

Understanding Systemic Diseases Featuring the Oral Sign and Symptoms: A Review Article

Gaurav Pratap Singh^{1*}, Atul Rathore¹, Radhika Gupta¹, Vaishali Malik², Ankit Goyal³

¹Department of Oral Medicine and Radiology, Index Institute of Dental Sciences, Indore, Madhya Pradesh, India.

²Department of Oral Medicine and Radiology, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, Uttar Pradesh, India.

³Department of Oral and Maxillofacial Pathology, Index Institute of Dental Sciences, Indore, Madhya Pradesh, India.

Abstract

The accurate examination of the oral cavity may acknowledge findings that demonstrate the presence of underlying systemic, which helps in earlier diagnosis as well as treatment. The oral tissues are accountable for damage as a disease's consequences that primarily affect other body systems. Various systemic diseases show oral manifestation. Some of these oral conditions include oral ulcers, caries, dry mouth, gingival bleeding, gingival hypertrophy, etc. This review article is prepared to make general physicians as well as dentists regarding systemic disorders or conditions that show dental or oral manifestations.

Keywords: Oral manifestations, Systemic diseases, Oral Medicine

INTRODUCTION

Inadequate oral health is utmost problem worldwide. There are many investigations done to check the relationship in-between various systemic diseases and oral health. Various epidemiology-based studies have relate the bad oral conditions with different conditions such as cardiovascular diseases, respiratory diseases, adverse pregnancy outcomes, stroke, malignant diseases, obesity, and rheumatoid arthritis.^[1-5] Oral inspection or investigation shows clinical features of various diseases such as hematologic conditions, endocrinopathies, immunologic diseases, nutritional disorder, and systemic infections.^[6] Mouth may be considered as a reflector of diseases or health. Various systemic diseases show their oral manifestation.^[7]

VARIOUS SYSTEMIC DISEASES WITH THEIR ORAL MANIFESTATION

Pulmonary disorder and oral manifestation

Chronic obstructive pulmonary diseases (COPD)

Smoking is considered as significant risk factors for COPD as well as periodontal abnormalities. As per the study conducted by Katancik *et al.* in 2005, they noted a remarkable relationship between periodontal disorders and airway obstruction.^[8] Another study was conducted by Prasanna in 2011 to check

the relationship between periodontal diseases and COPD. He proposed that periodontitis is an important risk factors for COPD.^[9] In the year 2014, Oztekin *et al.* in their study noted that there is the association between the periodontal diseases and COPD.^[10]

ASTHMA

According to Thomas *et al.*, the most common oral conditions which is related with asthma are periodontal diseases, dental cavities, oral candidiasis, and erosions.^[11] Principally asthmatic patients possess habit of breathing from mouth. As a result, gingival inflammation occurs due to alveolar mucosa dryness.^[12]

Tuberculosis

Pulmonary tuberculosis shows oral lesions in primary as well as secondary stages. According to Mignogna *et al.*, 0.05–5% of the TB patients shows oral lesions.^[13] Oral manifestations of tuberculosis can be seen in the form of ulcers, fissures,

Address for correspondence: Dr. Gaurav Pratap Singh,
Department of Oral Medicine and Radiology, Index Institute of
Dental Sciences, Indore, Madhya Pradesh, India.
Email: dr.gauravpsoffice@gmail.com

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nodules present on the lips, palate, or tongue, along with cervical lymphadenopathy.^[13,14]

Sarcoidosis

Sarcoidosis is an acquired systemic disease. Being a granulomatous disease, they show the occupancy of granulomas in lungs. Sarcoidosis shows some oral manifestations in the forms of local swellings, palatal ulceration, inflamed gingiva, and labial as well as buccal mucosa ulcerations.^[15]

Wegener granulomatosis

Wegener granulomatosis is considered as systemic diseases categorized as necrotizing granulomatous inflammation of small to medium vessels. The oral manifestations are expressed as oral mucosal ulceration or palatal ulceration and mobile tooth. “strawberry gingivitis” can be seen.^[16,17]

Pneumonia

Limeback^[18] observed in his study that a patient who is suffering from aspiration pneumonia should have poor oral hygiene. In another study done by Loesche and Lopatin,^[19] they noted that patients who are suffering from aspirational pneumonia have more chances of having periodontitis.

