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Common benign oral soft tissue masses

Tara Esmeili, DDS[a], Francina Lozada-Nur, DDS, MS, MPH[a,*], Joel Epstein, DMD, MSD, FRCD(C)[b]

[a]*Department of Stomatology, Division of Oral Medicine, Oral Pathology, Oral Radiology, School of Dentistry, University of California at San Francisco, 513 Parnassus Street, San Francisco, CA 94143, USA*

[b]*Department of Oral Medicine and Diagnostic Sciences, University of Illinois, 819 South Paulina Street, Chicago, IL 60612, USA*

Traumatic fibroma

Traumatic fibroma, also known as irritation fibroma, is a common benign exophytic oral lesion that develops secondary to tissue injury (Fig. 1).

Epidemiology

Fibromata are among the most common benign reactive lesions [1–5]. Prevalence studies among patients aged 15 to 82 years show a relatively common rate of occurrence (range, 1.19/1000 to 77/1000) [6]. A review of benign oral soft tissue tumors and bony prominences in white Americans older than 35 years old identified irritation fibromas as the second most common benign oral lesion (12.0/1000) [1].

Etiology

A fibroma is the result of a chronic repair process that includes granulation tissue and scar formation resulting in a fibrous submucosal mass. These lesions occur equally in both sexes. Recurrences are rare and may be caused by repetitive trauma at the same site. This lesion does not have a risk for malignancy.

* Corresponding author.
E-mail address: fln@itsa.ucsf.edu (F. Lozada-Nur).

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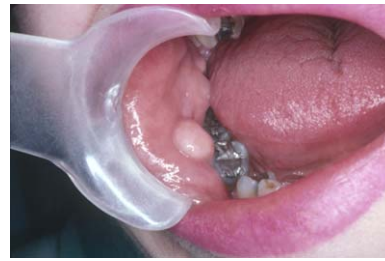

Fig. 1. A 40-year-old woman with fibroma of the buccal mucosa.

Clinical presentation

The most common sites of traumatic fibroma are the tongue, buccal mucosa, and lower labial mucosa. Clinically, they present as broad-based lesions, lighter in color than the surrounding normal tissue, with the surface often appearing white because of hyperkeratosis or with surface ulceration caused by secondary trauma. The growth potential of the fibroma does not exceed 1 to 2 cm in diameter [7].

Histopathology

Microscopic presentation of the lesion includes dense collagen, numerous mature fibroblasts, and chronic inflammatory cells. A hyperkeratotic overlying epithelium is often present because of chronic trauma [7].

Treatment

Surgical excision is the treatment of choice. Other lesions in the differential diagnosis, including benign tumors (neurofibroma, neurilemoma, granular cell tumor, salivary gland tumors, lipoma) and mucocele should be ruled out by biopsy.

Mucocele

Mucoceles are asymptomatic soft, raised benign lesions that appear in different shades of blue or occasionally are the color as the surrounding normal tissue (Fig. 2). The word *mucocele* is a clinical term that applies to the mucous extravasation phenomenon (MEP) [7]. The MEP occurs when saliva spills into the connective tissue and forms a mass. When a mucocele occurs in the floor of the mouth, it is called a ranula (Table 1). A clinically similar lesion is the mucous retention cyst (MRC) or mucous cyst. Although some MRCs are true salivary duct cysts, others occur from the retention of saliva in the ductal tissue (by plugging from a sialolith or mucous plug) causing dilatation of the ductal structure.

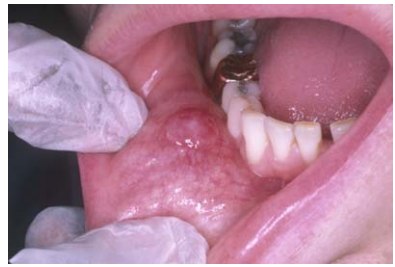

Fig. 2. A 34-year-old woman with mucocele of the lower labial mucosa.

