قالوا سبحانك لا علم لنا الا ما
علمتنا انك انت العليم الحكيم

الآية 32 سورة البقرة

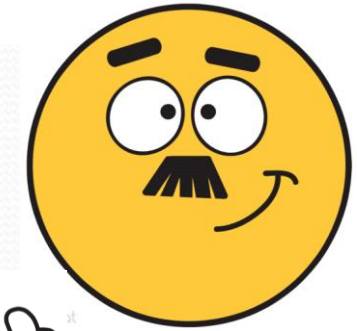
Good Morning

Emoticon

- An emoticon, short for "emotion icon", is a representation of a facial expression using characters—usually punctuation marks, numbers, and letters—to express a person's feelings or mood, or as a time-saving method *eg.*
- ☺ :D ☹ ...etc
- Then cell phones became more powerful and could afford to use real pictures ... now we do use **Emoji's** instead

This is not an Emoticon
It's an Emoji

All Emoji’s belong to one simple stem Emoji



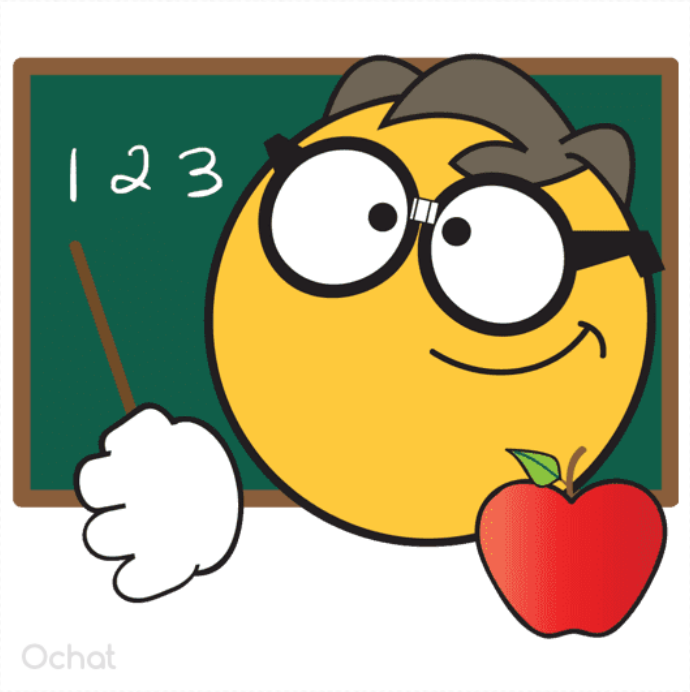
Just do some changes and modifications according to the required function and you’ll get a specialized emoji that does the job.

- In the field of cell biology, a type of undifferentiated cells is recognized in all living things waiting for a trigger of cellular changes to turn into cells of definite function.
  e.g. Ameloblasts, Odontoclasts, Osteoblasts…etc

In our field, these stem cells are there waiting for signals from growing permanent teeth to turn into odontoclasts to start the process of physiologic shedding

Today we'll study two close topics to each other as Emoticons and Emoji's ….

Apexogenesis and Apexfication



Apexogenesis, Apexification and Regenerative endodontics

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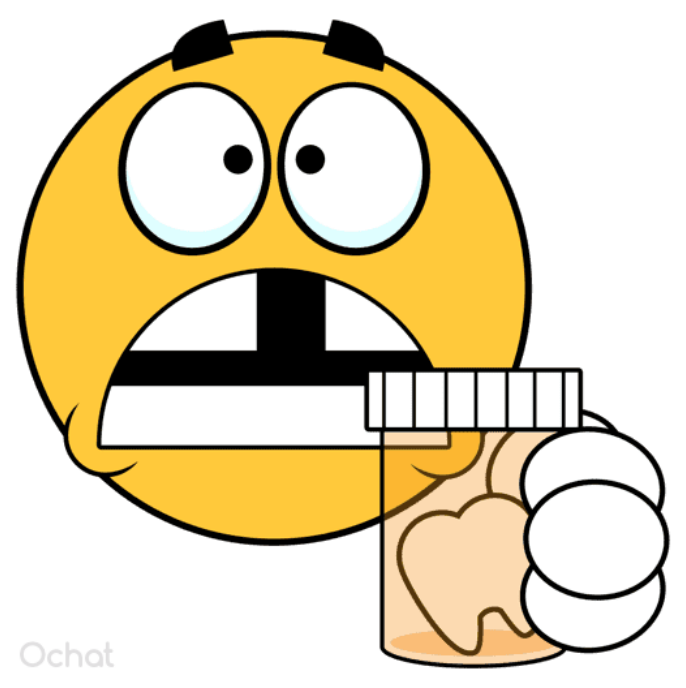
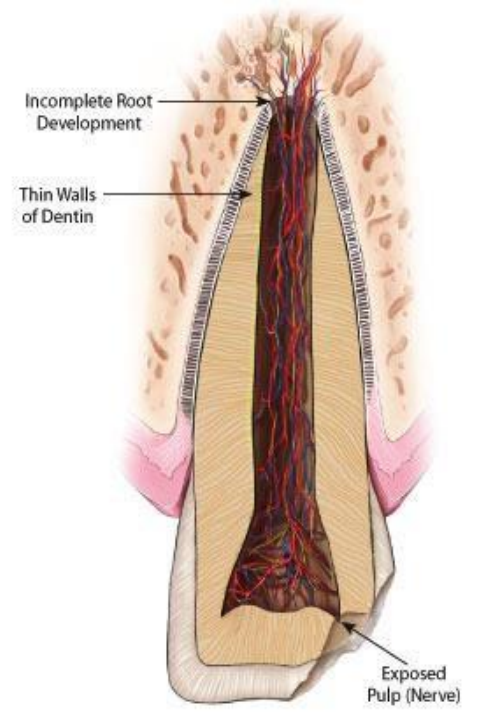
Trauma to the permanent dentition is common especially in children aged 8 to 10 years old that are prior to the completion of root formation.

