RELATIONSHIP BETWEEN THE RESULTS OF SELECTED MOTOR TESTS AND COMPETITIVE SUCCESSFULNESS IN TENNIS FOR DIFFERENT AGE CATEGORIES

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Abstract:

The study examined the relationship between selected motor tests and competitive successfulness in tennis for different age categories. The sample was comprised of 615 tennis players of both genders in the age categories of under-14 and under-18 years. Several motor abilities were investigated: the neuromuscular power of the arms, the elastic power of the legs, the dynamic muscular strength endurance of the trunk, acceleration, agility, hand-eye coordination, dynamic balance and running endurance. Competitive successfulness of players of both genders was defined by the position on the national ranking list and represented a criterion variable. The results of regression analysis showed in all categories a moderate, statistically significant correlation between the system of predictor variables and the criterion variable. A group of eight motor variables described 34% of the criterion variable variance in the category of 12- to 14-year old girls and 54% in the same age category of boys, whereas for the 15- to 18- year-old players the predictor variables described 52% of the criterion variable variance in girls and 34% in boys. The running endurance test in girls and the hand-eye coordination test in boys partially described competitive successfulness in the category of 12- to 14-year-olds. In the category of 15- to 18-year-olds, the criterion variance was partially described by the dynamic muscular strength endurance of the trunk in girls and hand-eye coordination and acceleration in boys. The results of the study underline the importance of several motor abilities for competitive successfulness in particular age categories of young tennis players.

Key words: *tennis, young players, motor abilities, competitive successfulness*

Introduction

Tennis is a polystructural complex sport with more than twenty different types of shots set apart by the type of execution, intensity and tactical goal. The shots are interconnected with specific movements that influence the execution of shots to a great extent. Suitably developed motor abilities and acquired specific motor skills are the foundation for the optimal execution of tennis shots and movements.

Several researchers have examined the significance of motor abilities in describing performance of tennis players. The conclusions of the research studies (Müller, 1989; Bunc, Dlouha, Hohm & Safarik, 1990; Filipčič, 1993, 1996; Unierzyski, 1994; Stare, 2002; Filipčič & Filipčič, 2005b) mostly show that out of a group of various motor tests only the ability of acceleration in up to a 20-metre distance run statistically significantly describes competition successfulness in tennis.

The neuromuscular power of legs, arms and shoulders are the abilities which influence performance of tennis players in a functional as well as a preventive way. This has been confirmed by several studies (Müller, 1989; Unierzyski, 1994; Šerjak, 2002; Filipčič & Filipčič, 2005a) which show a positive and statistically significant correlation between the neuromuscular power and execution of tennis strokes, jumps and quick first steps after a split step.

Tennis is a very dynamic game in which agility plays an important role. It combines the ability of acceleration, the neuromuscular power of the legs and the quality level of movement patterns. Several studies (Unierzyski, 1994; Filipčič, 1996; Šerjak, 2002, Filipčič & Filipčič, 2005a) have so far showed that out of a group of various motor tests only agility tests statistically significantly describe competitive successfulness.

In a few research studies (Filipčič, 1996; Završki, 1997; Stare, 2002; Filipčič & Završki, 2002; Filipčič & Filipčič, 2005b) running endurance (2400-metre run) and aerobic capacity (VO_{2max} measured in laboratory conditions) were also statistically significantly related to competitive successfulness. Only one study (Jedlička, 1998) showed a positive correlation between selected anaerobic variables and performance in tennis.

Psychomotor abilities, such as perception, reaction speed (Müller, 1989) and hand-eye coordination (Šerjak, 2002; Filipčič & Filipčič, 2005a) as well as upper and lower body flexibility (Filipčič, 1996; Šerjak, 2002; Filipčič & Filipčič, 2005a) have also been shown to be related to the criterion variable. In the research of Filipčič and Filipčič (2005a) performance was found to be related to dynamic balance as well.

The purpose of this study has been to establish the relationship between selected motor variables and competitive successfulness in two age categories (12 to 14 and 15 to 18 years of age) of young tennis players of both genders.

Methods

The sample of subjects consisted of male and female tennis players, tested annually within the framework of the Slovenian Tennis Association national team's programme, at the Faculty of Sport, University of Ljubljana.

