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METRIC CHARACTERISTICS OF SELECTED TESTS FOR THE EVALUATION OF BASIC TRAINING STATUS IN TOP LEVEL WRESTLERS

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Abstract

The aim of the investigation was to determine the metric characteristics (mostly concerning its reliability) of selected Polish tests for the assessment of the basic training status, on top-level Croatian wrestlers. The sample of participants was comprised of 35 top cadet wrestlers (15 to 17 years of age) from the discipline of classic style. The determined metric characteristics for the tests are: maximum turn in jump, zig-zag run, run with turnover, maximum high jump with both feet, 20 meter run with flying start, trunk bending. Each test was measured three or four times, and the given results were subjected to a series of statistically methods for the determined metric characteristics. The results of the investigations indicate that the selected tests have very good metrical characteristics on the representative sample of top-level Croatian cadet wrestlers.

Key words: classic style, co-ordination, speed, agility, explosive strength, and flexibility

Introduction

There is a small number of batteries of tests with a tradition of over 24 years of use in training like the Polish battery of tests of basic and specific training status for advanced wrestlers (Starosta & Tracewski 1981). Such a long tradition of using the battery of tests, and the subsequent success of Polish wrestlers (5 Olimpic medals in Atlanta 1996), lead us to the conclusion that the Polish battery of tests confirmed its validity in practice. In favour of this thesis there are the results of researches of the investigations the professors of the Faculty of Kinesiology in Zagreb (Marić, Soršak and Cvetković) on boys and juniors in Croatian summer wrestling camps in sport centres on the island Badija (1976, 1977, 1978 and 1980). They were made with battery of tests that consisted of some tests from the above mentioned Polish battery of tests. Some of these researches were published, and one part is stored in the archives of university for combat sports, the Faculty of Kinesiology in Zagreb. Many authors wrote about the importance of the basic readiness of wrestlers (Starosta & Tracewski 1981, Marić, Baić & Aračić 2003). The wish of the author is to find out whether the metric characteristics of lesser-known tests for basic training status have high results on some other populations of top level wrestlers.

Methods

The sample of participants was comprised of 35 top level cadet wrestlers from the discipline of classic wrestling, from 8 different Croatian clubs. The average age of the wrestling group was 16.24+/- 0.74 years. Their average number of training sessions per week was 4.65 +/- 0.94, years of training 5.69+/- 0.29, body height 172,28+7-1.49 cm, and body weight 66.47+/-1.92 kg. This sample we can consider as a representative sample of Croatian top wrestlers. All of these wrestlers were chosen according to their ranking (1-4 place) at the national championships in 2004. A small number of the participants who did not respond could not be foreseen, and that was the result of injuries, sickness or some other objective circumstances. All the tested wrestlers were healthy, which was determined by a physical examination. Selected tests for the assessment of the basic and specific training status for advanced wrestlers (Starosta & Tracewski 1981) were: maximum turn in jump (MAKS_OKR_LD) for assessment of co-ordination, zig-zag run (TR_CI_CA) and run with turnover (TR_S_ZAD) for assessment of agility, maximum high jump with both feet (SKOK_UVIS) for assessment of explosive strength, 20 meter run with flying start (TR_20M) for assessment of speed, trunk bending (back bench) (ZA_TR_LE) for assessment of flexibility. A longer description of these tests can be found in the written work (Starosta & Tracewski 1981), and the translation of the tests into Croatian (Baić 2003) can be found at the university for combat sports, the Faculty of Kinesiology in Zagreb. The research was conducted in January 2005 at the Faculty of Kinesiology in Zagreb, and 7 basic and 8 specific wrestling tests were conducted. The tests went from one test to another by random choice, and for the necessity of this research only the above-mentioned four tests were analyzed. The gyms were the tests were done were normally heated according to the season, and the testing took place between 9am and 2pm.

Results

The descriptive parameters include: arithmetic mean (Mean), minimum value (Minimum), maximum value (Maximum), standard deviation (Std. Dev) and they were calculated and presented in table. In that table were also presented correlations of items (n) with first main component (Factor 1), and evaluated Cronbach's- a coefficient of reliability if the particle item (n) was excluded (Cra id). The reliability of composite tests was tested by Spearman-Brown (SB), Kaiser-Caffrey (ac), and Cronbach's – a (Cra) metods (table 2). In table 2 were also calculated: the estimated Cronbach's - a coefficient of reliability if there are two items less (Ecra), average inter-item correlation (R), absolute amplitude of characteristic values of the matrix of item correlation (Eigenval) and percentage articulated cumulative part of characteristic values of the matrix of item correlation (Cumul. %). The given results indicate that the selected tests have very good metrical characteristics.

