Advanced Medical Journal, Vol.10, No.1, P.108-116,2025 https://doi.org/10.56056/amj.2025.324

Prevalence of Oral Pigmented Lesions in Dental Outpatient Attending Piramerd Dental Health Center in Sulaimani

Tavga Ahmad Hussain* Balkees Taha Garib**

Abstract

Background and objectives: Pigmentation of the oral mucosal is commonly encountered and constitutes a variety of clinical presentation that can be physiological, systemic disease, post inflammatory, drugs, smoker melanosis, hemoglobin and iron association, melanoacanthoma, melanotic macule, Malignant Melanoma, amalgam tattoo and idiopathic. This mucosal discoloration may arise from either endogenous pigments or exogenous materials and they are classified as melanocytic and non-melanocytic pigments in origin. The objective of this study was to determine the prevalence of various types of oral mucosal pigmentation among a sample of dental patients.

Methods: This cross-sectional study was carried out at the Piramerd Dental Health Center on December 2022 to May 2023, involving a cohort of 500 dental patients. Medical and dental histories were taken from all the participants were undergoing through a thorough intra oral examination to determine number, distribution, shape, location and color of pigmented lesions.

Results: Oral mucosal pigmentation presents 28.2% a sample of dental patient in Sulaimani city. Racial pigmentation (77.3%) and smoker's melanosis (17.3%) were identified as the predominant factors contributing to oral pigmentations. Most of the patients (97.8%) had diffused or multifocal pigmentation, while a focal pattern was identified in only three patients (% 2.1). The frequently affected areas included gingiva (80.1%) buccal mucosa (64.5%) and labial mucosa (34%) The area demonstrating the lowest incidence was the lower lip (2.1%) and palate (1.4%).

Conclusion: Oral mucosal pigmentation is a common occurrence, with racial and smoker's pigmentation being the most frequently encountered discolorations, primarily affecting the gingiva and buccal mucosa.

Keywords: Amalgam tattoo, Melanin, Pigmentation, Racial, Smoker’s melanosis

*B.D. S, H.D.D, KHCMS Candidate of Oral and Caxillofacial Medicine. Ministry of Health, Sulaimani, Iraq. Email: tavga81@gmail.com. Corresponding author.
** Ph.D. Professor of Oral Pathology, College of Dentistry, University of Sulaimani, Iraq. Email: balkesstaha@gmail.com

Introduction

Pigmentation within the oral cavity signifies alterations in the hue of the oral mucosa, primarily due to melanin-induced pigmentation.[1,2] The melanin, created by melanocytes situated in the basal layer of the epithelium, is the substance accountable for producing pigmentation in hair, eyes, and skin then conveyed to adjacent keratinocytes through brown-hued, membrane-bound organelles recognized as melanosomes. Despite the fact that the amount of melanin is genetically predetermined, many factors like radiation, hormones, trauma, and inflammation may increase melanin production.[3,4] Any discoloration or changes in color lead to aesthetic problems and can be distressful for patients. This condition impacts individuals of both genders. Typically, the oral mucosa does not maintain a uniform color but exhibits variations due to various physiological and pathological conditions, representing diverse clinical entities. Pigments contributing to mucosal discoloration can be categorized as either endogenous or exogenous. May have clinically they may have similar presentations; however, their treatment is different. Melanin-associated lesions constitute the most prevalent pigmentations, encompassing conditions such as racial pigmentation, smoker's melanosis, post-inflammatory pigmentation, oral melanotic macule, oral nevi, melanoacanthoma, oral melanoma, and melanotic neuroectodermal tumor of infancy. Nonmelanocytic lesions involve exogenous pigmentations like amalgam tattoo and heavy metal pigmentation. Furthermore, systemic diseases associated with oral pigmentations include Peutz-Jeghers syndrome, Addison's disease, Hyperthyroidism (Graves 'Disease), Primary Biliary Cirrhosis, Vitamin B12 (Cobalamin) deficiency, Cushing's disease, HIV/AIDS-associated melanosis and Laugier–Hunziker syndrome. Additionally, drug-induced pigmentations may originate from either melanocytic or nonmelanocytic sources.[5-7] Various subsites within the oral cavity exhibit diverse structural colors, influenced by factors such as the extent of keratinization, vascularity, and the underlying tissue types (such as bone, muscle, fat, or fibrosis).[8] The colors of pigmented lesions depend on the pigment's source, quantity, and depth. The discoloration can manifest in ranging from light- brown to more noticeable dark-black-blue discolored patches. Overproduction of melanin can lead to pigmentation affecting diverse areas of the oral cavity, such as gums, cheeks, palate and tongue.[4,9] From a clinical perspective, oral pigmented lesions are categorized as either focal or diffused. Focal pigmentation encompasses melanotic macules, amalgam tattoos, inflammation, melanocytic nevi, melanoma, and melanoacanthomas. On the flip side, multifocal or diffused macular pigmentations encompass a range of conditions, such as physiological pigmentation, melanosis induced by medications, melanosis linked to smoking, post inflammatory pigmentation, pigmentation due to heavy metal, and pigmentation associated with various systemic diseases. Depending on the history, causes, underlining oral manifestations and systemic conditions, diagnosis and management of the oral pigmentations can be made accurately.[2,4] Moreover, nevi are typically characterized as benign, pigmented neoplasms that can be congenital or acquired. These nevi are usually small in size, ranging between 0.1 and 0.6 cm in diameter, elevated, and often asymptomatic, aiding in their differentiation from other pigmented lesions.[10,11] The most desirable differential diagnoses for pigmented lesions are broad, encompassing instances of both endogenous and exogenous pigmentation. While biopsies are essential for diagnosing focal pigmented lesions, the assessment of diffuse lesions

