ASSESSMENT OF TRAINING'S INFLUENCE ON LEVEL OF TENNIS PLAYERS' TECHNIQUE AT THEIR SCHOOL AGE DURING TRAINING CAMP WITH THE USE OF ITN TEST

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- tennis,
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Abstract:
Aims: The main assumption of the research was a positive influence of tennis training on improving technical skills of the respondents.
Material and methods: The research were conducted among 35 tennis players at the tender age of 12 and 17. ITN tests were conducted during 12-days tennis camp, the first test was made in the second day, whereas the second test took place the day before last day of the camp.
Results: It's been noticed an increase of technical skills' level among respondents as follows: length of hits from the deep of tennis court with taking aspect of strength into account – it increased about average 4,8 points in comparison to the first test; length test results of volley were higher 8,5 points on average; accuracy of hits from the deep of the tennis court with taking strength of hits into account increased about 8,1 points on average; a level of service increased about 13 points, and a level of tennis players' agility increased about 7,0 points.
Conclusions: vast majority improved results in the conducted tests and one should claim, that service is a kind of hit, in which there are the biggest reserves and that has the biggest influence on player's own trainings.

INTRODUCTION

Contemporary tennis entails wholesale competition, and the score depends on many different factors. These are the factors that influence player during his/her training and sport rivalry. Start in the competitions is treated as the end of long preparations. Typical relation coach-competitor is not popular anymore. Nowadays, the whole team works on success of one person. Great number of factors influencing results and success cannot be submitted for selective, subjective and individual assessment and analysis [Ryguła, 2002].

Inseparable elements of assessment and analysis of training effects are various tests, playing three main functions [Królak, 1997]:

1. Cognitive and informative function and verifying of factors' level or the complex assessment and first of all, dynamics of progress of each player as information about skills' level and body reaction for the chosen program of trainings.
2. Incentive function to systematic and more and more difficult trainings for players.
3. Social function in the area of creation of fair play attitude as well as fellowship in the group.

Appropriate selection of tests and the use of them by coach can crucially influence effectiveness of trainings with an appropriate level of internal motivation of competitors thanks to attractive forms of trainings. Existing possibility of objective trainings' effects in the plan of tennis players' trainings is commonly used, because it provides lots of useful information for the coach.

Scientific research prove that tennis training at high level of effectiveness as well as results' analysis with a full feedback about realized aims, improves efficiency and speed of competitor's progress [Kraemer, 2000; Kovacs, 2011].

Tennis tests play a specific role for the sake of two elementary things. Firstly, the tests correspond with the specificity of tennis training process aiming at natural needs of rivalry, not in a game for points but the chosen technical and tactic as well as fitness tests. Secondly, the tests definitely better direct motivation of young people to improve their physical skills and new abilities than competition. The coach determines the attitudes, emphasizing a dynamics of progress, which means a difference between two results gained by the same competitor at the same test lead within some period of time [Królak, 1997].

The fundamental information for the coach during tests is increase of result in a function of time by each of competitors, whereas variability of training makes it necessary to have lead a many-sided control concerning all the periods of time during the whole process of training. Tests for tennis players respond to periodic kind of work effects' control by testing changes that occur in the area of chosen directed, special and technical and tactic condition factors, in isolate conditions. Summing up, one should underline, that all the tests drive at training effects' control, and the aim is to get information enabling management of training process for its optimization [Sozański, 1999].

Assessment of each test results is always double-track. On the one hand, it determines a place of player in training team; on the other hand, it indicates that there are scoring differences gained by player in comparison to the results from previous tests. The second assessment is more important for the coach because it gives comprehensive and more précised player's level. Additionally, it provides information about pace of changes, especially if tests are made systematically and there are identical conditions of procedures. The tests serve assessment of permanent state and are realized at all levels of sport advancement. Therefore, a very crucial issue is a choice of appropriate tests, enabling accurate assessment of changes' dynamics in the area of technique of hits in training conditions. Their choice should take level of technical advancement on board, corresponding with test improving hit or set of hits. The tests should be introduced at the beginning and in the end of each phase of technical and tactic training as well as in the end of camps devoted to techniques' improving [Królak, 1997].

