

Dentistry in Medically Compromised Patients

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ABSTRACT

Important physiologic processes like digestion, respiration and speech are performed from the oral cavity making it one of the most vital anatomical locations in human body. Signs of systemic disease are often manifested in the oral cavity before the disease itself was suspected or diagnosed. The various tissues including lips, tongue, gingiva, mucosal surfaces, dentition, and bone are involved in the presentation of a disease state. With the recent advances in medicine, the prognosis of medically compromised children is becoming better with earlier diagnosis, and new treatment principles. The present article reviews oral manifestations of various systemic diseases and their medical and dental management.

KEYWORDS: Oral Cavity, Oral Manifestations, Systemic Diseases

INTRODUCTION

Mouth is a mirror of health or disease, a sentinel or early warning system. As the gateway to the body, a constant barrage of invaders like bacteria, viruses, parasites, and fungi challenges the mouth. Many systemic diseases have oral manifestations like lesions or ulcers that may develop on the oral mucosa, tongue, gingiva, extraoral skin and other related structures. Appropriate diagnosis of disease and proper treatment should be plan for these oral manifestations.¹ Medically compromised children have an increased risk to develop an oral disease, because the disease itself may include oral manifestations. Furthermore, the treatment or medication prescribed may result in decreased host resistance and side effects in the oral cavity. Untreated dental disease in medically compromised children can significantly affect their general health and quality of life. Indeed, in some conditions, an acute dental infection can be life threatening.²

Dental disease can negatively affect the success of the medical treatment. Because of this risk to health, or even to life, their dental care is of vital importance. Medically compromised children should be given the highest priority for comprehensive, preventive dental care from as early as an age possible. Oral hygiene is extremely important for the prevention of oral diseases. However, in the case of medically compromised children, prevention of dental disease becomes more important because sometimes, dental disease can be life-threatening. Optimum oral health is always important to the physical well-being of medically compromised children and contributes to the success of many surgically corrected congenital malformations and organ transplantations. On

the contrary, poor oral health and neglect adversely affect the outcome of surgical interventions and the progress of the disorder.²

This article is a brief overview of the various oral manifestations associated with systemic diseases and their dental management.

VARIOUS MEDICALLY COMPROMISED CONDITIONS

Congenital Heart Disease: Congenital Heart Disease (CHD) occurs when the heart or blood vessels near the heart do not develop properly before birth. The blood flow is obstructed, and it put a strain on the heart muscle causing the heart to work harder and beat faster.³ Dental management of children with CHD requires special attention, because of their heightened susceptibility to infectious endocarditis, associated with bacteremia induced by invasive dental procedures.⁴

Oral Manifestations

- Development defects of enamel
- Delayed tooth eruption
- Increased risk of dental caries
- Xerostomia
- Papillary changes
- Patients with CHD along with cyanosis, pale tissues, cleft lip and palate.⁵

Dental Management: According to American Heart Association (AHA) antibiotic prophylaxis recommended in all dental procedures involving the periodontal procedures, dental extractions, endodontic surgery beyond the apex, dental implant placement and

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reimplantation of avulsed teeth, initial placement of brackets, biopsies, and prophylactic teeth cleaning where bleeding is anticipated. Prophylaxis in turn is not recommended in the routine injection of anesthetic solutions in non-infected tissues, dental X-rays, the placement of removable dentures or appliances.

Situation	Agent	Single dose 30-60 min before procedure	
		Adults	Children
Standard general prophylaxis (oral)	Amoxicillin	2gr	50 mg/kg (maximum 2 gr)
Unable to take oral medication	Ampicillin Cefazolin or Ceftriaxone	2 gr im or iv 1gr im or iv	50 mg/kg im or iv 50 mg/kg im or iv
Allergic to Penicillin's			
Oral	Cephalexin	2gr	50 mg/kg
	Clindamycin	600 mg	20 mg/kg
	Azithromycin or Clarithromycin	500 mg	15 mg/kg
	Unable to take oral medication	Cefazolin or Ceftriaxone Clindamycin	1g im or iv 600 mg im or iv

Table 1: Medications and Treatment Plan options

Asthma: Asthma is a common long-term inflammatory disease of the airways. It causes the obstruction of airflow due to chronic airway inflammation or increased airway hyper-responsiveness.⁷ Its correlation to Oral health has been listed in Table 2.

