INTRODUCTION TO PERIODONTOLOGY

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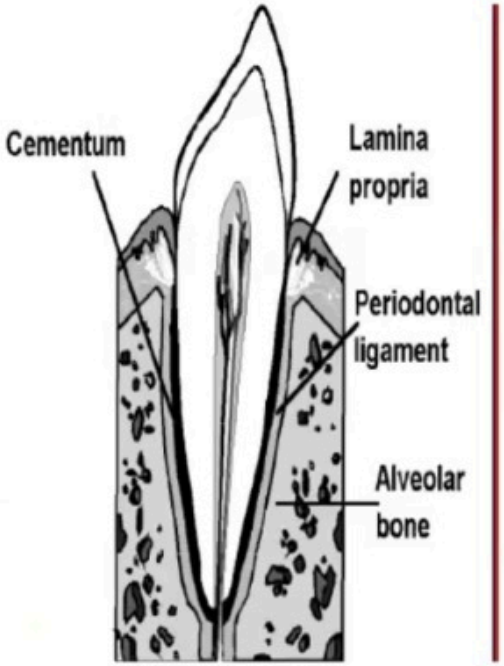
THE PERIODONTIUM

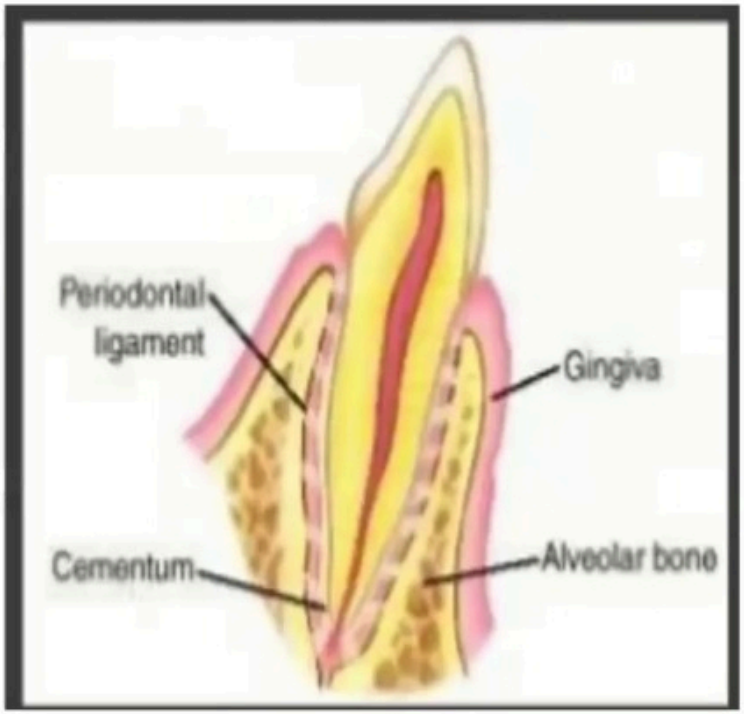
Definition: A complex functional structure of ***Specialised*** Tissues **supporting** and **investing** the tooth

- The word comes from the Greek word *Peri* meaning *"around"* and *odons* meaning *"tooth"* maintaining them in function in the jaw bones.
- It is derived from the dental follicle region, which originates from the cranial neural crest cells



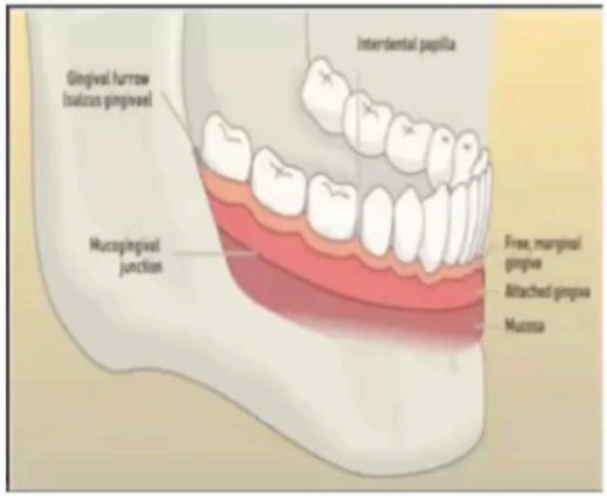
COMPONENTS OF THE PERIODONTIUM

- Four principal components
- 1. Gingiva
- 2. Periodontal ligament
- 3. Cementum
- 4. Alveolar bone



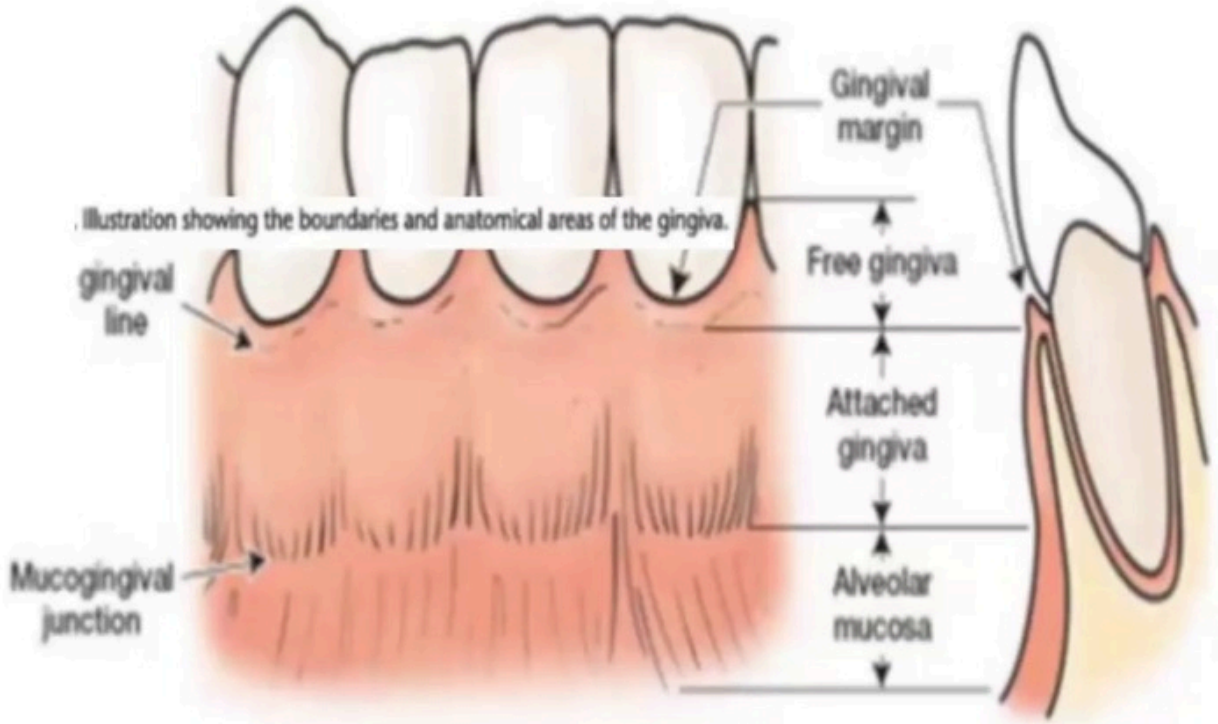
THE GINGIVA

- Covers the alveolar bone and the roots of the teeth just coronal to the CEJ



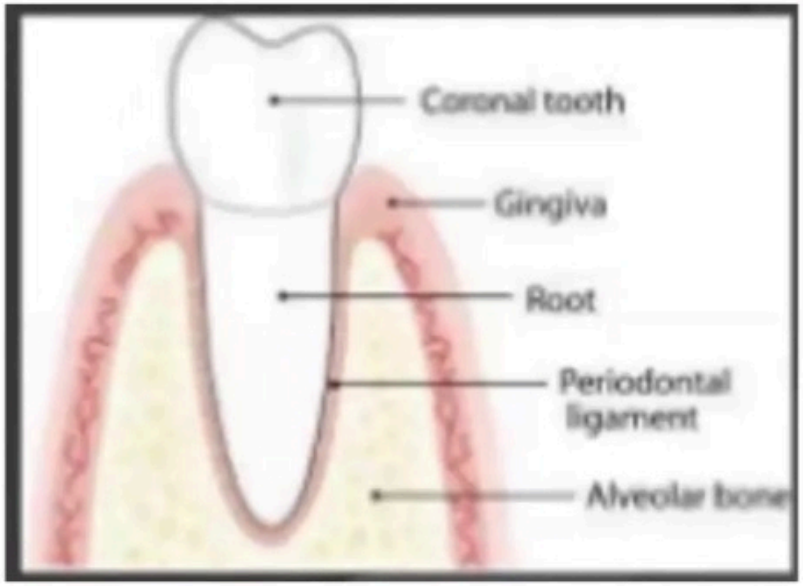
ANATOMICAL AREAS OF THE GINGIVA

- Marginal
- Attached
- Interdental



THE PERIODONTAL LIGAMENT (PDL)

- Soft specialised connective tissue situated between the cementum covering the root of the tooth and the bone forming the socket wall.

