Management and Treatment of Dental Trauma

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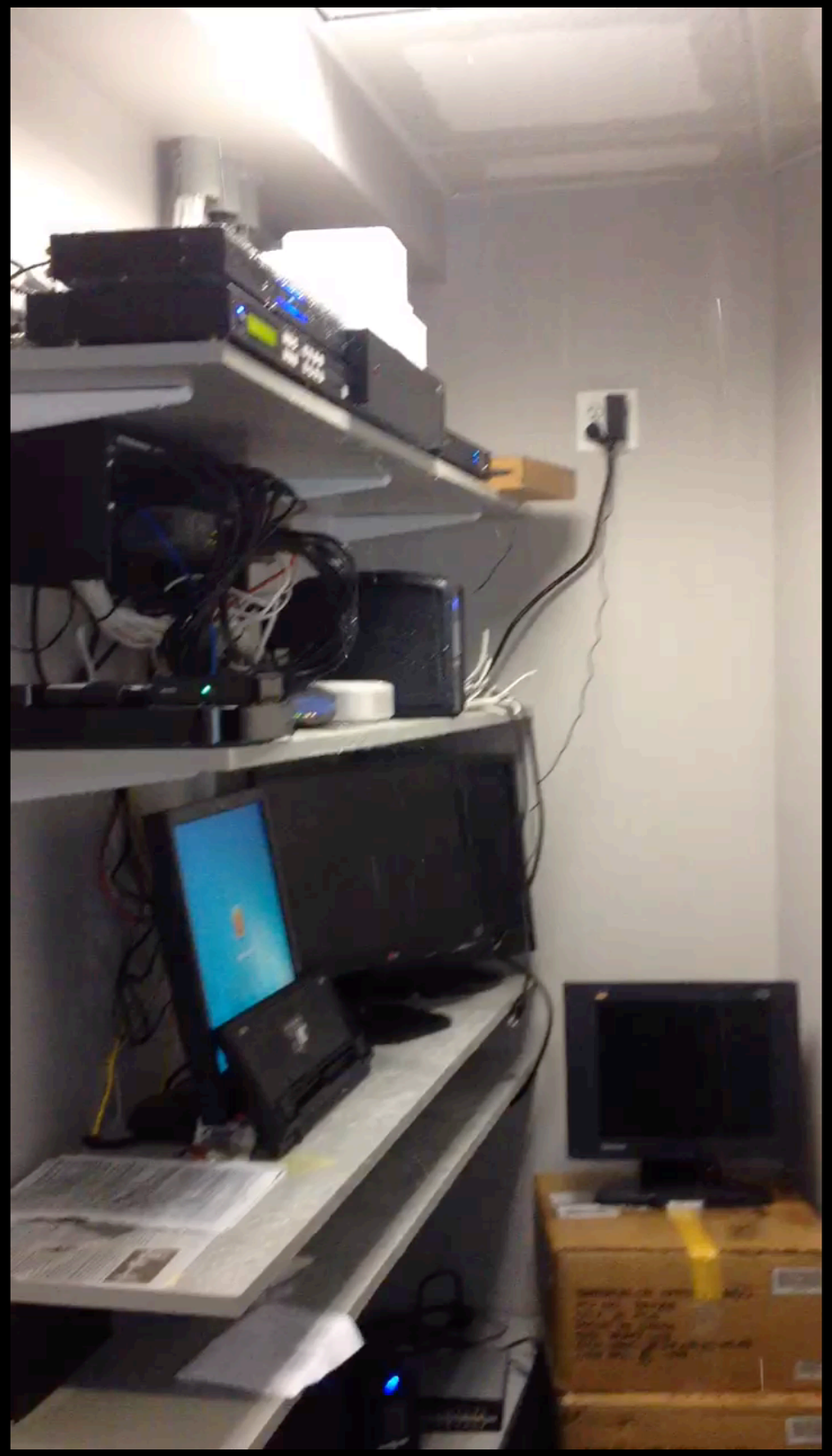


Common Causes

- Falls

Common Causes

- Falls
- Playground accidents

Common Causes

- Falls
- Playground accidents
- Bicycle

Common Causes

- Falls
- Playground accidents
- Bicycle
- Motor Vehicle Accident

Common Causes

- Falls
- Playground accidents
- Bicycle
- Motor Vehicle Accident
- Assaults/Altercations

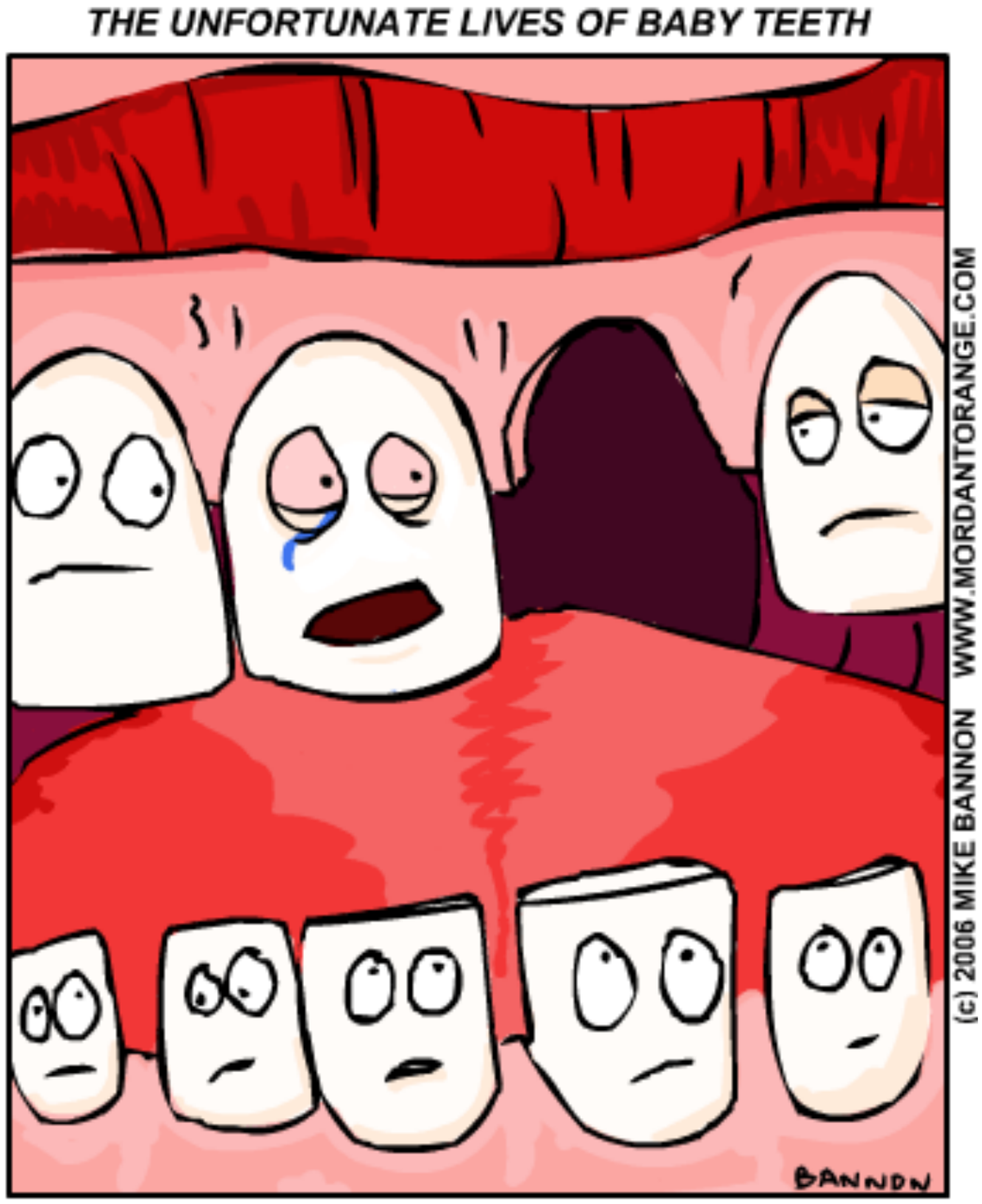
Common Causes

- Falls
- Playground accidents
- Bicycle
- Motor Vehicle Accident
- Assaults/Altercations
- Sports

Common Causes

- Falls
- Playground accidents
- Bicycle
- Motor Vehicle Accident
- Assaults/Altercations
- Sports
- Abuse

want to make a statement that i will be keeping this presentation to the permanent dentition as most major issues with primary teeth will simply result in extraction to prevent issues with the permanent tooth bud beneath



Where do we start??

History

- Timing
- Mechanism of injury
- Location
- Bleeding

Examination

- Account for all teeth
- Extent of injury
- Lacerations
- Teeth position
- Appearance of tissue
- Pulp testing (Percussion, EPT, Thermal)
- Palpation of soft tissue

Radiographs

- Panorex
- Periapical
- Occlusal
- CBCT

Where do we start??

Why Guidelines Are Important

- Compared to cases treated without compliance to guidelines, cases that adhered to guidelines produced more favorable outcomes, including significantly lower complication rates
- Early follow up visits were essential to ensure prompt treatment of complications when they arose

Bucher K. Complications and survival rates of teeth after dental trauma over a 5-year period. Clin Oral Invest 2013; 17:1311-1318

Where do we start??

Examination

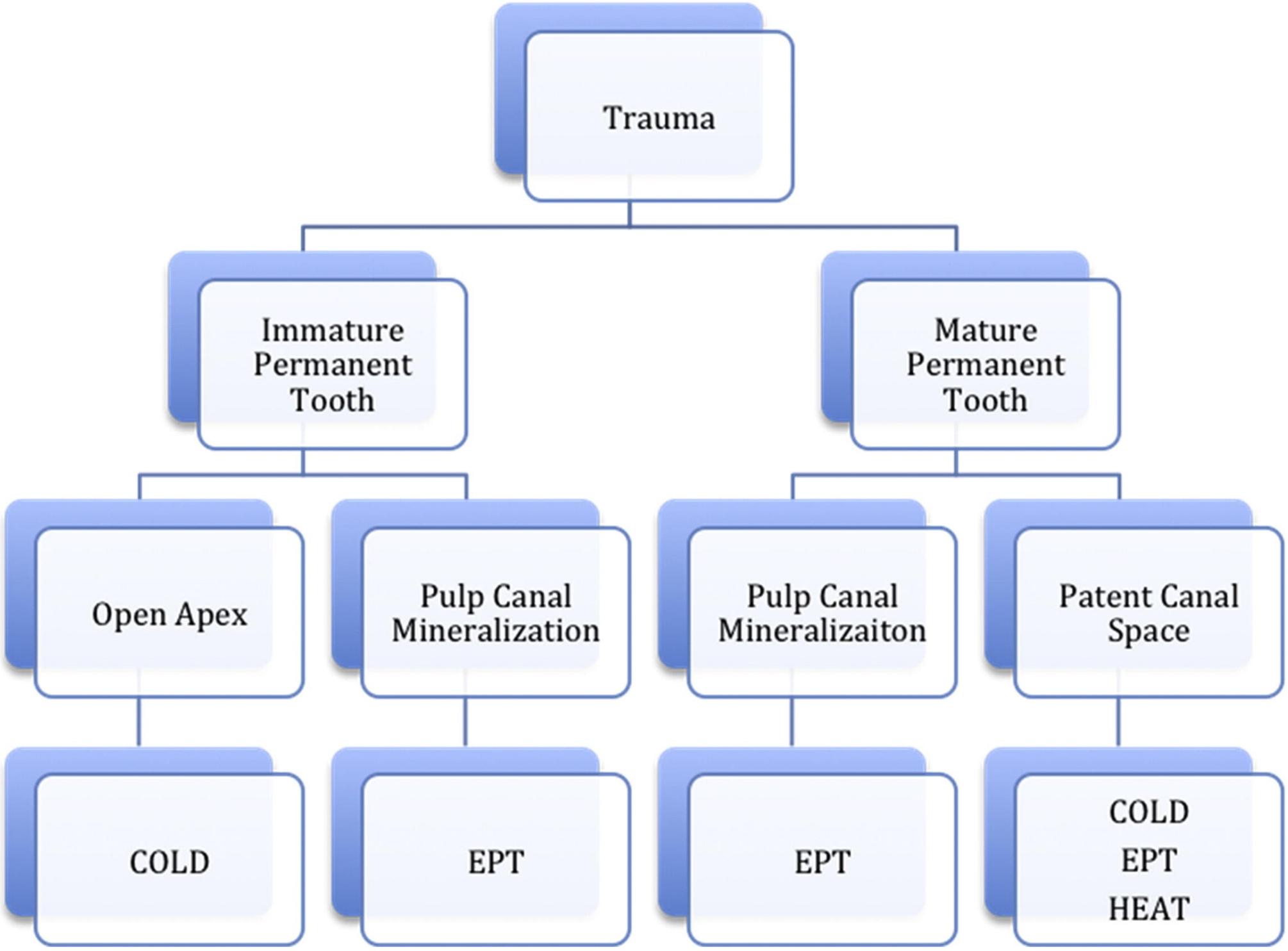
Access for risk of concussion or hemorrhage

- symptoms can be delayed for minutes to hours
  - loss of consciousness
  - difficulty of speech &/or slurred speech
  - naseau/vomiting
  - fluid from ear/nose
  - situational confusion
  - blurred vision or uneven pupils

Where do we start??

Examination

good slide reminding
ulp testing and use of



Levin L, Pulp and Periradicular Testing. *JOE* 2013;39:S13-S19

Pulp Testing

Andreasen and Diangeles 2012

False negative cold testing response may occur up to 3 months following horizontal root fractures.

A diagnosis of pulpal necrosis will typically be associated with swelling/apical tenderness and at times discoloration of the tooth.

