anatomy and function of the reconstructed area as closely as possible. The quality of the repair requires that the integrity of the aesthetic units and subunits of the face be respected [4]. The complete management of facial dislocations (emergency management, primary management, secondary management) remains difficult in our context. The aim of this work is to report, through the clinical observation of three patients, our results, despite the difficulties linked to the management of facial dislocations in a context of limited technical platform.

### 2. Observation 1

A 56-year-old patient was admitted for maxillofacial trauma caused by a firearm fired at close range. The clinical examination carried out on 16 May 2006 during the emergency trimming revealed haemorrhagic shock, a vast loss of cutaneous, mucous and bony substance, haemorrhagic of the middle and lower third of the face, taking away the premaxilla, the mandibular symphysis, the anterior oral floor, the anterior third of the tongue and half of the nasal pyramid (**Figure 1**). Radiological assessment was not performed due to the unavailability of CT scans.

The primary emergency treatment consisted of resuscitation with macromolecules, blood transfusion, antibiotic prophylaxis, and trimming under general anaesthesia without immediate bone stabilisation due to the unavailability of implants. The secondary treatment, 7 days after the first treatment, consisted of multiple maxillo-mandibular osteosynthesis (mandibular reconstruction by Krenkel splint, screwed plates on the maxilla), a cheiloplasty and the repair of the nasal pyramid. The patient had severe functional (speech impediment) and aesthetic sequelae following surgery (**Figure 2**). A third treatment for aesthetic and morphological purposes was planned but not carried out due to lack of funds. The patient was lost to follow-up.



**Figure 1.** Patient in supine position showing the extent of centofacial skin, muscle, mucosa and bone loss in the vertical middle third.



**Figure 2.** Progression on day 15 after secondary treatment, showing the extent of nostril wing retraction and microstomy. In the supra-sternal recess, a depressed tracheostomy scar.

### 3. Observation 2

A 47-year-old patient was seen on June 8, 2010 for sequelae of maxillofacial gunshot trauma that occurred 6 months earlier.

Clinical and radiological findings included extensive loss of centofacial substance with near total amputation of the nasomaxillofacial structures, three quarters of the mobile tongue with fibrotic ankyloglossia, multi-squamous fracture of the mandibular symphysis, subtotal amputation of the upper lip and nose leaving only the right wing attached to the jugal region (**Figure 3**). The management consisted of several surgeries, each spaced one month apart: First surgery: multiple osteosynthesis of the mandible, fabrication of a maxillary and mandibular dental prosthesis, repair of the labio-columellary height by a right naso-labial flap with inferior pedicle. Second surgery: Pelvi-glossoplasty, nasal epithesis and enlargement commissuroplasty. Third surgery: Abbé flap for upper labial repair and adjustment of the nostril openings. Fourth surgery: Weaning of the Abbé flap and readjustment of the various prostheses and epithetics. The outcome after the treatment of the sequelae was satisfactory from a morphological, functional, aesthetic and psychological point of view (**Figure 4**).



**Figure 3.** Subsequent maxillofacial gunshot trauma, six months after primary treatment.



**Figure 4.** Satisfactory end result after a multidisciplinary management involving maxillofacial surgeon, dental surgeon and prosthetist 10 months after initial trauma.

### 4. Observation 3

A 31-year-old patient was seen on 22 June 2017 for a cranio-maxillofacial trauma following a road accident the previous day. A motorcyclist, he had collided with a heavy vehicle and fell face down on the door. The clinical and radiological lesion assessment carried out on a conscious patient revealed a centropalatal dislocation associating: a haemorrhage; a loss of substance of the right two-thirds of the upper lip sparing the two commissures; a disinsertion of the right nostril wing and columella; a wound of the nasal pyramid; a vestibular wound with a loss of multi-squamous mucosa substance of the maxilla; a loss of teeth from 21, and 31 to 44; and a bifocal fracture of the mandible with loss of symphyseal bone substance (**Figure 5**). Associated injuries were: cranioencephalic trauma with an initial loss of consciousness lasting four hours, and a transverse fracture of the right patella. Cervical and brain scans were normal. The management was sequential in several surgical interventions: First surgery performed on June 23, 2017, 2 days after the initial trauma consisted of a debridement, then a mandibular osteosynthesis with two screwed plates with four and six holes, and an up-

