Lec. 3 **Community Dentistry**

Epidemiology of Oral diseases

1-Denata caries:

Dental caries is defined as a progressive irreversible microbial disease affecting the hard parts of tooth exposed to the oral environment, resulting in demineralization of the inorganic constituents and dissolution of the organic constituent, thereby leading to a cavity formation.

The relationship between diet and dental caries Bacterial enzymes + fermentable carbohydrates = acid
Acid + enamel = dental caries

Current Trends in Caries Incidence

-In developed countries, caries prevalence declined in last decade, causes are multifactorial. Eg: communal water fluoridation.
- In developing countries increase in caries prevalence, cause is increased use of refined carbohydrates.

CARIES SUSCEPTIBILITY OF INDIVIDUAL TEETH

- Upper and lower first molar → 95%
- Upper and lower second molar → 75%
- Upper second bicuspid → 45%
- Upper first bicuspid → 35%
- Lower second bicuspid → 35%
- Upper central and lateral incisor → 30%
- Upper cuspids and lower first bicuspid → 10%
- Lower central and lateral incisor → 3%
- Lower cuspids → 3%
- Teeth farthest back in the mouth are more frequently carious.
- Caries susceptibility of individual tooth surface

occlusal > mesial > buccal > lingual

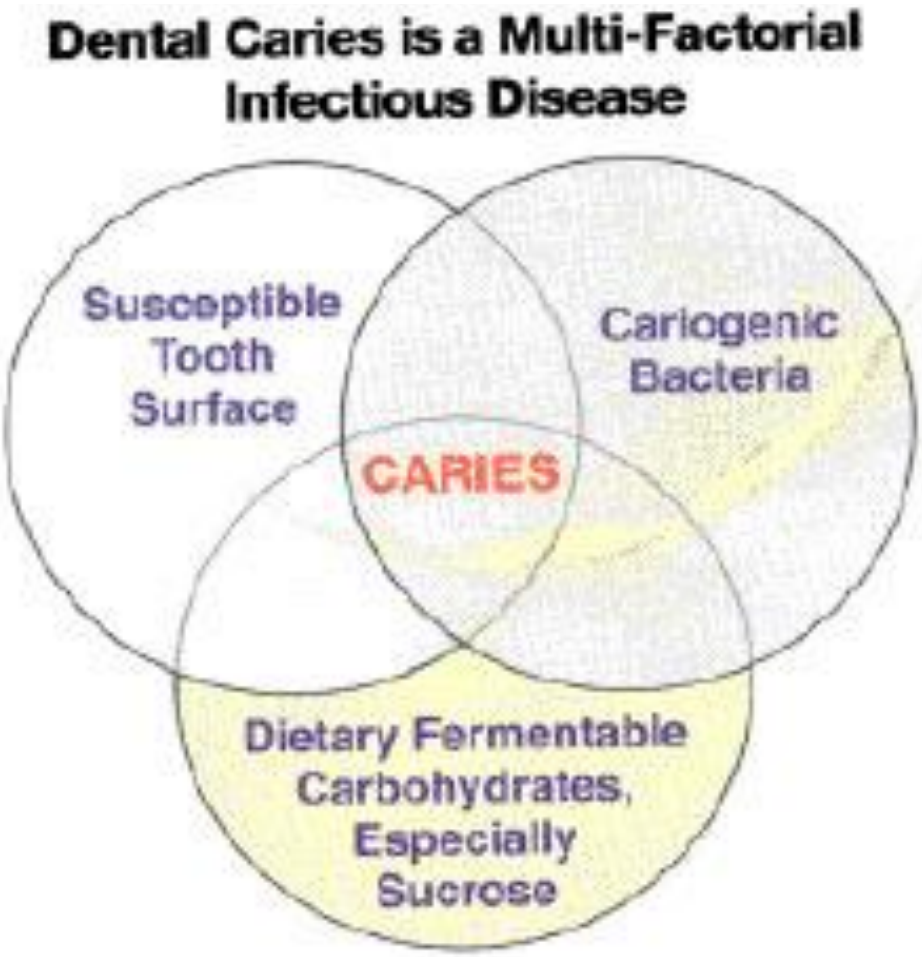
Etiologic factors in dental caries

- Dental caries is a multifactorial disease in which there is an interplay of 3 principle factors.

