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American Osteopathic Academy of Sports Medicine
Oral And Maxillofacial Injuries In Athletes
Primary Survey

- Mechanism of Injury!!
- Collateral damage: Closed head injury, C-Spine
- Airway compromise must be identified
- Bilateral anterior mandibular fractures can collapse the tongue into the airway- jaw thrust, chin lift; no head tilt until c-spine clear
- Hemorrhage control: direct pressure by whatever method
- Triage: Maybe to the bench, generally to the medical room; exception: when its time to ‘scoop and run’!!
Think Airway and C-Spine!
Thorough Clinical Evaluation

- Inspect the face for symmetry, swelling, ecchymosis, mobility: bimanual palpation
- Orderly exam: top to bottom, inside out
- Orbits, Zygomas, Nose, Maxilla and Mandible; Intra-oral exam
- Things that move should move: eyes, tongue, TMJ; things that don’t move shouldn’t: bones, teeth
- Look for fractures especially with higher pain report: crepitus, mobility, step discrepancy are good indicators
- Raccoon eyes (periorbital ecchymosis): Middle or upper face fracture; Battle’s sign (mastoid ecchymosis): Basilar skull fracture; Subconjunctival hemorrhage: Zygomatic or orbital fracture
Battle’s Sign: Fracture Of Skull Base
Intra-Oral Exam

- Look for open wounds, foreign bodies, and loose teeth or bony segments
- Evaluate the occlusion- ‘How does your bite feel?’
- Be wary of occult injuries that may lead to airway compromise: sublingual hematoma
- Appropriate x-rays if you suspect aspiration or ingestion of tooth, dental appliance or foreign body.
Aspirated Tooth
Open Wounds

- Initial management: hemostasis, hemostatics (surgicel), glue (Derma-Bond), steri-strips with skin adhesive, or quick transitional repair with ‘temporary sutures’

- Definitive Repair: Derma-Bond, Steri-strips with adhesive (mastisol), Sutures: sterile prep and local anesthesia as needed

- Extra-Oral: Superficial laceration: one layer non-resorbables (5-0 nylon); Deep laceration: layered closure with resorbables for deep layers (4-0 vicryl, vicryl rapide or chromic gut); non-resorbables for skin (5-0 nylon)

- Heavy suture for scalp (2-0 or 3-0 silk or nylon), finer for eyelids (6-0 nylon)

- Antibiotics: extensive or highly contaminated wounds, or near eyes: Keflex, or clindamycin if allergic

- Local anesthesia: 2% lidocaine with 1:100,000 epinephrine or 0.5% marcaine with 1:200,000 epinephrine given in infiltration or nerve blocks
Open Wounds

- Intra-oral: resorbables preferred but think stronger, longer lasting sutures in athletes: vicryl or vicryl rapide; can use non-resorbables in certain situations like tongue lacerations (3-0 or 4-0 silk)

- May need layered closures for extensive lacerations; tongue lacerations: vicryl for deep muscle, silk for surfaces (close both sides for self inflicted tongue bite); silk absorbs water, stays soft and lies flat for comfort

- Through-skin into oral cavity: 3-4 layer closure: close inside water-tight first, re-prep skin and work out; antibiotics (penicillin or amoxicillin; clindamycin if allergic)

- Always think about collateral injuries: nerves, salivary ducts or tear ducts

- Bolster dressing with suture-fixed cotton rolls impregnated with antibiotic ointment on either side of auricular lacerations to prevent hematomas and ‘cauliflower ear’

- Return to play dependent upon severity of wound: Immediate return vs 2-3 weeks
Imaging

- Mandible series: AP or PA mandible, Lateral oblique views, Townes view (condyles)
- Skull series: AP and PA, Waters view, submento-vertex or jug handle view (zygomatic arches), lateral skull (nasal bones)
- Orbital views
- These can often be done on site
- If indicated, definitive imaging with (usually) CT scan or MRI
Nasal Fracture

