

The effectiveness of personalized kinesitherapy on an inclined plane at degree I scoliosis in children: X-ray monitoring

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Every fourth child in Ukraine has posture disorders, in 5-6 children out of a thousand it is scoliosis [1].

A lot of conservative methods have been developed for the treatment of early stages of scoliosis, however, most of them are associated with a restriction of the patient's movement function, which is especially painful for children. The treatment of scoliosis on an inclined plane (Evminov's board) demonstrated that systematic, dosed traction of the spine according to this technique artificially activates diffuse nutrition of the discs. Strength exercises performed against the background of stretching, develop the muscular corset of the spine, have the effect of additional amortization-muscular compensation at vertical load, and increase the blood flow to the muscles of the spine for additional trophism of its structures [2].

The purpose is to evaluate the effectiveness of complex treatment of grade I scoliosis in children on an inclined plane.

Material and investigation methods

Throughout 2021, 42 children with degree I scoliosis aged from 8 to 13 years old (average age 10.5 years) were under observation. The children were consulted at the Evminov Vertebral Health Center. The diagnosis was made on the basis of complaints, anamnesis, physical examination data, computer photo-geometric method "Postava", spine X-ray, calcaneus ultrasonic densitometry, mineral metabolism laboratory study.

All children and their parents were informed and their voluntary consent was obtained for the investigation and treatment of their children. After investigation, all patients with degree I scoliotic disease were prescribed complex treatment, which included personalized kinesitherapy at Evminov's board, massage, electrical stimulation of the back muscles, and cholecalciferol intake (if indicated).

Two groups of patients were identified: Group I – children with grade I scoliosis before treatment (42 persons) and Group II – children with grade I scoliosis in the process of treatment (37 persons). Re-examination was carried out 4-5 months after the start of the course.

Results

19 (45.2 %) children of Group I had complaints of cerebroasthenic nature (in the morning after sleep or at the end of school hours), 4-5 months after treatment, only 5 (12 %) children of Group II had these complaints (Table 1).

When analyzing the indicators of ultrasound densitometry in 6 (14.3%) children of Group I, there were initial signs of osteopenia (Z-Score) (Table 2).

No hypocalcemia was detected in the investigated children during the initial and repeated laboratory examination. Laboratory indicators of mineral metabolism demonstrate that 25-hydroxycalciferol was at the lower limit of the normative values in children of Group I (Table 3).

Analysis of the compared groups according to the computer photo-geometric method "Postava" and spine X-ray (according to Cobbu)

Table 1.
Complaints of children with degree I scoliosis.

Complaints	Befor treatment n=42		After 4-5 months n=37	
	abs	%	abs	%
Head pain	9	21,4	2	5,4*
Dizziness	5	11,9	0	0*
Preconscious states	6	14,3	4	10,8
Increased weakness, fatigue	19	45,3	14	37,7

Note; * - $p < 0,05$.

Table 2.
Indicators of ultrasound densitometry in children with degree I scoliosis.

Parameters	Degree I scoliosis n = 39	Standard indicators
T-Score	-1,2	> -1,0
Z- Score	-1,2	> -1,0
T- coefficient, %	78,1	> 81,5
Z- coefficient, %	78,1	> 81,5
BQI (<i>Bone Quality Index</i>)	82,0	> 85,5

Table 3.
Laboratory study of mineral metabolism in children with degree I scoliosis.

