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DYNAMICS OF CHANGES IN THE STATE OF HARD DENTAL TISSUES UNDER THE INFLUENCE OF A TREATMENT AND PREVENTION COMPLEX IN CHILDREN WITH MUSCULOSKELETAL SYSTEM PATHOLOGY

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The study was dedicated to the evaluation of the impact of the developed treatment and prevention complex on the state of hard tissues of teeth and periodontium in children with musculoskeletal pathology. The study involved 41 children aged 12–15 years with musculoskeletal diseases of various genesis. The studies indicate a fairly high efficiency of the proposed treatment and prevention therapy for children with the above pathology, which included a universal natural biological complex of drugs with a broad therapeutic and preventive effect. The developed treatment and prevention complex helped to stabilise the prevalence of both caries and periodontal diseases. Positive dynamics of clinical indicators of the state of hard tissues of teeth and periodontium was observed against the background of increased serum 25(OH)D levels. Thus, the stable positive therapeutic effect of dental pathology in children with MSS diseases proves the inclusion of medical correction of vitamin D status in the complex treatment. The data obtained are the basis for the implementation of a treatment and prevention complex aimed at helping children with dental and periodontal diseases against the background of musculoskeletal pathology.

Key words: children, teeth, caries, periodontal disease, musculoskeletal diseases, total vitamin D.

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ДИНАМІКА ЗМІНИ СТАНУ ТВЕРДИХ ТКАНИН ЗУБІВ ПІД ВПЛИВОМ ЛІКУВАЛЬНО-ПРОФІЛАКТИЧНОГО КОМПЛЕКСУ У ДІТЕЙ З ПАТОЛОГІЄЮ ОПОРНО-РУХОВОГО АПАРАТУ

Дослідження присвячено проведенню оцінки впливу розробленого лікувально-профілактичного комплексу на стан твердих тканин зубів та пародонту у дітей з патологією опорно-рухового апарату. В дослідженнях приймали участь 41 дитина віком 12–15 років з захворюваннями опорно-рухового апарату різного генезу. Проведені дослідження свідчать про достатньо високу ефективність запропонованої лікувально-профілактичної терапії для дітей з зазначеною патологією, яка включала універсальний природний біологічний комплекс препаратів з широкою лікувально-профілактичною дією. Розроблений лікувально-профілактичний комплекс сприяв стабілізації процесу поширеності як карієсу, так і захворювань пародонту. Позитивна динаміка клінічних показників стану твердих тканин зубів і пародонту спостерігалася на фоні підвищення рівня сироваткового 25(OH)D. Таким чином, стабільний позитивний терапевтичний ефект стоматологічної патології у дітей з захворюваннями MSS доводить включення в комплексне лікування медикаментозної корекції статусу вітаміну D. Отримані дані є підставою для впровадження лікувально-профілактичного комплексу, спрямованого на допомогу дітям із захворюваннями зубів та пародонту на тлі патології опорно-рухового апарату.

Ключові слова: діти, зуби, карієс, пародонт, захворювання опорно-рухового апарату, загальний вітамін D.

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The frequency and intensity of major dental diseases depends on the state of the whole organism, on various pathological processes in other organs and tissues, the nature of nutrition and metabolism, and the functional activity of the nervous, endocrine and other systems [8, 12].

Among the diseases that affect children's dental health, one of the most important is musculoskeletal system disorders (MSS). MSS diseases are one of the most common pathologies worldwide. Their high prevalence determines the medical and social significance of MSS diseases, chronic progressive course, increasing rates of primary morbidity and disability, significant direct and indirect economic losses, as well as a decrease in quality of life and a reduction in its duration [3]. One of the causes of MSS pathology is undifferentiated connective tissue dysplasia, the types of which are bone and cartilage [1, 10]. Given the close relationship between connective tissue and dental hard tissues, it is important to assess the impact of MSS pathology on the occurrence of major dental diseases in children.

The purpose of the study was to clinically evaluate the state of hard tissues of teeth and periodontium in children aged 12–15 years with musculoskeletal pathology of various genesis against the background of low levels of total vitamin D in the blood serum.