Table 1. Descriptive parameters of particles and their influence on the test reliability (n=35)

R.b.	Test	n	Mean	Minimum	Maximum	Std.Dev	Factor 1	Cra id
1.	MAKS_OKR_LD (stupnjevi)	1	755.914	615	998	104.366	0.993	0.994
		2	753.971	609	978	104.277	0.995	0.989
		3	756.600	608	1004	106.085	0.995	0.991
1.1.	MAKS_OKR_L* (stupnjevi)	1	384.457	305	594	65.105	0.987	0.987
		2	383.543	283	560	67.394	0.991	0.982
		3	381.343	291	553	62.797	0.991	0.902
1.2.	MAKS_OKR_D** (stupnjevi)	1	371.457	280	487	48.680	0.985	0.975
		2	370.429	293	478	44.850	0.992	0.966
		3	375.257	307	490	49.298	0.978	0.987
2.	TR_CI_CA (sec)	1	23.841	21.63	25.91	1.128	0.977	0.842
		2	23.517	21.67	25.88	1.143	0.929	0.749
		3	23.736	21.8	26.2	1.210	0.869	0.854
3.	TR_S_ZAD (sec)	1	12.647	11.72	13.9	0.649	0.916	0.710
		2	12.275	11.36	13.51	0.600	0.914	0.719
		3	12.271	11.31	14.84	0.732	0.792	0.895
4.	SKOK_UVIS (cm)	1	47.526	36.5	72	7.982	0.955	0.941
		2	49.086	37.8	70	7.569	0.933	0.950
		3	49.923	41	67	6.523	0.940	0.950
		4	49.740	38.8	71	7.374	0.953	0.941
5.	TR_20M (sec)	1	2.509	2.12	3.07	0.202	0.945	0.923
		2	2.543	2.19	3.1	0.207	0.952	0.912
		3	2.520	2.1	3.17	0.222	0.949	0.918
6.	ZA_TR_LE (cm)	1	53.000	31	72	7.550	0.959	0.983
		2	53.657	33	72	7.239	0.987	0.971
		3	53.486	39	72	7.278	0.979	0.974
		4	53.314	38	73	8.040	0.975	0.977

Legend: MAKS_OKR_LD - maximum turn in jump; MAKS_OKR_L*- maximum turn in jump to the left is part of the test MAKS_OKR_LD, and can be performed as a separate test for co-ordination to the left; MAKS_OKR_D** - maximum turn in jump to the right is part of the test MAKS_OKR_LD, and can be performed as a separate test for co-ordination to the right; TR_CI_CA - zig-zag run; TR_S_ZAD - run with turnover; SKOK_UVIS - maximum high jump with both feet; TR_20M- 20 meter run with flying start; ZA_TR_LE - trunk bending (back bench)

Table 2. Analysis of reliability selected tests for top level wrestlers (n=35)

R.b.	Test	n	SB	ac	Cra	Ecra	R	Eigenval	Cumul. %
1.	MAKS_OKR_LD	3	0.994	0.995	0.994	0.980	0.983	2,965	98,843
1.1.	MAKS_OKR_L	3	0.990	0.990	0.989	0.968	0.970	2,939	97,976
1.2.	MAKS_OKR_D	3	0.985	0.986	0.984	0.953	0.960	2,912	97,073
2.	TR_CI_CA	3	0.871	0.871	0.870	0.690	0.697	2,385	79,502
3.	TR_S_ZAD	3	0.846	0.848	0.837	0.631	0.666	2,301	76,697
4.	SKOK_UVIS	4	0.960	0.960	0.959	0.921	0.860	3,574	89,351
5.	TR_20M	3	0.945	0.945	0.944	0.848	0.850	2,700	90,001
6.	ZA_TR_LE	4	0.983	0.982	0.988	0.965	0.940	3,801	95,073

Legend: MAKS_OKR_LD - maximum turn in jump; MAKS_OKR_L*- maximum turn in jump to the left is part of the test MAKS_OKR_LD, and can be performed as a separate test for co-ordination to the left; MAKS_OKR_D** - maximum turn in jump to the right is part of the test MAKS_OKR_LD, and can be performed as a separate test for co-ordination to the right; TR_CI_CA - zig-zag run; TR_S_ZAD - run with turnover; SKOK_UVIS - maximum high jump with both feet; TR_20M- 20 meter run with flying start; ZA_TR_LE - trunk bending (back bench)

