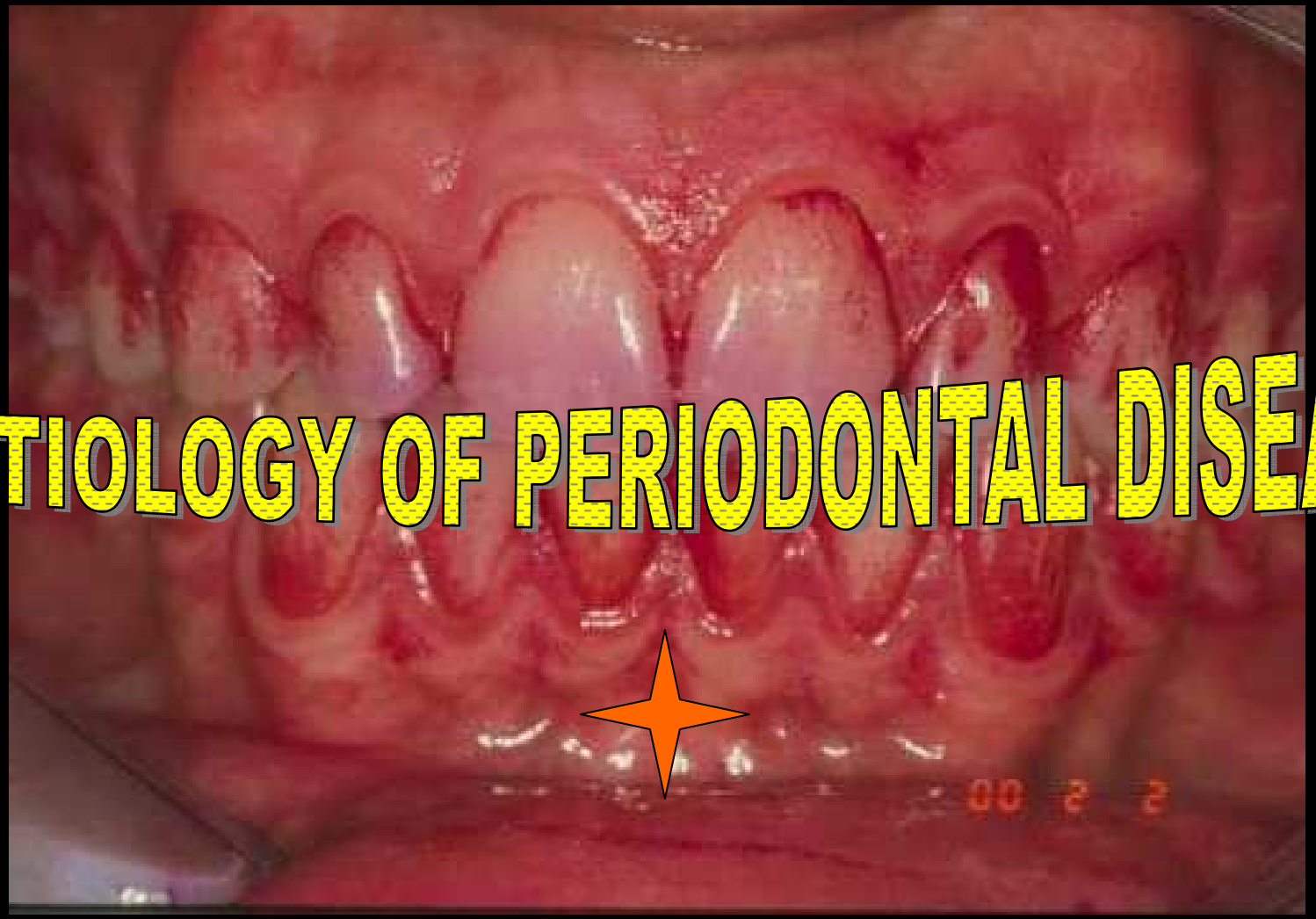
DENTAL PLAQUE - THE MAJOR ETIOLOGIC FACTOR OF ALL KIND OF PERIODONTAL DISEASES



THE HUMAN HOST IS HEALTHY DESPITE THAT THE 90% OF THE CELLS IN THE HUMAN BODY ARE BACTERIA (Henderson 1998)

Plaque is natural and exists in harmony with the host in health.

Maintenance of health depends on the balance of the homeostatic relationship between the bacterial challenge and the host response.

Most bacterial species currently implicated in periodontitis can be found in periodontally healthy subjects in low numbers.

In some geographical regions, some species or clones are infrequently detected in periodontal health, and therefore could be considered as not belonging to the resident microflora in these populations

(Van Winkelhoff et al. 2002).

DENTAL PLAQUE AS A BIOFILM

THE POSSIBILITIES OF CHEMICAL PLAQUE CONTROL

DR. GERA ISTVÁN SE DPT. PERIODONTOLOGY

DENTAL PLAQUE: BIOLOGICAL SIGNIFICANCE OF A BIOFILM AND COMMUNITY LIFE-STYLE

- Most microorganisms in nature attach to surfaces and form matrix-embedded biofilms.
- Biofilms are highly structured and spatially organized, and are often composed of consortia of interacting microorganisms,
- The properties of microbial communities, are more than the sum of the component species

