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Review Article

Orthodontic Management of Medically Compromised Patients

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ABSTRACT:
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 responsibilities 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.
Key words: Medically compromised patient, orthodontic management.

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INTRODUCTION

There is little doubt that the prevalence of patients with underlying medical condition seeking orthodontic care has increased over the past two decades. A pilot study performed in 2002 of several orthodontic practices revealed that more than 25% of patients seeking orthodontic therapy had some medical diagnosis that potentially impacted their care. While the general dentistry literature addresses many of these diagnosis and their medical and dental management, there is a paucity of information in the orthodontic literature as to the impact of these conditions on orthodontic care. The various medical problems affecting orthodontic care are discussed below under the following headings:

- Adverse hypersensitivity reactions in orthodontics.
- Orthodontic management of patient with seizure disorders.
- Orthodontic considerations in the diabetic patients.
- Psychiatric issues in the orthodontic patient.
- Pediatric cancer patient
- Cardiac diseases
- Bleeding disorders
- Asthma
- Adenotonsillar hypertrophy
- Handicapped child
- Conclusion
- References

HYPERSENSITIVITY REACTIONS:

In modern orthodontic practice, adverse patient reactions to orthodontic materials are both an irritant and a hypersensitivity nature. Although reactions of irritant origin are usually associated with direct friction between soft tissues and parts or accessories of the orthodontic appliances, hypersensitivity reactions are related to the antigenicity of some materials that result in an adverse patient response.

Adverse hypersensitivity reactions are manifested most often as allergic contact dermatitis (ACD) of the face and neck; but mucosal and gingival reactions, as well as potential general dermal and systemic reactions can occur in unusual circumstances. The most common and problematic hypersensitivity reactions in orthodontic practice are due to the use of latex based products and to the alloy components of metal-based orthodontic appliances.

- Latex based products
- Metal based appliances

LATEX BASED ALLERGIC REACTIONS:

Allergic type reactions to natural rubber latex have increased considerably since 1980's and have become a significant problem in affecting patients and health care workers in general, as well as dental professionals and dental patients. Disposable medical gloves, particularly powdered gloves, are considered the major reservoir of latex allergies in health care.

Two distinct types of allergic reactions to natural rubber are described in the literature.

- Type I hypersensitivity
- Type IV hypersensitivity

Type I hypersensitivity to natural rubber latex represents an immediate antibody mediated allergic response to multiple proteins on the latex / products. A type I immunological reaction to latex protein components may be responsible for a serious and potentially life-threatening systemic immune allergic episode .A type I reaction occurs within minutes or as long as several hours after direct skin or mucosal contact with the allergen. Although less than 1% of the general population are reported to be diagnosed with potential type I natural rubber hypersensitivity, a higher prevalence of between 6%-12% is reported among dental professionals.

Detailed medical history, which might document a prior episode, diagnosis of potential type I hypersensitivity in an individual should include identification of sources of natural rubber latex product exposure and any other previous allergic reactions. Patients at particular risk of allergy to natural rubber latex are those with a history of atopy, those who have had repeated operations and extensive contact with rubber surgical drains and tubes and those with bifid spine. A history of itching and redness from contact with balloons, rubber dams and so on, as well as other allergies such as hay fever, asthma, eczema and contact dermatitis can also be taken as potential risk factors.

A more delayed reaction, known clinically as type IV hypersensitivity to natural rubber latex, usually presents a reaction localized to the area of skin contact, thus the more common name of "allergic contact dermatitis". The generally localized reaction is typically characterized by diffuse or patchy redness eczema on the contact area. It is often accompanied initially by itching, redness and reside formation, which later evidence dry skin, fissures and sores. Initial signs of reaction develop in minutes to hours and may persist for several weeks. Type IV hypersensitivity is usually an allergic reaction to one or more of the compounding chemicals present in natural rubber latex products.

MANAGEMENT:

In the dental office, natural rubber latex allergic patients must be clearly identified in their records to prevent inadvertent use of natural rubber latex-containing products. The rule is simple: natural rubber gloves should not be used by or near individuals with a known type I hypersensitivity. Alternative products made of synthetic rubber or plastic should be used. Natural rubber latex gloves should be substituted with alternative over made of other components such as nitrile, neoprene, vinyl, polyurethane and styrene based rubbers or blends of these synthetic materials.

In addition, the use of powder free gloves will diminish the amount of aerosolized allergens. For any kind of natural rubber latex hypersensitivity reaction, topical medicaments and barrier creams can potentially worsen skin symptoms and should therefore be avoided. While total elimination of natural rubber latex products present in the orthodontic office may seem unreasonable, the goal should be to significantly reduce any patient exposure to these elements on a routine basis. Additionally, more frequent office cleanings, air-duct filter changes and cleanings, and early morning appointments can reduce patient exposure to air borne natural rubber latex particles. In certain cases appropriate treatment may have to include administration of pretreatment antihistamines. In cases of severe type I reaction, emergency procedures such as administration of epinephrine are recommended. Finally proper education of patient and workers regarding natural rubber latex allergies is very important component of these cases.

METAL BASED ALLERGIC REACTIONS:

The metal components of orthodontic appliances are generally composed of 18-8 stainless steel. Both of these metal components are allergens, but the nickel in particular is considered a common cause of contact allergy. Since orthodontic appliances almost always consist of metallic components, leaching of these elements may be a potential trigger to an allergic reaction. Nickel is the most common metal based contact allergy among women, with the incidence of nickel sensitivity in the female population reported as high as 30% compared with only 3% of males among the studied individuals. A key element in a study by Romageura and colleagues was the finding that nickel sensitivity was higher among subjects with a history of pierced ears ; there was 31% prevalence compared with subjects without pierced ears at 2% prevalence. Other studies have reported lower percentage of individuals with nickel sensitivity – on the order of no

more than 10% in the general population. These studies have generally found females 10 times more likely than males to express sensitivity to nickel-based metals. The research literature suggests that metal based orthodontic appliances do not increase the risk of nickel hypersensitivity to patients. Our current knowledge of intraoral orthodontic appliances corrosion pattern and the rare occurrence of possible and nickel allergic responses in patients suggests that concerns about sensitizing orthodontic patients to nickel are not supported in the literature.

However, it would seem that caution and close monitoring should be exercised in patients with a defined history of atopic dermatitis to nickel-containing metals but that orthodontic treatment avoidance is unnecessary.