Oral health condition	Possible Causes
Dental Caries	<ul style="list-style-type: none"> beta-2 agonist causes decreased in salivary flow rate <i>Lactobacilli</i> and <i>Streptococcus mutans</i> count increased Use of inhalers causes decreased in the salivary and plaque pH Anti-asthma medications contains fermentable carbohydrate (lactose monohydrate) To tolerate the taste of medication consumption of cariogenic drinks increases.
Dental Erosion	<ul style="list-style-type: none"> Prolonged use of beta-2 agonist causes reduced buffering capacity and salivary flow rate. Exposure of teeth to acids increased Extrinsic source like acidic soft drinks, acidity of medication Intrinsic source like Gastro-oesophageal reflux
Periodontal Diseases	<ul style="list-style-type: none"> salivary flow rate and concentration of secretory IgA reduced and causes alteration in salivary protection Mouth breathing habit causes dehydration of alveolar mucosa Increased concentration of IgE in gingival tissue altered immune responses Increased levels of calcium and phosphorous in saliva causes more calculus deposition. Long term use of inhaled corticosteroids causes decreased in bone mineral density
Oral Candidiasis	<ul style="list-style-type: none"> Generalized immunosuppressive and anti-inflammatory attributed to the use of steroids Growth and proliferation of <i>Candida</i> due to increased glucose concentration in saliva. Reduced salivary flow rate

Table 2: Oral manifestations and their possible causes in asthmatics

Preventive measures

- Educate the parent, care taker, and the asthmatic patients about the increased susceptibility to oral health problems.
- Regular dental check-ups

- Precautionary oral hygiene practices should be carried out like caries preventive measures (fluoride supplements and pit and fissure sealants), use of antimicrobial mouthwashes, rinse the mouth immediately after using an inhaler, drink water more often to counteract dry mouth, and use sugar-free chewing gum to increase salivary output.
- Use inhaler properly advised spacer device that deliver the inhaled drugs directly to the airway
- Inhaled corticosteroids should be administered in lowest possible dose
- Oral candidiasis can be prevented by the application of topical ointments (antimycotics) prevent.⁸

Diabetes Mellitus: Diabetes mellitus is a chronic metabolic diseases resulting from defects in insulin secretion, insulin action or both. Insulin secreted from beta cells of the islet of Langerhans of the pancreas, utilize glucose from digested food as an energy source. In Type 1 Diabetes, the body does not produce insulin, and daily insulin injections are required. It is usually diagnosed during childhood or early adolescence, and it affects about 1 in every 600 children.⁹

About a third of diabetic patients complain of xerostomia, which may be due to an overall diminished flow of saliva and an increased salivary glucose level. Concomitant diffuse, non-tender, bilateral enlargement of the parotid glands, called diabetic sialadenosis, may be seen in these patients. Xerostomia (dry mouth), results in increased susceptibility to opportunistic infections like *Candida albicans*. Other oral manifestation includes erythematous candidiasis presenting as central papillary atrophy of the dorsal tongue papillae, mucormycosis, benign migratory glossitis, altered taste and burning mouth syndrome. The increased glucose levels in the saliva and crevicular fluid in poorly controlled diabetes result in high incidence of dental caries.¹

Dental Management: The dental management depends upon the type of Diabetes as explained below (Table 3)¹⁰

Non-insulin Dependent Patients	Insulin Controlled Patients	If Extensive Surgery Needed
- All dental procedures can be performed without special precautions, unless complication of diabetes present.	- All dental procedures can be performed. - Early morning appointments patients advised taking usual insulin dosage and normal meals on day of appointment. - If symptoms of insulin reaction occur, informed to dentist before procedure. - Source of glucose available and given to the patients if symptoms of insulin reaction occur.	- Dietary consultation required with physician during postoperative period. - Antibiotic prophylaxis can be considered for patients with brittle diabetes and those taking high dose of insulin which also have chronic status of oral infections.

Table 3: Dental Management of Patients with Diabetes

Anaemia: Iron deficiency anemia is the most common hematologic disorder with characteristic oral manifestations including atrophic glossitis, mucosal pallor, and

angular cheilitis. Plummer Vinson Syndrome’s oral manifestation includes dysphagia due to pharyngo-esophageal ulcerations. Oral complications seen with sickle cell anemia include mandibular salmonella osteomyelitis that results in areas of osteoporosis and erosion followed by osteosclerosis.¹

Management: There are many different treatments for anemia, and it depends on the severity and the cause.

