

# PHYSICAL DEFICIENCIES AND HYDRO-KINESTHETIC THERAPY IN THEIR CORRECTION

E. MOLDOVAN<sup>1</sup> S. CIOROIU<sup>2</sup>

**Abstract:** *This paper is meant to offer more information about the beneficial effects of kinesthetic therapy and orthopedics in the treatment of scoliosis, a treatment which should be followed by swimming in a constant and systematic manner. In the case of those who suffer of scoliosis, swimming should be practiced for several years in order to have a good effect. In swimming, the patient shall practice various arts of swimming, namely: backstroke, bras and butterfly. This is an excellent active way of self-control and rebalancing of the backbone and of the pelvis, and sustains the harmonious development of the chest.*

**Key words:** *physical deficiencies, hydro-kinesthetic therapy.*

## 1. Introduction

Physical deficiencies are being studied not only because they are quite frequent, but especially related to the consequences they have on the body. The emergence of vertebral deviations before starting attending school requires special investigation of the vertebral column, establishing both the etiology of the vertebral deviations and particularly their evolution, taking into consideration that their prognosis is more serious if they emerge at a younger age.

Vertebral deviations found in school age children are considered as vertebral statics imbalances, accompanied by changes of the minimal vertebral structure, which in time determine and cause the emergence not only of statics disorders of the intra-thorax viscera, but also aesthetic changes of the body. Vertebral deviations found at school age are faulty positions (habitual at the work

desk, during the execution of certain professional abilities etc.), as well as differences between the development of the bone support - the vertebral column and the muscles-ligaments support, determined by permanentization. Thus, vertebral deviations at school age cause, besides aesthetic inconveniences (asymmetry of the shoulders and of the shoulder blades, of the thorax and of the abdomen), also functional troubles (especially of the vertebral column that highly depends on the function of the internal organs in the thorax and abdominal inlets [4, p. 87-90].

Accordingly, the specialty literature underlines the need to precociously track down vertebral deviations by initial and timely check-ups that are mandatory carried out at all levels of education.

Physical deficiencies are acquired pathological aspects of the human body, determined by genetic factors or by microbial factors or that emerged as a

---

<sup>1</sup> Dept. of Theory and Collective Sports, *Transilvania* University of Braşov.

<sup>2</sup> Dept. of Theory and Individual Sports, *Transilvania* University of Braşov.

consequence of defective, incorrect positions of vertebral statics, walking, global or segmental posture in daily attitudes (orthostatism, sitting, at the writing desk, walking). A physical deficiency represents a change from the normal of the form and function of the musculoskeletal system that negatively influences the body and that may totally or segmentarily change the body form or its functions. Physical deficiencies are the result of a hypo or of a hyper-function, of an imbalance or of the non-coordination of the musculoskeletal system functions. Pathological physical deficiencies are determined by structural changes of the elements making up the musculoskeletal system [6, p. 56-58].

- Adrian N. Ionescu described four groups of pupils classified on the grounds of the seriousness of the deficiency.

- *Group I* includes children without any physical, organic or mental deficiencies, with a harmoniously developed body, with a good nutrition condition, having a correct posture of the body and of its segments.

All these pupils execute the tasks stipulated in the physical education curriculum and take part in all forms of physical exercise at school.

- *Group II* includes pupils with *minor physical deficiencies* (deficient attitudes) that may concern the whole body or only certain segments and that, by the execution of the corrective move – functional test, are corrected and hyper-corrected (correct = partial remedy of the global or segment deficiency is carried out; hypercorrect = when we obtain not only the position rectification, but also the opposite aspect of the deficiency). These children do not show weight troubles or marks of organic or mental diseases. They are not exempted from physical education and, on the contrary, they are recommended additional exercises to remedy those deficiencies. Consequently, it would be advisable to

organize special moments of kinesics prophylaxis including 3-5 corrective and straightening exercises during the class or even special corrective lessons.

- *Group III* includes pupils with average deficiencies, showing stationary or slow evolution of morphological and functional faults, which are partially corrected or stay the same according to the functional test. Most of the average deficiencies are segmentary. These children are not exempted from physical education either, but only from certain exercises and moves that might aggravate the existing deficiency. They shall not take part in contests. The pupils showing average deficiencies shall follow a special life regime where the most important are the corrective physical exercises. By conforming both at school and at home to the recommendations of the physician and of the physical education teacher related to educating a correct posture of the body depending on the physical deficiencies found: rational alternation of work and resting time, as well as performing certain exercises daily, such deficiencies may partially remedy, their evolution may be stopped or they may be eradicated, up to their complete rectification.

