Orthodontic treatment for medically compromised patients

In recent years, there has been an increase in the number of patients seeking orthodontic treatment. Some of them are medically compromised or on medications. They are obligated to coordinate with their patients' physicians about some orthodontic procedures and whether any modification to the treatment will be needed during the treatment. Orthodontic treatment is not contraindicated in most of these conditions unless it is uncontrolled because the tissues' response to orthodontic treatment is jeopardized during the active or acute phase of an illness.

1-Hypersensitivity reactions:

In modern orthodontic practice, adverse patient reactions to orthodontic materials, hypersensitivity reactions are related to the antigenicity of some materials that result in an adverse patient response.

Management:

1- Sensitivity test if possible
2- Avoid using materials that cause sensitivity

2-Infective endocarditis (IE):

This condition results from infection of the heart or blood vessels endothelium. Heart valves are specifically susceptible, but this condition can affect any endothelial lined surfaces found in ventricles, atria, and pulmonary artery.

The association between IE and orthodontics has not been completely identified. The American Heart Association's committee found no significant risk for bacteremia from adjustment of orthodontic appliances. Thus, prophylaxis is not recommended for routine adjustment of removable or fixed orthodontic appliances or placement of orthodontic brackets.

Prophylaxis is recommended for any orthodontic procedures that might perforate oral mucosa or manipulate gingival tissues. These include

insertion and removal of orthodontic bands, interproximal reduction, and placement of temporary anchorage devices.

The antibiotic prophylaxis should be given as one dose before the procedure or up to 2 hours later.

Management:

1-Proper antibiotic prescription based on the risk level and orthodontic procedure intended

2- Bonded brackets and elastomeric ties are preferable.

3- All sharp edges should be smoothed and polished, and excess adhesives should be removed and cleaned.

4-Fixed acrylic appliances, like Nance and acrylic rapid maxillary expanders, should be avoided

3-Thrombocytopenia:

This condition results from a reduction of blood platelet count due to bone marrow disruption. This can be caused by malignancy of the bone marrow (leukaemia) or an autoimmune disease (aplastic anaemia). Spontaneous gingival bleeding in the presence of good oral hygiene is considered to be one of the early signs of leukaemia

Management

1-If the diagnosis of leukaemia is confirmed before the orthodontic treatment, orthodontic treatment should be delayed until chemotherapy is complete and at least two years after bone marrow transplantation.

2-If the diagnosis is confirmed during the orthodontic treatment, the orthodontist must remove all existing orthodontic appliances and a removable retainer can be used. Orthodontic treatment can be restarted after completion of all required therapy, and the patient has a minimum of two-year event-free survival

3-Orthodontic mechanics should be simple and light

4-The orthodontist needs to accept compromised results and treat the maxilla only

5-Clear aligners might be the best choice to treat these patients

6-Non-irritating orthodontic appliances are preferable

7-Nickel-free brackets are recommended over stainless-steel brackets

8-The use of aesthetic brackets or clear aligners is recommended since they cause minimal MRI distortion

9-For cancer patients in general, orthodontic treatment should start at least 2 years after the anticancer therapy

4-Haemophilia

This condition results from a deficiency of one of the blood clotting factors. Haemophilia A and B are caused by factor VIII and IX deficiency, respectively. Von Willebrand's disease is caused by a defect of Von Willebrand's factor.

Management:

1-Mucosal injury should be minimized. Sharp edges need to be smoothed, and excess wires should be cut.

2-Self-ligating brackets are preferable over the conventional type. Arch wires should be ligated with elastomeric rather than wire ligatures.

3-It is preferable to make an impression with a non-metal tray to minimize trauma. During bonding, a saliva ejector is recommended to be placed on a gauze placed on the mouth's floor

4-Minimal treatment time

5-Fixed appliances are preferable over the removable ones. Bonding over banding are advisable, if possible. A non-extraction treatment plan is recommended

6-For pain management, Acetaminophen is a safer than NSAIDs

7-Clear aligners should be trimmed carefully to avoid gingival irritation

5-Thalassemia:

This condition is manifested by reduction of synthesis of a or b polypeptide chains that make the normal haemoglobin compound HbA. This reduces the amount of haemoglobin in red blood cells and causes anaemia .

B-Thalassemia major (Cooley's anaemia) is considered to be the most severe type. Orthodontic problems include skeletal class II maloc- clusion, small teeth size, reduced dental arch dimensions, everted lips, anterior teeth spacing and flaring, open bite, protrusion, maxillary enlargement, and increased overjet. Maxillary bone marrow undergoes hyperplasia more than the mandible, which causes a distinctive "chip- munk face" .



Management

1-Orthodontic interceptive treatment is recommended to begin at early age by using functional appliances and extra-oral appliances to treat dentofacial problems. It is recommended to apply a medium force in short intervals

2-Tooth movement must be monitored by the orthodontist for short intervals of time. 3-Lighter forces than usual are highly recommended

6-Diabetes mellitus (DM)

This condition is characterized by a persistent elevation in blood glucose (chronic hyperglycaemia) due to insulin deficiency. Types 1 and 2 are the main types of DM.

Type 1 results from insulin secretion deficiency. Type 2 results from insulin resistance and inadequate insulin production. Periodontal problems are the main concern for poorly controlled DM.

