

## **EDITORIAL VIEW**

# **Firearm injuries to the maxillofacial region**

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### **SUMMARY**

Firearm or gunshot injuries have steadily increased in number and in their effects with the advent of powerful weapons and a more ready access to these. The resultant disruption of the normal anatomy may also lead to dysfunctional physiology, particularly of the upper respiratory system. This may also lead to combined challenges for the anesthesiologist as well as a maxillofacial surgeon. This editorial aims to highlight the need of close cooperation between the two.

**Key words:** Firearm injuries; Gunshot injuries; Maxillofacial region; Airway management

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Firearm or gunshot injuries have steadily increased in number and in their effects with the advent of powerful weapons and a more ready access to these.

Firearm injuries cause devastating effects on the maxillofacial region. Their propensity to cause an interference with the three basic tenets of life support, e.g. airway, breathing and circulation makes them life threatening and debilitating, functionally, aesthetically as well as psychologically.<sup>1</sup> The closeness of the resultant swelling of submandibular area, the floor of mouth structures and parapharyngeal spaces, cause an immediate danger to the airway and life. The midline neck structures up to sternum are also vulnerable to a gunshot wound which may play havoc with the upper airways. The rich vascularity of the head and neck area often comes to the rescue through provision of excellent healing, yet it can be a cause of troublesome profuse bleeding, both from deep vessels of the mouth and face, and the great vessels of the neck. According to an estimate about 30% of these injuries in United States are fatal.<sup>2</sup> In Pakistan, a definite figure is difficult to put forth because of very sporadic studies which fail to take a population cohort as a representative sample.<sup>3</sup> Studies done in the Khyber-Pakhtunkhwa province of Pakistan on homicidal deaths have demonstrated 27 to 33 percent of all eventually fatal gunshot wounds to be on face, head and neck area.<sup>4,5</sup> Urgent airway and bleeding control remain the most important factors in reducing mortality resulting from facial gunshot wounds.<sup>6</sup>

These cases require an immediate addressing of the airway. Where swelling has not yet set in, orotracheal intubation might need to be utilized early in the care.<sup>7,8</sup> Edema resulting from gunshot wounds to the head and neck and maxillofacial region progresses at a frightening pace, and an airway secured early, gives rapid access to the maxillofacial

surgeon to address bleeding and possibly undertake primary surgical repair. Although cricothyroidotomy has often been quoted as the next step to access the airway before tracheostomy, it is often the latter one that is commonly practiced to ensure a secure airway definitively. Intubation is often rife with visibility problems secondary to blood, oral secretions, shattered soft tissue, bone and tooth segments, as well as mobile jaw segments. Where there is uncertainty to the status of last meal, rapid sequence intubation provides a safer way to perform intubation. A nasogastric tube also needs to be inserted early, to first clear the gastrointestinal tract from swallowed blood, and later to ensure adequate enteral feeding and prevent contamination of the oral cavity by the ingested food.

The traditional technique for management of gunshot wounds to the maxillofacial region was a delayed repair, with only attention paid to control of bleeding and possibly tacking sutures to the displaced and lacerated soft tissue. With improvement in anesthesia and surgical techniques and better antibiotics, early definitive repair can be contemplated in selected cases, in which there is no large amount of soft tissue or bone loss. In these cases, maxillofacial fractures can be treated as regular fractures. However, it must be emphasized that there is no 'cookbook recipe algorithm' for the management of these injuries, and each case needs to be individually planned and executed in a customized manner.<sup>9</sup> Early delayed repair has become a normal practice also performed in the first 1-2 weeks unlike the traditionally performed delayed repair which was generally withheld for a few months.<sup>10</sup> The advancement in predictable microvascular surgery has enabled surgeons to replace large amounts of soft tissue and bone defects in kind. This surgery, however, requires a very exacting anesthetic management, and is only possible

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after initial stabilization of the patient, and is undertaken after ascertaining intact vital organ functions.

The maxillofacial region is associated with provision of important functions including speech, mastication, and deglutition; and any intended repair is required to specifically address all of the important functional and aesthetic attributes of the region. Successful resurrection

of the firearm trauma patients requires a closely knit multidisciplinary management between the anesthesia and surgery teams, with emphasis on airway and circulatory stabilization, and early return to function including feeding.<sup>11</sup> It also requires specialist input by the roles anesthetists acquire as pain medicine specialists and surgical intensivists.

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