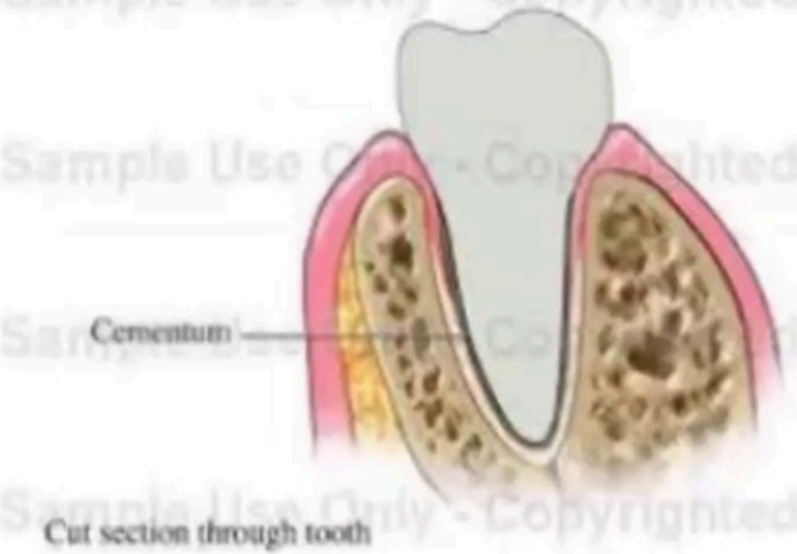


FUNCTIONS OF THE PDL

1. Attachment of teeth to bone
2. Shock absorber – soft tissue casing "resistance to impact forces"
3. Maintenance of gingival tissues in their proper working relationships
4. Sensory – abundant receptors and nerves
5. Nutritive role- blood vessels
6. Maintenance and adaptive role

CEMENTUM

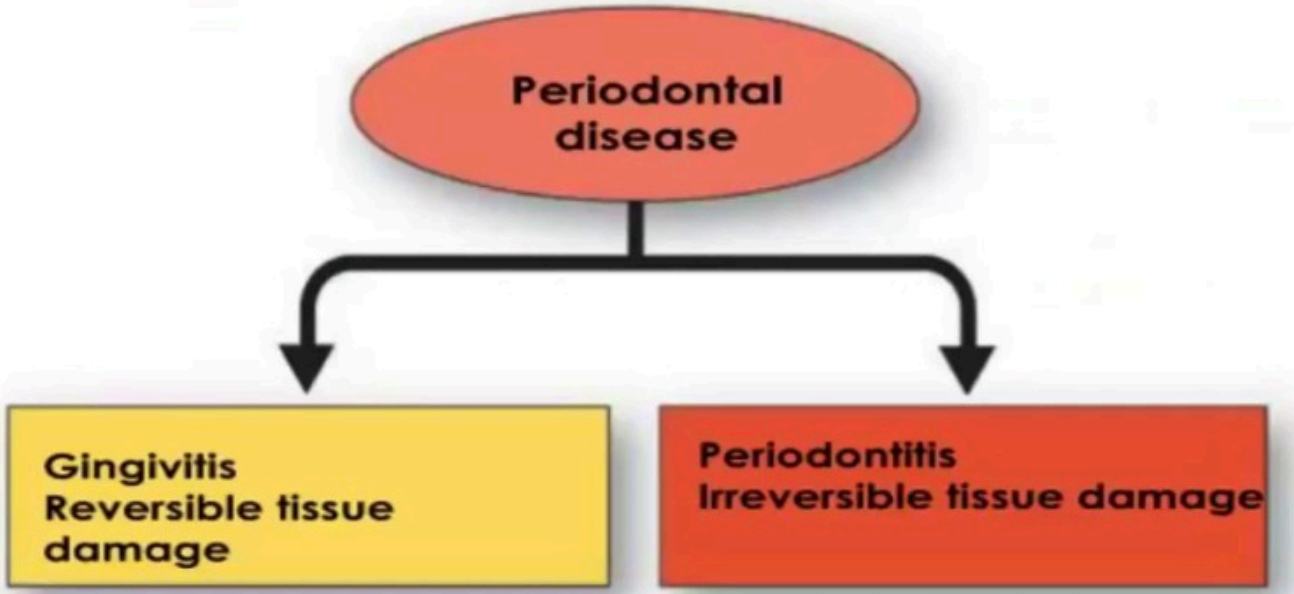
- A calcified avascular tissue that forms the outer covering of the anatomic tooth



ALVEOLAR PROCESS

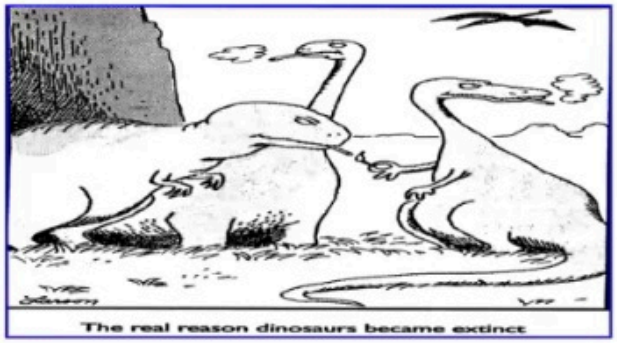
- It consists of
- Exterternal Buccal and Lingual cortical plates
- Cancellous trabeculae (spongiosa) between these two layers which act as supporting alveolar bone
- Inner socket wall (alveolar bone proper)

PERIODONTAL DISEASES



- Periodontal diseases comprise a variety of conditions affecting the health of the periodontium broadly divided into gingivitis & periodontitis

