

A CORRECTION OF POSTURE OF PRE-SCHOOL GIRLS UNDER THE IMPACT OF VARIOUS KINESYOLOGICAL OPERATORS

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Abstract

The aim of this research was to determine the effects of combined kinesiological programmes of corrective and Aqua gymnastics upon the improvement of bad posture with pre-school girls. The research itself had been conducted on a sample consisting of 45 girls, age 5 ± 0.5 years in which cases it had been established by an expert evaluation a weakness of some muscle groups but the entire musculature as well. For the evaluation of the posture condition, Naplan Wolanski method was used. It used nine variables that included the inspected body regions and the total estimation of posture. After the posture diagnosis has been established, a plan and programme of corrective gymnastic exercises was determined and it was carried out within small groups, sometimes individually. The programme of kinesiological activities has been carried out during the period of 16 weeks, twice a week per 60 minutes. For the purpose of analyses of the initial and final testing, T-test was used for subordinate samples. According to the results of research, it can be concluded as the applied programme had a significant effect in respect of improving the muscle tonus that directly was evident in improved posture of all examinees.

Key words: **posture, muscle tonus, corrective gymnastics, Aqua-gymnastics**

Introduction

Kinesiology is a science basically focused on transformational processes in regard of anthropological dimensions and its main aim is the health improvement, an optimal development of human characteristics, ability and motorical skills in order them to be maintained as long as possible on high level possible (Cools et. al., 2008). It is generally known that movement and various kinesiological activities have huge effect onto anthropological status of children and life quality (Rowland, 1990). In early childhood, the level of body activity is low one, primarily due to relatively low movement level

Sažetak

Cilj ovoga istraživanja bio je da se utvrde efekti kombiniranih kinezioloških programa korektivne i Aqua gimnastike, na poboljšanje loše posture kod djevojčica predškolske dobi. Ispitivanje je provedeno na uzorku od 45 djevojčica, dobi 5 ± 0.5 godina, kod kojih je ekspertnom procjenom evidentirana slabost pojedinačnih mišićnih grupa, ali i muskulature u cjelini. Za procjenu stanja posture, primjenjena je metoda Napleona Wolanskog. Korišteno je 9 varijabli koje su uključivale posmatrane regije tijela i ukupnu ocjenu posture. Nakon dijagnosticiranja stanja posture, određen je plan i program vježbi korektivne gimnastike koji je proveden u manjim grupama, ponekad i individualno. Program kinezioloških aktivnosti proveden je u periodu od 16 sedmica, dva puta sedmično po 60 minuta. Za analizu rezultata inicijalnog i finalnog testiranja korišten je T-test za zavisne uzorke. Na osnovu dobijenih rezultata istraživanja, može se zaključiti da je primjenjeni program imao znatnog efekta na poboljšanje mišićnog tonusa, što se direktno odrazilo na poboljšanje posture svih ispitanica.

Ključne riječi: **postura, mišićni tonus, korektivna gimnastika, Aqua-gimnastika**

(Hoos et. al., 2003). According to various researches od somatic parameters at children, it was concluded that there is an evolution of vast number of researched parameters, so for pre-school and school children it is advisable these different movement activities to be applied, learning the specific techniques of various fields of sport all in order to improve their physical development and correct posture (Marius et. al., 2009). Postural disorders and loco-motor apparatus deformities with more and more present hypokinezy, are the accompanying factors of modern life style. One of the important risk factors in the posture can be general and postural habits, which is highly variable, especially in children (McEvoy et. al.,

2005). According to some up-to-date researches, it was concluded that bad posture of pre-school and school children in fact a kind of indicator of some health problems, but those problems could become serious ones unless a bad posture is not corrected in time (Milošević, 2008). Body posture is treated as a dynamic stereotype that is formed within the process of individual development, physical education and exercise (Shklyarenko et. al., 2011). In fact, the maintaining of upright position of a body is a problem of a balance and it could be gained by complex impact of visual and vestibular systems (Kottke, 1980; Hardy et. al., 1984). In the period from 5th to 10th years when the growth is slower, the presence of postural problems is less, but reaching the puberty the condition of existing postural conditions and detecting new cases of it could be worsen up. So, it is of great importance to detect postural problems at early stage and keep them under kineziological control (Auxter, 1997), The therapy aimed for correction of postural disorders and deformities with children is usually difficult and strenuous, painful and uninteresting for children. On the other hand, the programmes of physical exercises that include the exercises of strength and muscle extension, especially postural anti-gravitation muscles, should be of a great help in preventing of health problems that could take place later in lifetime (Torlaković et. al., 2013). Taking into consideration the fact as the presence of bad posture at early age almost equal among both sexes, but later it is more often at girls due to the period of their earlier average faster growth (Vasić et. al., 2008), the main goal of this research is to establish the efficiency of combined kineziological programmes of corrective and Aqua gymnastics, upon the correction of removal of such posture with pre-school girls.

