

**CONTENTS**

<b>ORTHODONTIC MANAGEMENT OF MEDICALLY COMPROMISED PATIENTS</b> KARUNAKAR REDDY, ETHAMUKKALA ANITHA	<b>1</b>
<b>INSTRUCTIONS FOR AUTHORS</b>	<b>12</b>
<b>TONGUE THRUST HABIT - A review</b> GOWRI SANKAR SINGARAJU, CHETAN KUMAR	<b>14</b>
<b>MANAGEMENT OF OPEN BITE</b> PRASAD MANDAVA, ASHOK KUMAR	<b>24</b>
<b>SUBJECT REVIEW MCQ</b>	<b>32</b>
<b>EDITOR'S QUERY AND COMMENTS</b>	<b>33</b>
<b>DENTA QUEST MEMBERSHIP FORM</b>	<b>34</b>

## Orthodontic Management of Medically Compromised Patients

\* Karunakar reddy

\*\* Ethamukkala Anitha

\*Professor, Department of orthodontics, Narayana Dental college, Eluru.

\*\*Reader, Department of Orthodontics, SV Dental college, Mahboobnagar.

---

**Abstract** ; The nature of the orthodontic patient base seeking treatment continues to grow. Some of these patients may have potentially medical compromises or conditions. As such there is no absolute contraindication of orthodontic treatment in most of these conditions but may require a slightly modified protocol. This article reviews the orthodontic treatment Protocol for some common medical conditions.

**Key words**: Medically Compromised, orthodontic patients, treatment protocol

### INTRODUCTION

The nature of the orthodontic patient base seeking treatment continues to grow. Many of these patients have significant medical conditions that may alter both the course of their oral disease and the therapy provided. One of the therapeutic responsibility of the clinician includes identification of the patient's medical problems to formulate proper treatment plans. Thorough medical histories are of paramount importance. Practicing orthodontist should be well prepared to face the challenges in diagnosing and management of medically compromised patient. An orthodontist who is treating medically ill patient should be aware of basic nature of systemic disease and its consequences. Treatment plan should be modified according to impact of the particular disease in the oral cavity. The purpose of this article is to review common medical conditions and associated guidelines of orthodontic management. Systemic problems commonly encountered in routine orthodontic practice are<sup>1</sup>:

1. cardiac diseases-Endocarditis
2. metabolic disorders
3. Haematological disorders
4. Haematological malignancies
5. Autoimmune disorders--Juvenile rheumatoid arthritis
6. Chronic Renal failure
7. Bronchial asthma
8. Allergies
9. central nervous system—epilepsy
10. neuromuscular disorders-cerebral palsy
11. pregnancy

### 1. INFECTIVE ENDOCARDITIS (IE)

Infective endocarditis (IE) is a disease in which microorganisms colonize the damaged endocardium or heart valves. Endocarditis is a life threatening disease. Substantial morbidity and mortality can result from this infection despite advances in antimicrobial chemotherapy. The organisms most commonly encountered in IE are alpha -hemolytic streptococci(e.g., *Streptococcus viridans*). However, nonstreptococcal organisms' often found in the periodontal pocket have been increasingly implicated, including *Eikenella corrodens*, *Actinobacillus actinomycetemcomitans*, *Campylobacter*, and *Lactobacillus* species.

As diagnosis of endocarditis is difficult to confirm, prevention of endocarditis is very important. Now a days diagnosis of IE requires integration of clinical, laboratory and echocardiographic data. A specific and highly sensitive diagnostic schema known as the Duke criteria has been developed to assist diagnosis<sup>2</sup>.

According to recent guidelines published by American Heart Association, cardiac conditions associated with the highest risk of adverse outcome from endocarditis for which prophylaxis is required with dental procedures are'

If in doubt consult with the cardiologist as patients with a positive history eg"heart murmur" are not necessarily at risk. Low risk patients need no special precautions. High risk patients are best referred to a specialist centre for treatment in conjunction with the physician. A particularly careful assessment of the relative risks and benefits of

orthodontic treatment is needed in such cases before proceeding.

