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Original article

THE IMPACT OF THE KINETOTHERAPEUTIC INTERVENTION OF THE THERAPIST-PARENT COLLABORATION IN THE RECOVERY PROCESS OF STUDENTS WITH VERTEBRAL STATIC DISORDERS

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Abstract

Aim. Taking into account the fact that vertebral static disorders in children / adolescents are a medical-social problem, kinetic therapy is a classic modality, already established in the treatment of this condition, and we want to obtain the best results in the recovery of children/adolescents, we proposed an experimental study in which to apply the kinetotherapy program through a partnership with the parent to the subjects of the experimental group. National specialized studies report that vertebral static disorders are one of the most serious problems occurring at school age, considerably affecting children's health.

We believe that this aspect would highlight the effectiveness of the therapeutic intervention based on a partnership in improving the symptoms and well-being of the subjects studied by limiting the negative impact of pain and incorrect posture in the spine.

Methods. For this experimental study, a group of 30 subjects with a disorder of vertebral statics - *lumbar hyperdordosis*, aged 9-15 years, was formed. Somato-functional and psychic evaluation of subjects was performed. In physical therapy, evaluation is the first and last act of the recovery process. Recovery aims to identify the purpose of therapeutic intervention and establish the therapeutic strategy.

Results. The application of a physiotherapeutic intervention strategy in collaboration with the therapist-parent, both in the school office and at the students' home, determined the improvement of the psycho-motor functional deficit, favoring the increase of the chances of recovery of students with lumbar hyperlordosis.

Conclusions. It is undeniable that parental involvement in therapy plays an essential role in the success of the therapeutic process in the case of children with spinal static disorders. The results were much better in the group of subjects in which the introduction of the therapeutic program was allowed in the family environment.

Keywords: vertebral static disorders, partnership, joint mobility, physical therapy program, children with special needs

Introduction

Research in the field shows that there are various causes in the social sphere that determine the appearance of spinal static disorders in children and young people: low standard of living, lack of a healthy lifestyle in the family, prolonged sitting in asymmetrical positions, lack of physical activity, obesity, all these lead to deficiencies of the musculoskeletal system.

In recent years, more and more studies have focused on assessing body posture in children with special needs (SEN). The authors pointed out that in children with CES, spinal deformities are common. A study conducted by Wolan-Nieroda et al. (2018) points out that 63% of them have physical deficiencies in the spine and only 37% of them have correct posture. The results of international research highlight the unfavorable situation regarding the increased incidence of spinal static disorders in children and young people. (Brzęk et al., 2019).

Within special education, the figures are *worrying* after assessing the spine in students with disabilities. Gulap (2018) highlights that 63% of the students tested were detected with spinal static disorders. And Tătaru (2019), states that at the level of special schools in Bucharest, 33% of students involved in the kinesiotherapy program have vertebral static disorders.

Another study conducted by Bughirică-Georgescu (2021), highlights that in the kinesiotherapy program at the level of special schools, most students are treated for a spinal static disorder. The results of the study show that 71% of students with mental deficiencies have spinal static disorders. At the same time, it emphasizes that there is an increased incidence of this disease in students with special educational needs, of young school age, which imposes the need for early detection and treatment and family involvement.

One study conducted at the level of special schools in Bucharest mentions that 33% of students involved in the recovery program during physical therapy classes have vertebral static disorders (Șuță et al., 2017). Body posture in subjects with intellectual disability was also assessed by Momola and Czarny (2011), who studied a group of 201 subjects, (12–18 years) presenting with severe intellectual disability.

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The authors demonstrated that intellectually disabled children tend to present themselves with poor body posture. In the entire group, regardless of the degree of disability, only 7.7% of boys and 7.1% of girls had good body posture, while the remaining subjects had poor posture or posture-related defects, and 65.5% had bad posture. Momola (2007) also assessed body posture and leg shape in a group of girls with mild or severe intellectual disabilities. The results obtained show that in the majority of the children examined, posture defects were observed in the spine region rather than in the lower extremities.

Spinal static disorders can have a significant impact on the life of schoolchildren regarding *physical appearance* (exaggerated curvatures of the spine, chest deformity), *functionality* (pain and discomfort, limitation of movements), *education* (can affect a schoolchild's ability to learn and focus on specific activities, etc.), *social life* (difficulties in performing recreational activities, changes in well-being, etc.).

