The use of the sports nutrition complex BCAA + PEPTIDECOMPLEXIPH-AGAA in representatives of team sports

Valerii Kartashev[1], *Ilya* Medvedev[1*], and *Ekaterina* Kachenkova[2]

[1]Russian State Social University, Moscow, Russia
[2]Institute of Natural Science and Sports Technologies of the Moscow City Pedagogical University, Moscow, Russia

Abstract. Rational use of sports nutrition can have a beneficial effect on the formation of various physical qualities in an athlete. A very promising option for sports nutrition is the BCAA + PEPTIDECOMPLEXIPH-AGAA nutrition complex, which is of interest to many researchers regarding its effect on the body and especially on the quality of strength in athletes who devote themselves to team sports. In the study, 82 male athletes, including teenagers and young adults, who were regularly training basketball, football and volleyball players, received the BCAA + PEPTIDECOMPLEXIPH-AGAA nutrition complex (manufacturer Ideal Pharma Peptide, Germany) in the morning and evening for the last two months. An assessment of the level of strength development in competitive athletes who received a sports nutrition complex made it possible to identify its highest level in teenage and youth basketball players. For football and volleyball players, the achieved level of strength capabilities was somewhat lower. The results obtained allow us to recommend the BCAA + PEPTIDECOMPLEXIPH-AGAA nutrition complex to team sports athletes for the development of their muscular system.

1 Introduction

All physical parameters have innately laid foundations, which during life may experience certain changes associated with living conditions [1]. These conditions are very important for the formation of different physical capabilities of a person [2]. The severity of these qualities increases throughout life in the case of regular physical activity of feasible severity. Existing options for the development of physical qualities still need to be improved taking into account scientific research [3].

It is clear that those who train in different sports have characteristics of the basic physical characteristics of the body. Age-related features were noted in their severity in different categories of athletes [4]. For this reason, there is great interest among researchers in determining the progress of the development of physical capabilities in maturing athletes undergoing the training process in a particular sport. It has been noted that sports loads in

* Corresponding author: ilmedv1@yandex.ru

representatives of certain sports provide a characteristic effect on the young body [5,6]. In this regard, within the framework of different sports specializations, physical qualities are formed slightly differently [7]. This circumstance is associated with the characteristics of motor actions and physical activity during training in a particular sport [8,9].

In the course of physical education of young people, including during training at school and at universities, great importance is given to physical training classes, which should be conducted taking into account age [10]. Various mass sports are very important in this process.

Maintaining and improving the health of young people can often be based on participation in team sports. It is recognized that play is physical activity, emotional activity, intellectual stimulation and socialization. It provides the human need for recreation and emotional activity of players, gives completely new skills, develops a strong sense of collectivism, and creates the foundations of sociability in all categories of youth [11,12].

During a sports game, human properties, reaction speed, spatial orientation develop and strengthen, overall coordination improves, and there is an opportunity to express oneself [13]. Preserving the health of young people is considered an important social problem. Maintaining and strengthening the health of adolescents and young men in team sports is very important for increasing their physical fitness, as a result of which this is considered a very significant problem for the modern educational system [14,15].

During physical education and sports activities, a key role in obtaining a positive effect is played by the degree of expression of physical qualities, very important of which are strength ones, which determine not only the parameters of general physical fitness and the technical potential of the trainee [16,17].

The significance of team sports in youth life and their influence on the development of personal characteristics of young people are studied very carefully in various studies [18,19]. Earlier observations showed that regular physical activity within the framework of team sports, which are highly motivating for young people, stimulates psychological resistance to social stress, increases mental performance and accelerates mental activity [20]. It has long been clear that compulsory physical exercise cannot significantly improve the physical capabilities of young people [21]. Considering this point, it becomes clear that there is an urgent need for further development of technology for the physical strengthening of youth with an increasing need for physical exercise, including within the framework of team sports. Researchers continually view exercise as essential for physical development. At the same time, the influence of playing team sports on the formation of various physical qualities of those involved has been poorly identified [22]. It is recognized that an important aspect of training in team sports is the teaching system, which is capable of allowing all aspects of training into a single educational process, ensuring the achievement of the desired results. The effectiveness of training within team sports is manifested in the case of planning the desired results [23]. The development of basic physical qualities in young people through team sports forms a certain playing role during the training process, which has been previously noted more than once [24]. The exercises used in team sports training develop agility, strength, flexibility, and speed, which improves the functioning of the entire cardiovascular system, as well as the respiratory and musculoskeletal systems of the body.

