GINGIVAL ENLARGEMENT

CONTENTS

- Introduction
- Classification
- Inflammatory enlargement
  - Chronic
  - Acute
- Drug-induced enlargement
  - Role of Age
  - Role of Genetics
  - Role of Fibroblasts
  - Role of Cytokines
  - Role of Plaque
  - Role of Pharmacokinetics
  - Immunosuppresants
  - Ca Channel Blockers
  - Anti Convulsants

- Idiopathic Gingival enlargement
- Enlargements associated with systemic diseases or conditions
- False enlargement
- Conclusion.

Introduction

- Gingival Hyperplasia : “abnormal increase in the number of normal cells in a normal arrangement in an organ or tissue, which increase in volume”

- Gingival Hypertrophy : “enlargement or overgrowth of an organ or part due to an increase in size of its constituent cells”.

Classification:

- Inflammatory enlargement
  - Chronic
  - Acute
- Drug-induced enlargement
- Enlargements associated with systemic diseases or conditions
  - Conditioned enlargement
    - Pregnancy
    - Puberty
    - Vitamin C deficiency
    - Plasma cell gingivitis
  - Nonspecific conditioned enlargement
    - (pyogenic granuloma)

- B. Systemic diseases causing gingival enlargement
  - Leukemia
  - Granulomatous diseases (e.g., Wegener's granulomatosis, sarcoidosis)

- Neoplastic enlargement (gingival tumors)
  - Benign tumors
  - Malignant tumors

- False enlargement

Using the criteria of location and distribution

- Localized: Limited to the gingiva adjacent to a single tooth or group of teeth.
- Generalized: Involving the gingiva throughout the mouth.
- Marginal: Confined to the marginal gingiva.
- Papillary: Confined to the interdental papilla.
- Diffuse: Involving the marginal and attached gingivae and papillae.
- Discrete: An isolated sessile or pedunculated, tumor like enlargement

The degree of gingival enlargement : (Bőkenkamp et al., 1994)

- Grade 0: No signs of gingival enlargement.
- Grade I: Enlargement confined to interdental papilla.
- Grade II: Enlargement involves papilla and marginal gingiva.
- Grade III: Enlargement covers three quarters or more of the crown.

INFLAMMATORY ENLARGEMENT

- Gingival enlargement may result from chronic or acute inflammatory changes; chronic changes are much more common.

- Inflammatory enlargements usually are a secondary complication, creating a combined gingival enlargement.

Chronic Inflammatory Enlargement

- Etiology: Chronic inflammatory gingival enlargement is caused by prolonged exposure to dental plaque.

- Factors that favor plaque accumulation and retention include
  - poor oral hygiene,
  - irritation by anatomic abnormalities
  - improper restorative and
  - orthodontic appliances

- Clinical Features: originates as a slight ballooning of the inter-dental papilla and marginal gingiva.

- Early stages : life preserver-shaped bulge around the involved teeth.

- This bulge can increase in size until it covers part of the crowns.

- Progresses slowly and painlessly, unless it is complicated by acute infection or trauma.

- Histopathology:

- Lesions that are clinically deep red or bluish red are soft and friable with a smooth, shiny surface, and they bleed easily.

- A preponderance of inflammatory cells and fluid, with vascular engorgement, new capillary formation, and associated degenerative changes.

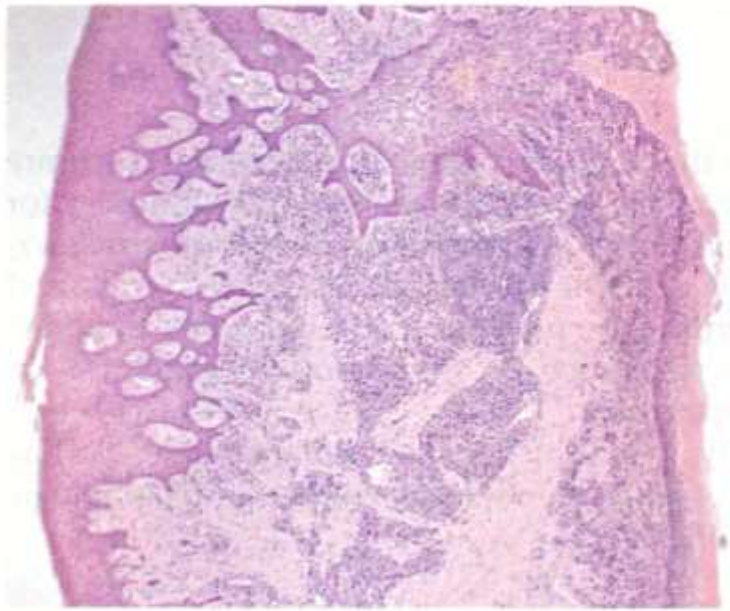


Figure 23-3 Survey section of chronic inflammato gingival enlargement showing the inflamed connecti tissue core and strands of proliferating epithelium.

Gingival Changes Associated with Mouth Breathing:

- Gingivitis and gingival enlargement are often seen in mouth breathers .

- The severity of the harmful effects produced by mouth breathing on gingiva will depend on :
  - Whether mouth breather is occasional or continuous
  - Duration of this habits
  - Presence or absence of other local irritational factors
  - Systemic background of the patient

- The exact manner in which mouth breathing affects gingival changes has not been demonstrated.

- Its harmful effect is generally attributed to irritation from surface dehydration.

- However, comparable changes could not be produced by air-drying the gingiva of experimental animals.

Clinical features:

- The labial gingiva of the upper anterior teeth is commonly affected.

- The effected gingiva is erythematous, shiny and enlarged with rolled margins.
- The interdental papillae on the labial aspect are red, edematous and bleed on slightest provocation.
- At puberty the hyperplastic tissue may progress to tumors like masses between the teeth.
- The colour of the gingiva will vary with the severity of inflammation from light red to dark bluish red

- The etiology has been tried to be explained as due to:

  - Irritation caused by passage of air

  - Dehydration of the mucous membrane leading to lowered tissue resistance

  - Saliva about the exposed gingiva becomes viscous, debris collects on the gingival and tooth surface due to lack of salivary flow resulting in enormous increase in bacterial population in the oral cavity.

Acute Inflammatory Enlargement

- **Gingival Abscess:** A gingival abscess is a localized, painful, rapidly expanding lesion that is usually of sudden onset.
- It is generally limited to the marginal gingiva or interdental papilla.
- Early stages ⟶ a red swelling with a smooth, shiny surface.
- Within 24 to 48 hours, the lesion usually becomes fluctuant and pointed with a surface orifice from which a purulent exudate may be expressed.

- The adjacent teeth are often sensitive to percussion.
- If permitted to progress, the lesion generally ruptures spontaneously.

- Etiology:
  - Acute inflammatory gingival enlargement results from bacteria carried deep into the tissues when a foreign substance is forcefully embedded into the gingiva.
    Eg: toothbrush bristle,
    piece of apple core,
    lobster shell fragment.
- The lesion is confined to the gingiva.

- Histopathology.
  - a purulent focus in the connective tissue,
  - surrounded by a diffuse infiltration of polymorphonuclear leukocytes (PMNs),
  - edematous tissue, and
  - vascular engorgement.

