Dental Problems of Children with Special Health Care Needs

Sickle Cell Anemia

Sickle cell anemia (SCA) is composed of sickle cell trait, which is benign and does **not restrict medical or dental treatment**, and sickle cell disease (SCD). Patients with SCD have an autosomal-recessive hemolytic disorder that occurs predominantly in persons of African descent but it also can be found among Italian, Arabian, Greek, and Indian people.

Patients with SCD **produce hemoglobin S instead of the normal hemoglobin** A. Hemoglobin S has a **decreased oxygen-carrying capacity**. Decreased oxygen tension causes sickling of cells. Those patients are susceptible to **recurrent acute infections**, which result in an "**aplastic crisis**" caused by **decreased red blood cell production** and in subsequent **joint and abdominal pain with fever. Over time, there is a progressive deterioration of cardiac, pulmonary, and renal function**.

Many factors can precipitate a sickle cell crisis, including **acidosis, hypoxia, hypothermia, hypotension, stress, hypovolemia, dehydration, fever, and infection.** Patients with SCD have hemoglobin levels of **6 to 9 g/dL** (normal, 12 to 18 g/dL).

1. Dental treatment should **not be initiated during a sickle cell crisis**. If emergency treatment is necessary during a crisis, only treatment that will make the patient more comfortable should be provided.
2. The use of local anesthetics with a vasoconstrictor is not contraindicated in patients with SCD. In addition, the use of nitrous oxide is not contraindicated in these patients. Care must be taken in treating patients with SCD to avoid diffusion hypoxia at the completion of the dental procedure.
3. **The restoration of teeth, including pulpotomies, is preferable to extraction**.
4. Pulpectomy in a non-vital tooth is reasonable if the practitioner is confident that the tooth can remain non- infected. If the tooth is likely to persist as a focus of infection, then extraction is indicated.
5. The level of Hemoglobin S should investigated before extraction it should be less than 30%. Poor healing may occur after surgical dental treatment so **prophylactic antibiotic may be needed.**
6. The use of general anesthesia for dental procedures must be approached cautiously in consultation with the hematologist and anesthesiologist.

VIRAL HEPATITIS

Acute viral hepatitis may be caused by any of the following:

Hepatitis A virus (HAV), HBV, hepatitis delta virus (HDV), HCV, or hepatitis E virus (HEV). HAV infection results in an **acute febrile illness with jaundice, anorexia, nausea, and malaise**. Most HAV infections in infants and children cause mild, nonspecific symptoms without jaundice. HAV is spread by the **fecal-oral route** and is endemic in developing areas. **The risk for transmission in a dental setting is low.** A two-dose vaccination series separated by 6 months can be given to anyone older than 1 year of age.

HBV transmission is of major concern to the dentist. Members of the dental profession assume a risk for acquiring HBV that may be **10 times greater than that of the general population**. An additional concern is the potential of becoming an **asymptomatic yet infectious carrier of HBV** and of having the capability of transmitting the disease to patients and dental staff members and family.

HBV is transmitted from person to person by parenteral, percutaneous, or mucous membrane inoculation. It can be transmitted by the percutaneous introduction of blood, administration of certain blood products, or direct contact with secretions contaminated with blood containing HBV. Infection may also result from inoculation of mucous membranes, including sexual transmission.

Wound exudates contain HBV, and open-wound to open-wound contact can transmit infection. There can also be vertical transmission from an **infected mother to her baby**, which frequently leads to chronic infection.

Acquired immunodeficiency syndrome (AIDS) is a clinically defined condition caused by infection with HIV type 1 or, much less commonly, type 2.

HIV-infected individuals can unknowingly **spread the virus to their sexual or needle-sharing partners or, in the case of infected mothers, to their children**. Infants and children with AIDS have clinical findings similar to those in adults.

Early manifestations of untreated HIV infection include weight loss and failure to thrive, hepatomegaly or splenomegaly, generalized lymphadenopathy, and chronic diarrhea. Unlike in adults**, recurrent and severe bacterial infections are more common in pediatric patients with untreated HIV infection.**

Oral Manifestations Of HIV Infection

1. The types of oral lesions seen in HIV infection may be caused by fungal, viral, or bacterial infections, as well as neoplastic and idiopathic processes.
2. Fungal Infection: the most common HIV-associated infection of the mouth is caused by the fungus Candida albicans. Oral candidiasis is frequently present and may lead to esophageal or disseminated candidiasis.

There are four major types of oral candidiasis:

1. pseudomembranous,
2. hyperplastic,
3. erythematous (atrophic),
4. angular cheilotic.

