

# Diagnosis, Classification & Clinical Detection of Dental Caries

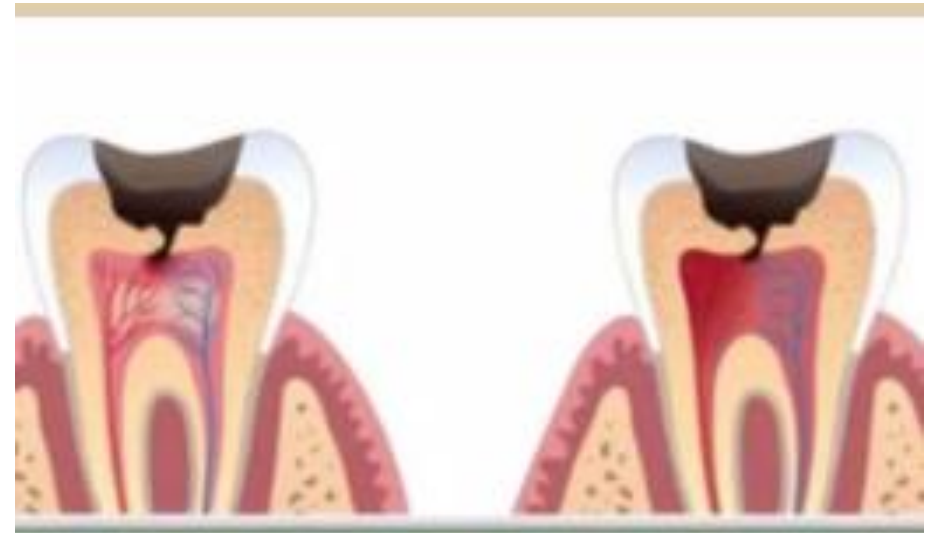
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## EXPECTED OUTCOMES

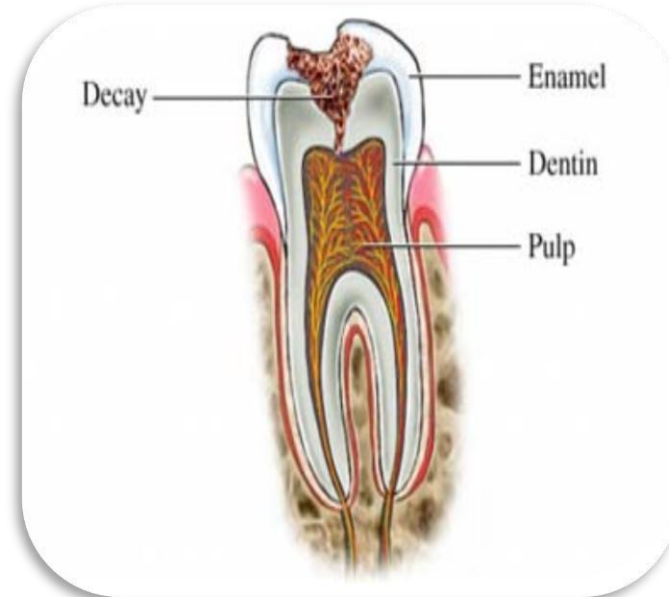
**By the end of this presentation, you are expected to be able to:**

- 1. Recognize the importance of early caries detection**
- 2. List the parameters of diagnostic techniques**
- 3. Describe the traditional techniques of caries detection and their limitations**
- 4. Rationalize the principles of novel caries detection techniques**

# DENTAL CARRIES

## Definition

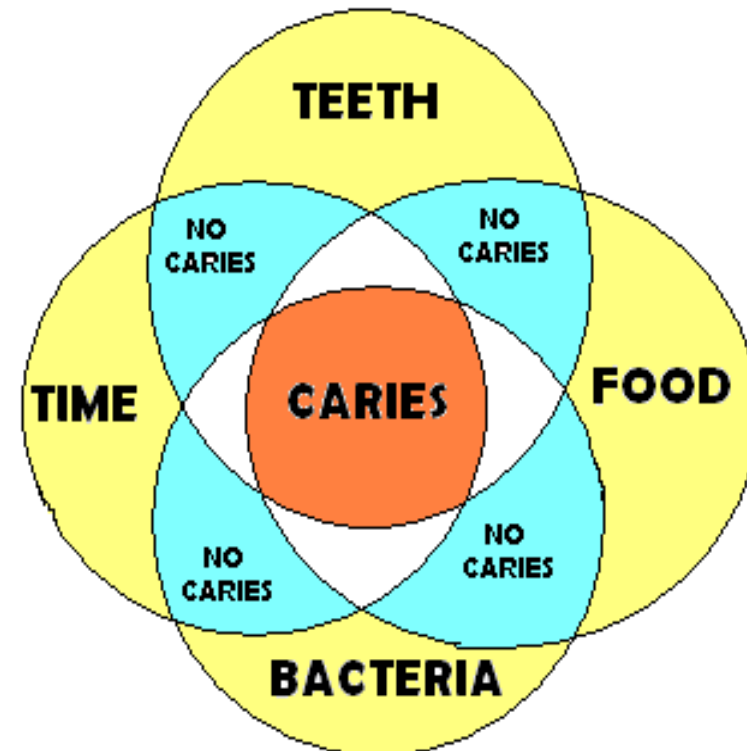
- It is a **chronic infectious microbiologic disease of the teeth** that results in localized dissolution and destruction of the calcified tissue.