Parameters	Degree I scoliosis n=42	Standard indicators
Total calcium, mmol/L	2,5 ± 0,1	2,2-2,7
Ionized calcium, mmol/L	1,19 ± 0,04	1,12-1,23
25-hydroxycalciferol, ng/mL	31,2 ± 2,7	30-60
Total protein, g/L	77,6 ± 3,5	57-80

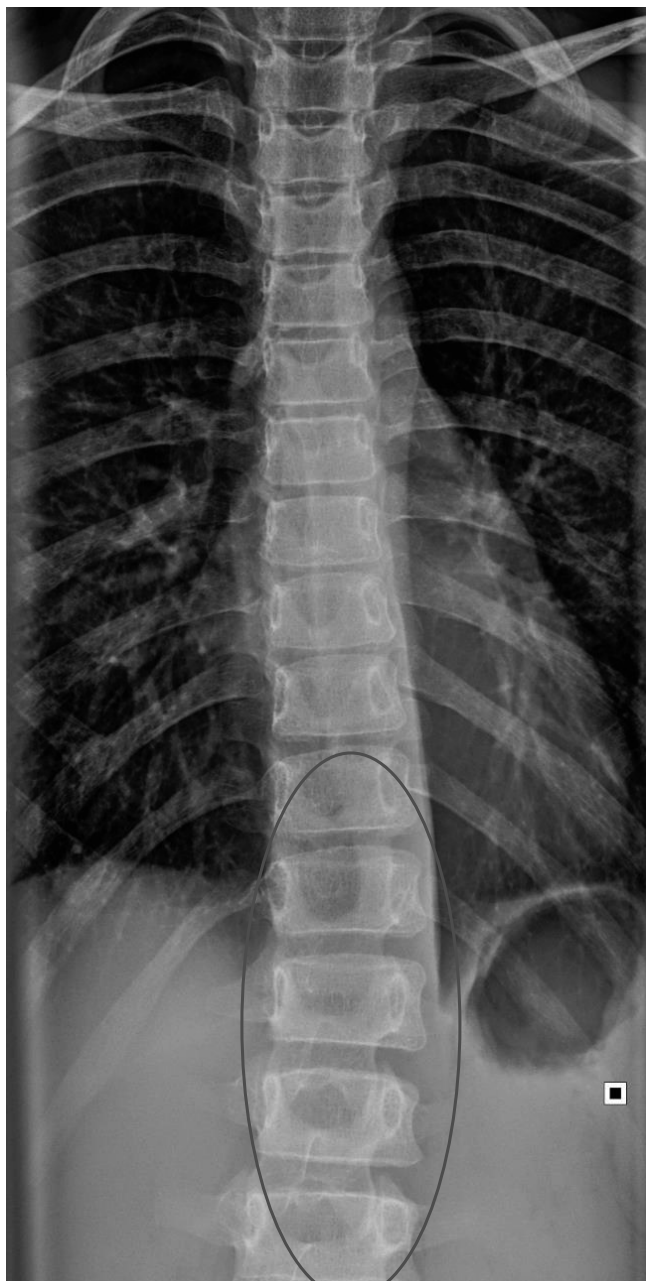
showed a positive trend in 34 (80.9 %) children of Group II (figure), 3 patients in this group had a stable clinical and instrumental picture.

Discussion

The International Scientific Society for Orthopedic and Rehabilitation Treatment of Scoliosis (SOSORT) in 2016 [13] issued a guideline that includes a total of 68 recommendations, which are divided into the following topics: spine fixation, prescriptions for preventing the progression of scoliosis during growth, during treatment with corset and surgical therapy and other conservative methods of treatment (exercises for impaired respiratory function, general sports activities).

Some of the authors in their works [6, 8] expressed the point of view that such methods of treatment as the Schroth method, physiotherapy, chiropractic and electrical stimulation, massage [5, 7] have a dubious positive result in eliminating the progression of scoliotic disease, while others scientists came to the conclusion that the use of a night corset [9], spine fixation for 23 hours, physiotherapeutic treatment [12], Schroth method [4], combined kinesitherapy with differential electrotherapy (TENS-therapy and electromyostimulation) [14] at moderately progressive idiopathic scoliosis (<25°) confirms the effectiveness of non-surgical treatment.

