

NATIONAL SPORTS ACADEMY

"VASIL LEVSKI"

Department: "Basketball, Volleyball, Handball"

Boris Mitkov Yankov

**Beach volleyball as a means of increasing physical
performance in students**

ABSTRACT

On a dissertation

for awarding the educational and scientific degree "doctor"

in a professional direction 7.6. Sports

“Sports Science Theory and Methodology”

Supervisor:

Prof. Dimitar Petrov Mihaylov, doctor

Sofia 2023

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Official Reviewers:

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The dissertation contains 208 pages, in which 58 figures, 41 tables, 3 appendices and 9 pages of literature, including 82 titles.

The numbering of the tables and figures in the abstract matches that of the dissertation.

The dissertation work was discussed and allowed to be defended at an extended meeting of the "Basketball, Volleyball, Handball" Department, held on 22.03.2023.

The public defense of the dissertation work for the award of the educational and scientific degree "doctor" will take place on 06/07/2023 in hall... of the National Sports Academy "Vasil Levski", Sofia.

I. INTRODUCTION

Since its creation at the beginning of the last century, beach volleyball has developed, changed and gained enormous popularity all over the world. It goes through various processes of promotion, changing of rules, tactics and technique of the game to reach its current form. For the past 20 years, it has consistently been in the top 10 of the most watched live sports during the Olympic Games.

The differences with classic volleyball are rather more than the similarities. The difference in the playing surface in practice can lead to differences in the technical performance of various performance skills that require push-off from the ground, such as jumping, short sprint and others (Dimitrios G., Balasas, 2018).

A study by G. Giatsis (2003) shows that 60% of beach volleyball plays last between 4 and 7 seconds, and 32% of plays last between 8 and 15 seconds.

Beach volleyball, like indoor volleyball, requires activities of short duration and extremely high power. (Scates A, Linn M, 2003).

The game of beach volleyball is divided into two phases: playing the opponent's opening shot and counter attack. The sequence of actions in beach volleyball is: serve, meet, lift, attack, block and defend (Giatsis and Zahariadis , 2008).

Over the years, the authors Giatsis G, Perez Turpin, Tilp, Wagner H, Müller E have done a number of studies providing information on the biomechanical differences in different movements (bounce, attack) in volleyball and beach volleyball. In addition to the differences in the size and type of the court, the differences in the execution technique for the various elements, the atmospheric conditions (sun, wind, rain) also have a huge influence.

Dimitrios, G. (2018), made a study on the influence of beach volleyball training on the physical conditions of volleyball players. "... beach volleyball training can be a very effective method of improving lower extremity strength." On

the same topic, Balasas, D., also conducted a study, which found an improvement in the physical condition of volleyball players after 12 weeks of training and participation in beach volleyball tournaments. "Improved work economy and VO2max can be significantly effective for athletes to maintain high performance throughout the duration of a volleyball match".

Koch, C., m. Tilp (2009a) examine the differences between men's and women's performance techniques of the various elements. "...the quality levels of techniques in men and women are similar, although they use different techniques in almost all the items examined. Furthermore, some actions may be due to gender differences in anthropometric characteristics or physical condition.'

Overall, based on the better effects of beach volleyball training on lactate responses to intense exercise and that injuries on sand are less than on hard surfaces, it can be concluded that this training method would lead to better performance in volleyball players (Rokhsati, S., 2015).

WORKING HYPOTHESIS OF THE DISSERTATION:

Through purposeful, experimentally proven methods of working with the sport of beach volleyball with students who are not active athletes in the classes of a chosen type of sport, their motor abilities will improve and increase, as well as their physical work capacity.

II. OBJECTIVE, TASKS, ORGANIZATION AND METHODOLOGY OF THE RESEARCH

II.1. Purpose and tasks of the study

The goal of the present study is to determine the degree of influence of the sport of beach volleyball on the physical performance of inactive athlete students.

To realize our goal, we set the following *tasks*:

- To make an informational content analysis of the problem.
- To determine the degree of interest in including beach volleyball as an elective sport among students.
- To establish the level of development and the variability of the specific physical indicators of the studied students.
- To develop and approve in practice a specialized educational and training program aimed at improving the sports-technical and physical preparation of students engaged in beach volleyball.
- To establish the credibility of the results obtained after the implementation of the specialized educational and training program.

The subject of the study is the educational and training work in the sports classes of inactive athlete students.

Object of the study are the physical qualities and functional capabilities of students.

The number of participants in the scientific experiment included 53 students, of which 15 playing beach volleyball, 16 playing basketball and 22 playing football.

The students in the experimental group had played volleyball before at school, but not professionally. The same applies to the participants in the two control groups practicing basketball and football.

II.2. Organization of the study

The conduct of the experiment went through the following stages :

First stage

It includes the time from the month of December 2020 to the month of June 2021. During this period, the following tasks were solved:

- Study of literary information sources on the problem;
- Formulation of the concept, hypothesis, purpose and tasks of the research;
- Development of research methods and methodology;
- Preparation and conducting of a survey in order to establish the attitude of students towards beach volleyball. A total of 102 I and II year students took part in the survey course, of which 35 foreigners and 67 Bulgarians from all major, selected randomly.

Second stage

It includes the time from the month of June 2021 to the month of August 2022.

- Designation of an experimental group of 15 students practicing beach volleyball, a control group of 16 students practicing basketball and a second control group of 22 practicing football;
- Preparation and conduct of preliminary experimental testing of field conditions. The sports-pedagogical tests with the three groups were conducted in exactly the same conditions, on two consecutive Mondays starting at 9:30 a.m. in the sports hall of MU-

Varna. On the first day, the students practicing beach volleyball and basketball were tested, and on the second - those practicing football. The functional tests were carried out on the same days starting at 04:00 p.m. in the Youth Hall of the Palace of Culture and Sports, Varna;

- Development and implementation of an educational and training program for one semester (30 exercises) in beach volleyball. The classes are held twice a week with a duration of 90 minutes. The educational and training program is presented in Appendix No. 3;
- Preparation and conduct of the final experimental testing in field conditions. The sequence, location, time, and manner of testing were identical to those of the pretest;
- Statistical processing of the obtained data and analysis of the test results.

