

Nutritional Considerations and Dental Management of Children and Adolescents with HIV/AIDS

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The HIV infected child has increased caloric needs, yet multiple factors interfere with adequate nutritional intake. Nutritional support is needed to maintain optimum nourishment during the symptomatic period, in order to prevent further deterioration of the nutritional status during acute episodes of infection, and to improve the nutritional status during the stable symptom free period.

With the advent of better methods of detection and better therapies, we are beginning to see HIV infected children surviving longer, and thus coming under the care of a host of affiliated medical personnel, including dentists. Oral health care workers need to provide dental care for HIV-infected patients and recognize as well as understand the significance of oral manifestations associated with HIV infection.

The present article reviews, on the basis of literature, nutritional status, nutrition assessment and counseling in HIV/ AIDS children and adolescents. Dental treatment considerations in these, as well as modifications in treatment if required, are also discussed.

Keywords. HIV, AIDS, children, dental, management, nutrition, prevention

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ROLE OF NUTRITION

HIV infections and its associated diseases have been reported to involve almost every organ system including the central and peripheral nervous system, the lungs, gastrointestinal tract, liver, pancreas, heart, endocrine system, skin, kidneys, hematology system and, most predominantly, the immune system.¹ In addition to organ impairment directly related to HIV, the progressive immune deficiency results in an increasing number of opportunistic diseases including malignancies such as Non-Hodgkins lymphoma.¹

When infected with the HIV virus, the body's defense system, the immune system works harder to fight infection. This increases energy and nutrient requirements. Further infections and fever also increase the body's demand for food.²

Adequate nutrition cannot cure HIV infection but is essential to maintain a person's immune system, to sustain healthy levels of physical activity, and for optimal quality of life. Adequate nutrition is also necessary to ensure optimal benefits from the use of antiretroviral treatment, which is essential to prolong the lives of HIV infected people and prevents transmission of HIV from mother to child.³

Nutritional disorders are often present in HIV/AIDS patients. Early studies demonstrated weight loss and protein depletion, findings associated with body cell mass depletion in untreated patients. The HIV/ AIDS affected children's nutrition is not as good as the unaffected kids.⁴ The average BMI of children in HIV/ AIDS affected families is found to be lower than average BMI for the population of children in general.⁵

Poor nutritional status may be caused by different factors:

- Inadequate nutrition intake or absorption, metabolic alterations, hypermetabolism, or a combination of these;
- Alteration of the gastrointestinal tract;
- Drug – nutrient interactions.⁶

The HIV infected child has increased caloric needs, yet multiple factors interfere with adequate nutritional intake. The neurological involvement can be associated with abnormal swallowing mechanisms (dysphagia), recurrent episodes of gastroesophageal reflux and aspiration, regression of developmental milestones, including eating skills, as well as decrease in taste and appetite.¹ Oral infectious lesions and dental pathology interfere with adequate oral intake due to pain, loss of taste, and disability in swallowing mechanisms.¹

There are multiple causes of malabsorption that complicate increased caloric needs and poor oral intake including primary HIV induced villus atrophy, and increase in severity and early onset of lactose intolerance and an expanding list of opportunistic infections including cryptosporidosis,

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mycobacterium avium intracellulae (MAI), CMV, human tuberculosis, salmonella and other agents.¹ Jejunal and duodenal villus atrophy with or without crypt hyperplasia occurs in all stages of HIV disease.^{7,8,9,10} Increased intestinal permeability is almost invariably found in patients with AIDS. Intestinal malabsorption is common after the development of AIDS and has important implications for nutrition in these patients.¹¹ Increased gut permeability has been associated with nutritional depletion in patients without HIV infection.¹²

Further compromising the nutritional status of HIV children are hepatitis and pancreatitis secondary to primary HIV infection, opportunistic infections and drug toxicities.¹ Although hepatitis and cirrhosis are known to interfere with metabolism of vitamin A and retinol binding protein,¹³ the relationship between liver disease and storage of vitamin A or other micronutrients during HIV infection has not been examined. HIV infected patients are at higher risk of developing renal disease, including acute renal failure, fluid-electrolyte and acid-base disturbances, HIV associated nephropathy and other glomerulopathies.¹⁴ A low molecular mass proteinuria appears to be common during HIV infection, even during asymptomatic infection leading to losses of retinol-binding protein and albumin.¹⁵