Epidemiology

Mucoceles are relatively common [8–10]. MEPs are common among children and adults [11–13]. Several studies among pediatric populations in different geographic and ethnic groups have ranked mucoceles among one of the most common benign oral lesions [9,11–14]. One study of 70 clinically appearing mucoceles in the lower lip found 68 were MEPs and only 2 were MRCs. The highest incidence of mucoceles was during the second decade of life; the male:female ratio was 1:1, and 2 of the 70 lesions recurred after surgical excision [15]. MRC is less common than MEP [15,16] and has been reported to be more common in older adults [17,18].

Etiology

MEP may follow trauma [19] to the minor salivary gland duct that results in spilling of the mucus into the connective tissue followed by an inflammatory reaction and formation of granulation tissue. MEPs often undergo cycles of appearance and disappearance (the mucous material reabsorbs, but then they recur). Some MRCs are true salivary duct cysts, whereas others are caused by the retention of saliva in the ductal tissue.

Table 1
Comparison pf MEP and MRC epidemiology, cause, age, intraoral distribution, and symptoms

	MEP	MRC
Epidemiology	Common	Uncommon
Cause	Trauma to the minor salivary gland duct and spilling of the mucus into the connective tissue	Retention of mucus in the salivary gland duct
Age group	Children and adolescents	Older adults
Intraoral distribution	Lower lip Buccal mucosa Ventral tongue Floor of the mouth Retromolar region	Upper lip Buccal mucosa Floor of the mouth
Symptoms	Asymptomatic	Asymptomatic

Clinical presentation

MEPs and MRCs have different clinical intraoral distribution. Their clinical presentation can also sometimes be slightly different:

The most common site for MEPs is the lower lip, followed by the buccal mucosa, ventral tongue, floor of the mouth, and retromolar region [7]. MEPs generally appear as asymptomatic, soft, bluish lesions with a smooth surface. A recent case report describes MEPs of the ventral tongue resembling pyogenic granulomata, polyps, or squamous papillomata, and they are characterized by sudden onset, increases and reductions in size, a bluish color, and a fluid-filled consistency [20].

MRCs occur mostly on the upper lip, palate, buccal mucosa, and floor of the mouth [7]. MRCs are asymptomatic, soft, mobile masses similar in color to the normal surrounding mucosa.

Histopathology

Microscopically, MEPs are characterized by mucus surrounded by granulation tissue, whereas MRCs show a cystic cavity lined by epithelium [16]. Within the MRC there may be mucus or a sialolith along with some connective tissue with minimal inflammation [7]. The minor salivary glands that are involved in the lesion can undergo metaplasia and degeneration [16].

Treatment

Treatment of MEPs includes surgical excision with removal of the associated gland. For MRCs, the cyst and associated minor salivary glands must be excised. Recurrence is minimized if the surgical excision includes the associated glandular structures.

Oral papillary lesions

The term *oral papillary lesion* (OPL) can refer to both verrucous and papillary growths of the oral mucosa [21]. The OPLs discussed in this article are squamous papilloma, verruca vulgaris, and condyloma acuminatum. The main components of these lesions are benign epithelium and underlying connective tissue. In some individuals, however, an OPL can be observed with dysplastic changes, especially in HIV-positive patients. The risk of dysplasias progressing to verrucous carcinoma or squamous cell carcinoma remains unknown, because patients would need to be followed in a longitudinal study without the normal treatment of excision [22]. Three distinct lesions should be recognized as occurring in the perioral and oral cavity areas: squamous papilloma, verruca vulgaris, and the condyloma acuminatum.

It is important to note the differences in the clinicopathogenesis of squamous papilloma, verruca vulgaris, and condyloma acuminatum.

