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Chemical And Physical Injuries Of Oral Cavity – A Review

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ABSTRACT

It is usual to uncover physical and chemical lesions of the oral cavity during routine examinations since the mouth cavity is constantly exposed to chemicals and trauma. These can include sharp occlusal anatomy, acidic and alkaline goods or medications, food or drink at different temperatures, and traumatic occlusion. We will talk about the following lesions: smoker's melanosis, systemic metallic intoxication, antral pseudocyst, cervicofacial emphysema, myosperulosis, anaesthetic necrosis, exfoliative chelitis, amalgam tattoos, oral piercing, traumatic ulceration, electrical and thermal burns, orofacial complications of drug abuse, and antral pseudocyst.

KEYWORDS : trauma, abrasions, heat injuries, exposure to toxic substances.

INTRODUCTION

A vital barrier shielding the underlying tissues, the oral mucosa can sustain injury from a variety of sources, including as trauma, abrasions, heat injuries, and exposure to toxic substances. This article examines the various facets of mechanical, physical, and chemical harm to the oral cavity's mucous membrane, exploring the clinic, diagnosis, treatment, and preventative measures related to these issues. A vital barrier shielding the underlying tissues, the oral mucosa can sustain injury from a variety of sources, including as trauma, abrasions, heat injuries, and exposure to toxic substances.

LINEA ALBA

Linea alba, which is caused by the negative pressure of sucking on the cheeks, can appear unilaterally or bilaterally. The lesion will appear white as a result of the tissue stretching under this pressure and becoming less vascular. This lesion is the product of habit, usually unconsciously created under stressful situations [1] Any patient, particularly those going through stressful times, may have linea alba. According to Amadori et al., linea alba was found to be present in 5.3% of a group of teens between the ages of 13 and 18, whereas Gonçalves Vieira-Andrade et al. discovered that it was present in 33.9% of a group of adults, with a preference for females [2].

TRAUMATIC ULCERATIONS

A traumatic ulcer is an ulceration that develops in the mouth cavity as a result of either acute or chronic trauma. Traumatic ulcers can be caused by mechanical, chemical, electrical, or thermal damage. They can also be brought on by oral cavity conditions including fillings, tooth deformity or misalignment, or broken teeth. A yellowish-white necrotic pseudo membrane that is wipeable covers its slightly elevated and reddish edges. Traumatic ulcers are most commonly found in the buccal mucosa, lips, and tongue. With a ratio of 2.7:1, men are more prone than women to get traumatic ulcers.
Because the movement of the tongue continuously traumatizes the area, these lesions can appear for a few days but also last for a few weeks, particularly if they develop on the lateral side of the tongue. [3].

ELECTRICAL AND THERMAL BURNS

The mucobuccal and gingival creases are where they are most frequently observed. The wounds are very painful, have a pseudomembrane covering them, and are irregular in colour and shape. It is possible for lesions to spread widely. If the lesions are contacted too soon, they appear superficially white and wrinkled. A quick touch cannot induce necrosis. Medications and caustic chemicals can cause irritation and direct damage to the oral mucosa when they come into touch with it. When medications are misused, such as when aspirin is put to the nearby mucosa of teeth that hurt and have decay, mucosal injury can result
During dental operations, the mucosa may get irritated by endodontic pastes that contain arsenic or irrigant solutions like formalin or sodium hypochlorite. However, these mishaps have decreased since the introduction of the rubber dam in dental care.

Treatment: The best therapy for chemical burns in the mouth is prevention. During endodontic procedures, a rubber dam helps prevent iatrogenic chemical burns. Burns to the superficial mucosa might heal in one or two weeks due to the rapid turnover of the oral mucosa. Antibiotics and oral surgery are necessary in extremely uncommon cases. Gel containing hyaluronic acid helps hasten the healing process. Depending on the extent of the wounds, treatments for chemical injuries may include topical and intralesional corticosteroids, caustic acid ingestion, commissuroplasty, mucosal flaps, free radial forearm flap, free jejunal graft, electrocautery or soft tissue laser surgeries, and periodontal pack covering.[4]