In addition, the multiple drugs used in the later stages of HIV infection compromise food intake due to drug interactions, nausea, and the physical amount of all these medications (some patients take 12 medications 2–3 times per day).¹

Anorexia related to the psychological processes provoked by the pathology (mainly social isolation), biochemical changes including an increase in the activity of the cytokines, a diverse drug intake, physical inactivity and opportunistic diseases also lead to a decrease in food intake.^{16,17,18}

Nutritional support is needed to maintain optimum nourishment during the symptomatic period, in order to prevent further deterioration of the nutritional status during acute episodes of infection, and to improve the nutritional status during the stable symptom free period.^{19,20}

Nutrition assessment

It is advocated that nutritional intervention should be applied early and individually, with periodic and constant screening.²¹ Early intervention and education are far more effective than attempts at repletion once nutritional compromise has occurred. Thus, every child who is infected should receive a complete baseline nutrition assessment with follow up assessments every 4 to 6 months depending on the child's age, nutritional status, and the risk of nutritional compromise.²²

In general, children with HIV/ AIDS need high energy, high protein, nutrient dense diets.²² For HIV infected children experiencing weight loss, energy needs are increased by between 50% and 100%.³ A diet rich in protein, energy and micronutrients contributes to resistance to opportunistic infections in HIV positive patients.^{23,24,25} In addition, the pro-

gression of the disease and even death might be delayed in well nourished HIV positive individuals.²⁵ In the absence of anti-retroviral therapy, high protein nutrition can be an effective intervention for HIV-positive patients in developing countries.

Micronutrients deficiencies are frequently present in HIV infected adults and children.³ The most prevalent micronutrient (MN) deficiencies iron, vitamin A, zinc, vitamin B-12, riboflavin, vitamin D, and vitamin E, usually occur together due to a low intake of animal source foods.²⁶ Micronutrients intake at daily recommended levels need to be assured in HIV infected adults and children through consumption of diversified foods, fortified foods and micronutrient supplementation as needed.³ There is some evidence that multiple micronutrients (MMN) improves CD4 counts and HIV-related morbidity and mortality in adults. The efficacy of MMN varies across trials, but overall there is evidence that outcomes are better than when providing ≤ 2 MN. Vitamin A, E and B12 deficiency accelerated the development of AIDS with low T cells, whereas their normalization retarded the development of immune dysfunction.²⁷ High dose vitamin A supplementation seemed to reduce diarrhoeal morbidity in HIV infected infants in an underprivileged population in Durban, South Africa.²⁸ Daily zinc supplementation (200mg/d) for 30 days reduced infectious disease morbidity in adults with AIDS in Italy.²⁹ A reduction in oxidative stress and an apparent decrease in viral load were noted in a clinical trial of vitamin E (800 IU/d) and C (1g/d) in HIV infected adults in Toronto.³⁰

Anthropometrics

Weight gain and growth should be monitored closely as failure to thrive and/ or growth stunting have been identified in up to 94% of HIV infected children.^{31,32} A complete set of anthropometric measurements, including weight, height, head circumference (through 3 years of age), mid-arm circumference, triceps skin-fold, and sub-scapular skin-fold with a calculated mid-arm muscle area, should be obtained at the initial nutrition assessment and at least every 6 months thereafter. Growth velocity should also be monitored using the National Center for Health statistics incremental growth charts.²² Anthropometric measurements are relatively inexpensive and non-invasive, so that they could be used routinely to monitor long term nutritional status and assess risk for malnutrition.³³

Biochemical values

Biochemical evaluation in AIDS must also include at least serum levels of albumin, transferrin, total protein, and cholesterol, blood hemoglobin content and hematocrit. It is also considered that the depletion of some of these is indicative of protein deficiency or anemia, respectively. On the other hand, routine indicators, such as the total number of lymphocytes and delayed hypersensitivity skin tests, are not useful as indices of nutritional state, due to the impact of the disease on immunological markers.³⁴ Nutritional assessment should include a measurement of body composition, and

analyses of nutritional parameters, including albumin, transthyretin, and C-reactive protein has been suggested by some authors.³⁵