Gastrointestinal disorder and oral manifestation

Crohn's diseases

Oral manifestations noted in Crohn's disease are commonly seen in young patients with 20–50% prevalence range.^[20] The oral manifestations include papules, ulcers, and edema with most common locations such as gingiva, lips, and vestibular sulci.^[21,22] In their study, Dupuy *et al.* observed that 0.5% of the patients suffering from Crohn's disease shows oral manifestations. Oral lesions are nodular or linear or have diffuse mucosal thickenings. They are generally firm and painless while examine. However, if they are ulcers, they possess severe pain on pressing. These ulcers are constant and deep.^[23]

Ulcerative colitis

Pellicer *et al.*^[24] stated that ulcerative colitis shows oral manifestations in the form of superficial hemorrhagic ulcers, aphthous ulcers, or angular cheilitis. A study was conducted by Elahi *et al.*^[25] and they observed that patients having ulcerative colitis show a higher frequency of tongue coating, oral ulceration, acidic taste, halitosis, and dry mouth.

Celiac disease shows various oral manifestations. Patients having celiac disease exhibit increased possibility of developmental enamel defects mainly enamel hypoplasia.^[26] Due to the celiac disease, there is a decreased rate of flow of saliva which in turn results in a dry mouth.^[27]

In a study done by Avsar and Kalayci,^[28] he observed that children with celiac disease have an increased risk of enamel defects and these enamel defects are responsible for the occurrence of caries.

Gastro-esophageal reflux diseases (GERD)

A study was conducted by Di Fede *et al.*^[29] in which he noted the significant relationship between GERD and erythema of palatal

mucosa as well as uvula. Wang *et al.*^[30] in their study observed a significant relationship between gerd and dental erosions.

Schroeder *et al.*^[31] in their study also observed that dental erosion is usually seen in GERD patients. Another oral manifestation seen in GERD is halitosis. Moshkowitz *et al.* conducted a study to analyze the association between GERD and halitosis. They observed that halitosis is a routine manifestation of GERD.^[32]

Hematologic disorder and oral manifestation

Anemia

The most frequent hematologic disorder is anemia. Iron deficiency anemia shows oral manifestation in the form of mucosal pallor, atrophic glossitis, and angular cheilitis.^[33] Sickle cell anemia shows mandibular salmonella osteomyelitis, pulpal necrosis, and mandibular nerve paresthesia as oral manifestations. Furthermore, they show enamel hypomineralization, orofacial pain as well as diastema.^[34-36]

Leukemia

Leukemia shows various forms of oral manifestation which includes petechiae, gingival hypertrophy, ecchymosis, hemorrhage, and mucosal ulcers.^[37] Numb chin syndrome may be seen occasionally.^[38] In the case of acute myeloid leukemia, the most common oral features seen are oral ulceration, gingival bleeding, and gingival hyperplasia. Furthermore, spontaneous bleeding can be seen in the palate, gingiva, lips, or tongue. Oral ulcerations can be noted very common.^[39-41] In those patients who are suffering from acute lymphoblastic leukemia, oral features include gingival bleeding, ecchymoses along with lymphadenopathy which is persistent sign.^[42] In addition, in the case of chronic lymphocytic leukemia, oral features seen include localized swelling with pain and ulcers. Gingival bleeding as well as purpura can be noted.^[41,43] Some features like gingival leukemic infiltration and palatal enlargement are linked with chronic lymphocytic leukemia.^[44,45]

Liver diseases and oral manifestation

In liver malfunctioning, the oral cavity displays some manifestations in the form of gingivitis, gingival bleeding, mucosal membrane jaundice, petechiae, fetor hepaticus, xerostomia, and atrophic tongue. Chronic periodontal disease is most commonly seen in these patients.^[46-48] Some manifestations such as gingivitis, angular cheilitis, and glossitis can be seen in patients suffering from alcoholic hepatitis.^[46,49] A study was conducted by Bagan *et al.*^[50] to check the dental status in patients having cirrhosis of the liver. He noted the remarkable number of missing teeth and carious teeth in patients with cirrhosis of the liver and he concluded that substandard dental status was seen.

