General Principles for Managing Dental Trauma

Prof. Paul V. Abbott ***AO***

BDSc, MDS, FRACDS(Endo), FPFA, FADI, FICD, FACD, FIADT

Specialist Endodontist

Winthrop Professor of Clinical Dentistry

UWA Dental School

The University of Western Australia

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General Principles for Managing Trauma

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  - Establish priorities
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  - Root surface (e.g. during repositioning)
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  - Local: intra-canal dressings, chlorhexidine m/w, gel
- Follow-up

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History, Examination & Assessment

- Full assessment of all injuries is essential
  - How, when, why, and where it happened
  - History, examination, tests, radiographs
    - Tests:
      - Mobility, percussion, palpation, etc
      - Pulp sensibility tests
        - May indicate other teeth damaged
        - Baseline data for later comparison

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Pulp Sensibility Tests

- Essential to perform at the emergency visit
  - *Time is NO EXCUSE for not doing these tests !!!*
- Can indicate teeth that have been injured
  - Where no other obvious signs
- Best predictor for subsequent pulp necrosis
- Baseline data for later comparison

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Pulp Sensibility Tests



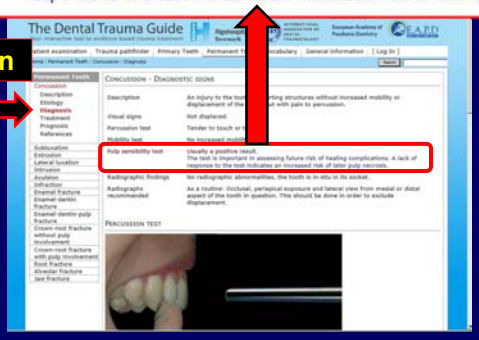


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Example from the Dental Trauma Guide

Pulp sensibility test	Usually a positive result. The test is important in assessing future risk of healing complications. A lack of response to the test indicates an increased risk of later pulp necrosis.

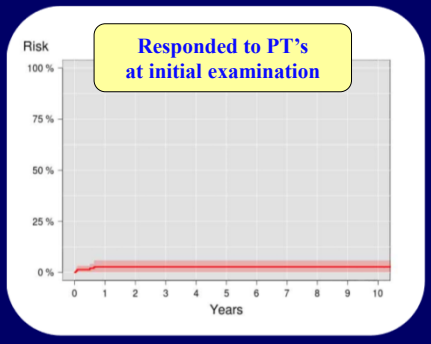
Re: Concussion

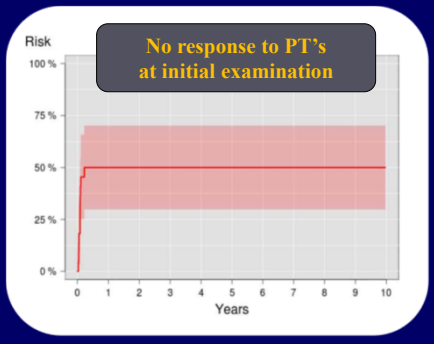


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Example from the Dental Trauma Guide

Pulp Necrosis after Concussion + Crown Fracture





Similar Differences for Other Injuries

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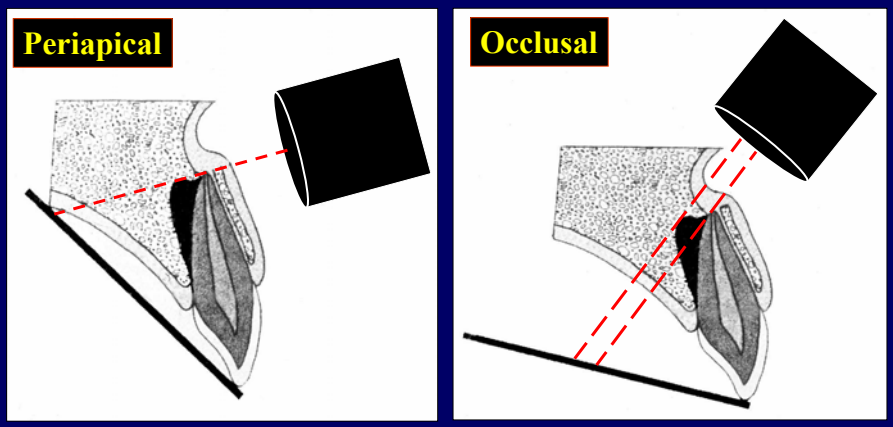
History, Examination & Assessment