Low serum levels of numerous micronutrients have been identified in patients with HIV/AIDS where nutrient intakes has been observed to be adequate. If deficiencies are suspected, vitamin A, C, B-6, B-12; folate; zinc; selenium; and iron may warrant monitoring.²²

Many of the HIV/AIDS medications are unpalatable and difficult to administer to an unwilling child, strategies to disguise their taste are helpful. Medications should be added to small quantities of food that will be completely consumed to ensure that the full dose is received.²²

The techniques used for assessment of dietary intake include: 24 hour dietary recall, food frequency questionnaires and diet diaries. Dietary assessments should be done as soon as possible upon confirmation of a diagnosis of HIV, with regular follow up assessment.^{36,33}

Nutritional education and counseling

Parents should be informed about making healthy food choices and referral may be made to an agency or health professional, as appropriate.

Feeding skills: Mild to severe developmental delay is estimated to exist in up to 80% of HIV infected children. The dietician should continuously monitor a child's oral motor and self-feeding skills through direct observation and parent/ caregiver report, especially in the first three years of life. Some observed oral motor impairment may be the temporary result of painful oral and esophageal lesions of candida and/ or herpes simplex.²² Soft, mashed foods and cold foods and liquids should be taken then and straw may be used. Very spicy and salty foods, acidic or very sour foods and foods that are too cold or too hot should be avoided.² If a person is ill or has poor appetite then food intake should be spread throughout the day.²

DENTAL MANAGEMENT OF HIV/AIDS CHILDREN AND ADOLESCENTS

Role of dentist

The clinical manifestations of HIV infection vary widely among infants, children and adolescents. In most infants, physical examination at birth is normal. Initial symptoms may be subtle, such as lymphadenopathy and hepatosplenomegaly, or nonspecific, such as failure to thrive, chronic or recurrent diarrhea, interstitial pneumonia, or oral thrush, and may be distinguishable only by their persistence.³⁷ As the oral health care provider may be the first health professional to suspect HIV infection in the pediatric patient, he should know the findings suggestive of HIV infection.³⁸

With the advent of better methods of detection and better therapies, we are beginning to see HIV infected children surviving longer, and thus coming under the care of a host of affiliated medical personnel, including dentists. These new treatments and newer mechanisms for assessing patients have enabled them to live longer often with prolonged peri-

ods of severely depressed CD4 cell numbers. During these times, they are also acquiring more opportunistic infections. Some of these infections have a predilection to the oral cavity. Thus oral health has become very important to physicians and dentists managing children with HIV infection.³⁹

Access to dental care is an essential need for all patients, particularly for individuals with complex medical conditions. Consequently, dentists have a moral and professional obligation to provide care for all individuals within the dentist's realm of expertise.⁴⁰ Dentists have not been universally receptive to caring for persons with HIV.^{40,41} Also, in spite of high rate of oral disease in persons with HIV, many do not use dental care regularly.⁴¹

The expanding role of the dentist in the acquired immunodeficiency syndrome (AIDS) era can today be classified by six issues: 1) Provision of routine dental care; 2) Oral lesions-screening, diagnosis, treatment, and recognition of their significance; 3) Collaboration with other health care workers and social support systems; 4) Education of other health care workers; 5) Education in the community; and 6) Resource to HIV infected health care workers.⁴²

Oral functions can be impaired by infections of the teeth, mucosa, and gingival and periodontal tissues.⁴³ Oral health care workers need to provide dental care for HIV-infected patients and recognize as well as understand the significance of oral manifestations associated with HIV infection.⁴⁴ It is important that dentist does not further compromise the already diminished health status of the infected patient by providing services or using medications that could be deleterious to the patient's general medical condition.⁴⁵ Treatment planning for the patient with HIV follows the same sequence as with other patients. Priorities are to alleviate pain, restore function, prevent further disease and consider esthetic results.⁴⁶

It may be safely assumed that the dentist will be called on to treat those who acknowledge their positive HIV serostatus as well as those who will offer no indication of being infected, either because they do not wish to tell or they do not know.⁴⁵ As a result many dentists will unknowingly treat HIV-positive children.⁴⁷ Therefore, the first consideration must be the use of universal dental operator infection control procedures in keeping with the guidelines and recommendations of the CDC, which is also reflected in the recommendations of the American Dental Association.⁴⁵ Routine universal infection control procedures if followed are excellent protections for both the patient and the practitioner. There is almost a negligible chance that one could become infected from a contaminated sharp instrument.⁴⁸ The recommendations for prevention of spread correspond to the measures appropriate for hepatitis B.⁴⁹