Discussion

The reliability of the tests maximum turn in jump (MAKS_OKR_LD, MAKS_OKR_D and MAKS_OKR_L) for an assessment of co-ordination, is very high (Table 2). The average coefficient of the correlation between the items shows very high values, which indicates a very high homogenity of the tests (Table 2). The arithmetical means of items are mostly unchanged, as well as the minimal and maximal results (Table 1). The size of the projections of the first important main component, and the evaluated Cronbach's -a coefficient of reliability, suggest that two attempts should be enough to obtain similar reliable results in this test (Table 1). This is very important information for these tests because too much time would be spent if the test was repeated three or more times. On the validity of the test (MAKS_OKR_LD) for the assessment of co-ordination results of former researches (Baić 2003) are indicated, where these tests get the biggest number of statistically important correlations with other tests for evaluating co-ordination (forward pass, forward somersault in squat position, backward somersault in squat position, backward pass). The same test was used to define the factor of turn-ability in the air. The reliability of tests zig-zag run (TR_CI_CA) and run with turnover (TR_S_ZAD) for assessment of agility, is relatively satisfactory (Table 2). However, in the tests of agility the average coefficient of correlation between the items shows the smallest level of all the selected tests. According to this we can assume that these tests are contaminated by the adaptation of the wrestlers to this test situation, and probably with fatigue ness in the last attempt. That is confirmed by the tendency of the smallest result being achieved in the first item of these two tests, and the smallest correlation coefficients of the first and last result on the first main component (Table 1). Because of that, the authors suggested in the case of a large number of tests throwing out the last item, because it has been detected that by throwing out the last item, the evaluated Cronbach's - a coefficient of reliability becomes bigger (Table 1). On the validity of the test for the assessment of agility results of former researches (Baić 2003) are indicated, where these two tests define the factor of agility. The validity of the test according to the success criterion in wrestling is confirmed by researches (Baić 2003, Baić, Starosta & Marić 2003), where the results in these tests were better as the group of wrestlers was better. The reliability of the test maximum high jump with both feet (SKOK_UVIS) for assessment of explosive strength, and 20 meter run with flying start (TR_20M) for assessment of speed, is very high (Table 2). The average coefficient of correlation between the items shows very high values, which indicates a very high homogeneity of the tests (Table 2). The arithmetical means of the items mostly are unchanged, as well as the minimal and maximal results (Table 1). The size of projections of the first important main component, and the evaluated Cronbach's - a coefficient of reliability, suggest that three attempts should be enough to obtain similar reliable results in the test maximum high jump with both feet (SKOK_UVIS), and two attempts in the test 20 meter run with flying start (TR_20M) (Table 1). On the validity of the tests for the assessment of explosive strength results of former researches are indicated (Baić 2003), where those tests have statistically important correlation test bridge from a standing position. The same test was used to define the factor of explosive strength. The reliability of test trunk bending (ZA_TR_LE) for the assessment of flexibility, is very high (Table 2). The average coefficient of correlation between the items shows very high values, which indicates a very high homogeneity of tests (Table 2). The arithmetical means of items mostly are unchanged, as well as the minimal and maximal results (Table 1). The order and size of the projections on the first important main component, and the evaluated Cronbach's - a coefficient of reliability, suggest that three attempts should be enough to obtain similar reliable results in this test. On the validity of the tests for the assessment of flexibility results of former research are indicated (Šadura at all, 1974) where an almost identical test (zaklon –z) has a high correlation with the specific test for the assessment of flexibility (most), where those two tests define one of the factors in the space of flexibility. The validity of the test according to the success criterion in wrestling is confirmed by researches (Baić 2003, Baić, Starosta & Marić 2003), where the results in this test were better as the group of wrestlers was better.

Conclusion

The authors conclude that the tests used have very good metrical characteristics on the representative sample of top-level Croatian cadet wrestlers. They also conclude that, in the case of the use of a greater part or the whole set of Polish tests, the number of items in every test has to be less and in accordance with the proposals of the authors (Starosta & Tracewski 1981). Namely, the number of tests for advanced wrestlers is very large (cadets and juniors 23, seniors 15), and already in this minor research it has been noticed that the accumulative fatigue was on the upper line of tolerance of the sportsmen and also their trainers. The authors think that in the researches of a greater number of top-level wrestlers, in which they are subjected to a larger number of tests, and for some dimensions we have even a few tests, it is not the most important factor to have tests with a large number of items for good metrical characteristics (reliability). That is also in accordance with the former researches (Bala 1990). The authors state that it is, for this kind of large set of tests, much more important to have an optimal number of items determined by many years of practice and with the number of researches, to distribute correctly the tests during each day of testing, to have determined normative values and to have the top-level sport results of sportsmen that were observed with the proposed set of tests. Only that way the motivation of top-level sportsmen for testing would be preserved under the influence of increasing fatigue and a also the real metrical characteristics of the used tests.

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