- Most frequent facial fracture
- External deformity, crepitus, airway compromise, pain and hemorrhage
- Stop hemorrhage: ice, vaso-constricting sprays or drops, packing
- Definitive repair when necessary and practical
- Simple closed reductions have been done on site
- Multiple unrepaired fractures are difficult to fix, and cause airway compromise
Displaced Nasal Fracture With Peri-Orbital Ecchymosis
Nasal Packing

- Dental roll
- Rhino rocket or Nasal Doyle or Mericel (absorbent expanding nasal tampons)
- Inflatable balloons for severe bleeds (especially posterior)
- Septal hematomas must be drained to prevent perforations
Treatment Nasal Fracture

- CT scan
- Closed reduction of bones, closed reduction of septal fracture if present
- Intra-nasal packing for 3 days, Denver splint externally for one week
- Open reduction with plates if severe fracture
- Return to play 4-6 weeks, 2-4 weeks with full face protection
Mandibular Fractures

- Second most common facial fracture
- ‘See one fracture, look for two’
- Can be associated with closed head injury because of temporomandibular joint
- Can cause airway compromise
- Often occurs through impacted third molar site
- Fracture sites: condylar, body/angle, symphysis, parasymphysis, coronoid(rare)
Condylar Fracture

- Most common; can be unilateral or bilateral
- Swelling pain crepitus, limited opening
- Malocclusion with prematurity usually on fractured side and anterior open bite
- Deviation of jaw on opening toward fracture
- May be open fracture with laceration of ear canal
Left Chin Trauma: Right Subcondylar Fracture
Body and Angle Fractures

- Movement and crepitus at site
- Malocclusion, bleeding
- Swelling and hematomas: intra and extra-oral
- Pain and limited opening
- Often through impacted third molars (a good reason for their prophylactic removal in athletes)
Symphysis or Parasympyphysis Fractures

- More easily missed on x-rays
- Often associated with condylar fracture
- Sublingual hematoma!!
- Avulsion of anterior teeth- chest x-ray if suspect aspiration
- Often a step deformity in teeth on either side of the fracture
- Bimanual palpation!!
Displaced Mandible Fracture
Acute Treatment

- Hemostasis
- Ice, analgesics, local anesthesia
- Plain films (mandibular series) if available; panorex ASAP
- Immobilization with Barton Bandage (ace wrap)
- Lasso ligature with 24 or 26 gauge wire or dental floss around stable teeth on either side of a fracture will decrease pain and bleeding, and temporarily immobilize the fracture
Definitive Treatment of Jaw Fractures

- CRMMF, ORIF

- CRMMF: Arch bars, wires; slower return to play, liquid diet, fixation for 4-6 weeks (less with some condylar fractures); aerobic exercise fine, light weights possible

- ORIF: Plate and screw fixation! Less MMF time required, earlier return to solid food and play (with full face protection)
What anatomic area of the mandible is most likely to be fractured?

A. Angle
B. Parasymphysis
C. Condyle
D. Body
E. Coronoid
Maxillary Fractures

- Significant injury force injury
- Malocclusion, swelling and pain
- Mid-face instability: stabilize athlete’s head at forehead or nose, grab the upper front teeth, and look for upper jaw mobility
- Bleeding, epistaxis
- Mid-face elongation/shortening, or flattening
- V2 paresthesia, concurrent injury
Principles of Treatment

- Re-establishment of proper occlusion is paramount
- Anatomic reduction is secondary
- Immobilize until bony union can occur
- Earlier mobilization with elastic traction for condylar fractures
- CRMMF (jaw wiring), ORIF (jaw wiring +plates and screws)
- Out 2-6 weeks; return with facial protection for 2-4 additional weeks
Zygroma Fractures

