

Dental-based Injuries



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

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



Traumatic Dental Injuries. Andreasen JO, et al. 2006.

IADT Guidelines 2012.

www.dentaltraumaguide.org. 2010, 2012

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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



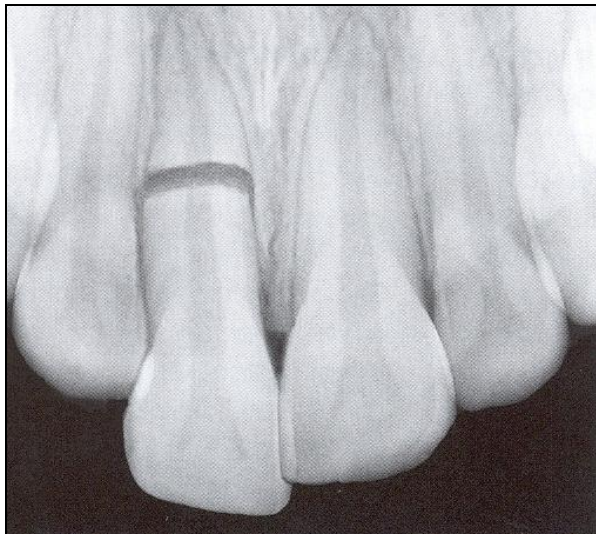
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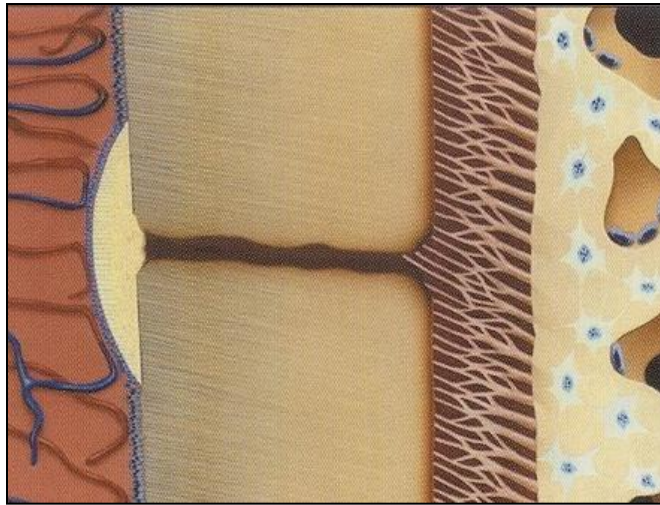
ROOT FRACTURE



- 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

ROOT FRACTURE

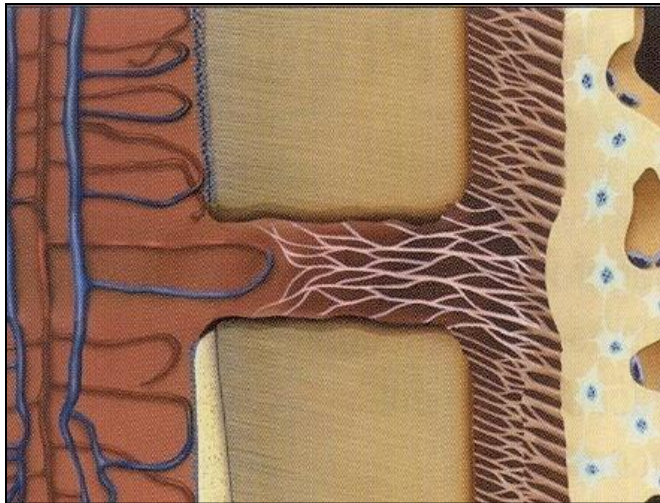
HARD TISSUE HEALING



- Dentin from odontoblasts and cementum bridge the gap
- Normal tooth mobility
- Normal pulp test
- Slightly discernible fx line

ROOT FRACTURE

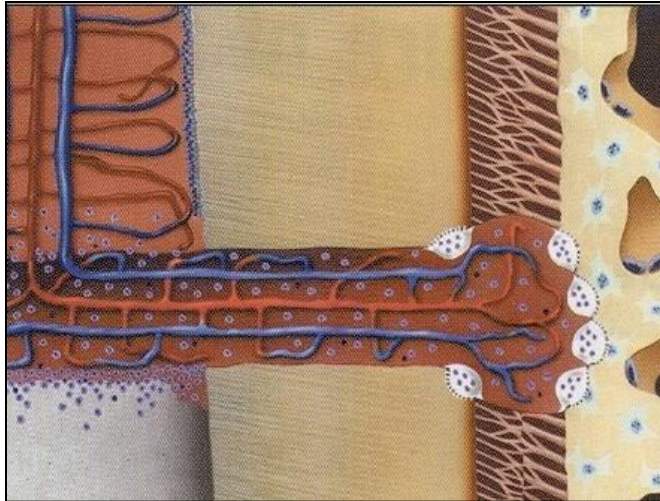
CONNECTIVE TISSUE HEALING



- 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



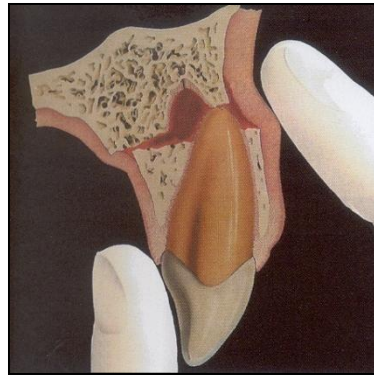
- Coronal pulp becomes necrotic
- Granulation tissue forms between the two fragments
- Necessitates removal of the coronal pulp tissue
- Coronal fragment treated with CaOH, then RCT or CaOH and MTA

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

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

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 (minocycline 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..

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 resorption?)
- Rinse coagulum out of socket
- Replant slowly and firmly
- Flexible splint for 4 wks
- ABX coverage, home instructions the same