Disorders of vertebral statics prevent the harmonious development of the body, change the external appearance, reduce adaptation to physical exertion, while diminishing the work capacity of the individual. (Fozza, 2003). According to Cordun (1999), disorders of vertebral statics can arise from different causes, systematized into predisposing, favoring and determining causes.

The interdisciplinary team that intervenes in treating this condition in children and young people consists of specialists (orthopedist, recovery doctor, physiotherapist, nutritionist, psychotherapist), who must communicate and collaborate with parents / legal representatives. Effective communication between interdisciplinary team members is beneficial for parents of children / adolescents with vertebral static disorders, who need precise and clear information to understand the diagnosis, and what are the steps in recovery. At the same time, the recovery of vertebral static disorders, especially structured ones, is a long-term process that requires perseverance, motivation and encouragement of the child and family. During the child's recovery, the effectiveness of therapy will largely depend on the possibilities offered to the child by the parents (financial possibilities, allocation of time, implementation of recommendations given by the doctor and physiotherapist).

Research in the field supports that when parents are involved in children's therapy, they are more motivated to work and achieve better results in their recovery. Parents have the role of generalizing the skills already developed by the therapist in working with the child. (Cristea, Sipos, Iftene, 2011)

Objectives

The objectives of the experimental study are: establishing and applying evaluation methods and tools; establishing a new therapeutic strategy based on therapist-parent collaboration; highlighting the importance of parents' involvement in the child's physical therapy activity; establishing and implementing the recovery protocol; establishing the effectiveness of therapeutic intervention through statistical analysis of the results obtained.

Methods

The experimental study was conducted at Special Secondary School No. 3, Bucharest between September 2022 and March 2023, on a group of 30 subjects aged 9-15. The group was divided into 2 groups: the control group (15 students) who benefited from a kinetotherapy program applied by the physiotherapist teacher in the school office, 1 kinetotherapy session / week lasting 3 months and the experimental group (15 students with 15 parents), followed a kinetotherapy program applied and supported in *therapist-parent* partnership, benefited from 3 kinetotherapy sessions (1 session / week, according to the class schedule and 2 sessions / week in the family environment), lasting 3 months.

The somato-functional and psychic (initial, final) evaluation of the subjects was performed in order to quantify the impact of the applied kinetotherapy program.

-assessment of spinal mobility targeted:T east finger-ground. *Schöber* test, *EUROFIT battery mobility test.*

-pain assessment was performed with the Wong Baker Faces Scale (VAS). The intensity of pain was rated on a scale of 0-10.

- the*value of well-being* was achieved by applying the WHO Questionnaire of the 5 criteria for assessing well-being.

Research samples

The research subjects were 30 students with lumbar hyperlordosis. Of these, 66.7% were boys and 33.3% girls, the average age of the subjects was 13.06 years in the control group and 11.6 years in the experimental group (val. min 9 years, val.max.15 years). The area of origin was 83.3% urban and 16.7% rural. (Table 1)

Statistical analysis

The recorded data were processed and statistically analyzed, following the effects of the applied program. The SPSS statistics program was used, a program that allowed the achievement of statistical-mathematical indices such as: arithmetic mean, standard deviation, minimum value, maximum value. In order to obtain comparative data between the control group and the experimental group, we used the Split files option in SPSS to compare groups. To compare the averages of the same groups at times t1 and t2, we used the "t" test for paired samples.

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Table 1. Characteristics of the subjects

No. crt.	Characteristics of the subjects	Group	N	mean±ab.std	value. min	value. max
1.	Age of subjects	G1	15	13.063±1.98	9	15
2.	Age of subjects	G1	15	11,6,±2,02	9	15
No. crt	**Characteristics of the subjects**	**Percent**				
1.	Gender of the subjects	66,7% boys 33,3% girls				
2.	The environment of origin	83,3% urban 16,7% rural				

Results

Table 2 contains the results of the initial and final assessments for all parameters tracked, namely: *joint mobility* (finger-ground test, Schöber test, Eurofit battery test), *pain intensity* and *well-being* of subjects in the **G1 control group**, subjects who had the physical therapy program applied 1/week in the school cabinet.