- Fighting, object strike, or collision: requires significant force
- Subconjunctival hemorrhage, paresthesia infra-orbital nerve, step discrepancy orbital rim or zygomatic arch
- Depressed, indented cheek bone (compare both sides)
- Can have altered bite
- Trismus and decreased extra-ocular motion (especially upward gaze)
- Plain films: Waters and Submental-Vertex views on site if available
Depressed Zygoma Fracture
Sub-conjunctival Hemorrhage
Treatment Zygoma Fractures

- CT scan recommended
- Eye exam by Ophthalmologist before repair
- ORIF with 2 or 3 point stabilization; plates at Frontal-zygomatic suture, inferior orbital rim and possibly intra-oral buttress
- Orbital floor implant for blow-out fracture if needed
- Return to play 4-6 weeks, 2-4 weeks with supplemental full face protection if possible
Orbital Fractures

- Blow out fracture most common
- Usually orbital floor or medial wall involved
- Repair needed for functional or esthetic compromise
- Often accompany zygoma fractures
- Orbital rim fractures occur with more severe forces and often accompany other facial bone fractures as well
- Repair generally is required
- Eye exam!!! Retinal injuries, globe trauma, hyphema
Orbital Signs

- Enophthalmos
- Vertical and horizontal displacements: superior (hematoma); inferior (blow out fracture); horizontal (NOE fractures)
- Diplopia, visual change
- Decreased extra-ocular motion
- Subconjunctival hemorrhage
Peri-Orbital Ecchymosis and Telecanthus: Nasal-Orbital-Ethmoidal Fracture
Treatment Orbital Fractures

- CT scan
- Eye exam by ophthalmologist before repair
- ORIF
- Orbital floor implant if needed
- Return to play 4-6 weeks, 2-4 weeks with full face protection and normal eye exam
Subconjunctival hemorrhage after facial trauma is suspicious for:

A. Maxillary Fracture
B. Zygoma Fracture
C. Concussion
D. Orbital Fracture
E. Both B and D
Dental Injuries
Injuries to the Teeth or Supporting Structures

• Injuries to teeth may involve the tooth crown, the root, or both

• Supporting structures like alveolar bone and gingiva are often involved

• Mouthguards significantly reduce the number and severity of dental injuries

• Orthodontic appliances (braces) can add a level of support to teeth, but without mouthguards they can complicate soft tissue trauma
Avulsed Teeth

- May occur with tooth or root fracture, usually involves alveolar process injury, and may result in alveolar mucosal laceration

- Teeth must be accounted for if possible; remember that teeth can be swallowed or aspirated, and may even lodge in the oral or hypo-pharynx

- Monitor the event for signs of aspiration or displacement into the pharynx or larynx (coughing, speech changes, sore throat)
Avulsed or Subluxed Teeth

- In ideal situations replant immediately; if grossly contaminated rinse tooth with water before replant; clot in socket may prevent re-implantation

- If subluxed, can try to reposition manually but better for oral surgeon or dentist to do especially if tooth is intruded

- If re-implant not possible but goal is to try to save tooth, place it in transport medium (milk, saline, under tongue in adult), and get to dentist ASAP--dental x-rays are key

- Don’t re-implant primary teeth

- Questionable re-implant if socket damaged or if out for greater than 30 minutes

- Dental implant success has shifted re-implant paradigm
Two Avulsed Teeth, One Intruded Tooth
Definitive Management of Avulsed or Subluxed Teeth

- Dental x-ray
- Antibiotics
- Splinting tooth to stable adjacent teeth with light wire or fishing line and dental composite, and left in place 2-3 weeks
- Root canal therapy as needed
- Or if the prognosis for the tooth is poor, extraction and dental implant
- Mouthguards!!!!
Return to Play Issues with Avulsed or Subluxed Teeth

- Return to play is largely dependent upon the athlete’s level of comfort.

- Conditional factors may be concurrent soft tissue trauma, and relative danger of re-injury, including avulsion and aspiration.

- Dietary restrictions (soft chew or non-chew foods) are routinely necessary and can present nutritional challenges.