Renal diseases and oral manifestation

Renal diseases may show various oral manifestations. These include mucositis, stomatitis, and glossitis which in turn leads to inflammation along with pain of oral mucosa and tongue. Furthermore, some other manifestations, such as dysgeusia, candidal infection, and altered taste sensations are established due to renal diseases.^[51]

In a study done by Martins *et al.*,^[52] they observed that those chronic renal failure patients (children and adolescents) undergoing hemodialysis, may show oral manifestations which include delayed tooth eruption, dry mouth, dental stains, and calculus. Koch *et al.*^[53] in their study noted that cases of chronic renal failure may influence the development of enamel in primary teeth which results in enamel hypoplasia.

Galili *et al.*^[54] in 1991 conducted a study to compare the dental pulp size in chronic renal diseases with healthy controls. He observed the significant relationship between renal diseases and the narrowing of pulp in premolar as well as molar teeth. Jaffe *et al.*^[55] in their study concluded that children suffering from chronic renal failure show delay in dental maturation.

Endocrine disorders and oral manifestation

Diabetes mellitus

It shows the number of oral manifestations. Most number of patients suffering from diabetes shows xerostomia due to restricted salivary flow and a rise in salivary glucose level. Other factors which contribute to oral manifestations include increased vulnerability to infections, collection of plaque and food debris, poor healing, etc.^[56]

Falk *et al.*^[57] has observed the high frequency of dental caries in poorly controlled diabetic patients. Furthermore, these patients show the occurrence of loss of periodontal attachment.^[58]

Hyperparathyroidism

The most common oral manifestations seen in the oral cavity include mobility of teeth, loss of bone density, variations in tooth eruption calcifications of soft tissue. Furthermore, loss of lamina dura with changes in jaw trabecular pattern can be seen.^[59-62]

Hypoparathyroidism

The most common manifestation seen in hypoparathyroidism is enamel hypoplasia and delayed eruption.^[63] Some teeth show root malformation along with interruption in the dental development and growth.^[64] Facial twitching with lip or tongue paresthesia can also occur. Radiographic features such as wide root canal, large pulp chambers, and thickened lamina dura are some other oral manifestations.^[65,66]

Hyperthyroidism

Variety of oral manifestations is seen in cases of hyperthyroidism. Periodontal diseases, osteoporosis of the maxillary or mandibular portion of the jaw, increased vulnerability to dental caries, and expedited dental growth.^[67]

Hypothyroidism

Hypothyroidism shows various oral manifestations which appear in the form of dysgeusia, substandard periodontal conditions, enlarged tongue, and delayed healing of wound.^[68]

CONCLUSION

The consequence of systemic diseases on the oral cavity is well noted and it includes various soft tissue and hard tissue

abnormality as well as pathology. Oral manifestation is the first sign of systemic diseases. General physicians and dentists need to be mindful of understanding the oral complaints.

