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## THE EFFECT OF THE MEDICAL AND PREVENTIVE TREATMENT MANAGEMENT ON THE PROGRESS OF MAJOR DENTAL DISEASES IN CHILDREN WITH DYSPLASTIC SCOLIOSIS

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The clinical manifestations of the dental caries, fluorosis and gingivitis had been studied in children with dysplastic scoliosis I-II degrees. The medical and preventive treatment management complex has been developed and tested in clinic, it has a aiming at preventing the occurrence and the subsequent progression of the main dental diseases in these children. The high clinical efficacy has been confirmed for this treatment complex. In one-year period the reduction of the increment of permanent teeth dental caries was 26.17% and 43.75% in 2-year period. The sustainable clinical remission of gingivitis was achieved, as evidenced by the reduction of the PMA index by 39.06% after 12 months. The use of the proposed management plan also had a significant prolonged medical-and-prophylactic effect on the hard tooth tissues with fluorosis.

**Keywords:** children, dental caries, fluorosis, gingivitis, dysplastic scoliosis, prophylaxis of dental diseases.

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Scoliosis in children is an important social and medical problem. Scoliosis affects the organs of the chest and abdominal cavity, changing their position, promotes the dysfunction of the cardiovascular and nervous systems, impairment of external respiration and digestive organs. Notably, the "scoliotic disease" term occurs in the publications more and more frequently, implying not only the local deformation, but also a violation of the general state of the body [1,2]. The analysis of current publications shows that this disease in children occurs within 2 to 9 cases per 100 examined patients and its prevalence is tending to increase [8,5]. Obviously, scoliotic disease also affects the dental morbidity of children [6,7,9]. In this regard, there is a need to develop specific recommendations concerning the prevention of major dental diseases in children with dysplastic scoliosis, which would be aimed at correction of the basic parts of the pathogenesis of these diseases.

The **purpose** of the study was to analyze the indices of dental caries prevalence, fluorosis and periodontal tissue diseases in children with dysplastic scoliosis and to develop a medical-and-preventive treatment management plan aimed at increasing the resistance of the hard tooth tissues of teeth and periodontal tissues and to assess its effectiveness.

**Material and methods.** To achieve the goal and objectives of the research 315 children, aged 7 to 15 years, with I-II degree dysplastic scoliosis and 236 almost healthy children of the same age group have been examined. Tooth decay and dental fluorosis analysis has been carried out according to the conventional technique, recommended by the WHO (2013) [4]. The effectiveness of the preventive measures was assessed using the index of the reduction of the caries increment. To record the state of the periodontal tissues the Schiller-Pisarev test and the PMA index of Parma modification was used [3].

**Results of the study and their discussion.** The findings of the studies have shown that the prevalence of the major dental diseases, namely, dental caries, fluorosis and gingivitis, in children with dysplastic scoliosis was significantly higher than in almost healthy children of the same age.

The prevalence of dental caries in children with scoliosis was  $78.62 \pm 2.29\%$ , and the incidence constituted  $2.83 \pm 0.13$ , whereas in the control group, these indices were significantly lower:  $63.56 \pm 3.13\%$  and  $1.39 \pm 0.15$ , respectively ( $p < 0.01$ ). According to the WHO evaluation scale, the incidence of dental caries of permanent teeth in the 12-year-old children with scoliosis can be assessed as "low" (Caries Filling Extraction Index (CFE) =  $2.12 \pm 0.20$ ) and in control group as "very low" (CFE =  $1.07 \pm 0.17$ ), which can be explained by the specificity of the geographical region.

The prevalence and incidence of dental caries increased with the growth of the severity of scoliosis. Thus, starting from the age of 8 years in children with II degree scoliosis the prevalence of dental caries was 80-100%, which significantly exceeded the indices in children with I degree scoliosis. The incidence of tooth decay is also significantly higher in children with II degree scoliosis, especially the difference is marked at the age of 8-10 and 12 years, when the cf + CFE indices were 2-2,5 times higher the similar indices in children with I degree scoliosis.

The study has established that dental fluorosis occurred in  $56.83 \pm 2.79\%$  of children with

dysplastic scoliosis that was 2 times more frequently than in healthy children ( $27.97 \pm 2.92\%$ ;  $p < 0.001$ ). With age, the proportion of children with moderate and severe forms of dental fluorosis is increasing and begins to prevail over the number of children with mild forms:  $30.77 \pm 9.05\%$  against  $26.92 \pm 8.69\%$ , respectively. In healthy children a similar tendency is observed, though the percentage of children with mild forms of dental fluorosis is 2 times higher the number of children with the moderate form ( $18.18 \pm 8.22\%$  against  $9.09 \pm 6.12\%$ , respectively); a severe form of fluorosis has not been detected at all.