Materials and methods. We examined 41 children aged 12 to 15 years. The children were diagnosed with various pathologies of the musculoskeletal system. Namely: flat feet, systemic connective tissue dysplasia, Beals syndrome (a rare monogenic connective tissue disease from the group of fibrillinopathies with autosomal dominant inheritance caused by a mutation of the FBN2 gene), exostoses, ochondroplasia, congenital false joint, Legg-Calvé-Perthes disease (osteochondropathy of the femoral head), Schinz disease, posture disorders (scoliosis of varying degrees, flat back, stoop, round back, asymmetrical posture), imperfect osteogenesis, Antley-Bixler syndrome (a disease with autosomal dominant inheritance). Patients have craniosynostosis with hypoplasia of the midface, brachiocephalic synostosis, femoral curvature with neonatal fractures), congenital hip dysplasia, and diffuse osteoporosis, Scheuermann-Mau disease (progressive deforming dorsopathy, juvenile kyphosis), Klippel-Feil syndrome (a rare congenital malformation of the cervical and upper thoracic vertebrae of autosomal dominant type, characterised by a short and immobile neck), VACTERL syndrome.

Children were divided into 2 groups: the main group (n=21) and the comparison group (n=20). The children in the main group were prescribed an appropriate treatment and prevention complex (TPC), which included the following drugs “Sliurem” gel (LLC “NVC Biomed”, Ukraine) (applied to the hard tissues of the teeth once a day before bedtime every 3 months for 1 week during the year); “Mumije” gel (LLC “Domashniy Doctor”, Ukraine) (applied to the gums for 10 minutes followed by light finger massage of the gums, twice a day after completion of morning and evening oral hygiene); “Akvadetrim vitamin D_3” (Medana Pharma S.A., Poland) aqueous solution (5000 IU per day); chondroitin with glucosamine (1–2 pills 3 times a day with a glass of water); vitamin and mineral complex “Alfavit-shkolyar” (JSC “Vitaminy”, Ukraine) (chew 1 tablet of each type (No. 1, No. 2, No. 3) once a day with food (at breakfast, lunch and dinner). Children in the comparison group took the vitamin-mineral complex “Alfavit-shkolyar” according to the regimen specified in the TPC.

“Sliurem” gel increases the mineralising potential of the oral fluid, activates the remineralisation of tooth enamel, and has an antiseptic effect. The active ingredient is hydroxyapatite (nanocalcide) at 3–5 %. “Mumije” gel has anti-inflammatory, adaptogenic, regenerating, osteotropic, increased salivation rate, antibacterial, haemostatic effects. The product contains goldenseal, echinacea, sage, mummy (tablets), and chlorhexidine 0.05 %. The source of vitamin D is “Akvadetrim vitamin D_3”. The aqueous solution (15,000 IU per 1 ml) is involved in the regulation of calcium and phosphate metabolism, promotes proper mineralisation and skeletal growth; it participates in the functioning of the immune system, affects the production of lymphokines, and is an active anti-rheumatic factor. An important component of TPC is Chondroitin with Glucosamine, a dietary supplement that stimulates hyaluronic acid synthesis. This substance is the basis for connective tissue and cartilage. Hyaluronic acid slows down the action of pathological enzymes that destroy cartilage, and also has anti-inflammatory and analgesic effects, and has a beneficial effect on the restoration of bone and cartilage structure by improving mineral metabolism. It contains chondroitin sulphate 90 % from shark cartilage – 0.15 g, glucosamine – 0.25 g, and ascorbic acid (vitamin C) – 0.005 mg. Vitamin-mineral complex “Alfavit-shkolyar” is an additional source of vitamins, trace elements, magnesium and β-carotene to support the normal functioning of the immune system, and adaptation to increased mental, physical and emotional stress.

All general medicines were prescribed only after consultation and permission from the attending physician of the underlying pathology.

Dental examinations were performed at 6, 12 and 24 months. During the 2-year follow-up period, after complete oral cavity rehabilitation, children in both groups visited a dentist once every 6 months for a preventive examination and professional oral hygiene. At home, it is recommended to use ‘Lacalut anti-caries’ toothpaste and brushing teeth after each meal.