OROFACIAL COMPLICATIONS OF DRUG ABUSE

a. XEROSTOMIA

With more than 500 medications, xerostomia, the most frequent adverse drug reaction affecting the oral cavity, is linked. Xerostomia was discovered as a side effect in 80–100% of prescribed medications in a systematic evaluation conducted in the United States. Taste changes, dysphagia, speech problems, dental cavities, and an increased risk of infections (such as candidiasis and sialadenitis) are all consequences of xerostomia.
treatment-induced xerostomia can be reversed, and stopping a treatment can restore normal salivary gland function. Saliva substitute, bethanechol, cevimeline, and pilocarpine are used to treat this problem.[5]

b. PEMPHIGUS

A collection of potentially fatal autoimmune diseases that impact the skin and mucous membranes is known as pemphigus. Oral lesions, which start as a bullae that is quickly disturbed and leave irregular shallow ulceration, are the initial sign of the disease in 60% of patients.Clinically, histopathologically, and immunofluorescently, several medications can cause oral lesions that resemble pemphigus.[5]

c. SALIVARY GLAND ENLARGMENT

Enlargement of the salivary glands has been documented as a side effect of medication. Iodine-containing medications, such as imaging contrast media, are most frequently linked to parotid enlargement. Radioiodine is a crucial treatment for thyroid cancer, and one of its most frequent adverse effects is swelling of the salivary glands.[5].

d. SALIVA DISCOLOURATION

Clofazimine, levodopa, rifampin, and rifabutin may result in the discoloration of saliva and other bodily fluids, turning them orange to red. [5]

ANESTHETIC NECROSIS

Accidental injection of the wrong substance into tissues can cause tissue death. This mistake can happen when a solution meant for another purpose is mistakenly used as an anaesthetic. Certain substances, including alcohol and formalin, are toxic to tissues and can cause death. If this mistake happens, the patient will feel sudden severe pain. To fix the problem, a pain-relieving medication like novocaine should be injected right away. If not treated quickly, the tissue can become swollen and die. The amount of damage depends on the type and amount of substance injected and where it was injected..[6]

EXFOLIATIVE CHELITIS

Exfoliative cheilitis (EC) is a rare and chronic condition that affects the lips, causing thick, scaly patches to form on the vermilion border. Despite appearing normal underneath, these scales can cause significant distress and impact daily life, affecting eating, speaking, and smiling. While the exact cause of EC is unknown, stress, personality issues, and psychiatric conditions are potential triggers. In some cases, repetitive lip biting, picking, or sucking can lead to chronic injury, resulting in factitious cheilitis. The condition's unpredictable nature and lack of targeted treatment make it a challenging and debilitating condition that affects not only a person's appearance but also their overall well-being. [7]

AMALGAM TATTOOS

Exogenous oral pigmentation is a common phenomenon that arises from the introduction of foreign substances into the oral mucosa. Typically harmless, this pigmentation can stem from various sources, including dental procedures. A classic example is the amalgam tattoo, which occurs when dental amalgam particles become embedded in the soft tissues of the mouth. These tattoos appear as grey, blue, or black spots near the site of dental work.

Other sources of exogenous pigmentation include outdated materials used in endodontic fillings, which can migrate through bone and tissue, causing mucosal discolouration. Accurate diagnosis relies on clinical

examination, but radiographs or biopsy may be necessary to distinguish these benign lesions from more serious conditions.

Management of exogenous pigmentation usually doesn't require intervention, unless aesthetic concerns or diagnostic uncertainty arise. The prognosis for patients with amalgam tattoos and similar lesions is generally favourable, highlighting the importance of awareness and understanding among dental professionals. [8].

ORAL PIERCING

Oral piercings, commonly found on the lips, tongue, cheeks, and uvula, pose significant health risks. These piercings can lead to various complications, including positional and systemic hazards. Short-term risks include infection, abscess, and endocarditis, which can be life-threatening. Long-term complications encompass abnormal tooth wear, grinding, cracking, and gingival recession.Studies reveal that the tongue and lips are the most frequent sites for oral piercings, with women being more likely to acquire them than men. Gingival recession is the most common complication, while the central mandibular incisors exhibit the highest incidence of periodontitis and gingivitis. Furthermore, individuals with tongue piercings are more prone to tooth fractures.Immediate complications, such as swelling and local inflammation, can also arise after the piercing procedure. Prolonged piercing wear can exacerbate gingival recession and tooth fracture, emphasising the importance of careful consideration before acquiring oral piercings. [9].