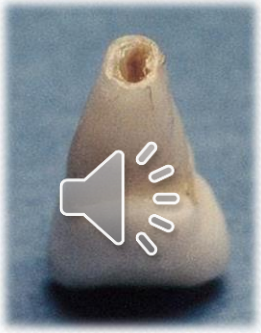




Young Permanent Teeth
Complicated Crown Fracture with pulp involvement

Do you remember Andreasean's classification?

Vital



Non-vital

Direct Pulp Capping
Partial Pulpotomy (MTA)
Cvek Pulpotomy (old CaOH pulpotomy)
(Apexogenesis)

Apexification / Regenerative endodontics

Apexogenesis

- What is it?
  - Procedure involves the removal of contaminated pulp tissue with a clean round high speed diamond bur, using saline or water irrigation.
  - A non-setting CaOH cement/MTA dressing is placed directly onto uncontaminated vital tissue.
- Indication?
  - Vital young permanent anterior tooth with open apex / incomplete root formation

Objectives of Apexogenesis

- Why to do it?
  - To preserve vital, non-inflamed pulp tissue, biologically walled off by a hard tissue barrier

Rationale

Vital pulp tissue covered with CaOH/ MTA is possible to form a dentine bridge over the defect this is much preferable to preserve tooth vitality rather than commence RCT

Undifferentiated cells turn into dentin building cells.

How to do it?

- Local anaesthesia
- Rubber dam placement and isolation of tooth is mandatory
- Pulp is washed with saline until haemorrhage stops
- Any clot should be gently washed away

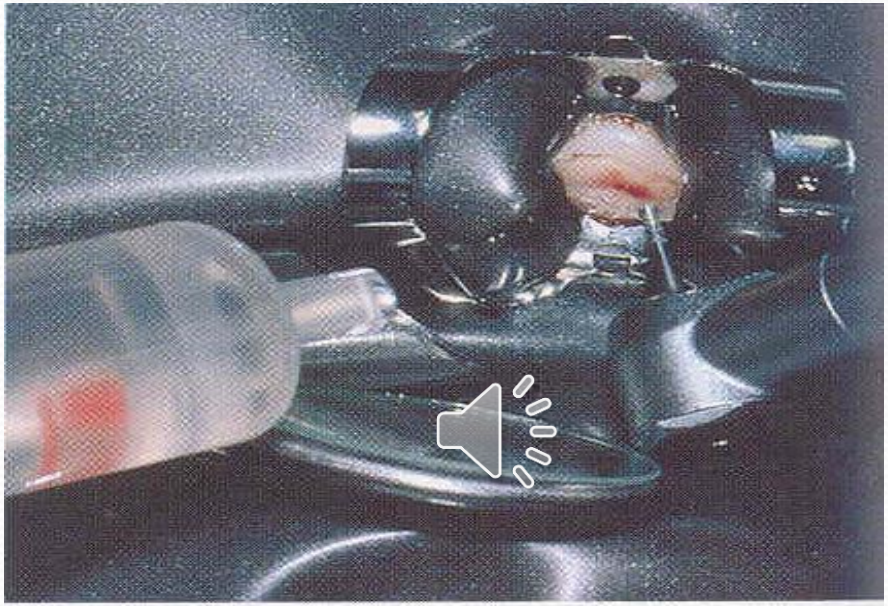
How to do it?...cont

- Non-setting CaOH / MTA is placed over the pulp and is then covered with a setting CaOH.
- GIC base is placed over the dressings and the tooth is restored with composite resin.
- The technique may be performed at any level of the root canal- benefits in preserving the vitality of traumatized incisors.