Third stage

From September 2022 to February 2023.

- Preparation and publication of reports on our research problem;
- Formatting and visualization of the dissertation work.
-

II.3. Research methods

Sports and pedagogical testing - indicators and methods

In order to determine the level of some physical indicators of the students participating in the experiment, 15 indicators will be taken divided into 4 groups (Table 1):

- indicators for evaluating the level of speed – 7 indicators (from 1st to 7th);
- Endurance assessment indicators – 3 indicators (9th, 14th and 15th);
- indicators for assessing the level of strength - 2 indicators (8th, 11th);

- flexibility assessment indicators – 2 indicators (12th and 13th).
- Indicators for evaluating the functional state – 2 indicators (14th and 15th).

Table 1 *Indicators studied*

no	Indicators	Measuring units	Accuracy of measurement	Direction of increase
1.	Lateral movement and change of direction test	second	0.01	-
2.	Sprint 30 meters	second	0.01	-
3.	Running with forward/backward change of direction	number	1	+
4.	Running with a change of direction left/right	number	1	+
5.	Special speed	second	0.01	-
6.	Shuttle run 10 meters	second	0.01	-
7.	Lower extremity speed	number	1	+
8.	Standing long jump	centimeters	0.5	+
9.	Wall Squat Test	second	0.01	+
10.	Abdominal presses for 30 seconds	number	1	+
11.	Throwing a ball 3kg from a sitting position	centimeters	0.5	+
12.	Ankle joint flexibility test	centimeters	0.5	+
13.	Shoulder joint flexibility test	centimeters	0.5	+
14.	Harvard Step Test	Beats per minute	1	-
15.	Running anaerobic sprint test 6x35m	second	0.01	-

Mathematical - statistical methods

- *Survey research;*
- *Variational analysis;*
- *Comparative t- criterion of Student*
- *One factor dispersive analysis*

III. RESULTS ANALYSIS

III.1. Analysis of survey results

The present study was carried out with the aim of establishing the attitude of the students of MU-Varna towards beach volleyball.

Regarding the recognizability of beach volleyball among the respondents, only 7% of Bulgarians and 17% of foreigners do not know the game as a type of sport, but rather as a way of having fun on the beach.

When asked if they have ever tried to play beach volleyball with friends, more than 70% of respondents gave a positive answer.



Figure 6

The main reasons that would make students attend beach volleyball classes are meeting new people and being interested in something new. The figure shows that 65% and nearly 62% indicated these two reasons. Almost 50% answered that after the COVID- 19 pandemic, beach volleyball activities will be a good opportunity to lose extra weight.

Nearly 45% of Bulgarians and foreign students would attend beach volleyball classes if possible.

In all indicators, the three groups are presented as highly and relatively homogeneous in both tests.

From the variation analysis, only on the "Wall Squat" test, the three populations are highly heterogeneous in the first testing, and this is preserved in the second testing only for the basketball training group (CG_b). The experimental ($EG_{b.v.}$) and the control group practicing football (CG_f) are presented as homogeneous at the end of the experiment.

III.3. Comparative analysis for the significance of the differences in the values of the indicators from the two tests for all studied students

III.3.1. Significance of the differences in the indicators of students from the sports-pedagogical tests .

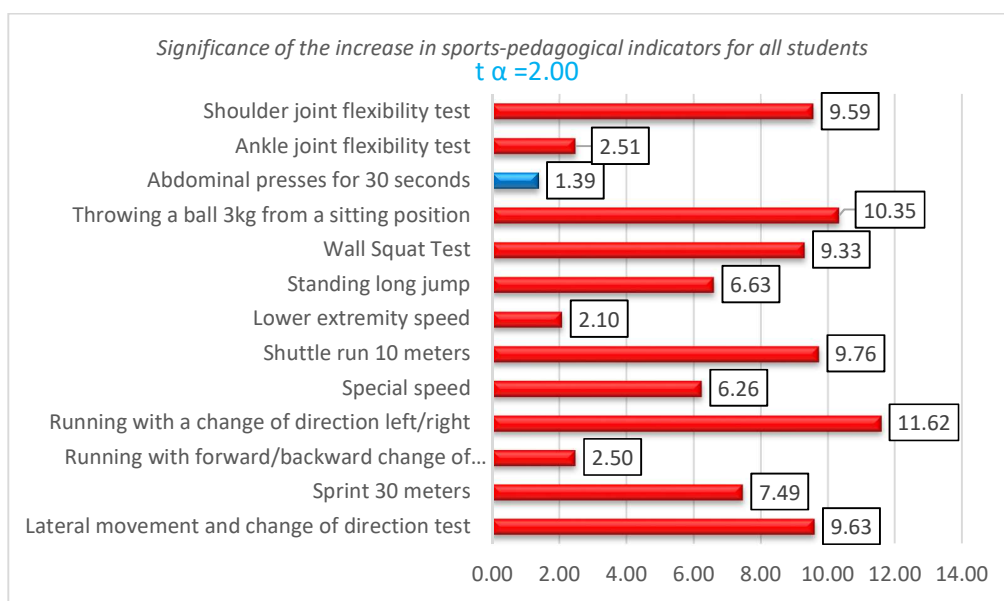


Figure 41

The critical value of *Student's t-criterion for dependent samples* is $t_{0.05;52} = 2.00$. The obtained empirical values are higher and vary from 2.10÷11.62, except for the result for the indicator "*Abdominal presses for 30 seconds*" ($t_{11} = 1.39$) , for which it can be assumed that there are no drastic changes occurred according to the null hypothesis. With a guarantee probability of more than 95%, it is proved that the values for the increment of the results are reliable (Fig. 41). This gives reason to accept the alternative hypothesis, according to which, as a result of training in beach volleyball, basketball and football, students improve their speed of movement, explosive power of the upper and lower limbs, power endurance and flexibility.

