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Original research paper

DIFFERENCES IN MOTOR SKILLS BETWEEN SCHOOL-AGED GIRLS PRACTICING HORSEBACK RIDING AND THEIR NON-SPORTING PEERS

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Abstract *The study aimed to determine whether there are differences in motor skills between school-aged girls who ride and who do not ride, aged 12 to 14. The following motor skills were examined: balance, flexibility, limb speed, leg and body coordination, explosive and repetitive strength.*

Forty-nine respondents were divided into two subsamples, namely riders n = 26 and non-riders n = 23. To assess motor skills, the following tests were used: the Single and double leg stance test on a balance beam, Overhead stick rotation, the Forward bend twist and touch, Plate tapping and Foot tapping, the Japan test 5 x 4,5 m, 20 lunges with a pass under, the Standing broad jump, 2 kg medicine ball throw from a seated position, Sit-ups, Push-ups, and Squats.

The distribution of the results was examined with the Kolmogorov-Smirnov test, and the difference in motor abilities was tested with the Mann-Whitney U test and the independent-samples T-test. The association between horseback riding and motor skills was examined using Pearson's and Spearman's correlation analyses. A significance level of $p < 0.05$ was accepted. The "Z" value was used to calculate the "r" value, and by calculating Eta squared and applying Cohen's d, the impact of horseback riding on the development of motor skills was analyzed.

The results showed that there is a significant difference in motor skills between riders and non-riders. A moderate to strong correlation was found between riding and the examined motor skills. The impact of riding on the development of motor skills was detected ranging from moderate to large.

Key words: *riding, balance, flexibility, coordination, and strength*

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1. INTRODUCTION

Physical activity is considered useful for the development of performance in children and adolescents (Cools, De Martelaer, Samaey, & Andries, 2009) and the development of sport-specific skills (Chagas & Batista, 2017). Horseback riding is an activity that implies ethological harmony with the horse, where the three-dimensional movements and movements of the horse's body are transferred to the rider. The perturbation caused by the horse's movement stimulates the musculoskeletal system to maintain the rider's posture while developing balance, coordination, agility, flexibility, leg, and arm muscle strength, and postural muscle strength (Kim & Lee, 2015; Sung, et al., 2015; Dengel, et al., 2019; Demarie, Galvani, Donatucci, & Gianfelici, 2022).

Bompa & Haff (2009) state in their work that balance, agility, endurance, and strength are the dominant motor abilities that are developed by horseback riding, which is confirmed by other authors pointing out that balance and the general physical fitness of the rider are important for riding (Meyers, 2006; Roberts et al., 2009). Demarie et al. (2022) state in their work the positive impact of riding on the development of motor skills in riders. One other study concluded that riding affects the development of balance (Murphy, et al., 2008). Liptak (2005) points out that riding improves muscle strength, agility, balance, and coordination. The results of the study by Lee et al. (2014) suggest that horse riding simulation in women has a positive effect on the development of balance, flexibility, lower extremities muscle strength, and muscle endurance. The findings of a study by Kuyulu & Kara (2023) show that riding affects the development of balance and improves limb muscle strength. Trabelsi et al. (2022) concluded that riding has a positive effect on the development of postural coordination and effective postural control.

This transversal study aimed to identify whether there are differences in motor skills between female respondents aged 12 to 14 years, who are included in the horse riding program and girls of the same age not involved in any sports activity, as well as to determine the association between horseback riding and the tested motor skills. For quantitative assessment of the motor skills in the field, a battery of tests was used to assess balance, flexibility, hand and foot speed, leg and body coordination, explosive arm and leg strength, and repetitive strength.