LÖE CLASSIC EXPERIMENTAL GINGIVITIS STUDIES

DENTAL PLAQUE

GINGIVITIS

PERIODONTITIS

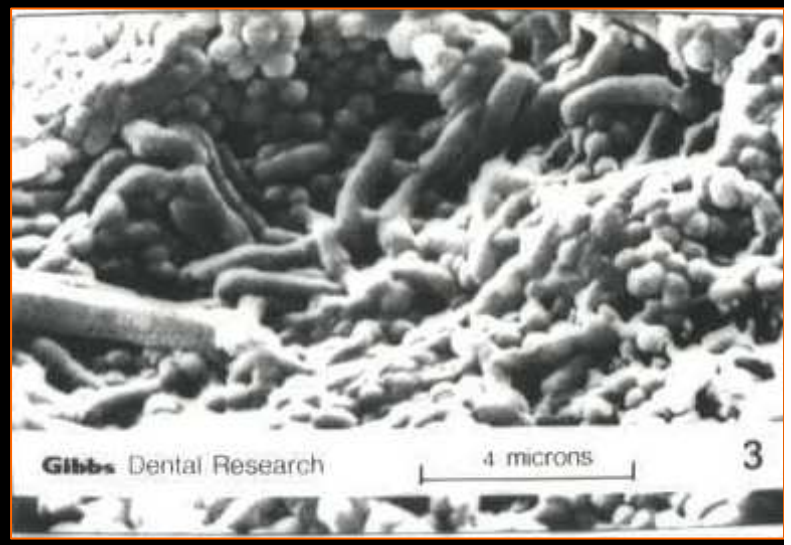
BACTERIAL BIOFILM

IS MADE UP OF

„FRIENDLY COMMENSAL BACTERIA

AND HOSTILE PERIODONTOPATHOGENIC STRAINS

THE MANIFESTATION OF PERIODONTAL BREAKDOWN IS DEPENDENT ON THE HOST'S SUSCEPTIBILITY AND THE VIRULANCE OF THE BIOFILM

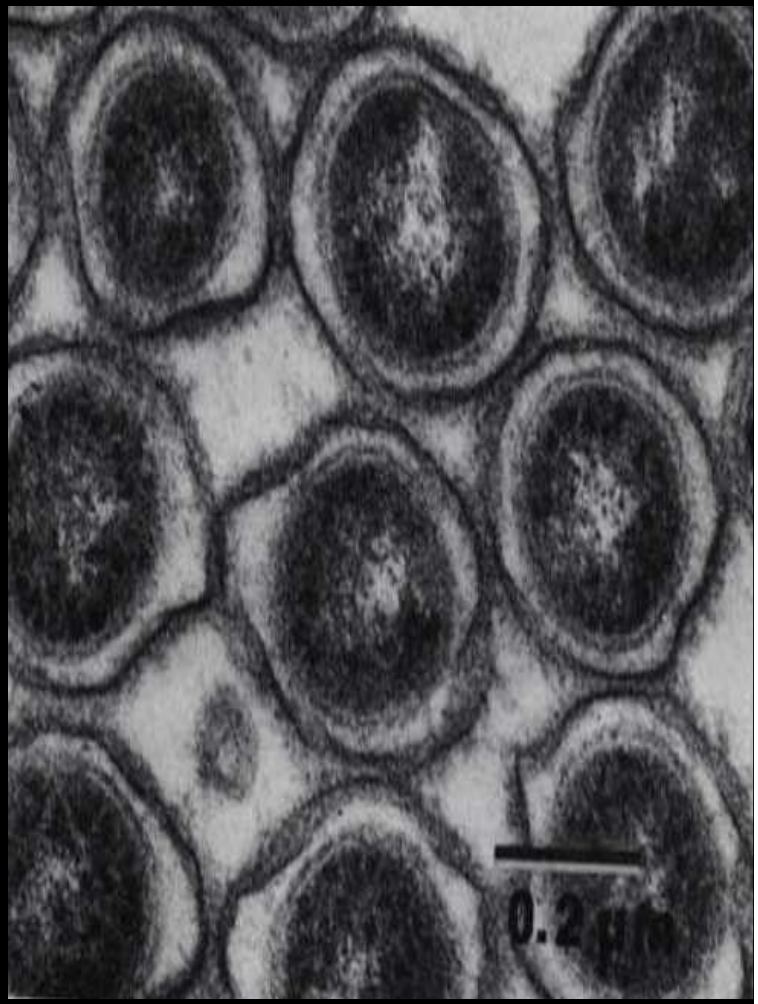


•Most natural biofilms contain multiple species and are termed microbial communities.

•The component organisms are not merely passive neighbors

• they are involved in a wide range of physical, metabolic and molecular interactions.

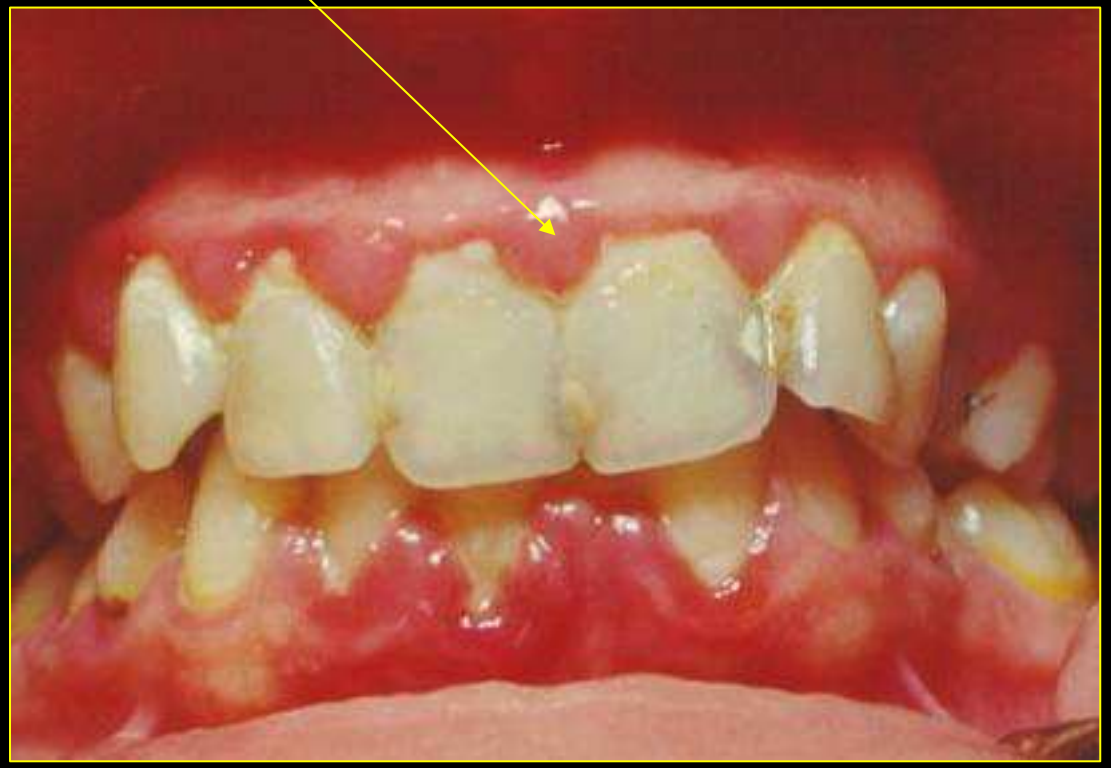
•These interactions may well be essential for the attachment, growth and survival of species at a site, enabling organisms to persist in hostile environments.



