

# PREPARATION OF SPRINT SWIMMERS

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## INTRODUCTION

The Men's 100m Freestyle is regarded as the blue riband event of the Olympic Swimming, World Championships, with many gold medallists becoming household names. It has led to two Olympic champions to movie fame: most notably Johnny Weissmuller in the role of Tarzan. He won two successive Olympic 100m Freestyle gold medals in the 1920s.

Among the Olympic champions we have two Australians ... John Devitt and Michael Wenden who were successful in 1960 and 1968 respectively. I have been privileged to coach Aleksandre Popov the World 100m Freestyle champion in 1994 and 1998, double Olympic Champion in the 50 and 100m Freestyle in 1992 and 1996 and the current World Record Holder (48.21 set in 1994).

Although Aleksandre was born in Russia, he currently lives and trains at the Australian Institute of Sport in Canberra, where I have a coaching contract until the 2000 Olympic Games.

At the recent 1998 World Championships in Perth, Western Australia, Australian sprinters achieved significant success. Michael Klim took a silver in the 100m Freestyle, a bronze in the 50m Freestyle, and gold medal in the 200m Freestyle. It is important to note after a long time that Australia was represented by two swimmers in the final of the 100m Freestyle. The successful Men's 4x100 Medley Relay team is attributable to the great efforts of the Australian athletes in this event, and also improvements in training and the technology used to prepare these swimmers.

Michael Klim became a household name after the 1997 Pan Pacific Championships where he won the 100 and 200m Freestyle events. He set the national record for the 100m Freestyle in the relay in Fukuoka of 49.15. At the 1997 National Championships he established a new world record in the 100m Butterfly (52.15). This showed us all that we had a new leader in the world of sprint swimming.

In this presentation I would like to share my experience in developing Michael Klim's talent. Reflecting back on the 1998 World Championships and the way we approached the plan, I realise that since 1993 when I first met Michael I cannot recall a single occasion when he was significantly off track or disappointed in his progress. His motivation and dedication to training during this period was extremely high. Since this time, he has swum some 8,000km in the pool with almost 500 races in his quest to become the number one swimmer in the world.

Many people have asked me the key to Michael's success. The answer is always the same: natural talent coupled with the ability to work consistently and adopting a philosophy that you shouldn't **dive twice into the same water**. The only way to win is with non-stop perfection. For developing athletes, the personality of the swimmer is extremely important and swimming and training with Aleksandre Popov, the world's fastest swimmer, helped Michael to improve his technique and educate himself in the way champions should behave.

## PHILOSOPHY OF COACHING

The philosophy of coaching sprint swimmers is not very different to training the other distances. My philosophy is based on the understanding of two things. Firstly, athletes should be fit both physically and mentally and, secondly technique should be perfected. This approach helps us divide the preparation into specific parts. There is no one particular successful method. The great individual variation in the make-up of athletes ... age, gender, anthropometrical characteristics dictate that the preparation must be tailored to suit the requirements of each swimmer.

If we examine the characteristics of current champions in the sprint events, most of them are very tall (greater than 190cm in height), look very athletic and aged between 18 and 25 years. Some of them are at the stage of stable performance and others in the stage of physical maturation and variable performance. In developing athletes, it is very important to find the key that is suitable for each individual personality.

For example, the key for the performance of Michael Klim for all distances and strokes is the 200m Freestyle event. If we compare Michael Klim with Aleksandre Popov, Aleksandre prepares for the 50 and 100m events only,

without paying attention to his 200m performance. His complementary preparation for his sprint Freestyle is centred on the 100 and 200m Backstroke events.

One of the most important parts of the preparation is the training plan. Our approach is based on the transformation of training from general to specific, aerobic to anaerobic, from endurance to speed. The key of this preparation is to support and maintain speed throughout every phase right through the training season.

If there is a single factor that can identify the champion sprint athlete, and a common feature of the best sprint training programs, it is the ability to swim competitive speeds under the pressure of high workloads and training volume. This is particularly important during the preparation about 4-5 weeks prior to the competition, when other swimmers do not swim close to competitive speeds.

