

Gender-related differences in motor abilities of children in the fencing school

Miroslav Smajic¹ ✉ · Nebojsa Cokorilo¹ · Vladimir Petrovic² · Valdemar Stajer¹ · Rasko Micic³ · Maja Ilic⁴

© The Author(s) 2017. This article is published with open access.

Abstract

Fencing is very dynamic and combative sport, with the following requirements of competitors: instant resourcefulness, precision, courage and fast reaction in different situations. It is just for this reason that the training of young fencers involves improvement of all motor abilities focusing on agility, speed, and explosive strength. The aim of this research is to determine gender-related differences of motor abilities in children engaged in fencing. The sample consists of 50 children (26 boys and 24 girls) whose average age is 10.46 years and, who train fencing in the “Omladinac” in Zrenjanin and “Vojvodina” in Novi Sad. Motor abilities are tested by means of four motor tests. Differences are determined using multivariate analysis of variance and univariate analysis of variance. The findings indicate that there is statistically significant difference related to Deep forward bend on the bench and T-test, which is in favor of girls, Long jump test from the standing start in favor of boys, whereas Tapping test does not show any significant difference between boys and girls. Numerous research works show that early

early maturing girls have better results of motor performance than those with a slower process of maturation (11-13 years), whereas individual differences in terms of motor performance depend on growth and development, especially in boys. Matching of results is related to the observed statistically significant differences in explosive strength in favor of boys and suppleness in favor of girls.

Keywords motorics · fencing · boys · girls

Introduction

The physical activity of girls and boys is largely determined by: their gender, the structure of the movement and the morphological characteristics. On the other hand, we can't ignore the influence of: family, school, and environment as well. Social standards, the cultural level of the environment, the place and the role of physical education in it are just some of the factors of the social environment that can, by their indirect action, affect the development of the motor abilities of its members (Matic, Kuljic, & Maksimovic, 2010).

Fencing is also very dynamic sport, full of combat and its competitors must possess: cleverness, precision, courage and must quickly respond in different situations. It is precisely for this reason that a very important part of young fencers' training is improving all motor abilities with the focus on agility, speed and explosive strength.

Different intensity of physical activity of boys

✉ miroslav.smajic@gmail.com

¹ University of Novi Sad, Faculty of Sport and Physical Education, Serbia

² Fencing Club “Omladinac”, Zrenjanin, Serbia

³ Fencing Club “Vojvodina”, Novi Sad, Serbia

⁴ Secondary Technical School “Branko Radicevic”, Ruma, Serbia

and girls during physical education classes and outside of them affects both their physical development and the transformation of motor abilities. Around the age of five, boys already dominate when tested: coordination, running speed and explosive strength of lower extremities. In many research studies, the authors came to the conclusion that the level of manifestation of motor abilities in the younger school children varies considerably in relation to the gender (Cvetkovic, Popovic, & Jaksic, 2007; Obradovic, Cvetkovic, & Krneta, 2008; Bigovic, 2006; Bigovic & Krsmanovic, 2007; Matic, 2007; Batez, Krsmanovic, Dimitric, & Pantovic, 2011; Krsmanovic & Radosav, 2008). Boys manifest higher levels of explosive strength and coordination while girls have a higher level of flexibility. The greatest similarities occur in the case of the manifestation of the speed of alternative movements, where there is no statistically significant difference in relation to the gender. The results obtained are largely similar to the results obtained by observing the differences in the motor abilities of pre-school children (Cvetkovic et al., 2007; Bala, 1981).

Boys, thanks to the richer motor life achieved by chasing a ball, climbing trees, running, as well as to their greater desire and motivation to win at that stage of development (Bujas, 1980, according to Maslov, 1982), get better results in strength, coordination and running speed test when compared to girls. Girls are interested in different things and they lead a more peaceful life in terms of games. Girls are better in fine, more precise movements (Burton & Miller, 1998). The better developed motor abilities in the boys are due to intense movement in pre-school and at the younger school age.

Boys develop speed, strength and coordination during a variety of jumping, creeping, climbing, running, etc., as opposed to girls who mostly practice games in smaller spaces with less number of movements but more precise and more fines ones that contribute to the development of flexibility (Matic, 2007). The trend of boys' dominance in terms of motor abilities from the preschool period continues during the early school period (Milne, Seefeldt, & Reuschlein, 1976).

