PROTOCOL PROPOSAL FOR EARLY DENTAL CARE IN INFANTS WITH CEREBRAL PALSY

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Palavras-chave: Paralisia Cerebral. Crianças com Deficiência. Assistência Odontológica para Pessoas com Deficiências. Assistência Odontológica.

RESUMO

Introdução: Crianças com Paralisia Cerebral (PC) apresentam um alto risco para o desenvolvimento de doenças bucais. **Objetivo**: Propor um protocolo de atendimento odontológico precoce para lactentes com PC. **Materiais e Métodos**: Foi realizada uma busca computadorizada sistemática nas bases de dados eletrônicas PubMed, Scopus e Embase. Também foi desenvolvida uma proposta de protocolo de atendimento a bebês com Paralisia Cerebral com foco no cuidado integral, abordagem transdisciplinar e promoção efetiva da saúde pelos cuidadores. **Resultados**: Foram incluídos 15 artigos publicados na literatura científica. O protocolo desenvolvido é composto pelos seguintes tópicos: Primeira consulta odontológica, tempo ideal da consulta, recomendações de higiene bucal, recomendações sobre dieta e recomendações sobre prevenção e controle dos hábitos bucais. A primeira visita ao dentista deve ser feita antes da erupção do primeiro dente. Como um grupo especial, é importante determinar o vínculo afetivo entre o paciente e o cuidador que receberá as recomendações de cuidados com a saúde bucal. Durante o exame clínico, a correta posição e estabilização do bebê na cadeira odontológica é importante para controlar os movimentos involuntários e reduzir a dificuldade de deglutição. Recomendações quanto à higiene bucal adequada, alimentação saudável e prevenção de hábitos bucais deletérios são importantes para prevenir o desenvolvimento de doenças bucais. Crianças com problemas de motilidade oral-motora e dificuldades de alimentação devem ser encaminhadas para acompanhamento terapêutico. Devido à presença de distúrbios neuropsicomotores normalmente presentes na Paralisia Cerebral, as crianças afetadas são mais vulneráveis às doenças bucais. Assim, os cuidados com a saúde bucal devem ser realizados o quanto antes pelos pais/responsáveis. **Conclusão**: Indivíduos com PC apresentam maior risco de desenvolver doenças bucais e programas de saúde bucal iniciados na primeira infância e direcionados às suas especificidades podem ser uma estratégia para minimizar as consequências que possam vir a acontecer.

Keywords: Cerebral palsy. Disabled children. Dental care for disabled. Dental Care.

ABSTRACT

Introduction: Children with cerebral palsy (CP) are at high risk of developing oral diseases. **Objective**: To propose an early dental care protocol for infants with CP. **Materials and Methods**: A computerized systematic search was performed in the PubMed, Scopus and Embase electronic databases for relevant articles. An early dental care protocol was then proposed for infants with cerebral palsy focused on comprehensive care with a multidisciplinary approach and effective health promotion by caregivers. **Results**: Fifteen published papers were included in the present literature review and protocol proposal. The protocol comprised the following topics: First dental visit, aspects related to the appointment, oral hygiene recommendations, dietary recommendations and recommendations for the prevention and control of harmful oral habits. The first dental visit should occur prior to the eruption of the teeth. As a special group, it is important to determine the affective bond between the patient and caregiver who will receive the oral health care recommendations. During the clinical examination, the correct positioning and stabilization of the infant is important for the control of involuntary movements and the minimization of swallowing difficulties. Counseling with regards to adequate oral hygiene, a healthy diet and the prevention of harmful oral habits is important to the prevention of dental diseases. Children with oral-motor motility problems and feeding difficulties should be referred to therapeutic follow-up. Due to the neuropsychomotor disorders often found in cerebral palsy, affected children are more vulnerable to oral diseases. Thus, oral health care must be performed as early as possible by the parents/caregivers of these children. **Conclusion**: Individuals with cerebral palsy are at greater risk of developing oral problems. Thus, oral health programs starting in early childhood and targeting the specificities of these individuals is a strategy for minimizing the occurrence of such problems and the associated burden.

