Università degli Studi di Ferrara
Corso di Laurea in Odontoiatria
Corso di Laurea in Igiene Dentale
Anno Accademico 2018-2019

Corso di Anatomia Patologica

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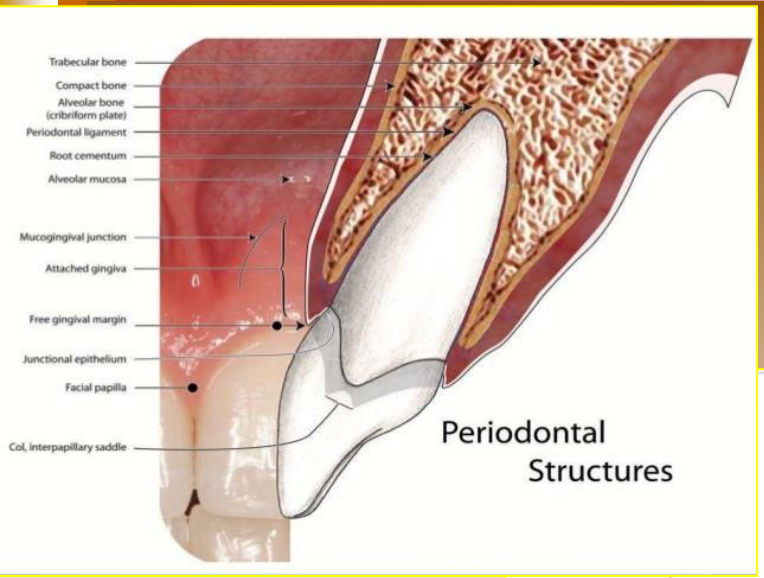
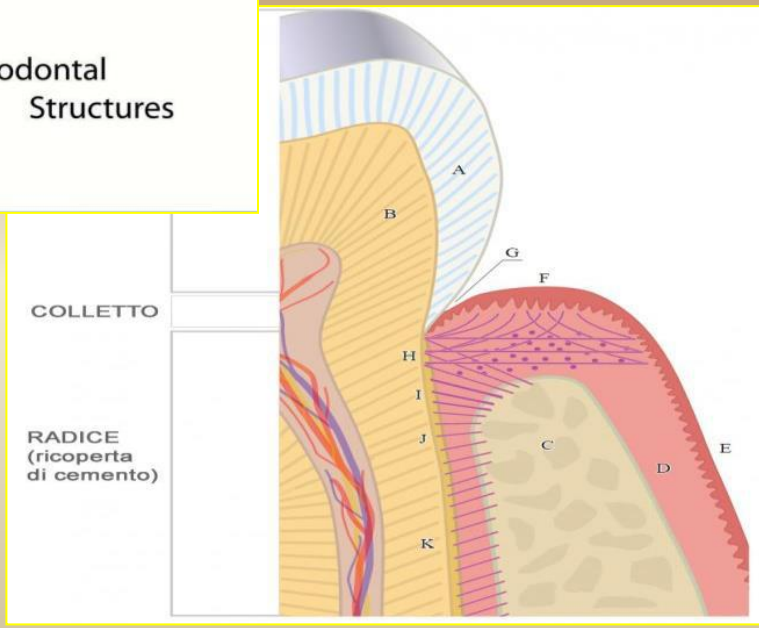
Dipartimento di Morfologia, Chirurgia e Medicina sperimentale
Università di Ferrara

Cavo orale IV: malattie periodontali

Anatomia dell'apparato gengivale





A. Corona dentale ricoperta dallo smalto

B. Dentina

C. Osso alveolare

D. Tessuto connettivo subepiteliale

E. Epitelio orale

F. Margine gengivale libero

G. Solco gengivale

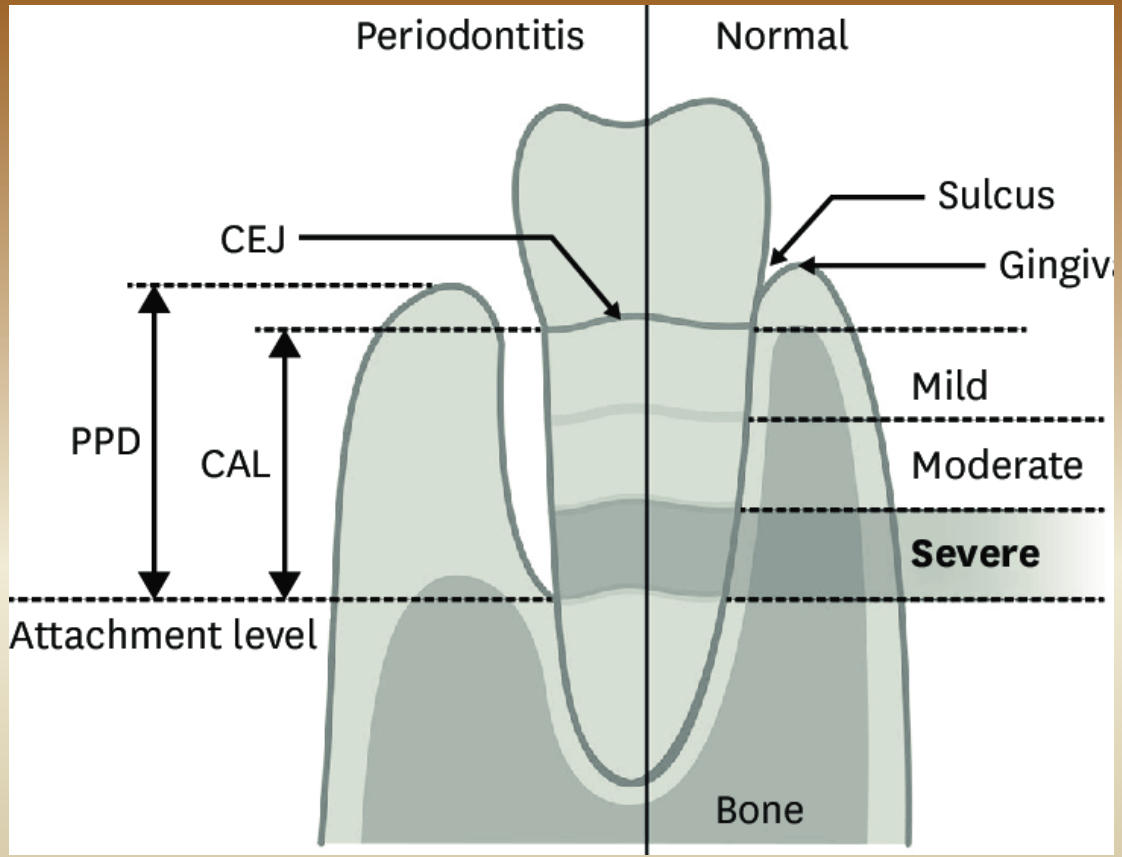
H. Fibre gengivali

I. Fibre della cresta alveolare dele legamento parodontale

J. Fibre orizzontali del legamento parodontale

K. Fibre oblique del legamento parodontale

Malattie periodontali
Parametri di valutazione clinica



CEJ: cementoenamel junction
CAL: clinical attachment loss
PPD: periodontal pocket depth

Wiebe, Putnins

Table 2 **Abbreviated version of the 1999 classification of periodontal diseases and conditions[2]**

I.	Gingival Diseases A. Dental plaque-induced gingival diseases B. Non-plaque-induced gingival lesions
II.	Chronic Periodontitis (slight: 1-2 mm CAL; moderate: 3-4 mm CAL; severe: > 5 mm CAL) A. Localized B. Generalized (> 30% of sites are involved)
III.	Aggressive Periodontitis (slight: 1-2 mm CAL; moderate: 3-4 mm CAL; severe: > 5 mm CAL) A. Localized B. Generalized (> 30% of sites are involved)
IV.	Periodontitis as a Manifestation of Systemic Diseases A. Associated with hematological disorders B. Associated with genetic disorders C. Not otherwise specified
V.	Necrotizing Periodontal Diseases A. Necrotizing ulcerative gingivitis B. Necrotizing ulcerative periodontitis
VI.	Abscesses of the Periodontium A. Gingival abscess B. Periodontal abscess C. Pericoronal abscess
VII.	Periodontitis Associated With Endodontic Lesions A. Combined periodontic-endodontic lesions
VIII.	Developmental or Acquired Deformities and Conditions A. Localized tooth-related factors that modify or predispose to plaque-induced gingival diseases/periodontitis B. Mucogingival deformities and conditions around teeth C. Mucogingival deformities and conditions on edentulous ridges D. Occlusal trauma

Malattie periodontali
classificazione 1999

mucosa sana

gengivite

periodontite

perdita dente

Malattie periodontali
fattori di rischio ed eziologici

Fattori eziologici

Locali
- Impatto del cibo
- Malposizioni dentali e protesiche
- Fattori irritanti locali (fumo, inalazione gas irritanti)
- Scarsa igiene orale, placca*

Sistemici
- Diabete mellito
- Gravidanza e ormoni sessuali
- Deficit nutrizionali/vitaminici (vit. C)
- Emopatie
- Fattori iatrogeni (FANS, antiepilettici, antipertensivi, immunosoppressori)
- Immunodeficienze

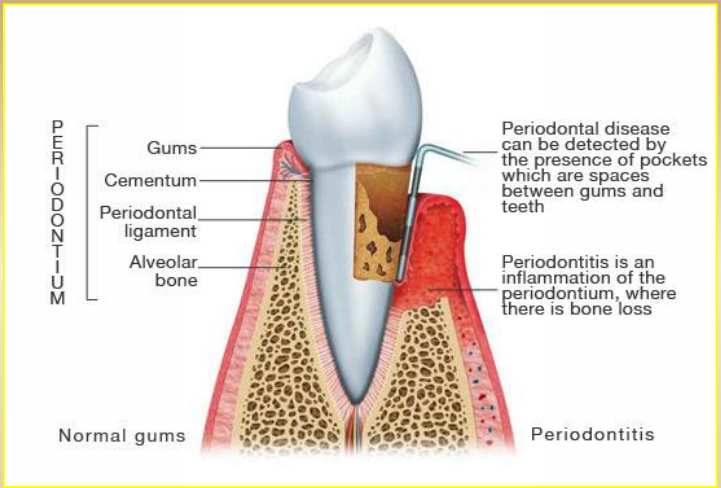
***Placca dentaria**
- Associazione tra placca, prevalenza e gravità
- Associazione, reversibile, con scarsa igiene orale
- Eziologia polimicrobica
- Massa placca aumentata (100-300 cell. vs. 1-20)
- Predominanza actinomiceti, anaerobi e Gram-

Epidemiologia
- Endemia
- Distruzione periodontale nel 10-15% della popolazione

Patogenesi

- Alterazione rapporto ospite/parassita
- Attivazione risposta infiammatoria e immunitaria
- Sintesi di citochine
- Distruzione tessuto connettivo
- riassorbimento dell'osso
- Nuovo equilibrio rapporto ospite parassita

Malattie periodontali
fattori di rischio ed eziologici

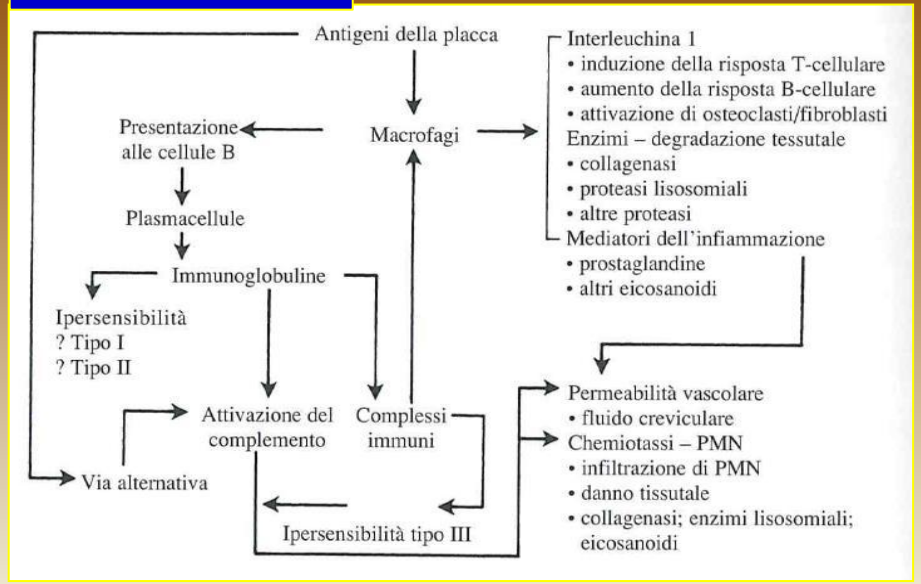


placca microbica
- ✓danno diretto
- ✓prodotti tossici
- ✓enzimi

difese ospite
- ✓fattori salivari
- ✓fluido creviculare
- ✓barriera epiteliale

Malattie periodontali
patogenesi

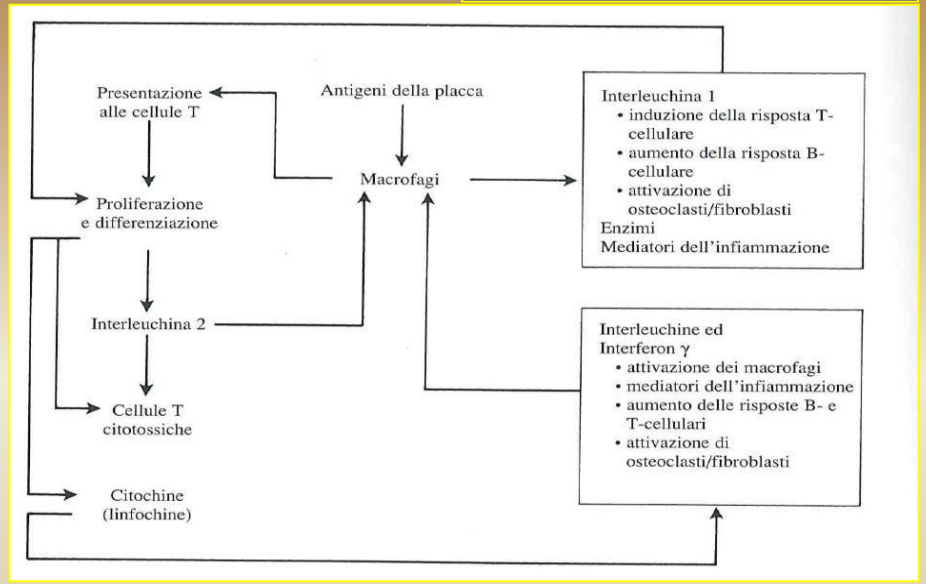
Immunità umorale



•In tutte le fasi della periodontite si verifica una migrazione di PMN (difesa) negli ep. giunzionali e nella tasca (chemiotassi: complemento nel fluido creviculare)

•La periodontite è dominata da plasmacellule, anche se con l. T ben rappresentati. Sono presenti Ab contro batteri periodontopatici (siero, liquido creviculare)

Immunità cellulo-mediata



•La lesione precoce è caratterizzata da una risposta T cellulare

Malattie periodontali
aspetti patologici della progressione

Gengivite iniziale
- Base del solco gengivale
- Vasodilatazione essudato, aumento del l. crevic.
- Infiltrazione PMN
- Rottura spazi intercellulari dell'epitelio

Gengivite precoce
- Aggravamento gengivite iniziale
- Ulteriore compromissione della funzione di barriera
- Infiltrazione linfocitaria
- Perdita collagene

Gengivite conclamata
- Ulteriore distruzione epitelio giunzionale (2/3 sett.)
- Ulcerazione dell'epitelio
- Distruzione connettivale
- Tentativo di riparazione (gengivite iperplastica)

Lesione avanzata
- Patogenesi ancora non del tutto chiara
- Estensione anche agli apici, flogosi distruttiva
- Predominanza plasmacellule
- Perdita attacco connettivale (IL-1; MMP; TIMP)
- Formazione della tasca
- Distruzione osso alveolare (interferenza osteogenesi)
- Danno ai legamenti
- Perdita del dente

