

## SPECIFICS OF TRIATHLON TRAINING

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### Abstract

**Objective of the study** was to identify the peculiarities of modern triathlon training process design.

**Methods and structure of the study.** We analyzed the primary and secondary sources, studies by the Serbian and foreign researchers on the Internet and in electronic journals, as well as personal experience of the authors.

**Results of the study and conclusions.** The training process design is based on a competitive year (it should not be equated to a calendar year) and a competitive period. The competitive year (macrocycle) is divided into fewer cycles: mesocycles, microcycles, one training day, and one training session. Particular attention should be given to work with young triathletes, as the period of ontogenesis is critical to the achievement of high sports results and development of certain anthropological potential.

Each training session should be clearly structured and characterized by its purpose, load intensity, choice of the training tools and methods, rest breaks. The goal of each training session must be a part or sub-goal of the cycle to which it belongs.

The triathlon training process should be designed with the participation of a sport physician who regularly monitors the athletes' cardiovascular and respiratory system functioning, blood parameters, etc.

**Keywords:** triathlon, training process design, sensory period, anthropological potential.

**Background.** Triathlon as a new sport is very interesting from the perspective of the training process design. It refers to cyclic and endurance sports. In triathlon, we are simultaneously looking for answers to the following questions: how and how much to train, how to coordinate trainings in three different sports (swimming, cycling, running) into a functional whole, how to distribute loads in a given period, what training tools and methods to use.

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and in electronic journals, as well as personal experience of the authors.

**Results and discussion. Physiological model in triathlon.** Triathlon is structured as endurance sports. The maximum oxygen consumption for upper triathletes ranges between 5.5 and 6.5 l/min.

The Olympic triathlon race lasts 2 to 3 hours depending on the athlete's sex and part. If the training is adjacent, triathletes must survive the entire race with the high oxygen consumption rates, which is 75-85% of  $\text{VO}_2$  max. During this time, the energy required for work is mainly produced by the aerobic sources (95%) and the remaining energy (5%) is produced by the anaerobic sources (the energy profile is highly depen-

dent on the configuration of the area in which the race is run).

The swimming lap, transition, and finishing start due to the functioning of the anaerobic energy-saving mechanisms.

The pulse rates are close to the anaerobic threshold throughout the entire race or get somewhat higher. The average heart rate is 150-170 bpm, so the blood lactate concentration varies within the reduced metabolic acidosis (3-7 mmol/l). The energy consumption during the race is extremely high and amounts to 20 kcal/min, or 2400-3600 kcal for the entire race. That is why the right diet, through glycogen supercompensation, is required a few days before the race to provide triathletes with a sufficient amount of energy substrate that dominates in the race [2].

**Table 1.** Physiological structure of Olympic triathlon [5]

Systems	Unit	Olympic triathlon
Heart and circulation	Beats / min	150 – 170
O <sub>2</sub> absorption	VO <sub>2</sub> max	75 – 85
Energy production	Aerobic/ anaerobic 95/5 %	95 / 5
Energy consumption	kcal/min, total	20 / 2400 – 3600
Glycolysis	Lactate (mmol/l)	3 – 7

**Specifics of triathlon training.** Triathlon includes three disciplines, so training loads are distributed in four rotating microcycles.

**Table 2.** Rotation of training loads in triathlon disciplines [5]

Microcycles	Swimming	Cycling	Running
1	heavy	moderate	easy
2	easy	heavy	moderate
3	moderate	easy	heavy
4	easy	easy	easy
5	Rotation as in the first week (+ 5-10% workload)		

Table 2 shows that triathlon trainings are not identical by the week. Each “strong” microcycle is followed by rehabilitation so that the body could regenerate. In the fourth microcycle, low-intensity exercises are used in all three disciplines. In the fifth cycle, the training schedule in the disciplines is the same as in the first one. However, after active recovery, the body is able to train with a higher volume or 5-10% intensity. Therefore, training loads are gradu-

ally increasing in all three disciplines without fear of overtraining [1, 3, 6].

