

## **Dental caries, explanation of its origin**

### **Classification of dental caries from various point of view**

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Tooth decay, also known as dental caries or cavities, is a breakdown of teeth due to acids made by bacteria. The cavities may be a number of different colours from yellow to black. Symptoms may include pain and difficulty with eating. Complications may include inflammation of the tissue around the tooth, tooth loss, and infection or abscess formation which can be an irreversible microbial disease of the calcified tissue of the teeth, characterized by demineralization of the inorganic portion and inorganic destruction of the the tooth, which often leads to cavitation.

Dental caries can be categorised based on the:

- Anatomical site
- progression
- virginity of lesion
- extend of caries
- tissue involvement
- pathway of caries
- number of tooth surface involved
- chronology
- whether caries is completely removed or not
- Tooth surface to be restored
- Black's classification
- WHO system

#### **Anatomical site**

- Occlusal (pit and fissures)

All caries bacteria rapidly colonize the pits and fissures of the newly erupted teeth. These early colonizers form a "bacterial plug" that remains in the site for long time, perhaps even the life of the tooth. Type and nature of the organisms prevalent in the oral cavity determine the type of organisms colonizing the pit and fissure. Numerous gram positive cocci, especially dominated by *S. sanguis* are found in the newly erupted teeth. Shape, morphological variation and depth of pit and fissures contributes to their high susceptibility to caries

- Smooth surface caries (proximal and cervical caries)

Less favorable site for plaque attachment, usually attaches on the smooth surface that are near the gingiva or are under proximal contact. In very young patients the gingival papilla

completely fills the interproximal space under a proximal contact and is termed as col. Also crevicular spaces in them are less favorable habitats for s.mutans. Consequently proximal caries is less likely to develop where this favorable soft tissue architecture exists.

- Linear enamel caries

Linear enamel caries odontoclasia is seen to occur in the region of the neonatal line of the maxillary anterior teeth. The line, which represents a metabolic defect such as hypocalcemia or trauma of birth, may predispose to caries, leading to gross destruction of the labial surface of the teeth. Morphological aspects of this type of caries are atypical and results in gross destruction of the labial surfaces incisor teeth

- Root caries

The proximal root surface, particularly near the cervical line, often is unaffected by the action of hygiene procedures, such as flossing, because it may have concave anatomic surface contours (Aueng) and occasional roughness at the termination of the enamel. These conditions, when coupled with exposure to the oral environment (as a result of gingival recession), favor the formation of mature, caries-producing plaque and proximal root-surface caries. Root-surface caries is more common in older patients. Caries originating on the root is alarming because: it has a comparatively rapid progression, it is often asymptomatic, it is closer to the pulp, it is more difficult to restore

### **Progression**

- acute

Of abrupt onset, in reference to a disease. Acute often also connotes an illness that is of short duration, rapidly progressive and in need of urgent care

- chronic

This is especially known for diseases. Any disorder leads to gum disease or cavities with an immediate reaction of the body immune system.

- arrested

Good nutrition plays a part in preventing as well as arresting decay. Only active caries lesions require treatment. Arrested caries is often a dark brown stain that seems ingrained in the tooth and won't come off when it is polished.

### **Virginity of lesion**

- Primary caries, No caries before at this spot
- Secondary caries, Next to filling, originates at borders
- Recurrent caries, Under the filling-insufficient excavation of caries

## **Extend of caries**

- Incipient caries

The early caries lesion, best seen on the smooth surface of teeth, is as a white spot. Histologically the lesion has an apparently intact surface layer overlying subsurface demineralization. Significantly, such a lesion can undergo remineralization and thus the lesion is not an indication for restorative treatment.

- cavitation

Occult carious lesions are usually seen with low caries rates which is suggestive of increased fluoride exposure. These hidden lesions are called fluoride bombs or fluoride syndrome. Recently it is seen that occult caries may have its origin as pre-eruptive defects which are detectable only with the use of radiographs.

- Occult caries

Once it reaches the dentinoenamel junction, the caries process has the potential to spread to the pulp along the dentinal tubules and also spread in lateral direction. Thus, some amount of sensitivity may be associated with this type of lesion. This may be generally accompanied by cavitation.