Malattie periodontali
classificazione 2017

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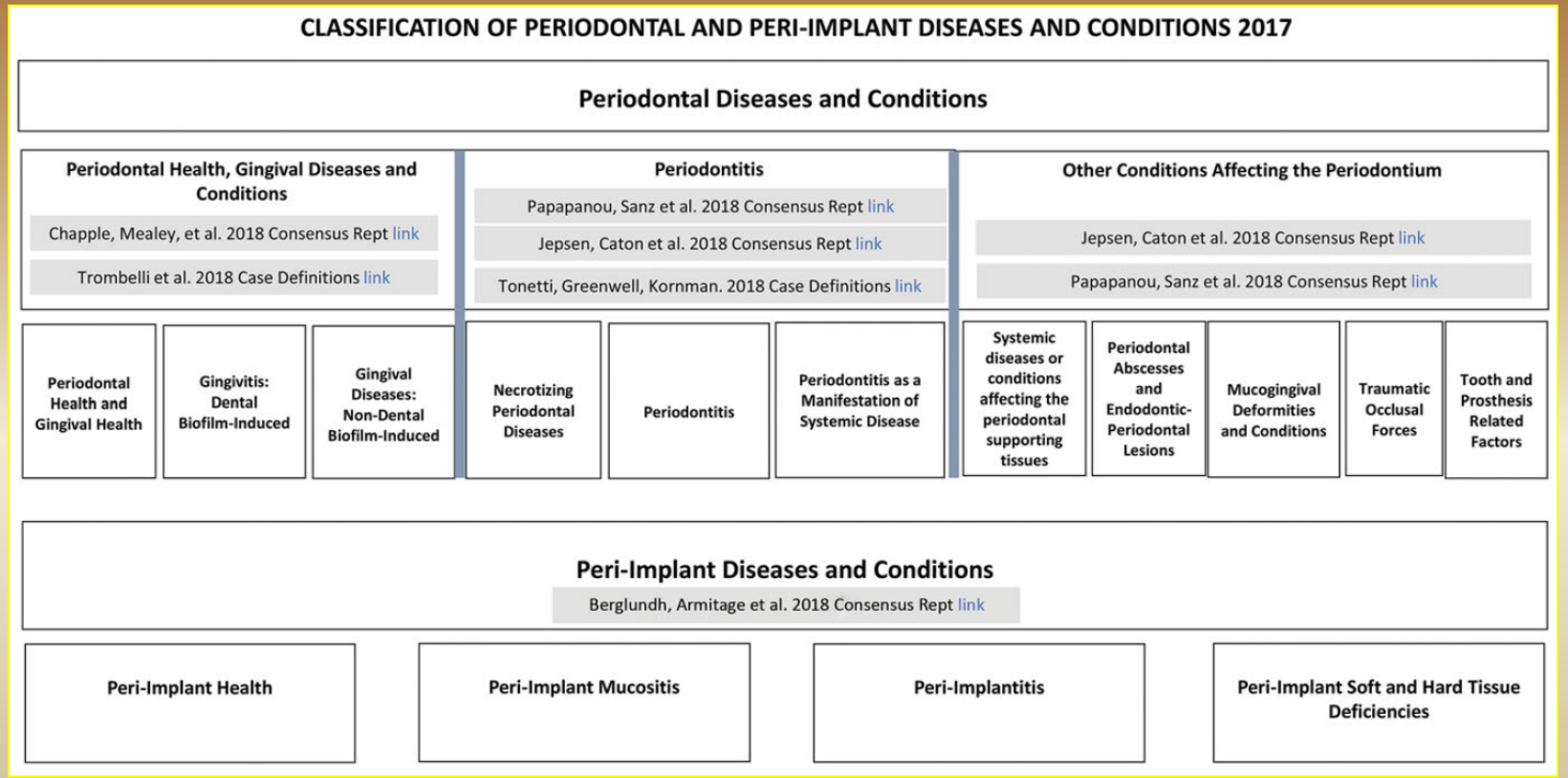
2017 WORLD WORKSHOP

JOURNAL OF Periodontology

A new classification scheme for periodontal and peri-implant diseases and conditions – Introduction and key changes from the 1999 classification

Jack G. Caton[1] | Gary Armitage[2] | Tord Berglundh[3] | Iain L.C. Chapple[4] | Søren Jepsen[5] | Kenneth S. Kornman[6] | Brian L. Mealey[7] | Panos N. Papapanou[8] | Mariano Sanz[9] | Maurizio S. Tonetti[10]

Malattie periodontali
classificazione 2017



Salute periodontale, condizioni/malattie gengivali
condizioni di salute

Periodontal Health and Gingivitis: Consensus Report
Chapple, Mealey, et al. 2018
Active link to consensus report

Gingival Diseases: Case Definitions and Diagnostic Considerations
Trombelli, Tatakis, et al. 2018
Active link to case definitions

PERIODONTAL HEALTH, GINGIVAL DISEASES/CONDITIONS

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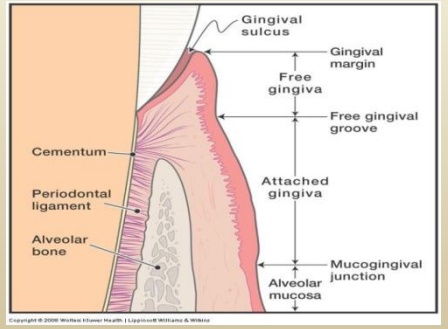

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2017 WORLD WORKSHOP

JOURNAL OF Periodontology

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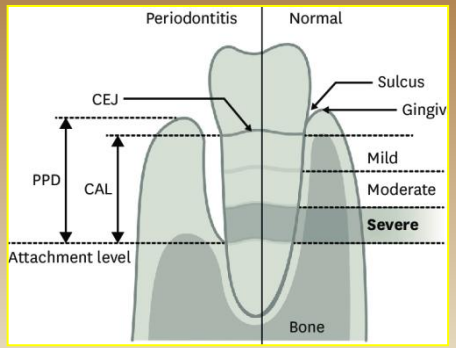

Condizioni di salute:

- Associate a infiltrato infiammatorio e a risposte di difesa compatibili con l'omeostasi
- A periodonto intatto:
  - Assenza di sanguinamento, edema/eritema, perdita di adesione ossea
  - distanza apice osso-CEJ: 1-3 mm
- A periodonto ridotto/ribassato (periodontite stabile/assenza di periodontite):
  - Assenza di sanguinamento, edema/eritema, sintomi.
  - Clinical Attachment Loss (CAL)
  - Aumento del rischio di progressione in pz. con periodonite
  - Assenza di rischi in pz. senza periodontite

Sanguinamento al sondaggio (Bleeding On Probing) parametri

Table 1. Sulcus Bleeding Index (SBI)[3]

Score	Description
0	Healthy P & M,* no bleeding on probing
1	Bleeding on probing, no color change, no swelling of P & M
2	Bleeding on probing, change in color, no swelling of P & M
3	Bleeding on probing, change in color, slight swelling of P & M
4	Bleeding on probing, change in color, obvious swelling of P & M
5	Bleeding on probing, spontaneous bleeding, change in color, marked swelling with or without ulceration

*P & M = papillae and marginal gingiva.

Table 3. Periodontal Screening and Recording (PSR)

Code	Description
0	Colored area of probe remains completely visible. No calculus or defective margins. No bleeding. Healthy gingiva.
1	Colored area of probe remains completely visible. No calculus or defective margins. Bleeding after gentle probing.
2	Colored area of probe remains completely visible. Supra- or subgingival calculus and/or defective margins.
3	Colored area of probe remains partly visible in deepest probing depth of sextant.
4	Colored area of probe completely disappears, indicating probing depth of greater than 5.5 mm.
*	Symbol added to sextant score in presence of: furcation invasion, mobility, mucogingival problems, or recession of 3.5 mm or greater.

Table 4. Papillary Bleeding Index (PBI)[20]

Grade	Description
0	No bleeding within 30 seconds of probing
1	Bleeding within a few seconds of probing
2	Immediate bleeding on probing
3	Bleeding along gingival sulcus on slightest touch

Indices to Measure Gingival Bleeding*

Ernest Newbrun

J Periodontol 1996;67:555–561.

Table 5. Papillary Bleeding Index (PBI), Revised[12]

Grade	Description
0	No bleeding
1	Single bleeding point 20 to 30 seconds after probing
2	Fine line of blood or several bleeding points
3	Blood fills interdental triangle soon after probing
4	Immediate profuse bleeding, fills interdental area, flows over tooth and gingiva

Table 6. Papillary Bleeding Score (PBS)*

Score	Description
0	Healthy gingiva, no bleeding
1	Edematous, red gingiva, no bleeding
2	Bleeding without flow
3	Bleeding with flow along gingival margin
4	Copious bleeding
5	Tendency to spontaneous bleeding, severe inflammation, marked redness, and edema

*On interproximal insertion of toothpick.[15]

Table 7. Bleeding Time Index (BTI)[14]

Grade	Description
0	No bleeding within 15 seconds of twice probing (i.e., 30 seconds total time)
1	Bleeding within 6 to 15 seconds of second probing
2	Bleeding within 11 to 15 seconds of first probing or 5 seconds after second probing
3	Bleeding within 10 seconds after initial probing
4	Spontaneous bleeding

Table 8. Assessment of Bleeding Tendency by a Modified Sulcus Bleeding Index (mSBI)[22]

Score	Description
0	No bleeding when a periodontal probe is passed along the gingival margin
1	Isolated bleeding spots visible
2	Blood forms a confluent red line on margin
3	Heavy or profuse bleeding

Sanguinamento al sondaggio (Bleeding On Probing) parametri

Table 1. Sulcus Bleeding Index (SBI)[3]

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3	Heavy or profuse bleeding

Alert…

- Confronto tra classificazioni (dicotomiche, policotomiche)
- Strumenti di sondaggio
- Sede del sondaggio *(mesio-buccale, buccale, disto-buccale, mesio-linguale, disto-linguale)*
- Angolazione del sondaggio
- Profondità del sondaggio
- Forza del sondaggio (0,25N)
- Riproducibilità delle misure
- Sensibilità/specificità del test come predittore di periodontite

Salute periodontale, condizioni/malattie gengivali
condizioni di salute

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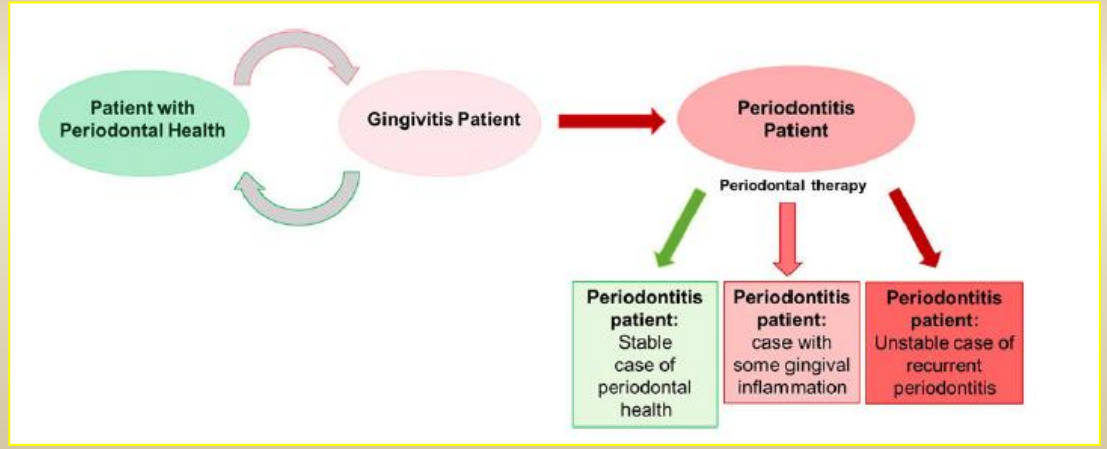
   a. Genetic/developmental disorders
   b. Specific infections
   c. Inflammatory and immune conditions
   d. Reactive processes
   e. Neoplasms
   f. Endocrine, nutritional & metabolic diseases
   g. Traumatic lesions
   h. Gingival pigmentation

Normalità/gengivite

- **<10%/≥10% sedi sanguinanti (profondità 3mm)**

Periodontite stabile

- **BOP<10%, nessun sanguinamento con profondità probe ≥ 4mm**
- **Nessun segno clinico di progressione/distruzione**



Salute periodontale, condizioni/malattie gengivali
gengivite

TABLE 2 Classification of gingival health and gingival diseases/conditions

1. **Periodontal health**[2]
   - **A.** Clinical health on an intact periodontium
   - **B.** Clinical gingival health on a reduced periodontium
     - (i) Stable periodontitis patient
     - (ii) Non-periodontitis patient
2. **Gingivitis – dental plaque-induced:** ***intact periodontium; reduced periodontium in non-periodontitis patient; reduced periodontium in successfully treated periodontitis patient.***[7]
   - **A.** Associated with biofilm alone
   - **B.** Mediated by systemic or local risk factors
     - **i.** Systemic risk factors (modifying factors)
       - (a) Smoking
       - (b) Hyperglycemia
       - (c) Nutritional factors
       - (d) Pharmacological agents (prescription, non-prescription and recreational)
       - (e) Sex steroid hormones
         Puberty
         Menstrual cycle
         Pregnancy
         Oral contraceptives
       - (f) Hematological conditions
     - **ii.** Local risk factors (predisposing factors)
       - (a) Dental plaque biofilm retention factors (e.g., prominent restoration margins)
       - (b) Oral dryness
   - **C.** Drug-influenced gingival enlargement
3. **Gingival diseases – non–dental plaque-induced**[26]
   - **A.** Genetic/developmental disorders
     - **i.** Hereditary gingival fibromatosis[a]
   - **B.** Specific infections
     - **i.** Bacterial origin
       - (a) *Neisseria gonorrhoeae*[a]
       - (b) *Treponema pallidum*[a]
       - (c) *Mycobacterium tuberculosis*[a]
       - (d) Streptococcal gingivitis
     - **ii.** Viral origin
       - (a) Coxsackie virus (hand-foot-and-mouth disease)[a]
       - (b) Herpes simplex I & II (primary or recurrent)[a]
       - (c) Varicella zoster (chicken pox & shingles – V nerve)[a]
       - (d) Molluscum contagiosum[a]
       - (e) Human papilloma virus (squamous cell papilloma; condyloma acuminatum; verruca vulgaris; focal epithelial hyperplasia)
     - **iii.** Fungal origin
       - (a) Candidosis
       - (b) Other mycoses, e.g., histoplasmosis, aspergillosis
   - **C.** Inflammatory and immune conditions
     - **i.** Hypersensitivity reactions
       - (a) Contact allergy[a]
       - (b) Plasma cell gingivitis[a]
       - (c) Erythema multiforme[a]
     - **ii.** Autoimmune diseases of skin and mucous membranes
       - (a) Pemphigus vulgaris[a]
       - (b) Pemphigoid[a]
       - (c) Lichen planus[a]
       - (d) Lupus erythematosus[a]
         Systemic lupus erythematosis
         Discoid lupus erythematosis
     - **iii.** Granulomatous inflammatory lesions (orofacial granulomatoses)
       - (a) Crohn's disease[a]
       - (b) Sarcoidosis[a]
   - **D.** Reactive processes
     - **i.** Epulides
       - (a) Fibrous epulis
       - (b) Calcifying fibroblastic granuloma
       - (c) Vascular epulis (pyogenic granuloma)
       - (d) Peripheral giant cell granuloma[a]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Salute periodontale, condizioni/malattie gengivali
gengivite

E. Neoplasms
- **i.** Premalignancy
  - (a) Leukoplakia
  - (b) Erythroplakia
- **ii.** Malignancy
  - (a) Squamous cell carcinoma[a]
  - (b) Leukemic cell infiltration[a]
  - (c) Lymphoma[a]
    - Hodgkin
    - Non-Hodgkin

F. Endocrine, nutritional & metabolic diseases
- **i.** Vitamin deficiencies[a]
  - (a) Vitamin C deficiency (scurvy)

G. Traumatic lesions
- **i.** Physical/mechanical trauma
  - (a) Frictional keratosis
  - (b) Mechanically induced gingival ulceration
  - (c) Factitious injury (self-harm)
- **ii.** Chemical (toxic) burn
- **iii.** Thermal insults
  - (a) Burns to gingiva

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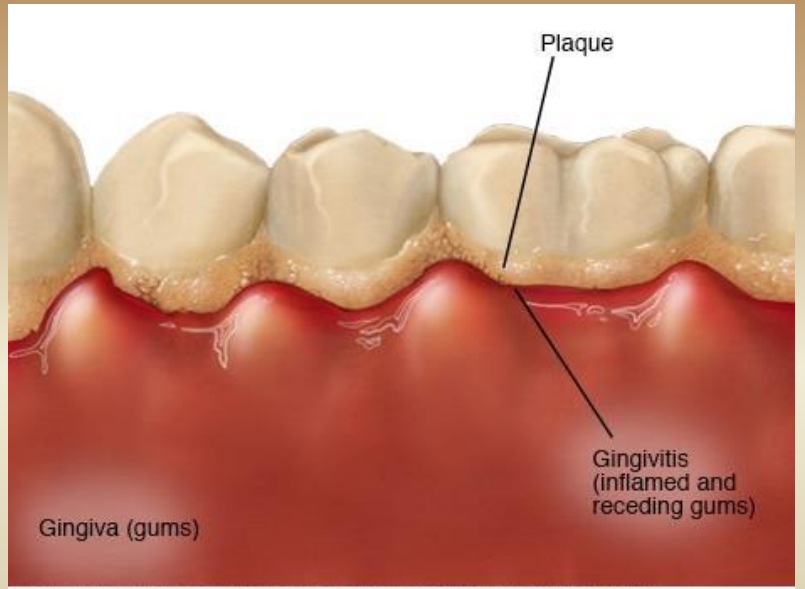
H. Gingival pigmentation
- **i.** Melanoplakia[a]
- **ii.** Smoker's melanosis
- **iii.** Drug-induced pigmentation (antimalarials, minocycline)
- **iv.** Amalgam tattoo

[a]Conditions marked with an "a" have associated systemic involvement or are oral manifestations of systemic conditions; therefore, other health-care providers may be involved in diagnosis and treatment.