https://doi.org/10.56056/amj.2025.324

typically necessitates a comprehensive patient history and laboratory investigations to establish a conclusive diagnosis.[12] The current study seeks to offer primary data on the prevalence of pigmented oral lesions among dental patients. It aims to determine both the frequency and distribution of pigmented lesions within this specific population.

Patients and methods

A cross-section clinical study included 500 patients. They seek routine dental care as outpatients at Piramerd Specialty Dental Health Center in Sulaimani city. Patients were randomly collected from December 2022 to May 2023 with (no exclusion criteria), after providing their acceptance to participate in the research and signing an informed consent form. The Research Ethical Committee of the Kurdistan Higher Council of Medical Specialties (KHCMS) approved the study proposal. Patients exhibiting oral pigmentation underwent a thorough examination of their medical history, focusing on precise information about the lesion's onset and duration. Additionally, comprehensive data were gathered concerning related skin hyperpigmentation, the utilization of medications, family history to any disorders related pigmentation, as well as an evaluation for systemic manifestations encompassing fever, malaise, fatigue, weight loss, abdominal pain, and gastrointestinal problem. Furthermore, details regarding cigarette and narghile (shisha) smoking, alcohol consumption, and other social habits were gathered from the patients. Patients who had extra oral pigmentations were reported. A thorough intra-oral examination was performed on the dental chair using a disposable mouth mirror and sterile gauze. To thoroughly evaluate the scope of pigmented lesions, examinations were performed on lips, buccal and labial mucosa, gingiva, alveolar ridge, vestibules, tongue, soft and hard palate and floor of the mouth. The assessment comprised documenting specifics including the quantity, distribution, location; shape, color, and the relationship of pigmented areas in relation to the adjacent teeth for each individual lesion. Biopsies were performed when necessary for a conclusive diagnosis. The collected data were tabulated in an Excel worksheet and then analyzed using the SPSS software package (version 16). The results were presented in terms of frequency, distribution, and percentages. A p-value less than 0.05 was considered statistically significant for the variables.

Results

1) The study sample consisted of (280, 56% females and 220, 44% males) with male-to-female ratio of 1: 1.2. A total of 141 patients (28.2%) had pigmented oral lesions (81-males, 60-female) their mean age was 35.66 ±15.34, (range 5-80 years old). The remaining 359 (71.8%) had non-pigmented lesions. The mean age did not show a significant difference between the two groups. (P=0.75), Table (1). Concerning social history, 82.27% of non-smoker patients exhibited oral pigmentation, while 25 out of 54 smoker patients showed oral pigmentation (P = 0.003). In terms of alcohol consumption, no significant association was found (P = 0.5), Table (1).

