• inadequate oral hygiene — this leads to the formation of bacterial plaque and its products, which are the primary etiologic factors in gingivitis

The initial microbiota of acute gingivitis consists of gram-positive rods, gram-positive cocci, and gram-negative cocci. The transition to gingivitis is evident by inflammatory changes and is accompanied first by the appearance of gram-negative rods and filaments, then by spirochetal and motile organisms.

The microbiota of chronic gingivitis consists of approximately equal proportions of gram-positive (56%) and gram-negative (44%) species, as well as facultative (59%) and anaerobic (41%) microorganisms. Predominant gram-positive species include S. sanguis, S. mitis, S. intermedius, S. oralis, A. viscosus, A. naeslundii, and P. micros. The gram-negative microorganisms are predominantly F. nucleatum, P. intermedia, and V. parvula, as well as Haemophilus, Capnocytophaga, and Campylobacter species.

Comparing the microbiota in health, gingivitis, and periodontitis, the following microbial shifts can be seen:
• From gram-positive to gram negative
• From cocci to rods
• From nonmotile to motile organism
• From facultative anaerobes to obligate anaerobes
• From fermenting to proteolytic species

All surfaces of the oral cavity (both hard and soft tissues) are coated with a pellicle (initial phase of plaque development). Within nanoseconds after vigorously polishing the teeth, a thin, saliva-derived layer, called the acquired pellicle, covers the tooth surface. This pellicle consists of numerous components, including glycoproteins (mucins), proline-rich proteins, phosphoproteins (e.g., statherin), histidine-rich proteins, enzymes (e.g., alpha-amylase), and other molecules that can function as adhesion sites for bacteria (receptors).

Halitosis (bad breath/oral malodor): At least 85% of breath malodors have an oral source. Gingivitis, periodontitis, and tongue coating are the predominant causes of bad breath. The gram-negative anaerobic bacteria associated with gingivitis and periodontitis cause bad breath by their proteolysis, which produces foul-smelling volatile sulfide compounds (VSCs).

Notes
1. The overall pattern observed in dental plaque development is a very characteristic shift from the early predominance of gram-positive facultative microorganisms to the later predominance of gram-negative anaerobic microorganisms.
2. The major factor in determining the different bacteria is oxygen. The redox potential of the gingival sulcus greatly influences the bacterial composition.