**Infective endocarditis, orthodontic treatment and bacteraemia<sup>3</sup> :**

Only a small minority of cases of infective endocarditis (IE) has any possible connection with dentistry. IE is extremely rare in adolescents and its incidence does not appear to be higher during orthodontic treatment. The prevalence and magnitude of bacteraemia of oral origin are directly proportional to the degree of oral inflammation

present . Most bacteraemia arises from everyday activities such as chewing and toothbrushing

The bacteraemia experienced by the patient may be increased by plaque accumulation which increases in the presence of orthodontic appliances. Various orthodontic procedures can produce a bacteraemia including impression making, placing separators, fitting or removing bands and surgical exposure of teeth.

**High risk patients:**

- Previous endocarditis
- prosthetic heart valves
- Complex cyanotic congenital heart disease( CHD)
- Unrepaired cyanotic CHD, including

**Medium risk patients:**

- Congenital heart defects eg VSD
- Acquired valvular disease (e.g. from rheumatic fever)
- Hypertrophic cardiomyopathy

**Low risk patients:**

- General population
- Repaired VSD's Isolated secundum atrial defects
- Note that coronary artery bypass grafts are not at risk
- Mitral prolapse with regurgitation
- palliative shunts and conduits

**Orthodontic considerations :**

Any cardiac pathology should be evaluated in initial medical history. Patients at risk of endocarditis should be treated in consultation with their cardiologist and within the appropriate guidelines. Informed consent requires that a patient is aware of any significantly increased risk.

- Patients must understand the need to maintain a high standard of oral hygiene and make a firm commitment to do so. Immaculate oral hygiene is must for starting orthodontic treatment.
- Patients may be encouraged to use a daily antimicrobial mouthwash, e.g. chlorhexidine 2% to aid plaque control, particularly for the two

days leading up to fitting, removal or major adjustments of a fixed appliance.

- Bonded appliances are to be preferred to banded appliances where possible, exceptions being cases needing RME, quadhelix or headgear.
- For unerupted teeth avoid bonding with closed eruption.

**Orthodontic procedures, risk of developing endocarditis and antibiotic prophylaxis:**

American Heart Association recommends that antibiotic prophylaxis should be given, in all cardiac patients with the highest risk of IE mentioned before, in all dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa.

These include probing, extractions, banding procedures ( both band placement and band removal) and placement of separators.

They do not recommend prophylaxis at the placement of removable orthodontic appliances, adjustment of orthodontic appliances, placement of orthodontic brackets, and bleeding from trauma to the lips or oral mucosa.

**Prophylactic regimens for bacterial endocarditis**

Prevention of endocarditis in patients with heart-valve lesion, patent ductus , septal defect or prosthetic valve

	Adult dose	Below 5years	5-10 years
<b>Dental procedures under local or no anaesthesia</b>			
patients who have not received more than a single dose of a penicillin in the previous month, including those with a prosthetic valve (but not those who have had endocarditis)	oral amoxicillin 3 g 1 h before procedure;	quarter adult dose	half adult dose
patients who are penicillin-allergic or have received more than a single dose of penicillin in the previous month, who have had endocarditis	oral clindamycin 600 mg 1 h before procedure (or)  - Erythromycin ethyl succinate 800 mg (or) Erythromycin - rate 1.0 g orally 2 hour before procedure, then half the dose 6 hours after initial dose	quarter adult dose	half adult dose patients
<b>Dental procedures under general anaesthesia,</b>			
no special risk (including patients who have not received more than a single dose of a penicillin in the previous month	either i.m. or i.v. amoxicillin 1 g at induction, then oral amoxicillin 500 mg 6 h later ( Or)	quarter adult dose	half adult dose
	oral amoxicillin 3 g + oral probenecid 1 g 4 h before procedure	quarter adult dose	half adult dose
Special risk (patients with prosthetic valve or who have had endocarditis),	i.m. or i.v. amoxicillin 1 g + i.m. or i.v. gentamicin 120 mg at induction, then oral amoxicillin 500 mg 6 h later;	amoxicillin quarter adult dose, gentamicin 2 mg/kg	amoxicillin half adult dose, gentamicin 2 mg/kg

patients who are penicillin-allergic or who have received more than a single dose of a penicillin in the previous month	either i.v. vancomycin 1 g over at least 100 min then i.v. gentamicin 120 mg at induction or 15 min before procedure (Or)		vancomycin 20 mg/kg, gentamicin 2 mg/kg
	or i.v. clindamycin 300 mg over at least 10 min at induction or 15 min before procedure then oral or i.v. clindamycin 150 mg 6 h later;	CHILD under 5 years quarter adult dose;	5–10 years half adult dose

Resource \*\*\* British National Formulary

Dental procedures that require antibiotic prophylaxis are: extractions, scaling and surgery involving gingival tissues. Antibiotic prophylaxis for dental procedures may be supplemented with chlorhexidine gluconate gel 1 % or chlorhexidine gluconate mouthwash 0.2%, used 5 min before procedure.

