Management of Children with Systemic Diseases

HEARING LOSS

Hearing loss (deafness) is a disability that is often overlooked because it is not obvious. If impairment is severe enough that dentist and child cannot communicate verbally, the dentist must use sight, taste, and touch to communicate and to allow the child to learn about dental experiences. Many times, mild hearing losses are not diagnosed, which leads to management problems because of the child's misunderstanding of instructions; children with more severe hearing losses already have psychological and social disturbances that make dental behavior management more complex. Parents may suspect profound hearing loss if their infant does not respond to ordinary sounds or voices. Early identification and correction of hearing loss are essential for the normal development of communication skills. No abnormal dental findings are associated with hearing loss. The following should be considered in the treatment of a hearing-impaired patient :

1. Prepare the patient and parent before the first visit .
2. Let the patient and parent determine, during the initial appointment, how the patient desires to communicate (i.e., interpreter, lip reading, sign language, note writing [for child who can read], or a combination of these .(
3. Enhance visibility for communication. Watch the patient's expression. Make sure the patient understands what the dental equipment is, what is going to happen, and how it will feel .
4. Reassure the patient with physical contact; hold the patient's hand initially, or place a hand reassuringly on the patient's shoulder while the patient maintains visual contact .
5. Use the tell-show-feel-do approach. Use visual aids and allow the patient to see the instruments, and demonstrate how they work. Hearing-impaired children may be very sensitive to vibration .
6. .Display confidence; use smiles and reassuring gestures to build up confidence and reduce anxiety. Allow extra time for all appointments .
7. Avoid blocking the patient's visual field, especially with a rubber dam .
8. Adjust the hearing aid (if the patient has one) before the handpiece is in operation because a hearing aid amplifies all sounds .
9. Make sure the parent or patient understands explanations of diagnosis and treatment .

VISUAL IMPAIRMENT

The modalities of listening, touching, tasting, and smelling are extremely important in helping these children learn coping behavior. Hypoplastic teeth and trauma to the anterior teeth have been reported to occur with greater than average frequency in visually impaired children. Such children are also more likely to have gingival

inflammation because of their inability to see and remove plaque. Other dental abnormalities occur with the same frequency as in the general population .
Before initiating dental treatment for a visually impaired child, the dentist should keep the following points in mind :

1. Rather than using the tell-show-feel-do approach, invite the patient to touch, taste, or smell, recognizing that these senses are acute. Avoid sight references . Describe in detail the instruments and objects to be placed in the patient's mouth .
2. Demonstrate a rubber cup on the patient's fingernail .
3. Because strong tastes may be rejected, use smaller quantities of dental materials with such characteristics .
4. Some patients may be photophobic. Ask parents about light sensitivity and allow these patients to wear sunglasses .
5. Explain the procedures of oral hygiene and then place the patient's hand over yours as you slowly but deliberately guide the toothbrush .
6. Maintain a relaxed atmosphere. Remember that your patient cannot see your smile .

The provision of dental care to a visually impaired child is facilitated by an in-depth understanding of the patient's background. A team approach by all health professionals involved in the care of the child is ideal. Disease prevention and continuity of care are of utmost importance .

Epilepsy

It is a brain disorder characterized by excessive neuronal discharge that can produce seizures .

Manifestations of Epilepsy

- Confusion
- Breathing difficulty
- Loss of consciousness
- Drooling
- Out of body experience
- Making sounds
- Falling down
- Shaking
- Inability to move
- Tongue biting
- Incontinence
- Heart racing
- Fear/Panic
- Staring
- Depression and sadness
- Sweating
- Electric Shock Feeling

- Teeth clenching/grinding

Oral Manifestations of Epilepsy

- Increased risk for dental caries
- Increased risk for oral trauma
- Medication-induced gingival hyperplasia, bleeding gums, and delayed healing .

Behavior Management of Epilepsy

- Take history
- Ensure medication has been taken as prescribed before treatment to reduce risk of seizure .Schedule appointment during time of day when seizures are less likely to occur .
- Children with severe, uncontrolled epilepsy may require general anesthesia for restorative and surgical needs .
- Minimize seizure triggers. Reduce stress and anxiety .
- Keep bright light out of child's eyes or allow child to wear dark glasses .
- Position the patient in as upright a position as possible
- Use low amounts of water and high volume suction to minimize aspiration .

Seizure Management during Treatment

- Remove all dental instruments from the mouth .
- Clear the area around the dental chair .
- Monitor airway to reduce risk of aspiration .
- Note time seizure begins: if seizure continues >3 min call EMS

RESPIRATORY DISEASES

ASTHMA (REACTIVE AIRWAY DISEASE)

Asthma is a common childhood disease, affecting 1 in 10 children. It is a chronic diffuse obstructive airway disease characterized by inflammation, increased mucus production, and bronchial constriction, caused by edema of the mucous membranes , increased mucous secretions, and spasm of smooth muscle .

Before initiating dental treatment, the dentist should know what are the frequency and severity of the attacks, what are the triggering agents, when the patient was hospitalized and/or in the emergency department, when the last attack occurred, what medications the patient takes, and what limitations on activity the patient may have. Patients taking systemic corticosteroids and those who were hospitalized or in the emergency department in the preceding year should be treated with caution because they are at higher risk of morbidity and mortality .