General treatment planning

HIV disease is multi-factorial with a spectrum of oral and systemic clinical effects. A comprehensive analysis of a patient's physical status cannot be overemphasized when planning treatment.⁴⁶ A review of the past medical history, present illnesses, and medication previously or currently

being used by the patient provides important data for consideration when evolving a course of treatment. A thorough clinical head and neck and oral examination helps to ensure acquisition of objective signs and symptoms of alterations from health that may or may not be associated with the HIV status of the patient.⁴⁵

For an HIV positive patient, the dentist should have a current complete blood count that includes a differential white cell count. A low level of circulating white cells represents generally a diminished ability to fight off new infections, a frequent finding in HIV-infected persons. The differential count may be altered as a result of current infections or other systemic diseases; a decrease in lymphocytes could mean aplastic anemia or a malignancy, such as Hodgkin's disease, whereas lymphocytes may be increased in infectious mononucleosis, lymphoma, and granulomatous diseases. Increased monocytes may indicate tuberculosis, monocytic leukemia, Hodgkin's disease, or even parasitic infections, whereas abnormally high basophils are found in myeloid leukemia and even polycythemia vera.^{50,51} Levels of hemoglobin and particularly the hematocrit are also important as patients who are HIV positive and anemic may have healing problems. The type of anemia should be diagnosed if primary test determines anemia.⁴⁵

Further, data on platelet level are critical to performing oral and maxillofacial surgical procedures.⁴⁵ A small percentage of patients may present with idiopathic thrombocytopenic purpura (ITP), secondary to dysfunctional immune system, or as a side effect to medications.⁴⁴ Some medications taken by HIV patients, such as azidothymidine (AZT), are known to have a thrombocytopenic effect.⁴⁵ Routine dental care, including simple extractions, can safely be performed in patients with platelet counts down to 50000–60000 cells/mm³, if all other hemostatic values are within normal limits.⁴⁴

Additionally, a bleeding time and prothrombin time should be included in the screening tests.⁴⁵ Prothrombin time (PT) and partial thromboplastin time (PTT) indicate the level of hepatic function and bleeding tendency. HIV infected patients with hemophilia also have impaired coagulation functions.⁴⁴

Because the patient is known to be HIV infected, the dentist should be aware of the T4 and T8 lymphocyte levels as well as the T4/T8 ratio. These are clearly related to immune function and diminished potential of the patient to combat infectious agents, which could, but to date has not been shown to, occur during the course of most dental treatment.^{52,53,54}

Although patients with HIV disease tolerate dental procedures well, providers need to be aware of possible concomitant cardiac, adrenal or gastrointestinal conditions that require modifications of dental procedures.

The primary care physician and the oral health care provider should discuss preventive and restorative dental treatment plans, work collaboratively to resolve questions of contraindications to dental procedures, and coordinate medical appointments with dental appointments.³⁸

Prevention

Because of the unpredictable nature of acute and chronic illnesses associated with HIV infection, the oral health care provider should always strive to prevent oral problems. Preventive and therapeutic dental programs should be instituted to meet the special needs of pediatric AIDS patients.⁵⁵

Daily tooth brushing, deplaquing of the tongue and flossing is recommended when ANC >500/mm³ and platelet count is >20,000/mm³. Dental hygiene efforts with moist gauze or toothette suggested only when ANC <500/mm³ or platelet count <20,000/mm³. Chlorhexidine mouth rinses may also be beneficial for decreasing halitosis in addition to management of gingivitis/periodontal diseases.⁵⁶ Chlorhexidine rinses are recommended when manual dexterity alone is not adequate for plaque control.⁴⁶

There are two phases of oral preventive protocols for all patients whatever their stage of HIV infection: 1) A primary program consisting of early identification of caries-susceptible oral environments and restoration of carious lesions; and 2) A secondary program including identification of risk factors for caries, dietary counseling, patient education in oral hygiene procedures and home care, application of topical fluoride and periodic recall examinations for supportive therapy.⁴⁶