- The surface epithelium has varying degrees of intracellular and extracellular edema,
- invasion by leukocytes, and sometimes ulceration

Periodontal (Lateral) Abscess.

- Etiology:
  - Extension of infection into the supporting periodontal tissues.
  - Lateral extension of inflammation from inner surface of a periodontal pocket into the connective tissue of the pocket wall.
  - In a pocket that describes tortuous course around root, a periodontal abscess may form in the cul-de-sac.
  - Incomplete removal of calculus.
  - After trauma to the tooth.

- Clinical features:
  - The most common symptom is pain.
  - Swelling is often seen in the area of pain.
  - A small enlargement of the gingival unit to a diffuse swelling including the gingiva, alveolar mucosa and oral mucosa and may extend to face & neck.
  - The affected tissues will be red to reddish blue.
  - Frequently the tooth is mobile and may even extrude form the alveolar socket and fell high to the occlusion.

Histopathology:

- The entry of bacteria into the soft tissue pocket wall could be the first event to initiate the periodontal abscess.
- Inflammatory cells are then attracted by chemotactic factors released by the bacteria, and the concomitant inflammatory reaction leads to destruction of the connective tissues.
- The encapsulation of the bacterial infection and the production of pus.
- Intact neutrophils are found surrounding a central area of soft tissue debris and destroyed leukocytes.
- At a later stage, a pyogenic membrane, composed of macrophages and neutrophils, is organised.
- The most frequent type of bacteria were gram-negative anaerobic rods and gram-positive facultative cocci.

Drug Induced Gingival Overgrowth/ Enlargement (DIGO)

- There is an ever increasing number of medications which may induce over growth of the gingiva.

- Drugs associated with gingival overgrowth can be categorized broadly into three major groups according to their therapeutic actions, namely
  - Anticonvulsants,
  - Immuno-supressants and
  - Calcium Channel Blockers

- **Anticonvulsants:**
  - Hydantoins
    - Ethotonin
    - Mephenytoin
    - Phenytoin
  - Succinimide
    - Ethosuximide
    - Methsuximide
    - Phensuximide
  - Valproic acid
    - Valproic acid
- **Immunosuppressants:** Cylcosporine A
- **Calcium channel blockers:**
  - Dehydropyridine derivatives
    - Amlodipine
    - Felodipine
    - Nicardipine
    - Verapamil
    - Diltiazem

Table 11. Other drugs with potential to cause gingival hyperplasia	
Cotrimoxazole	Phenobarbital
Cyclosporine	Primidone
Erythromycin	Sertraline
Ethosuximide	Sodium valproate
Ketoconazole	Topiramate
Lamotrigine	Vigabatrin
Lithium	

Factors effecting drug induced gingival overgrowth:

- Age
- Genetic predisposition
- Role of fibroblasts
- Plaque
- Pharmacokinetics of the drug

Role of fibroblasts:

- The essential features of all drug-induced gingival overgrowth is an increase in the connective tissue matrix,
- Collagen production from gingival fibroblasts in controlled by the coordination of Transcripted and Post-translation collagen regulatory mechanisms, including intracellular degradation.
- The later is controlled by synthesis and releases of MMPs and TIMPs.
- Histometric analysis of phenytoin-induced gingival overgrowth has shown that the lesion is characterized by an increase in "normal growth".

- **E**xposure of gingival fibroblasts to phenytoin increases the level of translatable collagen RNA.

- Overproduction of collagen by gingival fibroblasts in phenytoin induced gingival enlargement involves an increased steady state level of collagen mRNA and not a decrease in collagen degradation.

- Such fibroblasts may be selected during the development of overgrowth.

Role Of Plaque

- There is considerable evidence that plaque-induced gingival inflammation exacerbates the expression of drug-induced gingival overgrowth.

- The plaque-induced inflammatory changes within the gingival tissues enhance the interaction between the drug and gingival fibroblasts.

- Putative mechanisms at either a cellular or molecular level have now been postulated to support the interactive component.

Clinical Features

- The growth starts as a painless, beadlike enlargement of the interdental papilla and extends to the facial and lingual gingival margins.

- As the condition progresses, the marginal and papillary enlargements unite; they may develop into a massive tissue fold covering a considerable portion of the crowns, and they may interfere with occlusion

- When uncomplicated by inflammation, the lesion is mulberry shaped, firm, pale pink, and resilient, with a minutely lobulated surface and no tendency to bleed.

- The enlargement characteristically appears to project from beneath the gingival margin, from which it is separated by a linear groove.

- The presence of the enlargement makes plaque control difficult.
- The resultant enlargement then becomes a combination of the increase in size caused by the drug and the complicating inflammation caused by bacteria.
- Secondary inflammatory changes produce a red or bluish red discoloration, obliterate the lobulated surface demarcations, and increase bleeding tendency.

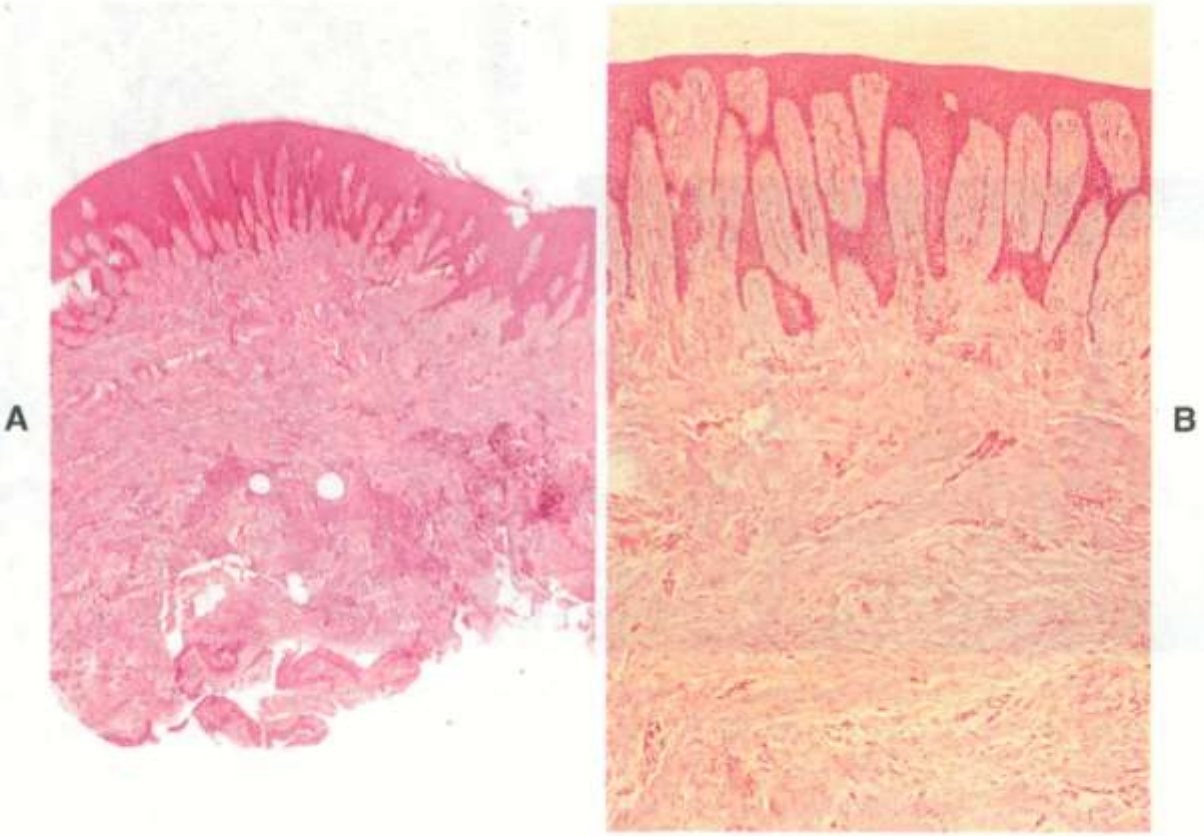
- It occurs in areas in which teeth are present.
- The enlargement is chronic and slowly increases in size, when surgically removed it recurs.
- Spontaneous disappearance occurs within a few months after discontinuation of the drug.

