

Pulp therapy in Paediatric Dentistry



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Outlines

- Primary tooth
- Types of pain & assessment
- Pulp therapies for primary teeth
 - Vital pulp therapy
 - Indirect pulp capping
 - Direct pulp capping
 - Pulpotomy
 - Non-vital pulp therapy
 - Pulpectomy

Primary tooth anatomy

- Smaller in all dimension, pulp relatively larger
- Thinner enamel
- Great variation in size and shape of pulp
- Pulp horns slender and closely follow external anatomy of the tooth
- Pulp chambers shallow and easily perforated
- Apical foramina large and accessory canals may be large and numerous

Pulp therapy in Paeds Dent

- Objectives:
 - to maintain the integrity and health of the teeth and their supporting tissues
 - to maintain the pulpally involved primary tooth
 - reduce the likelihood of mesial drift and malocclusion
 - Maintain aesthetics
 - Maintain normal eruption time of the succedaneous teeth

Types of Pain & pulpal status

- History of pain
 - Duration
 - Frequency
 - Location

Types of Pain & pulpal status

- Vital (reversible)
 - Intermittent
 - Chemical and/or thermal stimulus
- Non-vital (irreversible)
 - Spontaneous
 - Nocturnal
 - constant

Pulp therapy

- Vital
 - Indirect pulp capping
 - Direct pulp capping
 - Pulpotomy
- Non-vital
 - pulpectomy

Assessment

- **Clinical**
 - Percussion
 - Cold/ Thermal sensitivity
 - EPT

- **Radiographic**
 - Periapical
 - Panoramic

Vital pulp therapy

Indirect pulp capping

Direct pulp capping

Pulpotomy



Indirect pulp capping

- Definition:
 - Carious dentine is not remove completely
 - a material applied over a minimal amount of hard carious dentine
 - no clinical pulp exposure
 - generate dentine formation under the carious lesion

Indirect pulp capping

- Objectives

- arrest the carious process , allow pulp healing and reparative dentine formation
- avoid internal resorption or other pathologic changes as determined by periodic clinical and radiographic evaluation

- Materials used

- CaOH
- GIC

Direct pulp capping

- application of a medicament, dressing, or dental material to the exposed pulp
- to encourage the pulp to initiate reparative tertiary dentine formation at the exposure site
- to preserve pulp vitality
- Can be considered for a small mechanical or traumatic exposure

Direct pulp capping

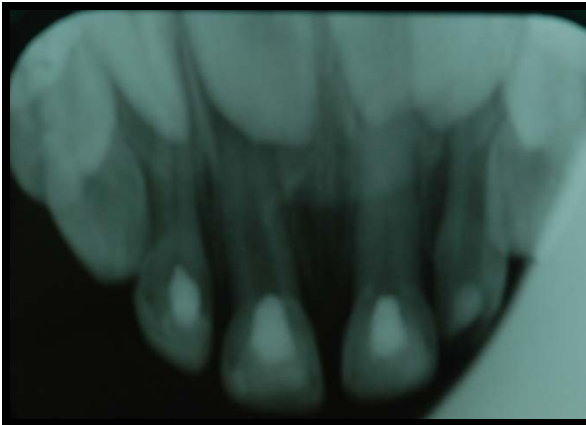
- low success rate (Kopel 1992, Fuks 2000, Rodd *et al.* 2006)
- NOT RECOMMENDED for carious exposures in primary teeth
- Material of choice is CaOH or MTA
- Both CaOH and MTA were successful (Tuna & Ölmez ,2008; Bodem *et al.*, 2004)

Direct pulp capping

- MTA
 - Has been shown to give better results
 - Less inflammation and thicker dentine bridge
 - Has good sealing ability & biocompatibility

Vital pulp therapy

Pulpotomy



Pulpotomy

- Is performed in primary tooth with extensive caries but without evidence of radicular pathology
- Caries removal results in a carious or mechanical pulp exposure
- Coronal pulp is amputated, remaining vital radicular pulp tissue surface is treated with medicaments