The plan usually consists of four parts...

- General
- Specific
- Competitive
- Recovery

### GENERAL PREPARATION

This phase starts with two weeks of technical and coordination work and reaches a volume of 40-50% of the peak volume for the season. This is usually 35-50km of swimming per week with about 10 sessions per week in the water, and 5x45-minute dryland sessions of fitness work and 2x30-40 minute running sessions. At this time, we discuss the plan for the season and the means of developing technique.

Progressively the plan is to re-establish the level of the previous preparation. Testing including blood testing, body composition (skinfolds), the 7x200m Step Test, and 25m times is conducted. It is very important to motivate the swimmers and prepare them for the goal of the cycle. A great deal of communication between the swimmer and the coach is essential.

In this stage we use sprint assisted training with surgical tubing, towing machine, and fins with the purpose to stimulate the physiological and neuromuscular adaptations necessary to swim fast while holding good technique (distance per stroke). Occasionally we use

fitness exercises in the water such as water polo and other games, and a great variety of swimming drills during regular training.

The next stage is to increase the training volume in three weeks up to a maximum of 80-100km per week. This is achieved primarily by low to moderate intensity aerobic work in the AM sessions with total volume of 5-6km per session, with individual sprint and technique work conducted at the end of the session. An example of this would be...

300m warm-up  
4 25m IM  
1x5000 distance with cruise speed  
400m kick + 8x50m kick on 50  
400m resistance (surgical tubing) + 8x25m assisted sprint

The afternoon session is based on repeating the previous distance work but this time broken into 100m intervals but with a similar structure...

500m warm up  
10x25m on 60  
30x100m on 1:30 (1:10 for Michael Klim, heart rate 140-150bpm)  
500m drills  
20x100m on 1:40 (1:05, heart rate 150-160bpm)  
400m kick  
4x100m on 1:40  
8x25m dive start on 2:00

The requirements for distance swimming and longer intervals centre on controlling the number of strokes per lap. For Michael, he is instructed to use no more than 30 strokes per lap using Freestyle. We continue this type of work for 2-3 weeks with the intensity increasing after two weeks.

### SPECIFIC

The goal of the **Specific** phase is to prepare the skills and energetic systems necessary for the competition. At this stage, the aim is to maximise the volume of swimming undertaken at competitive speeds. From analysis of the training of the best athletes, it is evident that the proportion of speed and/or specific work rarely exceeds 20% of the total training volume.

While the volume of work decreases and following the recommendation to decrease this some six weeks before racing. The weekly training volume is still quite substantial and may reach 50-60km per week in this phase. In

this phase, Michael Klim does not swim further than 6.5km per session with up to 10-12 sessions per week.

An example of the afternoon session for a standard Wednesday in the weekly program is...

600m warm-up  
8x50m on 50 D1-4  
8-10 x (400m (4:30) + 60s rest + 100m Freestyle (55 to 52 seconds))  
1000m kick and pull  
10x50m alt 100m pace, easy  
300m swimming down

### COMPETITIVE

The word **tapering** is very commonly used by coaches. The swimmer should develop his readiness in the general and specific phases to achieve competitive speeds in a heavy workload.

This is particularly important for the second 50m of a 100m race and the second 100m of a 200m race. Later this is achieved by reducing the volume and improving the recovery: speed will automatically develop through heightened activity of the nervous system and super-compensation of physiological capacities.

At this stage, a favourite exercise is three days of simulated competition approximately three weeks from competition, with a further day of time trials approximately 10 days from competition. This work typically takes the form of...

300m warm-up  
1x100m Butterfly (e.g. 54.60)  
3x50m on 3:00 (e.g. 25.0, 24.6, 24.6)  
6x100m recovery on 1:40 heart rate 130-140bpm  
8x25m dive on 2:00  
1000m kick and drills

The last high intensity training session is held five days before competition.

### TECHNIQUE

The key is constant attention to the quality of technique but without making excessive changes such that swimmers **lose** their technique and/or feel for the water.

