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Plasma cell gingivitis associated with khat chewing

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Plasma cell gingivitis (PCG) is characterised by a heavy plasma cell infiltration into the gingival connective tissue. It has been associated with the use of flavouring agents like cinnamon and mint in candy, chewing gum and herbal toothpastes. PCG secondary to khat (*Catha edulis*) chewing has recently been recognised. Khat is a psycho-stimulating herb that is cultivated and used in East Africa and the Arabian Peninsula. It produces a stimulating and euphoric effect on its users. Plasma cell gingivitis in a khat user is presented.

A 40-year-old male presented with a generalised diffuse erythema and painful gingival enlargement. He also reported bleeding upon eating and brushing. Generalised periodontal pocketing and moderate to severe attachment loss were detected on probing. Radiographs revealed generalised alveolar bone loss. A gingival biopsy revealed a dense infiltrate of plasma cells in the connective tissue. A histopathological diagnosis of plasma cell gingivitis was made. It was revealed that the patient was a Yemeni immigrant and a habitual khat chewer for the last 10 years. A marked improvement in gingival health was noted a few weeks following cessation of the khat chewing habit. Gingival erythema and swelling further diminished following initiation of oral prophylaxis.

A diagnosis of plasma cell gingivitis associated with khat use was made. A worldwide population of immigrants habituated to khat chewing could potentially increase the incidence of plasma cell gingivitis. Recognition of this habit and its implications on periodontal health is emphasised.

■ Introduction

Plasma cell gingivitis (PCG) is characterised by a prominent plasma cell infiltrate in the gingival connective tissue. This uncommon condition is of undetermined origin[1] and has been described in the literature also as atypical gingivostomatitis[2], idiopathic gingivostomatitis[3] and allergic gingivostomatitis[4]. PCG has been associated with gum chewing[3–5], use of mint candy[6], toothpaste ingredients[7,8], chilli peppers[9], and environmental and food flavouring allergens[10]. Plasma cell gingivitis in a habitual khat chewer has also been reported[11].

Fig 1 Khat leaves brought by the patient.

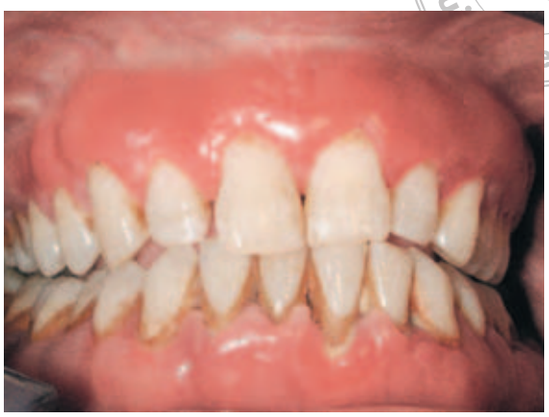

Fig 2 Swollen and erythematous gingiva extends to the mucogingival junction. The anterior maxillary facial gingiva shows a slightly granular surface and pinpoint erythema.

The habit of chewing the leaves of the khat plant is highly prevalent in East Africa and the Arabian Peninsula[12]. Khat is alternatively known as qat, kat, cat, mirra or ghat. In Yemen, the habit has a deep-rooted social and cultural tradition. This psycho-stimulating herb is usually chewed at social gatherings and is predominantly a male habit[12]. Cathinone, a natural amphetamine in Khat, produces an initial euphoria that is later followed by depression. Chewers may also experience irritability, anorexia and insomnia[13]. Several systemic effects of khat chewing have been reported. Significant among these are gastrointestinal disorders, respiratory problems, emotional instability and increased risk of myocardial infarction[12]. Oral effects include increased periodontal destruction and keratotic lesions of the mucosa[12]. Some studies have also associated khat use with oral cancer[14].

Khat use is most prevalent among immigrants from Yemen, Somalia and Ethiopia[14]. In western countries, khat is commonly sold in restaurants and grocery stores that cater to East African and Middle Eastern consumers[13].

