CASE HISTORY REPORT

ABSTRACT

Despite having a high prevalence of functionally compromising malocclusions, individuals with intellectual and developmental disabilities do not regularly receive necessary orthodontic treatment. Patients with behavior challenges are unlikely to be offered this treatment option. However, with appropriate behavior management interventions and pharmacologic sedation, orthodontic treatment becomes a possibility for clinicians to consider. Parents will likely seek out clinicians who can provide this type of advanced orthodontic care. Additional training is now becoming available as accredited Fellowship Programs in Craniofacial and Special Care Orthodontics are developed. Hopefully, the clinical examples described in this article will no longer be unique in the area of special care dentistry.

KEY WORDS: behavior difficulties, intellectual and developmental disabilities, sedation

Orthodontic care for the behavior-challenged special needs patient

Robert Rada, DDS, MBA;[1]* Heba H Bakhsh, BDS, MS;[2] Carla Evans, DDS, DMSc[2]

[1]Oral Medicine and Diagnostic Sciences, University of Illinois College of Dentistry, 801 South Paulina Street MC838, Chicago, Illinois; [2]Orthodontics, University of Illinois at Chicago, 801 S. Paulina St. MC841, Chicago, Illinois.

*Corresponding author e-mail: rrada@uic.edu

Spec Care Dentist 35(3): 138-142, 2015

Introduction

Individuals with intellectual and developmental disabilities (I/DD) are seeking care in private dental offices in increasing numbers. Patients with Down syndrome, multiple sclerosis, autism and other genetic syndromes are no longer restricted to large institutions. These individuals are now residing in our communities and are dependent on services from dental and medical providers, including orthodontists.[1]

Individuals with special needs present significant challenges. Their complex medical conditions and associated medications may affect oral health. These individuals often require special accommodations to manage their oral health care. For example, advanced anesthesia care may be necessary for proper and safe treatment of their oral health needs. In addition communication issues interfere with developing supportive relationships with these patients, their families and caregivers. Practitioners need to be careful not to apply labels and recognize the wide variation in individuals with I/DD.[1] Fortunately, many of these individuals can be easily managed in the dental office when effective behavior guidance techniques are used.

Although addressed over 40 years ago,[2] a practical clinical description of the management of people with I/DD is sparsely documented in the orthodontic literature.[3] The behavioral challenges have kept many orthodontists from even attempting to provide a limited form of treatment.[4] It can be challenging and intimidating to take on orthodontic treatment for patients who are intellectually or developmentally disabled.[5] Yet the benefits can be significant.

Malocclusion occurs more frequently in individuals with I/DD than in nonaffected people.[1] Seventy four percent of individuals with I/DD have a definitive malocclusion. Individuals with intellectual disabilities have a higher incidence of malocclusion than visual or hearing impairments. A higher incidence of Class II and Class III malocclusion and a higher incidence of open bite and overjet exist compared with the general population.[6] As an example, individuals with cerebral palsy represent a great need for treatment of Class II malocclusions and anterior diastemas. Malocclusion is more severe and more skeletally based than the general population, yet these patients are least likely to receive orthodontic treatment.[7] Individuals with Down syndrome were shown to have severe malocclusions that included open bites, anterior and posterior crossbites.[8]

Within the general population, improvement in dentofacial appearance motivates parents to seek orthodontic treatment for their children. In this special needs population, oral health and function assume great importance.[9] Severe malocclusion can be a root of

DOI: 10.1111/scd.12082

social discrimination and lead to further negative stereotyping of these individuals. Malocclusion can also create problems with oral function, such as chewing, swallowing and hygiene. The articulation of certain sounds and effective speech therapy can be dependent on the position of teeth. Orthodontic treatment has been used to reduce excessive drooling by correcting a malocclusion associated with a poor anterior oral seal.[10] Orthodontic treatment for a carefully selected group of these patients would seem to be justified, with the understanding that patient selection is of paramount importance.[1]