- **Full assessment of all injuries is essential**
  - How, when, why, and where it happened
  - History, examination, tests, radiographs
    - **Tests:**
      - Mobility, percussion, palpation, etc
      - Pulp sensibility
        - May indicate other teeth damaged
        - Baseline data for later comparison
    - **Radiographs:**
      - 3 x Periapicals, 1 x occlusal
      - Opposing arch also

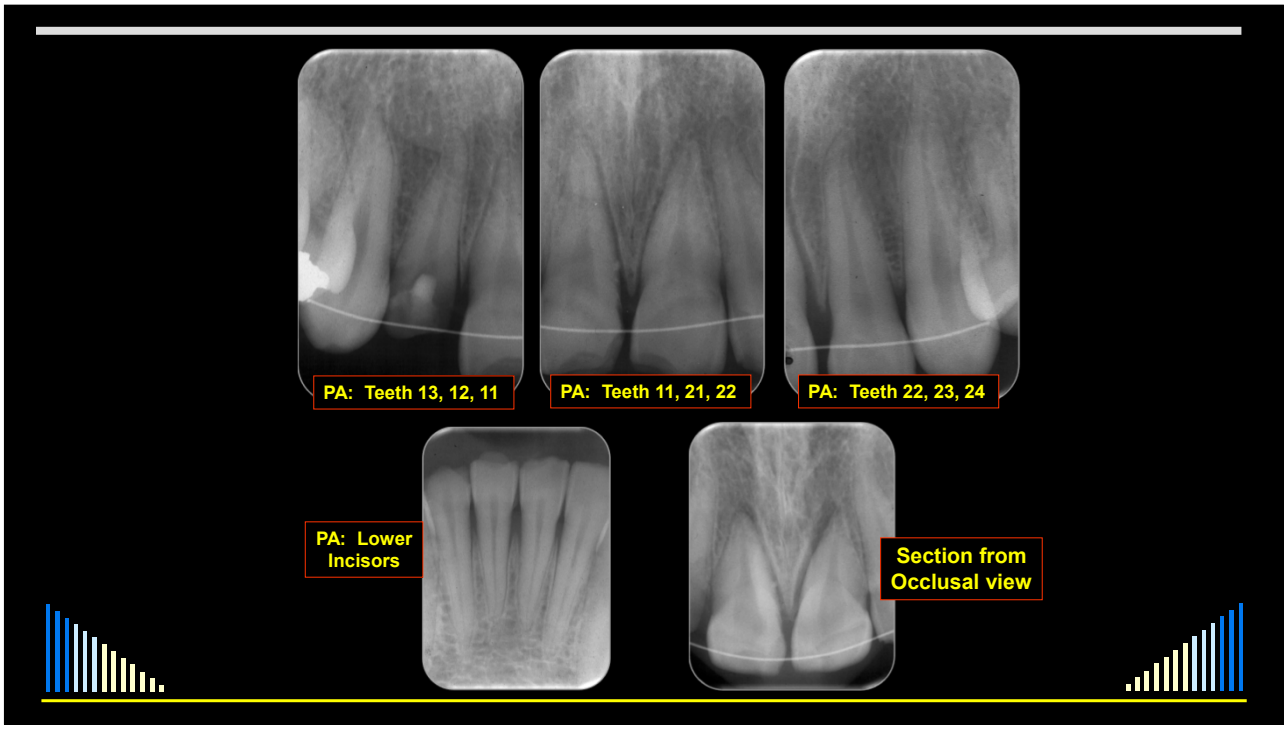
MINIMUM !!!

