EVALUATION OF THE TEETH AND JAW DEFORMITIES IN CHILDREN WITH SPECIAL HEALTH NEEDS

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ABSTRACT

INTRODUCTION: Special needs children (SNC) are a public health concern and need specific oral care. Globally, SNC have a significantly higher prevalence of teeth and jaw deformities (TJD). The malocclusions are often related to dental trauma, which immensely complicates the dental status of these children (e.g. big protrusion of the incisors is a predisposition for inflicting traumatic harm); create functional problems (e.g. masticatory function, saliva ejection); speech impediment and dysfunction of the temporomandibular joint (TMJ). The data in Bulgaria regarding SNC and their oral health is scarce.

AIM: The aim of this article is to determine the relative share of SNC among the treated at the University Medico-Dental Centre (UMDC) patients, who have teeth and jaw deformities.

MATERIALS AND METHODS: In the period January 2015-December 2019, 402 children with late mixed dentition and special health needs were included in a longitudinal clinical research. Teeth and jaw deformities were rare to be observed. The results were statistically evaluated using descriptive statistics, comparisons between groups were analyzed by non-parametric χ^2 test with IBM SPSS v.20.0.

RESULTS: Teeth and jaw deformities were diagnosed in 231 (57.5%) of SNC, and a significant difference was determined between children with and without malocclusions for different conditions ($p < 0.001$). Children with mental retardation had the highest relative share of malocclusions (75%), while children with cerebral palsy had the lowest – 44.1%. In the analysis of the type of malocclusion, there was a significant difference among the children with different conditions ($p < 0.01$).

CONCLUSION: SNC experience predominantly teeth and jaw deformities, which means that individualized care for their oral health has to be focused not only on treating dental caries and its complications, but on prophylaxis and treatment of orthodontic problems as well.

Keywords: *teeth and jaw deformities, children, special needs*

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INTRODUCTION

Special needs children (SNC) experience a significantly higher prevalence of teeth and jaw deformities (TJD) (1). The malocclusions are often related to dental trauma, which immensely complicates the dental status of the children (e.g. big protrusion of the incisors is a predisposition for inflicting traumatic harm); functional problems (e.g. masticatory function, saliva ejection); speech impediment and dysfunction of the temporomandibular joint (TMJ) (2, 3, 4). According to some studies, children with Down syndrome have a tendency for developing skeletal class III malocclusion, while in children with cerebral palsy, class II malocclusion is more common in the incisal area (5,6,7).

AIM

The aim of this article is to determine the relative share of SNC who have teeth and jaw deformities among the University Medico-Dental Centre (UMDC) patients ≤ 18 years of age.

MATERIALS AND METHODS

In the period January 2015-December 2019, 402 children with late mixed dentition and special health

needs were included in a longitudinal clinical research. The research was conducted at UMDC. Teeth and jaw deformities were rare to observe. Deviations in the position of the teeth, sagittal, transversal and vertical occlusal relations were included in the registration of the orthodontic status of the examined children. The children were divided into 3 groups – according to Angle and their orthodontic status (8,9).

- ✧ Angle Class I - normal medio-distal relations in the molar region, with deviations of the frontal teeth;
- ✧ Angle Class II - all deformities in which there is distal position of the lower first permanent molars, with protrusion of the frontal teeth (II1) or specific position of the incisors – retrusion of the central and protrusion of the lateral incisors (II2) are included;
- ✧ Angle Class III - all deformities in which there is mesial position of the lower first permanent molars, compared to the upper and a cross bite in the frontal teeth is included (8,10).

The following indicator was examined: relative share of the special needs children who have teeth and jaw deformities.

Table 1. Distribution of the examined children based on condition and gender for the time period 2015-2019

Condition	Gender	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	Total (%)	χ^2 P-value
Autism	Girls	2	3	2	30	41	78	$\chi^2=0.37$ $P>0.05$
		(1.35)	(2.18)	(1.35)	(18.27)	(25.70)	(54)	
	Boys	1	2	1	23	34	61	
		(0.67)	(1.35)	(0.67)	(16.24)	(23.00)	(46)	
Mental retardation	Girls	1	3	3	30	41	78	$\chi^2=1.11$ $P>0.05$
		(0.68)	(1.97)	(1.97)	(19.73)	(26.97)	(51)	
	Boys	1	2	1	30	40	74	
		(0.68)	(1.32)	(0.68)	(19.37)	(26.31)	(49)	
Cerebral palsy	Girls	2	6	10	10	11	39	$\chi^2=0.41$ $P>0.05$
		(2.94)	(8.82)	(14.7)	(14.7)	(16.18)	(57)	
	Boys	2	4	7	9	7	29	
		(2.94)	(5.88)	(10.29)	(8.82)	(10.29)	(43)	
Down syndrome	Girls	1	2	4	7	10	24	$\chi^2=2.11$ $P>0.05$
		(2.32)	(4.65)	(9.30)	(16.28)	(23.25)	(56)	
	Boys	2	2	1	7	7	19	
		(4.65)	(4.65)	(2.32)	(16.28)	(16.28)	(44)	

The results were statistically evaluated using descriptive statistics, comparisons between groups were analyzed by non-parametric χ^2 test. The level of statistical significance alpha was set at 0.05. Analyses were performed with IBM SPSS v.20.0.