Although, most OPLs are associated with the human papillomavirus (HPV), often viral changes or the virus itself is not routinely detected. The squamous papilloma is usually a solitary lesion and can be found in the oral mucosa. It is the most common benign oral epithelial neoplasm [21]. There is no clearly defined mode of transmission of this lesion; many occur spontaneously. Verruca vulgaris is a common skin wart that can appear on the vermilion border and, less commonly, in the oral cavity [21]. When found in the mouth, this lesion is usually seen on the palate or the keratinized gingival tissue. It is associated with HPV subtypes 2, 4, and 40 [7]. Condyloma acuminatum is characteristically situated in anogenital area; therefore its presence in the mouth is an indication of sexual transmission. Condyloma acuminatum is often associated with HPV subtypes 6 and 11 and is frequently seen in HIV-positive patients.

Epidemiology and etiology

Population-based prevalence studies indicate that OPLs are quite common (0.6–4.6/1000) [6]. Most OPLs are caused by the HPV. There are more than 100 genotypes of HPV. HPV usually induces benign lesions. Benign nondysplastic OPLs are commonly associated with HPV types 2, 4, 6, 11, and 57, whereas HPV 16, 18, and others may be present in dysplastic papillomas [7]. Transmission is thought to be through direct mucosal contact, although this conjecture has not been proven, and the mode of transmission is still not clearly defined [7,23]. OPLs seem to be only mildly contagious.

Clinical presentation

OPLs can appear as a sessile or pedunculated, papillary (Fig. 3) or verrucous, white (heavily keratotic) or coral pink growths. When the lesions clinically appear as multiple fingerlike projections, they are called ''papillary''; when they are white with a rough surface, they are called ''verrucous.'' They are generally solitary (except condylomata, which tend to occur in clusters) and are asymptomatic [24]. Their size usually does not exceed 1 cm. They may occur at any intraoral site as well as on the vermilion border of the lip [7]. The squamous papilloma is usually seen on the ventral tongue and on the frenal area, the palate, and the mucosal surface of the lips. The verruca vulgaris is usually seen on the keratinized surface of the gingiva and the palate. Condylomata are more commonly seen on the lips, commissures, and the gingival mucosa.

Histopathology

Microscopically the extension of epithelium supported by vascularized connective tissue is evident, and the upper layer of epithelial cells is occasionally altered by the associated HPV [7]. Histologically, various

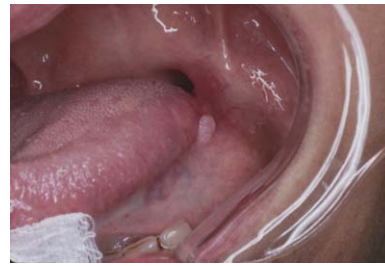

Fig. 3. A 66-year-old man with squamous papilloma of the ventral tongue.

configurations are recognized in each of the lesions. Squamous papillomas tend to exhibit epithelial tissue projecting upward from a central vascular core of connective tissue. Hyperkeratosis may or may not be pronounced. Verruca vulgaris are noted to have epithelial projections with more pointed tips. There is hyperparakeratosis at the tips with hyperorthokeratosis on the sides of the upward projections. The base appears much more congested and crowded. Condyloma is difficult to differentiate histologically from squamous papilloma, although HPV-related viral changes are always noted in condyloma. Mild to severe dysplasia may be detected in some individuals, especially in HIV-positive patients [25].

Treatment

Surgical excision of the mass is the treatment of choice [7,21]. Laser ablation is not recommended until well-designed clinical trials are done. OPLs tend to recur rapidly and involve more areas after laser ablation, possibly because viral particles in the laser plume inoculate adjacent cells. Intralesional injection of interferon-alpha has shown some promising results, especially in HIV patients with multiple lesions [26].

Gingival fibromatosis

Gingival fibromatosis is a firm, benign neoplasm that presents as a mass. Hereditary gingival fibromatosis (HGF) is a noninflammatory enlargement of the attached gingival-fibrous tissue [27–29]. It often is an isolated condition, but it also has been seen in some rare hereditary syndromes such as cherubism with psychomotor retardation, prune-belly syndrome, and fibromatosis in association with hearing loss and supernumerary teeth [30–32].

