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>>>>Training Clients for a "Tri"

Before creating a triathlon training program for clients, you must know the basic tenants of the sport, plus training schedules and techniques.

By Stephen A. Black, DSc, PT, ATC/L, NSCA-CPT

PREPARING CLIENTS FOR a multi-sport endurance event takes more planning than training them for one sport. Athletes need to be proficient at each sport, be well-rehearsed in transitions and be mentally ready for long training hours. The training schedule is typically longer than for one sport (a whole year for triathlons), and requires knowledge about seasonal training and overload prevention. Here is an overview of how to prepare clients for a triathlon.

Types of multi-sport events

Multi-sport participation can take many forms. The term typically categorizes four different events, including triathlon, duathlon, aquathlon and winter triathlon.

Triathlon. Triathlon is an activity that typically combines swimming, cycling and running in one event. The three sports are performed consecutively with no breaks. The portion of a triathlon when athletes change from one sport to the next is called a transition. It is also called the fourth leg of triathlon.

Triathlon has consistently gained participation/visibility since the inaugural event in 1978, and the ABC Wide World of Sports presentation of the Ironman event in 1980. The original event took place on the island of Oahu, but was moved to its present location on the "big island" of Hawaii in 1981. Another triathlon, called the Xterra Triathlon, is an off-road event that includes swimming, mountain biking and cross country running. This event has gained popularity since the televised world championship in Maui, Hawaii.

Winter triathlon. Winter triathlon is an activity that varies the sport greatly. Typically performed on snow, the competition can vary any three events, including speed skating, classic cross country skiing, skate skiing, snow shoeing, telemark skiing (with and without "skins") and mountain biking. Winter triathlon is ideal for states and countries that have colder climates and long winters. They also offer a perfect opportunity for athletes to cross-train, and maintain fitness during the winter.

Cycle cross. The sport of cycle cross is gaining traction worldwide. This event includes running and cycling off-road, and uses a new modification of road/mountain bikes called "cross bikes."

Duathlon. Duathlon is an activity that com-

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bines running and cycling. The event has three segments: run-bike-run. Duathlon provides an excellent option for people who are unable to swim, or who do not enjoy the water.

Aquathlon. Aquathlon is an activity that combines swimming and running. The event has three segments: run-swim-run. There is one exception to this order. If the swim requires a wetsuit (for safety, cold water, etc.), the event is changed to a swim-run. Aquathlon is an excellent introduction to the sport of triathlon, particularly for junior athletes. They are generally safe, and require little equipment.

Triathlon details

Triathlons are the most popular of the variations described. The majority of them follow the same format, and have four distances:

- Sprint: 750m (0.5 mile) swim, 20k (12.4 mile) bike, 5k (3.1 mile) run
- Olympic: 1.5k (0.93 mile) swim, 40k (24.8 mile) bike, 10k (6.2 mile) run
- Long Course (Half-Ironman or 70.3): 1.9k (1.2mi) swim, 90k (56 mile) bike, 21.09k (13.1 mile) run
- Full Course (Ironman): 3.8k (2.4 mile) swim, 180k (112 mile) bike, 42.195k (26.2 mile) run

In most triathlons, the events (swim-bike-run) are placed back-to-back in immediate sequence, and a competitor's official time includes the time required to "transition" between the individual legs of the race, including any time necessary for changing clothes/shoes, eating/drinking, etc. As a result, proficiency in swimming, cycling and running alone are not sufficient to guarantee a triathlete a competitive time; trained triathletes have learned to race each stage in a way that preserves their energy for subsequent stages.

Training goals

Whatever the sport or event, in this case triathlon, improvements will be gained through increases in strength, mobility and stamina. In general, the goal is for your clients to do the following:

- Increase general work capacity (force x distance/time) and power (work/time).
- Improve their ability to tolerate increasing levels of muscular fatigue.
- Elevate heart rate to upgrade cardiorespiratory capacity.
- Enhance overall body strength, including the strength and resiliency of muscles, tendons and ligaments, the integrity of joints, and bone density.
- Improve movement, balance, coordination and body awareness.
- Increase lean mass and decrease fat mass levels.

Seasonal planning

In general, a "typical" triathlon training plan is devised a year in advance. This allows for periodization with a focus on annual, monthly and weekly schedules. Various training sessions and schedules allow for the application of sound training principles according to individual progression and goals.

