



Normal oral flora

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Agenda:

Duration of presentation : 40 MIN

- ❖ *Introduction*
- ❖ *Human oral flora*
- ❖ *Four features that to make the oral cavity distinct from other areas :*

(Teeth /Specialized mucosal surfaces /Saliva /Gingival crevicular fluid)

- ❖ *Normal microflora of the oral cavity:*
(Lips/palate /cheek /Tongue /Saliva /Teeth)
- ❖ *Factors affecting the growth of microorganisms in the oral cavity*
- ❖ *Ageing and the oral microflora*
- ❖ *The importance of normal oral flora for dentists*
- ❖ *Human normal bacteria*



INTRODUCTION

- *Human body is made up of over 10^{14} cells of which only around 10% are mammalian .*
- *The remainder are the microorganisms that comprise the resident microflora of the host .*
- *This resident microflora does not have merely a passive relationship with its host, but contributes directly and indirectly to the normal development of the physiology, nutrition and defence systems of the organism .*
- *In general, these natural microfloras live in harmony with humans and animals and, indeed, all parties benefit from the association .*



INTRODUCTION

- *The oral cavity is a border area between the environment and the human organism, a gateway for food, an outpost of the immune system and above all a multilayered habitat inhabited by countless microorganisms. The mouth is continually exposed to organisms from the external environment ,beginning with the passage through the birth canal. In time a ecological balance is reached that serves to establish a resident microbial flora that remains fairly stable throughout life. Microorganisms in mouth were first described by Anton von Leeuwenhoek in 1683.*

A yellow construction crane is positioned on a white, tiered, cylindrical base. The crane's boom extends upwards and to the right. The background is a light gray gradient.

HUMAN ORAL FLORA

- ✓ *Gram-positive / negative cocci*
- ✓ *Gram-positive / negative bacillus*
- ✓ *Spirochetes*
- ✓ *Mycoplasma*
- ✓ *Fungus*
- ✓ *Protozoa*
- ✓ *Virus*



Four features that to make the oral cavity distinct from other areas of the body are :

- *Teeth*
- *Specialized mucosal surfaces*
- *Saliva*
- *Gingival crevicular fluid*



TEETH

- *The mouth is the only normally-accessible site in the body that has hard non-shedding surfaces for microbial colonization.*
- *Teeth (and dentures) allow the accumulation of large masses of microorganisms (predominantly bacteria) and their extracellular products, termed dental plaque .*
- *Teeth do not provide a uniform habitat but possess several distinct surfaces each of which is optimal for colonization and growth by different populations of microorganism.*



SPECIALIZED MUCOSAL SURFACES

- *The oral cavity have specialized surfaces which contribute to the diversity of the microflora at certain sites .*
- *The papillary structure of the dorsum of the tongue provides refuge for many micro-organisms which would otherwise be removed by mastication and the flow of saliva The mouth also contains keratinized (e.g. the palate) as well as non-keratinized, stratified squamous epithelium which may affect the intra-oral distribution of some micro-organisms.*



SALIVA

- *The mouth is kept moist and lubricated by saliva which flows over all the internal surfaces of the oral cavity .*
- *Saliva enters the oral cavity via ducts from the major paired parotid, submandibular and sublingual glands as well as from the minor glands of the oral mucosa (labial, lingual, buccal and palatal glands) where it is produced .*
- *Saliva contains several ions including sodium, potassium, calcium, chloride, bicarbonate and phosphate . Some of these ions contribute to the buffering property of saliva which can reduce the cariogenic effect of acids produced from the bacterial metabolism of dietary carbohydrates. Bicarbonate is the major buffering system in saliva but phosphates, peptides and proteins are also involved. The mean pH of saliva is between pH 6.75 and 7.25 although the pH and buffering capacity will vary with the flow rate .*



GINGIVAL CREVICULAR FLUID (GCF)

- *Serum components can reach the mouth by the flow of a serum-like fluid through the junctional epithelium of the gingivae. The flow of GCF is relatively slow at healthy sites, but increases during inflammation .*
- *GCF can influence the site by acting as a novel source of nutrients, while its flow will remove nonadherent microbial cells .*
- *GCF also contains components of the host defenses which play an important role in regulating the microflora of the gingival crevice in health and disease. The neutrophils in GCF are viable and can phagocytose bacteria within the crevice.*