The sample included 615 subjects: 214 boys, aged 12 to 14 years (age: 13.3±1.1, height: 161.7±11.3 cm, weight 49.9±11.1 kg); 159 boys aged 15 to 18 years (age: 17.5±2.2, height: 179.7±6.0 cm, weight: 69.74±6.9 kg); 160 girls aged 12 to 14 years (age: 13.0±1.2, height: 161.6±7.7 cm, weight: 49.6±8.2 kg); and 69 girls aged 15 to 18 years (age: 16.9±1.7, height: 168.9±4.3 cm), weight: 60.5±5.0 kg).

In designing the schedule and data collection the respective prescriptions of the Helsinki Declaration (WMA, 1996) for non-invasive studies were followed. The independent variables were collected from 8 tests of motor abilities (Table 1), selected on the basis of previous research studies (Filipčič, 1993; Filipčič, 1996; Filipčič & Završki, 2002; Filipčič & Filipčič, 2005a 2005b).

Competitive successfulness represented the dependent variable, defined by the sum of points at the maximum of six best tournaments over a 12-month period.

SPSS for Windows was used for the statistical analysis of the collected data. Firstly, the parameters of descriptive statistics were calculated. Secondly, the Kolmogorov-Smirnov test was carried out, showing that all the variables were normally distributed. Finally, the linear regression analysis was carried out for every age category and gender.

Results

12- to 14-year-old girls

The results of the motor ability tests and the regression analysis for 12- to 14-year-old girls are presented in Tables 2 and 3.

The group of selected motor tests (Table 3) explained 34% of the variance ($p<.00$) in competitive successfulness of 12 to 14-year-old girls. In this group of subjects *2,400-metre run* was the only variable significantly correlated to the criterion variable.

12- to 14-year-old boys

The results of the motor ability tests and the regression analysis for 12- to 14-year-old boys are presented in Tables 4 and 5.

The group of selected motor tests (Table 5) explained 54% of the variance ($p<.00$) in competitive successfulness of 12 to 14-year-old boys. In this group of subjects the *hand-eye coordination test* (RTBR) was the only variable significantly correlated to the criterion.

15- to 18-year-old girls

The results of the motor ability tests and the regression analysis for 15- to 18-year-old girls are presented in Tables 6 and 7.

Table 1. The selected motor ability tests

CODE	NAME OF THE VARIABLE	DIMENSIONS ASSESSED
MBP	Medicine ball throw – 2 kg (cm)	Neuromuscular power of the arms
QJ	Quarter jump (cm)	Elastic power of the legs
SU60	Sit-ups in 60 s (freq.)	Dynamic muscular strength endurance of the trunk
R20	20-m run (.01 s)	Acceleration
FAN	Fandrill (.1 s)	Agility
RTBR	Rebounding tennis ball with the racket (freq.)	Hand-eye coordination
TLB	Turns on low beam (freq.)	Dynamic balance
R2400	2,400-m run (s)	Running endurance
CS	Criterion variable	Competitive successfulness

Table 2. Results of the motor ability tests for 12- to 14-year-old girls

Variables	Min.	Max.	Mean	SD	K-S Z	P(K-S)
SU60	24	71	48.94	9.04	.88	.42
MBP	350	1190	711.87	161.41	.97	.29
TLB	11	88	29.41	16.96	.73	.58
RTBR	7	81	41.49	11.58	.76	.60
FAN	11.9	20.7	15.71	1.83	.68	.73
QJ	540	925	741.48	73.25	.83	.49
R20	3.27	4.37	3.77	.22	.49	.96
R2400	438	879	676.28	75.98	.63	.81
CS	1	10	4.80	2.31	.83	.28

Legend: SU60 – sit-ups in 60 s; MBP – medicine ball throw; TLB – turns on low beam; RTBR – rebounding tennis ball with the racket; FAN – fandrill; QJ – quarter jump; R20 – 20-m run; R2400 – 2,400-m run; CS – criterion variable

Table 3. Results of regression analysis for motor ability tests predicting competitive successfulness in 12- to 14-year-old girls

Variables	R	R^2	F	Sig. F
	.58	.34	5.84	.00
	Correl	**Beta**	**T**	**p(T)**
SU60	.23	-.12	-1.10	.27
MBP	.33	.04	.44	.65
TLB	.15	.03	.33	.74
RTBR	.43	.18	1.55	.12
FAN	-.20	-.03	-.25	.79
QJ	.33	.15	1.03	.30
R20	-.35	-.09	-.70	.48
R2400	-.45	-.38	-3.66	.00

