SWIM DOWNS: BEST PRACTICE

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INTRODUCTION

The purpose of this article is to describe the rationale for and practice of swim downs used by highly trained competitive swimmers. The primary purpose of **swimming down** is to hasten the recovery process from exhaustive training or competitive swims and, where appropriate, promote subsequent swimming performance. Practical guidelines and examples of swimming down are presented for coaches and swimmers. The use of heart rate and blood lactate monitoring to control swim downs is discussed, along with consideration of a number of other practical issues that may influence the swim down process.

RATIONALE FOR SWIMMING DOWN

A number of physiological reasons are generally suggested for swimming down. In scientific terms, the main reason for swimming down is to promote the process of re-establish homeostasis. With exhaustive exercise, the body and its various systems are placed under considerable stress. The cardiovascular responses of increased respiration, blood flow, heart rate, oxygen utilisation, muscle and blood lactate concentration are well characterised. These exercise-induced changes are also accompanied by changes in the hormonal, nervous and neuromuscular systems. All these systems need to recover for peak athletic performance to be sustained.

The specific physiological benefits of swimming down include … faster recovery of heart rate and other cardiovascular variables back towards baseline levels – faster recovery of respiration and breathing rate – and faster removal of excess lactate anions and hydrogen ions. In musculo-skeletal terms, an active recovery is thought to reduce tissue macro trauma and ease the discomfort of tight and overworked muscles. Swimmers can experience significant musculo-skeletal tightening, even after short sprints, and may benefit from some controlled aerobic swimming and post-swim down massage.

- In practical terms on the deck, swimming down takes on increased importance during competition. Preparing swimmers for their next swim is a fundamental process for coaches and swimmers. Within the same heat or finals session.
- For the finals that night.
- For racing on subsequent days.

Almost every swimmer – from the age group to the international level – usually competes in more than one event. Figure 1 shows the event schedule for Michael Klim during the 1998 World Championships – the sheer number of events on consecutive days demanded a well constructed and executed recovery plan.

Figure 1

Day	Event	Heat	Final	Result
1	200 FS	1.47.96	1.47.41	1st
2	4x200 FS	-	1.47.67	1st
3	100 FS	49.33	49.20	3rd
4	4x100 FS	-	49.27	2nd
5	100 Fly	53.34	52.25	1st
6	50 FS	22.58	22.47	3rd

7	4x100 MR	-	51.80	1st

Specific Guidelines for the Prescription of Swim Downs

Swim downs can be planned using the same approach as for any aspect of warm-up and training – i.e. prescription by time, distance, stroke, cycle time and heart rate. The Australian Institute of Sport (AIS) swimming coaches generally adopt the following protocol for swimming down:

Swim 800-1200m at moderate intensity (heart rate 100-140bpm) using intervals of 50-200m Freestyle or Freestyle/Backstroke. Individual Medley and form stroke swimmers should incorporate some 25 and 50m intervals in the stroke they have just swum. Heart rate should be checked after every 200-400m. Some shorter more intensive 15m efforts should be included (after an initial 400m of moderate intensity swimming) to recruit specific muscle groups and flush open the capillaries within the muscles. Where specified, heart rate and blood lactate measurements can be used to indicate whether sufficient swimming down has been completed.

At some stage, after swimming down 1500m or more, the possible disadvantages of metabolising or burning excessive glycogen probably outweighs other benefits of extended swimming down. Conserving and replenishing muscle glycogen stores is a limiting factor in prolonged and exhaustive training (Costill and Hargreaves, 1992), and during extended competitions over a period of several days.

Examples of swimming down…

Butterfly swimmer

2-3 x [200m as Freestyle/Backstroke
holding 140bpm HR]
[4 x 50m as 25 Freestyle/25 Butterfly on 60 sec]
Total = 800m

Freestyle swimmer

400 Freestyle/Backstroke, 200 Freestyle, 100 Freestyle, 4x50 Freestyle all on 45s
Total = 900m

Breaststroke swimmer

200 Freestyle/Backstroke, 50 Breaststroke, 200 Freestyle/Backstroke, 50 Breaststroke
2 x (100 Freestyle, 50 Breaststroke)
Total = 800m

Individual Medley swimmer

400 Freestyle, 2x100 Freestyle/Backstroke, 2x100 Breaststroke/Freestyle, 400 Freestyle
Total = 1200m

These examples are shown for illustrative purposes only and coaches will need to develop personalised plans according to their own individual circumstances. It is likely that younger age group swimmers would use shorter swim downs.