- *Group IV* includes pupils with accentuated deficiencies residing in pathological changes that are in an advanced evolutionary stage. Such pupils are exempted from the physical education class, yet we organize special lessons with them in order to correct their physical deficiencies. Systematic and organized practice of corrective physical exercises by these individuals is required both to provide normal bringing up, good psychomotive ability, and to correct the existing deficiencies, to prevent the compensating ones etc. It is highly important that the teacher of physical education, being aware of the differential characteristics of these groups, should correctly appreciate the

biological value of a group. The large number of deficiencies found in schools is explained by the non-differentiation of the minor deficiencies that are deficient attitudes, without changes in the tissues' structure, from the average and the accentuated deficiencies. Taking this classification into consideration, we may divide physical deficiencies into deficiencies of first, second and third degree (according to groups II, III and IV). It is true that sometimes the differentiation between the minor deficiencies and the average ones is not an obvious one, especially as far as the transition forms are concerned. At the same time, we would like to emphasize the importance of acknowledging such deficiencies for the harmonious development of teenagers and youngsters. Found in due time, properly guided and monitored, minor and average deficiencies may be corrected. Denying their existence is a big mistake, as big as the one of not correcting them or disregarding them. Only by knowing the biological and medical data of all pupils may the teacher of physical education establish the possibilities of the pupil's integration in the physical education process, decide and apply the most appropriate measures to prevent and to correct physical deficiencies.

The issue of finding, preventing and remedying physical deficiencies existing in children represents a permanent concern for both parents and teachers involved in their bringing up and education.

This paper deals with the possibility that the complex treatment of scoliosis (kinesthetic therapy and orthopedics) is associated with symmetrical aquatic procedures and moves, in a systematic and continuous manner, with the aim of considerably improving curative results. As far as people suffering from scoliosis are concerned, the hydro-kinesthetic

therapy by swimming must be symmetrical and practiced for several years. They must swim backstroke, breaststroke or butterfly stroke styles. This is an excellent active way of self-controlling and re-balancing the shoulder girdle and the pelvic girdle, of re-balancing the vertebral column and of directing the proportioned development of the thorax. Breathing gymnastics in water is executed as swimming or as special programs of breathing moves, 10-15 minutes, the patient being in water up to the chin, with stretched lower limbs and touching the pool with the tip of the toes [5, p. 67-69]. Inhaling and exhaling shall be simultaneous with the arms moving up, to the lateral, with or without inflexion, symmetrically or asymmetrically), with moves of the head and of the neck (flexions – extensions). As well, the level of the water in the pool may lower, so that the water reaches the line of the shoulders (the underarms). In such circumstances, to the moves of the upper limbs and of the head we add slow flexions and extensions of the body. The suppleness of the vertebral curvatures balances the girdles, stimulates the self-control of the deficient position and favors the development of the thorax symmetry, as well as the increase of the vital capacity [2, p. 145-148]. The main motivation of the paper is the high frequency of vertebral deviations, especially of scoliosis type ones, in pupils aged between 7 and 18 years. Such deviations are asymptomatic in the first stage – the attitude stage that may be found only on the occasion of a rigorous medical check-up. The pain occurring in maintaining certain positions or the permanent pain in the vertebral area noticed by teenagers determines the ascertaining of the already advanced scoliosis. Scoliosis, the physical deficiency with multiple preventive, therapy-corrective, recovery and social implications - represents an incompletely

solved issue [3, p. 112-114]. "Idiopathic scoliosis" or "scoliosis disease" as well as "congenital scoliosis" still do not have causal therapeutic solutions, as scholars are still searching for the most efficient solutions possible. Wishing to obtain a correct, aesthetic attitude of the child, parents appeal to the orthopedists. Yet we must understand that not all physical deficiencies are exclusively solved by medicine, most of them may be corrected also by doing therapy physical exercise [2, p. 145-148].

Scoliosis is the deviation from the normal of the vertebral column, in all the three planes: sagittal, horizontal and mostly frontal. Not found, not treated in an appropriate manner and neglected, it may become a serious, severe problem, with several negative effects on the form of the body, of the position of the upper and lower limbs, as well as on the operation of the thorax internal organs [1, p. 88-89]. The study does an applicative research to develop the field of hydro-kinesthetic therapy of physical deficiencies by means of specific swimming. Research is intended to adapt the means of swimming to the recovery of the potential physical deficiencies, establishing new directions to diversify the recovery programs, elaborating complex exercise systems to improve the results related to the correction of physical deficiencies, a direction in which we shall study the relationship between hydro-kinesthetic therapy and the specific means of swimming from the point of view of remedying physical deficiencies, studies meant to elaborate appropriate programs in the field of kinesthetic therapy necessary to train specialists in the field.

