

Table 1

The frequency of various aetiological factors as a percentage of all maxillofacial injuries in 7 reported series from Australia, India, South Africa, Japan and the United Kingdom.

| | Simpson & McLean [§] Adelaide 1989-92 N = 839 | Sawhney & Ahuja Chandigarh 1982-83 N = 262 | Ayyaz & Khan Harare 1985-86 N = 311 | McDade et al UK 1979-80 N = 395 | Tanaka et al. Tokyo 1977-89 N = 690 | Telfer et al. UK 1987 N = 4305 | Hutchison et al. UK 1997 N = 6114 |
|----------------|---|---|--|--|--|---|--|
| Assault | 51.3 | 13 | 81.6 | 47 | 15.5 | 50.1 | 24 |
| Fall/home | 9.7 | 24 | | 19.5 | 24.8 | | 40 |
| RTA | 18.8 | 50 | 14.8 | 18 | 38.4 | 17.3 | 5 |
| Sport or Other | 20.2 | 13 | 3.6 | 15.5 | 21.3 | 32.6* | 21 |
| Unknown | | | | | | | 9 |

[§] Adult maxillofacial injuries only

- Includes accidental falls

Table 2

Henderson's classification of malar fractures

| Type | Description of fracture |
|------|---|
| 1 | Undisplaced fracture at any site |
| 2 | Zygomatic arch fracture only |
| 3 | Tripod fracture – no distraction of zygomatico-frontal suture |
| 4 | Tripod fracture – distraction of zygomatico-frontal suture |
| 5 | Pure blow-out fracture of orbital floor |
| 6 | Isolated orbital rim fracture only |
| 7 | Comminuted fracture or other than any of the above |

Table 3

A simple anatomical classification system for maxillofacial fractures.

| Site | Sub-site | Severity (applies to all sub-sites) | Treatment options (applies to all sub-sites) | | |
|----------|-------------------------|--|--|--|--|
| Mandible | Condyle | Undisplaced Minimally displaced Severely displaced Comminuted | Conservative Closed reduction Open reduction | | |
| | Coronoid/Ramus | | | | |
| | Angle | | | | |
| | Body | | | | |
| | Symphysis/parasymphysis | | | | |
| | Dentoalveolar | | | | |
| Maxilla | Le Fort 1 | | | | |
| | Le Fort 2 | | | | |
| | Le Fort 3 | | | | |
| Zygoma | Henderson type 1 - 7 | | | | |
| Nasal | Nasal bones | | | | |
| | Naso-orbito-ethmoid | | | | |
| | Naso-maxillary | | | | |
| Orbit | Floor – impure | | | | |
| | Medial wall | | | | |
| | Lateral wall | | | | |
| | Roof | | | | |
| | Apex | | | | |
| Cranial | Calvarium | | | | |
| | Skull base | | | | |

Table 4

Extended AO/ASIF cranio-maxillofacial fracture classification of Haug & Greenberg (1993).

| Bone | | Fragments | | Location | | Occlusion | | Soft tissues | |
|-------------|----|------------------|----------------|--|----------------|------------------|----------------|---------------------------|----------------|
| Mandible | Mn | Incomplete | F ₀ | Precanine | L ₁ | Normal | O ₀ | Closed | S ₀ |
| | | Single | F ₁ | Canine | L ₂ | Malocclusion | O ₁ | Open intraoral | S ₁ |
| | | Multiple | F ₂ | Postcanine | L ₃ | Edentulous | O ₂ | Open extraoral | S ₂ |
| | | Fragmented | F ₃ | Angular | L ₄ | | | Open intra/extraoral | S ₃ |
| | | Avulsion | F ₄ | Supra-angular | L ₅ | | | Avulsion | S ₄ |
| | | | | Condyle | L ₆ | | | | |
| | | | | Coronoid | L ₇ | | | | |
| | | | | Alveolar | L ₈ | | | | |
| Maxilla | Mx | Incomplete | F ₀ | Separation through piriform aperture | L ₁ | Normal | O ₀ | Closed | S ₀ |
| | | Single | F ₁ | Separation through ZMS | L ₂ | Malocclusion | O ₁ | Open intraoral | S ₁ |
| | | Multiple | F ₂ | Separation through NMS/NFS | L ₃ | Edentulous | O ₂ | Open extraoral | S ₂ |
| | | Fragmented | F ₃ | Alveolar | L ₄ | | | Open intra/extraoral | S ₃ |
| | | Avulsion | F ₄ | | | | | Avulsion | S ₄ |
| Nasal | Na | Incomplete | F ₀ | Nasal tip | L ₁ | | | Closed | S ₀ |
| | | Single | F ₁ | Entire nasal bone | L ₂ | | | Open intranasal | S ₁ |
| | | Multiple | F ₂ | Nasal bone & frontal process of maxilla | L ₃ | | | Open cutaneous | S ₂ |
| | | Fragmented | F ₃ | Nasal, ethmoid, frontal process of maxilla | L ₄ | | | Open intranasal/cutaneous | S ₃ |
| | | Avulsion | F ₄ | nasal spine of frontal bone | | | | Avulsion | S ₄ |