**Cyclization in triathlon.** A competitive year (should not be equal to a calendar year) and a competitive period lie at the core of the training process. The competitive year (macrocycle) is divided into fewer cycles: mesocycles, microcycles, training days, and one training session [7].

**\*One training session and training day.** Triathlon training as a basic training unit consists of two main phases:

– **effort phase**, which is also known as a catabolic phase. It consists of:

\* *introducing part* - implies “warming up” of the body and takes about 40 minutes. This phase has a common and specific part that should be harmonized.

\* *main part* - represents the direction of training towards the set goal. The direction may be as follows: method, coordination, flexibility, speed, endurance, and a combination of the above qualities (first, working on coordination and speed, and then on endurance).

– **rest phase**, which is also known as an anabolic phase, and serves to cool the body by gradually decreasing the load intensity. These can include mild exercises for relaxation, massages, etc. At the end of the first stage of recovery, there begins the second phase of rest, where correct nutrition is of particular importance.

**\*Microcycle.** This is a one-week cycle (though may be shorter or longer) consisting of the training days and individual trainings to achieve the common goals of the microcycle, which depends on the microcycle goal and type.

Increment of training loads is the most complex and most important process within the microcycle structure. The 3:2 system consists of three training sessions with a sharp increase in workload followed by two light workouts. The 2:1:1:1 system consists of two training sessions with heavy workloads followed by one light workout succeeded by another high-intensity training session and ending with a low-intensity workout. One of the best systems is the 5:2 system (a gradual increase in workload from the first to the fifth day and then two relaxing days).

**\*Mesocycle.** This period consists of 3-6 microcycles. A mesocycle is considered to be the basic training cycle. This period is characterized by clear and measurable cumulative effects of adaptation to the training incentives applied, sufficient time to make the transition from a lower to a higher training level. A mesocycle may be focused on the development of speed, strength, endurance... This direction determines the type of a mesocycle.

**The simulating mesocycle consists of the following microcycles:**

*1. Main. 2. Simulating. 3. Simulating. 4. Relaxing.*

**In the preparatory period:**

*1. Preparatory. 2. Preparatory. 3. Main. 4. Relaxing.*

**In the precompetitive period:**

*1. Preparatory. 2. Main. 3. Simulating. 4. Relaxing.*

The **competitive mesocycle** was designed as a 1:3 system (one high-load training microcycle with gradual reduction of the workload during the subsequent three microcycles). These four microcycles are followed by competitions.

\* **Period** consists of several mesocycles. Depending on the competition schedule, one period may consist of 2-6 mesocycles. Periods:

– The **preparatory period** consists of:

\***The first part**, which includes the basic mesocycles, where the load volume (basic skills) is gradually increased.

\***The second part** of the preparatory period is focused on the enhancement of specific capabilities and is therefore referred to as a special preparatory stage.

– **Pre-competitive** - during this period, athletes should reach a high physical fitness level. Among the optimal structural designs of the precompetitive period is the training-control mesocycle that includes the following microcycles:

*1. Preparatory. 2. Main. 3. Simulating.*

*4. Simulating.*

*1. Preparatory. 2. Preparatory. 3. Main.*

*4. Simulating.*

– **The structure of the competitive period** depends on the competition schedule. A good physical shape is the key focus of the simulating mesocycle.

– **Interim or rehabilitation period** is the period when conditions should be created so that novice and motivated athletes started the next preparatory period while gradually increasing the low-intensity workload [5].

\***Macrocycle.** The macrocycle was designed to achieve the planned sports result [7].

**Conclusion.** Particular attention should be given to work with junior triathletes, as the period of ontogenesis is critical to the achievement of high sports results and development of certain anthropological potential.

Each training session should be clearly structured and characterized by its purpose, load intensity, choice of the teaching tools and methods, rest breaks. The goal of each training session must be a part or sub-goal of the cycle to which it belongs.

The triathlon training process should be designed with the participation of a sport physician who regularly monitors the athletes' cardiovascular and respiratory system functioning, blood parameters, etc.

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