

MEDICALLY COMPROMISED PATIENTS IN ORTHODONTICS

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Abstract

The majority of patients who are treated orthodontically are healthy young individuals. However, the last 20 years has seen a dramatic increase in the number of medically compromised patients seeking orthodontic treatment. Orthodontic therapy is no longer controlled only for healthy patients. Medically compromised persons are now regular visitors to the orthodontic clinics in every branch of the world. As such, there is no absolute contraindication of orthodontic treatment in most of the condition. Thus the practitioner should therefore recognize the consequences in relation to orthodontic treatment one should have a basic knowledge and understanding of the diseases and its impact on the oral cavity. This article reviews suggest the orthodontic treatment procedure for some common medical condition.

Keywords: Orthodontic treatment, Medically compromised.

Introduction

Increasingly, orthodontists are treating medically compromised patients. This phenomenon is a outcome of several factors including previous diagnosis and improved medical management of severe diseases¹. Orthodontic treatment is fully consistent with model of health that aims improve life expectancy and quality of life², better ambulation of persistently ill patients, and huge demand for all type of dental care, despite of primary health situation. It is no longer appropriate to deny “elective” dental or health care to patients with diagnoses that have previously been related with pitiable outcomes¹. The orthodontic management of patient with health disorders is fetching a rising part of current practice³. Medically compromised persons are now regular visitors to orthodontic practices⁴. An increase amount of the patients with severe health condition and drug regimens are looking for orthodontic treatment⁵, severals of suffering from persistent diseases. The practice of delegating reviews of the health record to ancillaries the orthodontist of a chance to begin a relationship with the patient or parent and, more significantly, the probability to completely value and interpret optimistic responses¹.

Infective Endocarditis (IE)

Systemic problems generally encountered in regular orthodontic exercise are⁶:

Infective endocarditis rare condition with a large mortality and morbidity. The primary prevention of IE is extremely essential. Antibiotic prophylaxis for such type of patients prior to an invasive procedure that could produce a bacteraemia has been a source of dental exercise for half a century, while the records of profit is inadequate. Very few cases of IE are now lesser to oral streptococci and staphylococcus aureus is now the general pathogen.⁷

Orthodontic consideration in patients with cardiovascular diseases

The Orthodontist should speak with the patient’s specialist to verify the risk of IE.⁸ After evaluation of medical condition,

Patients at risk of endocarditic should be treated in discussion with their cardiologist and within the proper strategy. knowledgeable support require that a patient is aware of any significantly enlarged risk.⁹ The National Institute for Health and Clinical Excellence (NICE) issued the modern management for dentists in the United Kingdom in March 2008. NICE has suggested that antibiotic prophylaxis should not be used in patients at risk of infective endocarditis undergoing dental procedures.⁸ Patients should be instructed about the significance of maintaining clean and tidy oral hygiene during the path of orthodontic treatment.⁹ several orthodontic procedures can cause a bacteraemia including impression and surgical exposure of teeth⁴. The main orthodontic procedure that has been postulate to cause a bacteraemia has been separator placement. Orthodontist should avoid using orthodontics bands instead use, bonded attachment. If banding is essential use of antibiotic prophylaxis is must¹⁰. Bonding with blocked eruption in impacted teeth should be avoided⁵. Any episode of infection in persons at risk of IE should be investigated and treated on time.

Bleeding disorders

Blood disorders, whether acquired or inherited can have an effect on the management of the orthodontic patients⁷. It is the most frequent congenital bleeding disorder. Haemophilia is a congenital Haematological state inherited and caused by a deficient action or absence of clotting factors that are necessary for normal haemostasis¹¹. The main inherited coagulation disorders include hemophilias A and B.⁶ Haemophilia is a common case which occurs due to clotting factor deficiency. Haemophilia A is a sex-linked disorder due to a deficiency of Factor VIII and generally seen in men². . This type of haemophilia is the very common and presents in 1 in every 10,000 people.¹¹ Other bleeding disorders include Haemophilia B or Christmas disease (factor IX deficiency) and von Willebrand’s disease (defects of von Willebrand’s factor)⁷. is present in 15 persons per million . Represents 15% of those affected. These patients did not react to desmopressin (DDAVP).¹¹ Medical management of choice in bleeding

disorders is management of a variety of factor concentrate. Transfusion of these concentrates derived from human blood may spread viral infections like hepatitis B, C and HIV. The orthodontist should consult the patient's doctor prior to dental treatment to make a decision the risk for bleeding and treatment modifications required⁹.

