



Gingival Enlargement

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Abstract

One of the common characteristic of gingival disease is gingival enlargement. Nevertheless because of the variety of ways in which these entities present, diagnosing these entities can be difficult for the clinician. They can be classified according to their etiopathogenesis, location, size, extend etc. With the help of current practice and clinical experience a differential diagnosis can be created. After thorough investigation the clinician arrives at a final diagnosis also known as diagnosis of exclusion. An accurate diagnosis is crucial because it determines how to treat these lesions and prevent them from recurring, in addition certain situations, gingival enlargement may be primary indicator of potentially fatal systemic disease.

Keywords: Decision Tree; Gingival Disease; Differential Diagnosis; Gingival Hyperplasia; Gingival Over Growth; Differential Diagnosis

Introduction

Gingival enlargement, also known as gingival overgrowth is a common feature of gingival disease that is characterized by an increase in the size of the gingiva. The key to timely management is accurately diagnosing the cause of the enlargement, but this can be challenging given the variety of gingival enlargement that can be classified as inflammatory, drug-induced, associated with systemic condition or disease, neoplastic or false enlargements based on their etiopathogenesis. They can also be classified as marginal, papillary, or diffuse and their distribution can be localised or generalised. Localised enlargement can be further classified in to three subtypes isolated, discrete regional. Discrete lesions are isolated sessile and pedunculated tumour like enlargement. Regional enlargement refers to the involvement of gingiva around three or more tooth in one or multiple areas of the mouth. Generalised enlargement refers to involvement of gingiva adjacent to almost all teeth present [1].

Classification [2,3]

Inflammatory enlargement

- Acute
- Chronic

Drug-induced gingival enlargement

- Anticonvulsants
- Immunosuppressant
- Calcium channel blockers

Enlargements associated with systemic conditions and disease

- Conditioned enlargement
- Pregnancy
- Puberty
- Vitamin C deficiency
- Plasma cell gingivitis
- Non-specific conditioned enlargement

Systemic disease

- Leukaemia
- Granulomatous disease

Neoplastic enlargement

- Benign tumors
- Malignant tumors

False enlargement

- Underlying osseous lesion
- Underlying dental tissues

Isolated reactive lesions of the gingiva

A corrective term “reactive lesion of the gingiva” [2] seems to be more appropriate for this category of swellings. Historically, localized enlargement of the gingiva was referred to as “which refers to any solitary/discrete, pedunculated or sessile swellings of the gingiva with no histologic characterization of a particular lesion. The most common diagnosis in this category is an inflammatory rather than neoplastic and may fall into one of the following group of reactive lesions: fibrous epulis/peripheral fibroma, angiogranuloma/pyogenic granuloma, and the peripheral giant cell lesion/granuloma.

Fibrous epulis/peripheral fibroma

The lesion commonly appears as a firm, pink, non-inflammatory mass in adults and appears to grow from below the free gingival margin/interdental papilla. The lesion is usually painless, though it can become painful if you brush, floss, or chew on it. Histologically, the fibroma may show additional foci of calcification (peripheral calcifying fibroma), foci of cementicles (peripheral cementifying fibroma, or trabeculae of bone (peripheral ossifying fibroma).

Angiogranuloma/pyogenic granuloma

Angiogranuloma that appears during pregnancy is known as pregnancy epulis/tumor or granuloma gravidarum. In adults, it presents as a smooth-surfaced mass that is frequently ulcerated and grows from beneath the gingival margin. These reddish/bluish coloured masses are highly vascular, compressible, and could bleed readily. Usually, they grow rapidly within the first few weeks and then slowly. The mass may penetrate interdentally and present as a bilobular (buccal and lingual) mass connected through the col area, but bone erosion is uncommon.

Histologically, there is a thickening of the stratified squamous epithelium, along with noticeable intercellular bridges, leukocytic infiltration, and rete pegs. There is also some intracellular and extracellular oedema

Peripheral giant cell granuloma

These lesions are very aggressive and have significant growth potential. They are most common in the anterior region in young patients, or in the posterior mouth during the mixed dentition phase in adults. Their purplish-red colour and tendency to bleed indicate that they are highly vascular. They also tend to penetrate interdentally, eroding adjacent bone and causing adjacent teeth to separate.

Gingival cyst

OExcisional biopsy is the best course of treatment for gingival cysts, which are unusual cysts of odontogenic source that are primarily found on the labial attached gingiva of the mandibular anterior teeth. The presence of fluid may give these lesions a bluish hue and they may cause pressure-induced resorption of the labial bone. Radiographically, their radiolucency may occasionally cause confusion with lateral periodontal cysts.

Neoplastic

Localized epulis-like lesions can also be classified as benign or malignant. Benign masses include fibroma, peripheral giant cell granuloma, central giant cell granuloma, papilloma, leukoplakia, nevus, myoblastoma, hemangioma neurilemmoma [4], neurofibroma [5], ameloblastoma [6] and fibroma. Malignant tumors include melanoma or squamous cell carcinoma. Among sarcomas, Kaposi's sarcoma [8] is more common, while fibrosarcoma, lymphosarcoma, and reticulum cell sarcoma are rarely reported [9]. Other rare lesions (<2% prevalence) include angioma, osteofibroma, myxoma, fibropapilloma, adenoma, and lipoma [10].

