

COMPETITIVE SWIMMING

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Summary

Foundations of competitive swimming (its place in the program of the Olympic Games, interrelation with other kinds of sport, chronology of records and evolution of methodology) are considered. The model of an elite swimmer, technique of swimming, corresponding equipment and accessories of the modern swimming pool are described. Information, concerning training of sports reserve and separate swimmers overland and in water, is represented.

1. Swimming in the Olympic program and its interconnection with other kinds of sport

Swimming is one of the most mass and popular kinds of sport. By the number of awarded Olympic medals, swimming concedes only to track and field athletics.

Athletes are awarded medals in the following events:

50, 100, 200, 400, 800 (women), 1500 m freestyle (man) (competitors in freestyle swimming can use any of the unregulated strokes, such as front crawl, dog paddle, or sidestroke, etc., but qualified athletes use the fastest style - front crawl stroke);
100 and 200 m breaststroke;

100 and 200 m butterfly (athletes apply more high-speed version of butterfly - a dolphin kick);

100 and 200 m swimming on the back (athletes apply the fastest style - backstroke);

200 or 400 m individual medley (Individual medley (I.M.) consists of four strokes (50 or 100 m each). Usually, 1/4 of the overall distance is swum in one stroke. The strokes are swum in this order: butterfly, backstroke, breast stroke, freestyle);

Medley Relay: 4×100 m combined (Medley relay is swum by four different swimmers from each team. Each swimmer swims one of the four strokes. The order of strokes is the following: backstroke, breast stroke, butterfly and freestyle.), 4×100 m and 4×200 m freestyle.

The calendar of sports competitions and direction of development of swimming are determined by the International Swimming Federation (FINA - Fédération Internationale de Natation) and the European Swimming Federation (LEN - Ligue Européenne de Natation). World and European Championships, World Cups and Eurocups are held in long (50 m) and short (25) course pools. FINA and LEN unite national federations of swimming of all countries of the world, including the All-Russian Federation of Swimming (ARFS). National federations solve problems of development of mass and swimming in corresponding countries, control work of municipal and regional federations of swimming, training and participation of the strongest swimmers in important competitions, develop a calendar of annual sports competitions for young and adult swimmers, work in the sphere of propaganda of going in for swimming among different strata of population, etc.

Many invalids with mental diseases, functional disorders of a locomotor apparatus, hearing, eyesight go in for sport of swimming. Athletes of this category take active part in swimming competitions within the frameworks of the Deaflympics and the Paralympic Games.

Sports value of swimming is determined not only by a great number of awarded Olympic medals, but also by the fact that swimming is in the basis of many Olympic kinds of sport. These are, first of all, water kinds of sport, branched from sport of swimming in the course of its development: diving, water polo, synchronized swimming, underwater kinds of sport, marathon swimming, etc. These kinds of sport are based on skills of swimming and diving. Swimming is a base component of training of athletes in these kinds of sport, and ability to swim is one of requirements of safety measures in all water kinds of sport.

Swimming, as a separate kind of competitions, is a part of a series of multisports. In this matter, first of all, we should mention the Olympic kind of sport – the Modern pentathlon, the widespread triathlon, and also military-applied swimming and rescue swimming multisport.

Ability to swim for such Olympic kinds of sport, as sailing, rowing, and also for powerboating, windsurfing, waterskiing, scuba diving and other water kinds of sport, is the necessary condition, providing safety of trainings.

2. Historiography

2.1. Stages of Development of Sport of Swimming

In development of swimming as a kind of sport, it is possible to distinguish conditionally four periods. The beginning of the first period (1860-1919) is connected with holding of regular swimming competitions. During these years fans of swimming have started to unite into sports organizations, and competitions became relatively regular.

The beginning of the second period (1920-1952) is connected with ending of the First World War, after which sport in whole and swimming in particular have started to develop rapidly, and competitions became socially significant, the Olympic Games and other international competitions gathered a significant number of spectators, results of competitions and established records were widely discussed in the printed media.