per labial reconstruction by suture. The central part of the upper lip, the columella, was left to heal under direction. Osteosynthesis of the transverse fracture of the right patella was performed at the same time by an orthopaedic team. Second surgery (performed two months after the first surgery): an Abbe-Estlander flap was performed for the upper lip repair. Third surgery (performed one month after the second surgery): this consisted of weaning the Abbe-Estlander flap and correcting a defect in the right nostril wing with a superior pedicle nasolabial flap around a nasal conformer. The immediate post-operative period was marked by a partial release of vermilion which was left to heal in a controlled manner. After healing, on postoperative day 35, the evolution was marked by functional and aesthetic sequelae such as multiple and retractile scars of the upper right white lip and asymmetry of the nasal orifices (**Figure 6**). A fourth surgery was envisaged to repair the upper lip retraction, however, the patient was lost to follow-up.



**Figure 5.** Central-facial dislocation of the vertical median third with loss of skin-musculoskeletal substance by road accident at day-1 of initial trauma (motorcycle accident).



**Figure 6.** Result at D-35 postoperatively. Hypertrophic appearance of the donor site scars of the superior pedicle nasolabial flap and the superior white lip after secondary treatment.

## 5. Discussion

Complex facial dislocations are rare [5]. The rarity of these lesions justifies the small population size in published case series [6] [7]. In 1968, in a study by Grellet *et al.*, over a 10-year period, the overall incidence was less than 1% of trauma patients [2] [8]. Forty years later, this incidence had risen to 15% - 20%, of which 23% occurred in road traffic accidents [9], particularly in developing countries. Two-wheeled vehicles are particularly responsible [2] [10]. The sample in our series is small, with three cases, including two ballistic injuries (observations 1 and 2) and one road accident involving a two-wheeler (observation 3). The under-reporting and poor archiving of medical documents did not allow us to evaluate the relative frequency of maxillofacial trauma in our department. In terms of lesions, we contrast trauma caused by road accidents and ballistic accidents. Firearms are responsible for immediately severe and mutilating trauma with extensive multi-tissue damage [11]. Road traffic accidents more rarely result in an interrupting loss of substance [11], as in observation 3. The centropfacial region was affected in all three patients in our series. The centropfacial region, in addition to housing the aesthetic nasal and labial subunits, has a major aesthetic (nasal pyramid, upper and lower lip) and functional (speech, chewing, swallowing, phonation and breathing) role. The repair of substance loss in this region remains difficult, even more so in the case of firearm trauma. The treatment protocol for these complex injuries involves meticulous surgical exploration and assessment, debridement, emergency fracture reduction and fixation, and remote reconstruction [12] [13]. There are two ways in which this can be life-threatening [12]: Immediately through haemorrhagic shock or respiratory distress and remotely through the risk of sepsis. This management must be rigorous and prioritised in order to initially look for lesions that could compromise the vital prognosis [5]. The injury assessment is established after the vital emergency has been resolved. The injury assessment must be meticulous, starting before the surgical management and continuing during the surgical exploration. The skeletal damage is significant and not systematised. They require iterative surgery [14]. The difficulties encountered in the management of complex facial dislocations in our practice are multiple:

- 1) The lack of specialists and the remoteness of specialised centres: only three Stomatology and Maxillofacial Surgery departments are available in the whole of Côte d'Ivoire, two of which are in the capital.

- 2) The absence of an available and adapted technical platform that would allow for the best possible care of these trauma victims. Having a quality technical platform, in the era of reconstructive microsurgery, is not currently the case in our daily practice. We have privileged local autoplasty. The principle is to replace the entire aesthetic unit concerned. This way, the skin remains homogeneous after the healing process. The scar is discreet, aesthetic and does not attract the attention of others. The use of local flaps ensures good results in terms of colour and texture, and therefore a much better aesthetic quality. They require little post-operative

care. They have a low cost of production, they require fewer follow-up visits to the hospital and avoid the patient having to travel long distances. In addition, a short operating time reduces the patient's stress, the risk of secondary and anaesthetic infection. Our main indications were the direct suture without tension in the first debridement step (observation 1), the upper (observation 3) and lower (observation 2) nasogenial pedicle flaps and the Abbe-Estlander flap (observations 2 and 3). A non-suturable loss of substance of the upper lip was left to heal under direction during the first debridement procedure (observation 3). A loose suture in the upper lip was observed after weaning of an Abbe-Estlander flap (observation 3). The highly corrosive action of saliva is incriminated as well as defective oral hygiene. The lesion was put into directed healing. Directed healing is a simple method of treating a superficial, non-suturable defect. In one patient (observation 2), a prosthetic restoration was proposed in view of the extensive maxillary bone loss. The perfect congruence of the prosthesis with the bone loss allows normal phonation, swallowing and speech [15]. These maxillary and mandibular prostheses served as a bone framework and allowed the patient's articulation to be restored.