REFERENCES

1. Lux J. Review of the oral disease-systemic disease link. Part I: Heart disease, diabetes. Can J Dent Hyg 2006;40:288-342.
2. Lux J. Review of the oral disease-systemic disease link. Part II: Preterm low birth weight babies, respiratory disease. Can J Dent Hyg 2007;41:8-21.
3. Kinane D, Bouchard P. Periodontal diseases and health: Consensus report on the sixth European workshop on periodontology. J Clin Periodontol 2008;35:333-7.
4. Seymour GJ, Ford PJ, Cullinan MP. Relationship between periodontal infections and systemic disease. Clin Microbiol Infect 2007;13:3-10.
5. Seymour RA. Is gum disease killing your patient? Br Dent J 2009;206:551-2.
6. Xiong X, Buckens P, Fraser WD, Beck J, Offenbacher S. Periodontal disease and adverse pregnancy outcomes: A systematic review. BJOG 2006;113:135-43.
7. Long RG, Hlousek L, Doyle JL. Oral manifestations of systemic diseases. Mt Sinai J Med 1998;65:309-15.
8. Katancik JA, Kritchevsky S, Weyant RJ, Corby P, Bretz W, Crapo RO, *et al.* Periodontitis and airway obstruction. J Periodontol 2005;76:2161-7.
9. Prasanna SJ. Causal relationship between periodontitis and chronic obstructive pulmonary disease. J Indian Soc Periodontol 2011;15:359-65.
10. Oztekin G, Baser U, Kucukcoskun M, Tanrikulu-Kucuk S, Ademoglu E, Isik G, *et al.* The association between periodontal disease and chronic obstructive pulmonary disease: A case control study. COPD 2014;11:424-30.
11. Thomas MS, Parolia A, Kundabala M, Vikram M. Asthma and oral health: A review. Aust Dent J 2010;55:128-33.
12. Stensson M, Wendt LK, Koch G, Oldaeus G, Birkhed D. Oral health in preschool children with asthma. Int J Paediatr Dent 2008;18:243-50.
13. Mignogna MD, Muzio LL, Favia G, Ruoppo E, Sammartino G, Zarrelli C, *et al.* Oral tuberculosis: A clinical evaluation of 42 cases. Oral Dis 2000;6:25-30.
14. Sezer B, Zeytinoglu M, Tuncay U, Unal T. Oral mucosal ulceration: A manifestation of previously undiagnosed pulmonary tuberculosis. J Am Dent Assoc 2004;135:336-40.
15. Suresh L, Radfar L. Oral sarcoidosis: A review of literature. Oral Dis 2005;11:138-45.
16. Ruokonen H, Helve T, Arola J, Hietanen J, Lindqvist C, Hagstrom J. "Strawberry like" gingivitis being the first sign of Wegener's granulomatosis. Eur J Intern Med 2009;20:651-3.
17. Aravena V, Beltran V, Cantin M, Fuentes R. Gingival hyperplasia being the first sign of Wegener's granulomatosis. Int J Clin Exp Med 2014;7:2373-6.
18. Limeback H. The relationship between oral health and systemic infections among elderly residents of chronic care facilities. Gerodontology 1988;7:131-7.
19. Loesche WJ, Lopatin DE. Interactions between periodontal disease, medical diseases and immunity in the older individual. Periodontology 2000;16:80-105.
20. Lisciandrano D, Ranzi T, Carrassi A, Sardella A, Campanini MC, Velio P, *et al.* Prevalence of oral lesions in inflammatory bowel disease. Am J Gastroenterol 1996;91:7-10.
21. Lankarani KB, Sivandzadeh GR, Hassanpour S. Oral manifestation in inflammatory bowel disease: A review. World J Gastroenterol 2013;19:8571-9.
22. Plauth M, Jenss H, Meyle J. Oral manifestations of Crohn's disease: An analysis of 79 cases. J Clin Gastroenterol 1991;13:29-37.
23. Dupuy A, Cosnes J, Revuz J, Delchier JC, Gendre JP, Cosnes A. Oral Crohn disease: Clinical characteristics and long-term Follow up of 9 cases. Arch Dermatol 1999;135:439-42.
24. Pellicer Z, Santiago JM, Rodriguez A, Alonso V, Antón R, Bosca MM. Management of cutaneous disorders related to inflammatory bowel disease. Ann Gastroenterol 2012;25:21-6.
25. Elahi M, Telkabadi M, Samadi V, Vakili H. Association of oral