Acute

Acute forms of isolated gingival enlargement can be classified as gingival, periodontal, periapical, or pericoronal abscesses; these can be distinguished based on the location and vitality of the associated tooth. For example, a gingival abscess may be located near the gingival margin or papilla; a periodontal abscess may be diffuse and form a significant portion of attached gingiva; an endodontic lesion may originate from an endodontic problem (periapical abscess/endo-perio lesion. When the associated tooth is not vital, the lesion may have its origin in an endodontic issue (periapical abscess/endo-perio lesion. The pericoronal flap that covers the

majority of mandibular teeth may become inflamed and swollen; abscess of these flaps may eventually develop if the inflammation persists.

The surface epithelium exhibits variable degrees of intra- and extracellular edema, invasion by leukocytes, and occasionally ulceration. Histopathological examination of gingival/periodontal/pericoronal abscess may present purulent focus in the connective tissue, surrounded by diffuse infiltration of polymorphonuclear leukocytes, edematous tissue, and vascular engorgement.

Characteristic features of generalised gingival enlargement

More frequently one of the various type of gingival enlargement, either localised or widespread, is the clinical manifestation of gingival disease.

Inflammatory gingival enlargement

Are an inflammatory reaction to a local irritant associated with the gingiva. The irritant may be microbiological deposits (calculus and plaque) fractured teeth, overhanging restorations, ill-fitting prosthesis; orthodontic brackets etc. The presentation starts as a slight ballooning of the papilla or marginal gingiva, depending on the location of the irritant. The bulge may progressively increase in size and extent to become generalized; clinically, they may appear bluish or deep red; they are often soft and friable with a smooth shiny surface and they usually bleed easily. Occasionally, chronic inflammatory enlargement may also present as firm, resilient, pink, and fibrotic enlargement which histologically show abundance of fibroblast and collagen fibers.

Gingival enlargement in mouth breathers

A diagnostic feature of this type of enlargement would be the presence of significant enlargement in the maxillary and mandibular anterior regions and no involvement of the posteriors. In a typical bimaxillary protrusion case, the enlargement will be limited to the palatal aspect of maxillary anteriors and labial aspect of mandibular anteriors. Patients present with mouth breathing habit. The exact mechanism of enlargement in mouth breathers is unclear, although it is thought to be caused by alternate wetting and drying of the gingival surface. The gingiva appears red and edematous with diffuse shiny surface.

Drug induced gingival enlargement

Numerous anticonvulsants, immunosuppressants, and calcium channel blockers have been linked to gingival enlargement in a variety of presentations. The enlargement usually manifests as a

bead-like enlargement of the interdental papilla at first, and eventually it may involve marginal gingiva. When secondary inflammation is not present, the enlargement resembles a mulberry shape, firm, pink, and resilient structure with minute lobulations and no bleeding upon probing. Although it may involve the gingiva around all teeth, it is more noticeable in maxillary and mandibular anteriors, absent in edentulous areas.

When patients are receiving combination therapy, which medication is known to cause gingival enlargement, it can be difficult to determine which should be attributed to the diagnosis of DIGO. One method to diagnose these patients is to speak with their doctor and ask him to substitute or stop one medication at a time, starting with the one that would have the least impact on their daily routine. Often, patients will report taking antihypertensives, anticonvulsants, or immune-suppressants for many years, but the enlargement has only been noticed for a few months. In these situations, it can be challenging to correlate the duration of enlargement with the history of related medication; however, specific questions about recent changes in the type or dosage of drug will help to associate both.

Genetic disorders associated with gingival enlargement

Based on their etiology, clinical features, and histology, they can be classified into four primary categories: idiopathic gingival enlargement, vascular disorders, elephantiasis, and hereditary gingival hyperplasia. Idiopathic gingival enlargement is also known as congenital familial fibromatosis, gingivomatosis, idiopathic fibromatosis, and unusual fibrotic gingival enlargement of localized or generalized extent. It can present as a distinct entity or as a component of a syndrome, and a positive family history of gingival enlargement can be used to make the diagnosis. Typically, it starts with the eruption of the primary or permanent dentition. A common finding could be the presence of firm bulky enlargement of gingiva restricted to maxillary and mandibular second and third molar areas.

Conditioned gingival enlargement

HORMONAL - Hormonal changes during pregnancy and puberty predispose the body to respond to local irritants in a pretended manner. The interproximal gingiva exhibits a more pronounced enlargement than the facial and/or lingual surfaces. The enlarged gingiva is typically friable and soft, with a smooth, shiny surface and bright red or magenta colour. Bleeding may occur spontaneously or in response to mild stimulation. The enlargement may spontaneously disappear after delivery, but full resolution may necessitate the removal of all local irritants and further surgical intervention of any fibrotic remnants.