Epidemiology and etiology

Gingival fibromatosis (both hereditary and idiopathic) has been generally reported as a rare disease [34,37,38], most commonly affecting children [33–35]. This lesion commonly recurs even after surgical excision [36].

Several studies have investigated the cause of HGF. Increased extracellular matrix synthesis such as collagen I and fibronectin and increased fibroblast proliferation have been thought to contribute to the condition [34,37,38]. Another study suggests that qualitative and quantitative differences in the transforming growth factor-beta isoform and receptor expression by fibroblasts in gingival overgrowth may be involved in the pathogenesis of the disease [39]. In a recent case report it was suggested that HGF might result from an increased biosynthesis of collagen and glycosaminoglycans rather than from cell proliferation [29]. One recent case report on an idiopathic gingival fibromatosis suggested that the condition might be caused by an increase in collagen synthesis by fibroblasts [35].

Clinical presentation

HGF may appear as single or multiple firm, fibrous tissue masses the same color as or lighter than the surrounding normal tissue. HGFs can appear in oral sites including mandible, buccal mucosa, tongue, and submandibular tissue. They are usually asymptomatic, benign lesions, but in some cases erosion of the underlying bone has been reported [7,36].

Histopathology

Microscopic findings generally include a high amount of collagen and fibroblasts [29,40]. This lesion is non-encapsulated, and it has a fascicular growth pattern. If muscle is involved, cells of muscle origin can also be seen. Some degree of vascularity is usually present [7].

Treatment

HGF is likely to recur even after complete excision by conventional surgery or laser surgery [28,33,41].

Pyogenic granuloma

Pyogenic granuloma is a common benign gingival mass that occasionally can present on other intraoral sites such as the buccal mucosa or the tongue. Pyogenic granulomata appear as soft, smooth-surfaced, bright red raised tissue that has a tendency to bleed (Fig. 4). The lesion may be caused by irritants such as calculus or denture irritation, or as a result of certain hormonal changes.

Epidemiology and etiology

Pyogenic granulomata can occur in persons of all ages [42,43] and are more common in females [42–44]. Studies done in Jordanian and Singapore populations have shown the greatest incidence in the second decade of life [42,44]. Pyogenic granulomata occur most often in response to an irritant.

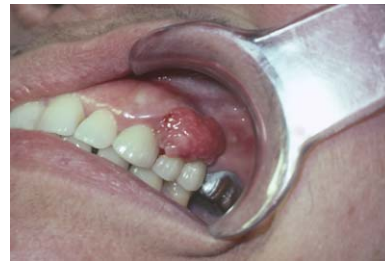

Fig. 4. A 17-year-old male with pyogenic granuloma of the gingiva.

Because of irritation the fibrovascular connective tissue becomes hyperplastic, and the proliferation of granulation tissue gives rise to the observed lesion [21]. Other possible causative factors are hormonal changes during pregnancy (pregnancy tumor) or puberty [45]. A recent case report has described formation of a pyogenic granuloma as a result of injury to a primary tooth [46].

Histopathology

Microscopically lobular masses of hyperplastic granulation tissue are present. There is no granulomatous tissue or suppuration.

Clinical presentation

Pyogenic granulomata usually appear as red, blue, or purple gingival masses, broad-based or pedunculated, ranging in size from a few millimeters to several centimeters. They may also become ulcerated. Occasionally nonspecific granulation tissue may proliferate from a recent extraction socket and resemble a pyogenic granuloma. Such a lesion is called an "epulis granulomatosum."

Treatment

Removal of the irritants (eg, relieving denture sore spots or removing calculus) and surgical excision of the lesion and involved connective tissue is the treatment of choice [47]. Pyogenic granulomata are highly vascularized, and in a case report an Nd: YAG laser excision was used because of its superior coagulation properties [48]. Pyogenic granulomata usually reduce in size at the end of pregnancy, but the residual lesion may need to be excised [7]. Oral hygiene and use of soft toothbrushes during pregnancy is important in preventing these pyogenic granulomata [49].

