

# Deep Caries Management

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# Specific learning Outcome

- Identify the deep caries lesion
- Outline and explain management of deep caries lesion
- Rationale of deep carious lesion management

# Definition

- ◉ Dental caries :
  - an infectious micro-biologic disease of the teeth that results in localized dissolution & destruction of the calcified tissues
  - requiring restorative intervention & even extraction

# Deep Carious Lesion

- The caries in dentin may be close to the pulp

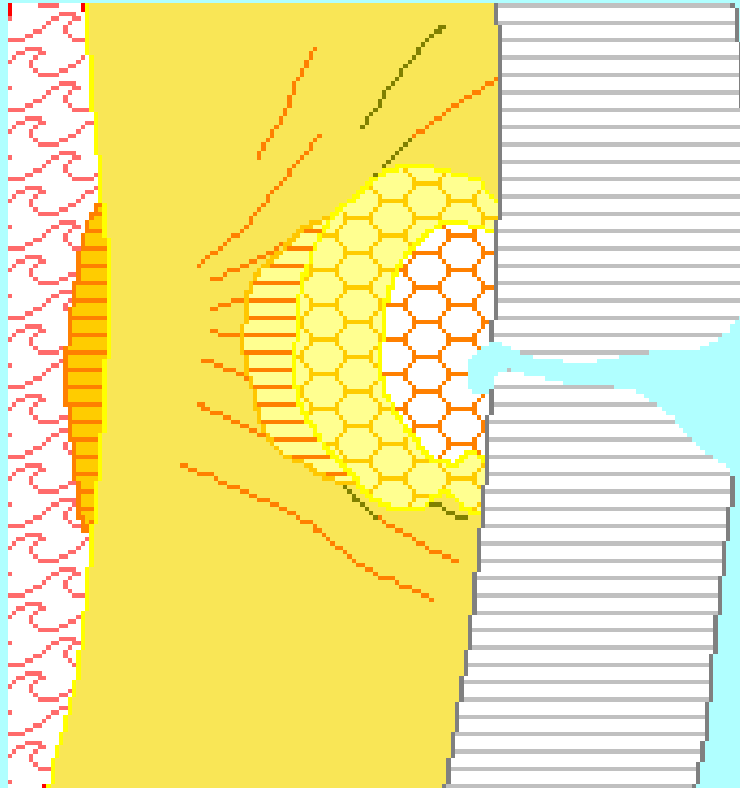


# Dentin caries

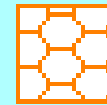
## Affected & Infected Dentin:

In operative procedures, it is convenient to term dentin as either **infected**:- requires removal, or **affected**:- which doesn't requires removal

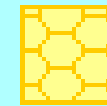
- › **Infected dentin:** → outer carious dentin & Bacterial plaque → is both softened & contaminated with bacteria
- › **Affected dentin:** is softened, demineralized dentin that is not yet invaded by bacteria → inner carious dentin



## CARIES

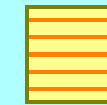


Infected



Affected

## BARRIERS



Intratubular  
Dentine



Secondary  
Dentine

# Management of deep caries lesion

Treatment option:

- ❖ Indirect pulp capping (IDPC)
- ✓ One step procedure
- ✓ Two step procedure @ stepwise excavation
- ❖ Direct pulp capping (DPC)

# Indirect pulp capping

- ◉ excavation of the dentin caries can be stopped at soft affected but not infected dentine (affected dentine could be remineralised if the acid production was halted)
- ◉ Medication is then applied over the dentine prior to placement of the definitive restoration



# Criteria of case selection

- ◉ No history of spontaneous pulpal pain
- ◉ Normal response to vitality tests
- ◉ Radiographic evidence of deep caries close to pulp but no signs of periapical involvement

# Procedure (one step)

1. LA administered and tooth isolated
2. Remove all undermined enamel-high speed hp with air-water spray. Excavate soft carious dentin.  
Take care to retain the deepest layer of carious dentin close to the pulp
3. Apply a liner-  $\text{Ca}(\text{OH})_2$  over deepest layer of demineralised dentin
4. Place a well sealed interim restoration of reinforced glass inomer (Fuji IX) or reinforced zinc oxide eugenol (IRM) over the  $\text{Ca}(\text{OH})_2$
5. A permanent restoration –after 6-8 weeks evaluating patient's response