Patients who use bronchodilators should take a dose before their appointment, and they should bring their inhalers or nebulizers into the dental office in case trouble arises .

Behavioral methods are used to reduce anxiety and the child may need to be positioned in an upright position for the dental procedure, and nitrous oxide–oxygen analgesia may be helpful. Hydroxyzine hydrochloride (Vistaril) and diazepam (Valium)

have been successful in alleviating anxiety. Barbiturates and narcotics are not indicated because of their potential for histamine release, leading to a bronchospasm. Aspirin compounds and nonsteroidal anti-inflammatory agents are contraindicated because about 4% of patients experience wheezing after taking these drugs .

Oral findings of children with moderate to severe asthma include higher caries rates, decreased salivary rates, increased prevalence of oral mucosal changes characteristic of chronic mouth breathers, and increased levels of gingivitis. Increased incidence of orofacial abnormalities such as high palatal vault, more posterior crossbites, greater overjets, and increased facial height is also seen .

HEART DISEASE

Heart disease can be divided into two general types: congenital and acquired. Because individuals with heart disease may require special precautions during dental treatment ,such as antibiotic coverage for prevention of infective endocarditis (IE), a dentist should closely evaluate the medical histories of all patients to ascertain their cardiovascular status .

The dentist should obtain a thorough medical and dental history, perform a physical examination, formulate a complete treatment plan, and discuss the treatment with the child's physician or cardiologist. Behavior management techniques are useful, and conscious sedation and nitrous oxide–oxygen analgesia have also been proven beneficial in reducing anxiety in such patients. Conscious sedation monitoring and cardiopulmonary resuscitation equipment should be readily available during the appointment. If general anesthesia is indicated, the dental procedures should be completed in a hospital setting ,where adequate supportive care is available if needed .

Other considerations are especially important in treating patients who are susceptible to IE :

- •Pulp therapy is not recommended for primary teeth with a poor prognosis because of the high incidence of associated chronic infection. Extraction of such teeth with appropriate fixed-space maintenance is preferred .
- Endodontic therapy in the permanent dentition can usually be accomplished successfully if the teeth to be treated are carefully selected and the endodontic therapy is adequately performed .
- A dentist who feels uncomfortable in treating patients who are susceptible to IE has a responsibility to refer them to someone who will adequately care for them .

Conditions at risk of infective Endocarditis during dental care :

Prophylactic antibiotic is necessary for invasive dental treatment :

1. Dental procedures likely to induce gingival or mucosal bleeding, including professional cleaning .
2. Surgical operations .
3. Incisions and drainage of infected tissues and endodontic treatment .
4. Intraligmentary injections .

5. Distal shoe space maintainer .

Any dental patient who has a history of congenital heart disease or rheumatic heart disease or who has a prosthetic heart valve should be considered susceptible. The American Heart Association's antibiotic recommendations for the prevention of bacterial endocarditis are presented as followed :

Regimens for a Dental Procedure

SITUATION	AGENT	REGIMEN: SINGLE DOSE 30 TO 60 MINUTES BEFORE PROCEDURE ADULTS	CHILDREN
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin OR Cefazolin or ceftriaxone	2 g IM or IV 1 g IM or IV	50 mg/kg IM or IV 50 mg/kg IM or IV
Allergic to penicillins or ampicillin—oral	Cephalexin *† OR Clindamycin OR Azithromycin or clarithromycin	2 g 600 mg 500 mg	50 mg/kg 20 mg/kg 15 mg/kg
Allergic to penicillin or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone† OR Clindamycin	1g IM or IV 600 mg IM or IV	50 mg/kg IM or IV 20 mg/kg IM or IV

IM, intramuscular; IV, intravenous.
*Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosage.
†Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema, or urticaria with penicillins or ampicillin.

HEMOPHILIA (DISORDERS OF HEMOSTASIS)

The hemophilia are disorders of hemostasis, resulting from a deficiency of a clotting factor that promotes formation of a fibrin clot, termed procoagulants. Hemophilia is an inherited bleeding disorder affecting approximately 1in 5000 males .Hemophilia A, or classic hemophilia, is a deficiency of factor VIII, also known as antihemophilic factor. It is the most common form of hemophilia and is inherited as an X -linked recessive trait. Therefore males are affected, females are carriers, and there is no male-to-male transmission .Hemophilia B, or Christmas disease which is factor XI (plasma thromboplastin antecedent) deficiency, it is caused by a deficiency of factor IX (plasma thromboplastin component) and it is also inherited as an X-linked recessive trait. Factor IX deficiency is one fourth as prevalent as factor VIII deficiency .

Hemophilia C or Rosenthal's disease, it is inherited as an autosomal-recessive trait , with male and female offspring equally affected. This disorder is most frequently observed in those of Ashkenazi Jewish descent, but it is found in many other populations .