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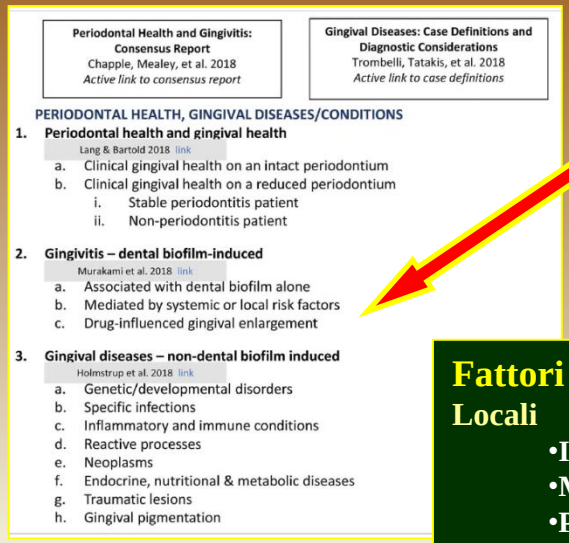

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1. **Periodontal health and gingival health**
   Lang & Bartold 2018 link
   a. Clinical gingival health on an intact periodontium
   b. Clinical gingival health on a reduced periodontium
      i. Stable periodontitis patient
      ii. Non-periodontitis patient

2. **Gingivitis – dental biofilm-induced**
   Murakami et al. 2018 link
   a. Associated with dental biofilm alone
   b. Mediated by systemic or local risk factors
   c. Drug-influenced gingival enlargement

3. **Gingival diseases – non-dental biofilm induced**
   Holmstrup et al. 2018 link
   a. Genetic/developmental disorders
   b. Specific infections
   c. Inflammatory and immune conditions
   d. Reactive processes
   e. Neoplasms
   f. Endocrine, nutritional & metabolic diseases
   g. Traumatic lesions
   h. Gingival pigmentation

Diagnosi:
(definizione non univoca)

1. La diagnosi (flogosi) è clinica
2. Segni
   - Gonfiore/rossore
   - Sanguinamento e fastidio al sondaggio
3. Sintomi
   - Gengive sanguinanti
   - Dolore
   - Alitosi
   - Difficoltà masticatorie
   - Riduzione QOL
4. Imaging
   - Inappropriato

Fattori di rischio:

Locali

- Impatto cibo
- Malposizioni dentali e protesiche
- Placca dentale
- Xerostomia
- Fattori irritanti (fumo, gas tossici)

Sistemici

- Iperglicemia (stress mitocondriale, AGEs)
- Deficit nutrizionali (Vit. C)
- Farmaci (riduzione saliva, danno endocrino, danni gengivali)
- Ormoni steroidi (pubertà, gravidanza, terapie)
- Emopatie (mielodisplasie, leucemie)

Salute periodontale, condizioni/malattie gengivali

gengivite

TABLE 1 Diagnostic look-up table for gingival health or dental plaque-induced gingivitis in clinical practice

Intact periodontium	**Health**	**Gingivitis**
Probing attachment loss	No	No
Probing pocket depths (assuming no pseudo pockets)[a]	≤3 mm	≤3 mm
Bleeding on probing[a]	<10%	Yes (≥ 10%)
Radiological bone loss	No	No
Reduced periodontium		
Non-periodontitis patient	**Health**	**Gingivitis**
Probing attachment loss	Yes	Yes
Probing pocket depths (all sites & assuming no pseudo pockets)[a]	≤3 mm	≤3 mm
Bleeding on probing[a]	<10%	Yes (≥ 10%)
Radiological bone loss	Possible	Possible
NB: In conditions where there is treatment but not cure, e.g. rheumatoid arthritis, periodontitis, the post-treatment parameters that define stability/health or gingivitis may differ from the parameters for health/gingivitis in a non-periodontitis patient. The threshold for "clinical health" in a treated and stable periodontitis patient is therefore set at ≤ 4 mm.		
Successfully treated stable periodontitis patient	**Health**	**Gingivitis in a patient with a history of periodontitis**
Probing attachment loss	Yes	Yes
Probing pocket depths (all sites & assuming no pseudo pockets)[a]	≤4 mm (no site ≥ 4 mm with BOP)[b]	≤3 mm
Bleeding on probing[a]	<10%	Yes (≥ 10%)
Radiological bone loss	Yes	Yes
NB: A successfully treated periodontitis patient in whom sites of gingival bleeding appear remains at high risk of disease recurrence at those sites and of progressive attachment loss. Therefore, gingivitis is defined as bleeding at a shallow site of ≤ 3 mm rather than ≤ 4 mm, as is the case in gingival heath. Where the probing depth is 4 mm or higher with bleeding, this is no longer a "closed pocket."[21,25]		

[a] **Assumes a light probing pressure of 0.2 to 0.25 N.**

[b] There was a rational minority view expressed that the threshold for defining a clinical case of health in a successfully treated periodontitis patient should be set at ≤ 3 mm with no BOP to acknowledge the elevated risk of recurrent disease. However, the counter and majority view was that the ≤ 3 mm threshold is rarely achieved at 100% of treated sites and could lead to over-treatment, since any non-bleeding site > 3 mm would not be classified as "health" and thus open to further invasive treatment, rather than monitoring and supportive care. The threshold was therefore set at ≤ 4 mm acknowledging that post-treatment clinical phenotypes need to be considered differently to pre-treatment phenotypes.

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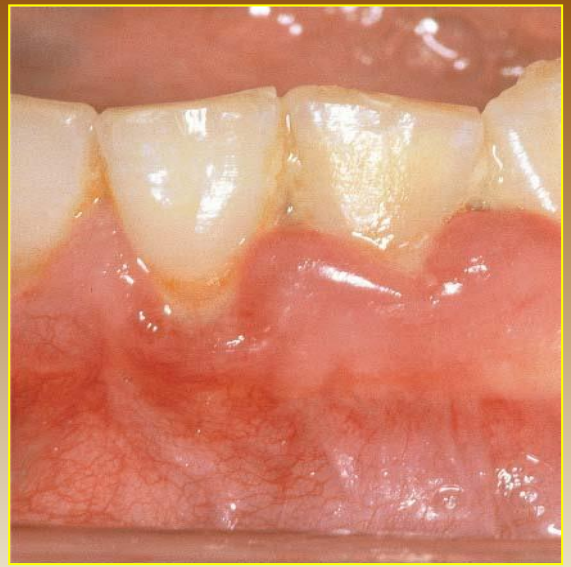
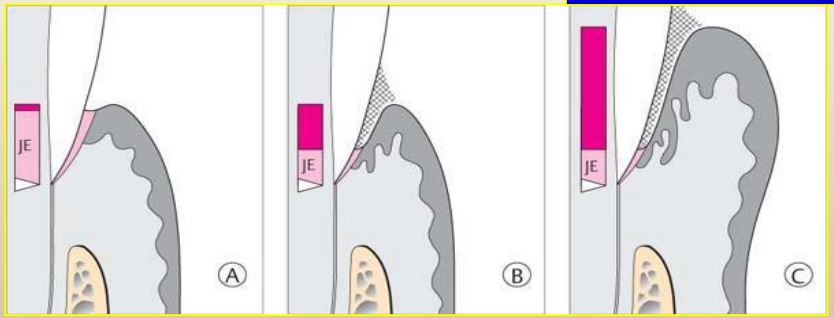
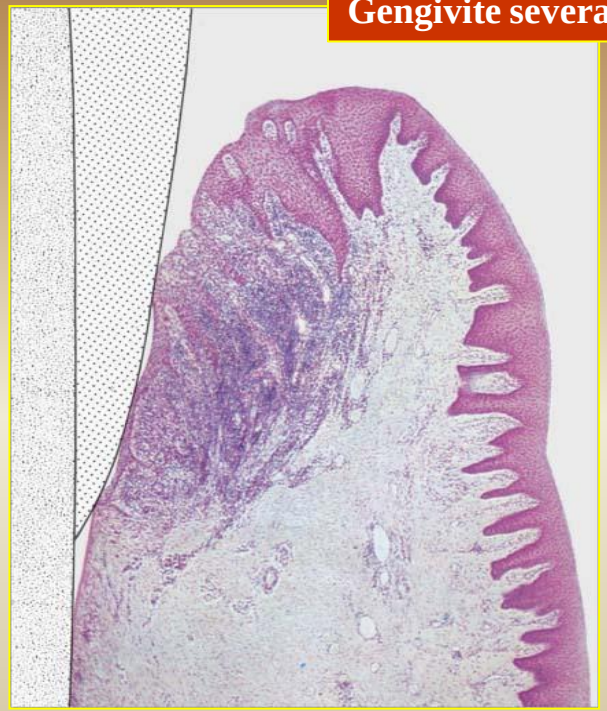
Salute periodontale, condizioni/malattie gengivali
gengivite



A. Solco gengivale
B. Tasca gengivale
C. Pseudotasca (da rigonfiamento)



Gengivite severa



Salute periodontale, condizioni/malattie gengivali
problemi aperti e obiettivi futuri

- **Sviluppo e validazione di mezzi diagnostici non invasivi, specialmente orientati alla rilevazione dell'infiammazione gengivale**
- **Individuazione dei caratteri utili a distinguere persone resistenti /sensibili allo sviluppo di gengiviti**
- **Maggiore conoscenza dei determinanti l'affidabilità degli strumenti diagnostici**
- **Caratterizzazione biologica delle differenze tra gengiviti con periodonto intatto dalle altre forme di malattie gengivali**
- **Affidabilità/riproducibilità dei test: standardizzazione (attualmente ISO 21672):**
  - ***Diametro strumento: 0,5mm.***
  - ***Struttura cilindrica***
  - ***Forza applicata ≤0.25N***
  - ***Scala graduata di 15 mm***
  - ***Restremazione puntale 1.75°***

Malattie periodontali

La periodontite è una malattia infiammatoria cronica multifattoriale associata a placca con squilibrio microbico del biofilm e caratterizzata da distruzione progressiva dell'apparato di supporto del dente

Periodontiti classificazione

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A new classification scheme for periodontal and peri-implant diseases and conditions – Introduction and key changes from the 1999 classification

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TABLE 3

Periodontitis Consensus Report Papapanou, Sanz et al. 2018 *Active link to consensus report*	**Staging and Grading of Periodontitis:** Framework and Proposal of a New Classification and Case Definition Tonetti, Greenwell, Kornman 2018 *Active link to case definitions*

FORMS OF PERIODONTITIS

1. **Necrotizing Periodontal Diseases**

   Herrera et al. 2018 link

   a. Necrotizing Gingivitis
   b. Necrotizing Periodontitis
   c. Necrotizing Stomatitis

2. **Periodontitis as Manifestation of Systemic Diseases**

   Jepsen, Caton et al. 2018 Consensus Rept link | Albandar et al. 2018 link

   Classification of these conditions should be based on the primary systemic disease according to the International Statistical Classification of Diseases and Related Health Problems (ICD) codes

3. **Periodontitis**

   Fine et al. 2018 link | Needleman et al. 2018 link | Billings et al. 2018 link

   a. **Stages:** Based on Severity[1] and Complexity of Management[2]
      - Stage I: Initial Periodontitis
      - Stage II: Moderate Periodontitis
      - Stage III: Severe Periodontitis with potential for additional tooth loss
      - Stage IV: Severe Periodontitis with potential for loss of the dentition

   b. Extent and distribution[3]: localized; generalized; molar-incisor distribution

   c. **Grades:** Evidence or risk of rapid progression[4], anticipated treatment response[5]
      i. Grade A: Slow rate of progression
      ii. Grade B: Moderate rate of progression
      iii. Grade C: Rapid rate of progression

[1] Severity: Interdental clinical attachment level (CAL) at site with greatest loss; Radiographic bone loss & tooth loss
[2] Complexity of management: Probing depths, pattern of bone loss, furcation lesions, number of remaining teeth, tooth mobility, ridge defects, masticatory dysfunction
[3] Add to Stage as descriptor: localized <30% teeth, generalized ≥ 30% teeth
[4] Risk of progression: direct evidence by PA radiographs or CAL loss, or indirect (bone loss/age ratio)
[5] Anticipated treatment response: case phenotype, smoking, hyperglycemia

Eziopatogenesi

Gengivite ulcerativa necrotizzante (NUG)

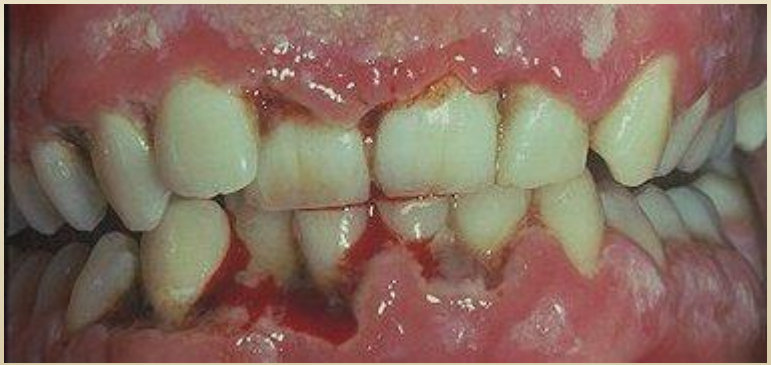
- Malnutrizione
- Scarsa igiene
- Immunodeficienze (HIV)
- Fumo di tabacco

Periodontite ulcerativa necrotizzante (NUP)

- Microflora
- Anomalie di risposta immune
- Fumo di tabacco
- Malattie sistemiche

Periodontiti

malattia periodontale necrotizzante



Anatomia patologica

Gengivite ulcerativa necrotizzante (NUG)

- Necrosi papillare
- Sanguinamento
- Dolore

Periodontite ulcerativa necrotizzante (NUP)

- Distruzione legamento
- Ulcerazione e necrosi del margine gengivale
- Coinvolgimento periodonto
- Dolore e sanguinamento
- Linfoadenopatia satellite, malessere generale

Periodontiti (forme)
malattia periodontale necrotizzante

TABLE 2 Classification of necrotizing periodontal diseases (NPD)

Category	Patients	Predisposing conditions	Clinical condition
Necrotizing periodontal diseases in chronically, severely compromised patients	In adults	HIV+/AIDS with CD4 counts < 200 and detectable viral load	NG, NP, NS, Noma. Possible progression
		Other severe systemic conditions (immunosuppression)	
	In children	Severe malnourishments[a]	
		Extreme living conditions[b]	
		Severe (viral) infections[c]	
Necrotizing periodontal diseases in temporarily and/or moderately compromised patients	In gingivitis patients	Uncontrolled factors: stress, nutrition, smoking, habits	Generalized NG. Possible progression to NP
		Previous NPD: residual craters	
		Local factors: root proximity, tooth malposition	Localized NG. Possible progression to NP
		Common predisposing factors for NPD (see paper)	NG. Infrequent progression
	In periodontitis patients		NP. Infrequent progression

NG, necrotizing gingivitis; NP, necrotizing periodontitis; NS, necrotizing stomatitis.