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INTRODUCTION

Cerebral palsy (CP) is characterized by a dysfunction in the area of the brain that controls movement, muscle tone and motor skills. This condition can be caused by multiple pre-, peri- or postnatal factors.[1] The clinical features of CP vary considerably in terms of the type and degree of impairment. Furthermore, more than one movement disorders may occur depending on the areas of the brain affected.[2]

In addition to motor impairment, the health of children with CP may involve comorbidities with varying degrees of severity, such as intellectual dysfunction, epilepsy and language/speech disorders.[1,3] Affected children are also more vulnerable to oral problems, such as caries and periodontal disease, due to insufficient intellectual or motor capacity to maintain their oral health, problems in gaining access to dental care and the frequent intake of sugary foods.[4,5,6,7] Therefore, children with CP have a high rate of dental caries.[6,8] These children are approximately 7.3 times likely to experience dental/mouth pain and 6.4 times more likely to have interdental food entrapment and poor oral hygiene.[9] Non-carious lesions, such as erosive tooth wear and parafunctional habits, such as bruxism, are also frequent in this group. Erosive tooth wear may be associated with the use of medications, such as anticonvulsants, and the occurrence of gastroesophageal reflux.[10,11] Other common findings are traumatic injuries to hard and soft oral tissues and self-mutilation injuries, such as lip and tongue bites.[12,9,13]

Given this scenario, preventive dental monitoring is necessary for the preservation of oral health and the reduction of risk factors that make these children more vulnerable to oral diseases. Dental treatment can improve quality of life through multidisciplinary management to ensure timely assessments and treatment as well as provide important information to caregivers.[7,8,14] The hypothesis of the present study is that children with CP are more vulnerable to the development of dental caries and require early dental care.

Therefore, the aim of this study was to perform a literature search on oral health status and care in individuals with CP and propose an early dental care protocol for infants with CP focused on comprehensive care with a multidisciplinary approach and effective health promotion by caregivers.

Information sources and search strategy to perform a protocol

A systematic search was conducted in the PubMed, Scopus and Embase electronic databases for relevant articles published up to July 2021. Only articles published in English, Portuguese or Spanish were considered. The search strategy involved the use of free and controlled terms. The Boolean operator AND was used to combine groups. Details on the search strategy are listed in Table 1. All references retrieved during the search were imported to the Mendeley Reference Manager (Mendeley Desktop Software; V-1.17.10) for the removal of duplicates. To continue the selection process, the references were then imported to the Rayyan web software (Qatar Computing Research Institute, Doha, Qatar),[15] which is an application for systematic reviews.

Eligibility criteria

The following were the inclusion criteria: Original studies, randomized clinical trials, case reports, systematic reviews and literature reviews on the oral health of individuals with cerebral palsy. The exclusion criteria were (1) a lack of a specific approach for cerebral palsy and dental care (inclusion of other syndromes or comorbidities); (2) articles not in Portuguese, English or Spanish; (3) articles published more than 20 years prior to the search; and (4) full text not available. Based on these criteria, 15 published papers were included and contributed to the construction of the present study. The flowchart of the article selection process is presented in Figure 1.

***Table 1**: Search strategy developed for databases.*

Database	Search (December 3rd, 2021)
PubMed	(((((((“cerebral palsy”) AND (“infant”)) OR (“child”)) OR (“children”)) AND (“dental caries”)) OR (“oral hygiene”)) AND (“dental care”)) AND (“dental care for disabled”)
EMBASE	(Cerebral AND (‘palsy’/exp OR palsy)) AND “infant” OR “child” OR “Children” AND (dental AND care) AND “dental procedure”
Scopus	(((((((“cerebral palsy”) AND (“infant”)) OR (“child”)) OR (“children”)) AND (“dental caries”)) OR (“oral hygiene”)) AND (“dental care”)) AND (“dental care for disabled”)

