SWIMMING APPLICATIONS IN THE SCOLIOSIS PROPHYLAXIS

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Abstract: The study of the functional somatic-sensory mechanisms regarding growth and development in the pre-pubertal children, related to the existing postural hygiene programs, there is a difficult situation, facilitating the appearance of postural vicious attitudes which determines complications at the spine level, the same as physical functional deficiencies.

Swimming may be one of the prophylactic means to prevent the installation of vicious postural attitudes in pre-pubertal children.

Introduction: Cordun M. 1999 called functional deficiencies deviations, positions and attitudes as being impaired function of support and movement of the body, always attracting muscle imbalances that will taint running movements. If these deficiencies are not detected in time, they will turn into structural deficiencies that will cause degenerative degradations that functionally or even organically fix, turning into deformations [2, p.53].

The most severe segmental deficiencies, the most important in terms of the consequences and complications that can be reached, are those of the spine (Kyphosis, lordosis, scoliosis and their combinations)

From the study of the elements that make up the clinical picture of functional spinal deficiencies afflicting pre-pubertal children and their morphological-functional implications on the body, the following aspects can be drawn:

- The growth and development period, namely the pre-pubertal one, is one in which the somatic and functional changes have an accelerated rhythm, with a specific dynamic to this period;
- due to this transition state, the anatomical elements that are in a period of growth and development are subject to demand that sometimes can trigger pathological conditions, namely somatic-functional imbalances with repercussions on body posture.

The neurological-muscular- joint -kinetic system is the one that undergoes visible changes during this period (pre-pubertal); therefore we believe that simply inventing and monitoring the pathology genesis and pathology physiology of the physical deficiencies of the spine is not sufficient to manage of these postural conflicts. It is noted that following the physical exercises in the body are produced a series of immediate or late effects, transient or long lasting, which improve the structure and function of the tissues, organs and systems of the human body. [3, p.28].

A determinant factor in achieving a prophylaxis of postural attitude deficit can be constituted by the development of a physical exercise capacity, by understanding the body's ability to perform as much mechanical work and to maintain as long as possible without interfering tiredness.

Unlike the sagittal deviations, which are more difficult to spot, deviations of the spine in the front plan, even the most discrete, are readily observed, the normal spine not presenting physiological curves in this plane. In the frontal plane are described deviations of the spine with one, two or more curvatures, structural and nonstructural deviations, with or without vertebral rotations, with or without thoracic deformations. From this category of deviations of the vertebral column are the scoliosis and kyphosis-scoliosis [5, p.88].

The word scoliosis does not define a pathological entity (Greek). The term scoliosis simply indicates a lateral deviation of the spine. Thus, scoliosis can be confirmed when, examining the human body in the standing position (orthostatic) with the equal weight distributed on both legs, it is observed, looking from the back, the lateral deviation of the line formed by vertebral apophyses. In the clinical examination, scoliosis of the spine presents two completely different functional forms: lateral deviations, which can be corrected by certain movements, active or passive, or spontaneously disappearing in certain positions (for example the disappearance of scoliosis curvatures when the trunk is in extension, flexion or hanging) and deviations that persist regardless of the attempts to reduce them, active or passive, and which have organic bone changes in the vertebrae (structural deviations). The spine deviations in the first category are generally nonstructural and may be secondary to distant causes, the vertebral bodies retaining their normal shape and structure. Scoliosis, whose etiology cannot be defined, are defined as idiopathic scoliosis, while evolutionary scoliosis is called scoliotic disease.

Material and Method: Jianu M., quotes in "Pediatric Scoliosis" 2010 on Carlioz and Seringe famous orthopaedic surgeons from France, textually say "There is no kinetotherapy treatment of evolutionary scoliosis". No proposed treatment has proved its efficacy because no study has shown positive results on scoliosis that has tested their evolution. Within this framework kinesiotherapy is not only useless, but equally damaging as it unfortunately explains the delay in adopting effective treatments "[4, p.53].

However, the same author mentions Dr. Jean Dubousset of St-Vicentde-Paul Hospital in Paris in the same paper: "Personally, I think a normal physical and sporting activity in a child, particularly of school age, can remove the re-education sessions that are high expansive for family and society."