Vitamin C deficiency

Vitamin C deficiency is defined as a serum ascorbic acid level of less than 2 µg/mL. Diabetes, stress, and smoking are the commonly identified factors that contribute to mild vitamin C deficiency. The gingiva is bluish red, soft, and friable with a smooth, shiny surface; bleeding can happen spontaneously or in response to minor irritation; surface necrosis with pseudomembrane formation is also commonly seen [11]. Kubota, *et al.* [12] noted that high-sensitivity C-reactive protein (hs-CRP) levels were inversely proportionate with serum vitamin C concentration, meaning that these patients may have elevated hs-CRP blood levels.

Plasma cell gingivitis

The etiology of plasma cell gingivitis is unclear, but it is thought to be a hypersensitivity reaction involving affluent plasma cells observed histologically. Common allergens linked to this lesion include toothpaste, khat, food products, especially cinnamon, chewing gum, or unknown origin. Patients typically complain of burning when eating hot, spicy food. The lesion appears reddish in colour, involves almost all attached gingiva, and has a slight granular surface appearance.

Gingival enlargement associated with systemic diseases

- **Leukemia:** The most serious condition associated with gingival enlargement in this category would be acute myeloid leukemia, which can be associated with signs and symptoms of bone marrow failure, such as ecchymosis, night sweats, recent infections, and lethargy. A simple full blood count can be used to quickly diagnose this rare condition. In addition to gingival enlargement, other associated features could be oral ulceration, spontaneous gingival bleeding, petechiae, mucosal pallor, herpetic infections, and candidiasis. Rarely, uncommon features like numbness in the chin and/or tooth pain have been reported [13].
- **Wegener's Granulomatosis:** The characteristic sign of this condition is "strawberry gingivitis," which is characterized by reddish-purple exophytic gingival swelling with patchial hemorrhage. The oral lesions could be very helpful in the timely diagnosis of this potentially fatal condition, as they persist for a long time before multi-organ involvement occurs [15,16]. To diagnose the condition as Wegener's Granulomatosis, at least two of the following criteria must be met: (1) ulcerative lesions of oral mucosa or nasal bleeding or inflammation; (2) nodules, fixed infiltrates, or cavities in chest radiograph; (3) abnormal urinary sediment; and (4) granulomatous inflammation on biopsy [15].
- **Crohn's Disease:** The gingiva has a distinctively minutely pebbled surface, and it is pink, firm, and almost leathery in consistency. Patients with this condition need to closely monitor any signs or symptoms, which are typically accompanied by fever, ulcers, bowel disturbances, and lip swelling. A gastroenterologist's advice will be beneficial.
- **SARCOIDOSIS:** Sarcoidosis is a multiorgan disorder that primarily manifests as pulmonary infiltration and hilar lymphadenopathy, dermal and ocular lesions [17], with oral involvement being uncommon. Diagnosis of sarcoidosis is primarily based on the exclusion of other conditions that do not cause granulomas to form, as well as other laboratory tests [17,18]. Serum angiotensin converting enzyme levels can also be significantly raised (normal range less than 670 nkat/L), and a chest X-ray may reveal hilar lymphadenopathy [19].
- **Tuberculous gingival enlargement:** Primary oral tuberculous lesions are extremely rare; however, when they do occur, they are usually observed in younger age groups. The lesions themselves are usually painless, but there may be associated caseation of the dependent lymph nodes [20,21]. In addition, primary tuberculosis that presents exclusively as gingival enlargement is extremely rare; it can be diagnosed based on history of fever, weakness, loss of appetite, and weight loss [22]. The diagnosis can be confirmed based on histopathology, complete blood count, and polymerase chain reaction [23]. In contrast, secondary oral tuberculosis can be observed in 0.05% to 1.5% of cases, with older adults being more likely to have it [21,22].
- **False enlargement:** These pseudo-enlargements appear as a result of increased size of the dental tissues (during tooth eruption) or osseous tissues (tori, exostosis, Paget's disease, cherubism, osteoma, etc.). The area overlying the gingiva exhibits no abnormal clinical features other than a massive increase in size.
- **Decision tree:** A decision tree is specially designed to get a broad overview of different possible diagnoses for localized or generalized gingival enlargements. This systematic presentation would be very helpful for the clinicians to arrive at a particular diagnosis. Lab investigations and/or biopsy specimens may be required to confirm the diagnosis or make a diagnosis of exclusion. Differential diagnosis of gingival enlargement requires thorough dental and medical history, careful evaluation of the type, nature, and extent of enlargement, and identification of etiologic or predisposing factors.

Conclusion

Despite the wide range of possible causes, gingival enlargements are often diagnosed with a careful history (e.g., drug- or hormone-influenced gingival enlargement), by location (e.g., mouth-breathing enlargement around anterior teeth), or by the clinical presentation (e.g., strawberry gingivitis). The presence of local irritants (plaque and calculus) may be the primary or associated cause of gingival enlargements, so controlling plaque in all patients is crucial to their care. In rare cases of gingival enlargement, an excisional/incisional biopsy and/or hematologic/histologic examination may occasionally be required to accurately diagnose the condition at hand. The clinician should be open-minded and weigh all options before making a final diagnosis.

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