https://doi.org/10.56056/amj.2025.324

Table (1): Frequency and distribution demographic features of the studied sample

		Total		Non pigmented		Pigmented		p value
		no	%	no	%	no	%	
	Total	500	100	359	71.8	141	28.2	
Gender	female	280	56	220	61.28	60	42.55	
	male	220	44	139	38.72	81	57.44	
Age	Mean ±	35.66± 15.34		35.78 ±15.45		35.32±15.11		0.75
Smoker	no	446	89.2	330	91.92	116	82.27	0.003
	yes	54	10.8	29	8.078	25	17.73	
Alcohol	no	483	96.6	348	96.94	135	95.74	0.5
	yes	17	3.4	11	3.064	6	4.25	

2) The predominant causes of oral pigmentations were racial pigmentation (77.3%) and smoker's melanosis (16.3%), Figure (1). Not any individual patient exhibiting oral pigmentation reported experiencing any symptoms (pain, burning, and swelling). However, 21 individual patients (4.2%)—17 females and 7 males—were aware of their oral pigmented lesions, showing significant difference (P= 0.018).

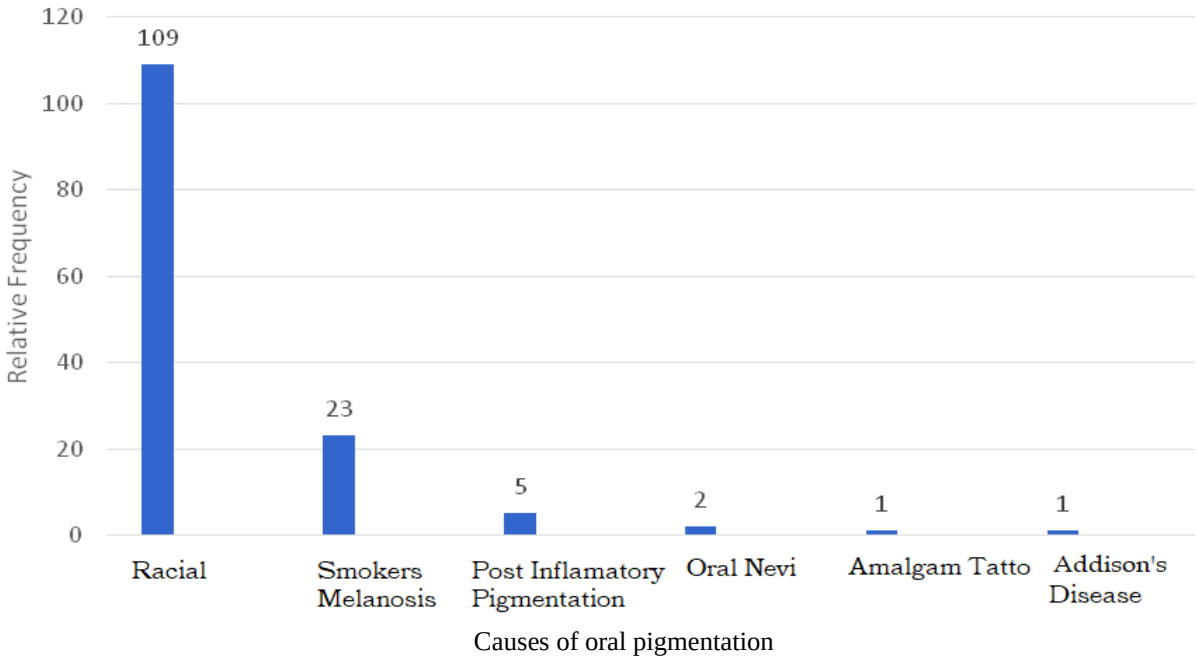

Figure (1): Frequency of the oral pigmented lesions according to the causative factors

3) The majority of the patients (97.8%) had diffused or multifocal pigmentation, while a focal pattern was identified in only three patients (% 2.1). The predominant affected sites were the gingiva (80.1%) buccal mucosa (64.5%) and labial mucosa (34%). The lower lip (2.1%) and palate (1.4%) showed the least prevalence of affected areas. There was no significant correlation between gender and site of pigmented lesion except for the labial mucosa which showed male predominance (36 versus 12, P =0.004), Figure (2).

