

# Modernization of training of highly qualified freestyle swimmers on the basis of historiographical analysis of world records

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## Abstract

**Objective of the study** was to identify the main directions of modernization of the training system for highly qualified freestyle swimmers based on a historiographic analysis of world records.

**Methods and structure of the study.** The dynamics of world records in freestyle swimming at distances from 100 to 1500 m for men and from 100 to 800 m for women was analyzed, and methodological "finds" were identified based on the analysis of scientific and methodological literature on swimming. The study was conducted in 2021.

**Results and conclusions.** In the period 1910-2020, there is an abrupt increase in record sports results in freestyle swimming. Basically, there is a conjugate change in these results in men and women at swimming distances of one energy supply zone, which indicates a methodological factor in changing sports results at this historical stage in the development of world swimming. The initial phase of rapid growth observed in the first decades of the 20th century is clearly marked, with a gradual slowdown in the growth of record results. In the second half of our century, a new acceleration in the growth of world records was revealed, which then gradually decreases.

The relationship between the dynamics of world records of swimmers and the evolution of the methodology for training highly qualified athletes is traced. This pattern is observed in both men and women. Methodical "finds" appear, as a rule, every 20 years. The main prospects for improving the system of training elite swimmers: advanced training of coaching staff; the problem of finding outstanding performers; further intensification of training; modern logistics; regular monitoring of the athlete's condition; search for rational options; social guarantees for athletes and coaches.

**Keywords:** world records, swimmers, training methods, results gains, freestyle.

**Introduction.** The constant growth of sports achievements in swimming, high competition in the international arena oblige specialists to look for new ways to improve the efficiency of the training process and competitive activity in this sport [1-4]. Comparing the growth of world records in freestyle swimming and methodological findings in this sport, it is possible to predict possible directions for improving the process of training highly qualified freestyle swimmers [5]. Unfortunately, such comparisons of results are not enough, therefore, additional research is needed in order to timely identify promising areas for modernizing the training system for highly qualified swimmers.

**Objective of the study** was to identify the main directions of modernization of the training system for highly qualified freestyle swimmers based on a historiographic analysis of world records.

**Results of the study and their discussion.** In the period 1910-1920, world records for men in swimming in the 100 m freestyle improved by 3.2%, in 1920-1930 - by 4.9%, in 1930-1960 the growth of world records decreased markedly and averaged only 1.1 per decade %. During the periods 1960-1970, (4.9%) and 1990-2000, (4.8%) showed an increase in the gains of world records, and then the growth of these results decreased.



During the analyzed period, the most intensive growth of world records at a distance of 200 m freestyle was noted in 1910-1920 - 6.0% and 1920-1930 - 7.1%. New waves of gains in world records appeared in the periods 1960-1970 (4.8%) and 2000-2010 (4.7%). At the present stage of 2010-2020 there was a significant decrease in the growth of record results at this distance.

In swimming in the 400 m freestyle, periods of intensive growth in record results: 1920-1930 - 7.7%, 1970-1980 - 5.1%. At a distance of 1500 m freestyle, there was also an abrupt change in record results: the periods of the largest gains in 1920-1930 - 8.6%, 1970-1980 - 8.8%.

For women at a distance of 100 m freestyle, the periods of the largest increases in world records were noted at the beginning of the historical development of swimming: 1910-1920 - 22.9%, 1920-1930 - 8.1%. In the future, the increase in record results has declined markedly, especially over the past decade. At a distance of 200 m freestyle, in general, a similar pattern can be traced: periods of intensive growth - 1920-1930 - 7.0%), 1930-1940 - 8.8%. At a distance of 400 m freestyle, periods of intensive growth in world records: 1920-1930 - 10.7%, 1930-1940 - 11.4% and 1970-1980 - 9.1%. In the future, there is a uniform, less significant increase in world records. At a distance of 800 m freestyle, the periods of the largest gains in world records: 1920-1930 - 8.8%, 1960-1970 - 9.4%, 1970-1980 - 8.6%.

Thus, in the period 1910-2020. there is an abrupt increase in record sports results in freestyle swimming. There is mainly a conjugated change in these results for men and women at swimming distances of the same energy supply zone, which indicates a methodological factor in changing sports results at this historical stage in the development of world swimming.

The undulating growth of world records in freestyle swimming for both men and women is clearly visible. The initial phase of rapid growth observed in the first decades of the 20th century is clearly marked, with a gradual slowdown in the growth of record results. In the second half of our century, a new acceleration in the growth of world records was revealed, which then gradually decreases.

Now let's trace the evolution of the methodology for training highly qualified swimmers. At the beginning of the 20th century, the determining method of training athletes was the method of long-term continuous work, during this period they worked out for

eight months a year, two to three times a week. In the 30s, the methods of variable and repeated work were actively used, and in the 40s year-round training was introduced with elements of interval training, variable and repeated swimming.

The growth of world records in freestyle swimming in the 50s is associated primarily with the widespread introduction of the interval training method, and in the 70s swimming lessons were already complex in nature using various ergogenic means. At that time, year-round training in swimming was actively developed, divided into periods and stages, taking into account the age characteristics of those involved. Training loads increased sharply, primarily due to the volume of training equipment, and by the beginning of the 80s, their intensity began to increase significantly with a decrease in the total volume of swimming with strict rest intervals and an increase in the volume of swimming aimed at developing anaerobic capacity. Devices were actively used to transfer the development of strength abilities from land to rowing movements in water.

**Conclusions.** For more than a century of development of swimming in the world, various options for using training exercises, load parameters, repetitions, rest pauses have been tested, so most likely a new leap in "methodical thought" in speed swimming will be aimed at finding combinations of physical activity with ergogenic means.

The main directions for modernizing the process of training highly qualified swimmers based on a historiographic analysis of world records:

1. Improving the information support of the sports training system.
2. Modernization of technology for searching for especially gifted athletes.
3. Optimization of the training process by improving the anaerobic capabilities of swimmers based on a high level of aerobic endurance development in combination with the use of ergogenic means.
4. Modern logistics for training swimmers on land and in water.
5. Implementation of information and analytical monitoring of the swimmer's physical condition.
6. Search for a rational variant of individual swimming technique.
7. Improving social guarantees for athletes and coaches.

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