The authors [15] proposed a three-dimensional active correction that includes curvature correction in the coronary plane, rotation in the horizontal plane, and abnormal physiologi-



X-ray of child H., 10 years old before (curvature angle 10°) and in the process of treatment after 4 months (curvature angle 5°).

cal curvature in the sagittal plane at the same time. Patients were trained in kinesitherapy with breathing exercises: drawing air into the concave side during inhalation and pushing air out of the concave side during exhalation and manual therapy – performed manual correction of the spinal column.

When analyzing the compared groups (22 girls of 7-8 years old with degree I scoliotic deformity were divided in equal proportions) [3] it was demonstrated that the use of medical gym-

nastics at Evminov's board significantly helps to strengthen the muscles that hold the spine in a vertical position.

From August 2013 to September 2017, a prospective controlled cohort study with special physiotherapy exercises was conducted at the Guangdong Xinmiao Scoliosis Center. The results demonstrated that 39.1 % of patients of teen age with degree I-II scoliosis showed improvement, 52.2 % - stabilization and 8.7 % - progression [10].

During the research 941 patients at the age from 11 to 25 years were examined [11]. Six studies (85.7 %) applied kinesiotherapy techniques, and three studies (42.8 %) – corrective orthoses. The median duration of kinesiotherapy methods was 37.6 weeks and 91.6 weeks in studies with corrective corsets. Improvement in the progression of lateral inclination of the spine was reported by 83.3 % (5 of 6) of studies of kinesiotherapy techniques and 66.6 % (2 of 3) of studies with a corrective corset.

Conclusions

The application of an inclined plane for children in the treatment of degree I scoliosis gives a positive result – regression of the spinal deformity.

The results indicate the need to develop medical and social programs for the prevention and treatment of degree I scoliotic deformity of the spine in children in general educational institutions at physical education lessons.

Conflict of interest information. The authors declare no conflict of interest related to the publication of this article.

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THE EFFECTIVENESS OF PERSONALIZED KINESITHERAPY ON AN INCLINED PLANE AT DEGREE I SCOLIOSIS IN CHILDREN: X-RAY MONITORING

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The purpose is to evaluate the effectiveness of complex treatment of grade I scoliosis in children on an inclined plane.

Material and methods. Throughout 2021, 42 children with degree I scoliosis aged from 8 to 13 years old (average age 10.5 years) were under observation.

All patients with degree I scoliotic disease were prescribed complex treatment, which included personalized kinesitherapy on an inclined plane (Evminov's board), massage, electrical stimulation of the back muscles, and cholecalciferol intake (if indicated).

Two groups of patients were identified: Group I – children with grade I scoliosis before treatment (42 persons) and Group II – children with grade I scoliosis in the process of treatment (37 persons). Re-examination was carried out 4-5 months after the start of the course.

Results. 45.2 % of children in Group I had complaints of cerebroasthenic nature, which remained in only 12 % of patients in Group II. No clinical signs of hypocalcemia were revealed in the examined children during the initial and repeated laboratory examination. When analyzing the indicators of ultrasound densitometry, 14.3 % of children in Group I had initial signs

of osteopenia (Z-Score); 25-hydroxycalciferol was at the lower limit of the normative values in children before the start of treatment. Regression of scoliosis was noted in 80.9 % of children of Group II, according to X-ray data, in 3 patients of this group there was a stable clinical and instrumental picture.

Conclusions. The application of an inclined plane for children in the treatment of degree I scoliosis gives a positive result – regression of the spinal deformity.

The results indicate the need to develop medical and social programs for the prevention and treatment of degree I scoliotic deformity of the spine in children in general educational institutions at physical education lessons.

Key words: children, degree I scoliosis, inclined plane, kinesitherapy, radiography, densitometry.

ЕФЕКТИВНІСТЬ ПЕРСОНАЛІЗОВАНОЇ КІНЕЗІТЕРАПІЇ НА ПОХИЛІЙ ПЛОЩИНІ ПРИ СКОЛІОЗІ І СТУПЕНЮ У ДІТЕЙ: РЕНТГЕНОЛОГІЧНИЙ МОНІТОРИНГ

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Мета – оцінити ефективність комплексного лікування сколіозу I ступеня у дітей.