SMOKERS MELANOSIS

Smoking is a well-established cause of various health issues. In recent years, research has highlighted the detrimental effects of secondhand smoke on children's health, emphasising the severity of exposure to smoking in this vulnerable population. The oral health community has also begun to investigate the impact of secondhand smoke on children, revealing concerning findings. Notably, a study by Hanioka et al. discovered a link between melanin pigmentation in the gingiva of children and parental smoking habits, underscoring the need for further research into the oral health consequences of secondhand smoke exposure in children. [10].To combat the detrimental effects of smoking, particularly among young populations, a collaborative effort between medical and dental professionals is necessary to promote smoking cessation. In the dental field, smoking is known to cause gingival pigmentation, a condition that can also be induced by tattoos, leading to potential toxicity and systemic diseases. Gingival pigmentation results from the accumulation of melanin produced by melanocytes. Research has consistently shown that smokers exhibit greater gingival pigmentation than non-smokers. Moreover, studies have demonstrated that quitting smoking can lead to a decrease in gingival pigmentation. Recent advancements in dental technology have enabled the precise evaluation of gingival colour using a dental photoelectric colorimeter, providing a valuable tool for assessing the effects of smoking on oral health.[11]

SYSTEMIC METALLIC INTOXICATION

Mercury, a primary component of dental amalgam, is highly toxic due to its strong affinity for proteins and amino acids. Research has shown that elemental mercury is ten times more toxic than lead to neurons. The liver, kidneys, and central nervous system (CNS) are the main targets for mercury bioaccumulation. Given the proximity of the oral cavity to the brain, mercury can penetrate and deposit in the brain, affecting the CNS.Studies have demonstrated the immediate fate of mercury release into the brain, and numerous epidemiological studies have assessed the impact of mercury exposure from dental amalgam. One study found that individuals with high mercury levels in their hair were 50% more likely to have periodontitis. The results suggest that mercury exposure is associated with periodontitis, regardless of gender.Anaerobic bacteria from periodontal diseases produce sulphur compounds that react with mercury amalgam to form "amalgam tattoos," which consist of toxic mercuric sulphide. The constant release of mercury vapour from dental amalgam is absorbed into the blood through the lungs and, to a lesser extent, through the tooth pulp or gingiva. Mercury vapour can easily pass through the blood-brain barrier, potentially causing neurological impairment.The direct relationship between the number of amalgam surfaces and mercury accumulation in

brain tissue is of significant concern. The bioaccumulation of mercury in the brain may contribute to various neurological diseases, including Parkinson's, Alzheimer's, and Amyotrophic Lateral Sclerosis. [12]

ANTRAL PSEUDOCYST

An antral pseudocyst is a dome-shaped, radiopaque lesion that appears on the floor of the maxillary sinus in panoramic radiographs. The presence of such cysts, an antral septum, or a thickened maxillary lateral wall can increase the risk of perforation during sinus lifting operations. Sinus lifting is a common procedure used to augment the maxillary posterior area with insufficient bone volume, but it carries a risk of perforation, ranging from 14% to 56%.The management of sinus cysts during sinus augmentation is not well-defined. Some authors suggest that sinus augmentation can be performed without removing the cyst, while others consider the presence of maxillary cysts a contraindication for sinus grafting, recommending cyst removal at least 6 months prior to sinus lifting.This case report presents a large maxillary sinus membrane perforation that occurred during sinus membrane elevation in the presence of an antral pseudocyst. The authors successfully enucleated the cyst, repaired the perforation with platelet-rich fibrin (PRF), and performed sinus grafting, reducing the healing time for dental implant placement. [13].

CERVOCIFACIAL EMPHYSEMA

Cervicofacial emphysema refers to the presence of air in the facial tissues. It typically occurs after trauma, such as facial injury, dental procedures, or recent surgery, which can cause changes in air pressure. The most common symptoms are swelling in the face and neck, while the primary clinical finding is crepitus, a crunching or bubbling sensation under the skin.To rule out more serious complications, patients with cervicofacial emphysema typically undergo evaluation for mediastinal involvement, such as pneumomediastinum or pneumothorax. Fortunately, the condition is generally non-fatal and self-limiting, and management is conservative, involving reassurance, close monitoring, and antibiotics. Most patients with cervicofacial emphysema experience a full and uneventful recovery. [14].