SEIZURE DISORDERS:

Seizure disorders are the most common serious chronic neurological condition. A seizure is a sudden, involuntary, time-limited alteration in neurologic function resulting from abnormal electrical discharge of cerebral neurons. Seizure manifests as altered sensation, behavior or consciousness. Epilepsy is defined as two or more seizures that are not provoked and are not due to an acute disturbance of the brain; it is a sign of underlying brain dysfunction, rather than a single disease. Epilepsy is the most common serious chronic neurological condition. The cumulative incidence of epilepsy from birth through age 20 years is about 1% and increases to 3% at age 75.

GENERALIZED:

Type	Manifestation
Absence	10-30 sec LOC (loss of consciousness), brief eye or muscle flattering, sudden halt in activity
Tonic clonic	LOC with following, 10-20 sec muscle rigidity followed by 2-5min clonic contractions of muscles of extremities, head, trunk, urinary and / or facial incontinence, postictal deep sleep 10-30 min.
Atonic	Brief loss of muscle tone with following, LOC variable
Clonic	Alternating muscle contraction and relaxation
Tonic	Persistent firm muscle contractions

A long recognized AED (Anti-epileptic drug) side effect is the gingival Hyperplasia reported to occur in up to 50% of patients treated with phenytoin. Gingival Hyperplasia has also been reported to occur with sodium nalproate and ethosuximide. Other AED-related oral findings include recurrent aphthous-like ulcerations, gingival bleeding, hypercementosis, root shortening, anomalous tooth development, delayed eruption and cervical lymphadenopathy.

Of particular interest to the orthodontist is a recent report of facial and body asymmetries attaching 41% of patients with partial seizures in the population studied; asymmetries included both hemihypertrophy and atrophy. There is consensus in the literature that dental management of patients whose seizures are well controlled does not present a major problem. For most patients dental health may enhance, but is not essential for, oral health. Treatment decisions should be influenced by subjective goals set by the patient and may be modified based on the patient's medical situation. A question regarding seizure disorder should be part of every orthodontic patient's medical history; further information is then solicited from those responding positively.

Details to ask about the seizure(s) include

a) Age of onset
b) Current and past frequency
c) Type
d) Description of behavior during event
e) Typical duration
f) Triggers
g) Postictal course
h) Medication
i) Diet

Patients with epilepsy and a malocclusion should have comprehensive orthodontic evaluation. The level of orthodontic intervention must take into account the type of seizure disorder and efficacy of control. History related by the patient should be confirmed during a discussion with the patient's physician.

Mechanical challenges such as dosing interdental spaces in the presence of gingival hypertrophy should be considered when estimating treatment time. The orthodontist and staff should be prepared to respond to a generalized tonic-clonic seizure or a partial motor seizure in the following way:

1) Do not try to restrain the patient,
2) If possible help the patient to the down on his or side
3) Remove eye glasses
4) Remove all dangerous objects from the area
5) Note the time
6) Stay with the patient until fully alert.

DIABETIC PATIENTS:

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 adult patients sucking orthodontic treatment. Many of them suffering from chronic diseases. Advances in the management of many of these maladies have allowed these patients to pursue elective orthodontic procedures that only years ago would have been considered contraindicated. One such disease is diabetes mellitus. The practitioner should therefore understand the consequences of DM (Diabetes mellitus) in relation to orthodontic treatment and should have a basic knowledge and understanding of this disease and its impact on the oral cavity. The vast majority of cases of diabetes fall into two broad etipathogenetic categories. In one category, type I diabetes, the cause is an absolute

deficiency of insulin secretion. The pancreatic islets are usually destroyed mostly as a result of a T-cell mediated autoimmune pathologic process, learning the patient totally dependent on exogenous insulin.

In the other, much more prevalent category, type 2 diabetes, the cause is a combination of resistance to insulin action and an inadequate compensatory insulin secretor response. There is no limit for orthodontic treatment; therefore the practitioner will be confronted in his office with type I as well as type 2 diabetes patients. Diabetes type 2 patients can be considered more stable when compared with type 1 patient. Diabetes type 1 in more often encountered in younger patients who will be more frequently selected for orthodontic treatment. Morning appointments are preferable. If the patient is scheduled for a long treatment session, that is, longer than 1½ hours, the patient should be advised to eat their usual meal and take their medication as usual. Before the procedures starts, the orthodontist should check whether the patient has fulfilled these recommendations or not. In this may a hypoglycemic reaction in the office can readily be accorded.

The key to any orthodontic treatment for a patient with diabetes is good medical control. Orthodontic treatment should not be performed in a patient with uncontrolled diabetes. If the patient is not in good metabolic control, every effort should be made to improve the diabetic state before starting orthodontic treatment. It's important to stress the maintenance of good oral hygiene, especially when fixed appliances are used. Indeed such appliances may give rise to increased plaque retention, which may in these patients more easily cause tooth decay and periodontal breakdown.

- Adjuvant daily rises with a fluoride rich mouth rinse, preferably before bed time, can provide further preventive benefits.
- Candida infections may occur and, if present blood glucose level should be monitored to rule out deterioration of the diabetic state.
- Diabetes related microangiopathy can occasionally occur in the periapical vascular supply resulting in an explained odontalgia, percussion sensitivitiy, pulpitis or even loss of vitality in sound teeth.
- It is advisable to use light forces and not to over load teeth.
- Periodontal reactions to orthodontic forces were studied by Holtgrans and Donath. They found a retarded osseous regeneration, a weakening of periodontal ligament and microangiopathies in the gingival area. The authors concluded that the specific diabetic changes in the periodontium are more pronounced following orthodontic tooth movement.

Since diabetic patients and, more specifically, uncontrolled or poorly controlled diabetic patients have an increased tendency for periodontal breakdown, these patients should be considered in the orthodontic treatment plan, as periodontal patients and treatment considerations accordingly be made.

Especially in adults, it is important before the start of orthodontic treatment to obtain a full mouth periodontal examination including probing, plaque and gingival score, and to evaluate the necessity for periodontal treatment.

First the periodontal condition should be unproved before any orthodontic treatment can take place. During orthodontic treatment the orthodontist should monitor the periodontal condition of patient with diabetes and keep control over the inflammation.

PSYCHIATRIC ISSUES IN THE ORTHODONTIC PATIENT:

Orthodontic treatment requires collaboration between the orthodontist, the patient and the family that may extend over several years. Clinical success is dependent on both technical excellence and compliance with the prescribed care. Compliance failure may not only impact the results of the orthodontic care but also may compromise future oral health. During the past few decades child and adolescent mental health has also been dramatically changing. Clinical research has markedly altered the understanding, diagnosis and treatment of disorders presenting in childhood or adolescence. Many of the disorders are rare in earlier childhood and markedly increase with the onset of adolescence. This is the same period of time in which most orthodontic treatment occurs.

