CEREBRAL PALSY

A REVIEW FOR DENTAL PROFESSIONALS

Purpose of this Module

The information presented in this module is intended to provide dental providers with the appropriate knowledge needed to modify treatment and preventive procedures to best meet the needs of patients with cerebral palsy.

Learning Objectives

After reviewing the materials, the participant will be able to:

1. Define cerebral palsy and state the prevalence of this condition.
2. Describe the association of cerebral palsy with premature birth and low birth weight.
3. List additional etiological causes of cerebral palsy in each of the following three categories: prenatal, neonatal and postnatal periods.
4. List and describe common classification/descriptive systems of cerebral palsy.
5. Describe the association of intellectual disability and cerebral palsy.
6. Describe medical problems associated with cerebral palsy and their impact on dental care.
7. Describe the implications of cerebral palsy on issues of dental caries, periodontal disease and malocclusion.
8. Describe procedures for and explain the advantages and disadvantages of treatment of drooling in individuals with cerebral palsy.
9. Describe possible modifications of personal oral hygiene procedures for persons with cerebral palsy.
10. Discuss possible modifications in prosthetic design appropriate for some persons with cerebral palsy.
11. Discuss the advantages and limitations of periodontal surgery for gingival hyperplasia in patients with cerebral palsy.

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INTRODUCTION

The following information is not an extensive review of cerebral palsy and the general management of this condition, but rather a review of the medical and dental conditions that may affect dental care. As with all medical conditions, generalizations can be helpful, but each person is provided care based upon individual needs.

Definition

Cerebral palsy is a permanent, non-progressive neuromuscular disorder caused by abnormal development or damage to the brain, either before birth, during the birthing process, or within the first years of a child's life. The pathology involves the areas of the brain regulating voluntary muscle movement and posture, and significantly interferes with functioning. Thus, cerebral palsy does not refer to a specific disease, but rather describes the neuromuscular effects following a variety of insults to the motor areas of the brain. Since the etiology occurs during the developing years, cerebral palsy is one of several developmental disabilities. It persists throughout a person's lifetime.

Prevalence

Cerebral palsy is the most common motor disorder in children. The prevalence of cerebral palsy is estimated at 1 in every 303 children. The birth prevalence is approximately 2 per 1000 live births (0.2%). There is a strong association with birth weight and gestational age. By birth weight, the prevalence is 59 per 1000 live births for those under 3.3 pounds, 10 per 1000 live births for those between 3.3 and 5.5 pounds, and 1.3 per 1000 live births for those over 5.5 pounds. By gestational age, the prevalence is 112 per 1000 live births for those born before 28 weeks, 43 per 1000 live births for those born between 28 and 31 weeks, 7 per 1000 live births for those born between 32 and 36 weeks, and 1.3 per 1000 live births for those born 37 weeks and later. With increased survival of very low birth weight and very preterm infants, the prevalence of cerebral palsy may be increasing.

ETIOLOGY

Conditions that can cause damage or abnormal development to the motor areas of the brain can result in cerebral palsy. The greatest risk factor for cerebral palsy is premature birth. Many causes of cerebral palsy seen in the neonatal or postnatal periods may be due to processes that began during the prenatal period.

Prenatal (70-80%)

- **Prematurity:** Premature and low birth weight infants are at increased risk of cerebral palsy. Premature birth can be due to a variety of prenatal causes.
- **Intrauterine Infection:** A common cause of premature birth is intrauterine infection. One important hypothesis is the inflammatory cytokine hypothesis. This hypothesis posits that intrauterine infection enters the amniotic fluid and results in inflammatory cytokines which not only cause damage to the developing fetal brain but increase the risk of preterm birth. This can result in periventricular leukomalacia which is a type of damage to the white matter of the brain.
- **Viral Infections:** TORCH infections account for 5% of cerebral palsy diagnoses. These include Toxoplasmosis, Other (syphilis, varicella-zoster, parvovirus B19, etc.), Rubella, Cytomegalovirus, and Herpes infections.

- **Multiple Gestation:** In addition to an increased risk of premature and low birth weight deliveries, multiple gestation also increases the risk of cerebral palsy due to growth restriction or death of a developing twin.
- **Intracranial hemorrhage:** Bleeding in the fetal brain can be due to fetal stroke due to blood clots in the placenta, malformed or weak blood vessels, blood clotting abnormalities, maternal hypertension or maternal infection.
- **Radiation and drugs:** Drug exposure, such as to alcohol or cocaine, can also result in damage to the fetal brain.