The intensity of the caries process in permanent teeth was determined in children of each group by DFMT and DFMS (carious lesions, filling, missed tooth), as well as the prevalence of dental caries [9].

The periodontal condition was assessed by determining the papillary-marginal-alveolar index (PMA, %) in the modification of Parma (1960). Also, the Schiller-Pisarev test was used and the bleeding symptom was determined in the modification of Muhnemann HP, Son S. [4].

Children in the intervention group stayed permanently in Ukraine, and there were no obstacles to their visits to the doctor for preventive examinations and occupational hygiene, as well as oral cavity sanitation if necessary. Children in the comparison group, due to the full-scale invasion of Ukraine by Russia and the declaration of martial law, periodically changed their place of residence, but once every 6 months they were able to visit a dentist at the place of examination (Department of Pediatric Dentistry and Orthodontics of SE “The Institute of stomatology and maxilla-facial surgery National academy of medical sciences of Ukraine” (SE “ISMFS NAMS”, Odesa)).

Particular attention was paid to the quality of food and the diet.

Caries prevention effectiveness was calculated using the formula:

$$CPE = 100 - \frac{DFMS\ (main) \times 100}{DFMS\ (comparison)}$$, where

CPE – caries prevention effect in percentage terms reflects the degree of reduction in the intensity of tooth decay in the intervention group compared to the comparison group [2].

Periodontal protective effectiveness was calculated by the formula:

$$PPE = 100 - \frac{PMA\ (main) \times 100}{PMA\ (comparison)}$$, where

PPE – the periodontoprotective effect in percentage reflects the degree of reduction in the intensity of periodontal damage in the main group compared to the comparison group [2].

Table 1

Dynamics of changes in caries intensity in children aged 12–15 years with musculoskeletal system pathology under the influence of treatment and prevention complex in the dynamics of treatment

Indices	Groups	Observation period			
		initial	after 6 months	after 12 months	after 24 months
DFMT	main, n=21	4.95±0.36	4.95±0.32 p_1>0.8	5.09±0.43 p_1>0.8	5.71±0.44 p_1>0.8 p_2>0.3
	comparison, n=20	3.85±0.30 p<0.05	4.6±0.42 p>0.5 p_1>0.25	5.6±0.47 p>0.4 p_1<0.002	6.8±0.53 p>0.2 p_1<0.001 p_2>0.1
DFMS	main, n=21	5.43±0.42	5.57±0.40 p_1>0.8	5.76±0.39 p_1>0.6	6.33±0.52 p_1>0.1 p_2>0.4
	comparison, n=20	4.35±0.38 p>0.1	5.10±0.45 p>0.1 p_1>0.25	6.55±0.40 p>0.2 p_1<0.002	7.90±0.61 p>0.2 p_1<0.001 p_2>0.1
D	main, n=21	4.76±0.38	0.52±0.03 p_1<0.001	0.38±0.02 p_1<0.001	0.52±0.04 p_1<0.001 p_2<0.02
	comparison, n=20	2.70±0.24 p<0.001	0.80±0.05 p<0.001 p_1<0.001	1.65±0.12 p<0.001 p_1<0.001	2.10±0.17 p<0.001 p_1<0.05 p_2<0.05
F	main, n=21	0.57±0.04	4.80±0.32 p_1<0.001	5.14±0.39 p_1<0.001	5.57±0.35 p_1<0.001 p_2<0.05
	comparison, n=20	1.50±0.26 p<0.001	4.20±0.41 p>0.2 p_1<0.001	4.75±0.48 p>0.5 p_1<0.001	5.70±0.43 p>0.5 p_1<0.001 p_2>0.4
M	main, n=21	0.05±0.04	0.23±0.01 p_1<0.001	0.23±0.02 p_1<0.001	0.23±0.01 p_1<0.001 p_2>0.8
	comparison, n=20	0.15±0.09 p<0.001	0.15±0.08 p>0.4 p_1>0.8	0.15±0.07 p>0.4 p_1>0.8	0.15±0.01 p>0.4 p_1>0.8 p_2>0.8
Complicated dental caries	main, n=21	0.38±0.01	0	0	0
	comparison, n=20	0 p<0.001	0	0	0
Caries increment by DFMT	main, n=21		0	0.14±0.01	0.62±0.02 p_2<0.001
	comparison, n=20		0.75±0.02 p<0.001	1.0±0.01 p<0.001	1.2±0.01 p<0.001 p_2<0.001
Caries increment by DFMS	main, n=21		0.14±0.01	0.19±0.01	0.57±0.01 p_2<0.001
	comparison, n=20		0.75±0.01 p<0.001	1.45±0.01 p<0.001	1.35±0.01 p<0.001 p_2<0.001

