



Case Report

Reconstruction of multiple hard and soft tissue wounds of the face in a patient following gunshot injury at ABUTH, Zaria

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Abstract

Facial gunshot injuries are uncommon and complex. They require careful planning for multi-staged reconstructive surgery. Initial conservative management followed by staged secondary reconstruction could be performed to obtain satisfactory functional and aesthetic results. We present a 46years old male with multiple facial gunshot injuries. He had ruptured right globe, multiple fractured fragments of the maxilla, palate and mandible, loss of part of left ala of the nose, full thickness loss of part of left cheek and part of upper lip. The patient had multi-staged surgeries that included stabilization of mandibulo-maxillary fractures and use of temporalis muscle flap and left laterally based forehead flap to reconstruct soft tissue defects. The surgeries were done over a period of 3months due to unavailability of funds. The determination of the surgical team and the desire of the patient to look good, lead to a fairly acceptable outcome, the challenges of late presentation, inadequate facilities and inadequate funds notwithstanding.

Keywords: Gunshot injury, multi-staged reconstruction, multidisciplinary approach, regional flaps.

INTRODUCTION

Facial gunshot injuries are unusual and complicated (Vanna et al., 2002; Saud et al., 2009). The majority of the wounds is caused by civilian type low velocity handguns and is purposefully and intentionally inflicted. The severity of facial gunshot injuries varies according to the caliber of the weapon used and the distance from which the patient sustained the injury. Close-range high velocity gunshot wounds can result in devastating functional and aesthetic consequences for the surviving patients (Perry and Phillips, 2001).

There is controversy regarding the ideal time for and method of reconstruction. Some authors believe that going by the mechanism of injury, initial conservative management followed by a staged secondary reconstruction could be performed to obtain satisfactory functional and aesthetic results (Kassan et al., 2000; Perry and Phillips, 2001). Alternatively other authors

advocate early aggressive management of facial deformity sating ease of tissue mobilization, reduced tissue fibrosis and reduced period of facial deformity as advantages of early intervention (Saud et al., 2009; Demetriades et al., 1998; Yang et al; 2001).

Our patient had delayed multi-staged reconstruction due to late presentation and insufficient funds. An earlier intervention in our opinion could have prevented tissue contracture, degeneration of orbital fat and ultimately given a better and more pleasing result.

CASE REPORT

A 46 year old farmer from the Middle belt region of Nigeria presented to the Maxillofacial clinic of ABUTH, Zaria, with more than 3month's history of severe facial deformities following an armed robbery attack. He was transporting his farm produce on a trailer, when they were attacked by armed robbers. He had first aid treatment in a government hospital the same day of the incident.