Macrocycles are periods within an entire

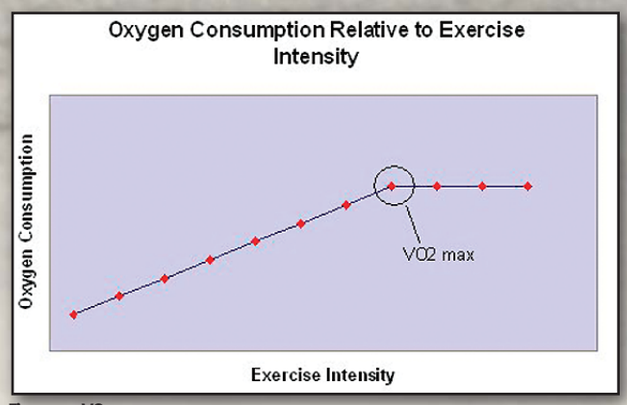

Figure 1. VO2max

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season that focus on specific physiological areas. Mesocycles are smaller "chunks" — usually three to four weeks in duration. They will often feature a progression (e.g., loading/unloading) of training from low to high intensity or from easy to difficult skill development. Microcycles are weekly schedules that creatively balance specific practices in each sport (e.g., long run, tempo cycle, interval swim).

An annual program may include the following:

Macrocycles.

December/January through March: Base/Prep work. To gain a base for the sport, have clients participate in a high-volume, low-intensity version of all of the sports. The primary purpose is to acclimatize muscles and tendons to explosive movements and forces that they will be exposed to later in the season (at higher loads and faster speeds).

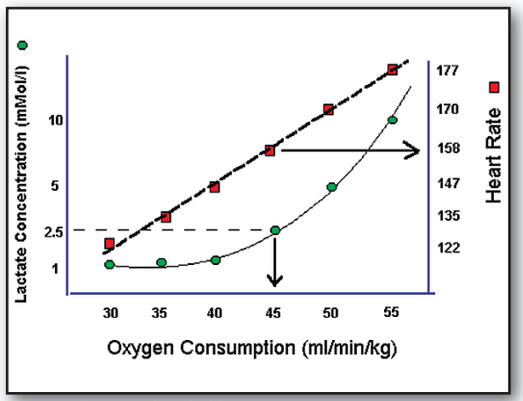

Figure 3. Lactate Threshold

March through June: Specific prep work. Specific prep work may involve periods of sport-specific work (e.g., run focus or swim focus) followed by triathlon-specific (balanced) training. The primary purpose is to target areas of weakness, including training on hills and in rough water, and to deal with potential injuries. In addition, this phase prepares clients for the demands of racing through the practice of specific skills, including transitioning from one sport to another.

June through September: Race season. The race season phase makes sure that clients are in peak condition for key event(s), and are resting to ensure adequate recovery between races. The primary purpose is to maintain fitness, and to perform at peak levels.

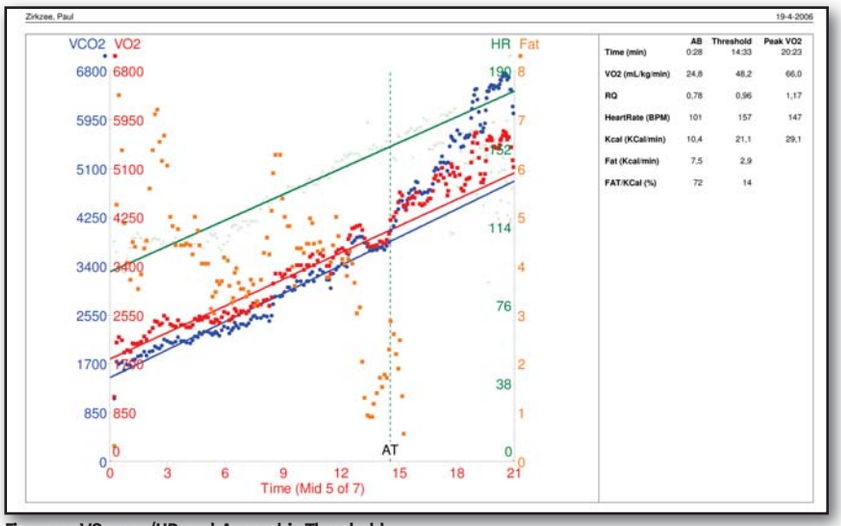

Figure 2. VO2max/HR and Anaerobic Threshold

September through December: Off season. During the off season, clients should maintain an emphasis on maintenance of fitness by engaging in other activities (skiing, hiking, climbing, etc.). The primary purpose is to allow the body to recover from the stress that was applied during the season, to target weak areas, to engage in alternate forms of activity and to rehab any injuries.

