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REVIEW ARTICLE

Clinical Management and Guidelines for Infective Endocarditis in Orthodontics

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ABSTRACT

The fixed orthodontic treatment is not contraindicated in systemic disorders, where orthodontist reveals the diagnosis from medical practitioner and plan the orthodontic treatment, oral hygiene maintenance and necessary prophylaxis. Due to privation of practical guidelines and fear of advancing the contagion, many orthodontist do not treat patient potentially at the risk of developing endocarditis. This review article highlights the sign, symptoms, orthodontic guidelines and prophylaxis modalities for infective endocarditis (IE).

Keywords: Infective endocarditis, Orthodontic treatment, Systemic disorders.

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INTRODUCTION

During recent decades, the number of adults seeking orthodontic treatment increased significantly. The majority of patients who are treated orthodontically are healthy young individuals. However, the last 2 decade, there has seen an increase in the number of adult patients pursuing orthodontic treatment, few of them suffering from medical disorders.[1] Few years back the patient having the medical disorders undergoing orthodontic treatment would have been contraindicated, but with advances in medical science in 21st century, the management of such patients is possible. Hence careful evaluation of health of the patient, precise diagnosis and implementation of orthodontic treatment, thus taking care of systemic health of the patient and thus avoiding the potential problems is integral part of orthodontic management in modern era. These systemic disorders are not absolute contraindications.

There are commonly observed medical problems during orthodontic treatment, which needs special consideration. Some of the commonly observed medical problems are: Infective endocarditis, hypertension, diabetes mellitus, epilepsy, thyroid disorders, respiratory disorders, renal disorders and allergies.

This article examines the aspects of the some of the conditions that are relevance to the orthodontic practice and describes the literature on special consideration on medical disorders. A comprehensive medical history should be taken and regularly updated. All medical conditions should be properly understood and before any treatment is planned, guidance from patient's physician is necessary.

Cardiovascular Diseases: Infective Endocarditis

Infective endocarditis is an inflammation of the inner tissues of the heart, the endocardium which may include one or more heart valves, the mural endocardium, or a septal defect, which may lead to intractable congestive heart failure and myocardial abscesses.[2] The primary prevention of infective endocarditis (IE) is very important. Antibiotic prophylaxis for such patients prior to an invasive procedure that could generate a bacteremia has been a founding principle of dental practice for half a century, although the evidence of benefit is limited. Very few cases of IE are now secondary to oral Streptococci and *Staphylococcus aureus* is now the most common pathogen. The National Institute for Health and Clinical Excellence (NICE) in March 2008 have issued the guidelines for dental practitioners in United Kingdom.[3] National Institute for Health and Clinical Excellence has recommended not to give chlorhexidine mouth wash and antibiotic prophylaxis in patients at risk of endocarditis undergoing dental procedures.

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Causative Organism

The causative organism[2] is enlisted in Table 1.

Clinical Features

Endocarditis is a life-threatening disease, although it is relatively uncommon

Some of the signs and symptoms[4] of IE:

- Night sweats
- Weight loss
- Joint pains and muscular pains
- Embolic phenomena and metastatic infection
- Fever and chills

Some Clinical Manifestations of Infective Endocarditis[4]

- Roths spot on fundi
- Oslers nodes which are painful tender swellings at the finger tips
- Positive blood culture
- Cerebral emboli
- Petechial hemorrhages of skin and mucous membranes
- Splinter hemorrhages and clubbing of nails
- Splenomegaly
- Hematuria
- Murmurs, arrhythmias and cardiac failure.

