AMBIDEXTERITY AND PERFORMANCE IN WRESTLING

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Abstract

Wrestling is a very complicated and demanding sporting activity of high intensity in which movements are performed in variable conditions symmetrically around all axes and planes, and in all directions. However, the wrestling training practice so far is such that learning and improving of the wrestling techniques in most cases is conducted on one side, which is severely criticized nowadays by trainers in practice and scientific workers. The basic aim of this research was to establish the relations between the symmetrical and asymmetrical method of learning and improving wrestling techniques and success in wrestling. The research was conducted on a sample of 115 beginner wrestlers, aged 19 to 21 years, divided in the experimental and control group. The experimental group was subjected to the training programme of learning and improving the wrestling techniques on both sides symmetrically, whereas the control group conducted the traditional training programme of learning and improving the wrestling techniques on the predominant side only asymmetrically. After the conducted program, lasting 48 hours, the differences between the experimental and control group in the area of the selected situational parameters in a wrestling bout were determined. The research results clearly show that planned and programmed training process of symmetrically conducted training resulted in statistically higher success rate in the beginner wrestlers. The beginner wrestlers that conducted the training programme symmetrically obtained statistically higher results in all situation variables used in this research. On the basis of this research results, the application of symmetrical learning and improving the wrestling techniques in the process of training from the beginning of practice, i.e. from the first inclusion in the training process, is recommended.

Key words*: lateral preference, dominant body side, combat sport, situation-related efficiency*

Introduction

Wrestling is a very complex high intensity sporting activity in which movements are performed under variable conditions bilaterally, around all body axes, in all planes, and to all directions (Marić, 2007). Wrestling training in Croatia is mostly based on the approach that favours unilateral learning and mastering of wrestling techniques. Ambidexterity is a common topic in sport science (Čular, 2010; Jaszczak, 2006; Rynkiewicz, 2013)Human ability to perform motor tasks skilfully to or on both body sides, thus engaging equally both the left and right arm and leg, is known as ambidexterity. Ambidexterity, or bilateral skilfulness in motor task performance, promotes exercise performance. Symmetric preparation is recognised as a factor that expands and improves coordination abilities of athletes (Lyakh, Sadowski & Witkowski, 2011; Rostowska, 2001). Repertoire of techniques is much wider if wrestlers are able to perform them to both body sides. Thus, bilateral wrestlers are more dangerous, more efficacious than their adversaries since they are able create more favourable positions for technique application during a bout. However, despite the well evidenced recognitions, in most wrestling schools in Croatia, and even in the world, unilateral approach to learning and mastering of wrestling techniques that is only to the preferred side is traditionally implemented. The purpose of this study is to scientifically verify superiority of the bilateral learning and mastering of wrestling techniques over the unilateral method. Therefore, the goal of the research is to establish probable statistically significant differences in wrestling bout performance (situation-related efficiency) variables between the experimental (bilateral) and control (unilateral) group.

Methods

Sample of participants

Sample of participants embraced 115 male beginners in wrestling, 1921 years of age, who were randomly divided into two groups: the experimental (n=54; age=20.1±0.7 years; body height ±179,43 ; body mass ±76,28) and control group (n=61; age=19.8±1.1 years; body height ±178,14 ; body mass ±74,83). This manuscript is a part of a larger study conducted on students of kinesiology (Vračan, 2016).

Sample of variables assessing performance or situationrelated efficiency

Sample of variables consisted of six variables assessing situationrelated efficiency in wrestling bouts (Marić, 2007).

1. General efficiency: the number of grips is divided by the number of bouts.

2. Point efficiency: the number of points is divided by the number of grips.

3. Perfect efficiency: the number of pins is divided by the number of grips.

4. Activity: the sum of the number of attempts and the number of throws is divided by the time of bout duration.

5. Performance: the number of attempts is divided by the number of grips.

6. Superiority: the number of the completed grips is divided by the number of the opponent's grips.

The wrestling beginners participated in two different training programmes of learning and improving wrestling techniques: the wrestlers of the control group conducted their training asymmetrically, to the preferred body side, whereas the experimental group wrestlers executed their drills symmetrically, to both body sides. Both programmes lasted 48 teaching hours (two 90-minute sessions twice a week during three months) and were balanced in terms of wrestling techniques learning and mastering duration, teaching methods and exercises, basic and specific physical conditioning, wrestling bouts, and other training programme parameters. At the end of the experiment a competition was organised between the wrestlers of the experimental and control group. Each participant had four 90-second bouts.