If clindamycin is used, periodontal or other multistage procedures should not be repeated at intervals of less than procedures should not be repeated at intervals of less than

Usually prophylaxis is continued 2 days after the procedure .\*\*\*

## METABOLIC DISORDERS

### A. Diabetes mellitus <sup>4</sup>

Diabetes mellitus (DM) is a metabolic disorder of diverse etiologic factors, characterized by hyperglycemia resulting from deficiencies in the insulin secretion, insulin action or both. Diabetes mellitus affects people of all ages. It has two types. The two major types of diabetes are type 1 (formerly known as "insulin-dependent diabetes") and type 2 (formerly called "non-insulin-dependent diabetes") Type 1 DM the cause is an absolute deficiency of insulin secretion. Type 1 DM is the most common endocrine metabolic disorder of childhood and adolescence with a peak incidence at 10-14 years of age. The cause of more prevalent type 2 DM is a combination of resistance to insulin action and an inadequate compensatory insulin secretory response. If the clinician detects intraoral signs of undiagnosed or poorly controlled diabetes, a thorough history is indicated The classic signs of diabetes include polydipsia(excessive thirst), polyuria (excessive urination), and polyphagia (excessive hunger, often with unexplained

concurrent weight loss). Further investigation via laboratory studies and physician consultation is indicated. For professionals the method of choice in monitoring the treatment of DM is the determination of the glycosylated hemoglobin concentration assay. Two different tests are available, the HbA1 and the HbA1c test; the HbA1c is more commonly used. There is a linear rise in HbA1c as the blood sugar increases in DM patients'

#### Glycated Hemoglobin Assay (HbA1c)

- 4% to 6% - Normal
- <7% -Good diabetes control
- 7% to 8% - Moderate diabetes control
- >8% - Action suggested to improve diabetes control

If a patient is known to have diabetes, the primary test used to assess glycemic control in a known diabetic individual is the glycosylated or glycated hemoglobin assay. Oral manifestations are mainly found in patients while DM is uncontrolled or poorly controlled. Several studies have shown that

gingivitis is more severe in children with DM. Even in well controlled DM patients have more gingival inflammation, probably because of impaired neutrophil function

**Orthodontic considerations :**

1. The key for treating orthodontic problems in diabetic patients is good medical control. If patient is not in good metabolic control (HbA1c more than 9%), every effort should be made to improve blood glucose control. Orthodontic treatment should be avoided in patients with poorly controlled Insulin-dependent DM as these patients are particularly susceptible to periodontal breakdown. There is no upper age limit for orthodontic treatment. The practitioner can treat both type 1 and type 2 DM patients.
2. There is no treatment preference with regard to fixed or removable appliances. It is important to stress good hygiene, especially when fixed appliances are used. Daily rinses with fluoride mouthwash can provide further benefits. Diabetes related microangiopathy can occasionally occur in the periapical vascular supply resulting in unexplained odontalgia, percussion sensitivity, pulpitis or even loss of vitality. Orthodontist should be aware of this phenomenon and regular vitality check ups are advised'
3. In adults especially it is important to evaluate periodontal status before initiating orthodontic treatment. If plaque control is difficult to achieve with mechanical aids like toothbrush and interdental aids, chlorhexidine mouthwash should be used. To minimize neutralizing effect of the chlorhexidine molecule, there should be at least a 30 minute interval between tooth brushing and the chlorhexidine rinse'
4. The most common dental office complication seen in diabetic patients taking insulin is symptomatic low blood glucose or hypoglycemia. The clinician should question diabetic patients about past episodes of hypoglycemia. Hypoglycemia is more common in patients with better glycemic control. When planning dental treatment, it is best to schedule appointments before or after periods of peak

insulin activity. This requires knowledge of the pharmacodynamics of the drugs being taken by the diabetic patient.