2. METHODS

The sample of respondents consisted of 49 healthy girls aged from 12 to 14 years (mean = 13.04 ± .76), with body height 163.29 ± 6.28 cm, body mass 53.57 ± 8.65 kg, and body mass index (BMI) 20.08 ± 3.13. They were divided into two sub-samples. The first sub-sample consisted of schoolgirls engaged in horseback riding n = 26 (53.1%), aged 13.08 ± .84 years, with an average body height of 162.73 ± 7.16 cm. Their body mass was 54.53 ± 9.12 kg, and their body mass index (BMI) 20.50 ± 3.26. They have been riding for 2.92 ± 1.05 years, with 2.92 ± .63 training sessions per week, with the time duration of one training session of 55.38 ± 7.06 minutes. The second sub-sample consisted of schoolgirls not taking part in horseback riding n = 23 (46.9%), aged 13.00 ± .67 years, with an average body height of 163.91 ± 5.20 cm, body mass 52.48 ± 8.15 and BMI 19.60 ± 2.98 who did not practice horseback riding or any other sport. The subjects were healthy in a locomotor and clinical sense and attended regular physical education classes three times per week. The respondent voluntarily participated in the experiment and following the description of the study, they gave their consent to participate in the testing.

The sample of measuring instruments consisted of measurements of body composition according to the protocol of the International Biological Program (IBP) and tests for the assessment of motor skills. Body characteristics were assessed using parameters: Body height - TV (cm) was measured with a meter, and body mass - TM (kg) was measured with a Body Composition Monitor BF511 scale (OMRON). and body mass index (BMI) which was calculated by using the formula BMI = weight (kg) / height (m^2).

Tests of motor skills consisted of tests for assessing balance, flexibility, speed of arms and legs, leg and body coordination, explosive strength of legs and arms, and repetitive strength. Balance (RV) was evaluated using the Single and double-leg stance test on a balance beam. Flexibility (FL) was evaluated using the Overhead stick rotation and Forward bend twist and touch tests. To assess the hand speed (BR) the Plate Tapping Test was used and for the leg speed (BN) Foot Tapping Test was used. Leg coordination (KN) was evaluated using the Japan test 5 x 4.5 m, while body coordination (KT) was evaluated using the 20 lunges with a pass under test. The explosive power of the legs (EN) was assessed by the Standing broad jump test, and the explosive power of the arms (ER) by test throwing a 2 kg medical ball from a seated position. Repetitive strength (RS) was assessed with sit-ups, push-ups, and squat tests (Madić et al., 2015). Data on the duration of the time spent horseback riding, the number of training sessions, and the duration of individual training sessions were obtained from the riders themselves in an oral survey.

The description of the experiment. A transversal research model was used, beginning on December 16, 2021, and ending on May 23, 2022, when the measuring and testing of the riders from the "Čokorska polja" and "Sarajevo" clubs were carried out, along with the measuring and testing of the non-rider participants, that is, schoolgirls from the "Branko Radičević" elementary school from Banja Luka. The testing protocol was demonstrated for the female participants, after which they were measured and tested under the same conditions. During the measuring process, the participants were barefoot, and during the testing, they wore leggings and sneakers. The study was carried out following the Declaration of Helsinki.

Statistical analysis. Descriptive statistics were calculated by using the statistical program "SPSS 19". The result distribution was verified by the Kolmogorov-Smirnov test, with the level of significance set at $p < 0.05$. The potential differences in motor skills between the subsamples were studied with the Mann-Whitney U test (MW) and the T-test for independent samples (T-test), as required. The association between taking part in horseback riding and motor skills was analyzed by Spearman's and Pearson's correlation coefficient analyses. Using the values of the "Z" coefficient, the value of "r" was calculated, and the calculated value of Eta squared along with Cohen's d suggested the effect size of horseback riding on the development of the studied motor skills. The level of significance was set at $p < 0.05$.

3. RESULTS

Table 1 shows the arithmetic mean and mean differences within the two subsamples. The results reveal better test results in favor of the rider for RV, FL, BR, BN, KN, KT, EN, while keeping in mind that lower values for BR, KN, KT are showing better test results. It can be stated that riders achieved better results than non-riders.