- manifestations with ulcerative colitis. *Gastroenterol Hepatol Bed Bench* 2012;5:155-60.
26. Mantegazza C, Paglia M, Angiero F, Crippa R. Oral manifestations of gastrointestinal diseases in children. Part 4: Coeliac disease. *Eur J Paediatr Dent* 2016;17:332-4.
 27. Costacurta M, Maturro P, Bartolino M, Docimo R. Oral manifestations of coeliac disease. *Oral Implantol (Rome)* 2010;3:12-9.
 28. Avşar A, Kalayci AG. The presence and distribution of dental enamel defects and caries in children with celiac disease. *Turk J Pediatr* 2008;50:45-50.
 29. Di Fede O, Di Liberto C, Occhipinti G, Vigneri S, Lo Russo L, Fedele S, *et al.* Oral manifestations in patients with gastro-oesophageal reflux disease: A single center case control study. *J Oral Pathol Med* 2008;37:336-40.
 30. Wang GR, Zhang H, Wang ZG, Jiang GS, Guo CH. Relationship between dental erosion and respiratory symptoms in patients with gastro-oesophageal reflux disease. *J Dent* 2010;38:892-8.
 31. Schroeder PL, Filler SJ, Ramirez B, Lazarchik DA, Vaezi MF, Richter JE. Dental erosion and acid reflux disease. *Ann Intern Med* 1995;122:809-15.
 32. Moshkowitz M, Horowitz N, Leshno M, Halpern Z. Halitosis and gastroesophageal reflux disease: A possible association. *Oral Dis* 2007;13:581-5.
 33. McFarlane DB, Pinderton PH, Dagg JH, Goldberg A. Incidence of iron deficiency, with and without anaemia, in women in general practice. *Br J Haematol* 1967;13:790-6.
 34. Kelleher M, Bishop K, Briggs P. Oral complications associated with sickle cell anemia: A review and case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1996;82:225-8.
 35. Andrews CH, England MC Jr., Kemp WB. Sickle cell anemia: An etiological factor in pulpal necrosis. *J Endod* 1986;9:249-52.
 36. Taylor LB, Nowak AJ, Giller RH, Casamassimo PS. Sickle cell anemia: A review of the dental concerns and a retrospective study of dental and bony changes. *Spec Care Dentist* 1995;15:38-42.
 37. Lynch MA, Ship II. Initial oral manifestations of leukaemia. *J Am Dent Assoc* 1967;75:932-40.
 38. Hiraki A, Nakamura S, Abe K, Takenoshita Y, Horinouchi Y, Shinohara M, *et al.* Numb chin syndrome as an initial symptom of acute lymphocytic leukemia: Report of three cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1997;83:555-61.
 39. Stafford R, Sonis S, Lockhart P, Sonis A. Oral pathoses as diagnostic indicators in leukemia. *Oral Surgery Oral Med Oral Pathol* 1980;50:134-9.
 40. Cooper CL, Loewen R, Shore T. Gingival hyperplasia complicating acute myelomonocytic leukemia. *J Can Dent Assoc* 2000;66:78-9.
 41. Hou GL, Huang JS, Tsai CC. Analysis of oral manifestations of leukemia: A retrospective study. *Oral Dis* 1997;3:31-8.
 42. Declerck D, Vinckier F. Oral complications of leukemia. *Quintessence Int* 1988;19:575-83.
 43. Kemp S, Gallagher G, Kabani S, Noonan V, O'Hara C. Oral non-Hodgkin's lymphoma: Review of the literature and World Health Organization classification with reference to 40 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;105:194-201.
 44. Presant CA, Safdar SH, Cherrick H. Gingival leukemic infiltration in chronic lymphocytic leukemia. *Oral Surg Oral Med Oral Pathol* 1973;36:672-4.
 45. Henefer E, Nelson J, Beaupre E. Palatal enlargement in chronic lymphocytic leukemia: Report of case. *J Oral Surg* 1970;28:371-5.