In the conducted research one put emphasis on definition of impact of many-sided training during training camp on level of technical test's results among young tennis players. Additional research problem was an analysis of differences' salience between the initial test conducted at the very beginning of the camp and the final test that took place at the end of the 12-days training camp as well as distinction of technical skill that was improved among respondents.

MATERIAL AND METHODS

35 tennis players at the tender age of 12 and 17 were comprised research. The tests took place during 12-days training tennis camp, the first test took place the second day of the camp, whereas the second test took place next-to-last day of the camp. All the needed procedures were preserved, the tests were preceded 15-minutes warm up for each player.

The authors of the paper used International Tennis Number (ITN), that was developed by experts' commission – ITF representatives – as well as national representatives of tennis unions to assess individual technical skills of the respondents [ITN, On Court Assessment Guide, 2017]. The set of tests consists the following tasks:

1. Test of length of hits from the deep of the court with taking strength aspect into account (10 forehands and backhands made in turns from the deep of the court).
2. Test of length of service by volley with taking strength aspect into account (8 volleys made in turns in forehand and backhand).

3. Test of accuracy of service from the deep of the court with taking strength aspect into account (6 forehands and backhands made from the deep of the court along line and 6 forehands and backhands made in turns from the deep of the court catty-cornered).
4. Test of service with taking strength aspect into account (12 services totally, 3 services in each control field).
5. Test of agility (test of collecting balls – measurement of time that was needed to collect 5 tennis balls and put them in a given place).

The test took place at the beginning and in the end of the tennis camp. Meaningfulness of training's effects was measured with the use of Wilcoxon's statistical test that is non-parametric test comparing changes in a level of some parameter in two periods of time – for example condition of patients before and after rehabilitation process. The test is used with features that are measured at ordinal scale at least. These tests are non-parametric alternative to t-test of dependent variables. In Wilcoxon's test, direction of changes of the chosen parameter is counted (its increase or decrease) as well as a scale of the change. Low values of p-test probability make it possible to negative zero hypothesis which says that values layout of the analyzed feature is identical in both of tests as well as conclusions concerning statistically significant changes in two tests. Direction of those changes (if values of the given feature presented increasing or decreasing tendency) can be analyzed on the base of average values' comparison in the first and second test [Stanisz, 2001].

RESEARCH RESULTS

Anthropometric data of the respondents are shown in table 1. The mean of the age of them was almost 14,5, the youngest was 12 and the oldest - 17; coefficient of variation points at low age differentiation among the respondents. The mean of body weight was 56,19 kg and the mean of height - 1,67 m, whereas the mean of BMI was 20,00 in the group.

Table 1. Statistical characteristics of anthropometric indicators of the respondents

	$\bar{x}$	Me	s	min	max	V
age	14,44	14	1,5	12	17	10,42%
body weight	56,19	57	12,49	30	75	22,22%
height	1,67	1,71	0,13	1,44	1,83	7,59%
BMI	19,81	20,07	2,39	14,27	24,44	12,04%

Results of length of hits from the deep of the court test with taking strength aspect into account increased around 4,8 points, although as the graph presents, some of the players presented decrease of their results in the measurement number 2. In spite of this, one can say about statistically significant effect in the area of length of hits (p-test value $p = 0{,}0249$*).

Table 2. Statistical characteristics of the test of length of hits from the deep of court with taking strength aspect into account

Test 1	N	$\bar{x}$	Me	s	min	max	V
measurement 1	35	23,5	25	10,8	4	42	46,1%
measurement 2	35	28,2	29,5	11,9	10	49	42,2%
trainings effect ($p = 0{,}0249$*)	35	4,8	5,5	9,6	-13	19	×