Neonatal (10-28%):

- **Hypoxia:** Previously, many clinicians believed that cerebral palsy was primarily due to hypoxia during the birthing process; however, it is now known that this is a much smaller cause of cerebral palsy than previously suspected. Hypoxic-ischemic encephalopathy can be caused by a lack of oxygen to the brain due to stress or trauma during labor and delivery, severe maternal low blood pressure, uterine rupture, placental detachment, or umbilical cord problems.
- **Mechanical ventilation:** Mechanical ventilation may be necessary for many preterm and low birth weight neonates; however, ventilation can result in brain damage due to hypotension, hypoxemia, acidosis, and hypocarbia.
- **Blood pressure regulation:** Preterm infants may have difficulty regulating their blood pressure which can result in periventricular hemorrhage infarction.
- **Other:** Birth injury can result in damage to the brain.

Postnatal (5-18%)

- **Trauma:** Traumatic injuries during the first years of life, such as abusive head trauma or drowning, may result in cerebral palsy.
- **Infections:** Infections leading to encephalitis or meningitis can result in cerebral palsy.
- **Toxins:** Toxins (e.g., lead or hydrocarbons) are risk factors.
- **Brain tumors:** Brain tumors are another potential cause of cerebral palsy

CLASSIFICATION AND DESCRIPTIVE SYSTEMS

Type of Movement Disorder Involved / Part of Brain Involved

- **Spasticity (70-80%):** The cerebral cortex is responsible for control of motor function. When this area of the brain is affected, spasticity (stiff muscles) can result, known as spastic cerebral palsy. One sees exaggerated movements, increase in muscle tone (hypertonicity), excessive reflex responses (hyperreflexia), tendency toward contractures (loss of joint movement due to decreased elasticity in muscles and tendons) and Babinski's sign (infantile reflexes of the feet and toes that persist past 2 years of age). Positioning or movement can increase or decrease spasticity. Loud noises or other stimuli can precipitate flexion/extension.

- **Dyskinesia (Athetosis, Dystonia, Choreoathetosis) (10-20%):** Dyskinesia results from lesions of the basal ganglia, which controls muscle tone. Persons with dyskinetic cerebral palsy can have uncontrollable muscle movements due to mixed muscle tone. Athetosis presents as twisting and writhing while dystonia presents as twitching and repetitive movements with sustained muscle spasms throughout the body. Choreoathetoid movements are irregular migrating contractions which are jerky and shaking along with the twisting and writhing seen with athetoid movements.

- **Ataxia (5-10%):** Ataxia results from a lesion of the cerebellum, which controls coordination of movement and balance. It is characterized by tremors, lack of coordination (hand to eye) and/or balance and gait problems. People with ataxic cerebral palsy may have intention tremors which make it difficult to carry out purposeful movements.

- **Mixed:** Cerebral palsy can also appear with mixed movement disorders, especially with both spasticity and dyskinesia.

Limb involvement

Limb involvement is usually specified for spastic cerebral palsy. Other types of cerebral palsy generally involve all extremities as well as the trunk.

- **Hemiplegia:** involvement of half the body (arm and leg on same side)
- **Quadriplegia:** all four extremities involved with arms more severely affected than in diplegia.
- **Diplegia:** involvement of lower extremities with minimal involvement of arms
- **Monoplegia:** one limb involved (rather rare)
- **Paraplegia:** only the legs involved
- **Triplegia:** any three extremities involved

Severity

The severity of cerebral palsy is equally separated into mild, moderate and severe categories. One classification system, the Gross Motor Function Classification System, classifies cerebral palsy into five levels based on functional ability.

INTELLECTUAL DISABILITY

Approximately 30-50% of individuals with cerebral palsy have no intellectual disability, while the other 50-70% of individuals with cerebral palsy do present with intellectual disability. When intellectual disability is present, it is most often classified as mild or moderate (75%) with the prevalence of severe or profound intellectual disability described at 25%. Many persons with cerebral palsy have learning disabilities, auditory and visual perception problems, and/or communication problems which make learning difficult and IQ testing a problem. With modified IQ tests, the prevalence of intellectual disability in the population with cerebral palsy appears to be much lower than previously thought. Generally, the greater the motor involvement is, the greater the degree of intellectual disability seen. Persons with spastic cerebral palsy on average seem to have more learning disabilities than those who have other categories of cerebral palsy.

