

# Review Article

## Limitations and scope of Orthodontic treatment in medically compromised patients

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### Abstract

Increasing number of medically compromised children and adults are likely to seek orthodontic care as improved medical management creates more long-term survivors. While for majority, treatment of orthodontic problems is possible, but individual precautions like medical consultation, maintaining a current knowledge of drug therapy, and modification in chairside procedures, are needed. Since orthodontic treatment can provide positive benefits it should not be denied solely due of the presence of a serious medical problem. Fixed appliance therapy can be done for most of these patients by applying appropriate management practices. This article discusses the implications of cardiovascular, endocrinal and respiratory diseases on orthodontic treatment.

**Key Words:** Orthodontics, Medically Compromised Patients, Systemic Disorders,

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### Introduction

Changed lifestyles and patient awareness has increased the number of patients seeking orthodontic care. Likewise patients with medical disorders are becoming an increasing part of modern day orthodontic practice<sup>1</sup>. A medically compromised patient is one in whom the underlying medical condition warrants a special consideration/modification in a routine treatment plan. An orthodontist who is treating medically compromised patients should have a working knowledge of the multitude of medically complex problems. Treatment plan should be modified according to effect of the particular disease in the oral cavity. As a rule, general medical problems can affect orthodontic treatment and care should be taken while managing medically compromised patients as it is not an absolute contraindication<sup>2</sup>. The purpose of this article is to review cardiovascular, endocrinal and respiratory conditions and associated guidelines of orthodontic management.

### I. Cardiac Disorders

#### a. Infective Endocarditis

Infective endocarditis (IE) is an infection of the endocardial surface of the heart, which may include one or more heart valves, the mural endocardium, or a septal defect. Its intracardiac effects include severe valvular insufficiency, which may lead to intractable congestive heart failure and myocardial abscesses<sup>3</sup>. The transient bacteremia usually results on the lining of mouth, intestinal tract, and minor cuts from our day to day activities, e.g, brushing teeth or chewing. Although very rare, endocarditis is important because,

despite antimicrobial therapy, it can result in serious complications such as stroke or even death<sup>4</sup>.

#### Orthodontic considerations:

1. An endocarditis risk assessment must be done with the consultation of patient's cardiologist. The orthodontic treatment should be initiated only after establishing a good oral health. Informed consent requires that a patient is aware of any significantly increased risk.
2. Prior to orthodontic procedure 0.2% Chlorhexidine mouthwash to be used.
3. Antibiotic prophylaxis should be used if required and orthodontist must be vigilant for any deterioration of oral health<sup>5,6</sup>.
4. Bonding should be preferred than banding<sup>7</sup>.
5. Antimicrobial mouthwash should be prescribed for plaque control.
6. Prevention of gingival bleeding by maintaining good oral hygiene.
7. Chronic irritation from orthodontic appliance may cause bleeding and special effort should be made to avoid any form of gingival or mucosal irritation.
8. Even though Elastomeric modules accumulate more plaque they should be used instead of wire ligatures, the reason being that there is increased chances of transient bacteremia due to mucosal cuts with the use of ligature wire. Likewise special care is required to avoid mucosal cuts when placing and removing the archwire<sup>8</sup>.

## b. Hypertension

High blood pressure is a trait as opposed to a specific disease and represents a qualitative rather than a quantitative deviation from the norm. Elective dental treatment for uncontrolled hypertensive patients should be deferred until control is achieved. There is no contraindications, however to provide orthodontic care for well-controlled hypertensive patients<sup>9</sup>.

### Orthodontic considerations:

1. Minimizing stress is important<sup>10</sup>.
2. Appointments should be less than one hour to minimize stress.
3. Maintaining periodontal health and good oral hygiene, educating the patient, and recommending specific oral hygiene aids and devices.
4. Calcium channel blockers can cause gingival hyperplasia in addition to the irritation caused by the fixed appliance. Depending on the condition, the patient should be referred back to his physician or cardiologist, to prescribe an alternative therapy<sup>10</sup>.

## II. Endocrinal Disorders

### A. Diabetes Mellitus (DM)

The orthodontist should be aware of the significance of diabetes in relation to susceptibility to periodontitis. Delayed skeletal maturation and decreased cephalometric linear and angular parameters are common in patients with juvenile diabetes, and it should be considered during planning of orthodontic treatment. Factors that may contribute to oral complication in diabetes include decreased polymorphonuclear (PMN) and leukocyte function and collagen metabolism. In addition, impaired neutrophil chemotaxis and macrophage functions add to impaired wound healing in diabetes patients<sup>11</sup>.