Challenges for the orthodontist

The parents and caregiver(s) must fully support the orthodontic treatment and understand the commitment level necessary for success. The willingness to cooperate must be demonstrated from the onset of evaluation. Considerable time must be taken to discuss the child's tolerance so that both clinician and parent/caregiver are fully informed. The I/DD individual will require a parent/caregiver to maintain excellent oral hygiene. Since these patients may have very limited manual dexterity and hypersensitive gag reflexes, parents must take the overall responsibility of cleaning the mouth to reduce the potential for gingival inflammation and help ensure a successful outcome.[7] The variation among willingness to provide care has been documented in the literature. For children living at home, parents were willing to take on the responsibility of day to day care and management of appliances. For children living in group homes or institutions, parents were willing to guide and teach the attendant staff, but were not prepared to go to the institution regularly and take direct responsibility.[5] A history of seizures is not a contraindication to treatment; however, patients with poorly controlled seizure disorders are not candidates for any type of orthodontic appliance. As part of the informed consent process the possibility of soft tissue injury during a breakthrough seizure must be discussed.[11]

The challenge in developing the orthodontic treatment plan centers on motivation, behavior guidance and chair procedures. The majority of patients are able to tolerate adjustments from a caring and compassionate orthodontist. Bands may be chosen over bonded brackets, even for anterior teeth. These will require special ordering from the manufacturer. Many I/DD patients have forceful oral habits which can result in bonded brackets being picked off the teeth. Multiple plans for retention may need to be considered because of the patient's inability to adapt to various appliances.[7] The aim of treatment must be modified from orthodontic perfection to an esthetically acceptable and functional result.[4]

Advanced anesthesia considerations

Therapeutic access can be challenged by numerous factors. Cooperative behavior can be limited by intellectual disability or uncontrolled body and limb movements as a result of physical disability. Excessive salivation can also be problematic when cementing appliances. Sedation may be necessary to create a relatively motionless state for the patient. The choice of pharmacologic technique should be the simplest and safest available that is appropriate for the needs of the specific task to be performed for each individual patient.[7,12]

The decision to perform the most difficult procedures under sedation or general anesthesia should be taken solely on the condition that the patient has proven to be able to undergo short appliance adjustment appointments with behavior management techniques alone. A scoring system has been developed to assist in evaluating patients for the appropriate behavior management mode.[12] Close cooperation between providers of routine care and the orthodontist is essential. It is likely that more frequent recalls will be necessary.

Conscious sedation may include nitrous oxide, oral sedatives and/or intravenous agents. Nitrous oxide and minimal oral sedation can be accomplished when the clinician is working alone. Orthodontic procedures facilitated with intravenous sedation will require a second, well-trained clinician to administer the medications and monitor the patient. When deep conscious sedation is used, the patient's airway can become compromised, because the protective reflexes within the oropharynx may be lost with greater depths of sedation. The dental assistant must be extremely vigilant to ensure that the mouth is free of debris. Ligation of small objects may be necessary and a simple gauze throat screen may also prove useful. Use of the rubber dam eliminates the risk of aspiration, maintains visibility and access, and can facilitate easy removal of treatment debris.[13,14]

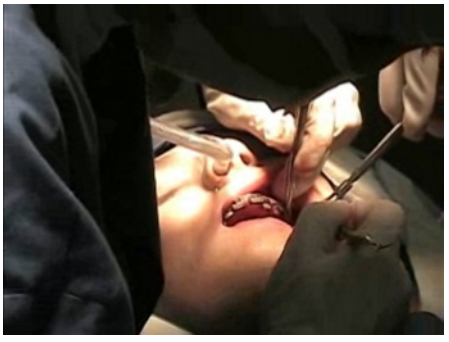

Figure 1. Orthodontist securing archwires to banded brackets for a patient under general anesthesia with a nasal endotracheal tube in place.

