Al-Mustaqbal University College
Dentistry Department
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Subject: Microbiology
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Class: Third Stage

Lec – 3 –

Oral Bacteria

DEFINITIONS:

- Commensal: An organism living in/on an organism of another species without injuring the host;
- Parasite: An organism living in/on and at the expense of another organism (the host). Equivalent to a pathogen;
- Opportunistic Pathogen: A commensal organism that can cause disease in certain circumstances ;
- Symbiosis: The mutually beneficial association between two organisms
- Aerobic Organism: requiring oxygen for growth and replication;
- Anaerobe: Organism that grows and replicates in the absence of oxygen; not necessarily killed by oxygen;
- Strict anaerobe: Anaerobe killed by oxygen;
- Facultative anaerobe: Organism capable of growth and replication in the presence or absence of oxygen.

Important Oral Bacteria

1. Gram Positive organisms:

• Rods (bacilli), cocci or irregular shape (pleomorphic);

• Oxygen tolerance varies from aerobes to strict anaerobes;

• Most are fermentative;

• Cell wall has thick peptidoglycan layer (penicillin has effect by interfering production of this layer).

Streptococci:

- Isolated from all sights of the mouth;
- Large proportion of resident microflora;
- Majority α-haemolytic**.**

Strep mutans:

- Associated with caries;
- Associated with bacterial endocarditis.

Streptococcus mutans.

- Streptococcus mutans is the primary bacterium involved in plaque formation and initiation of dental caries;
- Viewed as an opportunistic infection, dental disease is one of the most prevalent and costly infectious diseases

Strep salivarius:

- Colonise mucosal surfaces especially the tongue.

Strep angiosus:

- Isolated dental plaque & mucosal surfaces;
- Seen in maxillofacial infections, brain, liver etc.

Strep mitis:

- Opportunistic pathogens e.g. endocarditis.

Lactobacillus species

- Lactobacilli in the oral cavity probably contribute to acid formation that leads to dental caries.

Biofilm formation

- Biofilms usually occur when one bacterial species attaches specifically or non specifically to a surface, and then secretes carbohydrate slime (exopolymer) that imbeds the bacteria and attracts other microbes to the biofilm for protection or nutritional advantages.
- The classic biofilm that involves components of the normal flora of the oral cavity is the formation of dental plaque on the teeth;
- Plaque is a naturally-constructed biofilm, in which the consortia of bacteria may reach a thickness of 300-500 cells on the surfaces of the teeth;
- These accumulations subject the teeth and gingival tissues to high concentrations of bacterial metabolites, which result in dental disease.

Gram-negative bacteria

- Aerobes, facultative anaerobes, microaerophils

Cocci

- Neisseria

- N. flavescens

- N. mucosa

- N. sicca

- N. subflava

B. catarrhalis

Anaerobes

- Veillonella

- V. atypica

- V. dispar

- V. parvula

2. Gram Negative organisms

- Many Gram-negative bacteria found in the mouth, especially in established/subgingival plaque;

- Cocci, rods, filamantous rods, spindle shaped or spiral shaped;

- Range of oxygen tolerance but most important strict or facultative anaerobes;

- Some fermentative, produce acids which other organisms use acids as an energy source, others produce enzymes which break down tissue.

Most important Gram negative bacteria:

Rods

Actinomyces
A. naeslundii
A. odontolyticus
A. viscosus
A. israelii
A. meyeri

Actinomyces and various proteolytic bacteria are commonly found in human carious dentin and cementum, which suggests that they are secondary invaders that contribute to the progression of the lesions.