DENTAL TRAUMA: TICK TOCK!

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References:

- Guidelines
  - American Association of Endodontics
  - American Association of Pediatric Dentistry
Before you get to the teeth...

Indications of a head injury

- Scalp wound
- Fracture
- Swelling, bruising
- Loss of consciousness
- Nasal discharge
- Stiff neck
Trauma Evaluation: General

1. **Vital signs** - record BP, pulse (rule out internal bleeding)

2. Consciousness evaluation:
   - Ask *what happened?*...can’t remember = concussion
   - Ask *did you lose consciousness?* Any = concussion
   - Determine if alert and oriented x 3
     1. Where are you?
     2. What day is it?
     3. Who is the president?
Trauma Evaluation: Extraoral

1. Bruising:
   - Over mastoid?
   - Around eyes with no eye trauma?
     - May indicate basal skull fracture.
     - Refer after dental stabilization
   - “Raccoon eyes”
   - Battle’s Sign
Trauma Evaluation: Extraoral

2. Any fluid from nose or ears?
   - Blot with gauze or coffee filter
   - Look for “halo sign” of CSF
   - But refer if in doubt!

3. Check overall facial contours
   - Orbital rim intact?
   - Zygomatic arches even?
   - Border of mandible intact?

4. If there are lacerations, look for foreign objects. Consider rads of soft tissue
Cranial Nerve exam

Ask assistant to bring coffee can or eugenol, cotton-tipped applicator, penlight.

1. Sight:
   - Vision normal?
   - Follow finger in all directions, both eyes even in far upward?
   - Flash penlight in one eye – other pupil constricts?

2. Smell:
   - Test with coffee or eugenol
Cranial Nerve exam

3. Hearing
   - Rub fingers together near ear
   - Can they hear it on each side?

4. Have patient:
   - Raise eyebrows
   - Squeeze eyelids
   - Smile
   - Pucker lips
   - Shrug shoulders
Cranial Nerve exam

5. Evaluate speech- normal or hoarse?

6. Stroke face with stick end of cotton tip
   - Forehead
   - Cheek
   - Chin

7. “Open mouth, stick out tongue”
   - Tongue deviation?
   - Stroke uvula with cotton tip-elevates?
   - Lightly stroke soft palate- gag reflex normal?
Intraoral Exam

- Soft tissue injuries
- Occlusal plane aligned?
  Occlusion normal?
  Tooth alignment normal?
- Alveolar fractures?
Consider soft tissue radiographs if suspect foreign body
If teeth displaced or fractured, take PA’s
OK, now you can look at the teeth....
Classification schemes for fractured teeth:

- Forget Ellis Class...
- The WHO system – much more sensible!

But the bottom line is:

Is it a hard tissue or PDL injury?
Ask yourself: Hard tissue or PDL?

**Hard Tissue Injuries:**
- Crown fracture
  - + Pulp exposure
- Root fracture

**PDL Injuries:**
- **Luxation**
  - PDL only
    - Concussion
    - Subluxation
  - + Socket fracture
    - Intrusive
    - Lateral
    - Extrusive
- Avulsion
Get to the right page...

- From AAE and AAPD 2004
- Evidence based recommendation on how to diagnose, treat and follow up
- Don’t even try to learn this stuff!!!
Make multiple **copies**, laminate, place in:
- Front desk
- Treatment room
- **Home** - they will call you!
Hard Tissue Injuries

Tooth
Root
Crown Fractures

Pulp involved or not?
No pulp exposure = Uncomplicated
Pulp exposure = Complicated
Crown Fracture: Uncomplicated

No pulp exposure

- Enamel only: Smooth sharp edges
- Dentin exposed: Bonded composite
Crown Fracture: Complicated

With pulp exposure

- Stage of tooth development?
- Time since trauma?
- How much PDL injury?
- Restorative tx plan?
Crown Fracture: Complicated

- Stage of tooth development?
  If root end not formed, do a vital pulp procedure
  Not comfortable with this? Get to an endodontist ASAP
Crown Fracture: Complicated

- Time elapsed since trauma?

After 24 hours, more likely to be contaminated.

Direct pulp cap not as successful, consider Cvek pulpotomy.

Cvek M, JOE 1982
Crown Fracture: Complicated

- Periodontal injury?
  Pulp compromised - more mature the tooth, worse chance of pulp survival.