Матеріали та методи. протягом 2021 року за нашим спостереженням перебувало 42 дитини зі сколіозом I ступеня у віці від 8 до 13 років (середній вік 10,5 років). Всім пацієнтам із сколіотичною хворобою I ступеня було призначено комплексне лікування, яке включало персоналізовану кінезітерапію на похилій площині (профілактор Євмінова), масаж, електростимуляцію м'язів спини, прийом холекальциферола (за показаннями). Було виділено дві групи пацієнтів: I група – діти зі сколіозом I ступеня до лікування (42 людини) і II група – діти зі сколіозом I ступеня у процесі лікування (37 осіб). Повторне обстеження проводилося через 4-5 місяців з моменту початку лікування.

Результативу 45,2 % дітей I групи мали скарги цереброастенічного характеру, які збереглися лише у 12 % пацієнтів II гру-

пи. Клінічних ознак гіпокальціємії при первинному і повторному лабораторному дослідженні у обстежених дітей виявлено не було. Аналіз показників ультразвукової денситометрії довів, що 14,3 % дітей I групи мали початкові ознаки остеопенії (Z-Score); 25-гідроксикальціферол знаходився на рівні нижньої межі нормативних значень у дітей до початку лікування. Відзначався регрес сколіозу у 80,9 % дітей II групи, за даними рентгенографії, у 3 пацієнтів цієї групи мала місце стабільна клініко-інструментальна картина.

Ключові слова: діти, сколіоз I ступеню, похила площина, кінезитерапія, рентгенографія, денситометрія

ЭФФЕКТИВНОСТЬ ПЕРСОНАЛИЗИРОВАННОЙ КИНЕЗИТЕРАПИИ НА НАКЛОННОЙ ПЛОСКОСТИ ПРИ СКОЛИОЗЕ I СТЕПЕНИ У ДЕТЕЙ: РЕНТГЕНОЛОГИЧЕСКИЙ МОНИТОРИНГ

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Цель – оценить эффективность комплексного лечения сколиоза I степени у детей.

Материал и методы. На протяжении 2021 года под нашим наблюдением находилось 42 ребёнка со сколиозом I степени в возрасте от 8 до 13 лет (средний возраст 10,5 лет). Всем пациентам со сколиотической болезнью I степени было назначено комплексное лечение, которое включало персонализированную кинезитерапию на наклонной плоскости (профилактика Евминова), массаж, электро-

стимуляцию мышц спины, приём холекальциферола (по показаниям). Было выделено две группы пациентов: I группа – дети со сколиозом I степени до лечения (42 человека) и II группа – дети со сколиозом I степени в процессе лечения (37 человек). Повторное обследование проводилось через 4-5 месяцев с момента начала лечения.

Результаты. 45,2 % детей I группы имели жалобы цереброастенического характера, которые сохранились лишь у 12 % пациентов II группы. Клинических признаков гипокальциемии при первичном и повторном лабораторном исследовании у обследованных детей выявлено не было. При анализе показателей ультразвуковой денситометрии 14,3 % детей I группы имели начальные признаки остеопении (Z-Score); 25-гидроксикальциферол находился на уровне нижней границы нормативных значений у детей до начала лечения. Отмечалась регресс сколиоза у 80,9 % детей II группы, по данным рентгенографии, у 3 пациентов этой группы имела место стабильная клиничко-инструментальная картина.

Выводы. Использование детьми наклонной плоскости в лечении сколиоза I степени даёт позитивный результат: регрессию деформации позвоночника.

Полученные результаты свидетельствуют о необходимости разработки медико-социальных программ профилактики и лечения сколиотической деформации позвоночника I степени у детей в общеобразовательных учебных заведениях на уроках физического воспитания.

Ключевые слова: дети, сколиоз I степени, наклонная плоскость, кинезитерапия, рентгенография, денситометрия.