Histopathology

- Pronounced hyperplasia of the connective tissue and epithelium.
- There is acanthosis of the epithelium, and elongated rete pegs extend deep into the connective tissue, which exhibits densely arranged collagen bundles with an increase in the number of fibroblasts and new blood vessels.
- An abundance of amorphous ground substance.

- The enlargement begins as a hyperplasia of the connective tissue core of the marginal gingiva and increases beyond the crest of the gingival margin.

- An inflammatory infiltrate may be found at the bottom of the sulcus, or pocket.



Microscopic view of gingival enlargement associated with phenytoin therapy. **A,** Hyperplasia and acanthosis of the epithelium and densely collagenous connective tissue, with evidence of inflammation in the area adjacent to the gingival sulcus (pocket). **B,** Higher-power view showing extension of deep rete pegs into the connective tissue.

- Cyclosporine enlargements usually have a more highly vascularized connective tissue with foci of chronic inflammatory cells, particularly plasma cells.

- The "mature" phenytoin enlargement has a fibroblast/ collagen ratio equal to that of normal gingiva from normal individuals, suggesting that at some point in the development of the lesion, fibroblastic proliferation must have been abnormally high.

- Oxytalan fibers are numerous beneath the epithelium and in areas of inflammation.

- Recurring phenytoin enlargements appear as granulation tissue composed of numerous young capillaries and fibroblasts and irregularly arranged collagen fibrils with occasional lymphocytes.

Immunosuppresants - Cyclosporin

- Cyclosporine is a potent immunosuppressive agent used to prevent organ transplant rejection and to treat several diseases of autoimmune origin.

- Cyclosporine A is administered intravenously or by mouth and dosages greater than 500 mg/day have been reported to induce gingival overgrowth .

- Growth starts in the papillae – anterior facial areas & tissue is pink, dense, resilient and little bleeding tendency

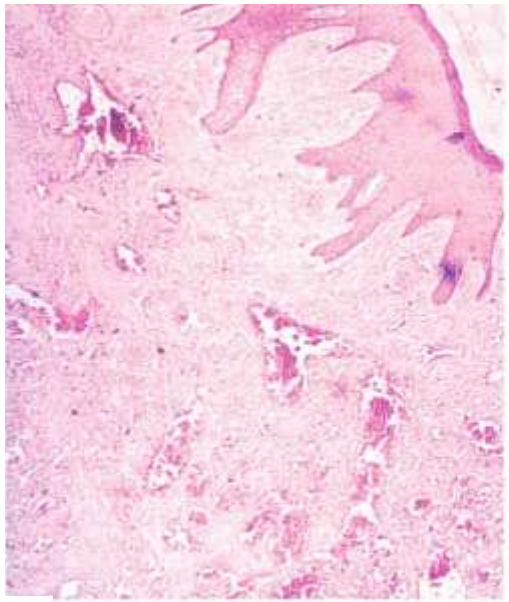
- Cyclosporine induced gingival enlargement is more vascularized than the phenytoin enlargement.

- Occurs in approximately 30% of patients receiving the drug & more frequent in children and its magnitude appears to be related more to the plasma concentration than to patients periodontal status.

- Gingival enlargement is greater in patients who are medicated with both cyclosporine and calcium channel blocking drugs.

- The microscopic findings of many plasma cells plus the presence of an abundant amorphous extracellular substance has suggested that the enlargement is a hypersensitivity response to cyclosporine

Cyclosporine-associated gingival enlargement. **A,** Mild involvement located particularly on papillae between teeth #9 and #10 and #10 and #11. **B,** Advanced generalized enlargement.



Microscopic view of cyclosporine-associated gingival enlargement. Note the epithelial hyperplasia and fibrous stroma with abundant vascularization.