Note. p – significance index relative to the main group; p_1 – significance index relative to the initial observation period; p_2 – significance index relative to 12 months of observation.

Additional examinations included a serum test for total vitamin D (25-OH) (D_2+D_3) (bone metabolism). The study was carried out at the laboratories of "Smartlab" in Odesa.

In the statistical processing of the collected data, the computer program STATISTICA 6.1 was used to assess their reliability and measurement errors [6].

Results of the study and their discussion. The prevalence of dental caries in children of the intervention group at the initial examination was 80.95 %, and in children of the comparison group – 90 %. After 24 months, this figure was 85.7 % and 95 %, respectively. The prevalence of caries in children of both groups was zero. These figures indicate that the caries process in the permanent teeth of the children studied began immediately after the eruption and progressed rapidly; by age 15, there were almost no children left with healthy teeth.

The results of the dental caries intensity in children of the intervention and comparison groups are presented in Table 1. According to the WHO methodology, these data give grounds to characterise the level of dental caries intensity in children of both groups as high.

During the first 6 months, the increase in caries of permanent teeth in children was: according to DFMT in the main group – 0, in the comparison group – 0.75 ($p<0.001$). During the first year, this index in the main group increased to 0.14, however, this is 7.14 times less than in the comparison group. After 2 years of observation, the increase in caries according to DFMT was 0.62 (from the baseline) in the main group, which is 1.9 times less than in the comparison group ($p_2<0.001$).

According to the DFMS index for 6 months of the first year, the increase in caries is 0.14 in the main group, which is 5.4 times less than in the comparison group ($p<0.001$). However, over the next 6 months (one year from baseline), we see that in the main group, the increase in carious cavities was 0.19, which is 7.6 times less than in the comparison group (1.45) ($p<0.001$). The increase in caries according to DFMS over two years of observation in the main group was 0.57, which is 2.4 times less than the 1.35 of the comparison group ($p_2<0.001$).

The caries prevention effect over 2 years of follow-up in the main group compared to the comparison group was 57.8 %.

The structure of 25(OH)D status in children aged 12–15 years with musculoskeletal pathology is shown in Fig. 1.

There are many different criteria for assessing vitamin D insufficiency based on 25(OH)D levels. According to the criteria of the National Academy of Medicine (USA), the American Association of Clinical Endocrinologists and others, a vitamin D level of less than 10 ng/ml is considered to be a severe deficiency. Of the 41 children with MSS pathology, there were no children with total vitamin D levels>30 ng/ml.

The results of the study on the content of total vitamin D in the blood serum are shown in Fig. 2. In the main group, the baseline 25(OH)D level was 12.05±0.69 ng/ml, and in the observation group – 16.25±0.83 ng/ml ($p<0.001$). Both groups of children were comparable in terms of age and body mass index.

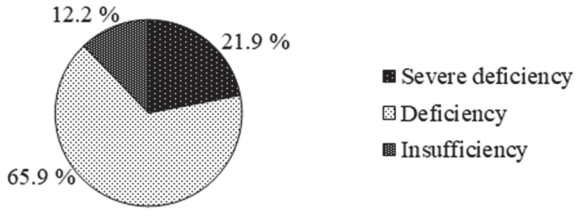

Fig.1. Structure of 25(OH)D status in children aged 12–15 years with musculoskeletal disorders.