A patient under general anesthesia will usually have an endotracheal tube placed to maintain the airway. (Figure 1) A properly placed throat pack will prevent debris from being aspirated. A well trained dentist and assistant are essential to ensure that the oral cavity is maintained free of debris throughout the procedure and that copious irrigation, suctioning and inspection are completed so that no wires or cements are left behind following extubation.[14]

If general anesthesia is required, multiple procedures can be accomplished. Extractions, restorations and minor periodontal treatment can often be done at the same general anesthesia session as the bonding of the orthodontic

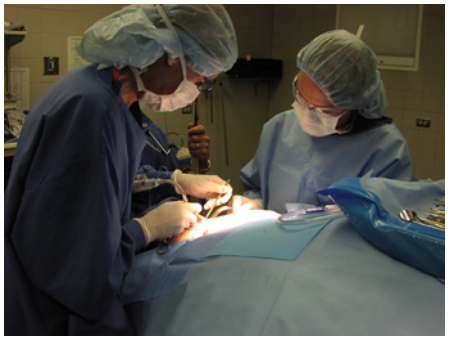

Figure 2. A knowledge of operating room protocols and extensive preplanning are essential for the special care orthodontist.

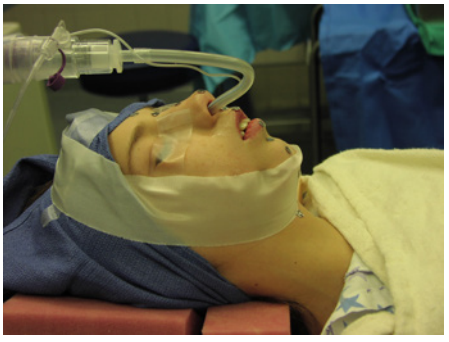

Figure 3. Twelve-year-old female patient with cerebral palsy under general anesthesia being positioned with lead foil markers to outline the soft tissue for a lateral skull radiograph.

appliances.[4] The clinicians may have to develop a tentative treatment plan and build upon this as treatment is carried out with adjunctive pharmacologic techniques used to gain increased cooperation. Some diagnostic data may even need to be captured during the general anesthesia session when the appliances are being placed.[7] When in the operating room, the orthodontist will need to be prepared by bringing the necessary instruments, brackets, and wires. (Figure 2) Preplanning is essential, as efficient use of time is a critical factor.

Clinical examples

Movement disorders and complete comprehension can be problematic when placing the appliances. The 12-year-old girl with cerebral palsy in Figure 3 was also unable to stand still in the cephalostat in order to take a cephalometric x-ray. It was decided to take a lateral skull x-ray while the patient was under general anesthesia. Unfortunately the medical grade x-rays in the operating room would not show adequate soft tissue contours. Lead foil circles, from a conventional periapical film packet were cut out and placed on the patients face in the strategic positions. These were stabilized on the skin using a water based surgical lubricant. When the radiograph was processed, the soft tissue contour was easily visualized. (Figure 4) A lead lined surgical glove was worn so that the clinician could move the mandible into maximum intercuspation as surgical tape was not adequate to hold the jaws together for the radiograph. Limited orthodontic treatment was carried out on this patient. Minor restorations and first bicuspid extractions were completed by the general dentist. The orthodontist then placed banded brackets on the maxillary teeth and secured the initial archwire all while the patient was under general anesthesia. Although this patient would not be able to undergo this extensive first appointment in a routine office setting, she did relatively well for orthodontic follow-up appointments. The treatment time was extended due to the requirement for behavior management sessions and more frequent adjustments. Figure 5 shows the pre- and posttreatment photographs.

In certain cases a young patient may require palatal expansion, but not be sufficiently cooperative to allow bonding of the appliance in the dental office. (Figure 6) This 8-year-old boy with autism had both caries and a developing malocclusion. Under general anesthesia, the patient had several carious lesions restored, after which the orthodontist bonded the appliance in a dry, clear field. It was only after extensive training with the patient's father that turning the expansion key would be possible. For the first 3 weeks the father actually brought the patient to the dental office where he could help restrain the patient and the orthodontist turned the key. After 3 weeks, the boy had become sufficiently desensitized to the procedure so that his father could do the procedure at home without behavior challenges.