[a]Mean plasma and serum concentrations of retinol, total ascorbic acid, zinc, and albumin markedly reduced, or very marked depletion of plasma retinol, zinc, and ascorbate; and saliva levels of albumin and cortisol, as well as plasma cortisol concentrations, significantly increased.

[b]Living in substandard accommodations, exposure to debilitating childhood diseases, living near livestock, poor oral hygiene, limited access to potable water and poor sanitary disposal of human and animal fecal waste.

[c]Measles, herpes viruses (cytomegalovirus, Epstein-Barr virus-1, herpes simplex virus), chicken pox, malaria, febrile illness.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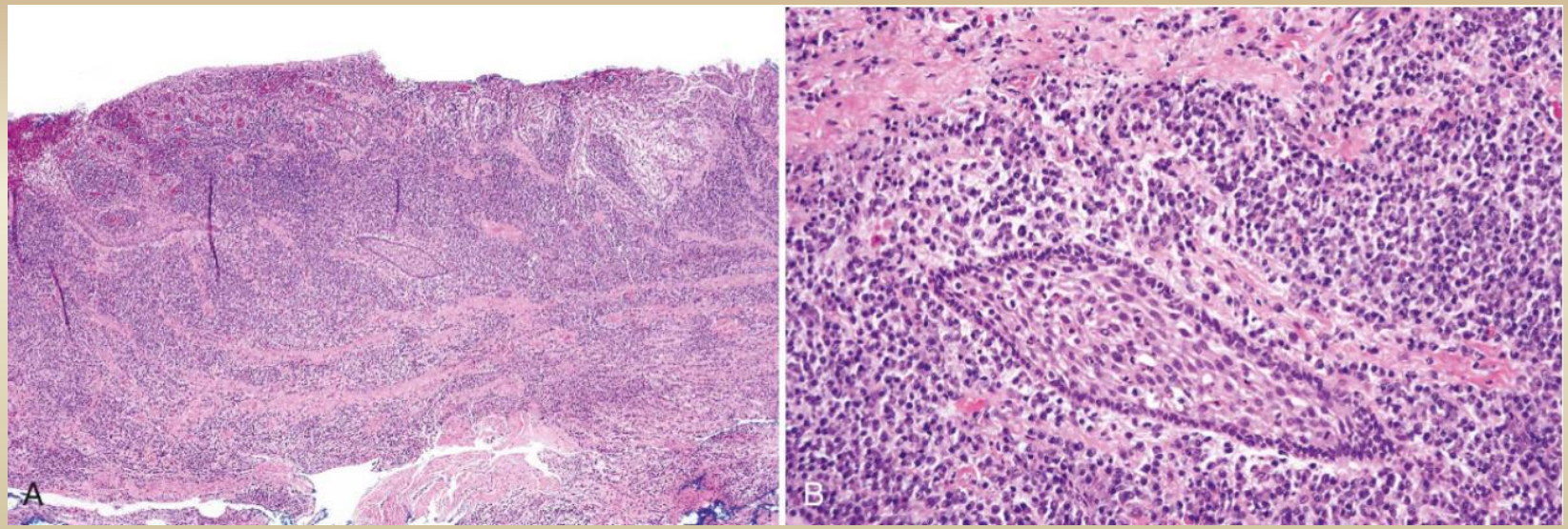
Differenti caratteristiche vs. periodontiti:
- **Ulcere mucose con flogosi periulcerosa**
- **Infiltrazione batterica**
- **Situazioni di immunodeficienza**

Periodontiti patogenesi

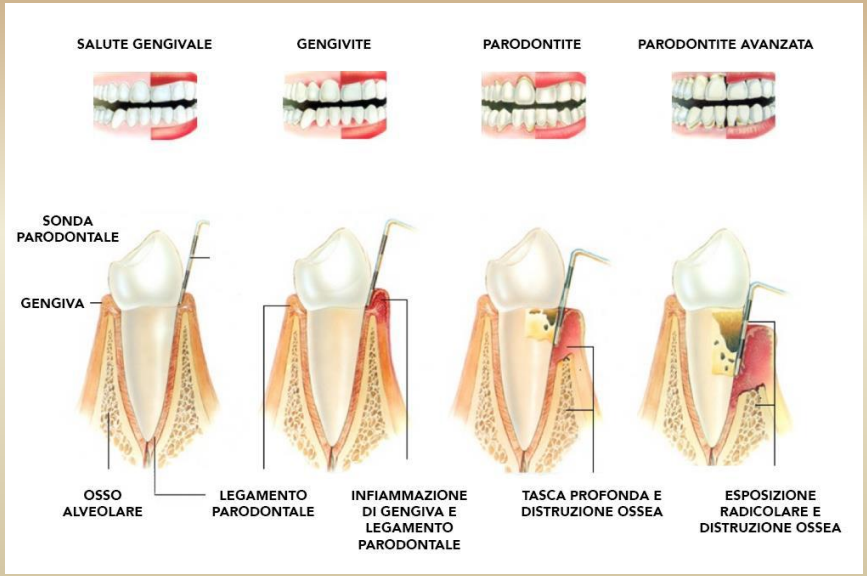
Degradazione collageno
- ✓collagenasi /proteasi batteriche
- ✓collagenasi /proteasi lisosomiali
- ✓metalloproteinasi
- ✓fagocitosi del collagene

Sintesi collageno
- ✓diminuzione da alterazioni citopatiche fibroblasti



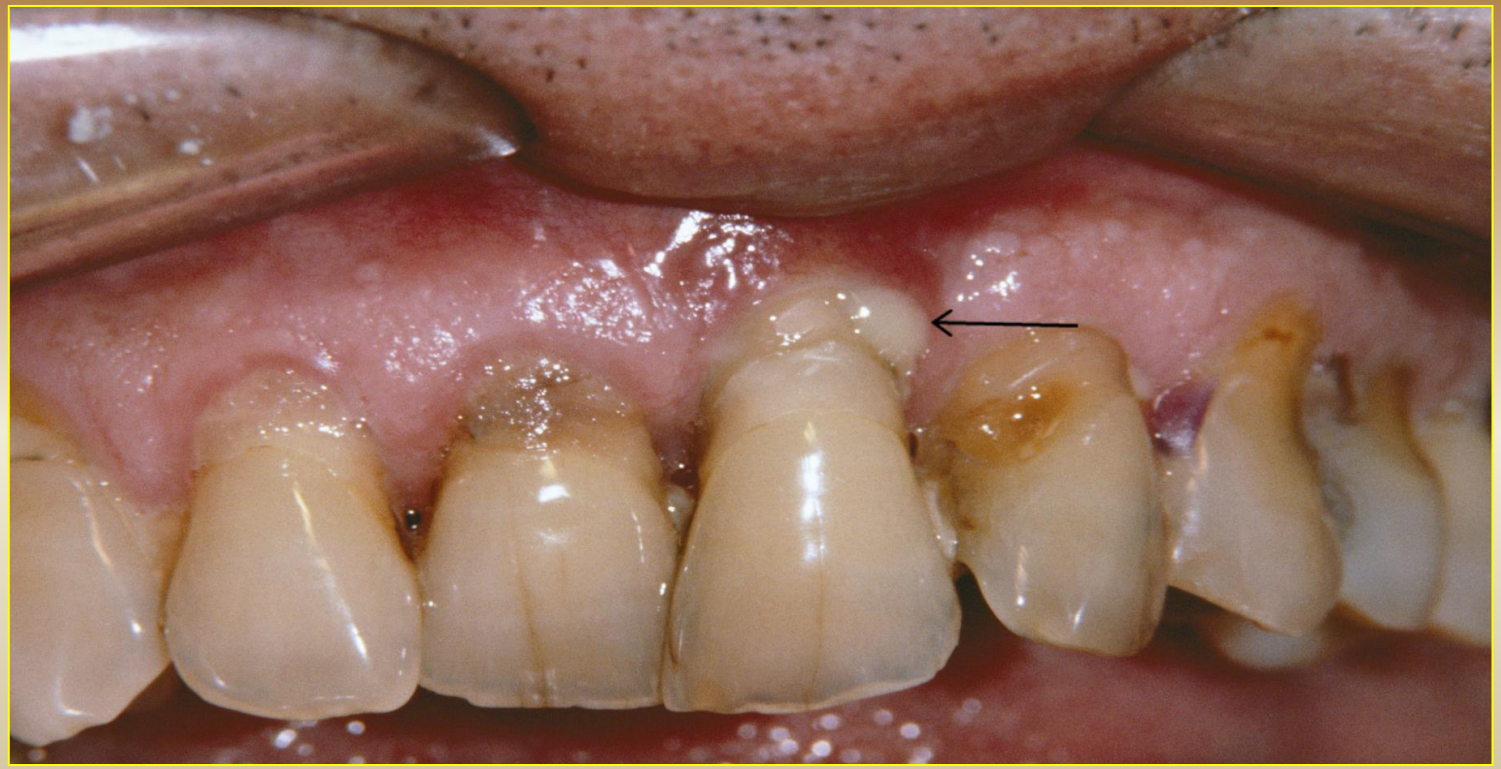
Periodontiti
patogenesi

Clinica:
Distruzione dell'attacco connettivale del dente
Perdita dell'osso alveolare
Formazione della tasca
Pregressa gengivite con evoluzione non costante

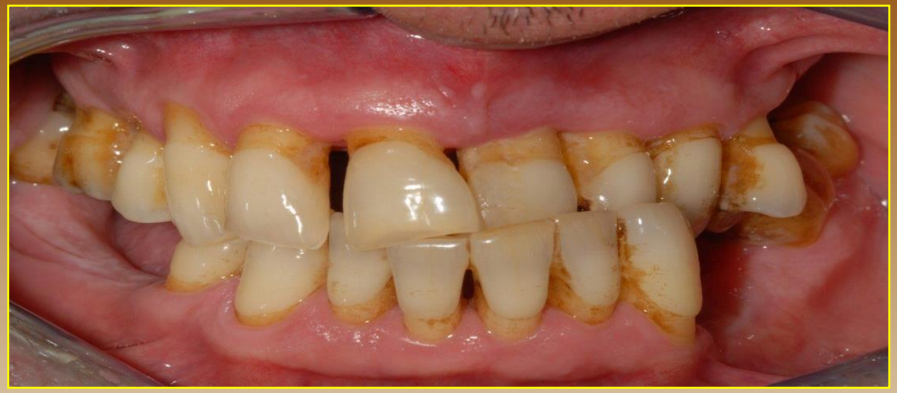


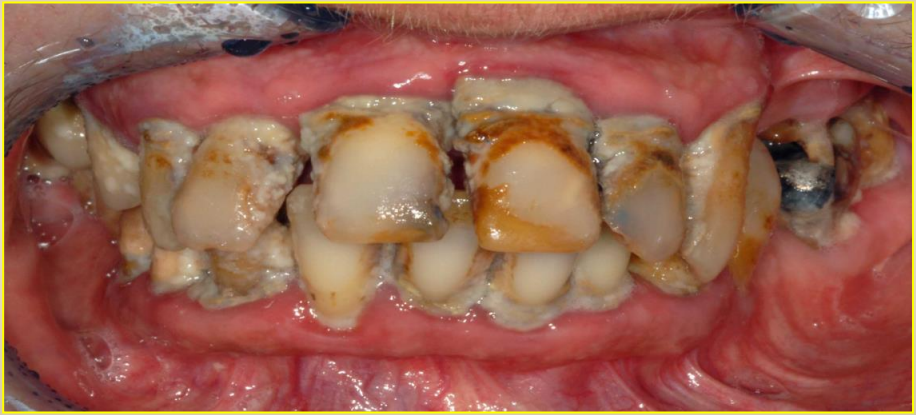
Anatomia patologica:
Estensione flogosi alla base dell'epitelio giunzionale
Infiltrato prevalentemente plasmacellulare
Distruzione del collagene alveolare
Migrazione apicale dell'epitelio giunzionale
Approfondimento della tasca
Distruzione del legamento periodontale
Riassorbimento dell'osso alveolare