# Two step procedure @ stepwise excavation

- Involves a step-by-step procedure at interval
- First step consists of partial dentin caries removal and cavity seal with  $\text{Ca}(\text{OH})_2$  and restorative material
- After 8-12 weeks-second step is performed which remaining caries lesion is removed and the tooth is conventionally restored

# Criteria of case selection

- ◉ Same as for indirect pulp capping (one step) procedure

# Procedure (stepwise excavation)

I visit:

1. Access is gained to the carious lesion
2. Superficial infected dentin at the periphery is removed –leaving behind the soft, infected dentin at the deeper portion of the cavity
3. Place  $\text{Ca}(\text{OH})_2$  liner on the dentin and GIC as temporary restoration

II visit: (After 3-6 months, in the absence of symptoms)

1. Re-entry to the deeper portion of the cavity and remaining caries is excavated

Caries will be darker in colour, harder and drier in consistency

2. Pulp protection is achieved by placing covered with glass ionomer liner
3. Finally, place a definitive restoration







# Direct pulp capping

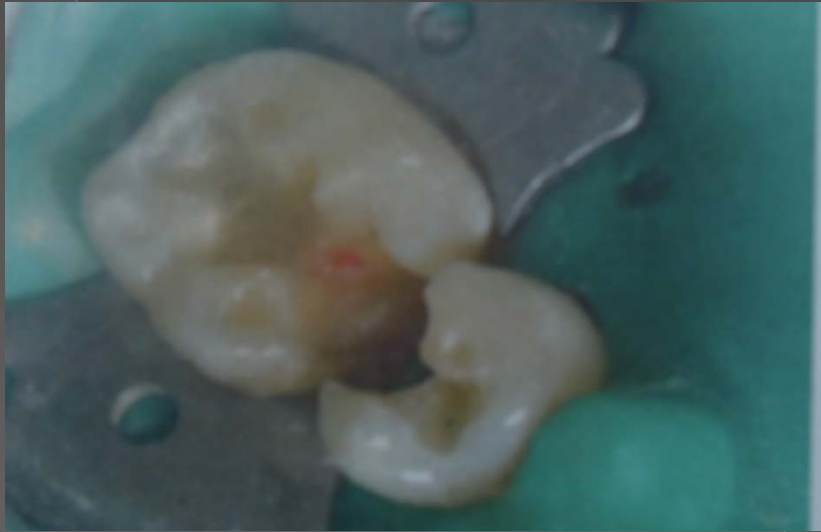
- Technique for treating a pulp exposure with a material that seals over the exposure site & promotes reparative dentin formation.

# Criteria of case selection

- Asymptomatic vital tooth
- Pin-point exposure (0.5mm or less in diameter)
- Non-hemorrhagic or easily controlled.
- Dry, sterile filed
- Area of exposure must be uncontaminated by saliva or gingival fluids

# Procedure

1. LA administered and tooth isolated
2. Hemorrhage from the pin point exposure should be control with cotton pellet
3.  $\text{Ca(OH)}_2$  liner /MTA is placed over the exposed pulp followed by temporary restoration using GIC
4. Permanent restoration may be placed after 6-8 weeks after evaluating the patient's response



- The success rates of IDPC in deep caries using calcium hydroxide liner varied from 92% to 97%.

Leksell et al 1996, Maltz et al 2002

- 'calcium hydroxide and a subsequent good marginal sealing reduced the substrate for bacteria, decreased lesion progression and promoted a physiological reaction in the pulp-dentin complex'
- 'It was also observed that calcium hydroxide may induce sclerosis and formation of secondary dentin'

- MTA (Mineral Trioxide Aggregate), a bioactive silicate cement-developed by Torabinejad et al., 1993 is gaining widespread acceptance as a direct pulp capping agent.
- Advantages of MTA:
  1. Highly biocompatible
  2. Sets in the presence of moisture and provides an excellent seal over the exposed pulp
  3. Promotes faster and thicker dentin bridge formation without any tunnel defects

# Conclusion

- ◉ Disease affecting the hard tissues of the tooth as well as most operative procedures are traumatic to the pulp.
- ◉ Hence gentle approach to cavity preparation and restoration should be employed.
- ◉ In an effort to preserve pulp vitality, procedures like IDPC, stepwise excavation and DPC have to be carried out when indicated.



# References

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4. Ticiane CF, Terezinha JE, Anuradha P, Eduardo B, José CP. Indirect pulp treatment in a permanent molar: Case report of 4-year follow-up. *J Appl Oral Sci.* 2009;17(1):70-4

Thank you