Disease is the consequence of this balanced relationship breaking down, provoked by

- **either changes to the magnitude or nature of the microbial challenge**
- ***or* the scale and appropriateness of the host response**

(Socransky et al. 1998).



Gene expression can alter markedly when cells form a biofilm,

resulting in many organisms having a radically different phenotype following attachment to a surface

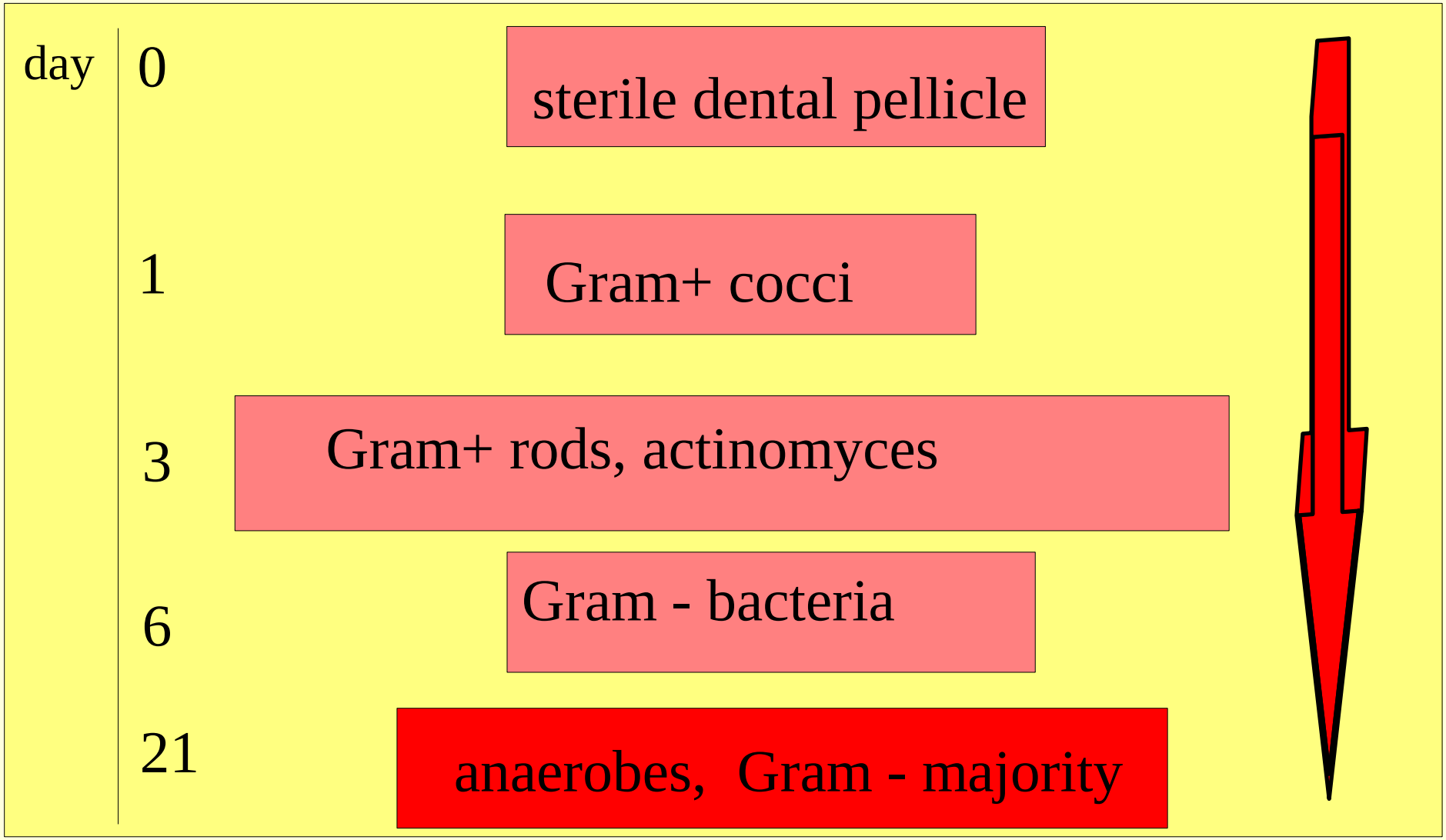
when compared with conventional liquid grown (planktonic) cells.