RESULTS

From all 402 SNC included in the study 219 (54%) were boys. The number of special needs children in regard to condition and gender for the time period 2015-2019 is presented in Table 1.

Table 2. Distribution of children with and without malocclusions based on special needs condition

Mental Condition	Without Malocclusions n (%)	With Malocclusions n (%)	Total n (%)
Mental retardation	38 (25.0)	114 (75.0%)	152 (37.8)
Autism	72/51.8 %	67/48.2 %	139
Cerebral palsy	38/55.9 %	30/44.1 %	68
Down syndrome	23/53.5 %	20/46.5 %	43
Total	171/42.5 %	231/57.5 %	402

The results show that there is no statistically significant difference between the boys and girls in the period of examination, but there is a tendency for increase in the number of SNC treated under general anesthesia. The highest increase is observed in 2018 and 2019.

Our research indicated that the highest number of SNC in need of pharmacological behavior influence were those with mental retardation - 38% (n=152), followed by autism 36% (n=148), cerebral palsy 17% (n=68), and other rare syndromes 9% (n=43). These results are close to those reported by other authors (11,12). According to a study, conducted in Spain in 2007, the highest percentage of treated patients with special needs have mental retardation - 86%, followed by cerebral palsy - 11%, and 3% with autism. The number of boys (51%) is insignificantly higher than the number of girls (49%) (13,14). According to other authors from Taiwan in a research conducted in 2014 the highest percentage is for children with autism - 31%, followed by mental retardation - 19%, and children diagnosed with cerebral palsy, deafness and blindness. The average age of

these children is (6.8±3.3 years). The boys are twice as many as the girls (62/34) (15,14,16).

Teeth and jaw deformities were established in 231 SNC, and a significant difference was observed between children with and without malocclusions for different conditions ($\chi^2=31.067$; $p<0.001$). Children with mental retardation had the highest relative share of malocclusions (75%), while children with cerebral palsy had the lowest - 44.1% (Table 2).

In our study the majority of the examined SNC

(n=231, 57.5 %) experienced malocclusions. The children with normal occlusal relations were 171 or 42.5 %.

In all 152 children with mental retardation, 114 (75%) had orthodontic problems, with more than half - 72 (63%) in Angle Class I, followed by 40 (35%) in Angle Class II, and only 2 (1.75%) in the group of Angle Class III.

From the 139 children with autism, 67 (48.2%) had teeth and jaw deformities, with 39 (58%) having Angle Class I, 25 (37%) - Angle Class II, and 3 (5%) - Angle Class III.

The children with cerebral palsy were 68 in number and 30 of them experienced malocclusions: 16 (53%) had Angle Class I, 13 (43%) - Angle Class II, and 1 (3%) - Angle Class III.

Out of the 43 Down syndrome children, 20 had teeth and jaw deformities, with 17 (85%) having Angle Class I, 2 (10%) - Angle Class II, and 7 (35%) - Angle Class III.

In the analysis of the type of malocclusion there was a significant difference among the children with different conditions ($\chi^2=38.974$; $p<0.01$).

DISCUSSION

Worldwide, the research shows that the number of children with indications for treatment under general anesthesia is increasing with each passing year (17). Our results closely resemble the international ones (1, 12, 18).

The number of SNC treated under general anesthesia is exponentially increasing with time, according to a research in China (11). The 791 children, included in the study, were divided into 3 age groups: <3 years – 65 cases, 3 to 6 years of age – 492 cases, and > 6 years – 235 cases. The number of girls treated under general anesthesia was 242. The boys were 549. There is a continuous increase in the number of parents of SNC, who accept the pharmacological techniques of behavior management, when there are indications for their use. This kind of treatment provides a complete oral rehabilitation in one visit without any pain and stress and this is the reason that a lot of parents would choose this method of treatment for their children (17, 18, 19).

The analysis of our data shows that more than half of the children with malocclusions had Angle Class I – 138 (57%). Around (n=78) 37% of the children with more severe orthodontic symptoms and diagnoses: mental retardation, autism, cerebral palsy, had Angle Class II deformities. The children with Down syndrome had very severe orthodontic deformities, more often Angle Class III (35%), rather than Class II – 2 (10%).

According to other authors, the relative share of SNC is lower – 40%, with the highest percentage being children with mental retardation (8,9,12,18). The results recorded by Greek and Indian authors are close and relevant to our data. According to their data 53% of the children with cerebral palsy have malocclusions (1,11,12,20).

Research conducted in Australia shows a higher relative share of the children with special health needs that have orthodontic anomalies – 92% (5). Our results resemble their data, showing that children with Down syndrome experience Angle Class III deformities more often, and children with mental retardation and autism have Angle Class II deformities more often (1,6,17).

CONCLUSION

The clinical findings proved that in most cases SNC experience teeth and jaw deformities. Consequently, the individual care for their oral health has to be focused not only on treating dental caries and its complications, but on prophylaxis and treatment of orthodontic problems as well.

The prevalence of disability, especially in children, is a huge public health challenge and an under-investigated field in Bulgaria. The World Health Organization and the World Bank recommend the development of special tools in order to fill in the research gaps and establish concrete protocols for preventive and clinical management (7).

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