Bacterial Infections, **Gingivitis, and Periodontitis**: Progressive and premature periodontal disease is seen relatively frequently in HIV-infected individuals and may even be the first sign of HIV infection. Unlike conventional periodontal disease, these lesions do not respond effectively to standard periodontal therapy. There may be a rapid progression from mild gingivitis to advanced, painful, spontaneously bleeding periodontal disease in a few months. **Treatment includes aggressive curettage, Peridex (0.12% chlorhexidine digluconate) rinses 3 times daily, and possibly antibiotic treatment.**

Bacteria causing oral lesions may **include Mycobacterium avium- intracellulare and Klebsiella pneumonia,** among others. Well-described conditions include **linear gingival erythema (LGE) and necrotizing ulcerative periodontitis (NUP),** which likely represent dysbiosis of the microflora.

Neoplasms: Kaposi sarcoma, secondary to transformation induced by human herpes virus

infection, is the most common malignancy seen in AIDS, it occurs in 15% to 20% of adult patients with AIDS. **Intraoral lesions may occur alone or along with skin, visceral, and lymph node lesions.** The first lesions of Kaposi sarcoma often appear in the mouth. They may be red, blue, or purple, flat or raised, and solitary or multiple. The most common oral site is **the hard palate**, although lesions may be found on any part of the oral mucosa. Treatment for aggressive lesions involves radiation, laser surgery, or chemotherapy. Conventional surgery may be appropriate for small lesions.



Idiopathic Lesions: oral ulcers of unknown etiology that are being reported with increasing frequency in people with HIV infection. The ulcers resemble aphthous lesions, appearing as well-circumscribed ulcers with an erythematous margin. Patients sometimes exhibit extremely large and painful necrotic ulcers that may **persist for several weeks.**

Salivary gland swelling: has been seen in both adults and children with HIV infection. The cause of the swelling is unknown and may be combinational. It usually involves the parotid glands and is accompanied by **xerostomia.**

Preventive measures to be used:

1. Routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids of any patient is anticipated.

2. Proper sterilization, HIV is sensitive to autoclaving at 121◦C for 15 min at 1 atmospheric pressure. Dry heat of instruments up to 170◦C.

3. Disinfectants for innate objects:

- Calcium hypochlorite.
- 0.2% sodium hypochlorite.
- 6% hydrogen peroxide for more than 30 min.
- 2% glutaraldehyde and 6% hydrogen peroxide.
- HIV is inactivated by treatment for **10 min at room temperature** with 10% household bleach, 50% ethanol and 3% hydrogen peroxide.

4. Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood or other body fluids. Hands should be washed immediately after gloves are removed.

To prevent needle stick injuries, needles should not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand.

Leukemia

- They are **hematopoietic malignancies** in which **abnormal leukocytes (blast cells)** proliferate in the bone marrow, replacing normal cells, and disseminate into the peripheral blood, accumulating in other tissues and organs of the body.
- **Leukemia is classified according to the morphology of the predominant abnormal leukocytes in the bone marrow.** These types are further categorized **as acute or chronic**, depending on the clinical course and the degree of differentiation, or maturation, of the predominant abnormal cells.
- Although the cause of **leukemia is unknown**, **ionizing radiation, certain chemical agents, and genetic factors** have been implicated. For example, children with chromosomal abnormalities (Down syndrome and Bloom syndrome), children with an identical twin who has leukemia, and children with immunologic disorders have an increased risk for leukemia. **In the United States, leukemia rates for white children are about 1.5 times those for black children.**

Oral Manifestations Of Leukemia



- Abnormalities in or around the oral cavity occur in all types of leukemia and in all age groups. However, oral pathologies are more commonly observed in acute leukemia than in chronic leukemia.
- The most frequently reported oral abnormalities attributed to the leukemic process include:

1. Regional lymphadenopathy.
2. Mucous membrane petechiae and ecchymosis,
3. Gingival bleeding, gingival hypertrophy.
4. Pallor, and nonspecific ulcerations.

Manifestations seen occasionally are:

Cranial nerve palsies, chin and lip paresthesias, odontalgia, jaw pain, loose teeth, extruded teeth, and gangrenous stomatitis. Each of these findings has been reported in all types of leukemia.



Skeletal lesions caused by leukemic infiltration of bone are common in childhood leukemia. The most common finding is a generalized osteoporosis caused by enlargement of the Haversian and Volkmann canals.

Osteolytic lesions resulting from focal areas of hemorrhage and necrosis and leading to loss of trabecular bone are also common. Evidence of skeletal lesions is visible on dental radiographs in up to 63% of children with acute leukemia.

