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Review

Pediatric Dentistry for Children with Cerebral Palsy Best Practices in Oral Hygiene and Prevention

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Abstract

Children with cerebral palsy often experience significant oral health challenges due to neuromuscular impairments, poor motor coordination, and difficulties with communication and cooperation. These factors contribute to higher rates of dental caries, gingivitis, malocclusion, and oral infections compared to their neurotypical peers. Maintaining effective oral hygiene in this population requires both individualized tools and adaptive techniques, as standard methods are frequently ineffective or impractical. Caregivers play a central role in daily oral care, yet many report feeling unprepared or unsupported, highlighting the need for ongoing education, training, and accessible resources. Preventive dental care is critical for reducing long-term complications, and approaches such as fluoride applications, sealant placement, dietary counseling, and regular professional monitoring have demonstrated positive outcomes. Customized strategies that integrate these measures into daily routines are most successful when developed collaboratively between healthcare providers and families. Adaptive toothbrushes, mouth props, and tailored brushing methods can help overcome physical limitations, while the use of antimicrobial rinses and low-fluoride toothpaste offer chemical support when mechanical cleaning is insufficient. Clinical care remains complex, especially when children exhibit behavioral challenges or require sedation due to severe limitations. Dental professionals often face difficulties related to treatment planning, communication barriers, and inadequate training in managing children with special needs. Enhancing access to specialized services and promoting interdisciplinary care can help close the gap in treatment disparities. With early intervention, consistent preventive strategies, and caregiver-centered education, the burden of oral disease in children with cerebral palsy can be significantly reduced, supporting not only better dental health but also improved overall well-being.

Keywords: *cerebral palsy, pediatric dentistry, oral hygiene, preventive care, caregiver support*

Introduction

Cerebral palsy (CP) is the most common motor disability in childhood, affecting movement, posture, and coordination due to non-progressive disturbances in the developing brain. Children with CP often experience a wide range of comorbidities that complicate daily living, including difficulties in maintaining proper oral hygiene. These challenges stem from both physical limitations, such as impaired manual dexterity, and cognitive factors that affect routine compliance. As a result, this population is more susceptible to dental problems such as caries, periodontal disease, and malocclusion, which can significantly impact their quality of life and general health (1, 2).

Oral health among children with cerebral palsy is often compromised due to a combination of intrinsic and extrinsic factors. Many children with CP have neuromuscular problems that affect chewing and swallowing, leading to prolonged exposure of teeth to food and increasing the risk of dental decay. In addition, drooling, mouth breathing, and the use of medications with high sugar content contribute to an unfavorable oral environment. Studies have shown that the prevalence of dental caries and gingivitis is higher in children with CP than in the general pediatric population, highlighting the need for focused preventive efforts (2).

Dental care for this group is further complicated by barriers to access, including limited availability of trained professionals, insufficient caregiver knowledge, and behavioral management difficulties during treatment. In many settings, children with special needs, including those with CP, receive less preventive care and more invasive interventions due to delayed appointments and inadequate home-based oral hygiene practices. These disparities are especially pronounced in low- and middle-income countries, where public health infrastructure may not adequately support children with disabilities (3).

A multidisciplinary approach to dental care is essential to address the unique needs of children with CP. Collaboration between pediatric dentists, occupational therapists, and caregivers can improve oral hygiene outcomes by tailoring techniques and tools to individual abilities. The use of adaptive toothbrushes, modified dental routines, and positive reinforcement strategies can make daily care more manageable. Regular dental visits, fluoride applications, and caregiver education are critical components of prevention. Emphasizing these strategies from an early age can help mitigate long-term oral health problems and promote better overall well-being (4).

Review

Children with cerebral palsy face persistent challenges in maintaining oral hygiene due to neuromotor impairments, limited manual dexterity, and communication difficulties. These barriers often lead to poor oral health outcomes, including increased rates of dental caries and gingivitis. Studies show that even when caregivers are involved, the effectiveness of oral hygiene practices is often compromised by the child's limited cooperation and physical constraints (5). As a result, preventive strategies must be both adaptive and individualized to meet the diverse needs of these children.

