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DESIGNING A BATTERY OF TESTS FOR ASSESSING, MONITORING AND FORECASTING THE RESULTS OF THE ENROLEES AT A FOOTBALL SCHOOL

IZDELAVA TESTNE BATERIJE ZA UGOTAVLJANJE, SPREMLJAVO IN NAPOVEDOVANJE REZULTATOV MED UDELEŽENCI NOGOMETNE ŠOLE

Abstract

The aim of the research is to design a battery of the tests for assessing, monitoring and forecasting the results of players undergoing training at a football school, based on the forecasting validity of the measuring characteristics of the variables. After the forecasting variables of basic motor abilities have been used, the object of the research is to isolate those variables that have the highest predictive value and impact on each specific motor variable that was used. The sample was a planned one, including 105 respondents, young football players aged 10 (±6 months) who were enrolled at the *Vojvodina RMR* football school in Novi Sad. Both the sample of variables for assessing basic motor abilities (predictive variables) and the sample of variables for assessing specific motor abilities (criterion variables) were used. Stepwise regression analysis was used in order to determine the smallest number of the predictive variables with the highest partial correlations in the situation where in each subsequent step the variable having the biggest partial influence was eliminated. The most predictive variables with the biggest partial contributions in multiple correlations were obtained and the system of predictive variables with the maximum multiple correlations was reduced; in other words, the battery of tests was designed for assessing specific motor abilities in young football players.

Key words: battery of tests, motor abilities, stepwise regression analysis

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Povzetek

Namen raziskave je bila izdelava baterije testov za ugotavljanje, spremljavo in napovedovanje rezultatov igralcev, ki trenirajo v nogometni šoli na podlagi napovedovalne vrednosti merskih značilnosti spremenljivk. Na podlagi napovedovalnih spremenljivk osnovnih gibalnih sposobnosti smo želeli izolirati tiste spremenljivke, ki imajo najvišjo napovedovalno vrednost in vpliv na posamezno gibalno spremenljivko. Vzorec je vključeval 105 mladih nogometnih igralcev starih 10 let (±6 mesecev), ki so bili vključeni v nogometno šolo *Vojvodina RMR* v Novem Sadu. Uporabili smo skupino spremenljivk, ki določajo osnovne gibalne dejavnosti (napovedovalne spremenljivke) in skupino spremenljivk, ki označujejo specifične gibalne sposobnosti (kriterijske spremenljivke). S postopne regresijo smo določili najmanjše število napovedovalnih spremenljivk, ki so imela največje parcialne korelacije v primerih, ko je bila v naslednjem koraku izločena spremenljivka, ki je imela največji parcialni vpliv. Spremenljivke z največjo napovedovalno močjo, ki so imele največje parcialne vplive, smo ohranili, sistem napovedovalnih spremenljivk z maksimalnimi multiplimi korelacijami pa je bil zmanjšan. Z drugimi besedami je baterija testov zgrajena za določanje specifičnih gibalnih sposobnosti pri mladih igralcih nogometa.

Ključne besede: testna baterija, gibalne sposobnosti, postopna regresija

INTRODUCTION

One of the principal research goals in sports training is to form optimal models that will have a simple structure, but also a substantial amount of important information. This is specifically required when forming a battery of tests for assessing, forecasting and monitoring in a training process and particularly when performing selective procedures. Such a series of tests used for assessing the dominant abilities in specific branches and sports disciplines has to be rather reduced so that only the smallest number would be singled out that best assess only those abilities that lead to the top sporting results. This is the only possible way to obtain the optimal model of efficacy criteria.

The aim of this research is to design a battery of the tests for assessing, monitoring and forecasting the results of the players undergoing training at the football school based on the predictive validity of measurement characteristics of the variables. After the predictive variables of basic motor abilities have been used, the object of the research is to isolate only those variables that have the highest predictive value and impact on each specific motor variable that was used. From a methodological point of view, in this procedure it is necessary to select only those predictive variables that have the highest multiple correlations together, then to determine the contribution of each variable with respect to the extent of multiple correlations and finally to ascertain which variable has the strongest partial impact on the criterion variable in such a reduced system. This procedure had to be started by eliminating those predictive variables that do not contribute to the expansion of a multiple correlation and whose partial impacts seem to be insignificant statistically; it finished with extracting a predictive variable that contributed most in the total coefficient of determination and whose partial impact is the most dominant one.