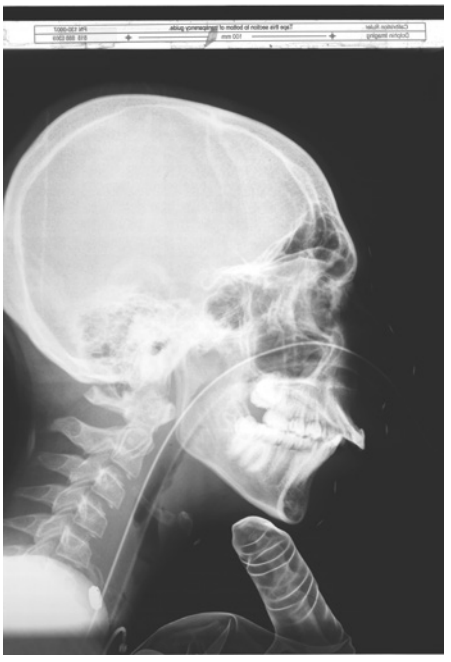

Figure 4. Lateral skull radiograph with visible markers outlining the soft tissue profile.

Craniofacial and special care orthodontics as a subspecialty

Orthodontists may choose not to treat special needs patients in their private practices due to limited experience, inadequate expertise, and the difficulty in assembling an interdisciplinary team. Frequently, these complex cases are only treated in academic centers. The American Dental Association Commission on Dental Accreditation has developed standards for an advanced fellowship program, a subspecialty of Orthodontics and Dentofacial Orthopedics. "A fellowship in Craniofacial and Special Care Orthodontics is a planned post-residency program that contains education and training in a focused area of the specialty of Orthodontics. The focused areas include but not limited to: Cleft lip/palate patient care; Syndromic patient care; Orthognathic Surgery; Craniofacial Surgery and Special Care orthodontics."[15] Currently, only four accredited programs exist in the United States. (Table 1) Although orthodontic residents recognize the importance of treating special needs patients, less than