The focus on oral health prevention and promotion should include the verification of community water fluoridation and the application of topical fluorides where necessary. Topical or systemic fluoride supplements for home use should be dispensed according to the American Academy of Pediatric Dentistry (AAPD) guidelines, which recommend fluoride mouth rinses twice daily for 1 minute. The use of fluorides including fluoride dentifrices and fluoridated pit and fissure sealants, has proven to be effective in preventing caries in immune-compromised children.⁴⁶

Patients with HIV infection should have a regular periodontal examination to detect emerging problems needing treatment.⁴⁶

Caries and eruption rate

Children with HIV infection have unmet preventive and restorative treatment needs, indicated by high proportion of decayed surfaces, mean value 7.7 out of a total caries experience of 13.3.⁵⁷ Caries prevalence of 28–33% among HIV infected infants and toddlers have been reported.⁵⁸ High (63%) caries prevalence among participants was observed by Eldridge and Gallagher.⁵⁹ Children with perinatally acquired HIV are at greater risk for caries than their uninfected siblings, more so with advancing disease.⁶⁰

The increased risk is due in part to baby-bottle decay, progressive immunodeficiency, effects of medications on salivary flow and oral flora, developmental delay, and/ or failure to thrive.^{38,39} Aside from their medical status, the absence of fluoridated water supplies or fluoride supplements, along with the presence of other factors such as the social history of the child, cariogenic diet, poor plaque control and clinical evidence of existing or past dental caries, add to this risk.⁶¹ Parents may be overburdened by the

medical, physical, psychological and emotional needs of their children, hence dental matters may be of low priority until problems arise.⁵⁹ It has been suggested that the immune response to caries related microflora may also be reduced in these children.⁵⁷

Both delayed and accelerated eruption of permanent teeth and over-retention of primary teeth have been reported among HIV infected children.⁶² The accelerated eruption pattern may be related to concurrent or previous dental and periodontal disease, but the exact cause of delayed eruption of teeth is unknown; the poor general health status of some children, particularly when there is malnutrition, may be an important cofactor.⁶²

Restorative dentistry and pain and anxiety management

HIV positive children should receive normal dental care based on their general ability to undergo treatment procedures, not their HIV status.³⁹ Young children and older phobic children may require behavior management techniques such as outpatient sedation or general anesthesia. Behavior assessments must be made by a pediatric dentist to determine their ability to cooperate in an outpatient setting when their treatment plan calls for major dental restorations.³⁹

In the overall health care management of the patient, the oral health care provider should give restorative care and develop a preventive program tailored to the profile of the individual child.⁴⁴ Restorations provided should be well contoured.⁵⁶

Local anesthetics: There are no contraindications related to the use of local anesthetics in patients with HIV disease. However, in patients with a history of poor hemostasis, it is advisable to avoid deep block injections. In these patients local infiltration is appropriate.⁴⁶

Xerostomia

Xerostomia or dry mouth is present with salivary gland disease.⁶³ Xerostomia independent of HIV-SGD may arise in HIV infection as a consequence of some nucleoside analog HIV reverse transcriptase inhibitors or protease inhibitors, by an unknown mechanism.⁶³

Lubricating agents in the form of gels, mouth washes, lozenges, and tooth pastes have been used, with varying results, to relieve the symptoms of xerostomia. Sugar free gum or sugar free candies may help to increase salivary output, but they may be inconvenient and affect patient's compliance. Commercial artificial saliva, available by prescription, also may alleviate the discomfort.^{63,64} Therapeutic management is with pilocarpine and cevimeline.^{63,65} These two currently used cholinergic agents, have not been approved for use in the pediatric population.⁶³ Children with xerostomia require an aggressive oral hygiene protocol, anticipatory guidance, implementation of fluoride treatments as necessary (twice a year as a minimum) and caries control. Use of fluoride trays might be considered with severe hypo-function. Recall visits should be scheduled every 3-5 months in children with salivary dysfunction due to their increased susceptibility to caries.⁶³