Oral supplements: Ferrous Sulfate, Ferrous Fumarate, or Ferrous Gluconate. Absorption of iron in the body increases with Vitamin C, so taking oral iron supplements with orange juice is of benefit.¹¹

Injectable Iron: It can be given concurrently with erythropoietin to ensure sufficient iron for increased rates of erythropoiesis.¹²

Blood Transfusions: In patients with hemoglobin below 60 to 80 g/L (6 to 8 g/dL).¹³

Hyperbaric oxygen (HBO): When patient’s condition is critical, blood transfusion is not possible due to medical or religious reason than HBO indicated to deliver oxygen into tissues. In conditions like blood product incompatibility or transmissible diseases.¹⁴

Erythropoiesis-stimulating agents (ESA): ESA are medication which stimulate the bone marrow to make new red blood cells. They are indicated in conditions like anemia (end stage kidney disease), chemotherapy, major surgery, or certain treatments in HIV/AIDS.¹⁵

Leukemia: Oral complications of leukemia frequently include gingival hypertrophy, petechiae, ecchymosis, mucosal ulcers, and hemorrhage. Less frequently, mental nerve neuropathy, called “numb chin syndrome,” may be the presenting complaint. Palatal ulcerations and necrosis may herald the presence of mucormycosis of the nasal cavity and the paranasal sinuses. Bacterial infections of the oral cavity, resulting in septicemia may occur. Treatment of leukemia with chemotherapeutic agents can result in reactivation of Herpes Simplex Virus (HSV) leading to oral mucositis. Chemotherapeutic drugs causes bone marrow suppression that allows the opportunistic organisms to invade and thinning of the surface layer of mucosa that leads to oral mucositis.

Dental Management: Mancheno *et al.* (2004) summarized preventive measures and considerations in dental management of patients with hematologic malignancies Table 4.¹⁶

Hypothyroidism: Hypothyroidism classified as acquired or congenital defects caused by the deficiency of the thyroid hormone also called as underactive thyroid or low thyroid. During pregnancy, hypothyroidism left untreated it leads to delay in growth and intellectual development in the baby manifested as cretinism. Oral manifestation of patients with thyroid gland disorder (Table 5).

Hyperthyroidism: Hyperthyroidism or thyrotoxicosis is defined by a decrease in thyroid hormone production and

Prior to dental treatment	During dental treatment
1. Advised consultation with the specialist 2. Blood investigation reports, detailed history, proper clinical and radiographic examination 3. Dental treatment should be performed before starting the chemotherapy or radiotherapy. 4. Long-term remission or maintenance phase patient can undergo dental treatment, while patients with advanced or relapsed disease with poor prognosis advised to receive palliative or urgent treatment only.	1. Bleeding tendency 2. Increased risk of infection. 3. Risk of developing osteonecrosis of the jaw. 4. Anemia 5. Corticosteroids treatment. 6. Secondary malignancies. 7. Specific Considerations.

Table 4: Dental Management for Leukemic Patients

Hypothyroidism	Hyperthyroidism
1. Delayed eruption 2. Enamel hypoplasia in both dentitions, (being less intense in the permanent dentition) 3. Anterior open bite and mouth breathing 4. Macroglossia and Micrognathia 5. Thick lips and Dysgeusia	1. Accelerated tooth eruption in children 2. Osteoporosis (Maxillary or mandibular) 3. Extra glandular thyroid tissue enlarged mainly seen in the posterior tongue 4. Higher incidence of caries 5. Increased incidence of periodontal diseases 6. Symptoms of burning mouth syndrome 7. Connective-tissue disorders like Sjögren’s Syndrome or Systemic Lupus Erythematosus

Table 5: Oral manifestation of patients with thyroid gland disorder

thyroid gland function.¹⁷

Dental Management

1. In uncontrolled patients, oral infection, central nervous depressants such as Narcotics and Barbiturates should be avoided because they may cause an exaggerated response.
2. During dental procedures, conditions like myxedematous coma that includes hypothermia, bradycardia, severe hypotension and epileptic seizure occurs, dental treatment should be discontinued and give emergency medical services.
3. Hemostasis – Patients with long standing hypothyroidism may have increased subcutaneous mucopolysaccharides. It decreases the ability of small blood vessels to constrict and may result in increased bleeding from infiltrated tissues, including mucosa and skin. Local pressure for an extended time will probably control the bleeding from the small vessels adequately.
4. Before treatment, a complete blood count is required to evaluate coagulation factors. Avoid using of epinephrine in local anesthetics or retraction cords.¹⁷

Crohn’s Disease: There is no direct time correlation between intestinal and oral lesions. Clinically, these patients present with diffuse swelling of one or both lips with associated angular cheilitis, hyperplastic rigid mucosa and cobble stoning of the buccal mucosa. The other manifestations include painful linear ulcerations in the buccal vestibule, painless localized swellings within the lips or face, tissue tags attached to the buccal mucosa, issuing on the midline of the lower lip, gingival Inflamm-

ation and cervical lymphadenopathy.¹

Ulcerative Colitis: It has been associated with destructive oral ulcerations resulting from immune-mediated vasculitis. These are similar to aphthous ulcers, but appear less frequently than lesions of Crohn’s disease. Pyostomatitis vegetans (inflammatory stomatitis) characterized by multiple painless intraepithelial micro abscesses connecting in linear or serpentine tracks mostly on the labial mucosa, soft palate and ventral tongue may be seen.¹

