Facial Trauma

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Facial Trauma

Outline of presentation:

- 5 W’s and How:
  - What kinds of injuries?
  - Who should treat these injuries?
  - Where are the injuries best treated?
  - When are they best treated - timeframe?
  - Why → is there an indication for referral?
  - How are the injuries best managed on your end?
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- **What kinds of injuries?**: 
  - **Mechanisms**:  
    - sports, falls, bites, occupational, altercations, self-inflicted, MVC
  - **Tissue or structures involved**:  
    - skin, fat, sensory/motor nerves, salivary glands, sinuses, eye and lids, lacrimal system, scalp/brow, nose, ears, muscle, bone, teeth
  - **Potential effects of trauma**:  
    - scars, facial deformity, facial numbness or palsy, diplopia, globe malposition, lacrimal obstruction, salivary gland fistula, salivary incontinence, sinus obstruction, compromised nasal and/or oropharyngeal airway, speech, dental malocclusion, TMJ ankylosis
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Who should treat facial trauma?:

- ED providers from local/regional/tertiary care hospitals with appropriate experience and expertise
- Ophthalmology
- Otolaryngology
- Oral-Maxillofacial Surgery
- Plastic Surgery
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- Where are the injuries best treated?:
  - Emergency department:
    - assuming stable, cooperative patient
    - adequate local anesthetic and/or sedation
    - proper setting (sterility, lighting, pulse-lavage, assistance, etc.)
    - Lacerations, abrasions
      - Skin, scalp, hairline, galea, brow, eyelid, tarsal plate, auricle (including cartilage), nose, lip; traumatic tattoo
    - Fractures
      - Nasal
Traumatic tattoo
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- **Where are the injuries best treated?**:
  - **Operating Room**:
    - unstable, uncooperative patient
    - inadequate local anesthetic and/or sedation
    - poor setting (sterility, lighting, pulse-lavage, assistance, etc.)
    - **Extensive lacerations, avulsions**
      - e.g., scalp avulsion, chain-saw, MVC, gunshot blast, etc.
    - **Fractures**
      - nasal, frontal, nasoethmoidal, zygomaticomaxillary, Lefort patterns, mandibular
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*Where are the injuries best treated?:*

- **Operating Room:**
  - unstable, uncooperative patient
  - inadequate local anesthetic and/or sedation
  - poor setting (sterility, lighting, pulse-lavage, assistance, etc.)

- **Nerve injuries**
  - sensory, motor

- **Specialized structures**
  - Parotid duct, lacrimal canalicular injuries
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- **When are the injuries best treated?**:
  - **Lacerations**
    - earlier is better, 8-12 hours or more, *depending on circumstances*
  - **Fractures**
    - within first few hours or after 5-7 days... *(up to 14 days!)*
  - **Nerve injury**
    - sensory: rarely repair early, if at all
    - motor: early is better if high level of suspicion – tag!
  - **Parotid duct, lacrimal duct**
    - earlier is better; explore wound at time of laceration and tag!
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- **Why → is there an indication for referral?:**
  - Lacerations, Abrasions, Avulsions:
    - within epidermis: steristrip or glue
    - *wounds gape only when dermis lacerated*
    - traumatic tattoo: pulse-lavage, remove particles
    - *what to do with the following?*
      - galea, eyebrow, ear and nasal cartilage, eyelid and tarsal plate, lacrimal system, parotid duct, scalp and nasal avulsion
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Why → is there an indication for referral?:

- Fractures:
  - Nasal
    - rule out septal hematoma with speculum exam (drain if necessary)
    - many show no evidence of lateral deviation or collapse – no surgery
    - antibiotics not required
    - imaging may not be necessary?
    - closed reduction in ED is reasonable option to consider
  
  - Orbital Floor
    - document visual acuity
    - CT required including thin-cut axial and coronal images
    - diplopia often is transient
    - globe displacement = indication for surgery
Orbital floor fracture and diplopia
Orbital floor fracture and enophthalmos

- Pseudoptosis
- Globe positioned caudad and posterior
Orbital floor fracture and enophthalmos

- Pseudoptosis
- Enophthalmos
Zygomaticomaxillary fracture
aka “quadripod fracture”

true fracture path
Zygomaticomaxillary fracture
aka “quadripod fracture”
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Why → is there an indication for referral?:

- Fractures:
  - Zygomaticomaxillary (aka “tripod”, “quadripod”, “malar”)
    - CT imaging required, fine-cut axial and coronal
    - V2 numbness is characteristic, resolves spontaneously
    - involves orbital floor and lateral wall by definition
    - involves maxillary sinus fracture, by definition
    - not associated with dental malocclusion
    - lower lid may drop laterally
    - antibiotics not required
    - indication for surgery generally is deformity = shared-decision making
Lefort fractures
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**Why → is there an indication for referral?:**

- **Fractures:**
  - **Lefort fractures**
    - CT imaging required, fine-cut axial and coronal
    - differentiating I, II, and III clinically
    - document loose and missing teeth
    - blenderized diet
    - antibiotics indicated
    - *surgery is required; usually repaired at 5-14 days post-injury*
Mandible fractures
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**Why → is there an indication for referral?:**

