



The Olympic Preparation of Alexander Popov by Gennadi Touretski (1996)

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A former National Team Member, Gennadi Touretski earned a degree in engineering, majoring in biomechanics, biochemistry, fluid mechanics, and sports physiology. In 1982, and 1991, Gennadi established the Olympic Training Center of the Soviet Union. In 1988 and 1992, Gennadi was the Olympic Team coach for USSR. In 1988, his team won a silver medal for the 400 freestyle relay and a bronze individual medal. In Barcelona, the USSR won five gold medals, among these athletes were Alexandre Popov, Vladimir Pyshnenko, Mukhin, and Veniamin Tainovitch. Gennadi was appointed as the Head Coach of the Australian Institute of Sport, in 1993. That same year, he was the coach of Alexandre Popov who set World Records in the 50 and 100 freestyle. He has also been the Australian team coach at the Rome World Championships and at the same time coach of Popov who won two gold medals. Gennadi is on the 1996 Olympic Team coaching staff for Australia as well as coach of Popov.

It was twenty years ago when I started as a coach that a very famous physiologist told me about the “Magic Sevens” in the preparation and sporting careers of athletes, seven years initial preparation, seven years of

development and then seven years for the athlete to perform at the highest level.

Now I'm looking back and see the way we approached the plan, I'm trying to realize that since 1990 I can hardly find three races that Alex lost in any level of competition. It's amazing because he had more than one thousand starts in that period of time.

Many people ask me about the key to Alex's success. The answer is simple: Natural Talent multiplied by the ability to work consistently, coming from an understanding that you cannot dive twice into the same water, and the only way to win is non-stop perfection.

Let's compare his Atlanta profile with how he looked in Barcelona; in Atlanta he was the same height as Barcelona, 200cm (6 feet 6.75 inches), his skinfold was 38mm (1.5 inches), but his weight had increased by 3kg (6.6 lbs.), so his technique has changed.

The key to his Olympic success is in his personality — the ability to learn and keep a clear mind in any circumstances. As an athlete since Barcelona he has learned to read fear in the eyes of opponents, how to communicate with the media, and even how to manage life in Australia.

Having a good education in coaching science he understands how to train and to be fit for the race; but few people know that he was sick at the World Championships in Rome in '94, and at the European Championships in Vienna in '95. The reason was that he lost his adaptation reserve as a result of the high intensity three weeks before the start.

In our Atlanta plan we paid more attention to fitness work, so Alex did not look so sharp at the beginning of the week's competition. You may be interested to know that his technique is based on the three R's: Rhythm, Relaxation, and Range.

Beauty comes from rhythm (an old saying), and rhythm leads the movement. The timing of his stroke is based on the kayak principle.

In predicting the opposition Alex would have in Atlanta, he did not believe that someone would break 49.0 seconds. It took me quite some time to explain to him that they would swim around 48.6 sees. You will see in the lecture how we make a model and plan for Alex's races, training paces and intervals at the aerobic, anaerobic and MVO₂, levels.

SPRINT EVENTS IN SWIMMING

Training for any swimming event is highly complex. However, until recently, the effectiveness of training depended heavily on the coach's skill, his intuition, his ability to motivate his swimmers and his ability to measure the effect of the training load.

However, we increasingly encounter the expression "scientific methods of controlling training", which implies that intuitive decision making is supplemented by scientifically founded actions that rely on measurements of the athlete's condition.

For example, people used to think that the most reliable way of increasing results was to simply arithmetically increase the volume of training in all its parameters. This seemed the only true way because this was the way that most of the record holders and champions achieved their success.

Today, training load volumes have reached such significant heights that, not only is increasing the training volumes not the ONLY WAY of improving results of top class athletes but often, it is an absolutely ineffective way of developing training programs for success.

If we have a look at the top 10 results of the 50m freestyle in 1986 and 1994, you would not notice any significant improvement. Is the result we have

achieved the limit or can't we develop training methods and views? I think the latter.

Let us put together the best 15 meters of Dano Halsall; 15-35 meter distance of Matt Biondi and last 10 meter of Alex Popov. We would have 19.83 for 50m Freestyle. Therefore it is crucial that we understand the complex mechanism that underlies a training system in order to prepare our swimmers for today's sprint competition.

The problem of organizing sprint training in swimming, despite the outward simplicity of the competitive action (movement) itself, is complex and perhaps is at a lower level of evolutionary development than that of other events in swimming performances.

Physiologists' studies show many bodily functions undergo varying degrees of significant change during sports training. A person becomes able to work longer or exert greater power because of these bodily changes. Individual motor qualities develop in an uneven manner for a number of reasons.