Morning appointment is preferable. If a patient is scheduled for a long treatment session e.g. about 90 minutes, he or she should be advised to eat a usual meal and take the medication as usual. This is important to avoid hypoglycemic reaction. When a hypoglycemic reaction occurs in the dental office, the orthodontist should recognize the symptoms and act appropriately. Most patients are familiar with these symptoms and can tell orthodontist in time. The cooperative and conscious patient who demonstrates clinical symptoms of hypoglycemia should be given high carbohydrate beverage such as orange juice. Management of the unconscious patient includes airway maintenance, oxygen administration and monitoring of vital signs.

5. Children with diabetes are at nutritional risk and should undergo nutrition screening to identify those who require formal nutrition assessment with development of a nutrition care plan'

-----  
**B- Adrenal insufficiency( cortical crisis )<sup>5-7</sup>**

Acute adrenal insufficiency is associated with significant morbidity and mortality owing to peripheral vascular collapse and cardiac arrest . Therefore the orthodontist should be aware of the clinical manifestations and ways of preventing acute adrenal insufficiency in patients

There are two types of adrenal insufficiency 1.primary with histories of primary adrenal insufficiency (Addison's disease) or 2. secondary adrenal insufficiency (most often caused by use of exogenous glucocorticosteroids).

The use of systemic corticosteroids is common in allergic, endocrine, respiratory, joint, intestinal, neurologic, renal, liver, skin, and connective tissue disorders

Significant complications associated with corticosteroid use include alterations in glucose metabolism (steroid-induced diabetes), increased risk of infection, altered wound healing: osteoporosis. etc.,

### **Orthodontic considerations**

Steroid cover should be considered for minor oral surgery procedures. Current corticosteroid therapy and corticosteroid therapy in the last 12 months should be evaluated. Before treating a patient with a history of recent or current steroid use, physician consultation is indicated to determine whether the patient's proposed treatment plan suggest a requirement for supplemental steroids. Use of a stress reduction protocol and profound local anesthesia may help minimize the physical and psychologic stress associated with therapy and reduce the risk of acute adrenal crisis. Hydrocortisone 200 mg (IV/IM immediately pre-operatively or orally 1 hour preoperatively) and continue normal dose of steroids post-operatively.

### **C. Thyroid and Parathyroid Disorders<sup>5-7</sup>**

Orthodontic therapy requires minimal alterations in the patient with adequately managed thyroid disease. Patients with histories of hyperthyroidism should be carefully evaluated to determine the level of medical management, and they should be treated in a way that limits stress and infection. Medications such as epinephrine and other vasopressor amines should be given with caution in patients with treated hyperthyroidism, although the small amounts used in dental anesthetics. Patients with hypothyroidism require careful consideration due to the potential for excessive sedation.

Routine orthodontic therapy may be provided to patients with parathyroid disease once that disorder has been identified and the proper medical treatment given. However, patients who have not received medical care may have significant renal disease, uremia, and hypertension.

### **III. Hematological disorders**

#### **A. Bleeding disorders<sup>1</sup>**

Patients with a history of bleeding problems caused by disease or drugs or operative procedures should be managed so as to minimize risks of hemorrhage. A thorough medical history is very important in these type of patients.

The main inherited coagulation disorders include hemophilias A and B and von Willebrand's disease.

Hemophilia A is the most commonly occurring bleeding disorder commonly encountered in dental clinic. In addition hemophilia A (Factor VIII deficiency), a number of congenital coagulation abnormalities cause by deficiency of other clotting factors have been recognized.

Patients with mild bleeding disorders do not usually present difficulties to the orthodontist. As occurrence of the malocclusion in the children is similar to the rest of the population and the long term outlook is good, orthodontic treatment is not contra-indicated. Two main areas to be considered in treatment of these patients are chances of iatrogenic viral infection and risk of bleeding during extraction. Medical treatment of choice in bleeding disorders is administration of various factor concentrates. Concentrates are derived from human blood donations. They carry a small risk of transmitting serious transfusion derived viral infections like hepatitis B, C and HIV. The clinician should consult the patient's physician before dental treatment to determine the risk for bleeding and treatment modifications required. To prevent surgical hemorrhage, factor VIII levels of at least 30% are needed. Parenteral l-deamino-8-D-arginine vasopressin (DDAVP) can be used to raise factor VIII levels 2- to 3-fold in patients with mild or moderate hemophilia. If extractions are required as a part of orthodontic treatment, most patients with moderate to severe hemophilia A are submitted to factor VIII concentrate infusion before extractions. The recent introduction of genetically manufactured factor VIII products has reduced the risk of viral transmission in this age group" If tooth extraction or other surgery like exposure of impacted canine is required in patients with severe bleeding disorders they are usually hospitalized and given transfusion of the missing clotting factor in advance of the procedure. So wherever possible a nonsurgical approach should be adopted.