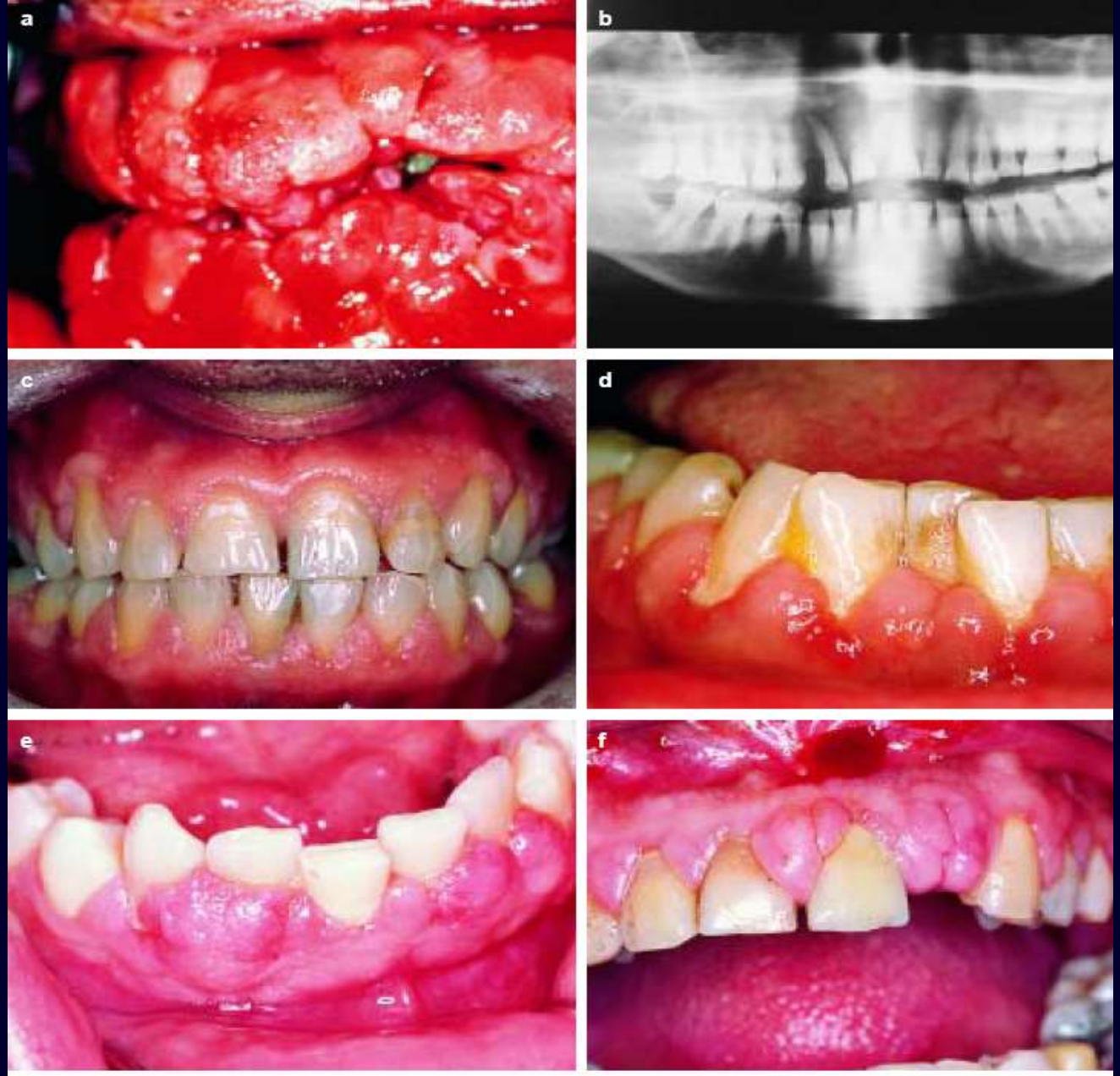


Fig. 5. – Examples of the variation in clinical appearance of cyclosporin-induced gingival overgrowth.
(a) Gross overgrowth covering almost 100 per cent of the teeth.
(b) Radiographic appearance of the patient in (a). Note the absence of any significant bone loss.
(c) Mild overgrowth.
(d) Inflamed moderate overgrowth.
(e) Mildly inflamed and fibrotic overgrowth.
(f) Fibrotic overgrowth.

- Another immunosuppressive drug called tacrolimus has been used effectively and is also nephrotoxic but it results in much less severe hypertension and gingival overgrowth.

- Initiation of Azithromycin, has been demonstrated to improve cyclosporine-associated gingival hyperplasia .

- However, the mechanism by which azithromycin may improve gingival hyperplasia is unknown.

Calcium Channel Blockers

- Developed for the treatment of cardiovascular conditions such as hypertension, angina pectoris, coronary artery spasms and cardiac arrythmias.

- Nifedipine one of the most commonly used induces gingival enlargement is 20% of the cases.

- The exact mechanism of nifidipine induced gingival overgrowth are still under investigation however several possible hypothesis have been proposed.

- Nifidipine and other calcium channel blockers may directly influence gingival fibroblasts causing increased cell proliferation & matrix synthesis significantly.

- Dose dependency in animals – not clear in humans.


a
b

- Nifidipine concentration 14 to 90 fold greater in GCF than in plasma.

- Deficiencies in collagen phagocytosis by fibroblasts have been observed in nifidipine induced gingival overgrowth.

Anticonvulsants - Phenytoin

- The first drug induced gingival enlargements reported were those produced by phenytoin **(Dilantin).**

- Other hydantoins known to induce **gingival** enlargements are
  - ethotoin and
  - mephenytoin.

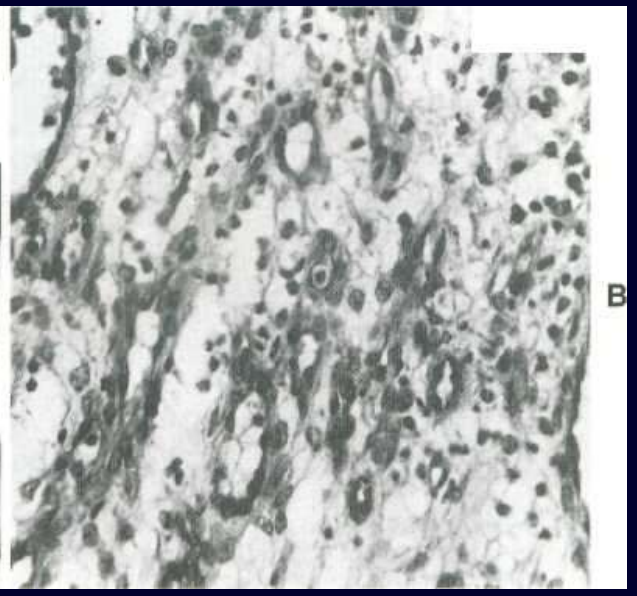
- Other anticonvulsants that have the same side effect are the
  - Succinimides,
  - methsuxinamide and
  - valproic acid.

- Gingival enlargement occurs in about 50% of patients receiving the drug although some authors have reported incidences from 3% to 84.5%.

- It occurs more often in younger patients. Its occurrence and severity are not necessarily related to the dosage after a threshold level has been exceeded phenytoin appears in the saliva.

- There is no consensus however on whether the severity of the overgrowth is related to the levels of phenytoin in plasma or saliva.


a


B

Idiopathic gingival enlargements :

- Idiopathic gingival fibromatosis is a rare condition of undetermined cause.
- Other names are :
  - fibromatosis gingiva,
  - elephantosis gingivae and
  - congenital familial fibromatosis.

Etiology:

- The cause is unknown, some have a hereditary basis but the genetic mechanism involved is not well understood.

- A study of several families found the mode of inheritance to be autosomal recessive in some cases and autosomal dominant in others.

Syndromes Associated With Diffuse Gingival Enlargements:

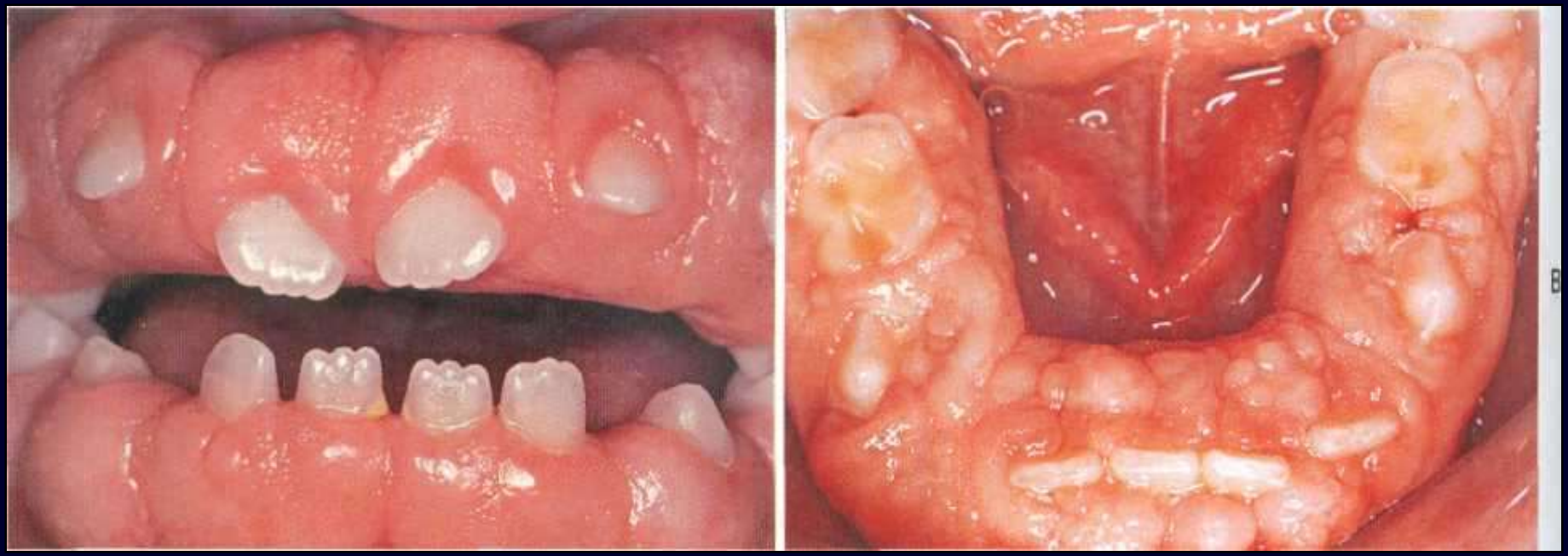
- **Autosomal dominant inheritance:**
  - Rutherford syndrome
  - Zimmerman-Laband syndrome
  - Cowden syndrome
  - Tuberous sclerosis
  - Goltz-gorlin (focal dermal hypoplasia) syndrome