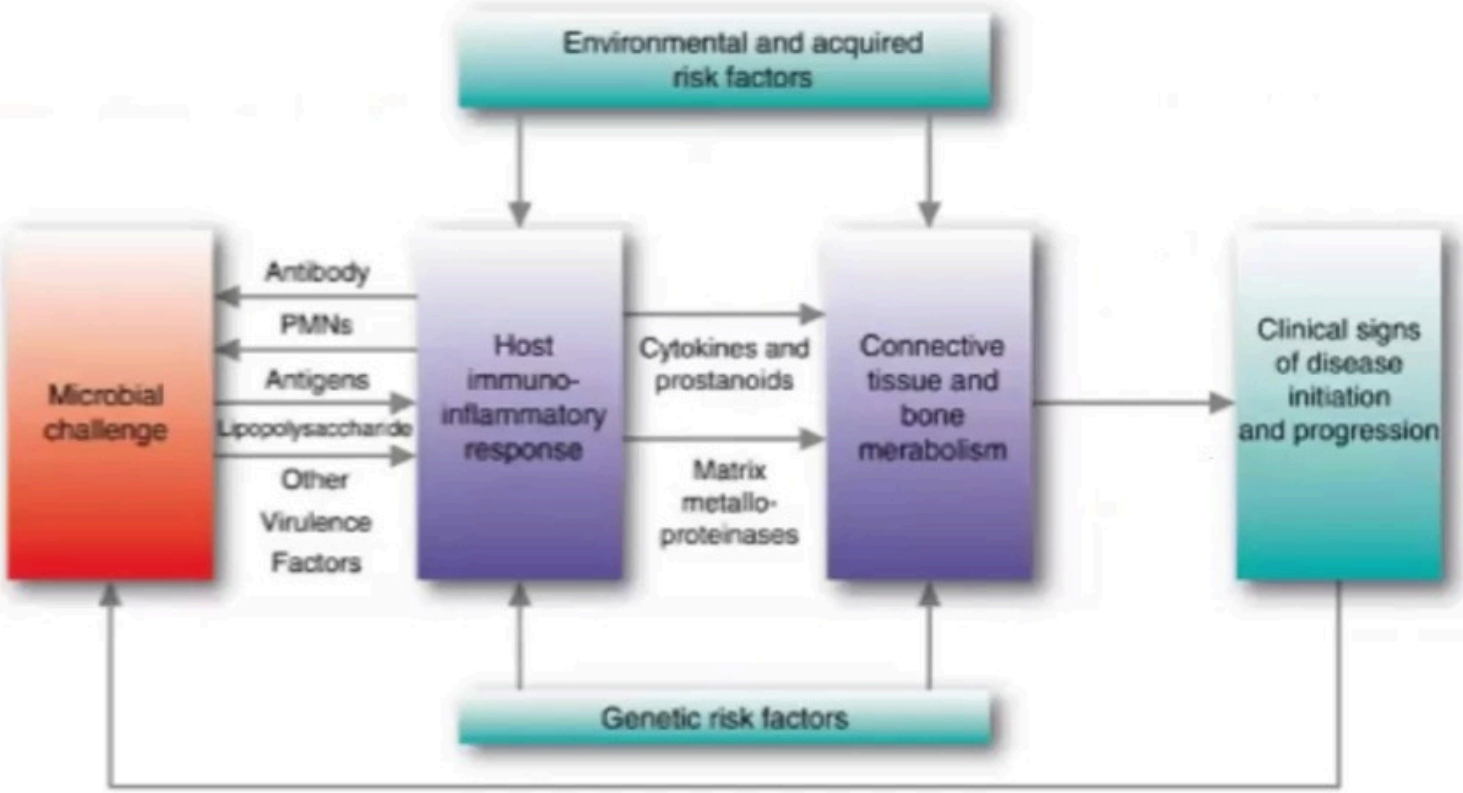
AETIOLOGY



- The initiation and progression of periodontal disease depend on the presence of **pathogenic bacteria, host response and risk factors.**
- Bacteria trigger inflammatory host responses which, along with the direct destructive effects of the bacteria, cause most of the tissue destruction
- Risk factors encompass systemic influences, external influences, intrinsic factors and local factors

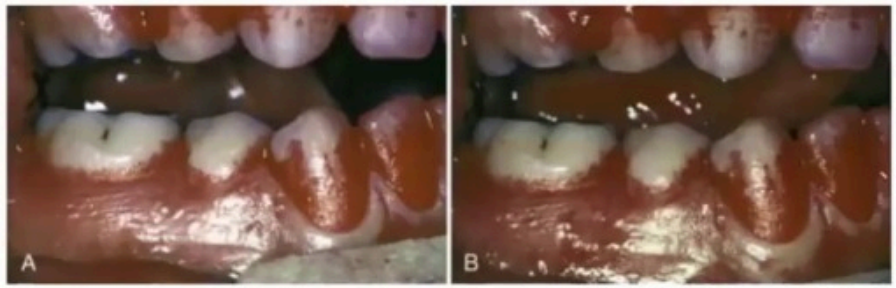
- **RISK FACTORS**
- Genetic (Race?)
- Smoking
- Stress
- Diabetes-Uncontrolleed
- HIV infection
- Oral hygiene (plaque control)-[SES, Male Gender, Age]

AETIOLOGY

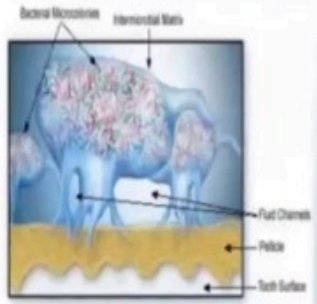

Environmental and acquired risk factors
Microbial challenge
Antibody
PMNs
Antigens
Lipopolysaccharide
Other Virulence Factors
Host immuno-inflammatory response
Cytokines and prostanoids
Matrix metallo-proteinases
Connective tissue and bone merabolism
Clinical signs of disease initiation and progression
Genetic risk factors

AETIOLOGY: ROLE OF PLAQUE

- **Dental Plaque "is a specific but highly variable** structural entity, resulting from sequential colonization of **microorganisms** on tooth surfaces & other parts of oral cavity, composed of **salivary components** desquamated epithelial cells, debris & microorganisms, all embedded in **extracellular gelatinous matrix."**
- **WHO 1961**



Dental plaque is a Microbial Biofilm
Sockransky & Haffajee 2002, Marsh 2004.



AETIOLOGY: ROLE OF PLAQUE

- 1. Fosters bacteria **adherence** in the periodontium environment
- 2. Provides a **conducive** microbial environment
- 3. Enhances bacteria evasion of host defence **(biofilm)**
- 4. Enhances microbial mechanisms of host tissue damage
- 5. Enhances bacterial transmissibility
- 6 . Confers Resistance To Antibiotics & Antimicrobials

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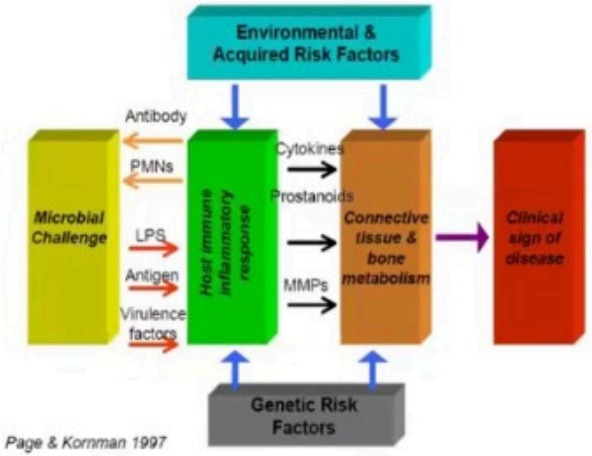


WHAT IS CALCULUS?

Calculus

Hard deposit formed by plaque mineralisation

Generally covered by a layer of unmineralised dental plaque

PERIODONTAL EXAMINATION STARTS BY COMPREHENSIVE ASSESSMENT OF A PATIENT´S

- Current health status
- History of periodontal disease
- Risk characteristics: poor oral hygiene, smoking,alcohol, stress etc.

GINGIVITIS

- Inflammation of gingiva usually ***in which the junctional epithelium is attached to the tooth at its original level.***

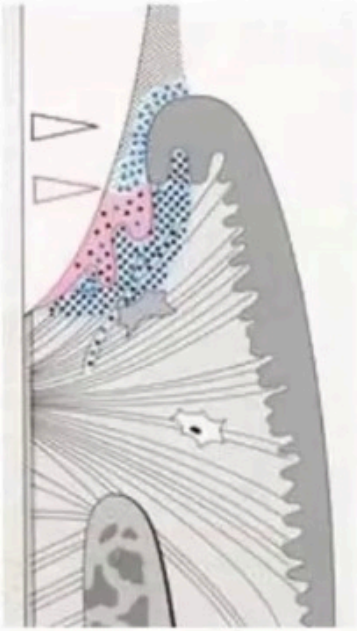
DIAGNOSIS OF GINGIVITIS

- Signs of inflammation (bleeding on probing , reddish colour, swelling)
- Assessment of the presence, degree and distribution of plaque / biofilm
- Assessment of plaque retentive factors: dental calculus, restorations etc.