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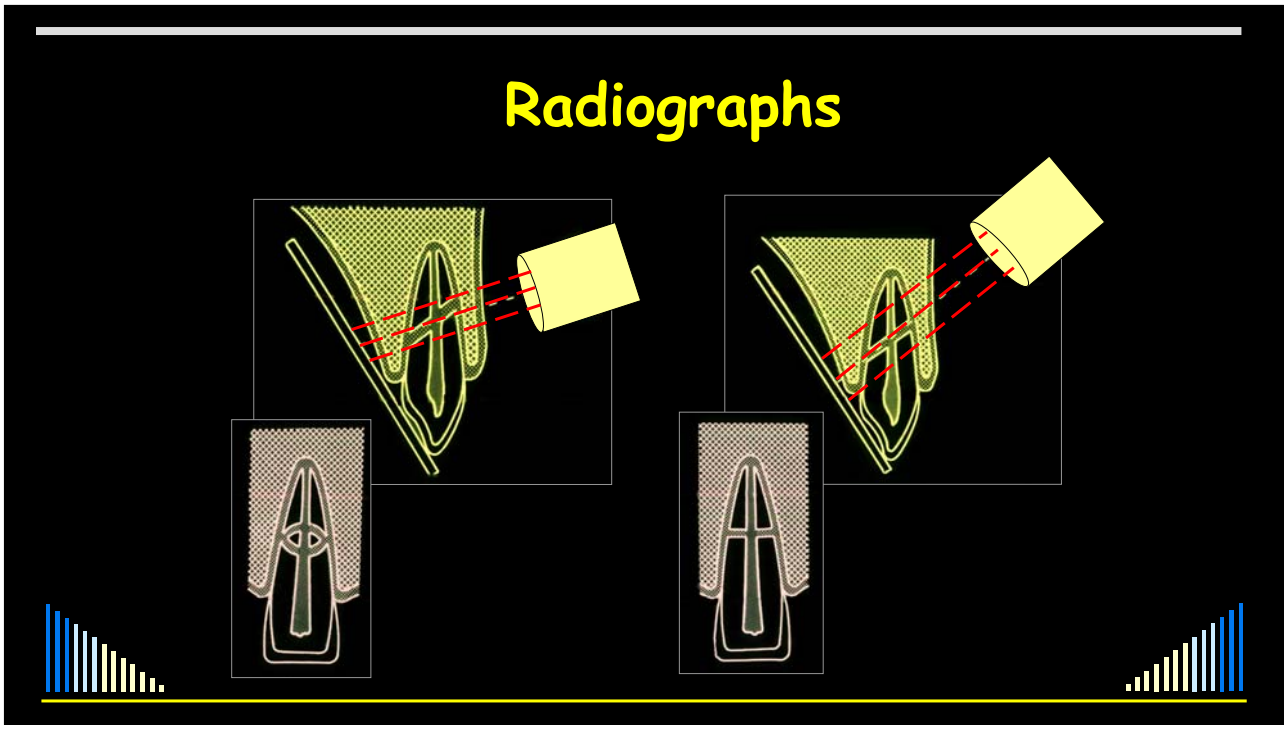
Radiographs



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PA: Teeth 13, 12, 11
PA: Teeth 11, 21, 22
PA: Teeth 22, 23, 24
PA: Lower Incisors
Section from Occlusal view

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Radiographs

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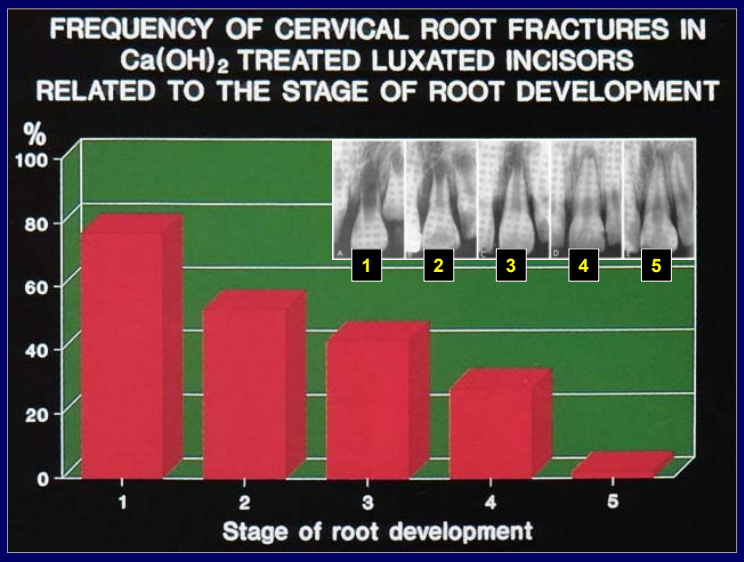
Protection of Pulp