Table 1 Descriptive statistics within the two subsamples

	riders / non-riders	N	Mean	Std. Dev.	Std. Error Mean	Mean differences
Balance (RV)	fem. riders	26	18.80	1.69	.33	
	non-riders	23	7.48	4.02	.84	11.32
Flexibility (FL)	riders	26	14.69	2.74	.54	
	non-riders	23	8.74	2.40	.50	5.95
Hand speed (BR)	riders	26	12.44	1.76	.35	
	non-riders	23	15.20	3.59	.75	-2.76
Leg speed (BN)	riders	26	21.04	3.26	.64	
	non-riders	23	15.30	2.65	.55	5.73
Leg coordination (KN)	riders	26	9.84	.94	.18	
	non-riders	23	12.48	1.26	.26	-2.64
Body coordination (KT)	riders	26	24.81	4.66	.91	
	non-riders	23	34.95	4.77	.99	-10.14
Explosive power of the legs (EN)	riders	26	151.35	24.02	4.71	
	non-riders	23	118.57	16.93	3.53	32.78
Explosive power of the arms (ER)	riders	26	317.85	99.77	19.57	
	non-riders	23	262.09	54.86	11.43	55.76
Repetitive strength (RS)	riders	26	49.42	8.27	1.62	
	non-riders	23	33.13	7.31	1.52	16.30

Legend: N – number of respondents; Mean – arithmetic means; Std. Dev. – standard deviation; Std. Error Mean – standard mean error; Mean Differences – mean difference

The results of the Kolmogorov-Smirnov test (Table 2) for the variables BN, KT, EN, and RS revealed a normal distribution of the results, while for the variables RV, FL, BR, KN, and ER that assumption had to be rejected.

Table 2 Descriptive statistics and normality of the result distribution for the entire sample (n = 49)

	Mean	SD	Skew.	Kurt.	KS	
					Stat.	Sig.
Balance (RV)	13.49	6.44	- .41	-1.54	.21	.00
Flexibility (FL)	11.90	3.94	.04	-1.20	.14	.02
Hand speed (BR)	13.74	3.08	1.46	2.85	.16	.00
Leg speed (BN)	18.35	4.14	.31	- .16	.10	.20
Leg coordination (KN)	11.08	1.72	.33	- .95	.14	.01
Body coordination (KT)	29.57	6.92	.08	- .32	.06	.20
Explosive power of the legs (EN)	135.96	26.55	.50	- .20	.11	.20
Explosive power of the arms (ER)	291.67	85.74	2.38	7.87	.15	.01
Repetitive strength (RS)	41.78	11.29	.14	-1.04	.08	.20

Legend: Mean – arithmetic means; Skew. – skewness; Kurt. – kurtosis; SD. – standard deviation; KS – the Kolmogorov-Smirnov test; Sig. – level of significance at $p < 0.05$.

The Mann-Witney U test (Table 3.) revealed a statistically significant difference between riders and non-riders for the values of the variables RV, FL, BR, KN, and ER at the significance level of $p < 0.05$. By applying the formula $r = Z/\sqrt{N}$, the effect size of the impact of horseback riding (r) on the tested variables was calculated. According to Cohen's criterion guidelines (0.1 = small effect, 0.3 = moderate effect, and 0.5 = large effect) the results suggest that horseback riding has a large impact on the improvement in RV, FL, KN and a medium impact on the improvement in BR and ER.

Table 3 The Mann-Whitney U test

	RV	FL	NO	RS	ER
MW	7.00	36.50	155.50	37.50	173.00
Z	-5.89	-5.28	-2.87	-5.24	-2.52
Asymp. Sig. (2-tailed)	.00	.00	.00	.00	.01
r	0.8	0.7	0.4	0.7	0.4
Cohen's guidelines	large	large	moderate	large	moderate

Legend: MW – the Mann-Whitney U test; RV – balance; FL – flexibility; BR – hand speed; KN – leg coordination; ER – explosive power of the arms; Z – approximation value; r – effect size; N – number of participants.

The t-test (Table 4) revealed a statistically significant difference between the subsamples for the values of BN, KT, EN, and RS at the $p < 0.05$ level of significance. By applying Eta squared and Cohen's d (0.01 = small effect size, 0.06 = medium effect size, 0.14 = large effect size), the results suggest that horseback riding has a large impact on the improvement in BN, KT, EN and RS.