Radiographs

AAE recommended guidelines:

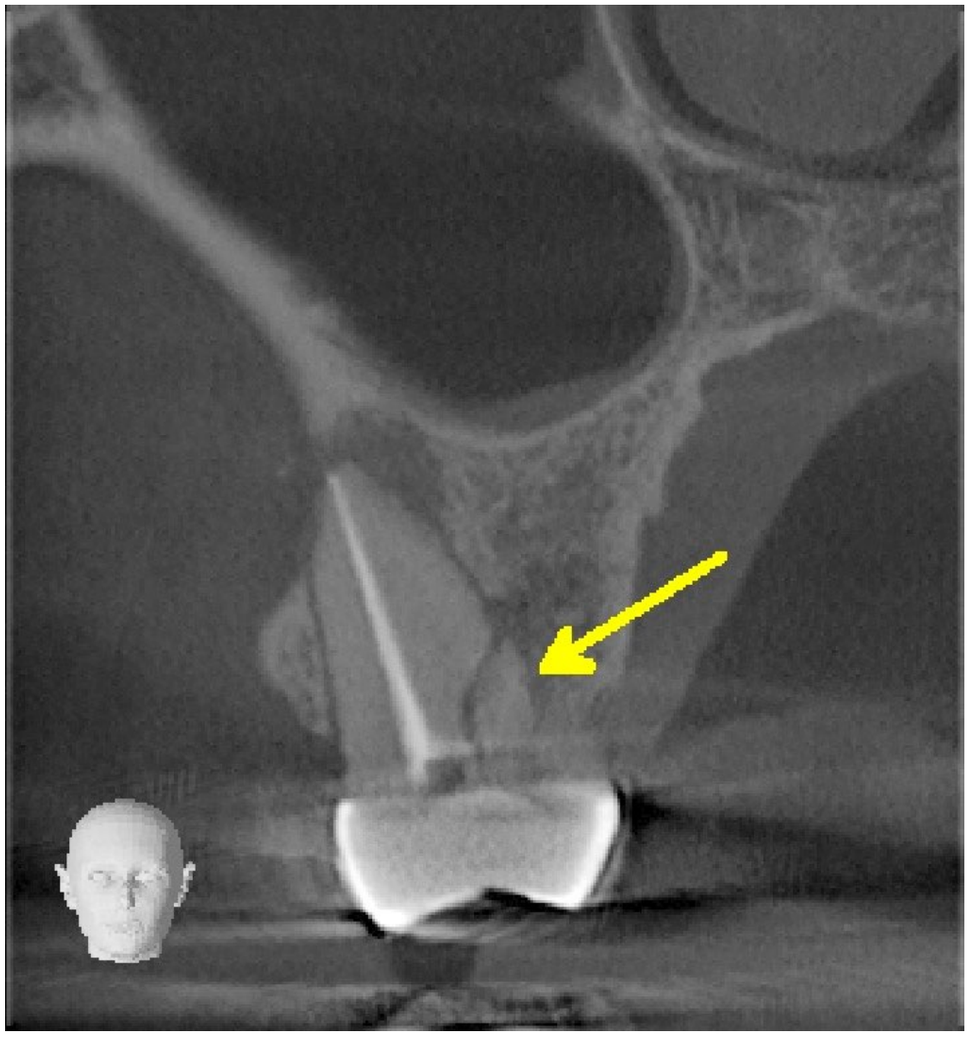
- 1 Occlusal
- 2 Periapicals at different lateral angulations
- CBCT if more serious of an injury

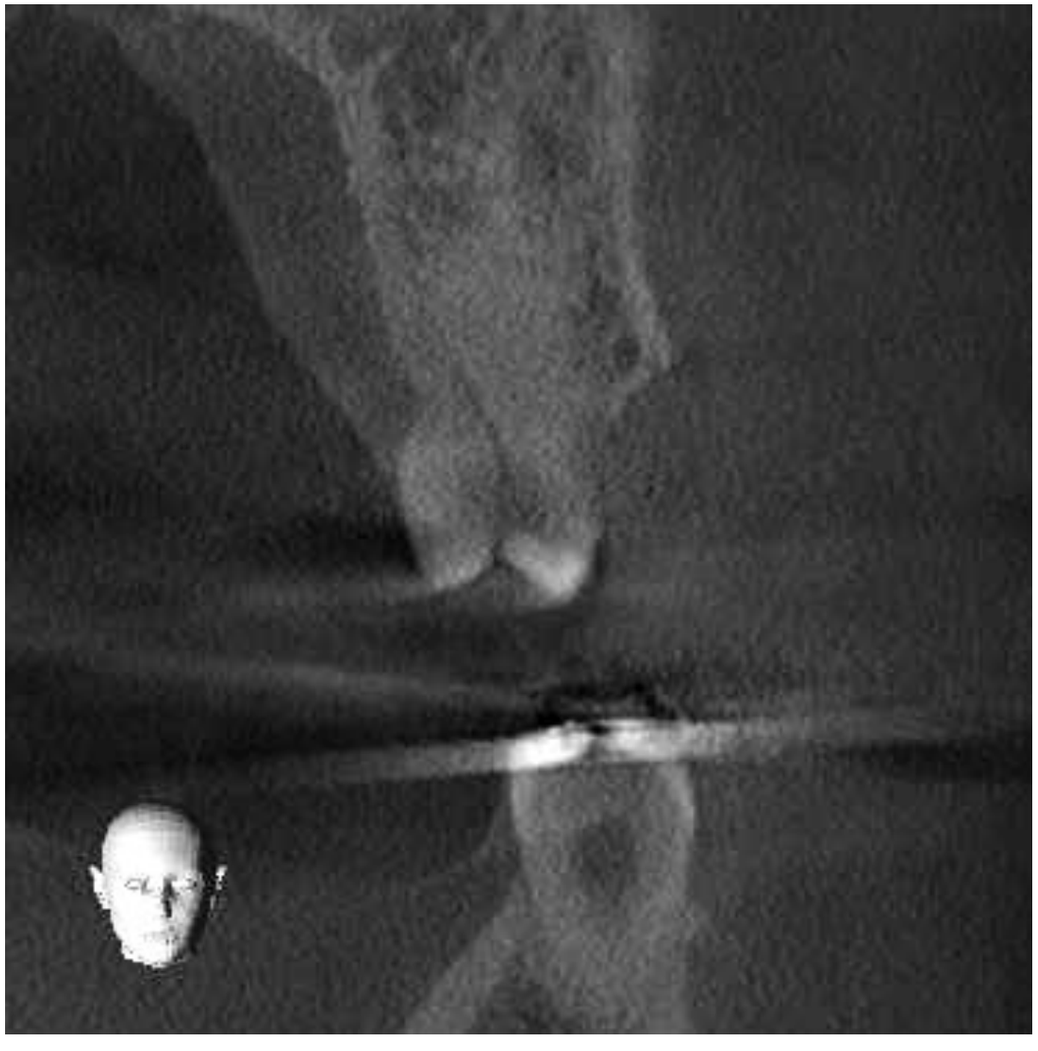
Panorex

Periapical

Radiographs

CBCT - 3D Imaging





Radiographs

Occlusal

Team Approach

restorative dentist (*general / pedo*)

endodontist ⟷ **oral surgeon**

ORTHODONTIST

hard tissue and pulp

periodontal tissue

supporting bone

gingival or oral mucosa

hard tissue and pulp

periodontal tissue

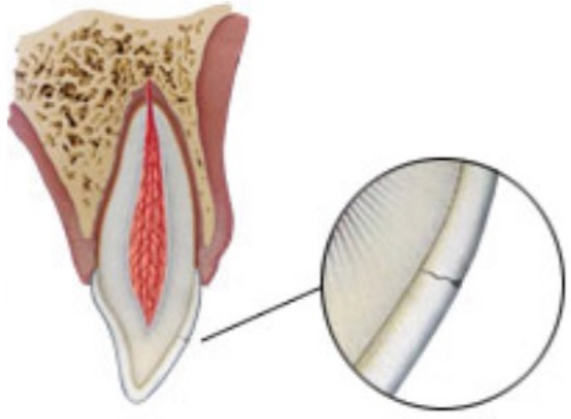
supporting bone

gingival or oral mucosa

- enamel infraction
- enamel-fracture
- enamel-dentin fracture
- enamel-dentin-pulp fracture
- crown-root fracture **w/o** pulp involvement
- crown-root fracture **with** pulp involvement

hard tissue and pulp

enamel infraction



ENAMEL INFRACTION

An incomplete fracture (crack) of the enamel without loss of tooth structure.

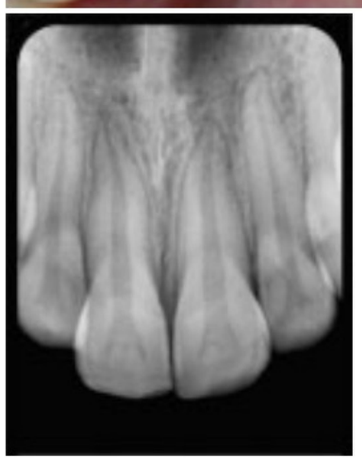
- impact to enamel only
- transilluminate for dx
- vitality check & f/u
- common max incisors
- **no treatment**
- If non vital at time of exam, observe

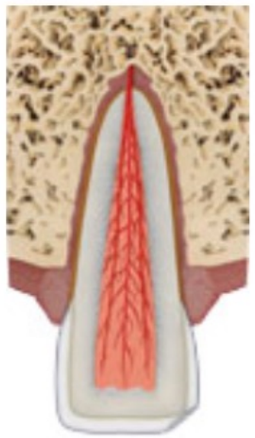
Follow up

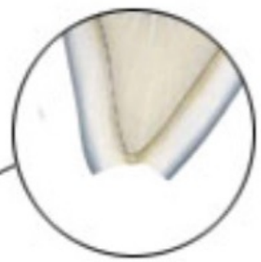
- none needed unless associated with luxation injury or other injury to same tooth

hard tissue and pulp

enamel-fracture







ENAMEL FRACTURE

A fracture confined to the enamel with loss of tooth structure.

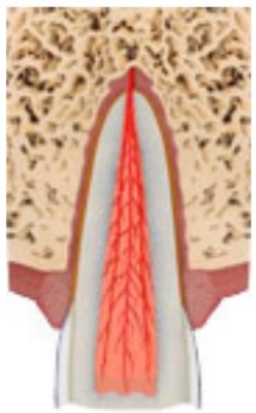
- enamelplasty
- if tooth fragment available, it can be bonded to the tooth
- composite restoration

Follow up

- clinical and radiographic control at 6-8 weeks and 1 year

hard tissue and pulp

enamel-dentin fracture



ENAMEL-DENTIN FRACTURE

A fracture confined to enamel and dentin with loss of tooth structure, but not involving the pulp.

- if tooth fragment available, it can be bonded to the tooth
- clean area with peridex/NaOCl
- promote secondary dentin, CaOH
- glass ionomer liner can be placed temporarily to monitor symptoms
- composite restoration

Follow up

- clinical and radiographic control at 6-8 weeks and 1 year

hard tissue and pulp

crown fracture

treatment with existing tooth fragment

- With modern bonding technology it is possible to rebond the fragment to the tooth
- If the fragment was left dry, rehydrate for 30 min in distilled water or saline. This process increases the bond strength

Fig. 1. (A) Clinical case of two uncomplicated crown fractures in which the two broken pieces were located and reattached. (B) After the two pieces had been attached, a chamfer was cut along the fracture line and additional composite cured in place. This will both increase the strength of the attachment and better hide the fracture line (C).

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hard tissue and pulp

enamel-dentin-pulp fracture

ENAMEL-DENTIN-PULP FRACTURE
(COMPLICATED CROWN FRACTURE)

A fracture involving enamel and dentin with loss of tooth structure and exposure of the pulp.

OPEN APEX & CLOSED APEX:

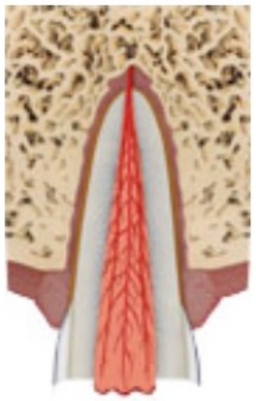
- clean area with peridex/NaOCl
- RD isolation
- Direct pulp cap or
  - amputate coronal 2mm of pulp tissue
  - Pressure with moist cotton pellet until bleeding stop
  - MTA (white) or Bioceramic
- glass ionomer liner
- composite restoration

Follow up

- clinical and radiographic control at 6-8 weeks and 1 year

hard tissue and pulp

enamel-dentin-pulp fracture



ENAMEL-DENTIN-PULP FRACTURE
(COMPLICATED CROWN FRACTURE)

A fracture involving enamel and dentin with loss of tooth structure and exposure of the pulp.