- Aim - to:
  - Preserve the pulp
    - Especially in incompletely developed teeth
  - Allow further root development
    - Improves the long-term prognosis of tooth
      - "Stronger tooth" - more dentine



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Protection of Pulp



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Protection of Pulp



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  - Preserve the pulp
    - Especially in incompletely developed teeth
  - Allow further root development
    - Improves the long-term prognosis of tooth
      - "Stronger tooth" - more dentine
- **Options:**
  - **Pulp Capping**
  - **Pulpotomy - Partial, Cervical**
  - **Pulpectomy - Partial**

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Protection of Pulp

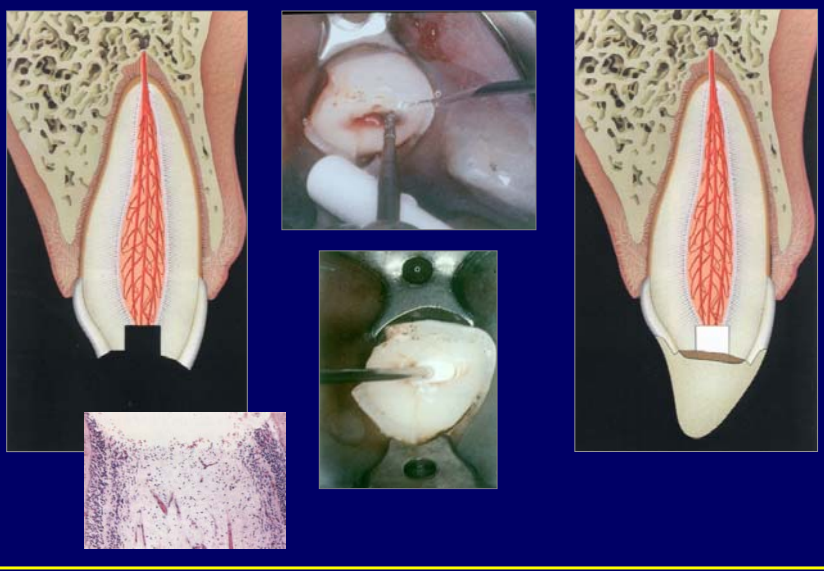
Healing frequencies

- ***Exposed pulp after crown fractures***

- **Pulp Capping**
  - **72 - 81 %**
- **Partial Pulpotomy - Cvek**
  - **94 - 96 %**
- **Cervical Pulpotomy**
  - **72 - 79 %**

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Cvek Partial Pulpotomy Technique



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Protection of Pulp

Healing frequencies

- *Exposed pulp after crown fractures*

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- **Cervical Pulpotomy**
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Which material should be used?

CHOICES:

- **Calcium hydroxide**
- **Corticosteroid / Antibiotic**
- **MTA - ProRoot**

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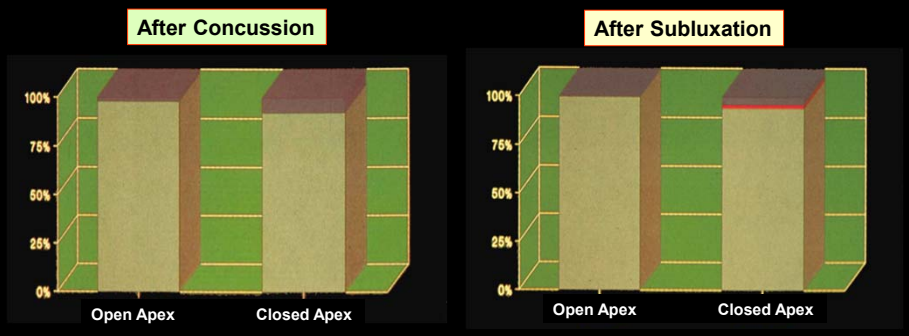
Protection of Root Surface

- Aim - to:
  - reduce damage to root
  - reduce chances of resorption
  - provide best chance for repair
- *Handle with care!!!*
- *Do NOT hold root*



