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# ORAL MANIFESTATIONS OF ANEMIA: A REVIEW

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## ABSTRACT

Oral cavity is the mirror of systemic health. Anemia is one such condition, which manifests itself in oral cavity. Anemic disorders such as iron deficiency anemia, Plummer Vinson syndrome, sickle cell anemia, thalassemia and aplastic anemia, affects oral cavity significantly. The common manifestations of anemia include pale mucosa, angular chelitis, glossitis, dysphagia, stomatitis etc. Mostly the manifestations are non-specific, but the dental surgeon must be aware of all, and should be able to diagnose the underlying cause.

**KEYWORDS:** Anemia; Angular Chelitis; Stomatitis; Glossitis.

## INTRODUCTION

Anemia is defined as a condition in which the total haemoglobin (Hb) level or number of red blood cells (RBCs) is poorly lowered. The World Health Organisation (WHO) defines anemia as Hb< 130g/L in men above 15 years, 110 g/L in pregnant women and <120g/L in non-pregnant women above 15 years of age.[1] The main etiology of anemia include, blood loss, decreased red cell production, and increased red cell destruction. Blood loss is the most common cause of anemia. The non-specific systemic signs and symptoms of anemia include mucous membrane pallor, tachypnea, raised jugular venous pressure, flow murmurs, postural hypotension, tachycardia, tiredness, light headedness, breathlessness, vetigo, development/ worsening of ischemic conditions.[2] Along with these systemic manifestations, anemia may also manifest certain oral manifestations, some of which are specific and some are non-specific to the condition which include mucosal pallor, angular chelitis, stomatitis, periodontal degeneration, dysphagia, depapillation of tongue etc.[3]

The study of orofacial manifestations of these disorders is important because these orofacial signs and symptoms may be the first clinical presentation that alerts the dentist/hematologist to an underlying hematological disorder.[4]

### Oral Manifestations of Anemia

**Anemia owing to decreased production of red cells**

- **Pernicious anemia/vitamin B12 deficiency anemia:** Pernicious Anemia is an autoimmune atrophic gastritis that leads to the deficiency in Vitamin B12 due to its malabsorption, this malabsorption is the result of deficiency of intrinsic factor, a protein that promotes its transport to the terminal ileum for absorption.[5] Intrinsic factor is necessary for the absorption of vitamin B12, which in turn is necessary for the formation of red blood cells.[6] The patients with pernicious anemia usually complaint of burning sensation in the lips, mucosal sites and tongue (glossopyrosis). The tongue and mucosa may be smooth (because of papillary atrophy in case of tongue) or may have patchy areas of erythema. In literature, cases with aphthous like ulcerations, dysphagia and taste alteration have also been reported.[7]

- **Aplastic anemia:** Aplastic anemia is a serious and often fatal hematologic disorder, which is characterized by hypoplastic bone marrow and peripheral pancytopenia. It is a rare, non-contagious and potentially life threatening disorder, which is caused by destruction of pluripotent stem cells in the bone marrow, thus giving rise to symptoms caused due to anemia, thrombocytopenia and neutropenia.[8] The oral manifestations of aplastic anemia may be the very first clinical symptoms of the disease and are directly associated to pancytopenia. The common features include petechial purpuric spots or frank mucosal hematomas of oral mucosa at any site, while gingival hemorrhage may be seen in some cases, these findings are seen because of platelet deficiency. Ulcerative lesions of oral mucosa and pharynx are seen as the result of lack of resistance of infection due to neutropenia.[9]

**Anemia owing to blood loss**

- **Iron deficiency anemia:** Iron deficiency anemia is characterized by incomplete synthesis of haemoglobin that results in microcytic and hypochromic red blood cells. Due to inadequate haemoglobin, there is reduction in the ability of blood to deliver oxygen to the other body cells and tissues.[10] Glossitis, glossodynia, angular cheilitis, erythematous mucositis, oral candidiasis, recurrent oral ulcers and burning mouth are the common oral complaints and iron deficiency anemia should be suspected in any such case.[11]
- **Plummer Vinson syndrome:** It is also known as Patterson–Brown–Kelly syndrome, and is characterized by iron deficiency anemia along with atrophic glossitis or angular cheilitis and dysphagia due to pharyngoesophageal ulcerations and esophageal webs. It is also associated with koilonychias or spoon nails.[12]

**Hemolytic anemia**

- **Sickle cell anemia:** It is characterized by a hemoglobin gene mutation, in which there is replacement of amino acid glutamic acid by valine, in the sixth position on the β-hemoglobin chain. As a result, the normal biconcave discoid shape of erythrocytes is distorted, and presents as sickle shape and the normal lifetime of 120 days is reduced to 14 days.[6] It is characterized by various oro-facial manifestations which include, "step-ladder" trabeculae pattern enamel hypomineralization, calcified canals, diastema, increased overbite and increased overjet.[13] Anesthesia or paresthesia of the mental nerve[14] and asymptomatic pulp necrosis may also be seen.[15] Osteomyelitis of mandible is one common complication.[16] Interruption of blood supply may lead to anesthesia of inferior alveolar nerve.[17]
- **Thalassemia:** These are heterogenous group of inherited disorders, which are caused by mutations resulting in decrease of rate of synthesis of α or β chains, which leads to deficiency of hemoglobin, with additional secondary red cell abnormalities caused by the relative excess of the other unaffected globin chain.[18] The most common orofacial manifestations are because of compensatory hyperplasia of the marrow and expansion of the marrow cavity.[19] The radiographic features of jaws and teeth in patients with thalassemia include, attenuated lamina dura, taurodontism, spiky shaped and short roots, enlarged bone marrow spaces, small maxillary sinus and absence of inferior alveolar canal.[20] The oral manifestation of thalassemia include overdevelopment of maxilla and mandible secondary to bone marrow hyperplasia, which leads to prominent cheekbones, sunken nose and labially inclined maxillary incisors, giving rise to incompetent lips, this representation is referred to as "rodent or chipmunk facies".[21]

## CONCLUSION

A large number of systemic disorders have oral manifestations, which sometimes could be the first symptoms of the disease. Anemia is one such condition, which manifests itself orally before any other systemic symptoms. Although, the findings are non-specific, but a little knowledge of the subject can help the dental surgeon to diagnose any underlying condition and hence help the patient for proper referral and treatment.

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