Legend: SU60 – sit-ups in 60 s; MBP – medicine ball throw; TLB – turns on low beam; RTBR – rebounding tennis ball with the racket; FAN – fandrill; QJ – quarter jump; R20 – 20-m run; R2400 – 2,400-m run

Table 4. Results of the motor ability tests for 12- to 14-year-old boys

Variables	Min.	Max.	Mean	SD	K-S Z	P(K-S)
SU60	26	74	53.77	9.09	1.09	.18
MBP	460	1950	834.96	235.49	.15	.48
TLB	8	95	26.86	14.68	.26	.77
RTBR	24	74	46.87	11.34	.74	.64
FAN	10.9	20.4	14.65	1.67	.74	.74
QJ	620	1040	805.30	84.42	.69	.58
R20	3.07	4.46	3.76	.27	.74	.63
R2400	512	868	637.56	61.12	.99	.27
CS	1	9.5	4.17	2.46	.22	.49

Legend: SU60 – sit-ups in 60 s; MBP – medicine ball throw; TLB – turns on low beam; RTBR – rebounding tennis ball with the racket; FAN – fandrill; QJ – quarter jump; R20 – 20-m run; R2400 – 2,400-m run; CS – criterion variable

The group of selected motor tests (Table 7) explained 53% of the variance (p=.01) in competitive successfulness of 15 to 18-year-old boys. In this group of subjects the test of *dynamic muscular strength endurance* of the trunk (SU60) was the only variable that significantly correlated to the criterion.

Table 5. Results of regression analysis for motor ability tests predicting competitive successfulness in 12- to 14-year-old-boys

Variables	R	R^2	F	Sig. F
	.73	.54	5.59	.00
	Corr	Beta	T	p(T)
SU60	.24	.00	.01	.98
MBP	.17	.03	.23	.81
TLB	.14	.07	.45	.65
RTBR	.38	.35	2.40	.01
FAN	-.20	.04	.23	.81
QJ	.20	-.04	-.26	.79
R20	-.24	.05	.28	.77
R2400	-.26	-.19	-1.48	.14

Legend: SU60 – sit-ups in 60 s; MBP – medicine ball throw; TLB – turns on low beam; RTBR – rebounding tennis ball with the racket; FAN – fandrill; QJ – quarter jump; R20 – 20-m run; R2400 – 2,400-m run

Table 6. Results of the motor ability tests for 15- to 18-year-old girls

Variables	Min.	Max.	Mean	SD	K-S Z	P(K-S)
SU60	34	73	55.40	7.61	.62	.83
MBP	620	1210	891.2	142.33	.79	.56
TLB	12	89	29.52	16.22	.62	.10
RTBR	27	70	51.16	11.02	.85	.46
FAN	12	19	15.17	1.49	.47	.97
QJ	500	940	791.70	86.92	.61	.84
R20	3.27	4.40	3.66	.20	1.00	.26
R2400	416	797	642.03	76.05	.76	.59
CS	2	10	6.01	1.61	.97	.29

Legend: SU60 – sit-ups in 60 s; MBP – medicine ball throw; TLB – turns on low beam; RTBR – rebounding tennis ball with the racket; FAN – fandrill; QJ – quarter jump; R20 – 20-m run; R2400 – 2,400-m run; CS – criterion variable

Table 7. Results of regression analysis for motor ability tests predicting competitive successfulness in 15- to 18-year-old girls

Variables	R	R^2	F	Sig. F
	.73	.53	3.27	.01
	Correl	Beta	T	p(T)
SU60	.34	.49	2.45	.02
MBP	.15	.17	1.08	.28
TLB	.10	.16	.72	.47
RTBR	.22	.28	1.62	.11
FAN	-.24	-.40	-1.75	.09
QJ	-.22	-.34	-1.61	.12
R20	-.22	-.29	-1.59	.12
R2400	-.22	-.30	-1.62	.11

Legend: SU60 – sit-ups in 60 s; MBP – medicine ball throw; TLB – turns on low beam; RTBR – rebounding tennis ball with the racket; FAN – fandrill; QJ – quarter jump; R20 – 20-m run; R2400 – 2,400-m run

15- to 18-year-old boys

The results of the motor ability tests and the regression analysis for 15- to 18-year-old boys are presented in Tables 8 and 9.

