ORTHODONTIC MANAGEMENT IN CHILDREN WITH SPECIAL NEEDS

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Abstract
Special needs individuals are children or adults prevented by a physical or mental condition permitting their full participation to the normal range of activities of their age groups. They usually exhibit high orthodontic treatment needs because of an increased prevalence and severity of malocclusions. These conditions often require a coordinated craniofacial orthodontic and surgical treatment in a team setting, to achieve optimal outcome. Orthodontic treatments for patients born with facial differences tend to be more complex than ordinary orthodontics. This multidisciplinary treatment often starts from birth and extends up to the late teen years. The young patient may require treatment by multiple specialists, including a craniofacial surgeon, pediatrician, geneticist, neurosurgeon, ENT, speech and language therapist, pediatric dentist, oral surgeon and prosthodontist. The objective of this paper is to summarize protocols of orthodontic treatment and to present various orthodontic management protocols regarding the children with special needs.

Keywords: special needs syndromes, orthodontics, behavior-management, facial deformity

INTRODUCTION

In general, syntagm “special needs” refers to individuals suffering from developmental disability (e.g., mental retardation, cerebral palsy, autism / attention deficit hyperactivity disorder [ADHD], Down syndrome), or medically compromised, high-risk patients who may require special attention. Over the past 20 years or so, both the absolute number and proportion of special needs children in society has increased, despite prenatal diagnostic techniques and 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. Secondly, given the progressive 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. With their higher public profile, the present–day affluent society of the Western world has considerably improved the life quality of these children, requiring, in turn, 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 [1].

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 routine home care. At the same time, the dentist is bound to encourage behavior alteration in both these areas. In contrast, orthodontics performed under these adverse conditions is not indicated, since a successful outcome is doubtful and iatrogenic damage, in the form of caries and gingival inflammation, possible [2]. Thus, while treatment need is often high and its object beneficial, orthodontics is still considered as elective.

BEHAVIOR MANAGEMENT AND THE ORTHODONTIST

The orthodontist should approach these patients with understanding and compassion, 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, their treatment in a
regular orthodontic office and among health patients being 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, which is rarely found in a private clinic, being usually achievable only in a hospital-type setting [3,4].

**GENERAL TREATMENT PRINCIPLES**

The aim of the pretreatment visits is:

1. To raise patient’s level of confidence in the dental environment;
2. To assess patient’s and parent’s compliance in dental homecare;
3. To evaluate the expected degree of cooperation that will be finally attained.

Clearly, sedation or GA cannot be performed for each visit of orthodontic appliance adjustment, so that it is important to determine if the patient can reach a level at which simple tasks may be performed with behavior management techniques only. Oral hygiene is perhaps the most crucial factor that dictates whether or not the orthodontic treatment should be provided for the particular patient.

**DRAWING UP A TENTATIVE TREATMENT PLAN**

In routine orthodontics with healthy children, our treatment plan is drawn up after clinical evaluation of the patient, examination of plaster casts, study of the clinical photographs, radiographs, and cephalometric analysis. 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, while the actual treatment procedures, such as band placement, extractions and dental fillings, are performed in the same session. In this way, a single sedation procedure may be wholly exploited, even if it does demand a high degree of diagnostic skill and experience from the part of the operator [3-5].

**SELECTING THE TREATMENT MODALITY**

Communication is vital for the education of our orthodontic special needs patients, since the 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 participants to the dental health care process, especially with the patient himself, when this is possible. For the patients with 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, namely 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 of 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. Subsequently, it remains only to make a decision as to which of the available additional modalities is suitable for the poorly tolerated procedures [4-6].

Conscious sedation is a pharmacologically-induced state of relaxation in which the patient remains conscious. It is aimed at changing 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, while opening 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.

ADAPTING ORTHODONTICS TO SPECIAL NEEDS CHILDREN

In the unusual circumstances presented by a special needs child, standard orthodontic protocols must be adapted to solve the individual problems seen in the patient [1-5].