Periodontiti
quadri clinico-patologici

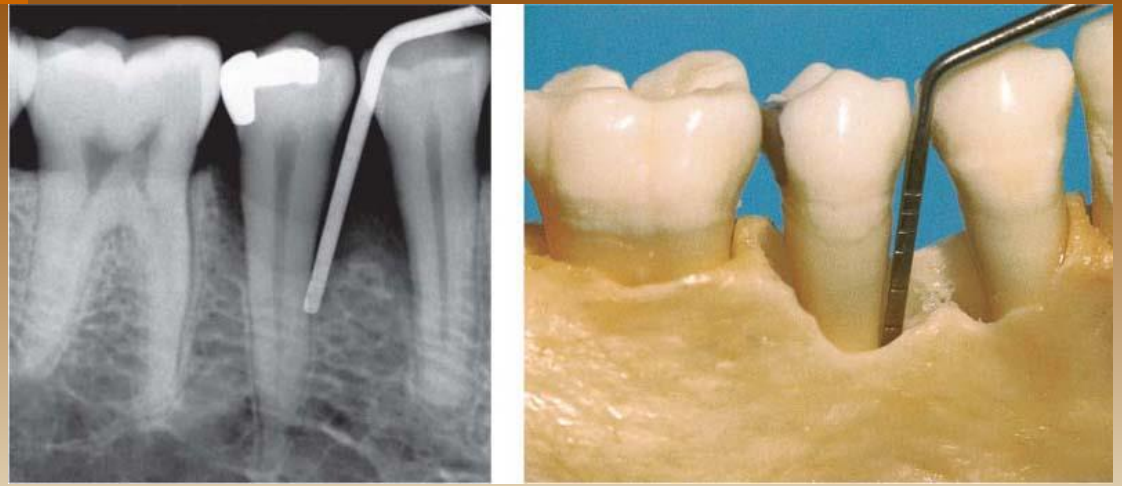


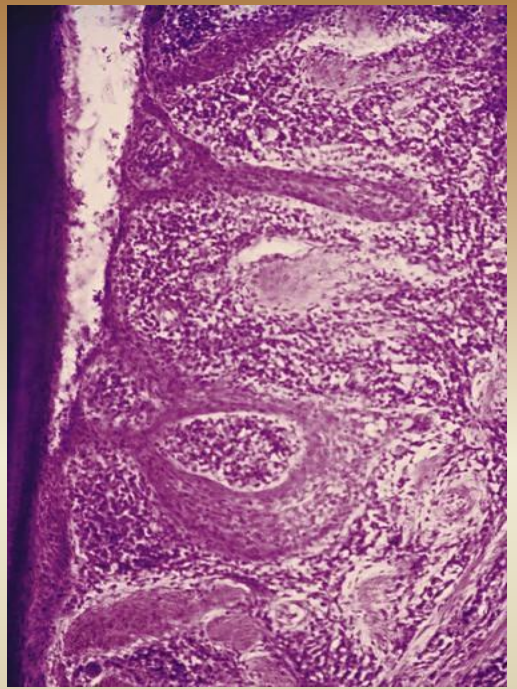
Periodontiti
quadri clinico-patologici

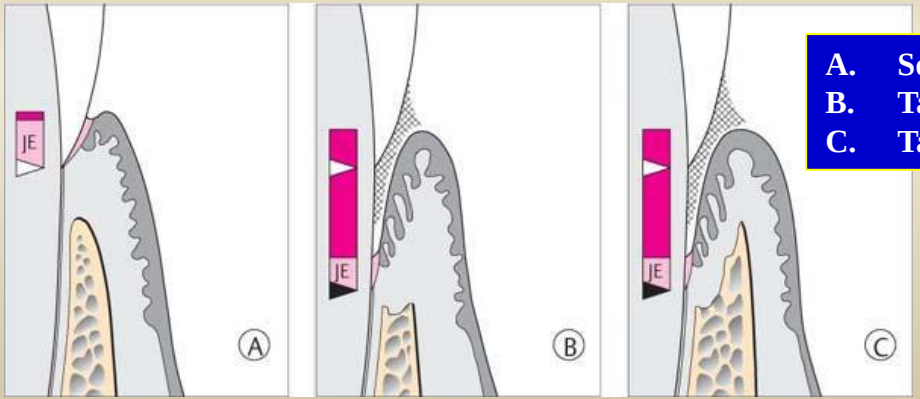




Periodontiti
quadri clinico-patologici

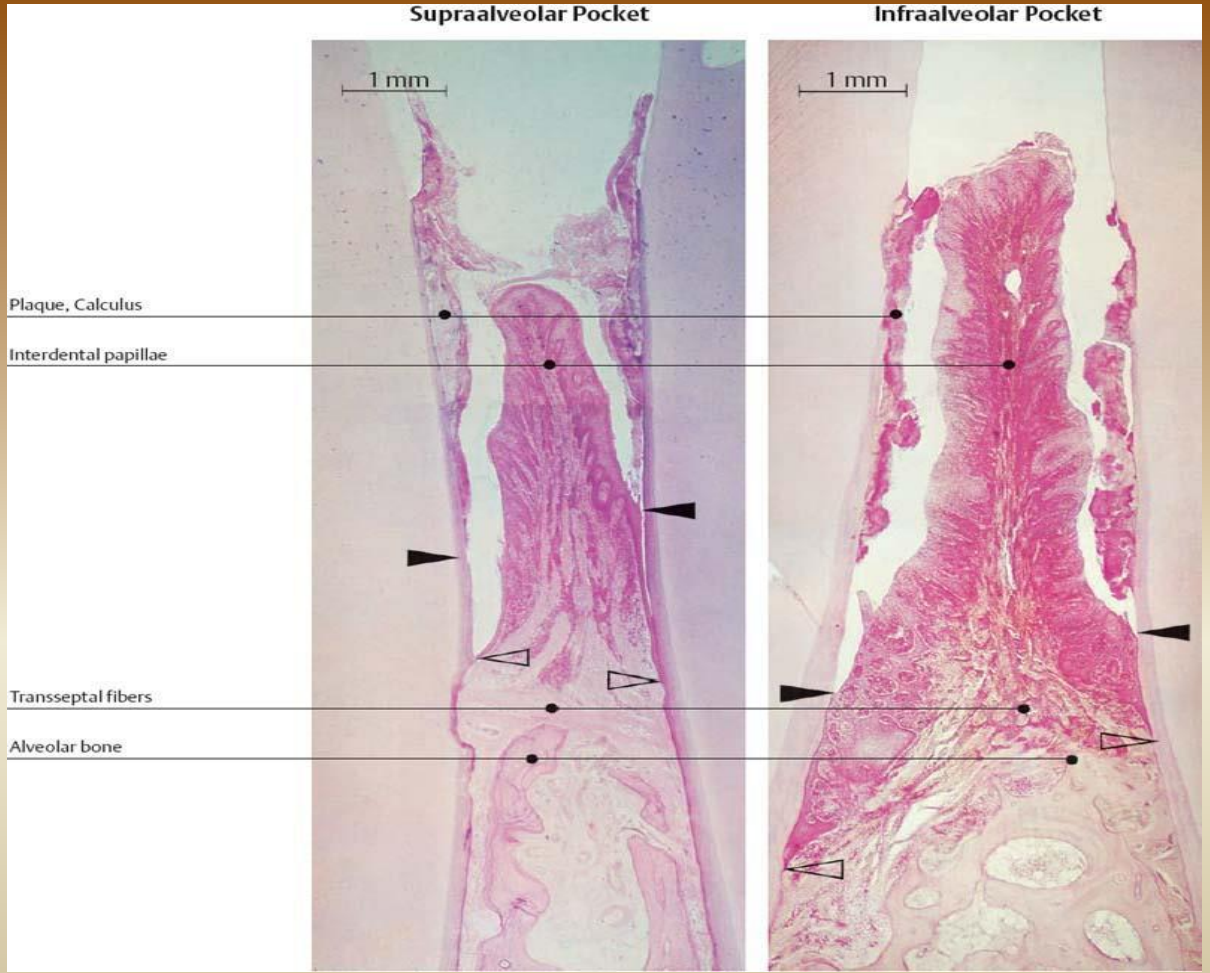




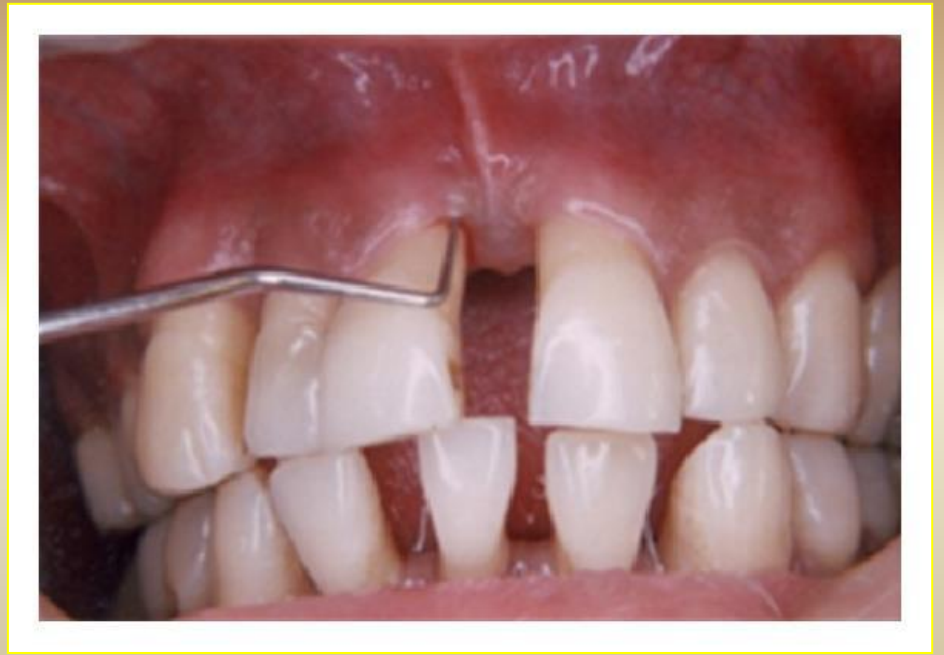


A. Solco normale
B. Tasca gengivale sovraossea
C. Tasca gengivale intraossea

Periodontiti
quadri clinico-patologici

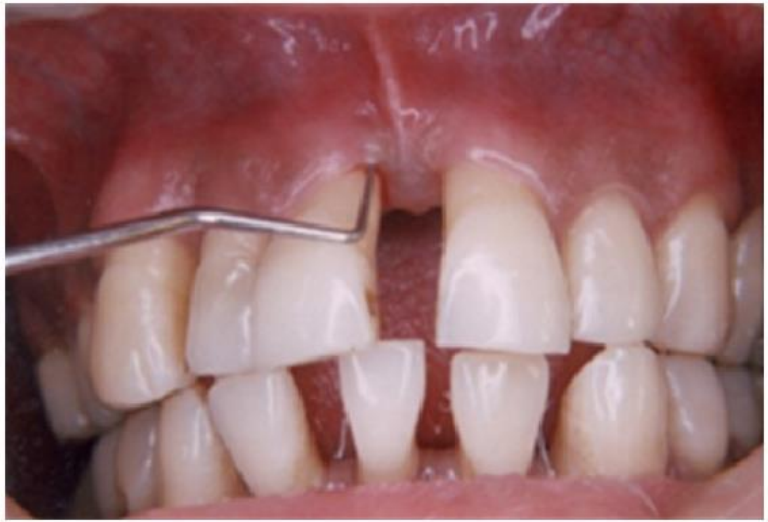


Periodontiti
quadri clinico-patologici



Periodontiti
caratteristiche/diagnosi

Caratteristiche:
- Perdita del tessuto di supporto a causa della flogosi
- Sanguinamento al sondaggio
- Proporzione dei denti con tasca superiore a valori soglia



Diagnosi:
- CAL individuabile in + di 2 denti non adiacenti oppure:
- CAL buccale/orale ≥3mm con tasca ≥3mm in + di 2 denti non adiacenti non ascrivibile a malattie non-periodontali (traumi, carie etc.)

Periodontiti
classificazione (stadio)

TABLE 1A Classification of periodontitis based on stages defined by severity (according to the level of interdental clinical attachment loss, radiographic bone loss and tooth loss), complexity and extent and distribution

Periodontitis stage		Stage I	Stage II	Stage III	Stage IV
Severity	Interdental CAL at site of greatest loss	1 to 2 mm	3 to 4 mm	≥5 mm	≥5 mm
	Radiographic bone loss	Coronal third (<15%)	Coronal third (15% to 33%)	Extending to mid-third of root and beyond	Extending to mid-third of root and beyond
	Tooth loss	No tooth loss due to periodontitis		Tooth loss due to periodontitis of ≤4 teeth	Tooth loss due to periodontitis of ≥5 teeth
Complexity	Local	Maximum probing depth ≤4 mm Mostly horizontal bone loss	Maximum probing depth ≤5 mm Mostly horizontal bone loss	In addition to stage II complexity: Probing depth ≥6 mm Vertical bone loss ≥3 mm Furcation involvement Class II or III Moderate ridge defect	In addition to stage III complexity: Need for complex rehabilitation due to: Masticatory dysfunction Secondary occlusal trauma (tooth mobility degree ≥2) Severe ridge defect Bite collapse, drifting, flaring Less than 20 remaining teeth (10 opposing pairs)
Extent and distribution	Add to stage as descriptor	For each stage, describe extent as localized (<30% of teeth involved), generalized, or molar/incisor pattern			

The initial stage should be determined using clinical attachment loss (CAL); if not available then radiographic bone loss (RBL) should be used. Information on tooth loss that can be attributed primarily to periodontitis – if available – may modify stage definition. This is the case even in the absence of complexity factors. Complexity factors may shift the stage to a higher level, for example furcation II or III would shift to either stage III or IV irrespective of CAL. The distinction between stage III and stage IV is primarily based on complexity factors. For example, a high level of tooth mobility and/or posterior bite collapse would indicate a stage IV diagnosis. For any given case only some, not all, complexity factors may be present, however, in general it only takes one complexity factor to shift the diagnosis to a higher stage. It should be emphasized that these case definitions are guidelines that should be applied using sound clinical judgment to arrive at the most appropriate clinical diagnosis.
For post-treatment patients, CAL and RBL are still the primary stage determinants. If a stage-shifting complexity factor(s) is eliminated by treatment, the stage should not retrogress to a lower stage since the original stage complexity factor should always be considered in maintenance phase management.

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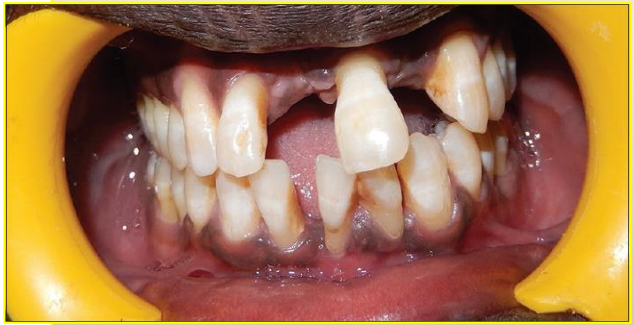

Periodontiti
classificazione (grado)

TABLE 1B Classification of periodontitis based on grades that reflect biologic features of the disease including evidence of, or risk for, rapid progression, anticipated treatment response, and effects on systemic health

Periodontitis grade			Grade A: Slow rate of progression	Grade B: Moderate rate of progression	Grade C: Rapid rate of progression
Primary criteria	Direct evidence of progression	Longitudinal data (radiographic bone loss or CAL)	Evidence of no loss over 5 years	<2 mm over 5 years	≥2 mm over 5 years
	Indirect evidence of progression	% bone loss/age	<0.25	0.25 to 1.0	>1.0
		Case phenotype	Heavy biofilm deposits with low levels of destruction	Destruction commensurate with biofilm deposits	Destruction exceeds expectation given biofilm deposits; specific clinical patterns suggestive of periods of rapid progression and/or early onset disease (e.g., molar/incisor pattern; lack of expected response to standard bacterial control therapies)
Grade modifiers	Risk factors	Smoking	Non-smoker	Smoker <10 cigarettes/day	Smoker ≥10 cigarettes/day
		Diabetes	Normoglycemic/ no diagnosis of diabetes	HbA1c <7.0% in patients with diabetes	HbA1c ≥7.0% in patients with diabetes

Grade should be used as an indicator of the rate of periodontitis progression. The primary criteria are either direct or indirect evidence of progression. Whenever available, direct evidence is used; in its absence indirect estimation is made using bone loss as a function of age at the most affected tooth or case presentation (radiographic bone loss expressed as percentage of root length divided by the age of the subject, RBL/age). Clinicians should initially assume grade B disease and seek specific evidence to shift towards grade A or C, if available. Once grade is established based on evidence of progression, it can be modified based on the presence of risk factors. CAL = clinical attachment loss; HbA1c = glycated hemoglobin A1c; RBL = radiographic bone loss.