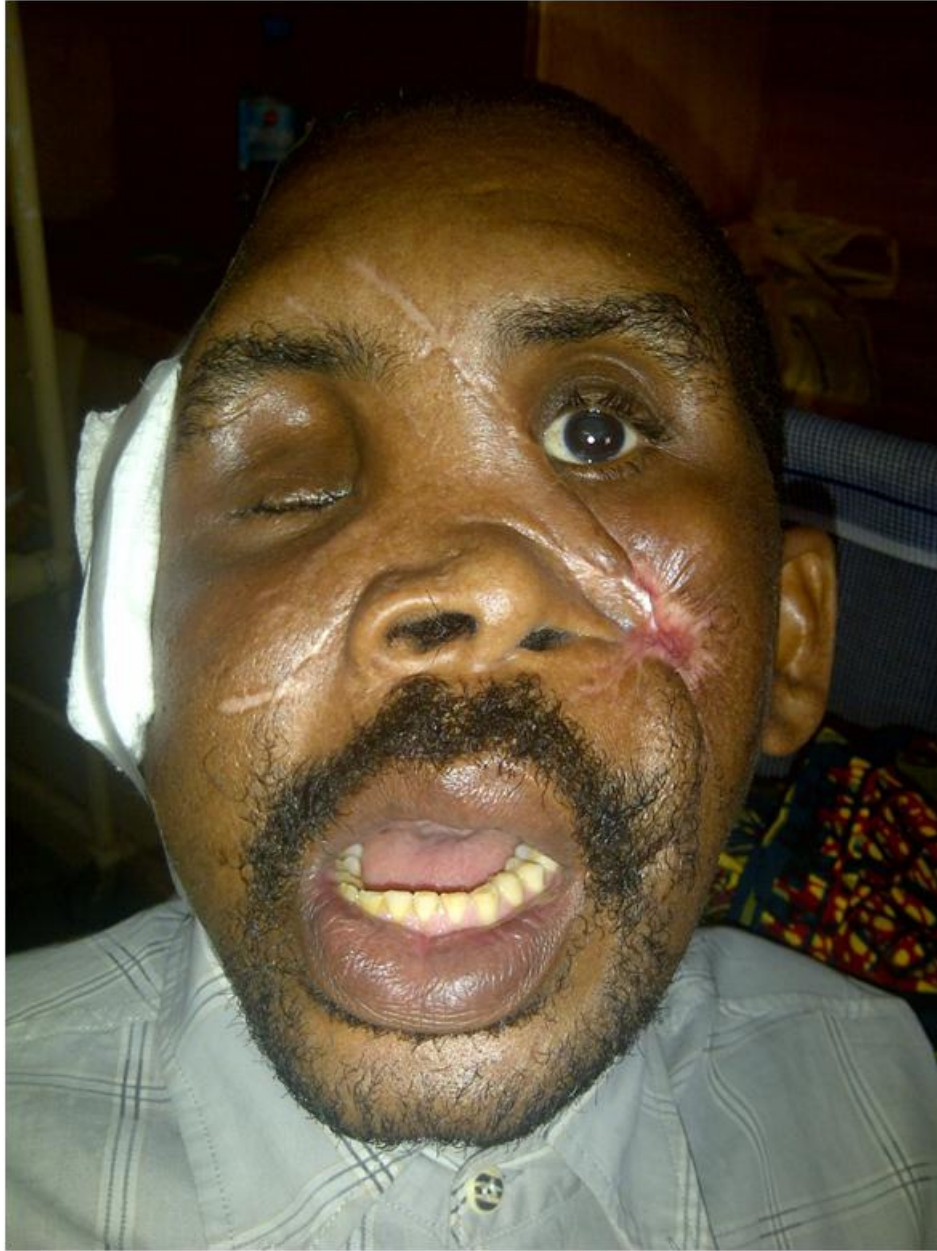


Figure 1. Pre- operative Appearance

He presented to our clinic on account of facial deformities causing some aesthetic embarrassment and functional disconnect. On examination he was fully conscious, well oriented, general condition stable without active haemorrhage or neurological deficit. Facial examination showed elongation of the face, with typical dish face deformity in the middle third of the face. There was rupture of the right globe with an expanded and sunken orbit. Also evident were bullet entry point lateral to the right orbit, widened inter-canthal distance, flattened right zygomatic bone and arch. There were multiple maxillary and palatal fractured segments, flattened nasal

bones, loss of part of the left ala of the nose and adjoining cheek tissue, as well as multiple mandibular fractures (Figure 1).

Ophthalmological review showed ruptured right globe and fractured orbital floor. There was appreciable atrophy of the orbital contents. The nasal bones had united in the fractured flattened position while the maxillary segments remained very mobile as separate fragments. Plain radiological images confirmed the findings of orbital rim and floor fracture multiple fractures of the middle third and mandibular fractures.

During the first surgical intervention, the maxillary and



Figure 2. Post Temporalis Muscle Flap

mandibular fractured segments were stabilized with arch bars and wires. Satisfactory occlusion could not be achieved due to missing fragments and also resorption of the existing fragments of bone. At same surgery,

enucleation of the ruptured right globe was done. A right temporalis muscle flap was raised and tunneled through the bullet entry point to fill the right socket (Figure 2).

A second surgery was carried out after 4weeks of the



Figure 3. Forehead Flap Reconstruction of Cheek and Ala Defects

first surgery. They delay was to enable patient build up both physically and financially. During the second surgery, a left laterally based forehead flap was raised to

fill up the left cheek defect and reconstruct the lost part of the left ala of the nose (Figure 3).

Due to lack of funds, the division of the flap could

not be done until a charity organization came to his rescue. He was unable to procure an artificial eye to replace the ruptured right globe. The patient was however quite happy with the result achieved. He still looked pretty good at 3month follow up review.