The largest percentage increase was seen for the *wall squat* ($d \% = 28.8\%$) or 22.3 seconds better test time.

A similar increase was also observed in "*Ball chair 3 kg*" ($d\% = 17.01\%$), as well as "*shoulder flexibility*" ($d\% = 28.64\%$). With a guaranteed probability $P_{(t)} \geq 95\%$, it can be said that training in general increased the strength endurance of the lower limbs, as well as the explosive power and flexibility of the upper limbs.

In more detailed analyses, we will try to establish in which of the studied groups there are the greatest differences for the indicators.

III.3.2. Significance of differences in student performance from functional tests

The values of *Student's t-test* are in the range of $5.65 \div 10.32$, which is well above the critical $t_{0.05;52} = 2.00$. This allows with a high guarantee probability ($P_{(t)} > 95\%$) to accept the alternative hypothesis that regular training improves the functional state of students (Fig. 42).

In percentage terms ($d\%$), the growth for the indicator "*average power*" is the largest (36.99%). With a guaranteed probability $P_{(t)} > 95\%$, it can be said that at the end of the experiment, students significantly increased their ability to maintain power over time, which is also confirmed by the decrease in the "*fatigue index*" value by 9.25% .

The "condition" score calculated using the "*Harvard Step Test*" ($X_1 = 85.33$ and $X_2 = 91.82$) shows that after the first testing the students' level of performance is "above average" ($X_1 = 80 \div 90$), and after the end of the experiment the level is "excellent" ($X_2 \geq 90$).

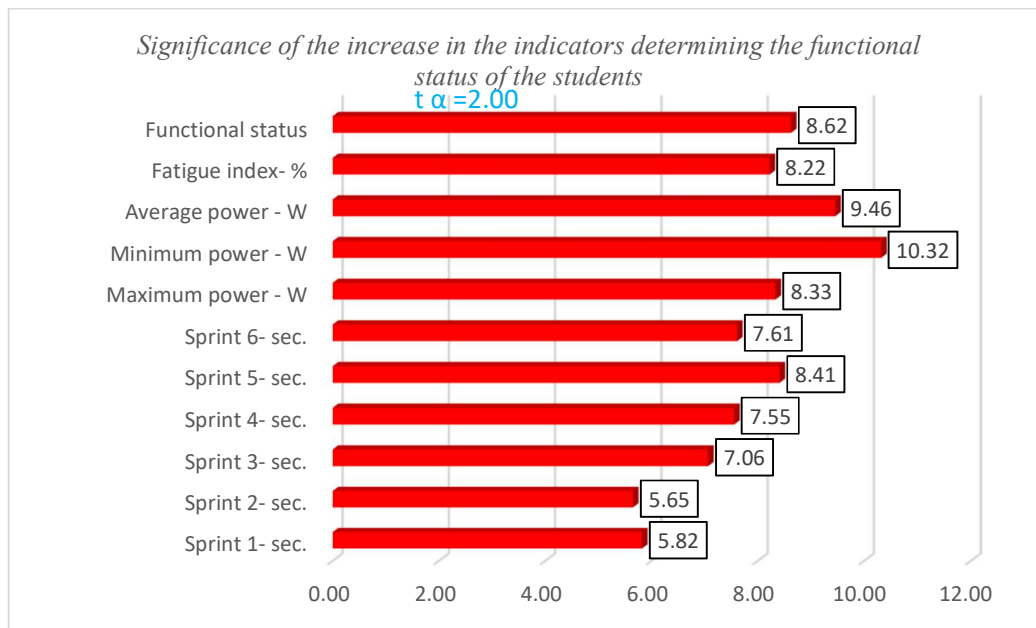


Figure 42

III.4. Comparative analysis for statistical significance of differences and growth of individual groups

Table 25 Significance of Differences "Sprint 30m"

Sprint 30m	EG _{b.v.}	CG _b	CG _f	EG _{b.v. 2}	CG _{b 2}	CG _{f 2}
EG _{b.v.}		X	X	X	X	X
CG _b	X		X			X
CG _f	X	X			X	X
EG _{b.v. 2}	X					X
CG _{b 2}	X		X			X
CG _{f 2}	X	X	X	X	X	

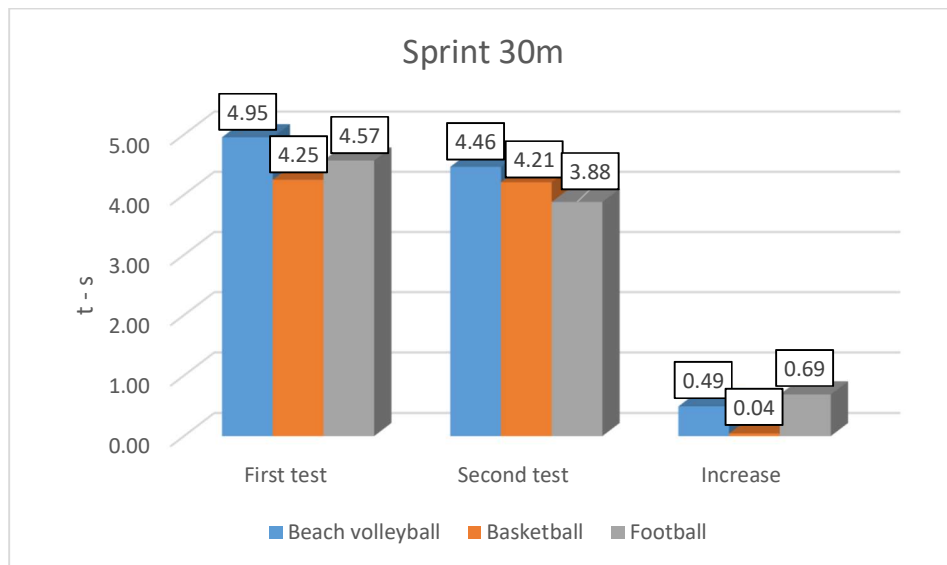


Figure 42

In the *"Sprint 30 m"* indicator of the first testing, CGb achieved the lowest time, which is significantly different from that of KG_f.