During the third period, the Olympic Games and the World championships became major international events, victory in which was very important for any country. The program and rules of competitions, design of pools during this period on the whole have got the modern image. During this period rapid growth of number of trainings and increase of loads took place.

In the fourth period (from 1973 to the present time), rivalry on the world sports arena aggravated significantly, and now for successful performance athletes need a purposeful long-term training course under guidance of professional coaches. In initially amateur sport, mechanisms of material stimulation of athletes, professionalization and commercialization started to develop. The importance of extra-training factors (specialized nutrition and pharmacology, and training in middle mountain regions, etc.) in the training process increased.

2.2. Dynamics of World Records as an Indicator of Training Methods Evolution

Development of sport and growth of records are caused by such socio-economic factors such as growth of standards of living of population, support from the side of state administration, presence of corresponding sports bases and equipment, organization of children-youth sport, changes in a system of international and national competitions, material-technical and medical provision of sport.

Growth of records also significantly depends on development of methodical thought and introduction of innovations of technology of training into a training process. The system of sports training in swimming is continuously changed and improved during more than the last 100 years.

The overall picture of changes in the sphere of freestyle swimming (100 m, men) from 1905 to 2010 is presented in Figure 1. The diagram includes results of Zoltán Halmay, launching official chronology of the FINA, results of the world record-holder (as of 01.01.2011) César Cielo, and also results of some outstanding sprinters of the world. Till 1957, records were registered in pools of various length, after - only in 50 m pools,

for that purpose the FINA has introduced the initial qualifying standard. Since 1991 separate registration of records in 25 m pools is also conducted.

From the beginning of the 21st century to the middle of 1920s, swimmers trained 2-3 times per week, 4-6 months per year. The core training method was long distance swimming (from 400 to 3000 m) uniformly with a certain average speed. The growth of results took place, mainly, due to radical changes of a technique of swimming, quickly progressing these years.

During these years, training technique directed to development of endurance was widespread: increase of general volume and intensity of swimming, appearance of elements of interval training, variable and repeated swimming. In 1932, during the Olympic Games in Los Angeles, the Japanese team won swimming competitions. They with the assistance of the state administration significantly have increased loads on swimmers at their young age and have developed for them special overland training exercises.

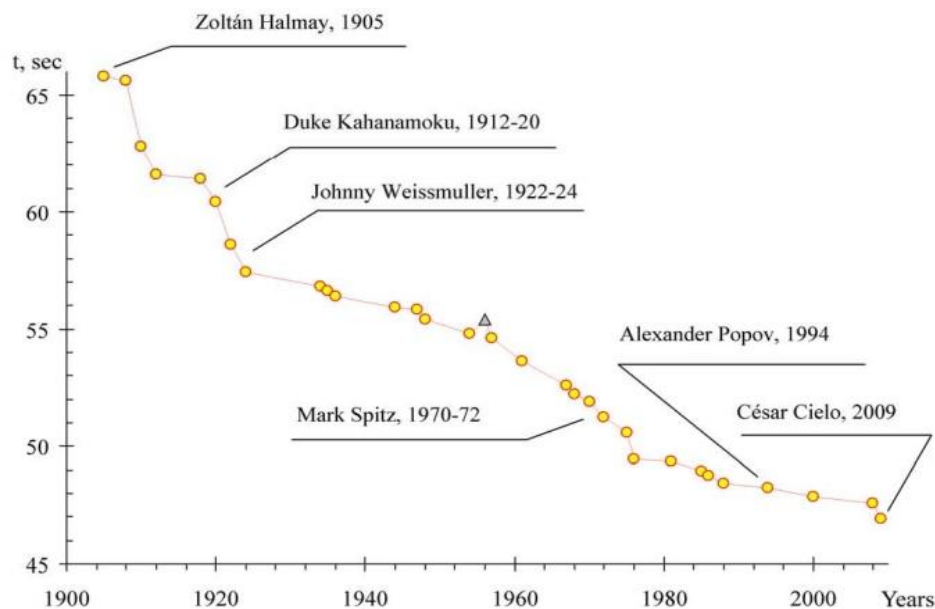


Figure 1. Dynamics of world records in swimming (100 m, freestyle, men).
The triangle designates the initial qualifying standard of the FINA

