www.contempclindent.org
DOI: 10.4103/0976-237X.73205

Extensive physiologic melanin pigmentation on the tongue: An unusual clinical presentation

Sunira Chandra, Vaishali Keluskar[1], Anjana Bagewadi[1], Kunal Sah[2]

Abstract

Pigmented lesions are commonly found in the oral cavity. Pigmentation has a multifactorial etiology. Most of the oral pigmentations are physiologic but sometimes it can be a precursor of severe diseases. Evaluation of a patient presented with a pigmented lesion should include a full medical and dental history, extraoral and intraoral examinations and even in some cases biopsy and laboratory investigations are required. In this article, we report a case of extensive physiologic pigmentation on the tongue in a 32-year-old female patient, posing a diagnostic challenge.

Keywords: Melanin, physiologic, pigmentation, tongue

Introduction

Human oral mucosal epithelium is not uniformly colored and several degrees of chromatic variegation may be observed in physiologic and pathologic conditions.[1-6] The term "pigmentations of the oral mucosa"may be applied to a wide range of entities caused by the accumulation of one or more pigments and featuring a change in color of the tissues.[1-5]

Oral pigmentation occurs in all races.[7,8] There were no significant differences in the oral pigmentation between males and females.[9] The intensity and distribution of racial pigmentation of the oral mucosa is variable, not only between races, but also between different individuals of the same race and within different areas of the mouth.[10]

Pigmentation of the oral mucosa can occur due to a wide variety of lesions and conditions. Oral pigmentation has been associated with a variety of endogenous and exogenous etiologic factors.[11,12] Most pigmentations are caused by five primary pigments. These include melanin, melanoid, oxyhemoglobin, reduced hemoglobin, and carotene. Others are caused by bilirubin and iron.[4,9]

Departments of Oral Medicine and Radiology, Teerthanker Mahaveer Dental College & Research Centre, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India
[1]Department of Oral Medicine and Radiology, VK KLE Institute of Dental Sciences, KLE University, Belgaum, Karnataka, India
[2]Department of Oral & Maxillofacial Pathology and Microbiology, Teerthanker Mahaveer Dental College & Research Centre, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

Correspondence: Dr. Sunira Chandra,
Department of Oral Medicine and Radiology, Teerthankar Mahaveer Dental College & Research Centre, Teerthankar Mahaveer University, Delhi Road, Moradabad - 244 001, Uttar Pradesh, India E-mail: Sunira_chandra1@yahoo.co.in

Melanin is produced by melanocytes in the basal layer of the epithelium and is transferred to adjacent keratinocytes via membrane-bound organelles called melanosomes. Melanin is also synthesized by nevus cells, which are derived from the neural crest and are found in the skin and mucosa. Pigmented lesions caused by increased melanin deposition may be brown, blue, gray, or black, depending on the amount and location of melanin in the tissues.[1]

Most of the oral pigmentations are physiologic and are probably genetically determined.[4] Dummett suggested that the degree of pigmentation is partially related to mechanical, chemical, and physical stimulation.[13] In darker skinned people, oral pigmentation increases, but there is no difference in the number of melanocytes between fair-skinned and dark-skinned individuals. The variation is related to the differences in the activity of melanocytes.[10]

Case Report

A 32-year-old female patient presented with a chief complaint of pigmentation on the tongue. It was present since many years, with no change in color and size. She was asymptomatic. There was no history of trauma to the area. The patient was in good health and was not taking any medications. Her past dental, medical, and personal history was noncontributory.

Extraoral examination revealed no significant findings. Lymph nodes were not palpable. Intraoral examination showed a well-demarcated, smooth, dark brownish-black pigmented lesion, present on the right and left dorsolateral border of the tongue, measuring approximately 5–6 cm in diameter [Figure 1]. Another brownish-black pigmented lesion was present on the ventral surface, almost covering the tongue at the midline [Figure 2]. No other marked deformity or pigmented lesion was noted extraorally or intraorally. A thorough systemic examination of the patient was preformed and was noncontributory.