Dental Management

- Frequent preventive and routine dental care.
- Evaluation of hypothalamic/pituitary/adrenal cortical function to determine the patient’s ability to undergo extensive dental procedures.
- Avoid prescribing non-steroidal anti-inflammatory drugs (NSAID), as they can trigger a flare-up, the use of paracetamol is recommended.
- Oral inflammatory and granulomatous lesions associated with Inflammatory Bowel Diseases may respond to topical steroid therapy. (Shivananda *et al.*1996).¹⁸

Acquired Immuno-Deficiency Syndrome (AIDS): AIDS caused by infection with Human Immuno-deficiency Virus (HIV). HIV-associated orofacial lesions in children are organized into three groups based on clinical experience and clinical studies limited to the Pediatric age group and on the frequency of association of these lesions with HIV infection as given in table below 6.¹⁹

GROUP I	Lesions commonly associated with Pediatric HIV infection
	a) Candidiasis <ul style="list-style-type: none"> • Pseudomembranous • Erythematous • Angular cheilitis b) Herpes simplex virus infection c) Linear gingival erythema d) Parotid enlargement e) Recurrent aphthous ulcers <ul style="list-style-type: none"> • Minor • Major • Herpetiform
GROUP II	Lesions less commonly associated with Pediatric HIV infection
	a) Bacterial infections of oral tissues b) Periodontal diseases <ul style="list-style-type: none"> • Necrotizing (ulcerative) gingivitis • Necrotizing (ulcerative) stomatitis • Necrotizing stomatitis b) Seborrheic dermatitis d) Viral infections <ul style="list-style-type: none"> • Cytomegalovirus • Human papilloma virus • Molluscum Contagiosum • Varicella – Zoster virus • Herpes zoster • Varicella e) Xerostomia
GROUP III	Lesions strongly associated with HIV infection but rare in children
	a) Neoplasms <ul style="list-style-type: none"> • Kaposi’s sarcoma • Non-Hodgkin’s Lymphoma b) Oral Hairy Leukoplakia

Table 6: Oral Mucosal lesions associated with HIV

Dental Management of HIV Associated Oral Lesions: Oral lesions are a common occurrence in HIV infected patients. The oral lesions may represent the initial manifestation of the disease and parallel the development of opportunistic infections and neoplasms with worsening immunosuppression.²⁰

SYSTEMIC TREATMENT		LOCAL TREATMENT
Oral Candidiasis (OC)	Preferred therapy: Fluconazole 100 mg PO* QD* for 7-14 days. Alternative therapy: Itraconazole oral solution 200 mg PO QD for 7-14 days, or Posaconazole oral solution 400 mg PO BID* once, then 400 mg daily.	Preferred therapy: Clotrimazole troches 10 mg PO 5 times daily or Miconazole ucoadhesive buccal tablet 50 mg QD for 5d. Alternative therapy: Nystatin suspension 4-6 ml QID or 1-2 flavored pastilles 4-5 times daily; Chlorhexidine 0.12% oral rinses
Necrotising ulcerative disease	Metronidazole (250 mg orally 4 times daily for 10 days), or other systemic antibiotics, such as Tetracycline, Clindamycin, Amoxicillin, and Amoxicillin-Clavulanate Potassium.	Chlorhexidine 0.12% oral rinses Periodontal debridement
Salivary gland disease	Adequate ART*, systemic corticosteroids	Repeated aspiration, or rarely a radical removal of large cysts; drinking more water, chewing sugar free gum
Recurrent aphthous-like ulcerations	Thalidomide (200 mg/d for 4-6 weeks) Systemic steroids in same doses and duration as those used for HIV-negative patients with recurrent aphthous ulcerations (prednisone 1mg/kg), or dapsone 50–100 mg daily for 4 weeks	Topical steroids in same doses and duration as those used for HIV-negative patients with recurrent aphthous ulcerations Chlorhexidine 0.12% oral rinses
Herpes simplex Infection	Valacyclovir 1 g PO BID, or Famciclovir 500 mg PO BID, or Acyclovir 400 mg PO TID for 5 to 10 days	
*PO- take orally, QD- once a day, BID- twice daily, TID- three times a day, ART- Antiretroviral Therapy		

Table 7: Treatment for HIV

CONCLUSION

Often oral manifestations are the first sign or the most significant sign of systemic disease. The knowledge on the systemic diseases is important in day to day clinical practice. Thus, mouth presents a window for easy observation of signs and symptoms of many systemic diseases because of its easy accessibility for visual investigation and examination by palpation. The primary care physician should be aware of the oral manifestation of systemic disease and prepared to recognize the associated changes in order to initiate correct treatment with the highest standard of care.

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