Principles of training

To appropriately prepare clients for a multi-sport event, baseline data needs to be acquired (see Figure 1). This data can then be used to evaluate and train clients using overloading, intervals, progression, specificity, maintenance, VO2max, anaerobic threshold, lactate threshold and critical power.

Overload. For training adaptation (improvement) to occur, the muscles, or physiological systems being trained, must be stressed at a higher-than-normal level.

Applied example:

Use the minutes-per-kilometer formula for a 10k run. For example, 1 km in four minutes.

Use the same formula, minus 4 percent (e.g., 4 min/km – 4% = 3 minutes, 51 seconds).

Intervals. Week 1: Two to three times for 1 km at overload pace (90 seconds rest).

Week 2: Three to four times for 1 km at overload pace (90 seconds rest). Continue this progression, and/or decrease rest or increase number of intervals.

Progression. Once adaptation occurs, the training stimulus must be changed to maintain the effects of "overload." The general rule is to increase by a maximum of 10 to 15 percent.

Applied example:

Week 1: Hours trained this week: 10 hours

>>>Overreaching is the result of giving the body more work or stress than it can handle.

Week 2: Week one hours plus 15 percent: 11.5 hours

Week 3: Week two hours plus 15 percent: 13 hours, 15 minutes

Specificity. Training caused by the SAID principle (Specific Adaptation to Imposed Demands). Training is specific to the muscle groups used, the metabolic pathway to challenge (energy system, intensity) and the joint angle (range of motion demands of sport).

Applied example: Have clients train for what they will do on race day. For example, bike immediately after swimming, or run immediately after biking.

Individuality. Athletes (clients) respond differently to training stimuli (genetics, gender, pre-training status). This causes a "ceiling effect," in which performance gains become slower the

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closer clients get to their genetic limit.

Applied example: Every person requires an individualized training program. Don't follow a "prescription" program exactly. Remember, what works for the professionals won't work for everyone.

Maintenance and reversibility. Forty percent of training frequency will maintain fitness level. As they say, "Use it or lose it." When a training stimulus is removed or reduced, performance stagnates and may eventually revert to original levels (reversibility). Performance decline begins within one week of cessation of training. Actually, research shows chemical deconditioning occurs in 72 hours.

Applied example:

Current run mileage or hours per week: 40 km per week

Required to maintain fitness: Current load – 40% (e.g., 40 km – 40% = 24 km)

This applied example can be used for each sport (swim, bike and run).

VO2max. VO2max is the highest rate of oxygen consumption attainable during maximal exercise. The test is typically done in a lab with a metabolic assessment system that will analyze both inhaled oxygen and expired carbon dioxide. Without directly measuring both, the test is invalid (see Figure 1). VO2 is usually expressed relative to bodyweight because O2 and energy needs differ relative to size. VO2 varies greatly between individuals, and even between elite athletes who compete in the same sport. In many cases, VO2 and heart rate are measured simultaneously (see Figure 2).

Anaerobic threshold. Anaerobic threshold (AT) is the point when an athlete can no longer meet the metabolic demands of the activity using oxygen to produce that energy. Typically, it is the onset of lactate accumulation (see Figure 2).