The group of selected motor tests (Table 9) explained 34% of the variance (p=.01) in competitive successfulness in 15 to 18-year-old boys. In this

Table 8. Results of the motor ability tests for 15- to 18-year-old boys

Variables	Min.	Max.	Mean	SD	K-S Z	P(K-S)
SU60	29	82	60.78	8.68	1.05	.22
MBP	640	2270	1386.57	294.44	.55	.91
TLB	11	80	32.41	17.07	.54	.65
RTBR	34	97	61.29	10.40	.66	.77
FAN	10.2	17.2	13.17	1.23	.67	.74
QJ	716	1180	975.06	89.31	1.11	.16
R20	2.85	3.84	3.30	.16	.84	.46
R2400	503	709	571.36	48.05	1.06	.21
CS	1	10	5.95	2.37	0.73	.69

Legend: SU60 – sit-ups in 60 s; MBP – medicine ball throw; TLB – turns on low beam; RTBR – rebounding tennis ball with the racket; FAN – fandrill; QJ – quarter jump; R20 – 20-m run; R2400 – 2,400-m run; CS – criterion variable

Table 9. Results of regression analysis for motor ability tests predicting competitive successfulness in 15- to 18-year-old boys

Variables	R	R^2	F	Sig. F
	.58	.34	2.81	.01
	Correl	**Beta**	**T**	**p(T)**
SU60	-.11	-.09	-.70	.48
MBP	-.00	-.19	-1.22	.22
TLB	-.04	-.20	-1.01	.31
RTBR	.39	.34	2.54	.01
FAN	-.06	-.15	-.77	.44
QJ	.09	-.11	-.68	.50
R20	-.42	-.43	-2.81	.00
R2400	-.15	-.01	-.09	.92

Legend: SU60 – sit-ups in 60 s; MBP – medicine ball throw; TLB – turns on low beam; RTBR – rebounding tennis ball with the racket; FAN – fandrill; QJ – quarter jump; R20 – 20-m run; R2400 – 2,400-m run

group of subjects the *hand-eye coordination test* (RTBR) and *acceleration test* (R20) were the only variables significantly correlated to the criterion.

Discussion and conclusions

A comparison of the determination coefficient (Table 3) in the group of 12- to 14-year-old girls (R^2=.34) revealed a lower value in comparison to those in the studies of Unierzyski (1994) (R^2=.65), Šerjak (2000) (R^2=.52), Filipčič and Filipčič (2005a) (R^2=.69) as well as of Filipčič and Filipčič (2005b) (R^2=.41). Higher explanatory power in other studies presumably resulted from the higher number of variables included in the studies, since only one test for a single motor ability was included in this study. In Šerjak's 2000 study the author used 13 motor tests. Filipčič and Filipčič (2005a) used 13 motor tests in their study and in another study (2005b) they used 9 motor and 2 anthropometric tests.

The highest and the only significant correlation to competitive successfulness was established for the variable the *2,400-metre run* (R2400), measuring running endurance. This ability has a considerable and direct significance in younger categories and is mostly expressed in matches of a longer duration and with longer rallies. From the training process' perspective it means the ability to sustain more extensive exercising, the ability to regenerate faster and the general feeling of well-being (Reid, Quinn, & Crespo, 2003).

Highly developed running endurance enables female tennis players to maintain a high game tempo throughout the entire match. The intensity of the game at this age is of a considerably lower level, therefore the aerobic processes and the ability are much more decisive. The analysis of young Slovenian female tennis players' matches (aged 14 or under) showed that in a single match they covered on average 945 - 950 metres by running. The matches lasted 65.4 minutes on average; an active phase lasted 6.2 seconds on average; 56.7% of points play was shorter than 5 seconds; 23.6% of points play lasted between 5 and 10 seconds; 14.8% of points play lasted between 10 and 20 seconds

and the rest of the points play lasted longer than 20 seconds (Filipčič, Perš, & Klevišar, 2006).

Running endurance also had an important effect on other motor abilities and was related to some personality traits (self-confidence, concentration, behaviour control, etc.) which play an important role in tennis. Achieving or maintaining a good level of basic endurance of players contributes to the improvement of their general well-being. Also, a more effective balance of the daily physical and mental loads is achieved in this way. From a neuromuscular perspective, a particularly high fatigue resistance of specific muscles is essential for a successful tennis performance, especially during prolonged matches. From the psychological standpoint, many coaches will also emphasize the importance of physical stress and willpower (Reid, Quinn, & Crespo, 2003).