- **Autosomal recessive inheritance:**
  - Murray-Puretic-Drescher syndrome
  - Cross syndrome
  - Ramon syndrome
  - Lysosomal storage diseases

- **Sporadic or Unknown pattern of inheritance:**
  - Sturge-Weber syndrome
  - Acanthosis nigricans (malignant variety)
  - Epidermal nevus (icthyosis hystrix lateris)

Clinical features

- The enlargement affects the attached gingiva as well as the gingival margin and interdental papilla.
- The facial and lingual surfaces of the mandible and maxilla are generally affected but the involvement maybe limited to outer jaw.
- The enlarged gingiva is pink, firm and almost leathery inconsistency and has a characteristic minutely pebbled surface.
- In severe cases the teeth are almost completely covered and the enlargement projects into the oral vestibule.
- Secondary inflammatory changes are common at the gingival margin.



Idiopathic gingival enlargement in 14-year-old white male patient. A, Facial view; gingiva is firm, with nodular, pebbled surface and partially covers the crowns of the teeth. B, Occlusal view of lower jaw.

- Histopathologv:

  - There is a bulbous increase in the amount of connective tissue that is relatively avascular and consists of densely arranged collagen bundles and numerous fibroblasts.
  - The surface epithelium is thickened and acanthotic with elongated rete pegs.

Enlargements associated with systemic diseases or conditions

- Many systemic diseases can develop oral manifestations that may include gingival enlargement. These diseases or conditions can effect the periodontium by two different mechanisms.

  - 1) Magnification of an existing inflammation initiated by dental plaque.

  - 2) Manifestation of the systemic diseases independently of the inflammatory status of the gingiva.

Conditioned Enlargement

- Conditioned enlargement occurs when the systemic condition of the patient exaggerates or distorts the usual gingival response to dental plaque.

- Bacterial plaque is necessary for the interaction of this type of enlargement.

- The three types of conditioned gingival enlargement are
  - hormonal (pregnancy, puberty),
  - nutritional (associated with vitamin C deficiency) and
  - allergic.

Enlargement in Pregnancy

- During pregnancy there is an increase in levels of both progesterone and estrogen which by the end of third trimester reach levels 10 and 30 times the levels during menstrual cycle respectively.

- These hormonal changes bring about :

1) Microbial changes
   - Increased ratio of anaerobe to aerobe
   - Increased number of prevotella intermedia

2) Vascular changes
   - Dilated gingival capillaries
   - Increased venule and capillary permeability

- 3) Cellular changes
  - Stimulated endothelial cells
  - Decreased keratinization
  - Increased epithelial glycogen
  - Altered polymerization of ground substance
  - Inhibited collagen production
  - Increased folate metabolism

- 4) Immune changes
  - Depressed neulrophil chemotaxis and phagocytosis
  - Depressed antibody response
  - Depressed T-cell response
  - Stimulated prostaglandin synthesis in macrophages

Clinical features

- The enlargement is usually generalized and occurs more prominently interproximally than on the facial & lingual surfaces.

- The enlarged gingiva is bright red or magenta, soft and friable and has a smooth shiny surface.

- Bleeding occurs spontaneously or on slight provocation.

- **Tumor like gingival enlargement or pregnancy tumour.**

- It usually appears after the third month of pregnancy but may occur earlier.
- A discrete mushroom like flattened spherical mass that protrudes from the gingival margin or more commonly from the interproximal space.
- Attached by a sessile or pedunculated base tends to expand laterally and pressure from the tongue and cheek perpetuates its flattened appearance.
- Generally dusky red or magenta it has a smooth glistening surface that often exhibits numerous deep red pin point markings.
- It is a superficial lesion and ordinarily does not invade the underlying bone.

- The consistency varies, the mass is usually semi firm, but it may have various degree of softness and shape friability.

- It is usually painless unless its size and shape foster accumulation of debris under it margin or interfere with occlusion in which case painful ulceration may occur

- Histopathology:
  - Generally enlargement in pregnancy is called **angiogranuloma .**
  - Central mass of connective tissue with numerous diffusely arranged nearly formed and engorged capillaries lined by cuboid endothelial cells.
  - The stratified squamous epithelium is thickened with prominent retepegs and some degree of intracellular and extracellular edema .

Enlargement in Puberty

- Enlargement of the gingiva is sometimes seen during puberty. It occurs in both male and female adolescents and appears in areas of plaque accumulation.

- Clinical features:
- The size of the gingival enlargement greatly exceeds that usually seen in association with comparable local factors.
- It is marginal and interdental and is characterized by prominent bulbous interproximal papillae.
- Often, only the facial gingiva are enlarged, and the lingual surfaces are relatively unaltered;
- Gingival enlargement during puberty has all the clinical features generally associated with chronic inflammatory gingival disease.