Power Zones

Zone	Power Output (% of MAP)	Heart Rate (based on HRmax)	Intensity
Recovery	Up to 40	40 - 60 b/min below HRmax	Recovery
1	40 - 55	45 - 50 b/min below HRmax	Endurance
2	50 - 65	40 - 45 b/min below HRmax	Endurance
3	60 - 70	30 - 40 b/min below HRmax	Endurance
4	65 - 75	25 - 30 b/min below HRmax	Intensive
5	70 - 85	15 - 25 b/min below HRmax	Intensive
6	80 - 110	0 - 15 b/min below HRmax	Maximal
7	110 - 150	0 - 15 b/min below HRmax	Maximal

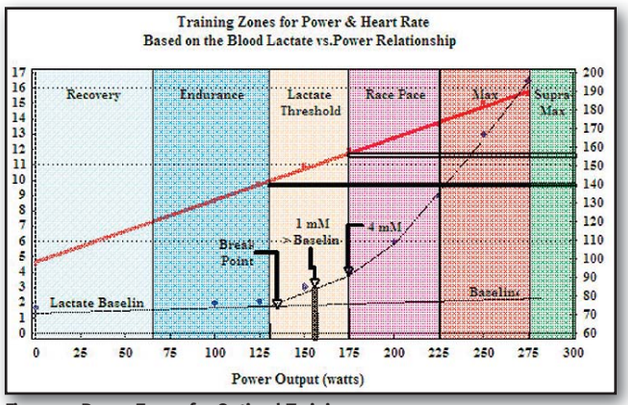

Figure 4: Power Zones for Optimal Training

Lactate threshold. The lactate threshold is the exercise intensity at which lactic acid starts to accumulate in the blood stream. It happens when lactic acid is produced faster than it can be removed. Lactate threshold is a useful measure for deciding exercise intensity for endurance sports, and can be increased greatly with training (see Figure 3).

Critical power. Training with power has come into preference with the development of measurement tools such as the CycleOps power tap. This device has made it relatively simple to test and train with power. Critical power is basically the amount of work produced over time. On the bike, it is how hard users can push on the pedals, and how fast they can turn the pedals for a given time. Typically, a power test lasts three to seven minutes, and the peak, or critical power, is the maximum power produced during this time. The average power is also measured, and often used in the training plan or to set up "power zones" (see Figure 4).

Using the data gathered by a testing session, a comprehensive training plan can be developed to safely and effectively progress

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	comments
swim 3	swim 2	bk/wts	swim 1	bk/wts	long run	bk	
	run 4	power tap 1	run 6	power tap 2	8	power tap 3	
	HR 156-165avg		HR 145-154		HR 130-140		
		wts - tab 2		wts - tab 2		wts - tab 2	
flex	flex	flex	flex	flex	flex	flex	
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	comments
swim 3	swim 2	bk/wts	swim 1	bk/wts	long run	bk	
	run 5	power tap 1	run 7	power tap 2	9	power tap 3	
	HR 145-154		HR 145-154		HR 130-140		
		wts - tab 2		wts - tab 2		wts - tab 2	
flex	flex	flex	flex	flex	flex	flex	
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	comments
swim 3	swim 2	bk/wts	swim 1	bk/wts	long run	bk	
	run 5	power tap 1	run 7	power tap 2		power tap 3	
	HR 145-154		HR 145-154		HR 130-140		
		wts - tab 2		wts - tab 2		wts - tab 2	
flex	flex	flex	flex	flex	flex	flex	
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	comments
swim 3	swim 2	bk/wts	swim 1	bk/wts	long run	bk	
	run 6	power tap 1	run 4	power tap 2	10	power tap 3	
	HR 145-154		HR 145-154		HR 130-140		
		wts - tab 2		wts - tab 2		wts - tab 2	
flex	flex	flex	flex	flex	flex	flex	
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	comments
swim 3	swim 2	bk/wts	swim 1	bk/wts	long run	bk	
	run 7	power tap 1	run 6	power tap 2	12	power tap 3	
	HR 145-154		HR 145-154		HR 130-140		
		wts - tab 2		wts - tab 2		wts - tab 2	
flex	flex	flex	flex	flex	flex	flex	
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	comments
swim 3	swim 2	bk/wts	swim 1	bk/wts	long run	bk	
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	HR 145-154		HR 145-154		HR 130-140		
		wts - tab 2		wts - tab 2		wts - tab 2	
flex	flex	flex	flex	flex	flex	flex	
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	comments
e 3	swim 3	swim 2	bk/wts	swim 1	bk/wts	long run	bk
		run 4	power tap 1	run 6	power tap 2	8	power tap 3
		HR 156-165avg		HR 145-154		HR 130-140	
			wts - tab 2		wts - tab 2		wts - tab 2

Figure 5. Sample Training Plan

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>>>A comprehensive training plan can be developed to safely and effectively progress multi-sport athletes toward their goals.

multi-sport athletes toward their goals. Through the use of a heart rate monitor and power measuring device, athletes can be monitored, keeping them on the training plan. Figure 5 shows one example of a training plan using power and heart rate to monitor and advance the athlete's fitness.