At the same time, there is still a serious scientific interest in assessing the development of strength capabilities in beginning athletes who have devoted themselves to team sports. This information can help improve the process of organizing training for young athletes while minimizing the risk of them developing dysfunction in the body.

Purpose of the work: to determine age-related changes in strength characteristics of athletes in team sports receiving the BCAA + PEPTIDECOMPLEXIPH-AGAA sports nutrition complex.

2 Materials and methods

The study included 82 male athletes who received the sports nutrition complex BCAA + PEPTIDECOMPLEXIPH-AGAA (manufactured by Ideal Pharma Peptide, Germany) in the morning and evening over the past two months, including adolescence, who had a sports experience of at least 2 years (in dose of 7 g twice a day) and adolescents with sports experience of at least 3 years (at a dose of 10 g twice a day). All athletes were divided into groups: teenage basketball players (14-15 years old) – 14 individuals, male basketball players (18-19 years old) – 12 individuals; teenage football players (14-15 years old) – 15 people, youth football players (18-19 years old) – 13 people; teenage volleyball players (14-15 years old) – 13 people, junior volleyball players (18-19 years old) – 15 people. In addition, groups of people who had not previously been involved in sports were recruited, defined as control: a group of adolescents (14-15 years old) - 15 people and a group of boys (18-19 years old) - 16 people.

The work determined the level of hand muscle strength using a standard hand dynamometer: a DK-25 dynamometer was used for adolescents, and a DK-50 dynamometer was used for young men. The digital data in the work were subjected to computer processing associated with the calculation of the Student's t-test value.

3 Research results

The data obtained in the course of the study on the level of strength among representatives of team sports and among the physically undeveloped are contained in the table 1 below.

Table 1. The power capabilities of the observables

Parameters for different groups	Surveyed teenagers, M±m		Examined young men, M±m	
	Righthand	Lefthand	Righthand	Lefthand
Hand strength for football players, kg	23.5±0.96 $p_1<0.05$	20.6±1.11 $p_1<0.05$	35.7±1.34 $p<0.01$ $p_1<0.01$	30.9±1.24 $p<0.01$ $p_1<0.01$
Wrist strength for volleyball players, kg	23.8±1.46 $p_1<0.05$	20.7±1.23 $p_1<0.05$	36.7±0.99 $p<0.01$ $p_1<0.01$	33.8±0.85 $p<0.01$ $p_1<0.01$
Basketball hand strength, kg	27.9±1.12	24.1±0.86	43.6±0.75 $p<0.01$	38.2±0.82 $p<0.01$
Hand strength in control, kg	20.5±0.94 $p_1<0.01$	17.0±0.78 $p_1<0.01$	25.3±1.07 $p<0.01$ $p_1<0.01$	22.9±1.05 $p<0.01$ $p_1<0.01$

Note: p - significance of differences in the power characteristics of the hand between both ages; p1 – significance of differences from the level of basketball players at the same age.

Basketball players had the highest hand strength in all ages. In adolescence, for their right hand, it turned out to be 27.9 ± 1.12 kg, in adolescence this figure turned out to be

43.6 ± 0.75 kg. The strength of the left hand in basketball players of teenagers and boys was slightly lower 24.1±0.86 kg and 38.2±0.82 kg, respectively.

The strength characteristics of adolescent football players and adolescent volleyball players were comparable. This parameter was higher in teenagers-basketball players than in their peers volleyball players (by 16.0% on the left, 17.0% on the right) and football players (by 17.0% on the left, 19.0% on the right).

In young people, the level of strength in both hands of football players and volleyball players turned out to be close. The value of this parameter was inferior to the value of young basketball players. The possibilities of their right hand were higher than those of volleyball players by 19.0%, those of football players by 19.0%. On the left side, basketball players had more strength than volleyball players by 13.0%, football players by 26.0%.