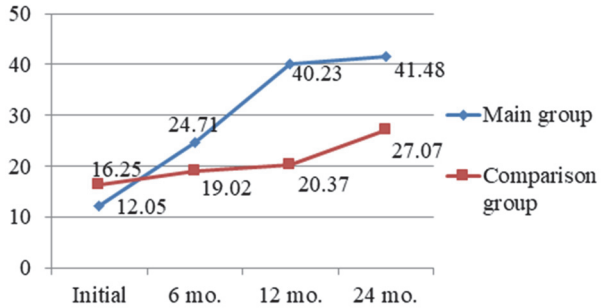

Fig.2. Dynamics of vitamin D supply (ng/ml) in children with MSS pathology with TPC (p_1 – significance index relative to the initial observation period).

When taking TPC (vitamin D in a dose of 5000 IU in agreement with a paediatrician), 6 months after the start of the study, the level of vitamin D supply in children of the main group was 24.71 ng/ml, which is 2 times higher than the baseline level in children of this group ($p_1<0.001$). In the comparison group, this indicator increased only 1.17 times ($p_1<0.05$). During the first year of TPC use, the serum 25(OH)D level in the blood of children in the main group increased 3.3-fold ($p1 < 0.001$), in the comparison group – 1.25-fold ($p_1<0.001$). Compared with the initial level, the serum calcidiol content in the blood of children of the main group increased by 3.4 times ($p_1<0.001$) over 2 years in the dynamics of treatment, and by 1.7 times ($p_1<0.001$) in the comparison group.

The following studies were carried out to assess the condition of periodontal tissues in children with musculoskeletal pathology. For this purpose, the PMA index, bleeding and the Schiller-Pisarev (S-P) test were used. The results of the studies are shown in Table 2.

Table 2

Effect of TPC on periodontal health in children aged 12–15 years with MSS pathology in the dynamics of treatment

Indices	Groups	Observation period			
		initial	after 6 months	after 12 months	after 24 months
PMA (%)	main, n=21	42.44±3.03	15.45±1.18 p_1<0.001	4.59±1.09 p_1<0.001	2.89±0.24 p_1<0.001 p_2<0.002
	comparison, n=20	32.54±2.75 p<0.02	17.72±1.10 p>0.4 p_1<0.001	19.65±1.54 p<0.001 p_1<0.001	13.22±1.11 p<0.001 p_1<0.001 p_2<0.002
Schiller-Pisarev (points)	main, n=21	1.44±0.09	1.22±0.01 p_1<0.02	1.10±0.01 p_1<0.001	1.04±0.01 p_1<0.001 p_2<0.002
	comparison, n=20	1.44±0.10 p>0.8	1.16±0.05 p>0.25 p_1>0.25	1.28±0.08 p<0.02 p_1>0.25	1.22±0.04 p<0.001 p_1<0.05 p_2>0.5
Bleeding (points)	main, n=21	0.54±0.03	0.13±0.01 p<0.001 p_1<0.001	0.06±0.002 p<0.001 p_1<0.001	0 p<0.001 p_1<0.001 p_2<0.001
	comparison, n=20	0.42±0.03	0.15±0.01 p<0.001 p_1<0.001	0.28±0.001 p<0.001 p_1<0.001	0.17±0.01 p<0.001 p_1<0.001 p_2<0.001

Note. p – significance index relative to the main group; p_1 – significance index relative to the initial observation period; p_2 – significance index relative to 12 months of observation.

The study of the PMA index, which indicates the prevalence of inflammation in the gums, showed that the PPE in the main group of children after 2 years was 78.14 %.

The prevalence of periodontal disease in children of the main group was 100 %, in children of the comparison group – 95 %. During the entire observation period, it was impossible to reduce the prevalence of periodontal disease, but it was possible to reduce the severity of the inflammatory process in both the main and comparison groups from moderate to mild gingivitis (p_1<0.001; p_2<0.002). After 2 years, the prevalence of periodontal disease in children of the intervention group was 66.7 % (p_1<0.001), while in the comparison group it remained 95 % (p_1<0.001). In the comparison group, 25 % of children were diagnosed with moderate gingivitis compared to 70 % at the initial examination. In the main group, 28.6 % of children had a PMA index ≥ 50 and 71.4 % had a PMA index of 25–50 at the beginning of the study. After 2 years of follow-up, 33.3 % of children in the main group had healthy periodontium.