- Smoking masks bop due to vasoconstrictive effect of nicotine

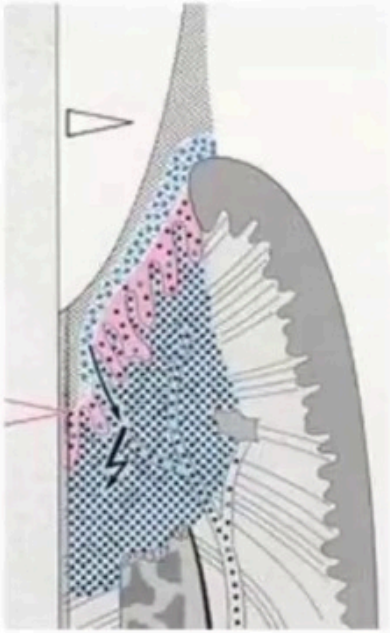
PROGRESSION FROM GINGIVITIS TO PERIODONTITIS

GINGIVITIS



Destruction of Connive tissue attachment

PERIODONTITIS



People vary in their susceptibility to periodontitis,

PERIODONTITIS

- Periodontitis involves irreversible changes to the supporting structures of the teeth. It is associated with bone loss, pocketing around the teeth, and in severe cases drifting, loosening of the teeth and eventually tooth loss

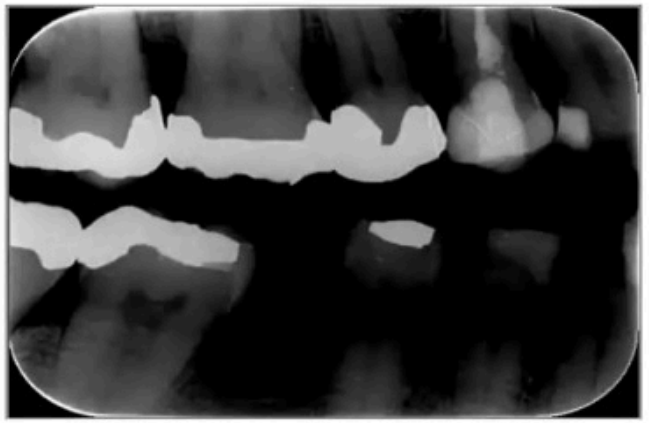
DIAGNOSIS OF PERIODONTITIS

- Attachment loss distinguishes periodontitis from gingivitis. Clinically detected by

❖Pkt probing depth ≥ 4mm

❖Gingival recession

❖Alvelar bone loss ≥ 2mm



PREVALENCE IN KENYA

- Prevalence of periodontitis in Kenya is between **10% to 40%**

Ng'ang'a PM. An overview of epidemiologic and related studies undertaken on common dental diseases and conditions in Kenya between 1980–2000. *Afr J Oral Hlth Sci* 2002 **3:** 103–110

CLASSIFICATION

The 1999 International Workshop for the Classification of Gingival Diseases

A. Dental plaque-induced gingival diseases
B. Non-plaque-induced gingival lesions

The 1999 International Workshop for the Classification of Periodontal Diseases.

A. Chronic periodontitis
B. Aggressive periodontitis
C. Periodontitis as a manifestation of systemic diseases
D. Necrotizing periodontal diseases
E. Abscesses of the periodontium
F. Periodontitis associated with endodontic lesions
G. Developmental or acquired deformities and conditions

1999 Classification of Periodontal diseases and conditions

- Gingival lesions are classified into two broad categories.

1. plaque induced

associated with dental plaque only

with local contributing factors

plaque induced modified by

i) Endocrine system

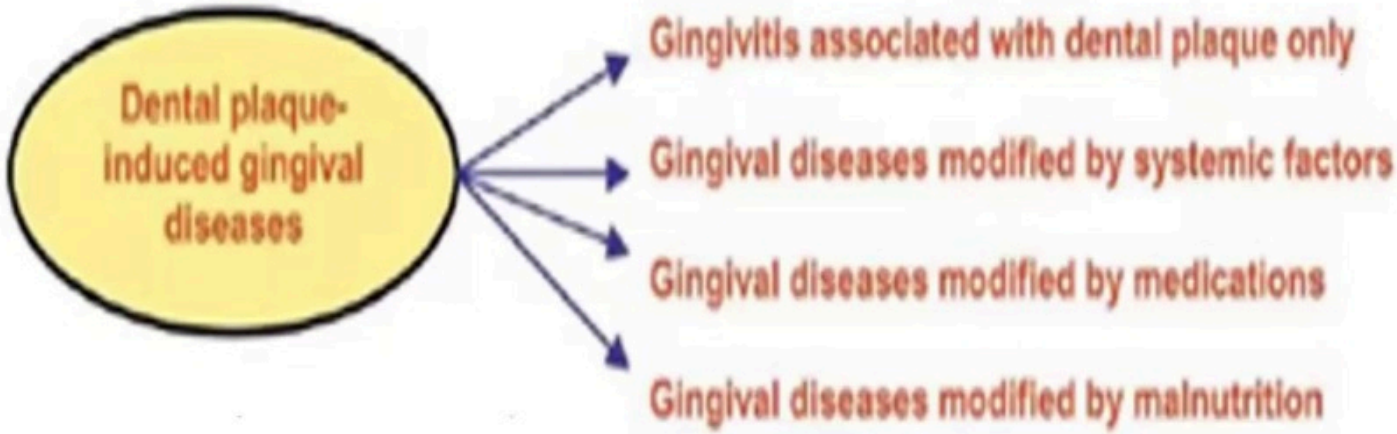
ii) Blood dyscrasias

iii) Medications

iv) Malnutrition

2. non-plaque induced.

PLAQUE-INDUCED GINGIVITIS



PREVALENCE OF GINGIVITIS

- Gingivitis is so common that any patient presenting with gingivitis could be considered typical; however more prevalent in
- Adolescents
- Pregnancy
- Males

PREVALENCE OF GINGIVITIS IN KENYA

- Most common form of periodontal disease
- Data on oral disease patterns among the kenyan population are scarce
- Prevalence of gingivitis in Kenya is about 40 to 90%

Ng'ang'a PM. An overview of epidemiologic and related studies undertaken on common dental diseases and conditions in Kenya between 1980–2000. *Afr J Oral Hlth Sci* 2002 **3:** 103–110

PREVALENCE OF GINGIVITIS BY AGE

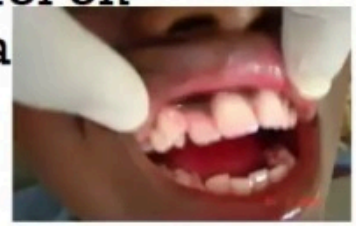
- More prevalent in adolescents than children or adults (↑ prevalence 13-17 years)
- Role of hormones is suspected to the cause by affecting composition of subgingival micro flora

❖↑ p. intermedia

❖↑ p. nigresence

- Even though the ↑levels of circulating sex hormones have been implicated, the influence of plaque control on gingivitis may be more important among the a

Slade G & Blade J 1999



PLAQUE RETENTIVE FACTORS

DISCLOSING PLAQUE

- By using a probe (toothpick) to remove plaque from the tooth surface.
- By staining the teeth with disclosing solution. This is probably the most useful method