Orthodontic Considerations in Patients with Infective Endocarditis

- Clinician should converse with the patient's physician to confirm the risk of IE. Informed patient consent is required.[1]
- Maintenance of good oral hygiene and prevention of oral disease are critical for these susceptible patients before and during orthodontic treatment.[5,6] Oral hygiene procedures should be given to the patient, such as toothbrushing and interdental flossing.[5] Oral hygiene status must be monitored by the orthodontist and where possible by the hygienist too.
- A daily oral rinse of 0.2% (w/v) chlorhexidine solution is effective in reducing the bacteremic level. Fortunately, repeated use of this disinfectant does not result in resistance to it by the bacteria. It is therefore recommended that these patients should have a chlorhexidine oral rinse prior to every orthodontic adjustment in addition to the daily rinse.[7,8]
- The orthodontic procedure that has been postulated to cause a bacteremia has been placement of a separator, taking alginate impression, placing the mini-implant, placing ligature ties and changing the arch wire, surgical exposure of impacted teeth, ultrasonic scaling.
- The use of orthodontic bands and fixed acrylic appliances should be avoided whenever possible in high-risk patients with poor oral hygiene. Orthodontist should bondable attachments instead of banding.
- The archwire should be secured with elastomeric modules instead of ligature ties and chronic irritation from the archwires should be avoided.
- Patient should do proper brushing, so that accumulation of plaque and calculus is prevented, thus marginal gingivitis is prevented.
- Patient must be encouraged to use antimicrobial mouthwash to control plaque and maintain a high standard of oral hygiene.
- The risk of using electric toothbrushes is poorly defined but a pilot study showed that brushing with a powered toothbrush results in a transient bacteremia more frequently than brushing with a manual or ultrasonic toothbrush.[9]
- If any such episodes of infection occurs in people at risk of IE should be investigated and treated promptly.
- Patient seeking orthodontic treatment should be made aware of the risk of endocarditis, the need to avoid bacteremia and the importance of maintaining good oral hygiene as the plaque accumulation may occur in the presence of orthodontic appliances.[10,11]
- Regimens for dental prophylaxis should always be given 30 to 60 minutes before the procedure. Oral amoxicillin remains the drug of choice. Amoxicillin 3 gm (child 50 mg/kg) oral 1 hour pre-procedure (i.v 30 mins before) Alternative: Clindamycin 600 mg (child 20 mg/kg). The prophylaxis is enlisted in Table 2.
- There are few lesions which have prone risk for developing IE. These are described in Table 3.
- The dental procedures which have high risk of developing IE, that require the antibiotic prophylaxis as recommended by European Society of Cardiology (2004),[12,13] British Society for Antimicrobial Therapy (2006)[14] and American Heart Association (2007)[15] are described in Table 4.

The American Heart Association and American Dental Association[10,15] suggested to give antibiotics prior to dental treatment in the following situations:

- If patient had history of bacterial endocarditis.

Table 1: Causative organism for infective endocarditis

Endocarditis	Organism
Subacute endocarditis	Streptococcus Viridans group (*S. sanguis*, *S. mitis*)
Acute endocarditis	*Staphylococcus aureus*, *S. pneumoniae*
Postoperative endocarditis	*S. epidermidis*

Table 2: Antibiotic prophylaxis against endocarditis

Procedure	*Antibiotic regimen*
Dental or upper respiratory tract infection under local anesthesia	Amoxicillin 3 gm orally 1 hour before
If allergic to penicillin	Clindamycin 600 mg orally 1 hour before
Special risk patients like prosthetic valve or previous endocarditis	Amoxicillin 1 gm IV and gentamicin 120 mg IV at induction and amoxicillin 0.5 gm orally 6 hours later
If allergic to penicillin	Vancomycin 1 gm IV infusion and gentamycin 120 mg IV at induction

Table 3: Risk of various endocarditis in various lesions

High risk	*Moderate risk*	*Low risk*
Prosthetic heart valve	Mitral valve prolapse	Articular septal defect
Tetralogy of fallot	Hypertropic cardiomyopathy	Surgical repair of atrial or ventricular septal defect
Ventricular septal defect	Mitral stenosis	
Contraction of aorta		Previous coronary artery bypass graft
Patent ductus arteriosus		

Table 4: Representation of guidelines for prevention of infective endocarditis

High risk	*Moderate risk*	*Low risk*
Dental procedures requiring prophylaxis according to European Society of Cardiology (2004)		
Dental procedure with risk of gingival or mucosal trauma	None	None
Dental procedures requiring prophylaxis according to British Society for Antimicrobial Therapy (2006)		
All invasive dental procedures	None	None
Dental procedures requiring prophylaxis according to American Heart Association (2007)		
Dental procedures involving the manipulation of gingival tissue, periapical areas of teeth or perforation of oral mucosa	None	None

- A prosthetic cardiac valve
- Cardiac valve disease and have had a cardiac transplant
- Congenital (present at birth) heart disease.

CONCLUSION

The systemic disorders are no absolute contraindication for the orthodontic treatment. Infective endocarditis is a rare condition, but it has high mortality and morbidity rates. Orthodontist should communicate and get advice from the patient's physician to confirm the risk of IE. The detailed medical history should be taken and regularly updated. Informed consent should be taken notifying that a patient is aware of any significantly increased risk. The primary prevention of IE is very important, complete oral hygiene maintenance and prophylaxis should be done for any invasive procedure. The use of orthodontic bands and fixed acrylic appliances should be avoided when possible in high-risk patients with poor oral hygiene.

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