The importance of running endurance is also shown when longer rallies are played, which is more characteristic for women's tennis. O'Donoghue and Liddle (1998a, 1998b) examined tennis games' time characteristics at two Grand Slam tournaments in 1996 (French Open and Wimbledon). They found out that on both surfaces (clay and grass) the exchanges were played longer by the female than by the male players. The analysis of 34 matches showed that on clay surface points play lasted 6.14 seconds on average in female players and 4.69 in male ones. On grass, the average values were also higher in female players (4.33 vs 2.54 seconds).

Završki (1997) found that the results of a running endurance test (*2,400-metre run*) and VO_{2max} significantly explained competitive successfulness among young tennis players. Stare (2002) came to the same conclusion stating that the starting speed (*5-metre run test*) also significantly contributed to competitive successfulness. Filipčič and Filipčič (2005) established on a sample of 13-year-old female tennis players that, in addition to running endurance, the tests of elastic power of the legs and dynamic balance also significantly contributed to competitive successfulness.

The determination coefficient in the group of 12 to 14-year-old boys (Table 5) in the present research (R^2=.54) was similar to the one obtained in the study of Šerjak (2000) (R^2=.52) and was higher than those in the studies of Filipčič (1993) (R^2=.40) and Unierzyeski (1994) (.36).

The RTBR test (*rebounding the tennis ball with a racket within a 60-second period*) is a specific hand-eye coordination test and is the only one significantly correlated to the criterion. Precision, perception and evaluation of the ball trajectory are important factors for this test. Undoubtedly this ability is of high importance in tennis. The level of the hand-eye coordination ability is expressed in the optimal hitting point for each shot in the game. The ball hitting precision influences further the precision of hitting various parts of the court. The sense of good timing also has to be emphasized, as it allows a player to execute a movement or some of its parts in an exact moment. This way, the tennis player can control the direction, speed, spin, height and length of the ball trajectory. In the test used, as well as in tennis game, a time limit is represented by the oncoming ball trajectory, to which the player adjusts his/her shot. The impact point is precisely defined. Any deviation from this point usually results in an error or loss of the point (Filipčič & Završki, 2002). Players with well-developed coordination ability, who are able to execute quickly complex motor tasks with a racket and a ball, are more successful.

A moderate, but statistically significant correlation (R=.50, sig. T=.01) between the test of *rebounding the tennis ball with a racket* and the criterion variable was also found in the study of Kondrič and Filipčič (2009). It confirms the importance of coordination in young tennis players. The determination coefficient (Table 7) in the group of 15 to 18-year-old girls (R^2=.53) was similar to the one found by Šerjak (R^2=.52)

The *sit-up test*, measuring dynamic muscular strength endurance of the trunk, was the only one significantly correlated to the criterion variable. The well developed trunk muscular groups decisively influence the core and trunk stability. The appropriate upper body stability plays an important role in forehand, backhand, serve and overhead smash shots (i.e. in all the shots where speed of muscle contractions is important); as the abdominal muscles represent an important part of the kinetic muscle chain involved in the execution of the shots. Appropriately developed abdominal muscles and consequently suitable upper body stability allow control and precision in shot execution, as movements of individual body segments contribute to the final velocity of the racket. Proper abdominal musculature is even more significant for the execution of shots with particularly emphasized rotation of the body and shots played off balance, such as base-line shots, volleys, passings and smashes. Core stability also contributes to a better protection against injuries.

The determination coefficient (Table 9) in the group of 15- to 18-year-old boys (R^2=.34) was lower than compared to the studies of Stare (2002) (.41) and Šerjak (2000) (.52). As previously argued, lower coefficient values could be described by a smaller number of variables included in our study with only one test per motor ability included.

The *20-metre run test*, measuring acceleration, had the highest and significant correlation with the criterion variable. As this particular test starts from the basic player's position and continues with an accelerated movement over a short distance, it simulates the quick movements of a tennis player on the court. Successfulness in tennis depends on the

ability to accelerate over short distances, as well as on a high starting velocity, the speed of reaction and the speed of repeated movements. All those types of velocity occur in a tennis game in the execution of gross movement from a basic position via split step, utilization of the ground reaction force and a quick execution of a first few steps. Boys of this age play tennis already on a high level; velocity of the ball is high, requiring players to generate high starting velocity and quick continuation of the movement. Velocity of movement and acceleration enables players to arrive at the ball in time and execute a large number of shots from a balanced position; players can reach and play balls further away. Similarly, Müller (1989) and Bunc and others (1990) reported the importance of speed for competitive successfulness in tennis.