Recent decades have seen different approaches to designing batteries of tests for assessing, monitoring and forecasting the results of motor abilities. Radosav (1985) designed a battery of tests for assessing, monitoring and forecasting the results of football school enrolees. In addition, Malacko and Patarić (1980) designed a battery of tests for assessing and monitoring the effects of PE courses on the male and female students at the University of Novi Sad. Krneta (1992) made a proposal of a battery of tests for assessing the specific motor activity of female volleyball players. Caput-Jogunica (1995) designed and validated a battery of composite motor tests suited for frontal use. Doder (2000) also designed a battery of tests for assessing and monitoring boys practicing karate. Furthermore, Bala and Ambrožić (2002) studied the effects of the problems regarding measuring and describing human characteristics and their abilities in kinesiology. Mikulić and Oreb (2006) designed and validated only one measuring instrument for assessing relative repetitive strength. Oja and Jurimae (1997) set a goal of constructing a battery of tests for measuring motor abilities in children from Estonia aged between four and five years.

MATERIALS AND METHODS

The sample was a planned one of 105 respondents, young football players aged 10 (±6 months) who were enrolled at the "Vojvodina RMR" football school in Novi Sad, Serbia. The boys took part in three trainings per week under the guidance of qualified football coaches. The parents gave their written consent for the testing of their children. The criteria for selecting the boys were as follows: how regularly they attended training sessions and how seriously they approached work in training sessions; in addition to this, their participation in games in the previous two years was taken into account. The tests used here were the ones whose measuring characteristics were verified in several earlier research projects, which thus made them valid as standardized tests. The aim and the issue of this research prompted us to use the following system of variables: the sample of variables used for assessing basic motor abilities (predictive variables) and the sample of variables used for assessing specific motor abilities (criterion variables).

The sample of the variables for assessing basic motor abilities included the tests for assessing strength (explosive strength-20-metre run-stand position (RUN20M), standing long jump (STLJUM), standing high jump (STHJUM) and repetitive strength-push-ups (PUSHUP), elevating the trunk from the floor while lying (ELTRFL), straightening of the trunk (STRTRU); tests for assessing the speed and the speed of alternative movements (60-metre run-standing position (RUN60M), foot tapping (FOOTAP), foot tapping against the wall (FOTAPW); endurance tests (speed endurance tests at the speed of 60 seconds-15 minutes (SE6015), 800-metre run (RU800M)); flexibility tests (lying on the back and lifting the legs (LYBLFL), lying on the stomach lifting the legs (LYSLFL), lying on the side and doing a side leg lift (LSSLL)); coordination tests (two-ball dribble with a foot (TWBDWF), coordination with a bat (COORBA), going under and jumping over a pommel horse (GUJOPH)).

The sample of the variables used for assessing specific motor abilities included: testing of the accuracy of hitting the target (vertical target with a foot (VWTAL), hitting a target while dribbling a ball with a foot (HTADBF)); ball-handling assessment tests (striking a rolling ball against the wall with a foot (SRBAWF), striking a rolling ball (without settling it first) against the wall – with one's foot (KIRBAW)), tests used for assessing the speed of guiding the ball (guiding the ball around the semicircle (GUBASE), guiding the ball in random directions (GUBRDI), tests used for assessing a ball kick force (kicking the ball over a long distance (KIBLDI), heading a ball over a long distance (HEBLDI)); and the tests for assessing curvilinear motion (running a semicircle (RUNSEC), and running in random directions (RUNRDI)).