Orthodontic consideration in patients with bleeding disorders

Exceptional oral hygiene is required to prevent gingival bleeding. Every possibilities should be made to avoid any chronic irritation from orthodontic appliance⁶. Intense chemotherapy reduces mucosal regeneration ability. Minor irritation can also direct to opportunistic infection and subsequent brutal complications. It is sensible to get rid of all orthodontic fixed appliances prior to starting chemotherapy as a safety procedure. Chronic irritation from orthodontic appliances should be avoided. Fixed appliances are preferable to removable appliances as the latter can cause gingival irritation⁹. Self-ligating brackets are preferable to conventional brackets. If conventional brackets are used, arch wires should be clutch with elastomeric modules instead of wire ligatures⁸. The period of orthodontic treatment should be kept to a minimum to reduce the potential for difficulties.

Sickle cell anemia

It is a heritable kind of chronic hemolytic anemia which is caused by genetic mutation of hemoglobin molecule³. This is a hereditary disorder that is characterizes by a haemophilia gene mutation (HbS as opposed to HbA). Deoxygenation, for example at the period of anaesthesia induces the red cell to deform into a sickle shape.

Oral manifestation of sickle cell anaemia

Hypoplasia of enamel in the appearance of -

- white spots appears on the surface of the tooth,
- hypo mineralized dentin late tooth eruption,
- pale oral mucosa and lips
- inflammation of the tongue

Orthodontic consideration in patient with sickle cell anaemia

- Orthodontic treatment is not restricted in sickle cell patients, provided the patient has no or very mild complications and the oral hygiene is excellent. Emotional stress should be avoided and care should be taken to make sure that the surgery is well ventilated and at an ambient temperature. The orthodontist should be conscious of possible pulpal necrosis involving healthy teeth, the changes in bone turnover, mandibular vaso occlusive crises, and the better susceptibility to infections.

It has been suggested that orthodontic forces should be reduced and rest intervals between activation should be increased to restore the regional microcirculation⁷.

Leukaemia

Leukaemia has an acute and chronic form⁴. Acute lymphoblastic leukemia (AAL) is most common presentation in children accounting for 25% of all childhood tumours⁷.

Orthodontic consideration in patient with leukaemia

Before diagnosis

- Major orofacial complication of leukaemia in children

comprise lymphadenopathy, spontaneous gingival bleeding caused by thrombocytopenia (reduction in platelets), labial and lingual ecchymoses and mucosal petechiae, ulceration, gingival swelling, and infection.

- The orthodontist may be the first to examine signs of the illness. Patients presenting with impulsive bleeding in the presence of high quality oral hygiene call for a direct transfer to a general practitioner.

After diagnosis

- Orthodontic management should be delayed if the patient requires chemotherapy as the drugs can aggravate the thrombocytopenia and agranulocytosis.⁷

Thalassemia

Thalassemia is a hereditary disorder of hemoglobin synthesis. It can be classified as a thalassemia, α -thalassemia, β -thalassemia, γ -thalassemia signifying which blood hemoglobin chains are affected¹⁰.