We document a case of plasma cell gingivitis associated with the habitual use of khat. Regression of gingival erythema and swelling following cessation of khat use is also shown.

■ Case description and results

A 40-year-old male was referred to the university dental practice by his general dentist for consultation regarding the patient's intensely erythematous gingiva. The patient's presenting complaint was moderate pain, swelling and extreme redness of the gingiva. He acknowledged being aware of the condition for some time and visiting his general dentist only when the pain progressively worsened. He also stated that his gums bled while eating and brushing.

The patient, a Yemeni immigrant had an unremarkable medical history. He reported no drug allergies. Based on his ethnicity, we enquired about the habitual usage of khat. He willingly admitted to being habituated to khat chewing and also displayed the leaves that he happened to possess (Fig 1). He had been indulging in this habit for about 10 years, chewing the leaves frequently, sometimes daily.

Extraoral examination was unremarkable. Intraoral examination revealed 31 erupted teeth and tooth 18 was impacted. No restorations were present and carious lesions were noted on the distal surface of tooth 27 and the mesial surface of tooth 38.

The left buccal mucosa was erythematous and a diffuse erythematous swelling of the facial and buccal aspect of the gingiva was noted. Gingival erythema and swelling was pronounced in the maxillary anterior segment. The gingival contour was generally scalloped with rolled margins. The interdental papillae were enlarged and blunted. Gingival recession was noted in the mandibular region (Fig 2). On palpation, the consistency of the gingival tissue in the maxillary and mandibular anterior and maxillary left buccal regions was soft and oedematous.

On further questioning, the patient stated that after chewing the khat leaves he was habituated to

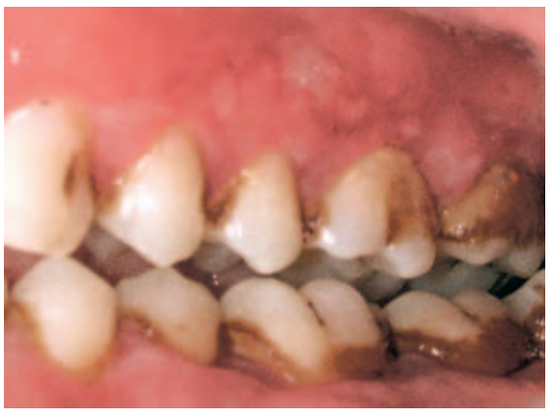

Fig 3 Closer view of maxillary left posterior gingival tissue showing areas of erythema, swelling and ulceration. Staining of teeth is prominent.

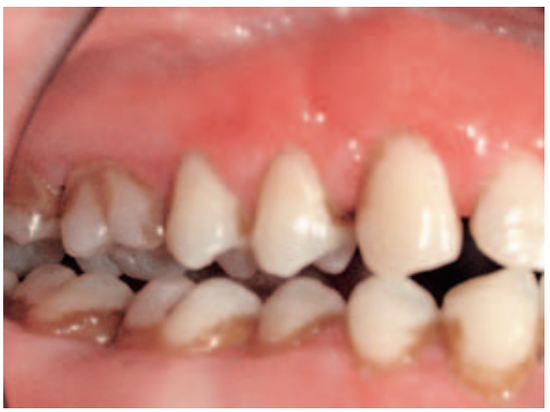

Fig 4 Buccal view of right side. Erythema and oedema of the gingiva and staining of teeth are less pronounced than on the left side. The gingival mucosa is not ulcerated.

holding the khat in the left buccal vestibule. This was consistent with greater staining of teeth in this region and the presence of gingival ulceration (Fig 3). In contrast, the right quadrants demonstrated only a mild degree of extrinsic staining and no mucosal ulceration (Fig 4).