Management:

1-Appointments early in the morning are preferable, and the patient is encouraged to eat a regular meal and take usual medication before the visit

2-Light orthodontic forces should be used

3-A periodontist should be involved, especially with adult patients, to evaluate periodontal condition before and during orthodontic treatment

4-Orthodontists and staff should be trained and ready to deal with any diabetic emergencies, especially sudden hypoglycaemia.

7-Thyroid disorders

Hyperthyroidism is caused by unregulated thyroid hormone synthesis. In contrast, hypothyroidism results from a reduction in thyroid gland function and its hormone production. Orthodontic problems with hyperthyroidism include high bone turnover and accelerated dental eruption. Orthodontic problems with hypothyroidism include anterior open bite, macroglossia, delayed eruption of teeth, impaction of the mandibular second molars, and low bone turnover

Management

1- A stress reduction protocol should be implemented NSAIDs and aspirin are not recommended, and alternative pain medication should be prescribed
2- Patients with hyperthyroidism tend to have an increased amount of tooth movement Patients with hypothyroidism tend to have an increased risk of root resorption

8-HIV/AIDS:

Human immunodeficiency virus (HIV) is a bloodborne retrovirus which infects the immune system cells (including T helper lymphocytes and macrophages) resulting in acquired immunodeficiency syndrome (AIDS). Oral lesions are usually detected first in these patients. These lesions include hairy leukoplakia and oral candidiasis. Depending on the progress

and stage of HIV infection, patients with HIV/AIDS may become medically compromised and require special considerations.

Management

1- An orthodontist can aid in detecting a possible HIV infection by recognizing the first oral manifestations of the disease HIV patients with no symptoms should be treated as regular patients.
2- These patients can receive regular orthodontic treatment after ruling out the possibility of neutropenia, immunosuppression, or thrombocytopenia
3- If any oral lesion is detected during the treatment, an appropriate referral is recommended
4- For pain management, Acetaminophen and aspirin should be used with caution

9-Juvenile idiopathic arthritis (JIA)

JIA is a destructive inflammatory disease that affects children, and results in joint pain, swelling, and interference with range of motion. JIA affects females more than males and begins before the age of 16. Articular surfaces of joints undergo progressive destruction, including hands, wrists, fingers, toes, knees, shoulders, and elbows. In 45% of cases diagnosed with JIA, the temporomandibular joint (TMJ) is involved. Orthodontic problems include mandibular retrognathia, condylar hypoplasia, steep mandibular plane angle, open bite, antegonial notching, increased lower face height, and skeletal class II.

Most of these problems are attributed to condylar bone resorption. Unilateral TMJ involvement results in facial asymmetry.

Management

1- The treatment of JIA involves medications, physical therapy, and psychosocial support to counteract the progressive and long-term nature of the disease
2- Joint inflammation should be controlled as early as possible with medications to prevent deteriorating effects on the mandibular growth Once the inflammation is under control, orthodontic treatment should aim at restoring optimal occlusion and function of the mandible

3- Heavy class II elastics should not be used.
4- The use of functional appliances is controversial, in the case of a moderate mandibular deficiency, headgear is recommended
5- Orthognathic surgery should be performed when growth is complete except in case of TMJ's ankylosis, which mandates surgical intervention sooner Maxillary surgery and advancement genioplasty have been advocated to treat severe mandibular deficiency
6- In case of severe deformity, distraction osteogenesis is recommended

10-Autism Spectrum Disorder (ASD):

It is a neurodevelopmental syndrome which starts before three years of age and continues for life. This spectrum presents with Asperger Disorder (AD), autism, Pervasive Developmental Dis- order, and Childhood Disintegrative Disorder (CID). This results in repetitive and limited behaviors in addition to impairments of communication and social interaction and responsiveness.

Orthodontically, these patients have more malocclusion than normal people. In particular, they have a higher prevalence of class II malocclusion, increased overjet, high and narrow palate, posterior crossbite, open bite, and severe maxillary crowding. These traits might be attributed to persistent parafunctional habits, including bruxism, lip biting, pacifier use, and tongue thrusting.

Moreover, autistic children tend to be rewarded with sweets when they perform certain tasks during therapy or at home. Therefore, they might have a high risk of caries if these rewards continue regularly.

Management

1- The presence of parents, giving short and clear sentences, voice control,
2- Tell-Show-Do technique, behaviour modification, and positive reinforcement can be utilized to improve communication and acceptance. This must be done over several visits before starting the orthodontic treatment .
3- Desensitization techniques can be used by gradually introducing the patient to the items used in the orthodontic office

4- Some procedures can be conducted using behaviour management and protective stabilization (restraint). Others might need sedation, or even general anaesthesia.
5- Removable orthodontic appliances are recommended for autistic patients. They should be as small as possible and be reinforced by wires.

11-ttention-deficit hyperactivity disorder (ADHD):

Attention-deficit hyperactivity disorder is characterized by inattention, impulsivity, forgetfulness, and inappropriate hyperactivity. Children with ADHD might have their growth disturbed by the disorder or medications used for its treatment. Dental manifestations include a high prevalence of caries, molar-incisor hypoplasia, and becoming more prone to dental trauma.

Management

Due to poor compliance, some orthodontic tasks, including activation of appliances and placement of elastics, need more follow-ups and the involvement of parents and other family members.

Strict oral hygiene is mandatory.

Short appointments scheduled early in the morning are recommended. Frequent breaks during the appointment are beneficial to gain compliance and attention.

Instructions should be simple and clear.

The Tell-Show-Do method has a great impact on behavior modification in these patients.

Orthodontic treatment plans that require high compliance should be avoided.