Pulpotomy

- **Indications**

- Pulp exposure due to caries or traumatic exposure
- Vital tooth with healthy periodontium
- Reversible pulpitis
- Tooth is restorable
- At least 2/3 of roots remain
- Bleeding from pulp is red and haemostasis evident within 5 mins

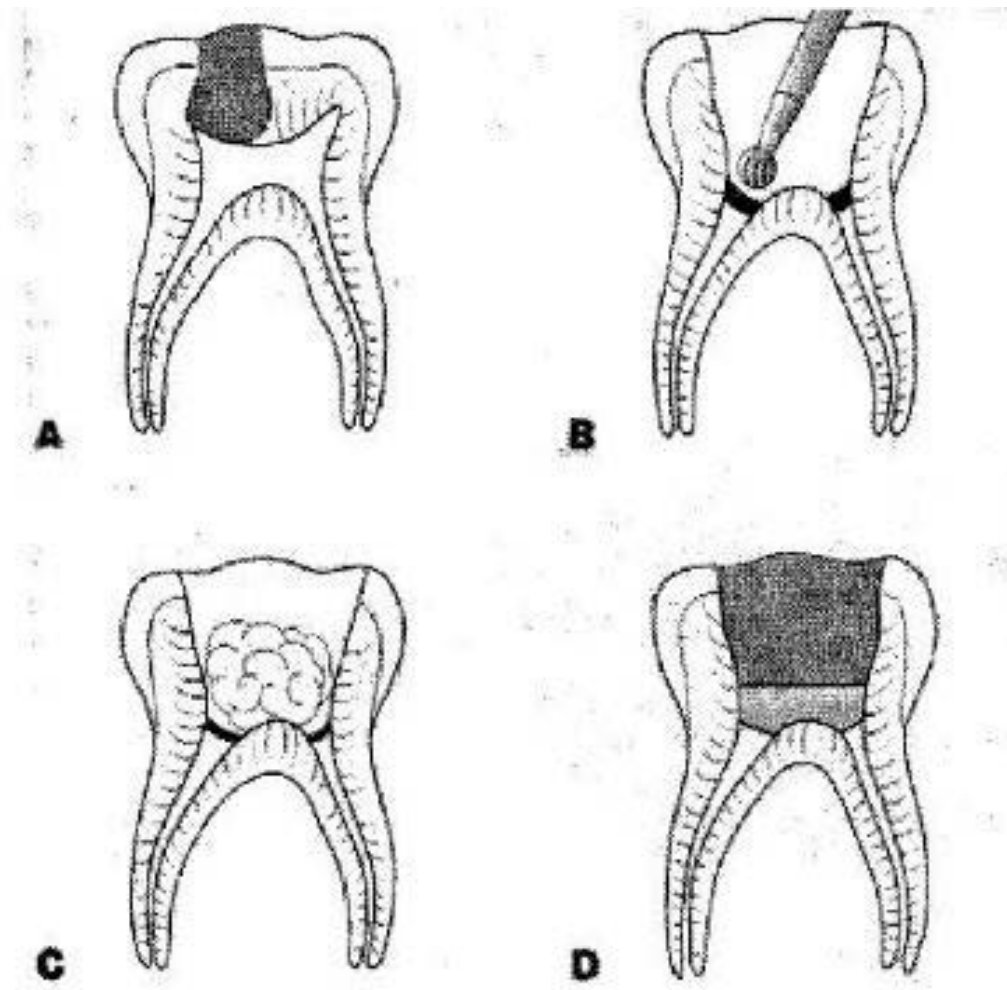
Pulpotomy

- **Contraindication**
 - Irreversible pulpitis
 - Presence of abscess or fistula
 - Necrotic pulp
 - Uncontrolled haemorrhage
 - Tooth with internal or external root resorption
 - Tooth with pathological mobility; roots $<2/3$
 - PA or bifurcation radiolucency