1. Realistic treatment goals

The aim of all orthodontic treatments is to achieve maximum correction for any child patient. Under favourable conditions, 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, the treatment must be reoriented toward more limited goals, better adapted to the circumstances dictated by patient’s condition. 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 for the clinician to understand that, for achieving an optimal rather than an ideal result, in spite of these limitations, he should not consider it a failure or deny such treatments. [6]

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, usually, it can be elicited successfully with a simple explanation and good communication. This is often not possible in the special needs child. Accordingly, alternative adjunctive modalities must be used, preferably in a step-by-step approach, starting from nitrous oxide conscious sedation alone (the simplest), or combined with other pharmacological agents, as already mentioned above. When considering radiographs, the panoramic view is considered to be the basic overall scan that may be used for orthodontic 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 cephalostate or in a panoramic machine, will often increase his fear and even generate panic. In many non-cooperating patients, with neuromuscular disorders or mental retardations, 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 x-ray exposure. In certain instances, we may send the patient to a computed tomographic (CT) scan performed under sedation in the hospital. However, the latter is rarely warranted. Whenever sedation or GA is needed for taking records, we will generally aim to combine them with other necessary dental (pedodontic, orthodontic, oral surgery) procedures, to limit to a minimum their number [5].

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 the treatment

In an earlier report, it had been pointed out that the problems encountered with fixed appliances were generally more severe than in the case of 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 precise positioning of the brackets, and complete dryness of the teeth. Thus, sedation or general anesthesia is
sometimes needed to facilitate their placement, which is not the case of removable appliances. Adjustment of removable appliances is made extraorally and does not disturb the child. In contrast, adjustment of fixed appliances can involve unpleasant sensations 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 removable appliances. Accordingly, it is recommended to extend the use of removable appliances, with or without extraoral headgear incorporated, and to limit the period of fixed appliance wear. Orthodontic appliances with a longer range of action, requiring less frequent visits, are to be preferred in cases of extraction, while correction of the anteroposterior and vertical discrepancies in the earlier part of the treatment with the same extraoral removable maxillary orthopedic splint are recommended, proceeding to space closure with the use of intra-arch mechanics following only after these stages. 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 placing 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 insertion of heavier arch wires, that are less likely to be deformed in the early stages of treatment. Space closure is much more rapid since it is performed by sliding mechanics in a broad slot. If, for any reason, the treatment must be stopped before its completion, more steps will have been achieved.

5. Adapting the treatment of sedation/GA

Aspiration is one of the most dangerous sequelae of any procedure, involving partial or total loss of patient’s protective reflexes. Due care and 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 (e.g., 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 an 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, reducing sedation time and minimizing the possibility of aspiration. This does not eliminate the need for an oropharyngeal pack, which is needed to block fluids and small particles (e.g., 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. Sandblasting is recommended, but only with a well-placed rubber dam and high-power suction, to prevent 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. [7-10]

6. Relapse and retention

As with any form of orthodontic treatment, post-treatment 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 vertical discrepancies seen in cerebral palsy and various congenital myopathies, or with large tongues, may never achieve stability. This should be predictable prior to initiating the treatment and, once completed the treatment, retention must occur 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. 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 total acrylic hi-pull integral headgear appliance, which covers (and thereby intrudes) the posterior teeth, while being trimmed free of the incisors [11-12].

CONCLUSIONS

The prevalence and severity of malocclusion is especially high in special needs individuals. Many have medical limitations to the various procedures often needed in the pursuit of excellent orthodontic treatments, and almost all have moderate to severe behavioural problems that make treatment delivery difficult or even impossible to achieve, with any degree of reliability. In general, the main goals of orthodontics are to improve the alignment and occlusion of the teeth and thus, indirectly, to improve facial appearance. However, its efficiency is limited, and it cannot provide a satisfactory answer for every situation. Individual benefits may be gained by patients mainly associated with patient’s own concept of himself or herself, and strongly influenced by those around them.

References