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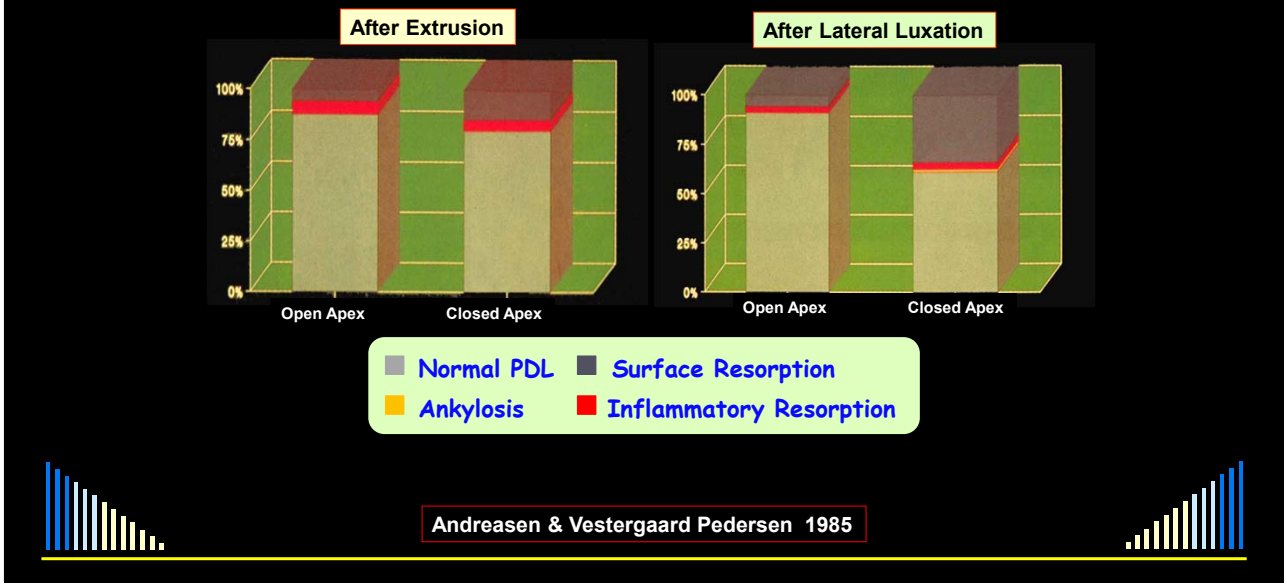
Periodontal Ligament Healing in the Permanent Dentition



Andreasen & Vestergaard Pedersen 1985

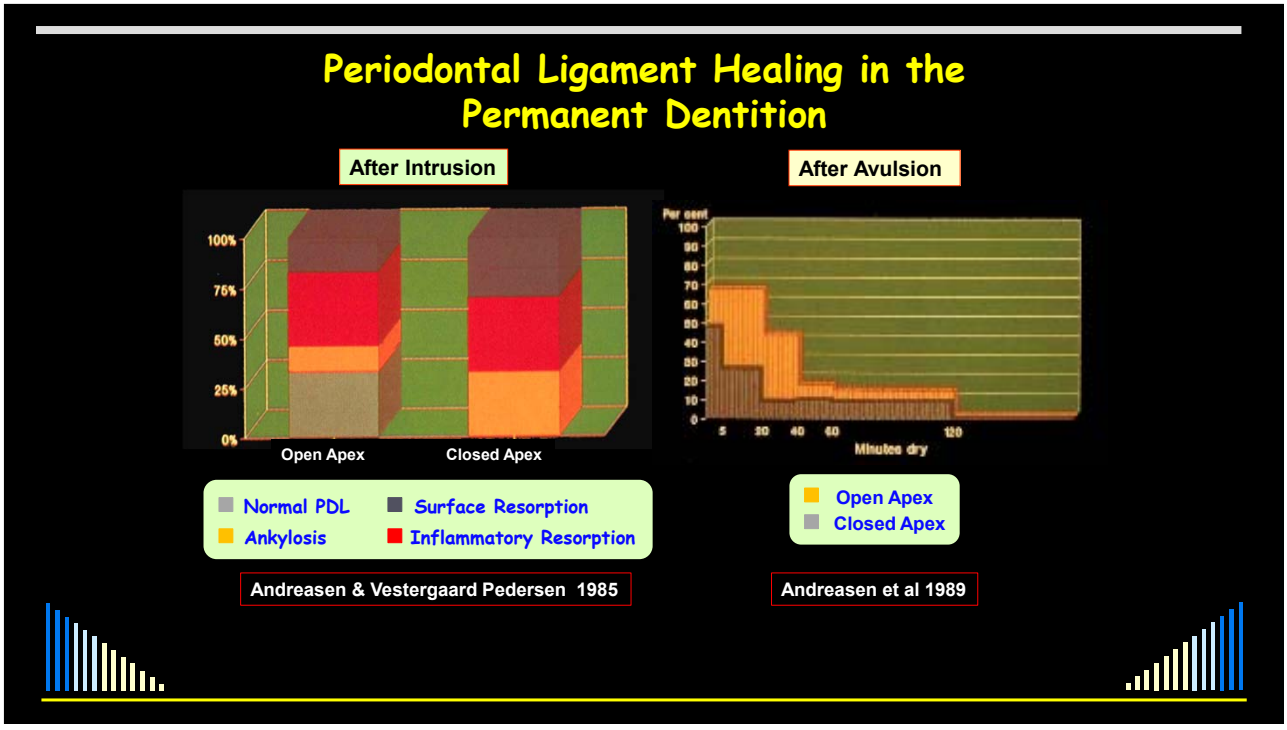
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Periodontal Ligament Healing in the Permanent Dentition