However, the prevalence of the dental fluorosis in children with II degree scoliosis is somewhat higher than in children with I degree scoliosis ( $63.41 \pm 5.31\%$  against  $54.07 \pm 3.26\%$ , respectively). Moderate and severe forms of dental fluorosis in children with II degree scoliosis occur more frequently than in children with I degree scoliosis ( $29.27 \pm 5.02\%$  against  $15.88 \pm 2.39$ , respectively ( $p < 0.05$ )).

In children with dysplastic scoliosis a significant prevalence of chronic catarrhal gingivitis ( $67.41 \pm 2.65\%$  against  $33.19 \pm 3.11\%$  in healthy children) has been found, which increased with age and in 15-year-old teenagers reached  $88.46 \pm 6.27\%$ , that was 1.8 times higher the index in almost healthy children ( $p < 0.01$ ). At the same time, in children with disorders of the locomotor system the dynamic pattern of the prevalence of inflammatory diseases of periodontal tissues and the severity of their progress, depending on the severity of scoliosis, has been established. At all age periods the prevalence of gingivitis in II degree scoliosis children was higher and reached  $60.00 \pm 20.00\%$  to  $94.12 \pm 5.71\%$ , and at the age of 7, 8, 14 and 15 years 100% of children had inflammatory disease of the gums ( $p < 0.001$ ).

In children with scoliosis a mild degree of gingivitis was detected 2.3 times more often than moderate gingivitis:  $69.67 \pm 3.16\%$  and  $30.33 \pm 3.16\%$ , respectively. In healthy children a similar tendency was observed, though the share of moderate degree of severity was only  $10.53 \pm 3.52\%$ , which is significantly different from the indices of the main group ( $p < 0.001$ ). The percentage of children with moderate gingivitis was always higher in the group with II degree scoliosis.

The findings of the study of clinical and laboratory features of the progress of dental diseases in children with dysplastic scoliosis permitted us to develop, together with Professor A. P. Levitskii (Odessa Research Institute of Dentistry) the medical-and-preventive treatment management plan that included: outpatient supervision in children's orthopedist-traumatologist; treatment of dental caries and its complications; training of individual oral hygiene with the use of "Zhemchug" toothpaste 2 times a day; professional oral hygiene with the follow-up control; oral use of vitaminized drug with adaptogenic properties "Biotrit-C" with the regimen of 1 pill 3 times a day; oral use (sublingual) of "Kaltsit" drug as the sources of a soluble calcium with a high degree of absorption with the regimen of 1 pill 3 times a day; oral use of the "Ekso" drug with osteotropic, anti-inflammatory and antioxidant action with the regimen of 1 pill 2 times a day.

The course of medical-and-preventive treatment management lasts for 1 month and is prescribed 2 times a year. The efficacy of the management was determined by dynamic observation of 105 children aged 11-12 years with dysplastic scoliosis: the proposed management lasted for 1.5 years, applied to 50 children (Group 1), whereas the rest 55 children (Group 2) kept to thorough oral hygiene only. The analysis of the finding of the research has shown that the use of the medical-and-preventive treatment management had a positive effect on the homeostasis of the oral cavity. The study of indices of the incidence and prevalence of dental caries a year after treatment showed that the CFE increment in Group 1 was  $0.30 \pm 0.08$  teeth, and  $0.47 \pm 0.09$  teeth in children of Group 2. The prevalence of dental caries in children of Group 2 increased by  $7.27 \pm 3.50\%$ , and by  $3.07 \pm 2.14\%$  in almost healthy children. No prevalence increment was found in the Group 1. In one-year period the caries-preventive effect accounted for 36.17%. The long-term results of the use of medical-and-preventive treatment management after 2 years demonstrate a significant caries-preventive effect. The dental caries incidence in children of Group 1 was  $0.54 \pm 0.09$  teeth, and  $0.96 \pm 0.12$  teeth in Group 2. (Table 1). The use of medical-and-preventive treatment management had a beneficial effect on the course of dental fluorosis. After one-year-period no increase in the severity of fluorosis was detected in a single patient of the study group, while in control group, the share of children with insignificant or mild fluorosis decreased by 1.13 times (Table 2).