The testing was carried out in May, 2002. During the testing, there were not more than three to four boys tested at a time. All the measuring was guided by a well-trained measurer using standardized equipment. The boys were wearing sports clothes and sports shoes during the testing; the time interval between the tests was 10-15 minutes. The tests were used after a short (5-7 minutes) warm-up (easy running and jumps, no stretching exercises). The collected data were processed by means of the statistical application program SPSS 10.0 adjusted to be used by personal computers. Multivariate values were calculated by means of the following parameters: Ro^2 - square of the multiple correlation or the total variances of a system of predictive variables with respect to criterion variable (the coefficient of determination), Ro – multiple correlation between the whole system of predictive variables and criterion variable, f – significance testing using F relationship and p – statistical significance of the impact of a whole system of predictive variables on the criterion variable at the level of $p=.05$ and $p=.00$. When calculating and analyzing the obtained results, the following invariant statistical parameters were used: β – individual influence of each forecasting variable on a criterion variable by means of the regression coefficient (beta ponders), and t – testing the significance of an influence of each predictive variable on a criterion variable at the level of $p=.05$. Stepwise regression analysis was used in order to determine the smallest number of the predictive variables with the largest partial correlations in the situation where in each subsequent step the variable that had the biggest partial influence is eliminated. This analysis helped determine the smallest number of predictive variables that contributed to the largest influence on the criterion variable; in other words, it helped ascertain the smallest number of the predictive variables that have the largest correlations in a situation where in each subsequent step the variable with largest partial influence is eliminated. The procedure lasted until the largest multiple correlation was obtained. In this way, a hierarchical sequence was established regarding the predictors with the strongest influence on the criterion variable and a battery of tests was formed for assessing, monitoring and forecasting the results in specific-motor tasks performed at a football school.

RESULTS

Using stepwise regression analysis, we obtained the results that represent a basis for drawing certain conclusions. These results are given in the tables further in the text.

In the first table, we used the applied predictive variables of basic motor activity to obtain the six variables that have the largest multiple correlation (Ro=.508) with the criterion variable of specific motor activity in kicking the ball towards a target in a vertical position. Therefore, the rest of the predictive variables did not have any influence on the multiple correlation. The following variables had the biggest impact: 800-metre run, then standing long jump and elevating the trunk from the floor while lying on the back. The other three variables did not show significant partial relatedness.

Table 1: Stepwise regression analysis of a specific motor variable of kicking the ball towards a target in a vertical position and the variables of the basic motor activity using a dead-end elimination method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
RU800M	-.394	.096	-.018	.004	-4.107	.000
STLJUM	.314	.103	.035	.011	3.037	.003
ELTRFL	-.277	.109	-.079	.031	-2.541	.012
FOTAPW	.121	.092	.094	.072	1.308	.193
RUN20M	.152	.100	.591	.390	1.514	.133
TWBDWF	-.129	.096	-.120	.090	-1.334	.184

Ro= .508 Ro^2= .258 F(6.98)=5.694 p= .000

The second table shows how much the predictive variable contributed to the multiple correlation and the coefficient of determination, along with their statistical significance. The significant influences of the three mentioned predictive variables can be seen here. Therefore, the 800-metre run, then standing long jump and elevating the trunk from the floor while lying on the back are the tests by means of which we could best forecast the result in the criterion variable of kicking a target in a vertical position. The high level of relatedness and influence of a standing long jump and elevating the trunk from the floor while lying on the back with the criterion variable of kicking a target in a vertical position is accounted for by the force impact of the hip flexors and knee extensor muscles on the ball kicking force. However, the impact of the 800-metre run should be the characteristic of the sample of the boys in this research. Specifically, the boys had better results in the 800-metre run and in the test of kicking the ball towards a target in a vertical position, which can be explained by better motor fitness of these boys. In such a situation, it is not easy to choose the best test to forecast efficient kicking the target in a vertical position even though statistics gave a clear result of a tested sample of the boys. For this reason, we cannot generalize in this case, but take these as orientation values and recommend using all three of the test in the battery of the tests.