Peripheral giant cell granuloma

Peripheral giant cell granuloma (PGCG) is a benign reactive gingival lesion [50]. This relatively uncommon [51] lesion occurs as a reparative

response of the connective tissue to gingival irritants. This lesion often clinically resembles a pyogenic granuloma. Patients may complain of irritation in the affected area, and traumatic ulcers can develop on the mass.

Epidemiology and etiology

PGCG is a rare condition. Several case reviews suggest that PGCGs are more common in females than in males [52,53]. They can occur at any age but are more commonly seen in adults [7].

The biologic origin of the lesion is thought to be the periodontal ligament or the periosteum [7], and the lesion sometimes can cause resorption of the alveolar bone and tooth mobility or displacement [45]. Poor oral hygiene is thought to be a predisposing factor [54,55]. PGCGs larger than 2 cm are seen more commonly in females with poor oral hygiene and xerostomia [52]. They rarely recur after removal [7].

Clinical presentation

This lesion appears as a broad-based blue/red mass. The most common location is the gingival mucosa between the first molar and incisors [7]. Diameter of the mass is usually about 1 cm, but a diameter as large as 5 cm has been reported [52].

Histopathology

Under the microscope, fibroblasts, multinucleated giant cells, chronic inflammatory cells, and at times islands of metaplastic bone may be seen [7]. Immunohistochemical analysis of nine cases of PGCG suggest that giant cells characterizing giant cell granuloma display a phenotype different from that of other giant cells found in sites of chronic inflammation and may be true osteoclasts [56].

Treatment

Surgical excision along with elimination of the irritating agent is the treatment of choice [50,54]. If excision does not include the involved periodontal ligament or periosteum, there is a possibility for recurrence [55].

Peripheral ossifying fibroma

Peripheral ossifying fibroma (POF) is a reactive mass of the gingiva. POF may clinically resemble a peripheral fibroma, but histopathologic analysis always reveals immature bone and osteoid within the lesion.

Epidemiology and etiology

POF can occur at any age, although young adults are most commonly affected. The lesion is more common in females than in males [7]. The most

common site is the gingival tissue anterior to the permanent molars [7,57,58]. In the case of recurrence, re-excision to the PDL should prevent further recurrence, because cells of connective tissue in the submucosa and the PDL are the source of this lesion [7].

Clinical presentation

POF is a slow-growing lesion with limited growth potential, usually about 1.5 cm in diameter, although some have reached 6 cm in diameter [59].

These lesions can be sessile or pedunculated and are the color of the normal surrounding mucosa. They are usually asymptomatic unless ulceration occurs or the lesion interferes with oral function [60].

Histopathology

Osteoid with fibroblasts, which have been described as immature bone islands, are seen. This lesion has a minimal vascular component. Typically, along with surface ulcers, chronic inflammatory cells are found in the periphery [7].

Treatment

Removal of any irritant and surgical excision of the reactive tissue is necessary. If the underlying periodontal ligament or periosteum is involved, it should be removed [60]. If the lesion is properly removed, the chance of its recurrence is low [57,60,61].

Generalized gingival overgrowth

Depending on its causative factor, generalized gingival overgrowth (GGO) can look as mild as generalized gingivitis or as severe as a ''gummy smile'' in which teeth are covered by the gingival tissue.