Manifestations in the jaws include generalized loss of trabeculation, destruction of the crypts of developing teeth, loss of lamina dura, widening of the PDL space, and displacement of teeth and tooth buds.

Because none of the oral changes is a pathognomonic sign of leukemia and all can be associated with numerous local or systemic disease processes, a diagnosis of leukemia cannot be based on oral findings alone. Such changes should be, however, alert the clinician to the possibility of malignancy as the underlying cause.

Candidiasis is common in children with leukemia.

They are especially susceptible to this fungal infection because of:

(1) General physical debilitation,

(2) Immunosuppression,

(3) Prolonged antibiotic therapy,

(4) Chemotherapy,

(5) Poor oral hygiene



Dental Management Of Patients With Leukemia

Before any dental treatment is administered to a child with leukemia, the child's hematologist/oncologist or primary care physician should be consulted. The following information should be ascertained:

1. Primary medical diagnosis
2. Anticipated clinical course and prognosis
3. Present and future therapeutic modalities
4. Present general state of health
5. Present hematologic status

For a child whose **first remission has not yet been attained or one who is in relapse, all elective dental procedures should be deferred.** However, it is essential that potential sources of systemic infection within the oral cavity be controlled or eradicated whenever they are recognized (e.g., immediate extraction of carious primary teeth with pulpal involvement). Routine preventive, restorative, and surgical procedures can usually be provided for a patient who is in complete remission yet is undergoing chemotherapy.

❖ Before the appointment—preferably the same day—a blood cell profile (complete blood count) and platelet count should be obtained

❖ **Pulp therapy on primary teeth is contraindicated in any patient with a history of leukemia**.

❖ **Endodontic treatment for permanent teeth is not recommended for any patient** with leukemia who may have a chronic, intermittent suppression of granulocytes.

❖ A platelet level of **100,000/mm3** is adequate for most dental procedures

❖ Routine preventive and restorative treatment, including non-block injections, may be considered when the platelet count is at least **50,000/mm3.**

❖ If the platelet count is lower than **20,000/mm3,** all the intraoral mucosal tissues may show clinical evidence of spontaneous hemorrhaging (e.g., petechiae, ecchymosis, or frank hemorrhage).

No dental treatment should be performed at such a time without a preceding prophylactic platelet transfusion. Good oral hygiene must be maintained while the platelet count is at this level, but it may be necessary to discontinue the use of a toothbrush and to substitute **cleaning with moist gauze wipes, supplemented by frequent saline rinses.**

❖ The use of a soft nylon toothbrush for the removal of plaque is recommended.

Management of Children with Systemic Diseases

Endocrinopathies (Hyperthyroidism)

Patients with Hyperthyroidism are of a great concern to the dental surgeon. In children with untreated or poorly treated thyrotoxicosis, dental treatment, infections or trauma can precipitate an acute emergency called **thyroid crisis or thyroid storm.**

Causes of thyrotoxicosis

1. Ectopic thyroid tissues
2. Graves' disease (Appears to be due to an autoimmune disorder in which a substance is produced that abnormally stimulates the thyroid gland)
3. Multinodular goiter
4. Thyroid adenoma
5. Pituitary gland disease

Note: Thyroid hormones are important for metabolic functions that are involved with utilization. Thyrotoxicosis means increased amount of thyroid hormones, thyroxine and triiodothronine in blood.

Oral manifestations in children

1. Premature loss of primary teeth and early eruption of permanent teeth.
2. Early development of the jaw bones.
3. Increased periodontal disease.

Management in the dental clinic

1. Consultation with child's physician.
2. Avoid elective dental treatment until thyrotoxicosis is under control.
3. Acute infections must be dealt with antibiotic therapy to prevent thyroid crisis.
4. Avoid use of **adrenaline and other vasoconstrictors**.
5. Thyroid storm may be precipitated due to trauma, surgery, stress, or infections. Early recognition and management is important. It includes ice applied on skin, intravenous administration of hydrocortisone, glucose, etc. and cardiopulmonary resuscitation, if required.
6. Patients under good medical control can be managed as normal.

Hypothyroidism

It does not manifested as sever, life-threating condition and in children it is called cretinism.

Oral manifestations

1. Delayed eruption of teeth
2. Malocclusion
3. Enlarged tongue

Hyperparathyroidism

1. A lower level of calcium level stimulates release of parathyroid hormone which:
2. Increase bone resorption.
3. Retains calcium by reabsorption in the kidneys.
4. Favors absorption of calcium in the intestine.
5. The net effect is increased serum calcium level which inhibits further parathyroid hormone secretion.