Significant probing depths were 5 mm in the region of teeth 42 and 43 and 8 mm in the region of teeth 27 and 26. Clinical attachment levels ranged from 2 to 8 mm, with teeth 26 and 27 demonstrating levels in the range of 5 to 8 mm. Teeth 16 and 46 had Glickman's grade I furcation involvement[15]. Teeth 26, 27 and 38 had Glickman's grade II furcation involvement[15]. Teeth 31 and 41 had grade 1 mobility[16]. The plaque index[17] was 2.8 and the gingival index[18] was 2.6.

Intraoral, periapical and bitewing radiographs revealed generalised moderate and localised severe bone loss. The bone loss pattern was primarily horizontal. Radiographs also revealed the presence of calculus. Furcation radiolucencies were noted involving teeth 16, 26, 27, 38, 39 and 46. The most severe bone loss in this patient was noted in the maxillary left posterior segment, in the region of teeth 26 and 27. Carious involvement of the distal surface of tooth 27 and mesial surface of tooth 38 was also detected (Fig 5).

Prior to referring the patient to us, the patient's general dental practitioner had submitted a biopsy of the swollen gingival tissue to the oral and maxillofacial pathology biopsy service. The gingival biopsy showed a diffuse, severe inflammatory process of the connective tissue. The surface stratified squamous epithelium exhibited a wide variation in thickness with some areas demonstrating considerable atrophy. Intracellular oedema, leukocytic and red blood cell exocytosis were also noted within the epithelium. Superficial capillaries were dilated and engorged with red blood cells (Fig 6). The chronic inflammation consisted largely of plasma cells (Fig 7). No atypical or pleomorphic plasmacytoid cells were noted. Mitotic figures were not identifiable. On the basis of these findings, a histopathological diagnosis of chronic mucositis consistent with plasma cell gingivitis was reported. Correlating histological findings with the clinical appearance and the habitual use of khat leaves, the final diagnosis was plasma cell gingivitis associated with khat use. A diagnosis of coexisting generalised moderate and localised severe chronic periodontitis was also made.

The overall prognosis was deemed fair. The initial phase of the treatment plan consisted of cessation of the khat chewing habit, a diligent following of oral hygiene instructions, and 4 quadrants of scaling and root planing followed by periodic re-evaluation. The patient's general dentist was informed of the carious lesions. The patient had been prescribed 5 mg of oxycodone hydrochloride by his general dental practitioner previously for the pain and was comfortable with this. No treatment was done during this initial visit and the patient was advised to come back in 2 weeks time for evaluation of the gingiva after absolute cessation of the khat chewing habit.

The patient was unable to come back in 2 weeks and was seen at 4 weeks after the initial visit. At this point he stated that since his initial visit he had