Combined therapy positively affects the state of periodontal tissues: discomfort and gingival hemorrhage disappeared, the values of the PMA index and Schiller-Pisarev tests decreased. In this way, after the applied course of therapy the PMA index decreased by 3.3 times, and the prevalence of gingivitis reduced by 4.3 times. The apparent tendency to prolonged stabilization of the inflammation was observed after 12 months: the share of children whose Schiller-Pisarev test was positive decreased by 1.5 times and the PMA index decreased by 39.06% (Table 3).

Table 1

**The prevalence and incidence of dental caries permanent teeth of in children with dysplastic scoliosis in the dynamics of treatment (M±m)**

Groups of children	Prevalence of dental caries (abs./%)			Incidence of dental caries (CFE index)		
	Before treatment	After one-year period	After 2-year period	Before treatment	After one-year period	After 2-year period
Healthy children n=65	35 53,85±6,18	37 56,92±56,14	40 61,54±6,03	1,02±0,12	1,14±0,13	1,31±0,13
Group 1 n=55	39 70,91±6,12	43 78,18±5,57	47 85,45±4,75	2,05±0,28	2,53±0,27	3,02±0,26 p<0,02
Group 2 n=50	40 80,00±5,65	40 80,00±5,65	42 84,00±5,18	1,86±0,17	2,16±0,18	2,42±0,19 p<0,05

Note: p - reliability of difference with initial values.

Table 2

**The prevalence of permanent teeth fluorosis of different severity in the dynamics of treatment**

Groups of children	Schedule of examination	Fluorosis degrees of severity							
		Very mild form		Mild form		Moderate form		Severe form	
		abs	%	abs	%	abs	%	abs	%
Healthy children n=65	before treatment	8	12,31±4,07	6	9,23±3,59	4	6,15±2,97	-	-
	after one-year period	5	7,69±3,30	8	12,31±4,07	5	7,69±3,30	-	-
	after 2-year period	4	6,15±2,97	8	12,31±4,07	6	9,23±3,59	-	-
Group 1 n=50	before treatment	12	24,00±6,03	5	10,00±4,24	8	16,00±5,18	5	10,00±4,24
	after one-year period	12	24,00±6,03	5	10,00±4,24	8	16,00±5,18	5	10,00±4,24
	after 2-year period	11	22,00±5,85	6	12,00±4,59	8	16,00±5,18	5	10,00±4,24
Group 2 n=55	before treatment	18	32,73±6,32	7	12,72±4,49	10	18,18±5,20	1	1,82±1,80
	after one-year period	16	29,09±6,12	6	10,91±4,20	12	21,82±5,56	2	3,63±2,52
	after 2-year period	12	21,82±5,56	8	14,54±4,75	13	23,64±5,73	3	5,45±3,06

Table 3

**Indices of the hygiene and state of the periodontal tissues in the dynamics of treatment**

Groups of children	Hygiene index (score)				Prevalence of gingivitis (abs./%)				PMA index (%)			
	Before treatment	After treatment	After one-year period	After 2-year period	Before treatment	After treatment	After one-year period	After 2-year period	Before treatment	After treatment	After one-year period	After 2-year period
Healthy children n=65	1,44±0,04		1,34±0,04	1,27±0,05	38,46±6,03		44,62±6,16	46,15±6,18	5,36±1,02		6,14±1,08	6,67±1,14
Group 1 n=55	1,63±0,05	1,19±0,05 p <sub>1</sub> < 0,001	1,63±0,05	1,55±0,05	69,09±6,23	27,27±6,00 p <sub>1</sub> < 0,001	76,36±5,73	81,82±5,20	12,38±1,48	6,58±1,45 p <sub>1</sub> < 0,01	13,46±1,52	15,35±1,56
Group 2 n=50	1,72±0,07	1,03±0,06 p <sub>1</sub> < 0,001	1,38±0,06 p <sub>1</sub> < 0,001	1,47±0,06 p <sub>1</sub> < 0,01	78,00±5,85	18,00±5,43 p <sub>1</sub> < 0,001	52,00±7,07 p <sub>1</sub> < 0,01	72,0±6,35 p <sub>2</sub> < 0,01	11,52±1,43	3,44±1,04 p <sub>1</sub> < 0,001	7,02±1,31 p <sub>1</sub> < 0,05	10,62±1,44 p <sub>2</sub> < 0,05

Note: p<sub>1</sub> - reliability of differences of the indices in the group in dynamics of treatment; p<sub>2</sub> - reliability of differences of the indices in the prophylactic groups.