Describing the bleeding index, it can be noted that after the use of TPC containing “Mumije” gel, 100 % effect was achieved in children of the main group, while in children of the comparison group the index decreased by 2.5 times over 2 years of observation. It should be noted that the dynamics of bleeding index reduction in children of the main group is more pronounced.

The S-P test in children of the main group at all stages of observation tended to decrease and after 2 years was already significantly different from the initial data (by 1.4 times); in children of the comparison group, there was a marked decrease in the intensity of inflammation, by the end of the study the S-P test decreased by 1.2 times compared to the initial data (p_1<0.05).

According to our data, in 15 % of children with MSS pathology, we noticed obvious signs of abrasion. Parents notice spasms of the masticatory muscles in children during sleep, nighttime teeth grinding, and pain in the temporomandibular joint, especially in the morning. We can assume that these are also manifestations of chronic stress and that this condition requires further investigation.

The most important and reasonable macronutrients for inclusion in the diet of patients of any age with MSS diseases are complete proteins containing substitutable and essential amino acids. They are essential for the synthesis of collagen and elastin, the main structural components of cartilage and bone tissue [7]. Traditional and specialised foods and/or food supplements containing chondroprotectors should also play a significant role in the diet of children with MSS. It has been proven that the use of second- and third-generation chondroprotectors has a clinically proven positive therapeutic effect: 2nd generation – mono-preparations

containing purified hyaluronic acid or chondroitin sulfate or glucosamine; 3rd generation – combined preparations: for example, glucosamine with chondroitin sulfate, or in combination with other agents: manganese ascorbate, polyunsaturated fatty acids (PUFAs) Omega 3 and 6, vitamins D, E, K, minerals zinc, silicon, sulfur, selenium. The drug was introduced to the TPC. Many products of animal and plant origin contain chondroprotectors (chondroitin sulfate, glucosamine and glucuronic acid). For example, rich meat and fish broths, meat, fish and meat stew, and jelly are rich in them. Various jelly and fruit jellies can be recommended for dessert for children with MSS. In addition, vitamin and mineral complexes containing macro- and micronutrients such as calcium, phosphorus, magnesium, zinc, sulfur, manganese, selenium, iron, copper, boron, and vitamins D, C, K, bioflavonoids in addition to the basic diet. The best sources of vitamin D in the diet are fatty fish, liver, fish caviar, dairy fats, and eggs. In addition, due to its lactose content, cow's milk has anti-caries properties. Milk contains phosphates, calcium, and casein, which are protective factors against demineralisation [13]. When signs of osteoporosis appear, doctors first of all try to stop the process by using calcium and vitamin D supplements in different proportions. However, human connective tissue can only fully function if there is a certain Ca/Mg ratio. The presence of the required amount of Mg promotes the absorption of Ca and vitamins, which are essential for the physiological remodelling of bones and cartilage [5]. Taking the above into account, TPC introduced the “Alfavit-shkolyar” vitamin and mineral complex. The results of this study highlight the significant role of both endogenous and exogenous factors in the development of caries and periodontal diseases in children with musculoskeletal system (MSS) pathology. The high prevalence of these conditions aligns with findings that link systemic health to oral diseases, particularly in cases involving connective tissue disorders, which directly affect the structural integrity of dental tissues [1, 10]. This supports the notion that prevention strategies must address systemic factors, such as vitamin D deficiency, alongside standard oral hygiene practices. Vitamin D deficiency, prevalent in children with MSS, plays a critical role in the progression of dental pathology. This study demonstrated a significant improvement in both caries prevention and periodontal health following vitamin D supplementation. These results are consistent with existing research, which emphasizes the role of vitamin D in maintaining dental and bone health through its regulatory effects on calcium metabolism [5]. The observed positive outcomes following the treatment and prevention complex (TPC) underscore the importance of systemic interventions in managing dental health in children with MSS pathology [8, 11]. In addition to endogenous factors, exogenous factors like chronic stress – particularly in the context of martial law may also contribute to the development of periodontal disease. Chronic stress has been linked to increased inflammation and immune dysfunction, exacerbating oral health problems, including periodontal diseases [4, 11]. However, the influence of such stressors on dental health during wartime remains an underexplored area of research, especially concerning pediatric populations. In conclusion, this study demonstrates that addressing both systemic factors like vitamin D deficiency and external stressors is crucial for effective dental disease prevention in children with MSS pathology. Further research is needed to explore the long-term impact of chronic stress on oral health, particularly during periods of heightened psychological and environmental challenges such as wartime [11].