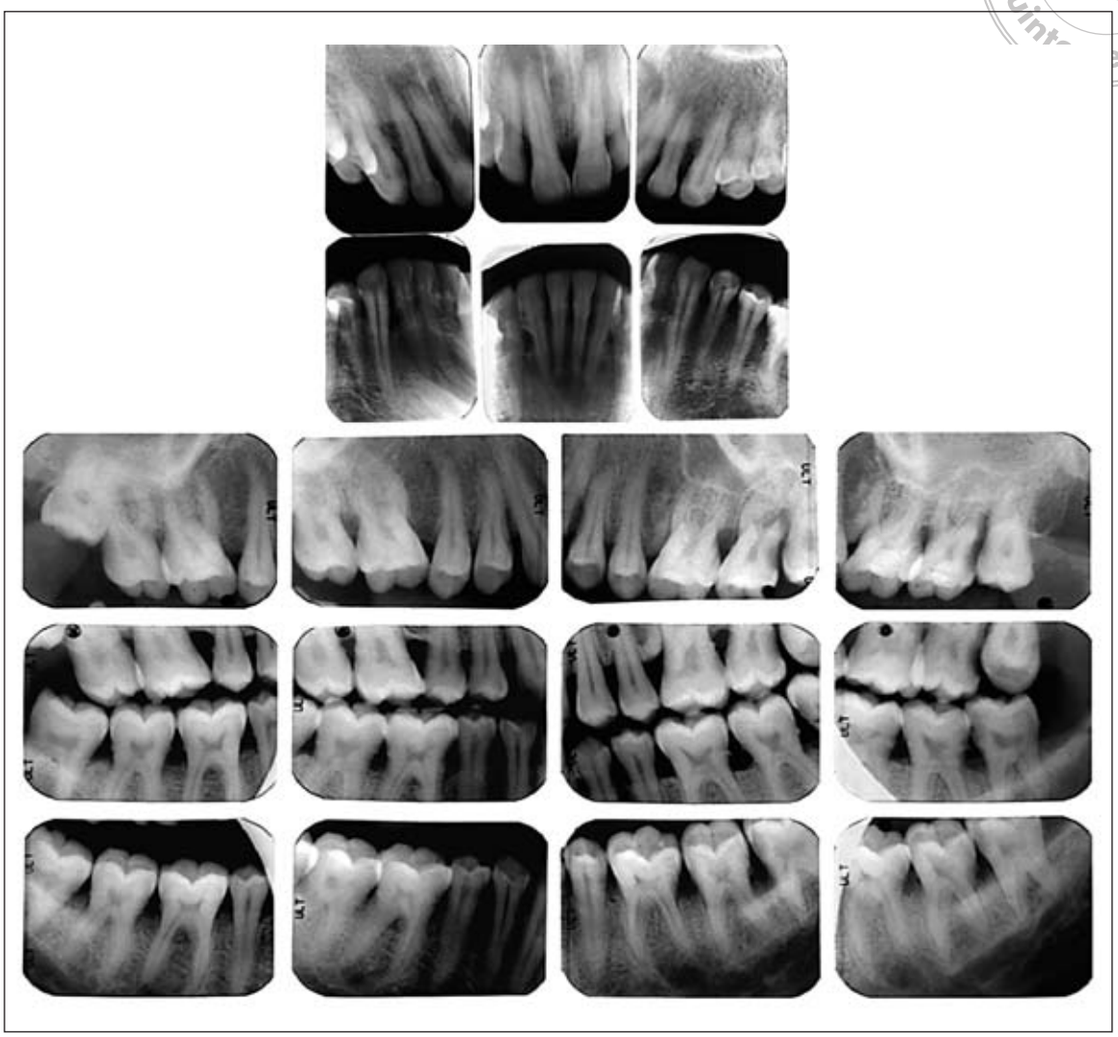

Fig 5 Intraoral radiographs show generalised bone loss. Bone loss is more severe in the maxillary left molar region.

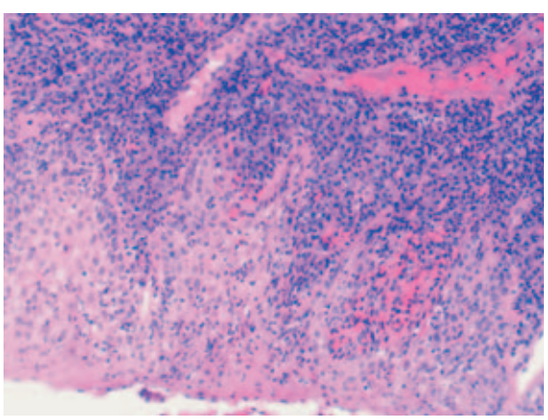

Fig 6 The surface epithelium varies in thickness and demonstrates a leukocytic exocytosis. Superficial vasculature is engorged with red blood cells and the lamina propria shows a diffuse, severe mononuclear inflammatory infiltrate. H&E stain, 100X.

