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Review Article

Burns of oral mucosa – A review

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ABSTRACT

Objectives: The objective of this review is to understand burns of oral mucosae as a type of injury, the different etiologies, clinical features and management of these oral burns in clinical practice. This review aims to aid dentists to evaluate and assess patients sustaining burn injuries in a better way and to understand the varied treatment protocols for particular types of burns in order to help patients restore their oral health.
Materials and Methods: Articles from PubMed and Google Scholar (from1991 to 2019) were reviewed. All articles relevant to the topic, case reports and literature reviews were included in this review. No articles were excluded.
Results: All included articles suggested that burns are a type of tissue injury that can produce localized or diffuse areas of tissue damage depending on the severity and extent of the insult. Burns of the oral mucosa may be caused by thermal, mechanical, chemical, electrical or radiation injury. Thermal burns are usually caused due to ingestion of high temperature foods or drinks. Similarly, chemical burns occur due to exposure of oral mucosa to acids or alkalis or certain drugs. Electrical burns are less common, however, they are mostly noted in children due to biting onto electrical cables or wires etc. Clinical features of all types of burns range from whitish red erythema to necrotic patches. The sites of burns usually vary based on their etiology.
Conclusion: Although, there are some contemporary guidelines, there exists no specific standard of care with regards to management of different kinds of burns. This article aims to form a general review of burns of the oral mucosa and its treatment guidelines.

1. Introduction

Burns are a type of tissue injury that can produce localized or diffuse areas of tissue damage depending on the severity and extent of the insult. Burns of the oral mucosa may be caused by thermal, mechanical, chemical, electrical or radiation injury.[1] Oral soft tissue injuries can be unintentional (accidental or iatrogenic) and intentional (self-inflicted).[2]

Thermal burns due to high heat most commonly result from hot food or drinks, particularly microwaved food items, and most commonly affect the anterior one-third of the tongue and the palate.[3] On the other side, ingestion or contact of substances of extremely low temperatures can also result in cryogenic burns.

Another important cause of intra oral burns is due to chemical insults to the oral mucosa. A chemical burn of the oral mucosa occurs as a result of a noxious agent placed in direct contact with the mucosa either by the patient or a dentist.[4]

Oral electrical burns are less common in today's day and age. If found, they're seen in young children who come in contact with electrical wires etc.

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Although, there are some contemporary guidelines, there exists no specific standard of care with regards to management of different kinds of burns. This article aims to form a general review of burns of the oral mucosa and its treatment guidelines.

2. Materials and Methods

Articles from PubMed and Google Scholar (1991 to 2019) were reviewed. All articles relevant to the topic, case reports and literature reviews were included in this review. No articles were excluded.

The inclusion criteria used for this article were the selection, when possible, of recent articles, with well-structured experimental designs relevant to the topic of our research. No contemporary articles were excluded.

2.1. Thermal burns

2.1.1. Etiology

Thermal burns mostly happen by accidental ingestion of hot substances. High incidence of thermal burns with a prevalence of 24.6% is seen among children and young patients.[5] Usually caused due to contact with very hot foods, liquids, hot metal objects or iatrogenic usage of lasers (diodes, Nd:YAG, Er:YAG or CO2), piezoelectric surgery, or electro-surgery devices.

It is well-known that microwave heated food may cause human injury.[6] The temperature of food heated by microwaves is another important issue for understanding the etiology of this type of injury. It is generally accepted that food centrally containing liquid or soft material, such as cheese, may have higher temperature internally than externally.[7] Several cases of oral burns caused by e-cigarette explosions and by reverse smoking have also been described in the literature in the last few years.[8]

2.1.2. Clinical features

Although the clinical appearance of the burn varies with its etiology and severity of the burn itself, the lesions could be described as oval-shaped or circular pattern erosions, with erythematous borders surrounding whitish damaged mucosa.[9]

Most commonly involved area is considered the palatal arc and the anterior tongue.[7] In most cases, burns cause areas of erosion, or in more extreme cases, ulcerations. The previous observation depends primarily on the temperature at the time of contact, and secondly the duration of contact.[7] Clinically, the condition appears as a red or white, painful erythema that may undergo desquamation, leaving erosions. In excessive damage to tissues, necrosis could appear. In mild lesions, wounds can heal spontaneously within a week.[10]

2.1.3. Management of thermal burns

No treatment is required for simple lesions. Care should be taken in deep lesions to avoid contamination during healing period. Saline would be prescribed to accelerate wound healing and avoid bacterial ingrowth. Ozone therapy and laser biomodulation could help for good prognosis.[11]

If the lesion is not particularly extensive and painful, the normal tissue repair process can be expected with topical gel application; for extensive and painful lesions, the cortisone therapy is evaluated by considering a local anesthetic based on nervous involvement.[2,12]

Management of palatal burns depends on the size of the lesion. Up to medium size lesion, it is recommended to use preventive measurements, such as non-steroidal anti-inflammatory drugs (NSAIDs), antibiotics – in cases of poor oral hygiene or in cases where systemic status indicates – and finally antiseptic mouth washes.[9]

Recent studies suggest that the administration of exogenous growth factors may improve wound healing.[13,14]

2.2. Cryogenic burns

2.2.1. Etiology

Dry ice and liquid nitrogen used in cryotherapy can lead to the development of these lesions.[15]

2.2.2. Clinical features

Burns from low temperatures are clinically configured with a necrotic lesion in the affected area with consequent risk of infection. In fact, the lowering of temperature induces not also the crystallization of interstitial fluids but vasoconstriction too, mostly capillary, which causes a hypo perfusion of the area.[16]

2.2.3. Management of cryogenic burns

In these cases, the treatment is very similar to thermal burn lesions,[17] with particular attention to antibiotic therapy given that, in addition to the infectious risk that accompanies the necrotic lesions, we must consider that the low temperatures in the injured area reduces the immune defenses.