- **Dental caries** and **periodontal disease** are probably the **most common chronic diseases** in the world.

○ There are **four main criteria** required for **caries formation**:

- **A tooth surface**
- **Caries-causing bacteria**
- **Substrate**
- **Time**



Clinical **sites** for caries **initiation**:

- ✓ **Pit and fissures caries**
- ✓ **Smooth surface of crown caries**
- ✓ **Root surfaces caries**



# CLASSIFICATION OF DENTAL CARIES

**Caries can be classified according to:**

**1- Location**

**2- Rate of progression**

**3- Affected hard tissues**

# 1- LOCATION

G.V. **Black** created a classification system that is widely used and based on the **location of the caries on the tooth**

# BLACK'S CLASSIFICATION OF CARIES LESIONS

## Class I

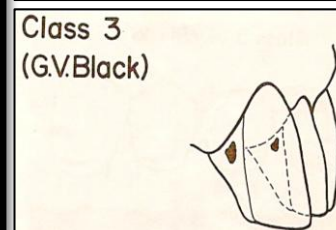
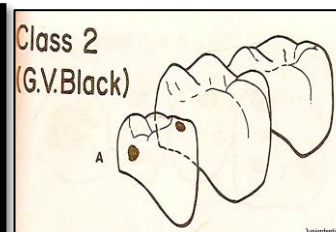
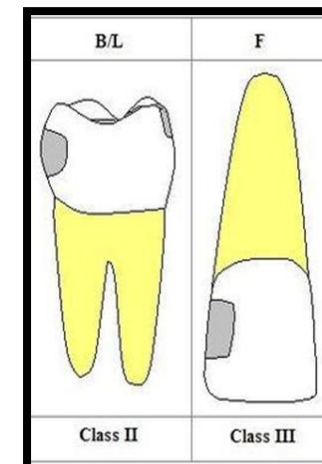
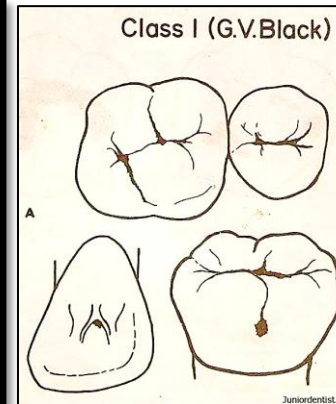
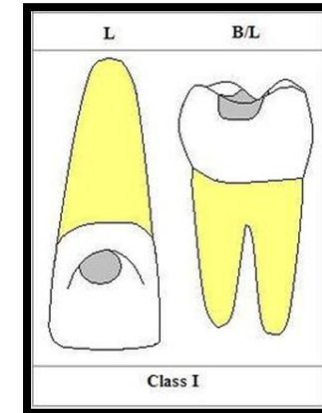
- Caries that affects the **pits and fissures** of posterior teeth (premolars and molars) on the occlusal, buccal and lingual surfaces. The **lingual surface of anterior teeth** is also Class I.

## Class II

- Caries that affects the **proximal surfaces** (mesial and distal) of **premolars and molars**.

## Class III

- Caries that affects the **proximal surfaces** of **central, lateral and canine teeth**.