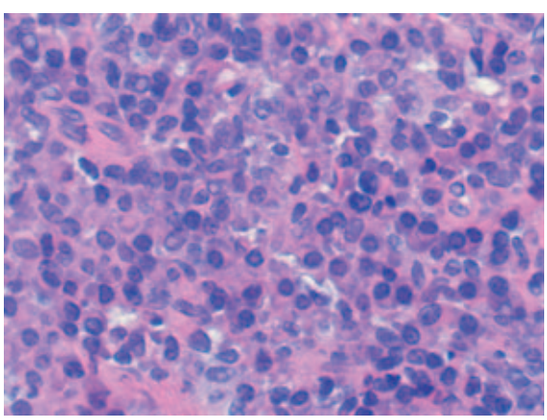

Fig 7 The majority of the mononuclear chronic inflammatory cellular infiltrate consists of plasma cells. The plasma cells do not exhibit pleomorphism, or increased or atypical mitosis. H&E stain, 400X.

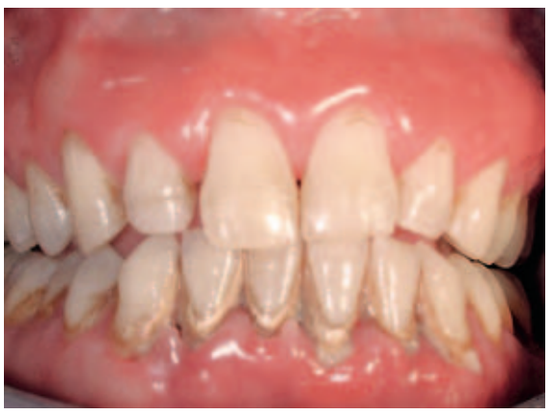

Fig 8 Anterior facial gingiva 4 weeks after cessation of khat chewing. Note the reduction in gingival swelling and erythema as compared to Fig 2.

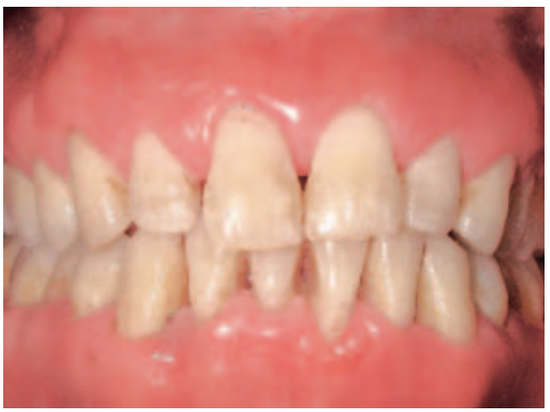

Fig 9 Anterior facial view after discontinuation of khat chewing habit and 10 days following gross debridement. Note improved colour and contour of the gingiva as compared to Fig 8.

stopped the khat-chewing habit entirely. He no longer had any gum pain and bleeding on brushing had reduced. Intraoral clinical examination revealed that the intense diffuse gingival erythema had greatly reduced (Fig 8) and the ulcerated area in the maxillary left attached gingiva had healed. Gingival swelling had also markedly reduced. The overall gingival contour and consistency had also improved. However, gingival inflammation persisted, apparently due to local factors. The patient elected to undergo a gross debridement instead of initiating a thorough scaling and root planing regimen as he was planning on going out of the country for a few weeks. Therefore, gross debridement was performed and oral hygiene instructions, including the use of a soft toothbrush, were given. Oxycodone hydrochloride use was discontinued at this time.

The patient returned for an evaluation of his gingival condition 10 days after this procedure, prior to leaving the country. He stated that the gingival bleeding had stopped entirely and he no longer had any pain or discomfort. On intraoral examination, the diffuse gingival erythema had further reduced in intensity and the tissue contour and consistency had also improved since the previous visit (Fig 9). The plaque and gingival indices had reduced to 1.6 and 1.3, respectively. This demonstrated improved oral hygiene with reduction in the degree of gingival inflammation.

Since no other medication was prescribed to this patient, the improvement in the oedema and erythema affecting the attached gingiva could be attributed primarily to cessation of the khat chewing habit. Further improvements in the gingival tissue colour, contour and consistency followed a reduction in local aetiologic factors and improved oral hygiene. Since then, the patient has not made any further contact to continue periodontal treatment and attempts to contact him have been unsuccessful.