The differences in the times of the three studied groups after the first testing were statistically significant.

After the systematic practice of beach volleyball, in addition to significantly improving his result EG_{b.v.} approaches the achievement of CGb, with no significant difference observed between them.

Table 29 Significance of differences *"Shuttle run 10m"*

Shuttle run 10m.	EG _{b.v.}	CG _b	CG _f	EG _{b.v. 2}	CG _{b 2}	CG _{f 2}
EG _{b.v.}			X	X		
CG _b				X		
CG _f	X			X	X	X
EG _{b.v. 2}	X	X	X		X	X
CG _{b 2}			X	X		
CG _{f 2}			X	X		

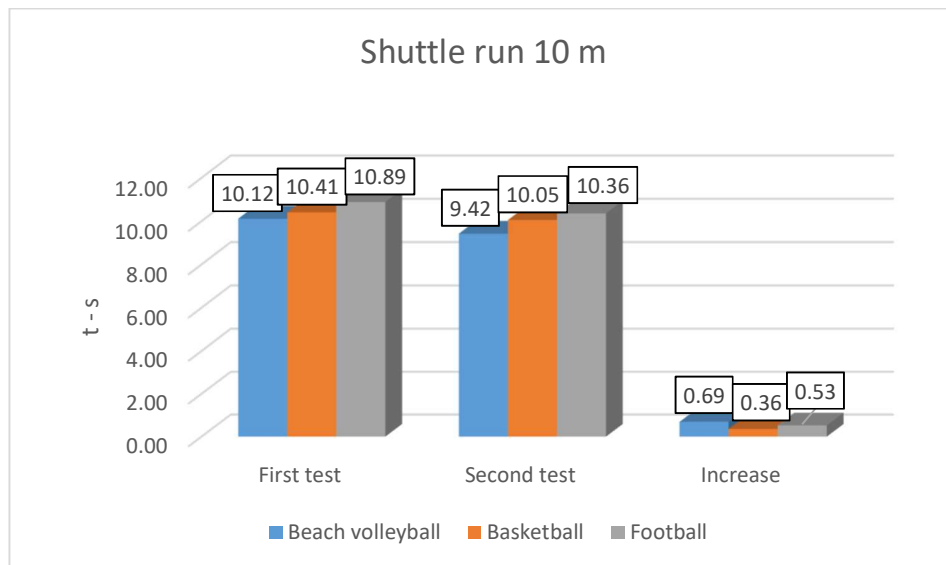


Figure 46

On the first testing $EG_{b.v.}$ have achieved best time (10,12 sec.), as the difference with CG_f is significant (10.89 sec.). The result on CG_b doesn't significantly differ from the one of the other two groups. After the second testing increase is reported at the three groups, as statistically significant are the values on $EG_{b.v.}$ and CG_f . At the end of the experiment $EG_{b.v.}$ is ahead of the other two groups by a significant margin. This is explained by the specific technique of performing this test. At the change of direction, the student picks up a tennis ball from the ground, and at the next one leaves it. Dropping low to the ground is characteristic in beach volleyball, while it is uncharacteristic in basketball and football.

Table 33 Significance of differences "Ball 3 kg from a chair"

Ball 3kg from a chair	EG _{b.v._}	CG _b	CG _f	EG _{b.v. 2}	CG _{b 2}	CG _{f 2}
EG _{b.v._}				x	x	x
CG _b				x	x	x
CG _f				x	x	x
EG _{b.v. 2}	x	x	x			
CG _{b 2}	x	x	x			
CG _{f 2}	x	x	x			

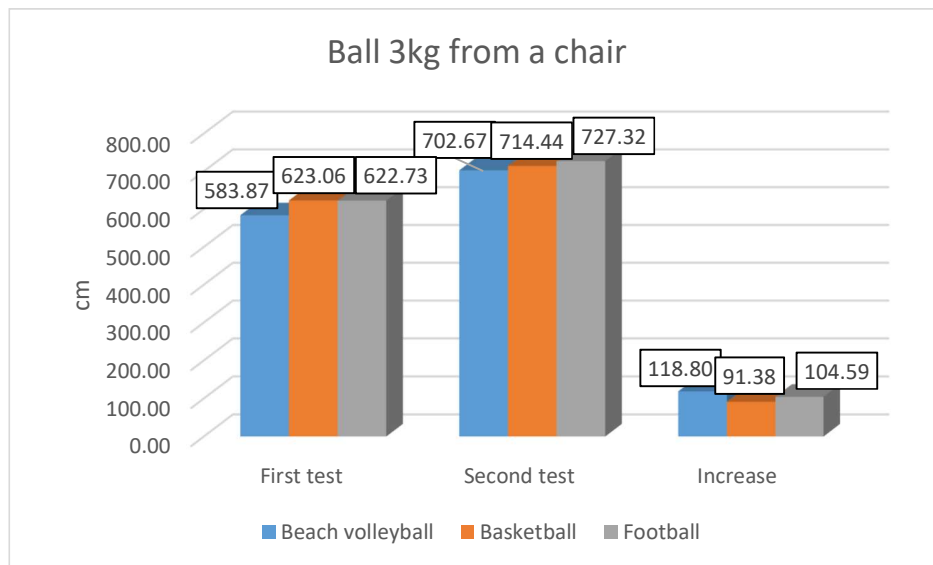


Figure 50

Regarding the strength of the upper limbs monitored by the test "Ball 3 kg. from a chair" no significant differences were observed between the individual groups in both tests. The increase in the results of all three groups has a statistically significant value. The close growth values are a consequence of the fact that the training activities of all three groups used exercises with different throws of solid balls of 3

and 4 kg each. The performance after the second test of each of the groups was better than that of the three groups at the first test.