BEHAVOUR THERAPY:

Suggestions for using some cognitive behavioral therapy (CBT) principles and techniques to support the treatment have been made. CBT is grounded on two basic principles. The first or cognitive part is that there is a link between thoughts, feelings and actions. Altering anyone of the three changes the other two. The second principle is based on the behavioral school. It states that the balance of rewards and punishments will shape behaviors. From this prospective, all interventions are based on careful observations and tuning the incentives or disincentives to shape response behavior.

Operationally, the first behavioral step is to define the problem as explicitly as possible. For example patient "A" is not nearing his head gear. The next step is to look for patterns. Z and his family keep logs of whether he wears it, specifically recording what happened just before he was to put it on (autocident) and what happens just after (consequences). Keep track over a week. Then set the first set of goals equal to what he is currently doing. So, if he missed three rights, in the observation week than any might lies successful he "earns" a small reward, which might be a trip to the local icecream shop. The next week, is for two rights or fewer of missing the head gear. In advertent rewards are avoided. An other example of an inadvertent reward is the parent who takes the child out to McDonald's after the child acted up in the

office, because he was so "upset". Although well intentioned, it has reinforced being upset in the office.

ORTHODONTIC CONSIDERATIONS IN THE PEDIATRIC CANCER PATIENT:

It is now estimated that 1 in every 900 young adults between the age of 16 and 44 is a survivor of childhood cancer. The overall survival rate for all types of childhood cancer is now approaching 80%. Approximately 50% of all survivors will experience delayed sequale of therapy. Both chemotherapy and radiation therapy given to the growing individual will have consequences for growth, dental development, and craniofacial growth. The caries risk may also be increased due to salivary dysfunction. It has been shown that although ideal treatment results are not always achieved, orthodontic treatment does not produce any harmful side effects. Strategies to be followed in treating this patient group may include

1) Using appliances that minimize the risk of root resorption.
2) Low force application
3) Accepting a compromised treatment result by simplistic mechanics.
4) Terminating the treatment earlier than normal
5) Not treating the lower jaw.

It is advised to postpone the start of orthodontic treatment at least 2 years after completion of cancer therapy. Remington and colleagues evaluated 100 patients who exhibited root resorption during appliance therapy after a mean period of 14.1 years. No apparent increase in root resorption was found after termination of active therapy, although a progressive remodeling of the root surface was evident. Even severely resorbed teeth appeared to be functioning in a reasonable manner, with Hypermobility observed in only two patients. The apical portion of the root is of relatively minor importance for the total periodontal support. Approximately 3mm of loss of support has been found to be equivalent to 1mm of crestal bone loss. In light of the already compromised root length that many of these cancer patients experience, every effort should be made to minimize further root resorption during active therapy. The general recommendation with all orthodontic patients and risk of root resorption is to take an apical film after 6 months into active treatment. If the film reveals progress of the resorption the treatment should be interrupted for 3 months. The arch wire should not be removed but should be adjusted to a passive stage so that there would be no active tooth movement. Since radiation therapy has a growth suppression effect, especially on cartilage growth, the prognosis for treating a skeletal class II malocclusion with growth modification would be questionable.

CARDIAL DISEASES, BLEEDING DISORDERS AND ASTHMA:

While orthodontic therapy has been histogically considered to be completely noninvasive, specific orthodontic procedures may place some patient at risk for serious sequelae. Among the most common of those conditions are those associated with cardiac diseases, bleeding disorders and asthmas. Aggressive risk assessment is the key factor in the identification and prevention of medically associated problems.

RISK ASSESSMENT:

Identification of patient at risk before the initiation of treatment remains the best may to effectively manage medically compromised patients and prevent or minimize the risk of adverse outcomes. A thorough written medical history and verbal review is the corner stone of risk assessment.

Although not well studied, it appears that the major risks for medially compromised orthodontic patients are associated with bacteremias caused by band placement and removal, bleeding and infection caused by mucosal or gingival irritation and the ability of patients with some condition to tolerate treatment. Consequently, the medical conditions likely to be most important to the orthodontist are cardiac conditions that predispose to endocarditis, disease that result in immunosupression or myelosuppression, conditions that increase the risk of bleeding or local infection, and diseases that modify patients ability to tolerate treatment.

BACTERIAL ENDOCARDITIS:

Dental procedures associated with clicking bleeding are the onces that have been associated with endocarditis risk. The only orthodontic procedure for which the American heart association defines a significant risk of bleeding is the initial placement of bands, but not brackets. However three are two other clinical situations in which gingival bleeding might also be elicited: BAND REMOVAL and orthodontic emergencies in which hard ware becomes detached or loosened causing by traction of interrupted teeth has been suggested but not studied.

Three management tenants form the basis for patients who are at risk of BE (Bacterial Endocarditis):

1) Communication with patients physician to confirm that a risk for BE truly existed.
2) Aggressive pretreatment and intratreatment oral hygiene to minimize the presence of gingival inflammation.
3) Prudent use of prophylactic antibiotic therapy.

The consistent protection for BE is antibiotic prophylaxis interestingly, use of antibiotic prophylaxis for patients at risk for BE is not routine in orthodontic practice. A 1985 study concluded that only 79% of American and 30% of British orthodontists routinely prescribed antibiotics for patient at risk of BE. The current recommendations for endocarditis prophylaxis by the American heart association are a single dose of amoxicillin (2g in adults or 50 mg/kg in children) administrated 1 hour before the procedure. For penicillin allergic patients

clindamycin (600mg for adults and 20mg / kg for children) may be used in the same schedule. If patient forgets to take his or her premedication, or if unanticipated bleeding occurs, the AHA guidelines suggest that antibiotic given at the thing of treatment or up to 2 hours from the time of insult is effective.

PATIENTS WITH BLEEDING DISORDERS:

For patients with a congenital bleeding disorder, probably the suggest orthodontic associated risk is associated with extractions associated with treatment. In these cases, the administration of factor replacement along with AMICAR OR TRANEXAMIC ACID is prudent. Amicar and tranexamic acid are anti-fibronolytic agents that prevent the breakdown of the clot in the extraction site, allowing for better organization, and thereby decreasing the likelihood of post operative bleeding. Care should be used in placement and removal of orthodontic hard ware to minimize the risk of mucosal injury. Likewise it has been suggested that elastomeric modules are preferential to cure ligature.