### Orthodontic considerations:

1. The orthodontist should be aware of the significance of diabetes in relation to susceptibility to periodontal breakdown and orthodontic treatment should be avoided in patients with poorly controlled Insulin-dependent DM.
2. Periodontal condition should be evaluated before initiating the treatment and should be monitored in every visit and the patient should maintain good oral hygiene as they are prone for gingival inflammation due to impaired neutrophil function.
3. Xerostomia is seen in many diabetic patients. Daily rinses with fluoride mouthwash can provide further benefits.
4. Diabetes related microangiopathy can occasionally occur in the periapical vascular supply resulting in unexplained odontalgia, percussion sensitivity, pulpitis or even loss of vitality. Hence periodical checkups are advised<sup>12</sup>.
5. Check for HbA<sub>1c</sub> or contact the patient's physician to verify the control of the disease.

6. Only light orthodontic forces should be applied. Vitality of the teeth involved should be checked on a regular basis.
7. Early appointments, preferably after breakfast or insulin dose, should be given to avoid hypoglycemia.

### B. Adrenal insufficiency (cortical crisis)

Acute adrenal insufficiency is associated with 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 -

- i. primary adrenal insufficiency (Addison's disease)
- ii. Secondary adrenal insufficiency (secondary to the use of exogenous glucocorticosteroids).

### Orthodontic considerations:

1. Physician consultation to determine whether the patient's proposed treatment plan suggest a requirement for supplemental steroids.
2. Minor oral surgery procedures should be performed under steroid coverage<sup>13</sup>.
3. Use of a stress reduction protocol and profound local anesthesia minimizes the physical and psychological stress associated with therapy and reduces 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

Orthodontic therapy can be carried out with minimal alterations in patients with effectively managed thyroid and parathyroid disease. Thyroid dysfunction is a relative contraindication for the use of IV sedation. Hypothyroid patient are particularly sensitive to CNS depressants such as sedative hypnotic, antianxiety agents, and narcotic analgesic. Hyperthyroid patient, on the other hand, is very extremely difficult to sedate due to the high metabolism and heart rate. Atropine and scopolamine therefore should be avoided in these patients. Common oral findings in hypothyroidism include macroglossia, delayed eruption, poor periodontal health and delayed wound healing.

### Orthodontic considerations:

1. Treatment procedures such as banding and bonding should have brief appointments and stress management is important for patients who have hyperthyroidism.
2. Adrenaline should be used judiciously due to the spread of infectious foci<sup>14</sup>
3. Treatment should be discontinued if signs or symptoms of a thyrotoxic crisis develop and access to emergency medical services should be available.
4. After treatment it is important that patients

continue taking their thyroid medication as prescribed.

- Excessive radiation exposure should be avoided. Thyroid collar should be used while taking patient X-rays<sup>15</sup>.

### III. Respiratory Disorders

#### A. Bronchial Asthma

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 hyper reactivity of the airways to a variety of stimuli and a high degree of reversibility of the obstructive process<sup>16</sup>. Patients with asthma have a greater rate of caries development than the non-asthmatic counterparts because of antiasthmatic drugs induced xerostomia and the common habit of mouth breathing in asthmatic patients and immunological factors leads to gingival inflammation.

#### Orthodontic considerations:

##### A) Before treatment

- Assess risk level by reviewing the medical history of the illness; ascertain the frequency and severity of acute episodes, the patient's medications and determining the specific triggering agents.
- Preventing a sudden episode of airway obstruction is essential when treating an asthmatic patient<sup>17</sup>.
- 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.
- Dental materials and products like dentifrices, fissure sealants, tooth enamel dust (during interproximal slicing) and methyl methacrylate are known to exacerbate asthma. Therefore, fixed appliances and bonded retainers without acrylic are preferable.
- Oxygen and bronchodilator should be available during treatment. 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.
- Anxiety is a known 'asthma trigger', so the orthodontist should reduce the stress level of the patient.

##### B) During treatment

- Improper positioning of suction tips, fluoride trays or cotton rolls could trigger a hyper reactive airway response in sensitive subjects<sup>18</sup>.
- Eliciting a coughing reflex should be avoided.
- Prolonged supine positioning, bacteria-laden aerosols from plaque or carious lesions and ultrasonically nebulized water can provoke asthma triggers in the dental setting.

- 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)<sup>19</sup>
  - Alert emergency medical services. Maintain a good oxygen level until the patient stops wheezing and/or medical assistance arrives.
- Post treatment NSAIDs include ketorolac, ibuprofen and naproxen should be avoided as these may trigger allergy and drug of choice should be acetaminophen.

### Conclusion

Many patients seeking dental care have significant medical conditions that alter both the course of their oral disease and the therapy provided. Treatment of medically compromised orthodontic patients should be directed towards the prevention of oral complication that could be life threatening and hence special precautions are usually required. With appropriate management, successful orthodontic treatment can be done with minimal physical damage and maximum treatment outcome.