MODIFIED BY ENDOCRINE

MODIFIED BY MALNUTRITION

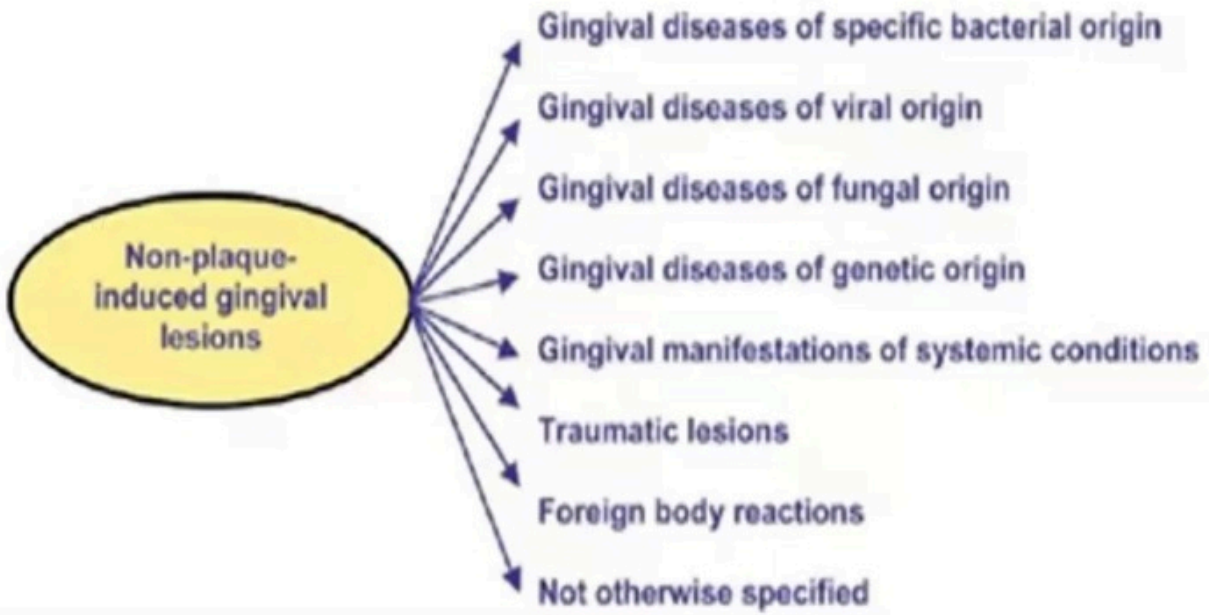
- Bright red, swollen and bleeding gingiva

MODIFIED BY BLOOD DYSCRASIA

- Malignant neoplasm of WBC precursors
- ***spongy*** gingival enlargement and bleeding of gingival tissues caused by excessive infiltration by abnormal forms and numbers of WBCs

MODIFIED BY MEDICATIONS

NON PLAQUE INDUCED GINGIVAL LESIONS



NON-PLAQUE-INDUCED GINGIVAL LESIONS

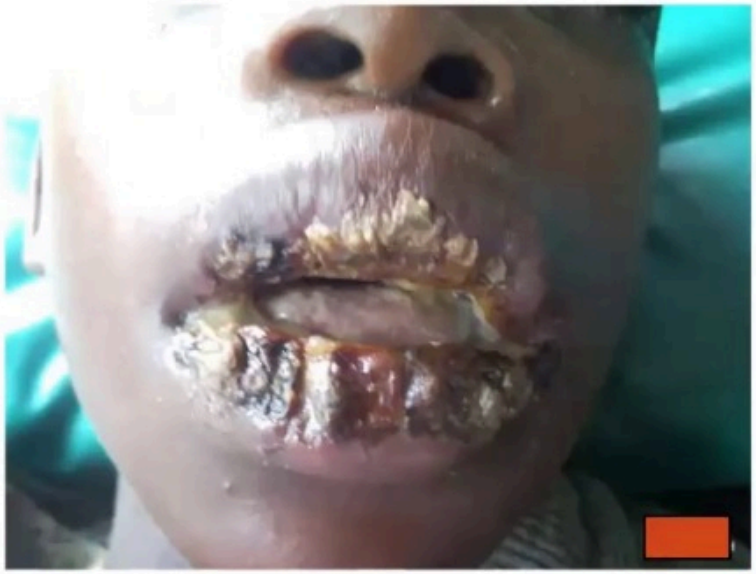
- Prevalence: Rare
- Observed mainly in lower SES and immunocompromised individuals

NON-PLAQUE-INDUCED GINGIVAL LESIONS

- Gingival diseases of specific bacterial origin (*N.gonorrhea T. pallidum*)
- Gingival diseases of viral origin (Herpes)
- Gingival diseases of Fungal origin

  (Candidiasis)
- Gingival lesions of genetic origin (HGF)
- Gingival manifestations of systemic conditions (DG and allergic reactions)

HERPETIC GINGIVOSTOMATITIS



HGF

DG/ PLASMA CELL GINGIVITIS?

1999 Classification of Periodontal diseases and conditions

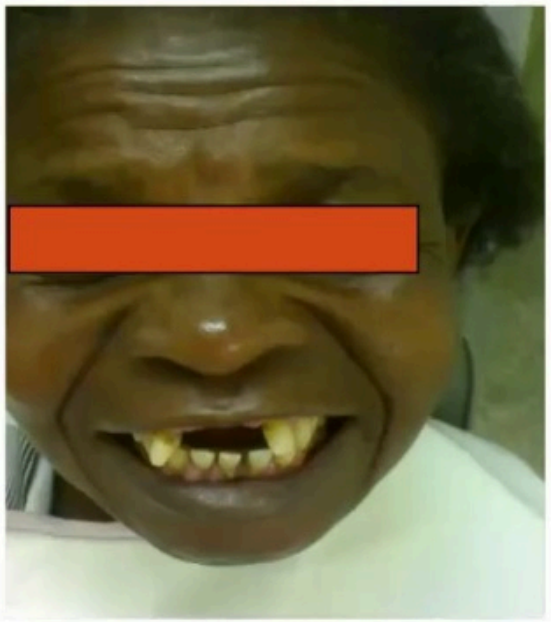
Five Different Forms of periodontitis

- Chronic periodontitis
- Aggressive periodontitis
- Necrotising periodontitis
- Periodontitis as a manifestation of systemic disease.
- Periodontitis associated with endodontic lesion

- Periodontal abscesses
- Developmental or acquired malformations and conditions.

CHRONIC PERIODONTITIS (C.P)

- Most prevalent form of periodontitis
- Most prevalent in adults>35 years when it becomes clinically significant
- Rarely observed in children



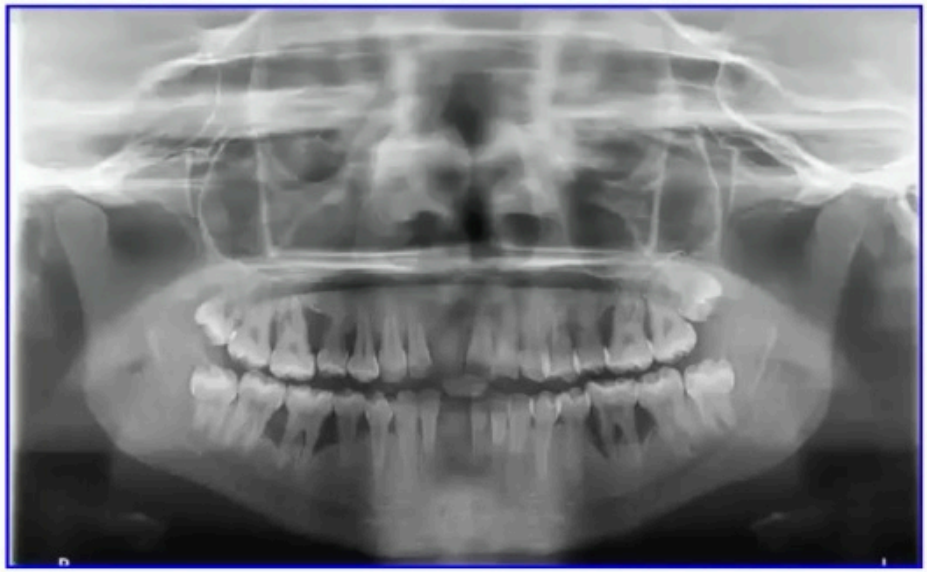
CHRONIC PERIODONTITIS

- **Cigarette smokers** are up to 5 times more likely to develop severe periodontal diseases