MEDICAL CONDITIONS

Epilepsy

Epilepsy is a condition where recurrent disturbances in the neuronal activity in the brain are present, which may or may not produce seizures or convulsions. It is estimated that 30% of persons with cerebral palsy have epilepsy (the actual seizure disorder) compared with 1.7- 2.5% of the general population. Active seizures present dental problems due to potential for trauma to the orofacial region. There is also the concern for seizures occurring during dental procedures, depending on the level of control of the seizure disorder. Anticonvulsant medications present problems in the provision of dental services. For example, Dilantin (phenytoin) often causes gingival hyperplasia and Depakote (valproic acid) can occasionally create hematologic abnormalities, including bleeding tendencies, at higher doses.

Dysphagia and Aspiration

Delayed cough reflex and abnormalities in swallowing (dysphagia) are commonly associated with cerebral palsy. As would be expected, more choking, coughing and aspiration problems are the result of this condition. Attention from dental providers in airway management, whether or not employing sedation, is critical.

Gastroesophageal Reflux Disease

One study reported that 53% of children with cerebral palsy had gastroesophageal reflux disease (GERD). Individuals with communication difficulties, as often seen in the population with cerebral palsy, are less likely to communicate symptoms of GERD. Dental erosion associated with untreated GERD may be the first indication that there is an undiagnosed reflux problem. Additionally, the presence of GERD increases the risk of aspiration.

Bisphosphonate Medications

The use of bisphosphonate medications among persons with cerebral palsy due to osteopenia or osteoporosis is common, including among children. The dental provider should be aware of the potential for bisphosphonate-related osteonecrosis of the jaw in this population.

Speech Disorders

Dysarthria (difficulty with articulation) is a common problem among persons with cerebral palsy. The prevalence of this condition ranges from 31-88% and is due to difficulty in controlling muscles of speech and mastication. Dysarthria is not related to intellectual disability and it is important not to inappropriately attribute an intellectual disability to a person due to a stigma of unclear speech.

Drooling

Severe drooling is seen in 10-37% of the population with cerebral palsy. However, hypersalivation is not considered the cause in these cases. Although related to the common prevalence of anterior open bite and lack of lip closure, drooling in this population is primarily due to swallowing dysfunction. Drooling can present as a major stigma for many persons with cerebral palsy.

Nutritional Disorders

Due to constant involuntary movement and resultant calorie consumption, along with feeding difficulties, many persons with cerebral palsy may be undernourished. Diet consistency may be altered to cope with an altered chewing capability and swallowing dysfunction; pureed, soft or chopped diets are common.

Visual Impairments

A large number of individuals with cerebral palsy also have visual impairments including strabismus (15-60%) and significant refractive error (40-76%). These problems not only involve vision but also adversely affect development of visual motor skills.

Hearing Impairments

In persons with cerebral palsy, partial hearing loss is common, especially in those with athetoid-type cerebral palsy. The prevalence of hearing impairment has been reported at 10-41%.

Other Associated Conditions

Although cerebral palsy itself is non-progressive, other associated conditions may be degenerative in nature. These include chronic respiratory ailments, osteoarthritis and other orthopedic problems such as spinal

disorders, especially scoliosis. The prevalence of scoliosis in the population with cerebral palsy has been estimated at 4-64%. Other issues associated with cerebral palsy include hyperactivity, decreased attention span and depression. Hyperactive gag reflexes and hyperactive bite reflexes are also a common finding.

ORAL HEALTH

Dental Caries

Studies indicate that people with cerebral palsy experience a somewhat higher degree of dental decay. Many factors may contribute to the caries problem in those with cerebral palsy and include oral hygiene problems, soft diet, enamel hypoplasia, mouth breathing, anti-drooling medications and food retained in the mouth longer than usual due to dysphasia. Contributing to poor oral hygiene is the difficulty of many individuals with cerebral palsy to physically cope with brushing and flossing activities independently as well as the difficulty caregivers have in brushing the teeth of individuals with movement disorders and intellectual disabilities, whether due to lack of training and support or issues related to oral health literacy.

Periodontal Disease

There is extensive documentation of an increased prevalence of periodontal disease and gingivitis in the population with cerebral palsy. The prevalence of periodontal disease has been estimated as three times higher than in the general population. Poor oral hygiene and gingival hyperplasia due to Dilantin therapy are major contributors to this problem. Surprisingly, most studies have reported no differences in the presence of calculus, except in cases where the individual relies on enteral nutrition (via feeding tube) due to dysphagia, aspiration, or other feeding difficulties.