Table 2: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	p
RU800M	1	.369	.136	16.284	.000
STLJUM	2	.412	.169	4.084	.045
ELTRFL	3	.469	.220	6.509	.012
FOTAPW	4	.483	.233	1.733	.190
RUN20M	5	.495	.245	1.534	.218
TWBDWF	6	.508	.258	1.782	.184

The third table shows a somewhat reduced system of predictive variables for the performance efficiency of kicking the ball towards a target in a vertical position. There are four variables that contributed to the largest overall multiple correlation, whose values are, however, rather low. Nevertheless, not one partial correlation is significant. Only the variable of standing high jump seems to be close to the borderline significance.

Table 3: Stepwise regression analysis of specific motor variable of propelling the ball towards a goal through dribbling (running with the ball close to one's feet) with the variables of basic motor activity, using a dead-end elimination method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
RU800M	-.183	.104	-.011	.006	-1.764	.080
STHJUM	.197	.101	.102	.052	1.941	.055
TWBDWF	.150	.099	.179	.118	1.512	.133
COORBA	-.134	.096	-.205	.147	-1.393	.166

Ro= .334 Ro^2= .111 F(4,100)=3.146 p= .017

The fourth table shows that within a reduced system, the 800-metre run again appeared to contribute to the largest extent in the multiple correlation. Therefore, it is justified only to talk about an overall influence of a system containing four predictive variables and not about the dominant variable in that system, since no single predictive variable has significant partial relatedness to the criterion one. The proposal was that out of the remaining three variables, the 800-metre run be included in the battery of the tests and, according to the obtained results, another two variables should be included as well: the standing high jump and two-ball dribble with a foot

Table 4: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	P
RU800M	1	.230	.053	5.794	.017
STHJUM	2	.274	.075	2.459	.119
TWBDWF	3	.307	.094	2.119	.148
COORBA	4	.334	.111	1.940	.166

The fifth table shows an evidently high level of significance of multiple correlation of a reduced system of predictive variables with the criterion variable of kicking the ball after it bounces off the ground and kicking it against the wall. All the partial correlations (four predictive variables) are significant.

Table 5: Stepwise regression analysis of the specific motor variable of kicking the ball after it bounces off the ground and kicking it against the wall with the variables of basic motor activity using the dead-end elimination method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
ELTRFL	.311	.092	.143	.042	3.361	.001
PUSHUP	.255	.096	.091	.034	2.638	.009
TWBDWF	-.197	.092	-.298	.138	-2.148	.034
STRTRU	-.187	.096	-.027	.013	-1.944	.054

Ro= .499 Ro^2= .249 F(4.100)=8.297 p= .000

The sixth table shows the hierarchical order of each variable's contribution in the overall multiple correlation. The top position belongs to the variable of elevating the trunk from the floor while lying on the back, then followed by push-ups, two-ball dribble with a foot and straightening of the trunk. Considering the extent of a partial influence and the influence in the overall multiple correlation apart from the predictive variables, the battery of the tests can also include elevating the trunk from the floor while lying on the back, which has already been included and the variable of push-ups.

Table 6: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	p
ELTRFL	1	.388	.150	18.291	.000
PUSHUP	2	.437	.191	5.137	.025
TWBDWF	3	.469	.220	3.796	.054
STRTRU	4	.499	.249	3.780	.054

The analysis of specific motor variable of striking a rolling ball (without settling it first) against the wall (with one's foot) with the variables of basic motor activity is given in the seventh table. It shows that, in the overall largest multiple correlation, nine predictive variables participate, which accounted for the connection with the criterion variable by 35%. In such a system, individual partial correlations are only significant in the case of the 800-metre run and two-ball dribbling with a foot. The variable speed endurance is also close to a significance threshold of p=.05, while other variables are much farther from that value.