## **Tissue involvement**

- Initial caries, Demineralization without structural defect. This stage can be reversed by fluoridation and enhanced mouth hygiene
- superficial caries, Enamel caries, wedge-shaped structural defect, Caries has affected the enamel layer, but has not yet penetrated the dentin.
- Moderate caries, dentin caries. Extensive structural defect, Caries has penetrated up to the dentin and spreads two-dimensionally beneath the enamel defect where the dentin offers little resistance.
- Deep caries, structural defect, caries has penetrated up to the dentin layers of the tooth close to the pulp
- Deep complicated caries, Caries has led to the opening of the pulp cavity (pulpa aperta or open pulp)

## **Pathway of caries**

"Forward-backward" classification is considered as graphical representation of the pathway of dental caries.

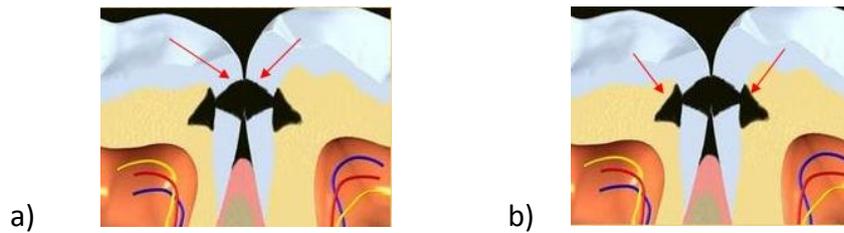


Figure1. A) forward caries B) backward caries

### Numbers of tooth surface involved

- Simple, a caries involving only one tooth surface
- Compound, a caries involving two surfaces of tooth
- Complex, a caries that involves more than two surfaces of a tooth

### Chronology

- EARLY CHILDHOOD CARIES
- ADULT CARIES
- Adolescent CARIES

### Whether caries is completely removed or not during treatment

- Residual caries is that which is not removed during a restorative procedure, either by accident, neglect or intention.
- Sometimes a small amount of acutely carious dentin close to the pulp is covered with a specific capping material to stimulate dentin deposition.
- The carious dentin can be removed at the later time.

### Surface to be restored

Most widespread clinical utilization: O, Occlusal; M, mesial; D, distal; F, facial; B, buccal; L, lingual surfaces. Various combinations are also possible, such as MOD, for mesio-occluso-distal surfaces.

### Black's classification

Greene Vardiman Black (1836–1915), commonly known as G.V. Black, is known as one of the founders of modern dentistry in the United States.<sup>[1]</sup> He is also known as the father of operative dentistry. He organized 'Black's Classification of Caries Lesions' which is still in use today. Since that time, only one more category has been added to his classification system.

- Class I Caries affecting pits and fissures on occlusal third of molars and premolars, occlusal two thirds of molars and premolars, and Lingual part of anterior teeth
- Class II Caries affecting proximal surfaces of molars and premolars
- Class III Caries affecting proximal surfaces of central incisors, lateral incisors, and cuspids without involving the incisal angles
- Class IV Caries affecting proximal including incisal angles of anterior teeth
- Class V Caries affecting gingival 1/3 of facial or lingual surfaces of anterior or posterior teeth
- Class VI (never described by Black, added later by W J Simon in 1956) Caries affecting cusp tips of molars, premolars, and cuspid

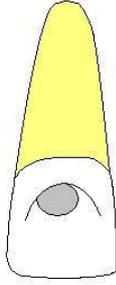
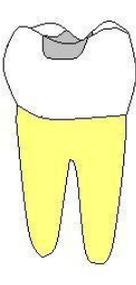
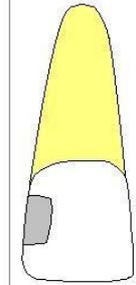
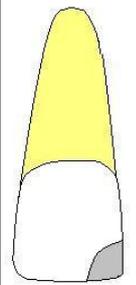
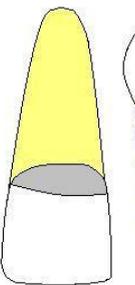
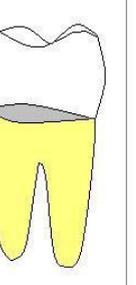
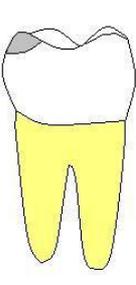
<b>G.V. Black</b>							
L	B/L	B/L	F	F	F/L	B/L	B/L
							
Class I	Class II		Class III	Class IV	Class V		Class VI

Figure2. GV Black Classification of Restorations

### World health organization (WHO)

In this classification the shape and depth of the caries lesion scored on a four-point scale;

- Clinically detectable enamel lesion with intact (not cavitated) surfaces
- Clinically detectable cavities limited to enamel
- Clinically detectable cavities in dentin
- Lesion extending into the pulp