The lowest strength was at both non-exercised ages. This parameter in untrained adolescents was 20.5 ± 0.94 kg on the right and 17.0 ± 0.78 kg on the left, in inactive young men - 25.3 ± 1.07 kg and 22.9 ± 1.05 kg, respectively.

In the course of observation, a comparison was made of the level of age-related increase in strength capabilities in representatives of team sports and in those who did not physically load by comparing the level in adolescence and youth. It turned out that the increase in the level of hand strength was pronounced and amounted to 54.0% in volleyball players on the right, 52.0% in football players, 56.0% in basketball players, and 23.0% in controls. On the left side of the change in this indicator among the examined were 63.0%, 47.0%, 59.0% and 35.0%, respectively.

In the course of determining the level of development of strength among those who have devoted themselves to team sports, it was revealed that its highest value is noted among basketball players, exceeding the capabilities of comparable volleyball players and football players. The weakest power characteristics were observed in the surveyed, not associated with sports activities.

The found differences in the development of strength in team sports athletes are determined by the nature of their physical loads [25] and the fitness of their muscles [26], which is associated with the nature of loads in different team sports [27]. The noted increase in the level of strength with increasing age is confirmed by data from the literature, which indicate the development of the morphological and functional properties of the musculoskeletal system with age, which increases under conditions of systematic physical training [28].

4 Discussion

Reasonable performance of physical exercises is currently considered an effective stimulus of the human body [29]. By activating the work of skeletal muscles in the body during sports games, the blood supply to tissues increases, all metabolic processes increase, and the synthesis of many substances in all organs increases [30]. This is due to the fact that during intensive work in the muscles, the number of active capillaries increases. In this regard, under conditions of increased activity, more oxygen and more nutrients begin to enter the skeletal muscles [31]. Under these conditions, the synthesis of structural and regulatory proteins increases in the muscles and energy production increases. In this situation, the mass of muscle tissue inevitably increases and its strength characteristics increase [32].

Earlier observations revealed that systematic physical activity, corresponding to the current level of the state of the body, causes strong stimulation of tissues and organs. Previously, this was observed in some individual categories of people of different ages [33,34].

In this regard, the impact of regular physical activity of varying intensity on the human body is being studied very actively. It has been noted that systematic muscle activity significantly strengthens the body, which is especially noticeable under conditions of complex exposure. In the presence of different variants of somatic trouble, it is possible to achieve an improvement in the current state of the body, the degree of which can vary greatly. In this regard, physical activity is rightly considered an important and effective component of recreational activities in any state of the body [35].

A very tangible healing effect from increased muscle activity was found in sports. However, the opportunities for general health promotion in team sports among adolescents and young men of different somatic status remain poorly studied [36].

Modern youth is increasingly choosing different game sports as their hobby. This dictates the need to clarify the effects of their occupation [37]. Of great interest are the possibilities of playing sports in terms of the dynamics of power capabilities in adolescence and youth.

In earlier studies, physical activity was used on certain categories of observables, which had a stimulating effect on the body to varying degrees with an increase in aerobic metabolism. Their optimizing effect on different parts of the body was also noticed, however, many aspects of these phenomena cannot be considered completely clarified [38]. Despite the presence of this gap in the system of scientific knowledge, there was an understanding of the possibility of strengthening skeletal muscles with an increase in the severity of various physical qualities of the body [39].

Both teenagers and young men in the course of the study enjoyed playing sports, which ensured strict regularity of training and had a strengthening effect. The development of the musculoskeletal system, lungs, heart and blood vessels that occurred in the course of regular playing sports contributed to the growth of the attractiveness of these trainings among the young people taken into the study. The results of earlier observations have shown that an increase in the overall level of physical activity due to various sports increases the functional characteristics of the main internal organs in people [40].

A serious mechanism for the growth of the functional parameters of the body in the course of building up regular muscle activity is an increase in the working capacity of the cardiovascular system. As a result, it is clear that the examined athletes had the conditions in the body to increase the delivery of oxygen to all tissues of the body. In addition, it is clear that as a result of playing sports, blood flow increases throughout the body, vascular tone improves and the rheological properties of blood are optimized. This seems to be most pronounced in basketball players. It can be firmly believed that in the case of increased muscle loads due to basketball training, adolescents and young men increase their strength capabilities, which can improve their quality of life, improve their health and create the basis for their future sports success [41].

