



Ch 35 - Facial Trauma

EPISODE CONTENT BASED ON ROSEN'S EMERGENCY MEDICINE (9TH ED.)

Italicized text is quoted directly from Rosen's.

Key Concepts:

The face is central to the patient's ability to breathe, eat, and communicate. Injuries to the face can have serious psychological and psychosocial consequences.

- 1. Facial injuries may be prevented by the appropriate use of seat belts, child restraints, air bags, helmets, and mouth and face guards.*
- 2. The epidemiology of facial injury is changing, with an increased proportion of injuries occurring as a result of interpersonal violence. A careful history is required, and the possibility of abuse should be considered for every patient.*
- 3. Shock from facial trauma is rare and results only from obvious external bleeding. Facial injuries should not distract the emergency clinician from aggressively searching for other causes of shock.*
- 4. Assertive management of the airway is indicated in a patient with significant facial injuries. Surgical management (cricothyroidotomy) may be required, particularly with gunshot wounds.*
- 5. Directed facial CT scanning is the best imaging technique in patients with obvious injuries.*
- 6. Definitive treatment may be delayed, if necessary, to allow other serious injuries to be addressed.*

Core Questions

1. Detail the nerve supply of the face.
2. What bones form the borders of the orbit?
3. Outline the LeFort fracture classification system.
4. What is the tongue blade test and how is it performed?
5. Outline the Ellis System for dental fracture classification.
6. Outline an approach to the management of ingested/aspirated teeth.
7. Describe three techniques for the reduction of anterior TMJ dislocations.
8. List four indications for Panorex X-rays.



Wisecracks

1. At what age do the following sinuses become aerated:
 - a. Mastoid
 - b. Ethmoid
 - c. Facial
 - d. Maxillary
 - e. Sphenoid
2. What is the association between the presence of facial injuries and the presence of intracranial injuries/cervical spine injuries?
3. What facial lacerations require prophylactic antibiotics?
4. List three solutions in which avulsed teeth can be placed to preserve them.

Rosen's in Perspective

Alright, podcast listeners. We are back at it again with another episode of CRACKCast. Today, we will be reviewing Chapter 35 - Facial Trauma in Rosen's 9th Edition. This is one of the lengthy chapters in the Bible of EM, so make sure to allot time to crush out the chapter readings.

Anyone who has worked in the ED for any significant period of time will know that facial injuries are commonplace. We have all seen our fair share of complex facial fractures, wounds, etc... and are relatively comfortable with the initial management strategies for these injuries. However, what many of us (including myself before reading this chapter) fail to recognize is the true significance of facial trauma. As is the case with many of the disease processes we manage every day, the effects of facial trauma extend far beyond the resuscitation bay. Often, patients who sustain significant facial injuries suffer lifelong physical, psychiatric, and socioeconomic issues as a result of their trauma. Several studies indicate that individuals who have experienced facial trauma often have difficulties with unemployment, ~~incarceration~~incineration, marital issues, PTSD, anxiety, and much more! Thus, it is paramount that ED clinicians know how to assess for, treat, and refer these patients appropriately.

If you feel like you could use a refresher on the topic, or if you are someone who just doesn't want to wreck someone's glamour shots for the remainder of their years, listen up. Today, we will review some of the relevant content you will need to know on your next shift in the thunderdome. So, as always, grab a cup of coffee, take a deep breath, and enjoy the show!



Core Questions:

[1] Detail the nerve supply of the face.

- **Sensory:**
 - The trigeminal nerve (CN V) supplies sensation to the face through 3 key divisions
 - V1 (the ophthalmic division) supplies the upper third of the face, including the eye and the nose
 - V2 (the maxillary division) provides sensation to the midface, and includes the infraorbital nerve
 - V3 (the mandibular division) provides sensation to the lower third of the face
- **Motor:**
 - The facial nerve (CN VII) innervates the vast majority of the muscles of facial expression
 - It lies just inferior to the external auditory canal

[2] What bones form the borders of the orbit?

