Indirect Pulp Capping
Study objective

• Define, understand, and describe all the principles involved in indirect pulp capping technique.
• Discuss indications, contraindications, clinical procedures, and reasons for failures of indirect pulp capping technique in children.
• Discuss materials used in indirect pulp capping.
Study objectives -3

• Define, understand, and describe all the principles involved in direct and indirect pulp capping, pulpotomy and pulpectomy techniques
• Discuss indications, contraindications, clinical procedures, and reasons for failures of pulp treatment in children.
Types of Pulp Therapy

Vital pulp therapy:
- Indirect pulp capping
- Direct pulp capping,
- Vital pulpotomy
- Apexogenesis
Non vital pulp therapy:
- Non-vital pulpotomy
- Pulpectomy
- Apexification
- Root canal treatment
General Principles of Treatment

- Ensure control of pain. Assess patient’s cooperative ability and choice appropriate pain and anxiety control mechanism before starting procedure.
- Infection control principles must always adhered too.
• Use of rubber dam is very important for maintenance of dry sterile field, prevention of aspiration or swallowing of dental instruments, isolation of tooth and protection of soft tissues from injury.
Tooth selected for vital pulp therapy should have a good chance of responding favorably to the pulp therapy.

The advisability of performing the pulp therapy and restoring the tooth must be weighed against extraction and space management.
• The level of patient and parent cooperation and motivation in receiving the treatment should also be considered.
• The level of patients and parent desire and motivation in maintaining oral health and hygiene is important.
• The caries activity of the patient and overall prognosis of oral rehabilitation.
• The degree of difficulty anticipated in performing the pulp therapy in particular case.
• Space management issues resulting from previous extractions, preexisting malocclusion, ankylosis, congenitally missing teeth, and space loss caused by extensive carious destruction of teeth and subsequent drifting.
• Eradication of infection.
• Capitalization of reparative ability of the pulp.
Indirect Pulp Capping

- This describes the placement of a dressing over residual hard carious dentine in an attempt to stimulate secondary dentine formation within the pulp chamber.
Indirect Pulp Capping - 2

Indications

• Deep carious lesion, which is close to, but not involving the pulp in vital primary or young permanent teeth.
• Pulpal inflammation adjudged to be minimal.
• There is a definite layer of affected dentin after removal of infected dentine and complete removal of caries would cause pulp exposure.
• Mild pain associated with eating.
Indirect Pulp Capping - 3

Indications

• No history of spontaneous toothache
• No tenderness to percussion
• No abnormal mobility
• No radiographic evidence of radicular disease
• No internal or external root resorption detectable radiographically.
Contraindications

- Sharp, penetrating pulpalgia indicating acute pulpal inflammation.
- Prolonged night pain
- Discoloration of the tooth.
- Mobility of the tooth.
- Negative reaction of electric pulp testing.
Contraindications

• Soft leathery dentine covering a very large area of the cavity, in a non restorable tooth.
• Definite pulp exposure.
• Any signs of pulpal or periapical pathology.
• Interrupted or broken lamina dura.
Objectives of Indirect Pulp Capping

- The vitality of the tooth should be preserved.
- The restorative material should seal completely the involved dentine from the oral environment.
- No prolonged post-treatment signs or symptoms of sensitivity, pain or swelling should be evident.
- Remineralization of carious dentine.
Objectives of Indirect Pulp Capping - 2

- Arresting of carious process.
- The pulp should respond favourably and tertiary or reparative dentine should be formed, as evidenced by radiographic evaluation.
- There should be no evidence of internal resorption or other pathologic changes.
Indirect Pulp Therapy

- Indirect pulp therapy is a technique for avoiding pulp exposure in the treatment of teeth with deep carious lesions in which there exists no clinical evidence of pulpal degeneration or periapical disease.
- The procedure allows the tooth to use the natural protective mechanisms of the pulp against caries.
• It is based on the theory that a zone of affected, demineralized dentin exist between the outer infected layer of dentine and the pulp.
• When the infected dentine is removed, the affected dentine can remineralize and the odontoblasts form reparative dentine, thus avoiding pulp exposure.
Three distinct layers of dentine can be identified in active caries:

- Necrotic, soft dentine not painful to stimulation and grossly infected with bacteria.
- Firm but softened dentine, painful to stimulation but containing few bacteria.
- Slightly discolored, hard, sound dentin containing few bacteria and painful to stimulation.
• In indirect pulp therapy, the soften infected layer of carious dentine are removed. Thus most of the bacteria are eliminated from the lesion.
• When the lesion is sealed, the substrate on which the bacteria act to produce acid is also removed.
• Care must also be taken in removing the caries to avoid exposure of the pulp.
• With the arrest of caries process, the reparative mechanism is able to lay down additional dentine and avoid a pulp exposure.
• Although carious dentine left in the tooth probably contains some bacteria, the number of organisms can be greatly diminished when this layer is covered with ZOE or calcium hydroxide.
If the preliminary caries removal is successful, the inflammation will be resolved and deposition of reparative dentine beneath the caries will allow subsequent eradication of the remaining caries without pulpal exposure.
• The rate of reparative dentine deposition is about 1.4um/day after cavity preparation. The rate decreases markedly after 48 days.
Indirect Pulp Capping Technique

- Use local anesthesia and isolation with rubber dam.
- Establish cavity outline with high speed hand piece.
- Remove the superficial debris and majority of the soft necrotic dentine with slow speed hand piece using large round bur.
- Stop the excavation as soon as the firm resistance of sound dentine is felt.
- Carious dentine is removed with a sharp spoon excavator.
• Cavity flushed with saline and dried with cotton pellet.
• Cover site with calcium hydroxide.
• Remainder cavity is filled with reinforced ZOE and amalgam.
Aids to soft dentine removal

- Staining carious lesion was proposed many years ago to allow differentiation of remineralizable and non remineralizable dentine.
• Harmless dyes can be used demonstrate non remineralizable dentine. Parts of the tooth that remain stain should be removed. Any tooth structure that does not stain can remain, since this soft dentine will remineralize.
• Examples of some brands of caries dentin test are caries detector, caries funder and sable seek.
• The greatest benefit of Calcium hydroxide is the stimulation of reparative dentin bridge. This is due to its high alkalinity, which leads to enzyme phosphatase being activated resulting in the release of inorganic phosphate from the blood (calcium phosphate).
• It also has an antibacterial action. Its high alkalinity (pH of 9.0 to 10.0) results in the destruction of bacteria cell wall.
• A set back of the potential for internal resorption after pulp exposure and capping with calcium hydroxide.
Indirect Pulp Capping Materials

• Dressing materials should promote pulp tissue healing and tertiary dentine formation, and minimize microleakage.
• **Traditional materials:** Calcium hydroxide, ZnO eugenol
• **New materials:** Composite resin and glass ionomer cements.
Indications for indirect pulp capping:

- Teeth free from pulpitis
- History of spontaneous toothache
- Tenderness to percussion
- No abnormal mobility
Contraindication of indirect pulp capping:

- Prolonged night pain
- Discoloration of the tooth.
- Mobility of the tooth.
- Positive reaction of electric pulse oximeter.

Quiz 2
Quiz 3

Materials used for indirect pulp capping:

- Zinc oxide Eugenol
- Glass ionomer cement
- MTA
- Compomer
Acknowledgement

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