Results obtained after conducting tapping with hands, stepping aside and long jump from the standing start tests show that there are significant differences between boys and girls in the space of motor abilities (Mladineo, 2006). Also, some authors came to the conclusion that there are statistically significant differences in the following motor tests:

running 20 m sprint, backward polygon, sit and reach, long jump from the standing start, flexed arm hang test and speed slalom with three medicine balls test, while in the tapping with hands test they did not find any differences. In all of the tests, apart from the sit and reach test, boys achieved better results than girls (Krsmanovic & Radosav, 2008).

Optimal age for children to start fencing is between 10 and 12 years of age, because it is a stage of development when children start to slowly mature in terms of motor abilities to the point they can perform not only to basic motor tasks, but also the simplest specific ones regarding the fencing itself (Evangelista, 1999).

School children engaged in fencing must first master basic motor abilities with an emphasis on the explosive strength of the lower limbs, agility and speed because these represent the most important factors that will later make the difference between an average and a successful fencer (James, 2007).

We always have to keep in mind that all children do not mature at the same time, since this process depends on many of factors. When it comes to fencing, girls may show a higher degree of motor training than the boys at the very beginning, but in time, this difference goes over to the boy's side (Czajkowski, 2005).

In this paper, the emphasis is placed only on certain motor abilities, i.e. abilities that were tested in the sample of children in the fencing school.

The explosive strength of the lower extremities, which play a critical role in the movement and performance of specific movements during an attack or defense is of great importance in fencing.

Fencing does not require maximum flexibility, as is the case in rhythmic and sport gymnastics, but requires "normal", i.e. optimal flexibility, which makes it easier to perform specific movements related to fencing. Also, speed is very important because very often thanks to it, points are won.

The aim of this research is to determine gender-related differences in motor abilities of children engaged in fencing school.

Method

An interdisciplinary approach is necessary since previous findings have indicated that any motor characteristic of a person, and especially of athletes,

cannot be influenced in isolation-without a proper change in some of his other motor dimensions. All those motor dimensions, environmental characteristics, their similarities and differences, both within a sample of the subjects and among the various samples of the subjects, must be measured and evaluated in various ways, by various techniques and measuring instruments. The data obtained in the research of gender-related differences in the motor abilities of children engaged in fencing are controlled and prepared for processing in accordance with the aim. The databases are sorted by traceable features and prepared for the planned statistical processing. The results obtained by statistical processing are shown in the tables and analyzed by the corresponding logical units. The presentation of the research results, together with the whole procedure and explaining individual connections allow the examination of the overall gender-related differences in the motor abilities of children who are engaged in fencing in accordance with the aim of the research, that is, contributing to a clear determination according to the expected application of the obtained results in practice (Bala, 2007).

The sample of subject consisted of 50 children (26 boys and 24 girls), whose average age is 10.46 years and who are engaged in fencing in the fencing clubs "Omladinac" Zrenjanin, and "Vojvodina" Novi Sad.

Four tests were used for the assessment of motor abilities:

For the assessment of explosive strength:

1. Long jump from the standing start;

Table 1. Differences between boys and girls in fencing school

Variables	Boys	Girls	F	p
	mean±SD	mean±SD		
Deep forward bend on the bench	39.90±6.20	46.02±10.18	4.27	0.02
Long jump from the standing start	200.75±26.95	185.28±13.67	4.95	0.04
T test	16.61±1.73	15.26±1.72	8.75	0.00
Tapping with hands	38.22±6.42	37.84±5.80	1.20	0.24
	F=5.43	P=0.00		

Based on a univariate variance analysis (ANOVA), it has been determined that there is a statistically significant difference in the following tests: Deep forward bend on the bench and T test in favour of the girls. Results of the long jump from the standing start test were in favour of the boys, while in

For the assessment of flexibility:

2. Deep forward bend on the bench;

For the assessment of alternative hand movements:

3. Tapping with hands;

For the assessment of agility:

4. T test;

For each applied test and for both boys and girls, the mean (M), standard deviation (SD), were calculated from the basic central and dispersion statistics. Multivariate variance analysis (MANOVA) revealed statistically significant differences in the overall system of motor abilities tests between boys and girls. Subsequently, differences were found in each applied test by using the univariate analysis of variance (ANOVA).

Results

Based on the insight into the obtained results (Table 1), it can be said that the results are homogeneous.