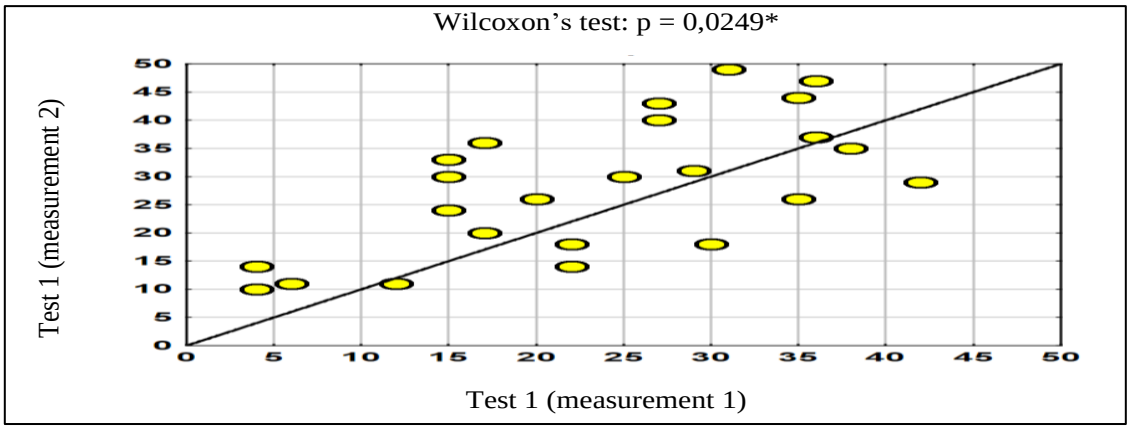


Figure 1. Skills' level layout in 1 and 2 length of hits tests

Graph 1. Comparison of the average in 1 and 2 length of hits tests

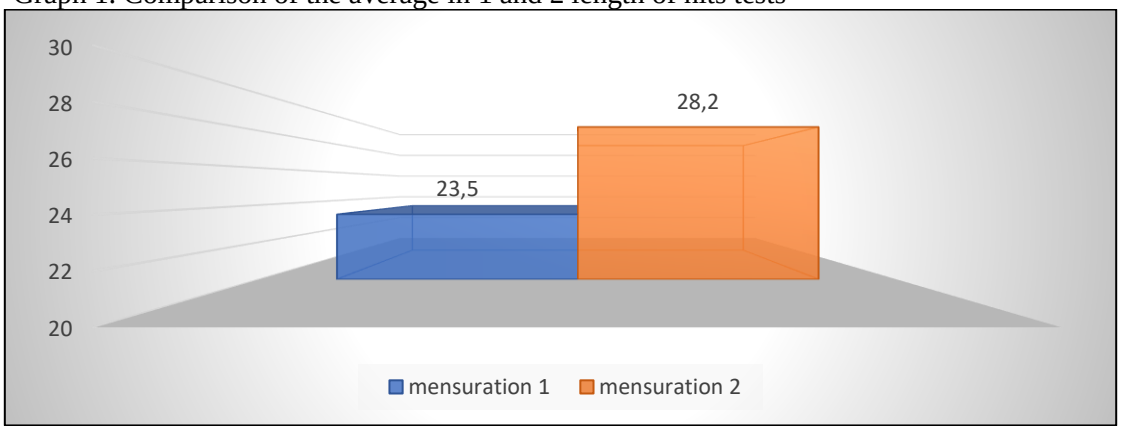


Table 3. Statistical characteristics of the test with volley hits with taking strength aspect into account

Test 2	N	$\bar{x}$	Me	s	min	max	V
measurement 1	35	13,8	11	8,5	0	35	61,5%
measurement 2	35	22,6	22	9,9	6	39	43,7%
trainings effect (p = 0,0001***)	35	8,5	8,5	7,4	-2	20	×