Complicated fracture of an immature incisor with microbial invasion of the coronal pulp. Pulp has been exposed for more than 24 hours

- Traumatic exposure of upper permanent central incisor
- Pulp exposure

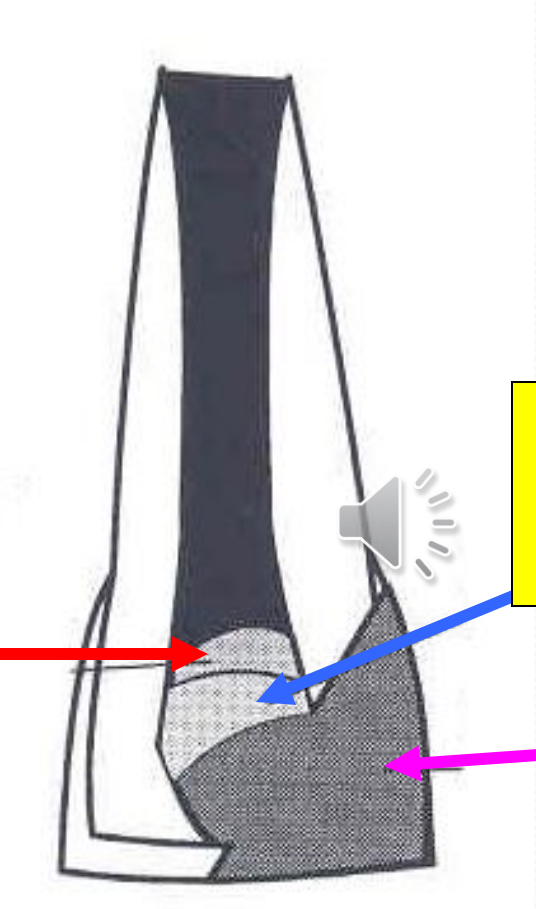
Access to the coronal pulp and amputation of coronal pulp tissue with a diamond bur running at high speed with constant water cooling



- Access to pulp chamber using high speed diamond bur with saline

- Removal of 2 mm of pulpal tissue to a level of vital uncontaminated tissue
- Placement of non-setting CaOH dressing over vital pulp tissue

Dressing the pulpal wound to promote calcific repair

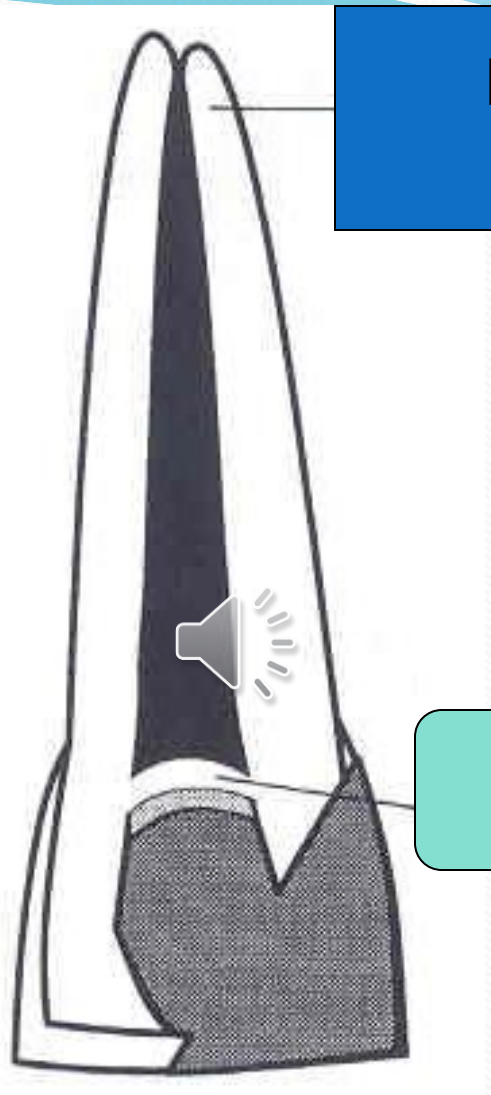


Non-setting CaOH

Hard setting cement

Composite resin

The tooth at review



Root formation complete

Calcific barrier formation

Review

- 3-6 monthly with pulp vitality tests
- Radiographs at review to check for hard tissue barrier formation and continued root development
- Prognosis
  - Success rate: 80-90%

