Facial Injury Module

Introduction

Maxillofacial injuries occur most commonly in young adult males. Blunt injury accounts for the vast majority, of which three quarters are secondary to MVA. The rest are subsequent to falls, assaults and sporting injuries.\(^1\) In women, the presence of orbital fractures has an increased likelihood for domestic violence or sexual assault.

Maxillofacial injuries are often associated with other injuries – 60% of severe facial injuries have multisystem trauma.

Facial fractures occur commonly. Most are accounted for by nasal fractures (45%), followed by mandibular (13%), zygomatic (13%), orbital floor (3%) and maxilla (2%).\(^2\)

Maxillofacial injuries can distort airway anatomy precipitating or exacerbating airway compromise. They can also be responsible for significant haemorrhage with arterial injury secondary to mid-face fractures. Life threatening facial haemorrhage occurs in 1% of trauma patients.\(^3\)

Nasal Fractures

Nasal bone #s are exceedingly common. The diagnosis is typically made clinically on the basis of tenderness and deformity. Early important complications necessitating urgent ENT intervention include uncontrolled epistaxis and septal haematoma formation.

![Figure 1](image.png)  
**Figure 1**  Traumatic Septal haematoma\(^4\)

Most uncomplicated nasal fractures are managed as outpatients, with operative reduction performed typically to restore cosmesis.

Orbital Floor Fractures

Orbital floor fractures may occur as part of a zygomaticomaxillary fracture, or as an isolated floor blowout. The orbital blowout occurs when a sudden increase in intra-ocular pressure – typically through transmission of pressure from a fist, elbow or small ball – disrupts the relatively weak orbital floor herniating contents into the maxillary sinus.\(^2\)

Important features on examination include enophthalmos, diplopia and impairment of upwards gaze (with impingement of the inferior rectus in the fracture site) and infraorbital nerve paraesthesia or numbness. Communication of the fracture site with a sinus can manifest as
subcutaneous emphysema peri-orbitally, worsening on any manoeuvre which increases intra-sinus pressure.

Inferior rectus entrapment warrants urgent operative decompression.

![Figure 2 Orbital Blowout fracture with Inferior Rectus Herniation](image)

Simple orbital fracture without evidence of entrapment or nerve impingement are usually managed as outpatients, with this group of patients being discharged on oral analgesia, antibiotics (eg Augmentin) with instructions not to blow their nose awaiting maxillofacial OPD.

**Mandibular Fractures**

Mandibular fractures are classified according to anatomy. At least 50% are multiple.¹

![Figure 3 Distribution of anatomical fracture sites of the mandible](image)

OPG is 86% sensitive in detecting a mandibular #. CT imaging approaches 100% sensitivity.² OPG however, better visualises dental structures in particular dental root fractures and should be performed in all patients with a mandibular #. Mandibular #s are often compound through the gingiva and require antibiotic prophylaxis.
Maxillary Fractures

There are 3 classic patterns of maxillary fractures which are referred to by the Le Fort classification. They involve fractures through the pterygoid plates detaching the maxilla from the skull base. They result in significant functional and cosmetic morbidity.

Le Fort I pattern (dashed line) traverses the maxillae and lower nasal septum. It is referred to as palato-facial disjunction and is secondary to low or lateral blows to the maxilla. It creates malocclusion and a free floating hard palate.

Le Fort II pattern (dotted line) runs obliquely across the maxillae to the inferior orbital rims and across the nasal bridge. It is the most common Le Fort injury and is referred to as pyramidal disjunction. It is caused by a direct blow to the central mid-face or an inferior/lateral blow to a closed mouth. It essentially separates the nasal region from the cranium.

Le Fort III pattern (bold line) runs transversely across the orbits and nasal bridge, involving the zygomatic arches. This results in complete cranio-facial disjunction and is caused by a superiorly directed blow to the nasal bones.