Malocclusion

A dramatic increase in the prevalence of class II malocclusion is a common finding in people with cerebral palsy. Parafunctional muscle and tongue movements are responsible for tongue thrust (primitive swallowing pattern) which then creates an anterior open bite, a common finding in this population. Most of the class II malocclusions represent a skeletal relationship not merely the alignment of teeth. An anterior open bite with protruding splayed anterior teeth, together with abnormal muscle movement and posture problems, are responsible for much of the trauma to anterior teeth seen in this population. This anterior trauma, with resultant tooth fractures and avulsions, is a major problem managed by dental providers.

There have been no differences reported in palatal vault height or intermolar width. Not surprisingly, most studies report a longer anterior-posterior maxillary arch length and crowded lower anterior teeth. Dry lips due to mouth breathing is also a common finding.

Parotid Gland Secretion/Composition

There are conflicting references as to hyposalivation in individuals with cerebral palsy. Parotid flow rates in this population have been reported to be lower compared with the general population (0.16 vs. 0.63 ml/min/gland), but salivary composition appears to be within normal range. Reduced salivary flow rates reduce the pH buffering capacity of saliva and may contribute to a higher caries rate.

Bruxism

Bruxism is a common finding in persons with cerebral palsy, especially those affected most severely. A prevalence of 58% has been reported. The effect of bruxism can be aggravated by existing enamel hypoplasia. Although the bruxism seen in this population is much more clinically severe than bruxism

seen in the general population, pulp exposures are rare. This is in contrast to pulp exposures commonly seen in rumination (regurgitation of stomach contents) which is reported in 8% those with intellectual disability. The severe wear seen from bruxism in many of those with cerebral palsy is apparent on the lingual cusps of the upper permanent molars and buccal cusps of the lower permanent molars. This can lead to loss of vertical dimension and may contribute to temporomandibular joint (TMJ) problems. Bruxism in persons with cerebral palsy apparently does not appear to contribute to increased periodontal disease or tooth mobility. More bruxism is seen in individuals with more severe cerebral palsy and with more severe intellectual disability. Loss of crown height due to bruxism can cause restorative problems for the dentist.

Enamel Erosion and Enamel Hypoplasia

In addition to bruxism, enamel loss in individuals with cerebral palsy is often due to acid erosion (from gastroesophageal reflux disease) or developmental enamel hypoplasia. The prevalence of enamel hypoplasia has been reported as high as 25-36% among persons with cerebral palsy. Hypoplasia attracts calculus, increases staining and can exacerbate the enamel loss experienced due to other factors (such as erosion or bruxism). Loss of enamel can cause restorative problems as well as pain during scaling and other dental procedures.

Eruption/Supernumerary/Congenitally Missing Teeth

No differences in eruption times of primary or permanent teeth in individuals with cerebral palsy have been reported. This is in contrast to the often overall physical developmental delays experienced in this population. There have been no reported differences in the number of supernumerary teeth, congenitally missing permanent teeth, tongue size or prevalence of cleft lip/palate.

Temporomandibular Joint (TMJ) Problems

There is an increased prevalence of TMJ problems among those with cerebral palsy. Such problems include tenderness on palpation, pain on opening and chewing, restricted or deviated mandibular movements, crepitation and luxation of condyles. There appears to be fewer TMJ symptoms in those with cerebral palsy who have a Class I occlusion.

MEDICAL TREATMENT OPTIONS

Cerebral palsy is a permanent disorder and while no curative treatment is available, some treatments may improve quality of life for this population. The strategies for the general management of the physical disabilities resulting from cerebral palsy (e.g., adaptive equipment, positioning, wheelchair transfer techniques, speech therapy, etc.) are beyond the scope of this review. Some procedures have been tried to reduce spasticity (e.g., spinal rhizotomy) but are only available for patients fitting specific criteria and present with significant risks.

One medical problem that is directly related to dental care is the management of drooling. Several techniques have been used to manage drooling in this population. These include the use of anticholinergics (scopolamine, benztropine, glycopyrrolate), botulinum toxin-A, surgical procedures (parotid gland duct ligation, submandibular gland excision), oral motor and oral sensory therapies, physical therapy, behavioral therapy, intraoral appliances, and acupuncture. Few randomized control trials on controlling drooling in people with cerebral palsy have been performed. A 2012 systematic review found that there was not clear evidence on which therapies proved effective for drooling in this population. Any attempt to control drooling with surgery or medication can have the unwanted side effect of dry mouth and resultant loss of the buffering capacity of

saliva. Rampant caries and subsequent loss of dentition is a major concern.