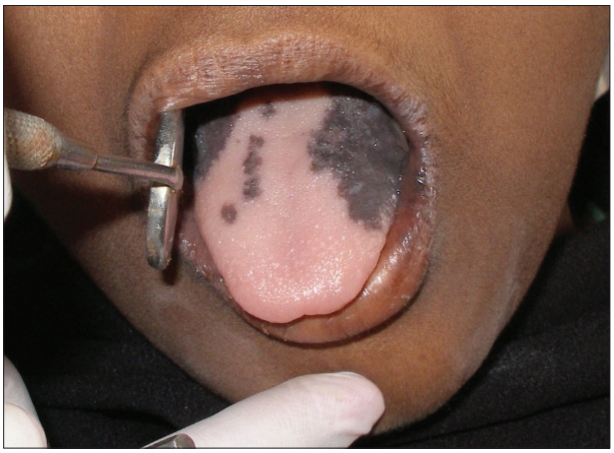

Figure 1: Clinical view of the patient showing extensive melanin pigmentation on the dorsal surface of tongue

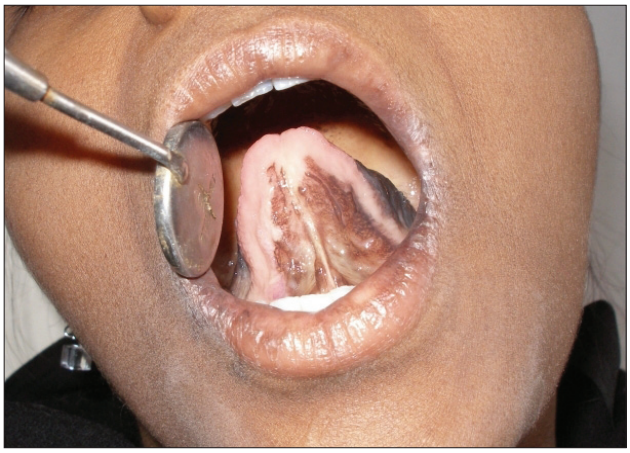

Figure 2: Clinical view of the patient showing extensive melanin pigmentation on the ventral surface of tongue

Differential diagnosis for brownish pigmentation depends on whether the lesion is focal (melanotic macule, nevus, melanoma), diffuse (ecchymosis, melanoma, drug induced), or multifocal (physiologic pigmentation, drug induced, oral lichen planus, and so on). Most of the pigmentations are benign but sometimes they can be malignant. By evaluating the patient's history, systemic condition, and clinical findings, a diagnosis of physiologic melanin pigmentation was made.

Discussion

Physiologic pigmentation of the oral mucosa is clinically manifested as multifocal or diffuse melanin pigmentation with variable prevalence in different ethnic groups.[2] Melanin is normally found in the skin, produced by melanocytes, its functions include absorption of ultraviolet light and scavenging of some cytotoxic compounds.[1]

Melanocytes were first identified in the oral epithelium by Becker[14] in 1927; a few years later they were isolated from samples of gingival tissue by Laidlaw and Cahn.[15] During early intrauterine life, the precursors of melanocytes, melanoblasts, migrate from the neural crest to the epidermis and the hair follicles, becoming differentiated into dendritic cells.[16-18] Head and neck region are the first site of the body where melanocytes appear after approximately 10 weeks of gestation.[18]

Melanocytes are located in the basal epithelial layer of squamous mucous membranes and do not contact each other. They are regularly interspersed between the basal keratinocytes. Melanocytic dendrites reach a number of keratinocytes in the close vicinity, and through these dendrites, melanin is transported and transmitted to these epithelial cells.[4,19,20] Normal melanocytes of the oral mucosa have a small, round nucleus and a small amount of a clear cytoplasm, with slender dendrites extending between adjacent keratinocytes. Melanocytes are devoid of desmosomes or attachment plates.[13] Melanin-containing electron-dense vesicles, so-called melanosomes, are formed within the cytoplasm and transported along the dendrites.[20]

The most specific histochemical method for labeling melanocytes is 3,4 dihydroxyphenylalanine, a substrate for tyrosinase. Other methods include argentaffinic melanin-labeling techniques, such as the Masson–Fontana staining. Inactive oral mucosal melanocytes, lacking melanin and melanin precursors, may not stain with this method.[19] Immunohistochemically, the S100 antigen is by far the most common marker used. S100 staining appears to be stronger in melanocytes lacking pigment. Another commonly used marker is HMB-45, a monoclonal antibody directed against a melanosomal glycoprotein. HMB-45 is not expressed by melanocytes that lack all melanogenic activity.[1]

Various stimuli, such as trauma, hormonal changes, medication, and radiation may result in an increased production of melanin.[12] An age-related increase of oral melanocytes has also been observed.[4]

Physiologic pigmentation, which is common in African, Asian, and Mediterranean populations, is due to greater melanocyte activity rather than a greater number of melanocytes.[5] Physiologic pigmentation develops during the first decades of life but may not come to the patient's attention until later.[21] The color ranges from light to dark brown. The attached gingiva is the most common intraoral site of such pigmentation, where it appears as a bilateral, well-demarcated, ribbon-like, dark brown band that usually spares the marginal gingiva.[1] Pigmentation of the buccal mucosa, hard palate, lips, and tongue may also be seen as brown patches with less well-defined borders. The physiologic pigmentation is asymptomatic, and no treatment is required.[3]