### References

- Patel A, Burden DJ, Sandler J. Medical disorders and orthodontics. *Journal of Orthodontics*. 2009 Dec;36 (1):1-21
- Burden D, Mullally B, Sandler J. Orthodontic treatment of patients with medical disorders. *Eur J Orthod* 2001 Aug; 23(4) :363-72
- Charles Anila, Senkutvan RS, Sanjay Jacob, Krishnan CS, Sivaram Subbiah. Clinical Management of Medical Disorders in Orthodontics. *International Journal of Dental Sciences and Research* 2014; 2(2): 36-41.
- Guntheroth WG. How important are dental procedures as a cause of infective endocarditis? *Am J Cardiol*. 1984 Oct 1; 54(7):797-801.
- Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association: A guideline from the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *J Am Dent Assoc*. 2008;139 (Suppl): 3S-24S

- 6) Hobson RS, Clark JD. Infective endocarditis associated with orthodontic treatment: a case report. *Br J Orthod*. 1993 Aug; 20(3):241-4.
- 7) Lucas VS, Omar J, Vieira A, Roberts GJ. The relationship between odontogenic bacteraemia and orthodontic treatment procedures. *Eur J Orthod* 2002 Jun ; 24(3) : 293-301
- 8) Hobson RS, Clark JD. Management of the orthodontic patient 'at risk' from infective endocarditis. *Br Dent J*. 1995 Apr 22;178(8): 289-95.
- 9) Van Venrooy JR, Proffit WR. Orthodontics care for medically compromised patients: possibilities and limitation. *J Am Dent Assoc*. 1985 Aug; 111(2):262-66.
- 10) Sonis ST. Orthodontic management of selected medically compromised patients: cardiac disease, bleeding disorders, and asthma. *Semin Orthod* 2004 Dec; 10(4): 277-80.
- 11) Cianciola L J , Park B H, Bruck E, Mosovich L, Genco R J. Prevalence of periodontal disease in insulin dependent diabetics . *J Am Dent Assoc*. 1982 May;104(5):653-60.
- 12) Bensch L, Braem M, van Acker K, Willems G. Orthodontic treatment considerations in patients with diabetes mellitus. *Am J Orthod Dentofacial Orthop* 2003 Jan;123(1):74-8.
- 13) Little. In: *Dental Management of the Medically Compromised Patient*. 7th ed. An Imprint of Elsevier, Mosby, 2007; pp 60-84, 680-690.
- 14) Stephen T. Sonis. In: *Dental Secrets*. 2nd ed. Philadelphia: Hanley & Belfus, 1999:pp 37-49.
- 15) Carlos Fabue L, Jiménez Soriano Y, Sarrión Pérez MG. Dental management of patients with endocrine disorders. *J Clin Exp Dent*. 2010; 2 (4): e 196-203.
- 16) Bjerkeborn K, Dahllöf G, Hedlin G, Lindell M, Modeer T. Effect of Disease Severity and Pharmacotherapy of Asthma on Oral Health in Asthmatic Children. *Scand J Dent Res*. 1987 Apr;95(2):159-64.
- 17) Malamed SF. Asthma. In: *Medical Emergencies in the Dental Office*. 5th ed. St. Louis: Mosby, 2000
- 18) Dalal Anjali, Amanpreet Singh, and Jyotkiran Singh. Orthodontics & Medically Compromised Patients. *Indian Journal of Dental Sciences*. 2012 Sep;4( 3) 128-30
- 19) Singaraju, Gowri Sankar, Venkataramana Vannala, Raja Sigamani, Kolasani Srinivasa Rao, Irfan Adil. Management of the Medically Compromised Cases in Orthodontic Practice. *Asian Journal of Medical Sciences* 2010; 1(2) 68-74.

### Smoke early to feel the pain!

The need to keep the weight down, the peer pressure and the lack of self-esteem are some of the cited reasons that apparently spur the teenage girls in western countries to take up smoking. By one estimate, more than 35% of all teenage girls in US are smokers. Whether they derive any benefit out of it or not, many of them end up with periodic pain they never bargained for. In a prospective cohort study conducted in Australia involving 9067 young women, the researchers explored the relationship between smoking and dysmenorrhoea. They found that the women who started smoking before the age of thirteen and were active smokers at the time of the survey, had 60% greater chance of suffering from chronic dysmenorrhoea that lasted longer than 2 days, compared to non-smokers. The smoking may induce pain by causing relative ischaemia or by affecting menstrual hormones. Quitting smoking may provide the relief.

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- Dr. K. Ramesh Rao