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Periodontal Ligament Healing in the Permanent Dentition



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Protection of Root Surface

- Avulsed teeth - IMPORTANT:
  - Don't allow the root to dry out
    - PDL cells will die
  - Storage media important
    - Milk or tissue culture: BEST
    - Saliva, Saline or Plastic Wrap: OK
    - *AVOID water*
  - Replant / reposition ASAP
  - Physiological splint
  - Antibiotics - systemic
  - Endodontic treatment

To reduce chance of replacement resorption

To reduce chance of inflammatory resorption

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External Replacement Resorption

- Types
  - Transient
    - Minor areas of damage
    - Later disappear - normal PDL forms
  - Progressive
    - Associated with drying or removal of PDL
    - Gradually involves whole root

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External Replacement Resorption

- Treatment
  - Transient
    - → NIL required
    - → Difficult to assess: transient -v- progressive
  - Progressive
    - → NIL - can not arrest
    - → Extraction eventually
    - → AIM to prevent or minimise occurrence

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External Replacement Resorption

Factors - Summary

- Extra-alveolar time
  - Keep as short as possible (ideally < 12 mins)
- Storage conditions
  - Milk > saliva = plastic wrap ≠ water = dry
- Damage during avulsion and replant
  - Avoid mechanical damage
- Splinting
  - Flexible > Rigid
- Endodontic treatment
  - Avoid toxic materials; use CS-Ab's

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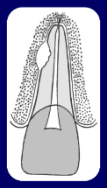
Injuries Where Root Surface and PDL Damage, PLUS Pulp Necrosis and Infection are PREDICTABLE



FULLY DEVELOPED TEETH

- Avulsion
- Intrusion
- Lateral Luxation + Crown Fracture
- Extrusion + Crown Fracture

HENCE - in ALL these cases, a *"preventive approach"* should be taken to prevent external inflammatory resorption



INCOMPLETELY DEVELOPED TEETH

- Intrusion + Crown Fracture
- Avulsion + Crown Fracture



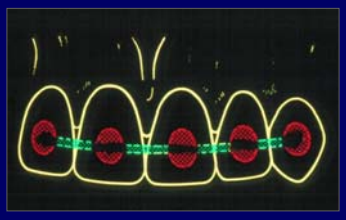
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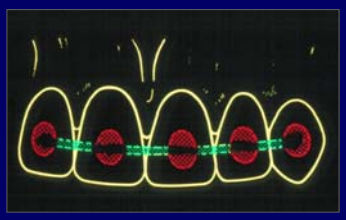
Splinting



- Splinting
  - Two types of splints:
    - Flexible
    - Rigid

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Splinting



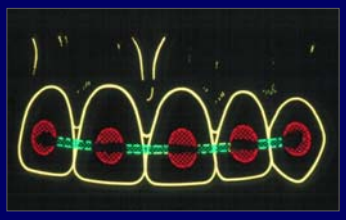
- Splinting
  - Flexible splint:
    - *If NO root or bone fractures*
    - Allows "functional" healing of p.d.l.
    - Reduces ankylosis & replacement resorption
      - 7 - 10 days only