CLOSED APEX:

- In older patients with closed apices and an associated *luxation injury with displacement*, **root canal treatment** is typically the therapy of choice

hard tissue and pulp

crown fracture

complicated (pulp involvement)

In an effort to maintain vitality perform an MTA/Bioceramic pulp cap procedure

- Create a 1-2mm reservoir into the pulp with a high-speed diamond and copious water cooling
- Place capping material & GI liner followed by tooth fragment or restore with a crown with a composite resin material

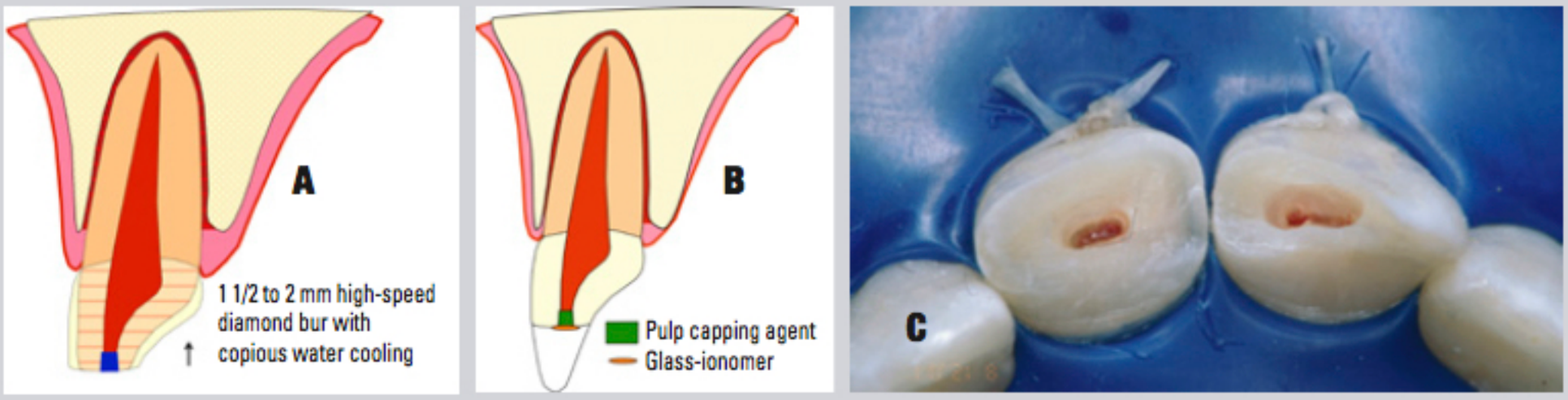


Fig. 2. (A) Schematic diagram of minimal pulpotomy, where an approximately 2-mm reservoir is cut with a high-speed diamond bur and copious water cooling and calcium hydroxide mixed with sterile water placed. (B) Glass ionomer or a protective liner is placed over the pulp capping agent to ensure it stays in place during etching and bonding. (C) Clinical pictures of the minimal pulpotomy. *Schematic drawings courtesy of Dr. Sigurdsson.*

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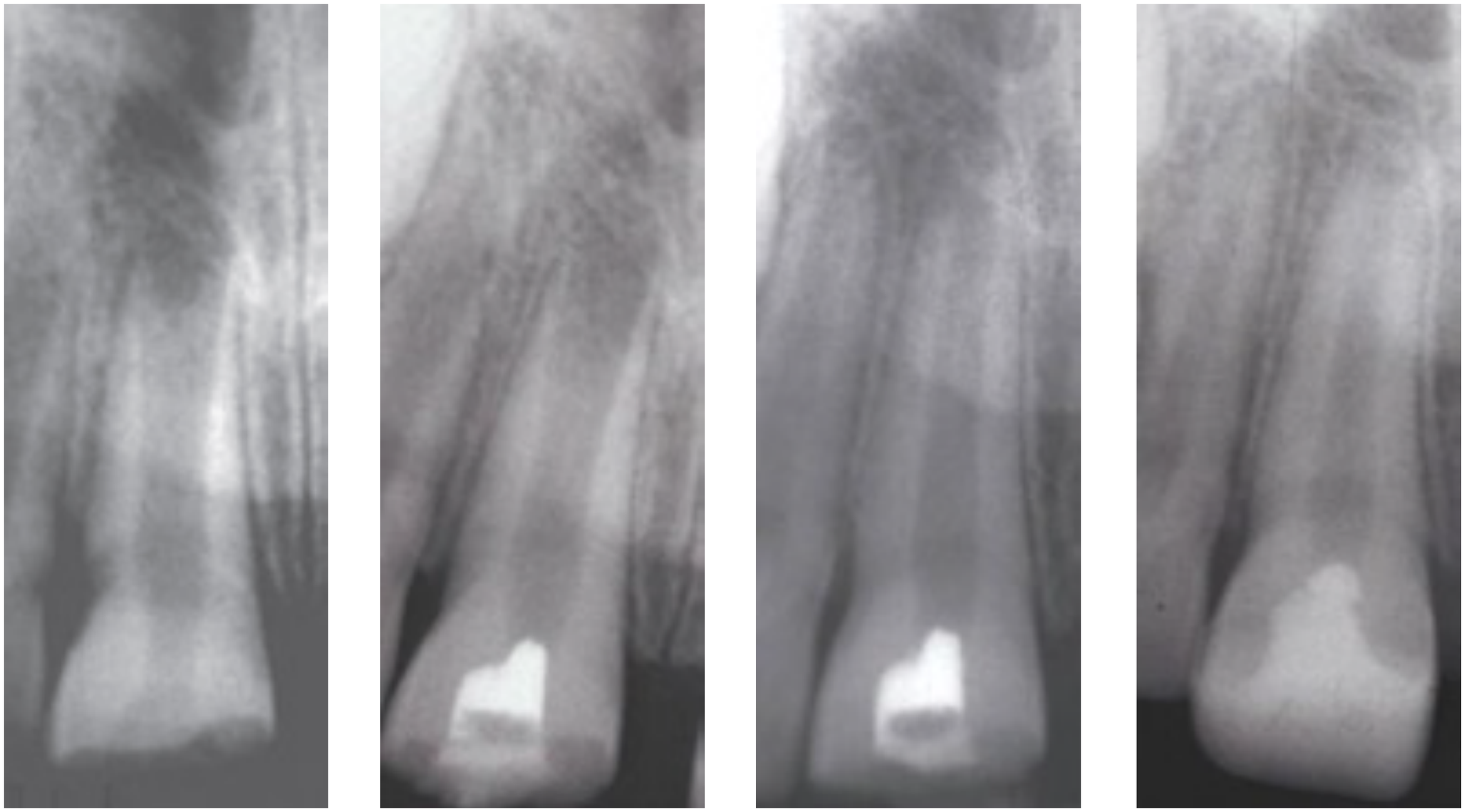
pulpotomy & capping



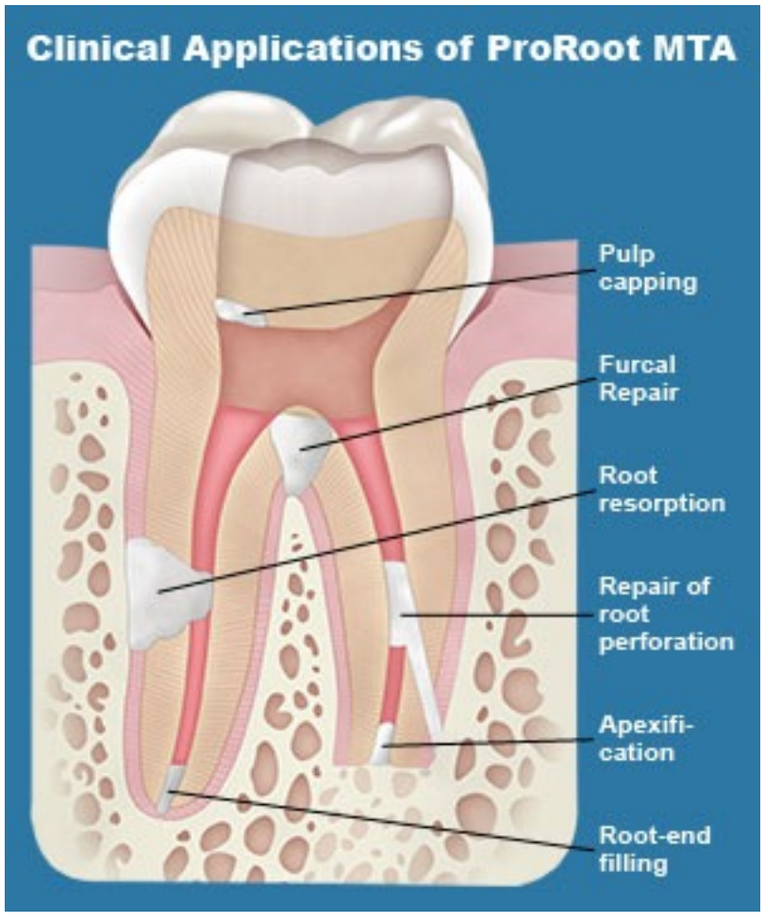
MTA

MTA *(mineral trioxide aggregate)*

- High biocompatibility
- based off Portland Cement: grey and white
- white version has a fluxing agent that removes the ferrite phase - prevents prior grey hue
- place GI cement over MTA prior to final composite restoration

MTA Pulp cap

7 months post op



EndoSequence

- High biocompatibility
- Osteogenic
- Non-Staining
- Extremely resistant to washout
- Moldable/Condensable Putty

- tricalcium silicate, dicalcium silicate, zirconium oxide, tantalum pentoxide, calcium phosphate monobasic and filler agents

Hirschman, Theater, Bringas, Horn. Cytotoxicity of three current direct pulp-capping agents with a new bioceramic repair putty. *J Endo.* 2012 38(3):385-8

- Dycal shown to have statistically significant cytotoxic effect on dermal fibroblasts

biodentine

bioactive dentin substitute

- sets in 10 - 12 minutes

- natural micro mechanical anchorage for excellent sealing properties without surface preparation.

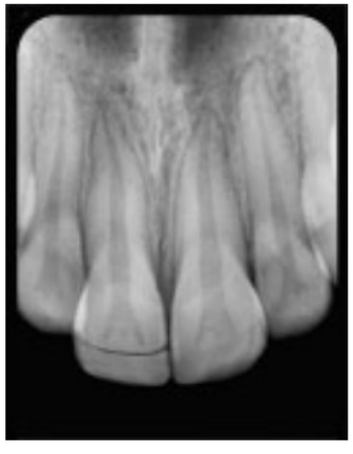
- similar mechanical properties and mechanical behavior as human dentin.

- 3.5mm aluminum radiopacity for easy short and long term follow-up.

hard tissue and pulp

crown-root fracture

uncomplicated (no pulp involvement)



CROWN-ROOT FRACTURE WITHOUT PULP INVOLVEMENT

A fracture involving enamel, dentin and cementum with loss of tooth structure, but not exposing the pulp.

- treatment depends on amount of root remaining
- primary teeth → extract
- permanent teeth
  - fragment removal only
  - extract if fracture is deep
  - surgical / ortho extrusion
  - RCT and submerge root
  - EXT socket preservation
  - EXT immediate implant

Follow up

- clinical and radiographic control at 6-8 weeks and 1 year

hard tissue and pulp

crown-root fracture

complicated (pulp involvement)

CROWN ROOT FRACTURE WITH PULP INVOLVEMENT

A fracture involving enamel, dentin, and cementum with loss of tooth structure, and exposure of the pulp.

Perform pulpotomy or RCT

- fragment removal
- surgical/orthodontic extrusion
- coronectomy

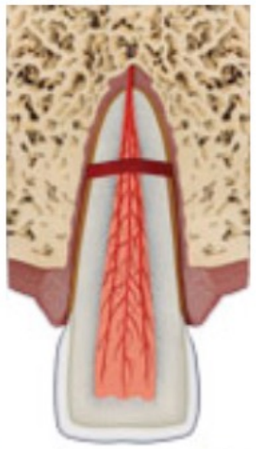
Extraction

Follow up

- clinical and radiographic control at 6-8 weeks and 1 year

hard tissue and pulp

root fractures



ROOT FRACTURE

A fracture confined to the root of the tooth involving cementum, dentin, and the pulp. Root fractures can be further classified by whether the coronal fragment is displaced

The more apical the fracture the better the prognosis

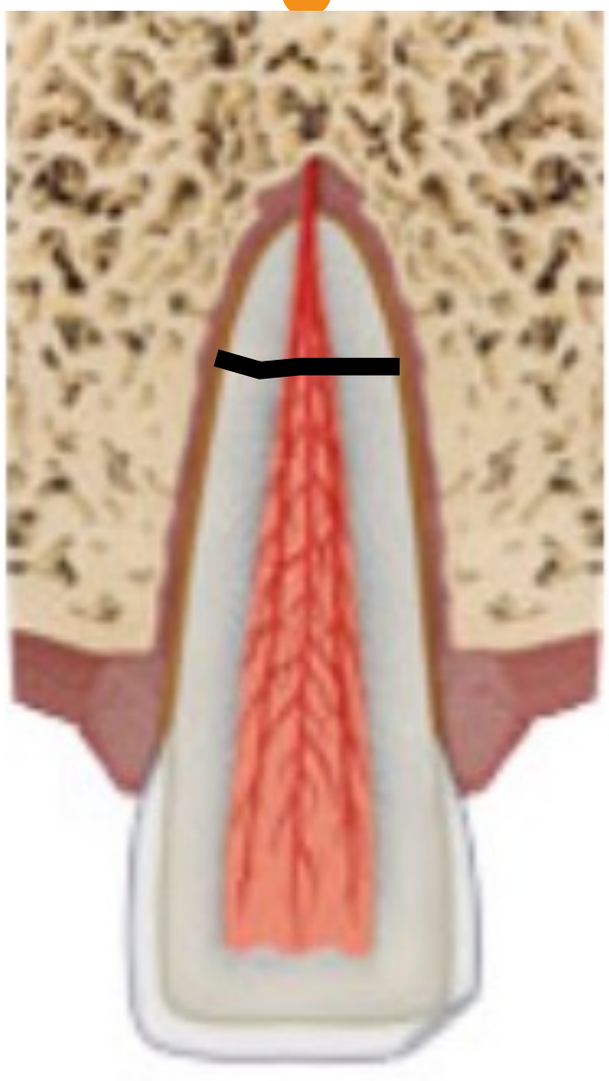
Michanowicz 1971

- rinse & reposition as soon as possible
- check position with x-ray
- stabilize with flexible splint for **4** weeks (for root fractures near cervical area stabilization may be 4 months)
- monitor healing >1 year