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Lesioni endo/periodontali
classificazione

TABLE 3 Classification of endo-periodontal lesions

Endo-periodontal lesion with root damage	Root fracture or cracking	
	Root canal or pulp chamber perforation	
	External root resorption	
Endo-periodontal lesion without root damage	Endo-periodontal lesion in periodontitis patients	*Grade 1* – narrow deep periodontal pocket in 1 tooth surface
		Grade 2 – wide deep periodontal pocket in 1 tooth surface
		Grade 3 – deep periodontal pockets in > 1 tooth surface
	Endo-periodontal lesion in non-periodontitis patients	*Grade 1* – narrow deep periodontal pocket in 1 tooth surface
		Grade 2 – wide deep periodontal pocket in 1 tooth surface
		Grade 3 – deep periodontal pockets in > 1 tooth surface

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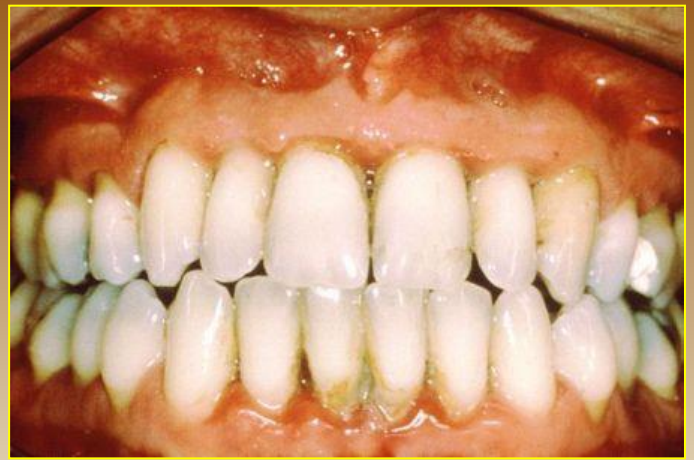
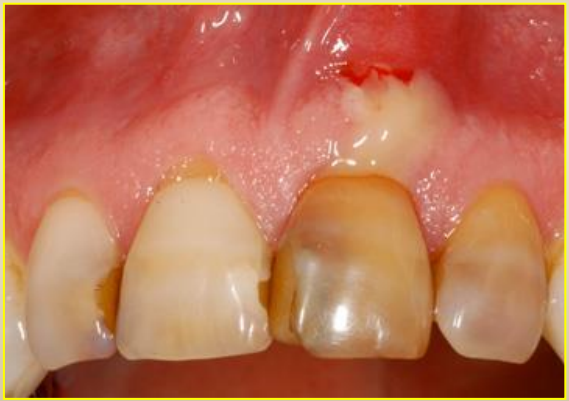
Definizione:
- Patologia con interessamento di polpa e periodonto
- Forme acute e croniche
- Formazioni di tasche periodontali, comunicanti con la polpa
- Talora rimaneggiamento osseo
- Dolore, mobilità dentale
- Flogosi purulenta

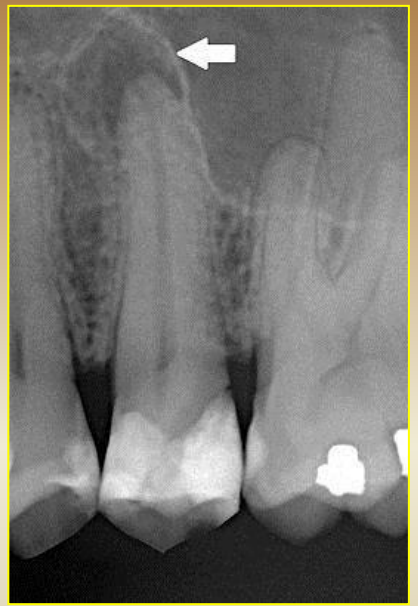
Differenti caratteristiche vs. periodontiti:
- Lesione trigger (carie, trauma)
- Interessamento pulpare primario
- Interessamento periodontale secondario

Lesioni endo/periodontali
periodontite periapicale

Eziologia:
- Pulpìte e necrosi pulpare
- Traumi (barotraumi)
- Trattamenti endodontici



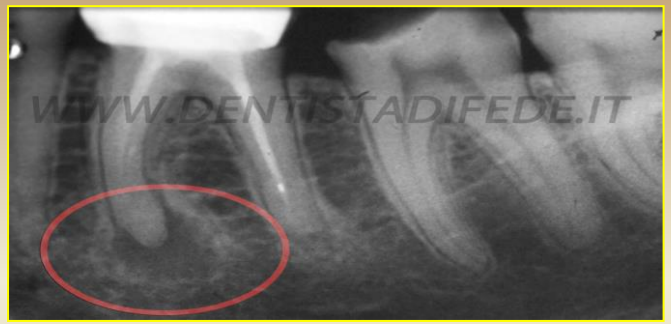


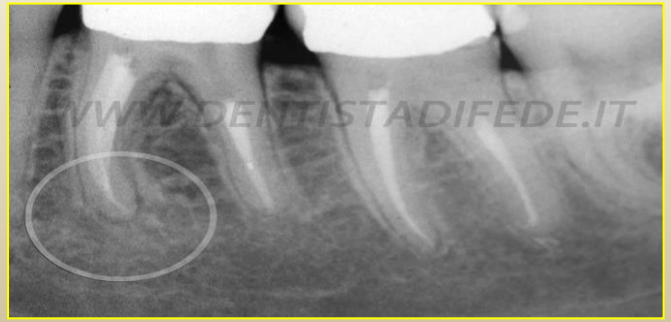


Forme:
- Acuta
- Cronica (granuloma periapicale)

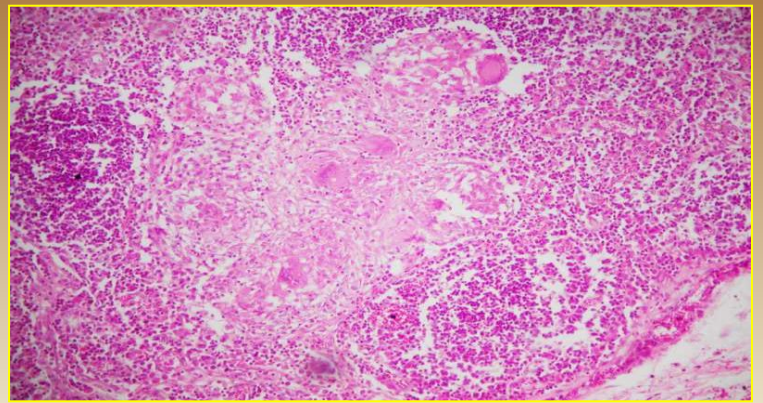
Granuloma periapicale:

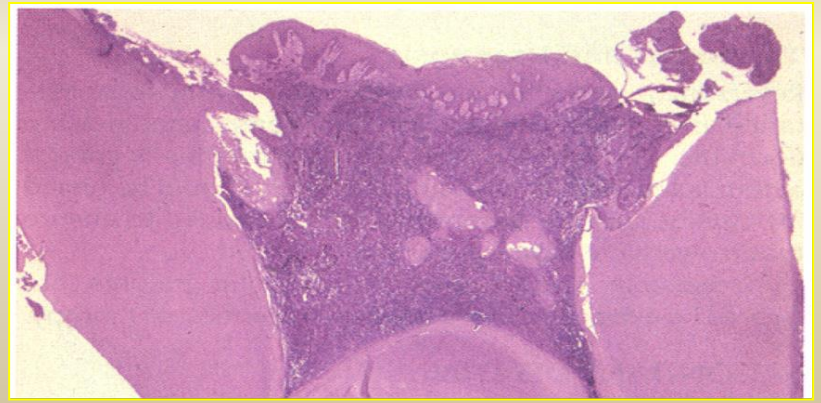
- **Lesione asintomatica** (radiolucente, freq. in questa sede)
- Dolore alla masticazione
- Insorgenza prevalentemente in denti devitalizzati
- Radiolucente
- Processo variamente circoscritto
- Rx non diagnostico (DD cisti radicolare)





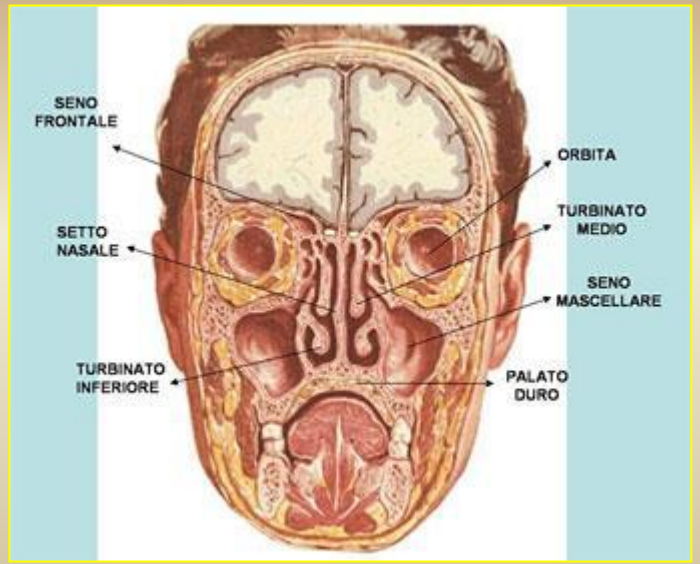
Lesioni endo/periodontali
periodontite periapicale



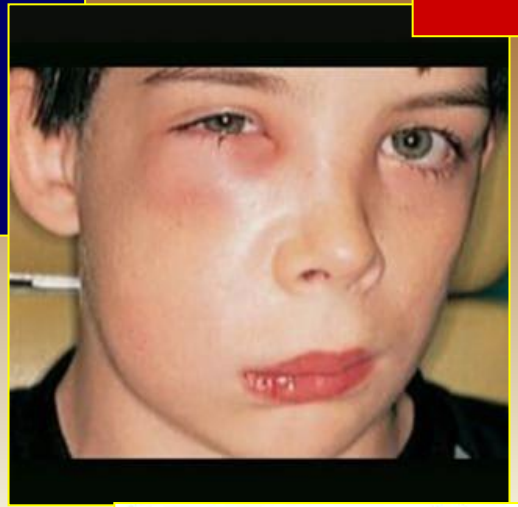


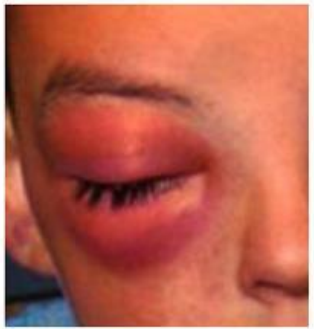
Evoluzione forme acute:

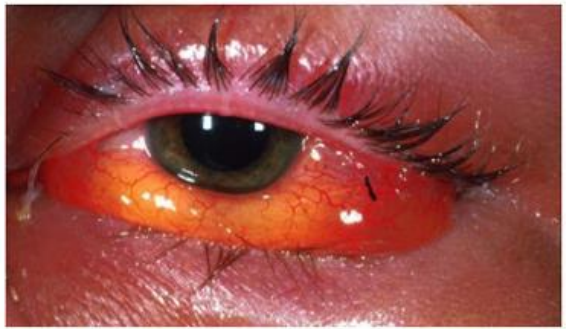
- Guarigione
- Fistolizzazione orale/cutanea/sinusale
- Ascesso palatale/sottomandibolare
- Ascesso tessuti molli
- Perforazione mandibolare
- Cellulite cervico-facciale (estensione cavità oculare)



Lesioni endo/periodontali
periodontite periapicale

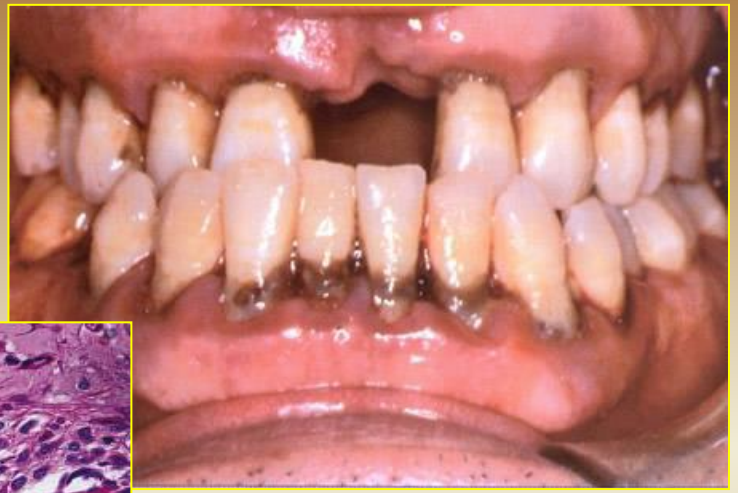


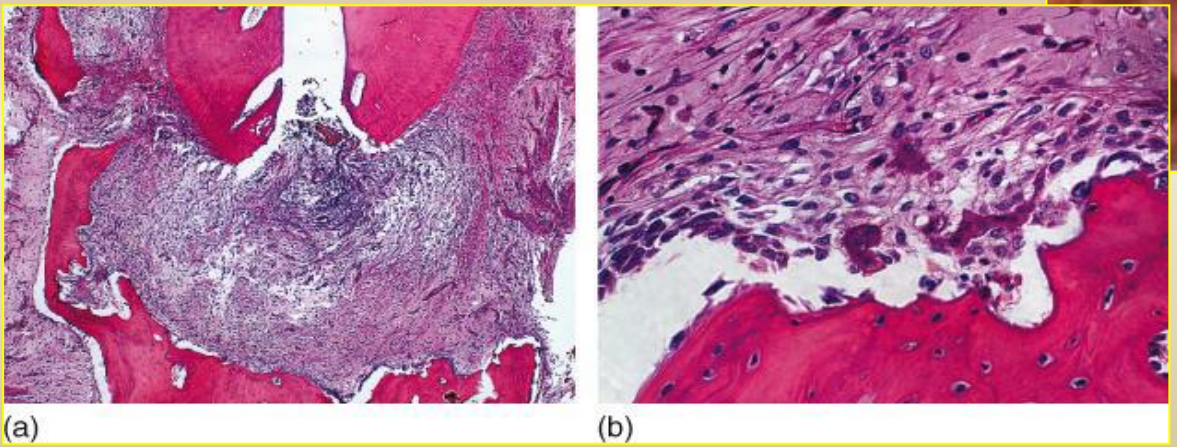




Lesioni endo/periodontali
periodontite periapicale

Evoluzione forme croniche:
- Espansione granuloma
- Riassorbimento osseo
- Suppurazione (ascesso periapicale)
- Proliferazione residui di Malassez
- Osteosclerosi
- Ipercementosi





Ascessi periodontali
classificazione eziologica

TABLE 4 Classification of periodontal abscesses based on the etiologic factors involved

Periodontal abscess in periodontitis patients (in a pre-existing periodontal pocket)	Acute exacerbation	Untreated periodontitis	
		Non-responsive to therapy periodontitis	
		Supportive periodontal therapy	
	After treatment	Post-scaling	
		Post-surgery	
		Post-medication	Systemic antimicrobials
			Other drugs: nifedipine
Periodontal abscess in non-periodontitis patients (not mandatory to have a pre-existing periodontal pocket)	Impaction		Dental floss, orthodontic elastic, toothpick, rubber dam, or popcorn hulls
	Harmful habits		Wire or nail biting and clenching
	Orthodontic factors		Orthodontic forces or a cross-bite
	Gingival overgrowth		
	Alteration of root surface	Severe anatomic alterations	Invaginated tooth, dens evaginatus or odontodysplasia
		Minor anatomic alterations	Cemental tears, enamel pearls or developmental grooves
		Iatrogenic conditions	Perforations
		Severe root damage	Fissure or fracture, cracked tooth syndrome
		External root resorption	

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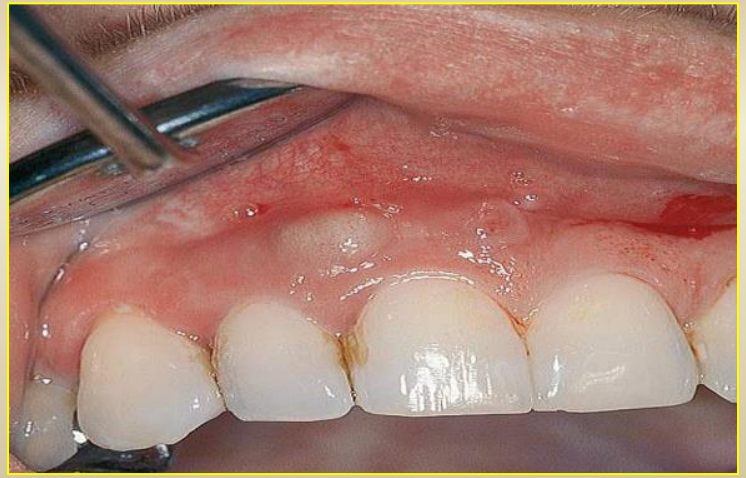
Differenti caratteristiche vs. periodontiti:
- **Insorgenza rapida**
- **Rapida distruzione periodonto**
- **Dolore, rapido ricorso al Medico**

Ascessi periodontali
generalità

Ascesso gengivale
Clinica
- Eziologia batterica
- Scarsa igiene
- Lesione limitata alla gengiva marginale/papilla interdentale
- Lesione localizzata, dolorosa
- Insorgenza rapida, edema e iperemia marcati

Anatomia patologica
- Focolaio purulento connettivale
- Diffusa infiltrazione PMN
- Edema intra-extracellulare dell'epitelio
- Ulcerazione



Ascesso pericoronale
Clinica
- Localizzazione pericoronale, II molare mandibolare
- Marcata flogosi ascessualizzante
- Cellulite alveolare
- Possibile estensione ascessuale sub-mascellare e faringea
- Trisma
- Edema marcato, dolore
- Linfoadenomegalia satellite

Anatomia patologica
- Stroma marcatamente iperemico
- Flogosi acuta/cronica, ascessualizzante