Table 7: Stepwise regression analysis of the specific motor variable of a rolling ball against the wall (with one's foot) with the variables of basic motor activity using the dead-end elimination method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	P
RU800M	-.260	.105	-.024	.009	-2.475	.015
RUN60M	-.126	.108	-.396	.339	-1.167	.245
TWBDWF	-.189	.094	-.344	.172	-2.000	.048
SE6015	.192	.111	.057	.033	1.736	.085
LYSLFL	-.123	.085	-.050	.034	-1.443	.152
PUSHUP	.146	.097	.063	.041	1.504	.135
STRTRU	-.113	.094	-.019	.016	-1.200	.232
FOTAPW	.104	.089	.158	.134	1.178	.241
ELTRFL	-.096	.096	-.053	.053	-1.000	.319

Ro= .594 Ro^2= .353 F(9.95)=5.768 p= .000

The eighth table shows the hierarchical order of each predictive variable's contribution in the overall multiple correlation. It is again the 800-metre run taking the first position with the partial significance at the level of p=.00, followed by the standing position 60-metre run. These results show us that 60-metre run using a standing start should be included in the battery of tests for forecasting the performance efficiency of specific motor tasks.

Table 8: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	p
RU800M	1	.447	.200	25.775	.000
RUN60M	2	.510	.260	8.286	.004
TWBDWF	3	.532	.283	3.244	.074
SE6015	4	.549	.301	2.669	.105
LYSLFL	5	.563	.317	2.273	.134
PUSHUP	6	.574	.329	1.744	.189
STRTRU	7	.581	.338	1.273	.261
FOTAPW	8	.588	.346	1.228	.270
ELTRFL	9	.594	.353	1.000	.319

The ninth table contains nine predictive variables (as the most predictive ones out of the 17 used in total) for assessing the performance efficiency of the specific motor test of guiding the ball in a semicircle, which manifest considerable partial influence in the case of the variables 800-metre run, push-ups, lying on the side and doing a side leg lift, standing long jump and two-ball dribble with a foot. The efficient performance of the test of guiding the ball in a semicircle requires a whole series of motor abilities that can best be assessed using the aforementioned system of predictive variables. Multiple correlation is extremely high and the entire system containing nine predictive variables influences the efficiency in the criterion variable up to 50%.

Table 9: Stepwise regression analysis of the specific motor variable of guiding the ball in a semicircle with the variables of basic motor activity using the dead-end method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
RU800M	.323	.083	.018	.004	3.860	.000
RUN20M	.141	.091	.670	.434	1.540	.126
PUSHUP	-.226	.084	-.061	.022	-2.688	.008
STLJUM	-.206	.085	-.028	.011	-2.397	.018
TWBDWF	.180	.083	.206	.095	2.151	.033
LSSLL	-.224	.092	-.033	.013	-2.432	.016
LYBLFL	.189	.097	.040	.020	1.947	.054
STHJUM	-.137	.091	-.069	.045	-1.508	.134
FOOTAP	.106	.084	.072	.057	1.257	.211

Ro= .701 Ro^2= .491 F(9.95)=10.199 p= .000

The tenth table shows the hierarchical order of each predictive variable's contribution in the overall multiple correlation. The 800-metre run takes the first position, which is then followed by the standing position 20-metre run, standing long jump, whereas other variables showed no significant partial influence. The results pointed to another predictive variable that should be included in the battery of the tests: 20-metre run.

Table 10: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	p
RU800M	1	.478	.229	30.615	.000
RUN20M	2	.600	.360	20.871	.000
PUSHUP	3	.630	.397	6.227	.014
STLJUM	4	.657	.432	6.125	.015
TWBDWF	5	.671	.450	3.314	.071
LSSLL	6	.678	.460	1.801	.182
LYBLFL	7	.688	.473	2.431	.122
STHJUM	8	.694	.482	1.743	.189
FOOTAP	9	.701	.491	1.581	.211

The eleventh table shows significant multiple correlation of seven predictive variables with the criterion variable of guiding the ball in random directions. After the overview of the partial influences of the t-test values, four variables exhibiting a considerable individual impact on the criterion variable were observed: standing long jump, 800-metre run, push-ups and two-ball dribble with a foot.

