Dental-based Injuries

- LUXATIONS
- CROWN FRACTURE
- CROWN/ROOT FRACTURE
- ROOT FRACTURE
- ALVEOLAR BONE FRACTURE
- AVULSIONS

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LUXATIONS
The tooth is loose, now what?

1. **Concussive** - not loose or displaced, but tender to percussion
2. **Subluxation** - loose, but no displacement
3. **Extrusive Luxation** - partially out of socket
4. **Lateral Luxation** - displaced usually toward the palate
5. **Intrusive Luxation** - clinical crown appears shorter
CONCUSSIVE

• Looks normal in mouth and on x-ray
• Only sign is tender to percussion
• Check occlusion and soft diet for 1 wk
• If really tender, flexible splint for comfort for 1-2 weeks
• 0.1% Chlorhexadine rinse and good OH
• Pulpal issues are rare
• Monitor with radiographs at 4 wks, 6-8 wks and 1 yr

IADT Guidelines 2012.
SUBLUXATION

• Looks normal in the socket on an x-ray-similar to concussive
• Check occlusion and adjust
• Soft diet
• 0.1% Chlorhexadine rinse and OH
• Flexible splint for 7-14 days for patient comfort
• Good long term pulpal prognosis-monitor at 4 wks, 6-8 wks and 1 yr

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EXTRUSION LUXATION

• Apical portion of socket empty
• PDL is disrupted
• Reposition and check occlusion
• 0.1% Chlorhexadine rinse and soft diet
• Flexible splint for 2 weeks (up to 3)
• Monitor for apical changes and resorption with radiographs – 4 wks, 6-8 wks, 6 mo, and 1 yr. Pulpal necrosis usually seen by 4 weeks
• Immature apex likely to revascularize, mature apex minimal chance

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LATERAL LUXATION

• Usually displaced palatally-root apex can be palpated in vestibule on occasion
• Looks similar to extrusion on x-ray
• Labial plate may be fractured
• Firmly reposition with anesthesia (can be locked) and check occlusion
• Flexible splint 3-4 weeks (due to bony fx), then check for PDL changes. Monitor with x-rays
• May need 3-4 additional weeks (radiographs)
• 0.1% Chlorhexadine rinse and OH
• Immature apex favorable; closed apex unfavorable, 75% go necrotic
• Surface resorption frequent-esp. at apex


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INTRUSION LUXATION

• May sound dull when percussed

• Open apex, loosen in socket with a forceps and allow to erupt normally. No movement in 3 wks, start orthodontic repositioning

• Closed apex, requires orthodontic appliances to reposition right away

• May require surgical repositioning. Flexible splint for additional 4-8 weeks after

• 0.1% Chlorhexidine rinse and OH

• Revascularization possible with open apex, but necrosis likely with mature root – initiate RCT with CaOH

• Potential tooth loss due to root resorption


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ROOT FRACTURE

- Complex injury to the PDL, cementum, dentin, and pulp
- Tooth appears elongated clinically
- Radiolucent line(s) separate fragments—may be subtle
- Apical fragment usually undamaged
- Must reposition coronal fragment and splint, but no consensus on length of time

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• Dentin from odontoblasts and cementum bridge the gap
• Normal tooth mobility
• Normal pulp test
• Slightly discernible fx line
ROOT FRACTURE
CONNECTIVE TISSUE HEALING

- PDL cells invade the entire fracture gap and enclose both segments
- Normal pulp test
- Increased mobility
- Obvious fx line
- Coronal pulp chamber obliterated
ROOT FRACTURE
GRANULAR TISSUE HEALING

- Coronal pulp becomes necrotic
- Granulation tissue forms between the two fragments
- Necessitates removal of the coronal pulp tissue
- Coronal fragment treated with CaOH, then RCT or CaOH and MTA

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ROOT FRACTURE
HEALING OUTCOMES

- Key factor to healing is the stage of root development and degree of displacement of the coronal portion
  - Immature apex heals by HT most likely
  - Mature apex usually heals by CT and nonhealing by GT
  - HT healing likely with fragments not displaced
  - CT path to healing likely if fragment displaced or not repositioned properly

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ALVEOLAR BONE FRACTURE

• Segment containing one or more teeth is displaced
• Occlusion is off
• Entire section is mobile
• Differentiate between root fx and alveolar fx by using radiographs-in a root fracture, fx position (line) will not move if beam angle changed
• Force needed to reposition segment
• Flexible splint for 3-4 weeks
• Monitor closely for necrosis especially with closed apex

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At the office...tooth out of the mouth (dry time)

OPTIONS

Extraoral Time < 60 minutes
Open Apex

Extraoral Time < 60 minutes
Closed Apex

Extraoral Time > 60 Minutes
Open Apex

Extraoral Time > 60 minutes
Closed Apex
Out of the mouth < 60 minutes.

OPEN APEX

- Revascularization possible
- Rinse off debris gently with saline
- Soak root surface for five minutes with topical abx (minocyline or doxycycline)*
- Replant-verify position w/ xray
- Do not initiate endodontic treatment at this point
- Flexible splint for 10-14 days
- ABX coverage, soft diet, Peridex, tetanus booster

CLOSED APEX

- Revascularization unlikely, but still good chance for periodontal healing
- Rinse off debris with saline and coagulum from socket
- Replant gently-xray to check
- Flexible splint for 10-14 days
- Initiate endo – CaOH paste to decrease chances of root resorption
- ABX coverage, soft diet, OH, etc..

IADT Guidelines 2012. *Experimentally successful

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Out of the mouth > 60 minutes

OPEN APEX

- Revascularization possible, but not likely
- Check for necrosis over next 2-4 weeks
- Treat same as closed apex
- Endo could be done extraorally to aid in obtaining a tight seal
- If intraorally, CaOH for 2-4 weeks. Monitor for closing of apex

CLOSED APEX

- Poor long-term prognosis
- Eventual outcome is ankylosis and resorption
- Remove PDL with a gauze
- RCT can be done extra/intra orally at this point (IADT) or 7-10 days (Andreasen)
- Soak in 2% NaF solution for 20 minutes (may slow down resoprtion?)
- Rinse coagulum out of socket
- Replant slowly and firmly
- Flexible splint for 4 wks
- ABX coverage, home instructions the same

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