Periodontiti
problemi aperti e obiettivi futuri

- Sviluppo di metodologie più accurate di indagine sulle alterazioni ossee e dei tessuti molli associate alla progressione della periodontite
- Individuazione di markers genetici/biologici in grado di differenziare i diversi fenotipi della malattia e della sua progressione
- Aumentare la sorveglianza epidemiologica in aree geografiche attualmente non coperte
- Integrazione informativa (clinica, imaging, -omica) per un migliore approccio biologico allo studio della malattia
- Sorveglianza epidemiologica per la validazione/implementazione degli attuali sistemi di codifica

Periodontiti “secondarie”
manifestazione di malattie sistemiche

TABLE 4

Periodontal Manifestations of Systemic Diseases and Developmental and Acquired Conditions: Consensus Report
Jepsen, Caton et al. 2018
Active link to consensus report

PERIODONTAL MANIFESTATIONS OF SYSTEMIC DISEASES AND DEVELOPMENTAL AND ACQUIRED CONDITIONS

1. **Systemic diseases or conditions affecting the periodontal supporting tissues**
   Albandar et al. 2018 link

2. **Other Periodontal Conditions**
   Papapanou, Sanz et al. 2018 link | Herrera et al. 2018 link
   a. Periodontal Abscesses
   b. Endodontic-Periodontal Lesions

3. **Mucogingival deformities and conditions around teeth**
   Cortellini & Bissada 2018 link
   a. Gingival phenotype
   b. Gingival/soft tissue recession
   c. Lack of gingiva
   d. Decreased vestibular depth
   e. Aberrant frenum/muscle position
   f. Gingival excess
   g. Abnormal color
   h. Condition of the exposed root surface

4. **Traumatic occlusal forces**
   Fan & Caton 2018 link
   a. Primary occlusal trauma
   b. Secondary occlusal trauma
   c. Orthodontic forces

5. **Prostheses and tooth-related factors that modify or predispose to plaque-induced gingival diseases/periodontitis**
   Ercoli & Caton 2018 link
   a. Localized tooth-related factors
   b. Localized dental prostheses-related factors

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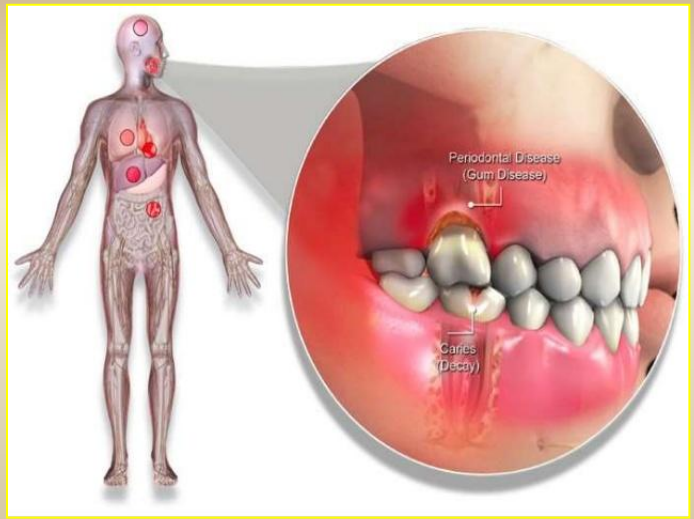

Periodontiti “secondarie”
malattie e condizioni sistemiche associate

TABLE 1 Classification of systemic diseases and conditions that affect the periodontal supporting tissues (adapted from Albandar et al.[1])

Classification	Disorders	ICD-10 code
1.	**Systemic disorders that have a major impact on the loss of periodontal tissues by influencing periodontal inflammation**	
1.1.	**Genetic disorders**	
1.1.1.	**Diseases associated with immunologic disorders**	
	Down syndrome	Q90.9
	Leukocyte adhesion deficiency syndromes	D72.0
	Papillon-Lefèvre syndrome	Q82.8
	Haim-Munk syndrome	Q82.8
	Chediak-Higashi syndrome	E70.3
	Severe neutropenia	
	– Congenital neutropenia (Kostmann syndrome)	D70.0
	– Cyclic neutropenia	D70.4
	Primary immunodeficiency diseases	
	– Chronic granulomatous disease	D71.0
	– Hyperimmunoglobulin E syndromes	D82.9
	Cohen syndrome	Q87.8
1.1.2.	**Diseases affecting the oral mucosa and gingival tissue**	
	Epidermolysis bullosa	
	– Dystrophic epidermolysis bullosa	Q81.2
	– Kindler syndrome	Q81.8
	Plasminogen deficiency	D68.2
1.1.3.	**Diseases affecting the connective tissues**	
	Ehlers-Danlos syndromes (types IV, VIII)	Q79.6
	Angioedema (C1-inhibitor deficiency)	D84.1
	Systemic lupus erythematosus	M32.9
1.1.4.	**Metabolic and endocrine disorders**	
	Glycogen storage disease	E74.0
	Gaucher disease	E75.2
	Hypophosphatasia	E83.30
	Hypophosphatemic rickets	E83.31
	Hajdu-Cheney syndrome	Q78.8
1.2.	**Acquired immunodeficiency diseases**	
	Acquired neutropenia	D70.9
	HIV infection	B24
1.3.	**Inflammatory diseases**	
	Epidermolysis bullosa acquisita	L12.3
	Inflammatory bowel disease	K50, K51.9, K52.9

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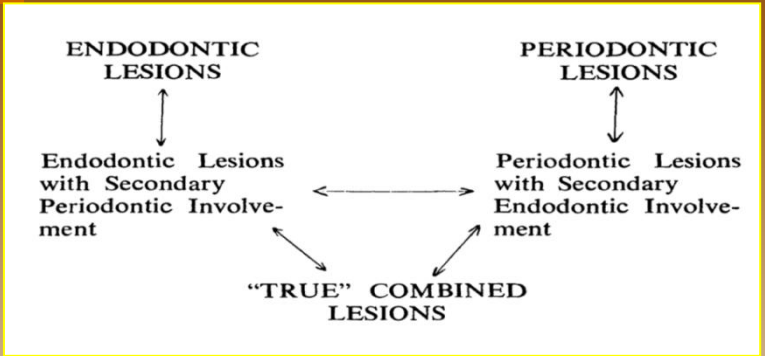
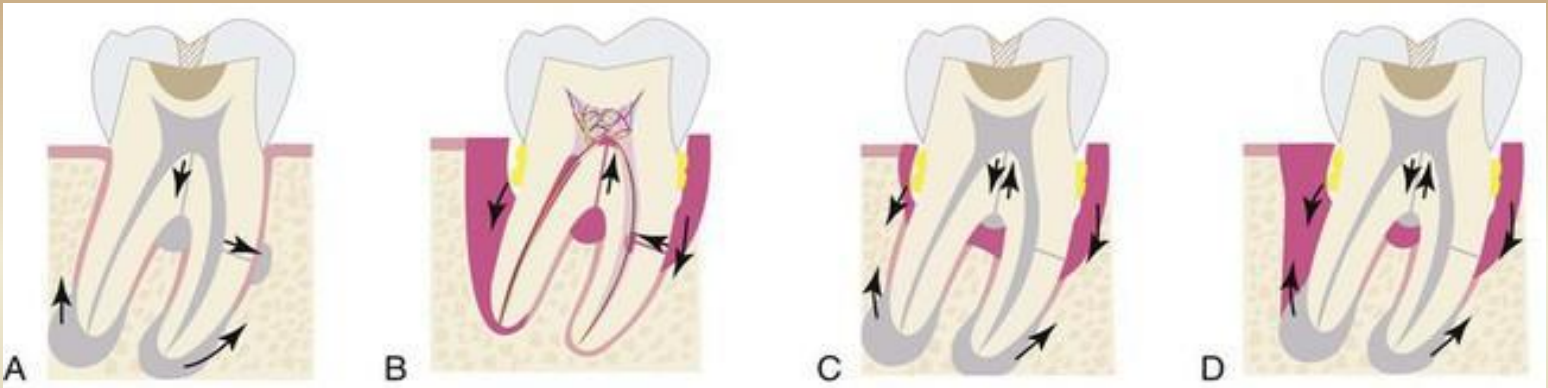
2.	**Other systemic disorders that influence the pathogenesis of periodontal diseases**	
	Diabetes mellitus	E10 (type 1), E11 (type 2)
	Obesity	E66.9
	Osteoporosis	M81.9
	Arthritis (rheumatoid arthritis, osteoarthritis)	M05, M06, M15-M19
	Emotional stress and depression	F32.9
	Smoking (nicotine dependence)	F17
	Medications	

3.	**Systemic disorders that can result in loss of periodontal tissues independent of periodontitis**	
3.1.	**Neoplasms**	
	Primary neoplastic diseases of the periodontal tissues	
	– Oral squamous cell carcinoma	C03.0 – 1
	– Odontogenic tumors	D48.0
	– Other primary neoplasms of the periodontal tissues	C41.0
	Secondary metastatic neoplasms of the periodontal tissues	C06.8
3.2.	**Other disorders that may affect the periodontal tissues**	
	Granulomatosis with polyangiitis	M31.3
	Langerhans cell histiocytosis	C96.6
	Giant cell granulomas	K10.1
	Hyperparathyroidism	E21.0
	Systemic sclerosis (scleroderma)	M34.9
	Vanishing bone disease (Gorham-Stout syndrome)	M89.5



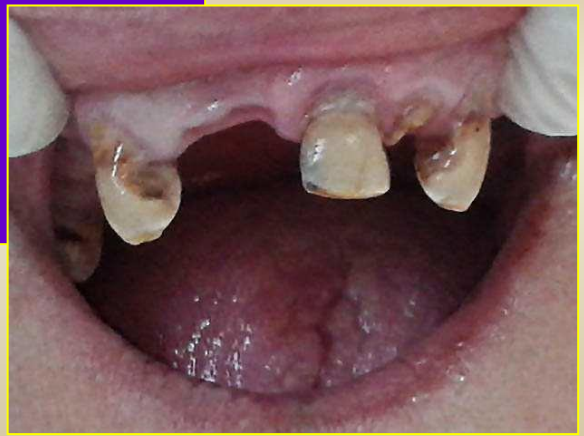
Periodontiti "secondarie"
associazione a lesioni endodontiche



A. Lesione pulpare primaria con periodontite periradicolare
B. Infezione primaria periodontale con perdita ossea e pulpìte
C. Infezioni primarie sincrone/metacrone pulpari e periodontali
D. Lesioni pulpari e periodontali combinate

Periodontiti “secondarie”
condizioni acquisite o di sviluppo

- ✓**Fattori legati a forma/struttura dei denti, che possono predisporre a periodontiti**
- ✓**Deformità mucogengivali o delle strutture periodontali**
- ✓**Deformità legate a edentulia**
- ✓**Traumi occlusali**



Periodontiti “secondarie”
relazioni patogenetiche

Il “fenotipo periodontale”

Comprende la combinazione di caratteristiche gengivali (spessore, cheratinizzazione) e ossee (spessore piatto buccale) che rendono la gengiva più prona alla retrazione.

Metodo di valutazione del fenotipo periodontale

- GT (Gingival thickness: visibilità della sonda all’esame gengivale (≤1 mm; >1 mm))
- KTW (keratinized tissue width)

Utilità di una classificazione della retrazione gengivale

2017 WORLD WORKSHOP

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Traumi occlusali - evidenze di relazioni patogenetiche

- Limitate evidenze per flogosi gengivale
- Evidenze per la progressione della periodontite
- Evidenze per la retrazione gengivale

TABLE 4 Classification of factors related to teeth and to dental prostheses that can affect the periodontium

A. Localized tooth-related factors that modify or predispose to plaque-induced gingival diseases/periodontitis

1. Tooth anatomic factors
2. Root fractures
3. Cervical root resorption, cemental tears
4. Root proximity
5. Altered passive eruption

B. Localized dental prosthesis-related factors

1. Restoration margins placed within the supracrestal attached tissues
2. Clinical procedures related to the fabrication of indirect restorations
3. Hypersensitivity/toxicity reactions to dental materials

Condizioni e malattie peri-impianto
classificazione

Peri-implant Diseases and Conditions
Consensus Report
Berglundh, Armitage et al. 2018
Active link to consensus report

PERI-IMPLANT DISEASES AND CONDITIONS

1. **Peri-implant health**
   Araujo & Lindhe 2018 link
2. **Peri-implant mucositis**
   Heitz-Mayfield & Salvi 2018 link
3. **Peri-implantitis**
   Schwarz et al. 2018 link
4. **Peri-implant soft and hard tissue deficiencies**
   Hammerle & Tarnow 2018 link

Renvert et al. 2018 Case Definitions link

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Peri-implant diseases and conditions: Consensus report of workgroup 4 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions

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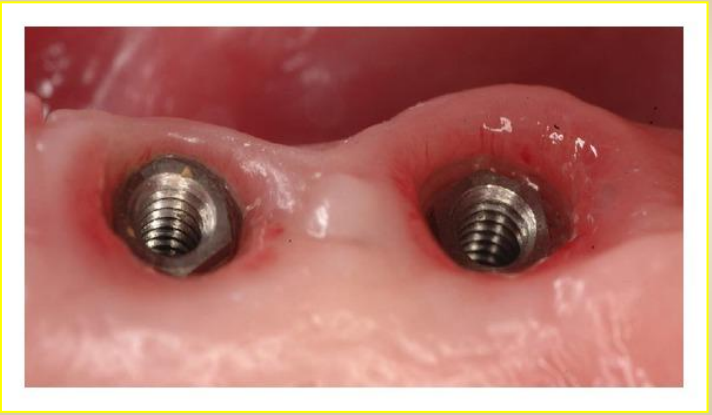
Inquadramento:
Definizione dei quadri di normalità
Caratteristiche della mucosite peri-impianto
Definizione di “peri-impiantite”
Danni ai tessuti molli
Definizione dei casi e considerazioni diagnostiche

Condizioni e malattie peri-impianto

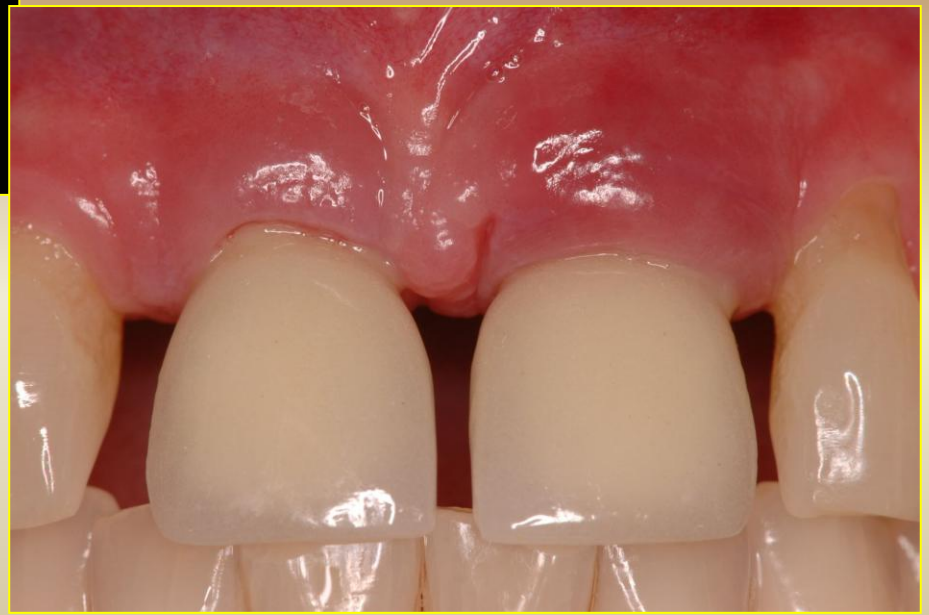
normali condizioni dei tessuti peri-impianto

- Assenza di flogosi/sanguinamento
- Impianto: accorciamento delle papille/aumento profondità rima gengivale
- Mucosa peri-impianto dello spessore di 3-4 mm, epitelio normale