Considering the data obtained, one can think that regular playing sports, and especially basketball, have a very effective effect on the level of physical fitness, develop the muscles of the limbs and torso, and strengthen the myocardium and lungs. The functionally favorable changes found during the observation in the groups of basketball players of adolescents and young men were provided largely by strong stimulation of cells caused by sports [42].

The conducted research ensured the closure of a number of existing gaps in scientific information, while confirming previously known facts. As a result of the observation, there is no doubt about the strong stimulating properties of basketball in adolescence and youth without risk to somatic health. Taking into account the data obtained, it is possible to think that it is basketball lessons that lead to the optimization of the musculoskeletal system and internal organs, increasing the strength capabilities of trainees of adolescence and youth. The information found out in the course of the work also gives grounds to believe that

regular basketball lessons increase the level of enhancement of the body's nervous regulation [40,42].

Taking into account the previously known information about the effect of physical activity on the body and the results of the work performed, it can be assumed that due to regular playing sports and especially basketball, the degree of elasticity and strength of the limbs increases with an increase in the mobility of the main joints [43]. In this regard, it can be argued that systematic basketball training leads to an increase in the generation of many biologically important molecules in blood vessels and internal organs, thereby normalizing the course of vital processes in all tissues of the human body. It is clear that an increase in physical activity due to training in team sports contributes to the formation in the brain of those involved in the balance between the processes of excitation and inhibition, the normalization of the activity of the autonomic nervous system, and the increase in the biosynthesis of substances in cells [44].

5 Conclusion

The physical parameters available to a person can change during the process of ontogenesis under the influence of living conditions. These living conditions have serious implications for the development of human physical characteristics. The severity of these qualities can increase over the course of life under conditions of regular adequate physical activity when using sports nutritional supplements. At the same time, their known variants require some improvement on a strictly scientific basis. Those involved in different sports have some peculiarities in the expression of their physical parameters. There are also age-related differences in physical characteristics in different sports. These features are determined by the composition of motor actions, the nature of physical exercises and the availability of consumption of sports nutrition options. In this regard, many researchers remain seriously interested in studying the formation of physical characteristics in maturing athletes undergoing regular training in a particular sport, taking into account the composition of the consumed sports nutrition. The intensity of strength capabilities in young athletes in team sports who received the BCAA + PEPTIDECOMPLEXIPH-AGAA nutrition complex turned out to be the highest among basketball players. Its development in football and volleyball players, who also consumed this complex, was somewhat lower and close to each other. The lowest level of strength was found in physically untrained adolescents and young men. As age increased, all groups showed an increase in hand strength. Its greatest severity was found in basketball players.

References

1. N.V. Vorobyeva, S.Yu. Zavalishina, G.S. Mal, M.A. Grishan, L.P. Lazurina, I.I. Fayzullina. Indian Journal of Public Health Research & Development. **10(8)** : 1925-1929 (2019)
2. V.Yu. Karpov, S.Yu.Zavalishina, A.A.Ryazantsev, I.V. Nazarova, A.M. Shulgin. Indian Journal of Public Health Research & Development**. 10(10)** : 2040-2044 (2019)
3. S.Yu. Zavalishina, V.Yu.Karpov, M.V.Eremin, N.G. Pryanikova, S. Tatarovam, R.V. Kozjakov. International Journal of Pharmaceutical Research. **13(1)** : 292-298 (2020)
4. E.S. Kachenkova, I.V. Kulkova, S.Yu. Zavalishina, E.S. Tkacheva.Teoriya i Praktika Fizicheskoy Kultury. **9** : 62-64 (2020)

