Urgent Craniofacial Injuries in Hockey
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Disclosure Information
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Disclosure of Relevant Financial Relationships
I have no financial relationships to disclose.

Disclosure of Off-Label and/or Investigative Uses
I will not discuss off label use and/or investigational use in my presentation.

The Problem

- Serious neck injuries (cervical spine fractures) are usually the result of a direct blow to the top of the head (axial load) with the cervical spine slightly flexed (chin down position).
- Players should learn to protect themselves by making initial board contact with another part of their body other than their head. When sliding on the ice or being checked near the boards, try to make board contact with the shoulder blade or buttocck areas.
- A larger ice surface (“Olympic-size” rink) may decrease player-board contact, which may decrease the risk of injury, especially to the head and neck.
Establishing an Airway

- May be difficult in head and neck injury
  - Endotracheal Intubation (oral, nasal)
- May be impossible in head and neck trauma
- Surgical airway is the best option in head and neck trauma
  - Cricothyrotomy
  - Tracheostomy
Laryngeal Trauma

- Blunt Trauma - may occur with minimal related trauma
- Signs / Symptoms
  - Hoarseness
  - Subcutaneous emphysema
  - Hemoptysis
  - Hematemesis
  - Stridor
  - Dyspnea
  - Loss of laryngeal prominence

Palpation of the neck
  - Subcutaneous emphysema
  - Crepitation of larynx

CT scan
  - Cartilage disruption
  - Do not need CT if fracture is apparent on physical exam

Evaluation
  - Airway
    - Trach is preferable to orotracheal or nasotracheal intubation
    - Cricothyrotomy may be difficult
  - Fiberoptic Airway Exam
    - Blood, mucosal lacerations, vocal cord motion
Laryngeal Trauma

- Get ENT involved as early as possible
- CT scan not necessary on every patient
- One of the few traumas that ENT will want to operate on ASAP
- “True Emergency” in the sense of repairing and reconstruction of airway

Esophageal Injury

- Penetrating trauma as a rule
- Rigid esophagoscopy is better than radiographic studies
- Close the wound
- Drain the wound
- Antibiotics to cover oral flora

Taylor Pre-Game Skate Injury
Lacerations to the Head and Neck

- Explore the wound underlying the injury
- Fractures
- Muscle Injury
- Nerve Injury
  - Motor and Sensory
- Duct Injuries
  - Lacrimal System
  - Salivary System

Immediate Treatment

- Vascular injury
- Major hemorrhage can occur from scalp lacerations or great vessel injuries
  - May require specialized interventions
- Mid-face trauma can injure the Internal Maxillary Artery (IMA) resulting in uncontrollable hemorrhage
**Facial Lacerations**

- Common injury
- **NOT** difficult to repair
  - Time consuming closure
- 2-3 layered closure, small sutures
- Clean the wound of all debris
  - Nidus for infection
  - Tattooing of the skin and soft tissues
Facial Lacerations

- Minimize debridement of tissue
  - Even something that looks like it will die, usually survives in the head and neck
  - Excellent blood supply
- Small skin sutures (5-0, 6-0)
- Take skin sutures out early
  - 5-7 days
- Closure can be delayed because of the excellent blood supply to the region

Hall of Fame goalie Terry Sawchuk
The Nose

- Vascular Supply
  - Anterior - branches of internal carotid
  - Posterior - distal branches of external carotid

Epistaxis Management

- Anterior Sites
  - Pressure +/- cautery and/or tamponade
  - all packs require antibiotic prophylaxis

Nasal Packing

- BIPP
- Merocel™
- Rapid Rhino™
How NOT to pack a nose!!!

Nasal Fractures Overview

• The most common facial fracture
• The injury may create both aesthetic and physiologic compromise
• Significant incidence of adverse outcome despite treatment

Anatomy
Mechanism of Injury

- High and low momentum injuries create very different injuries of both the hard and soft tissues

Septal Hematoma

Nasal Lacerations / Avulsions
- Management similar to auricular injuries
Cory Price Dental Injury

Dentoalveolar Fracture

Mandibular Fractures

- May be obvious
- Anesthesia of the lower lip and teeth
- Malocclusion
- Crepitance
- Freely mobile segments
- May cause airway compromise if the fracture is in the area of the symphysis
  - loss of anterior tongue support
- Always fractures in two places
Jeremy Roenick’s Jaw Fracture

Occlusion

Teeth have a precise relationship to one another
If you place the teeth in their proper position, the bone is generally realigned
Jaw fractures (maxilla and mandible) are managed by reducing and fixing the teeth

Panorex

• High sensitivity for fractures
  – Mandible
  – Alveolus
  – Dentoalveolar fractures
  – Dental injuries
CT Scan

- Now considered gold standard
- Uses reconstructive tomography for the representation of anatomic cross-sections
- Details osseous anatomy with soft tissue control
- Axial, Coronal, Sagittal planes
  - Coronal scans require hyperextension of the neck
- Three-dimensional reconstructions
- May be the only option

CT Scan – Axial and Coronal Cuts
CT Scan – 3-D Reconstruction

Mandibular Fractures
Treatment
- Maintain airway
- Treatment usually not emergent or urgent
- Treatment can be delayed hours to days
- Can splint with modified Barton’s dressing
- Repair is time consuming
  - Closed reduction with arch bars
  - Mandibular-maxillary fixation (MMF, IMF)
  - Open reduction with wire or microplates

Internal fixation: Plates and screws
Syd Crosby Slap Shot Injury

Mid-face Fractures (LeFort)

- Common
- Mid-face is relatively weak compared to mandible and fronto-orbital areas
- Almost never “pure” LeFort fractures
  - Various combinations of I, II, and III