As in the category of 12 to 14-year-old-boys, the *hand-eye coordination test* significantly contributed to the description of the criterion variable variance in this age group as well. As previously stated, the test requires precision, good perception and evaluation of the ball trajectory. Again it can be concluded that precise hitting of the ball in all the shots also in this age category influences the competitive successfulness of a player. One of the related reasons is also the large number of shots played in each match. Most of the shots are played under a certain time pressure. A quick and optimal perception of the opponent's decision, as well as evaluation of the ball trajectory, enables precise hitting of the ball (within/close to the sweet spot of the racket).

Several conclusions can be drawn from the findings of this study.

Firstly, due to the relation between the predictors and the criterion variable it can be concluded that demands in the game of tennis (within the age groups studied) differ with age and gender.

Secondly, the results of each male and female tennis players' age group confirm previous studies. Namely, in 12- to 14-year-old girls the most important ability is running endurance, as the game is slower and includes longer rallies. In the category of 15- to 18-year-old girls the most important ability is upper-body dynamic muscular strength endurance, related to the ability to execute faster shots. In the category of 12- to 14-year-old boys hand-eye coordination is important, as the game in this age category is related to precise execution of shots. In the category of 15- to 18-year-old boys the frequency and speed of shots are higher which demands higher acceleration and velocity of gross movement over short distances. This allows the players to position themselves properly to the oncoming ball and cover the court more efficiently.

Finally, these findings can be used to adjust specific tennis and fitness training programmes to different age categories. We presume it may impart a more effective, goal-oriented training process with an individual approach to each tennis player.

Furthermore, the study elaborates only the area of players' psycho-motor abilities. They are important for assessing players' performance and competitive successfulness, but they are not the only ones assessed. So it would be necessary in the following studies to use an even more complex approach and to include also morphological characteristics, tactical and technical competences, a player's cognitive abilities and personality traits.

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POVEZANOST REZULTATA ODABRANIH TESTOVA MOTORIČKIH SPOSOBNOSTI I NATJECATELJSKE USPJEŠNOSTI MLADIH TENISAČICA I TENISAČA RAZLIČITIH DOBNIH KATEGORIJA

Cilj ovog istraživanja bio je utvrditi povezanost izabranih testova za procjenu motoričkih sposobnosti i natjecateljske uspješnosti u tenisu za različite dobne kategorije. Uzorak ispitanika uključivao je 615 tenisača i tenisačica u kategorijama od U14 do U18. Testirano je nekoliko motoričkih sposobnosti: eksplozivna snaga ruku i ramenog pojasa, elastična snaga nogu, repetitivna snaga trupa, eksplozivna snaga tipa sprinta, agilnost, koordinacija ruka-oko, dinamična ravnoteža te izdržljivost. Natjecateljska uspješnost igrača i igračica iz uzorka bila je definirana pozicijom na nacionalnoj rang listi te je predstavljala kriterijsku varijablu u ovom istraživanju. Skup od osam varijabla pomoću kojih su procijenjene motoričke sposobnosti ispitanika objasnio je 34% varijance kriterijske varijable u kategoriji djevojčica u dobi od 12 do 14 godina te 54% varijance u istoj dobnoj kategoriji muških ispitanika. Za kategoriju djevojčica od 15 do 18 godina prediktorski je skup varijabla objasnio ukupno 52% kriterijske varijable, dok je za istu dobnu kategoriju muških ispitanika prediktorski skup varijabla objasnio 34% kriterijske varijable. Natjecateljsku uspješnost tenisačica u dobi od 12 do 14 godina djelomično je objasnila varijabla *izdržljivosti* dok je natjecateljska uspješnost u dječaka od 12 do 14 godine djelomično objašnjena sposobnošću *koordinacija ruka-oko*. U dobnoj kategoriji od 15 do 18 godina, kriterijska je varijanca bila djelomično objašnjena *repetitivnom snagom trupa* u djevojčica te *koordinacijom ruka--oko* i *eksplozivnom snagom tipa sprinta* u dječaka. Rezultati ovog istraživanja naglašavaju važnost testiranih motoričkih sposobnosti za natjecateljsku uspješnost mladih tenisača i tenisačica u određenoj dobi.

Ključne riječi: *tenis, mladi igrači, motoričke sposobnosti, natjecateljska uspješnost*