MONITORING SWIM DOWNS

There are several options for coaches to use when monitoring the swim downs of their athletes. The most common means is simple observation with the coach's **eye**. Apart from monitoring basic adherence to the swim down and ensuring that the correct distances, strokes and paces are used, the coach may also like to point out deficiencies in stroke technique or race strategies at this time. The two most common physiological means of monitoring swim downs are by heart rate and blood lactate testing. Monitoring heart rate is a common method for prescribing and checking routine training sessions. In the same way, blood lactate can be used to assess the degree of physical exertion imposed by the race, and the extent of swim down required to recover.

USING BLOOD LACTATE TO MONITOR SWIM DOWNS

One of the principal reasons for swimming down is that active recovery elicits faster removal of excess blood and muscle lactate than does simple passive (resting) recovery. Scientific studies conducted in the mid 1970s established this point (Belcastro and Bonen 1975), and many subsequent studies and on-deck testing has confirmed these initial findings. Optimal removal rates generally occur at exercise intensities between 40-60% of VO_2 max. This equates to moderate aerobic swimming within a heart rate range of 50-70% of maximum heart rate. For a swimmer with a maximum heart rate of 200bpm, this equates to 100-140bpm. An active recovery at this intensity will accelerate the removal of excess lactate in two ways. Firstly, a portion of the lactate will be removed by oxidation in muscle (converting lactate to energy). While another portion will be transported via the Cori Cycle to the liver and converted back to glycogen (the principal storage form of carbohydrate in the muscle) (Brooks 1986; Gaesser and Brooks 1984).

Blood lactate testing was originally used to indicate the extent of anaerobic (without oxygen – anaerobic glycolysis) contribution to various swimming events. Research has shown that there are many confounding variables in relation to blood lactate concentration, energy demands and overall swimming performance. For this reason, post-competition lactate testing is only used as a gross indicator of anaerobic contribution and is not linked directly to performance. The current approach is to link the immediate post-competition blood lactate test with that of the post-swim down test to determine the extent that the blood lactate concentration has fallen, and by implication the extent that the recovery process has progressed. Blood lactate concentrations for a given swimmer are influenced by several factors, including – individual physiology, event distance, effort/speed, residual fatigue, and measurement error. These factors need to be considered when interpreting post-competition and post-swim down results.

Results from lactate testing conducted at 1998 World Selection Trials held in Brisbane in October 1997 are presented as follows…

Measure	Heats	Rec.	Finals	Rec.	Total #
Average (mM)	9.1	2.8	10.5	3.4	
SD	2.8	1.4	3.4	1.8	
Min	4.1	0.9	4.7	1.8	
Max	17.6	7.2	21.2	8.4	
n	75	47	60	21	203

Inspection of the results indicates that post-race lactates are generally around 9-11mM although these can vary from as low as 4mM up to 21mM. Post-swim down lactates (after a standard swim down of 800m) averaged 2.8 to 3.4mM and ranged from 0.9mM to a high of 8.4mM.

OTHER CONSIDERATIONS

At many competitions there may only be limited pool space to swim down during the Meet. Normally, short course pools (25m) or diving pools are provided for swimmers to both warm up and swim down. Diving pools can be quite variable in length and coaches will need to modify instructions on intervals, cycles and pace to suit the available facilities. Two of the main considerations in the recovery and swimming down process are fluid replacement and dietary snacks (Ivy 1991; Whitehead and Holmik 1989).

At major national level and international Meets, the presence of media can be a distraction for swimmers and coaches. The practice adopted by the Australian Swimming Team is for swimmers to meet the initial requirements of poolside TV interviews and then take some brief questions from the assembled media. Under the direction of Team Management and Officials, swimmers are then accompanied to the

swim down area. Media representatives seeking more extensive interviews are asked to wait for swimmers to complete their swim down commitments.

Medal presentations can also present some difficulties. Quite often medals are presented about 15-20 minutes (two or three events) after a swimmer's race. This can necessitate an early exit from the swim down pool. In these circumstances, swimmers are asked to return to finish their swim down after the medal ceremony. The same policy applies to drug testing commitments. Taken together, these requirements can mean a late finish to an evening's swimming, but in the era professionalism, these little things should be attended to.

References:

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