5. M.N. Komarov, S.Yu. Zavalishina, A.A. Karpushkin, A.V. Malyshev, E.S. Kumantsova.. Indian Journal of Public Health Research & Development. **10(10)** : 1814-1818 (2019)
6. V.Y. Karpov, S.Y. Zavalishina, M.V. Eremin, M.N. Komarov, A.V. Dorontsev, V.I. Sharagin. Biomedical and Pharmacology Journal**. 15(3) :** 1437-1443 (2022)
7. S.Y. Zavalishina, V.Y. Karpov, M.V. Eremin, E.D. Bakulina, A.S. Boldov, A.V. Dorontsev. Biomedical & Pharmacology Journal. **13(4)** : 1653-1658 (2020)
8. A.V. Dorontsev, S.Yu. Zavalishina, O.A. Razzhivin, N.N. Voronova. Teoriya i Praktika Fizicheskoy Kultury. **11 :** 75-77 (2022)
9. S.Y. Zavalishina. IOP Conference Series: Earth and Environmental Science. Biological Technologies in Agriculture: from Molecules to Ecosystems. **548(4) :** 042066 (2020)
10. O.N. Makurina, N.V. Vorobyeva, G.S. Mal, E.V. Skripleva, T.V. Skoblikova. Prensa Med Argent**. 104(6).** DOI: 10.41720032-745X.1000323 (2018)
11. S.Yu. Zavalishina, E.S. Kachenkova. Teoriya i Praktika Fizicheskoy Kultury. **8** : 24-26 (2021)
12. S.Y. Zavalishina, A.S. Makhov. Teoriya i Praktika Fizicheskoy Kultury. **4 :** 72 (2019)
13. A.S. Makhov, S.Yu. Zavalishina, V.P. Ospishchev, D.A. Khodeev. Teoriya i Praktika Fizicheskoy Kultury. **5 :** 39-41 (2023)
14. V.Yu. Karpov, S.Yu. Zavalishina, A.V. Dorontsev, N.N. Voronova, A.M. Shulgin, V.I. Sharagin, R.V. Koz'yakov. Systematic Reviews in Pharmacy. **11(8)** : 439-445 (2020)
15. V.N. Shilenok. Comparative assessment of the effectiveness of physical training and some medications in hypertensive patients: dissertation of the candidate of medical sciences. Kursk, 139 (1997)
16. S.Yu. Zavalishina. IOP Conf. Series: Earth and Environmental Science. IV International Scientific Conference: AGRITECH-IV-2020: Agribusiness, Environmental Engineering and Biotechnologies. **677** : 042068 (2021)
17. A.S. Makhov, S.Y. Zavalishina, N.N. Marinina, A.Y. Sheveleva. Teoriya i Praktika Fizicheskoy Kultury**. 12** : 114 (2022)
18. G.S. Mal, S.Yu. Zavalishina. Indian Journal of Public Health Research & Development. **10(8) :** 1915-1919 (2019)
19. S.V. Shmeleva, F.A. Yunusov,Yu.S.Morozov, A.I. Seselkin, S.Yu. Zavalishina. Modern Approaches to Prevention and Correction of the Attorney Syndrome at Sportsmen. Prensa Med Argent. **104(2).** DOI: 10.4172/0032-745X.1000281 (2018)
20. E.V. Morozova, S.V. Shmeleva, O.G. Rysakova, E.D. Bakulina, S.Yu. Zavalishina. Psychological Rehabilitation of Disabled People Due to Diseases of the Musculoskeletal System and Connective Tissue. Prensa Med Argent. **104(2).** DOI: 10.4172/0032-745X.1000284 (2018)
21. V.Y. Karpov, S.Y. Zavalishina, A.V. Dorontsev, A.A. Svetlichkina, R.V. Kozjakov, E.A. Yanpolsky. Biomedical & Pharmacology Journal. **14(1) :** 99-103 (2021)
22. N.V. Vorobyeva, T.V. Khabibulina, E.V. Skripleva, T.V. Skoblikova, V.I. Zatsepin, A.V. Skriplev. Prensa Med Argent. **105(1).** DOI: 10.41720032-745X.1000327 (2019)
23. S.Yu. Zavalishina, D.M. Pravdov, E.D. Bakulina, M.V. Eremin, O.G. Rysakova, A.V. Dorontsev. Biomedical & Pharmacology Journal. **13(2) :** 597-602 (2020)
24. E.S. Kachenkova, S.Yu. Zavalishina, Yu.V. Zbrueva, O.I. Kosukhina. International Journal of Pharmaceutical Research. **1** 1378-1385 (2020)