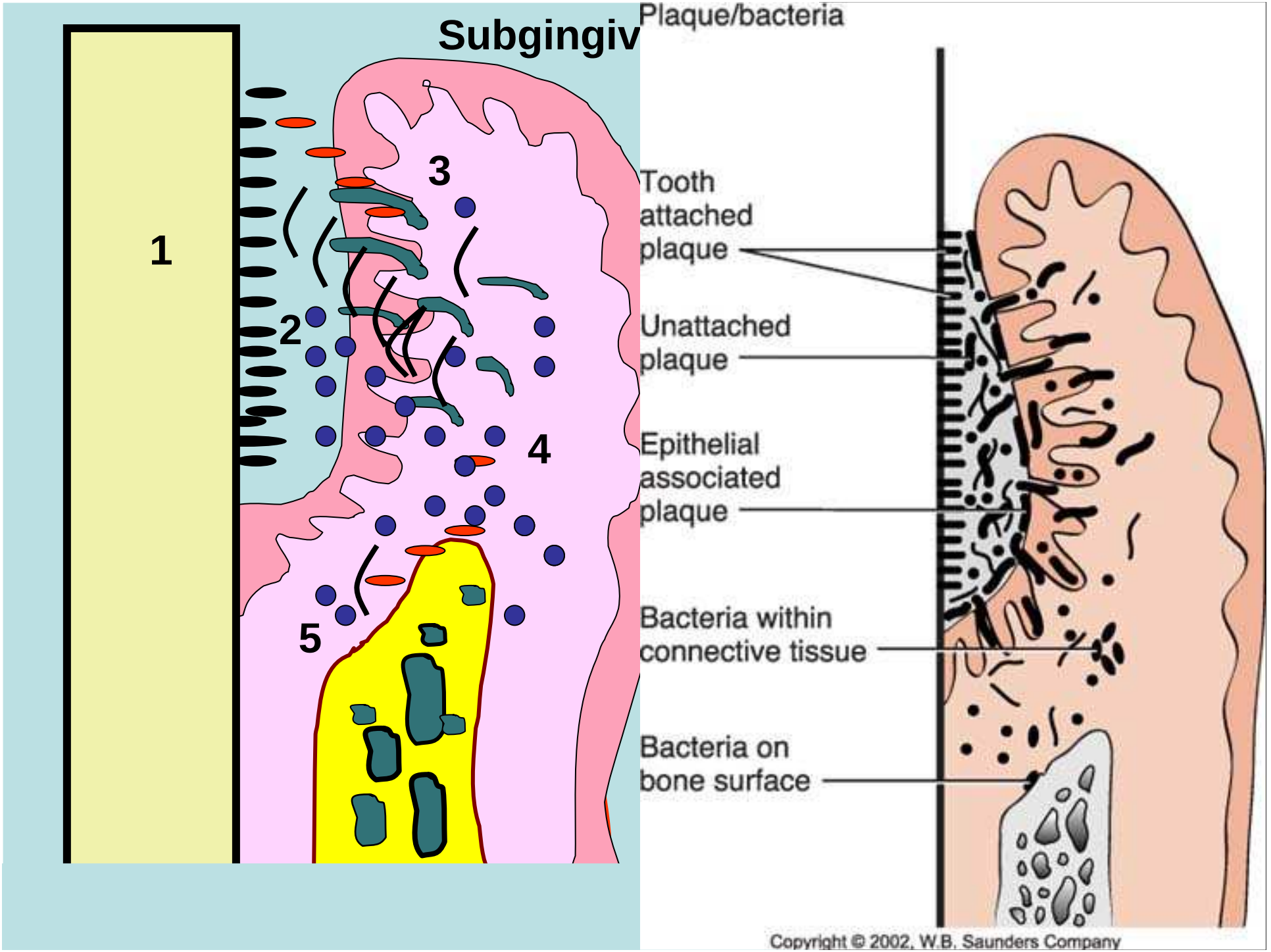
(Whiteley et al. 2001)

An important clinical consequence of both the structural organization of biofilms and the subsequent altered pattern of gene expression therein is the reduced susceptibility of cells to antimicrobial agents

(Gilbert et al. 1997, 2002, Ceri et al. 1999, Stewart & Costerton 2001).

THE MECHANISM OF PLAQUE ACCUMULATION




Subgingiv
1
2
3
4
5
Plaque/bacteria
Tooth attached plaque
Unattached plaque
Epithelial associated plaque
Bacteria within connective tissue
Bacteria on bone surface
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GINGIVITIS

PERIODONTITIS

IRREVERSIBLE DAMAGE OF THE ATATCHMENT APPARATUS

THE CONSEQUENCE OF THE INADEQUATE GINGIVAL PROTECTION

WHY NOT NECESSARILY ALL GINGIVITIS PROGRESSES TO DESTRUCTIVE PERIODONTITIS????