For root fractures where the coronal segment has been avulsed from socket follow avulsion guidelines

hard tissue and pulp

root fractures



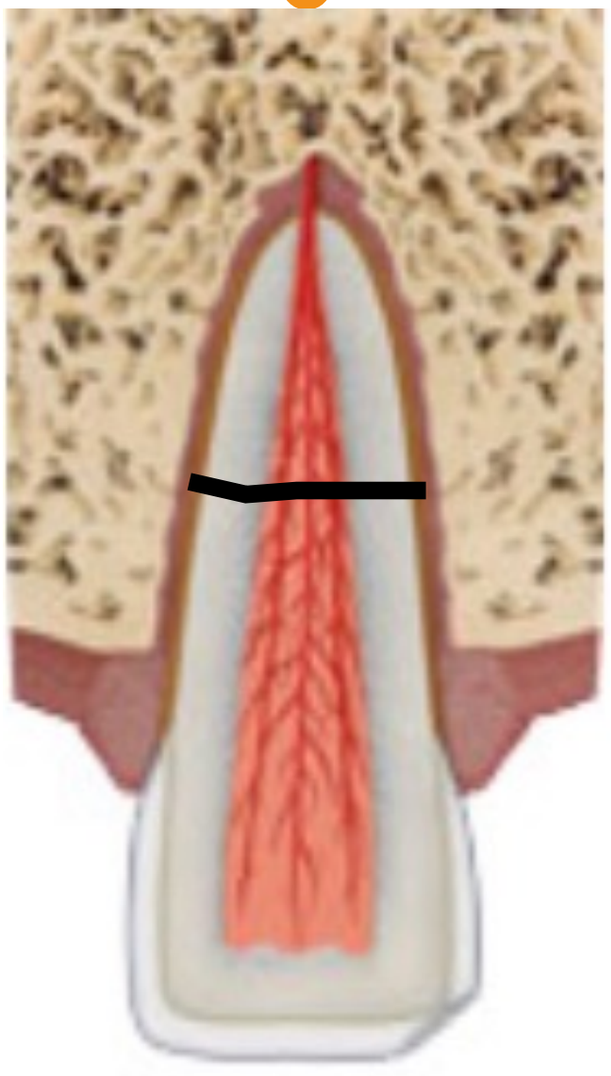
Permanent Teeth

apical third level

- no mobility - prognosis good with minimal treatment
- coronal aspect may remain vital and typically no endo treatment is needed

hard tissue and pulp

root fractures

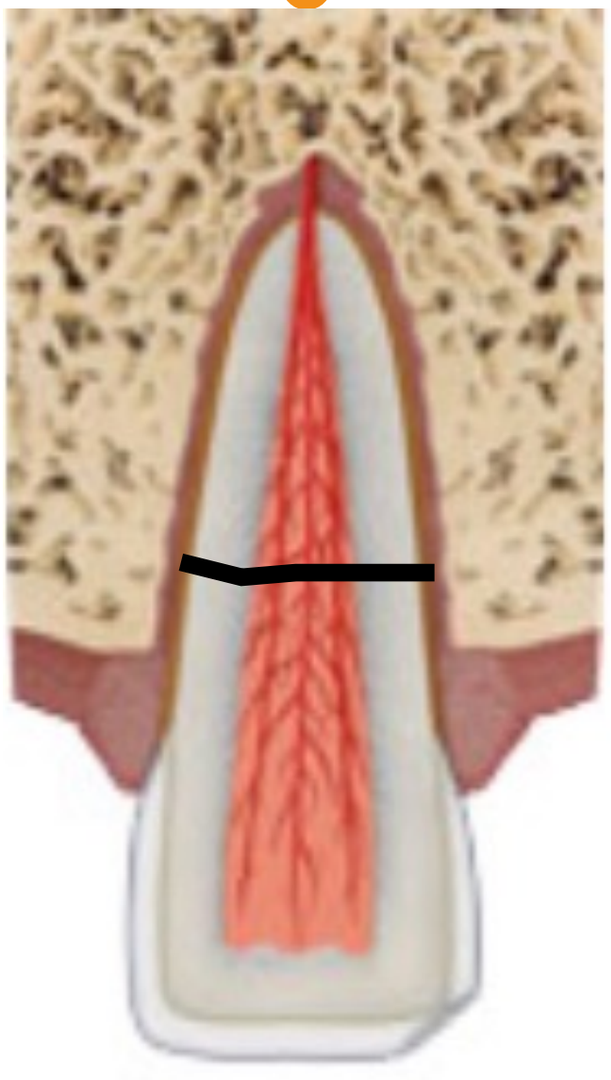


Permanent Teeth

mid-root level

- may have fair prognosis
- splinting 4 weeks to 4 months
- check vitality continually
- **resorption** occurs in 60% within the first year

hard tissue and pulp



root fractures

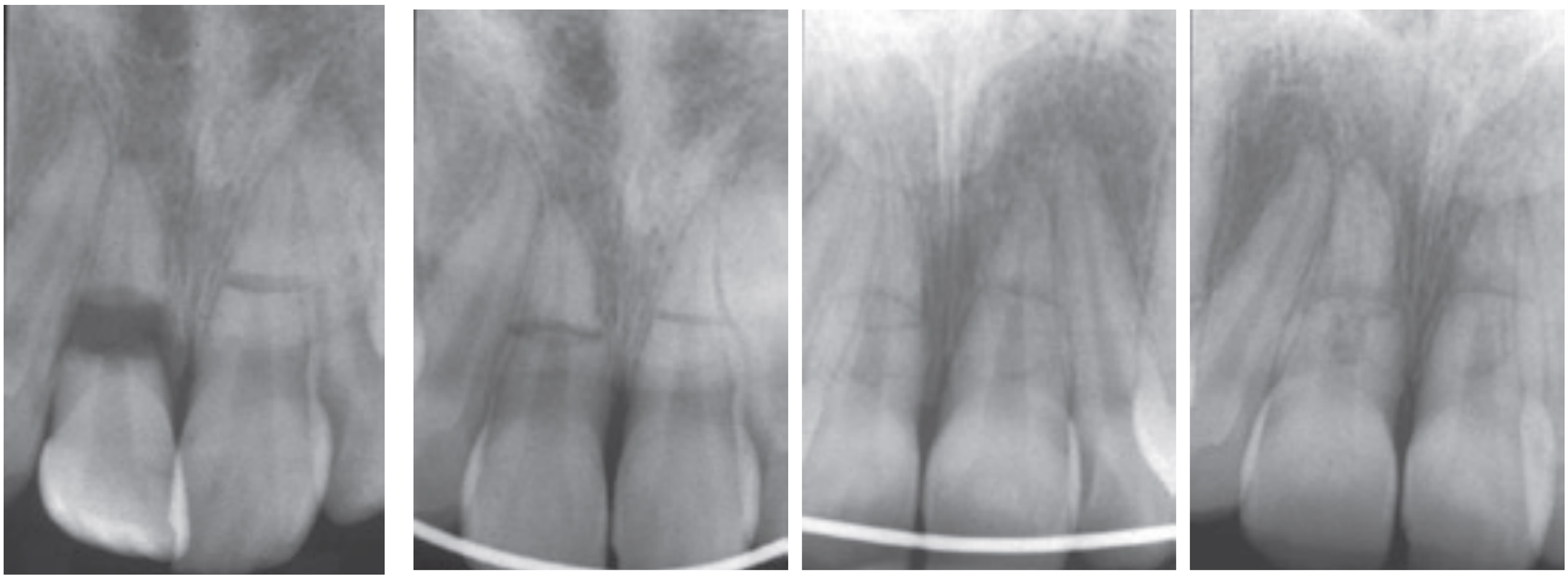
Permanent Teeth

high-root level

- poor prognosis due to insufficient crown:root
- coronectomy and bury the root
- atraumatic extraction

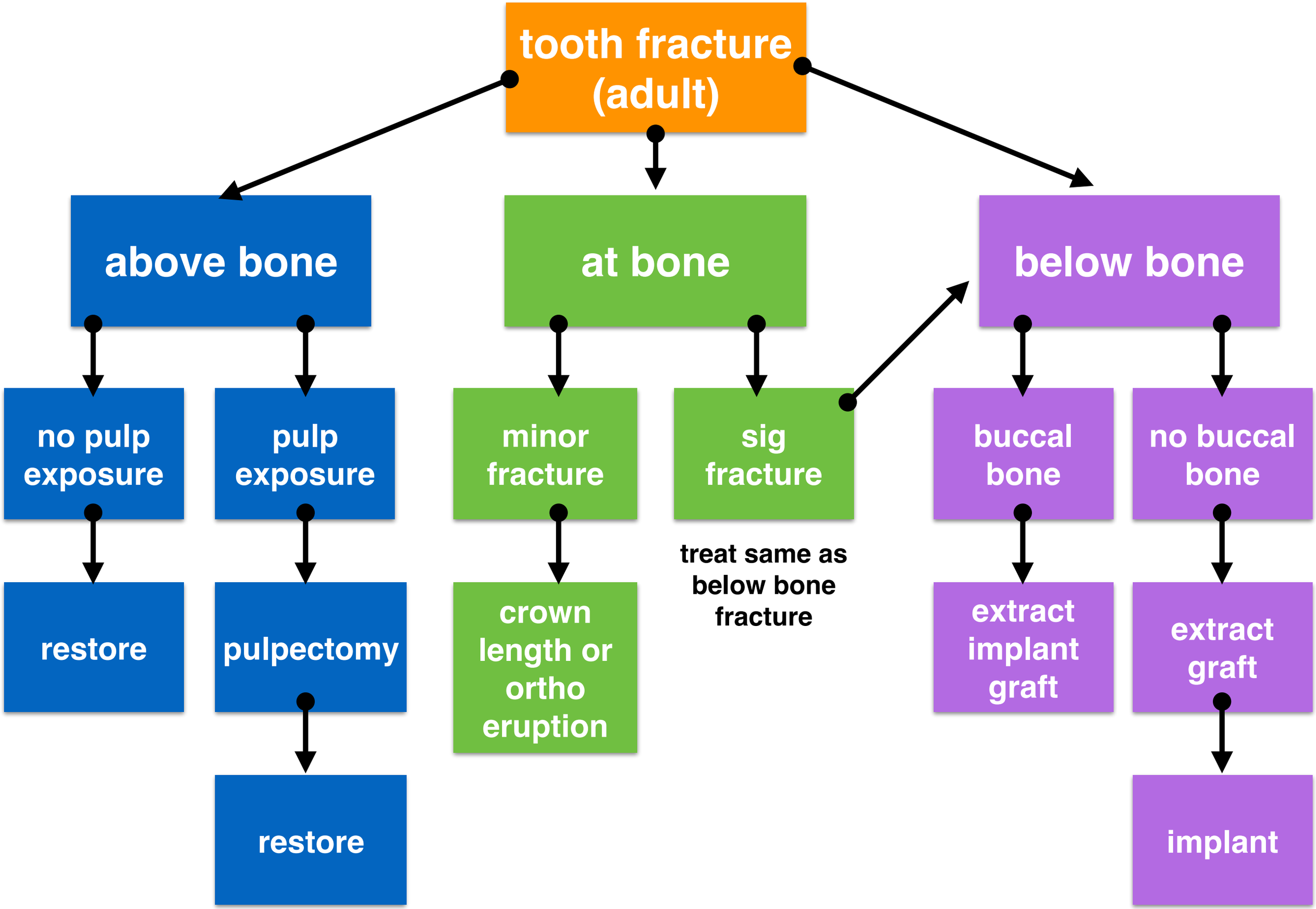
  - immediate implant / graft
  - socket preservation / delayed implant placement

healing by ‘calcific callus’

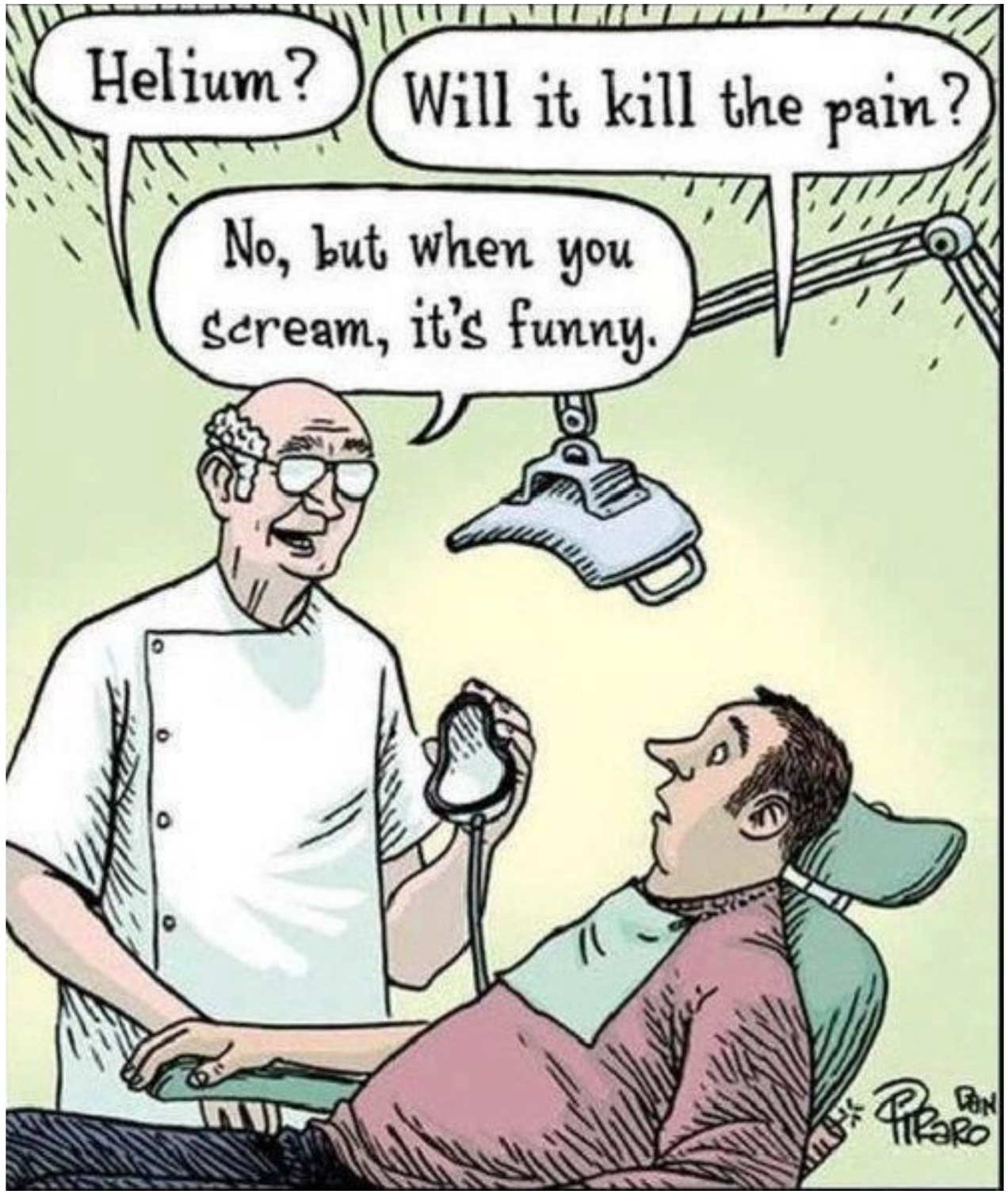


Andreasen 2004 - Dislocation of the coronal fragment <1mm favors healing with hard tissue

Jacobson 1980 - Pulp necrosis is nearly aways confined to the coronal segment following horizontal root fractures


tooth fracture (adult)
above bone
at bone
below bone
no pulp exposure
pulp exposure
minor fracture
sig fracture
buccal bone
no buccal bone
restore
pulpectomy
crown length or ortho eruption
treat same as below bone fracture
extract implant graft
extract graft
restore
implant

Ok now lets switch gears and talk about the periodontal tissues



hard dental tissue & pulp

periodontal tissue

supporting bone

gingiva or oral mucosa

- concussion
- subluxation
- extrusion
- lateral luxation
- intrusion
- avulsion

Increasing severity

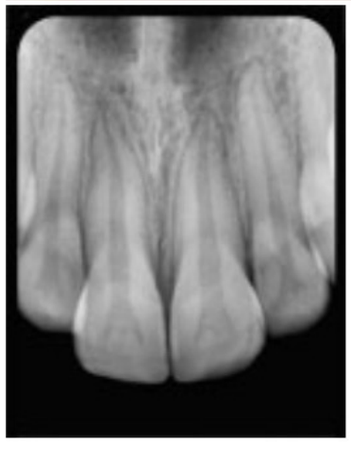
periodontal tissue

concussion

Concussion

An injury to the tooth-supporting structures without increased mobility or displacement of the tooth, but with pain to percussion.

