OSTEOARTICULAR SYSTEM IN CHILDREN WITH BAD POSTURE ON THE BACKGROUND OF HEREDITARY DISORDERS OF CONNECTIVE TISSUE DEVELOPMENT

INTRODUCTION
The prevalence of postural disorders in the frontal plane, kyphoscoliotic deformities of the spine, and other osteoarticular changes in children currently remains high. According to the literature, it is up to 10% (I.L. Tager, V.A. Dyachenko). The initial manifestations of pathological posture are diagnosed more often in preschool age against the background of hypotonia of the back muscles (N.A. Schenk). In the outpatient practice of a pediatric surgeon, orthopedic trauma surgeon, it becomes significant that increasing the effectiveness of prevention, diagnosis, treatment, clinical examination of children with bad posture in the frontal plane against the background of hereditary disorders of connective tissue development is impossible without scientific concepts and approaches (GULIYEVA, 2013). Such a vicious state is common in everyday activities. The relevance of the issue is due to the prevalence, systemicity of lesions, the involvement of many body structures in the pathological process, including the osteoarticular apparatus, the hematopoietic system (GULIYEVA, 2013; ZEMTsovSKY, 2006).

Medical and social aspects, epidemiology of postural disorders in the frontal plane, kyphoscoliotic changes in the spine remain unstudied to the end. The problem of practical health care remains the prevention of the formation of this pathology, the early detection of bad posture in combination with hereditary disorders of the development of connective tissue. Diagnostics, treatment and rehabilitation of postural disorders in the frontal plane, kyphoscoliotic deformities of the spine in childhood is a multifaceted process (KADURINA, 2009; STARODUBTSEVA, 2005). Difficulties are encountered at the stage of early diagnosis of vicious, bad posture. Insufficient attention is paid to concomitant background pathology. In assessing the severity of the disease, radiography is often limited. Participation in the pathological process of the surrounding soft tissues, changes in laboratory parameters are not always considered.

The peculiarities of treatment and rehabilitation schemes in children with postural problems in the frontal plane, kyphoscoliotic deformity of the spine against the background of hereditary disorders of connective tissue development are not designated. Approaches associated with unloading the spine, the formation of a muscle corset are not always interpreted unambiguously (STRUkov, 1993; TORSHN, 2008).

Many domestic and foreign authors use original methods of treatment based on early activation, drug correction, corsetting. Nevertheless, rehabilitation schemes remain unformed; indications for medication normalization of phosphorus-calcium metabolism in children with hereditary disorders of connective tissue development are not always justified (KADURINA, 2014; SERKoVA, 2007; SCHHEPLYAGIN, 2005).
Long-term and, at times, ineffective rehabilitation treatment of children against the background of hereditary disorders of the formation of connective tissue indicates the need to predict this pathology in the early stages. It is necessary to develop and implement into the practice of a pediatric surgeon, orthopedic trauma surgeon, individual treatment and rehabilitation programs for this group of patients.

Now there are inaccuracies in dynamic observations with patients who have been diagnosed with incorrect posture, kyphoscoliotic deformity of the posture against the background of pathological formation of connective tissue. We do not always see clear, tactical algorithms for managing such patients, including those offered by a number of domestic and foreign authors. There is no single, designated dispensary registration scheme aimed at prophylactic measures, preventing the development of further complications.

To determine the features of the development of the osteoarticular system in childhood, to substantiate tactical approaches in predicting and preventing the development of kyphoscoliotic deformity of the spinal column, to improve treatment and rehabilitation measures for children with faulty posture against the background of hereditary disorders in the development of connective tissue on an outpatient basis.

