

SYSTEMIC AND DENTAL ASPECTS IN CEREBRAL PALSY

LEILA MAUÉS OLIVEIRA HANNA¹, RODOLFO JOSÉ GOMES DE ARAÚJO², AMÉLIA LIMA PAGANINI³, ANDRESSA SORAIA BARROS MAYHEW⁴

1. PhD in Dentistry – University Cruzeiro do Sul (UNICSUL); 2. PhD Student in Biology of Infectious and Parasitic Agents – Federal University of Para; 3. Dentist – ESAMAZ; 4. Dentistry Student - ESAMAZ

* TV. Rui Barbosa 1533 / 302, Nazaré, Belem, Para State, Brazil. ZIP CODE: 66035-220 rjgaraujo@gmail.com

Received: 10/02/2015; Accepted: 12/23/2015

ABSTRACT

Cerebral palsy (CP) can be considered a group of disorders of movement and posture, and it is not attributed to progressive problems occurring in the brain during the fetal period and the baby, resulting in difficulties in functional abilities. These functional deficits, as a rule, cause affect the quality of oral health and quality of life of these patients. This article presents a literature review on the systemic and dental aspects of individuals with cerebral palsy, emphasizing conceptual, epidemiological and clinical aspects, in order to impart knowledge to health professionals and thus try to improve attention to overall health in this population group. However it was concluded that not just impart knowledge it is necessary also the implementation of public policies that address the promotion, prevention and improvement of specialized services for these patients, together with inter-actions of health that contribute to comprehensive care and improvement of services.

KEYWORDS: Socialization, oral health, prevention, movement disorders.

1. INTRODUCTION

Patients with special needs are people who have any kind of limitation that makes them need special service for a certain period of your life or even for their lifetime¹. Within this group, are inserted patients with Cerebral Palsy (CP), those patients with brain lesions defined with nonprogressive disorders of movement and posture. Is commonly associated with epilepsy as well as abnormalities of speech, hearing, vision, and mental retardation².

The prevalence of CP hovers around one to two per 1,000 live births Individuals. Any agent capable of injuring the brain during the ripening process of the nervous system can cause CP². Regarding prenatal factors in the general population, estimated to CP Occurs in 35% of cases, 45% perinatal, and postnatal 15%. Prenatal causes are related to injuries resulting from the time of fertilization until birth, can be determined by viral, parasitic and genetic malformations neuropathies. Concerning to neonatal causes have as causes neonatal anoxia, intracranial

hemorrhage, infection, cranial trauma, prematurity and low birth weight. Regarding to postnatal causes, from birth to early childhood, predisposing factors are: meningeal infection, encephalitis, cerebral vasculitis and viral infections such as rubella, cytomegalovirus, herpes virus, among others³.

Patients with CP present varying degrees of cerebral functional impairment, such change affects mainly manual dexterity consequently it fails properly to sanitize the oral cavity, which provides a greater plaque buildup. Therefore individuals with CP can be considered as high risk for oral diseases primarily for periodontal disease^{4,5}.

Intellectual impairment in individuals with CP makes them unable to understand the importance of oral hygiene for the control and prevention of oral diseases, preventing the necessary motivation for effective removal of plaque^{6,7}. Researchers have suggested the creation of preventive educational programs, mainly for the control of periodontal disease through education of parents and guardians, motivating them to take care of oral hygiene, explaining the importance of reducing the accumulation of dental plaque to prevent the appearance of inflammatory periodontal disease⁸.

Periodontal disease represent one caused multifactorial infection, often from the biofilm accumulation and, depending on its location in the oral cavity, can favor the proliferation of anaerobic microorganisms inside the formed bags in consequence this pathology results in a local production of cytokines, interleukins and prostaglandins as well as in the induction of synthesis of specific antibodies⁹.

Long ago, it is related to periodontal disease and other systemic changes being considered, even as a risk factor for the onset of atherosclerosis and other cardiovascular diseases¹⁰.