Table 11: Stepwise regression analysis of the specific motor variable of guiding the ball in random directions with the variables of basic motor activity using the dead-end method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
RUN60M	.138	.108	.248	.196	1.268	.207
STLJUM	-.300	.093	-.037	.011	-3.201	.001
TWBDWF	.200	.095	.209	.099	2.103	.037
RU800M	.233	.091	.012	.004	2.549	.012
COORBA	-.148	.091	-.199	.122	-1.623	.107
PUSHUP	-.226	.094	-.056	.023	-2.386	.018
GUJOPH	-.169	.111	-.168	.110	-1.528	.129

Ro= .578 Ro^2= .335 F(7.97)=6.986 p= .000

The twelfth table shows the hierarchical order of each predictive variable's contribution in the overall multiple correlation. The standing position 60-metre run takes the first position, which is then followed by standing long jump, push-ups and 800-metre run, which comes at the very significance threshold at p=.05. All of these variables were recommended to be included into the battery of tests, and the findings only confirmed their predictive value with respect to efficient performance of specific motor tasks.

Table 12: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	p
RUN60M	1	.378	.143	17.261	.000
STLJUM	2	.444	.197	6.879	.010
TWBDWF	3	.488	.238	5.419	.021
RU800M	4	.516	.266	3.860	.052
COORBA	5	.539	.291	3.459	.065
PUSHUP	6	.564	.319	3.974	.048
GUJOPH	7	.578	.335	2.335	.129

The thirteenth table shows significant multiple correlation of seven predictive and basic motor variables with the specific motor variable of heading a ball over a long distance. Partial contributions are the greatest in the case of two variables: standing long jump and lying on the stomach lifting the legs.

Table 13: Stepwise regression analysis of the specific motor variable of heading a ball over a long distance with the variables of basic motor activity using the dead-end method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
STLJUM	.279	.100	.019	.007	2.780	.006
SE6015	.178	.102	.017	.009	1.743	.084
LYSLFL	-.224	.099	-.029	.013	-2.251	.026

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
RUN20M	-.185	.108	-.452	.264	-1.713	.089
LYBLFL	.157	.103	.017	.011	1.513	.133
GUJOPH	.187	.118	.104	.066	1.583	.116
FOOTAP	.130	.098	.045	.034	1.316	.191

Ro= .514 Ro^2= .264 F(7.97)=4.977 p= .000

The overview of a hierarchical order regarding the contribution of the overall multiple correlation of each predictive variable pointed to three variables with statistically significant contributions and all three of them are given the Table 14. They are as follows: standing long jump, speed endurance and lying on the stomach lifting the legs. According to the results, two more predictive variables should be included in the battery of tests: speed endurance and lying on the stomach lifting the legs.

Table 14: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	p
STLJUM	1	.387	.149	18.162	.000
SE6015	2	.430	.185	4.455	.037
LYSLFL	3	.467	.218	4.297	.040
RUN20M	4	.478	.228	1.299	.257
LYBLFL	5	.488	.238	1.292	.250
GUJOPH	6	.501	.251	1.630	.204
FOOTAP	7	.514	.264	1.732	.191

The fifteenth table shows a significant multiple correlation of a reduced system with six predictive, basic motor variables with the specific motor variable of kicking the ball over a long distance. High partial significance occurs only in the case of the variable of standing long jump, whereas the remaining variables have a significant impact only in the system with other predictive variables.

Table 15: Stepwise regression analysis of the specific motor variable of kicking the ball over a long distance with the variables of basic motor activity using the dead-end method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
STLJUM	.360	.097	.102	.027	3.712	.000
SE6015	.163	.113	.063	.044	1.430	.155
GUJOPH	.249	.105	.559	.235	2.374	.119
RUN20M	-.132	.104	-1.297	1.026	-1.263	.209
RU800M	-.115	.102	-.013	.012	-1.130	.260
RUN60M	-.121	.110	-.494	.449	-1.101	.273

Ro= .555 Ro^2= .308 F(6.98)=7.286 p= .000

The sixteenth table shows the hierarchical order of each predictive variable's contribution in the overall multiple correlation, in which the standing long jump takes the first position, while the speed endurance also appears to be highly significant. According to the results of the previous procedures, both of the variables should be included in the battery of tests; thus, these findings only confirm their predictive value.