### 3) Availability and cost of osteosynthesis material

The treatment of our patients required sequential and iterative surgical interventions. The modalities were multiple, and our guide was the principle of Pichler's craniofacial reconstruction: "bone first, then soft tissue" [12] [15]. In the first case, however, the unavailability of CT scans and implants in the emergency room meant that soft tissue injuries had to be managed first. Osteosynthesis maintains the gap between the different bone fragments, reduces skin retraction during healing and facilitates the placement of maxillary prostheses [15]. In our series, osteosynthesis was performed within 48 hours (observation 3), seven days (observation 1) and six months after the initial trauma (observation 2). The use of screw plates facilitates restraint and postoperative management [16]. Mini screw plates were used extensively in our series, in accordance with the literature; so was an inter-maxillary block (observation 3). The use of an external fixator has been reported by some authors [5] [17], especially in ballistic dislocations. In the face, the external fixator is uncomfortable for the patient. Moreover, it leaves additional scars on an already damaged face. We have not experienced this. The number of surgeries varied between two (observation 1), four (observation 2) and three (observation 3). One patient (observation 1) had two procedures seven days apart. The minimum time between two procedures was one month (observation 2 and 3). These intervening periods are long enough to allow for the disappearance of reactive inflammatory phenomena in the soft tissues. They are also used to inform and educate the patients or to readjust the various prostheses and epithetics.

### 4) The financial capacity of the patient or his family

The absence of social security for patients is a barrier to their care. The family and friends must find the necessary means to pay for the treatment in an emer-

gency. The high cost of equipment is a handicap for our patients. Epithetics and prostheses, which are expensive, replace certain laborious reconstructions of extensive loss of substance of the face, and spare the patient from iterative, even heavy microsurgical interventions. They are therefore an effective and suitable alternative in our working contexts in a precarious health situation. Financial difficulties compromise the completion of all stages of treatment, which is often limited to primary treatment. Patients then settle for the acceptable and are lost to follow-up after the first intervention. The psychological state of the patient and his or her family must be taken into account before treatment. Indeed, dysmorphophobia is inseparable from physical injuries and will indelibly condition the whole experience of the accident and its aftermath. The face is the support for external and internal identity, dignity and relational life. It cannot be damaged without deep psychological damage. The care of the traumatized person also includes the care of his or her family, who need to be calmed and reassured because the accident never affects the victim alone, but the whole family [18]. In our series, the postoperative course was marked by severe functional (speech impairment) and aesthetic sequelae (observations 1 and 3). Hypertrophic scarring, a frequent and unpredictable complication in black skin, was observed in one patient (observation 3). The evolution after the multidisciplinary treatment of the sequelae (observation 2) was satisfactory from a morphological, functional, aesthetic and psychological point of view; the comfort of life of our patients was improved.

## 6. Conclusion

Post-traumatic facial disfigurement is mutilating and severe. Their treatment is relatively difficult. But, therapeutic abstention is unthinkable. In spite of the many difficulties linked to our conditions of practice, the multidisciplinary management of these complex lesions gives satisfactory results and improves the quality of life of the patients. The repair process is long and tedious for both the surgeon and the patient. The therapeutic strategy is established on a case-by-case basis. Nevertheless, “zero” sequelae is still difficult to achieve in the comprehensive management of complex facial dislocations.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- [1] Monteil, J.P. (2010) Plaies de la face. Les Monographies Amplifon.
- [2] Herve, V. (2011) Les traumatismes maxillo-faciaux et leurs implications en pratique odontologique: Intérêts d’une approche pluridisciplinaire. Thèse N° 3498, Chirurgie dentaire, Université Nancy Poincaré-Nancy 1, Nancy.
- [3] Benateau, H., Compere, J.F., Labre, D. and Cantaloube, D. (2000) Traumatisme de la face par arme à feu en pratique civile. *Encycl. méd. Chir. Paris Stomatologie/odontologie*, 22-075-B-10, 7 p.