| | | | | | | | |
|------------------|------------|----------------|------------------------------|----------------|--|---------------------------|----------------|
| Zygoma Zm | Incomplete | F ₀ | Arch | L ₁ | | Closed | S ₀ |
| | Single | F ₁ | Supra-arch | L ₂ | | Open intraoral | S ₁ |
| | Multiple | F ₂ | Displacement of ZFS | L ₃ | | Open extraoral | S ₂ |
| | Fragmented | F ₃ | Displacement of ZMS | L ₄ | | Open intra/extraoral | S ₃ |
| | Avulsion | F ₄ | Displacement of ZTS | L ₅ | | Avulsion | S ₄ |
| | | | | Orbital floor | | L ₆ | |
| Frontal Fr | Incomplete | F ₀ | Supraorbital rim | L ₁ | | Closed | S ₀ |
| | Single | F ₁ | Anterior wall frontal sinus | L ₂ | | Open intranasal | S ₁ |
| | Multiple | F ₂ | Posterior wall frontal sinus | L ₃ | | Open cutaneous | S ₂ |
| | Fragmented | F ₃ | Floor frontal sinus | L ₄ | | Open intranasal/cutaneous | S ₃ |
| | Avulsion | F ₄ | | | | Avulsion | S ₄ |
| Other cranial Cr | Incomplete | F ₀ | Sphenoid | L ₁ | | Closed | S ₁ |
| | Single | F ₁ | Parietal | L ₂ | | Open transcutaneously | S ₂ |
| | Multiple | F ₂ | Temporal | L ₃ | | Avulsion | S ₃ |
| | Fragmented | F ₃ | Occipital | L ₄ | | | |
| | Avulsion | F ₄ | | | | | |

ZMS = zygomatico-maxillary suture

NMS = naso-maxillary suture

NFS = naso-frontal suture

ZFS = zygomatico-frontal suture

ZTS = zygomatico-temporal suture

Table 5.
Some signs and symptoms of maxillofacial fractures

| Fracture site | Sign or symptom |
|-------------------|---|
| Mandible | Pain Oedema Ecchymosis Drooling Sublingual haematoma Malocclusion Visible or palpable deformity Mental nerve paraesthesia (numb lower lip) Deviation on opening Bleeding from anterior wall of ear canal (condylar fracture) |
| Maxilla | Pain Facial deformity (long, flat or dish face) Bilateral circumorbital ecchymosis and oedema Epistaxis Malocclusion Mobile maxilla – possible split palate Infraorbital nerve paraesthesia (numb cheek) Diplopia (with Le Fort 2 & 3 fractures) Ophthalmoplegia (with Le Fort 2 & 3 fractures) Reduced visual acuity (with Le Fort 2 & 3 fractures) |
| Zygomatic complex | Pain Circumorbital ecchymosis and oedema Subconjunctival haemorrhage Flat cheek |

| | |
|------------------------|---|
| | Infraorbital nerve paraesthesia (numb cheek) Limitation of mandibular opening (arch impinging on coronoid) Malocclusion Unilateral epistaxis Ophthalmoplegia, diplopia, enophthalmos Reduced visual acuity |
| NOE complex | Dished in nasal bridge with saddle deformity Telecanthus Enophthalmos Shortened palpebral fissure |
| Anterior cranial fossa | Epistaxis +/- CSF rhinorrhea Anosmia |
| Middle cranial fossa | Ecchymosis over mastoid process (Battle's sign) Bleeding from middle ear or posterior ear canal wall |

Table 6

Scoring sheet for determining which patients with facial injuries require referral to an ophthalmologist. From Al-Qurainy *et al* (1991).

| Clinical feature | Score |
|------------------------------|-------|
| Visual acuity | |
| 6/6 or better | 0 |
| 6/9 – 6/12 | 4 |
| 6/18 – 6/24 | 8 |
| 6/36 or less | 12 |
| No light perception | 16 |
| Malar fracture type | |
| Comminuted (type 7) | 3 |
| Blow-out (type 5) | 3 |
| Others | 0 |
| Motility abnormality | |
| Present (diplopia or squint) | 3 |
| Absent | 0 |
| Amnesia | |
| Retrograde + post traumatic | 5 |
| Absent | 0 |

Add 1 if total score is 11 and female sex or age 30-39 years or RTA.