LeFort I
Separates the hard palate from the skull
LeFort II
Separates the central maxilla from the cranium

LeFort III
Separates the entire maxilla and lower face from the cranium
Combination LeFort III and Trimalar fracture

Mid-face Fractures (LeFort)
- Require “significant” trauma to the area
- Be aware of an associated CNS injury
- Usually bloody
  - Laceration of IMA and branches
- Usually a lot of edema
  - May loose airway
  - Immediate or delayed
Mid-face Fractures (LeFort)

- Can be difficult to diagnose
- Mobile hard palate and mid-face
  - Stabilize the skull with your other hand
- May have orbital trauma
- May have intracranial trauma

CT Scan – Axial and Coronal Cuts

Immediate Treatment

- Internal Maxillary Artery Hemorrhage from LeFort fractures, penetrating traumas
- Difficult to control
- Difficult exposure of the area
- Do ANYTHING to tamponade the bleeding
  - Reduce the fracture
  - Pack the nasopharynx
  - Pack the oropharynx
  - Pack everything!
Drew Miller Skate Injury


High Index of Suspicion

• “Keep an eye out” for ocular injuries
• Present until proven otherwise
• Suspect in setting of:
  – Blow to head, tripod region, and frontal area
  – Laceration of the face and eyelids
  – History of foreign body sensation
Eye Exam

- Pupils-APD, irregularity (ie tear drop pupil)
- Motility-omit if question of open globe
- Visual fields-confrontation, Amsler grid
- Slit lamp if available

Ancillary Studies

- Only if obtained without delay in referral
- CT-axial and coronal for orbital fractures, foreign body localization, etc.

Lateral Canthotomy and Cantholysis

- Sub-Q lidocaine (optional)
- Grasp lateral canthus
- Hemostat to fornix
- Close hemostat
- Sharp heavy scissors divide lid margin and lower canthal tendon
- Lid should move freely away from globe
Medications

- Tropicamide 0.5% - if the optic disc evaluation depends on you!
- Fluorescein or topical anesthetic - often allows the patient to open the eye for examination
- Cyclogyl 1% - relaxes the ciliary muscle and often obviates narcotics for pain relief

Perichondrial Hematoma

**RX**
- Systemic antibiotics
- Analgesia
- URGENT REFERRAL for incision & drainage

Aspiration of Auricular Hematoma
Perichondrial Cellulitis

Rx: Systemic antibiotics
Analgesia
REFERRAL to ENT if no response after 24hr

Auricular Lacerations
- Preserve all viable tissue
- Not black and crusty
- Minimal debridement, but thorough cleaning
- Cartilage can be handled like other tissues
- Meticulous closure
- Antibiotics to cover skin flora etc.
- Attempt to lessen risk of perichondritis

General points
- ENT trauma is rarely emergent except airway and bleeding
- After patient is stabilized think about
  - Laryngeal injury
  - Facial Nerve injury
  - Ophthalmologic injury
- If you are getting a CT, scan these areas as well. Only takes a few more minutes, and information is priceless
Injuries in international ice hockey: A prospective, comparative study of injury incidence and injury types in international and Swedish elite ice hockey.

Lorentzon R, Wedren H, Pietila T, Gustavsson B.

- incidence of facial wounds was 70.8 per 1,000 player-game hours
- high incidence of facial injuries in international hockey is due to a high rate of stick contact injuries.


Rampton J, Leach T, Therrien SA, Bota GW, Rowe BH.

- 226 patients presented to ED, mean age 23, 85% were facial injuries
- 1% required hospitalization
- Most occurred in older recreational players who did not wear facial protection
- Full facial protection reduced the chance of upper facial injury (p = 0.0001)
- Risk of such injury while wearing a half-visor was the same as while wearing no facial protection at all (p > 0.05).

Head and Neck Injuries Among Ice Hockey Players Wearing Full Face Shields vs Half Face Shields

Brian W. Benson, MSc; Nicholas G. H. Mohadd, MD, MSc; M. Sarah Rose, PhD; Willem H. Meeuwisse, MD, PhD


- Speculation exists that use of a full face shield by ice hockey players may increase their risk of concussions and neck injuries, offsetting the benefits
- determine the risk of sustaining a head or neck injury among intercollegiate ice hockey players wearing full face shields compared with those wearing half shields
- Results Of 319 athletes who wore full face shields, 195 (61.6%) had at least 1 injury during the study season, whereas of 323 who wore half face shields, 204 (63.2%) were injured. The risk of sustaining a facial laceration and dental injury was 2.31 (95% confidence interval [CI], 1.53-3.48; P = .001) and 9.90 (95% CI, 1.88-52.1; P = .007) times greater, respectively, for players wearing half vs full face shields.
PREVENTION OF ICE HOCKEY INJURIES

Mandatory use of standardized helmets has apparently reduced the incidence of severe head injuries with brain damage.

Facemasks have dramatically reduced the risk of eye injuries, including blindness, and lacerations (cuts). No permanent eye injury has been reported to a player wearing a certified mask.

Full facial protection for all participants may reduce the risk of facial lacerations, dental fractures (broken teeth), and potentially serious eye injuries.

“A comparison of facial protection and the incidence of head, neck, and facial injuries in junior hockey players. A function of individual playing time”.


• in a prospective study of the Swiss Ice Hockey leagues A and B a direct correlation between players violating the rules and head and facial injuries. Head and facial injuries were caused by illegal activity in most cases
• In contrast with the opinion of referees, the reporting doctors considered that most head and facial injuries were caused by illegal activities. It is alarming that the referees in most of these instances of potentially serious face and head injuries did not call a penalty
Hockey Fights