Table 35 Significance of differences in "Ankle flexibility"

Ankle flexibility	EG _{b.v._}	CG _b	CG _f	EG _{b.v._2}	CG _{b2}	CG _{f2}
EG _{b.v._}				x		
CG _b				x		
CG _f				x		
EG _{b.v._2}	x	x	x		x	x
CG _{b2}				x		
CG _{f2}				x		

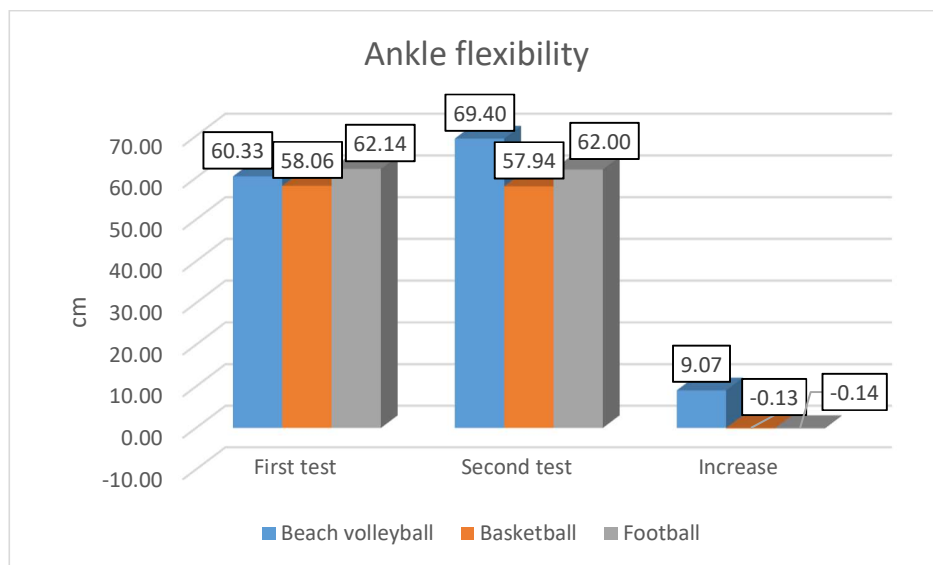


Figure 52

At the beginning of the experiment, no significant differences were noticed between the results of the individual groups, with the football players doing the best, followed by the EG_{b.v.} and the basketball players.

At the second testing, no significant change was observed in the results of the control groups, and it can be said that they maintain their levels for this indicator. The experimental group had a height of 9.07 cm at the end of the experiment. This value is statistically significantly greater than that at the beginning of the experiment, as well as the values of the other two groups. This improvement in ankle flexibility is certainly due to training on sand. No specific exercises were applied during the experiment to develop flexibility. Moving on the uneven surface during play has higher demands on the muscles, tendons and joints, thus having a positive impact on improving the flexibility of the lower limbs.

"When bouncing, the unevenness of the sand surface makes it difficult for the ankle to push through the vertical axis of the body's motion, and as a result, it slides back in an attempt to maximize propulsion." As a result, the body tries to balance and equalize this movement and move the hip into greater extension." (Giatsis G, Kollias I, Panoutsakopoulos V, Papaiakevou G. 2004).

III.5. Significance of differences and increase in the results of tests determining functional status

Table 37 Significance of Differences at "Maximum Power"

Maximum power	EG _{b.v._}	CG _b	CG _f	EG _{b.v. 2}	CG _{b 2}	CG _{f 2}
EG _{b.v._}		x	x	x	x	x
CG _b	x					x
CG _f	x					x
EG _{b.v. 2}	x					x
CG _{b 2}	x					
CG _{f 2}	x	x	x	x		

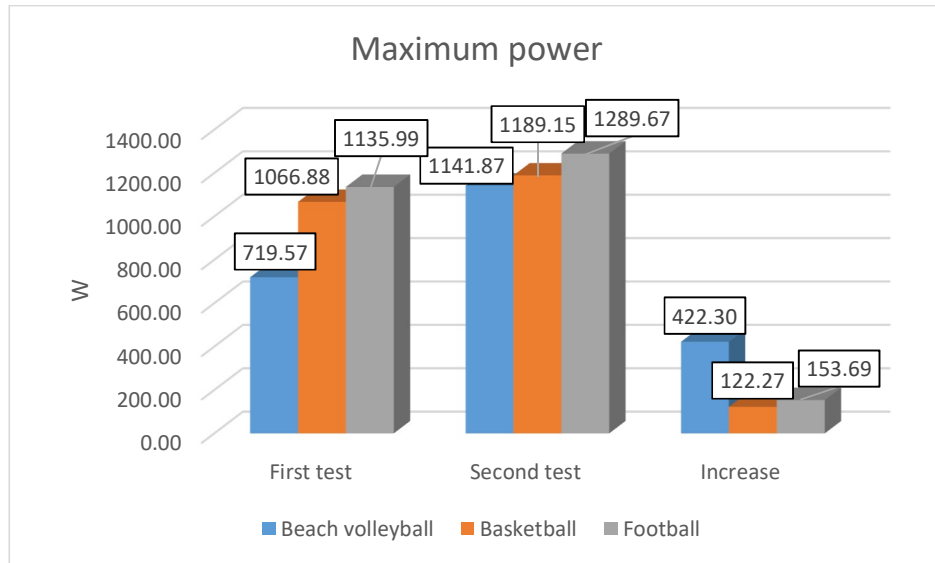


Figure 54

At the first test, the experimental group had the lowest result for this indicator, and the difference with the values of the control groups was statistically significant. The score of the football players was 69 W higher than that of CG_b at the beginning of the experiment. The obtained values for the growth of all three groups are statistically reliable. The biggest increase is in the result of the EG_{b.v.}, which, in addition to training on sand, is also due to the relatively low performance of the first test. Also, the maximum power of the EG_{b.v.} at the end of the experiment was higher than that of the two control groups at the beginning, but without significant differences. We can say that training on sand improved the result of the experimental group bringing it closer to the achievement of CG_b without a significant difference. According to the type of load and the specifics of the game, CG_f have the highest results in both tests, and their difference is statistically significant only with EG_{b.v.}