DENTAL TREATMENT OPTIONS

There is a paucity of information on treatment options for patients with cerebral palsy in the dental literature. The clinician should develop innovative approaches based upon the most recent research available. The following information combines recommendations from the literature with suggestions from the authors.

Preventive Care

Since individuals with cerebral palsy, due to the movement disorder, generally have difficulty carrying out oral hygiene procedures, modification of the usual methods are often indicated. A major issue is the problem of oral hygiene for adults with cerebral palsy who are not able to effectively brush their own teeth. Help is rarely available if the individual has an independent or semi-independent living arrangement and often not consistent if the individual lives in a group home or institutional setting. For those living with family members, the family members may be reluctant or feel unsure of how to carry out oral hygiene procedures for their loved ones.

Modification of regular toothbrushes to cope with grip or arm extension problems are usually easily done. Many specially designed manual toothbrushes are commercially available. One, the Collis Curve®, has been reported as more efficient but no more effective than regular brushes. The recommendation for use of an automatic brush has proven helpful and more efficient in some cases, especially when the parent or caregiver carries out brushing for an individual with cerebral palsy. However, ineffective brushing with an electric toothbrush is still a concern for those who don't have good brushing technique or where there is considerable resistance to tooth brushing. Commercially available props (e.g., Open Wide® disposable mouth rests) can be of help to parents or caregivers brushing the teeth of individuals with cerebral palsy.

The use of floss holders has proven very helpful, especially for patients who bite down suddenly. A floss holder with a long handle (e.g., Reach Access® or FlossAid® flossers) is helpful in this regard. An oral irrigation device (e.g., Waterpik®) has usually proven of little value for most persons with cerebral palsy. Disclosing tablets and solutions are messy and have proven of little help with most of these patients. Further information, including purchasing sources of commercially available oral hygiene aids can be found in Module 11.

The use of antimicrobial mouth washes (e.g., Peridex®, Listerine®) have proven problematical for those individuals with cerebral palsy who cannot rinse and expectorate. Alternative methods of delivery, such as a dry mouth spray or gel, have proven helpful. Using a toothbrush for delivery may prove helpful, with the toothbrush moistened with the antimicrobial solution. Staining from Peridex® may be more of a problem for patients who have enamel hypoplasia. In some cases, long term chlorhexidine use may be appropriate when weighing the benefits and risks.

Periodontal Disease

Periodontal disease may be difficult to manage due to oral hygiene problems. For periodontitis, traditional scaling and root planing procedures are essential. As noted above, long term chlorhexidine use may be appropriate in some cases.

Another significant issue is the surgical management of gingival hyperplasia. Most dentists have become very conservative in recommending surgery, especially in conditions of poor oral hygiene, due to the

common outcome of rapid regrowth. Surgery is usually reserved for patients who have increased risk of periodontal infection, severe overgrowth onto the occlusal surfaces of posterior teeth that ulcerate upon mastication, or for primarily esthetic reasons involving the anterior teeth. The choice of surgical procedure will vary. Many dentists prefer a modified flap procedure to gingivectomy, especially since maintenance of a periodontal pack is impossible with many patients with cerebral palsy. Other options include use of electrocautery or lasers. Sedation or general anesthesia may be necessary in some cases due to the complexity of surgical treatment in a moving patient. Education with the patient and any caregivers is essential in terms of oral hygiene for prevention of gingival hyperplasia as well as reducing the risk of gingival hyperplasia recurrence following surgical treatment.

Caries

The approach to dealing with dental caries in persons with cerebral palsy differs little from the general population; although the presence of a movement disorder may complicate the delivery of care. Many patients with cerebral palsy may not be able to tolerate the treatment required to prepare and impress for traditional crowns (cast, porcelain, or other full coverage crowns). Rapid set impression materials can help in treating this population. Stainless steel crowns are often an option on permanent posterior teeth where patient cooperation or movement precludes a cast restoration. Where composite restorations are the usual choice, but bruxism is a problem, the selection of a posterior composite or amalgam may be a superior choice. Glass ionomer restorations are often recommended when caries is a problem, and are often useful for restoring class V carious lesions.

The increased use of sealants and professional and/or home-use fluoride preparations is helpful. Dietary counseling is important especially in patients with cerebral palsy who have a high caries risk. Issues of diet consistency and sugar content of liquid medications are of particular concern. More frequent recalls may be indicated if the caries risk is high.