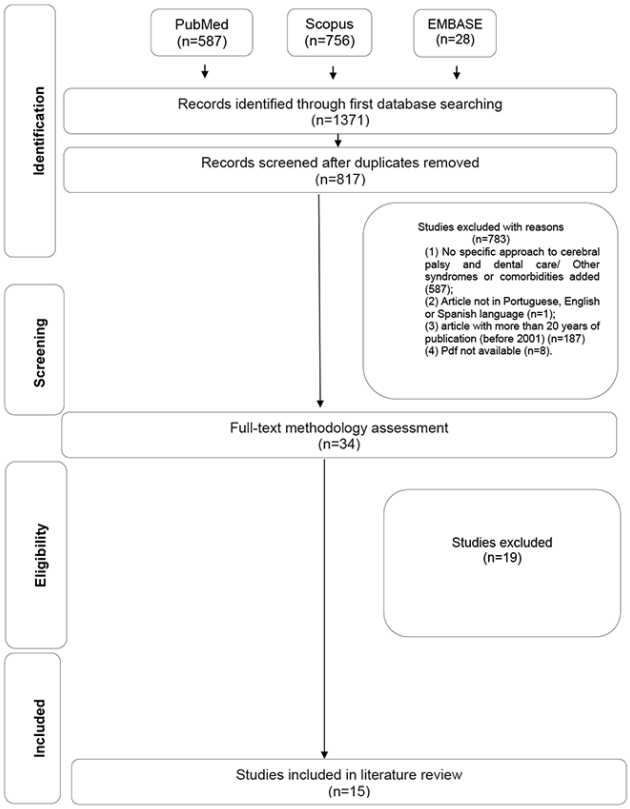


***Figure 1**: Flowchart of article selection process. Adapted from PRISMA.*

RESULTS

Oral health status of individuals with CP

Children with CP may have several oral problems, such as dental caries, gingivitis, bruxism and traumatic dental injury. These individuals are also more exposed to the consumption of cariogenic foods.[16,17,18] The literature reports that such individuals are often from families with a less privileged socioeconomic status and have no access to oral health services. Moreover, the condition is reported to exert a strong negative impact on oral health care and quality of life.[19]

Dental caries is described as the most common oral health condition in children with CP. In a cross-sectional study published in Saudi Arabia in 2010 involving 140 children with CP, the overall prevalence of dental caries in the sample was 98.6%. The study also showed that children with poor oral hygiene had higher decayed, missing and filled surface scores compared to those with fair to good oral hygiene.[20] According to Srinivas et al.[21] and Jan,[22] numerous factors are involved in the higher prevalence of dental caries in children with CP, the most important of which are cognitive and motor impairments. The impaired functional skills in this population affect the ability to perform adequate oral hygiene. Furthermore, cognitive deficits can exert a negative influence on the degree of cooperation, making effective oral care more difficult. A cross-sectional study published in Brazil in 2011 evaluated 33 institutionalized and 37 community-dwelling children with CP, reporting that the institutionalized sample had lower decayed, missing and filled surface scores compared to the community-dwelling sample.[23] This underscores the importance of defining oral health measures beginning in early childhood for children with CP and draws attention to the fact that health care providers must be prepared to treat individuals with special needs with different degrees of impairment.[23]

Oral health care for individuals with CP

Individuals with CP are at greater risk of developing oral diseases and should therefore receive early dental care to avoid or minimize the consequences inherent to the condition. According to Gutierrez et al.,[24] however, individuals with disabilities often have fear of dental treatment as well as a lack of treatment options and a lack of qualified professionals to treat them. In this cross-sectional study, the authors evaluated 191 individuals with disabilities (114 with a diagnosis of CP) and most had never been to a dentist.[24]

Oral health programs targeting individuals with CP can be a strategy to minimize the burden that such oral problems might cause.[25] An interventional study developed in Brazil in 2011 evaluated the impact of an oral health program for children with CP and their caregivers.[26] The authors performed weekly visits to the families for a period of 90 days, offering counseling on toothbrushing techniques, fluoride therapy and dietary habits. After the program, the authors found that the actions produced positive changes regarding the oral hygiene and dietary habits of the children.