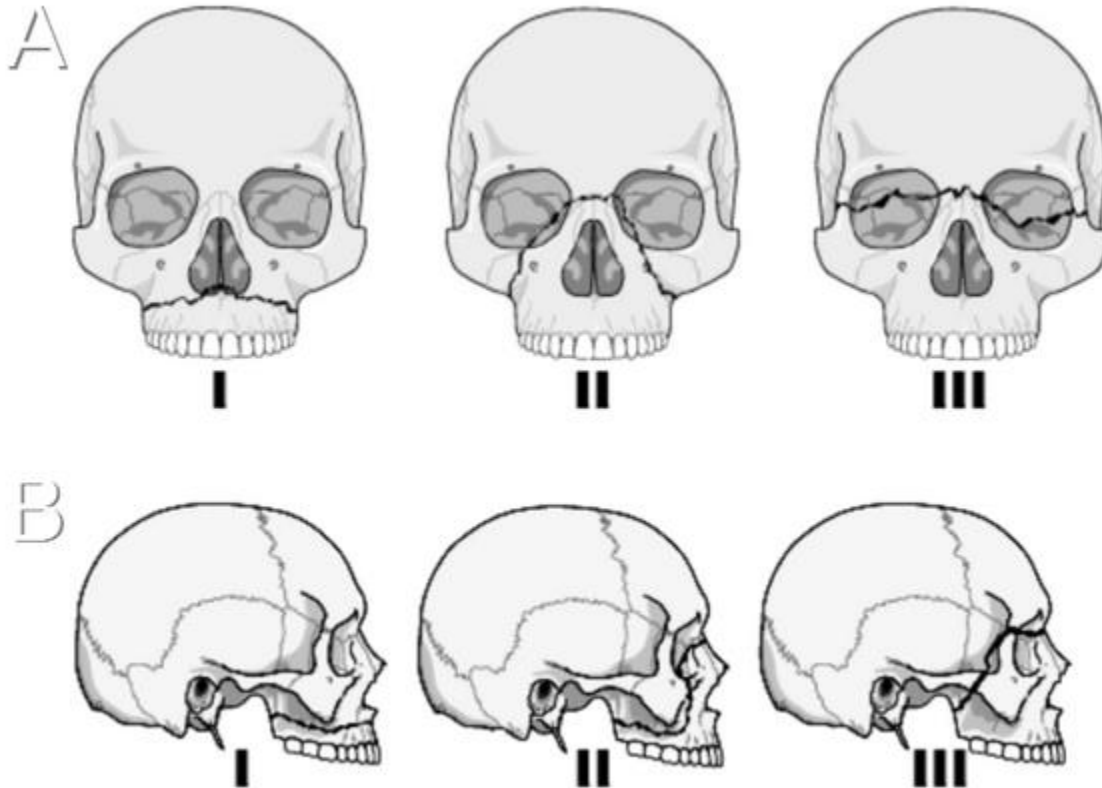
- The bony orbit is comprised of the following bones:
 - Superior Border = FRONTAL BONE
 - Lateral Wall/Lateral Floor = ZYGOMA
 - Medial Floor/Anteromedial Wall = MAXILLA
 - Medial Wall = LACRIMAL AND ETHMOID BONES = most delicate portion of the bony orbit

[3] Outline the LeFort fracture classification system.

- The Le Fort system, named after the ingenious physician Rene Le Fort, who beat down cadaver heads with all manner of weaponry, is a system used to classify midface fractures. While the system fails to capture the complexity of these fractures entirely, it is still commonly used.
- In essence, in order for a fracture to be classified as a true Le Fort fracture, it must conform to a specific pattern and must involve the pterygoid plate.
- A Le Fort I fracture involves a transverse fracture through the maxilla above the roots of the teeth. It can be unilateral or bilateral.
- A Le Fort II fracture is typically a bilateral injury and has a pyramidal shape. The fracture extends superiorly to involve the nasal bridge, maxilla, lacrimal bones, orbital floor, and rim
- A Le Fort III fracture (commonly referred to as craniofacial disjunction) involves the bridge of the nose, extending posteriorly along the medial wall of the orbits (ethmoids), along the floor of the orbit (maxilla), and through the lateral orbital wall breaking the

zygomatic arch. Intranasally, they extend through all the lesser bones to the base of the sphenoid

- To detect these injuries clinically, grasp the upper incisors and pull medially. Movement of the alveolar ridge indicates Le Fort I, movement of the midface indicates Le Fort II, and movement of the entire face indicates Le Fort III.



Source: <https://rad.washington.edu/about-us/academic-sections/musculoskeletal-radiology/teaching-materials/online-musculoskeletal-radiology-book/facial-and-mandibular-fractures/>

[4] What is the tongue blade test and how is it performed?

- The tongue blade test is a physical examination maneuver that allows the clinician to, with relative certainty, determine whether a mandibular fracture is present
- The clinician inserts a tongue blade in between the upper and lower molars on one side of the mouth. The patient is instructed to bite down as hard as they can while the clinician twists the tongue blade.
- If the tongue blade snaps, it is unlikely that a fracture exists on that side of the mandible (Sens 96-97%, Spec 64-68%)
- The test should be repeated on the side opposite the first tested



[5] Outline the Ellis System for dental fracture classification.