Table 2. Values obtained during the pre-test/post-test evaluation (control group G1 – 15 subjects)

No. crt.	The evaluated parameter	G1 N=15	mean±ab.std	value min.	value max.	p ≤ 0,05
1	Index fingers-sol	T1	12,33±6,28	3	20	0,009
	Index fingers-sol	T2	11,20 ±6,57	1	19	
2	Schöber test	T1	3,93±0,59	3	5	0,001
	Schöber test	T2	4,47 ±0,51	4	5	
3	Eurofit battery test	T1	13,87±2,72	11	20	0,000
	Eurofit battery test	T2	15,47±2,92	12	24	
4	Pain	T1	2,60±1,63	0	6	0,000
	Pain	T2	1,53±1,12	0	3	
5	Well-being	T1	44±8,82	20	54	0,000
	Well -being	T2	52,53±7,38	32	64	

*Correlations are significant for p<0.05.

According to table no. 2 It was noted that initially, the mean finger-to-ground test was 12.33 (±6.28) cm. (wave min. 3, val.max. 20). At the final evaluation, the mean finger-to-ground test decreased to 11.20 (±6.57) cm., (val. min.1, val.max.19). There is a significant difference [t = 3,012, diff = 14 p = 0,009] between the value T1 and T2, decreasing on average by 1,13 cm. The mean Schöber test at baseline was 3.93 (±0.59) cm. (val min. 3, val.max.5). At the final evaluation, the Schöber test mean increased to 4.47 (±0.51) cm. (val. min.4, val..max.5). There is a significant difference [t = -4.000, diff = 14, p = 0.001] between the value of the Schöber test at the initial assessment compared to that at the final assessment, increasing on average by 0.54 cm.

Initially, the average joint mobility in the Eurofit battery was 13.87 (±2.72) cm. (wave min. 10, val.max.18). At the final evaluation, the average joint mobility increased to 15.47 (±2.92) cm. (val. min. 11, val. .max. 20). There is a significant difference [t = -12.220, diff = 14, p = 0.000].

Initially, the average pain intensity was 2.60 (±1.63), (val. min. 0, val.max. 6), which means that on average, subjects of this group characterized pain as tolelable. At the final evaluation, the average pain intensity decreased to 1.53 (±1.125) (val. min. 0, val.max.3), group subjects characterized pain as mild to disturbing. There is a significant difference [t = 5.172, diff = 14, p = 0.000] between the intensity of pain felt by subjects at the initial assessment compared to the final one, decreasing on average by 1.07 points.

At the initial assessment, the average well-being was 44 (±8.82) points, (val min. 20, val.max. 54). At the final assessment, the average well-being increased to 52.53 (±7.386) points, (val. min. 32, val.max. 64).

There is a significant difference [t = -7.794, diff = 14, p = 0.000] between the level of well-being at T1 compared to Q2, increasing on average by 8.53 points.

Table 3 contains the results of initial and final assessments for all parameters tracked, namely: *joint mobility* (finger-ground test, Schöber test, Eurofit battery test), *pain intensity* and *well-being* of subjects in experimental group G2, subjects who were applied the physiotherapy program in therapist-parent partnership.

Table 3. Values obtained during the pre-test/post-test evaluation (experimental group G2 – 15 subjects)

No.crt.	The evaluated parameter	G2 N=15	mean±ab.std	value min.	value max.	p ≤ 0,05
1	Index fingers-sol	T1	12,00±4,62	6	20	0,000
	Index fingers-sol	T2	9,07 ±5,25	2	17	
2	Schöber test	T1	3,87±0,35	3	4	0,000
	Schöber test	T2	5,00 ±0,00	5	5	
3	Eurofit battery test	T1	13,47±2,80	10	20	0,000
	Eurofit battery test	T2	16,87±3,20	12	24	
4	Pain	T1	2,53±1,68	0	6	0,000
	Pain	T2	0,87±0,91	0	3	
5	Well-being	T1	44±8,94	20	52	0,000
	Well -being	T2	73,07±11,15	52	88	

*Correlations are significant for p<0.05.