Oral manifestations

1. Drifting and loosening of teeth
2. Malocclusion
3. Pathological fracture of jaw bones
4. Radioluscencies representing bone cysts (osteitis fibrosa cystica), loss of lamina dura
5. A generalized ground glass or moth eaten appearance of bone may be seen.

Management in the dental clinic

1. Consultation with child's physician.
2. Determine serum calcium, phosphate and alkaline phosphatase level.
3. Avoid routine dental treatment in patients with severe renal failure. Emergency dental treatment must be provided with proper medical advice.
4. Dental treatment of malocclusion, missing teeth... etc. should be done after the treatment of the cause of hyperparathyroidism.

Hypoparathyroidism

Commonly seen following surgical procedures involving thyroid gland and inadvertent excision of parathyroid gland (damage to the gland during surgery). Severe cases of hypoparathyroidism may lead to tetany.

Oral manifestations

1. Hypoplasia of teeth
2. Blunting of molar roots
3. sharp tap over the facial nerve in front of the ear causes twitching of facial muscles around the mouth (Chvostek sign).

Management in the dental clinic

1. Consultation with child's physician.
2. Avoid elective treatment in case of severe hypocalcemia with serious cardiac problems.

Diabetes Mellitus

It is a disease complex of disordered metabolism characterized by hyperglycemia, altered protein and lipid metabolism as a result of absolute or relative deficiency of insulin. Clinically it can be classified as:

- Insulin dependent mellitus
- Non-Insulin dependent mellitus

general symptoms

1. Excessive thirst , Fatigue and tiredness
2. urinating a lot, losing weight
3. having blurried vision

Oral manifestation:

1) Gingivitis, increased severity of periodontitis, bone loss, periodontal abscess, etc.

2) Xerostomia 3) Delayed wound healing

4) Pulpitis in non-carious tooth 5) Burning sensation in tongue

6) Acetone smell in breath 7) Oral ulcers 8) Oral candidiasis

9) Increase the susceptibility to dental caries (due to xerostomia and increase saliva glucose)

10) Miscellaneous conditions such as: Neuropathies: may affect cranial nerves (facial).

Management in the dental clinic

To minimize the risk of an operative emergency, clinicians need to consider some issues

before initiating dental treatment:

✓ Medical history: Take history and assess glycemic control at initial appointment, by:

✓ Glucose levels

✓ Frequency of hypoglycemic episodes

✓ Medication, dosage and times.

✓ Consultation

1. Scheduling of visits:

Morning appointment

Do not coincide with peak activity.

3. Diet: Ensure that the patient has eaten normally and taken medications as usual

4. Blood glucose monitoring: Measured before beginning. (<70 mg/dL)

5. Prophylactic antibiotics: To get rid of the establishment of infection.

6. During treatment: The most common complication of DM occur is: Hypoglycemic episode. Hyperglycemia

7. After treatment:

Dietary intake

Medications: salicylates increase insulin secretion and sensitivity➔ avoid aspirin

MANAGEMENT OF SYNCOPE:

Treat the underlying cause

Immediate symptomatic therapy includes:

Recognition of unconsciousness

“Shake & shout”

Check for protective reflexes

Management

Position victim-supination

Assess & open airway-head tilt, chin lift

Airway patency, breathing, circulation-look, listen & feel

Artificial ventilation & cardiac massage-cardiopulmonary resuscitation

Cystic fibrosis

It is an **autosomal-recessive disorder occurring in 1 of every 2000 births**. The genetically altered protein affects exocrine gland function. The defective exocrine gland function leads to microobstruction of the pancreas, which results in cystic degeneration of the pancreas and, ultimately, a digestive enzyme deficiency producing malabsorption of nutrients.

Children with cystic fibrosis have a high incidence of tooth discoloration when systemic tetracyclines are taken during tooth formation. With the advent of alternative antibiotics, the incidence of tooth discoloration is decreasing.

The incidence of dental caries in children with cystic fibrosis is low secondary to long-term antibiotic therapy, buffering capacity of excess calcium in the saliva, and pancreatic enzyme replacement therapy.

There is a high incidence of mouth breathing and open-bite malocclusion associated with chronic nasal and sinus obstruction.

Patients with cystic fibrosis may prefer to be treated in a more upright position to allow them to clear secretions more easily.

The use of **sedative agents that interfere with pulmonary function** should be avoided, and the patient's physician should be contacted before nitrous oxide-oxygen sedation is used in a patient exhibiting evidence of severe emphysema.