## 2. Hypothesis of the Paper

We start from the assumption that associating kinesthetic therapy with the specific means of swimming we may obtain visible results in remedying scoliosis in school age children. Tasks of the Paper: the following tasks of the study derive from this purpose:

- demonstrating the importance of the study related to the physical deficiencies of school age children;
- selecting the specialty bibliographic material;
- demonstrating the efficiency of the proposed exercise complexes and attaining the objectives related to the evaluation and comparison of the initial and final deviation values of the studied scoliosis;
- highlighting the need of hydro-kinesthetic therapy in the treatment of scoliosis;
- demonstrating the efficiency of the proposed exercise complexes and attaining the objectives related to the evaluation and comparison of the initial and final deviation values of the studied scoliosis;
- selecting the teenagers making up the experimental group;
- composing exercise complexes for the medical gymnastics lesson, in the kinesthetic therapy gym (by the specialist in kinesthetic therapy) and of the special exercises for the pool.

The Research Methods were: analysis of the specialty literature, pedagogic observation, conversation method, tests method, graphic method.

The methods of analyzing specialty literature – a method by which we obtained data related to the results obtained by other researchers in the field of that particular theme. This method implied the search for bibliographic sources, consulting them,

information selection, processing and interpretation.

Studying school documents – especially of the medical record sheet of each pupil where we found data on the causes that determined the installation of the physical deficiency, on its severity.

The method of the case study – as a research method, resides in the analysis and debate of a proposed case, of a pupil in our case. The feature of this method is that it allows a direct confrontation with the real circumstances, considered as representative for a class of phenomena; the circumstances serve as premises for inductive knowledge. Its functionality is revealed both in the process of acquiring new theoretical information as well as in the study of concrete situations. In order to collect data for each pupil, we used the study of the medical record sheet, anthropometrical data in accordance with the hypotheses of this paper.

The mathematical – statistics method – we used it to express quality relations from the quantity point of view. The data supplied by this method helped us establish the progress made in remedying the physical deficiencies.

The execution of the experiment: we included 8 children in the research who represented the experimental sample; these cases were selected after the examination of 102 pupils of secondary school. The term of the experiment was of 10 months. The subjects included in the experimental group had two classes per week in the kinesthetic therapy gym (60 min) and two classes at the Olympic Swimming Pool of Brasov (50min). The research includes the data of the subjects related to: identity, anamnesis, clinical examination, anthropometrical examination.

Specific measurements: Thorax imbalance, cervical, thorax, lumbar arrows, right hemi-thorax, radiological examination.

The research was especially substantiated on:

- the personalized study of the subjects;
- establishing the objectives of the kinesthetic therapy and hydro-kinesthetic therapy program;
- the study and elaboration of the recovery programs;
- going through the proposed complexes together with the subjects;
- comparing the initial parameters to the final ones.

### 3. Steps of the Research

1. Theoretical documentation by exploring the specialty literature.
2. The contact with the kinesthetic therapist.
3. The study and the elaboration of the recovery programs.
4. The direct contact with the subjects of the experimental group.
5. The registration of the initial data.
6. Providing the best conditions to carry out the lessons and their content at the swimming pool together with the other two specialist collaborators, swimming instructors.
7. Initial and final testing
8. Data registration and interpretation.

The programs elaborated during the recovery classes and the methodology of elaborating the programs related to scoliosis remedy had the following objectives:

- correcting physical deficiencies, scoliosis and stopping its evolution;
- ensuring correct body posture;
- ensuring harmonious physical development and a correct body posture;
- improving control and adjustment of the breathing cycle;
- improving static and dynamic balance;

The achievement of such objectives was possible by implementing special programs to prevent and remedy the deviations of the lumbar column in the anterior-posterior plane, all through the academic year and during the physical education classes of the children with potential physical deficiencies.

*Data related to the studied experimental group (initial testing)* Table 1

No.	Full name	Length of the lower limb cm		Weight kg	Vital capacity	Thorax perimeter/ Inhalation / exhalation	Value indexes of the scoliosis deviation (cm) cm		
		Right	Right				cervical	dorsal	lumbar
1		88	88,5	50	2500	82/88,5/79	0,3	0,5	1, 0
2		82	82,5	50	2450	81/84,5/79	0,2	0,5	0, 8
3		89	89,5	51	2550	86/92/81,5	0,2	0, 8	1
4		82	81,5	50	2550	74/81,5/69	0, 5	1,0	0,7
5		87,5	87	52	2600	75/81/69	0,8	0,8	1,3
6		81,5	82	49	2450	78,5/83/74,5	0,8	0,5	0,8
7		61,5	61	47	2350	63/68/60	0,3	0,3	1,1
8		86,5	87	53	3200	75,5/79/72,5	0, 2	0,7	0,7