■ Discussion

Although the exact mechanism of plasma cell gingivitis is not known, it is considered to be allergic in origin by many authors who have associated it with components of chewing gum, toothpastes and food products[3–9]. Some cases of PCG without any known or identifiable allergenic factors have also been reported[19–22]. In the case of PCG reported here, the patient was a habitual user of khat leaves. Upon cessation of the habit, there was a marked improvement in gingival colour, contour and consistency within a few weeks. This clearly shows that the intense erythema and swelling of the gingiva was associated with khat use.

To date, there is only one previous case of PCG associated with khat use reported in English literature in which the authors reported that the lesions were mainly localised to the left side of the mandibular gingiva and buccal mucosa in association with placement of the khat leaves in the sulcus. The gingiva and buccal mucosa were described as red and swollen in the presence of fibrin-covered ulcers[11]. In the pres-

ent case report, the gingival changes were generalised, being more prominent in the maxillary facial and left buccal region. The patient was in the habit of placing the khat leaves in the left buccal vestibule after chewing. Similar to the previously reported case, mucosal ulcerations in proximity to the khat placement were also noted. Radiographs of the previously reported case revealed marked destruction of alveolar bone associated with the affected site[11]. In the present case, moderate to severe attachment loss and periodontal pocketing was noted. Generalised alveolar bone loss was also present. It was, however, more severe on the left side. As in the previous report, cessation of the khat chewing habit in the present case brought about resolution of the lesions within a few weeks.

The intraoral consequences of khat chewing have been reported in the literature. In a study of periodontal conditions among various ethnic groups in Israel, the authors found that males of Yemeni origin had a higher rate of periodontal disease. They attributed this to the use of khat and the fact that many Yemeni males had chewed khat before migrating to Israel[23]. Likewise, in a study of 1,001 Yemeni subjects, clinical attachment loss among males in the age group of 12 to 24 years was significantly higher among khat chewers as compared to non-chewers[24]. In another study conducted on Yemeni males, most of whom were khat chewers, the authors found that non-chewing sides had significantly greater periodontal pocket depths than the chewing sides. This group of patients had a lower caries rate and some amount of mucosal keratosis due to khat chewing[25]. A third group in Kenya found no significant differences in the periodontal health of khat chewers as compared to non-chewers[26]. An objective, direct, cause-and-effect relationship between khat chewing and periodontal destruction has not been investigated. However, khat-induced gingival inflammation with soreness, bleeding and pain prevents the patient from carrying out routine brushing and flossing. Eventually, this results to the accumulation of plaque and calculus that in turn leads to periodontal destruction.

On clinical examination, the diffusely swollen and erythematous gingiva are reminiscent of other disorders including plaque-induced gingivitis; gingival reactions attributable to dentifrices, mouth rinses and food additives; foreign body reaction; leukemia-associated gingivitis and mucocutaneous disorders including erosive lichen planus, cicatricial pemphigoid and pemphigus vulgaris.

In the present case, sufficient local deposits of plaque and calculus were detected. However, the gingival erythema and oedema extended to involve the attached gingiva extending to the mucogingival junction. This finding was inconsistent with plaque-induced gingivitis that would normally include the marginal gingiva and not the entire width of the attached gingiva. Also, it was noted that the gingival erythema, swelling, pain and bleeding markedly reduced upon cessation of the khat chewing habit alone. Thereafter, gross debridement resulted in further reduction in gingival erythema and swelling. Pain and gingival bleeding upon brushing stopped entirely following gross debridement. Therefore, it follows that the gingival swelling, erythema, pain and bleeding were primarily due to a local response to khat chewing, and that these changes were compounded by the presence of plaque and calculus.

A wide variety of substances included in dentifrices, mouth rinses and flavouring agents in food substances may elicit a local response in the oral cavity including the labial and buccal mucosa in addition to the gingiva. In such cases, a history of recent change in oral health care products or food selections by the patient may assist in the diagnosis. In many instances, an inciting agent may never be traced.