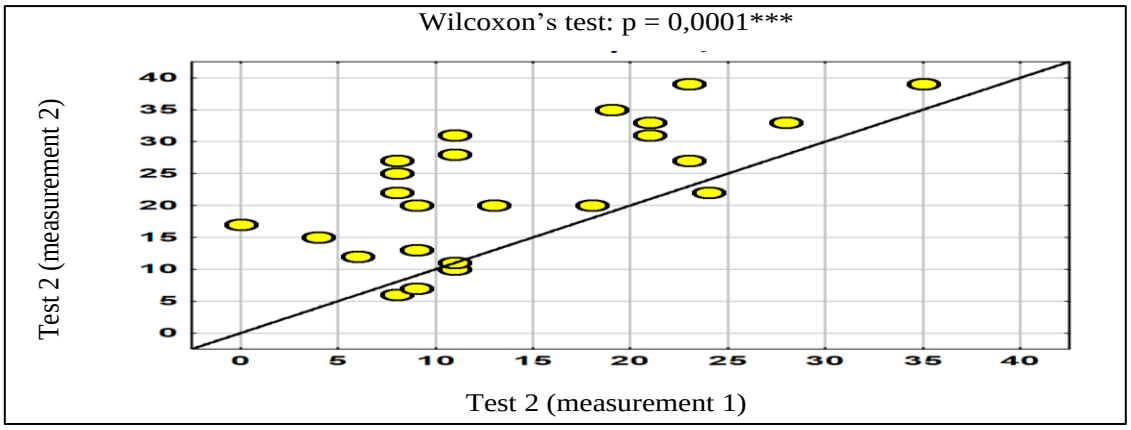
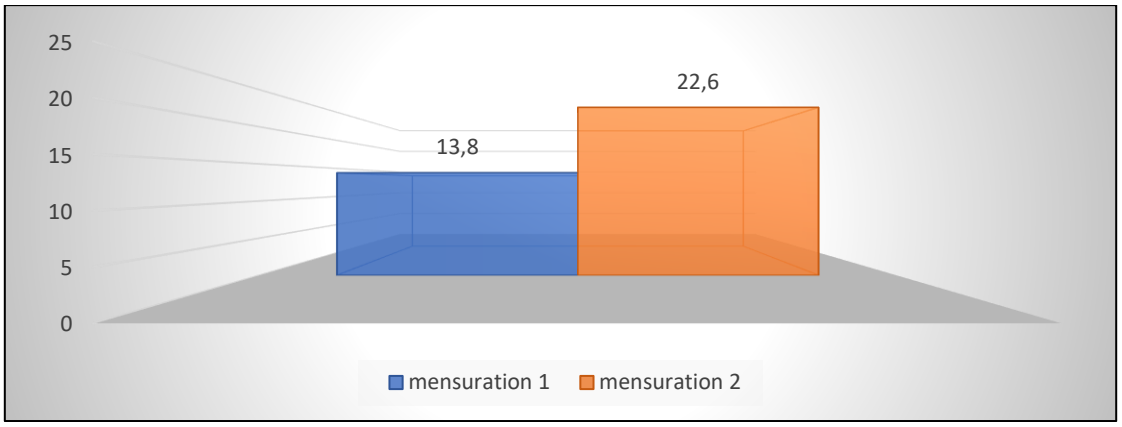


Figure 2. Skills' level layout in 1 and 2 length of tests with volley hits

Graph 2. Comparison of the average in 1 and 2 length of tests with volley hits



As a result of training, effects of hits' accuracy test from the deep of the court with taking strength aspect into account increased 8,1 points on average. As one can see on the graph, some of the players presented marginally worse results in test number 2. Trainings' effect is statistically very significant when talking about hits' accuracy (p-test value p = 0,0006*).

Table 4. Statistical characteristics of hits' accuracy test from the deep of the court with taking strength aspect into account

Test 3	**N**	**$\bar{x}$**	**Me**	**s**	**min**	**max**	**V**
measurement 1	35	22,1	23	11,4	0	46	51,5%
measurement 2	35	30,7	31	12,8	6	55	41,6%
trainings effect (p = 0,0006***)	35	8,1	5	9,7	-6	34	×