Correct attitude is a function based on a series of sensory-motor reflexes; these are related to the impulses received by the proprioceptors in the musculoskeletal structures as well as through the inter-receptors in the skin and visual or acoustic-vestibular analyzers. All these excitations are transmitted through sensory upward nerve pathways to analyze the central nervous system where responses to motor structures are generated and transmitted, controlling static and dynamic muscle tone in order to maintain a stable and correct postural attitude. The practice of swimming induces and produces on the body through its demands a series of beneficial changes to the human body, contributing to healthy growth and development, maintaining an optimal morphological-functional status, conferring it increased resistance to pathogens. At the same time, the influence on the attitude of the body is determined by the practice of the swimming technique on a regular basis through the stresses imparted to the locomotion system, especially the muscular-bony-joints system, the joints being released by the weight of the body (according to Archimedes principle) increased by the exercises addressed [6]. The thoracic cage and implicitly, the spine, through the amplitude movement performed during breathing with the help of the respiratory muscles (diaphragm, abdominal muscles, intercostals), favors the harmonious development of the trunk and maintaining a correct spine attitude.In the same context, the movements that are required to move in the aquatic environment require the two important belts: scapular-humeral and pelvic, located at the extremities of the spine.

The lower limb pendulum movements strength and stabilize the pelvic belt and the movement of the arms maintains a good range of motion to the scapular-humeral belt structures, a tonic musculature that ensures good stability and functionality of the body in static and movement. The musculature and bony-joints structures are very solicited, due to the unstable support environment which the water provides during the swimming techniques.

By the character of the movements, "symmetric central in the brass and butterfly and axially symmetrical in the crawl and back style" (E. Eyestone, 1992), cited by [1], swimming provides the formation of a correct body attitude, maintaining it and eventually remedy postures deficits.

Table representing the match between swimming-specific elements and anatomical	
structures interested in postural conflict (scoliosis)	

The vicious attitude	Scoliotic attitude
Anatomical structures subject of a bad alignament	Spine, Basin, Lower limbs.
Muscles groups and joints involved in the postural conflict	Joints of the cervical and thoracic spine, Scapular-humeral belt. Muscles: sternocleidomastoidians, trapezius, dorsalis, obliques, serratus, deltoid, pectoral, rectus abdominis, quadriceps, hamstrings
Action by the muscular group	Fllexion, extension of the thoracic-lumbar spine, Side bending, rotation, on the left side, right side; Flexion- extension of the tight on the hip.
Specific technical items of swimming used in prophylactic programs of correct body posture	Crowl brass, back style, butterfly (with floating object and without); with arms stretched forward or by the side of the body,with one arm in front and the other one on the side of the body)
Main groups of the solicited muscles in the swimming technique used	Joints of the cervico-thoracic spine, Scapular-humeral belt Muscles: trapezius, dorsalis, oblique, serratus, deltoid, pectoral, rectus abdominis Pelvic belt joints and and lower limbs joints; the muscles of the thigh and of the pelvis.
Effects on solicited anatomical structures by the swimming technique	The Range of Motion of the scapular-humeral belt, pelvis-trochanterian and of the spine; increase the muscles tonus around the joint, muscles strengthening, increasing stability of the spine

In the table presented are detailed the anatomical elements that are part of the postural conflict called scoliosis and those used in the swimming technique.

Results and Discussion: The presentation of this table wants to argue the practice of swimming technique to prevent the appearance of the postural deficits in the spine in children of school age.

The degree of concordance between the muscles groups involved in the postural conflict and the muscles groups used in the swimming technique is in a percentage of over 90%. In the same context, the influence of swimming on the thoracic cage and the joints of the scapular-humeral and pelvic belts produces positive changes in terms of mobility, tonicity and proprioceptive stability.

Conclusions:

- If we relate the body's ability to develop motor skills in a stability regime, strength and amplitude, maintaining a correct postural attitude in relation to the acquired psycho-motor skills, it can be concluded that a body with a correct postural attitude will be able to carry out activities varied under different conditions without any problems.
- In terms of somatic resistance, strength and mobility musculoskeletal structures through the solicited requests applied to it, may be obtained improvement in all musculoskeletal structures.
- In this respect, it is necessary to consider the selection of the swimming exercises, the individual characteristics of the children in the morphological-functional, physical, motor, psychomotor and psychological fields.

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APLICAȚII ALE ÎNOTULUI ÎN PROFILAXIA SCOLIOZEI

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Cuvinte cheie: scolioză, înot, deficiență fizică funcțională, profilaxie.

Abstract: studiul mecanismelor de creștere și dezvoltare somatofuncțională la copiii de vârstă prepubertară, raportat la programele de igienă posturală existente, se află într-o situație deficitară, favorizând instalarea atitudinilor posturale vicioase, care determină complicații la nivelul coloanei vertebrale de natura deficiențelor fizice funcționale.

Înotul poate fi unul din mijloacele profilactice în vederea prevenirii instalării atitudinilor posturale vicioase la copii de vârstă prepubertară.