Methods

The sample of examinees

The research had been conducted on the sample comprising of 45 girls from kindergartens from Sarajevo, where by an expert evaluation a weakness of single muscle groups was detected, but the entire musculature, that reflected upon the condition of their posture. The girls were of 5 ± 0.5 yrs old; mean height = 112 ± 8 cm; mean weight = 20 ± 3.5 kg. Within the frame of final data processing, the girls taking part in initial and final measuring had been included and who were regularly attending the planned programme of corrective and Aqua gymnastics.

The sample of variables

For the purpose of posture condition estimation (Table 1) the Napoleon Wolansky's method had been used (Wolansky, 1975; Radisavljević, 2001). Nine variables were used throughout the research and they included observed body areas: Head Posture (HPA), Shoulders Posture (SPA), Shoulder-Blade (SBPA), Chest Cavity (CPA), Spinal Cord

Posture (SCPA), Abdomen Posture (APA), Leg Posture (LPA), Feet Posture Condition (FPA) and Overall of Body Posture (OBPAW).

Table 1. Sample of variables

Variable	Measured capacity
HPA	Head Posture Assessment
SPA	Shoulder Posture Assessment
SBPA	Shoulder Blade Posture Assessment
CPA	Chest Posture Assessment
SCPA	Spinal Cord Posture Assessment
APA	Abdominal Posture Assessment
LPA	Leg Posture Assessment
FPA	Feet Posture Assessment
OBPAW	Overall Body Posture Assessment by Wolanski

The diagnosing of the body posture condition was made by pointing of variations of some body parts from normal (correct) posture. The pointing had been made by the method of expert evaluation (Table 2). On the basis of total points score, an evaluation on some observed parts as well as a general body posture had been made (table 3).

Table 2. Posture Assessment according to the negative Score Model – Wolanski

Scores	Degree of deviation from proper posture
0	No deviation
1	Partial deviation
2	Extreme deviation

Table 3. Defining the posture status according to Wolanski

Scores	Grade	Description
0	5	Excellent body posture
1-4	4	Very good body posture
5-8	3	Good body posture
9-12	2	Bad body posture
13-16	1	Very bad body posture

The programme of exercise

After the diagnosing (posture evaluation), a plan and programme have been made of the exercises of corrective gymnastics conducted within small groups, sometimes individually. According to the character, the applied exercises were as follows: passive, active, assisted, against the resistance and the exercises with controlled breathing. The instructors and physiotherapists made corrections and motivated the examinees with permanent warning that exercises are carried out in controlled quantities and being adjusted to every single individual.

The programme of corrective gymnastics (with or without props) has been conducted in sport hall with appropriate

flooring. The programme of Aqua gymnastics, basic games and exercises was carried out in slightly elevated swimming pool depth of 40-90 cm with average water temperature 29,4 C. The exercise was conducted in groups of 10-15

examinees headed by a physiotherapist and professor of sports and physical education. The programme was carried out during afternoon hours. The activities covered 16 working weeks, twice a week per 60 minutes (Table 4).

Table 4. Implementation of the programme contents by week

Program/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Corrective gymnastics (out-of-pool)	*	*			*		*		*		*		*		*	
Hydro - Aqua gymnastic	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Pilates balance ball exercises			*	*		*		*		*		*		*		*

Every hour of exercise consisted of four phases. Warm up exercises 5-10 minutes, corrective gymnastic exercises on firm ground 20-25 minutes, 20-25 minutes of games and aqua gymnastics exercises of aerobic type in water, and 5-10 minutes of relaxation of the body. During every class, introductory-preparation and main „A“ phases were performed on the firm ground, but the main „B“ phase and the final one were conducted in the water.

Methods Of Data Processing

Data on examinees have been accomplished by measuring of the same variables within two time points, i.e. prior and after the realization of the programme. For the purpose of analyzing the initial and final testing, T-test had been used for subordinate samples (differences are significant at $p < 0,050$).

Results

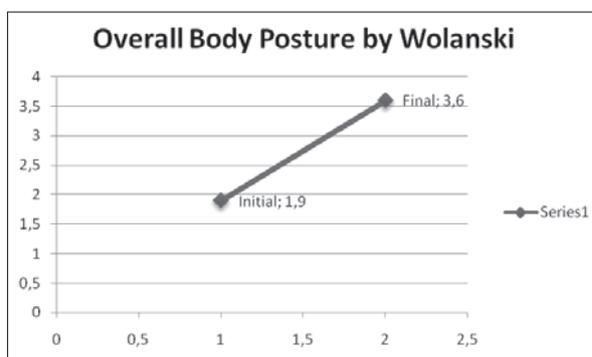
From the results of T-test for subordinate samples (table 5), a high statistic significance is notable with almost all variables of posture evaluation. By discriminative methods, improvements have been noticed as in single inspected body areas so in final evaluation of body posture. During the initial evaluation, an average score of examinee's posture had been within the zone of bad posture. During the final evaluation, the average score for posture (OBPAW) has been within the zone good –very good (Figure 1). The most often variations with all examinees were noticed at variables of estimation of feet condition, that had been proved in earlier researches (Muftić et. al., 2010).