Using the multivariate variance analysis (MANOVA), it was found that there was a statistically significant difference in the overall system of analyzed motor abilities tests, depending on the gender of children included in the sample (Table 1).

the tapping with hand test there was no statistically significant difference between boys and girls.

Discussion

It is likely that the higher level of motor abilities in boys is conditioned by the faster flow of the impulse from the cerebral cortex to the muscle effectors. Each newly learned activity enriches the child's motor life during the early school age, which especially reflects on his/her basic motor abilities (Halasi, 2012).

The motor abilities of younger school boys and girls differ significantly in terms of: flexibility, agility and explosive strength, while differences in the speed of alternative movements do not exist. These results are proved by many research studies conducted by many authors (Obradovic, Cvetkovic, & Krneta, 2008; Cvetkovic et al., 2007). The causes of these phenomena are most likely found in the determined genotype (the genetic structure of the inheritance of the parents, the full gender predestination or the structure of their movements (the girls opt for activities dominated by the large amplitude of the movements and the boys for the activities dominated by force).

In the lifetime (from 7 to 17 years of age), training with targeted development of motor abilities has the best effects, while the biological maturity significantly influences motor performance (Malina et al., 1999; according to: Mladineo, 2006).

Development status affects motor performance differently in boys and girls. Various studies show that girls who become mature faster have better results in terms of motor abilities than those who enter the maturation phase more slowly (11-13 years of age) and the differences between individuals in the population when it comes to motor abilities depend on growth and development, especially in boys (Buenen et al., 1988, according to: Mladineo, 2006). The coincidence of the results relates to the statistically significant differences in coordination and explosive strength in favour of boys and flexibility in favour of girls (Matic, 2007).

It has been found out that girls throughout the developmental period have a significant advantage in the field of manifestation of flexibility compared to boys (Branta, Haubenstricker, & Seefeldt, 1984).

In the fencing club "Omladinac" and the fencing club "Vojvodina", the differences between boys and girls in the explosive strength of legs, agility and flexibility are observed, which is a consequence of regular training. The training plan and program are adjusted to the age of children and gender. The

exercises that were done were mainly aimed at learning basic technical elements, as well as the improvement of motor abilities. All these exercises affect the improvement of motor abilities and the growing gender gap in favor of boys, because the differences between the boys and girls are more evident in this period, while the correct training sessions are the foundation of the consistent development of the anthropological characteristics of the pupils.

Regarding the influence of morphological characteristics on the difference between boys and girls at the age of 9-12, it has been shown that there is an influence of the body's volume on the manifestation of all motor abilities of younger school children, both boys and girls (B. Krsmanovic, Batez, T. Krsmanovic, 2009; Kalentic & Obradovic, 2007, according to Obradovic, 2008; Matic, 2007). The explosive strength of legs, agility and the speed of alternating movements in male and female fencers at the age of 9 to 12 years are adversely affected by an excessive amount of fatty tissue that diminishes functional and motor abilities which further adversely affects the ability of an athlete's organism.

After all, it can be concluded that the differences in the motor abilities between boys and girls in the early school age, engaged in fencing, are influenced by a really long series of factors, starting from previous engagement in physical activities, factors of growth and development, anthropometric characteristics, morphological characteristics, and by training, environment and parents as well.

Comparing the differences in the motor abilities of boys and girls involved in fencing can provide trainers with meaningful information about the different manifestations of the same motor abilities and enable them to pay more attention when it comes to developing those certain motor abilities.

This research is even more important given the fact that there is a very small number of similar studies or they are non-existent in our country. Fencing is a sport in expansion and is increasingly popular among younger school children, so trainers need to be ready, well-prepared to work with children and have all the data and information they could use in their further work.