To illustrate this point, I would like to relate a story from last year where we discussed technique with Scott Volkens (coach of Samantha Riley and Susie O'Neill) and a top Russian coach Victor Advyenko (coach of

Olympic Champions Denis Parikratov and Evgeny Sadovyi). Both represented their training theories in about 20 minutes. Journalists and coaches were very surprised that the two coaches had very different approaches. Advyenko's approach could be characterised as high volume – low intensity while Volker's is medium volume and higher intensity. Both coaches have been extremely successful at the international level.

I have had the opportunity to work with both Volkens and Advyenko ... they shared one characteristic ... a great ability to control, influence and teach efficient technique.

The most important aspect in teaching is that the swimmer is learning and acquiring the correct technique.

The swimmer needs to develop a self-organised psychosomatic system based on positive feedback using information derived from the training program.

The role of the coach is extremely important in selecting the information and using the correct words and images for the swimmer to understand and learn the skills. In Australia, this is best illustrated by the **heart rate** set where the coach informs the swimmer of the desired pace and heart rate. The swimmer needs to develop a balance between effort and technique in order to achieve the correct pace and intensity.

In my opinion when we speak of technique we need to understand that this includes biomechanical parameters such as stroke rate and stroke length, physiological responses such as lactate and heart rate, and of course performance and split times. This should act as positive feedback and influence the technique in the best possible way.

Immediately after the 1996 Olympic Games, Michael Klim's technique was modified to incorporate the old-fashioned straight arm recovery. The longer recovery seems to lengthen the stroke.

The particularities of Michael's technique (straight arm recovery and late body pitch) moves his centre of mass moved forward which helps him to reach the correct horizontal body position without over kicking. Generally I use the principle of the three R's to explain and teach good swimming technique.

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RHYTHM	The basis of maintaining the quality of motion. As soon as rhythm is lost, distance per stroke and speed decrease.
RANGE	Through the stroke we can determine the optimal range for competitive swimming. In training the goal is to reduce the number of strokes per length.
RELAXATION	John Weissmuller was reported to have said that the secret of sprinting is in the recovery part of the stroke.

The feel of the water is the ability to balance the propulsive forces and counter them through the stroke. In training, the goal is to minimise the intracycle fluctuations in acceleration and deceleration that occur at different phases of the stroke.

### STARTS

The importance of starting and turning is well described. In the 100m Freestyle event, the start and turn cover almost 30% of the total distance at a speed greater than the average race speed.

There are six essential points...

- Centre of gravity is in line with the front edge of the block
- The hips push forward as a trigger motion
- At the moment of leaving the block, the body is outstretched in a straight line, at the lowest possible angle to the water
- The whole body enters the pool through the same small hole
- The body remains rigid and streamlined in a torpedo-like trajectory
- The body reaches the surface at the smallest possible angle

### URNS

- Maintain the maximal possible speed in the last 5m before the wall
- Use a minimum radius of rotation (head close to knees)
- No twisting of feet on the wall
- Streamline the body in the drive from the wall
- Stay under the following wave
- Keep lowest possible angle when breaking the surface

### SUMMARY

Are we going to be the fastest swimming nation in the world in 2000, and starting the new millennium as the fastest swimmers in the world? There is a lot of to do and not much time available. As the Sydney 2000 Olympic Games approaches, the time seems to be going more quickly and tension mounts. We need to answer many questions, in order to predict the situation in the Olympics.

I will be considering the following issues...

- Predicting the opposition
- Competitive model for each individual event
- A model of the basic characteristics of each athlete

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- The effects of various training factors such as volume, intensity, race schedule
- Methods of controlling and monitoring the athletes condition
- Calculating the magnitude and structure of the training loads
- The principle model of rehabilitation and support for the training process
- Prediction of positive and negative factors during training and competition phases up to and during the 2000 Olympics

As a coach I see three key steps in this planning process...

- Increase the number of competitive opportunities (quality racing)
- Improve the swimming technique
- Improve the fitness qualities of swimmers

The problem of organising sprint training is complex despite its outward simplicity. Perhaps sprint swimming is at a lower level of evolutionary development than that of other events on the swimming program.

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

Who is going to be the number one sprinter in Sydney 2000?