## Class IV

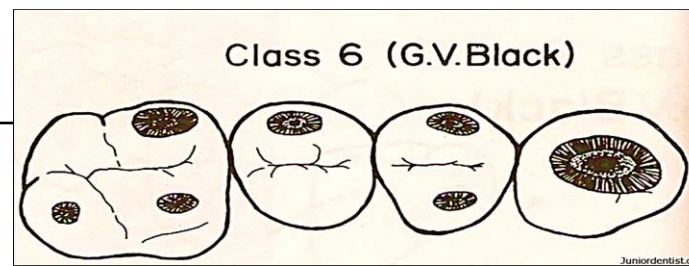
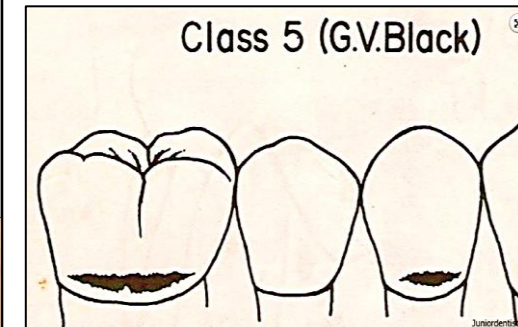
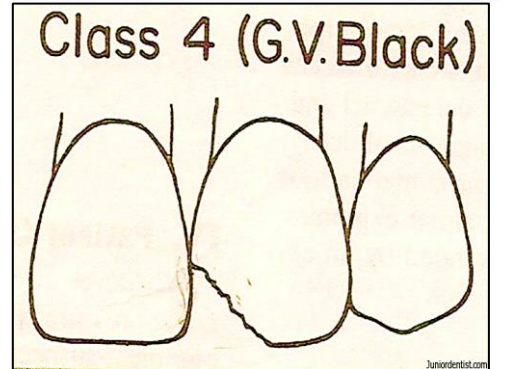
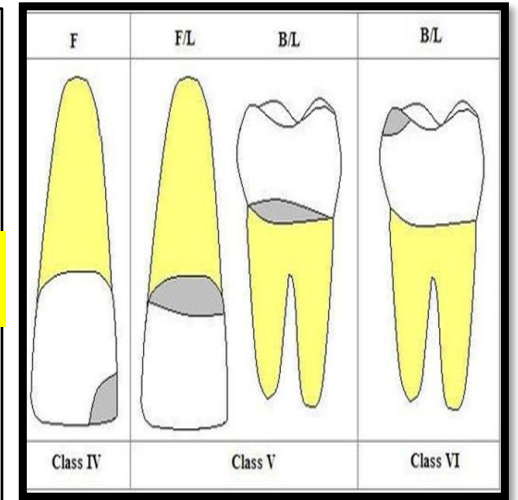
- Caries that affects the proximal surfaces of anterior teeth but also involves the incisal edge.

## Class V

- Caries that affects the gingival 1/3 of the buccal or lingual surface on anterior and posterior teeth

## Class VI

- Caries that affects cuspal tips of molars, premolars, and canines.



## 2- RATE OF PROGRESSION

1-"Acute" signifies a **quickly developing** condition

2-"Chronic" describes a condition which has taken an **extended time to develop**



### 3) Recurrent caries

Also described as **secondary**, are caries that appears at a location with a **previous history** of caries, This is frequently found on the **margins of fillings** and other dental restorations.



**4- Incipient** caries describes decay at a location that has not experienced previous decay.

**5-Arrested** caries describes a lesion on a tooth which was previously demineralized but was remineralized before causing a cavitation



Figure 17. Clinical illustration of arrested caries. The dentin is hard, darkly discolored, dry looking and plaque free.

# 3-CARIES AFFECTED HARD TISSUE

1-Enamel caries

2-Dentinal caries

3-Cementum caries



## RAMPANT CARIES "BABY BOTTLE CARIES"

- ✓ Is a pattern of decay found in young children with their *deciduous teeth*
- ✓ The teeth most likely affected are the *maxillary anterior teeth*
- ✓ Significance advance or severe decay on multiple surfaces of many teeth



# DIAGNOSIS

*Diagnosis* has been defined as “*the art or act of identifying a disease from its signs and symptoms*” and caries detection is the signs and symptoms identified.



# Importance of Early Detection

Prevents pulpal involvement



Minimally invasive dentistry



Better prognosis



Cost-effective treatment

# Methods of Diagnosis

## A) Conventional Methods

Visual examination

Tactile examination

Radiographic examination

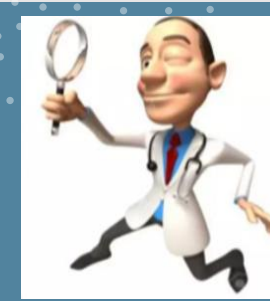
## B) Advanced Methods

Transillumination

Caries detector dyes

Laser fluorescence devices

# Visual examination



- ❖ Direct inspection of tooth surfaces under good lighting.
- ❖ Use of light, dental mirror, and compressed air (3-way syringe).

## Visual Signs:

- White spot lesion (opacities)
- Brown/black discoloration
- Surface roughness
- Cavitation



# Visual examination

## **\*\*Advantages\*\***


- \* Simple
- \* No equipment needed
- \* Non-invasive

## **\*\*Limitations\*\***


- \* Early lesions may be missed.