References

- Bala, G. (1981). *Struktura i razvoj morfoloških i motoričkih dimenzija dece SAP Vojvodine [Structure and development of morphological and motor dimensions of SAP Vojvodina children]*. Novi Sad: Fakultet fizičke kulture.
- Bala, G. (2007). *Dizajniranje istraživanja u kineziologiji [Designing research in kinesiology]*. Novi Sad: Fakultet sporta i fizičkog vaspitanja.
- Batez, M., Krsmanović, B., Dimitrić, G., & Pantović, M. (2011). Razlike u nivou motoričkih sposobnosti učenika i učenica mlađeg školskog doba. [Differences in the level of motor abilities of male and female pupils of younger school age]. *Sport i zdravlje*, 6 (2), 32-36.
- Bigović, M., & Krsmanović, B. (2007). Motoričke sposobnosti učenika starih deset godina. [Motor abilities of male pupils ten years old]. U B. Krsmanović i T. Halaši (Eds.), *Trinaesti međunarodni simpozijum „Ekologija, sport, fizička aktivnost i zdravlje mladih, Zbornik radova* (pp. 273-288). Novi Sad: Novosadski maraton.
- Bigović, M. (2006). Motoričke sposobnosti učenica mlađeg školskog doba. [Motor abilities of female pupils of the younger school age]. *Glasnik antropološkog društva Jugoslavije*, 41, 289-302.
- Branta, C., Haubenstricker, J., & Seefeldt, V. (1984). Age changes in motor skills during childhood and adolescence. *Exercise Sport Sci. Rev.*, 12, 467.
- Burton, W.A., & Miller, D. E. (1998). *Movement Skill Assessment*. Champaign: Human Kinetics.
- Cvetković, M., Popović, B., & Jakšić, D. (2007). Razlike u motoričkim sposobnostima predškolske dece u odnosu na pol. [Differences in motor abilities of preschool children in relation to gender]. U N. Smajlović (Eds.), *Zbornik naučnih i stručnih radova II međunarodnog simpozijuma „Nove tehnologije u sportu”* (pp. 288-293). Sarajevo: Fakultet sporta i tjelesnog odgoja.
- Czajkowski, Z. (2005). *Understanding Fencing*. New York: SKA Swordplay Books.
- Evangelista, N. (1999). *The Art and Science of Fencing*. Gloucester: McGraw-Hill Education.
- Halaši, S. (2012). Razlike u motoričkim sposobnostima i telesnoj kompoziciji. [Differences in motor abilities and body composition]. *Sportske nauke i zdravlje*, 2(1), 75-79.
- James, H. (2007). *Strenght Training For Fencers*. New York: SKA Swordplay Books.
- Krsmanović, B., Batez, M., & Krsmanović, T. (2009). Uticaj antropometrijskih karakteristika i motoričkih sposobnosti učenica na motoričku efikasnost. [The influence of anthropometric characteristics and motor abilities of female pupils on motor efficiency]. *Glasnik antropološkog društva Srbije*, 44, 401-410.
- Krsmanović, T., & Radosav, S. (2008). Razlike antropometrijskih karakteristika i motoričkih sposobnosti učenika uzrasta od devet do jedanaest godina. [Differences of anthropometric characteristics and motor abilities of male pupils aged nine to eleven years]. *Glasnik antropološkog društva Srbije*, 43, 194-198.
- Maslov, H. A. (1982). *Motivacija i ličnost. [Motivation and personality]*. Beograd: Nolit.
- Matić, R. (2007). *Relacije motoričkih sposobnosti, morfoloških i socio-ekonomskih karakteristika dece mlađe školskog uzrasta. [Relationships of motor abilities, morphological and socio-economic characteristics of children of younger school age]*. Magistarski rad, Novi Sad: Fakultet sporta i fizičkog vaspitanja.
- Matić, R., Kuljić, R., & Maksimović, N. (2010). Motoričko ponašanje i socioekonomsko okruženje. [Motor behavior and socioeconomic environment]. *Teme*, 4, 1248-1260.
- Milne, C., Seefeldt, V., & Reuschlein, P. (1976). Relationship between grade, sex, race and motor performance in young children. *Res. Q. Exercise Sport*, 47, 726.
- Mladineo, M. (2006) Različitost između dječaka i djevojčica petih razreda u nekim motoričkim sposobnostima. [Diversity between boys and girls of the fifth grade in some motor abilities]. *Zbornik radova 15. ljetne škole*. Rovinj: Hrvatski kineziološki savez.
- Obradović, J. (2008). *Osnovi antropomotorike. [Fundamentals of anthropomotorics]*. Novi Sad: Fakultet sporta i fizičkog vaspitanja.
- Obradović, J., Cvetković, M., & Krneta, Ž. (2008). Razlike u motoričkim sposobnostima dece mladeg školskog uzrasta u odnosu na pol. [The differences in motor abilities of children younger school age in relation to gender]. *Sport Mont*, 15, 16, 17./VI, 527- 533.