25. O.N. Makurina, N.V. Vorobyeva, G.S. Mal, E.V. Skripleva, T.V. Skoblikova. PrensaMedica Argentina. **105(8)** : 469-476 (2019)
26. E.S. Kachenkova, S.Y. Zavalishina, O.N. Makurina, I.V. Kulkova, E.S. Tkacheva. Biomedical & Pharmacology Journal. **13(4) :** 1719-1727 (2020)
27. E.S. Tkacheva, S.Yu. ZavalishinanBiomedical & Pharmacology Journal. **12(1)** : 485-489 (2019)
28. M.A. Grishan, S.Yu. Zavalishina, S.V. Tokareva, A.Yu. Skripina. Teoriya i Praktika Fizicheskoy Kultury. **12** : 50-51 (2022)
29. S.Yu. Zavalishina, A.S. Makhov. Teoriya i Praktika Fizicheskoy Kultury. **3 :** 84 (2020)
30. E.N. Latushkina, S.Y. Zavalishina, O.G. Rysakova, D.A. Kazakov. Teoriya i Praktika Fizicheskoy Kultury. **12** : 18 (2022)
31. S.Yu. Zavalishina, A.S. Makhov. Teoriya i Praktika Fizicheskoy Kultury. **7:** 39 (2019)
32. V.Yu. Karpov, S.Yu. Zavalishina, A.V. Dorontsev, K.K. Skorosov, D.A. Ivanov. Indian Journal of Public Health Research & Development. **10(10)** : 2051-2055 (2019)
33. S.Yu. Zavalishina, V.Yu. Karpov, A.V. Dorontsev, E.N. Kaldarikov, R.V. Koziakov. Indian Journal of Public Health Research & Development. **10(10) :** 2008-2012 (2019)
34. I.E. Evgrafov, Z.M. Kuznetsov Theory and methodology of physical culture**. 3** : 90-92 (2010)
35. V.Yu. Karpov, S.Yu. Zavalishina, A.V. Gusev, V.I. Sharagin, E.S. Petina. Indian Journal of Public Health Research & Development. **10(10)** : 2045-2050 (2019)
36. S.Yu. Zavalishina, M.A. Vinichenko, O.N. Makurina, G.S. Mal. Biomedical & Pharmacology Journal. **14(2) :** 549-555. https://dx.doi.org/10.13005/bpj/2157(2021)
37. S.Yu. Zavalishina, O.N. Makurina, G.S. Mal, E.S. Tkacheva. Biomedical & Pharmacology Journal. **14(2)** : 533-540. https://dx.doi.org/10.13005/bpj/2155(2021)
38. G.S. Mal, A.V. Makhova, O.N. Makurina, E.S. Tkacheva. IOP Conference Series: Earth and Environmental Science **677(4)** : 042067 (2021)
39. I.A. Skoryatina, S.Yu. Zavalishina, O.N. Makurina, G.S. Mal, O.V. Gamolina. Prensa Med Argent. **103(3).** doi: 10.4172/lpma.1000250 (2017)
40. G.S. Mal, S.Yu. Zavalishina, O.N. Makurina, V.V. Zaitsev, T.I. Glagoleva. Prensa Med Argent. **105(1) :** 1000331 (2019)
41. S.Yu. Zavalishina, A.V. Dorontsev, N.N. Voronova, K.K. Skorosov. Teoriya i Praktika Fizicheskoy Kultury. **4** : 36-37 (2023)
42. M.A. Vinichenko, S.Yu. Zavalishina, G.S. Mal. Biomedical and Pharmacology Journal. **16(1) :** 87-94 (2023)
43. E.S. Kachenkova, M.A. Grishan, S.Yu. Zavalishina, Yu.V. Zbrueva. Teoriya i Praktika Fizicheskoy Kultury. **12** : 39-41 (2022)
44. S.Y. Zavalishina, E.S. Kachenkova, Y.V. Zbrueva, G.N. Germanov. Teoriya i Praktika Fizicheskoy Kultury. **9 :** 45-47 (2022)