DISCUSSION

Gunshot injuries are uncommon problems except in wartime or in certain areas. They are unpredictable puncture injuries that cause major tissue damage. Three major factors work together to determine the severity of a gunshot wound namely; location of the injury, size of the projectile and speed of the projectile (Brouhard, 2010). Close-range high velocity gunshot wounds can result in devastating functional and aesthetic consequences for the surviving patient (Kara et al., 2008; Perry and Phillips, 2001). Our patient had multiple wounds from a close range gunshot injury.

There are four main steps in the management of patients with gunshot wounds to the face; securing an airway, controlling haemorrhage, identifying other injuries, and definitive repair of the traumatic facial deformities (Demetriades et al., 1998; Phillips, 2001).

Early management of patients with gunshot wounds should focus on resuscitation with paramount attention given to the airway. Bleeding from the airway and the subsequent swelling can significantly compromise the airway. Control with either an endotracheal tube or tracheostomy should be considered early. Airway management in these patients can be difficult. An urgent airway is required in up to 35% of patients (Schade et al., 2000); in 83% of patients, oral endotracheal intubation is initially successful (Demetriades et al., 1998; Yang et al., 2001); while a surgical airway is required in the remaining 17% of patients (Schade et al., 2000) due to tracheal occlusion from oedema, loss of bony integrity or active haemorrhage. Blind nasal intubation is contraindicated in patients with basilar skull fractures, CSF leaks or mid-face instability (Vanna et al., 2002). There are multiple reports of nasally intubating the cranium in such patients (Schade et al., 2000). Needle ventilation of the trachea followed by tracheostomy is another surgical option (Onajin-Obembe et al., 2007).

Haemodynamic resuscitation should be performed next following the ABC protocol of managing the severely injured patient. While both angiography and direct surgical control are options for haemostasis, angiography is helpful in the evaluation of anterior neck trauma (Yang et al., 2001; McLean et al., 2005).

They secondary physical examination of the face must consider the entry point of the missile, velocity, trajectory and exit site. The laceration size, depth and proximity to the neurovascular supply with surrounding tissue injury must also be taken into account (Greenberg AM, 1998; Guilliani et al., 1997). Facial fractures should be identified

by thorough clinical examination followed by plain radiographs. CT scan of the brain, face and neck will assist in the examination of associated injuries as well as to quantify the extent (Yadavalli and Girish, 2011) of facial fractures. Though CT scanning machine is available in our center, it is however beyond the reach of many of our patients including the one presented here. Gunshot wounds to the head and neck, will have intracranial parenchymal involvement in approximately 17% of patients and cervical spine injury in 18% (Guilliani et al., 1997; MacFarlane, 1999). The most common bony injury in order of occurrence, associated with gunshot injury wounds to the face include the mandible, maxilla and zygomatic arch (Alper et al., 1998).

Subsequent line of management of the patients becomes controversial in terms of timing of surgical reconstruction for facial function and aesthetics. Some authors (Motamedi, 2011; Robertson and Manson, 1999; Demetriades et al., 1998; Guilliani et al., 1997; Gruss et al., 1991), advocate early aggressive intervention for one stage reconstruction of all involved structures. The advantages of early aggressive reconstruction they argued include ease of tissue mobilization, reduced tissue fibrosis and reduced period of facial deformity. This line of management prevents social isolation of the patients for months, scar reversal and bacterial colonization of wounds usually associated with delayed repair.

The severity of injury and uncertain margins of tissue damage are reasons proffered by other authors (Kintir et al., 1993; MacFarlane, 1999), favoring initial conservative approach. Perry and Phillips (2000), noted that attempts at immediate definitive reconstruction often fail secondary to loss of mucosal integrity and septic necrosis of the surrounding bone. Traditionally these wounds were managed with conservative debridement, serial dressing changes, external fixation and delayed reconstruction. The surgeon here contends with increased risk of infection due to tissue destruction associated with the missile track, creation of dead space, retained foreign bodies and entrapped oral flora.