#### **Orthodontic considerations :**

1. Excellent oral hygiene is must for preventing gingival bleeding before it occurs. Every effort should be made to avoid any chronic irritation from orthodontic appliance.
2. Archwires should be secured with elastomeric modules rather than wire ligatures, which carry the risk of cutting the mucosal surfaces. Special

care is required when placing and removing archwires".

3. Duration of orthodontic treatment for any patient with a bleeding disorder should be given careful consideration. The longer the duration of treatment, greater the potential for complications.
4. Bleeding can be managed by replacement of missing clotting factors, so extractions and orthognathic surgery is not contraindicated if managed carefully"
5. Intense orthodontic or orthopedic forces such as extraoral anchorage or maxillary distraction should he managed with more care.

#### **IV. Hematological malignancies <sup>8</sup>**

More than 40 percent pediatric malignancies are hematological either leukemia or lymphoma. Leukemias account for 30 percent of all childhood malignancies". Acute leukemia includes two types: Acute lymphoblastic leukemia (75-80 percent) and Acute nonlymphocytic leukemia (15-20 percent). Chronic myelocytic leukemia accounts for 5 percent of all childhood malignancies. Lymphomas include Hodgkin's lymphoma and nonHodgkin's lymphoma. Both account for 10 per cent with equal incidence.

##### **Before diagnosis:**

Oropharyngeal lesion can be the initial signs in 10% of acute leukemia. In the absence of local causative factors, orthodontist should be suspicious of patients who present with gingival redness pain or hypertrophy, pharyngitis and lymphadenopathy" In such cases prompt referral to a physician is necessary to exclude hematological malignancy.

##### **After Diagnosis:**

In most cases orthodontist will see a patient who has already been diagnosed with a hematological malignancy. Those receiving chemotherapy have an increased potential for infection which is the leading cause of morbidity in immunocompromised patients' The orthodontist should be aware of the implications of preexisting infection. Developing dental tissues are particularly sensitive to radiation. Chemoradiation often causes developmental anomalies. Careful consideration should be given to

the patients having severe root shortening while planning the treatment.

##### **Orthodontic considerations:**

1. As orthodontic treatment is an elective procedure, patient's physician should be consulted. If orthodontic treatment has not been started, it should be delayed until the patient has completed chemotherapy and is on long term remission.
2. If orthodontic treatment has been already started the orthodontist should contact the patient's physician possible for prognosis. As the time of diagnosis of malignancy is very stressful for the patient and family, orthodontist should be aware of its psychological implications.
3. Intense chemotherapy weakens regenerative capacity of mucosa. Minor irritation can lead to opportunistic infection and subsequent severe complications. It is advisable to remove all orthodontic fixed appliances before starting chemotherapy as a safety procedure.
4. Apart from smooth appliances such as band and loops and fixed lower lingual arches, all fixed appliance parts should be removed. Removable appliances and retainers that fit well may be worn as long as tolerated by the patient who shows good oral care. If band removal is not possible vinyl mouth guards or orthodontic wax should be used to decrease tissue trauma"
5. To counter xerostomia during cancer therapy use of sugar free chewing gum, candy, saliva substitutes, frequent sipping of water, and/or moisturizers is recommended<sup>2,3</sup>
6. Orthodontic treatment may start or resume after completion of all therapy and after at least 2-year event free survival when risk of relapse has been decreased and patient is not on immunosuppressive drugs. A thorough assessment of any dental developmental disturbances caused by cancer therapy must be done before initiating orthodontic treatment. American Academy of Pediatric Dentistry recommends following strategy to provide orthodontic care for patient with dental sequelae"
  - a. Appliances that minimize root resorption should be used.
  - b. Light force should be used.
  - c. Treatment should be terminated earlier than normal.



- d. The simpler method for treatment needs should be chosen.
- e. Lower jaw should not be treated.

However specific guidelines for orthodontic management including optimum force and pace remain undefined.