Initially, the mean finger-to-ground test was 12.00 (±4.62) cm., (val. min. 6, val.max. 20). At the final evaluation, the mean finger-to-ground test decreased to 9.07 (±5.25) cm., (val. min. 2, val. .max. 17). There is a significant difference [t = 10,330, diff = 14, p = 0,000] between the level of the finger-to-ground test at the initial assessment compared to that at the final assessment, decreasing on average by 2.93 cm. Initially, the average Schöber test was 3.87 (±0.35) cm, (val. min. 3, val. .max. 4). At the final evaluation, the Schöber test mean increased to 5.00 (±0.00) cm. (val. min. 5, val. min. 5, val.max. 5). There is a significant difference [t = -12.475, diff = 14, p = 0.000] between the level of the Schöber test at the initial assessment compared to that at the final assessment, increasing on average by 1.13 cm.

It is noticed that initially, the average mobility test in the Eurofit battery was 13.47 (±2.80) cm., (wave min. 10, val.max.20). At the final evaluation, the average joint mobility increased to 16.87 (±3.20) cm., (val. min. 12, val.max. 24). There is a significant difference [t = -13,360, diff = 14, p = 0,000] between joint mobility from initial assessment compared to final assessment, increasing on average by 3.4 cm.

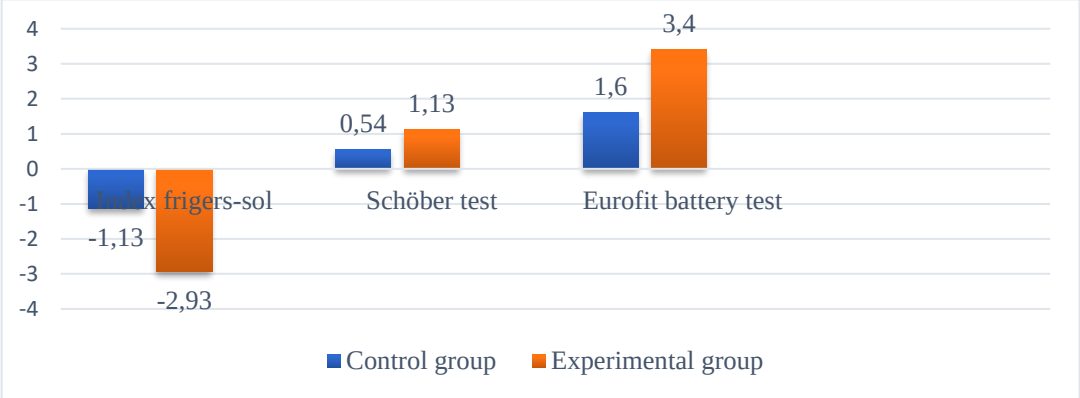

Figure 1. The difference in the average values obtained for joint mobility after the therapeutic intervention (control group and experimental group)

Initially, the average pain intensity was 2.53 (±1.68) (val. min. 0, val.max. 6), meaning that on average, subjects characterized pain as tolelable. At the final assessment, the average pain intensity decreased to 0.87 (±0.91) (val. min. 0, val.max.3), subjects characterized pain as very mild. There is a significant difference [t = 6.616, diff = 14, p = 0.000] between the intensity of pain felt at the initial assessment compared to the final one, decreasing on average by 1.66 points.

Initially, the average well-being was 44 (±8.94) points, (wave min. 20, val.max. 52). At the final assessment, the average well-being increased to 73.07 (±11.15) points, (val. min. 52, val.max. 88). There is a significant difference [t = -9.656, diff = 14, p = 0.000] between the level of well-being at the initial assessment compared to that at the final assessment, increasing on average by 29.07 points.