Conclusions

1. The results of studies of clinical indices of the prevalence and intensity of caries and gingivitis over 2 years in children aged 12–15 years with MSS pathology showed that the most pronounced positive dynamics of these changes is in children who regularly underwent professional oral hygiene using the proposed TPC. It was possible to stabilise the prevalence of both caries and periodontal disease.

2. Positive dynamics of clinical indices of the state of hard tissues of teeth and periodontium in children aged 12–15 years with MSS diseases was observed against the background of increased serum 25(OH)D levels. Thus, the stable positive therapeutic effect of dental pathology in children with MSS diseases proves the inclusion of medical correction of vitamin D status in the complex treatment.

Prospects for further research are to develop an effective method for the prevention of major dental diseases in children, depending on the level of vitamin D in the blood serum, using an appropriate treatment and prevention complex.

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EFFECT OF PLACENTAL CRYOEXTRACT ON SCAR TISSUE FORMATION AFTER ELECTIVE SURGERY IN PATIENTS WITH MORNING CHRONOTYPE

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In the realities of today, the number of maxillofacial injuries is growing every day, which increases the number of people who visit maxillofacial surgeons, which in turn leads to an increase in the percentage of pathological scarring. Previous studies have shown that the formation of scars after surgery is also influenced by a person's chronotype. Circadian rhythms play a fundamental role in the regulation of basic functions in the human body, such as changes in body temperature, hormone secretion, cognitive and physical abilities, etc. Placental cryo-extract has a positive effect on wound healing throughout the entire treatment period. The main factor is the chronotype of a person, so in people with a morning biorhythm who underwent surgery in the first half of the day, the indicators are better than in patients who underwent surgery in the second half of the day.

Key words: cryopreserved placenta, scar, chronotype, extract, skin, biological rhythms.

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ВПЛИВ КРІОЕКСТРАКТУ ПЛАЦЕНТИ НА УТВОРЕННЯ РУБЦЕВОЇ ТКАНИНИ ПІСЛЯ ПРОВЕДЕННЯ ПЛАНОВИХ ОПЕРАТИВНИХ ВТРУЧАНЬ У ПАЦІЄНТІВ ІЗ РАНКОВИМ ХРОНОТИПОМ

У реаліях сьогодення кількість щелепно-лицевих травм зростає з кожним днем, це збільшує аудиторію яка звертається до щелепно-лицевих хірургів, що в свою чергу веде до збільшення відсотка утворення патологічний рубців. Попередні дослідження показали, що на формування рубців після хірургічних утручань також впливає хронотип людини. Циркадні ритми відіграють фундаментальну роль у регуляції основних функцій в організмі людини таких як, зміна температури тіла, секреція гормонів, когнітивних і фізичних здібностей та інші. Кріоекстракт плаценти позитивно впливає на загоєння рани протягом всього терміну лікування. Головним фактором виступає хронотип людини, так у осіб з ранковим біоритмом яким оперативні втручання проводилися о першій половині доби показники кращі, ніж у пацієнтів яким оперативні втручання проводилися у другій половині доби.

Ключові слова: кріоконсервована плацента, рубець, хронотип, екстракт, шкіра, біологічні ритми.

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In the realities of today, the number of maxillofacial injuries is growing every day, which increases the number of people who visit maxillofacial surgeons, which in turn leads to an increase in the percentage of pathological scarring [4].

Despite the fact that there is currently a strong interdisciplinary interest and a significant amount of literature on the prevention and treatment of pathological postoperative scars, international guidelines