

THE PREVALENCE OF MALOCCLUSIONS IN A GROUP OF CHILDREN WITH CEREBRAL PALSY

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ABSTRACT.

Cerebral palsy (CP) represents for children an important problem of health. At complete neurological picture may be associated other problems, less studied comparative to other aspects of CP. The aim of this study was to evaluate the prevalence and determinant factors of malocclusions in children with CP. The study group included 129 children (43 girls and 86 boys) aged 2-18 years, diagnosed with various forms of cerebral palsy according to the proposal of Surveillance of Cerebral Palsy in Europe Group and Gross Motor Function Classification System (GMFCS) after Palisano. The protocol of our study included general and neurological examination, psychological evaluation and dental exam. The data regarding oral hygiene were collected using a questionnaire administered to the parents. Dental examination recorded the 20 anterior/posterior cross bite and anterior open bite. Among the followed children with cerebral palsy, more than a half (77.52%) had poor hygiene of the oral cavity. Malocclusion was observed at 55.04% children with cerebral palsy. 69,01% of these patients were diagnosed with CP level III-V CMFCS and 30,99% were diagnosed with CP level I-II CMFCS. Orthodontic treatment was limited only at children with malocclusions and CP level I-III CMFCS. Poor oral hygiene was a predominant finding in our children with CP and the prevalence of malocclusions in these patients was found to be high. The severity of neuromuscular spasticity can favour the development of malocclusions and can be considered a determinant factor for these oral problems. Patient of paediatric age with cerebral palsy and malocclusion need orthodontic treatment, but the possibility of offering this treatment is limited.

Key words: cerebral palsy, malocclusion, children

INTRODUCTION

Cerebral palsy (CP) is a chronically cerebral disease which is defined like a group of non-progressive motor disorders that onset in the first year of life. At paediatric age, CP is the most frequent cause of infirmity motor problems; the type and the severity of motor problems alternate from a case to another. The cerebral palsy classification includes four types: spastic, dyskinetic, hypotonic, and mixed, the spastic type being the most common one. Spastic tetraparesis represents the most severe form of spastic CP, in which

the motor disturbance affects the whole body: face, trunk, legs, arms, and usually puts the patient in a wheelchair.^{1,2}

Although there is a general agreement that malocclusions are more frequently found in CP children, yet there is disagreement among various authors regarding correlation between specific type of malocclusion and type of CP.³ While some studies have reported class II division 1 malocclusion to be common in spastic CP children,⁴ others have reported that these children usually exhibit a class II,

division 2 malocclusion with unilateral or bilateral cross bite.^{4,5,6}

Neurological aspects of the disease are associated with other issues which were less investigated so, the aim of this study was to evaluate the prevalence and determinant factors of malocclusions for children with cerebral palsy.

MATERIAL AND METHOD

The study group included 129 children (43 girls and 86 boys) age 2-18 years, diagnosed with various forms of CP, in five years, in the Department of Paediatric Neurology, „Sf. Maria” Iasi Emergency Hospital for Children. All parents signed informed consent. The classification of CP was made after the proposal of Surveillance of Cerebral Palsy in Europe Group and after Gross Motor Function Classification System (GMFCS) after Palisano.⁷ (see Table 1)

Children with a previous orthodontic history were excluded from our study. The protocol included general and neurological examination, psychological evaluation and dental exam. The level of oral hygiene in children with physical disabilities has been assessed by oral and dental examination at those that the level of mental development allowed us. Also, the data regarding oral hygiene were collected using questionnaire administered to the parents.

The questionnaires included questions on how child was feeding, about the presence and severity of sialorrhea and data about dental hygiene. Dental examination recorded the anterior cross bite (lower incisors in front of the upper incisors), posterior cross bite (posterior teeth of the upper arch displaced to the palatal region, in relation to the lower teeth either unilaterally or bilaterally), deep bite and

anterior open bite (no contact between the upper and lower anterior teeth).