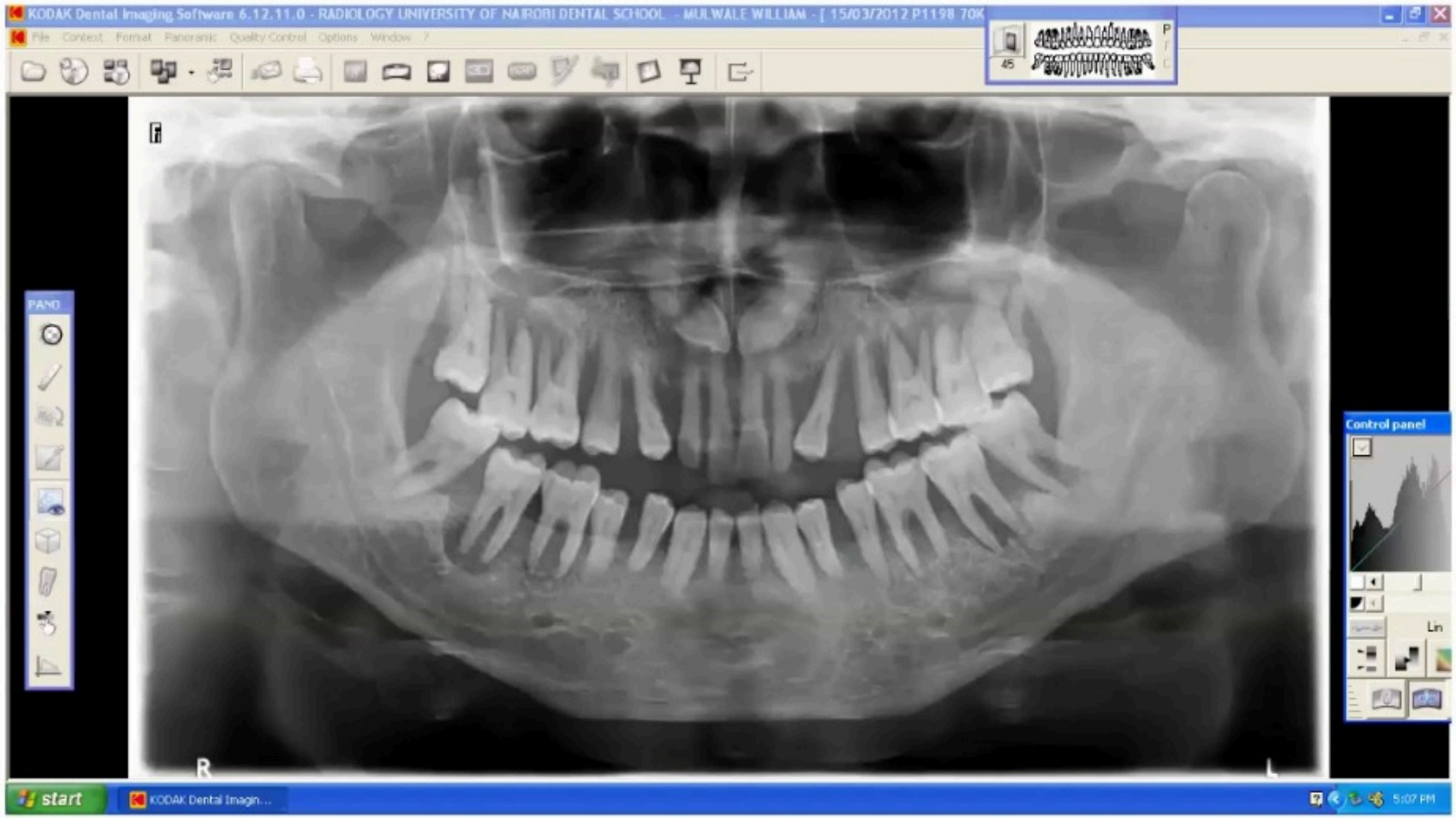
AGGRESSIVE PERIODONTITIS (A.P)

- Until recently early onset/juvenile periodontitis.
- 2nd and 3rd decades of life i.e. between ages of **10 to 30 years.** Usually Circumpubertal onset.
- Rapid tissue destruction.
- Amounts of bacterial deposit inconsistent with of tissue destruction
- Familial aggregation

AGGRESSIVE PERIODONTITIS IN A 15 YEAR OLD FEMALE

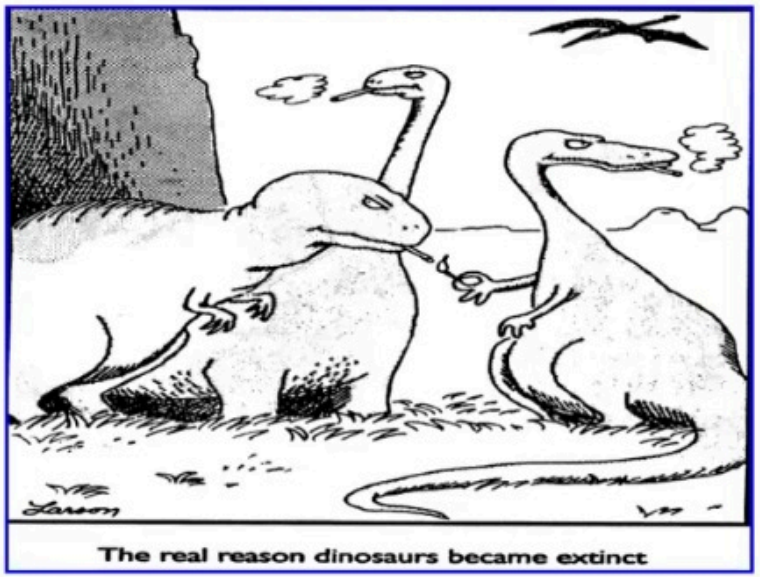


GENERALISED AGGRESSIVE PERIODONTITIS



NECROTIZING PERIODONTAL DISEASES

- Represent acute forms of periodontal destruction, associated with host compromise.
- Predisposing Factors
  - Emotional stress
  - Poor oral hygiene
  - Cigarette smoking
  - Poor nutrition
  - Immunosuppression
  - viral infections



The real reason dinosaurs became extinct

NECROTISING PERIODONTAL DISEASES

- **Clinical Features**
  - Punched out papillae
  - Spontaneous gingival bleeding
  - Pain
  - Fetid Oduor
  - Very rapid soft tissue and bone destruction
  - lesions in HIV/AIDS patients may be more aggressive

PERIODONTITIS AS A MANIFESTATION OF SYSTEMIC DISEASES

- This is the diagnosis used when the SYSTEMIC CONDITION is the MAJOR PREDISPOSING FACTOR and local factors are not clearly evident

- Several haematological and genetic disorders

- Periodontitis as a manifestation may be observed as a manifestation of the following disorders:

  A) Associated with haematological disorders

  B) Associated with genetic disorders

  C) Not otherwise specified (NOS)

The major effect of these disorders is through **alterations in host defence mechanisms**