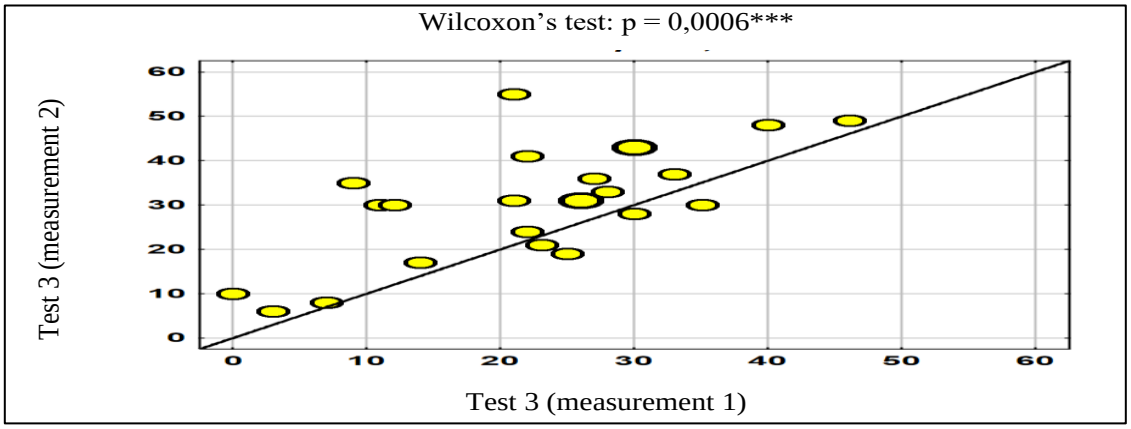
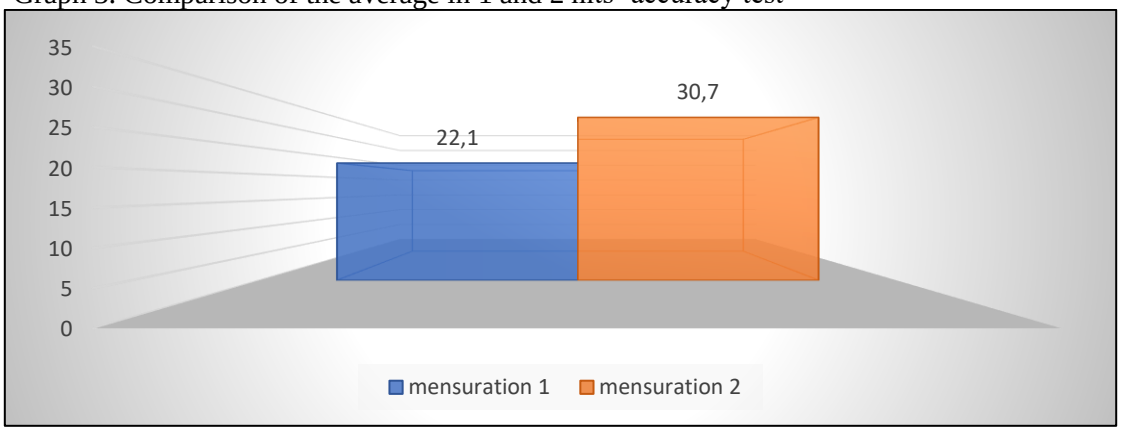


Figure 3. Skills' level layout in 1 and 2 length of hits' accuracy test

Graph 3. Comparison of the average in 1 and 2 hits' accuracy test



Results of service test with taking strength aspect into account increased 13,0 points on average – that is almost twofold increase in comparison to initial average. One can say about very reliable results – training's effect is statistically very significant when talking about skills measured with the use of test number 2 (p-test value p = 0,0003*).

Table 5. Statistical characteristics of service test with taking strength aspect into account

Test 4	**N**	**$\bar{x}$**	**Me**	**s**	**min**	**max**	**V**
measurement 1	35	15,3	15	11,0	0	36	71,9%
measurement 2	35	27,5	25	14,4	5	78	52,3%
trainings effect (p = 0,0003***)	35	13,0	12,5	12,8	-12	42	×