- tooth is tender to touch
- no mobility
- percussion tenderness
- **check vitality** for at least 1 year
- necrosis can develop in several weeks to months

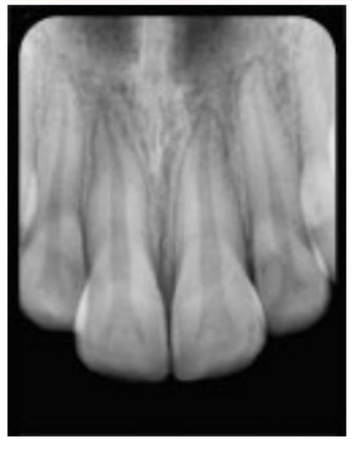


Follow up

- clinical and radiographic control at 4 weeks, 6-8 weeks and 1 year

periodontal tissue

subluxation



SUBLUXATION

An injury to the tooth supporting structures resulting in increased mobility, but without displacement of the tooth. Bleeding from the gingival sulcus confirms the diagnosis.

- bleeding is common
- percussion sensitive
- positive mobility
- treatment: non rigid splint for 7-14 days if necessary for comfort
- monitor for pulpal complication

Follow up

- splint removal and radiographic control after 2 weeks
- clinical and radiographic control at 2 weeks, 4 weeks, 6-8 weeks and 1 year.

periodontal tissue

extrusion

EXTRUSION

Partial displacement of the tooth out of its socket

An injury to the tooth characterized by partial or total separation of the periodontal ligament resulting in loosening and displacement of the tooth. The alveolar socket bone is intact in an extrusion injury as opposed to a lateral luxation injury. In addition to axial displacement, the tooth will usually have an element of protrusion or retrusion. In severe extrusion injuries the retrusion/protrusion element can be very pronounced. In some cases it can be more pronounced than the extrusive element.

- Reposition tooth into its original location with finger pressure
- stabilize tooth for 2 weeks with flexible splint.

periodontal tissue

extrusion

- monitoring the pulpal condition is essential to prevent infection/related root resorption
- **immature teeth:** revascularization confirmed with radiographs and continued root formation
- **fully formed teeth:** a diagnosis of necrosis exceeding 3 months warrants need for RCT or evidence of PARL or swelling or discoloration

periodontal tissue

extrusion

- **splint removal**: after **2** weeks.

Follow up

- clinical and radiographic control and splint removal after 2 weeks
- clinical and radiographic control at 4 weeks, 6-8 weeks,1 year and yearly for 5 years

periodontal tissue

lateral luxation

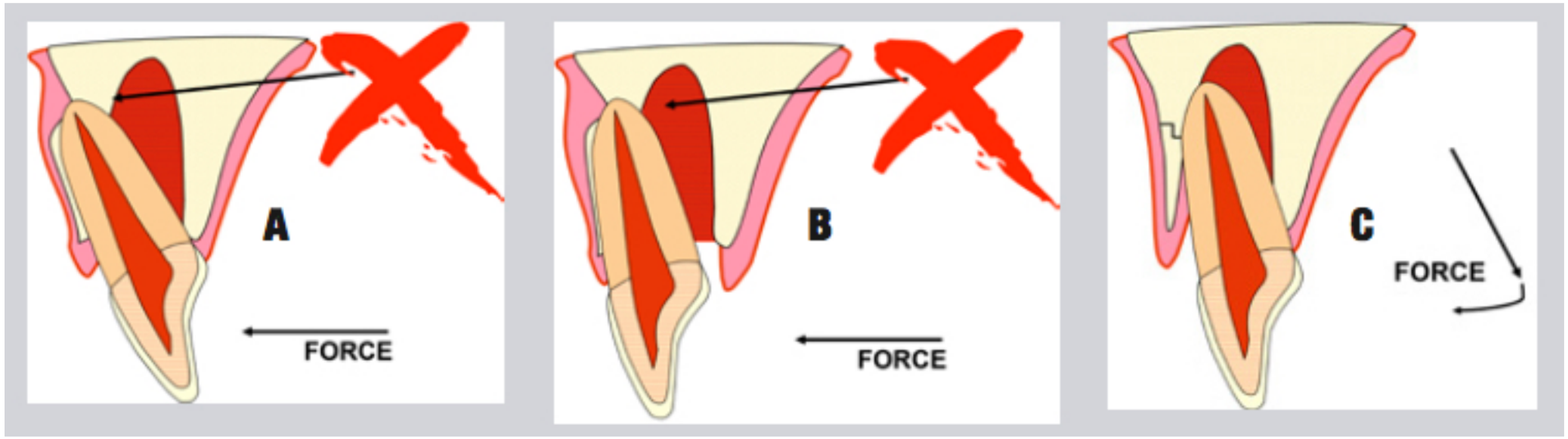
Lateral luxation

Displacement of the tooth *other than axially*. Displacement is accompanied by comminution or fracture of either the labial or the palatal/lingual alveolar bone.

Lateral luxation injuries, similar to extrusion injuries, are characterized by partial or total separation of the periodontal ligament. However, lateral luxations are complicated by fracture of either the labial or the palatal/lingual alveolar bone and a compression zone in the cervical and sometimes the apical area. If both sides of the alveolar socket have been fractured, the injury should be classified as an alveolar fracture (alveolar fractures rarely affect only a single tooth). In most cases of lateral luxation the apex of the tooth has been forced into the bone by the displacement, and the tooth is frequently non-mobile.

periodontal tissue

lateral luxation



The apex is frequently pushed through the cortical place facially. To reposition the tooth it has to be released prior to moving the crown forward (B) and (C). *AAE Endodontics: Colleagues for Excellence The Treatment of Traumatic Dental InjuriesSummer 2014*

- Reposition tooth from its bony lock into its original location with finger pressure / forcep
- stabilize tooth for **4 weeks** with flexible splint. *(4 weeks bc of bone fracture)*

periodontal tissue

lateral luxation

- monitoring the pulpal condition is essential to prevent infection/related root resorption
- **immature teeth:** revascularization confirmed with radiographs and continued root formation
- **fully formed teeth:** *a diagnosis of necrosis exceeding **3 months** warrants need for RCT*

periodontal tissue

lateral luxation

- **splint removal**: after **4** weeks.

Follow up

- clinical and radiographic control after 2 weeks
- splint removal 4 weeks
- clinical and radiographic control at 6-8 weeks,1 year and yearly for 5 years

periodontal tissue

intrusion

INTRUSION - INTRUSIVE LUXATION

Displacement of the tooth *into* the alveolar bone. This injury is accompanied by comminution or fracture of the alveolar socket.

Spontaneous Repositioning

- clean area
- suture any gingival lacerations
- allow spontaneous repositioning to take place
- Follow progress for 2-4 weeks. If eruption has not begun reposition surgically or orthodontically before ankylosis develops

periodontal tissue

intrusion

Treatment choice

Factors determining treatment choice are stages of root development and intrusion level

degree of intrusion		Repositioning		
		spontaneous	orthodontic	surgical
Open Apex	Up to 7mm	x		
 Open	More than 7mm		x	x
Closed Apex	Up to 3mm	x		
	3-7mm		x	x
 Closed	More than 7mm			x

periodontal tissue

intrusion

INTRUSION - INTRUSIVE LUXATION

Displacement of the tooth *into* the alveolar bone. This injury is accompanied by comminution or fracture of the alveolar socket.

Orthodontic Repositioning

- clean area
- suture any gingival lacerations
- Adapt arch wire to anterior region
- Acid Etch/Bond and Fixate with resin
- Fixate bracket with resin and apply elastic retraction

Surgical Repositioning

Intrusion with major dislocation of tooth (>7mm)

- clean area
- reposition with forceps following local anesthetic
- apply flexible splint for **4 weeks**

periodontal tissue

intrusion

- **Immature tooth**: high probability the pulp will survive. If not proceed with apexification / ***revascularization***
- **Mature tooth**: bc of the injury to the PDL endodontic treatment is likely needed. Rapid inflammatory root resorption can occur (within days or a few weeks) if the necrotic pulpal tissue becomes infected.
- Endodontic therapy should be initiated within 3-4 weeks post trauma with calcium hydroxide therapy for 2-4 weeks prior to completing the RCT;shown to decrease incidence of resorption

periodontal tissue

intrusion

Follow up

- clinical and radiographic control after 2 weeks
- splint removal **4** weeks
- clinical and radiographic control at 6-8 weeks,1 year and yearly for 5 years

periodontal tissue

avulsion

AVULSION

The tooth is completely displaced *out* of its socket. Clinically the socket is found empty or filled with a coagulum.

Treatment guideline for permanent teeth

- Closed apex: tooth replanted prior to patient's arrival at the dental office
- Closed apex: extra oral dry time < 60min
- Closed apex: extra oral dry time >60min or longer storage in non physiologic media
- Open apex: tooth replanted prior to patient's arrive at the dental office
- Open apex: extraoral dry time < 60min
- Open apex: extra oral dry time >60min or longer storage in non physiologic media

periodontal tissue

avulsion

Closed apex: extra oral time <60 min

- time is of the essence to get tooth back in place <30min
- if not replanted prior to visit examine alveolar socket
- verify position of tooth clinically and radiographically
- apply flexible splint for up to 2 weeks
- administer system antibiotics: tetracycline (Doxycycline 2x per day for 7 days based on age and weight) those less than 12yrs old use Penn VK or amoxicillin
- Confirm tetanus coverage
- Initiate root canal treatment 7-10 days after replantation and before splint removal. Place calcium hydroxide within tooth for 1 month

periodontal tissue

avulsion

Closed apex: extra oral time >60 min

- remove non-viable soft tissue with gauze
- examine alveolar socket, reposition with minimal pressure
- verify position of tooth clinically and radiographically
- apply flexible splint for 4 weeks
- administer system antibiotics: tetracycline (Doxycycline 2x per day for 7 days based on age and weight) those less than 12yrs old use Penn VK or amoxycillin
- Confirm tetanus coverage
- Initiate root canal treatment immediately or can be done 7-10 days after replantation and before splint removal. Place calcium hydroxide within tooth for 1 month
- to slow osseous replacement soak with 2% sodium fluoride for 20 min
- ankylosis & resorption unavoidable after delayed replantation

periodontal tissue

avulsion

Open apex: extra oral time <60 min

- time is of the essence to get tooth back in place
- if not replanted prior to visit examine alveolar socket
- verify position of tooth clinically and radiographically
- apply flexible splint for up to 2 weeks
- administer system antibiotics: tetracycline (Doxycycline 2x per day for 7 days based on age and weight) those less than 12yrs old use Penn VK or amoxycillin
- Confirm tetanus coverage
- Goal is to allow possible revascularization