Therefore, the finding of the study confirm the appropriateness of applying the proposed medical-and-preventive treatment management plan in children with dysplastic scoliosis, aiming at prevention the progression of dental caries and fluorosis and complex treatment of periodontal tissues diseases.

**Conclusions**

The prevalence (78,62±2,29%) and incidence (2,83±0,13) of the dental caries, fluorosis (56,83±2,79%) and gingivitis (67,41±2,65%) in children with dysplastic scoliosis is significantly higher

as compared with almost healthy children. The prevalence and incidence of dental caries, the severity of dental fluorosis and gingivitis is directly proportional to the degree of severity of scoliosis.

The medical-and-preventive treatment management plan has been developed, aiming at preventing the occurrence and the subsequent progression of dental caries, fluorosis and gingivitis in children with dysplastic scoliosis, and its high clinical effectiveness was confirmed. In one-year period the reduction of the increment of permanent teeth dental caries was 26.17% and 43.75% in 2-year period. The sustainable clinical remission of gingivitis was achieved, as evidenced by the reduction of the PMA index by 39.06% after 12 months. The use of the proposed management plan also had a significant prolonged medical-and-prophylactic effect on the hard tooth tissues with fluorosis.

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#### Реферати

##### **ВПЛИВ ЛІКУВАЛЬНО-ПРОФІЛАКТИЧНОГО КОМПЛЕКСУ НА ПЕРЕБІГ ОСНОВНИХ СТОМАТОЛОГІЧНИХ ЗАХВОРЮВАНЬ У ДІТЕЙ З ДИСПЛАСТИЧНИМ СКОЛІОЗОМ**

**Коротич Н.М., Доброскок В.О., Колісник І.А., Попело Ю.В., Ващенко І.Ю., Ілик Р.Р.**

Вивчено клінічні особливості перебігу карієсу зубів, флюорозу і гінгівіту у дітей, які страждають на диспластичний сколіоз I-II ступенів важкості. Розроблено й апробовано в клініці комплекс лікувально-профілактичних заходів, спрямованих на попередження виникнення та подальшого прогресування основних стоматологічних захворювань у цих дітей. Підтверджено його високу клінічну ефективність. Редукція приросту карієсу постійних зубів склала за рік 26,17%, через 2 роки - 43,75%. Досягнуто стійку клінічну ремісію гінгівіту, про що свідчить зменшення ПМА через 12 місяців на 39,06%. Застосування комплексу мало виражений пролонгований лікувально-профілактичний вплив на тверді тканини зубів, уражених флюорозом.

**Ключові слова:** діти, карієс зубів, флюороз, гінгівіт, диспластичний сколіоз, профілактика стоматологічних захворювань.

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##### **ВЛИЯНИЕ ЛЕЧЕБНО-ПРОФИЛАКТИЧЕСКОГО КОМПЛЕКСА НА ТЕЧЕНИЕ ОСНОВНЫХ СТОМАТОЛОГИЧЕСКИХ ЗАБОЛЕВАНИЙ У ДЕТЕЙ С ДИСПЛАСТИЧЕСКИМ СКОЛИОЗОМ**

**Коротич Н.Н., Доброскок В.А., Колесник И.А., Попело Ю.В., Ващенко И.Ю., Илик Р.Р.**

Изучены клинические особенности течения кариса зубов, флюороза и гингивита у детей, страдающих диспластическим сколиозом I-II степеней тяжести. Разработан и апробирован в клинике комплекс лечебно-профилактических мероприятий, направленных на предупреждение возникновения и дальнейшего прогрессирования основных стоматологических заболеваний у этих детей. Подтверждена его высокая клиническая эффективность. Редукция прироста кариса постоянных зубов составила за год 26,17%, через 2 года - 43,75%. Достигнута устойчивая клиническая ремиссия гингивита, о чем свидетельствует уменьшение ПМА через 12 месяцев на 39,06%. Применение комплекса имело выраженное пролонгированное лечебно-профилактическое воздействие на твердые ткани зубов, пораженных флюорозом.

**Ключевые слова:** дети, карис зубов, флюороз, гингивит, диспластический сколиоз, профилактика стоматологических заболеваний.

Рецензент Ткаченко П.І.