

chapter 5

PHYSICAL AND CHEMICAL INJURIES

LINEA ALBA

Fig. 5.1

Linea alba is a grayish-white line that occurs along the buccal mucosa at the level of the occlusal plane. The lesion is typically bilateral. Although few studies have been done, linea alba is common, with one investigation finding a prevalence of 13% in a sample of 256 young adults. Linea alba is probably related to frictional trauma along the occlusal plane and may be associated with negative intraoral pressure that pulls the buccal mucosa between the upper and lower teeth. It does not seem to be related to rough cusps or insufficient horizontal overlap of the teeth. The white appearance is probably created by hyperkeratosis of the epithelium. The lesion is totally benign and no treatment is necessary.

MORSICATIO BUCCARUM (CHEEK-BITING)

Fig. 5.2

Morsicatio buccarum is a self-inflicted injury in which a patient habitually chews or sucks on the buccal mucosa. The habit is often a conscious one, although it may be subconscious in some individuals. The mucosa exhibits a grayish-white macerated or parchment appearance that is characterized by irregular areas of flaky desquamation and small erosions. The lesions are confined to areas that can be reached by the teeth. The condition is often bilateral and may also involve the lips (morsicatio labiorum) and lateral tongue (morsicatio linguarum). The condition is benign and usually no treatment is indicated except to try to motivate the patient to discontinue the habit. In some cases, a modified maxillary occlusal splint can be fabricated to cover the teeth and prevent the trauma.

SUBMUCOSAL HEMORRHAGE (PETECHIA, ECCHYMOSIS, HEMATOMA)

Fig. 5.3

Intraoral hemorrhage is caused by rupture of blood vessels, which may occur secondary to trauma, surgery, or some form of bleeding diathesis. A petechia is a nonraised, pinpoint area of bleeding, whereas an ecchymosis is a larger, nonelevated area of hemorrhage. A hematoma is a localized collection of extravasated blood within a tissue space that produces clinical swelling (-oma is Greek for swelling). Submucosal hemorrhage is most often reddish-purple but also may appear blue or bluish-black. Because the blood is free within the soft tissues, it should not blanch when compressed. In some instances, hemorrhagic lesions may be a sign of an underlying bleeding diathesis, such as hemophilia, leukemia, thrombocytopenia, or anticoagulant therapy. Most areas of hemorrhage will organize with granulation tissue and resolve without treatment. Large hematomas may have to be surgically incised and drained.

- **Figure 5.1**
LINEA ALBA
Elevated white line along the occlusal plane.



- **Figure 5.2**
MORSICATIO BUCCARUM
Macerated appearance of buccal mucosa in areas where the teeth can reach it.



- **Figure 5.3**
SUBMUCOSAL HEMORRHAGE
Diffuse area of ecchymosis on the buccal mucosa after a tooth extraction. (Courtesy of Dr. Robert Gellin.)



Figs. 5.4, 5.5, and 5.6

Trauma-induced ulcerations of the oral cavity are frequently encountered by the clinician. The most common source of ulcers is probably self-induced trauma in which the patient inadvertently bites the buccal mucosa, lip, or tongue. Other causes include ill-fitting dentures, jagged teeth, toothbrush trauma, accidents, and iatrogenic injuries such as those that may occur during a dental or surgical procedure. Usually, traumatic ulcers can be readily diagnosed by their clinical features and history. They will usually heal within several weeks if the source of the irritation is removed. An ulcer that fails to heal will usually require biopsy to rule out the possibility of malignancy.

The clinician should always bear in mind the possibility of a self-inflicted injury as a symptom of underlying emotional disturbance. In such cases, patients may purposefully and secretly injure themselves to seek out medical or dental care (Munchausen syndrome). Such behavior may result from a desire for attention and sympathy or to obtain drugs. Psychiatric counseling is usually necessary in these cases.



Figure 5.4
TRAUMATIC ULCER

Ulcer of the tongue secondary to intubation for surgery.