Oral manifestation of thalassemia

The most common orofacial manifestation is extension of the maxilla, bossing of the head and prominent molar eminences due to the severe compensatory hyperplasia of the upper arch. This lead to expansion of the middle cavity and a facial appearance known as "chipmunk" face. The overdevelopment of the upper arch frequently result in an increased overjet and spacing of upper teeth and other degree of malocclusion¹⁰

Orthodontic consideration in patient with thalassemia

Functional and extra-oral appliances can be used; however, the "skeletal forces" in thalassemia patients must be in a less than than what is used with regular patients because of the thin cortical plates in thalassemic patients. Regular prophylaxis and fluoride applications are recommended in these patients.¹⁰

Metabolic Disorders

Diabetes mellitus (DM)

Diabetes mellitus (DM) is a metabolic disorders of various etiologic factors^{5,6} categorized by chronic hyperglycaemia⁶. The typical symptoms of noticeable hyperglycemia include polyuria, polydipsia loss of weight, and propensity to infection. Chronic hyperglycemia is connected with long-term dysfunction, injure and collapse of different organs. Long term difficulties of diabetes include retinopathy, nephropathy, peripheral and autonomic neuropathy, and cardiovascular disease. Also, improved tendency for periodontal infection is often found in persons with diabetes¹²

There are two most important types of DM⁸

Type 1 DM, (insulin dependent, IDDM or juvenile-onset diabetes) results from defects in insulin secretion. The onset is generally before maturity and accounts for approximately 5-15% of all persons with DM.

Type 2 DM (non-insulin dependent NIDDM or mature-onset diabetes) develops as a outcome of defects in insulin discharge, insulin act or both. There is a link with being overweight. Type 2 DM generally appears in persons more than the age of 40, although in South Asian and African-Caribbean persons

frequently appears after the age of 25.¹³ DM is progressive and has potentially injurious consequences for physical condition. Strict blood glucose control, lowering of blood pressure, together with a fit lifestyle improves well being and protects beside long term harm to the eyes, kidneys, nerves, heart and most important arteries.¹²

Oral complication include

Xerostomia , Burning mouth and/or tongue, Candidal infection, Altered taste, Progressive periodontal infection, Dental caries, Acetone breathing, Oral neuropathies, Parotid enlargement and Delayed wound healing.

Orthodontic consideration in patients with DM

Orthodontic management should be avoided in person with uncontrolled diabetes. As they are prone to periodontal break. The patient should be made attentive of the consequences of poor oral health and the increased risk of periodontal infection. There is no first choice of the treatment with regard to fixed or removable orthodontic appliances. It is important to maintain high-quality oral hygiene, mainly when fixed orthodontic appliances are worn. Every day rinses with fluoride mouthwash can give extra benefits. The general dental office problem seen in diabetic patients taking insulin is symptomatic low blood glucose or hypoglycemia.⁹

Adrenal insufficiency (cortical crisis)

Acute adrenal insufficiency is connected with significant morbidity and mortality due to peripheral vascular collapse and cardiac arrest⁶. Therefore, the dental practisner should be conscious of the clinical manifestations and ways of preventing acute adrenal insufficiency in patients⁹.

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 consideration in patients with Adrenal insufficiency

Prior to treating a patient with a record of steroid use, general practitioner discussion is indicated to decide whether the patient's future management plan recommend a necessity for supplemental steroids⁹. Steroid cover should be considered for small oral surgery procedures.⁶ Use of a stress reduction protocol and profound local anesthesia may help to decrease the physical and psy-chologic stress linked 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 average dose of steroids post-operatively.⁹.

Respiratory system

Respiratory disorders are very common now a days and the use of intravenous (IV) sedation and general anaesthesia (GA) may be contraindicated during elective procedures. The effects of given drugs can also influence the orthodontic treatment of these patients.

Asthma

Asthma is a chronic lung disease that inflames and narrows the airways of the lungs with episodes of chest tightness that causes breathlessness, coughing, and wheezing all of which are linked with inflammation of bronchiole. It is related by hyper reactivity