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Splinting



- **Splinting**
  - **Rigid splint**
    - ➔ ***ONLY*** **use if:**
      - **A bone fracture ➔ 6 weeks**

      OR if:

      - **A root fracture ➔ 3 months**





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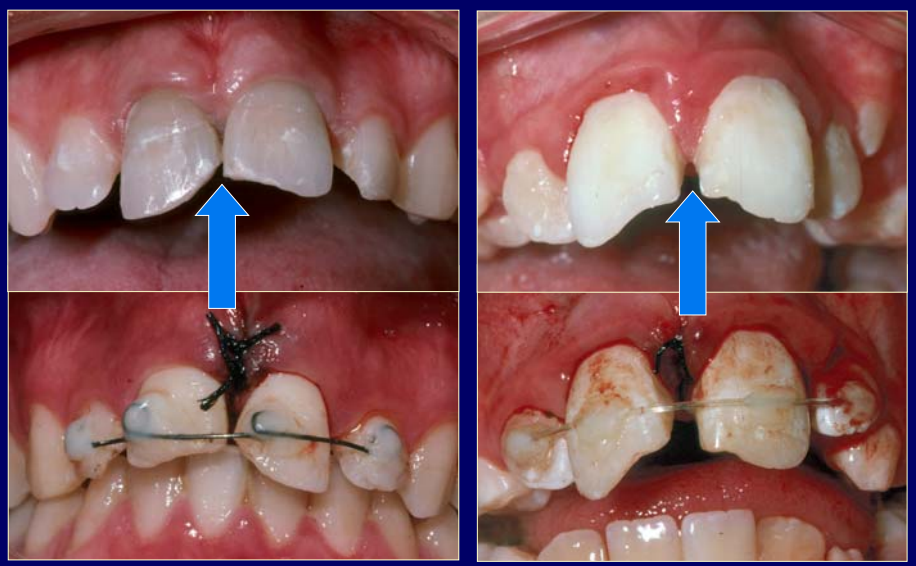
Soft Tissue Management

- Suture *ALL* lacerations
  - For optimum healing
  - To maintain tissue position
  - To prevent gingival recession



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Soft Tissue Management



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Soft Tissue Management

- No sutures
- No tissue repositioning

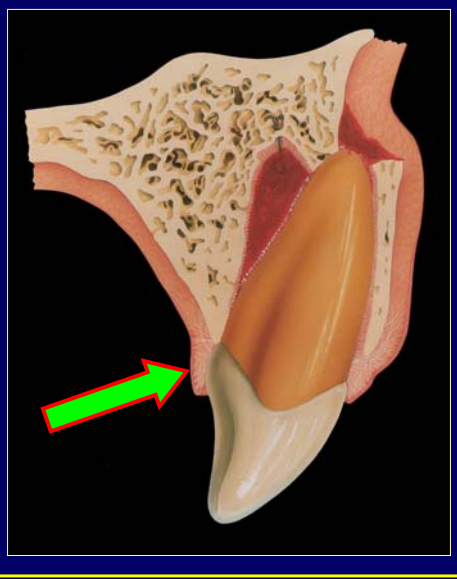
} → Poor healing
} → Ging. recession + bone loss





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Soft Tissue Management



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Temporary Restorations

- **Cover dentine + protect pulp**
- **Aesthetics**
  - **"Composite Bandage"**
  - **Glass ionomer cements**



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Systemic Medication

- Tetanus toxoid é Check status (10 years)
- Antibiotics é *Prophylaxis*
  - Inflammatory resorption
  - Pulp healing (tetracycline)
  - K *Choices*
    - Penicillin / amoxycillin
    - Tetracyclines
- NSAID's é *Anti-inflammatory*
  - Ibuprofen
  - Synergism with tetracyclines
- Analgesics
  - K *Rarely needed*
  - K Use NSAID's for analgesic + anti-inflammatory actions

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Local Medication

- **Intra-canal dressings**
  - Ledermix paste initially
  - Calcium hydroxide - NOT initially
  - 50:50 mix of Ledermix / $Ca(OH)_2$
- **Chlorhexidine mouthwash**
  - After each meal until 2 days after sutures removed
  - Warn about staining of teeth - avoid tannin
- **Chlorhexidine gel**
  - Apply with cotton bud, finger or toothbrush
  - 2-3 times / day
  - Continue for 2 - 3 weeks