Interventions that involve caregiver training and the use of assistive devices have shown promising results in improving oral hygiene outcomes. Modified toothbrushes, electric toothbrushes, and specially designed mouth props can significantly enhance the ability to perform effective oral cleaning. Moreover, integrating behavioral management techniques and routine reinforcement into daily care can lead to gradual improvements in cooperation during oral hygiene tasks. Community-level programs that offer caregiver education and accessible dental care services are crucial to reducing disparities in oral health for children with special needs (6).

Oral Hygiene Tools and Techniques

Children diagnosed with cerebral palsy frequently encounter difficulty performing daily oral care routines, largely due to limitations in motor control, coordination, and muscle tone. These impairments directly affect their ability to brush and floss effectively. For many, assistance from caregivers

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becomes essential. Conventional toothbrushes may not be suitable due to their size, grip, or motion requirements. Adaptive tools have therefore emerged as essential instruments in supporting oral hygiene maintenance. These include toothbrushes with enlarged handles, angled heads, and electric or battery-operated functions that simplify the brushing process when hand mobility is limited (7).

Positioning during brushing also contributes to effectiveness. Stabilizing the head and ensuring comfort can make a significant difference in cooperation and thoroughness. Children with poor trunk control may benefit from brushing in a reclined position or with head support. In clinical and home settings, the use of mouth props or bite blocks can assist in keeping the mouth open safely during hygiene procedures. These tools help minimize discomfort, reduce risk of injury, and allow caregivers to access all areas of the oral cavity more easily. Recent findings emphasize the importance of choosing tools that are compatible with each child's motor abilities and oral sensitivity levels to reduce distress during oral care (8).

Beyond hardware solutions, tailored brushing techniques have been introduced to support consistency and efficiency. The Fones method, characterized by circular brushing motions, is often recommended for younger children or those with limited precision. In contrast, the horizontal scrub technique may be simpler for children who cannot coordinate complex hand movements. For children who exhibit strong oral reflexes or involuntary movements, short sessions repeated multiple times daily may be more effective than a single prolonged brushing. Caregiver training in these methods can directly impact outcomes. Visual aids, modeling, and physical guidance have proven useful in helping caregivers learn how to adapt their techniques and maintain oral hygiene in unpredictable conditions (9).

Flossing remains one of the most challenging tasks, often neglected in home care for children with cerebral palsy. The use of floss holders, interdental brushes, or pre-threaded floss picks can improve accessibility between teeth, especially for caregivers managing care alone. While these tools may not fully replace traditional flossing in effectiveness, they provide a practical alternative that significantly lowers the bacterial load in interproximal areas. In some cases, dentists recommend antimicrobial rinses or topical gels as supplements to mechanical cleaning. However, the use of chemical aids should always be assessed carefully in children with swallowing difficulties or poor gag reflexes. The careful selection and consistent use of hygiene tools and adapted techniques are therefore central to preventive care efforts, especially in non-clinical settings where most oral care takes place (10).

Preventive Care Approaches

Preventing oral disease in children with cerebral palsy begins with consistent daily care, yet the broader strategy extends far beyond brushing routines. Dietary modifications play a key role, especially given that many children with cerebral palsy consume soft, carbohydrate-rich foods that adhere to tooth surfaces and encourage bacterial growth. Limiting the frequency of sugary snacks and introducing tooth-friendly alternatives like fibrous fruits or sugar-free options can reduce acid exposure. Caregivers often underestimate the role of diet in oral health, so nutrition counseling should be an integral part of dental education efforts tailored to special needs populations (4).

Topical fluoride remains a cornerstone of preventive care. Regular in-office applications of varnish have been shown to significantly reduce caries in children with motor impairments. Home use of fluoride toothpaste with appropriate concentrations, depending on age and swallowing ability, adds another layer of defense. For children who struggle with spitting, low-fluoride formulations are safer yet still effective. Chlorhexidine gels or rinses, used periodically under professional supervision, help manage plaque and gingival inflammation. These chemical aids are especially useful for children unable to tolerate mechanical cleaning techniques for extended periods (3, 11).

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Sealant placement on molars is often overlooked in this population despite its proven benefits. Since many children with cerebral palsy have difficulty maintaining cleanliness in the posterior regions of the mouth, sealing pits and fissures can significantly reduce the chance of occlusal decay. Applying sealants during early mixed dentition, especially during visits for other treatments under sedation or general anesthesia, provides long-term protection with minimal effort. Regular monitoring is necessary to ensure retention and repair of worn sealant material, particularly because bruxism and enamel defects are common among children with neuromotor disorders (12).