Table 1. The characteristics for the studied group of patients

	Nr. of children
Type of cerebral palsy:	
1. Spastic forms of CP	114 (89.37%)
2. Dyskinetic CP	8 (6.2%)
3. Ataxic CP	5 (3.87%)
4. Mixed CP	2 (0.56%)
Cognitive development	
➤ Normal	57 (44.19%)
➤ Easy mental retardation	10 (7.75%)
➤ Mild mental retardation	21 (16.28%)
➤ Severe mental retardation	41 (31.78%)
GMFCS	
➤ level I	38 (29.45%)
➤ level II	31 (24.03%)
➤ level III	9 (6.97%)
➤ level IV	16 (12.40%)
➤ level V	35 (27.13%)

GMFCS = Gross Motor Function Classification System

RESULTS

The questionnaires completed by parents, revealed that dental hygiene was very good in 7 (5.43%) cases of children with CP, was good in 22 (17.05%) cases, and poor in 100 (77.52%) children. Also, 43 (33.33%) children had sialorrhea, 75 (58.14%) of them received any type of food, 31 (24.03%) children received only liquid and semisolid food, and 23 (17.83%) patients received mostly liquid diet. Of the evaluated patients with cerebral palsy, 71 (55.04%) of them presented malocclusion. The following malocclusions were diagnosed: anterior cross bite in 18

(25.35%) cases, posterior cross bite was diagnosed in 23 (32.39%) cases and anterior open bite was diagnosed in 40 (56.23%) cases (see figure 1).

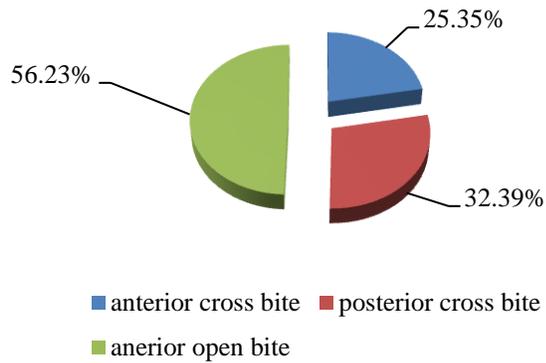


Fig. 1. Types of malocclusions for the group of CP children



Fig. 2. Patients with CP: level of dental status hygiene and deep bite malocclusion (clinical cases)

Other 28 (39.44%) children had moderate or severe malocclusion.



Fig. 3. Patient with CP: level of dental status hygiene and anterior and unilateral cross bite malocclusion (clinical case)



Fig. 4. Patient with cerebral palsy and class II malocclusion (clinical case)

Among children with cerebral palsy and malocclusion, 49 (69.01%) of these patients were diagnosed with CP level III-V GMFCS (2 children with level III GMFCS, 12 children with level IV GMFCS and 35 children with level V GMFCS) and 22 (30.99%) of the patients presented mild forms of CP level I-II GMFCS (13 children with level II GMFCS and 9 children with level I GMFCS). (See table 2)

Table 2. Patients with malocclusions related to Gross Motor Function Classification System (GMFCS)

GMFCS Levels	Patients with malocclusion	Percent values
level I	9	12.67%
level II	13	18.30%
level III	2	2.81%
level IV	12	16.90%
level V	35	49.29%
Average	14.2	19.99%

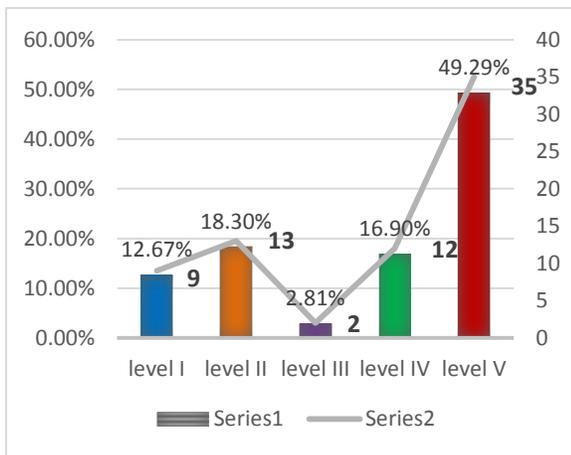


Figure 5. Graphic representation of CP patients with malocclusion by GMFCS classification

DISCUSSIONS

Cerebral palsy (CP) represent for children an important problem of health, many studies reported a prevalence of 1-2,4 cases /1000 new born. The motor problems often manifest together with cognitive and behaviour disorders, epileptic seizures, digestive disorders, respiratory problems.