PATIENTS WITH ASTHMA:

Episodic narrowing of the airways that result in breathing difficulty and wheezing characterizes asthma. There are three management considerations in producing care to asthmatic patients:

The first objective is the prevention of acute asthmatic attacks. Key to this is the identification of patient at risk. The medical history should specially query for the condition. For patients with the condition information regarding the severity of the disease, medication, and factors that precipitate an attach is critical communication with the patients physician will assist in risk assessment. Orthodontic treatment should probably be differed in patients who report symptomatic disease or have frequent flares despite being adequately medicated. For patients at low risk or moderate risk, since anxiety and stress are often associated with acute attacks, morning appointments when the patient is rested, short waiting times and visits of limited duration are most desirable.

The orthodontist should assure that the patient has taken his or her medication and, if appropriate has his or her inhaler present if needed during the appointment. Chronic use of inhalers especially those containing steroids, may result in a predilection for developing oral candidiasis and xerostomia. Orthodontists should be aware of these possibilities in the patient with asthma. If noted, candidiasis can be treated with topical antifungal agents such as nystatin. Xerostomia enhances the risk of caries. Consequently, aggressive oral hygiene, supplemental topical fluorides, and vigilance for dental disease are appropriate. Finally, it has been suggested that orthodontic induced external root resorption occur with greater frequency in patients with asthama than in nonasthamatic patients. It would seem prudent, therefore, for orthodontist to disclose the lightened risk of external root resorption to patients before initiating treatment.

ADENOTONSILLAR HYPERTROPHY: The Presentation and Management of Upper airway

Obstruction:

Obstructive sleep disorders and sleep-associated airway obstruction are being recognized more frequently by all health care providers as significant problems in children and adolescents. The significance of sleep-related respiratory obstruction is not completely understood and the proper diagnosis and treatment remain controversial. Children and adolescents with adenotonsillar hypertrophy may present with a variety of conditions such as nasal obstruction, mouth breathing, fatigue, and obstructive sleep disorders.

Historical Perspective:

In 1837, dickens described an obese hypersomnolent boy named “Joe” in the Posthumous Papers of the Pickwick Club. Dickens described the clinical features and behavior of Joe, which became the model for many subsequent descriptions of these patients. In 1889, Hill describes a child “who breaths [sic] through his mouth instead of his nose, snores, restless at night and suffers from headache at school”. In 1918, Osler coined the term pickwickian to describe hypersomnolent and morbidly obese patients. In 1965, Menashe and colleagues describes two nonobese children with adentotonsillar hypertrophy and cardiovascular changes who were treated successfully with adenotonsillectomy.

PATHOPHYSIOLOGY

In obstructive sleep apnea, there is decreased airway because of anatomic obstruction of the upper airway. To maintain adequate airflow through a diminished lumen, the patient must increase respiratory effort. Because of the Bernoulli effect, increased intraluminal negative pressure, and a compliant airway structure, collapse of the airway and cessation of airflow result. Increasing negative airway pressure paradoxically causes further airway collapse and increased resistance to airflow. Peripheral and central neuromuscular regulation of respiratory function also contributes to the development of obstructive sleep disorders. There is a decrease in the activity of the genioglossus and diaphragm during a normal sleep cycle. It appears that obstructive apneas occur more frequently during these periods of decreased electromotor activity. Anatomic obstruction and decreased muscle tone causes cessation of airflow, which leads to physiologic changes including acidosis, hypercapnia, and hypoxemia. Once sufficient changes in the partial pressure of oxygen, (PO_2) the partial pressure of carbon dioxide (Pco_2), and the pH occur, central and peripheral chemoreceptors and baroreceptors are stimulated to cause arousal and awakening from sleep, which may

occur many times in a night. Therefore, the quality of seep, both physiologic and psychological restful sleep, is markedly disturbed, which may lead to behavioral changes such as hypersomnolence, hyperactivity, depression, and learning difficulties. Also, secondary cardiovascular changes in cluding arrhythmias, right-sided heart failure, and corpulmonale are of major concern.

Symptoms of Upper Airway Obstruction:

- Snoring
- Restless sleep
- Mouth breathing
- Nocturnal sweating
- Frequent wakening
- Abnormal head posture
- Fatigue during the day
- Failure to thrive
- Paradoxical chest-abdomen motion

Etiology

Adenotonsillar hypertrophy is the most common cause of respiratory obstruction of the upper airway. However, many other congenital, anatomic, and neuromuscular causes have been reported. Patients with craniofacial syndromes such as Crouzon, Apert, Treacher Collins, and Pierre Robin often have abnormalities of the upper airway manifesting as snoring and disorders, other causes such as nasal septal deviation, choanal stenosis, maxillary hypoplasia, micrognathia, retrognathia, and macroglossia may also be contributing factors.

Research in craniofacial growth has led to the realization that the mechanisms controlling the growth processes in the face are complex, interrelated, and interdependent, growth of the mandible alone is seen to be modulated by highly complex system involving both local and peripheral feedback mechanism and hormonal and central nervous system influences. There are numerous theories regarding facial growth, ranging from intrinsic genetic factors controlling the mechanisms of growth and development remain controversial. However, children and adolescents who present with mouth breathing and nasal obstruction should have a compete evaluation to rule out septal deviation, choanal atresia or stenosis, and adenotonsillar hypertrophy regardless of their age and the severity of malocclusion. The timing of referral and evaluation should be coordinated among the orthodontist, primary care physician, and otolarynoglogist during the initial period of evaluation and before any surgical or orthodontic intervention.

Diagnosis

The diagnosis of obstructive sleep disorder is based on a through history, a physical examination, and appropriate ancillary studies. Snoring is a cardinal finding. However, severity of snoring does not imply severity of the disorder. Loud snorers may have little or no apnea, whereas quiet snorers may have extended periods of apneas. Nocturnal enuresis is also a common complaint that occurs because of a decrease in neuromuscular tope during sleep and may be worsened by an obstructive sleep disorder. Other nighttime complaints include night terrors, restless sleep, diaphoreses, and frequent awakening. These children may also present with mouth breathing, hypersomnolence, excessive daytime sleepiness, and behavior problems. Mouth breathing and hyponasal speech quality die to adenoid hypertrophy is also a frequent finding. Articulation errors are common with phonemes such as/m/, /n/, and /ng/. These require nasal escape of air for proper formation and can be assessed easily during the physical examination.

Physical Examination

The examination should include a complete head and neck examination with particular attention to the potential sites for airway obstruction from the nares to the larynx, Mouth breathing, dry lower lip, and hyponasal speech are commonly found in patients with adenotonsillar hypertrophy. A complete nasal examination should be performed to rule out deviated septum, allergic rhinitis, or stenosis, and nasal masses such as dermoid, glioma, and encephalocele.