DENTAL PLAQUE

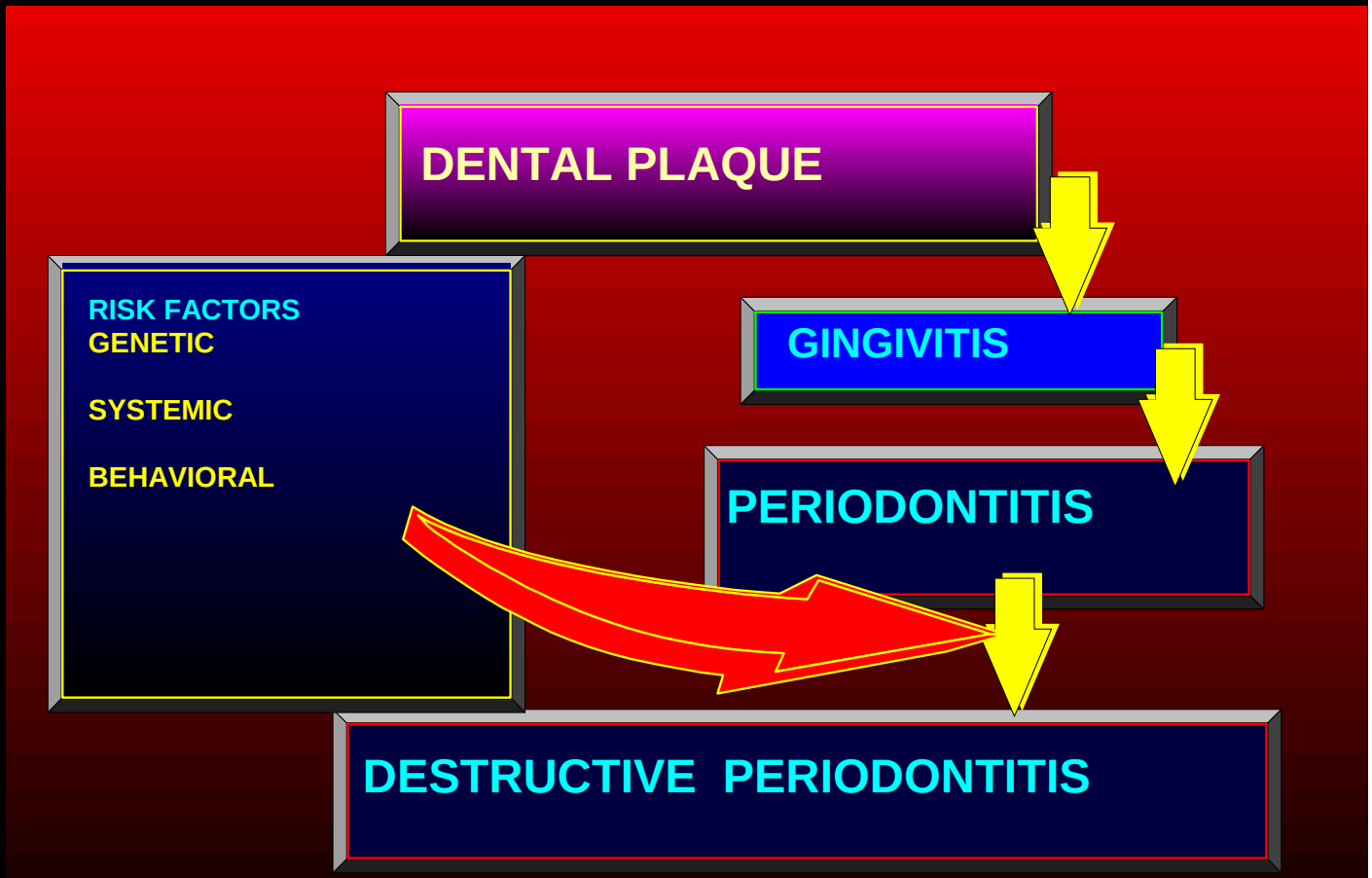
↓

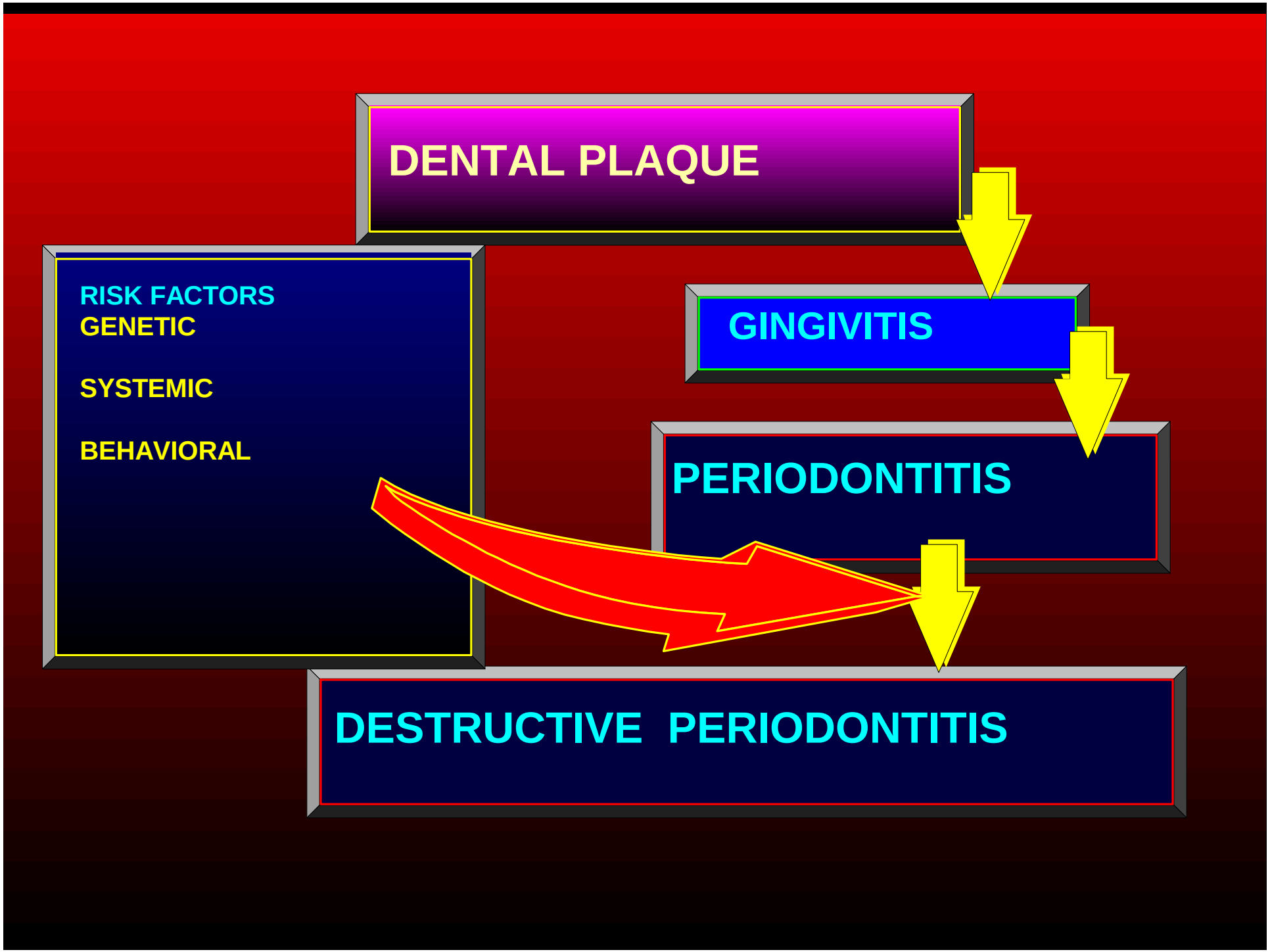
GINGIVITIS

↓

PERIODONTITIS

DENTAL PLAQUE IS NECESARRY BUT NOT SUFFICIENT ETIOLOGIC FACTOR OF DESTRUCTIVE PERIODONTITIS




DENTAL PLAQUE
RISK FACTORS
GENETIC
SYSTEMIC
BEHAVIORAL
GINGIVITIS
PERIODONTITIS
DESTRUCTIVE PERIODONTITIS

RISK FACTORS:

GENETICS
1(IL-1)
TNF

SYSTEMIC
ENDOCRINE
CARDIOVASCULAR
IMMUNOLOGICAL

BEHAVIORAL
STRESS
DIET
SMOKING
WAY OF LIFE

SEVERAL SYSTEMIC AND LOCAL MODIFYING FACTORS

ETIOLOGIC FACTORS

- Oral hygiene
  Local plaque retentive factors
  bacterial specificity
  systemic immune status
  Diabetes mellitus
  Tobbaco smoking
  Osteoporosis
  Ethnic background
  Age
  Diet
  Genetics
- Stress
  Socio-economics

ETIOLOGIC FACTORS

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HEAVY SUPRAGINGIVAL DENTAL CALCULUS DEPOSITION MECHNICALLY SEPARATING FRONT TEETH

HEAVY SUPRAGINGIVAL PLAQUE AND DENTAL CALCULUS DEPOSITION

ETIOLOGIC FACTORS

- Oral hygiene
  Local plaque retentive factors
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  Osteoporosis
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FAULTY RESTAURATIONS

LOCAL PLAQUE RETENTIVE FACTORS

ETIOLOGIC FACTORS

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  systemic immune status
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LARGE MASS OF SUPRAGINGIVAL PLAQUE AND CALCULUS