- Custom mouthguards made over splints may offer additional security.

- Added facial protection is recommended.
Fractured Teeth

- Fractures may extend into enamel, dentin, pulp, or root
- Enamel fractures are minor and usually not painful
- Fractures into dentin cause pain and temperature sensitivity
- Fractures exposing the pulp can cause severe pain and temperature sensitivity
- Not all teeth are natural teeth: crowns, bridges, implants and dentures- be aware
Management of Fracture Teeth

- Acutely: account for fragments (may be in soft tissue wounds) and pain control: local anesthetics and analgesics
- Dental x-rays
- Extraction if fractured below gum line
- 1 year follow up and root canal therapy if tooth loses its vitality but is salvageable.
- Splint if mobile
- Dental restoration: bonding, veneers, or crowns as indicated
Alveolar Process Fractures

- Fractures of the tooth bearing portion of the upper and lower jaws
- Fracture segments may include multiple teeth
- Soft tissue injury is common
- Malocclusion is a common complaint so injury must be differentiated from jaw fracture
- Segments may vary from minimally mobile and displaced, to grossly mobile and markedly displaced, to totally nonviable
Alveolar Process Fractures

- Minimally displaced segment with normal occlusion can be managed with antibiotics and soft diet.
- More mobile or displaced fractures must be repositioned and splinted.
- Repositioning can usually be done with digital manipulation under local anesthesia.
- Splinting is done with light cured acrylic with or without fine wire or heavy fishing line; severely displaced or larger segments are splinted with arch bars and wires; jaw wiring may be required in the most extensive cases.
- Nonviable segments may need to be debrided, but segments are usually splinted even if teeth are unsalvageable to try to preserve bone.
Acute Treatment of Alveolar Fractures

- Hemostasis, analgesics, local anesthesia
- Reposition segment if possible
- Soft tissue repair
- Check clinically for jaw fracture
- Plain radiographs if available
Definitive Treatment of Alveolar Fractures

- Dental radiographs: Panorex, dental periapical films
- Reposition and splint segment in proper anatomic and occlusal relationship
- Splint generally 2-4 weeks
- Root canal evaluation and treatment as is needed
- Return to play as is practical and comfortable, with mouthguard and additional facial protection
Pearls for Treating Dental/ Oral Injuries

- Dental Kit: Dental rolls, Cavit (temporary filling material), temporary cement (no super glue!)
- Clove Oil
- Magic Mouthwash/Viscous Lidocaine
- Local anesthesia: Blocks or infiltration: marcaine 0.5% 1:200,000 epinephrine or lidocaine 2% 1:100,000 epinephrine; ½ and 1 ½ inch 25 gauge needles
- Roll of 24 or 26 gauge stainless steel wire, dental floss
Obstructive Sleep Apnea

- 12 million people in US
- 1 in 25 men, 1 in 50 women; more than half are overweight
- Snoring, poor sleep, daytime somnolence, accessory muscle breathing, apneic events
- Apneic events can lead to reduced flow of blood to vital organs and cause irregular heart rhythms
- Diagnosis: physical exam, plain x-rays, 3D airway imaging
- Definitive diagnosis: Sleep Study
Treatment Of OSA

• Mild: Weight loss, sleep position improvement with pillows or bed, avoid alcohol or sleeping pills, nasal sprays or strips, mandibular repositioning appliances

• Mild to moderate: Appliances, CPAP, minor surgeries (ie., septoplasty, palatoplasty, tonsils and adenoids, chin advancement)

• Severe: CPAP, minor surgeries, major surgery (Maxillo-Mandibular Advancement or MMA)

• Mike Napoli
Maxillo-Mandibular Advancement

- 54 yo dentist from Louisville
- Snorer, fragmented sleep, daytime somnolence
- 6’3”, 203, otherwise healthy
- Positive sleep study, decreased airway on plain film, positive 3D volumetric airway study
Pre-op

5 days Post-op
Questions?