This study through the literature review is to emphasize the clinical and dental aspects of patients with cerebral palsy, emphasizing conceptual, epidemiological and clinical aspects, in order to impart knowledge to health professionals and thereby trying to improve health care overall this population group requiring special service.

2. MATERIAL AND METHODS

To conduct the Literature Review, extensive research was carried out in LILACS, BIREME, SciELO and MEDLINE, using the following search terms: cerebral palsy, dentistry, medical condition and cerebral palsy.

A total of 1,000 articles published among the years 1980-2013, however only 28 articles were selected found. It was used as inclusion criterion items that emphasized the conceptual, epidemiological and clinical features of patients with CP and had the purpose of transmitting knowledge to health professionals.

3. LITERATURE REVIEW

Systemic aspects of Individuals with Cerebral Palsy

In the last two decades, the great advances in imaging technologies and research in the basic sciences enabled researchers a different look at the brain of infants and children with CP. Bad structural formations, damage areas and genetic mutations associated with abnormal fetal brain development offers clues about what might be going wrong during brain development to cause changes that lead to the CP¹¹.

The CP can result from brain injuries that occur during the prenatal, perinatal or postnatal. Seventy to eighty percent of PC cases are acquired in the prenatal period and of unknown causes. Currently, it is estimated that approximately 6% of patients with congenital cerebral palsy occurred due to birth complications, including asphyxia¹².

Are considered neonatal risk factors for PC prematurity at birth less than 32 weeks gestation babies weighing less than 2.5 kg, delayed intrauterine growth, intracranial hemorrhage and trauma. About 10% to 20% of patients acquire cerebral palsy after birth, brain injury, mainly due to bacterial meningitis, viral encephalitis, hyperbilirubinemia, collision vehicle accidents, falls, or domestic violence, child abuse¹³.

Cerebral palsy was classified according to their anatomical and clinical aspect, emphasizing the motor symptom, which is the main element of the clinical picture. According to the National Institute of Neurological Disorders and Stroke (2013)¹², we have the following breakdown: Spastic or Pyramid, Choreaathetosis or Extrapramidal, Ataxic and Mixed¹².

Seventy to eighty percent of individuals with cerebral palsy with clinical features of spasticity with extensor muscle hypertonia and adductor of the lower limbs, increased deep tendon reflexes, tremors, weakness, and the spasticity of the lower limbs is very intense, results in the position scissor, to try to put the patient standing. The athetoid type or dyskinetic cerebral palsy affects 10-20% of patients with characteristic involuntary movements where can be observed changes in muscle tone of dystonia type, with variations more or less, during the move or in main-

taining posture. Abnormal increase in slow movements and contortions of the hands, feet, arms or legs, are exacerbated during periods of stress and absent during sleep^{4,14-17}.

The rarest form is ataxic cerebral palsy, which occurs in 5 to 10% of patients and predominantly affect the balance and coordination. These patients roam with a broad base of gait and tremors that have complicated the performance of daily activities that require fine motor skills. In the ataxic forms there are important alterations of balance and motor coordination, associated with clear muscle hypotony. Mixed forms are characterized by different combinations of pyramidal, extrapyramidal motor disorders, ataxic-pyramidal or pyramidal, extrapyramidal-ataxic¹⁷.

In addition to the loss of motor functions, most CP cases involving losses of intellectual, hearing, visual or sensory. In severe cases, the carrier rigidly assume the fetal position, presented in communication disability and total dependence. Already, other patients at a moderate level PC, have a mild lack of motor coordination. As for the intellectual involvement, 30% of those affected by CP have mental retardation, with intelligence quotient (IQ) below the mean, others may be educated reaching a satisfactory intellectual performance¹⁶.