Table 5. Results of T-test for dependent samples (Paired Samples Test) in assessing postures and awarding body posture grades

Varijable	Mean	Std. Devij.	Std. Error Mean	95% Confidence Interval of the Difference		t-test	df	p
				Lower	Upper			
HPA 1 HPA 2	0,058	0,247	0,052	-0,016	0,136	1,771	44	0,081
SPA 1 SPA 2	0,925	0,123	0,031	0,879	1,016	30,835	44	0,000 *
SBPA 1 SBPA 2	0,957	0,144	0,028	0,971	1,035	38,001	44	0,000 *
CPA 1 CPA 2	0,118	0,311	0,046	0,019	0,239	2,629	44	0,016 *
SCPA 1 SCPA 2	1,020	0,287	0,040	0,970	1,123	24,955	44	0,000 *
APA 1 APA 2	0,142	0,370	0,062	0,054	0,293	3,055	44	0,003 *
LPA 1 LPA 2	0,342	0,422	0,057	0,207	0,420	5,522	44	0,000 *
FPA 1 FPA 2	0,628	0,501	0,063	0,453	0,751	9,012	44	0,000 *
OBPAW 1 OBPAW 2	-1,339	0,480	0,067	-1,476	-1,204	-19,806	44	0,000 *

The T-test results analyses /comparison of initial and final testing/ points out the high level of statistic significance at variables of evaluation of shoulder posture (SPA $p=0,000$), evaluation of shoulder-blades (SBPA $p= 0,000$), evaluation of spine column (SCPA $p= 0,000$), legs posture (LPA $p= 0,000$), feet evaluation-posture (FPA $p=0,000$), evaluation of abdomen posture (APA $p= 0,003$), evaluation of thoracic cavity (CPA $p= 0,016$) and total - overall body posture by Wolanski (OBPAW $p= 0,000$). The low level of statistic significance has been noticed only at variable of evaluation of head posture (HPA $p= 0,081$). Having in mind that at this variable during the initial testing there have been slight variations, it was expected that applied programme could not significantly influenced onto its correction.

Figure 1. Comparison between the overall initial and final assessments of body posture by Wolanski method.



Discussion

The results of this research show that all examinees have absolutely improved the evaluation of body posture. The other authors have got the similar conclusions and they consider that it is possible to improve body posture at children by applying the adequate kineziological programmes (Ilić et. al., 2012; Torlaković, 2012). A water, as liquid media, resisted during the movements which gave good preposition for strenghtening of agonist and anti-agonist muscles. This was just to confirm the results of previous studies (Getz et. al., 2006) when it was stated that combined programmes of physical and hydrotherapy unmatched at therapy of body deformities, especially of spine column, shoulder-strap, thoracic cavity and shoulder blades. Good balanced movement activities influenced the intensification of postular reflexes by which the body tries to maintain in relatively static position. This also confirmed the conclusions of earlier studies dealing with the effectiveness of such approach to exercise (Kurtović et. al., 1983; Prins, 2009) on entire posture of children. In the period when the growth is slowed down, the presence of postural problems is somehow least, but with puberty the aggravation of present postular problems could be expected as well as revealing the new cases. It is of great importance to emphasize that early diagnosis represents the most important element of successful treatment. In order to establish the moment of appearance of postural

disorder, regardless to the cause, this problem should be revealed from the beginning of childrens' attending the kindergarten. After that, with help of adequate choice of kinezi-therapeutic programmes, by persistent work of health professionals, kineziologists, child and his parents, it can lead to desired success in correction of diagnosed variations.

Conclusion

On the basis of results obtained by the research, it can be concluded that a combined programme of corrective gymnastics through games and exercises in the water, had significant effect on the improvement of muscle tonus that directly had an impact on girls' posture. Therefore, the applied programme had led to significant correction in almost all variables as in partial so in integral defining of posture condition. It is also important to note that during the exercises of corrective gymnastics a special attention should be paid to initial position in order to prevent the functional aggravation of posture. The results of this research extend the possibility of its comparison with the effects of other researches and programmes having the same or similar aims, because the correct posture represent one of the basic pre-conditions of good health, normal growth and development in general.

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