THE SUBGINGIVAL PLAQUE IS TOTALLY INDEPENDENT OF THE SUPRAGINGIVAL ORAL ENVIRONMENT FORMS A BIOFILM, THAT CAN ONLY BE REMOVED BY PROFESSIONAL MECHANICAL DEBRIDEMENT

ETIOLOGIC FACTORS

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  Local plaque retentive factors
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ETIOLOGIC FACTORS

- **Oral hygiene**
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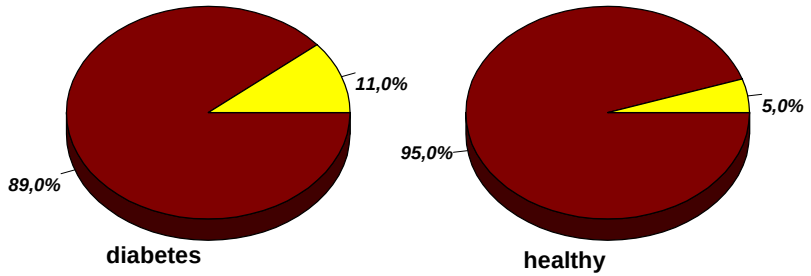
- **Stress**
  Socio-economics

THE PREVALENCE OF SEVER PERIODONTITIS AMONG DIABETEC AND NON DIABETIC POPULATION

THE PERCENTAGE OF TEETH WITH >5mm ATTACHMENT LOSS



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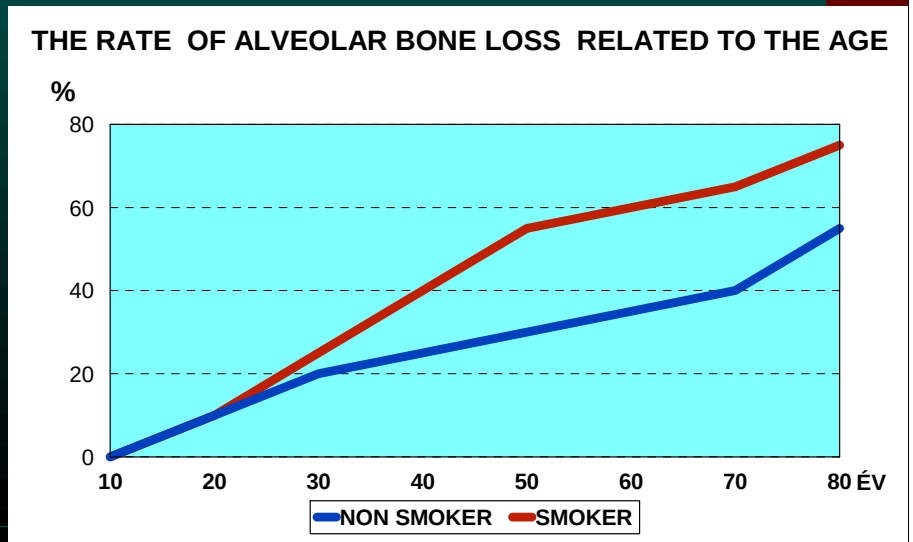
  Socio-economics



ETIOLOGIC FACTORS

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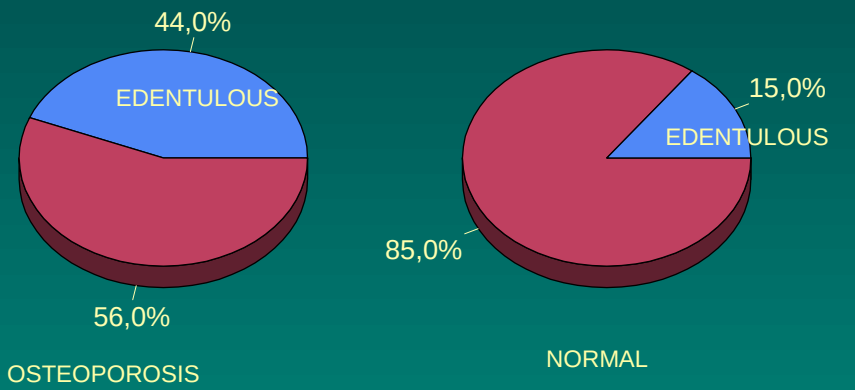
  Socio-economics

TOTAL EDENTULOUSNESS IN OSTEOPOROTIC AND NORMAL AGE MATCHED POPULATION



Taguchi A et al. Tooth loss and mandibular osteopenia Oral Surg Oral Med Oral Path 1995;79:127-132

ETIOLOGIC FACTORS

- Oral hygiene
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THERE IS NO CORRELATION BETWEEN LOCAL ETIOLOGIC FACTORS AND THE SEVERITY OF TISSUE DESTRUCTION

ETIOLOGIC FACTORS

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  Local plaque retentive factors
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  Genetics
- **Stress**
  Socio-economics

CPITN scores in Hungary in 1985 and 1991.

WHO pathfinder studies

CPITN scores	12 year old	12 year old	35-44 year old	35-44 year old
	1985	1991	1985	1991
Deep pocket (CPITN 4)	0,1	0	8	2,3
3-5mm Pocket (CPITN 3)	4,1	0	26,4	15,41
Calculus (CPITN 2)	30,9	30,1	50,8	71,3
Initial gingivitis (CPITN 1)	38,5	30,8	7,6	6,8
Healthy (CPITN 0)	26,2	39,1	5	4,3

Czukor J.: National Oral Health Pathfinder surveys in Hungary in the years 1985 and 1991. Fogorv. Szl. 1994; 87: 223-235