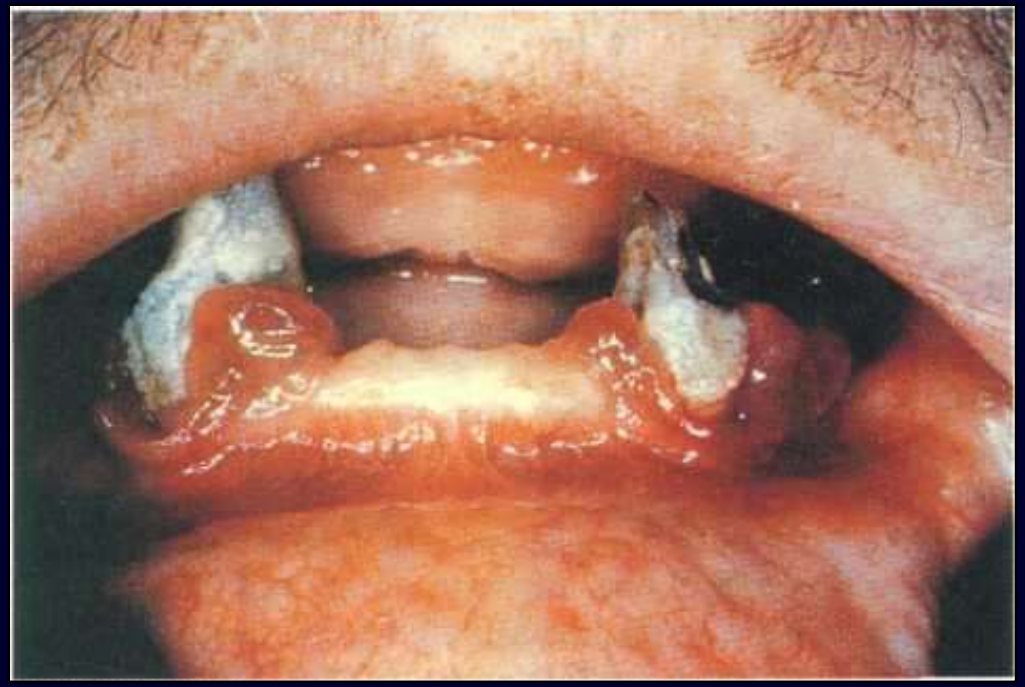
Enlargement in vitamin C deficiency

- This enlargement is essentially a conditioned response to bacterial plaque.
- Acute vitamin C deficiency does not of itself cause gingival inflammation but it does cause hemorrhage, collagen degeneration and edema of the gingival connective tissue.
- The combined effect of acute vitamin C deficiency and inflammation produces the massive gingival enlargement in scurvy.
- Gingivitis with enlarged hemorrhagic bluish red gingiva is described as one of the classic signs of vitamin C deficiency.

- Clinical features :

- Gingival enlargement is marginal, the gingiva is bluish red, soft & friable and has a smooth shiny surface.
- Hemorrhage occur either spontaneously or on slight provocation and surface necroses with pseudomembrane formation are common features.

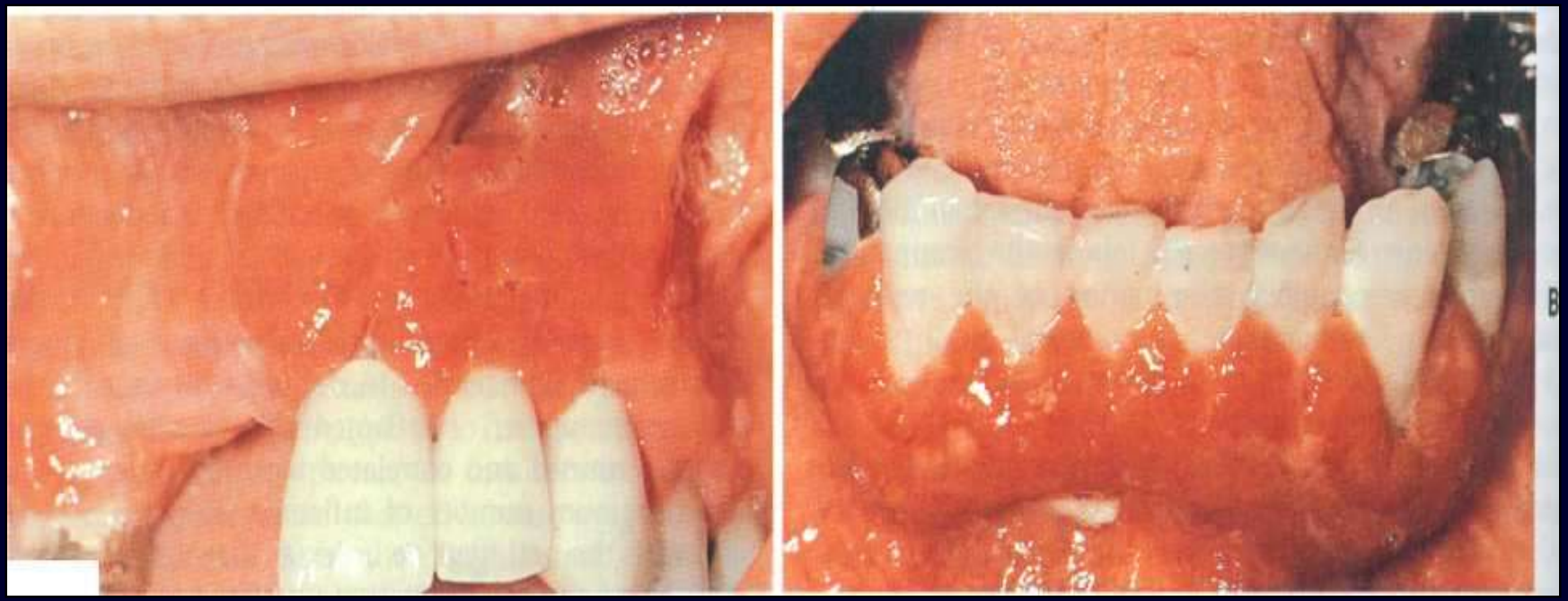
- Histopathology :
- A chronic inflammatory cellular infiltration with a superficial acute response.
- There are scattered areas of hemorrhage with engorged capillaries, marked diffuse edema, collagen degeneration and scarcity of collagen fibrils or fibroblasts are seen.



Gingival enlargement in scorbutic patient with prominent hemorrhagic areas

Plasma cell gingivitis

- Plasma cell gingivitis is also referred to as atypical gingivitis and plasma cell gingivostomatitis
- Often consists of mild marginal gingival enlargement that extends to the attached gingiva.
- More prevalent in young females .
- There is intense hyperemia, edema and inflammation of the free and attached gingiva which in severe cases extends to involve the buccal and vestibular alveolar mucosa.



- Histopathology :

- Oral epithelium shows infiltration with inflammatory cells, ultrastructurally there are signs of damage in the lower spinous layers and basal layers.

- The underlying connective tissue contains a dense infiltrate of plasma cells that also extends to the oral epithelium inducing a dissecting type of injury.

Non specific conditioned enlargement
Pyogenic granuloma :

- Distinctive clinical entity originating as a response of the tissues to a non specific infection.
- It is a tumor like gingival enlargement that is considered an exaggerated conditional response to minor trauma.

- Etiology :

- It is now generally agreed however that the pyogenic granuloma arise as a result of some trauma to the tissues, which provides a pathway for the invasion of non specific types of microorganisms.

- The tissues respond in a characteristic manner to these organisms of low virulence by the overzealous proliferation of a vascular type of connective tissue.

- The pyogenic granuloma of the oral cavity arises most frequently on the gingiva but may also be found on the lips, tongue and buccal mucosa and occasionally on other areas.

- The lesion is usually an elevated, pedunculated or sessile mass with a smooth, lobulated or even a warty surface which commonly is ulcerated and shows a tendency for hemorrhage wither spontaneously or upon slight trauma.

- Sometimes there is exudation of purulent material. It is deep red or reddish purple depending upon its vascularity, painless and rather soft in consistency.

Histopathology :

- Pyogenic granuloma appears as a mass of granulation tissue with chronic inflammatory cellular infiltration.
- Endothelial proliferation and the formation of numerous vascular spaces are the prominent features.
- The surface epithelium is atrophic in some areas and hvperplastic in others. Surface ulceration and exudation are common features.

Systemic diseases causing Gingival enlargement :

- Leukemia :
- Gingival hyperplasia is often an early finding in acute monocytic, lymphocytic or myelocytic leukemia.
- Leukemia does not cause the gingivitis but the lowered resistance to infection due to lack of normal functioning leukocytes tends to aggravate already present gingivitis and the increased bleeding tendency.
- It also has been claimed that the large immature cells in acute monocytic leukemia may act as emboli in the fine gingival capillary loops and create stasis.

