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THE EFFECTS OF SWIMMING ON BODY POSTURE IN PRESCHOOL AGE CHILDREN

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Abstract

In this study we analyzed the effects of swimming on the posture of preschool children. The sample for this study consisted of 153 preschool boys and girls children aged 4-6 years (standard deviation= 1.1 years) living in Canton Sarajevo and divided into two groups of boys and girls, with one attended swimming school (n=61) and other did not (n=92). In order to evaluate the postural status, we used a reduced Napoleon Wolanski method with eight variables for the observed body parts: assessment of head posture (HPA), assessment of shoulder posture (SPA), assessment of scapular posture (SBPA), assessment of chest posture (CPA), scoliotic posture (SCP), assessment of abdominal posture (APA), assessment of leg posture (LPA), and assessment of foot posture (FPA). The results indicated a great effect of swimming on posture. We concluded the paper with some suggestions on how to incorporate swimming programs into regular school curricula.

Keywords: swimming, body posture, preschool children

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Introduction

Swimming is a sport where the influence of gravitational force on the spine isreduced to a minimum. The posture adopted during swimming does not accentuate the curves of the spine. Also, the increased curvature of the spine creates more resistance and negatively affects the movement of the body during swimming (Torlakovic et al. 2014).The influence on body posture is determined by practicing swimming regularly through the stress that the locomotor apparatusis subjected to, especially the musculoskeletal system, the joints being freed from the weight of the body (according to Archimedes' principle), the muscular effort being able to be reduced or increased depending on the exercises addressed(Tate et al., 2020; Taşkıran, 2020). Many people, especially children, suffer from spinal deformities caused by congenital malformations, certain degenerative diseases, spinal trauma, but especially caused by poor postureformed from the childhood(Łubkowska et al., 2014; Stoychevski, 2021).Swimming can be used as an associated means in various therapies. Regardless of how swimming is used as a motor activity, it influences the body through its demands, contributing to healthy growth and development, to maintaining an optimal morpho-functional status, giving it increased resistance to pathogenic factors (Waller et al., 2014; Zarzeczny et al., 2022). Modern lifestyle and reduced locomotor activity are the main factors in the occurrence of abnormal posture and a variety of spinal deformities (Kozinoga et al., 2022). Also a swimming programme implemented over a period of 4 months, 2 sessions of 60 minutes per week has a positive effect,according to Maniu, in correcting spinal deviations in the sagittal plane in visually impaired children (Maniu et al., 2021). Other study, says that posture is also influenced by the swimming styles we practice. In consequence, he analyzed a group of 200 swimmers, divided into 4 groups. With the help of electromyography, he analyzed each pull, depending on the style of swimming practiced and came to the conclusion that the muscles that influence the posture the most are the ones used in the backstroke and butterfly (Martens et al., 2014). Research carried out by Ruska Paskaleva was to monitor the effect of isometric training and swimming in children with spinal deficiencies. They used a 6-month program, consisting of physical therapy sessions, massage and swimming, carried out three times a week. The obtained results concluded that the implemented program has a significantly positive effect on posture, muscle tone and mobility. Also, scoliosis was corrected in 77% of the children in the first group and in 55% of the children in the second group (Paskaleva, 2017). There are enough studies to confirm that practicing swimming has positive effects on posture. On the other hand, a researcher Zaina confirms that swimming is associated with an increased risk of trunk asymmetry and hyperkyphosis. Furthermore, although swimming has been considered a beneficial sport for treating scoliosis, the data presented by Zaina contradicts this aspect. A total of 329 teenagers participated in this study. These subjects trained at least 4 (up to 6) times per week with an average of 2-2.5 hours per training session. After analysing the results, the author concluded that swimming can increase the risk of kyphosis, lordosis, body asymmetry and can negatively influence lumbar pain in girls (Zaina et al., 2015). It is also not recommended that swimming replace medical gymnastics, but rather be an additional treatment in the correction of spine deficiencies (Aksamit et al., 2019).

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Swimming is often recommended as an ideal physical activity for children due to its numerous health and developmental benefits. In addition to improving cardiorespiratory fitness and muscle strength, swimming offers unique advantages for posture. The water provides resistance that helps strengthen the muscles of the back, torso, and extremities, while simultaneously reducing pressure on the joints and spine. Swimming also enhances coordination and balance, which are crucial elements for proper posture.

Many studies have examined the effects of various physical activities on children's posture (Vranesic-Hadzimehmedovic & Memisevic, 2018; Vranesic-Hadzimehmedovic et al., 2023), but relatively few have focused exclusively on swimming. Research on this topic has shown positive results, but further investigation is needed to explore the long-term effects and specific mechanisms through which swimming influences posture. Posture is a key aspect of physical development in preschool children, as it affects their growth, health, and overall well-being. Poor posture can lead to various health problems, including back pain, poor balance, and breathing issues. Early intervention and appropriate activities can significantly improve children's posture, and swimming is one of the most effective activities in this context.