Adenoid hypertrophy generally exists along with tonsillar hypertrophy and does not need independent documentation. However, if the tonsils are small or absent, a flexible endoscopy is indicated to examine the nasal cavity and nasopharynx for adenoid hypertrophy. The oropharynx should be examined for the condition of the teeth, occlusion, position of the tongue, and tonsillar hypertrophy. The mandible should be assessed with regard to micrognathia are retrognathia.

Disorders Causing Upper Airway Obstruction

- Anatomic
  - Nasal
    - Septal deviation
    - Nasal polymosis
    - Nasal masses
  - Nasopharyngeal
  - Choanal stenosis or atresia
    - Adenoid hypertrophy
  - Oropharyngeal
    - Tonsillar hypertrophy
    - Macroglossia
    - Retrognathia
    - Micrognathia
  - Craniofacial syndromes
    - Apert
    - Crouzon
    - Down
    - Treacher Collins
  - Neuromuscular
    - Cerebra palsy
    - Vocal cord paralysis
    - Arnold-Chiari malformation
  - Miscellaneous
    - Allergic rhinitis
    - Obesity
    - Congenital myxedema
    - Storage disease

There is some controversy with regard to the accurate diagnosis of obstructive sleep disorder based solely on history and physical examination, Brouillette and colleagues have suggested that the diagnosis of obstructive sleep disorder can be based on a thorough history and examination. Other investigators have concluded that parents and physicians may overestimate the severity of the sleep disturbances and have recommended other ancillary testing to confirm the diagnosis.

Ancillary Studies

Radiography

Soft tissue lateral x-ray films are most commonly used to assess adenoid hypertrophy. However, it is important to realize that these are two-dimenstional studies and their accuracy in assessing the degree of nasal obstruction because of adenoid hypertrophy is controversial.

Cephalometric Study

These studies are used to assess the bony landmarks and have limitations in assessing soft tissue abnormalities. A cephalometric study is recommended in any patient with craniofacial syndrome of facial dysmorphism.

Polysomnography

Polysomnography or sleep study is the gold standard for the diagnosus of sleep apnea or any other associated sleep disorder. The sleep study can determine frequency, type, duration, and severity of apneic episodes. It provides information on several variables, which include 1) oxygen saturation monitoring, 2) electrocardiogram, 3) electroencephalogram, 4) thoracic respiratory movements, and 5) nasal and oral airflow. By monitoring these variables, one can differentiate between central and obstructive apneas. With obstructive sleep apnea, there is respiratory movement dispite cessation of airflow, which suggests upper airway obstruction. Central apnea implies central nervous system dysfunction demonstrating lack of respiratory movement despite apneic episodes. The mixed pattern is also seen in young children and it begins as central and then progresses to obstructive apnea.

Treatment

Management of obstructive sleep disorders can be surgical, medical, or airway position therapy. Treatment must be individualized based on the age, history, severity of obstructive episodes, and physical examination. Medial treatment includes 1) weight reduction and dietary measures, 2) nasal continuous positive airway pressure, and 3) medications such as acetazolamide, steroids, and theophyline. Surgical interventions are directed toward relieving the site of airway obstruction. Adenotonsillar hypertrophy is the most common cases of obstructive sleep apnea, and adenotosillectomy is the most frequently performed procedure. Care should be used remove all adenoid tissue at the level of the choanae to relief the nasal obstruction and prevent any future regrowth of the adenoid.

Treatment Options For Upper Airway Obstruction

Medical
- Diet and weight reduction
- Nasal positive airway pressure medications (steroid, acetazolamide,
- protriptyline)

Intervention: bypass of obstruction
- Nasopharyngeal airway
- Tracheotomy

Surgery: removal of obstruction
- Adenotonsellectomy
- Uvulopalatopharyngoplasty
- Septoplasty
- Nasal polypectomy
- Tongue reduction

Surgery: positional manipulation of airway
- Hyoidoplasty
- Orthognatihic surgery
- Craniofaical surgery

Other surgical interventions include orthognathic surgery, uvulopalatopharyngoplasty, tongue reduction, and tracheotomy. These procedures may be considered in patients with a cransiofacial abnormality after a careful evaluation by an interdisciplinary team approach.

ORTHODONTIC TREATMENT FOR THE SPECIAL NEEDS CHILD:

In general, “special needs” refers to those individuals suffering from developmental disability (e.g., mental retardation, cerebral palsy, autism / attention deficit hyperactivity disorder [ADHD], Down syndrome), or who are medically compromised, high – risk patients and who may require special attention. In the present review, only those with developmental disability involving behavioral problems will be discussed.

Over the past 20 years or so, both the absolute number and proportion of special needs children in society has increased, despite prenatal diagnostic technique and the improvement in prenatal identification of congenital anomalies. The main reasons are, first, sophisticated medical care, both prenatal and adult, that has increased the survival rate of newborns, but also their overall life expectancy. Second, given the enlightened attitude of society today, changing social policies and legislation, many more special needs children are seen as integral parts of their own families, with adoptive families or in sheltered housing and thus far more visible in general, whereas three decades ago they were largely housed in institutions. This gradual but palpable process of “mainstreaming” has brought about a greater awareness f them on the part the general public.

With their higher public profile, the present – day affluent society of the Western world has created a general improvement in quality of life of these children that, in turn, expresses itself in an increased

demand for aesthetics and normal function. The aim is acceptance into society, including the chance for employment toward self – sufficiency. Concern for facial appearance has become an item for discussion among parents and this has generated a demand for orthodontic treatment.

In general, the main goals of orthodontics are to improve the alignment and occlusion of the teeth and thus, indirectly, improve facial appearance. However, its efficacy is limited and it cannot provide a satisfactory answer for every situation. Individual benefits may be gained by patients that are principally associated with the patient's own concept of himself or herself and that are often strongly influenced by those around them.

Studies of the effects that dental appearance has on the individual and his or her surroundings have found this to be extremely important in overall facial aesthetics. It is a principle focus for teasing among school children, has a significant emotional impact on the individual, and is a factor used in social acceptability and personality judgment by others.

In their everyday life, special needs children comprise a group of individuals who depend heavily on their families and others for their needs and welfare. From the observations of Oreland and colleagues, we learn that they suffer from malocclusion of the teeth, which is more frequent, more severe, and more skeletally based than in the general population. Several conditions, such as cerebral palsy, Down syndrome, and mental retardation, exhibit increased prevalence of specific dental features, which can adversely affect function. However, these patients are those least likely to receive orthodontic treatment.