- Clinical features :

- Leukemic enlargement may be diffuse or marginal, localized or generalized.
- The highest incidence in patients with acute monocytic leukemia (66.7%) followed by acute myelocytic monocytic leukemia (18.7%) and acute myelocytic leukemia (3.7%).
- Leukemic gingival enlargement is not found in edentulous patients or in patients with chronic leukemia.

- It appears as a diffuse enlargement or a discrete tumor like interproximal mass.

- In leukemic enlargement the gingiva is generally bluish red and has a shiny surface.

- Consistency is moderately firm but there is tendency toward friability and hemorrhage occurring either spontaneously or on slight irritation.

Leukemic gingival enlargement (acute myelocytic leukemia)

Granulomatous Diseases

- Wegener's Granulomatosis.
- Wegener's granulomatosis is a rare disease characterized by acute granulomatous necrotizing lesions of the respiratory tract, including nasal and oral defects.

- Clinical features:
- The initial manifestations of Wegener's granulomatosis may involve the orofacial region and include oral mucosal ulceration, gingival enlargement, abnormal tooth mobility, exfoliation of teeth, and delayed healing response.

- The granulomatous papillary enlargement is reddish purple and bleeds easily on stimulation. The hemorrhagic condition is often termed as Strawberry gingivitis.

Figure 9-23 • Wegener's granulomatosis. Hemorrhagic and friable gingiva (strawberry gingivitis) of the anterior mandibular facial gingiva.

Sarcoidosis.

- Sarcoidosis is a granulomatous disease of unknown etiology.

- It starts in individuals in their 20s or 30s, predominantly affects blacks, and can involve almost any organ, including the gingiva, where a red, smooth, painless enlargement may appear.

- Histopathology :
- Sarcoid granulomas consist of discrete whorls of epitheloid cells and multinucleated, foreign body type giant cells with peripheral mononuclear cells."

NEOPLASTIC ENLARGEMENT (GINGIVAL TUMORS)

- **Benign Tumors of the Gingiva**

- Epulis is a generic term used clinically to designate all discrete tumors and tumorlike masses of the gingiva.

- It serves to locate the tumor but not to describe it. Most lesions referred to as "epulis" are inflammatory rather than neoplastic.

- In another study of 868 growths of the gingiva and palate, of which 57% were neoplastic and the remainder inflammatory, the following incidence of tumors was noted:
  - carcinoma, 11.0%;
  - fibroma, 9.3%;
  - giant cell tumor, 8.4%;
  - papilloma, 7.3%;
  - leukoplakia, 4.9%;
  - mixed tumor (salivary gland type), 2.5%;
  - angioma, 1.5%;
  - osteofibroma, 1.3%;
  - sarcoma, 0.5%;
  - melanoma, 0.5%;
  - myxoma, 0.45%;
  - fibropapilloma, 0.4%;
  - adenoma, 0.4%; and
  - lipoma, 0.3%.(Bernick S, 1948)

Fibroma.

- Appears as an elevated lesion of normal color with a smooth surface and a sessile, or occasionally, pedunculated base.

- Projecting above the surface, the tumor sometimes becomes irritated and inflamed and may even show superficial ulceration.

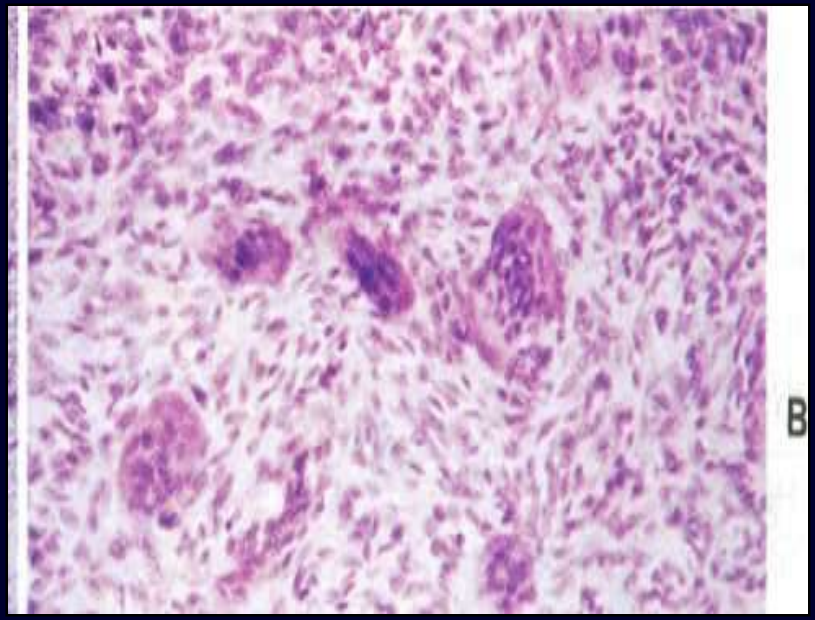
- It is nearly always a well defined, slowly growing lesion that occurs at any age, but is most common in the third, fourth and fifth decade

- Fibromas are composed of bundles of well-formed collagen fibers with a scattering of fibrocytes and a variable vascularity

Figure 12-4 • Fibroma. Smooth-surfaced, pink nodular mass of the palatal gingiva between the cuspid and first bicuspid.

Peripheral Giant Cell Granuloma.

- Giant cell lesions of the gingiva arise interdentally or from the gingival margin, occur most frequently on the labia surface
- May be sessile or pedunculated.
- Vary in appearance from smooth, regularly outlined masses to irregularly shaped, multilobulated protuberances with surface indentations.
- Ulceration of the margin is occasionally seen
- They may be firm or spongy, and the color varies from pink to deep red or purplish blue
- In the past, giant cell lesions of the gingiva have been referred to as "peripheral reparative giant cell tumors." These lesions, however, are essentially responses to local injury and are not neoplasms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Papilloma.

- Papillomas are benign proliferations of surface epithelium associated with the human papillomavirus (HPV).

- The papilloma is an exophytic growth made up of numerous, small finger-like projections which result in a lesion with a roughened, verucous or "cauliflower like" surface.

- It is a well-circumscribed pedunculatcd tumor, occasionally sessile,

- The papilloma lesion consists of fingerlike projections of stratified squamous epithelium, often hyperkeratotic, with a central core of fibrovascular connective tissue.

- There is characteristic proliferation of the spinous layer of cells. Connective tissue is not involved .

Central Giant Cell Granuloma.

- These lesions arise within the jaws and produce central cavitation.
- They occasionally create a deformity of the jaw that makes the gingiva appear enlarged.
- Either jaw may be involved, but the mandible is affected more often.
- The lesions are more common in the anterior segments of the jaws and, not uncommonly, cross the midline.
- Produces a radiolucent area with either a relatively smooth or a ragged border, and sometimes showing faint trabeculae.
- Definite loculations are often present, particularly in larger lesions

Periodontal Cyst:

- Most often in the mandibular canine-premolar area.

- The following possible etiologies have been suggested:
  - Odontogenic cyst caused by proliferation of the epithelial rests of Malassez; the stimulus initiating the cellular activity is not known.
  - Lateral dentigerous cyst retained in the jaw after tooth eruption.
  - Primordial cyst of supernumerary tooth germ.
  - Stimulation of epithelial rests of the periodontal ligament by infection from a periodontal abscess or the pulp through an accessory root canal.