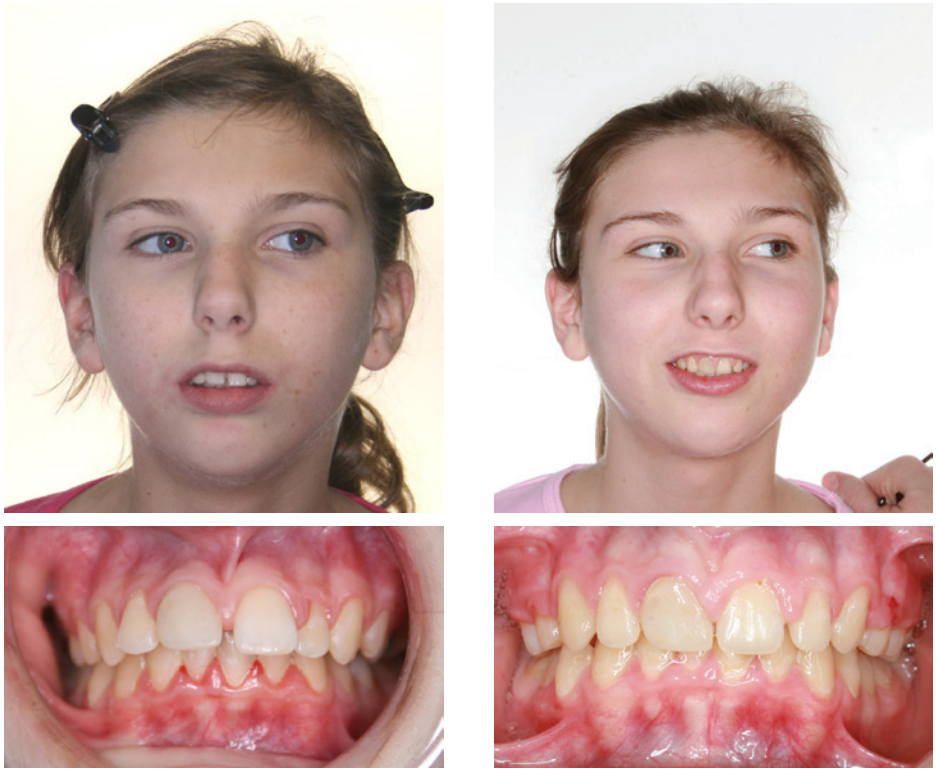

Figure 5. Pre- and posttreatment views—full face and intraoral.

30% indicated an interest in pursuing a fellowship program.[16]

Orthodontic interventions in behavior- and growth-challenged patients require careful consideration. For example, to achieve the goal of minimizing the overall time with fixed appliances, the orthodontic provider may intervene with space maintenance, guided eruption of teeth, or growth guidance with orthopedic devices. Using a series of sequenced interventions with limited objectives tests compliance and provides opportunities for an early exit should progress be unfavorable. Gradual introduction of appliances may help the clinician detect compliance problems before extracting teeth and being committed to closing extraction spaces. At times, a partial improvement may be the treatment plan of choice!

Table 1. Clinical Fellowship Programs in craniofacial and special care orthodontics.

Childrens Hospital of Los Angeles Division of Dentistry http://www.chla.org/site/apps/nlnet/content2.aspx?c=iplNKTOAJsG&b=7632571&ct=11759289#.UY2ONMri6Yp
University of Michigan School of Dentistry http://www.dent.umich.edu/admissions/apply/craniofacialfellowship
New York University Langone Medical Center / Institute of Reconstructive Plastic Surgery http://plastic-surgery.med.nyu.edu/education/fellowship-programs/craniofacial-orthodontic-fellowship
Case Western Reserve University School of Dental Medicine http://dental.case.edu/orthodontics/craniofacial/

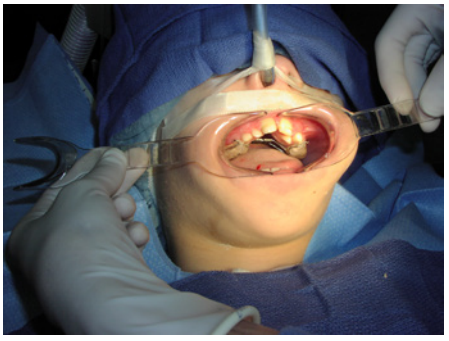

Figure 6. Fixed palatal expander placed while this 8-year-old boy was under general anesthesia in the operating room.

In cleft lip/palate and craniofacial patients, orthodontic interventions are often phased as components of coordinated treatment plans developed with other members of the treatment team. For example, cleft infants may receive feeding plates or nasoalveolar molding appliances prior to lip closure. In the cleft child's mixed dentition, arch expansion may be undertaken prior to alveolar bone grafting. Usually adolescence is the time for comprehensive orthodontic treatment in the cleft youngster, but after growth is completed other orthodontic movements may be needed in combination with orthognathic surgery to reposition jaw(s).

The orthodontist member of a special needs, cleft lip/palate or craniofacial team has several roles and works closely with other members of the treatment team. From infancy through adulthood, the orthodontist participates in evaluations of patients and takes records for documentation, diagnosis, and treatment planning and follow-up purposes. The orthodontist implements appropriate appliance therapy at stages from the primary through adult dentitions for those patients having special needs, traumatic injuries, tumors, or craniofacial anomalies. Orthodontists may also be involved with appliance therapy for sleep-disordered breathing and surgical splint design and construction. Special knowledge of medically compromising conditions and genetics is required because prognoses may differ from unaffected patients.