Ongoing counseling and training of parents/caregivers to assist in the oral health care of individuals with CP is needed to improve the oral health status of this population.[27-30] An observational case series study performed in Brazil in 2020 evaluated the perceptions of caregivers regarding the oral health care of 94 children/adolescents with CP.[19] The majority of mothers/caregivers reported that their child was highly dependent in terms of oral hygiene, especially those with severe CP. According to the authors, this type of dependence places a burden on caregivers and may lead to postponement or omission of oral hygiene practices. Furthermore, the results showed that the caregivers have knowledge on the oral health problems that may be related to CP and that the main problem is the occurrence and severity of caries. However, a large proportion of parents/caregivers reported difficulties in gaining transportation and access to dental services. Thus, constant

orientation as well as comprehensive, humanized oral health care need to be offered to mothers/caregivers and individuals with CP.[19]

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Many infants with CP and neuropsychomotor disabilities may have poor oral hygiene and are therefore more vulnerable to tooth decay. A significant portion of this population depends on another person to perform their oral hygiene. Moreover, parents/caregivers often have a lack of adequate information regarding the importance of maintaining the child's oral health. Children with CP also often have a semi-solid diet and take medications with a high sugar content and that can cause xerostomia.[7,14,31,32]

Each dental visit should include individualized counseling. The topics to be addressed are oral/dental development and growth, speech/language development, nonnutritive habits, diet/nutrition and injury prevention.[4,10,12]

1. First dental visit

Dental visits should start prior to the eruption of the teeth. The first dental visit is an important moment for the infant and family and may exert an influence on the child's behavior during future visits.

2. Aspects related to appointment

a) Determine the affective bond between the patient and the caregiver who will provide detailed information on the infant and receive oral health care counseling.

b) Set realistic goals during dietary and hygiene counseling.

c) Deliver a written summary of the instructions in simple language.

d) At the end of the appointment, reinforce the main points covered and answer questions to dispel possible doubts.

e) Medical history: To obtain the correct diagnosis and determine an effective treatment plan, collect detailed information on the history of the current disease, diagnosed medical conditions, hospitalizations/surgeries, experience with anesthesia, medication use, allergies and vaccination status.

f) Extraoral evaluation: Perform a complete head and neck evaluation, considering the following:

- Maintain a neutral time interval between changing position from the waiting room to the dental unit or cot.

- Infant's position during examination – On the caregiver's lap in the knee-to-knee position (caregiver and dentist) or on a specific cot (Figure 2):

Position the infant and massage the shoulders and hips to facilitate the relaxation of upper and lower limbs.



***Figure 2**: A) Infant laid on caregiver's lap in knee-to-knee position. B) Infant laid in on specific cot (Macri®).*

Stabilize the head with the help of the caregiver or assistant to control involuntary movements.

Stabilize the infant in an inclined position, avoiding the complete supine position to minimize swallowing difficulty.

- Position the dental unit light progressively, avoiding direct contact with the patient's eyes.

- For the optimal evaluation of breathing, clean secretions with the nasal aspirator.

- Evaluate lip seal and inform caregiver about the importance of correcting the lip posture, especially when sleeping.

- Indicate orofacial motor therapies, if necessary, due to the hypo/hypertonicity found in some individuals with CP.

g) Intraoral evaluation

- Evaluate the state of the anatomical structures, such as the palate, cheeks, tongue, labial frenulum and lingual frenulum.

- A mouth opener (tied with dental floss to prevent accidents) or other device, such as PVC® tube or toothpicks, can be used to prevent the child from closing the mouth during the intraoral examination (Figure 3).



***Figure 3**: Dental exam using PVC® tube.*

- Use magnifying glasses and take photographs to detect enamel defects, carious lesions and erosive dental wear and enable evaluating the progression of these problems at the next follow-up appointment.

3. Oral hygiene recommendations

Edentulous patient

- Handling the mouth of an edentulous infant is not recommended due to the unique biochemical synergism between breast milk and infant saliva that strengthens early innate immunity.[33]

- In patients with a high arched palate and the retention of formula/food, swab from back to front to remove remaining of milk or food, avoiding the appearance of fungi and patient discomfort.

