

# On the question of the optimal age for starting sports: results of a bibliometric analysis of the works of foreign and Russian scientists

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## Abstract

**Objective of the study** was to identify the degree of elaboration of the issue of determining the optimal age for starting sports on the basis of a bibliometric analysis of the works of foreign and Russian scientists.

Methods and structure of the study. Scientific work was carried out in three stages: 1) identification of the main areas of research on this issue using the PubMed database; 2) construction of a complex of top phrases (the most common) in the selected areas of research; 3) analysis of the works of domestic scientists using the scientific electronic library eLIBRARY.RU according to the selected top phrases. Publications for the period 2018-2022 were analyzed. Used library bibliometrix R-package. The study sample included 167 scientific publications on the topic under study.

Results and conclusions. In the course of the analysis, three main areas of research on this issue were identified. Within the framework of the first direction, physiometric, anthropometric and other indicators characterizing the physical development of young athletes are analyzed, the second one examines the effect of physical activity on young basketball players, including the risk of their health disorders and injuries. The studies of the third direction are aimed at studying the factors similar to the second direction of young athletes in another sport - baseball.

Based on a bibliographic search, it was determined that this issue is relevant in modern science and requires additional research to determine the optimal age for starting sports.

**Keywords:** *optimal age for starting sports, youth sports, bibliometric analysis, bibliometrix R-package, PubMed.*

**Introduction.** At the present time the issues of increasing the number of people involved in physical culture and sports, including children, are becoming urgent. As the studies show, the early start of sports and suboptimal training contribute to an increase in the risks of children's health disorders [1]. The most highly traumatic sports are currently popular such as ice skating, equestrian sports, rugby [2]. Over a 10-year period, the rate of hospitalizations due to sports-related diseases in Europe and other countries has not significantly decreased [3.].

Bibliographic search showed that there is no unanimous opinion in solving the issues of determining the optimal age of starting to play sports in science. In Russia, the recommended age for the beginning of

various types of sports is specified in the standards of sports training [4]. At the same time in the studies of scientists the problem is discussed that the age ranges indicated in the standards are not optimal and do not correspond to the periods of active development of necessary abilities [5], which creates the need for additional research on determining the optimal age for the start of various sports. This determined the purpose of the present study.

**Objective of the study** was to identify the degree of elaboration of the issue of determining the optimal age for starting sports on the basis of a bibliometric analysis of the works of foreign and Russian scientists.

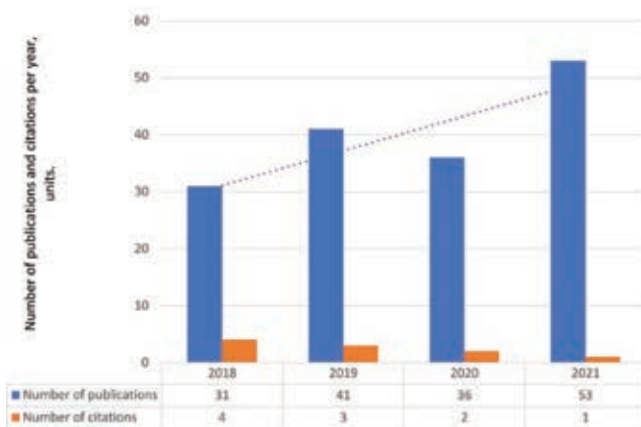
Methods and structure of the study. The research methodology includes three stages: 1) the allocation



of the main directions of research on the given problem; 2) the construction of a set of top-words on the allocated directions of research; 3) the analysis of works of domestic scientists was carried out with the use of scientific electronic library eLIBRARY.RU on the allocated top-words.

The selection of the main directions of researches on the given problem on the basis of the bibliometric analysis was carried out with the use of bibliometrix R-package library according to the international database of medical and biological publications PubMed. The key query "Age of onset of sports" was used in the study. The method of factor analysis: multiple concordance analysis was used to highlight the main areas of research. Top word combinations are the most frequently encountered word combinations; their construction was carried out according to the abstracts of the analyzed articles. Word combinations of three words - trigrams - were used. Publications for the period 2018-2022 were analyzed.

**Results of the study** and their discussion. Using the bibliometrix R-package library, 167 scientific publications on the subject under study were found. The total number of citations for the period under study is 10. Figure 1 shows the dynamics of the number of publications and their citations on a yearly basis.