**MATERIALS AND METHODS**

On the basis of the city children's polyclinic, 125 children were registered with a diagnosis of bad posture in the frontal plane against the background of hereditary disorders of the development of connective tissue. They were included in the main group. 30 children of the same age and gender presented a comparison group with a diagnosis of bad posture in the frontal plane without hereditary impairment of connective tissue development. The dynamic observation involved 30 healthy children - control group. They seek medical help with minor soft tissue injuries. Thus, according to sex and age parameters, children in the groups were equally distributed. They were registered at the dispensary in the period from 2015 to 2020. The groups had the same number of boys and girls. The orthopedic status of the examined, complaints, life history, anthropometric data, physical and mental development, phenotypic signs of hereditary disorders in the development of connective tissue from the osteoarticular system were identified, and the manifestations of dysplastic processes were considered. The laboratory parameters were assessed. The level of calcium, phosphorus, alkaline phosphatase in blood serum, hydroxyprolines, calcium and phosphorus in urine was reflected. The research used an automatic biochemical analyzer Hitachi-911E, a semi-automatic photometer Epo11-20 by ECO-MED-POLL and an SF-46 spectrophotometer.

Parameters were determined: total calcium in blood serum and urine (Parchen, 1975), inorganic phosphorus in blood and urine (Tietzn., 1986), alkaline phosphatase in blood (Rick W., 1990), hydroxyproline in blood and urine (Osadchuk, 1979).

X-ray examination of the spinal column was performed in all children in the groups using the Prestige 1S apparatus. Patients were placed with the centralization of the apparatus on the damaged spine - lying on their stomach and on their left side, standing in frontal and lateral projections. Additional examination methods were prescribed individually - ultrasound, densitometric, computed tomography, magnetic resonance imaging, electroneuromyographic, stabilographic.

**RESULTS**

A characteristic symptom complex for children with hereditary disorders of connective tissue development was noted in 100% of cases in the main group. It was not determined in the comparison group. The children of the main group differed from the comparison and control group by pathological changes in the osteoarticular system, other manifestations of hereditary disorders of the development of connective tissue.

These are dyskinesia of the biliary tract, dysbiosis, adenoiditis, infectious-allergic arthritis, arthralgia, coccygogenation. It were determined hyperelasticity of the skin, hypermobility of joints, increased vascular pattern, telangiectasis, hyperpigmentation. Often, at different age periods, pathology of cardiac activity (37.6%), gastrointestinal tract (20.8%), urinary system (20.0%), vegetative-vascular dystonia (18.4%), disorders of functions of the organ of vision (15.2%) were determined (Table 1).
The total number of identified changes, of which in various combinations