Table 38 Significance of Differences at "Minimum Power"

Minimum power	EG _{b.v._}	CG _b	CG _f	EG _{b.v.2}	CG _{b2}	CG _{f2}
EG _{b.v._}		x	x	x	x	x
CG _b	x		x		x	x
CG _f	x	x				x
EG _{b.v.2}	x					x
CG _{b2}	x	x				x
CG _{f2}	x	x	x	x	x	

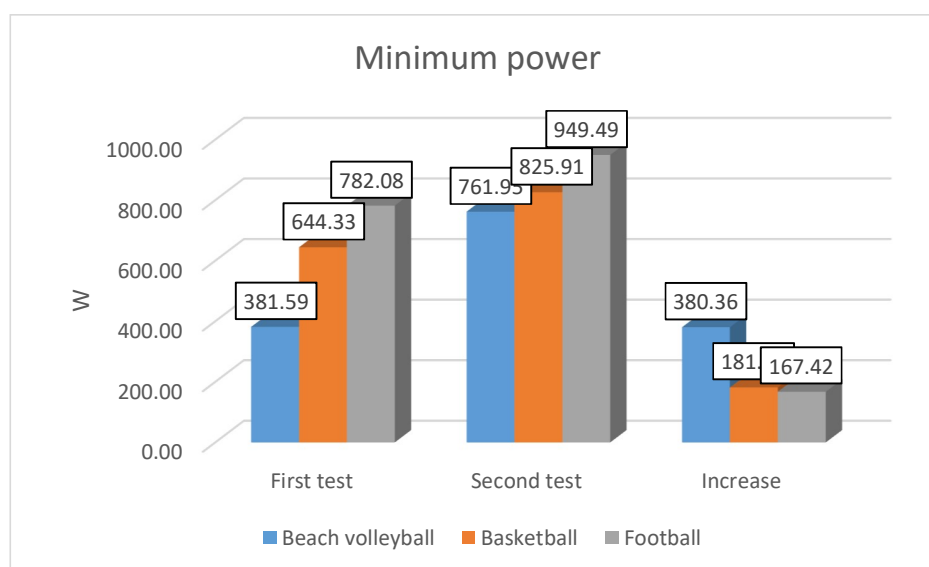


Figure 55

At the first test there were statistically significant among the three groups. The value of CG_f for this indicator is more than twice that of the experimental group and 137.75 W higher than the achievement of CG_b. "Minimum power" is the indicator achieved by the students under the influence of the greatest fatigue from the performance of

the test. It can be seen that at the first test the minimum power of the football players is greater than the maximum of the EG_{b.v.}

The growth values after the second testing for all three groups has statistical significance. There is no significant difference between the results of EG_{b.v.} and CG_b, which means that after the experiment, the achievement of the beach volleyball players approaches that of the basketball players at the end and reaches the level of the football players for this indicator at the beginning of the experiment. Both at the beginning and at the second testing, CG_f achieved a result that differed from those of the other two groups with statistical significance.

Table 39 *Significance of Differences at "Average Power"*

Average power	EG _{b.v._}	CG _b	CG _f	EG _{b.v. 2}	CG _{b 2}	CG _{f 2}
EG _{b.v._}		x	x	x	x	x
CG _b	x		x	x	x	x
CG _f	x	x				x
EG _{b.v. 2}	x	x				x
CG _{b 2}	x	x				x
CG _{f 2}	x	x	x	x	x	

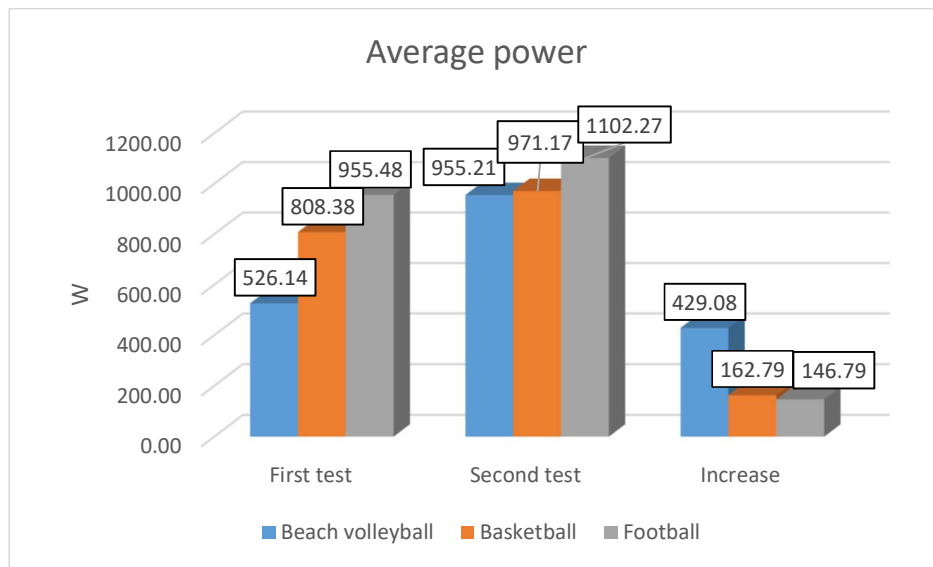


Figure 56

"Average Power" indicator provides information on students' ability to maintain power over time. From table 39, it can be seen that on the first testing $EG_{b.v.}$ lags behind CG_b , both of which have lower results than CG_f and all differences have a statistical significance. On the second test, all three groups performed better with significant differences, with the greatest increase in the $EG_{b.v.}$ score. In the second testing, there is no significant difference between the results of $EG_{b.v.}$ and CG_b , but the achievement of the football players is the best and the difference with the other two groups is statistically significant. At the end of the experiment, the $EG_{b.v.}$ equalize the value of the average power of the football players from the first testing.