Malocclusion

The correction of the typical class II malocclusion and tongue thrust associated with persons with cerebral palsy is usually not possible. The orthodontic/surgical procedures indicated for this skeletal relationship are usually not tolerated by individuals with motor disorders, especially those affecting the head and neck. Even simple fixed orthodontic procedures may be contraindicated due to a high caries rate. Removable orthodontic procedures are also not viable options in many cases, but with careful case selection may be helpful in some instances. The major deterrent to successful orthodontic treatment is the high degree of expected relapse due to the inability to correct the causative motor dysfunction (e.g., tongue thrust). Selected extraction of severely crowded teeth or maintenance of the existing occlusion may often be the only treatment options available.

Patient Movement and Ability to Follow Treatment Instructions

One issue often presented by dental patients with cerebral palsy is the increased need for stabilizing and protective devices due to body, head, and/or mouth movements. There is a greater need for body wraps, seat belts, mouth props, positioning bags/cushions and other devices among this group than for those with other developmental disabilities. Further discussion on the use of stabilizing and protective devices is presented in Module 6.

If sedation is employed, a drug choice with a muscle relaxant component may be helpful. The dentist should inquire whether tablets/ capsules or liquid medications are

better tolerated by the individual. Patients with a feeding tube generally benefit from a liquid medication that can be administered enterally. Further discussion on the use of sedation is presented in Module 5.

Individuals with cerebral palsy who also present with intellectual disability may have difficulty following treatment instructions due to a variety of reasons on top of the movement disorder, including difficulty understanding treatment instructions and difficulty cooperating. Treatment adaptations for persons with intellectual disability, with or without cerebral palsy, are similar and are discussed in Modules 2, 5, and 6.

Aspiration

If the person with cerebral palsy presents with swallowing dysfunction or gastroesophageal reflux disease and has problems with aspiration, positioning the patient semi-upright in the dental chair may be indicated. Careful suctioning of oral secretions and water is critical. When possible, limiting the use of water may be beneficial. Education regarding good oral hygiene is essential as the oral bacteria can produce aspiration pneumonia in at-risk patients.

Prosthodontic Services

There is considerable disagreement among dentists about prosthodontic services for patient with cerebral palsy. There is a particular reluctance on the part of dentists to provide fixed partial dentures (FPDs) to a patient with a history of a seizure disorder. Assuming other prosthetic criteria are met, and if the danger of fracture and possible subsequent aspiration is no greater than with the natural dentition, provision of cast restorations and fixed bridges can be an option for some patients with cerebral palsy. However, the procedures for FPDs are technique sensitive and may not be feasible in patients with movement disorders, hyperactive gag reflexes, or gingival problems. If continued trauma is a realistic expectation, design changes in cast restorations (e.g., acrylic facings vs. porcelain fused-to metal) should be considered. The problem of replacing missing anterior teeth in the presence of multiple diastemas poses a dilemma and demands a creative approach to bridge design by the dentist. If short crowns due to bruxism are a problem, more attention to intracoronal retention is important. Complications posed by gingival hyperplasia must also be coped with in embrasure design.

Bonded bridges offer advantages and disadvantages in this population. The expectation of further anterior trauma would be a disadvantage and a direct contraindication. The lack of interfering occlusion seen in anterior open bites may be an advantage.

Removable partial dentures (RPDs) also pose a dilemma for the dentist. The inability of many persons with cerebral palsy to remove, clean and insert the RPD needs to be considered for this treatment choice. Conscientious and reliable caregiver support can be a major help in this regard. If removable partial dentures are planned, design changes (e.g., all metal or reinforced acrylic) may increase the success of this treatment choice. Although there are exceptions, the athetosis and spasticity seen in many individuals with cerebral palsy sometimes preclude complete dentures. Likewise the prognosis of implant-retained removable prostheses is poor with this population.

SUMMARY

The provision of dental care to individuals with cerebral palsy poses a particular challenge to the dental practitioner. A detailed knowledge of the dental implications of this condition, together with an innovative and problem solving approach to providing treatment options will greatly benefit patients with this condition. The limitations of

treatment choices must be carefully explained to patients, guardians and caregivers to help clarify realistic treatment expectations.

REFERENCES

Editors' Note:
An outstanding reference for the practitioner is the cerebral palsy portion of the self-instructional series in Rehabilitation Dentistry provided by the DECOD Program in Seattle. Title: Module II. Dental Treatment of the Patient with a Developmental Disability; Unit D: cerebral palsy. Also, Module I, Unit D: Wheelchair Transfers in the Dental Office. Order from: Dental Education in Care of the Disabled (DECOD), University of Washington School of Dentistry.

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