Apexification

- What is it?
  - Procedure using CaOH to create an apical hard tissue barrier against which the root canal filling can be placed
- Indication?
  - Non-vital young permanent anterior tooth with open apex / incomplete root formation
- Why do it?
  - Apical barrier is formed allowing for RCT if needed
  - Maintain tooth in arch – aesthetic, function

Problems in Apexification

- Long term survival of tooth treated by this method is low
- Tooth has thin cervical dentine, shortened root, easily fracture

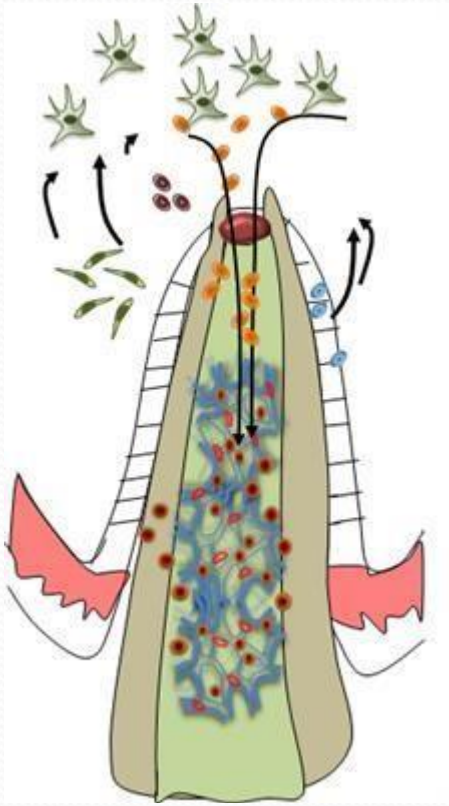
Regenerative endodontics

Diagnostic criteria:

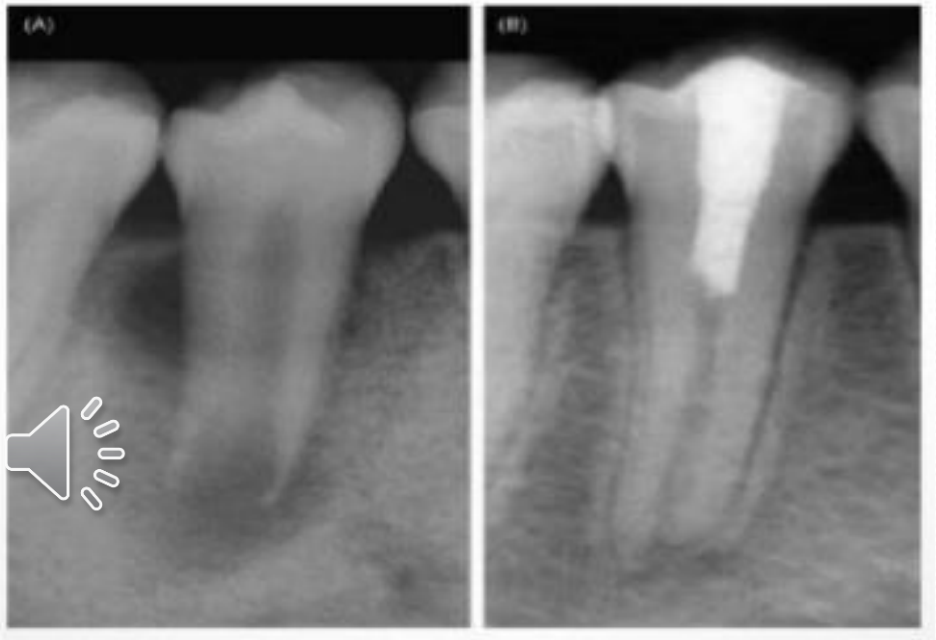
1. Necrotic young permanent tooth with open apex / incomplete root formation
2. Negative to pulp vitality testing.

Regenerative endodontics

Necrotic permanent first molars revascularization protocol include 2.5% NaoCl irrigation, ca$(OH)_2$ medication in the coronal third of the root canals for 3 weeks, induction of apical bleeding, coronal sealing with white MTA. Radiographs taken after 9 to 10 months…….. (*Cehreli et.al 2011*)



Unlike apexification, Regenerative endodontics may lead to complete root growth



Please refer to case report presented last lecture where regenerative endo resulted in dystrophic calcification

Undifferentiated cells + scaffold + signaling molecules

Necrotic immature teeth

- NaoCl irrigation and treatment with triple antibiotic paste
- After 1 month bleeding was evoked and sample collected with paper points.
- Molecular analyses of blood collected indicated stem cell marker CD 73 and CD 105 up by 600-fold compared with systemic blood.
- These cells contribute to the regeneration of pulp tissues and root development

Lovelace 2011

Thank you