https://doi.org/10.56056/amj.2025.324

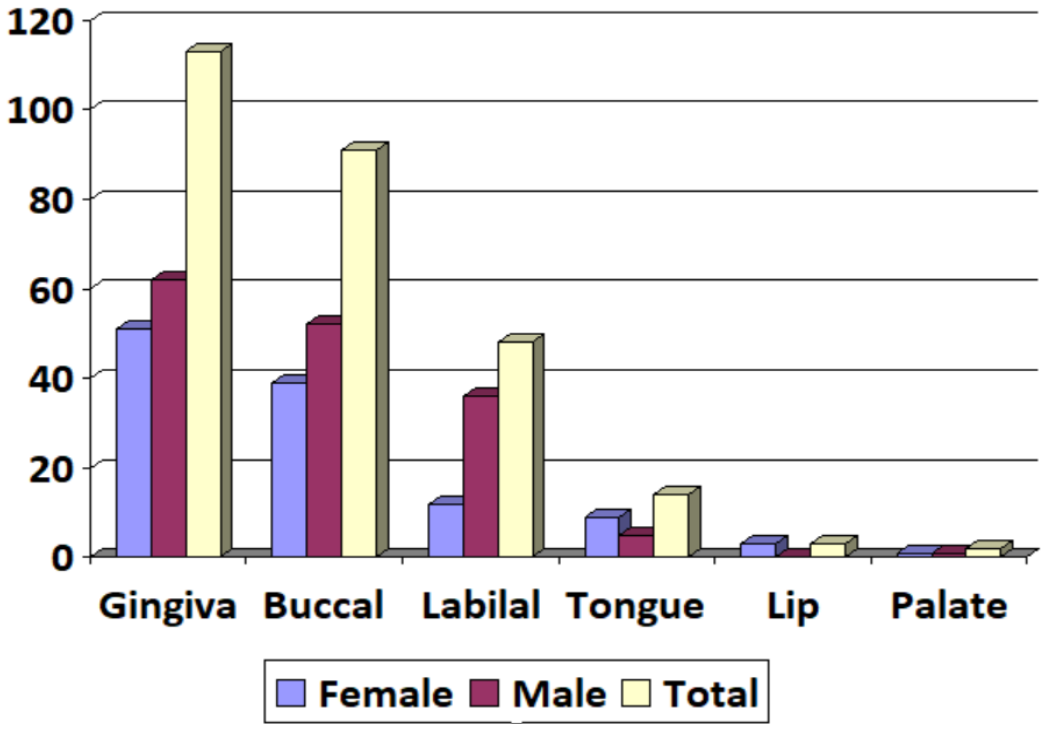

Figure (2): Frequency distribution of the oral pigmentations with oral sites

One of the frequently observed types of pigmentation identified was racial pigmentation, found in 109 patients, consisting of 58 males and 51 females, displaying a bilateral and uniformly multifocal pattern of brownish pigmentation Figure (3A). The gingiva was predominantly affected in the majority of cases (98%), followed by other affected sites, such as buccal mucosa (66%), labial mucosa (22.93%) and tongue (8.2%), Table (2). Melanosis due to smoking was detected in 23 patients, consisting of 22 males and 1 female. The most prominently affected region was the labial mucosa (91.3%), followed by the buccal mucosa (56.5%), the gingiva (13%), and the palate (4.3%). As seen in Table (2). The hallmark of smoker's melanoma was multifocal gray to brown spots with an erratic pattern Figure (3B). On the other hand, post-inflammatory pigmentation was reported in 5 females having oral lichen planus. Post-inflammatory pigmentation manifested as multifocal light brown patches on buccal mucosa and the tongue Figure (3C). Regarding pigmentation due to systemic disease or medications, it was observed in a single patient who had Addison's disease for one year before presentation. The patient, a 55-year-old female, exhibited pigmentation manifested as scattered, pale brown patches on buccal mucosa and inner surface of the lower lip. Additionally, macular pigmentations were evident on the dorsal hands and palms. Nonetheless, an amalgam tattoo was identified in a 36-year-old male, featuring small gray to black macules primarily situated on the gingivae near to a previously extracted tooth that had been filled with amalgam. Figure (3D and 3E). Lastly, oral nevi were noted in two females appear on the lower lip, small about 2 mm, a well-defined macule characterized by a tan or brown color. Figure (3F).

https://doi.org/10.56056/amj.2025.324

Table (2): Distribution of oral pigmented lesions with regard to affected area

Type	Gingiva	Buccal	Labial	Palate	Tongue	Lip	female	male	Total
Racial	107 (98%)	72 (66%)	25 (22.93%)	0	9 (8.2%)	0	51	58	109
Smoker's melanosis	3 (13%)	13(56.5%)	21(91.3%)	1(4.3%)	0	0	1	22	23
Post inflammatory	0	5	1	1	5	0	5	0	5
Systemic Disease	0	1	1	0	0	1	1	0	1
Amalgum Tattoo	1	0	0	0	0	0	0	1	1
Oral Nevi	0	0	0	0	0	2	2	0	2
Sum	113	91	48	2	14	3	60	81	141