Epidemiology and etiology

There are no prevalence studies on GGO. Nonspecific chronic inflammation, hormonal changes, medications, and systemic diseases are some of the causative factors. Nonspecific chronic inflammation, as its name indicates, is caused by nonspecific factors such as poor oral hygiene. Gingival inflammation during pregnancy or puberty suggests a hormonal cause. The most common medications that cause gingival overgrowth include phenytoin (Dilantin) (Fig. 5), an antiseizure medication, cyclosporine (Neoral), an immunosuppressive agent used in patients with autoimmune disease and transplant recipients, and nifedipine (Adalat), a calcium-channel blocker used for treatment of hypertension, arrhythmia, and angina [62–66]. Systemic diseases that cause gingival overgrowth include leukemia

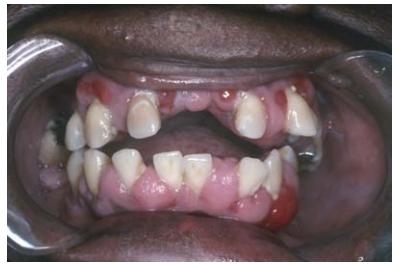

Fig. 5. A 52-year-old man with phenytoin-induced gingival overgrowth.

(especially monocytic leukemia), although the gingival enlargement is generally less fibrotic and more infiltrated with immature neutrophils. Also, gingival overgrowth may occur in some rare conditions such as Cowden's, Zimmerman-Laband, Cross', Rutherfurd's, and Murray puretic-Drescher syndromes [7].

Patients receiving combination therapy of cyclosporine and calcium-channel blockers seem to have a more severe degree of gingival inflammation and overgrowth [67,68]. Not every person who takes these medications will have gingival overgrowth, because factors such as poor oral hygiene are thought to contribute to the onset of GGO [67–69].

Clinical presentation

Clinically the gingiva looks edematous and bulky, with loss of stippling. The consistency can vary from soft to firm, depending on the underlying cause. In nonspecific inflammatory, hormonal, and the leukemic types, the gingiva looks more inflamed and erythematous. In drug-induced GGO, the gingiva looks more fibrous and is less inflamed; its color is closer to the color of the surrounding mucosa [7].

Histopathology

Many fibroblasts, collagen fibers, chronic inflammatory cells, and a hyperplastic epithelium are microscopically evident. In some lesions, such as those of hormonal origin, capillaries are evident as well. In specimens from leukemia patients, atypical and immature white blood cells (blasts) indicative of malignant infiltration may be found packing the tissue [7].

Treatment

Good oral hygiene, gingivoplasty, and gingivectomy are the modes of treatment. Nifedipine- and cyclosporine-induced overgrowth is reversible with discontinuation of the drugs, but phenytoin-induced overgrowth is irreversible [7].

Leukemic infiltrates respond when the underlying systemic disease is treated and the local factors, including oral hygiene, are improved.

Lateral periodontal cyst

Although it is not a true mass, a lateral periodontal cyst (LPC) is included in this discussion. An LPC is a small ovoid (tear-drop shaped) or round, radiolucent, unilocular or, less commonly, multilocular lesion with well-corticated radiopaque borders that appears at the lateral side of the roots of a vital tooth [70–72]. LPCs can occasionally present as small clinical masses in the oral cavity.

Epidemiology and etiology

LPCs are relatively rare cysts in the jaw [72,73] and are more common in adults than in children [72]. This lesion originates in the rests of Serres (remnants of dental lamina) in the bone.

Clinical presentation

The most common location of LPCs is at the mandibular premolar-canine area [72,73], but they are sometimes noted in the incisor area. This lesion is usually asymptomatic, but it may be symptomatic [71,72]. If apparent on clinical examination, it looks like a smooth-surfaced red- or blue-colored, raised gingival swelling. Radiographic findings can differentiate a gingival cyst from an LPC, because there is not bone loss in gingival cysts [74].

Histopathology

To determine the definitive diagnosis, the histologic examination is important [71,75]. Lesions such as odontogenic keratocyst, ameloblastoma, and calcifying odontogenic cysts can be clinically confused with an LPC [75–77]. Microscopically thin epithelium consisting of nonkeratinized and clear epithelial cells, many of which contain glycogen, may be seen in focal thickening of the cyst lining [70,78].

Treatment

Surgical excision of the lesion cures the condition. If the lesion is multilocular, there is a possibility of recurrence; therefore, follow-up is necessary.