Table 4 The T-test for independent samples

	BN	KT	EN	RS
T-test				
t	6.70	-7.52	5.57	7.27
Sig. (2-tailed)	.00	.00	.00	.00
Mean Differences	5.734	-10.14	32.78	16.29
Eta square	0.5	0.5	0.4	0.5
Cohen's guidelines	large	large	large	large

Legend: T-test - T-test of independent samples; BN – leg speed; KT – body coordination; EN – explosive leg strength and RS – repetitive strength; N1 – number of riders; N2 – number of non-riders.

Spearman's rank correlation coefficient (ro) (Table 5) and following Cohen's guidelines (low = 0.10 to 0.29; moderate = 0.30 to 0.49; strong = 0.50 to 1.0) indicate strong positive correlation between horseback riding and RV (ro = 0.85; $p < 0.05$), FL (ro = 0.76; $p < 0.05$). A moderate positive correlation was found between riding and ER (ro = 0.36; $p < 0.05$). A moderate negative correlation between riding and BR (ro = -0.41; $p < 0.05$) and a strong negative correlation between riding and KN (ro = -0.76; $p < 0.05$) were found. Pearson's correlation coefficients (r) (Table 5) following Cohen's guidelines indicate a strong positive correlation between riding and BN (r = 0.70; $p < 0.05$), EN (r = 0.62; $p < 0\ .05$) and RS (r = 0.73; $p < 0.05$). A strong negative correlation was detected between riding and KT (r = -0.73; $p < 0.05$).

Table 5 Spearman's rank coefficient of correlation and Pearson's correlation coefficient

Spearman's rank coefficient of correlation “ro”							Pearson’s correlation coefficient “r”					
	Variables							Variables				
	JA	RV	FL	BR	KN	ER		JA	BN	KT	EN	RS
ro	1	.85	.76	-.41	-.76	.36	r	1	.70	-.73	.62	.73
Sig(2-t.)		.00	.00	.00	.00	.00	Sig(2-t)		.00	.00	.00	.00

Legend: N – number of participants; JA – horseback riding; RV – balance; FL – flexibility; BR – hand speed; KN – leg coordination; ER – explosive power of the arms; BN – leg speed; KT – body coordination; EN – explosive power of the legs; RS – repetitive strength; Sig (2-tailed) - p < 0.01 level of significance.

4. DISCUSSION

The results of the study indicate that riding for a duration of 2.92 ± 1.05 years, with the number of trainings per week 2.92 ± .63 with the time duration of one training session of 55.38 ± 7.06 minutes in children aged 13.00 ± .67 years improves RV, FL, BR, BN, KN, KT, EN, ER, RS considering that the participants taking part in horseback riding scored better results on the tests than the non-riding participants.

The value of the arithmetic mean (Table 1) of the tested motor skills indicates better results for the riders compared to the non-riders, whereby there is a clear increase in the values of the studied motor skills starting from the non-riders and ending with the riders. The results of the Mann-Whitney U test (Table 3) and the T-test of independent samples (Table 4) show a statistically significant difference in the values of the tested motor skills between riders and non-riders. The results of Spearman's rank correlation coefficient (ro) (Table 5.) suggest that riding activity follows a large development of RV, FL, and KN and a moderate development of BR, and ER. The coefficient of Pearson's correlation (r) (Table 5.) points out that riding follows the great development of BN, KT, EN, and RS. According to Cohen's guidelines (small = 0.10 to 0.29; moderate = 0.30 to 0.49; large = 0.50 to 1.0) it can be suggested that riding has a large effect on the development of RV, FL, BN, KN, KT, EN and RS and a medium effect on the development of BR and ER.