of the airways to a different types of stimuli and a high degree of reversibility of the obstructive procedure. Symptoms can last for a few moments or for a day leading to inflammation and subsequent fibrosis⁵. Asthma is a major cause for chronic illness during childhood. The etiology is poorly understood but it is a complex disorder involving all the factors such as immunological, infectious, biochemical, genetic, and psychological. The most known cause for the development of asthma is atopy, an inherited tendency to show signs of allergic reactions. Acute episodes of coughing and wheezing are often precipitated by exposure to allergens and irritants, like cold air or noxious fumes and emotional stress. Drug treatment is now the foundation of treatment both prophylactically and during acute exacerbations. Generally it involves bronchodilators, inhaled corticosteroids, theophylline and anticholinergics⁵. Asthmatic patients have generally a greater rate of caries development than the nonasthmatic patients because of antiasthmatic drugs induced xerostomia and the familiar habit of mouth breathing in asthmatic patients and immunological factors leads to gingival inflammation³. A number of indoor factors have been recognized that involve and potentiate asthma in children living in urban environments. The data supports the role of cockroach, dust mite, and mouse antigens and indoor air pollutants similar to second-hand smoke, volatile organic hydrocarbons, and nitrogen oxides.¹⁴

Asthma is one of the general problems of public health this problem is a chronic inflammatory lung disease leading to extreme sensitivity (allergic reaction) in airways and finally shortness of breath (Burki *et al.*, 2006)¹⁵.

Orthodontic consideration in patients with respiratory disorder

Generally, if a patients is asymptomatic or whose symptoms are well controlled than only the orthodontics should be performed. Appointment should always be given in late morning or the late afternoon so that the risk of attack will be reduced. Orthodontist needs to know the potential of the patients for dental equipment and stuff to aggravate asthma. Therefore, fixed appliances and bonded retainers are prefer without acrylic. Always Oxygen and bronchodilator should be available at the time of treatment. Maintain airway and govern bronchodilator via inhaler/nebulizer. prepared emergency medical services. Maintain oxygen level until the patient stops wheezing and/or medical support arrives⁷.

Liver diseases

Liver disease can be cause acute or chronic harm to the liver, usually due to infection, injury, certain drug exposure or toxic compounds, an autoimmune process, or by a genetic defect During childhood the cause of liver diseases is generally unknown.

The belongings of liver disease can be classified into:

- Blood coagulation disorders;
- Drugs toxicity
- Fluid and electrolyte imbalance;
- Problems with drug treatment;
- Infectivity.

Orthodontic consideration in patients with liver disease

General liver disease

Care should be taken before prescribing any medicine for the person who is suffering with liver disease. Hepatic impairment

can lead to collapse of metabolism of some drugs and result in toxicity.

- Patients who undergo liver transplantation will get immunosuppressive drugs that can further cause gingival hyperplasia.
- Haemostasis will be affected and this should be accounted for when scheduling treatment.

Hepatitis- All patients should be treated in the dental chair as if they are infected and always general cross-infection control precautions have to be taken. Several studies have shown that orthodontists are more self-satisfied than general dentist with consider to cross-infection.

- All the group member must be immunized against HBV. A booster dose is compulsory in those with anti-HBs level less than 100⁷.

Tuberculosis

TB is an airborne and chronic communicable disease. TB diseases is mostly seen in epidemic proportions and is evaluated by the World Health Organization to infect approximately nine million people per year. Lungs is primarily affected by TB and can also affects most part of the body including the oral cavity .it is noted that very low rate of exposure to an active TB patient in dentistry. Oral manifestation of TB are rare, with most cases appear as a chronic painless ulcer.¹⁰

Orthodontic consideration in patients with Tuberculosis

Patients who have medical history and who shows the sign and symptoms of undiagnosed active TB must be refer for medical check up to decide possible infectiousness .non-compulsory dental treatment including orthodontics treatment should also be delayed until a general practitioner confirms that a patient is not suffering from communicable TB.TB is not a regular condition in orthodontist clinic but the orthodontic team must be conscious of its potential and the issues now connected with the occurrence of active TB in patients who have immune disorders, particularly those with human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS).The challenge to orthodonticist is to be well organized for all communicable diseases because that may affect the practice.¹⁰

Eating disorders

The most frequent eating disorders are anorexia nervosa (AN) and bulimia nervosa (BN).⁴ Eating disorders are most commonly seen in females and usually have their onset by the teen age but often continue as a chronic illness. This is an important cause of mortality in adolescent females. Patients with AN have a combination of body image variation and controlled eating. Binge eating and purging are also description of BN. Patients who have eating disorders hardly present with problem of compliance. Oral manifestation of eating disorders are following dental caries, erosion, dentinal hypersensitivity, salivary gland hypertrophy, raised occlusal restoration and xerostomia.⁷