- The Ellis System for dental fracture classification allows clinicians to describe and manage dental fractures
- The system organizes fractures into the following classifications:
 - Class I - fractures involving the enamel of the tooth; these are typically not painful and can await outpatient evaluation by a dentist
 - Class II - fractures involving the dentin (exposes the yellow dentin); these are painful, but as long as they are managed appropriately, can be seen by a dentist as an outpatient. If encountered, the fracture should be covered with a dressing of calcium hydroxide paste and aluminum foil
 - Class III - fractures involving the pulp. These are exquisitely painful and expose the red of the tooth's pulp. These need to be seen urgently by a dentist (generally within 48hrs), and should be covered with a dressing of calcium hydroxide paste and aluminum foil

[6] Outline an approach to the management of ingested/aspirated teeth.

- Avulsed teeth that are not found after a significant trauma can cause some less-than-ideal consequences if not located
 - Aspiration of teeth often result in intrapulmonary abscess formation
- Thus, your actions after you suspect a person may have aspirated/ingested some chicklets are as follows:
 - Ensure a thorough search of the oropharynx is performed
 - If no teeth are found, perform a AP/Lateral CXR
- If you do find some pearly whites in places they should not be, you have to decide if they need to be taken out.
 - Teeth lodged in a bronchus or the esophagus require bronchoscopy or endoscopic removal
 - If the tooth is below the level of the diaphragm, no retrieval is required

[7] Describe three techniques for the reduction of anterior TMJ dislocations.

1. Syringe Method
 - a. Place a 5-10 cc syringe between the upper and lower molars on the side of dislocation. Instruct the patient to gently bite down on the syringe whilst rolling it forward and backward until reduction occurs. If a bilateral dislocation is present, often the opposite side reduces spontaneously. If it does not, place the syringe on the opposite side and repeat the process.
2. Intraoral Technique
 - a. Insert your thumbs into the mouth on the ridge of the mandible adjacent to the molars. Next, grasp the outside of the jaw with your fingers. While having an assistant prevent head movement, apply downward pressure to the mandible to free the condyles. Then, guide the mandible posteriorly and superiorly back into the temporal fossae.



3. Extraoral Technique

- a. On one side, grasp the mandibular angle with the fingers of the hand and place the thumb over the malar eminence of the maxilla
- b. On the other side, place the thumb just above the palpated, displaced coronoid process and fingers behind the mastoid process
- c. When in place, pull the mandibular angle forward on one side while pushing back on the coronoid process on the other side, causing one side of the mandible to reduce. If there is bilateral TMJ dislocation, the side opposite usually reduces spontaneously.

[8] List four indications for Panorex X-rays.

- Given the poor sensitivity of plain radiographs of the mandible and the risk of radiation exposure that comes with HRCT, Panorex X-rays may be sufficient in the following situations:
 - First episode of TMJ dislocation
 - Isolated mandibular fractures
 - Dental fractures
 - Fractures of the alveolar ridge

Wisecracks:

[1] At what age do the following sinuses become aerated:

- a. Mastoid
- b. Ethmoid
- c. Facial
- d. Maxillary
- e. Sphenoid

Answer:

1. Ethmoid/Mastoid antrum = aerated at birth
2. Sphenoid/Remainder of mastoid = 3 years
3. Frontal = 6 years
4. Maxillary = 10 years

[2] What is the association between the presence of facial injuries and the presence of intracranial injuries/cervical spine injuries?

Answer:

While we are typically taught that the presence of facial injuries lessens the risk for significant brain injury, this does not appear to be the case. Recent studies have noted a significantly increased risk of brain injury in patients who have sustained blunt trauma with facial fractures



The traditional teaching regarding risk for C-spine injury in the context of facial trauma also seems to not hold water. It has often been said that the presence of facial trauma increases the risk for concomitant cervical spine injury. However, large studies suggest there may actually be reduced risk for C-spine injury in facial trauma patients.

In reality, what is really important when assessing patients with significant facial trauma is considering the MECHANISM OF INJURY. This will help you discern the risk for intracranial and cervical spine injuries in this patient population.

[3] What facial lacerations require prophylactic antibiotics?

Answer:

While antibiotic prophylaxis for lacerations is a rather complex and hotly-debated issue, Rosen's 9th Edition recommends patient's with the following facial wounds be considered for an Rx for anti-bug juice:

1. Bite wounds
2. Wounds with any evidence of devascularization
3. Wounds through the buccal mucosa
4. Wounds involving the cartilage of the ears or nose
5. Wounds with extensive contamination (e.g., barnyard or fecal matter)

[4] List three solutions in which avulsed teeth can be placed to preserve them.

Answer:

1. Saliva
2. Pasteurized milk
3. Normal saline
4. Hank's Balanced Salt Solution