In this study, we will analyze the effects of swimming on the posture of preschool children. Our aim is to provide a comprehensive insight into how swimming can contribute to improving the postural status of preschool children and to justify the objective need to move the mandatory swimming school within the regular physical education curriculum in the Sarajevo Canton from the fourth grade of elementary school to the second grade. This would directly influence the early involvement of children in practicing basic physical activity, swimming, which has been shown in numerous studies to have positive effects on posture and overall physiological development during key phases of their intensive growth.

Methods

Participants

The sample consisted of 153 preschool boys and girls children aged 4-6 years (standard deviation= 1.1 years) living in Sarajevo and divided into two groups of boys and girls, with one attended swimming school (n=61) and other did not (n=92).

The control group of children belonged to one preschool institution, while the children enrolled in the swimming training program were members of the DAMI swimming school in Sarajevo. Basic non-swimmer training sessions took place at the Thermal Riviera Ilidža pool twice a week for 3 months. The water temperature in the mentioned recreational pool was 29 degrees Celsius, significantly warmer compared to Olympic pools where the temperature is 26 degrees Celsius.

Procedure

The assessment of children's posture was conducted with parental consent and by two experts, both master's degree holders in sports and physical education, one male and one female. The testing of children was done individually and in a separate room. The control group was tested in the preschool institution during their stay there, while the children undergoing 3 months of swimming training were tested at the pool before their entry into the water.

Instruments

In order to evaluate the postural status we used a reduced Napoleon Wolanski method. As part of that evaluation, we used 8 variables for the observed body parts: assessment of head posture (HPA), assessment of shoulder posture (SPA), assessment of scapular posture (SBPA),

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assessment of chest posture (CPA), scoliotic posture (SCP), assessment of abdominal posture (APA), assessment of leg posture (LPA), and assessment of foot posture (FPA).

Results

In the Table 1, the total frequencies depict the analysis of body posture assessment of the overall sample of preschool-aged children treated in this study. It is evident that 2/3 of the children exhibit deviations from correct head (64.7%), shoulder (89.6%), and scapula (81.7%) posture, along with deviations from the normal abdominal position (total of 58.8%), which is a precondition for the development of kyphotic posture and kyphosis deformities. The situation regarding the lower extremities' health status is not better, with 69.3% of preschoolers having poor leg posture and 62.1% having poor foot posture characterized by flat feet. This poses a direct risk for spinal deformity in the future of these children, since previous research has proven their direct correlation.

Table 1. Total frequencies

	153	**%**
HPA		
0	54	35,3
1	50	32,7
2	49	32,0
SPA		
0	16	10,5
1	119	77,8
2	18	11,8
SBPA		
0	28	18,3
1	103	67,3
2	22	14,4
CPA		
0	123	80,4
1	24	15,7
2	6	3,9
SCP		
0	87	56,9
1	51	33,3
2	15	9,8
APA		
0	63	41,2
1	64	41,8
2	26	17,0
LPA		
0	47	30,7
1	75	49,0
2	31	20,3
FPA		
0	58	37,9
1	64	41,8
2	31	20,3

In the table 2. frequencies by the criterion trains/does not trains are presentet. It is clearly evident that preschool-aged children who practice swimming have significantly better posture across all assessed variables. For instance, in the assessment of head posture, 52.2% of children have extremely poor posture with a rating of 2 according to Wolanski, while only 1.6% of children who swim have the same diagnosis. Analysis of shoulder posture results revealed that none of the swimming children exhibited extremely poor posture, whereas 19.6% of the control group did.

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Scoliosis, a spinal deformity characterized by a lateral curvature, was identified in 64.1% of the children in preschool, compared to only 11.2% of the swimming children.
Differences were also noted in the assessment of abdominal posture, where swimming participants again showed better results, with 27.9% having deviations from normal, compared to 79.5% of non-swimming children. Relaxed abdominal muscles are often an indicator of the risk for developing lordosis or hyperlordosis, which can cause back pain. The leg and foot posture was significantly better among the swimming children, with 55.7% showing no deviations from normal in the LPA variable and 78.7% in the FPA variable. In contrast, 85.9% of non-swimming children had deviations in leg posture, and 89.1% had deviations in foot posture.
The posture of a preschool-aged child can be a good indicator of their current growth, development, and health status, but it can also indicate the future health of their spine. The modern lifestyle has brought many challenges that need to be overcome by implementing basic motor activities from the earliest ages to sufficiently strengthen the musculature. Swimming has been one of the main activities recommended by physiatrists and medical doctors for preschool and younger children for years to prevent poor posture and spinal deformities during the sensitive developmental phase. A recent scientific study has shown two key things: preschoolers indeed exhibit deviations from proper body, spine, leg, and foot development, but these can be minimized through swimming.