Conclusion

For special needs patients, compliance and modification of the treatment plan as needed will likely play the greatest roles in a successful treatment outcome. I/DD should not eliminate the possibility of orthodontics as treatment option. Certainly there are financial limitations. However, funds can be procured through philanthropic agencies. In some states, financial assistance is possible through the Medicaid system. In addition, an occasional donated case can reflect most favorably on the clinician. Treatment can be planned in stages to allow for modified financial agreements, emphasize the need for revision or even discontinuation of treatment. Detailed documentation and clear, extensive conversation with parents or caregivers are essential from a risk management perspective.

Orthodontists willing to care for the behaviorally challenged special needs patient are unique. Although additional training is valuable, it is not essential. What is essential are flexible management styles and a commitment to team-style working relationships to properly treat these complex patients.[17] Behavior management often requires specialists from outside the dental profession. This interaction, as well as the rewards of caring for these patients can make one's professional career especially fulfilling.

References

1. Waldman HB, Perlman SP, Swerdloff M. Orthodontics and the population with special needs. *Am J Orthod Dentofacial Orthop* 2000;118:14-7.
2. Jackson EF. Orthodontics and the retarded child. *Am J Orthodontics* 1967;53:596-605.
3. Wei SHY, Casko J eds. *Orthodontic Care for Handicapped Persons: Proceedings of a Workshop Held at the University of Iowa, Iowa City, Iowa, May 8, 9, and 10, 1977*. Iowa City, Iowa: The University of Iowa; 1978.
4. Chadwick SM, Asher-McDade. The orthodontic management of patients with profound learning disability. *Br J Orthod* 1997;24:117-25.
5. Becker A, Shapira J, Chaushu S. Orthodontic treatment for disabled childrena survey of patient and appliance management. *J Orthod* 2001;28:139-44.
6. Vittek J, Winik S, Winik A, Sioris C, Tarangelo AM, Chou M. Analysis of orthodontic anomalies in mentally retarded developmentally disabled individuals. *Spec Care Dent* 1994;14:198-202.
7. Becker A, Chaushu S, Shapira J. Orthodontic treatment for the special needs child. *Semin Orthod* 2004;10:281-92.
8. Bauer D, Evans CA, BeGole EA, Salzmann L. Severity of occlusal disharmonies in Down syndrome. *Int J Dent* 2012; 20122012. Doi: 10.1155/2012/872367.
9. Becker A, Shapira J, Chaushu S. Orthodontic treatment for disabled children: motivation, expectation and satisfaction. *Eur J Orthodont* 2000;22:151-8.
10. Shapira J, Becker A, Moskovitz M. The management of drooling problems in children with neurological dysfunction: a review and case report. *Spec Care Dent* 1999;19:181-5.
11. Sheller B. Orthodontic management of patients with seizure disorders. *Semin Orthod* 2004;10:247-51.
12. Chaushu S, Becker A. Behaviour management needs for the orthodontic treatment of children with disabilities. *Eur J Orthodont* 2000;22:143-9.
13. Chaushu S, Gozal D, Becker A. Intravenous sedation: an adjunct to enable orthodontic treatment for children with disabilities. *Eur J Orthodont* 2002;24:81-9.
14. Chaushu S, Zeltser R, Becker A. Safe orthodontic bonding for children with disabilities during general anaesthesia. *Eur J Orthododnt* 2000;22:225-8.
15. Accreditation Standards for Clinical Fellowship Training Programs in Craniofacial and Special Care Orthodontics. Commission on Dental Accreditation. *American Dental Association* 2013.
16. Noble J, Schroth RJ, Hechter FJ, Huminicki A, Wiltshire WA. Motivations of orthodontic residents in Canada and the United States to treat patients with craniofacial anomalies, cleft lop/palate, and special needs. *Cleft Palate-Craniofacial J* 2012;49: 596-600.
17. Evans CA. Orthodontic treatment for the medically compromised patient. In: Graber TM, Eliades T, Athanasiou AE. *Risk Management in Orthodontics: Experts' Guide to Malpractice*. Chicago: Quintessence Publishing Co; 2004: 177-9.