2.3. Chemical burns

2.3.1. Etiology

Oral chemical burns are traditionally caused by the insult of an acid or alkali. Acids and alkalis damage oral tissues in different ways. Acids cause coagulation necrosis, leading to the formation of eschar that limits the penetration of the substances to deeper mucosa layers.[17]

Alkalis react with tissue proteins and cause liquefactive necrosis and saponification, penetrate deeper into the tissues and have extremely poor prognosis.[18]

Contact with these substances can occur in different situations, according to Lai et al.[19] The 2005 annual report

of American association of poison control centers the most common reasons for exposure are:

1. Unintentional (83.8%).
2. Suicidal intent (8.1%).
3. Therapeutic errors (9.9%).
4. Unintentional non-pharmaceutical product misuse (4.2%).

A case report of a 49-year-old man seeking care for maxillary tooth pain who had an oral mucosal burn of the maxillary vestibule caused by topical application of crushed raw garlic. The patient believed this treatment would alleviate his dental pain. Localized tissue necrosis was visible at the site of application.[20]

Self-inflicted lesions due to improper medication are also common. Aspirin and derivates, bisphosphonates,[21] alendronate,[22] tetracycline hydrochloride,[23] if misused, can cause oral burns. Low pH, especially in aspirin, seems to be the cause of the development of these lesions.[24]

Mouthwashes including Listerine.[25] hexetidine[26] and chlorhexidine based ones[27] can also lead to oral ulcers.

2.3.2. Clinical features

Some clinical features of chemical traumatic ulceration are similar. In general, the severity of the lesions depends on how much caustic the substance is and the exposure time.[24]

The most common sites affected by these lesions are the labial and buccal mucosae. Gingiva and mucobuccal folds are also regions where such lesions are found.[11]

The wounds have irregular shape and white color, are overlaid by a pseudomembrane, and are very painful. Lesions can cover an extended area. If the lesions are contacted shortly, a shallow whitish and wrinkled appearance occurs. Brief contacts cannot cause necrosis.[28]

Generally the chemical lesions, except in the most severe cases, heal spontaneously within 15 days without scarring outcomes.[29]

2.3.3. Management of chemical burns

The best treatment of chemical burns of the oral cavity is prevention. The proper use of a rubber dam during endodontic procedures reduces the risk of iatrogenic chemical burns. Superficial burns of mucosa can heal in a short period of time (within 1 or 2 weeks) as the turn-over of oral mucosa is very high.[28]

Oral surgery and antibiotics are necessary in very rare cases. Gel with hyaluronic acid can accelerate the healing process. Possible treatments after chemical injuries, in relation with the severity of wounds, are topical and intralesional corticosteroid applications, caustic acid ingestion, commissuroplasty, mucosal flaps, free radial forearm flap and free jejunal graft, surgeries made with electrocautery or soft tissue laser, and wound coverage by periodontal pack.[30]

Intraoral lesions from acids normally remain superficial without affecting the basement membrane, for this reason it is sufficient to keep the wound irrigated to avoid the surgical debridement.[17] In severe cases,surface irrigation is often not sufficient so surgical debridement becomes necessary.[31]

2.4. Electrical burns

2.4.1. Etiology

Electrical burns of the mouth are the most common electrical injury in children and can have serious, long-term functional and aesthetic consequences.[32] Electrical burns in the oral cavity account for 2.2% of all electrical burns and only 0.12% of all burns; thus, the incidence of electrical burns in the oral cavity is relatively low[33] Oral electrical trauma affects mainly small children, for example due to bites to different types of electric cables, such as those of the television.[34]

2.5. Clinical features

Most commissural electrical burns involve mucosa, submucosa, muscle, nerve, and vascular tissue.[11] Oral electrical burns to the lip commissure are disfiguring injuries for a child.[35]

Damage made accidentally to lingual or/and labial arteries can cause abundant bleeding. When burned tissues spontaneously start to loosen or slough and occasional trauma occurs, this type of bleeding happens. Generally, this is observed 3–4 days after burn injury.[36]

2.5.1. Management of electrical burns

Whatever is the severity of burned injury, the basic treatment strategy involves pain relief, infection control, and acceleration of wound repair.[17] Kang et al.[17] points out in his review that if the burn in the lips, vestibule or floor of the mouth is severe, the best treatment is with the aggressive approach, employing early surgical debridement followed by mucosal resurfacing. By contrast, a milder electrical burn with limited anatomy involvement should be treated with the conservative approach. Application of antibiotic ointments to the burn area has been recommended by some authors.[36] Systemic antibiotics are recommended by most clinicians to prevent wound infection.[17]

Facial disfigurement takes place in case of severe electrical burns if splints are not applied. Microstomia reduces mouth opening, renders oral hygiene difficult, and decreases functions of speech and chewing. Most of the cases need plastic surgery.[36]Current treatment includes the use of an orally anchored splint to hold the lip commissures at their correct positions during healing. After wearing an appliance for a period of one year, the burn site is evaluated for the need for corrective surgery.[35]

3. Conclusion

In traumatology, chemical, thermal, cryogenic and electrical injuries must not be underestimated. Trauma-related oral lesions are common in clinical practice of dentistry. It is in fact fundamental to know the substantial differences of these lesions and their clinical development. Such lesions can impair patients' normal oral function and can cause pain while eating, chewing, and talking. After arriving at a diagnosis, treatment can be provided by first removing the causative factor. A deep knowledge in this field allows the dentist to identify and select the most suitable treatment plan to achieve the best results and restore patient's health.

4. Conflict of Interest

The authors declare no relevant conflicts of interest.

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