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Trauma Follow-Up Examinations

- Examine soft tissues
- Examine teeth
  - Percussion and Palpation
  - Mobility
  - Colour changes
- Pulp sensibility tests
  - CO_2 and Electric tests
- Periapical radiograph(s)

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Trauma Follow-Up Schedule

- Will depend on type of injuries present
  - Especially need for endodontic treatment
    - → e.g. Immediate: Avulsion, Intrusion - mature teeth
  - And need to remove sutures & / or splint
    - → Sutures: 5 - 6 days
    - → Flexible splint: 7 - 10 days
    - → Rigid splint: 6 weeks - 3 months

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Trauma Follow-Up Schedule

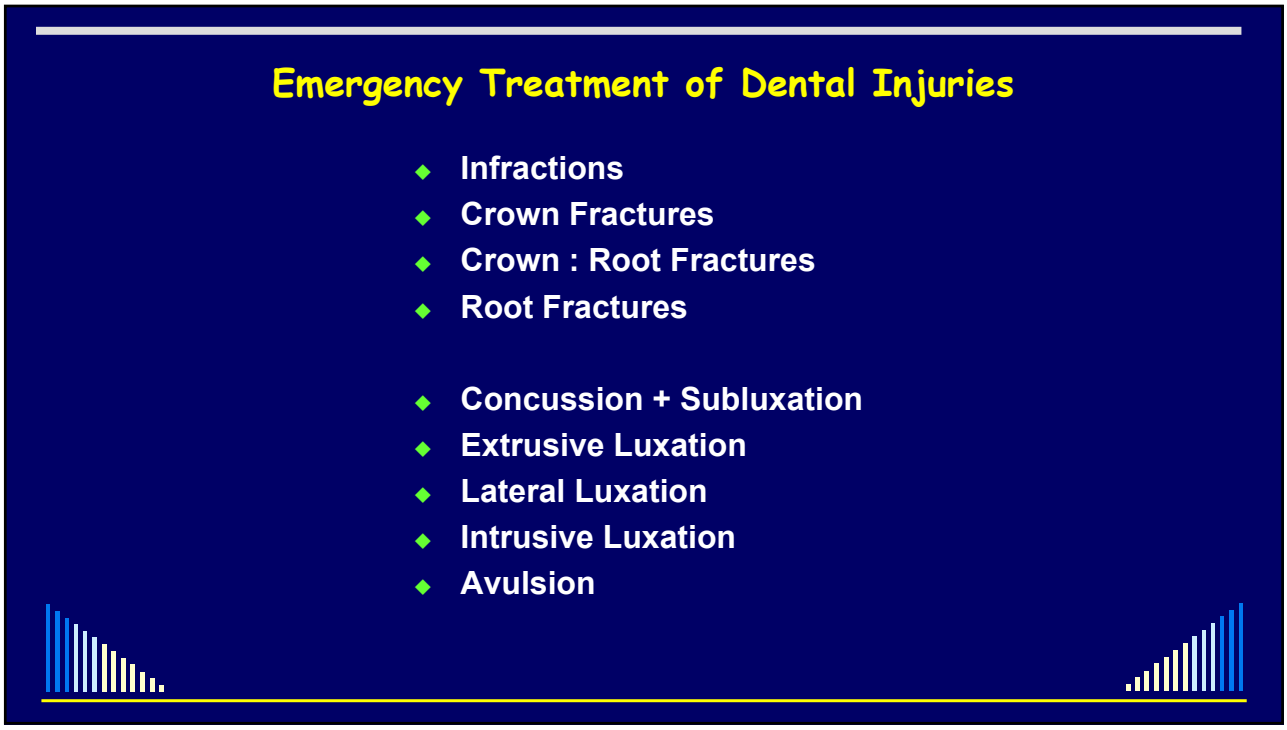
- If immediate endodontics is not required:
  - 2 weeks
  - 1 month
  - 2 months
  - 3 months
  - 6 months
  - 9 months
  - 1 year
  - Annually for 5 years
  - Then every 3 years

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Emergency Treatment of Dental Injuries
Infractions
Crown Fractures
Crown : Root Fractures
Root Fractures
Concussion + Subluxation
Extrusive Luxation
Lateral Luxation
Intrusive Luxation
Avulsion

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