Table 40 Significance of differences in "Fatigue Index"

Fatigue index	EG _{b.v._}	CG _b	CG _f	EG _{b.v. 2}	CG _{b 2}	CG _{f 2}
EG _{b.v._}		x	x	x	x	x
CG _b	x		x		x	x
CG _f	x	x				x
EG _{b.v. 2}	x					x
CG _{b 2}	x	x				
CG _{f 2}	x	x	x	x		

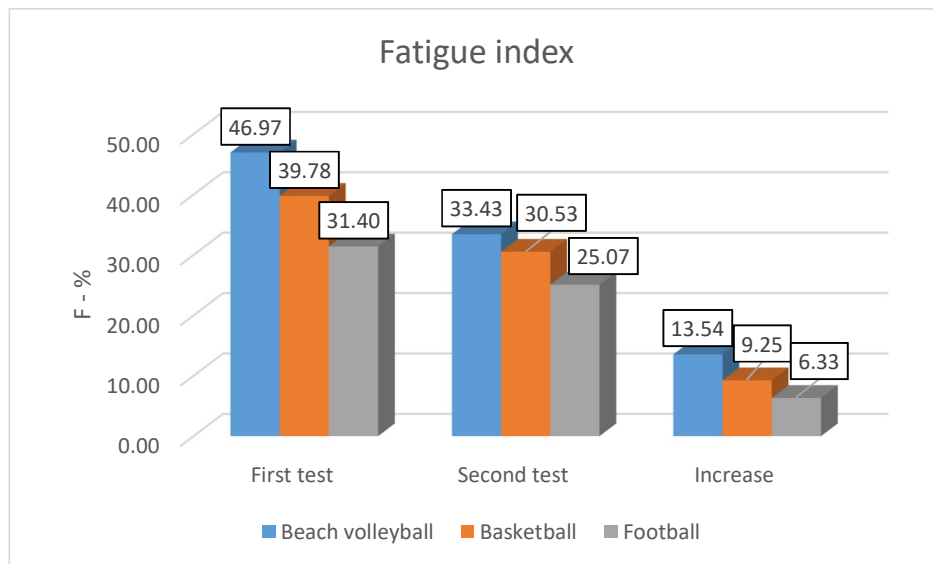


Figure 57

A "fatigue index" shows how quickly students' power declines during the test. Its smaller value means better tolerance to anaerobic loads. At the beginning of the experiment, the three groups achieved results with statistically significant differences. This is also confirmed by the test database, according to which the level of EG_{b.v.} is "average" ($42\% < F = 46.97\% < 50\%$), that of CG_b is "above average" ($35\% < F = 39.78\% < 42\%$), and that of CG_f is "excellent" ($F = 31.4\% < 35\%$). At the end of the study, a statistically significant increase was reported in all three groups

(Table 40), the highest being in EG_{b.v} (13.54%). The results of the second testing defined the performance of all groups as "excellent" ($F < 35\%$). There are no significant differences between the EG_{b.v} and the basketball players at the end of the experiment. The football players outperformed the other two groups at the beginning and at the end of the experiment with statistically significant differences. The only missing difference between the values of the second testing is between CG_f and CG_b.

Beach volleyball training has a positive effect on the anaerobic endurance of beach volleyball players. In the second test, they come close to the basketball players, who in turn reduce the difference in value with that of the football players to statistically insignificant.

Table 41 Significance of Differences in "Functional Status"

Functional status	EG _{b.v.}	CG _b	CG _f	EG _{b.v.} 2	CG _b 2	CG _f 2
EG _{b.v.}			x	x	x	x
CG _b			x	x	x	x
CG _f	x	x				x
EG _{b.v.} 2	x	x				
CG _b 2	x	x				
CG _f 2	x	x	x			

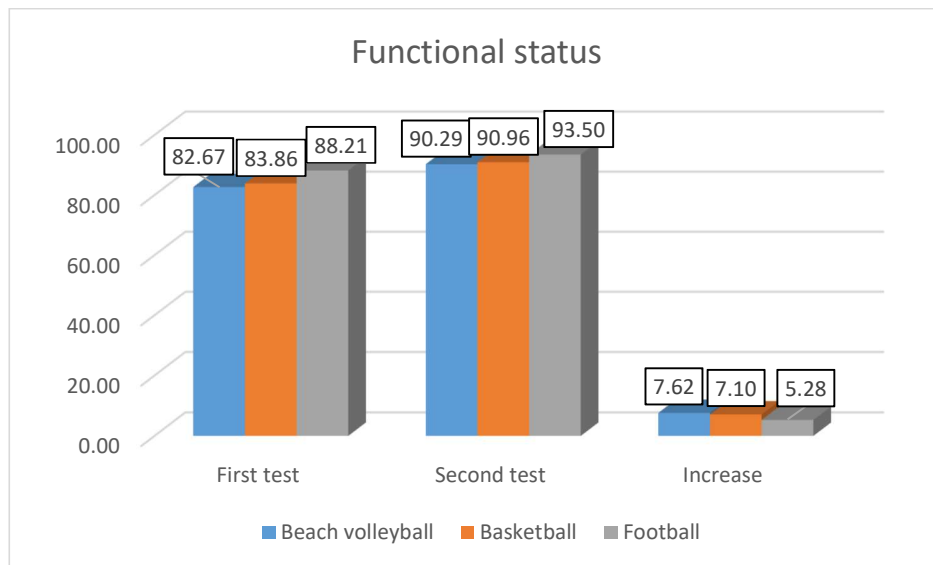


Figure 58

Normative data for *the Harvard Step Test* determine the "above average" level of the *Functional Status indicator* on the first test ($80 < S < 90$). However, CG_f outperformed the other two groups by a statistically significant difference. At the end of the experiment, no statistically significant differences were observed among the individual groups. Each of the studied groups improved their result compared to the beginning of the experiment with a significant difference, and the levels of the "Functional Status" indicator fall into the "excellent" column ($S > 90$).