Andreasen JO, 1970
Crown Fracture: Complicated

- **Restorative Tx Plan?**

Vital pulp therapy risky:

- Better results if minimal restorative follows
- Don’t bother when expensive and extensive care is planned...endo is more predictable.

Andreasen JO, 1970
Case 1. Kaitlin

- Immature tooth
- Trauma resulted in large pulp exposure 36 hours ago
- Bleeding from the sulcus noted
- Will need crown

What do you think is the best treatment?
Case 1. Kaitlin

- Apexogenesis
- Partial Pulpotomy
- Bonded restoration until root formation complete

Future plan:
- Endodontic therapy
- Crown
Crown-Root Fracture

Pulp involved?
No = Uncomplicated
Yes = Complicated
Key determinant is restorability
Case 2. Eugene

What do you think is the best treatment?
Case 2. Eugene

- **High smile line** - Crown lengthening not a good option
- **Extrusion** an option - may result in narrow neck of crown
- **Implant** - but not yet!

Given the age of pt, may temporize, then plan implant.
Root Fracture

- Not common <3% of dental injuries
- Usually oblique facial to palatal
- Treat:
  1. Reposition
  2. Hard splinting 7-14 days, maybe longer if bone fx.
- Complex- probably best to refer to Endodontist after stable.
Periodontal Ligament Injuries

Luxation or Displacement
Avulsion
Luxation Injuries: Consequences

- **Pulp:**
  - Neuro-vascular supply to pulp affected

- **Results:**
  - Altered or total loss of vitality
  - Can cause canal obliteration (calcification). Most often:
    - Open apices
    - Extrusive, lateral luxation
    - Rigid splinting
Luxation Injuries: Consequences

- Attachment damage:
  - **Surface** - local, if no stimulus heals within 14 days
  - **Replacement** - clasts resorb bone, blasts lay down new = ankylosis
  - **Inflammatory** - necrotic pulp leak toxins, causes resorption of root and bone
Injuries to PDL: 1. Concussion

- **Concussion** = “Bumped”
  - Dx- Sore, no displacement
  - Sensitive to percussion
Injuries to PDL: 2. Subluxation

- “Bumped” + bleeding from gingival crevice
- Dx- Still no displacement
- Tx- ± Stabilize with flexible splint for comfort
Injuries to PDL: 3. Extrusion

- **Dx-** Elongated in socket
- **Tx-** Reposition, stabilize with flexible splint
- Follow up per AAE recommendations
Injuries to PDL: 4. Lateral

- **Dx-** Elongated in socket, very percussion sensitive
- **Tx-** Stabilize with flexible splint
Case 3: Duane

“I kissed my wrench.”
Case 3: Duane
Case 3: Duane

- How will you treat this case?

Pre-Op Radiographs
Case 3: Duane

Flexible splint
Case 3: Duane
Case 3: Duane
Injuries to PDL: 5. Intrusive

- **Dx**- Apical displacement into alveolus
- Most damaging! Extensive trauma to PDL and cementum
  - Pulp necrosis likely - follow closely
  - Ankylosis almost a certainty
- **Tx**- Stabilize with flexible splint
Injuries to PDL

- Paint a realistic picture of the prognosis for these kind of injuries
- Expect
  - Endo tx
  - Possible ankylosis
  - Resorption
Avulsion and Replantation
Avulsion and Replantation

- **PDL**
  - Damaged along entire surface
  - Time is critical for cell death

- **Pulp**
  - Neurovascular supply severed
  - Always get pulpal necrosis
  - Revascularization possible in immature teeth
Avulsion and Replantation

- Variables:

  Primary tooth vs Permanent tooth
  Immature (open apex) vs. Mature tooth
  Rapid replantation vs Delayed replantation
Avulsion and Replantation

“Replantation of primary teeth is not justified due to the risk of pulp necrosis and possible interference with the development of the permanent successors.”

Andreasen JO, Andreasen FM 1994
Avulsion and Replantation

Permanent Tooth

- Dry time < 60 min OR in transport media
  - Flexible splint 1-2 weeks
- Tooth already replanted
- Dry time > 60 min
  - Flexible splint 4-6 weeks

- Closed apex
  - Start Endo
- Open apex
  - Don’t start Endo
Avulsion and Replantation

Permanent Tooth

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For all, treatment determined by apex

- Closed apex
  - Start Endo
- Open apex
  - Don’t start Endo
Questions?