In order to have a development on activities that stimulate your potential, you need to motor stimulus, sensory, auditory and visual, and in this respect, the family is fundamental¹⁸. However, not always the family is prepared to take care of a patient with cerebral palsy. Mothers, who are usually the primary caregivers, can have a negative impact on their health and quality of life, but it is not yet possible to say whether the clinical and demographic factors are decisive for this loss. A recent study evaluated the quality of life related to health (QVRS) of mothers of children and adolescents with cerebral palsy (CP) compared to mothers with healthy children. Mothers of children and adolescents with CP have physical and mental negative impact on QVRS compared with mothers of healthy children and adolescents¹⁹. The higher the intensity of depressive symptoms, the greater the impairment in QVRS mothers. Maternal age, patient's age, maternal education, employment and some dimensions of QVRS son revealed association with maternal QVRS¹⁹.

According to Miura (2007)²⁰ not only the family, but everyone involved in various areas such as Dentists, Physiotherapists, Speech Therapists, Psychologists, Doctors, Occupational Therapists, Teachers, social workers are essential to form a multidisciplinary team able to promote the greatest degree of possible independence, respecting the neurological potential of each.

The focus of rehabilitation treatment was recently transferred to the neurological rehabilitation in response to growing evidence of neuroplasticity. This approach aims to improve the development and function, taking ad-

vantage of the innate ability of the brain to change and adapt over the life of the patient. As the life expectancy of individuals with cerebral palsy is similar to the general population, therapies must be developed to meet the needs of older adults with this deficiency²¹.

Dental Aspects

There is no specific oral diseases associated with CP. Frequent oral diseases are the same that afflict the population in general. They differ in the approach and the techniques to develop dental treatment²². Dental caries, gingival changes, occlusion problems, enamel hypoplasia, bruxism and dental trauma are some of the most frequent oral manifestations and severe in individuals with CP due to motor difficulties presented by the majority of these patients²³.

Altered dietary patterns, as frequent intake of carbohydrates and adding substances "thickeners" milk are common in the daily lives of individuals with CP. Other predisposing factors for tooth decay are: inability to perform their own oral hygiene, pasty diet, prolonged retention of food residues in the oral cavity by inability of language to promote the self-cleaning of the mouth after feeding, dental occlusion disorders and hypoplasia enamel^{22,23,24}.

In 2005 a group of 124 non-institutionalized patients with CP underwent assessment of primitive reflexes and pathological children and its effect on tooth decay and oral hygiene²⁵. The presence/ absence of the primitive oral pathological reflexes of sucking, swallowing, biting and coughing was evaluated by observing the reaction of patients after a stimulus. The authors suggest that the more severe are the most frequent neurological damage is the presence of bite reflex and consequently the greater the risk of oral diseases in the population because of the difficulty in performing adequate oral hygiene²⁵.

Guerreiro & Garcia (2009)² conducted an epidemiological survey in order to determine the oral health status and associated factors in 41 children with cerebral palsy. The variables were socioeconomic factors, risk factors for the development of oral diseases, access to dental care, caries index, periodontal disease, malocclusion and dental fluorosis. The children assessed were aged from one to twelve years. The authors concluded that children with cerebral palsy showed high levels of gum damage and caries experience, mainly in the primary dentition and severe malocclusion in most cases. The study shows that in addition to quantitative need for care, it is also necessary to improve the quality of consultations of these patients. Almost all of the subjects who had access to dental care showed no satisfactory treatments. Take into account the difficulty of access and lack of resolution of accumulated demands, it is important that it be made available not only for this population, but for all persons with disabilities, appropriate location, and public action programs in

oral health integrated with multidisciplinary actions².

Huang *et al.* (2010)²⁷ evaluated the state of oral health and treatment needs of institutionalized children with cerebral palsy in Taiwan. Were examined 345 children with cerebral palsy aged 18 years, residents in the institutions. The dental examination was performed according to the criteria of the World Health Organization protocol. The index of primary teeth decayed, extracted or filled (CPO-D) for children with cerebral palsy with 5 years of age was 7.00 ± 6.73 , the rate of permanent teeth decayed, missing and filled (CPO-D), for ages from 12 to 18 years was 2.50 ± 3.17 and 7.42 ± 5.48 , respectively. The need for dental treatment increased with increasing age and degree of disability. The researchers suggest the need to promote education in oral health of parents, cares and nurses, and integrate prevention programs from childhood, encouraging dentists to create a dental care system to this disabled population²⁷.