Methods of data processing

Data was processed using the program Statistica 12 (StatSoft, Tulsa, OK, USA). Descriptive statistical parameters (arithmetic mean, standard deviation) were calculated, and their goodness of fit (distribution normality) was verified using the Kolmogorov-Smirnov test. Discriminant analysis was applied to determine differences between the groups in the variables assessing situation-related efficiency in wrestling bouts. The significance level was set at $p<0.05$.

Results

In following tables, descriptive statistics (Table 1), results of discriminant analysis (Table 2) and factors structure matrix in discriminant analysis (Table 3) are given.

	Experimental group (n=61)		Control group (n=54)	
	Mean±SD	K-S test	Mean±SD	K-S test
General efficiency	3.39±1.49	p<0.20	2.77±1.19	p<0.20
Point efficiency	2.87±0.76	p<0.20	2.55±0.86	p<0.20
Perfect efficiency	0.19±0.12	p<0.20	0.15±1.14	p<0.15
Activity	2.85±1.82	p<0.20	4.25±1.49	p<0.20
Performance	1.70±1.04	p<0.20	1.51±0.97	p<0.05
Superiority	2.11±2.62	p<0.20	1.24±1.61	p<0.20

Table 1. Descriptive statistical parameters and results of the KolmogorovSmirnov test of the performance/situation-related efficiency variables. Mean – arithmetic mean; SD – standard deviation; K-S test – Kolmogorov- Smirnov test

Table 2. Results of discriminant analysis of differences between the experimental and control group and group centroids on the discriminant function

Test of function(s)	Wilks' Lambda	Chi-square	df	p	Centroids	
					Asymmetric	Symmetric
1	0.37	108.84	6	<0.001	1.37	-1.21

Note. Wilks' Lambda – values of Wilks' lambda; Chi-Sqr– values of the Chi-square test used to check the discriminant function significance; df – degrees of freedom; p – proportion of error.

Table 3. Correlations of the variables of situation-related efficiency with the discriminant function.

	General efficiency	Point efficiency	Pure efficiency	Activity	Performance
Discriminant function	**0.20**	**0.19**	0.15	**0.41**	0.12

Most variables established a fairly low correlation with the discriminant function (Table 3).

Discussion

Basic descriptive statistical parameters demonstrate that the experimental group scored higher than the control group in all the situation-related efficiency variables. The results obtained for the variable general efficiency indicate that the wrestlers conducting the symmetrical training programme completed by 0.62 more techniques in each bout than their counterparts from the asymmetric training programme. Also, as seen from the variable point efficiency, the experimental group wrestlers performed higher rated techniques (symmetrical programme 2.89; asymmetrical programme 2.55). Perfect efficiency indicates that the symmetrically trained wrestlers completed 19% of their grips with a pin, whereas their counterparts did the same in only 15% of grips. Variable activity reveals that the wrestlers who trained symmetrically had 5.75 techniques applied or attempts per bout, whereas their counterparts accomplished an average of 4.25. Also, small numerical differences between the groups were noticed in the variable performance, which puts into ratio the number of attempts and the number of completed grips (symmetrical programme 1.70; asymmetrical programme 1.51). Results of the variable superiority, based on the ratio of the grips performed and grips conceded, suggest that the members of the experimental group were superior in a bout (symmetrical programme 2.11; asymmetrical programme 1.24). As far as we know, there are no similar studies, therefore reference values for the utilised variables do not exist; the only one similar investigation of situational parameters of wrestling bouts was executed by Plavec (2002). However, quality comparison to that research (Plavec, 2002) is not possible since its participants were 4-5 years younger than the participants in our study, although the results of both studies are similar.