| The nature of the changes               | Patients with fault in posture (at different age periods) | Total (n=125) |
|----------------------------------------|----------------------------------------------------------|---------------|
|                                        | 5 years (n=26)                                           | 7 years (n=30) | 9 years (n=40) | 11 years (n=29) |               |
|                                        | 17 (65,4%)                                               | 22 (73,3%)    | 34 (85,0%)     | 25 (86,2%)      | 96 (76,8%)    |
| vegetative dystonia                   | 5 (19,2%)                                                | 2 (6,7%)      | 5 (12,5%)      | 5 (17,2%)       | 17 (13,6%)    |
| vertebrobasilar insufficiency          | -                                                        | 3 (10,0%)     | 2 (5,0%)       | 1 (3,5%)        | 6 (4,8%)      |
| oligaenphoria                         | -                                                        | 1 (3,3%)      | 2 (5,0%)       | 1 (3,5%)        | 4 (3,2%)      |
| mitral valve prolapse *               | 3 (11,5%)                                                | 3 (10,0%)     | 4 (10,0%)      | 4 (13,8 %)      | 14 (11,2%)    |
| subaortic stenosis                    | -                                                        | -             | 1 (2,5%)       | 1 (3,5%)        | 2 (1,6%)      |
| mitral stenosis                       | -                                                        | -             | 1 (2,5%)       | -               | 1 (0,8%)      |
| dextrocardia                          | -                                                        | -             | -              | 1 (3,5%)        | 1 (0,8%)      |
| idiopathic myocardial hypertrophy     | 1 (3,9%)                                                 | 1 (3,3%)      | 5 (12,5%)      | 2 (6,9%)        | 9 (7,2%)      |
| arrhythmia                            | 1 (3,9%)                                                 | 2 (6,7%)      | 12 (30,0%)     | 5 (17,2%)       | 20 (16,0%)    |
| biliary dyskinesia                    | 5 (19,2%)                                                | 2 (6,7%)      | 3 (7,5%)       | 4 (13,8%)       | 14 (11,2%)    |
| Gilbert's syndrome                    | 1 (3,9%)                                                 | 2 (6,7%)      | 6 (15,0%)      | 3 (10,3%)       | 12 (9,6%)     |
| nephrophtosis                         | 2 (7,8%)                                                 | 5 (16,7%)     | 4 (10,0%)      | 5 (17,2%)       | 16 (12,8%)    |
| kidney anomaly                        | 1 (3,9%)                                                 | 1 (3,3%)      | 2 (5,0%)       | 3 (10,3%)       | 7 (5,6%)      |
| phimosis                              | 1 (3,5%)                                                 | -             | 1 (2,5%)       | -               | 2 (1,6%)      |
| enuresis                              | -                                                        | -             | 2 (5,0%)       | 1 (3,5%)        | 3 (2,4%)      |
| asymmetry of tendon reflexes          | -                                                        | 1 (3,3%)      | 4 (10,0%)      | 6 (20,7%)       | 11 (8,8%)     |
| myopia                                | 2 (7,8%)                                                 | 4 (13,3%)     | 7 (17,5%)      | 4 (13,8%)       | 17 (13,6%)    |
| strabismus                            | -                                                        | -             | 2 (5,0%)       | -               | 2 (1,6%)      |
| congenital hearing loss               | 1 (3,9%)                                                 | -             | -              | -               | 1 (0,8%)      |
| hypoplasia of the uterus              | 1 (3,9%)                                                 | -             | -              | -               | 1 (0,8%)      |

Note: * Of the 14 patients in this group, one patient had a combination with Botalov’s duct non-closure, the other had an interventricular septal defect.

Source: Search data.

Up to one year of life, all patients (in 100% of cases) of the main group were diagnosed with dysplasia of the hip joints (in 50% of cases), torticollis myogenic (in 20% of cases), and other pathological manifestations of the osteoarticular system. Conservative treatment was carried out. Bad posture in the frontal plane was diagnosed in all patients of the groups during the period of the child’s stay in a preschool institution, at the age of about 5-6 years, on preventive examinations. The patients underwent X-ray examination. The development of bad posture in the frontal plane in patients of the two groups was not equally distributed. In patients of the comparison group, pathological changes progressed, complications were noted later. Of the patients we examined in the comparison group, kyphoscoliotic deformity began to develop at the age of 7 years, in 5 (5.6%) patients. This was not observed in patients of the main group. Signs of dysplastic changes in the spine, in patients of the main group, were observed in 19 (15.25%) patients aged 5-6 years.

Of these, lumbarization and non-closure of the L4-5 arches - in two, spondyloepiphyseal dysplasia in one, synostosis of bodies C5-S and non-closure of the arches at this level, also, in one patient. Signs of dysplastic manifestations of the spine were observed in 7 (5.6%) patients, including non-closure of the arches of bodies L4-S and S1-S, lateral spondylolisthesis of the L5 vertebra and sacralization - in one patient, lumbarization - in one patient, additional C1 vertebra - in one patient, additional ribs with lumbarization and anomaly of L5, S vertebrae - in one patient. Signs of hereditary connective tissue developmental disorders were detected in four (3.2%) patients, of which the wedge-shaped L5 hemivertebra - in one, anomaly in the development of the lumbar spine was detected in two (one patient with Klippel-Feil syndrome), lumbarization was detected in one patient. Pathological signs were detected in four (3.2%) patients, of which synostosis of the vertebral bodies and synostosis of the ribs was detected in two patients, lumbarization was detected in one patient and sacralization was detected in one patient. In the examined patients of the main group with bad posture in the frontal plane, manifestations of dysplastic changes in various segments of the skeleton were detected in 92.3% - 95% of cases in the corresponding age periods, significantly different from the comparison group, where no changes were observed (p <0.001) (Table 2).
Table 2. The frequency of dysplastic changes in different segments of the skeleton in patients of the main group with bad posture in the frontal plane at different age periods