NORMAL MICROFLORA OF THE ORAL CAVITY

- **LIPS** : *staphylococci, micrococci and Gram positive*
- **PALATE** : *streptococci and actinomyces; veillonellae*
- **CHEEK** : (*buccal mucosa*) : *Streptococci*



NORMAL MICROFLORA OF THE ORAL CAVITY

- **TONGUE** : *The dorsum of the tongue with its highly papillated surface has a large Streptococci , salivarius- and mitis.*
- **SALIVA** : *Although saliva contains up to 108 microorganism. (saliva and GCF flow, chewing, oral hygiene). .*
- **TEETH** : *The microbial community associated with teeth is referred to as dental plaque. Its composition varies at each tooth surface due to the local environmental conditions*



Factors affecting the growth of microorganisms in the oral cavity:

- *Temperature*
- *Redox potential*
- *pH*
- *Nutrients*
- *Adherence and agglutination*
- *Anti-microbial agents*
- *Host defence*
- *Host genetics*



AGEING AND THE ORAL MICROFLORA

- **Infancy & Early Childhood :** *The eruption of deciduous teeth provides a new attachment surface and turns *Streptococcus sanguis* and *mutans* as regular inhabitants of oral cavity .*
- **Adolescence:** *The greatest number of organisms in mouth occur when permanent teeth erupt. These teeth have deep fissures, larger inter proximal spaces and deeper gingival crevice, allowing a great increase in anaerobes.*
- **Adulthood :** *increase in *Bacteroides* and *Spirochetes* with maturity of dental plaque .*
*Edentulous persons harbour few *Spirochetes* or *Bacteroides* but carriage of Yeast increases.*



The importance of normal oral flora for dentists

- *Suppress of the immune system*
- *Infection of surgical wounds*
- *Dispersion of normal oral flora around surgery and dentistry*
- *bacteremia*



HUMAN NORMAL BACTERIA

جدول ۱-۳. فلور طبیعی حفره دهان، حفره بینی، پوست ناحیه اطراف دهان و فک و صورت و ناحیه زیر ترقوه و انگشتان

Region	Bacteria
Oral cavity (حفره دهان)	Aerobic gram-positive organisms, primarily streptococcus spp. Actinomyces spp. Anaerobic bacteria, including prevotella melaninogenica Candida spp.
Nasal cavity (حفره بینی)	Aerobic gram positive organisms, primarily streptococcus spp. In children, Haemophilus influenza frequently present In adult, staphylococcus aureus frequently present
Facial skin (پوست صورت)	Staphylococcus spp., primarily S. epidermidis Occasionally s. aureus Corynebacterium diphtheria Propionibacterium acnes
All areas below clavicles, including hands (نواحی زیر ترقوه شامل دست بویژه نوک انگشتان)	S. epidermidis C. diphtheria gram-negative aerobes, such as Escherischia coli, Klebsiella spp., and Proteus spp. Anaerobic enteric organisms, including Bacteroides fragilis

TYPE OF HERPES VIRUS

جدول ۱-۲. هشت گونه ویروس هرپس انسانی

Type	Other Name	Disease
HHV 1	Herpes simplex	(HSV-1) Oral, ocular and some genital herpes
HHV 2	Herpes simplex	(HSV-2) Genital Herpes, some oral herpes
HHV 3	Varicella-zoster	(VZV) Chicken pox, Shingles
HHV 4	Epstein-Barr virus	(EBV) Infectious mononucleosis, hairy Leukoplakia of tongue
HHV 5	Cytomegalovirus	(CMV) CMV disease, retinitis
HHV 6	None	Roseola
HHV 7	None	Not yet known
HHV 8	None	Kaposi's sarcoma

HHV= Human Herpes Virus= ویروس هرپس انسانی

HSV= Herpes simplex virus= ویروس هرپس ساده

Varicella-zoster= آبله مرغان، زونا

(VZV) = Varicella-zoster virus= ویروس آبله مرغان، زونا

Chicken pox= varicella= آبله مرغان

Shingles = زونا

Roseola = سرخچه



THANK YOU

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