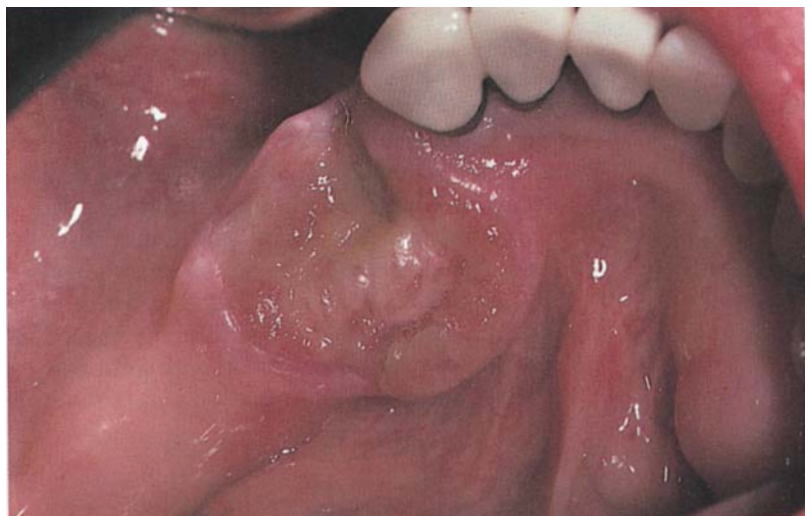
Figure 5.5
COTTON ROLL ULCER

Gingival lesion caused by removal of dry cotton roll adherent to the mucosa.



Figure 5.6
FACTITIAL ULCER

Chronic ulceration of the mandibular alveolar ridge secondary to self-induced trauma.



TRAUMATIC GRANULOMA (TRAUMATIC ULCERATIVE GRANULOMA WITH STROMAL EOSINOPHILIA, EOSINOPHILIC ULCER OF THE ORAL MUCOSA, RIGA-FEDE DISEASE)

Fig. 5.7

Some traumatic ulcerations of the oral mucosa are associated with a more florid and pseudoinvasive inflammatory reaction that extends deeper into the fibrous connective tissue and underlying skeletal muscle. This inflammatory infiltrate characteristically includes numerous eosinophils and histiocytes. These lesions are known by a variety of names, including traumatic granuloma, traumatic ulcerative granuloma with stromal eosinophilia, and eosinophilic ulcer. Riga-Fede disease (see Fig. 2.22) represents a distinctive form of traumatic granuloma in infants that occurs on the anterior ventral tip of the tongue secondary to trauma from the primary mandibular incisor teeth during feeding. Traumatic granulomas tend to be slow to resolve and, therefore, may be difficult to distinguish from carcinoma. For this reason, biopsy is often indicated to establish the diagnosis and promote healing. In infants with Riga-Fede disease, extraction of the anterior primary teeth is not recommended. Discontinuation of nursing or use of a protective shield will usually allow the lesion to resolve.

ANESTHETIC NECROSIS

Fig. 5.8

On rare occasions, focal tissue necrosis may be produced at the site of injection of local anesthetics. The most common location for such lesions is the hard palate, where the mucosal tissues are tightly bound to the underlying bone. Usually such lesions present as well-circumscribed, punched-out ulcers that appear within a few days of the injection. The ulcer is created by ischemic necrosis that is probably induced by the direct trauma of the anesthetic solution being injected into the tissues, vasoconstriction from epinephrine in the anesthetic, or both. The ulcer often takes several weeks to heal and sometimes becomes chronic. Local stimulus, such as a cytologic smear, may be sufficient to induce healing in these cases.

SOFT-TISSUE EMPHYSEMA

Fig. 5.9

Soft-tissue emphysema is a rare phenomenon in which air or gas is introduced into the soft tissues. In the orofacial region, soft-tissue emphysema most often is associated with the use of an air syringe or air-driven turbine handpiece with which air is forcefully blown into a surgical site, laceration, or salivary gland duct. Other possible causes include trauma, violent coughing, Valsalva maneuvers, and playing wind instruments. The introduced air may dissect along tissue planes, producing a sudden swelling. The presence of crepitation, or a crackling sound on palpation, is a helpful clinical sign. Emphysema in the neck can spread downward and produce a pneumomediastinum. Patients with soft-tissue emphysema should be treated with antibiotics to prevent secondary infection. Most cases resolve in 1 to 2 weeks.