Regarding the "Power" and "Fatigue Index" indicatorsp EG_{b,v} seriously lagged behind the control groups at the beginning of the experiment. At the end, for all indicators, the greatest increase was reported in the results of EG_{b,v}, which brings their results closer to those of basketball with a statistically insignificant difference. CG_f achieved the best results in this test, which is natural considering its essence (6 sprints of 35 m.). In basketball, there are similar loads, but at a shorter distance, while in beach volleyball, loads are of similar duration, but of a different type (short sprints, bounces, plunges, etc.).

Regarding the "Functional status" indicator, we have an equalization of the achievements of $EG_{b,v}$ and CG_b in the second testing and a statistically insignificant difference between them and that of CG_f .

IV. CONCLUSIONS AND RECOMMENDATIONS

IV. Conclusions

Based on the conducted research aimed at improving the physical working capacity of students through beach volleyball activities, the following conclusions have been formulated:

1. The following conclusions can be drawn from *the questionnaire survey* :
 - $\frac{1}{4}$ of the surveyed students do not play sports, and this percentage is the same for Bulgarian and foreign students.
 - The desire of the majority of the respondents is to have the opportunity to do sports more than twice a week, with only three of the Bulgarian and 6 of the foreign students not wishing to do so.
 - Beach volleyball is highly recognizable by all respondents, with over 70% of them having tried the game on the beach. Students perceive the game as exciting and a good means of maintaining a beautiful body. In no case do they consider beach volleyball to be dangerous to health.
 - If given the opportunity to choose beach volleyball as a discipline, half of the respondents would do so, believing that it would help them cope with stress, that it would be interesting for them and that they would meet new people.
 - We can conclude that the attitude of MU-Varna students is positive towards sport activities. A large part of them are willing and would do sports more than twice a week. Beach volleyball is a desirable option

for students if it is included in the university's sports curriculum, which will lead to an increase in the employment resource.

2. After the *variation analysis* of the results of the sports-pedagogical and functional tests and the calculation of the average levels of the indicators, it is proven that:
 - The entire studied population is highly uniform in terms of sports pedagogic tests. Only on the "Wall Squat" test, students from the three groups show results defining them as highly heterogeneous groups.
 - In terms of functional testing, the studied population was relatively uniform at first testing.
 - At the end of the experiment, the experimental group was highly homogeneous in terms of sports-pedagogical tests. The same can be said for both control groups, but again on the Wall Squat test, the variability is at a level that defines the groups as relatively homogeneous.
3. All changes that occurred as a result of the impact of the complex training programs in the preparation of the students of the three groups are significant and supported with a high guarantee probability.
4. At the end of the experiment, the increase in the results of the experimental group was the highest in the functional indicators, as well as in the indicators of flexibility, upper limb strength and speed endurance.
5. In the two control groups, there was also an increase in the results, proven with high statistical significance, with the football players having the best achievements in the functional tests, and the basketball players in the speed movements for 30 seconds.
6. The conducted sports-pedagogical experiment proves that beach volleyball activities develop the physical working capacity of students at a high level, not inferior to basketball and football activities.

IV.2. Recommendations for practice

In order to optimize and improve the educational process in physical education and sports in higher schools in the city of Varna, we recommend:

1. Addition of beach volleyball as part of the sports curriculum for students from MU-Varna, as well as for students from other higher schools, where the resource base allows.
2. To disseminate the scientific and practical results of the research among sports educators in higher schools through:
 - a. participation in scientific conferences and seminars;
3. Development of a teaching-methodical aid for teaching beach volleyball in higher schools.
4. The increase of results in the experimental group gives us grounds to recommend to track the effect of conducting activities on sand and in other types of sports (beach football, beach handball, beach tennis, etc.) in future scientific researches.

SCIENTIFIC AND SCIENTIFIC-APPLIED CONTRIBUTIONS OF THE DISSERTATION

1. A theoretical analysis was made on the researched problem of the place of beach volleyball as a sport in Higher Schools.
2. A comparative content analysis was made for the possibilities that beach volleyball provides for developing the motor skills of the participants.
3. A complex study was conducted with students who were not active athletes, using a test battery with a wide range of indicators, establishing the degree of development of the motor qualities of beach volleyball players.

4. A specialized educational and training program aimed at improving the sports-technical and physical fitness of students engaged in beach volleyball has been developed and tested in practice.
5. A one-semester beach volleyball curriculum was developed with higher schools' students.

Posts on the topic:

1. Yankov, B., Vasilev, Y., BEACH VOLLEYBALL AS A TOOL FOR IMPROVING STUDENTS' PHYSICAL CONDITION, " Science and Education in the Digital era " , © Medical University "Prof. Dr. P. Stoyanov" – Varna, (2020), ISBN 978-619-221-283-4, p.384-391 ;
2. Yankov, B., Kotev, V., THE ATTITUDE OF STUDENTS FROM MU-VARNA TOWARDS BEACH VOLLEYBALL, " One year education in a digital environment - sharing good practices in foreign language learning and sports, © Medical University " Prof. Dr. P. Stoyanov " – Varna, (2021), ISBN 978-619-221-381-7, p . 26-31 ;
3. Kotev , V., Yankov, B., ANALYSIS OF THE DIFFERENCES IN THE SPEED, ACCELERATION, AND POWER OF VOLLEYBALL PLAYERS ON DIFFERENT PLAYING SURFACES, V. Kotev , B. Yankov, Proceeding book off INTERNATIONAL SCIENTIFIC CONGRESS "APPLIED SPORTS SCIENCES " 2 - 3 December 2022, ISBN (Online): 978-954-718-702-3, Vol. 2, pages 128-132.