The inherent three-dimensional movement of a horse cyclically disrupts the rider’s balance, presenting him/her with the challenge to mobilize the concept of contracting the ipsilateral and contra lateral adductors and abductors, which requires a synergistic relationship between the body musculature, the impulse of visual control, and the vestibular and somatosensory system in the form of a phase response to maintain balance, whereby the aforementioned activity affects the development of balance (Lagarde, Peham, Licka, & Kelso, 2005). A statistically significant difference in balance in favor of the riders [(MW = 7.00; Z = -5.89; $p < 0.01$) (Table 3.)], a strong positive correlation between horse riding and balance [(ro = .85; $p < 0.01$) (Table 5.)], and the value [(r = 0.8) (Table 3.)], with the implementation of Cohen’s d, all suggest that horseback riding has a large effect on the development of balance. The results of this study suggest that horseback riding has an impact on the development of balance, which was confirmed by the results obtained by other authors (Kim & Lee, 2015; Sung et al., 2015; Kuyulu & Kara, 2023).

A horse’s stride requires continued phase movements of flexion and extension, rotation and lateral flexion of the trunk, and especially the pelvis and lumbar region of the spine, as well as the activation of the m. quadriceps femoris and m. gluteus maximus to maintain balance, which increases flexibility. The reflex contractions and decontractions of the par spinal muscles needed to maintain balance during a stride contribute to the decrease in muscle tone and rigidity, and the increase in the flexibility of the rider (Hobbs et al., 2014; Sung et al., 2015). The Mann-Whitney U test (Table 3.) detected a statistically significant difference in flexibility between the groups in favor of the riders (MW = 36.50; Z = -5.28; p < 0.01), whereby the strong positive correlation between horseback riding and flexibility [(ro = .76; p < 0.01) (Table 5.)] points to the conclusion that horseback riding leads to an increase in flexibility, while the value [(r = 0.7) (Table 3.)], per Cohen's d, suggests that horseback riding has a large effect on the development of flexibility. Our finding, that horseback riding has an impact on the development of flexibility, matches the findings of other authors Hobbs et al. (2014) and Sung et al. (2015), who state that horseback riding training can increase flexibility.

Hand speed can contribute to successful riding. The results (Table 3.) show a significant difference in hand speed in favor of riders compared to non-riders (MW = 155.50; Z = -2.87; p < 0.01). The moderate negative correlation between horseback riding and hand speed [(ro = -.41; p < 0.01) (Table 5.)] suggests that horseback riding has a medium effect on the development of hand speed [(r = 0.4) (Table 3.)] Contact with the horse's mouth, achieved through the hands, reigns, and the bit, is generally used to control a horse using positive and negative reinforcement. This action is realized through continuous phase variations following the cycle and phases of the horse's stride. The speed of such a complex hand movement in part depends on factors related to the horse and the way the horseback riding is taking place, and in another part on the position of the rider in the saddle. The significance of the role of the rider's hands is indicated through the requirement for continued contact between the rider's hands and the horse's mouth, which in horseback riding terminology means 'a steady hand above all', or in other words 'there is no need for unnecessarily quick movements', which is in agreement with the findings of other authors (Clayton et al., 2011; Egenvall et al., 2015). The requirement of having steady hands and moving slowly may help us understand the results obtained in this study.

The speed of the rider's legs is the consequence of rapid repetitive activations of the leg muscles due to the need to annul inertial forces, adapt to the kinematics of the horse's gait, and due to the need for quick and timely information regarding the points of contact with the horse. The findings of De Cocq, et al. (2010) suggest that lateral movement of the horse requires variable speed of the rider's legs, which contributes to the development of their speed. The comparison of the leg speed of the riders and non-riders in this study reveals a statistically significant difference in favor of the riders [(t = 6.70; p < 0.01) (Table 4.)], while the value of Eta squared [(0.5) (Table 4.)], per Cohen's d, suggests that horseback riding has a large effect on the development of leg speed. Pearson's correlation coefficient [(r = .70; p < 0.01)] (Table 5.) reveals a strong positive correlation between horseback riding and leg speed.