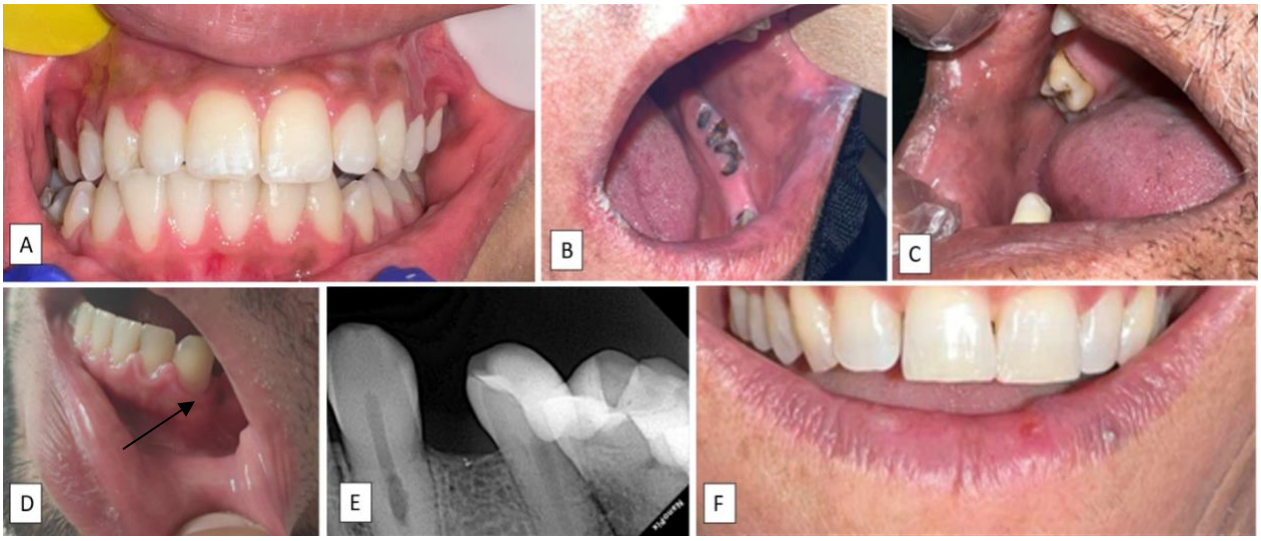

Figure (3): Diffuse homogenous brown pigmentation of the attached gingiva in racial pigmentation (A). Post-inflammatory pigmentation observed on the buccal mucosa in a patient diagnosed with erosive lichen planus. (B). Brown to black patch visible on buccal mucosa in a patient who reported smoking one pack of cigarettes per day for 40 years (C). Clinical depiction of amalgam tattoo (D). Radiographic findings of the same patient in (E). Small well-circumscribed, tan- or brown-colored macule located on the lower lip (F).

Discussion

In this study, while more females were enrolled, a higher frequency of oral pigmentation was observed among male participants. This observation might be attributed to the higher prevalence of smoking among males compared to females in our community. This observation aligns with the findings of previous research studies by Kamble[13] and Hassona.[4]The study revealed an overall prevalence of oral mucosal pigmentation at 28.2%, primarily linked to racial pigmentation and melanosis due to smoking. The main contributors to oral pigmentation are in line with a study conducted by Hassona.[4] Furthermore, we concur with the findings of earlier studies by Collins[14] and Albuquerque[9]. Both of which also emphasized that racial pigmentation was the most frequently identified entity in the oral mucosa.On the other hand, 17.73% of the smoking participants exhibited melanosis.