The patient we presented came with severe facial deformity (Figure 1), from a gunshot injury. The initial resuscitation had been performed elsewhere about three months previously. Our treatment planning therefore focused on controlling infection, wound debridement and secondary reconstruction. Thus, following the principle of working from interior to exterior, from function to aesthetics, and from osseous to soft tissues, our plan comprised reduction and immobilization of mandibulo-maxillary fractures, enucleation of ruptured right globe and filling of the expanded socket with temporalis muscle flap. Reconstruction of the lip, cheek and ala of the nose defects using a forehead flap was undertaken in a separate surgery. Multi-staged reconstruction for this patient was indicated because of the nature of the osseous and soft tissue defects and the general condi-

tion of the patient.

In conclusion, facial gunshot wounds should be managed like other types of facial traumas with initial resuscitation and wound care. The choice of either immediate aggressive reconstruction or delayed secondary reconstruction depends on the patient's general condition, the time of presentation, wound status and surgeon's overall judgment. The overall objective which is to restore function and aesthetics in our opinion can be achieved through careful planning and timely surgical intervention by a dedicated team.

REFERENCES

- Alper M, Totan S, Cankayali R, Songur E (1998). Gunshot wounds of the face in attempted suicide patients. *J. Oral and Maxillofacial Surg.* 56(8):930-3.
- Brouhard R (2010). How to treat a gunshot wound. *About.com.First Aid.* Oct. 24.
- Demetriades D, Chahwan S, Gomez H, Falabella A, Velmahos G, Yamashita D (1998). Initial evaluation and management of gunshot wounds to the face. *J. Trauma.* Jul; 45(1):39-41.
- Greenberg AM (1998). Management of facial fractures. *NY State Dent. J.* 64:42-7.
- Gruss JS, Antonyshin O, Philips JH (1991). Early definitive bone and soft tissue reconstruction of major gunshot wounds to the face. *Plast Reconstr Surg.* 87:436-50.
- Guiliani G, Anile C, Massarelli M, Maira G (1997). Management of complex craniofacial trauma. *Reb Stomatol Chir Maxillofac;* 98:100-2.
- Kara MI, Polat HB, Ay S (2008). Penetrated shotgun pellets: A case report. *Eur. J. Dent.;* 2:59-62.
- Kassan AH, Lalloo R, Kariem G (2000). A retrospective analysis of gunshot injuries to the maxillofacial region. *SADJ.* July; 55 (7): 359-63.
- Kihtir T, Ivatury RR, Simon RJ, Nassoura Z, Leban S (1993). Early management of civilian gunshot wounds to the face. *J. Trauma;* 35:569-75.
- MacFarlane C (1999). Management of gunshot wounds. The Johannesburg experience. *Int Surg.* 84:93-8.
- McLean JN, Moore CE, Yellin SA (2005). Gunshot wounds to the face – acute management. *Facial Plast Surg.* Aug; 21(3):191-8.
- Motamedi MK (2011). Management of firearm injuries to the facial skeleton: Outcomes from early primary intervention. *J. Emerg. Trauma Shock* 4:212-6.
- Onajin-Obembe BOI, Kushimo OT, Essien OL (2007). Gunshot facial injury: a multidisciplinary management. *SAJAA* 6:13-14.
- Perry CW, Phillips BJ (2001). Gunshot wounds sustained injuries to the face: A University Experience. *The Internet Journal of Surgery;* 2(2):1-6.
- Robertson B, Manson P (1999). High energy ballistic and avulsive injuries: A management protocol for the next millennium. *Surg. Clin. North Amer.* 79(6): 1489-1502.
- Saud Al S, Khalil al-S, Hamed Al D, Sadat Q (2009). An unusual case of firearm injury to the face with bullet cover lodged in the nose. *Rhinology;* 47:214-6.
- Schade K, Borzotta A, Michaels A (2000). Intracranial malposition of nasopharyngeal airway. *J. Trauma* 49(5):967-8.
- Vanna Long, Lun-Jou L, Yu-Ray C (2002). Facial reconstruction after a complicated gunshot injury. *Chang Gung Med J* 25:557-62.
- Yadavalli G, Girish G (2011). Unusual case of gunshot injury to the face. *J. Clin. Imaging Sci.* 1(1):1-4.
- Yang W, Tsai T, Hung C, Tung T (2001). Life threatening bleeding in a facial fracture. *Ann Plast Surg.* 46(2):159-162.

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