Beneficial but Not Essential:

The pediatric dentist must treat a patient to eliminate dental disease and to relieve pain, regardless of whether the child is cooperative in the dental chair and diligent in their routine home care. At the same time, the dentist is duty bound to encourage behavior alteration in both these areas. By contrast, orthodontics performed under these adverse conditions is contraindicated since a successful outcome is doubtful and iatrogenic damage, in the form of caries and gingival inflammation, is likely. Thus, while treatment need is often high and its object beneficial, orthodontics is still considered to be elective.

Therapeutic Access:

Therapeutic access to these patients is impeded by the following several specific obstacles.

1. General behavior is often problematic because of reduced understanding and increased apprehension, short attention span, and limited tolerance.
2. Uncontrolled limb and head movements and an inability to sit still- making it difficult even to seat the child in the dental chair.
3. Level of cooperation during treatment is usually significantly impaired.
4. Exaggerated gag reflex, apparently related to dental / medical phobia.
5. Markedly increased incidence of drooling in many cases.

These factors contribute to significant difficulty in performing otherwise routine procedures, such as impression taking and intraoral radiography. Accordingly, successful treatment delivery often requires different behavior management approaches, starting from simple behavior modification techniques through conscious and deep sedation to general anesthesia.

Motivation and Expectation:

In a previous study, we have reported that most of the parents of children with disabilities who sought treatment were among those whose affected children lived at home. These children received continuous daily attention from highly motivated parents who seemed prepared to go to great lengths to improve the child's well – being from within the family unit. Most f the parents had requested orthodontic treatment on their own initiative or were referred by their dentists. In contrast, physicians and social workers, who are involved with "the more serious" aspects of the child's disability, were less dentally aware and perhaps regarded orthodontic treatment as trivial and superfluous. This would lead one to consider that an educational campaign, aimed at those professionals involved in other aspects of the special needs child's treatment and at the public in general, could provide benefit for these children. As with healthy children, improvement in facial appearance is the main motivating factor for treatment. However, among special needs children, the proportion of parents whose declared aim was improvement in oral health and function was markedly increased, presumably due to a higher frequency of impairment. The parents expected the treatment to improve the child's quality of life and their acceptance within society. Half of the parents considered that the outcome of orthodontic treatment for their child would reflect positively on their social status.

Behavior management and the orthodontist:

The orthodontist must approach these patients with understanding and compassion and aim to gain their trust. Treating these patients is enormously challenging and is not for everyone! They require more chair side time, an increased number of appointments, and treating them in a regular orthodontic office and among health patients is problematic, since they disturb the regular schedule times. Furthermore, combining several procedures into a single sedation or general anesthesia (GA) session requires the availability of several professionals, for example, pedodontist, endodontist,

oral surgeon, and anesthesiologist, and this is rarely found in a private clinic, being usually achievable only in a hospital – type setting.

Unlike pediatric dentists, orthodontists are rarely in the position of having to overcome serious behavior problems in their patients and accordingly, find the prospect of treating a special needs child daunting. This will generally be sufficient for them to raise objection to accepting such patients under their care and justifying this with a variety of excuses.

General treatment Principles:

The aim of the pretreatment visits is three – fold :

1. to raise the patient's level of confidence in the dental environment
2. to assess the patient's and parent's compliance in dental homecare, and
3. to evaluate the expected degree of cooperation that will finally be forthcoming.

Clearly, sedation or GA cannot be performed for each visit for orthodontic appliance adjustment and so it is important to determine if the patient can reach a level at which simple tasks may be performed with behavior management techniques only. To assist in this evaluation, Chaushu and Becker have introduced an arbitrary scoring system, which may be used as a guideline to predict the most suitable orthodontic behavior management modality for the patient.

Oral hygiene is perhaps the most crucial factor that dictates whether or not orthodontic treatment should be provided for the particular patient. toothbrushing is not usually practiced by special needs children and, even when it is, considerable collections of food from recent meals may be seen in several areas of the mouth, including around the teeth. A lessened activity of the oral musculature, common in several debilitating conditions, and a lack of manual dexterity may contribute significantly to the stagnation.

The first step is to educate the parent and, whenever possible, the child to recognize plaque and gingival inflammation and to teach them the correct way to brush the teeth. While the child may be prepared to improve their ways, it is made clear to the parent that they must undertake the overall responsibility of achieving a mouth that is both cleaned regularly and that may become inflammation – free. This will generally mean that the parent must brush the child's teeth, since the child may well not be able to reach the required standard alone, for the reasons detailed above. It is crucial, therefore, to check the gingival response on several occasions, before committing to treatment. In the event that the required level is not reached, the orthodontist should politely refuse to accept the patient for treatment. A further advantage of parental toothbrushing , the value of which should not be underestimated, is that it accustoms the child to the insertion of foreign instruments (the toothbrush initially) into the mouth, by a person he or she trusts (the parent) and helps to overcome the child's defense reaction, apprehension, and often, the gag reflex. This encourages the child to subsequently surrender control of the oral environment to professional intrusion into the oral cavity.

Drawing Up a tentative Treatment Plan:

In routine orthodontics with healthy children, our treatment plan is drawn up after evaluating the patient clinically, examining plaster casts, studying clinical photographs, radiographs, and the cephalometric analysis. The steps and largely trouble – free. However, in an apprehensive or antagonistic special needs patient, some of these records may not be achievable without some form of pharmacological assistance and others may never be obtainable. Therefore, a general direction of treatment is sometimes determined on the basis of a clinical examination only, and full diagnostic records are acquired subsequently, as the initial items in the first sedation session. The tentative treatment plan is confirmed or altered and actual treatment procedures, such as band placement, extractions and dental fillings, are performed at the same session. In this way, a single sedation procedure may be exploited to the full, but it does demand a high degree of diagnostic skill and experience on the part of the operator.