Occasionally, impregnation of polishing agents into the gingival connective tissue may occur during treatment. This may induce a foreign-body reaction in some patients that may clinically manifest as gingival swelling and erythema. Although patients may experience some soreness in a limited area of the gingiva, generalised distribution and pain are uncommon. Also, a gingival biopsy would demonstrate the presence of fine particulate foreign material that may or may not demonstrate birefringence using polarised light. Often, a giant cell response including formation of foreign body granulomas may be observed histologically.

Leukemia-associated gingivitis is a condition in which leukemic cells infiltrate the gingival connective tissue causing a diffuse, boggy and non-tender swelling of the gingiva. It is noted more frequently in myelomonocytic leukemia. The resulting myelophthisic anaemia, thrombocytopenia and leukopenia of normal

mature white blood cells causes fatigue, dyspnea, easy bruising, gingival haemorrhage and fever. Other findings may include hepatosplenomegaly, lymphadenopathy, serious haemorrhagic complications, urinary tract infections, pneumonia, septicaemia, mycotic infections, herpetic infections and oral ulcerations including deep punched-out lesions of the gingiva[27]. The present patient's medical history was unremarkable and he was otherwise in good health. Also, the histology of the gingival biopsy did not show a granulocytic sarcoma that would indicate the presence of an extramedullary myeloid tumour.

The generalised gingival swelling and erythema with ulceration in the maxillary left posterior buccal gingiva requires differentiation from immune-mediated mucositis including erosive lichen planus, cicatricial pemphigoid and pemphigus vulgaris. Patients with gingival erosive lichen planus, pemphigus vulgaris or cicatricial pemphigoid are symptomatic with varying degrees of soreness and pain. Lesions present as irregular erythema and ulceration. Lesions affecting other parts of the oral cavity and cutaneous lesions may or may not be present. Histopathological features suggestive of a lichenoid mucositis, intraepithelial or a subepithelial clefting process may be noted. Direct immunofluorescence studies demonstrate a shaggy band of fibrinogen at the basement membrane zone in lichen planus, while intraepithelial and subepithelial deposits of immunoglobulin and complement are seen in pemphigus vulgaris and cicatricial pemphigoid, respectively[27].

Intraoral examination of the present patient showed a diffusely swollen and erythematous gingiva as well as areas of ulceration in the maxillary left posterior buccal gingiva and erythema of the adjoining buccal mucosa. On questioning, it was soon realised that the khat leaves were held between these areas of gingival ulceration and buccal mucosal erythema. Also, white striae or blistering suggestive of potential lichen planus, pemphigus vulgaris or cicatricial pemphigoid were not identified. Moreover, the gingival biopsy did not show histopathological features suggestive of lichen planus, pemphigus or pemphigoid. In the absence of these histopathological findings, the patient was not subjected to serological testing for antibodies.

On microscopic examination of the biopsied tissue, a finding of sheets of plasma cells evoked a histopathological differential diagnosis of plasma cell dyscrasia including myeloma. In the present case, immunohistochemical tests for light chain restriction suggestive of myeloma were not carried out because the plasma cells did not exhibit cytological and nuclear atypia. Therefore, the histopathological analysis was consistent with a reactive non-neoplastic proliferation of plasma cells.

Management of PCG secondary to khat chewing includes immediate cessation of this chewing habit. As in the present case, it may be expected that the gingival swelling and erythema would reduce within a few weeks of cessation. Removal of plaque and calculus, and regular maintenance visits should result in further reduction in the degree of inflammation. This in turn will result in the alleviation of pain and bleeding with relative normalisation of gingival contour and texture.

Increasing migration of people of varying ethnicity and culture worldwide can present clinical and diagnostic challenges. In part, this is due to the clinicians' lack of awareness of myriad habits and their potential complications in the oral cavity. A differential diagnosis must take into consideration the possibility of such habits and practices among people of different races and ethnicity in the causation of clinical findings otherwise beyond the scope of routine.

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