Another reason for monitoring heart rate (see Figure 6) and power is to prevent "overreaching," often referred to as "overtraining" (see Figure 7).

What is overreaching (overtraining)?

Overreaching is the result of giving the body more work or stress than it can handle. Overreaching occurs when clients experience stress and physical trauma from exercise faster than their body can repair the damage. This does not happen overnight, or as a result of one or two workouts. Remember that it is exercise that breaks the body down, while it is the rest and recovery that makes it stronger and healthier. Improvements only occur during times of rest.

Stress can come from a multitude of sources. It is not just physical stress that causes overtraining. Excessive exercise may lead to overtraining, but do not forget other stresses, such as family or work commitments. Stress is stress — whether it is a physical, mental or emotional stress, it still has the same effect on health and well-being.

A consistent (three- to five-day) rise in resting heart rate, heart rate variability, a dramatic change in "excess post-exercise oxygen consumption" (EPOC) and a drop off in power in a workout are all signals of overreaching.

To prevent overreaching, plan your client's program by using this six-stage process:

1. Establish goals that the athlete/client wants to accomplish.

2. Outline a process for targeting and accomplishing the goals.

3. Create a program for measuring and monitoring the process.

4. Evaluate the results of the process, and determine if the goals were reached.

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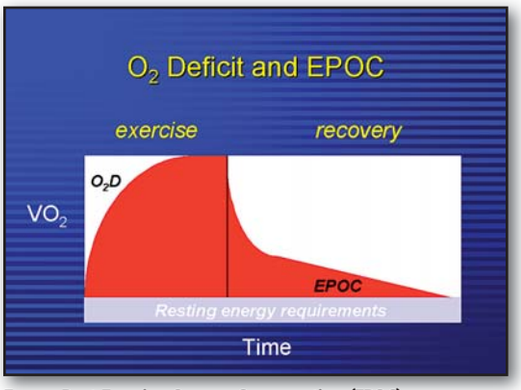

Excess Post-Exercise Oxygen Consumption (EPOC)

Figure 7. Diminishing Power

5. Modify the process when and if necessary.

The finish line

Don't be overwhelmed at the complexity involved in multi-sport training. Time taken at the onset of the season or training cycle is effective. The mesocycle, with adequate rest, has a proven track record for affecting large improvements. The only rule is that the client should be ready for that uploading week when it rolls around. The third loading week should be arduous and challenging.

One other purpose of planning is to ensure that personal outcomes are included every day in training and in life. Many people neglect the vital elements of tracking, checking and assessing. Self-improvement is a cycle — one that not only involves the initial feelings of, "Yes! I want to do that!" but that also involves a continual, reflective process (i.e., what went well, what flopped, what could be changed?). The last plan should include the exercise target that clients want to achieve after their initial goal. This keeps them moving forward, and maintains a degree of mental and physical preparedness.

Effective planning skills transcend sport, and can be applied to many areas of life. Never forget the woodcutter who had six hours to chop down a tree and spent the first four hours sharpening the axe! FM

Stephen A. Black, DSc, PT, ATC/L, NSCA-CPT, is an entrepreneurial expert in the healthcare vocation. He has 30 years of experience in the health and wellness industry, has traveled the world promoting healthy lifestyles and providing expert insight and research in areas related to rehabilitation, fitness and sports-specific training. He has worked with professional teams, including NFL, NBA, NHL, WNBA and ABL/NBL affiliates. Currently, Black oversees clinical and research operations at the Rocky Mountain Human Performance Center (RMHPC), an exercise testing and prescription facility located in West Springfield, Mass., and Boulder, Colo. RMHPC provides individualized programs for athletes, weekend warriors and post-rehab clients. Black is also a presenter to the health and wellness industry, and serves as an advisor to several organizations and non-profit entities. In his spare time, Black has completed multiple endurance events, including the Ironman World Championship in Kona, Hawaii.

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