Table 16: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	p
STLJUM	1	.441	.195	24.981	.000
SE6015	2	.500	.250	7.530	.007
GUJOPH	3	.519	.269	2.670	.105
RUN20M	4	.537	.288	2.665	.105
RU800M	5	.547	.299	1.575	.212
RUN60M	6	.555	.308	1.214	.273

The seventeenth table shows the seven most predictive of the basic motor variables for the efficient performance of a test running in random directions. Significant multiple correlation occurred in three significant partial correlations, i.e. in three significant t-tests, in the case of variables: two-ball dribble, push-ups and standing long jump.

Table 17: Stepwise regression analysis of the specific motor variable of running in random directions with the variables of basic motor activity using the dead-end method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
TWBDWF	.277	.093	.130	.044	2.950	.003
SE6015	-.114	.112	-.008	.008	-1.020	.309
PUSHUP	-.230	.091	-.025	.010	-2.527	.013
LYBLFL	.136	.093	.012	.008	1.454	.149
STLJUM	-.192	.094	-.010	.005	-2.038	.044
FOTAPW	.164	.095	.064	.037	1.729	.086
RU800M	.117	.108	.002	.002	1.087	.279

Ro= .538 Ro^2= .290 F(7,97)=5.663 p= .000

The eighteenth table shows a hierarchical order of each predictive variable's contribution in the overall multiple correlation, in which two-ball dribble contributed to the largest extent, and is immediately followed by the speed endurance variable. Both of the variables have already been included into the battery of tests; this is one of the examples where their predictive values are confirmed.

Table 18: Gradual dead-end elimination method

variables	Step +in/-out	Multiple R	Multiple R-square	F – to Entr/rem	p
TWBDWF	1	.348	.121	14.211	.000
SE6015	2	.427	.182	7.964	.006
PUSHUP	3	.459	.211	3.665	.058

variables	Step +in/-out	Multiple R	Multiple R-square	F – to Entr/rem	p
LYBLFL	4	.488	.238	3.568	.061
STLJUM	5	.511	.261	3.122	.080
FOTAPW	6	.530	.281	2.664	.105
RU800M	7	.538	.290	1.183	.279

The nineteenth table shows a highly significant multiple correlation of a system with eight predictive, basic motor variables with the specific motor variable *running a semicircle*. Significant partial correlations occurred in the case of variables push-ups, lying on the back and lifting the legs, and standing long jump. The results show that not one predictive variable has a particularly high partial influence on the criterion variable.

Table 19: Stepwise regression analysis of the specific motor variable of running a semicircle, with the variables of basic motor activity using the dead-end method

N=105	β	St. Err. of β	B	St. Err. of B	t (98)	p
RUN60M	.191	.101	.177	.093	1.895	.060
ELTRFL	-.111	.096	-.018	.015	-1.155	.250
STLJUM	-.183	.092	-.011	.005	-1.993	.049
PUSHUP	-.177	.082	-.022	.010	-2.156	.033
SE6015	-.153	.091	-.013	.008	-1.676	.096
STLJUM	-.173	.097	-.040	.022	-1.783	.077
LYBLFL	.192	.094	.019	.009	2.049	.043
LSSLL	-.129	.092	-.009	.006	-1.397	.165

Ro= .676 Ro^2= .457 F(8.96)=10.129 p= .000

The twentieth table shows the hierarchical order of each predictive variable's contribution in the overall multiple correlation. The variables with the highest significant influence appeared to be 60 metres running and elevating the trunk from the floor while lying, which are immediately followed by the standing long jump variable. The results confirmed the predictive value of all the three variables of basic motor activity already recommended for the inclusion into the battery of tests for assessing the performance efficiency of specific motor tasks.

Table 20: Gradual dead-end elimination method

Variables	Step +in/-out	Multiple R	Multiple R-square	F – to entr/rem	p
RUN60M	1	.518	.268	37.815	.000
ELTRFL	2	.587	.345	11.952	.000
STLJUM	3	.614	.377	5.278	.023
PUSHUP	4	.631	.398	3.476	.065
SE6015	5	.648	.420	3.009	.057
STLJUM	6	.658	.433	2.289	.133
LYBLFL	7	.668	.446	2.308	.131
LSSLL	8	.676	.457	1.951	.165

DISCUSSION

Considerable advances in the development and use of batteries of tests for assessing motor abilities of older children were made when Eurofit battery of tests was designed (1988). Therefore, the obtained results indicate that the recommended tests are suitable for the assessment of motor abilities of young football players.