Orthodontic consideration in patients with eating disorder

- The orthodontist should always consider these features and must be suspicious of these illnesses and deal with them very delicately. The first referral must be to the patient's general practitioner. However, it is always

important to care for privacy and gain consent.⁷ Diet advice is vital as this many patients may drink an excessive quantity of acidic or carbonated drinks to as an replacement of normal food. Patients should be advised not to brush the teeth just after vomiting. They should be given suggestion on how to raise the intra-oral pH by chewing gum, or rinsing the mouth with water or milk.⁴

References

1. *Sonis S T.* Orthodontic Management of selected Medically compromised patients: Cardiac Disease, Bleeding Disorders, and Asthma. *Seminars in orthodontics* 10:277-280; 2004 Elsevier.
2. *Mostafavi S M S, Moeini S, Moeini M, Rezaei N.* Orthodontic treatment considerations in hemophilic patients. *Journal of Orthodontic Research* Sep-Dec 2013, Vol : 1, Issue 3:.
3. *Khattari S, Bhardwaj M.* Orthodontic Management in Medically Compromised Patients. *Int.J.Dent.Clinics.* 2012; 4(3): 26-29.
4. *Reddy R, Satish M, Pasam N.* Importance of Orthodontic consideration in medically compromised patients- part I. *Indian Journal Of Dental Research And Review* Apr 2012 – Sept 2012.
5. *Yadav A.* Orthodontic Consideration in Medically Compromised Patients. *Indian Journal Of Research* Vol : 2, Issue : 3, March 2013.
6. *Dalal A, Singh A, Singh J.* Orthodontics & Medically Compromised Patients. *Indian Journal of Dental Sciences.* Sep 2012, Issue : 3, Vol : 4.
7. *Patel A, Burden D J, Sandler J.* Medical Disorders and Orthodontics. *Journal of Orthodontics,* Vol : 36, 2009, 1-21.
8. *Varadharaja M M, Kumar V, Kanagasabapathy B, Udhy J.* Orthodontic Consideration in Medically Compromised Patients-Contemporary Review. *International Journal Of Research in Dentistry,* Vol : 5, Issue : 1 Jan-Feb, 2015.
9. *Singaraju G S, Vannala V, Sigamani R, Rao K S, Adil I.* Management of The medically Compromised Cases In Orthodontic Practice. *Asian Journal of Medical Sciences* 1 (2010) 68-74.
10. *Maheshwari S, Verma S K, Ansar J, Prabhat K C.* Orthodontic Care of Medically Compromised Patients. *Indian Journal of Oral Sciences,* Vol : 3, Issue : 3, Sep-Dec 2012.
11. *Gomez-Moreno G, Canete-Sanchez M, Guardia J, Castillo-Naveros T, Calvo-Guirado J.* Orthodontic Management in Patients With Hemophilia. About two clinical cases. *Med Oral Patol Oral Cir Bucal.* 2010 May 1;15 (3):e463-6.
12. *Bensch L, Braem M, Willems G.* Orthodontic Considerations in the Diabetic Patient. *Seminars in Orthodontic* 10:252-258; 2004 Elsevier.
13. *Burden D, Mullally B, Sandler J.* Orthodontic treatment of patients with medical disorders. *European Journal of Orthodontic,* 23 (2001) 363-372.

14. *Goss C H, Mayer-Hamblett N.* The Yin and Yang of Indoor Airborne Exposures to Endotoxin. *American Journal of Respiratory and Critical Care Medicine*, Vol : 188, 2013.
15. *Hedayatmofidi S M, Ahmadi A, Badeleh M T, Bakhsha F, Joshaghani H R.* Prevalence of Asthma among Schoolchildren in Gorgan, Iran by Questionnaire Surveys in 2006. *Journal of medical sci*, 7 (6): 1054-1056, 2007.

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