

What, How and Why do we train?

As a coach and ex-competitive swimmer, I have been asked many times “why are we doing this set”, “I’m a sprinter why am I training on 100s and 200’s?”, “I am a distance swimmer, why are you asking me to train 50’s and 100’s”, “Why would you tell a swimmer to slow down in training”? These are all valid questions and ones that a coach must explain.

The objective of this article is to educate swimmers, parents and teachers / coaches who have just come in to the sport and **briefly** explain the energy systems and types of sets given to help towards optimum performance.

Books have been written to explain the energy systems so I will summarise. It is important that ALL 3 systems must be developed. There are 3 main energy systems;

- **Alactic system (ATP-CP)**
- **Lactic (Anaerobic/glycolytic system)**
- **Aerobic**

1) Alactic system (ATP-CP)

This system is used for immediate energy. ATP (Adenosine Triphosphate) is the chemical substance that creates this energy. It consists of one molecule of protein (adenosine) and 3 (tri-) molecules of phosphate. ATP only lasts a few seconds. ATP is then recycled by other sources of energy: creatine phosphate (CP), fats, carbohydrates and proteins. This lasts for 8-12 seconds giving immediate energy (equivalent to 15m sprints, at turns and starts).

2) Lactic (Anaerobic/glycolytic system)

Anaerobic Lactic – When we go beyond our anaerobic threshold it means that we are working so hard that we cannot get enough oxygen to our muscles. Glycogen is broken down into glucose, which then forms pyruvic acid. When pyruvic acid cannot be broken down Lactic Acid will start to build up causing pain and tiredness. This system will last up to 3 minutes.

3) Aerobic System

Basically lactic acid is skipped, as the body is able to remove waste products systematically. This system lasts beyond 3 minutes.

Why is it important to train all systems?

Let me explain. All races last for more than 12 seconds and many races last more than 3 minutes. So, if you swim a 400m free event, you would use your ATP system for the first 15m (and at turns), your AEROBIC system will be used up to approximately the 250 mark and then the ANAEROBIC THRESHOLD system will kick in and lactic acid will build up quickly during the last 150m. The same will apply to all other distances (the % used for each system will depend on the event e.g. a 1500 will consist of 90-95% aerobic).

Training all systems will ensure you are able to train and compete at your best, and take advantage of the chemical reactions your body goes through.

Be aware, training consistently at a high level (e.g. at Aerobic Overload) will result in ‘burn out’ and poor performances (this explains the last question at the beginning of this article).

Training Systems

Within my club, I use training Zones & heart rates to monitor training performance. Heart rate training and training relative to individual's personal best times should be used to ensure swimmers are training at the correct pace. Please the below table to explain the different types and training used to develop each of the above energy systems and some sample sets;

Training Zones	GB swimming	Description	HR (bbm)	Simplified description	Targets
1	A1	Aerobic Intensity Low	>50	Aerobic	½ 200 PB + 15-20 secs
	A2	Aerobic Maintenance	40 – 50		½ 200 PB + 10-15 secs
2	AT	Anaerobic threshold	30 – 40 20- 30		½ 200 PB + 7-10 secs
3	VO2	Aerobic Overload	10 – 20		½ 200 PB + 4-7 secs
4	LP	Lactate Production	0 – 10	Race Pace	PB
	LT	Lactate Tolerance	0 - 10		PB
5	HVO	Speed	n/a	Race Speed	Max Speed

20 seconds eg, 4x800, 15x200 swim/drill/kick, 1500, 800, 400, 200, 100 20 secs RI (targets and HR will differ depending on whether you are working @ Aerobic low or Aerobic maintenance.

Anaerobic Threshold – 10-30 secs RI (HR 30-20 bbm). 24x100 with 20 secs RI, 6X400 with 15-20 secs RI, 12X200 with 30 secs RI

Aerobic Overload – (30 secs – 1min or work to rest ration of 1.5:1 Examples 20X100 off 2mins, 8x200 with 60 secs RI (HR to be monitored see above table)

Lactate Production – 8x50 on 4min, 12x75 on 4mins (75 max, 75 easy), 4x100 off 10mins

Lactate Tolerance – 5x100 on 4 mins, 1x200 on 6min 2x100 on 3min 4x50 on 2min, 4x150 on 5min

Speed – 10x25 max on 2min, 10x25 (12.5m max, 12.5m easy), Dives breaking out into 15m – 30m sprints

(The above document, sample training sets and descriptions can be found on the British Swimming website)

To summarise, the above information gives you a brief insight into what is required of you, as swimmers, and what we as coaches are working towards to ensure you have all of the ammunition to compete at your optimum level. It also helps you understand why specific training set are given and the importance of training at the right level.

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