The epoch of interval training begins in the sport of swimming in the middle of 1950s. Such training has been introduced into swimming by the Australian trainers in cooperation with sports scientists. In the history of development of sport of swimming, it is the first example of purposeful and fruitful cooperation of trainers of a national team with physiologists and medics. The early beginning of long-term training of athletes has been theoretically proved and successfully applied, and a system of training of swimmers in different age groups has been developed. All-the-year-round training with accurate division into some periods became an indispensable attribute of training of the strongest swimmers. We also must notice that numerous biomedical researches have been conducted within the framework of the state program for the purpose of successful performance of Australian swimmers during the Olympic Games in

Melbourne in 1956. And this purpose has been achieved - from 13 gold medals, awarded at this Olympic Games, Australians have won 8.

Exactly during these years, fast growth of volume of swimming trainings was registered: from 500-600 km per year in 1953-54 up to 2400-2700 km per year to the middle of 1975, the same can be said about overland trainings. First of all, trainers and specialists increased the volume of swimming of small intensity (below a level of the AMT - anaerobic metabolism threshold).

In the area of power training, at the turn of the 1960s and 1970s, there was a real methodical revolution. It was evident that specific overland power training is crucial for a swimmer. And thus, the general physical training in corresponding age groups was designed so that it was focused on swimming (not on weightlifting), and qualified athletes based it on special complexes of exercises with use of specific exercise machines. In the mid-1950s the first exercise machines and training equipment, based on tension of rubber cords, have been created, and by 1970 a series of training apparatuses of a lever type “Mini-Gym”, “Huttel-Mertens”, specially designed for swimmers, has been developed. Dynamic and kinematic parameters of stroke movements, performed with use of these training apparatuses, were much closer to similar parameters of common natural swimming. Also during this period training apparatuses “Nautilus” and “Universal” (for simultaneous development of power qualities and mobility in joints) have appeared.

In the late 1970s, training loads reached quickly enough their maximum level (record values of separate swimmers - 3800-4000 km per year). Attempts to reach and furthermore to surpass these magnitudes led only to lowering of a level of results. Termination of growth of general volume of loads in swimming, and also struggle against application of dopes has led to sharp impairment of growth of records, and at some sports distances - to temporary stabilization of achievements.

Since reserves of growth of loads due to significant volume of trainings to the beginning of 1980s were exhausted, trainers increased intensity of loads. At the same time general volume of swimming decreased even by a little bit. Swimming with rigid intervals and high speed was widely applied.

The volume of overland loads was stabilized to the middle of 1980s and now it makes approximately 300-350 hours per year. The specific diagnostic training apparatus “Biokinetic” allowing engaging the basic muscles participating in a stroke and to register muscular force of swimmers appeared and is widely used. Athletes also apply special equipment and accessories for total simulation of real strokes (performed in water) through overland exercises with corresponding force: brakes, paddles, rubber cords, stretched by a swimmer, drawing equipment, designed by a principle of “facilitating leading”, etc.

Extra-training factors became an important component of a training process. Medical and biologic means, stimulating growth of working capacity, include special pharmaceutical compositions, additives-nutrients, used for the purpose of ergogenic dietetics, natural (at a middle mountain level) and artificial hypoxic training. For

correction of regenerative processes trainers apply different kinds of massage; dry air and steam baths, electro- and hydro-procedures. While in 1970 and 1980s these means were applied as separate additions to a training process, in the late 1990s for highly qualified athletes the majority of ergogenic means was included into a single complex plan of training.

For the swimming development in the 20th century, trainers and researchers studied and tested in practice various variants of combinations of key parameters of loading: different kinds of exercises, their intensity and duration, size of pauses of rest and a number of repetitions of exercises. The new period of acceleration of growth of sports achievements in swimming will be connected with search of unusual combinations of general kinds of physical loads with ergogenic means, capable to cause in an organism of an athlete adaptive reorganization, accompanied by growth of working capacity.

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