periodontal tissue

avulsion

Open apex: extra oral time >60 min

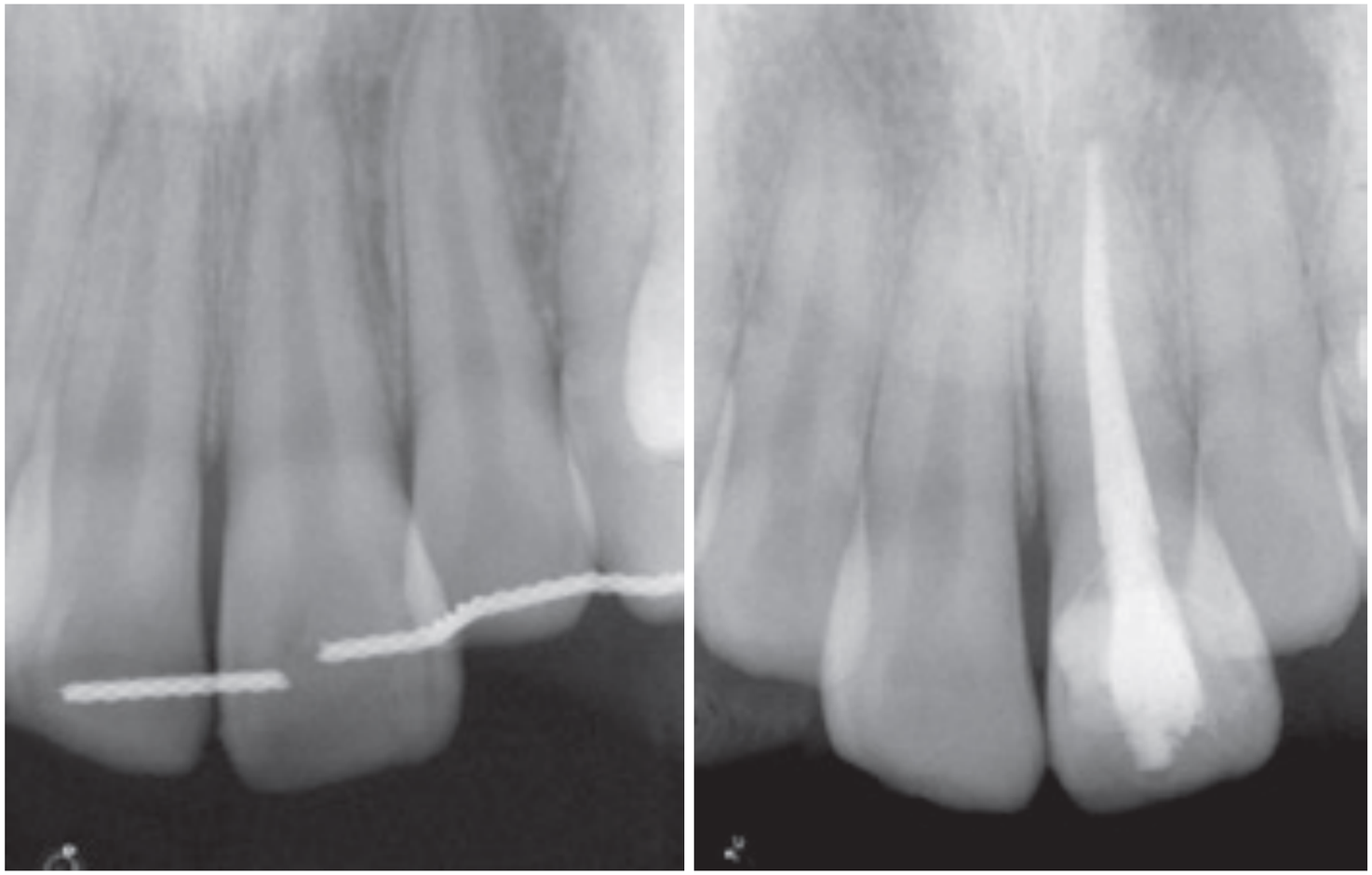
- remove non-viable soft tissue with gauze
- Root canal treatment can be carried out prior to replantation or later *(dependant on root length)*
- *For immature teeth, root canal treatment should be avoided unless there is clinical or radiographic evidence of pulp necrosis*
- examine alveolar socket, reposition with minimal pressure
- verify position of tooth clinically and radiographically
- apply flexible splint for 4 weeks
- administer system antibiotics: tetracycline (Doxycycline 2x per day for 7 days based on age and weight) those less than 12yrs old use Penn VK or amoxycillin
- Confirm tetanus coverage
- **ankylosis and resorption unavoidable after delayed replantation**

periodontal tissue

avulsion (exarticulation) **re-implantation**

follow-up procedures

time	closed apex	open apex
1-2 weeks	initiate endo treatment	endo or monitor for vascularity
2-3 weeks	clinical & x-ray eval	clinical & x-ray eval
3-4 weeks	clinical & x-ray eval	clinical & x-ray eval
6-8 weeks	clinical & x-ray eval	clinical & x-ray eval
6 months	clinical & x-ray eval	clinical & x-ray eval
1 year	clinical & x-ray eval	clinical & x-ray eval
yearly for 5 years	clinical & x-ray eval	clinical & x-ray eval



periodontal tissue

avulsion

Transport medium

- Hanks balanced salt solution
- Saliva
- Saline
- Milk
  - If nothing available can place within the buccal vestibule

Avoid the following:

- placement of the tooth in tap water (osmolality issue)
- wiping off the tooth surface

hard dental tissue & pulp

periodontal tissue

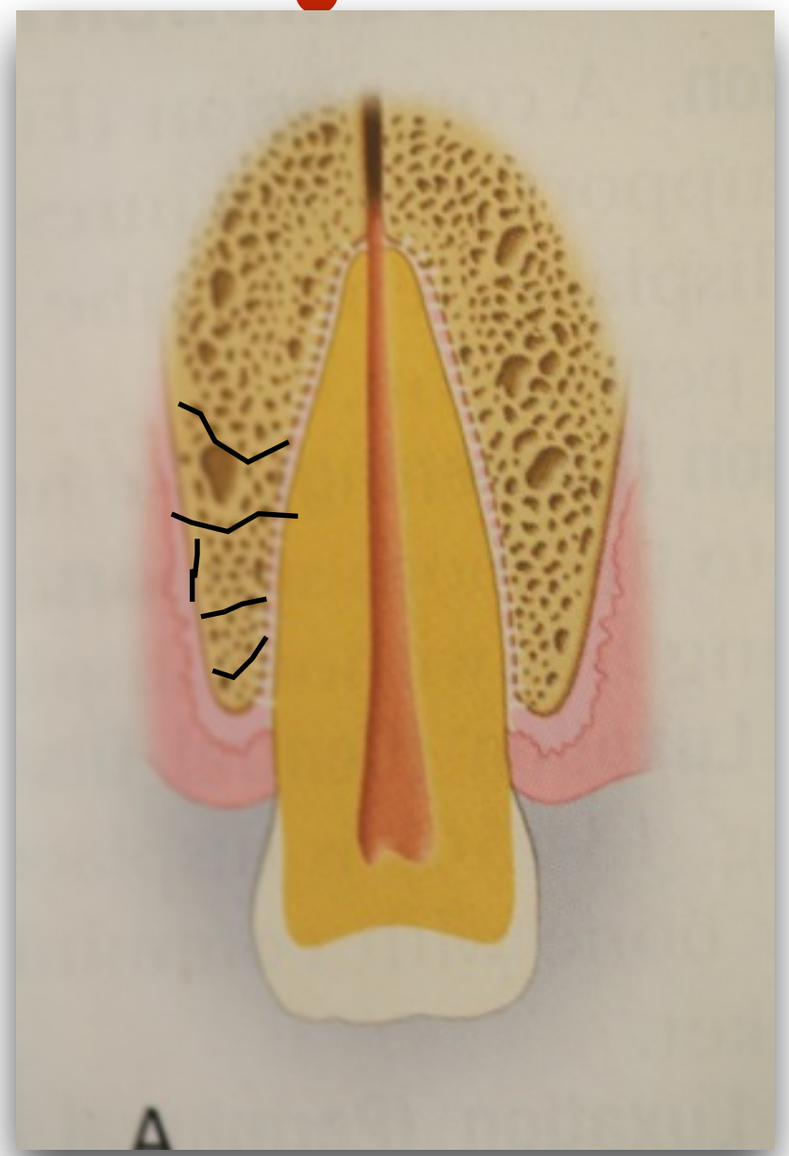
supporting bone

gingiva or oral mucosa

- comminution of the alveolar socket
- fracture of the alveolar socket wall
- fracture of the alveolar process
- fractures of the mandible or maxilla

supporting bone

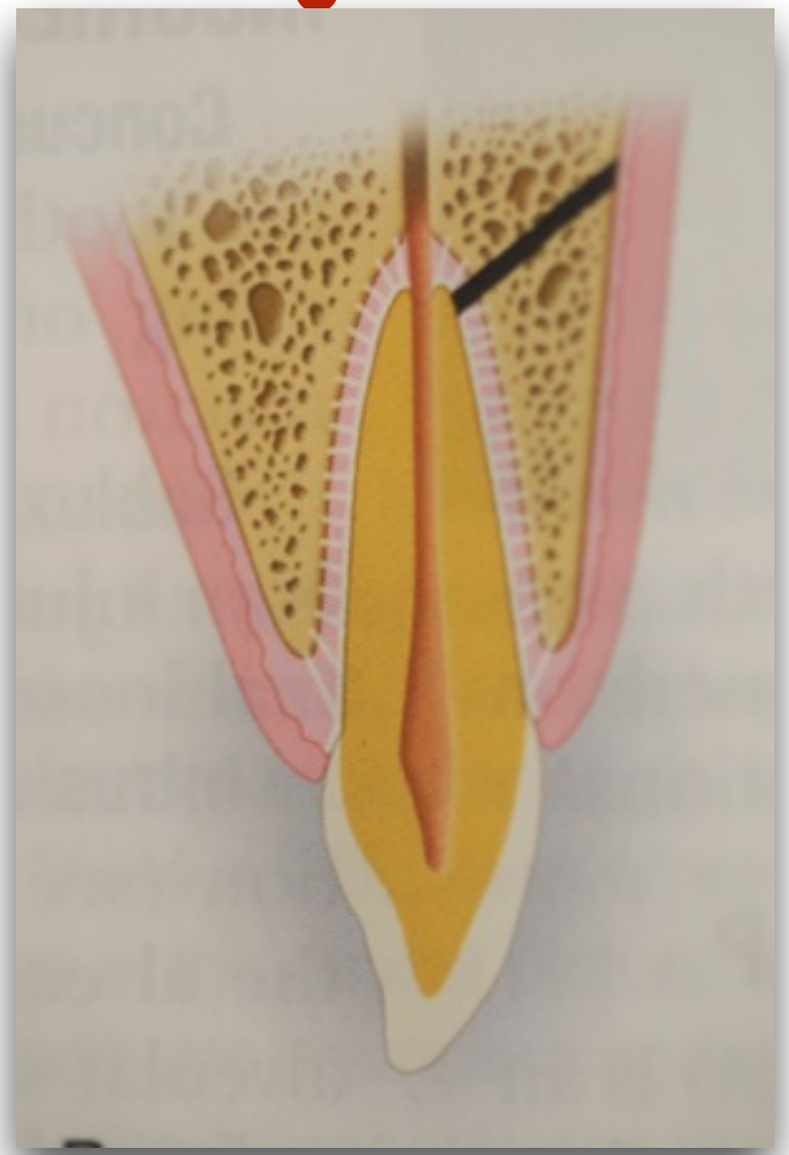
comminution- alveolar bone



- **reduce with digital manipulation**
- **if tooth can not be preserved, extract and graft site to preserve tissue**

supporting bone

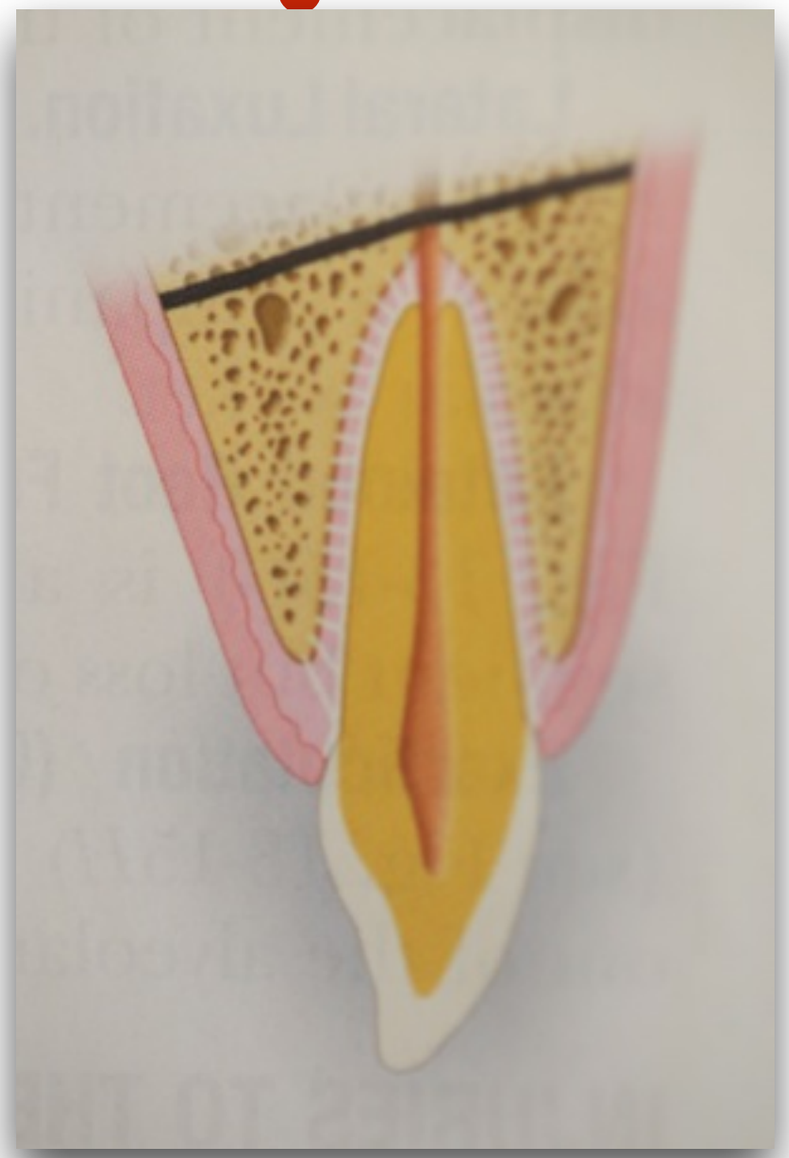
fracture of socket wall



- **reduce**
- **rigid splint for 4 weeks**
- **primary teeth- may not need any treatment**

supporting bone

fracture- alveolar process



- **closed reduction**
- **open reduction if segment is notably displaced**
- **stabilization for 4 weeks**
- **check teeth vitality and monitor**

Follow Up Procedures for Fractured Permanent Teeth and Alveolar Fractures

TIME	Crown Fracture		Crown-Root Fracture		Root Fracture	Alveolar Fracture
	Uncomplicated	Complicated	Uncomplicated	Complicated		
4 Weeks					Splint removal*, clinical and radiographic control	Splint removal and clinical and radiographic controls
6-8 Weeks	Clinical and radiographic control	Clinical and radiographic control	Clinical and radiographic control	Clinical and radiographic control	Clinical and radiographic control	Clinical and radiographic control
4 Months					Splint removal**, clinical and radiographic control	Clinical and radiographic control
6 Months					Clinical and radiographic control	Clinical and radiographic control
1 Year	Clinical and radiographic control	Clinical and radiographic control	Clinical and radiographic control	Clinical and radiographic control	Clinical and radiographic control	Clinical and radiographic control
Yearly for 5 Years					Clinical and radiographic control	Clinical and radiographic control