Today coaches and swimmers know how to develop strength effectively, quickly and reliably. The use of significant weights, resistance and biokinetic devices, together with nutritional regime and high intensity training — these are a brief list of strength training methods.

Endurance development methods have appeared successfully, making it possible to increase endurance specifically, mostly because of better classification of training loads and their influence in the athlete's performance.

Animal experiments and practical sports training experience show that speed develops 3-4 times slower than strength, and 23 times slower than endurance.

How do you explain these facts?

I think that there is no such thing in sprint events as the speed factor limiting the performance but that there is a complicated whole that brings together strength, agility, endurance and flexibility into a multi-component “alloy” which can be called “Individual Highly Efficient Swimming Technique” (IHEFST) or the widely known name — good technique.

Let’s have a look at and compare two kinds of sports — swimming and track and field. Speed in swimming is four times less than in running, so we can use 25 meters lap in swimming and 100 meters in running.

Swimmers in every session can do training sets of 10 x 25 with 2 minutes rest on maximum speed. In the case of Alex Popov, he would do this better than 10 seconds. Can you imagine a track and field athlete doing the same set 10 x 100 with 2 minutes rest, doing 10 seconds each? It is obvious, that a swimmer creates less power and is less exhausted than the runner doing the same sprint high intensity work. What does it mean for us? It simply means we are in the Stone Age with swimming action as we compare to other kinds of human actions such as running.

The future in developing technique in order to increase speed and decrease resistance (active drag), is to increase output (release) the energy of sprinting.

We know from theory that very high speed cyclical exercises are controlled by the cerebral structures that are responsible for automatic movements and are accomplished by means of a clearly formed algorithm. Hence, sharply increasing one element of an already well balanced program can lead to incoordination and interfere with swimming technique.

The modern approach to achieving optimally functioning complex systems in which individual elements have differing degrees of dependence on each other and on the ultimate result is based on systematic structural approach to planning and control and solving two fundamental problems:

1. Identify the system's elements, ie. Determine all the factors that influence the result.
2. Establish inter-relationships between the system's identified elements.

The following basic components should be present in swimming training systems for sprinters

-competitive model;

– to understand the difference between a given athlete's basic characteristics and the model's characteristics;

– the methods of the various training effects (the training means, the volume and intensity of exercises, the sequence in which exercises are used and so on);

– methods of controlling or monitoring the athlete's condition; calculations of the magnitude and structure of the training loads;

– the principal models of rehabilitation and of supporting the training process.

The number one element of this table is the swimming result. THE ULTIMATE GOAL, whose achievement is supported by action of the whole system. The components, or substances which influence the overall result are defined at the next lower level.

Having a detailed itemization of these secondary components, allows a coach to plan training and conduct it in the most effective way possible. In sprint events, these are measurements that characterize the 'start': starting speed (15m); stroke rate and stroke length; velocity of swimming in standard points and the level of decreasing velocity during the race. It is most important to identify when developing long term plan the training strategy factors that prevent the swimmer from attaining a high result. These factors can be divided into two groups:

1. Stability – to undergo little or no change when subject to training;
2. Trainable factors.

The model characteristics of training and competitive activity of top level sprinters provide objective values for technique, speed-strength qualities, and energetics. These values are, in essence, the goals to be reached by using specific methods.

Swimmer's Name: Alexandre Popov

Date of Plan: Wed, Nov 1 1995

MEN'S 100m Freestyle

100m Goal 48.00

First 50m 23.15

Second 50m 24.85

Planning My Goal 100m Time: If I am to reach my goal of 100m Freestyle in 48-00 Time hand touch; I should achieve a best 50m time of 21.90 Time hand touch; I should achieve a best 25m time of 10.80 Time head position; I should achieve a best 10m Start time of 3.14 Time head position; I should achieve a best 10m Finish time of 4.47 Time hand touch.

Program Structure (Preparation of Cycles)

The AIS Swimming model is based on the concept that each preparation is divided into six (6) or twelve (2 x 6) week cycles. This structure is designed to permit an adaptation process involving general, specific and competitive phases.

The following general structure is suggested for each coaching group. It is intended that individual groups will have the flexibility to tailor their program for specific purposes.

Based on this format it is possible to conduct 4 x 12 week cycles each year giving a 4 week rest period each year.

The volume for each 12 week cycle would be approximately 500-600 km (i.e. an average of 40-50 km per week) which gives an annual volume of approximately 2000-2500km. Again this may change depending on the requirements of specific coaching groups.