ETIOLOGIC FACTORS

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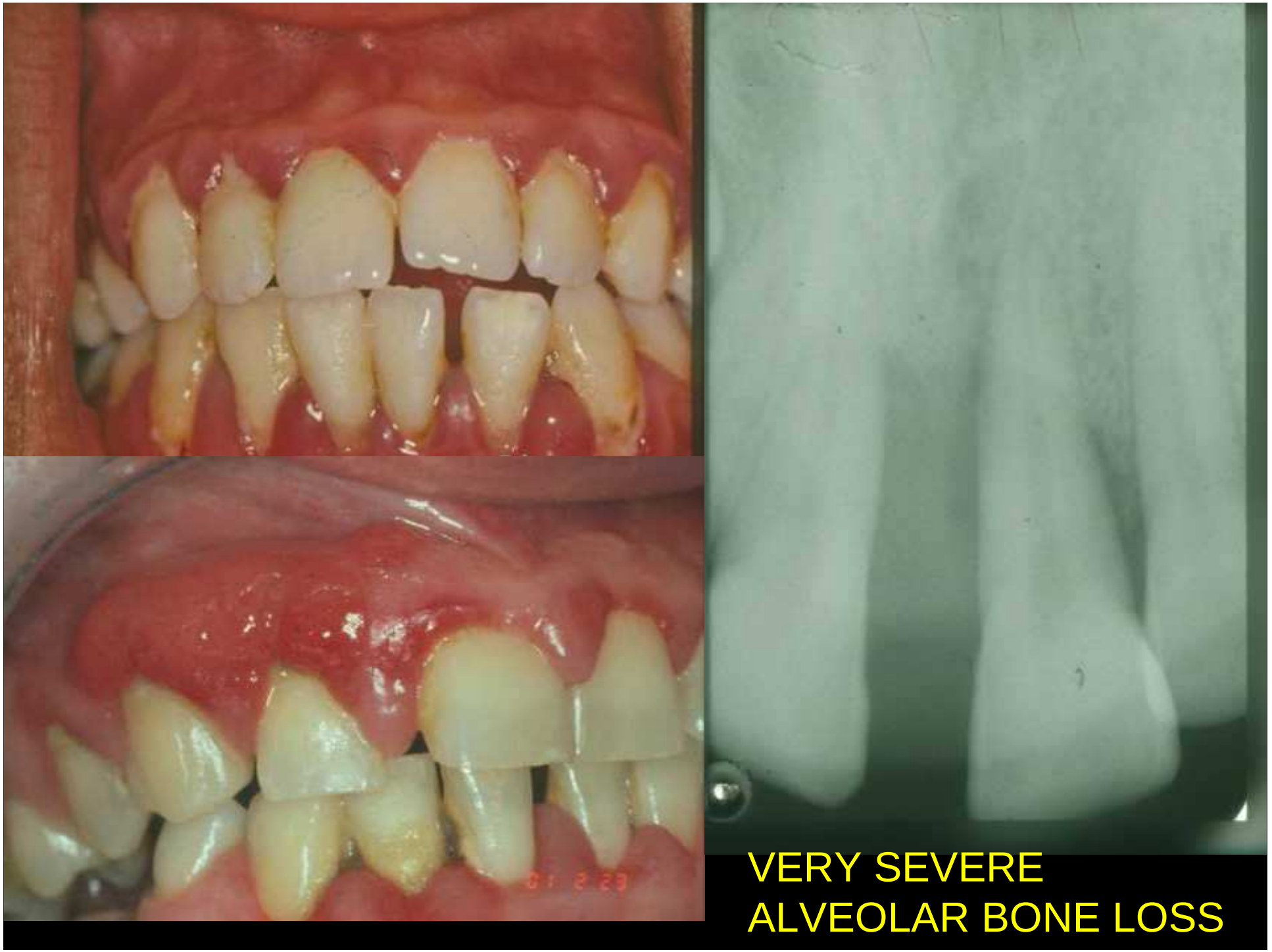
VERY SEVERE
ALVEOLAR BONE LOSS

ETIOLOGIC FACTORS

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ETIOLOGIC FACTORS

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  Socio-economics

Many studies have indicated that lower income groups have a much higher prevalence of gingivitis and periodontitis than people living on a much higher living standards *(Oliver et al. 1998, Micheelis & Bauch 1996)*.

These can be attributed to the inferior oral hygiene, the lack of sophisticated oral hygienic aids, the inferior standards in dental care and the limited access to dental services