Prophylactic antibiotic recommendations for children

Expert consensus suggests that routine antibiotic coverage to prevent septicemia from bacteremias arising from dental procedures is not indicated based solely on the patient's HIV status, but is recommended for severely neutropenic patients with absolute neutrophil counts below 500 cells/mm³.⁶⁵ Although neutropenia may result from use of medications to treat HIV infection or its opportunistic disease, less than 1% of HIV infected dental patients are likely to develop severe neutropenia.⁶⁶ Children with absolute neutrophil counts below 500 cells/mm³ or WBC <2000/mm³ should have dental procedures deferred until their neutropenia has resolved.^{46,56} As a rule an absolute neutrophil count below 1000 cells/mm³ usually requires antibiotic prophylaxis. The regimen may require 5-7 days of antibiotic coverage.⁴⁴ If CD4 cell count <200 cells/mm³, prophylactic antibiotic may be considered.⁵⁶ Other reasons for antibiotic premedication are uncontrolled hyperglycemia, as determined by glycosylated hemoglobin [hemoglobin A1C (Hgb_{A1C})], or conditions where the American Heart Association prophylactic regimens need to be implemented.⁴⁴ However, dentists may choose to prescribe antibiotics for patients to prevent local wound or distant site infection.⁶⁵

Medication interactions

Patients with HIV infection usually take numerous medications. Some of the medications used in HIV disease affect the hematologic status of patients. Medications causing neutropenia and anemias include common drugs such as zidovudine, trimethoprim-sulfamethoxazole, and ganciclovir.⁴²

Some of these medications may have significant side effects and may interact with medications commonly used in dentistry.⁴⁴ Rifampicin and isoniazid (INH), two commonly used anti-tuberculosis medications, decrease the efficacy of certain other drugs. For example, the absorption rate of ketoconazole, an antifungal agent, may be reduced as much as 80% with concurrent use of rifampicin-INH. Patients show increased adverse reactions toward other antibiotics including amoxicillin-clavulanic acid, ciprofloxacin, dicloxacillin, erythromycin and clindamycin, when their CD4 cell count decreases.⁴²

Patients with hepatic and renal disease may require alteration to the type and dosage of medications that dental care providers may use.^{44,67}

General post-procedural complications

Complications may result from dental treatment in any healthy person. Whether HIV infected patients have a greater propensity for experiencing complications from dental treatment has been controversial.⁶⁵ Post-procedural complication rate in patients with CD4+ cell count < or = 200 cells/mm³ was found to be 0.9%.⁶⁸ HIV positive patients do not have an increased risk of developing serious odontogenic infections as when compared with HIV negative patients.⁶⁹

Endodontic considerations

Neither HIV infection nor AIDS are contraindications for

endodontic treatment, including pulpotomy.⁴⁶ There is no contraindication with appropriate diagnosis.⁵⁶ Indeed, as in many other cases of immune-suppression (transplants, dialysis etc.), endodontic treatment and retention of natural teeth offers numerous advantages for patients with HIV.⁴⁶

Endodontic treatment does not appear to be associated with increase in post-operative complications and does not warrant routine pre or post procedural antibiotics.^{46,70} Endodontic therapy has a relatively high degree of success in the majority of HIV/AIDS patients.^{71,72}

In case of acute pulpitis, endodontic treatment must be performed immediately to eliminate the risk of periapical infection and other complications. This is especially important when surgical treatment cannot be performed because of systemic limitations (e.g. coagulation concerns). One step endodontic therapy should always be considered in case of acute pulpitis or when patients with physical limitations are unable to return for multiple visits. Patients requiring antibiotic premedication should also be treated by one-step endodontic therapy.⁴⁶

Extractions and other surgical procedures

The decision to perform dental extractions and other oral surgical procedures for patients with HIV should be based on the same criteria as for all patients. If a questionable health status influences anticipated oral surgery, the dentist must consult with the patient's physician.⁴⁶

All procedures must be performed in a manner that minimizes bleeding and avoids bringing oral pathogens into the deeper fascial planes and oral spaces. Improvements in oral hygiene should be encouraged when necessary, together with pre-operative scaling to minimize the risk of postoperative complications.⁴⁶

