Direct and Indirect pulp capping
PULP THERAPY IN CHILDREN

• Vital pulp therapy
  ❖ Indirect pulp capping
  ❖ Direct pulp capping
  ❖ Pulpotomy

• Nonvital pulp therapy
  ❖ Pulpectomy
VITAL PULP THERAPY
INDICATIONS:

• In a tooth with a normal pulp, when all caries is removed for a restoration, a protective liner may be placed in the deep areas of the preparation to minimize injury to the pulp, promote pulp tissue healing, and/or minimize post-operative sensitivity.
OBJECTIVES:

• The placement of a liner in a deep area of the preparation is utilized to preserve the tooth’s vitality, promote pulp tissue healing and tertiary dentin formation, and minimize bacterial microleakage.

• Adverse post-treatment clinical signs or symptoms such as sensitivity, pain, or swelling should not occur.
• Indirect pulp capping is defined as a procedure where in small amount of carious dentin is retained in deep areas of cavity to avoid exposure of pulp, followed by placement of a suitable medicament and restorative material that seals off the carious dentin and encourages pulp recovery (Ingle).
Objectives:

1. Arresting the carious process
2. Maintaining pulp vitality
3. Promoting dentin sclerosis (reducing permeability)
4. Stimulating the formation of tertiary dentin
5. Remineralizing the carious dentin
INDICATIONS

1. History
   a) Mild discomfort from chemical and thermal stimuli
   b) Absence of spontaneous pain.

2. Clinical examination
   a) Large carious lesion
   b) Normal color of tooth.

3. Radiographic examination
   a) Large carious lesion in close proximity to the pulp.
   b) Normal lamina dura.
   c) Normal periodontal ligament space.
   d) No periapical radiolucency.

- Ideally, used when pulpal inflammation is just minimal and complete removal of caries would cause a pulp exposure.
CONTRAINDICATIONS

- Spontaneous pain - pain at night
- Swelling
- Fistula
- Tenderness to percussion
- Pathological mobility
- External root resorption
- Internal root resorption
- Periapical radiolucency
- Pulp calcifications
Treatment procedure

First appointment

Tooth showing deep carious lesion adjacent to pulp

Local anesthesia

Isolation with rubber dam

Establish cavity outline using a high speed hand piece

Remove superficial debris and soft necrotic dentin with a slow speed hand piece using large round burs. Do not expose the pulp.
Peripheral carious dentin removed using spoon excavator.

Flush cavity with saline and dry with cotton pellets.

Site is covered with a commercial hard set Ca(OH)$_2$ preparation and cavity is filled with fast setting ZOE cement.

Placement of Ca(OH)$_2$ and ZOE after excavation of soft caries.
• **Between the appointment, history must be negative and temporary restoration should be intact.**

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**Second visit (6-8 weeks later)**

- Treated tooth is re-entered after 6-8 weeks.
- **Rate of reparative dentin deposition is an average of 1.4 microns/day which decrease markedly after 48 days.**
- **Take bite wing radiograph & observe for reparative dentin. Then carefully remove all temporary filling material.**
- **On re-entering caries will appear arrested, flaky, dried out.**
Colour will change from deep red rose to light grey to light brown.

Texture will change from spongy & wet to hard.

Cavity is washed out & dried gently

Cover the entire floor with Ca (OH)$_2$

Base is built up with GIC

Final restoration is placed

After placement of final restoration
Direct Pulp Capping

It is the placement of a medicament or non-medicated material on a pulp that has been exposed in course of excavating the last portions of deep dentinal caries or as a result of trauma.

Or

It is the procedure in which there is small pin point exposure of the pulp which is caused due to:

- Traumatic injury
- Cavity preparation or
- Caries

which is surrounded by sound dentin & covered with a biocompatible radio opaque base in contact with exposed pulp tissue prior to restoration.

Acc. to Kopel (1992)
OBJECTIVES:

1. The vitality of the tooth should be maintained.

2. No prolonged post treatment signs and symptoms of sensitivity, pain or swelling should be evident.

3. Pulp healing and reparative dentin formation should result.

4. There should be no pathological changes.
**INDICATIONS:**

- Small mechanical exposures that are surrounded with sound dentin.
- Exposed pulp should have slight red hemorrhage that is easily controlled.
- Traumatic exposures in a dry and clean field.
CONTRAINDICATIONS:

1. Severe tooth aches at night
2. Spontaneous pain
3. Tooth mobility
4. Thickening of periodontal ligament
5. Radiographic evidence of pulp or periradicular degeneration
6. Excess of hemorrhage at the time of exposure
7. Purulent or serous exudate from the exposure
PROCEDURE:

• Once pulpal exposure encountered, further manipulation of pulp is avoided

• Irrigation with saline under Rubber Dam

• Control bleeding at exposure site from sterile cotton pellets.

• Pulp capping agent placed—close contact with vital pulp tissue—attain marginal seal.
• Formation of reparative dentin is part of healing process.

• Permanent restoration
Materials used for Pulp Capping

- CALCIUM HYDROXIDE
- MINERAL TRIOXIDE AGGREGATE
- ANTIBIOTICS
- COLLAGEN
- CORTICOSTEROIDS
- ISOBUTYL CYANOACRYLATES
- TRICALCIUM PHOSPHATE
- BONE MORPHOGENIC PROTEIN
- DENATURED ALBUMIN
- LASER
• Calcium hydroxide forms a dentin bridge when placed in contact with pulpal tissues.

• Initially, a necrotic zone is formed adjacent to the material, and, depending on the pH of the calcium hydroxide material, a dentin bridge is formed directly against the necrotic zone.
Dycal possesses a quick, convenient and easy paste to paste mixing system.

The material sets hard quickly and can withstand amalgam condensation, allowing for the immediate placement of restorative material or an intermediary base.
A. Twenty-four hours after application of calcium hydroxide.
B. After 2 or 3 weeks.
C. After 4 or 5 weeks.
D. After 8 weeks
Mineral Trioxide Aggregate

- Excellent results have been with the use of a new biocompatible pulp-capping agent mineral trioxide aggregate (MTA) (ProRoot MTA)
- When compared with Ca(OH)$_2$, MTA produced significantly more dentinal bridging in a shorter period of time with significantly less inflammation.
- Dentin deposition also began earlier with MTA.
• Textbook of Pediatric Dentistry- Nikhil Marwah.
• Textbook of pediatric dentistry- Shobha Tandon.
Thank you