Dental pathology is commonly seen in paediatric patients with cerebral palsy. For those patients dental health evaluation is difficult due to communication problems and low cooperation. More than half of followed

children with cerebral palsy had poor dental hygiene. In the majority of these children poor oral hygiene was attributed to the inability of these children to perform basic home care procedures of oral hygiene.

Chandna and al.⁸ (2011) assessed oral hygiene in 25 children with cerebral palsy and concluded that poor oral hygiene was a predominant finding and only 16% of children brushed twice daily. The authors attributed poor oral hygiene of children with CP to the inability of these children to perform basic home care procedures of oral hygiene. In our study among the followed children with CP, more than a half (77.52%) had poor hygiene

Malocclusion are among the most frequent oral alterations found in children with CP. There is an increasing incidence of class II malocclusion for patients with CP, most of them representing a skeletal problem. The anterior open bite with protrusion of the anterior teeth, together with abnormal muscle movement and posture problems, are responsible for much of the trauma to anterior teeth. There were also, observed: a longer anterior-posterior maxillary arch length and crowded lower anterior teeth.

Numerous authors considers that malocclusion has a considerable impact on the lives of the children with CP because can cause various problems related to oral functions, such as swallowing and speech (Kaye 2005, Ortega 2007)^{9,10}.

Ortega et al.¹⁰ considered that children diagnosed with CP exhibited a greater chance of having an anterior open bite and he explained this finding by the fact that muscle incompetence impairs lip seal and leads to a systematic anterior posture of the tongue, facilitating the onset and maintenance of the habit of tongue interposition. Also, the author

considered that patients have a greater percentage of non-nutritive sucking habits. In our study, 17.83% of the children received mostly liquid diet.

In a study that assessed the prevalence of malocclusion in 181 children diagnosed with various neurological problem, Oliveira (2011)¹¹ reported the presence of earlier cross bite to 3.8% of children with CP, posterior cross bite at 13.9% and anterior open bite at 43%. Oliveira considered that patients of paediatric age diagnosed with CP exhibit physiological abnormalities represented by insufficient development of the orofacial musculature, which facilitate the appearance of malocclusions.

Also, Martinez-Mihi et al. (2014)¹² studied the presence of malocclusion in a group of 48 children with CP and he noted that only four subjects had no malocclusions, while, 91.6% required some type of orthodontic treatment and 68.2% of these patients presented open bite.

Guerreiro (2009)¹³ used Dental Aesthetic Index to study a group of 41 patients with CP and find that 75% of the subjects presented severe disabling malocclusion. In our study, 39.44% of children with CP presented mild or severe malocclusion and 56.23% was diagnosed with anterior open bite.

In their studies, Dougherty¹⁴ and Miamoto et al.¹⁵ have been reported a prevalence rate of malocclusion between 59% and 92%, with vast majority of malocclusion

classified as Angles Class II with increased overjet and overbite.

It has been estimated that approximately 75% of patient with disability require orthodontic treatment to achieve and maintain an optimal occlusal relationship necessary to ensure adequate oral function and aesthetic appearance.¹⁶

CONCLUSIONS

Poor oral hygiene was a predominant finding in our children with CP and the prevalence of malocclusion in these patients was found to be high. The severity of neuromuscular spasticity can favour the development of malocclusion and can be considered a determinant factor for these oral problems. Patient of paediatric age with CP and malocclusion need orthodontic treatment, but the possibility of offering this treatment is limited.

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