Postoperative complications following extractions could be persistent bleeding, persistent pain, localized alveolitis, local wound infection and delayed wound healing. Postoperative complications in HIV patients were reported to be minor and patients were treated on outpatient basis.^{73,74,54, 75,76} One study reported that HIV positive patients have an increased risk of post extraction complications and as the level of HIV disease increases, the risk of complications also increases.^{77,78,79} None of the authors suggested a need to take special precautions for the HIV positive patients who do not have a coagulopathy (that is, hemophilia, thrombocytopenia or other known bleeding disorders) and are sufficiently healthy to be seen on an outpatient basis. Application of an intra alveolar socket medicament was seen to reduce the incidence of post operative complications in patients with HIV.⁸⁰

Periodontal considerations

HIV gingivitis, now called linear gingival erythema, and HIV periodontitis now called necrotizing ulcerative periodontitis, have microbiology profiles similar to conventional adult periodontitis, although these lesions are quite different clinically.⁸¹ A study suggested that in a medically well controlled HIV-infected population, with the exception of the prevalence of linear gingival erythema, the periodon-

tal findings were similar to their HIV-negative household peers and to the general pediatric population.⁸²

In HIV infected individuals intensified dental care can result in decrease in mean periodontal pocket depth, gingival erythema index and caries rate, but it has no effect on systemic AIDS-related complications, symptoms or mortality.⁸³

The treatment principles involve instructions in improved oral hygiene, scaling and debridement combined with chlorhexidine mouth rinse.⁴⁶ Povidone iodine irrigation is often recommended during this debridement procedure due to its anesthetic and antiseptic effects.⁸⁴

Antibiotics as adjunct to treatment should be used with caution due to the risk of overgrowth of candida species. Narrow spectrum antibiotics such as metronidazole may leave the greater portion of gram positive flora intact in order to prevent candida overgrowth.⁸⁴

A greater percentage of transient bacteremia in HIV patients immediately after scaling have been reported.⁵³ However, these bacteremia levels returned to normal within 30 minutes.⁸⁴ Lucatorto concluded that special provisions for antibiotic prophylaxis in these patients may be unnecessary.⁵³

Orthodontic considerations

Patients with undiagnosed HIV infection have received successful orthodontic treatment, suggesting that asymptomatic HIV-infected patients respond to orthodontic treatment in the same manner as do non-infected orthodontic patients.⁴⁶

The factors to consider in planning orthodontic treatment are the same for patients with HIV infection as for all patients and include the patient's overall health, stage of disease, and oral health, his or her ability to comply with appointments and treatments, and the presence of oral lesions and their possible effects on treatment.⁴⁶

Late stage AIDS, like other debilitating systemic diseases is a primary contraindication for extensive orthodontic treatment.⁴⁶ There should be greater emphasis on oral hygiene and meticulous care of retainers and appliances. Chlorhexidine mouth rinses should be advised and fluoride supplementation prescribed.⁵⁶

Management of oral lesions in HIV infected pediatric patient

Infections of the oral tissues may be frequent, severe, persistent, and recurrent, even after appropriate treatment.⁸⁵ Oral and primary healthcare providers should work together to provide diagnosis, observation, and management of any lesions that disrupt the integrity of the oral mucosa in children.³⁸ Prevention and treatment of oral disease is required to maintain quality of life and to improve prognosis.⁸⁶ HIV infected children whose disease is well controlled by ARV therapy will commonly show no signs of oral lesions. Untreated or undiagnosed children will be more likely to develop lesions.³⁸

It is critically important that oral healthcare professionals in all parts of the world be competent in the diagnosis of HIV-associated oral lesions, be knowledgeable of evidence-

based treatments for these oral conditions, and be trained to provide patients with an appropriate referral for diagnosis and medical management, if undiagnosed HIV infection is suspected.⁸⁷

CONCLUSIONS

As we improve the longevity of HIV infected infants and children through adolescence with advances in primary HIV therapies, we must not let the quality of life suffer due to a lack of nutritional intervention.¹ Although the dietary treatment of these patients is challenging, the maintenance of optimal nutritional status can be achieved by an early and accurate assessment, periodic reassessment, and the formulation of an appropriate treatment plan.²²

All dentists should be able to provide routine dental care for the adult or child with HIV disease. Good judgment and prudent application of techniques are important in treating the HIV-positive patient, just as they are in treating any other patient. There are no prescribed rules as to when not to treat an oral condition. Each patient's oral health care needs and the appropriate level of dental care must be assessed individually.⁴⁶

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