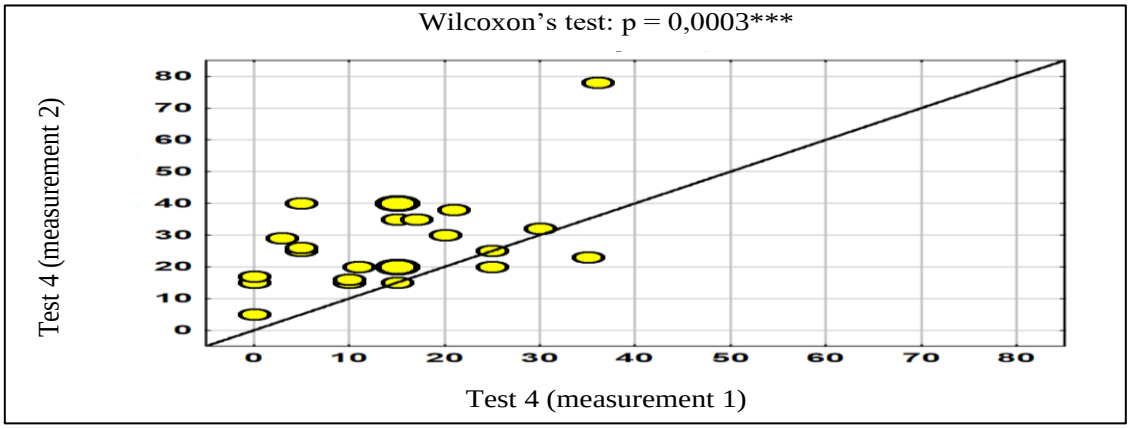
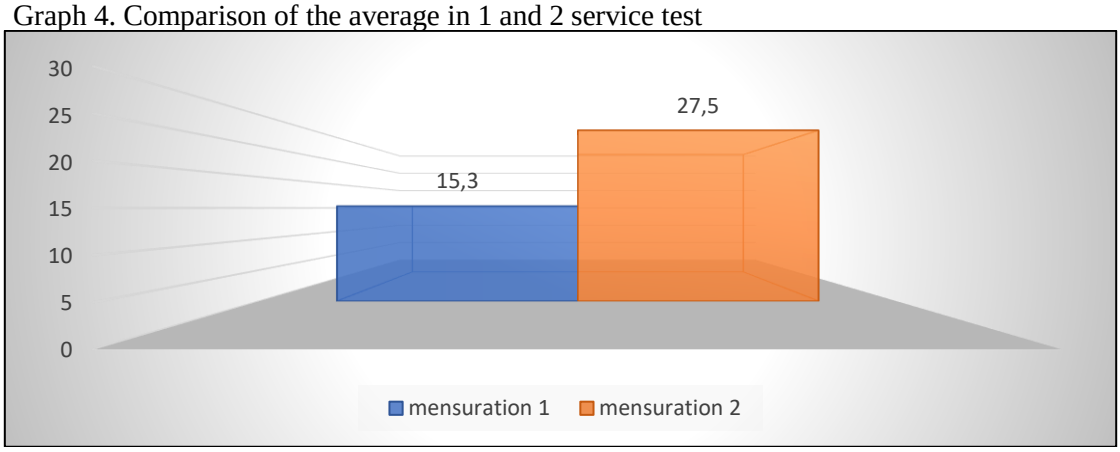


Figure 4. Skills' level layout in 1 and 2 service test

Graph 4. Comparison of the average in 1 and 2 service test



As a result of training, effects of agility test increased 7,0 points on average. The effects are statistically very significant when talking about agility skills (p-test value p = 0,0007*).

Table 6. Statistical characteristics of agility test

Test 5	**N**	**$\bar{x}$**	**Me**	**s**	**min**	**max**	**V**
measurement 1	35	26,1	26	8,3	14	45	31,9%
measurement 2	35	33,4	32	10,2	18	52	30,5%
trainings effect (p = 0,0007***)	35	7,0	6,5	7,6	-5	21	×