Pulpotomy

- Procedures
 - LA
 - Rubber dam
 - Caries removal up to roof of pulp chamber to gain access
 - Inspect the pulp chamber
 - Haemostasis
 - No evidence of coronal tissue tags
 - Treatment of remaining radicular pulp

Pulpotomy



Pulpotomy

- Medicaments
 - Formocresol
 - Calcium hydroxide
 - Gluteraldehyde
 - Ferric sulfate
 - MTA
 - Laser
 - electrocautery

Pulpotomy

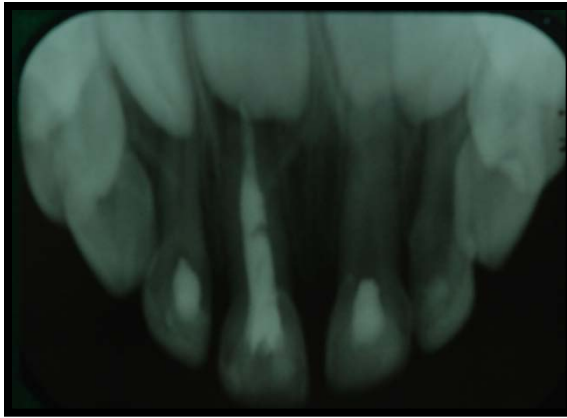
- Formocresol
 - Success rates 62-97%
 - Actions:
 - Bactericidal
 - Fixation
 - Progressive fibrosis
- Buckley's formocresol usually used in 1:5 dilution
- Haemostasis of radicular pulp should be obtained prior to applying formocresol
- Pellet should be blotted dry and placed in pulp chamber for 5 minutes
- A ZOE or glass ionomer base is then placed before final restoration done

Pulpotomy

- Formocresol
 - Reported undesirable effects
 - Leakage into hard & soft tissues (mutagenic and carcinogenic potential has been shown in animal studies)
 - Enamel hypoplasia
 - Over retention of primary tooth
 - Ectopic eruption of permanent teeth
 - hypomineralization

Non-vital pulp therapy

Pulpectomy



Pulpectomy

- Definition:
 - is a root canal procedure for pulp tissue that is irreversibly infected or necrotic
 - root canals are debrided and shaped

Pulpectomy

- Objectives
 - removes necrotic pulp
 - allow periradicular tissue to heal
 - no further breakdown of supporting structures
 - demonstrate evidence of successful fill
 - resorption of filling material and tooth structure should occur normally

Pulpectomy

- **Indications**
 - Irreversible pulpitis
 - necrotic pulp
 - $> 2/3$ roots length
- **Contraindications**
 - Tooth with internal or external root resorption
 - Tooth with pathological mobility; roots $< 2/3$

Pulpectomy

- **Materials**
 - nonreinforced zinc/oxide eugenol
 - iodoform-based paste (KRI®)
 - iodoform and calcium hydroxide paste (Vitapex®, Diapex®)



Pulpectomy

- Procedures
 - LA
 - Rubber dam
 - Remove caries as much as possible before entering pulp
 - Remove entire roof of chamber to gain access
 - Debride canals. Canals of primary teeth should not be enlarged

Pulpectomy

- Procedures
 - Irrigate canals carefully using sterile saline and/or sodium hypochlorite
 - Obturate canals using ZOE or iodoform paste. Can be placed with hand condenser, syringe or lentulo spiral
 - Radiographic evaluation
 - Restore tooth

References

- The American Academy of Paediatric Dentistry. Guideline for pulp therapy in primary and immature permanent teeth. *Reference manual* 2009; 33(6): 212-219
- Tuna D & Ölmez A. Clinical long-term evaluation of MTA as a direct pulp capping material in primary teeth. *International Endodontic Journal* 2008; 41:273–278
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- Coll JA. Indirect pulp capping and primary teeth: Is the primary tooth pulpotomy out of date? *Pediatr Dent* 2008;30(3):230-6.