 46. Golla K, Epstein JB, Cabay RJ. Liver disease: Current perspectives on medical and dental management. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2004;98:516-21.
 47. Hazin R, Abu-Rajab Tamimi TI, Abuzetun JY, Zein NN. Recognizing and treating cutaneous signs of liver disease. *Cleve Clin J Med* 2009;76:599-606.
 48. Grau-García-Moreno DM. Dental management of patients with liver disease. *Med Oral* 2003;8:231.
 49. Friedlander AH, Marder SR, Piseigna JR, Yagiela JA. Alcohol abuse and dependence: Psychopathology, medical management and dental implications. *J Am Dent Assoc* 2003;134:731-40.
 50. Bagan JV, Alapont L, Sanz C, del Olmo JA, Morcillo E, Cortijo J, *et al.* Dental and salivary alterations in patients with liver cirrhosis: A study of 100 cases. *Med Clin (Barc)* 1998;111:125-8.
 51. Thomas C. The roles of inflammation and oral care in the overall wellness of patients living with chronic kidney disease. *Dent Econ* 2008;98:111-20.
 52. Martins C, Siqueira WL, Guimaraes Primo LS. Oral and salivary flow characteristics of a group of Brazilian children and adolescents with chronic renal failure. *Pediatr Nephrol* 2008;23:619-24.
 53. Koch MJ, Buhner R, Pioch T, Schärer K. Enamel hypoplasia of primary teeth in chronic renal failure. *Pediatr Nephrol* 1999;13:68-72.
 54. Galili D, Berger E, Kaufman E. Pulp narrowing in renal end stage and transplanted patients. *J Endod* 1991;17:442-3.
 55. Jaffe EC, Roberts J, Chantler C, Carter JE. Dental maturity in children with chronic renal failure assessed from dental panoramic tomographs. *J Int Assoc Dent Child* 1990;20:54-8.
 56. Rees TD. The diabetic dental patient. *Dent Clin North Am* 1994;38:447-63.
 57. Falk H, Hugoson A, Thorstensson H. Number of teeth, prevalence of caries and periapical lesions in insulin-dependent diabetics. *Scand J Dent Res* 1989;97:198-206.
 58. Chi A, Neville BW, Krayner JW, Gonsalves WC. Oral manifestations of systemic disease. *Am Fam Physician* 2010;82:1381-8.
 59. Silverman S Jr., Ware WH, Gillooly C Jr. Dental aspects of hyperparathyroidism. *Oral Surg Oral Med Oral Pathol* 1968;26:184-9.
 60. Silverman S Jr., Gordan G, Grant T, Steinbach H, Eisenberg E, Manson R. The dental structures in primary hyperparathyroidism. Studies in forty-two consecutive patients. *Oral Surg Oral Med Oral Pathol* 1962;15:426-36.
 61. Bridge AJ. Primary hyperparathyroidism presenting as a dental problem. *Br Dent J* 1968;124:172-6.
 62. Hayes CW, Conway WF. Hyperparathyroidism. *Radiol Clin North Am* 1991;29:85-96.
 63. Goepferd SJ, Flaitz CM. Enamel hypoplasia associated with congenital hypoparathyroidism. *Pediatr Dent* 1981;3:196-200.
 64. Kelly A, Pomarico L, de Souza IP. Cessation of dental development in a child with idiopathic hypoparathyroidism: A 5-year follow-up. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;107:673-7.
 65. Takeuchi H, Hioki H, Ishikura Y, Tomizawa M, Noda T, Fukushima M. Dental findings in a case of idiopathic hypoparathyroidism. *Shoni Shikagaku Zasshi* 1989;27:678-91.
 66. Hansted C, Holst G. Changes in dental tissue in hypoparathyroidism. *Acta Odontol Scand* 1952;10:71-4.
 67. Pinto A, Glick M. Management of patients with the thyroid disease: Oral health considerations. *J Am Dent Assoc* 2002;133:849-58.
 68. Young ER. The thyroid gland and the dental practitioner. *J Can Dent Assoc* 1989;55:903-7.