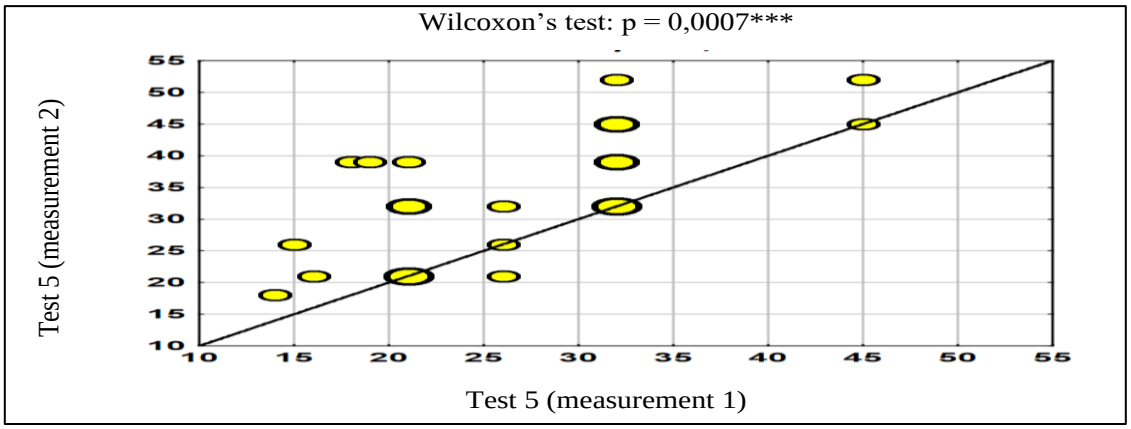
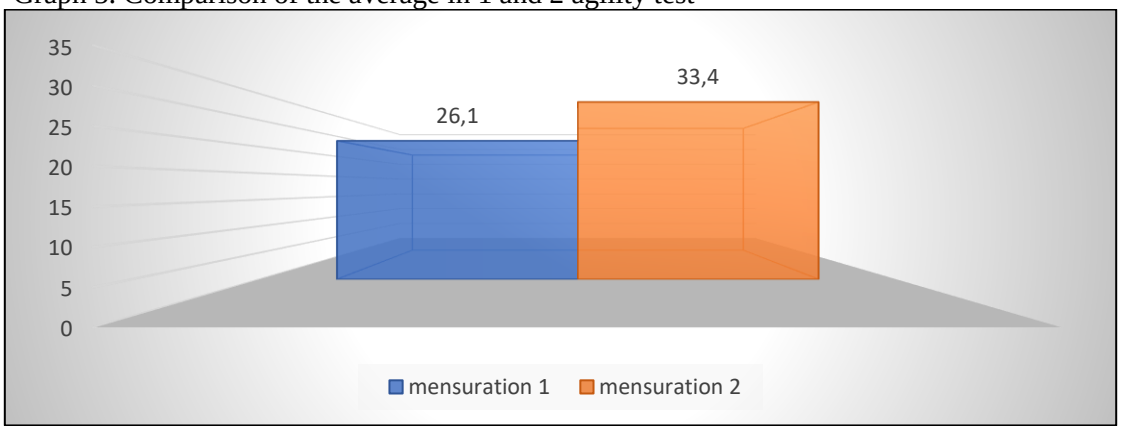


Figure 5. Agility level layout in 1 and 2 test

Graph 5. Comparison of the average in 1 and 2 agility test



Trainings that took place during 12-days camp caused that one can see increase of total result of ITN test at about 15,2 points, although the graph presents, that some of the players present marginally worse results in the second test. One definitely can say, that the result of the second test is very reliable and it has a high statistical significance (p-test value 0,0036**). Notwithstanding, the aggregate effects, in comparison to initial values, are lower than for compositional values. It probably comes from the fact, that some of the tennis players were better in some parts of the tests, but they were worse in other skills.

Table 7. Statistical characteristics of ITN test

Total points of ITN test	**N**	**$\bar{x}$**	**Me**	**s**	**min**	**max**	**V**
measurement 1	35	127,0	128	42,4	41	232	33,4%
measurement 2	35	142,3	149	46,6	50	248	32,7%
trainings effect (p = 0,0036**)	35	15,2	15	23,2	-34	69	×