Lipoma

A lipoma is a smooth-surfaced, benign neoplasm, yellow-cream in color, with no inflammatory component.

Epidemiology and etiology

A lipoma is a lesion of adipose tissue origin and is generally considered an uncommon condition [79–83]. A recent article, however, suggested that although lipomas represent 1% to 5% of all oral neoplasms, few large series of intraoral lipomas and its variants are reported in the literature [84]. The most common reported locations are the buccal mucosa and tongue [80,84,85].

Clinical presentation

Lipomas are round, smooth-surfaced, raised masses with intact epithelium and sometimes with visible superficial vessels. They are yellow, have a well-localized border, and are soft to palpation. They usually are smaller than 2.0 cm [80].

Histopathology

Microscopically, well-circumscribed mature fat cells can be found with or without mesenchymal tissue [82].

Treatment

Surgical excision is the treatment of choice [80,84,85]. Recurrence after treatment is uncommon [84,85].

Denture-induced fibrous hyperplasia

As apparent from its name, denture-induced fibrous hyperplasia (epulis fissuratum, inflammatory hyperplasia, denture hyperplasia of oral mucosa) is a connective tissue lesion that appears as a fibrous growth under and around the borders of ill-fitting dentures (Fig. 6).

Epidemiology and etiology

Epulis fissuratum is a common mass of vestibular mucosa that presents around the borders of an ill-fitting denture [86]. Ill-fitting dentures can cause

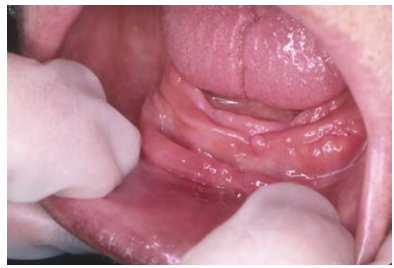

Fig. 6. A 73-year-old woman with denture-induced fibrous hyperplasia.

trauma to the underlying tissue. Over time, as the edentulous ridge resorbs, denture flanges extend into the vestibule. Chronic trauma over a long period of time can cause a reparative response, which results in fibrous tissue hyperplasia.

Clinical presentation

As described, the fibrous hyperplastic tissue appears around the denture borders. Denture-induced fibrous hyperplasia is mostly asymptomatic [86] and can be the color of the normal mucosa with areas of irritation and erythema.

Histopathology

The basic histologic presentation of denture-induced hyperplasia is the same as that of traumatic fibroma.

Treatment

If the denture is removed for a long period of time or relined, the underling fibrous tissue may reduce in size. Any remaining tissue can be removed by surgical excision. Construction of a new, well-fitting denture or relining the old denture is critical to prevent the recurrence of this lesion.

Summary

This article has outlined some of the most common benign oral soft tissue masses. Most of these masses require diagnosis and surgical removal with attention paid to the cause so that recurrence is less likely. The approach to management has been presented.

Most of the masses discussed in this article are benign in nature, but a definitive diagnosis is necessary. In all cases a biopsy is needed to establish a definitive diagnosis that determines the treatment. Furthermore, lesions such as fibromata and mucoceles can become traumatized and painful, interfering with patient's speech and daily hygiene routine, thereby warranting excision.

Malignant neoplasms, including Kaposi's sarcoma, leukemic infiltrates, oral squamous cell cancer, and metastases of other cancers in the oral cavity can mimic a benign process. The clinician should be mindful of these entities when approaching a patient with a soft tissue mass.

Perhaps because these lesions are benign and because there are relatively successfully established modes of treatment, less research has investigated intraoral benign soft tissue masses than other types of lesions. The recent literature does not introduce much new information regarding the epidemiology, etiology, pathogenesis, and treatment of these lesions. Prevalence studies for these masses are still in their infancy. In the future, it would be of

interest to expand the epidemiologic studies of these lesions in different populations throughout the world. Such studies could provide more insight into the risk factors and prevention of these benign masses.

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