- **Figure 5.7**
TRAUMATIC GRANULOMA
Large, irregular area of ulceration on the tongue.



- **Figure 5.8**
ANESTHETIC NECROSIS
Site of a palatal injection.



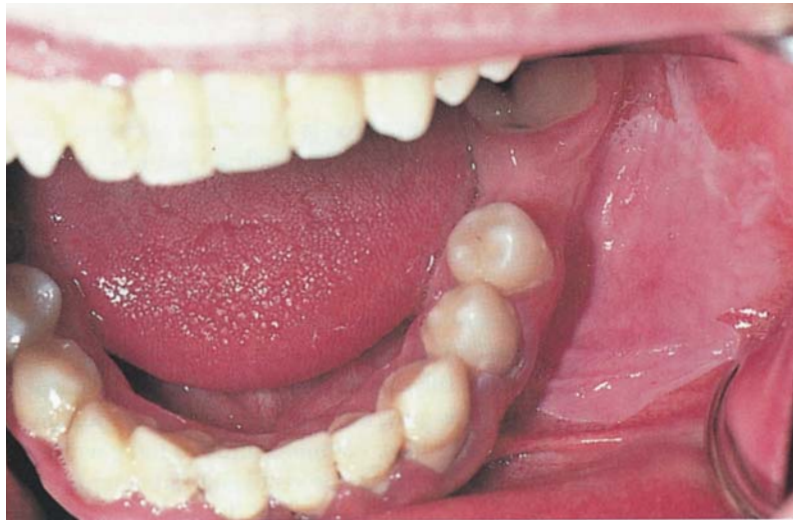
- **Figure 5.9**
SOFT-TISSUE EMPHYSEMA
Facial and periorbital swelling caused by air-driven handpiece used during third molar removal.



Figs. 5.10, 5.11, and 5.12

Burns of the oral mucous membranes may be caused by injudicious use of a variety of drugs and chemical agents. The most common of these is the aspirin burn produced when a patient unwisely uses an aspirin tablet or aspirin powders topically for relief of a toothache. Usually the patient will place the aspirin in the buccal or labial sulcus so it can be held directly against the painful tooth. As it dissolves, a painful white area of epithelial necrosis is produced, which may slough off and leave a raw, red, bleeding ulceration. We have seen similar burns produced by the use of over-the-counter medications for toothaches and by other innovative topical home remedies such as rubbing alcohol, hydrogen peroxide, ice, and gasoline. Iatrogenic burns also can be produced by a variety of agents used in dentistry and medicine, such as silver nitrate, phenol, and eugenol. Treatment for oral chemical burns consists of elimination of the causative agent to allow normal healing to occur.

► **Figure 5.10**
ASPIRIN BURN
White lesion of buccal mucosa.



► **Figure 5.11**
RUBBING ALCOHOL BURN
White lesion of buccal mucosa.



► **Figure 5.12**
CHEMICAL BURN
This patient repeatedly applied Anbesol to treat a toothache.



AMALGAM TATTOO

Figs. 5.13 and 5.14

The amalgam tattoo is a common pigmented lesion of the oral mucosa caused by the inadvertent introduction of dental amalgam particles into the soft tissues. Such lesions may be produced in several different ways: (1) during placement of a silver amalgam restoration, particles may be condensed into abraded gingiva or deposited in an accidental laceration of the mucosa; (2) during removal of old amalgam restorations, particles may be deposited in accidental lacerations or forcefully propelled through intact mucosa by high-speed drills; (3) during root canal therapy with a retrograde amalgam, particles may be incorporated into the surgical wound; or (4) during tooth extraction, fragments of amalgam restoration may fall into the tooth socket.