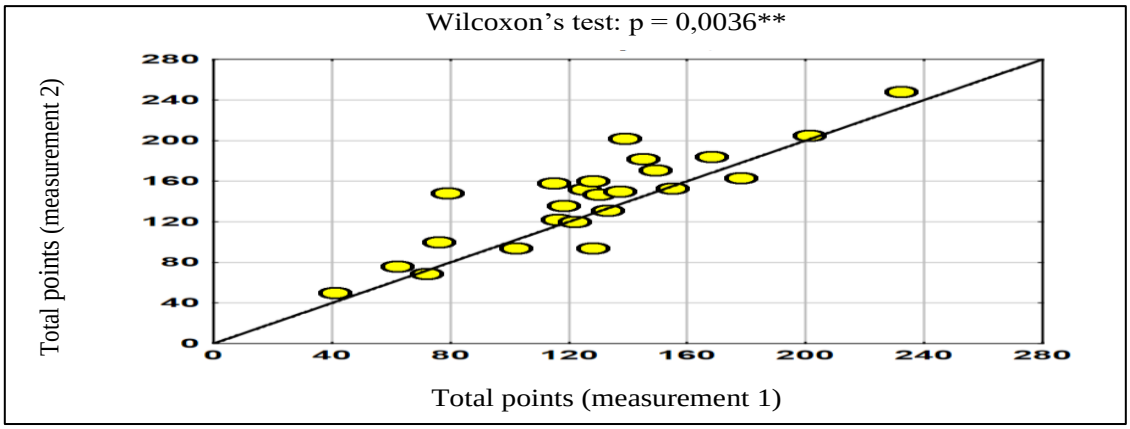
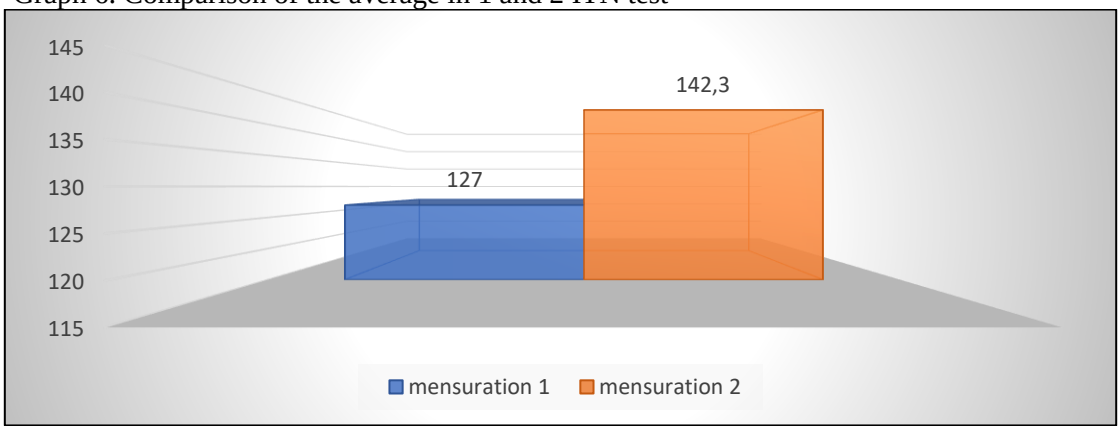


Figure 6. Skills' level layout in 1 and 2 ITN test

Graph 6. Comparison of the average in 1 and 2 ITN test



Tennis training is a systematical process, in which the player learns different techniques and tactics, shapes his/her fitness as well as his/her mentality and gets knowledge about sports activity [Andrzejewski, 2014]. Additionally, research results indicate that a regular tennis training influences human body holistically [Ferrauti, 1997; Malliou, 2008; Oja, 2017; Pluim, 2007].

In the conducted research, the authors made an attempt to define an influence of intensive training during camp on technical test International Tennis Number results' level among young tennis players. Additional research problem was an analysis of differences' significance between initial test at the beginning of the camp and final test in the end of 12-days camp. The research were also to answer the following question: which of the analyzed skills, included in the test, moved forward with points among players.

Tennis camp gives an opportunity to intensify training incentives what can be seen in test' results that show increase of skills – length of hits from the deep of the court with taking strength aspect into account (4,8 points on average) in proportion to the first test, whereas the results of length of volleys with taking strength aspect into account increased 8,5 points on average. Accuracy of hits from the deep of the court with taking strength aspect into account increased 8,1 points on average, and service skills' level with taking strength aspect into account increased 13 points. Agility level of tennis players varied in 7,0 points.

All the differences between results of first and second test are statistically significant, thus result of length of hits from the deep of the court test is statistically variable with test probability p = 0,0249*, result of volley test is also very statistically significant with test probability p = 0,0001*. Results of the second test of tennis ball controlling skills with test probability p = 0,0006* is statistically significant. Service test results are also statistically significant (p = 0,0003*) as well as agility test results with test probability p = 0,0007*.

The highest increase during testing one can observe on example of service where an average level of values increased from 15,3 points to 27,5 points, which means almost twofold increase in proportion to initial average.

CONCLUSIONS

Multiway statistical analysis of the results made it possible to present general conclusions as follows:

- vast majority of the conducted tests triggered motivation among young tennis players focused on improving test results,
- tests can be a form of a good competition,
- test on the court can be a very intensive form of training,
- test can be a big attraction for tennis players as well incentive to more intense work,
- tests should take place at the beginning and in the end of each phase of technical and tactic training as well as in the end of training camp,
- tests' results show, that service is a kind of hit, in which the biggest reserves occur and where own training of the competitor has the best influence.

To sum up, one can underline, that all the tests should focus on control of coach's work effects and the aim is to get information enabling management of training process to improve it. Therefore, a very important thing is to make an accurate choice of appropriate tests enabling accurate assessment in the area of hits' techniques in training conditions.

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