It is widely known that specific motor abilities stem from basic ones and thus the whole spectrum of the base of potential basic motor abilities represents a measure of possible upgrading of specific motor fitness. Particular attention must be paid to the influence of basic motor abilities on the specific ones at a younger age, because it determines and sets the dynamics and the course of development, i.e. of the transformations of the dominant abilities. A football player whose dominant basic motor abilities have not developed up to the optimal level will never be able to reach a high level in specific motor abilities. The optimal, i.e. the most efficient, way of transforming basic motor abilities into specific ones is derived from the conclusions that confirm which basic motor abilities are the ones most significant for later high levels in the case of the specific motor abilities. It is of the utmost importance to design and practically implement reliable and valid measuring instruments (tests) for the assessment, control and monitoring of those basic motor abilities that represent the primary potential for the efficiency in performing of specific motor tasks.

Frequently, the aim of research is designing a battery of tests that would enable determining selective procedures and transformation operators with high predictability. Therefore, it is important for the dominant motor abilities that are the basis of the efficiency in football to be measured and developed through a proper training program, which is to be elevated to higher levels.

One of the emphases in this research was placed on forming a battery of tests of basic motor abilities that have the largest influence of the performance efficiency of motor tasks in order for selection, control and training process to be as efficient as possible. The basic motor abilities in football players have been determined with a large amount of research. In this research paper, they are taken as a priority in assessing the efficient performance of specific motor tasks, with special effort being made to single out the most predictive ones in order to obtain a reduced battery of tests that best assesses those basic motor abilities having the greatest influence on efficient performance of specific motor tasks. Such a battery of tests should have the highest value in the process of planning program content, especially in the case of the football schools for younger players. With such players, a higher potential basis is formed for later higher upgrading related to top performances in football. The years of experience the authors have had working with the boys aged between 7 and 12 at the football school helped them choose the tests used for assessing those motor abilities that were most developed within the program content. The analysis of these tests made it clear that they assess a wide spectrum of motor abilities, but endurance, stamina, speed and coordination are to be the dominant ones. The combination of motor abilities that is to be found in most of the tasks in the tests is precisely the potential that most influences the efficient performance of specific motor tasks, i.e. movement structures in football. Thus, it is very important to choose such a battery of tests that contains the dominant combination of basic-motor abilities upon which efficient transformation into the specific ones is mostly dependent on.

In the process of determining relations between the tests of the basic motor activity and those testing specific motor activity, it was observed that a more complex movement structure in the tests of specific motor activity also requires the significant presence of motor abilities that are necessary for performing such structures.

Stepwise regression analysis produced most predictive variables with the largest partial contributions in the multiple correlations and a reduced system of predictive variables with a maximum multiple correlation. In other words, a battery of tests was designed that will be used for assessing specific motor abilities in young football players.

The tests are arranged according to the order they are used. The results showed that this battery of tests is comprised of lying on the stomach lifting the legs, standing long jump, elevating the trunk from the floor while lying, two-ball dribble with a foot, metres running – standing position, speed endurance and 800-metre run. When compared to the battery of tests designed by Radosav (1985) with the same goal, it may be concluded that lying on the stomach lifting the legs, two-ball dribble with a foot and the 800-metre run appeared to be new categories that contribute to the development of the science, both theoretically and practically. Other tests for the assessment of basic-motor abilities were consistent with the aforementioned research.

The designed battery of tests covers the assessment of wider range of basic motor abilities and if it were to be reduced to only one dimension, that dimension would be interpreted as the integral system of dominant basic-motor abilities for the efficient performance of specific motor tasks in football. This dimension contains aerobic endurance, explosive strength, repetitive strength, agility, speed and speed endurance. Therefore, these basic motor abilities are dominant in football and particular attention should be paid to them during the training process as they have the largest influence on situational motor abilities.

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