#### **V. Autoimmunedisorders - Juvenile rheumatoid arthritis<sup>5-7</sup>**

Juvenile rheumatoid arthritis (JRA) is an autoimmune inflammatory arthritis occurring before the age of 16 years. Juvenile rheumatoid arthritis is more severe than the adult disease and leads to gross deformity. One form of this disease which affects girls in late childhood may involve any joint and is associated with rheumatoid nodules, mild fever, anemia and malaise. Temporomandibular joint (TMJ) can be damaged up to complete bony ankylosis. In 30 per cent of the cases a severe skeletal class II jaw discrepancy occurs due to restricted growth of the mandible" Classic signs of rheumatic destruction of the TMJ include condylar flattening and a large joint space.

It has been suggested that orthodontic treatment for patients with JRA would prevent worsening of TMJ condition by reducing mechanical loads resulting from stabilization of occlusion. This contributes to long-term stability with a functional improvement.

#### **Orthodontic considerations:**

1. Regarding load on TMJ in rheumatoid arthritic patients receiving orthodontic treatment, there are different opinions. Proffit et al have suggested that orthodontic procedures that place stress on the TMJ, such as functional appliances and heavy class II elastics, should be avoided if TMJ is involved in rheumatoid arthritis" On the other hand, Kjellberg et al suggested that functional appliances may unload the affected condyle and act as a "joint protector"
2. If the wrist joints are affected these patients have difficulty with tooth brushing. They require additional support from a hygienist during their orthodontic treatment and the use of an electric toothbrush should be considered. Sugar-free medicines should be preferred to minimize caries.

3. It has been suggested that in cases of severe mandibular deficiency, mandibular surgery should be avoided and a more conservative approach using maxillary surgery and genioplasty should be considered

Other considerations include the corticosteroid therapy of the patient for the underlying disorder and the associated problems which are discussed in this chapter

#### **VI A. Bronchial Asthma<sup>5-7</sup>**

Asthma is a diffuse chronic inflammatory obstructive lung disease with episodes of chest tightness that causes breathlessness, coughing, and wheezing all of which are related to bronchiole inflammation. It is associated with hyperreactivity of the airways to a variety of stimuli and a high degree of reversibility of the obstructive process. Symptoms can last for a few moments or for as long as a day leading to inflammation and subsequent fibrosis.

Asthma is a leading cause of chronic illness in childhood. The etiology is poorly understood but it is a complex disorder involving immunological, infectious, biochemical, genetic, and psychological factors. The strongest identified risk factor for the development of asthma is atopy, an inherited tendency to exhibit allergic reactions. Acute episodes of coughing and wheezing are often precipitated by exposure to allergens and irritants, such as cold air or noxious fumes and emotional stress. Drug therapy is now the mainstay of treatment both prophylactically and during acute exacerbations. Usually it involves bronchodilators, inhaled corticosteroids, theophylline and anticholinergics

#### **Typical oral health conditions in asthma:**

1. Patients with asthma have a greater rate of caries development than do their nonasthmatic counterparts because of antiasthmatic drugs-induced xerostomia.
2. The use of nebulized corticosteroids can result in throat irritation, dysphonia and dryness of mouth, oropharyngeal candidiasis and, rarely, tongue enlargement.
3. The common habit of mouth-breathing in asthmatic patients and immunological factors lead to gingival inflammation.

**Orthodontic considerations:**

Management in orthodontic care can be divided in three parts- before orthodontic treatment, during treatment and after treatment.

**Before treatment:**

1. When an asthmatic dental patient seeks care, the clinician must assess his or her risk level by taking an oral history of the illness: ascertaining the frequency and severity of acute episodes, reviewing the patient's medications thoroughly (as they provide an indication of disease severity) and determining the patients specific triggering agents. Preventing a sudden episode of airway obstruction is essential when treating an asthmatic patient.
2. As a general rule, elective orthodontics should be performed only on asthmatic patients who are asymptomatic or whose symptoms are well controlled. to minimize the risk of an attack, the patient's appointment should be in the late morning or the late afternoon.
3. Orthodontist needs to be aware of the potential for dental materials and products to exacerbate asthma. These items include dentifrices, fissure sealants, tooth enamel dust( during interproximal slicing) and methyl methacrylate. Therefore Fixed appliances and bonded retainers without acrylic are preferable.
4. Anxiety is a known 'asthma trigger'. For most patients, asking for a simple confirmation that they have taken their most recent scheduled dose of medication can prevent stress. Oxygen and bronchodilator should be available during treatment.
5. Before sending patient to any invasive work to another specialist, he should be informed about the medical history. Dental local anesthetics with vasoconstrictors should be used with caution in asthmatic patients, as many vasoconstrictors contain sodium metabisulfite, a preservative that is highly allergenic.