**Splint removal in apical third and mid-root fractures; **Splint removal with a root fracture near the cervical area*

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Follow Up Procedures for Luxated Permanent Teeth

TIME	Concussion/Subluxation	Extrusion	Lateral Luxation	Intrusion
2 Weeks	Splint removal (if applied for subluxation) Clinical and radiographic examination	Splint removal Clinical and radiographic examination	Clinical and radiographic examination	Clinical and radiographic examination
4 Weeks	Clinical and radiographic examination	Clinical and radiographic examination	Splint removal Clinical and radiographic examination	Splint removal Clinical and radiographic examination
6-8 Weeks	Clinical and radiographic examination	Clinical and radiographic examination	Clinical and radiographic examination	Clinical and radiographic control
6 Months	Clinical and radiographic examination	Clinical and radiographic examination	Clinical and radiographic examination	Clinical and radiographic examination
1 Year	Clinical and radiographic examination	Clinical and radiographic examination	Clinical and radiographic examination	Clinical and radiographic examination
2-5 Years	Yearly up to 5 years	Yearly up to 5 years	Yearly up to 5 years	Yearly up to 5 years

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hard dental tissue & pulp

periodontal tissue

supporting bone

gingiva or oral mucosa

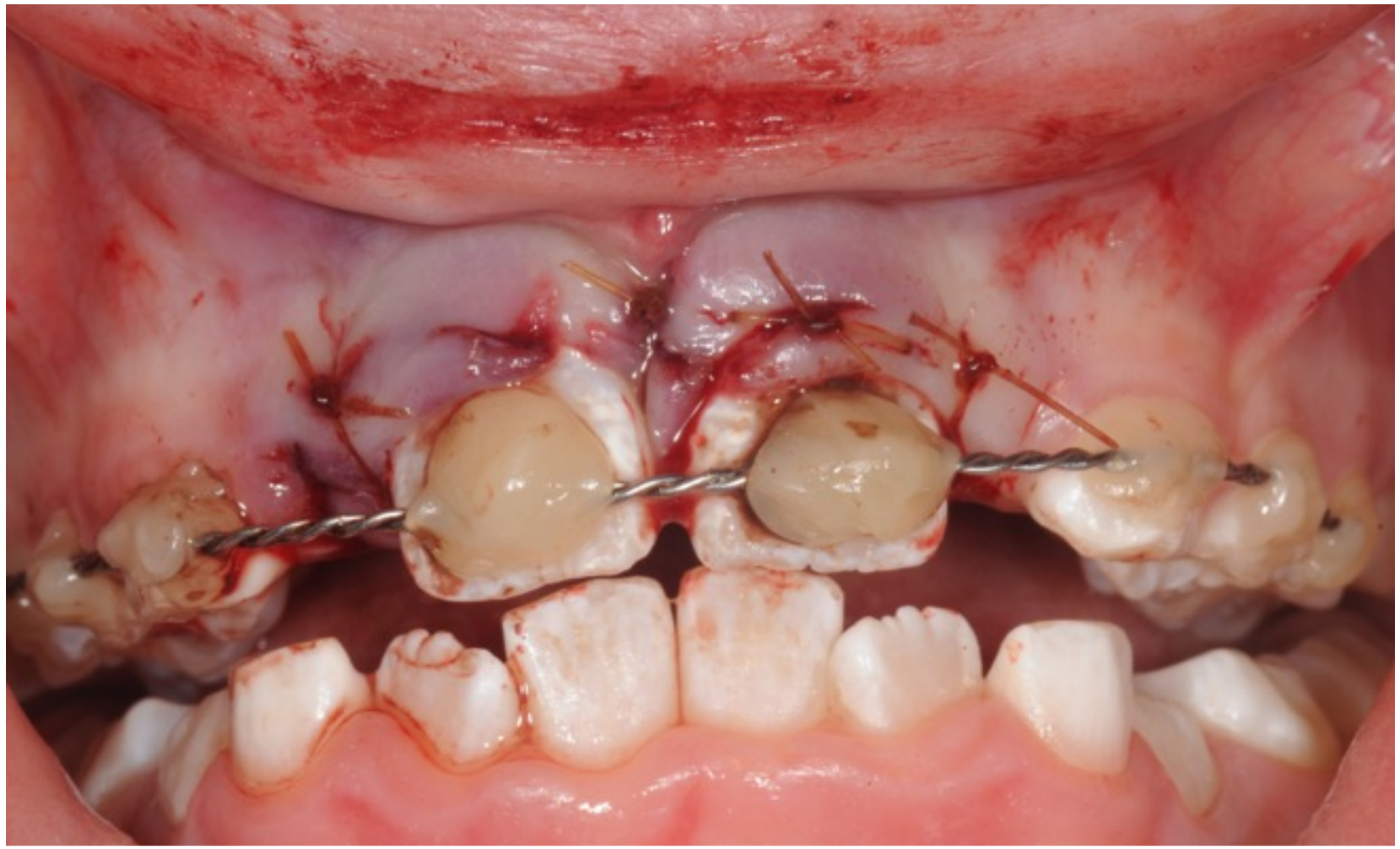
- laceration of gingiva or oral mucosa
- contusion of gingiva or oral mucosa
- abrasion of gingiva or oral mucosa

splinting

techniques

splinting- acid etch resin splint

- **light cured preferred to allow time**
- **bridge: resin or wire (28g)**



splinting- semirigid splint

- **resin with waxed dental floss, suture, flexible braided ortho wire or monofilament nylon line**
- **kevlar**
- **fiber splints (fiber force)- use with protemp material for more movement**
- **flexible wire composite splints**
- **titanium splints**

splinting- semirigid splint

Once tooth has been repositioned, the patient bites into a softened pink wax plate that has been previously rolled one or two times. This will ensure that the luxated (or avulsed) tooth stays in place while being splinted. In this case fishing line was used as the splint.

splinting- semirigid splint

fishing line splints

fiber splints

Splint Time for Various Types of Injuries

Type of Injury	Splinting Time
Subluxation	2 weeks
Extrusive luxation	2 weeks
Avulsion	2 weeks
Lateral luxation	2 weeks
Intrusion	4 weeks
Root fracture (middle 1/3)	4 weeks
Alveolar fracture	4 weeks
Root fracture (cervical 1/3)	4 months

For further information:

www.dentaltraumaguide.com

Andreasen - Denmark

AAE Trauma Guidelines

http://www.nxtbook.com/nxtbooks/aae/traumaguidelines/#/16

CASE #1

Prior trauma 4 months ago
Presents following pulpectomy procures performed by his restorative dentist

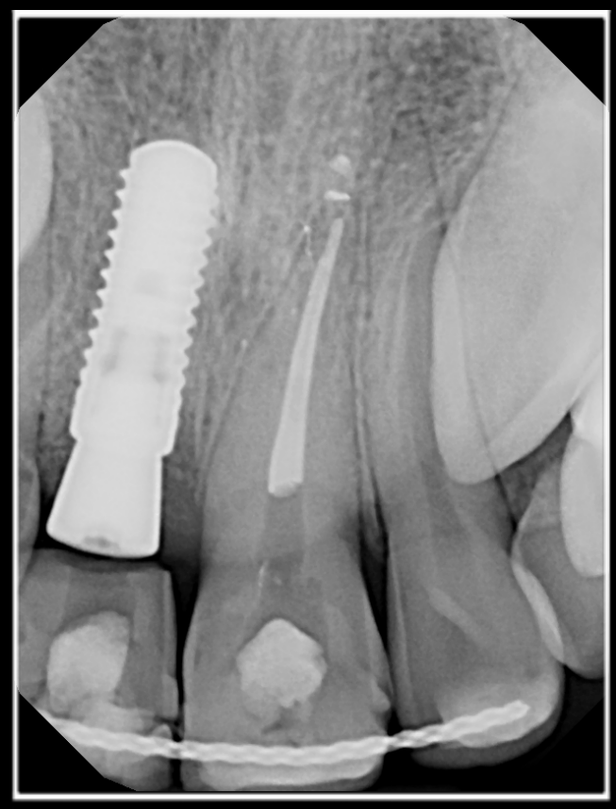
- Tooth #8: horizontal root fx in the cervical area with +2 mobility
- Tooth #9: Tooth fragment rebonded. ++percussion, 0 mobility, - apical palpation

CASE #1

First appointment
- placed Ca(OH)2 tooth #8, 9
- stabilized teeth with non rigid splint

Second appointment (2 weeks later)
- Tooth #8: +2 mobility,
  + tenderness palpation no swelling.
- Tooth #9: Asymptomatic. RCT #9 completed

CASE #1



Third Visit (emergency visit)

- Traumatized tooth #8 debonded coronal segment #8
- Atraumatic extraction and immediate implant placement
- Bonded coronal segment to existing arch wire for esthetics

- Number one placed implant in the world (#2 in the US)
- SLA surface full integration within 6-8 weeks
- SLActive surface has full integration within 6-8 weeks
- Roxolid surface -
  - first Titanium-Zirconium alloy material
  - High tensile strength
  - improved osseointegration over other titanium implants

straumann

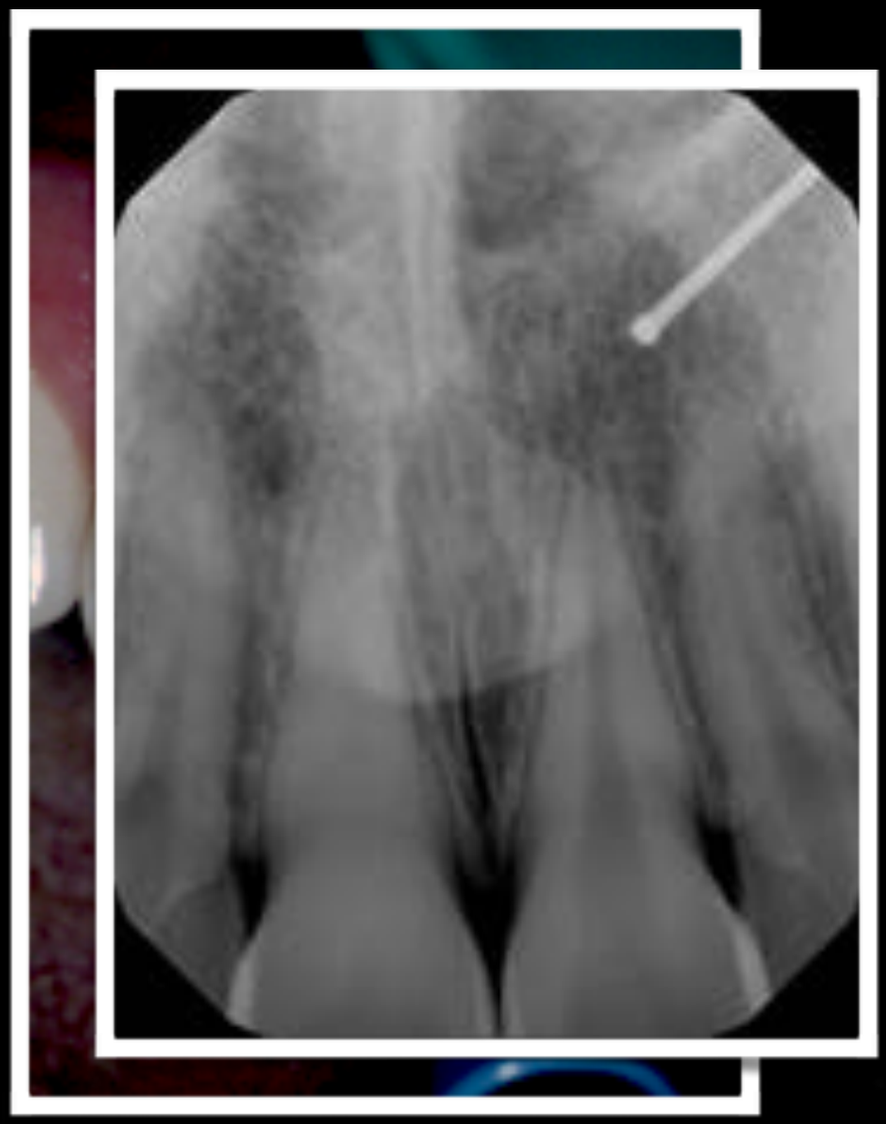
- Faster osseointegration due to hydrophilic properties
- Reduced healing times from 6-8 weeks to 3-4 weeks
- Increased predictability in stability-critical protocols
  - smokers
  - diabetics

CASE #2

Prior trauma as a child recalls getting hit in the mouth by a swing a the playground.