Dentate patient

- Tooth brushing is recommended after each main meal, with an emphasis on night brushing.

- Oral hygiene should also be performed after appointments with speech therapists who often use sweet/sticky foods during the child's examination.

- Once the mouth is cleaned, brush with fluoride toothpaste (minimum 1000 ppmF) in the amount of a grain of rice (Figure 4). Considering the difficulties/abnormalities in the orofacial motor skills of children who are generally unable to spit, the same amount of paste should be maintained until five years of age.

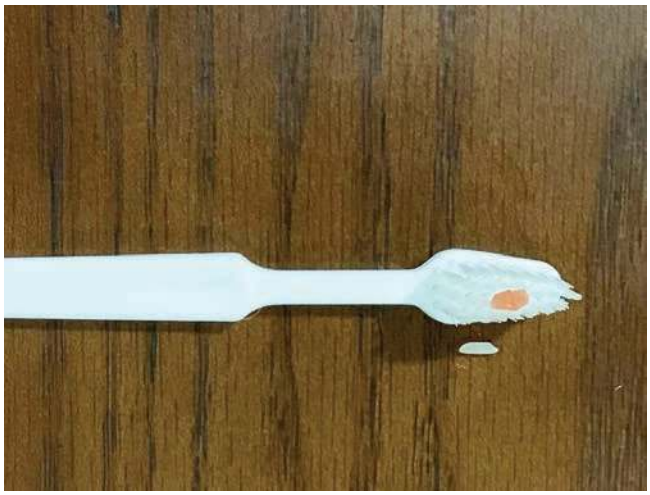


***Figure 4**: Recommended amount of toothpaste (1000 ppm/F) for infants (size of grain of rice).*

- Place a terry cloth or bib on the child.

- A mouth opener can be used to facilitate brushing. Parents can use the same devices as those used by the dentist.

- Remove food debris with a toothbrush without paste. After each pass, immerse the brush in a glass of water and shake vigorously to remove food residue. Repeat this action as many times as necessary.

- Oral hygiene does not need to be done in the washroom. It can be done in the bedroom to avoid moving the child.

4. Dietary recommendations

Feeding difficulties are often encountered in the first year of life of children with CP. This is mainly due to oral motor deficiency. Sucking difficulties during breastfeeding and/or bottle feeding are described as the main problems. Children with these problems should be referred to therapeutic follow-up to improve oral-motor motility and feeding ability.

Promoting breastfeeding is important due to the short- and long-term health benefits for the child and mother. It is also important to instruct parents/caregivers regarding the introduction of healthy foods, such fruits and vegetables, after six months of exclusive breastfeeding.

5. Recommendations for prevention and control of harmful oral habits

Nonnutritive sucking habits are frequently observed in children with CP and may be associated with the absence or shorter period of breastfeeding. To avoid or minimize the clinical consequences of these habits on the oral development, some instructions should be followed.

Parents/caregivers should be instructed to avoid the introduction of pacifiers and bottles. When breastfeeding is not possible due to sucking difficulties, breast milk or supplemented milk offered with the aid of a spoon or cup is recommended.

When finger sucking or the habit of biting objects is present, parents/caregivers should be instructed to remove the finger or the object from the mouth immediately and perform distractions to divert the child's attention.

6. Recommendations regarding caries risk assessment and treatment

Once dental eruption has begun, carious lesions and enamel defects (opacities) need to be evaluated. If caries is found, the child should be considered part of the risk group and parents/caregivers should help to identify the causes. Treatment should be based on severity. Cariostatic agents, such as silver diamine fluoride (SDF) 38%, are considered a good option for individuals who are unable to tolerate more invasive dental treatment, such as the special needs population. SDF is a dental product that stops the progression of caries without the removal of sound dental tissue.[34] Children at high risk should be followed up every three months. Those at moderate risk should be followed up every six months and those at low risk every six to 12 months.[35]

7. Final recommendations

a. Promote multidisciplinary care to ensure that all infants and toddlers diagnosed with CP can achieve better overall health.

b. Carry out individualized follow-up in accordance with the needs of each patient.

c. Administer medications in syrup form using a syringe to reduce contact with dental surfaces and then offer water.

d. Apply SDF 38% twice a year, as this is a safe, low-cost, easy-to-apply cariostatic agent.