Dental management of cystic fibrosis

- Those children suffer from delayed dental development, more commonly have enamel opacities and are more prone to calculus
- May also have cirrhosis of liver -> clotting defects -> haemorrhaging following surgical procedures
- May be prescribed tetracycline to prevent chest infections -> intrinsic dental staining
- General anaesthesia should be avoided

Renal disease

In renal disorders there is increased susceptibility to: Infection and immunosuppression, bleeding tendency, decreased ability to excrete drugs, existence of A-V shunt, cross infection.

Dental management of renal disorders:

- Prevent dental diseases- OHI and education
- Strict cross-infection control
- Consult patient's physician before performing dental treatment
- Monitor BP pre-op and post-op
- Treat all infections aggressively and consider prophylaxis
- Use additional hemostatic measures
- Be careful with prescribing drugs
- Never subject those patients to out-patient general anaesthesia
- Remember veins are precious
- Poor bone density -> frequent denture adjustments
- Try to perform dental treatment just after dialysis if possible

Oral Manifestations of Renal Disease and Dialysis:

- Enlarged (asymptomatic) salivary glands i.e. Parotitis
- Decreased salivary flow, Xerostomia
- Dry mouth
- Odor of urea on breathe, ammonia like taste and smell
- Metallic taste
- Increased calculus formation
- Low caries rate
- Enamel hypoplasia
- Extrinsic (secondary to liquid ferrous sulfate therapy), dark brown stains on crowns Intrinsic (secondary to tetracycline staining)

Under Conservative Care

from a diminished mass of the excretory, metabolic and endocrine functions of the kidney which leads to the development of the clinical syndrome of uremia, so:

1. Consultation with patient's physician
2. Check lab values, blood urea nitrogen
3. Avoid dental treatment if the disease is unstable.
4. Monitor blood pressure closely
5. Pay meticulous attention to good surgical technique
6. Avoid nephrotoxic drugs
7. Adjust doses of drugs metabolized by the kidney

- If medical parameters permit:

1. Try to eliminate all foci of infection
2. Keep only the easily maintainable teeth
3. Insist on keeping a good oral hygiene

- If patient is in advance stages, dental care may best be provided after physician's consultation and in a hospital like setting
- Because of the potential bleeding problems:

1. Pretreatment screening for bleeding time and platelet count PTT, PT, platelet count.

2. A hematocrit level and hemoglobin count should be obtained to assess the status of anemia.

- If an orofacial infection exists, aggressive management is necessary using culture and sensitive tests and appropriate antibiotics. Consider corticosteroid supplementation as indicated

Nephrotoxic Drugs:

- Tetracyclines, Streptomycin, Vancomycin, Gentamycin, Acyclovir, Acetaminophen

Phenacetine, NSAIDs, Asprin, Antihistamines, Phenobarbitones

Therefore, you should give:

- Cloxacillin, erythromycin, minocycline, codiene, diazepam, lidocaine.

Patient Receiving Dialysis

Those patients at high incidence of serum hepatitis, high incidence of anemia, significant incidence of secondary hyperparathyroidism, uremic stomatitis may exist, may undergo heparinization during hemodialysis, and may have arteriovenous shunt or fistula. So keep in mind:

- The work will be the same as conservative care conditions
- Beware of concerns of arteriovenous shunt
- Consult with the physician about risk for infective endocarditis
- Avoid blood pressure cuff and IV medications in arm with shunt
- Consider antimicrobial prophylaxis

Dental management

- Avoid dental care on day of treatment; best to treat on day after
- Consider corticosteroid supplementation as indicated
- Assess status of liver function and presence of opportunistic infection in those patients because of increased risk for carrier state of hepatitis B and C viruses and human immunodeficiency virus.

1-Screen for HBsAg and HBsAb

2-Antibiotic prophylaxis to prevent endarteritis of arteriovenous fistula

3-Prevent hypoxia

4-Provide treatment on the day after hemodialysis

5-Be careful to protect the fistula or shunt when patient on dental chair

6-Refer the patient to physician if uremic stomatitis is noted to develop

Renal transplant patient

Infection in such patients is life -threatening. Before transplantation only maintained teeth should be determined by dental team approach, however, teeth with furcation involvement, periodontal abscesses, or extensive surgical requirements should be extracted.

Dental management

1- Emergency treatment only for 1st 6 months

2- HBs Ag screening

3-Prophylactic antibiotics according to AHA recommendations

4- Erythromycin is **contraindicated in patients on cyclosporins**

5- Immunosuppressed patients requires supplemental corticosteroids.