**During treatment:**

1. It has been found that improper positioning of suction tips, fluoride trays or cotton rolls could trigger a hyperreactive airway response in sensitive subjects' Eliciting a coughing reflex should be avoided.

2. Prolonged supine positioning, bacteria-laden aerosols from plaque or carious lesions and ultrasonically nebulized water can provoke asthma triggers in the dental setting.
3. In case of acute attack following steps should be taken.
  - Discontinue the procedure and allow the patient to assume a comfortable position.
  - Maintain a patent airway and administer bronchodilator via inhaler/nebulizer.
  - Administer oxygen via face-mask. If no improvement is observed and symptoms are worsening, administer epinephrine subcutaneously (1:1,000 solution, 0.01 milligram/kilogram of body weight to a maximum dose of 0.3 mg)
  - Alert emergency medical services. Maintain a good oxygen level until the patient stops wheezing and/or medical assistance arrives.

Owing to chances of allergy, offending NSAIDs include ketorolac, ibuprofen and naproxen sodium should be avoided after banding and bonding. Analgesic of choice is acetaminophen.

**B. Allergies<sup>9</sup>**

**Latex allergy** is a common allergy in dental office. Groups at increased risk of allergy:

- Atopic individuals
- Oral health care staff
- Patients who have undergone multiple surgical interventions
- Spina bifida patients
- Patients with urogenital anomalies

Latex can cause:

- Irritant contact dermatitis
- Delayed cutaneous reaction which can extend beyond the area of latex contact.
- Immediate hypersensitivity reaction. e.g. angioedema

**Screening** - All patients should be asked if they are allergic to any drugs, food or latex products, or are prone to any allergic type reaction.

Note that immediate hypersensitivity reactions are not generally a feature of nickel allergy.

### **Orthodontic considerations**

- If latex allergy is suspected refer to dermatologist.
- If confirmed latex allergy use latex-free products and ensure the patient's notes marked "latex allergy."
- Use of powder free and low free latex protein gloves recommended for all patients.

### **Nickel Allergy**

Nickel allergy as detected by skin testing is common. Intra-oral reactions to nickel are extremely rare and cannot usefully be predicted from skin tests. Contact hypersensitivity may occur on the skin of the cheeks or neck in response to the outer headgear bow or studs of the headgear in patients with nickel allergy.

### **Orthodontic considerations**

Most patients with nickel allergy can tolerate orthodontic treatment with normal orthodontic appliances. In the rare event of a marked intra-oral reaction, nickel free components will need to be used. The outer bow of the headgear or any studs can be covered if a skin reaction occurs

In case of doubt, a trial appliance with one or two bands and brackets may be used to assess reaction. A length of archwire should also be fitted in case nickel is released by galvanic reaction.

Wires and brackets are available in nickel-free alloys of titanium and cobalt-chromium or non-metallic materials

### **VII. Central nervous system disorders <sup>10</sup>**

Some of the patient may have seizure disorders, Epilepsy (e.g. Grand mal), Hydrocephalus, Cerebrospinal shunts. Epilepsy is not a disease in itself but a term applied to recurrent seizures, either of unknown origin (idiopathic epilepsy) or due to congenital or acquired brain lesions (secondary epilepsy). It affects about 0.5-2% of the population. Medical management usually consists of long-term anticonvulsant drug therapy

- Avoid removable appliances if epilepsy is poorly controlled. Phenytoin may cause gingival hyperplasia. A very high standard of oral hygiene is required to minimize the development of gingival enlargement and orthodontic treatment should never be contemplated unless the oral hygiene is good.
- Antibiotic prophylaxis may be required. Consult specialist
- Stress may occasionally precipitate seizures. Sedation may be indicated

### **VIII. Neuromuscular disorders <sup>11</sup>**

The common physical impairments the dentist will encounter are: developmental neuromuscular disorders, for example, cerebral palsy, spina bifida, scoliosis, and osteogenesis imperfecta; and degenerative neuromuscular disorders, for example, muscular dystrophy and juvenile forms of arthritis. Cerebral palsy is a group of non-progressive neuromuscular disorders caused by brain damage, which can be pre-, peri-, or postnatal in origin, and is classified according to the type of motor defect: 1. Spasticity 2. Athetosis 3. Rigidity 4. Ataxia