https://doi.org/10.56056/amj.2025.324

This might be attributed to the potential role of melanin in the detoxification of harmful substances, such as polycyclic amines and benzopyrenes commonly present in tobacco. Thus, a melanosis might serve as a mucosal protective mechanism against the detrimental effects of smoking.[4] This finding supports that of earlier studies by Mumcu[15] and Shaheen[16] who also indicated a higher prevalence of oral mucosal pigmentation among smokers compared to non-smokers. Concerning post-inflammatory pigmentation, chronic inflammatory mucosal conditions, particularly lichen planus, are known to cause mucosal pigmentation[5]. The current study documented five female participants exhibiting oral lichen planus on the buccal mucosa, characterized by multifocal light brown patches. Within the framework of tissue structure, there is an augmented production of melanin by melanocytes, resulting in the build-up of macrophages carrying melanin in the outermost layer of the connective tissue. However, there is a scarcity of available literature concerning its potential progression into a malignant state.[5].A deficiency in corticosteroid levels triggers the pituitary gland to produce and release elevated amounts of adrenocorticotropic hormone (ACTH). Consequently, this can lead to diffuse dark pigmented lesion of both oral mucosa and skin.[12] Within scope of this study, only one patient with a one-year history of Addison's disease was identified before their presentation; she was a 55-year-old female. The pigmentation manifested as dispersed light brown patches on the inner surface of the lower lip. Additionally, macular pigmentation was observable on the dorsal hands and palms. This finding resembles reported by Dantas.[17]Furthermore, (silver, mercury, and tin) as components of amalgam, are responsible for the most prevalent exogenous oral pigmentation, the so called (amalgam tattoo) which can be confused with melanin pigmentation. Thus, biopsy studies are indicated in such cases[18]. In the present study only one case was observed with amalgam tattoo located in gingival mucosa adjacent to an extracted amalgam tooth, which presented as small gray to black macule. This finding is similar to that reported by Luiz[19] who described a 2 mm black macule on the oral mucosa in age of 46 years old woman. Patient mentioned that a tooth containing an amalgam filling was removed from that area 15 years ago. Currently, the prevalence of tattoos in dental fillings has markedly decreased, a trend attributed to the widespread adoption of composite fillings. Finally, oral nevi were observed in two females. These nevi presented as asymptomatic, small about 2 mm, a well-defined macule characterized by a tan or brown color on the lower lip, typically exposed to sunlight. However, this observation contrasts with previously reported cases by Amérigo[20] and Shumway[21] where oral mucosal nevi were primarily located in the attached gingiva, buccal mucosa and hard palate. In present research, the gingival mucosa showed the highest occurrence of oral pigmented lesions at 80.1%, followed by the buccal mucosa at 64.5%. This discovery is consistent with a prior study conducted by Dhanuthai[22] who similarly reported that the majority of pigmented lesions were found in the gingiva, followed by the labial/buccal mucosa.In this study, only small patients were aware of their oral pigmented lesions, (17 females and 4 males) and the difference was significant. This discovery aligns with research conducted among the population in Jordan, indicating that female patients demonstrated a higher likelihood of being cognizant of their oral mucosal pigmentation compared to males[4]. This could be ascribed to the fact that females are more concern about their oral health and facial esthetics. However, it much less than with the Turkish study by Unsäl[23]

https://doi.org/10.56056/amj.2025.324

according to their findings, out of 496 participants, 14% responded positively when asked about their awareness of oral pigmentation.

Conclusion

The study provided valuable insights into the prevalence, causes, and patterns of oral mucosal pigmentation in a sample of Sulaimani dental patients that draw dentists' attention during routine examinations for better management. Oral mucosal pigmentation is a common finding in dental patients. The most frequent cause was the racial, followed by smoking. Gingiva, buccal, and labial mucosa were the frequently affected sites descendingly. Males showed more oral mucosal pigmentation than females, who display greater oral health awareness.

Disclosure:

The authors assert that they have no conflicts of interest.