Most of the brownish pigmentation is physiologic but

sometimes it can be a precursor of severe diseases. Differential diagnosis includes the following: ecchymosis, drug induced, oral lichen planus, physiologic pigmentation, melanotic macule, nevus, and melanoma.[3]

In the present case, patient past medical, dental, drug, and personal history was evaluated. On intraoral examination, an extensive dark brownish, multifocal, flat pigmented lesion was present on the dorsal and ventral surface of the tongue, with no change in color and size since many years. Based on these findings, a diagnosis of physiologic melanin pigmentation was made.

Conclusion

Diagnosis of pigmented lesions of the oral cavity is a challenging task. Most of the oral pigmentations are physiologic but, sometimes it can be a precursor of severe diseases. Evaluation of a patient presented with a pigmented lesion should include a full medical and dental history, extraoral and intraoral examinations, and in some cases even biopsy and laboratory investigations are required for proper diagnosis.

References

1. Eisen D. Disorders of pigmentation in the oral cavity. Clin Dermatol 2000;18:579-87.
2. Lenane P, Powell FC. Oral pigmentation. J Eur Acad Dermatol Venereol 2000;14:448-65.
3. Kauzman A, Pavone M, Blanas N, Bradley G. Pigmented lesions of the oral cavity: Review, differential diagnosis, and case presentation. J Can Dent Assoc 2004;70:682-3.
4. Çiçek Y, Ertaş Ü. The normal and pathological pigmentation of oral mucous membrane: A review. J Contemp Dent Pract 2003;3:76-86.
5. Gaeta GM, Satriano RA, Baroni A. Oral pigmented lesions. Clin Dermatol 2002;20:286-8.
6. Nandapalan V, Roland NJ, Helliwell TR, Williams EM, Hamilton JW, Jones AS. Mucosal melanoma of the head and neck. Clin Otolaryngol 1998;23:107-16.
7. Perlmutter S, Tal H. Repigmentation of the gingiva following surgical injury. J Periodontol 1986;57:48-50.
8. Tamizi M, Taheri M. Treatment of severe physiologic gingival pigmentation with free gingival auto-graft. Quintessence Int 1996;27:555-8.
9. Steigmann S. Treatment of melanin-pigmented gingiva and oral mucosa by CO2 laser. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2000;90:14-5.
10. Özbayrak S, Dumlu A, Ercalik-Yalcinkaya S. Treatment of melanin-pigmented gingiva and oral mucosa by CO2 laser. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2000;90:14-5.
11. Meyerson MA, Cohen PR, Hymes SR. Lingual hyperpigmentation associated with minocycline theapy. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1995;79:180-4.
12. Amir E, Gorsky M, Buchner A, Sarnat H, Gat H. Physiologic pigmentation of the oral mucosa in Israeli children. Oral Surg Oral Med Oral Pathol 1991;71:396-8.
13. Dummett CO. Clinical observation on pigment variations in healthy oral tissues in the Negro. J Dent Res 1945;24:7-13.
14. Becker SW. Melanin pigmentation. Archs Dermatol Syphilol 1927;17:259-309.
15. Laidlaw GF, Cahn LR. Melanoblasts in the gum. J Dent Res 1932;12:534-7.
16. Takeda Y. Existence and distribution of melanocytes and HMB-45-positive cells in the human minor salivary glands. Pathol Intern 2000;50:15-9.
17. De Luca M, D'Anna F, Bondanza S, Tito Franzi A, Cancedda R. Human epithelial cells induce melanocyte growth *in vitro* but only skin keratinocytes regulates its proper differentiation in the absence of dermis. Eur J Cell Biol 1988;46:176-80.
18. Bolognia JL, Orlow SJ. Melanocyte biology. In: Bolognia JL, Jorizzo JL, Rapini RP, editors. Dermatology. 2nd ed. London: Mosby; 2003. p. 44.
19. Barrett AW, Scully C. Human oral mucosal melanocytes: A review. J Oral Pathol Med 1994;23:97-103.
20. Hicks MJ, Flaitz CM. Oral mucosal melanoma: Epidemiology and pathobiology. Oral Oncol 2000;36:152-69.
21. Kleinegger CL, Hammond HL, Finkelstein MW. Oral mucosal hyper-pigmentation secondary to antimalarial drug therapy. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2000;90:189-94.

Source of Support: Nil, **Conflict of Interest:** None declared.