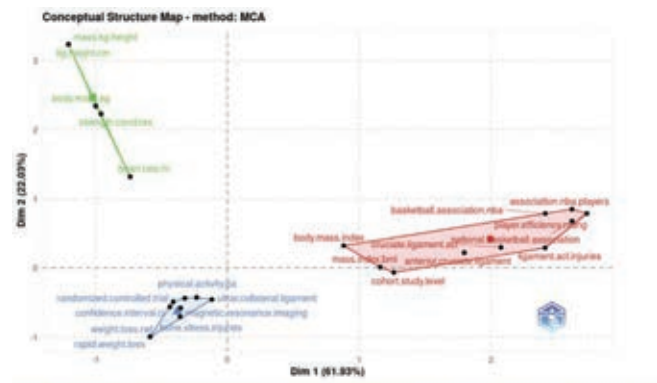
**Figure 1.** Dynamics of the number of publications and their citations by years on the problem of determining the optimal age of starting to do sports

Thus, we can conclude that the above-mentioned problems are gaining relevance in the foreign press, with a decrease in the number of publications in 2020 probably due to the reorientation of research on SARS-CoV-2 (COVID-19). The greatest contribution to the development of theoretical and practical aspects on the issue under study was made by the following sci-

entists: Knechtle B., Nikolaidis P. T., Okorona K. R., Owens B. D., Rosemann T., Ahmad C. S. et cetera.

Figure 2 shows the results of the factor analysis. There are three main directions, the clusters corresponding to the directions are highlighted in different colors.

Within the first direction physiometric, anthropometric and other indicators of physical development of young athletes are analyzed (green cluster in Fig. 2). The greatest contribution to this direction has been made by scientists: Araujo M. P., Lattari E., Castagna C.



**Figure 2.** Directions of research on the problem of identifying the optimal age for starting a sport using factor analysis

The works of scientists of the second direction analyze the impact of physical activity on young basketball players, including the emergence of risks of violations of their health and injury. Also studied in this direction are the effectiveness of their sports training (Fig. 4 cluster in red). The greatest contribution to the development of this direction has been made by scientists DeFroda S.F., Tramer J.S., Khalil L.S., Lemme N.J. et al. A number of studies have concluded that the early onset of sport contributes to an increase in the incidence of injuries in young athletes.

The third direction of research is similar to the second, but studies are conducted mainly for baseball (in Fig. 4, the cluster is blue). The works of scientists Magrini M.A., Mouton C., K Kl Y, Baranauskas M., etc. made a significant contribution.

A bibliographic search within the highlighted directions in the scientific electronic library eLIBRARY.RU allowed us to draw the following conclusions. The first direction of research is represented by scientific publications of Russian authors, mainly in the VAK journals. The greatest contribution to this direction was made by scientists Abramova T.F., Nikitina T.M., Rudenko L.K., etc. In contrast to foreign researches in works of domestic scientists the specified prob-



lematics is investigated taking into account motor activity. Scientific schools located in St. Petersburg, Rostov-on-Don, and Kursk are the most active in this direction. The greatest contribution to the development of theoretical aspects of determining the optimal age of starting to play sports was made by scientists from the National State University of Physical Culture, Sports and Health named after P. F. Lesgaft, St. Petersburg Research Institute of Physical Culture. Abramova T.F., Nikitina T.M., Polfuntikova A. V., Malinin A. V. in a number of studies, they have determined that it is advisable to begin practicing sports from the age of 6 years, this is due to the peculiarities of heterochrony and synchronization of the processes of growth and development of children. They also emphasize the need to emphasize the general physical training of children of this age in children's and youth sports, because it contributes to the harmonious formation of the functions of the basic systems of life support in children [7].

But at the same time in a number of other studies these results are not confirmed. For example, Pasikova M. V. on the basis of the studies justifies the need to start young athletes windsurfing only at the age of 12-14 years.

The obtained research results do not comply with a number of federal standards of sports training used in Russia [4].

The second and third identified areas of research using bibliometrix R-package are not analyzed in the works of domestic scientists.

**Conclusions.** On the basis of the bibliometric analysis the following conclusions can be made. The problematic of determining the optimal age for starting to practice various sports is gradually gaining relevance in the domestic and foreign press.

Foreign studies mainly focus on determining the patterns of physical development of children engaged in sports, the effectiveness of the training process and reducing the risks of health disorders in young basketball and baseball players. In the works of domestic scientists, in contrast to foreign ones, the issues of identifying patterns of physical development of children are studied taking into account the motor mode and the peculiarities of the construction of the training process. The issues of determining the optimal age of the beginning of sports activities are raised, and these age periods differ in a number of studies.

But the results obtained are currently contradictory: different studies indicate different non-overlapping

age periods when it is recommended for children to start playing sports, the specified age range varies from 3 to 14 years. The research results in most cases are not supported by domestic regulatory documents in the field of physical education and sports.

The indicated problems are relevant in modern science, as evidenced by the increase in the number of publications on the topic, and require additional research, including the use of methods of intellectual analysis and computer vision.

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