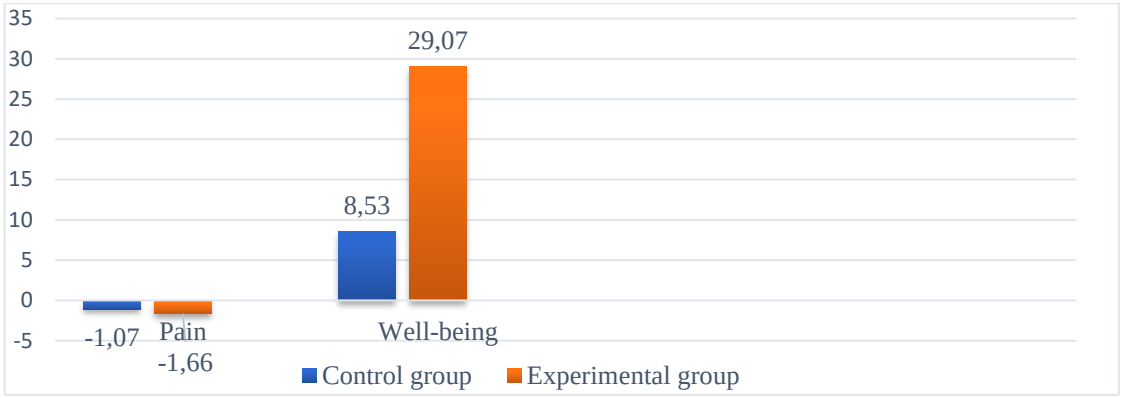

Figure 2. The difference in the mean values obtained in the assessment of pain and well-being after the therapeutic intervention (control group and experimental group)

Discussions

1. It is undeniable that the involvement of parents in the child's therapy plays an essential role in the success of the therapeutic process in the case of children with spinal static disorders. The results were much better in the group of subjects in which the introduction of the therapeutic program was allowed in the family environment, with the support and continuation of therapeutic activity with parents. (Briceag, 2016).

2. Although the parent is not qualified for the activity of physical therapy, through cooperation, information and training he/she has the privilege to become *a cotherapist*, to work with his/her own child, in parallel with the therapy carried out in the office of the school unit.

3. The therapeutic program cannot be effective if the child does not practice the skills acquired in the school office within the family. Thus, we recommend actively involving the family in the therapeutic program, to point out the aspects of either stagnation of spinal deviations or improvement.

4. Children's interactions with their parents influence school performance, aspirations, attitudes and health. (Bărbulescu, 2021). Parents have the role of generalizing the skills already developed by the therapist in working with the child. The family in which the child is staying must be informed from reliable sources about therapeutic means and maintain collaboration links with specialists in treating the condition in question. (Racu, Bodorin, Maximciuc, Plămădeală, 2011).

Conclusions

I. Both therapeutic approaches, both the one applied by the physiotherapist teacher in the school office (1 session / week) and the one applied in therapist-parent partnership in the school office and in the family environment (3 sessions / week), managed to modify the parameters followed positively.

II. It is clear from the intragroup analysis that:

1. The application and support of the therapeutic program in collaboration therapist-parent, both in the school office and at home, is more effective in increasing joint mobility in the experimental group, than the therapeutic program applied only in the school office by the physiotherapist teacher in the control group.The mean value in the finger-to-ground test decreased by 1.13 cm. in G1 and in G2 it decreased by 2.93 cm. The average value in the Schöber test increased in G1 by 0.54 cm and in G2 by 1.13 cm. The average value after the mobility test in the Eurofit battery shows an increase of 1.6 cm. in G1, and at G2 by 3.4 cm.

2. The application and support of the therapeutic program in collaboration therapist-parent, both in the school office and at the students' home, is more effective in reducing the intensity of pain in the experimental group, than the therapeutic program applied only in the school office by the physical therapist teacher in the control group. The difference in average values obtained when assessing pain after therapeutic intervention shows that at G1 pain decreased by 1.07 points, which meant that subjects characterized *mild* pain. La G2 pain decreased by 1.66 points, meaning that subjects characterized pain as *mild* to *disturbing*

3. The application and support of the therapeutic program in collaboration therapist-parent, both in the school office and at the students' home, is more effective in improving the well-being of the experimental group, than the therapeutic program applied only in the school office by the physical therapist teacher in the control group. G2 subjects' well-being

on positive mood (good mood, relaxation), vitality (active mood and rest) and general interests (interest in things) averaged 73 points, compared to G1 which averaged 52 points;

4. The application of a kinetotherapeutic intervention strategy in collaboration therapist-parent, both in the school office and at the students' home, determines the improvement of the psycho-motor functional deficit, favoring the increase of the chances of recovery of students with vertebral static disorders.

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