| Manifestations of dysplasias | Age periods | Total |
|------------------------------|-------------|-------|
|                              | 5 лет (n=26) | 7 лет (n=30) | 9 лет (n=40) | 11 лет (n=29) | Total (n=125) |
| The total number of detected changes in the skeleton, of which in various combinations | 24 (92.3%) | 28 (93.4%) | 38 (95.0%) | 27 (93.2%) | 117 (93.6%) |
| dysplasia of the skull bones | 4 (15.4%) | 8 (26.7%) | 11 (27.5%) | 7 (24.2%) | 30 (24.0%) |
| high gothic palate | 10 (38.5%) | 11 (36.7%) | 11 (27.5%) | 8 (27.6%) | 40 (32.0%) |
| malocclusion | 1 (3.9%) | 3 (10.0%) | 8 (20.0%) | 5 (17.3%) | 17 (13.6%) |
| pterygoid scapula | 6 (23.1%) | 8 (26.7%) | 2 (5.0%) | 1 (3.5%) | 17 (13.6%) |
| keeled chest deformity | 1 (3.9%) | 1 (3.4%) | – | 1 (3.5%) | 2 (1.6%) |
| funnel chest deformity | 1 (3.4%) | 1 (3.4%) | – | 1 (3.5%) | 2 (1.6%) |
| flat feet | 10 (38.5%) | 10 (33.4%) | 10 (25.0%) | 11 (37.9%) | 41 (32.8%) |
| violation of the axis of the lower extremities | 3 (11.5%) | 6 (20.0%) | 7 (17.5%) | 8 (27.6%) | 24 (19.2%) |
| habitual dislocations, subluxations | 5 (19.2%) | 2 (6.7%) | 4 (10.0%) | 3 (10.4%) | 14 (11.2%) |
| congenital dislocations and dysplasia of the joints | – | 3 (10.0%) | 1 (2.5%) | 1 (3.5%) | 5 (4.0%) |
| instability of the cervical spine | 3 (11.5%) | 1 (3.4%) | – | – | 4 (3.2%) |
| arachnodactyly | 2 (7.8%) | 2 (6.7%) | 3 (7.5%) | 1 (3.5%) | 8 (6.4%) |

Source: Search data.

The patients of the main group were dominated by flat feet, a high “Gothic” palate, dysplastic changes in the bones of the skull, violation of the axis of the lower extremities, pterygoid scapula, and malocclusion. Joint hypermobility was found in 106 (84.8%) patients of the main group with bad posture in the frontal plane against the background of hereditary disorders of connective tissue development. The frequency did not correlate with the age and severity of the manifestation of the pathological process. In the comparison group, joint hypermobility was determined in 10 (18.2%), p <0.05.

It should be noted that in 117 (93.6%) patients of the main group with bad posture in the frontal plane against the background of hereditary disorders in the development of connective tissue, there was a combination of various clinical manifestations of background pathology, the number of signs exceeded the total number of patients. 12.0% had two signs of dysplasia, three - 8.8%, four - 21.6%, five - 16.0%, six -15.2%, seventy- 20.0% of patients. In the comparison group, organ and systemic changes were found in 9 (16.4%) patients, which significantly differed from patients in the main group with impaired posture in the frontal plane against the background of hereditary disorders of connective tissue development (p <0.001).