Other factor deficiencies, such as factors II, V, and XIII and factor are rare and are inherited as autosomal-recessive traits .Von Willebrand disease (VWD) is a hereditary bleeding disorder resulting from an abnormality of the von Willebrand factor (VWF) found in plasma, platelets ,megakaryocytes, and endothelial cells. VWF circulates in conjunction with factor VIII ,protecting it from proteolytic degradation, and is important in platelet adhesion to the sub endothelium via collagen and therefore the formation of the primary platelet plug .

The mainstay of therapy for hemophilia is replacement of the deficient coagulation factor through the use of purified concentrates either manufactured through recombinant technology or from pooled plasma. In the past, whole blood, plasma, or

cryoprecipitate was used; but at present, genetically engineered products represent the main source of replacement therapy .

Based on the level of the procoagulant present, hemophilia can be classified into three groups :

- •Severe deficiency: levels less than 1%
- Moderate deficiency: levels between 1% and 5%
- Mild deficiency: levels greater than or equal to 5% to less than 50%

For mild factor VIII deficiency, DDAVP (1-deamino-8-d-arginine vasopressin) may be used for minor hemorrhagic episodes to achieve hemostasis. This drug, when given intravenously, subcutaneously, or intranasally causes a rise in activities of factor VIII and VWF .

USE OF ANTIFIBRINOLYTIC AGENTS

Antifibrinolytic agents are an adjunctive therapy for dental management of patients with bleeding disorders and are important for the prevention or treatment of oral bleeding. These agents include ε-aminocaproic acid (its advantage for children is that it is available in both tablet and liquid form.) and tranexamic acid .

Hemophilic patients form loose, friable clots that are easily dislodged or rapidly dissolved, especially in the oral cavity, where local fibrinolysis is increased . Antifibrinolytics prevent clot lysis within the oral cavity and are often used as an adjunctive therapy to factor concentrates. For some dental procedures in which minimal bleeding is anticipated, antifibrinolytics may be recommended as the sole hemostatic agent. It should not be used when renal or urinary tract bleeding is present or when there is evidence of disseminated intravascular coagulation .

RISKS TO DENTAL STAFF

The risk for acquiring hepatitis B (HBV), hepatitis C (HCV), or human immunodeficiency (HIV) virus infections following an accidental needle stick are 30% ,3% ,and 0.3%, respectively. Although there is now evidence for the transmission of HIV when infected mothers premasticate food for their children, the quantifiable risk of HIV transmission via saliva alone is lower than that from a needle-stick injury .

DEVELOPMENT OF A TREATMENT PLAN

With recent advances in treatment, most patients with bleeding disorders receive outpatient dental care routinely. With a thorough understanding of the patient's hemostatic disorder, the dentist, in conjunction with the hematologist, is able to make safe and appropriate treatment decisions .

The dentist must be aware of the procedures that can be safely performed and those in which complications may arise. The dentist should confer with the patient's physician and hematologist to formulate an appropriate treatment plan. The dentist should know the specific type of bleeding disorder, severity, frequency of and treatment for bleeding episodes, as well as the patient's inhibitor status. Many individuals with hemophilia self -administer infusion products at home and are therefore able to treat themselves as required .

The dentist should be prepared to discuss with the hematologist the type of anesthetic anticipated to be administered, invasiveness of the dental procedure, amount of bleeding anticipated, and time involved in oral wound-healing in order to help establish an appropriate treatment plan, including the need for replacement and adjunctive therapies .

PAIN CONTROL

Analgesia

If patient apprehension is significant, sedation or nitrous oxide–oxygen inhalation analgesia may be considered. Hypnosis has also proved beneficial for some individuals .

Intramuscular injections of hypnotic, tranquilizing, or analgesic agents are contraindicated especially in patients who have not received replacement therapy or in patients with inhibitors, due to the risk of hematoma formation .Analgesics containing aspirin or anti-inflammatory agents (e.g., ibuprofen) may affect platelet function and should be avoided. Acute pain of moderate intensity is frequently managed with acetaminophen (Tylenol, Temprat). For severe pain, narcotic analgesics may be required and are not contraindicated in the patient with a bleeding disorder .

Local Anesthesia

In the absence of factor replacement, periodontal ligament (PDL) injections may be used .

The anesthetic is administered along the four axial surfaces of the tooth by placement of the needle into the gingival sulcus and the PDL space .

Infiltration anesthesia can generally be administered without pretreatment with either ε-aminocaproic acid or replacement therapy. However, if the infiltration injection is into loose connective tissue or a highly vascularized area, then factor concentrate replacement to achieve a level of approximately 30% to 40% activity is required (bleeding in pterygomandibular region may result in Asphyxia)

One must proceed with caution when considering block anesthesia. The loose , connective, non-fibrous and highly vascularized tissue at the sites of inferior alveolar nerve injection and posterior superior alveolar injections is predisposed to development of a dissecting hematoma, which may cause airway obstruction and result in a life-threatening bleeding episode .

The dentist must carefully aspirate to ensure that the needle has not entered a blood vessel .

If bloody aspirate is present, further factor replacement may be required, and the attending hematologist should be notified immediately following the operative procedure .

All patients should be observed for development of a hematoma and immediately referred for treatment in cases where hematomas develop after the administration of local anesthesia .