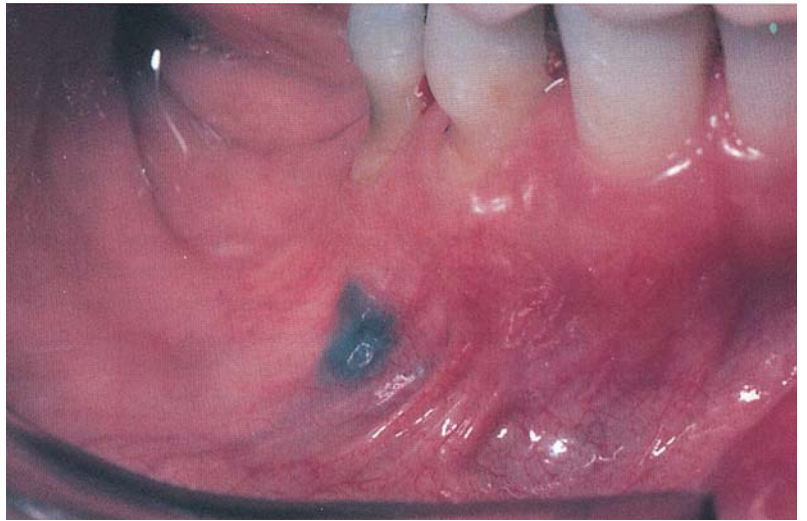
Clinically, amalgam tattoos present as macular areas of pigmentation that are usually described as gray, blue, or black. Most are less than 1 cm in size, but occasionally they can be quite large. The most common sites are the gingiva, alveolar mucosa, and buccal mucosa. Small radiopaque flecks may be visible on radiographs in some cases, but often the radiographic results will be negative because of the small size of the amalgam particles. Diagnosis usually can be made on a clinical basis, but biopsy may be necessary for unusual cases. Amalgam tattoos of the anterior gingiva may be aesthetically displeasing and may require surgical removal with gingival grafting. One recent report also documents the successful use of a Q-switched ruby laser for the treatment of an amalgam tattoo of the anterior maxillary gingiva.

SMOKER'S MELANOSIS

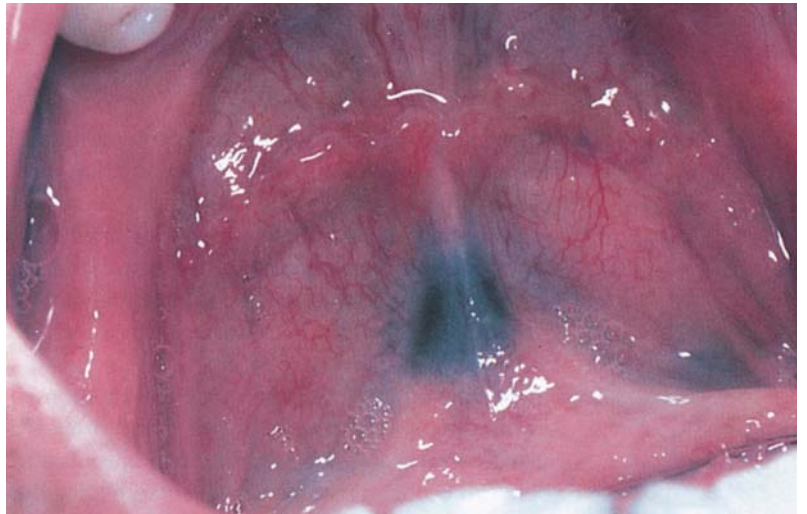
Fig. 5.15

Individuals who smoke may develop benign areas of hyperpigmentation of the oral mucosa. Depending on the number of cigarettes smoked daily, as many as 31% of smokers may develop clinically visible areas of melanin pigmentation. Smoker's melanosis is seen more often in females and most frequently affects the anterior mandibular and maxillary gingiva. However, virtually any oral site may be affected. The pigmentation varies from light to dark brown and may appear diffuse or be more localized in nature. The diagnosis often can be made by correlating the smoking history with the clinical presentation of the lesions. However, biopsy should be considered for pigmented lesions in unusual locations, such as the hard palate, or for pigmented lesions with an unusual clinical appearance. Smoker's melanosis usually will disappear gradually during a 3-year period after cessation of smoking.