  I. The host (teeth, saliva etc.)

  II. Micro flora

  III. Substrate (diet)
- In addition the fourth factor, time must be considered.



I. HOST FACTORS

Tooth

- Composition
- Morphologic characteristics
- Position

Composition of tooth

Enamel:-

- Inorganic : 96%
- Organic + water : 4%

Dentin:-

- Organic matter +water :35%

- Inorganic :65%

Cementum:-

- Inorganic : 45-50%
- Organic +water : 50- 55%

Morphological characteristics of the tooth

- Feature predisposed to the development of dental caries is presence of deep narrow occlusal fissure/ buccal and lingual pits

Tooth position

- Which are malaligned, out of position, rotated or otherwise not normally situated, may be difficult to clean and tend to favor the accumulation of food and debris which subsequently lead to dental caries

Saliva

- Composition
- PH
- Quantity
- Viscosity
- Antibacterial factors

Composition of saliva

Inorganic:-

Positive ions:- Ca, Mg, K,

Negative ions:- CO2, Cl, F, PO4, thiocynate

Organic:-

Carbohydrates : glucose

Lipids : cholesterol, lecithin

Nitrogen : non- protein→ ammonia, nitrites & amino acids

protein → globulin, mucin, total protein

Miscellaneous : peroxides

Enzymes : carbohydrases, proteases, oxidases

PH of saliva

- Determined by bicarbonate concentration
- PH increases with flow rate, normal PH 7.8
- Sialin is an argenine peptide described PH rise factor, present in saliva

Quantity of saliva

- Normal quantity 700-800 ml per day
- In case of salivary gland aplasia and xerostomia in which salivary flow may entirely lacking, resulting in rampant dental caries

Viscosity of saliva

Thick, mucinous saliva increases the dental caries

Antibacterial properties of saliva

Lactoperoxidase

- They participate in killing of microorganisms by catalyzing the H2O2 mediated oxidation of a variety of substances in the microbes
- Utilizing thiocynate ions in saliva peroxidation generate highly reactive chemical compound that bond and inactivate general intracellular microbial enzyme system, as well as microbial surface compound.

Lysozyme

- Small, highly positive enzyme that catalyze the degradation of negatively charged peptidoglycan matrix of microbial cell wall

Lactoferin

- Fe binding basic protein found in saliva with mol. wt. near 80,000.
- Tends to bind & link the amount of the free Fe which is essential for microbial growth

IgA

- Immunoglobulin in saliva
- Inhibit adherence and prevent colonization of microbial on tooth and mucosal surfaces

II. Agent: The most common cariogenic oral flora is two type of bacteria (streptoccus mutans and Lactobacillus) produces an acids that cause the distraction of inorganic components of enamel and dentine.

III. Diet: The cariogenic bacteria produce and secretes the chemical substances (organic acid) from fermentation of carbohydrate which may cause demineralization of tooth

IV. Time: once the diet is rich in suitable carbohydrate the caries can be begin within days of a tooth erupting into the mouth (frequency of exposure to cariogenic environment).

Factors affecting caries prevalence

1-Age: dental caries essentially is a disease of childhood, the mean of DMF increase with age because it is accumulative disease.

2-Gender: Its higher in female than male could be explained in children by early eruption of teeth in females.

3-Race: people living in different geographical area having different caries incidence an in Africa and India enjoyed greater freedom caries than Europeans.

4-Hereditary:(genetic factor) dental caries run in the family of the parents suffering from caries, although the environment factors have great influence but also the genetic factors contributes to caries occurrence.

5-Emotional disturbance: anxiety status influence the incidence of dental caries.

6-Socioeconomic factors: prevalence of dental caries in many developing countries are increasing due to the availability of refined sugars, while the caries experience decrease in undeveloped countries.

7-Nutrition: malnourished people are attributed higher prevalence of dental caries.

8-Tobacoo smoking : it may increase the risk of caries formation.

9-Oral hygiene habits: tooth brushing, flossing and uses of fluoride supplement reduce the occurrence of dental caries.

10-Pregnancy and Lactating : neglect their oral hygiene.

11-Use of medications: drugs promote xerostomia.

12-Radiation: increasing caries susceptibility.

Book: Essential of Preventive and Community Dentistry