ETIOLOGIC FACTORS

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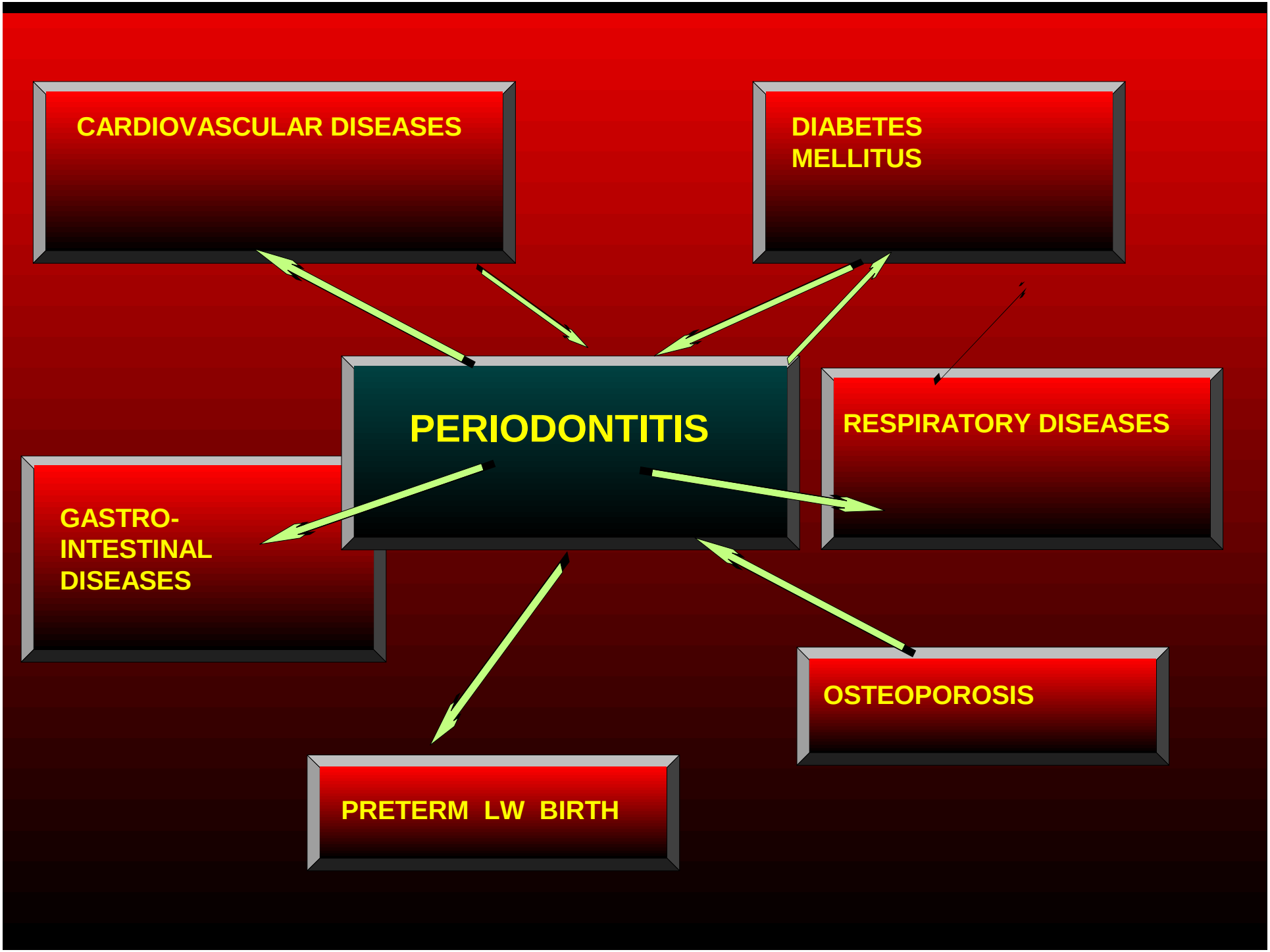
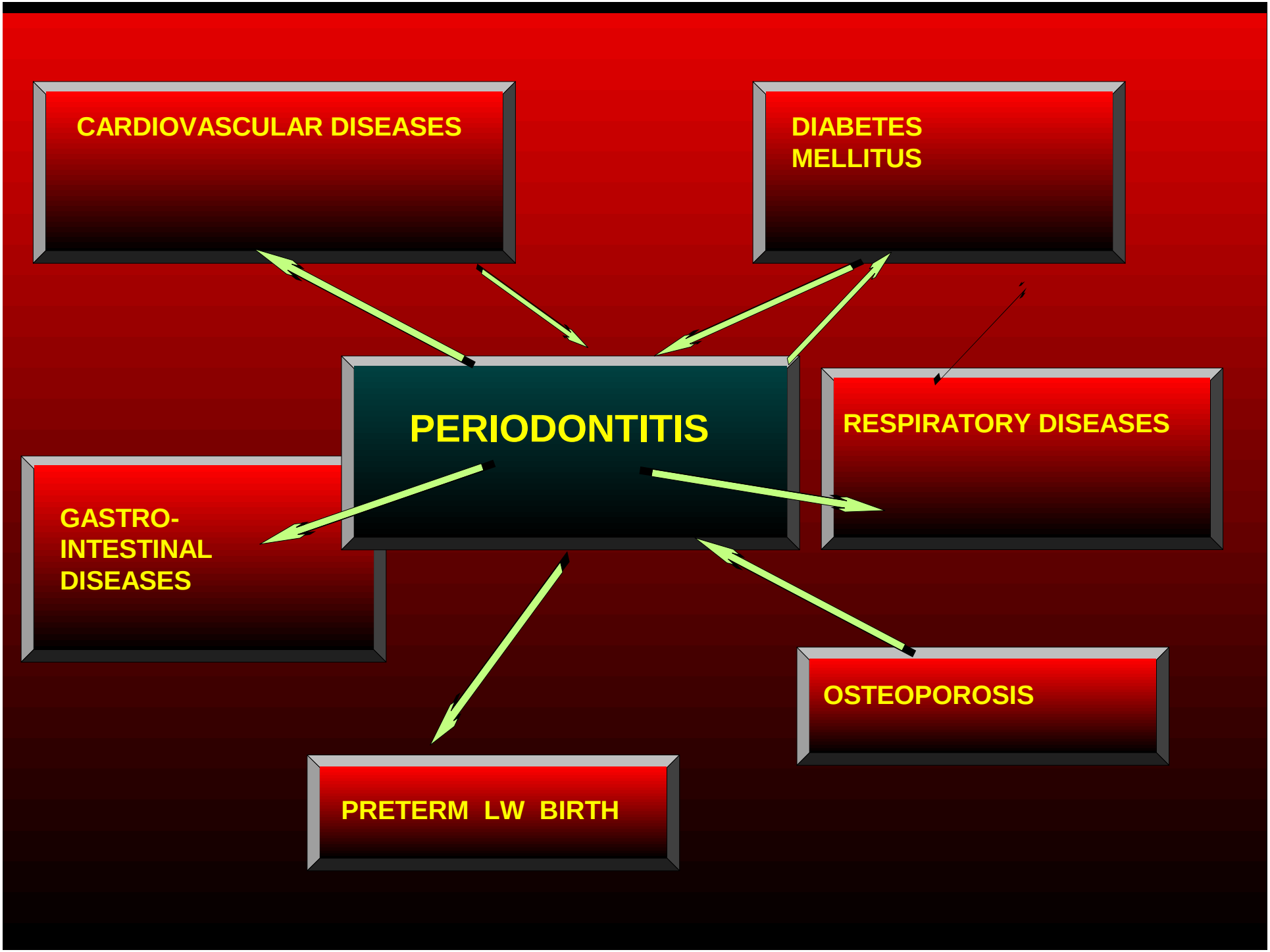
According to a survey from eastern Germany **62,4% of all people** with a qualification equivalent to **junior high school certificate** had advanced periodontitis and none of them had healthy periodontium,
while **only 37.7%** of the participants with **university degree** had advanced periodontitis *(Mengel et al. 1993)*


CARDIOVASCULAR DISEASES
DIABETES MELLITUS
PERIODONTITIS
RESPIRATORY DISEASES
GASTRO-INTESTINAL DISEASES
OSTEOPOROSIS
PRETERM LW BIRTH

SEVERAL SYSTEMIC AND LOCAL MODIFYING FACTORS

THE INFECTED PERIODONTAL POCKET CAN BE A DENTAL FOCUS


CARDIOVASCULAR DISEASES
DIABETES MELLITUS
PERIODONTITIS
RESPIRATORY DISEASES
GASTRO-INTESTINAL DISEASES
OSTEOPOROSIS
PRETERM LW BIRTH

THE MAJOR GOAL OF ANY CAUSE RELATED PERIODONTAL TREATMENT IS:

TO CLEAN TEETH AND RESTORE ORAL HYGIENE