- [4] Kadre, A.K.O., Mayaou, A.K., Djafarou, B., Illé, S., Moustapha, H., Salami, A., *et al.* (2021) Utilisation des lambeaux dans les pertes de substances maxillo-faciales: À propos de 32 cas au Niger. *European Scientific Journal*, **17**, 306. <https://doi.org/10.19044/esj.2021.v17n17p306>
- [5] Nicolas, J., Soubeyrand, E., Labbe, D., Compere, J.F. and Benateau, H. (2008) Traumatismes de la face par arme à feu en pratique civile EMC. Paris. Elsevier Masson, 2007, Médecine buccale, 28-510-G-10.
- [6] Wang, W., Duan, J., Wang, Q. and Kuang, W. (2015) Complex Reconstruction of Facial Deformity and Function after Severe Gunshot Injury: One Case Report. *International Journal of Clinical and Experimental Medicine*, **8**, 1427-1433.
- [7] Raotoson, H.S., Randrianirina, H., Randrianirina, M.S.E., Rakoto Alson, S., Ramaroson, J., Ralaarimanana, L.F.E., *et al.* (2017) Un cas de traumatisme maxillo-facial grave. *Revue d'odontostomatologie malgache en ligne*, **12**, 12-19.
- [8] Grellet, M., Keravel, Y., Marsault, C., Morax, S., Roujas, F. and Scheffer, P. (1981) Traumatologie faciale en traumatologie d'urgence. *Revue de Stomatologie et de Chirurgie Maxillo-Faciale*, **82**, 149-158.
- [9] Lebeau, J., Kanku, V., Duroure, F., Morand, B., Sadek, H. and Raphaël, B. (2006) Traumatismes faciaux au CHU de Grenoble. *Revue de Stomatologie et de Chirurgie Maxillo-Faciale*, **107**, 23-29. [https://doi.org/10.1016/S0035-1768\(06\)76977-7](https://doi.org/10.1016/S0035-1768(06)76977-7)
- [10] Zégbeh, N.E.K., Béréte, P.I.J., Salami, T.A., Yapo, A.R.E., Traoré, I. and Crézoit, G.E. (2020) Les fractures du massif facial au centre hospitalier universitaire de bouaké (Côte d'Ivoire). *Revue Internationale du Collège d'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **27**, 66-71.
- [11] Duroure, F. (2000) La reconstruction osseuse de la face. Revue des particularités et des procédés, synthèse des indications. Thèse Médecine, Université Henry Poincaré Nancy, Nancy.
- [12] Diallo, O.R., Bah, M.L. and Condé, A. (2020) Les traumatismes maxillo-faciaux par arme à feu au centre hospitalier universitaire de conakry: Aspects socio-démographiques, anatomo cliniques et thérapeutiques, à propos de 42 cas. *Revue Internationale du Collège d'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **27**, 72-77.
- [13] Christensen, J., Sawatari, Y. and Peleg, M. (2015) High-Energy Traumatic Maxillofacial Injury. *Journal of Craniofacial Surgery*, **26**, 1487-1491. <https://doi.org/10.1097/SCS.0000000000001789>
- [14] Palacios Vivar, D.E., Miranda Villasana, J.E. and Calderon Lumbresasi, A.S. (2017) Gunshot Caused Facial Wound. Literature Review and Clinical Study of Three Cases. *Revista Odontológica Mexicana*, **21**, 125-132. <https://doi.org/10.1016/j.rodex.2017.05.018>
- [15] Roux-Vaillard-Souchet, S. (2002) Maxillectomies pour cancer: Quelles reconstructions proposer? Thèse médecine Angers France.
- [16] Giraud, O., Teysseres, N. and Brachet, M. (2007) Traumatisme Maxillofacial. EMC (Elsevier Masson SAS, Paris), Médecine d'urgence, 25-200-C-30. [https://doi.org/10.1016/S1959-5182\(07\)73330-5](https://doi.org/10.1016/S1959-5182(07)73330-5)
- [17] Naija, S., Yacoub, A., Barhoumi, M., Akkeri, K., Chebbi, G. (2021) Traumatisme balistique de la face: Un nouveau fléau en Tunisie. *Annales de Chirurgie Plastique Esthétique*, **66**, 210-216. <https://doi.org/10.1016/j.anplas.2021.03.004>
- [18] Jalal, E. (2018) Prise en charge des fracas faciaux à Marrakech: À propos de 50 cas. Thèse N° 187, Faculté de Médecine et Pharmacie Marrakech Université Cadi Ayyad.