Patients with cerebral palsy have a reduced function of self-cleaning of the oral cavity because of the difficulty of swallowing his own saliva and abnormal movements of the tongue and facial muscles. To minimize this problem, one must give greater importance to the microbiological and clinical diagnostics to detect patients who have higher risk of developing periodontitis²⁵.

In a recent study evaluated the existence of an association between attention/executive functions and development of dental caries in individuals with cerebral palsy (CP)²⁸. Seventy-six children with CP were selected from a physical rehabilitation center in a school that serves children with this disability. The control group consisted of 89 children without neurological impairment. The socioeconomic status, the presence of teeth with cavities, the degree of motor impairment and intellectual, executive functions and attention were evaluated. The average age of participants was 8.9 years (DP = 3.56). The CP group had a significantly lower performance ($p < 0.05$, Mann-Whitney test) compared to the control group. Based on clinical diagnosis (CP or control group), intellectual and motor impairment function, the important explanatory variables for the presence of teeth with cavities were evaluated in Complex Figure Rey Test (OR = 0.941) and the subtest of Digits Range of Wechsler Intelligence (OR = 0.581). The authors concluded that, after controlling intellectual function, clinical diagnosis and motor impairment, deficits in executive functions and attention increased the chances of tooth decay development in children with cerebral palsy²⁸.

4. CONCLUSION

After the moment that can classify the type of cerebral palsy that the person has the etiology and the problems associated with them, you can develop a plan of treatment and/or monitoring able to maintain oral and general health of these special patients.

However it was concluded that it is not just impart

knowledge it is also need to make the implementation of public policies that address the promotion, prevention and improvement of specialized services for these patients, together with inter-actions of health that contribute to comprehensive care and improvement of services.