Total score = 0 – 4 Do not refer
 5 – 11 Routine referral
 12+ Urgent referral

Table 7.

The signs and symptoms of the superior orbital fissure syndrome

| Sign or symptom |
|--|
| Periorbital oedema |
| Proptosis |
| Subconjunctival ecchymosis |
| Ptosis |
| Mydriasis |
| Ophthalmoplegia |
| Absent direct light reflex |
| Preservation of consensual light reflex |
| Absent accommodation reflex |
| Absent corneal reflex |
| Paraesthesia/anaesthesia over forehead to vertex |

Table 8.

Direct and indirect radiographic signs of facial fractures

| Direct | Indirect |
|---------------------------------------|-----------------------------------|
| Demonstration of fracture lines | Asymmetry |
| Displacement of suture lines | Sinus opacification |
| Absence of normal anatomic structures | Air-fluid interface (fluid level) |
| | Air in soft tissues |
| | Malocclusion |

Table 9. Some fixation methods employed in the management of maxillofacial fractures

| Type | Method |
|--------------------------------|--|
| External fixation | |
| <i>Intermaxillary fixation</i> | Eyelet wire Arch bars Splints – cap, gunning |
| <i>Frames</i> | Halo Levant Box Custom pin and rod systems |
| <i>Fixators</i> | Commercial devices Custom pin and rod systems |
| Internal fixation | |
| <i>Non-rigid</i> | Transosseous wires or sutures Suspension wires – circum-zygomatic, circum-mandibular Kirschner wires |
| <i>Semi-rigid</i> | Transosseous miniplates (1.0 – 2.0 mm) or mesh |
| <i>Rigid</i> | Compression plates Reconstruction plates (2.7 – 3.0 mm) with bi-cortical screws Lag screws |

Table 10.

Suggested sequencing scheme for the management of panfacial fractures.
After Kelly *et al* (1990).

| Order | Activity | Result achieved |
|-------|---|--------------------------------------|
| 1 | Apply arch bars and IMF | |
| 2 | ORIF palatal fractures if present | Sets lower facial width |
| 3 | ORIF frontal bone and manage frontal sinus fractures | |
| 4 | Bone graft and /or pericranial flap to isolate nasal cavity from cranial cavity | |
| 5 | ORIF frontal bone to supraorbital bar | |
| 6 | ORIF orbital roof, medial & lateral orbital rims and ORIF all to supraorbital bar | |
| 7 | ORIF zygomatic arches | |
| 8 | ORIF infraorbital rim | Stabilises NOE projection |
| 9 | ORIF zygomatico-frontal suture | |
| 10 | Bone graft orbital walls, floor and roof | Completes reduction of upper midface |
| 11 | ORIF mandibular fractures in sequence order: a) ramus, b) horizontal body | |
| 12 | ORIF condylar fractures | Completes reduction of lower face |
| 13 | ORIF Le Fort 1 level fracture at the pyriform and canine buttresses bilaterally | Links upper and lower face together |

ORIF = Open reduction and internal fixation

NOE = Naso-orbito-ethmoid complex

Table 11.

Some types of dental injuries and their emergency treatment.
Adapted from Dewhurst *et al* (1998).

| | Type | Treatment |
|-------------------|--|---|
| Crown fracture | Enamel | Smooth rough edges |
| | Dentine | Dress with calcium hydroxide paste and restore with acid-etch composite |
| | Pulp exposure – same day, small, clean | Irrigate with sterile saline and treat as for dentine fracture |
| | Pulp exposure – next day, large, dirty | Minimal pulpotomy to 2mm below exposure then treat as for clean exposure |
| Root fracture | Coronal third | Reposition, check radiograph and splint for at least 2 months |
| | Middle third | Reposition, check radiograph and splint for at least 2 months |
| | Apical third | Reposition, check radiograph and splint for at least 2 months |
| Luxation injuries | Subluxation | Splint for 7-10 days if very mobile |
| | Lateral luxation | Reposition, compress socket and splint for 2-3 weeks |
| | Intrusion | If firm gently luxate to allow slight mobility no splint. If mobile leave alone |
| | Extrusion | Reposition and splint for 7-10 days |
| | Avulsion - immediate | 10 second rinse under cold water and replant in socket and splint for 7-10 days |
| | Avulsion – delayed | Place tooth in patient's saliva or milk for transport then treat as for immediate |