- **Figure 5.13**
AMALGAM TATTOO
Bluish-gray pigmentation in the alveolar mucosa.



- **Figure 5.14**
AMALGAM TATTOO
Grayish-black pigmentation in the floor of the mouth. (Courtesy of Dr. Brian Blocher.)



- **Figure 5.15**
SMOKER'S MELANOSIS
Diffuse pigmentation of the maxillary facial gingiva.



Fig. 5.16

In addition to their use in the treatment of malaria, antimalarial drugs such as quinacrine, chloroquine, hydroxychloroquine, and amodiaquine have found widespread use in the treatment of rheumatoid arthritis, lupus erythematosus, and other skin disorders. One of the occasional side effects of these drugs is the development of hyperpigmented lesions of the oral mucosa, usually on the hard palate. This pigment usually is described as gray or bluish-black, often with a sharp line of demarcation at the junction of the unaffected soft palate. The nail beds and conjunctiva also may be affected, and a yellow pigmentation may occur on the skin. Similar pigmentation also has been reported in association with quinidine, a chemically similar drug used to treat patients with cardiac arrhythmia.

TRAUMATIC LESIONS FROM OROGENITAL SEX

Figs. 5.17 and 5.18

The practice of orogenital sex is common today, both in the form of fellatio (oral stimulation of the penis) and cunnilingus (oral stimulation of the female genitals). During the course of these sexual practices, traumatic lesions may occur to the oral mucosa. Fellatio may result in erythematous, petechial, or ecchymotic lesions near the junction of the hard and soft palate. It is theorized that such lesions are the result of direct trauma, negative pressure, or both, resulting in hemorrhage in the tissues. Differential diagnosis includes prodromal mononucleosis, upper respiratory infections, hemorrhagic disorders, and other types of suction trauma. The area usually resolves in 7 to 10 days.

During cunnilingus, traumatic ulceration may occur on the midportion of the lingual frenum as the tongue is protruded forward and rubbed over the lower incisor teeth. These lingual ulcers usually heal within 1 week, although chronic trauma may lead to fibrous hyperplasia. Similar ulcers can occur in patients after otolaryngologic examination, when the tongue is pulled out as far as possible to allow examination of the pharynx and larynx.

- **Figure 5.16**
ANTIMALARIAL PIGMENTATION
Palatal hyperpigmentation secondary to chloroquine therapy. (Courtesy of Giansanti JS, Tillery DE, Olansky S. Oral mucosal pigmentation resulting from antimalarial therapy. *Oral Surg Oral Med Oral Pathol* 1971;31:66.)



- **Figure 5.17**
PALATAL ECCHYMOSIS SECONDARY TO FELLATIO
(Courtesy of Damm DD, White DK, Brinker CM. Variations of palatal erythema secondary to fellatio. *Oral Surg Oral Med Oral Pathol* 1981;52:417.)



- **Figure 5.18**
TRAUMA FROM CUNNILINGUS
Repeated irritation led to hyperkeratinized fibrous hyperplasia of the lingual frenum.



Fig. 5.19

The pseudocyst of the maxillary sinus appears as a dome-shaped, homogeneous radiopacity arising from the floor of the sinus. Such lesions are common, having been found radiographically in 1.5 to 10.0% of the population. The terms “sinus mucocele” and “retention cyst” have been used for this entity; however, these terms are inaccurate because the lesion is not related to mucin accumulation but is most likely inflammatory in origin. (True sinus mucoceles and retention cysts can occur in the maxillary sinus but are much less common.) The pseudocyst represents an accumulation of fluid below the periosteum of the floor of the sinus that results in separation and elevation of the sinus mucosal lining from the bony wall. The fluid appears to be an inflammatory exudate that may on occasion represent extension of adjacent dental infection, for which the patient should be evaluated. Generally, the patient will have no symptoms. The lesion often regresses on its own, and no treatment is necessary in most cases.