Selecting the Treatment Modality:

Communication is vital for the education of our orthodontic special needs patients, since orthodontic treatment is a multivisit modality of extended duration. Little progress can be made toward achieving a change in negative behavior or improving the quality of outcomes without communication between all the participants in the dental health care process, especially with the patient himself, where this is possible. For these patients who have difficulties in communication and a relative inability to cooperate, we can offer conscious sedation, deep intravenous sedation, or the use of general anesthesia. The choice of the technique used should be the simplest and safest available that is appropriate for the needs of the specific task to be performed for each individual patient. it is pertinent to note that the main reason for the need for sedation does not relate to pain, but rather to achieving a submissive or motionless state in the patient, for an extended period of time. It is essential to establish that, for most routine visits for appliance adjustment, the use of behavior management techniques, such as "Tell, Show, and Do", behavior modification and positive and negative reinforcement is adequate to achieve the goals of the respective visits. It then remains for a decision to be made as to which of the available supplementary modalities is suitable for poorly tolerated procedures. Conscious sedation is a pharmacologically induced state of relaxation in which the patient remains conscious. It is aimed at changing the patient's mood and degree of compliance throughout the dental treatment,

facilitating acceptance of the procedure. The several different available methods of conscious sedation have widened the scope of procedures that may be undertaken in dentistry for the uncooperative, difficult, or frightened patient, and this has, in turn, opened the way for the orthodontist to provide treatment in some of the most resistant cases – previously considered untreatable. This modality is used as an adjunct to the regular behavior modification techniques, only when the latter have failed to permit therapeutic access. It may be elicited by the administration of drugs through inhalation (nitrous oxide and oxygen), transmucosally via nasal drops (Midazolam, Versed® ; Roche Products Inc, Nutley, NJ) orally (chloral hydrate, Noctec® ; Squibb and Co, Princeton Inc, Diazepam, Valium®; Roche Products Inc, Nutley, NJ ; Midazolam, Versed® ; Roche Products Inc, Nutley, NJ), or intravenously (Propofol Diprivan® ; Astrazenca, Wilmington, DE).

It is particularly relevant to mention midazolam as a very effective but short – acting conscious sedation agent. Its application in the form of nasal drops or oral syrup is simple and painless, making it particularly useful in the dental setting with patients with disabilities. Since midazolam has anxiolytic, sedative, and amnestic effects but not analgesia, its combined use with nitrous oxide, thereby including analgesic and relaxing effects, can provide the operator wit an ideally relaxed patient for short procedures.

Although conscious sedation is relatively free of pharmacokinetic and cardiovascular complications and is relatively inexpensive, its limited sedation potency makes it largely inadequate for the more demanding long and complicated procedures, such as orthodontic bracket bonding. Accordingly, general anesthesia has been employed for the more involved orthodontic procedures. However, the latter requires the patient to be hospitalized and the procedure performed in a specialized operating theater room, with all the attendant potential intraoperative or postoperative respiratory and cardiovascular complications. These complications increase the potential morbidity and the overall cost. Because of the latter impediments, the authors have introduced the use of in travenous (IV) deep sedation as an alternative to GA and have found it successful for even the most challenging orthodontic cases. It is much more suited than GA to the relatively trivial and painless procedures that are specific to orthodontics, insofar as it does not require an operating theater room and hospitalization, but can be performed by the anesthesiologist in the orthodontist's office, provided the premises have been appropriately equipped for sedation. The most suitable agent for IV deep sedation used presently is propofol (Diprivan®). Induction and recovery are rapid, a safe level of sedation is easily achieved, with few side effects, and with sensible use of safety measures, the risk of aspiration and other medical emergencies is extremely small. Vital reflexes are maintained throughout, intubation is superfluous, and complications thereby reduced. Given its convenience and availability, and the fact that it is conducted in the regular orthodontic office environment, patient acceptance is increased, more complex procedures become achievable, and other nonorthodontic tasks may be incorporated into the session, simultaneously. Thus, IV sedation facilitates therapeutic access to special needs children and reduces morbidity. Parents, too, are more prepared to accept treatment without the increased stress and other implications that accompany GA and hospitalization. It is the authors' belief that IV deep sedation holds the key to the ability to achieve therapeutic access to the special needs child on an outpatient basis. It is a "user – friendly" system, insofar as all types of orthodontic procedures are performed in a regular orthodontic clinic, yet within a hospital framework where other disciplines are close at hand to perform adjunctive procedures or as the needed support for a high – risk situation.

Adapting Orthodontics to the Special Needs Child:

In the unusual circumstances presented by a special needs child, standard orthodontic protocols must be adapted to suit the individual problems seen in the patient.

1. **Realistic Treatment Goals:**

With all orthodontic treatment, the aim is to effect the maximum treatment correction for any given child. When conditions are favorable, the orthodontist should be able to produce results approaching the idealistic standards of Board Certification. However, when conditions are compromised by the existence of adverse factors, then treatment must be redirected toward more limited goals, more suited to the circumstances that the patient's condition dictates. Each child has his or her own achievable optimum, which needs to be assessed by the clinician, who must then apply treatment procedures appropriate for the child. It is imperative that the clinician understand that to achieve an optimal result for that patient because of these limitations, rather than an ideal result, is not a reason to consider this as failure or to deny such treatment because of it.

2. **How To Take Records:**

While we must assume that an adequate clinical examination is possible by using behavior modification techniques alone, problems will often arise when attempting to take impressions or radiographs. Impressions in a compliant healthy child who has a developed gag reflex may be difficult, but can usually be elicited successfully with simple explanation and good communication. This is often not possible in the special needs child. According, alternative adjunctive modalities must be used, preferably in a step – by – step approach, from nitrous oxide conscious sedation alone (the simplest), or combined with other pharmacological agents, as mentioned above.

When considering radiographs, the panoramic view is considered to be the basic overall scan that may be used for the orthodontic of assessment. However, it requires minimal patient cooperation in sitting still during the rotation of the tube of the panoramic machine. Restricting a misunderstanding and frightened child in a cephalostat or in a panoramic machine, will often increase their fear and even generate painc. In many patients with a lack of cooperation, neuromuscular disorders, or mental retardations, therefore, these views may never be obtained. There are several other alternative radiographic views, such as multiple intraoral per apical views or lateral extra oral jaw views, where the film or cassette may be held by a suitably protected parent during the x- ray exposure. In certain instances, we may refer our patient for a computed tomographic (CT) scan performed under sedation in the hospital. However, the latter is rarely warranted.Whenever sedation or GA are needed for taking records, we will generally aim to combine them with other needed dental procedures (pedodontic, orthodontic, oral surgery) to limit to a minimum the number of such procedures.

3. **Treatment Provided In Modules:**
It is wise to establish reasonable goals on a modular basis, and to reassess them after each stage, being prepared to make the necessary changes if needed based on the treatment experience with the previous stage, for the particular disabled individual.