The main laboratory parameters at the beginning of dispensary registration in the main group differed from those of healthy children. In the comparison group, laboratory parameters corresponded to the normal variant. The most significant indicator of the state of collagen metabolism in the body was the amount of hydroxyproline in blood serum and urine. This examination determined the depth and degree of connective tissue damage. All patients of the main group had an increase in the concentration of hydroxyproline in the blood serum, urinary excretion of hydroxyproline and calcium. This was evidence of impaired collagen metabolism in patients. Changes in the level of hydroxyproline in blood serum and during renal excretion could confirm the fact of a violation of the formation of collagen fibers, one of the main components of the matrix of connective tissue, including growth zones. In the group of healthy children, no changes were found (Table 3).
Table 3. Main laboratory parameters at the beginning of dispensary observation

| Indicators                         | Main group (n=30) | Group of healthy children (n=30) | \( P_{1-2} \) |
|------------------------------------|-------------------|---------------------------------|----------------|
|                                    | \( \bar{M}\pm m \) | \( \bar{M}\pm m \)              |                |
|                                    | 1                 | 2                              |                |
| Blood calcium (mmol / l)           | 2.38±0.02         | 2.38±0.02                      | 0.981          |
| Blood phosphorus (mmol / l)        | 1.54±0.02         | 1.57±0.02                      | 0.677          |
| Urine calcium (mmol / l)           | 3.69±0.07         | 2.33±0.09                      | <0.001         |
| Urine phosphorus (mmol / l)        | 24.89±0.39        | 25.32±0.64                     | 0.922          |
| Blood oxyproline (umol / l)        | 27.20±0.46        | 15.09±0.07                     | <0.001         |
| Urine oxyproline (umol / mg creatinine) | 26.21±0.37 | 19.48±0.04                     | <0.001         |

Source: Search data.

The main preventive measures in the patients of the main group were - minimization of the development of kyphoscoliotic deformity, stabilization of the spinal column, orientation towards the formation of a muscular corset of the back, unloading of the injured segment of the spine, in the presence of complaints of pain, - relief of pain syndrome - analgesic ointments, nonsteroidal anti-inflammatory drugs (taking into account the age dosages, which are indicated in the instructions for the medicinal products). At home, the child was recommended an orthopedic functional bed or adapted to an orthopedic functional bed. With the participation of an instructor, an exercise therapy doctor, therapeutic exercises were carried out in a polyclinic.

Complex preventive functional programs for children of the main group provided for the improvement of the function of vital organs, external respiration, lymph circulation, blood supply, strengthening of the muscles of the back and abdomen.

The patient was offered a set of exercises that had to be mastered on the "Swedish wall", orthopedic ball during rehabilitation treatment at the outpatient stage.

The first lesson was planned for 20-30 minutes in the morning. The selection of physical exercises was based on the restoration of impaired functions, strengthening of the muscle corset.

Exercises on the Swedish wall included "crawling" on the Swedish wall upwards with further "throwing out the lower support", that is, the child put down his legs, while holding onto the crossbar of the Swedish wall with his hands. This exercise was alternated with the following: in the initial position on the stomach with straightened legs and arms, the child sagged back and was in this position as long as possible (up to 10 minutes). I also did it with the support of an exercise therapy instructor on an orthopedic ball. The repetition was carried out 5-7 times.

Classes were held daily with each child for 10-14 days. The exercise complexes were formed depending on the general condition, physical fitness, were individualized in the child's physical activity modes.

After 2-3 sessions, the children were allowed to do their homework under the supervision of their parents.

An important element of an integrated approach was the appointment of therapeutic swimming in the pool with an exercise therapy instructor. This had a beneficial effect on strengthening the muscles of the trunk, increasing the respiratory capacity of the lungs.

If necessary, strictly individually, at the initial stages of the development of postural disorders in the frontal plane, an orthopedic corset was prescribed on the thoracic and lumbosacral spine, in case of unsatisfactory performance of complex exercises, the child’s refusal to perform physiotherapy exercises, and irregular attendance at physiotherapy exercises. The base of the corset was made of cotton fabric with breathability and heat saving properties. The corrective effect of the product was carried out due to long metal stiffening ribs with increased spring-loaded properties. Raising of the upper shoulder girdle was carried out with two straps,
crossed on the back, fixed on the stomach. Such a composition of modeling of the ribs for the bending of the spinal column and the tension of the straps made it possible to individually select the corset.