EFFECTS OF RADIATION THERAPY

Figs. 5.20 and 5.21

Radiation therapy is used widely for the treatment of oral and paraoral malignancies and often is associated with transient or permanent side effects. One of the first manifestations is the development of oral erythema and edema, which may occur within the first 2 weeks of therapy. As treatment continues, the mucosa becomes ulcerated and covered by a fibrinoid exudate. The mouth is quite painful, making eating difficult and contributing to nutritional impairment. Radiation mucositis will persist throughout therapy, but it typically resolves several weeks after treatment is completed.

Patients who receive radiation therapy also develop xerostomia secondary to the direct effect on salivary glands in the fields of irradiation. The degree of xerostomia is related to the dose and ports of radiation, and it may be permanent. This alteration of salivary flow may later contribute to the development of xerostomia-related caries or “radiation caries,” a rampant form of tooth decay occurring at the cervical margins of the teeth. Other side effects associated with oral radiotherapy include loss of taste, trismus, candidiasis, possible development of osteoradionecrosis (see Figures 4.17 and 4.18), and arrested development of teeth (see Figure 2.7).

Caring for the patient who receives radiation therapy can be complex and requires a multidisciplinary approach involving a radiation oncologist, a general dentist, an oral and maxillofacial surgeon, and a dental hygienist. All patients who are to receive radiation therapy to the head and neck should have a dental consultation as soon as possible before the onset of therapy. At this time, nonsalvageable teeth can be removed, oral foci of infection treated, dental prophylaxis performed, and oral hygiene instructions emphasized. During and after the radiation therapy, oral management often includes oral rinses and antibiotics to treat mucositis; saliva substitutes and sialogogues to treat xerostomia; frequent prophylaxis and topical fluoride applications to prevent caries and periodontal disease; and exercises to prevent trismus.

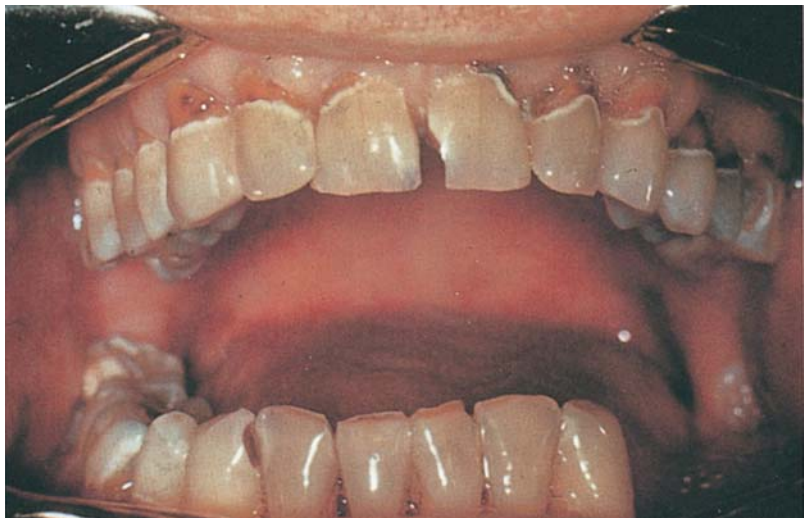
- **Figure 5.19**
PSEUDOCYST OF THE MAXILLARY SINUS
Dome-shaped, radiopaque lesion of the floor of the sinus.



- **Figure 5.20**
RADIATION MUCOSITIS
Painful ulceration of the tongue. (Courtesy of Dr. Rich Daniel.)



- **Figure 5.21**
XEROSTOMIA-RELATED CARIES
Extensive cervical decay in a patient with previous radiation therapy of the head and neck.



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