MYOSPHERULOSIS

Myospherulosis is a rare granulomatous reaction that occurs when red blood cells come into contact with lipid-containing materials. First described by McClatchie et al in 1969, it is characterised by unusual soft tissue nodules with fungus-like spherules, often involving skeletal muscle, hence the term "myospherulosis". [15].The cause of myospherulosis remained unknown for a long time, until research revealed that most cases occurred after ear, nose, or throat surgery, where petroleum-based ointments were used to pack wounds. It is now understood that myospherulosis is a result of medical treatment, where red blood cells come into contact with petroleum-based materials, forming a lipid membrane that triggers a lipogranulomatous reaction. Although petroleum-based ointments have beneficial properties for wound healing, their use, especially with petroleum-impregnated gauze, increases the risk of myospherulosis in patients. [16]

REFERENCES

1. McKinney R, Olmo H, McGovern B. Benign Chronic White Lesions of the Oral Mucosa. [Updated 2024 Jan 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan.

2. Vieira-Andrade RG, Zuquim Guimarães Fde F, Vieira Cda S, Freire ST, Ramos-Jorge ML, Fernandes AM. Oral mucosa alterations in a socioeconomically deprived region: prevalence and associated factors. Braz Oral Res. 2011 Sep-Oct;25(5):393-400.

3Mortazavi H, Safi Y, Baharvand M, Rahmani S. Diagnostic Features of Common Oral Ulcerative Lesions: an Updated Decision Tree. *Int J Dent*. 2016;2016:1–14.

4. Becker DE, Reed KL. Local anesthetics: Review of pharmacological considerations. Anesth Prog. 2012;59:90-101

5. Bakhtiari S, Sehatpour M, Mortazavi H, Bakhshi M. Orofacial manifestations of adverse drug reactions: a review study. Clujul Med. 2018;91(1):27-36.

6. Lepsky, V., & Osik, C. V. (2018). NECROSIS AS A COMPLICATION OF LOCAL ANESTHESIA IN DENTISTRY. *Ukrainian Dental Almanac*, (5), 74-77.

7. Thongprasom K. Glycerin Borax Treatment of Exfoliative Cheilitis Induced by Sodium Lauryl Sulfate: a Case Report. Acta Stomatol Croat. 2016 Jun;50(2):158-161.

8. Abati S, Sandri GF, Finotello L, Polizzi E. Differential Diagnosis of Pigmented Lesions in the Oral Mucosa: A Clinical Based Overview and Narrative Review. Cancers (Basel). 2024 Jul 8;16(13):2487.

9. Mosaddad SA, Talebi S, Hemmat M, Karimi M, Jahangirnia A, Alam M, Abbasi K, Yazadaniyan M, Hussain A, Tebyaniyan H, Abdollahi Namanloo R. Oral Complications Associated with the Piercing of Oral and Perioral Tissues and the Corresponding Degree of Awareness among Public and Professionals: A Systematic Review. Diagnostics (Basel). 2023 Nov 2;13(21):3371.

10. Hanioka T., Tanaka K., Ojima M., Yuuki K. Association of melanin pigmentation in the gingiva of children with parents who smoke. Pediatrics. 2005;116:186–190.

11. Kato T, Mizutani S, Takiuchi H, Sugiyama S, Hanioka T, Naito T. Gingival Pigmentation Affected by Smoking among Different Age Groups: A Quantitative Analysis of Gingival Pigmentation Using Clinical Oral Photographs. Int J Environ Res Public Health. 2017 Aug 4;14(8):880.

12. Jirau-Colón H, González-Parrilla L, Martinez-Jiménez J, Adam W, Jiménez-Velez B. Rethinking the Dental Amalgam Dilemma: An Integrated Toxicological Approach. Int J Environ Res Public Health. 2019 Mar 22;16(6):1036.

13. Baykul T, Fındık Y. Maxillary sinus perforation with presence of an antral pseudocyst, repaired with platelet rich fibrin. Ann Maxillofac Surg. 2014 Jul-Dec;4(2):205-7.

14. Kanaparthi K, Talwar A, Khan S, Talwar A, Capozzi B, Talwar A. Cervicofacial emphysema: A systematic review. Intractable Rare Dis Res. 2024 Nov 30;13(4):208-212.

15. McClatchie S, Warambo MW, Bremner AD. Myospherulosis: a previously unreported disease? Am J Clin Pathol. 1969;51:699-704.

16. Lawen TI, Hong P, Harris AT, Taylor SM. Myospherulosis following Rhinoplasty. OTO Open. 2017 Dec 8;1(4):2473974X17746960.