When at trot, the diagonal contralateral strides of the horse produce vertical movements of the cranial and caudal parts of the horse's trunk, while when at walk or canter (gallop), the trunk of the horse rotates around the median – the lateral axis producing various inertial transitions. For successful horseback riding, the rider's leg muscles are exposed to alternating perturbations and three-dimensional translations, mobilizing the continued omnipresent contralateral alternating coordination of the rider's legs. The various types of gait, slowing down and speeding up of the horse's trunk stimulate the contralateral or dorsal-ventral activation of the muscles of the trunk, with a rapid alternation of the overall activation. Horseback riding poses a challenge to the rider to simultaneously generate the inertial forces of the horse's gait in the musculoskeletal system of his/her legs and trunk, which would then be synchronized with the inertial parameters of the horse's gait, which impacts the improvement of the rider's leg and trunk coordination. The aforementioned coordination provides an independent seat, which allows coordinated movement of the legs as the primary means of controlling the activities of a horse (Lagarde et al., 2005; Clayton & Hobbs, 2017; Elmeua González & Šarabon, 2020). In this study (Table 3.), a significant difference was noted in leg coordination in favor of the riders (MW = 37.50; Z = -5.24; $p < 0.01$) with a strong negative correlation between horseback riding and leg coordination [(ro = - .76; $p < 0.01$) (Table 5.)], which implies that horseback riding has a large effect on the improvement of leg coordination [(r = 0.4) (Table 3.)]. In the case of body coordination, the results (Table 4.) showed a statistically significant difference in favor of the riders (t = -7.52; $p < 0.01$). The value of Pearson's correlation coefficient [(r = - .73; $p < 0.01$) (Table 5.) indicates a strong negative correlation between horseback riding and body coordination. The value of Eta squared (Eta squared = 0.5) indicates that horseback riding has a large effect on the development of body coordination. The findings of this study agree with the findings of Lagarde et al. (2005), Clayton and Hobbs (2017), and Elmeua González, et al. (2020), whereby the aforementioned authors pointed out the association between horseback riding and coordination between the body and legs.

The stirrups are a means of creating a point of support for the rider during the horizontal, vertical, and inertial oscillations, as a result of which the muscle-ligament fascial system is activated with variable intensity of the force, to maintain the posture of the rider. The posture of the rider, along with the kinematics of the horse's gait, generate a high frequency of alternation between maximum and minimum leg force, which stimulates the development of the explosive power of the legs (Elmeua González & Šarabon, 2020). In this study, a statistically significant difference was noted in the explosive power of the legs between the groups of participants in favor of the riders [(t = 5.57; $p < 0.01$) (Table 4.)], along with a strong positive correlation between horseback riding and explosive power of the legs [(r = .62; $p < 0.01$) (Table 5.)]. The value of Eta squared [(Eta squared = 0.4) (Table 4.)] indicates that horseback riding has a large impact on the development of explosive power of the legs among riders. The finding of this study, that horseback riding has a large effect on the development of the power of the lower extremities, is in agreement with the findings of Gribble and Hertel (2004), who point out that leg strength is the main factor in establishing and maintaining posture, with a focus on the abductor muscles, flexor muscles, and extensors of the thigh muscles, and the musculoskeletal system of the ankle, while during sudden transitions the focus is on the musculoskeletal system of the hip and knee joint.

Constant variations of the power distribution of the arms on the reins, to realize various gaits, exercises, positions of the head, turns and specific signalization during horseback riding (Egenvall, Eisersiö & Roepstorff, 2012), can stimulate the development of the explosive power of the arms of the rider. In order not to disrupt the behavior of the horse, the methodology of horseback riding universally promotes the principle of 'gentle contact of the hands with the horse's mouth' (Eisersiö et al., 2015), which can to an extent limit the development of the power of the arms. The results of the study (Table 3.) indicate that there is a significant difference in explosive power of the arms in favor of the riders compared to non-riders (MW = 173.00; Z = -2.52; $p < 0.01$), whereby a moderate positive correlation was noted between horseback riding and explosive power of the arms [(ro = .36; p < 0.01) (Table 5.)], which indicates that horseback riding has a medium effect on the development of the explosive power of the arms [(r = 0.4) (Table 3.)].