Table 2. Frequencies by the criterion „trains/does not train"

		TRAINS		DOES NOT TRAIN
HPA				
0	45	73,8 %	9	9,8%
1	15	24,6%	35	38,0%
2	1	1,6%	48	52,2%
SPA				
0	16	26,2%	0	0%
1	45	73,8%	74	80,4%
2	0	0%	18	19,6%
SBPA				
0	19	31,1%	9	9,8%
1	40	65,6%	63	68,5%
2	2	3,3%	20	21,7%
CPA				
0	59	96,7%	64	69,6%
1	2	3,3%	22	23,9%
2	0	0%	6	6,5%
SCP				
0	54	88,5%	33	35,9%
1	6	9,8%	45	48,9%
2	1	1,6%	14	15,2%
APA				
0	44	72,1%	19	20,7%
1	13	21,3%	51	55,4%
2	4	6,6%	22	23,9%
LPA				
0	34	55,7%	13	14,1%
1	27	44,3%	48	52,2%
2	0%	0%	31	33,7%
FPA				
0	48	78,7%	10	10,9%
1	10	16,4%	54	58,7%
2	3	4,9%	28	30,4%

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Discussion

Swimming, as a fundamental sports activity and motor skill, should be utilized from the earliest ages of children, as it significantly influences the correctness of body posture development. This importance cannot be overstated, as the benefits of swimming extend far beyond mere physical health. It serves as a critical foundation for overall physical development, fostering coordination, balance, and flexibility. These attributes are crucial during the formative years when children are rapidly growing and developing. The aquatic environment offers a unique medium that supports the body while reducing the risk of injury. This is particularly beneficial for preschool-aged children, who are still developing their motor skills and are more susceptible to accidents during physical activities on land. In water, the buoyancy helps to reduce the impact on the joints and muscles, allowing children to move freely and with less strain. This unrestricted movement is vital for promoting a healthy range of motion and flexibility in young bodies. Furthermore, swimming helps in building strength and endurance. The resistance provided by the water is gentle yet effective, ensuring that muscles are worked evenly and safely. This balanced muscle development is key in preventing the imbalances that can lead to poor posture. Strong core muscles, which are actively engaged during swimming, play a pivotal role in maintaining proper body alignment. A strong core supports the spine and helps children hold themselves upright with ease. Engaging preschool-aged children in swimming also promotes good habits early on. It instills a sense of discipline and routine, which can translate to other areas of their lives. Regular physical activity becomes a norm, encouraging a healthy lifestyle that can last into adulthood. The skills and habits learned in the pool can set the stage for a lifetime of active living and overall well-being. In addition to physical benefits, swimming can have a positive impact on mental and emotional health. The rhythmic and repetitive nature of swimming can be calming and therapeutic, helping to reduce stress and anxiety. For young children, this can translate into better emotional regulation and improved concentration and focus. The confidence gained from learning to swim and overcoming the challenges it presents can also boost self-esteem. Social interactions are another valuable aspect of swimming. Whether in a structured swim class or free play at the pool, children have the opportunity to interact with their peers in a fun and engaging environment. These social experiences can enhance their communication skills, cooperation, and teamwork, all of which are essential for their overall development.Enrolling your child in swimming lessons is not an unwritten obligation for every parent, but since 2018, the Ministry of Education in the Sarajevo Canton has partially taken on this responsibility by including mandatory swimming classes as part of physical education in the 4th grade of elementary school. With the increase in the availability of both indoor and outdoor swimming facilities in Sarajevo, the number of swimmers and swimming clubs offering basic swimming training has intensified. With the introduction of nine-year education, children are exposed to computer-related tasks, sitting in desks, carrying school bags earlier, increasing the risk of facing potential poor posture from an even younger age. One assumption is that it might be too late for a child at the age of 9 to learn to swim and wait for recreational swimming, which would strengthen the muscles needed to resist the negative impacts of modern living environments. To prevent this and enable the early involvement of younger children in swimming, consideration

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should be given to moving the Canton Swimming School from the 4th grade to the 2nd grade of elementary school.

In conclusion, incorporating swimming into the lives of preschool-aged children offers a multitude of benefits. It is a comprehensive activity that supports physical, mental, and emotional development. By promoting proper body posture and preventing poor posture habits, swimming lays a strong foundation for a healthy and active lifestyle. Parents and educators should recognize the value of swimming and encourage children to take part in this beneficial activity from an early age.

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