Often guided by systems like **\*\*ICDAS** – International Caries Detection and Assessment System\*\*.

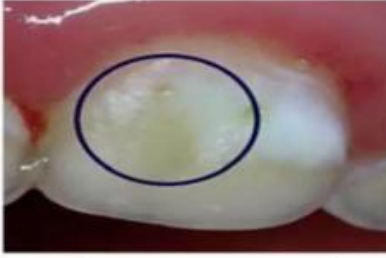
Score	Criteria
0	No or slight change in enamel translucency after prolonged air drying (5s)
1	First visual change in enamel (seen only after prolonged air drying or restricted to within the confines of a pit or fissure)
2	Distinct visual changes in enamel
3	Localized enamel breakdown in opaque or discoloured enamel (without visual signs of dentinal involvement)
4	Underlying dark shadow from dentine
5	Distinct cavity with visible dentin
6	Extensive distinct cavity with visible dentin (involving more than half of the surface)


**Score 1**



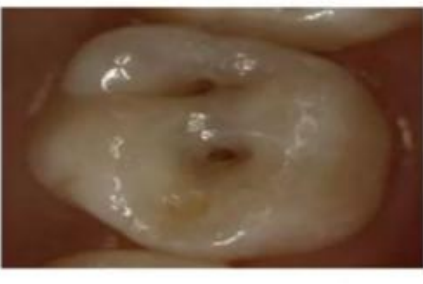
**Score 2**




**Score 3**

**Score 4**



**Score 5**



**Score 6**

# Tactile examination



- \* **Uses** \*\*dental explorer/probe\*\* gently on tooth surface.

- \*\***Findings**\*\*

Sticky pits and fissures may indicate decay

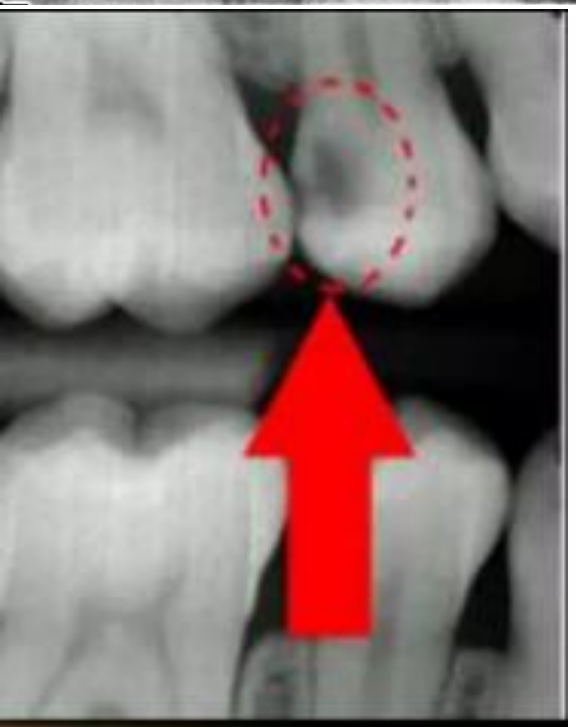
Surface roughness.

⚠ **Avoid** forceful probing (can damage remineralizable enamel).

## Using dental Floss.

Shredding of dental floss indicates a proximal cavity.





# Radiographic Diagnosis

- **Types of Radiographs:**

- Bitewing (most common for detecting proximal caries)
- Periapical show full tooth and surrounding bone
- Occlusal radiographs

- **Radiographic Appearance:**

- Radiolucent (dark) areas
- Triangular shape in enamel



## Conventional Radiographs:

presents a 2-D picture of a 3-D object.

net mineral loss must exceed at least 20%-30% in order to be radiographically visible.

- intraoral periapical
- bitewing radiographs

(bitewing radiographs have more diagnostic value)

## Advantages:

- Non-invasive method
- Disclose sites inaccessible to other diagnostic methods
- Permanent record for monitoring progress or arrest of the carious lesion.

*Problems encountered with radiographic methods are:*

1. Overlapping of approximal contacts.
2. False diagnosis due to overestimation of lesion depth, due to change in angulations.
3. Radiolucency may be because of caries or resorption or any other defect i.e. wear, etc.
4. A superficial demineralization in the buccal & lingual surfaces may be imaged on the radiograph as an approximal carious lesion.
5. Fracture of one lingual cusp may appear as radiolucent approximal cavity.
6. Tilt of maxillary lateral incisors appears as caries on the mesial side of lateral incisors.
7. Cervical burnout may mimic cervical caries.



Thank you