Community-based programs have demonstrated measurable success in improving oral health outcomes for children with developmental conditions. Mobile dental clinics, school-based dental screenings, and training sessions for caregivers create a supportive environment where prevention becomes a shared responsibility. These models reduce dependence on clinic-based care, which many families find inaccessible due to transportation or behavioral challenges. Prevention strategies are most effective when built into broader care routines, rather than treated as separate tasks. When oral hygiene is viewed as part of daily comfort or communication readiness, both caregivers and children become more engaged. Customized schedules that incorporate brushing, dietary reminders, and visual aids can help build a sustainable preventive routine at home. Programs that integrate dental care into occupational or physical therapy settings can also encourage cooperation and create familiar spaces for hygiene reinforcement (13).

Clinical and Caregiver Challenges

Delivering oral healthcare to children with cerebral palsy involves navigating a combination of clinical complexity and caregiver limitations. Muscle rigidity, involuntary movements, and compromised head control all influence how dental procedures must be adapted. Many of these children exhibit oral hypersensitivity or gag reflexes that make basic examinations difficult. Dentists often need to adjust lighting, instruments, and even posture to create a manageable environment. Clinical time may double or triple compared to neurotypical patients, which raises challenges in appointment scheduling and practice management. Behavioral responses such as anxiety, resistance, or communication breakdowns add another layer of difficulty, especially when patients are non-verbal or minimally expressive. Dentists unfamiliar with disability-focused care often lack the confidence to handle such scenarios, even when they possess the technical skill (14).

Sedation and general anesthesia are frequently used to facilitate treatment, especially in cases requiring restorative or surgical intervention. However, the decision to sedate must be approached with caution due to respiratory vulnerabilities common in cerebral palsy. Children may have coexisting conditions such as epilepsy, gastroesophageal reflux, or poor airway tone, all of which increase procedural risk. Parents are sometimes reluctant to consent to sedation due to these medical complexities, even when the alternative is untreated dental disease. Clinicians must coordinate closely with pediatricians and anesthesiologists to weigh the benefits against the risks. Treatment planning must be both flexible and cautious, balancing what is ideal with what is realistically safe for the child (15).

Caregivers often bear the full responsibility of daily oral maintenance, yet many report feeling underprepared or unsupported in that role. Brushing a resistant child with poor oral access requires not just instruction, but hands-on training, repetition, and confidence. A recurring theme in caregiver reports is the lack of continuity in guidance. Instructions are often given during rushed clinical appointments without time for demonstration or follow-up. Cultural factors, education level, and competing demands like mobility, feeding, or medication management influence how oral hygiene is prioritized. Some families live in rural or underserved areas with limited access to pediatric dental specialists, making routine care or emergency visits logistically difficult. Missed appointments due to transportation challenges or the unpredictability of a child's health further widen the care gap (16).

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Communication between dental professionals and caregivers can falter when assumptions are made about what families can implement at home. Suggestions such as flossing daily or using mouth rinses may be unrealistic if the child resists opening their mouth or cannot spit. Without modifications or alternatives, these recommendations may be ignored entirely. There is also a tendency to over-rely on the caregiver without acknowledging their burnout or emotional stress. Many parents express guilt over their child's dental condition, even when structural and systemic barriers are to blame. Collaborative care models that include caregiver input in planning are more effective in aligning expectations with reality. Clinics that offer desensitization visits, visual supports, and behavioral coaching tend to build more trust and longer-term compliance (15).

Conclusion

Improving oral health in children with cerebral palsy requires a comprehensive, individualized approach that combines clinical adaptation, preventive care, and caregiver support. Tailored hygiene tools and techniques, consistent preventive measures, and collaborative care models are essential for long-term success. Addressing access barriers and enhancing caregiver education can significantly reduce oral disease burden. Integrating dental care into the child's overall health plan promotes better outcomes and quality of life.

Disclosure

Conflict of interest

There is no conflict of interest.

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Ethical consideration

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Data availability

All data are available within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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