Condizioni e malattie peri-impianto

mucosite peri-impianto



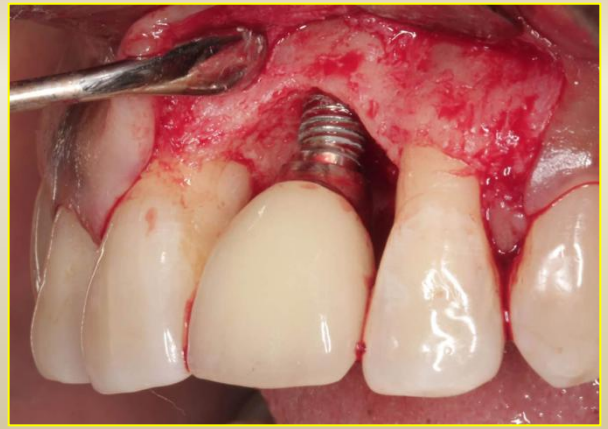
- Gonfiore, eritema, flogosi di vario grado e tipo
- Aumento profondità rima gengivale (tasca)
- Ruolo eziopatogenetico della placca
- Possibile risoluzione (>3 settimane)

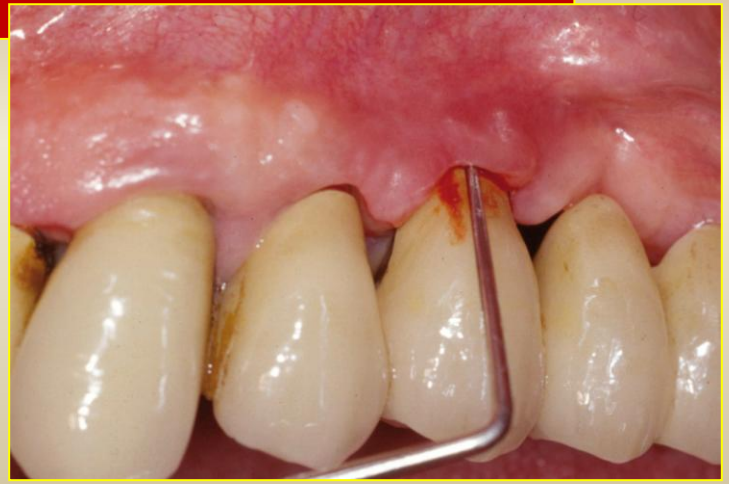
- Mucosite peri impianto
- Infiltrato infiammatorio con marcata neoangiogenesi
- Inflltrato limitato alla sede subapicale

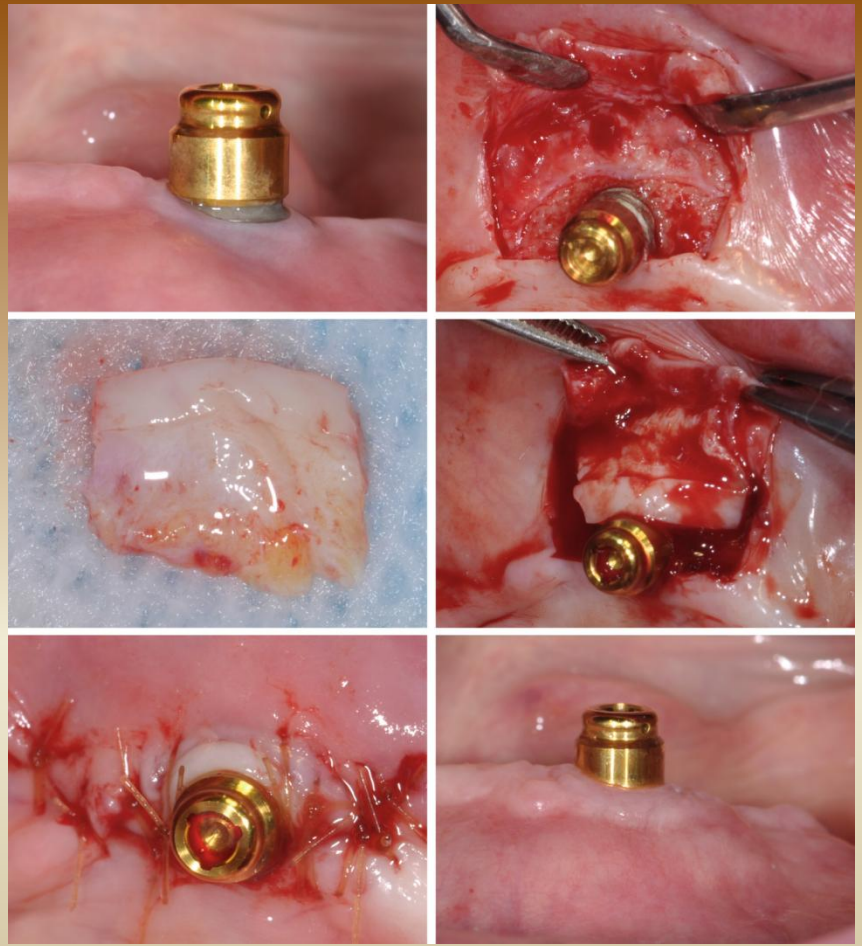
Condizioni e malattie peri-impianto

peri-impiantite

- Aumento del rischio in pz. con precedenti periodontiti
- Ruolo eziopatogenetico della placca
- Marcata flogosi peri-impianto, estesa all'apice dell'epitelio della tasca
- Progressiva perdita del tessuto osseo di supporto
- Sanguinamento
- Approfondimento della tasca, recessione del margine mucoso
- Progressione variabile







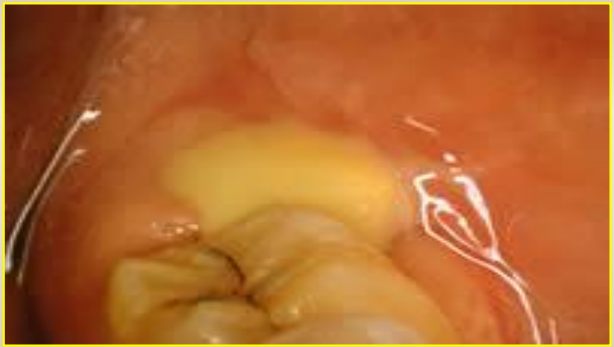
Condizioni e malattie peri-impianto
danni ai tessuti molli

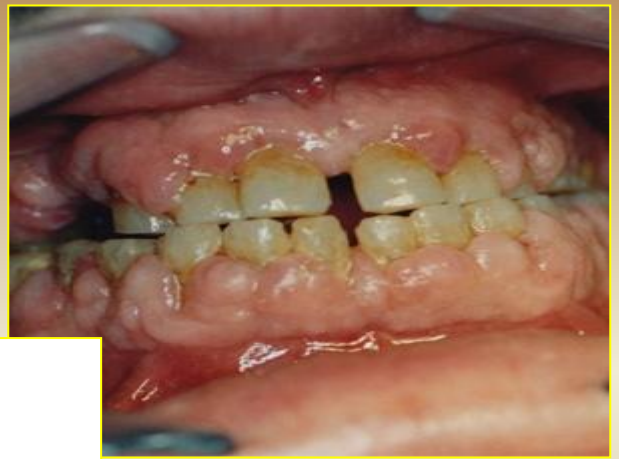
- Perdita di denti
- Deficit di supporto periodontale
- Infezioni endodontiche
- Frattura radici
- Malposizioni dentali
- Pneumatizzazione del seno mascellare
- Deficit di osteogenesi
- Agenesia dentale
- Pressione da apparecchi ortodontici mobili

Malattie periodontali
altre periodontopatie

Ipertrofia gengivale
- Gengivite cronico-iperplastica
- Iperplasia da farmaci (fenitoina, ciclosporina, nifedipina)
- Fibromatosi gengivale
- Altre ipertrofie

Gengivite desquamativa
Ascesso periodontale laterale
Pericoronite
Alterazioni legate all'età





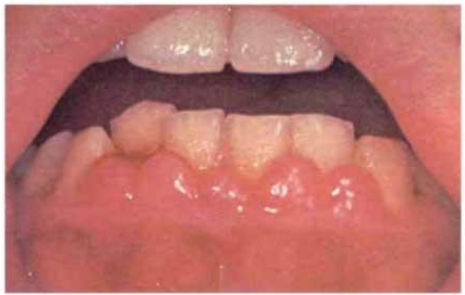
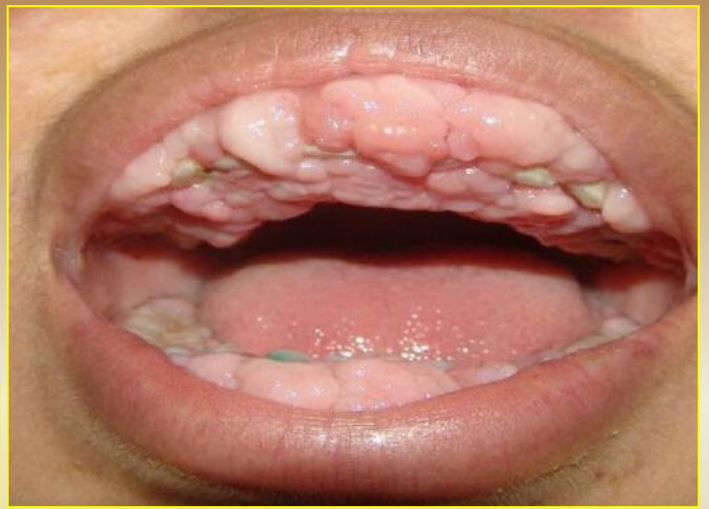


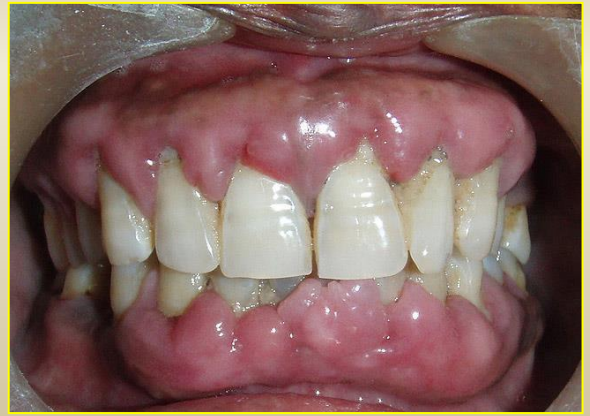
Fig. Paciente con crecimiento gingival secundario con el uso de ciclosporina y nifedipino.

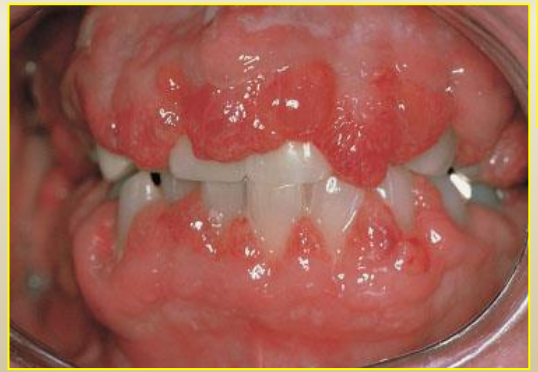
Malattie periodontali
altre periodontopatie

Ipertrofia gengivale (gengivite cronica iperplastica)

- Eziopatogenesi :
- Placca dentaria
- Iatrogena
  - Antiepilettici (fenitoina)
  - Antineoplastici (ciclosporina)
  - Antiipertensivi (verapamile, nifedipina)
  - Terapia immunosoppressiva
- Pregresse gengiviti
- Fattori ereditari
- Altri fattori sconosciuti







Bifosfonati

Azione:

- Inibizione dell'attività osteoclastica
- Apoptosi osteoclasti
- Effetto antinfiammatorio

Indicazioni:

- Trattamento dell'ipercalcemia
- Trattamento del dolore da metastasi ossee
- Prevenzione complicanze scheletriche in pz con M+ ossee

Effetti collaterali:

- Osteonecrosi (osteomielite mascellare) – 1-10% pz.

Fattori rischio:

- Estrazioni dentarie
- Implantologia,
- Traumatismi
- Scarsa igiene orale
- Parodontopatie croniche

osteonecrosi mandibolare

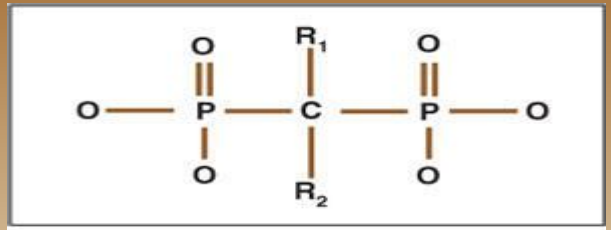
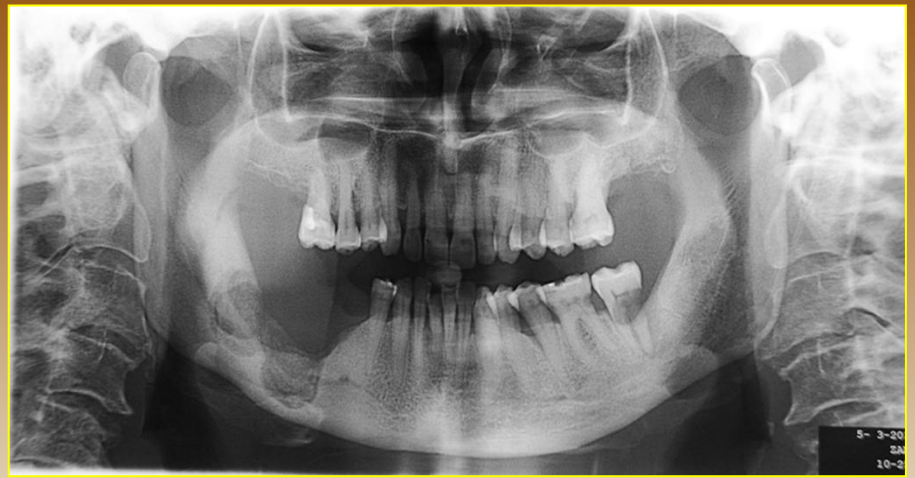
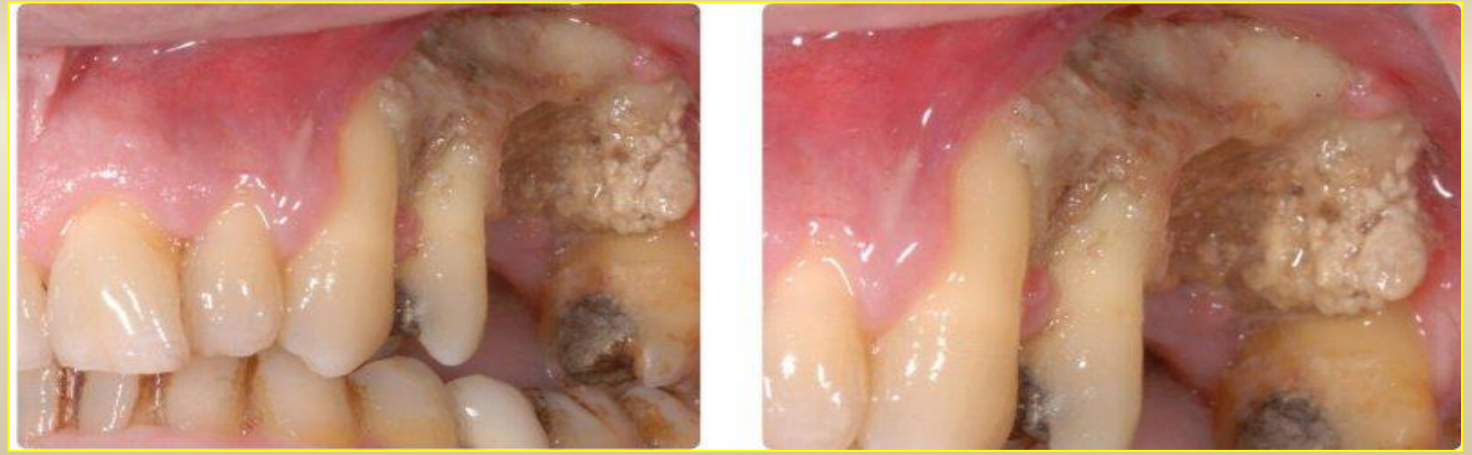


Figure 1. Basic Structure of Bisphosphonates

Screening – bonifica dentale (riduzione 77%)

osteonecrosi mandibolare





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