Haemorrhage

Life threatening haemorrhage has a high association with midface fractures, particularly Lefort III. The Internal Maxillary Artery is the most commonly involved in intractable post-traumatic haemorrhage. Conservative management (anterior and posterior packing) will control life-threatening bleeding in 29% cases and slow it down in 44%. Transcatheter arterial embolisation has replaced surgical ligation as the mainstay of therapy when conservative management fails, and has a success rate over 95%. Approximately 80% of patients with life-threatening midface haemorrhage will require control of their airway.

Assessment

History

The history is taken along standard lines for a trauma patient, with particular attention given to the mechanism of injury and the amount of pre-hospital facial blood loss.
Examination

Inspection
- Life threats – airway obstruction, severe haemorrhage and shock
- deformity/asymmetry/enophthalmos/ nasal septum deviation or haematoma/ CSF rhinorrhea/ Battle’s sign

Palpation & sensation

Assess mid-face mobility

Assess occlusion and extent of jaw opening
- Tongue blade test is 95% sensitive and 65% specific to detecting a mandible #

Dedicated ophthalmic examination

Assess for other associated traumatic injuries

Imaging

Plain imaging was once the standard in imaging facial trauma. Many of the views employed have eponymous names.

- Water’s view (occipito-mental)
- PA
- Towne’s view (PA mandible)
- Jug handles view (submento-vertex)
- OPG

Compared to CT imaging, plain films lack the anatomical detail to best assess injury severity and guide management. Typically if a significant facial injury is suspected CT facial bones is performed in the first instance. Often these patients are multiply injured and further CT imaging is required. CTA may be a useful adjunct to patients with severe / life-threatening facial haemorrhage to identify the source of haemorrhage in preparation for IR if conservative measures to stem the haemorrhage have failed

MRI may occasionally be necessary to assess soft tissue injury. In particular it is helpful to further assess cranial nerve deficits. It is impractical in the multiply injured patient acutely as competing resuscitative priorities prevail.

Management

The aims of management in facial injuries are to:

1. address life threats
   i. airway compromise
   ii. haemorrhage

2. maintain normal function & cosmesis through expediting definitive care

Resuscitation is performed along standard lines as warranted by a trauma patient. In particular care should be given to airway and circulatory management.

Airway
- employ airway opening manoeuvres
- anticipate a difficult airway if there is evidence of mid-face mobility, malocclusion, significant swelling or haemorrhage
Circulation
- control haemorrhage in a stepwise fashion
  - direct pressure
  - relocation of mid-face
  - packing the pharynx in an intubated patient:
    - place bite blocks or gauze rolls between the upper and lower molars
    - pack the oropharynx
    - place a cervical collar to splint the mid face against the base of skull
  - packing the oropharynx
    - anterior / posterior nasal catheters
    - Foley Catheter with anterior packing if these fail
  - operative reduction in OT
  - vessel ligation in OT
  - embolisation in the IR suite

Specific Therapy
- Irrigate any wounds and cover with cephazolin 1g IV, add metronidazole 500mg IV if cover for oral flora (compound mandibular #s) is necessary
- Ensure adequate tetanus prophylaxis

Supportive Therapy
- Ensure adequate analgesia
- Chart anti-emetics
- Chart maintenance IV fluids
- Keep NBM until surgical review
- Ensure normothermia
- Ensure euglycaemia and normal electrolytes
- Complete documentation

Disposition
The disposition of the multiply injured trauma patient with facial injuries will be along standard lines according to the total injury profile.

Patients with isolated simple maxillofacial injuries are often treated as outpatients. Operative fixation, if necessary, typically occurs down the track once swelling has settled.

More complex injuries, compound injuries, those with neurovascular impingement and those affecting occlusion (most mandibular fractures) are managed as inpatients with earlier operative intervention.

Additional Information
- Sinuses render the mid-face vulnerable to fractures, thus mid-face fractures are rarely seen in children under 6yo.

References