The oral and dental features that may be seen in children with cerebral palsy are:

- (1) poor oral hygiene, increased periodontal disease, and drug-induced gingival enlargement;
- (2) malocclusion (increased prevalence of skeletal class II with anterior open-bite);
- (3) a tendency to bruxism;
- (4) tongue thrust and mouth breathing;
- (5) an increase in caries prevalence;
- (6) increased prevalence of anterior trauma;
- (7) enamel hypoplasia;
- (8) heightened gag reflex and peri-oral sensitivity;
- (9) drooling;
- (10) decreased parotid flow rate.

These patients require definite orthodontic therapy. Hypoplastic teeth can be very sensitive, particularly to extreme cold. Hypoplastic enamel does not have the same ordered prism structure as normal enamel and, despite acid etching, may not provide optimum retention for bonding.

Another area of concern is children with neuromuscular disorders may have reduced manual dexterity for self cleansing. Proper maintenance of oral health care should be given due importance in this type of patients in general and particularly during orthodontic therapy. Powered tooth brushes may be useful.

#### **IX. PREGANANCY**<sup>5-7</sup>

Pregnancy as such is not a contraindication for orthodontic treatment. Care should be taken to minimize the potential exaggerated inflammatory response related to pregnancy-associated hormonal alterations. Meticulous plaque control and oral hygiene should be maintained during treatment. Avoid X-rays or drug therapy and extractions particularly in the first trimester. The second trimester is the safest time to perform treatment.

Avoid supine position in late pregnancy. Supine hypotensive syndrome may occur due to obstruction of the vena cava and aorta. This may result in reduction in return cardiac blood supply with decreased placental perfusion. This can be prevented by placing the patient on her left side or simply by elevating the right hip 5 to 6 inches during treatment. Appointments should be short, and the patient should be allowed to change positions frequently. A fully reclined position should be avoided if possible.

However, long, stressful appointments and surgical procedures should be delayed until the postpartum period. Analgesics, antibiotics, local anesthetics, and other drugs required during pregnancy should be reviewed for potential adverse effects on the fetus

#### **Conclusion:**

An orthodontist needs to recognize the systemic disease processes and significance of different systemic diseases. Good patient cooperation, consent before treatment, proper referral when required and constant monitoring of the progress of

the treatment are necessary to minimize physical damage and to maximize treatment outcome. while carrying out orthodontic treatment, Careful and practical selection of the treatment objectives, timing of treatment and type of appliance is must in each patient with medical disorder.

#### **References**

1. Donald Burden, Brian Mullally, Jonathan sandler, Orthodontic treatment of patients with medical disorders, *Eur J orthod*, 2001;23:363-372
2. Simmons N A *et al.* 1993 The Endocarditis Working Party recommendations for endocarditis prophylaxis. *Journal of Antimicrobial Chemotherapy* 31: 437-438.
3. Dajani A S *et al.* Prevention of bacterial endocarditis: Recommendations by the American Heart Association. *Journal of the American Medical Association*, 1997: 277: 1794-1801
4. Luc Bensch, Marc Braem, and Guy Willems. Orthodontic Considerations in the Diabetic Patient, 2004 *Semin Orthod* 10:252-258
5. Burket's Oral Medicine Diagnosis & Treatment Tenth Edition—341-571
6. Dental Secrets SE By Stephen T. Sonis, D.M.D., D.M.Sc.-II nd edition-Pg 37-64.
7. Little: Dental Management of the Medically Compromised Patient, 7th ed.
8. Göran Dahll, Jan Huggare. Orthodontic Considerations in the Pediatric Cancer Patient: A Review, *Semin Orthod*, 2004 10:266-276
9. Hain, Longman, Field, Harrison Natural rubber latex allergy: implications for the orthodontist, *J Orthod*, 2007: 34(1); 6-11
10. Barbara Sheller. Orthodontic Management of Patients with Seizure Disorders. 2004, *Semin Orthod* 10:247-251.
11. Adrian Becker, Stella Chaushu, Joseph Shapira. Orthodontic Treatment for the Special Needs Child. *Semin Orthod*, 2004 : 10:281-292