Horseback riding training requires longer time intervals of aerobic muscle strain, whereby this activity, initiated by the requirements of the training itself, can be responsible for the improvement of aerobic repetitive strength among riders (Westerling, 1983). The authors Lee et al. (2014), Eisersiö et al. (2015), Elmeua et al. (2020), and Kuyulu, et al. (2023) all report that horseback riding improves overall muscle strength of the arms (m. biceps brachii, m. triceps brachii), trunk (m. rectus abdominis, m. transversus abdominis, m. obliques abdominis, m. gluteus maximus, m. latissimus dorsi), and legs (m. adductor longus, m. quadriceps femoris), which supports the findings of this study. The results indicate a statistically significant difference in repetitive strength (Table 4.). The riders achieved better results compared to non-riders (t = 7.27; p < 0.01). The value of the coefficient (r = .73; p < 0.01) indicates a strong correlation between horseback riding and repetitive strength, while the value of Eta squared (0.5) indicates that horseback riding has a large effect on the improvement in muscle strength.

5. CONCLUSION

Relying on the results of this transversal study, it can be stated that there is a significant difference in the nomenclature values of the examined motor skills between girls aged 12-14 who ride and who do not ride, where the girls who ride have achieved significantly better results. The correlation between horseback riding and motor skills ranges from moderate to strong, with the potential role of riding in increasing motor skills being detected as medium to large. The study supports the view that riding provides an adequate stimulus for the development of the examined motor skills. Balance is recognized as a central motor attribute for successful riding, and it can be suggested that to recognize talents, balance is recommended as the most hereditary trait for riding.

The inability to generalize the data, the exclusively female sample, and the small number of participants are among the limitations of this study, whereby the results could be interpreted from the perspective of their usefulness for future studies.

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RAZLIKE U MOTORIČKIM SPOSOBNOSTIMA IZMEĐU DEVOJČICA ŠKOLSKOG UZRASTA KOJE SE BAVE JAHANJEM I DEVOJČICA KOJE SE NE BAVE SPORTOM

Studija je imala za cilj da utvrdi da li postoje razlike u motoričkim sposobnostima između devojčica školskog uzrasta koje jašu i koje ne jašu, uzrasta od 12 do 14 godina. Ispitivane su sledeće motoričke sposobnosti: ravnoteža, fleksibilnost, brzina udova, koordinacija nogu i koordinaciju tela, eksplozivna i repetitivna snaga. Četrdeset devet ispitanica su podeljene u dva poduzorka, i to jahači n = 26 i nejahači n = 23. Za procenu motoričkih sposobnosti korišćeni su sledeći testovi: Stajanje na jednoj i sa dve noge na uzdužno postavljenoj klupici, Iskret sa palicom, Pretklon zasuk dodir, Taping rukom i nogom, Japan test 5 x 4,5 m, 20 iskoraka sa provlačenjem palice, Skok udalj iz mesta, Bacanje medicinke od 2 kg iz sedećeg položaja, Dizanje trupa, Sklekovi i Čučnjevi. Distribucije rezultata ispitana je Kolmogorov-Smirnov testom, a razlika u motoričkim sposobnostima Mann-Whitney U testom i T-testom za nezavisne uzorke. Povezanost između jahanja i motoričkih sposobnosti ispitana je pomoću Pirsonove i Spirmanove korelacione analize. Prihvaćen je nivo značajnosti p < 0,05. Pomoću vrednosti „ Z“, izračunata je vrednosti „r“ i izračunom vrednosti Eta kvadrata i uz primenu Cohenovih smernica ispitivan je uticaj jahanja na motoričke sposonosti. Rezultati su pokazali da postoji značajna razlika u motoričkim sposobnostima između jahača i nejahača. Utvrđena je umerena do jaka korelacija između jahanja i ispitivanih motoričkih sposobnosti. Uticaj jahanja na razvoj motoričkih sposobnosti detektovan je u rasponu od umerenog do velikog.

Ključne reči: *jahanje, balans, fleksibilnost, koordinacija, i snaga*