ASSOCIATED WITH HAEMATOLOGICAL DISORDERS

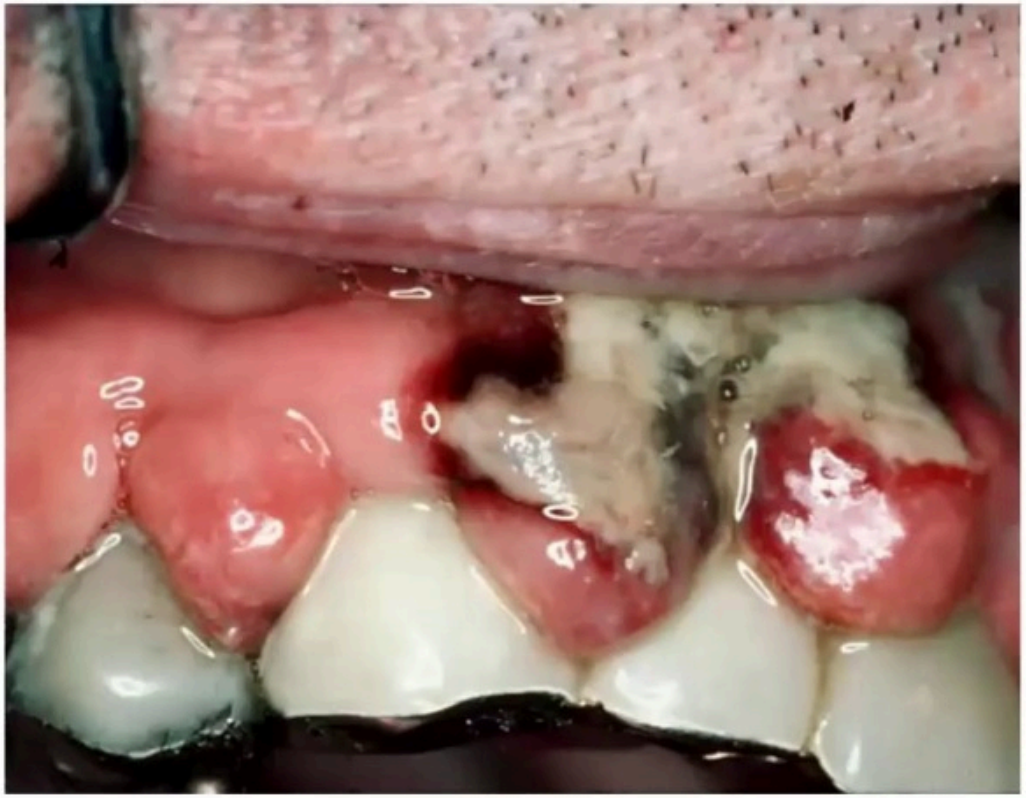
- 1) Acquired neutropenia
- 2) Leukaemias
- 3) Other

ASSOCIATED WITH GENETIC DISORDERS

- 1) Familial and cyclic neutropenia
- 2) Down Syndrome
- 3) Leukocyte adhesion deficiency syndromes
- 4) Papillon-Leferve syndrome
- 5) Chediak – higashi syndrome
- 6) Histiocytosis syndromes
- 7) Glycogen storage disease
- 8) Infantile genetic agranulocytosis
- 9) Cohen syndrome
- 10) Ehlers- Danlos syndrome (Types IV and VIII AD)
- 11) Hypophosphatasia
- 12) Other

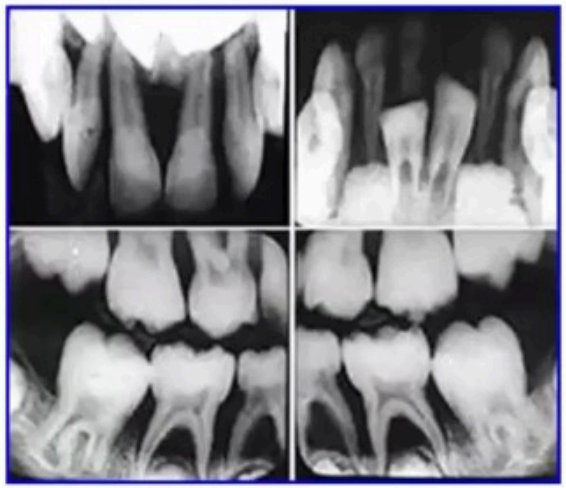
LEUKAEMIA

- Gingival infiltration results in leukemic GO.



NEUTROPENIA

- Is a blood disorder that results in low levels of circulating neutrophils
- Marked destruction of the periodontium and the necrotizing gingivitis type lesions

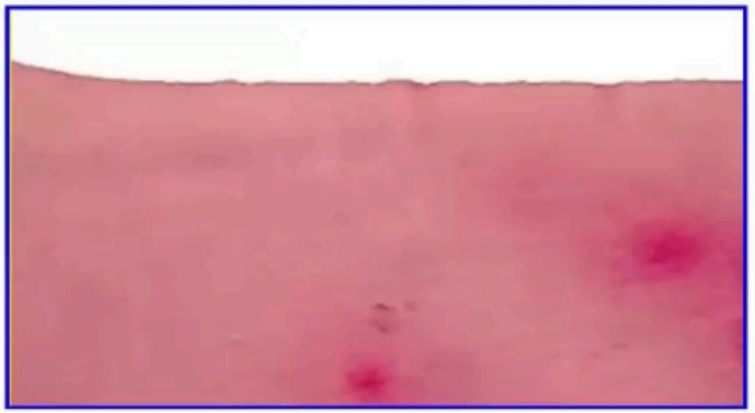


PAPILLON LÈFEVRE SYNDROME

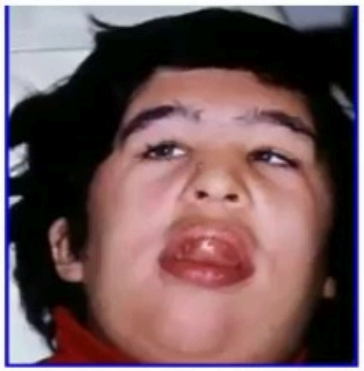
- Mutation of cathepsin c gene leading to diminished chemotaxis, phagocytosis, and intracellular killing by neutrophils

HYPOPHOSPHATASIA

- Patient lost anterior teeth for lack of cementum formation as seen in the microscopy of the root.

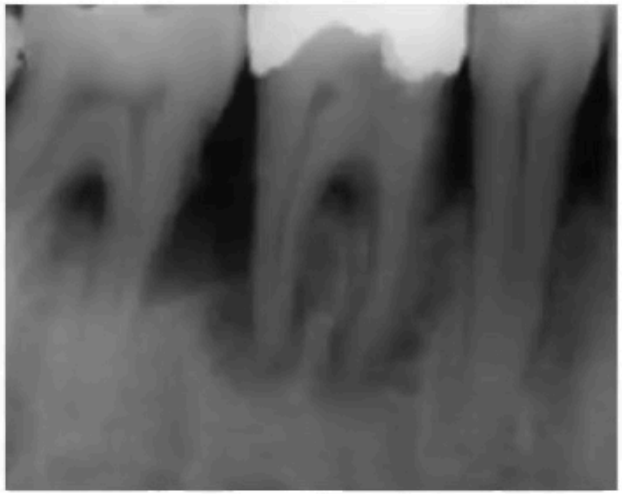


DOWN SYNDROME



- Trisomy 21,common cause of mental retardation
- Severe periodontal diseases even in primary dentition.
- Normal PMN numbers but with defects in chemotaxis, phagocytosis, or intracellular killing
- ↑ release of tissue destructive enzymes such as collagenase from salivary and GCF

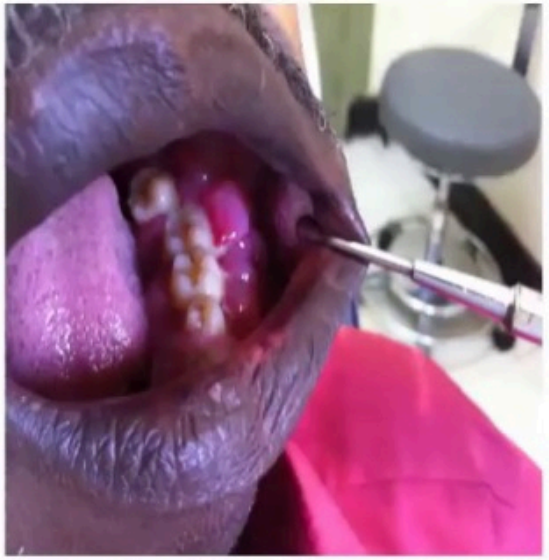
PERIOENDO LESIONS



GINGIVAL ABSCESS

PERIODONTAL ABSCESS

LOCALISED PURULENT INFECTIONS OF THE PERIODONTAL TISSUES

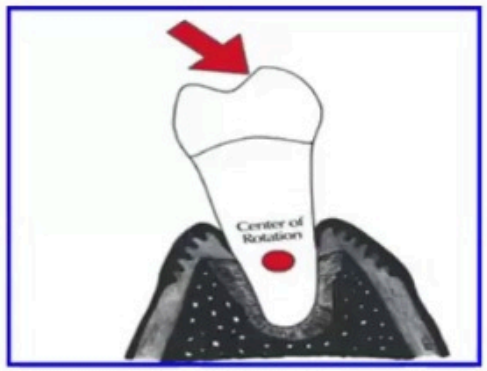


TRAUMA FROM OCCLUSION

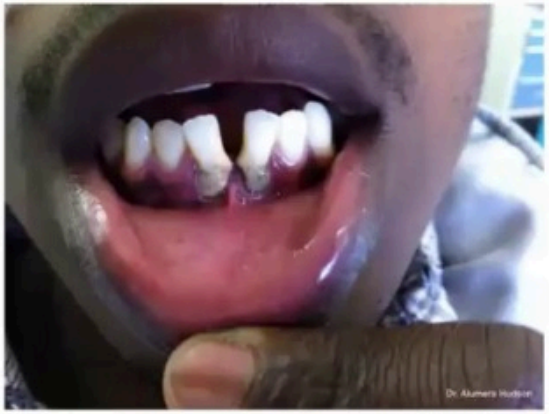
TRAUMATIC OCCLUSION PRODUCES PERIODONTAL INJURY.