References

1. Firoozi P, Noormohammadi R, Rafieyan S. Effect of environmental tobacco smoke on oral pigmentation: A systematic review. J Oral Health Oral Epidemiol. 2020;9(1):1–6.
2. Rotbeh A, Kazeminia M, Kalantari M, Rajati F. Global prevalence of oral pigmentation and its related factors: a systematic review and meta-analysis. J Stomatol Oral Maxillofac Surg. 2022;123(5): e411–24.
3. Gondak RO, da Silva-Jorge R, Jorge J, Lopes MA, Vargas PA, Silva-Jorge da R. Med Oral Patol Oral Cir Bucal. 2012;17(6):919–43.
4. Hassona Y, Sawair F, Al-karadsheh O, Scully C. Prevalence and clinical features of pigmented oral lesions. Int J Dermatol. 2016;55(9):1005–13.
5. Tarakji B, Umair A, Prasad D, Alsakran M. Diagnosis of oral pigmentations and malignant transformations. Singapore Dent J. 2014;35: 39–46.
6. Tavares TS, Meirelles DP, de Aguiar MCF, Caldeira PC. Pigmented lesions of the oral mucosa: A cross-sectional study of 458 histopathological specimens. Oral Dis. 2018;24(8):1484–91.
7. Eisen D. Disorders of pigmentation in the oral cavity. Clin Dermatol. 2000;18(5):579–87.
8. Rosebush MS, Briody AN, Cordell KG. Black and Brown: Non-neoplastic Pigmentation of the Oral Mucosa. Head Neck Pathol. 2019;13(1):47–55.
9. Albuquerque DM, Cunha JL, Roza AL, Arboleda LP, Santos-Silva AR, Lopes MA, et al. Oral pigmented lesions: a retrospective analysis from Brazil. Med Oral Patol Oral Cir Bucal. 2021;26(3): e284–91.
10. Suma GN, Prakash SMR, Rao D, Goel S. Blue rubber bleb nevus syndrome: Prominent oral findings. Indian J Dermatol Venereol Leprol. 2010 Mar 1;76(2):168–71.
11. Lee HY, Na SY, Son YM, Kang HK, Baek JO, Lee JR, et al. A malignant melanoma associated with a blue nevus of the lip. Ann Dermatol. 2010;22(1):119–24.
12. Alawi F. Pigmented lesions of the oral cavity: an update. Dent Clin North Am. 2013;57(4):699–710.
13. Kamble K, Guddad S, Nayak A, Suragimath A, Sanade A. Prevalence of Oral Mucosal Lesions in Western Maharashtra: A Prospective Study. J Indian Acad Oral Med Radiol.2017;29(4):282–7.
14. Collins JR, Brache M, Ogando G, Veras K, Rivera H. Prevalence of oral mucosal lesions in an adult population from eight communities in Santo Domingo, Dominican Republic. Acta Odontol Latinoam. 2021;34(3):249–56.
15. Mumcu G, Cimilli H, Sur H, Hayran O, Atalay T. Prevalence and distribution of oral lesions: a cross-sectional study in Turkey. Oral Dis. 2005;11(2):81–7.

https://doi.org/10.56056/amj.2025.324

16. Shaheen RS, Alsaif FM, Alghofaily GA, Alhumaid NS, Almusallam RZ, Alharthi R a. The Prevalence and Extent of Physiological and Pathological Gingival Pigmentation in Patients Visiting Riyadh Elm University Clinics. Pak J Med Health Sci.2021 Oct 30;15(10):3039–43.
17. Dantas TS, do Nascimento IV, Verde ME, Alves AP, Sousa FB, Mota MR. Multifocal oral melanoacanthoma associated with addison's disease and hyperthyroidism: A case report. Arch Endocrinol Metab. 2017 Aug 1;61(4):403–7.
18. Joska L, Venclikova Z, Poddana M, Benada O. The mechanism of gingiva metallic pigmentations formation. Clin Oral Investig. 2009 Mar 1;13(1):1–7.
19. Luiz J, Parizi S, Nai GA, Alborghetti G. Amalgam tattoo: a cause of sinusitis: J Appl Oral Sci. 2010 Jan-Feb;18(1):100-4.
20. Amérigo-Góngora M, Machuca-Portillo G, Torres-Lagares D, Lesclous P, Amérigo-Navarro J, González-Cámpora R. Clinicopathological and immunohistochemical analysis of oral melanocytic nevi and review of the literature. J Stomatol Oral Maxillofac Surg. 2017;118(3):151–5.
21. Shumway BS, Rawal YB, Allen CM, Kalmar JR, Magro CM. Oral Atypical Cellular Blue Nevus: An Infiltrative Melanocytic Proliferation. Head Neck Pathol. 2013;7(2):171–7.
22. Dhanuthai K, Theungtin N, Theungtin N, Thep-Akrapong P, Kintarak S, Klanrit P, et al. Pigmented Oral Lesions: A Multicenter Study. Eur J Dent. 2022 May 1;16(2):315–9.
23. Ünsal E, Paksoy C, Soykan E, Halil Elhan A. Oral melanin pigmentation related to smoking in a Turkish population Community. Dent Oral Epidemiol. 2001;29(4):272–9.

https://doi.org/10.56056/amj.2025.324