4. **Simplifying Treatment:**
In an earlier report it had been pointed out that the problems encountered with fixed appliances were generally more severe than with removable appliances. From the orthodontist's point of view, fixed appliances are more difficult to place, especially in these children, because they require specific conditions, such as the need for the patient to sit still for long periods of time to enable the precise positioning of the brackets and with complete dryness of the teeth. Thus, sedation or general anesthesia is sometimes needed to facilitate their placement, which is not the case with removable appliances. Adjustment of removable appliances is made extraorally and does not disturb the child. In contrast, adjustment of fixed appliances can involve unpleasant se4nsations of pressure caused by the introduction and manipulation of instruments within the mouth. From the parents' point of view, maintaining adequate oral hygiene is more difficult with fixed than with the removable appliances. Accordingly, it is recommended to extend the use of removable appliances, with or without extraoral headgear incorporated, and limit the period of fixed appliance wear. Orthodontic appliances with a longer range of action, requiring less frequent visits, are to be preferred. Becker and Shapira found excellent acceptance and rapid results with the full – time wearing of removable, en bloc, integral extraoral splint, for the treatment of severe Class II malocclusions. This is simple to sue, safe, requires few adjustments, and permits significantly fewer and less frequent appointments. It also reduces the number of patients who will require the extraction of premolar teeth – an orthodontic strategy that is difficult to perform well, in general and particularly in the present context. In extraction cases, correction of the anteroposterior and the vertical discrepancies in the earlier part of the treatment with the same extraoral removable maxillary orthopedic splint is recommended and, only then, proceeding to space closure with the use of intra-arch mechanics. This protocol is preferred to limit or eliminate the use of intermaxillary elastics, thereby relieving the parent or home care givers of the considerable responsibility and burden of having to place rubber bands bonds on a daily basis. The use of a Tip Edge appliance versus other types of straight wire brackets is advantageous because it permits the insertion of heavier arch wires that are less likely to deform in the early stages of treatment. Space closure is much more rapid since it is preformed by sliding mechanics in abroad slot. If, for any reason treatment must be stopped before its completion, more will have been achieved.
Nonroutine extraction plans can simplify mechanics and shorten treatment duration and should be considered in the present context more than in healthy orthodontic patients.

5. Adapting Treatment of Sedation/GA
Aspiration is one of the most dangerous sequellae of any procedure that involves a partial or total loss of the patient's protective reflexes. Due care and the application of specific safety measures are essential to prevent debris, water, saliva, blood, or orthodontic materials entering the airway and producing laryngospasm or possible infection of the trachea or bronchi. In specific disability groups (eg, those with cerebral palsy or muscular dystrophy), the cough reflex is impaired and there is an increased danger of aspiration. Chaushu and colleagues have recommended the use of a rubber dam as a useful aid and an effective safeguard in bracket bonding during GA. An oropharyngeal pack is mandatory when rubber dam placement is impossible (for impression taking, band fitting, or appliance cementation such as palatal/lingual arches). Indirect bonding of brackets is faster, reduces sedation time, and minimizes the possibility of aspiration. This does not eliminate the need for an oropharyngeal pack, which is needed to block fluids and small particles (eg, brackets) from entering the upper respiratory tract.

Since the sedated patient cannot bite down on a bite stick, it is prudent to fit molar bands before the sedation or GA session, wherever possible. High quality and accurate bonding must be assured to avoid the need for subsequent rebonding without sedation. The most reliable and proven bonding materials should be employed. Sendblasting is recommended, but only with a well-placed rubber dam and high-

power suction to prevent the aspiration of the fine aluminum oxide powder. Recently developed primers that enhance the strength of bonding even in wet environments are particularly useful in patients with excessive salivation. These, together with the use of antisialogogue drugs and special devices to maintain dryness, such as the Dry system are also helpful.

6. Relapse and Retention:

As with any form of orthodontic treatment, posttreatment retention is essential if the fruits of the combined labors of orthodontist, parent, and child are not to be lost. However, within the special needs population, there are many subgroups of children in whom the etiology may not be eliminated during the treatment. Thus, children with skeletal discrepancies, particularly the vertical discrepancies seen in cerebral palsy and the various congential myopathies, or with large tongues, may never achieve stability. This should be predictable before treatment is undertaken and, once treatment is completed, retention must be for an extended period of time. Removable retainers will hold the alignment of teeth within the maxillary or mandibular arch, but cooperation must be assured. Where this may be in doubt. Bonded lingual splints are preferred, even though this may involve a further sedation session for its reliable placement. A tendency for relapse in Class II and open bite cases abounds among these patients. “Active retention” may be essential and is best achieved by using the same removable en bloc acrylic hi-pull integral headgear appliance, which covers (and thereby intrudes) the posterior teeth while being trimmed free of the incisors.

CONCLUSION:

The number of medically compromised patients seeking orthodontic care is increasing. The trend is likely to continue .While orthodontic treatment is typically viewed as being or low risk compared with more invasive dental procedures, specific orthodontic manipulations, associated with fixed therapy, are potentially harmful to certain patient populations. Prevention is more important aspect of risk management. A good medical history, communication with patient’s physician, and clinical vigilance are critical in the medically compromised patient population.

REFERENCES:

1. Smrat ER, Macloid RL, Laerence CM: Allergic rections to rubber gloves in dental patients:Br Dent J 172: 445-447,1992.
2. Smith DC: Corrosion of orthodontic bracket bases.AJODO 81,:43-48,1982.
3. Field EA: issues of latex safety in orthodontics:Br DentJ 179:247-253,2001.
4. Brandley TD: Pathogenesis of obstructive sleep apnea syndrome .Med Clin North Am. 69:1169-1185, 1985.
5. Sanders AJ, Dodge NN: Manging patients who have seizure disorders: dental and medical issues J Am Dent Assoc 126:1641-47, 1995.
6. Green wood M, Meechan JG: General medicine and surgery for dental practioners,Part 4: Neurological disorders . Br DentJ195:19-25, 2003.
7. Burden D: Orthodontic treatment of patients with medical disorders . Eur J Orthod 23:363-372, 2001.
8. Proffit-WR:Orthodontic care for compromised patients : possibilities and limitations . J Am Dent Assoc111:262-266, 1985.
9. Sther H, Hyles H: Cephalometric study of children with endocrine disorders: Am J Orthod 59: 362-375 .1971.
10. Forsberg CM:Facial growth and morphology in long term survivors after borne marrow transplantation. Eur J Orthod11:332-340,1989.
11. Kjaer I: Morphological characteristics of dentitions developing excessive root resorption during orthodontic treatment Eur J Orthod16:25-34, 1995.
12. Burden D, Mullaly B: Orthodontics and infective endocarditis Br J Orthod 26:295-298, 1999.
13. Becker A: Orthodontic treatment of disabled children. J Orthod28:39-44, 2001.
14. Becker A: Behaviour management needs for orthodontic treatment of children with disabilities.EurJ Orthod 22:143-149,2000.
15. Andrews L: The medically compromised orthodontic patient. Sem Orthod.Vol 10,No. 4 ,Dec 2004.