



## The Recovery - an Essential Condition for Optimizing the Performance Capacity

### KEYWORDS

recovery capacity, volleyball, effort

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### ABSTRACT

The purpose of this study is to highlight the recovery capacity of the volleyball players in a university representative team. We assume that the recovery, like the effort, are individualized regarding age, gender, level of training, environment conditions (the altitude of 600- 800 meters being the most appropriate), branch of sport, state of stress, the nature and duration of effort, the moment of its approach (during the training, after the training, during the microcycle, the mezocycle, the macrocycle etc.)

### Introduction

The volleyball game is characterized by a series of individual and collective driving reactions, performed with great speed, power and precision, in order to solve the variable game situations. Volleyball consists of a cyclic effort, with phases that are repeated for many times during the game (attack strikes, blockings, plunges, field trips, assists, services) and with effort that is interrupted by short breaks (active, passive). The request upon the body has a variable intensity:

- maximum intensity and short duration (a few seconds) efforts, such as: jump service, attack strikes, blockings, plunges;
- submaximal efforts (field trips, assists).

The metabolic substrate is mixed (aerobic and anaerobic), but the anaerobic effort prevails. After the training effort, the so-called "anabolic resting" immediately follows. It expresses, in fact, the pronounced decrease of the energy reserves in the various organ systems of the body and means the state of physiological fatigue. If, however, the functional capacity of the body is exceeded, the premises for entering another phase, the pathological fatigue, with all its consequences, are created.

One can speak about a natural or spontaneous recovery of the organism, dependent on the central nervous system, which constitutes the main type of post-training recovery. In the natural recovery process there is a certain stereotype, a certain series of events, in which the vegetative parameters (heart rate, respiratory rate, blood pressure etc.) are restored first, in a matter of minutes, while the metabolic, neuroendocrine and enzymatic parameters are restored later, in a matter of hours or even days.

The guided restoration applies to healthy, but affected by effort organisms, as opposed to the recovery, which applies to diseased bodies (morphologically or functionally disabled).

The objectification of the recovery is of great importance and it targets: the appetite, the training disposition, the efficiency, the fatigue onset, the sleep (quantitative and qualitative), the clino-orthostatic test (the measurement of the heart rate, while lying, after rising from bed and after 20 squats), the weight curve (in the morning, after waking

up, before and after effort), the apnea after inhaling and after exhaling, the dynamometry etc. All these data are at the reach of the sportsman and the coach and can be very well viewed in a self-control diary which includes all the objective and subjective factors, their way of manifestation being watched daily, either by the sportsman, either by the team staff.

**The recovery after effort** - a component of the training process, has gained importance because high performance volleyball is practiced today with increased intensity and complexity. The mutual relations between the training effort, the recovery period and the professional duties must be regarded in the process designed to increase efficiency. The sportsman does not have the same level of efficiency at any moment of the 24 hours of a day. Generally, two peaks of maximum activity in the course of a day have been observed: between 10-11 and 16-17. Trainings should be scheduled according to these peaks. Practically, however, these hourly intervals cannot be followed strictly.

The correct relationship of the effort in a training and the time interval between the trainings is an essential condition for improving efficiency. The too short resting time does not allow for the recovery of the general performance capacity, while leading to decreases in efficiency.

**The objectives of the research** - determining the recovery capacity of the body after ceasing the physical effort; determining the most efficient methods for improving the recovery capacity of the body; determining the degree of homogeneity of the volleyball team.

### The research methods

Within the investigation, the following scientific methods of research have been applied: studying scientific literature, the observation method, the case study method, the comparative method, the mathematical analysis method, the statistical method, the graphical method.

### The subjects and the research organization

The research was made over a 5 weeks period. During each training, there were from 12 to 15 participants. The measurements were made on 12 students, aged from 18 to 21 years old. From a group of 15 students, 12 of them were selected based on: the level of physical development, their constitution, health, height, and the regularity of which they participate in the sport activities.

The tests consisted of measurements of each student's heart rate in a 60 minutes interval, after the sport training, at the point of minute 5, 30 and 60 respectively. After the 5 trainings, the participants took their heart rate and noted the results on the given files. The information on files reviews the name and surname of the students, age, height, weight, the number of the training he or she made, the heart rate at a normal resting, the heart rate at the point of minute 5, 30 and 60, and after the end of training. After the 5 trainings ended, each participant in the study gave his or her file for the data analysis.

The utilized formula to study the level of post effort recovery I used is the Dorgo Index, which is calculated:  $(P1+P2+P3+P4) - 300$ ,

P1 – FC (heart rate) at a normal resting;

P2 – FC at the point of minute 5 after the beginning of the training,

P3 - FC at the point of minute 30, after the beginning of the training;

P4 – an hour after the end of training.

Interpretation: between -10 and -5 = very good (FB);

-5 and 0 = good (B);

0 and +5 = average (M);

5 and 0 = poor (S);

above 10 = very poor (N)

**THE AVERAGE HEART RATES AND THE DORGO INDEX ON THE TRAININGS OF THE TEST GROUP**

Training	P1	P2	P3	P4	The arithmetic mean on training	Index DORGO
	Rest	5 minutes after effort	30 minutes after effort	60 minutes after effort		
A1	66.00	106.67	94.00	82.33	87.25	4.90
A2	66.33	105.00	93.67	79.67	86.17	4.47
A3	65.67	104.67	92.00	79.67	85.50	4.20
A4	66.33	104.33	93.00	79.67	85.83	4.33
A5	67.00	106.67	93.67	80.33	86.92	4.77

**INDICATORI STATISTICI**

The arithmetic mean	66.27	105.47	93.27	80.33	86.33	4.53
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Standard error	0.22	0.50	0.36	0.52
Median	66.33	105.00	93.67	79.67
Module	66.33	106.67	93.67	79.67
Standard deviation	0.49	1.12	0.80	1.15
Dispersion	0.24	1.26	0.63	1.33
The amplitude	1.33	2.33	2.00	2.67

Minimum	65.67	104.33	92.00	79.67
Maximum	67.00	106.67	94.00	82.33
Coeff.of variation	0.75	1.06	0.85	1.44

Table no. 1



**THE AVERAGE PULSES AT REST END AFTER EFFORT ON THE TRAININGS**

Graphic no. 1

**Conclusions**

- The Dorgo index for the whole group is (4,53), which is an average value; the homogeneity is high at every moment of the study

- After the data analysis and after the comparison of P1 (heart rate at a normal resting), with P4 (heart rate at an hour after the end of training) of a subject whose post effort recovery capacity is good, I found out that the difference between P1 and P4 is of 7.2 beats per minute (bpm), while of a student whose post effort recovery capacity is very poor, the difference between P1 and P4 is of 30.4 beats per minute (bpm). Therefore, I found out that the post effort recovery capacity is individualistic determined based on the subject's particularities (state of health and training, the post effort recovery techniques applied, etc.).

- After the measurements made before (P1 - heart rate at normal resting) and after the volleyball trainings at defined intervals ( P2 – 5 minutes after the end of training); (P3 – 30 minutes after the end of training); (P4 – one hour after the end of training) and applying the Dorgo Index on a group of 12 subjects aged between 18 and 22 years old, I obtained:

- 16.6 % of the Academy have a good post effort recovery (B)
- 41.6 % have an average post effort recovery (M)
- 33.3 have a poor post effort recovery (S)
- 8.3% have a very poor post effort recovery (N)

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