CC: My tooth is yellow

- IOE: WNL no swelling or erythema present
- Tooth #8: Non vital to pulp test (Cold NR, 80 EPT)

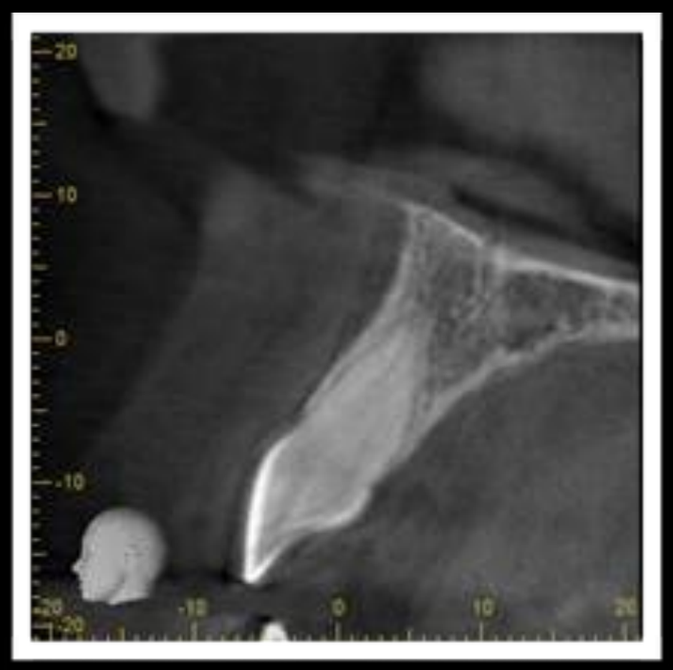


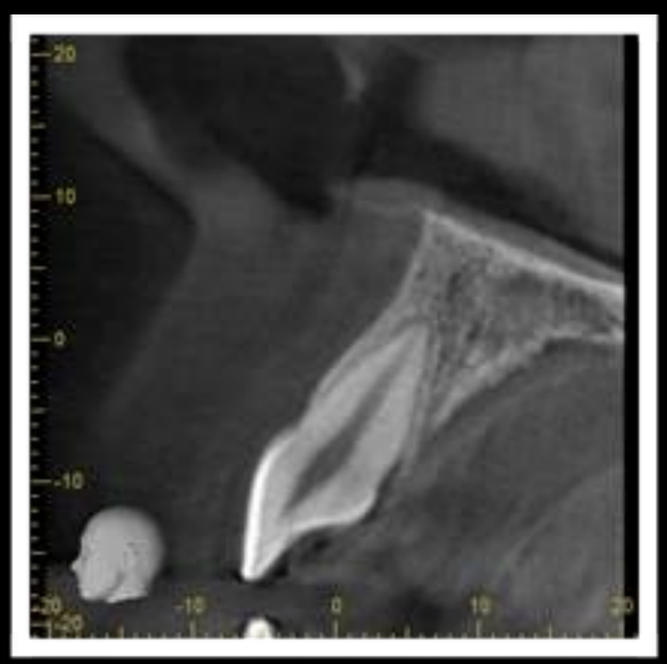
Pulp Canal Obliteration

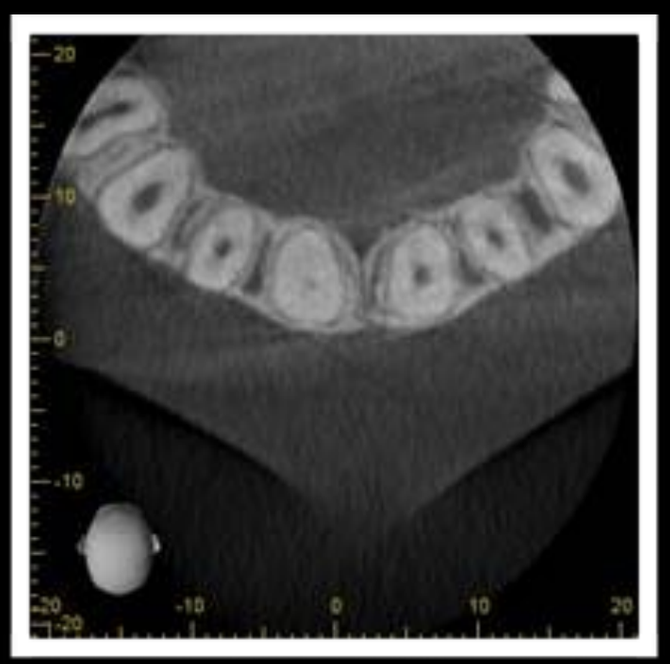
- Andreasen reported an increased incidence of PCO after orthodontic band fixation of traumatized teeth.
  - Assumed that band application might have caused displacement of root with compression of the apical vessels.
  - Orthodontic intrusive movements are considered to have the greatest impact on the apical region and plural blood supply.
- PCO was found in all luxation categories with **69% of the teeth demonstrating yellow crown discoloration**

Andreasen FM, Yu Z, Thomsen BI, Andersen PK. Occurrence of pulp canal obliteration after luxation injuries in the permanent dentition. Endod Dent Traumatol 1987;3:103-5.

CASE #2



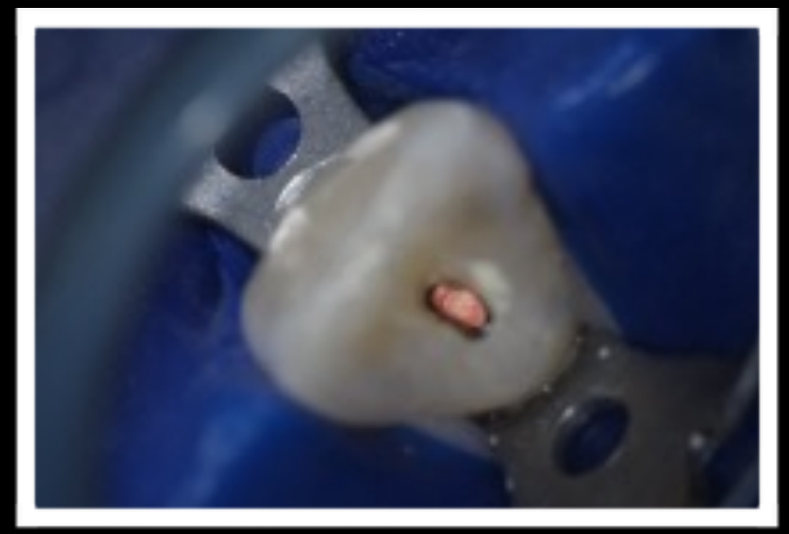




CASE #2

Ball R. Intraoperative Endodontic Applications of CBCT. Journal of Endo April 2013, 39 548-557.

CASE #2



CASE #3

Prior trauma playing football

CC: My tooth is discolored

- IOE: WNL no swelling or erythema present
- Tooth #8: Non vital to pulp test (Cold NR, 80 EPT)

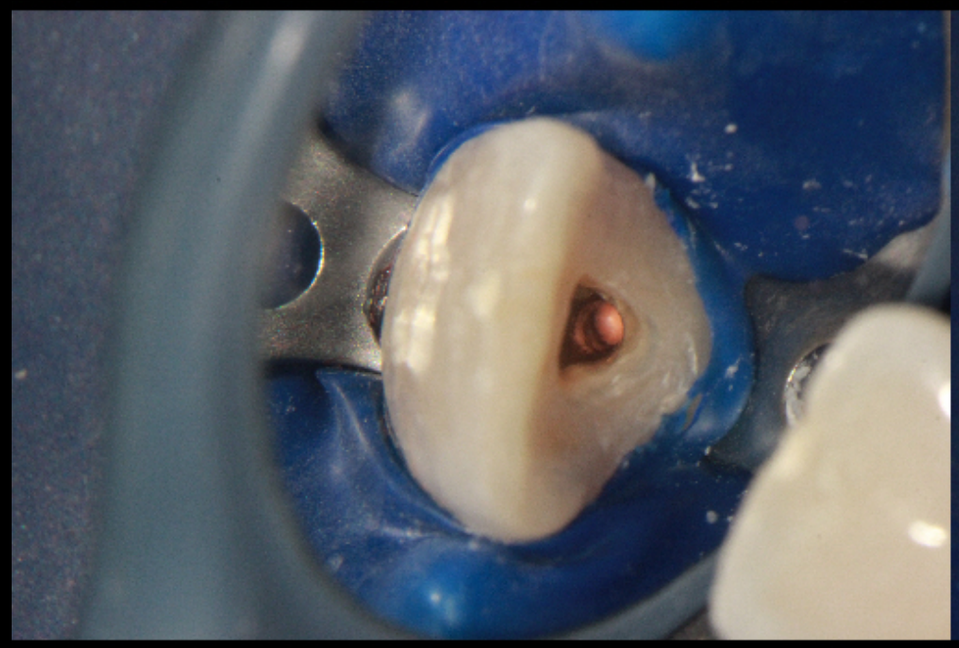
CASE #3

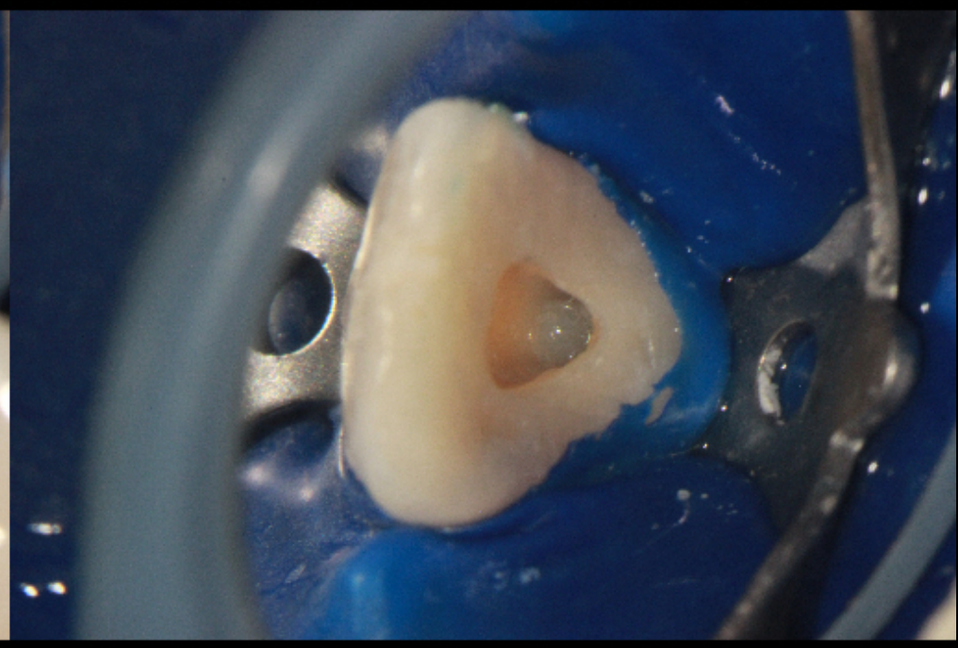
Internal Bleaching “Walking Bleach Technique

Opalescence Endo - Ultradent

- 35% hydrogen peroxide
- 3-5 day treatment

Before starting procedure be certain to place a GI on the floor of the chamber and seal the obturation from penetration of the hydrogen peroxide





CASE #3

CASE #4

CC: “It hurts when I chew.”

Referred for possible retreatment of tooth #14.

CASE #4

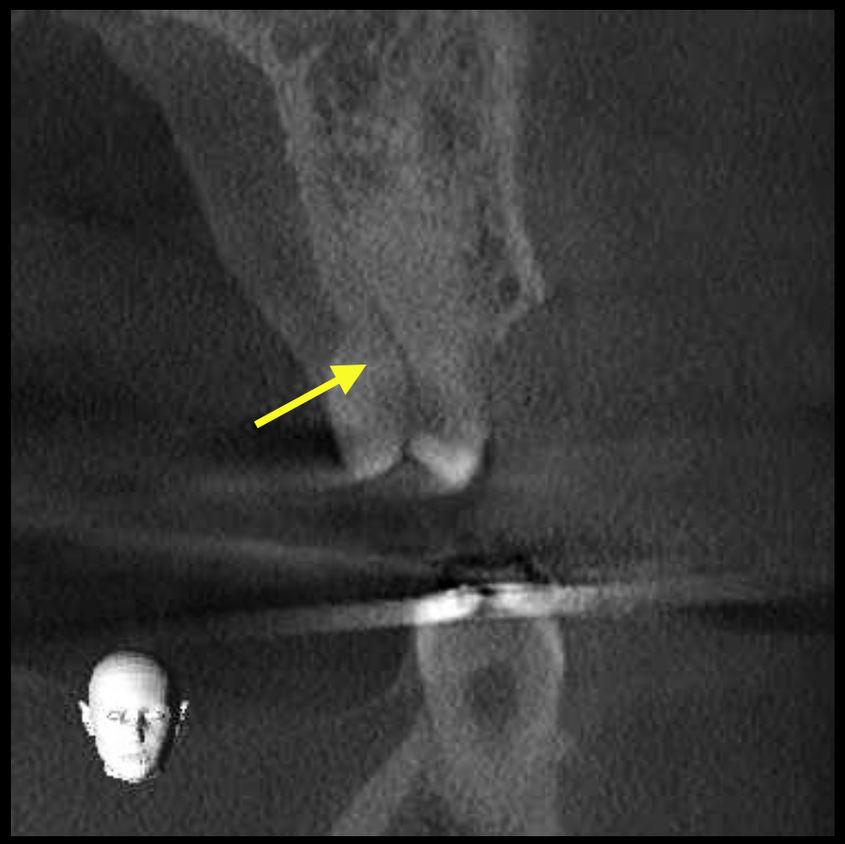
Clinical examination:

- Tooth #12: WNL
- Tooth #13: +percussion, Cold WNL.
- Tooth #14: +percussion, - apical palpation
- Tooth #15: - percussion Cold WNL

CASE #4

Radiographic examination:

CBCT findings:



CASE #5

Prior trauma 3 months ago fell off swing resulting in extrusion of both teeth. Pediatric dentist splinted teeth for 2 weeks however they were not able to reposition the teeth.

CC: Swelling

- IOE: buccal swelling in area of both #8 and 9 with sulcular drainage
- Tooth #8 & 9: Cold NR, 80 EPT ++percussion, + apical palpation

CASE #5

Revascularization / Pulpal Regeneration

Case selection:

- Necrotic with immature apex
- Pulp space not needed for post space
- compliant patient/parent

Alternative: MTA apexification or extraction at later date

Goals:

1. eliminate symptoms
2. increased root wall thickness and/or increased root length
3. + Response to vitality testing

CASE #5

Revascularization / Pulpal Regeneration

First visit:

- Local anesthetic, Isolation
- Diluted NaOCl irrigation
- Dry canals
- CaOH2
- Temporization

Rx: Penn VK
Children <12 years: 25-50 mg/kg/day in divided doses every 6-8 (maximum 3 g/day)
- warm compresses

CASE #5

Revascularization / Pulpal Regeneration

Second visit: 4 weeks

- Local anesthetic: NO EPI
- EDTA irrigation
- NaOCl
- Dry canals
- Stimulate bleeding up canal
  - very challenging
- MTA over clot (Collagen matrix first over the blood clot) now using L-PRF membrane
- Temporization

CASE #5

Revascularization / Pulpal Regeneration

12 month recall

- Patient was seen monthly to monitor healing and change temporary filling
- Tooth #8: vital to pulp testing. thickening of root noted with incomplete apical formation
- Tooth #9: vital to pulp testing with complete root formation

CASE #5

Revascularization / Pulpal Regeneration

THANK YOU

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