The mechanism of corrective effects of the corset consisted of horizontal and vertical reclination, intensity of straps tension. At the same time, the clavicles were diluted, their acromial ends were brought down, and the shoulder blades were brought down and lowered.

Vertical reclination occurred due to long stiffening ribs located paravertebrally above the transverse processes of the vertebrae, as well as indirectly through the clavicle, sternum and upper ribs from the pressure of the straps on the shoulder joints.

The outpatient polyclinic stage provided for medical observation of the patient by an orthopedist and trauma surgeon in a city children's polyclinic once every 4 months, if necessary, on an individual basis, once every 3 months.

The tasks of the outpatient stage included the creation of a protective-training regime, the formation of a muscular corset, the creation of favorable conditions for the functional recovery of the spine with activation, social and psychological adaptation of patients, the prevention of complications - kyphoscoliotic deformity of the thoracic and lumbar spine.

For the entire period of dispensary observation, the patient was recommended to sleep on a hard bed. Under the strict control of parents, it was allowed not to use the prescribed corset in the morning hours within the apartment or house.

**DISCUSSIONS**

Previously, the authors of the article conducted research on the prevention of scoliosis and postural disorders in children of different age groups (METALNIKOV ET al., 2020). All children of the main group received a complex vitamin composition, including calcium in the form of hydroxyapatite, micronutrients, chondroitin sulfate, vitamins. The dose of the drug, the duration of administration, were selected individually, considering the age, weight of the child.

Repeated courses of treatment were carried out 3 times a year. Prescribed therapeutic swimming in the breaststroke style (SAUKO, 2019), as well as exercises "hanging" on the Swedish wall with pull-ups on the hands (TIMNEA, 2019). Particular attention was paid to dietary patterns. It was recommended to include in the diet:

- proteins of animal origin (meat, fish, seafood, milk and dairy products, cottage cheese, cheese);
- vegetable proteins (legumes);
- strong broths, jellied meat, jellied dishes (meat, fish, fruit jellies);
- products which contain calcium (hard cheeses, fish, meat, milk, etc.);
- dietary supplements with polyunsaturated fatty acids of the "Omega" class.

The following physiotherapy procedures were used:

1. electrophoresis with polymineral napkins for 10-15 sessions 2 times a year;
2. mud therapy;
3. 10-15 sessions of electrostimulation of the spine twice a year;
4. 10-15 sessions of magnetic therapy of the spine twice a year.

In the course of dispensary observation, in patients of the main group, as a result of training in complex preventive programs, the number of complications in the form of juvenile osteochondrosis of the thoracic spine in adolescence decreased, which was not observed in patients of the comparison group (Table 4).
Table 4. Development of juvenile osteochondrosis in adolescence in groups of patients

| Complication                                | Main group (n=30), abs. (%) | Comparison group (n=30), abs. (%) | Control group (n=30), abs. (%) | P1-2 | P1-3 | P2-3 |
|---------------------------------------------|-----------------------------|-----------------------------------|--------------------------------|------|------|------|
| Juvenile osteochondrosis of the thoracic spine | 2 (6.7)                     | 8 (26.7)                          | 0 (0.0)                        | 0.230| 0.853| 0.023|

Source: Search data.

Thus, the results of the research in patients of the main group five years after the start of complex preventive programs showed an increase in the endurance of the back muscles, a decrease in the number of pathological manifestations, including arthritis, arthralgic syndromes, and coccygodynia. By the age of 16, the patients were visualized good posture, a well-to-do muscle corset, and such complications as juvenile osteochondrosis of the thoracic spine were minimized.