REFERENCES

- [1] Resende VLS, Castilho LS, Souza ECV, Jorge WV. Atendimento odontológico a pacientes com necessidades especiais. In: 8º Encontro de Extensão da UFMG: 2005 Belo Horizonte. Anais do 8º Encontro de Extensão da UFMG. 2005; 1-6.
- [2] Guerreiro PO, Garcias GL. Diagnóstico das condições de saúde bucal em portadores de paralisia cerebral do município de Pelotas, Rio Grande do Sul, Brasil. *Ciênc Saúde Col*. 2009; 14(5):1939-46.
- [3] Garcia PNS. Impacto de um programa preventivo com ênfase na educação de hábitos de higiene oral. *Rev Odontol UNESP*. 1998; 27(2):394-403.
- [4] Velasco E, Machuca G, Martinez-Sahuquillo A, Rios V, Lacalle J, Bullón P. Dental health among institutionalized psychiatric patients in Spain. *Spec Care Dentist* 1997; 17(6):203-6.
- [5] Whyman RA. The oral health of long-term residents of a hospital for the intellectually handicapped and psychiatrically ill. *New Z Dent J*. 1995; 91(6):49-56.
- [6] Barreto EC, Santana EJB. Avaliação do estado de saúde periodontal em pacientes psiquiátricos. *Revista da FOUFBA*. 1990/1991; 10-11:33-41.
- [7] Shaw MJ, Shaw L. The effectiveness of differing dental health education programmes in improving the oral health of adults with mental handicaps attending Birmingham adult training centers. *Community Dental Health*. 1991; 8(2):139-45.
- [8] Armitage GC. Development of a classification system for periodontal diseases and conditions. *Ann of Periodontol*. 1999; 4(1):1-6.
- [9] Dias CRS, Almeida KGB, Scheibe KGBA, *et al.* A doença periodontal como fator de risco para os acidentes cerebrovasculares. *Pesq Bras Odontoped Clin Integr*, 2007; 7(3):325-29.
- [10] Sinaglia AC, Nassar CA, Nassar PO, Giancuri TS. Inter-relação doenças periodontais e doenças cardiovasculares. *Odontologia.com.br Medcenter*, Março, 2007. Disponível em: <http://www.odontologia.com.br/artigos.asp?id=702>. Acesso em: 20 de Maio de 2008.
- [11] National Institute of Health. Program. Working together to manage diabetes: a guide for pharmacists, podiatrists, optometrists and dental professional. 2010. Disponível em: <http://www.ndep.nih.gov>. Acesso em: 17 de mar. 2012.
- [12] National Institute of Health. National Institute of Neurological Disorders and Stroke. Cerebral Palsy Information. Disponível em: <http://www.ninds.nih.gov/disorders/cerebral>. Acesso em 06 de Janeiro de 2013.
- [13] Krigger KW. Cerebral palsy: an overview. *Am Fam Physician*. 2006; 73(1):91-100.
- [14] Hengen M. The role of dental hygienist in dental care of the cerebral palsy patient. *Dent Hyg*. 1980; 54(10):472-3.
- [15] Bax M. Proposed definition and classification of cerebral palsy. *Dev Med Child Neurol*. 2005; 47:571-6.
- [16] Carvalho RB. Saúde bucal e função motora oral de pacientes com paralisia cerebral. 2009. 81 f. Dissertação (Mestrado em Ciências e Saúde) – Universidade Federal do Piauí. 2009.
- [17] Arruda MCV. Condições bucais de pacientes com paralisia cerebral. 2011. 117 f. Dissertação (Mestrado em Odontologia) – Faculdade de Araçatuba, da Universidade Estadual Paulista. 2011.
- [18] Sousa KG. Paralisia cerebral e a reconstrução do cotidiano familiar. 2009. 81 f. Dissertação (Mestrado em Ciências e Saúde) – Universidade Federal do Piauí, 2009.
- [19] Abanto J, Carvalho TS, Bönecker M, Ortega AO, Ciamponi AL, Raggio DP. Parental reports of the oral health-related quality of life of children with cerebral palsy. *BMC Oral Health*. 2012; 12:15.
- [20] Miura RT. Experiência e qualidade de vida de mães de crianças com paralisia cerebral. 2007. 151 f. Dissertação (Mestrado em Ciências) – Faculdade de Filosofia e Ciências de Ribeirão Preto da USP, Ribeirão Preto. 2007.
- [21] Aisen ML, Kerkovich D, Mast J, Mulroy S, Wren TA, Kay RM, *et al.* Cerebral palsy: clinical care and neurological rehabilitation. *Lancet Neurol* 2011; 10(9):844–52.
- [22] Figueiredo JR. Odontologia em paralisia cerebral. In: Sousa AMC Ferrareto I. *Paralisia cerebral: aspectos práticos*. São Paulo. Menon. 1998; 11:148-68.
- [23] Kavanagh J. The dental treatment of the cerebral palsied patient. *J Dent Que*. 1982; 19:47-52.
- [24] Linderman RZG, Zaszchel-Grob D, Opp S, Lewis MA, Lewis C. Oral health status of adults from a California Regional center for developmental disabilities. *Spec Care dentist*. 2001; 21(1):59-63.
- [25] Camargo MAF. Incidência de cárie em crianças com paralisia cerebral no contexto brasileiro. 2009. 112 f. Tese (Doutorado em odontologia) – Faculdade de Odontologia de Bauru da Universidade de São Paulo. 2009.
- [26] Santos MT, Nogueira MLG. Infantile reflexes and their effects on dental caries and oral hygiene in cerebral palsy individuals. *J Oral Rehabil*. 2005; 32(12):880-5.
- [27] Huang ST, Hung SJ, Liu HY, Chen CC, Hu WC, Tai YC, *et al.* The oral health Status and treatment needs of institutionalized children with cerebral palsy in Taiwan. *J Dent Sci*. 2010; 5(2):75–89.
- [28] Dourado M da R, Andrade PM, Ramos-Jorge ML, Moreira RN, Oliveira-Ferreira F. Association between executive/attentional functions and caries in children with cerebral palsy. *Res Dev Disabil*. 2013; 34:2493–99.