It was possible to form one discriminant function (Table 3), which discriminated the groups significantly at the significance level of $p<0.01$. Within the applied discriminant analysis a fairly low value of Wilks' Lambda (0.37) was obtained in the process of testing statistical significance of the differences between group centroids. Considering that values of the Wilks' Lambda ranges from 0 (total discrimination) to 1 (no discrimination), it is obvious that the obtained discriminant function, based on the set of the selected variables, differentiates well between the wrestlers who participated in the symmetrical training and their counterparts participating in the asymmetrical training programme. Value of the Bartlett's Chi-square test of the discriminant function was 108.84. The value was larger than the limiting value out of six degrees of freedom and at the significance level of $p<0.00$; therefore, it was feasible to conclude that the discriminant function was significant enough to differ between the groups. The highest correlations between the predictor variables and discriminant function were established by the variable activity 0.41, followed by the variables general efficiency 0.20 and point efficiency 0.19. Therefore, the discriminant function is defined as activity and efficiency in a wrestling bout. Namely, the group with the symmetric training programme demonstrated a more pronounced activity and efficiency in wrestling bouts. Such results were expected based on the conclusions of previous research studies which indicated that the symmetric training programme should lead to better sports achievements (Starosta, 1985, 1999; Haaland, 2003). Furthermore, according to Lyach and colleagues (2011), symmetric preparation, together with technical and technical-tactical preparation, promotes athletes' competition performance and efficiency. Certain research studies with wrestlers, but also with athletes of other sports, suggest left lateral preference is favourable in sport. Ziyagil and colleagues (2010) established that among the best

international quality wrestlers, participants of the World Wrestling Championships, the left-handed athletes won a higher number of bouts and their percentage of victories was also higher when compared to the right-handed combatants. Baker and Schorer (2013) suggested that the performers with left side preference had a higher probability of becoming the highest level achievers in various interactive sports. However, those studies only compared athletes of either left or right preference and not those athletes who harmoniously developed both sides of their body. Therefore, future research should focus on relations among all three options (athletes of predominantly left or predominantly right side preference, and harmoniously developed athletes).

Conclusion

The goal of this study was to establish if there were any statistically significant differences between the experimental and control group in performance or situation-related efficiency variables collected from wrestling bouts. The research established statistically significant differences between the groups: the group that had conducted the symmetric training programme scored better in all performance/situationrelated efficiency variables than the group that had trained asymmetrically (to the preferred body side). Harmonious development of both body sides leads to a more dynamic activity of wrestlers, probably due to a wider repertoire of techniques.

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AMBIDEKSTERNOST I UČINKOVITOST U HRVANJU

Sažetak

Hrvanje je vrlo komplicirana i zahtjevna sportska aktivnost visokog intenziteta u kojoj se kretanja izvode u promjenjivim uvjetima simetrično oko svih osi i ravnina, te u svim smjerovima. Međutim, do sada je praksa treninga za hrvanje takva da se u većini slučajeva učenje i poboljšanje tehnika hrvanja provodi s jedne strane, što je trenutačno ozbiljna kritika trenerima u praksi i znanstvenim radnicima. Osnovni cilj ovog istraživanja bio je uspostaviti odnose između simetrične i asimetrične metode učenja i poboljšanja tehnika hrvanja i uspjeha u hrvanju. Istraživanje je provedeno na uzorku od 115 hrvača početnika, u dobi od 19 do 21 godine, podijeljeno u eksperimentalnu i kontrolnu skupinu. Eksperimentalna skupina bila je podvrgnuta programu obuke učenja i poboljšanja tehnika hrvanja s obje strane simetrično, dok je kontrolna skupina provodila tradicionalni program osposobljavanja za učenje i poboljšanje tehnika hrvanja na dominantnoj strani samo asimetrično. Nakon provedenog programa, u trajanju od 48 sati, utvrđene su razlike između eksperimentalne i kontrolne skupine na području odabranih situacijskih parametara u hrvanju. Rezultati istraživanja jasno pokazuju da je planirani i programirani proces obuke simetrično provedenog treninga rezultirao statistički višom stopom uspjeha kod početničkih hrvača. Početni hrvači koji su provodili program obuke simetrično su dobivali statistički veće rezultate u svim situacijskim varijalama korištenim u ovom istraživanju. Na temelju ovih rezultata istraživanja preporučuje se primjena simetričnog učenja i poboljšanja tehnika hrvanja u procesu osposobljavanja od početka prakse, tj. Od prvog uključivanja u proces izobrazbe.

Ključne riječi: bočna sklonost, dominantna strana tijela, borbeni sport, situacijska učinkovitost

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