- **Fractures:**
  - **Mandible**
    - CT imaging preferable, fine-cut axial and coronal
    - V3 numbness is characteristic, usu. resolves spontaneously
    - document loose and missing teeth
    - requires analgesia!
    - requires mouthwash (peridex)
    - blenderized diet
    - antibiotics indicated
    - *indication for surgery is dental malocclusion (usual)*
    - *usually repaired at 5-14 days post-injury*
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- One request regarding facial fractures referrals:
  - Please, no NSAIDs prior to referral!
Common concerns

- galea is violated
- eyelid is lacerated +/- some full-thickness lid missing
- tarsal plate is lacerated
- eyebrow laceration
- ear or nasal cartilage involved
- concern about facial nerve injury
- “open” mandible fracture
- lip laceration
- parotid duct; lacrimal apparatus
- how to preserve avulsed tissue?
- how to preserve avulsed teeth?
- patient/family wants a plastic surgeon
Common concerns

- **galea is violated**
  - no special significance other than very vascular and good layer for a sturdy repair
  - cauteterize galea liberally; but be careful cauteterizing around hair follicles
  - irrigate and repair with 2-0 or 3-0 PDS/vicryl
Common concerns

- “tarsal plate is injured”
  - should be primarily repaired
  - 6-0 or 7-0 vicryl or silk
  - conjunctiva does not need to be repaired since it is firmly adherent to the tarsal plate
  - make sure tarsal sutures do not go thru conj.
  - use silk suture on lid margin and leave ends long and taped to cheek skin to avoid corneal irritation
Tarsal plate repair

Location of margin sutures

Tarsus

7-0 silk

tarsal plate
tarsal (Meibomian) gland
Common concerns

- eyelid is lacerated, full-thickness is missing
  - <25% of lid missing: repair primarily
  - 25-35%: release lateral canthal ligament and local advancement flap
  - >35-50% more complex flap repair
Eyelid defect (70% full-thickness)
Eyelid defect (70% full-thickness)  
tars-oconjunctival flap
Eyelid defect (full-thickness)
tarsococonjunctival flap
Common concerns

- **eyebrow laceration**
  - repair in layers with care to align and orient properly
  - avoid cauterizing follicles
  - avoid turned-in hairs
Common concerns

- ear or nasal cartilage injury
  - repair cartilage primarily
  - use tapered needle - avoid *cheese-wiring* cartilage
  - use un-dyed suture: e.g., 4-0 vicryl
  - if cartilage is exposed consider sulfamylon
facial nerve injury?
- if palsy, consider exploring wound
- if found, tag nerve ends prior to referral
- frontal and marginal mandib. branches key
- repair: loupe magnification with 8-0 or 9-0 nylon
Facial nerve

injury to the frontal branch and marginal mandibular branch most concerning

division of the branches of the facial nerve anterior to this line = minimal risk
Sensory nerve repair

V2 injury
Common concerns

- “open” mandible fracture
  - *same rules apply*
  - oral antibiotics
  - mouthwash
  - analgesia
  - *surgery within 5-14 days*
Common concerns

- lip laceration
  - *key is to align landmarks*
    - philtral columns
    - white roll
    - vermiliocutaneous junction
    - wet-dry line
Lip landmarks

- philtrum
- column
- white-roll
- VC junction
- wet-dry line
Dogbite
Dogbite – lip switch procedure
Dogbite
**Common concerns**

- **parotid duct injury**
  - can lead to salivary fistula
  - know where the location of the duct is
  - *if wound is suspicious can consider intubating duct opening intraoral with methylene blue dye*
The parotid duct lies under the middle third of a line between the tragus and the oral commissure.
Dogbite (think: parotid duct?)
Parotid duct
Cannulating the parotid duct

Cut ends of parotid duct

Fine catheter passed through parotid duct opening
Common concerns

- **Iacrical canalicular injury**
  
  - *Injury occurring near medial canthus*
  
  - Exploring the wound is low-yield
  
  - If wound is suspicious consider intubating canaliculus with methylene blue dye and 22G angiocath
Lacrimal canaliculus
Lacrimal system

Anterior view of the lacrimal apparatus

FLOW OF TEARS
- Lacrimal gland
- Lacrimal ducts
- Lacrimal canal
- Nasolacrimal duct
- Nasal cavity
How to preserve avulsed teeth?

- Handle tooth by crown only
- Attempt reimplantation in the field (if < 1 hour)
- If unable to reimplant, use carrier media and consult dentist
  - e.g., Hanks solution, milk, saline, saliva, water
Common concerns

- how to preserve avulsed tissue?
  - sterile, moist, chilled (not frozen)
Chainsaw accident
Chainsaw accident
Motor vehicle collision
facial avulsion, scalp, lid, nose
Motor vehicle collision
facial avulsion, scalp, lid, nose
Motor vehicle collision
facial avulsion, scalp, lid, nose
Scalp avulsion
Scalp avulsion

*rule out neck injury first!*
Self-inflicted gunshot blast
Self-inflicted gunshot blast
Self-inflicted gunshot blast
Common concerns

- patient/family wants a plastic surgeon!
Nasoorbital-ethmoidal fracture
Pre/Post Test Questions

FACIAL TRAUMA:

1. ideally, within what time frame should a facial fracture be repaired?
   a. 24 hours
   b. 72 hours
   c. 1 week
   d. 2 weeks
   correct answer is d

2. what are the indications for surgical intervention for a zygomatic fracture?
   a. diplopia
   b. facial deformity
   c. trigeminal (V2) numbness
   d. dental malocclusion
   correct answer is b