- **Excessive** forces are exerted on teeth with an otherwise **normal, healthy non inflamed** periodontium.

- The adaptive capacity of the periodontium to withstand occlusal forces is impaired by periodontal attachment and bone loss

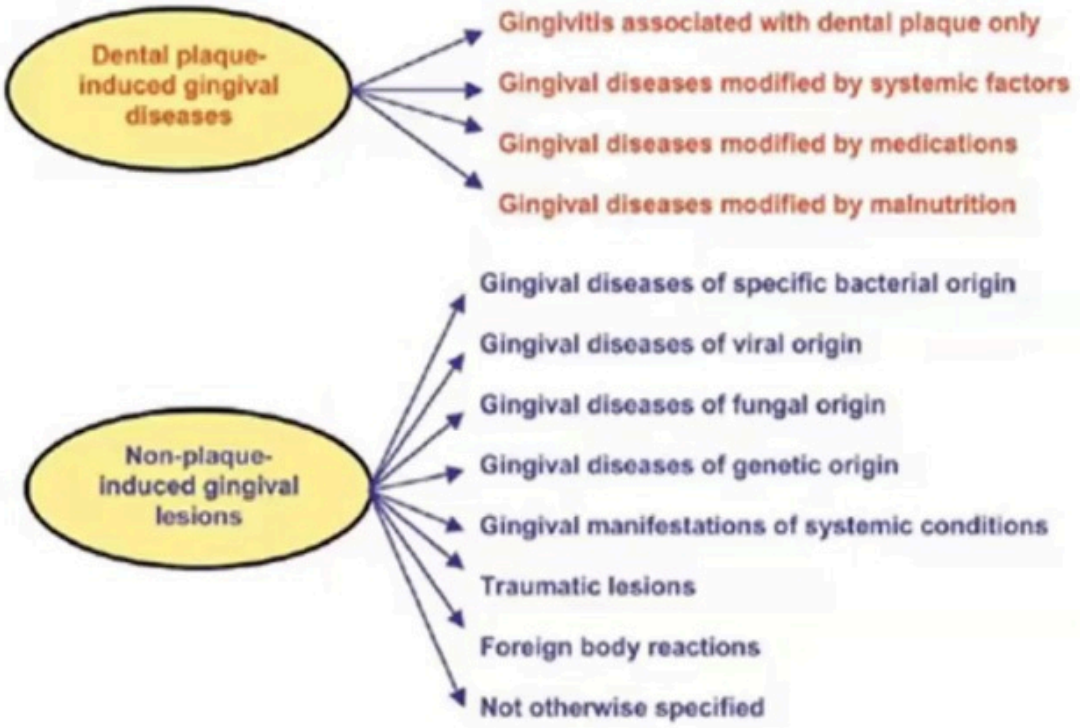


MUCOGINGIVAL DEFORMITIES

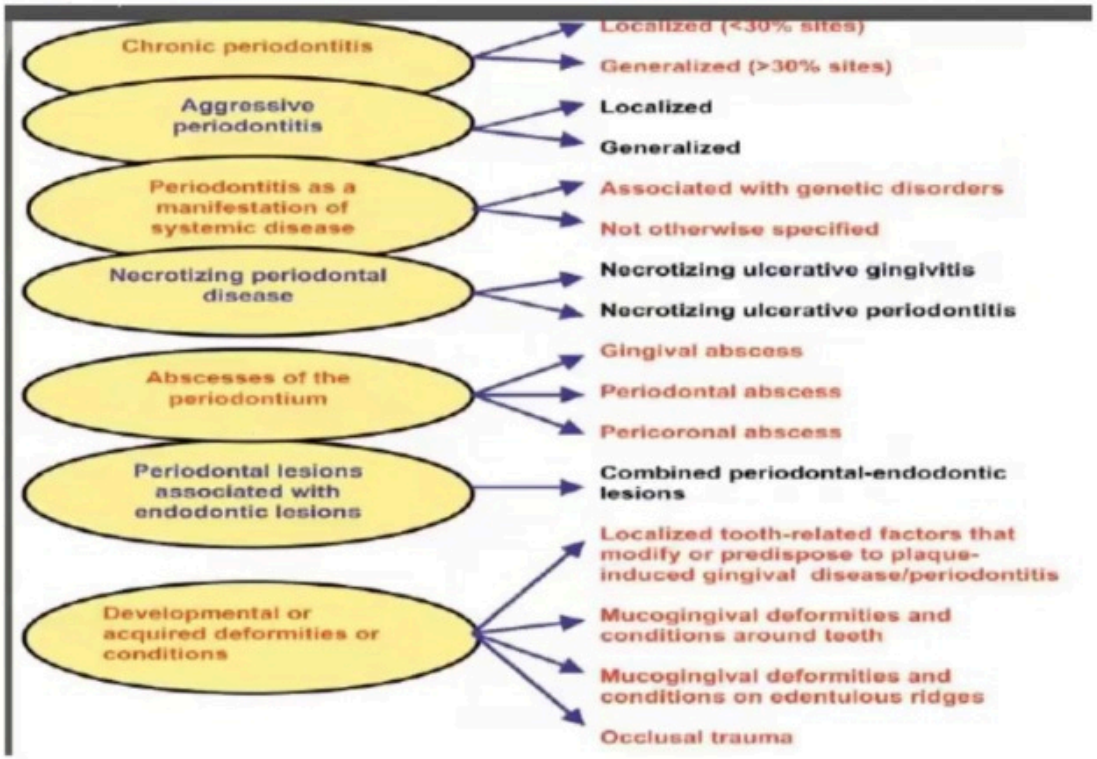


- Gingival/soft tissue recession
- Lack of keratinized gingiva
- Aberrant frenum

CONCLUSION


Dental plaque-induced gingival diseases
Gingivitis associated with dental plaque only
Gingival diseases modified by systemic factors
Gingival diseases modified by medications
Gingival diseases modified by malnutrition
Non-plaque-induced gingival lesions
Gingival diseases of specific bacterial origin
Gingival diseases of viral origin
Gingival diseases of fungal origin
Gingival diseases of genetic origin
Gingival manifestations of systemic conditions
Traumatic lesions
Foreign body reactions
Not otherwise specified

CONCLUSION


Chronic periodontitis
Localized (<30% sites)
Generalized (>30% sites)
Aggressive periodontitis
Localized
Generalized
Periodontitis as a manifestation of systemic disease
Associated with genetic disorders
Not otherwise specified
Necrotizing periodontal disease
Necrotizing ulcerative gingivitis
Necrotizing ulcerative periodontitis
Abscesses of the periodontium
Gingival abscess
Periodontal abscess
Pericoronal abscess
Periodontal lesions associated with endodontic lesions
Combined periodontal-endodontic lesions
Developmental or acquired deformities or conditions
Localized tooth-related factors that modify or predispose to plaque-induced gingival disease/periodontitis
Mucogingival deformities and conditions around teeth
Mucogingival deformities and conditions on edentulous ridges
Occlusal trauma