DISCUSSION

A lack of awareness, insufficient knowledge on oral health, difficulty in gaining access to dental treatment and an exhausting workday are some of the factors associated with poor oral health in children with CP.[21,22,24] These children have peculiarities and specificities associated with the condition, which makes a multidisciplinary approach necessary to minimize the possible harm that can exert a negative impact on quality of life. Dentists should also be part of the multidisciplinary team, especially in the early years of life, to monitor the developing dentition and occlusion through regular clinical examinations. According to the American Academy of Pediatric Dentistry,[36] early preventive management of caries/oral conditions can improve a child's oral and general health.

Dental care in the first year of life should be centered mainly on family education. Having an infant that requires special care can be a source of anxiety in parents/caregivers. Due to cultural and traditional reasons, mothers are the main caregivers of their children.[36] Therefore, appropriate information on children's oral conditions is important to help mothers and caregivers deal with the oral implications inherent to CP.

The dentist should use the best approach for the child and family to provide a good experience and efficient care. This approach should be based on dietary advice to limit the intake and frequency of free sugars,[37] the training of caregivers in oral hygiene with fluoridated toothpaste (1000 to 1450 ppmF) and considering the future application of a cariostatic agent in accordance with the activity/risk of caries.[5]

Consultations with a pediatric otolaryngologist and speech therapist should be considered when abnormalities are observed during the examination that may prevent adequate nasal breathing or if tonicity and development of the orofacial muscles is needed to promote correct posture, lip competence, swallowing, etc.[31,38] It is important for parents/caregivers to discuss this possibility with the child's pediatrician and pediatric dentist.

If the dentist observes poor oral hygiene, dietary habits with high sugar intake or dental caries, the child should be considered part of the group at risk for oral diseases. Parents/caregivers should help to identify the causes. Infants at high risk should be followed up every three months, whereas those at moderate risk should be followed up every six months and those at low risk every six to 12 months.[36] The dentist should establish the frequency of appointments in accordance with the child's risk of developing oral diseases.

As most infants with CP have motor impairment, parents/caregivers may face difficulties when providing oral health care. Such difficulties may also be related to the uncontrolled dyskinetic movements and oral reflexes. Therefore, dentists should instruct parents about oral cleaning adaptations, such as the use of an adapted toothbrush with a large handle, floss holders or devices that can help maintain the mouth open.[39]

Children with CP are more likely to develop eating disorders due to structural abnormalities of the central and peripheral nervous system. Gastroesophageal reflux disease is described as one of the most prevalent disorders in CP. Therefore, this population is at greater risk of developing erosive dental wear, which should be documented and monitored.[10]

During counseling, it is important to encourage mothers to breastfeed, as there is conclusive evidence regarding the positive impact of breastfeeding on the survival, health and development of the child and mother.[32] However, the dynamics of breastfeeding may be negatively affected by the motor dysfunctions inherent to CP. If breastfeeding is not possible, the use of spoon or cup feeding is recommended.

Regarding the treatment of dental caries, dentists should consider the use of a cariostatic agent, the effectiveness of which has been demonstrated in different studies for the control of cavities in patients at high risk of dental caries who cannot be treated in a conventional way.[5] The use of minimally invasive treatment usually causes little discomfort to the patient, enables better behavioral management and greatly reduces the possibility of accidental pulp exposure and the need for complex treatments. Consequently, the financial cost and treatment time are lower.[40]

CONCLUSION

As individuals with CP are at greater risk of developing oral diseases, oral health programs targeting the specificities of this population constitute a strategy to minimize the burden this condition might cause. This protocol highlights the importance of a detailed and carefully dental support provided to infants with CP. The use of a protocol can help clinicians to provide a careful dental plan treatment, adjust the recall intervals and also educate caregivers to provide better home care measures to maintain their child´s oral health.

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