*Data related to the studied experimental group (final testing)* Table 2

No.	Full name	Length of the lower limb cm		Weight kg	Vital capacity	Thorax perimeter/ Inhalation / exhalation	Value indexes of the scoliosis deviation (cm) cm		
		Right	Left				cervical	dorsal	lumbar
1		87,5	8	52	2400	81,5/86,5/77,5	0,3	1,2	2
2		81,5	8	50	2300	80/83/78	0,2	0,9	1,3
3		88	8	55	2500	85/90/80	0,2	1,4	2,0
4		82	8	53	2500	73/80/69	0,5	1,8	1,5
5		87,5	8	55	2600	74/77,5/68	1,0	1,8	2,3
6		81	8	48	2300	77/82/73	1,3.	1,0	1,8
7		61	6	47	2250	62/67/58	0,9	1,2	2,1
8		86	8	55	3150	73/78/70	0,8	1,5	1,7

#### 4. Conclusions

It is necessary to find such deviations as early as possible and this may be achieved by medical examination of the whole class of pupils, each beginning of the academic year, thus using the somatoscopic

examination, in which the teachers of physical education should take part.

In the correction of the physical deficiencies, the teacher of physical education plays an important part, by organizing the methodical forms of interfering in the prevention and remedy of

vertebral column physical deficiencies in collaboration with the medical room of the school.

The identification of the physical deficiencies must be as early as possible and the treatment means should be set as fast as possible to obtain the maximum possible correction.

A major physical deficiency may prevent the future adult from exerting a certain trade (connection of the flat foot – trade with long-term standing up, scoliosis with rotation – asymmetric sports).

Also, in certain conditions, physical deficiency (scoliosis with thorax gibbosity or accentuated kyphosis) may generate conduct disorders or psychopathy. The benefits obtained from associating kinesthetic therapy means with aquatic gymnastics on the human body are the following:

- joint release;
- reinforcement of the kinesthetic system;
- training of the breathing muscles;
- training of the bloodstream;
- fortification and relaxation of the body;
- improvement of the tactile sense;
- improvement of balance and of coordination.

The association of melotherapy with kinetic means makes children participation be a better, more active and more motivated one. The sports stressing and straining the body in a harmonious and symmetrical manner have beneficial effects on scoliosis, especially in the starting phase, while their prophylactic valence is essential.

Scoliosis shows as a deviation from normal of the vertebral column, not only in the frontal plane, but also in the sagittal and horizontal planes. Not treated, they may become a serious and severe problem, with multiple negative effects on the body, the upper and lower limbs as well as on the operation of certain internal organs.

The examination of a child suffering from scoliosis must include:

- identification data;
- anamnesis;
- measurements;
- radiological examination;

The treatment must be complex:

- orthopedic,
- kinesthetic,
- electrotherapeutic
- physiotherapeutic.

It was proven that swimming plays a particularly important part.

A high percentage of children aged between 11 - 15 years have this type of deficiency, out of which, according to the studies, 71 % are girls. Educating a correct attitude of the body must start even from the early ages of childhood and must be maintained all life long.

The outcome depends on the precocity of the deficient attitude, on the choice of the remedy means and especially on the therapy factors used to obtain a correct posture.

## 5. Practical Methodic Recommendations

We would like to propose kinetic exercises grouped in complexes that turned out to be efficient among teenagers.

We would recommend swimming that meets certain particularly valuable qualities from the point of view of scoliosis treatment: it is executed in conditions of maximum release of the vertebral column;

- it represents a type of excellent breathing gymnastics;
- it develops all muscles by equal strain, the symmetry of the girdles and of the body / we recommend symmetric swimming styles and the complexes from the previously presented examples.

**References**

1. Cioroiu, S. *Noţiuni elementare de kinetologie şi masaj*. Braşov: Editura Universităţii “Transilvania” din Braşov, 2003.
2. Codrun, M. *Kinetologia medicală*. Bucureşti: Editura Axa, 1999.
3. Codrun, M.; Cirila, L. *Hirdokinetoterapia în afecţiunile reumatice*. Bucureşti: Editura Printech, 1999.
4. Dimitriu, V. *Studiul dezvoltării fizice la şcolari printr-un sistem de proporţii*. Acad. de Şt. Medicale, 1979.
5. Enoiu, R.S. *Manual pentru învăţarea înotului*. Braşov: Editura Universităţii „Transilvania” din Braşov, 2006.
6. Ionescu, A. *Creşterea şi dezvoltarea*. Bucureşti: Editura Stadion, 1970.