CONCLUSION
The effectiveness of preventive measures aimed at reducing the development of kyphoscoliotic deformity in children with a vicious, incorrect posture against the background of hereditary disorders of the development of connective tissue is noted, the expediency of early medical examination in an outpatient setting is substantiated. As a result of the work done, the authors have proven the effectiveness of clinical examination of children with hereditary disorders of the development of connective tissue. The features of the development of the osteoarticular system in childhood have been determined, tactical approaches have been substantiated in predicting and preventing the development of kyphoscoliotic deformity of the spinal column, and treatment and rehabilitation measures have been improved for children with poor posture against the background of hereditary disorders in the development of connective tissue in outpatient settings.

CONFLICTS OF INTEREST
The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Osteoarticular system in children with bad posture on the background of hereditary disorders of connective tissue development

Sistema osteoarticular em crianças com má postura no contexto de doenças hereditárias de desenvolvimento do tecido conjuntivo

Sistema osteoarticular en niños con mala postura antecedentes de trastornos hereditarios del desarrollo del tejido conectivo

Resumo
Os autores do artigo apresentado analisam as manifestações patológicas do sistema osteoarticular no contexto de uma doença hereditária existente no desenvolvimento do tecido conjuntivo. Além disso, outras alterações nos órgãos internos e no sistema hematopoietético foram estudadas. Com base na policlínica infantil da cidade, 125 crianças foram cadastradas com diagnóstico de má postura no plano frontal, no contexto de distúrbios hereditários do desenvolvimento do tecido conjuntivo. Eles foram incluídos no grupo principal. 30 crianças da mesma idade e sexo apresentaram grupo de comparação com diagnóstico de má postura no plano frontal sem comprometimento hereditário do desenvolvimento do tecido conjuntivo. A observação dinâmica envolveu 30 crianças saudáveis como grupo de controle. Foram observadas alterações entre as crianças em idade pré-escolar em exames preventivos em creches, consultas ambulatoriais agendadas. Foi diagnosticada hipotensão dos músculos que endireitam a coluna e má postura.

Palavras-chave: Postura. Cifoescoliose. Sistema osteoarticular. Exercícios de fisioterapia.

Abstract
The authors of the presented article analyze the pathological manifestations of the osteoarticular system against the background of an existing hereditary disorder of the development of connective tissue. In addition, other changes in the internal organs and the hematopoietic system have been studied. On the basis of the city children’s polyclinic, 125 children were registered with a diagnosis of bad posture in the frontal plane against the background of hereditary disorders of the development of connective tissue. They were included in the main group. 30 children of the same age and gender presented a comparison group with a diagnosis of bad posture in the frontal plane without hereditary impairment of connective tissue development. The dynamic observation involved 30 healthy children as a control group. Changes were observed among children of preschool age at preventive examinations in kindergartens, scheduled outpatient visits. Hypotension of the muscles that straighten the spine and bad posture was diagnosed.

Keywords: Posture. Kyphoscoliosis. Osteoarticular system. Physiotherapy exercises.

Resumen
Los autores del artículo presentado analizan las manifestaciones patológicas del sistema osteoarticular en el contexto de un trastorno hereditario existente del desarrollo del tejido conectivo. Además, se han estudiado otros cambios en los órganos internos y el sistema hematopoyético. Sobre la base del policlínico infantil de la ciudad, se registraron 125 niños con un diagnóstico de mala postura en el plano frontal en el contexto de trastornos hereditarios del desarrollo del tejido conectivo. Fueron incluidos en el grupo principal. 30 niños de la misma edad y sexo presentaron un grupo de comparación con diagnóstico de mala postura en el plano frontal sin deterioro hereditario del desarrollo del tejido conectivo. La observación dinámica involucró a 30 niños sanos como grupo de control. Se observaron cambios entre los niños en edad preescolar en los exámenes preventivos en los jardines de infancia, las visitas ambulatorias programadas. Se diagnosticó hipotensión de los músculos que enderezan la columna y mala postura.

Palabras-clave: Postura. Cifoscoliosis. Sistema osteoarticular. Ejercicios de fisioterapia.