- A periodontal cyst is usually asymptomatic, without grossly detectable changes, but it may present as a localized, tender swelling.

- Radiographically:
- An interproximal periodontal cyst appears on the side of the root as a radiolucent area bordered by a radiopaque line.

- Histopathology.
- Cystic cavity is lined by a thin, flattened epithelium with or without localized areas of thickening.

- Less frequently, the following types of epithelium can be found: unkeratinized stratified squamous epithelium, keratinized stratified squamous epithelium, and parakeratinized epithelium.

Figure 15-34 • **Lateral periodontal cyst.** A larger lesion causing root divergence.

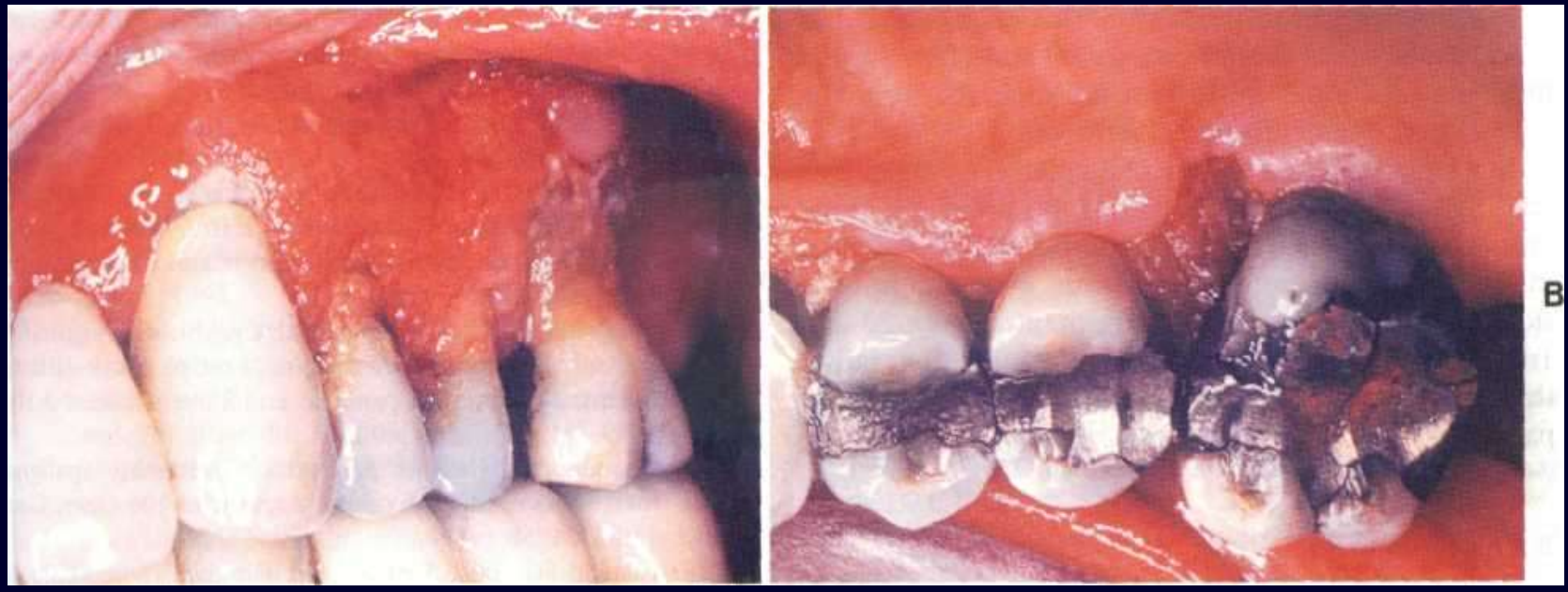
Figure 15-35 • **Lateral periodontal cyst.** Gross specimen of a botryoid variant. Microscopically, this grapelike cluster revealed three separate cavities.

Other lesions:

- Other benign tumors have also been described as rare or infrequent findings in the gingiva. They include
  - nevus:
  - leukoplakia
  - Lipoma
  - myoblastoma,
  - hemangioma,
  - neurilemoma,
  - neurofibroma,
  - mucus-secreting cysts (mucoceles), and
  - ameloblastoma.
  - Verruciform xanthoma
  - Dental lamina cyst of newborn

Malignant Tumors of the Gingiva

- **Carcinoma.** Oral cancer accounts for less than 3% of all malignant tumors in the body but is the sixth most common cancer in males and the twelfth in females.
- The gingiva is not a frequent site of oral malignancy (6% of oral cancers).
- Squamous cell carcinoma is the most common malignant tumor of the gingiva.
- It may be exophytic, presenting as an irregular outgrowth, or ulcerative, appearing as flat, erosive lesions.
- It is often symptom free, going unnoticed until complicated by inflammatory changes that may mask the neoplasm but cause pain.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- **Metastasis.** Tumor metastasis to the gingiva occurs infrequently. Such metastasis has been reported with various tumors, including
  - adenocarcinoma of the colon,
  - lung carcinoma,
  - primary hepatocellular carcinoma,
  - renal cell carcinoma,
  - hypernephroma,
  - chondrosarcoma, and
  - testicular tumor.

FALSE ENLARGEMENT

- False enlargements are not true enlargements of gingival tissues but may appear as such as a result of increases in size of the underlying osseous or dental tissues

- **Underlying Osseous Lesions**
- Enlargement of the bone subjacent to the gingival area occurs most often in tori(torus palatinus & torus mandibularis) and exostoses,

- It can also occur in Paget's disease, fibrous dysplasia, cherubism, central giant cell granuloma, ameloblastoma, osteoma, and osteosarcoma.

- The gingival tissue can appear normal or may have unrelated inflammatory changes.

Figure 1-35 • **Exostoses.** Multiple buccal exostoses of the maxillary and mandibular alveolar ridges.

Figure 1-40 • **Torus palatinus.** Asymmetric, lobulated bony mass.

Figure 1-41 • **Torus mandibularis.** Bilateral lobulated bony protuberances of the mandibular lingual alveolar ridge.

- **Underlying Dental Tissues:**

- During the various stages of eruption, particularly of the primary dentition, the labial gingiva may show a bulbous marginal distortion caused by superimposition of the bulk of the gingiva on the normal prominence of the enamel in the gingival half of the crown.

- In a strict sense, developmental gingival enlargements are physiologic and usually present no problems.

- However, when such enlargement is complicated by marginal inflammation, the composite picture gives the impression of extensive gingival enlargement.

Conclusion

- Gingival enlargement can be caused by a wide variety of etiologies
- The clinician can often diagnose the cause by a careful history (e.g., drug-induced or pregnancy-induced enlargement), by location (e.g., mouth-breathing enlargement), or by the clinical presentation (e.g., generalized enlargement with gingival hematoma formation seen in leukemia).
- Plaque-induced inflammation can be the sole cause of gingival enlargement or can be a secondary cause, so in all patients, therapy to control gingival inflammation is essential.
    - Thus Correct diagnosis & treatment planning form the most essential part of the treatment of gingival enlargement to achieve proper functional and esthetic harmony.


Thank You
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