

Mildronate Effect on Physical Working Capacity Among Highly Qualified Judokas

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Abstract

The effect of Mildronate on physical working capacity among judokas has been investigated. It is stated, that effect of Mildronate is more efficient in case of aerobic type of physical training and can be used as an additional pharmacological agent for the athletes. Mildronate does not belong to doping.

Key words: *physical working capacity, highly qualified judokas, left ventricular functional parameters, Mildronate*

Introduction

The main task of contemporary sports medicine is the improvement of sportsmen's fitness but the effectiveness of educational measures is exhausted today. Thus for the insurance of the sportsmen's fitness new approaches get special significance. One of such approaches is made by the possibility to effect muscles energy supply during training. Drugs belonging to the several groups have been used for this purpose, but many of them are comprised within the list of substances prohibited in sports. Among the prohibited pharmaceuticals there are not included compound directly influencing energy metabolism on the cell level-Mildronate. The research results obtained so far about the Mildronate allow us to conclude that Mildronate optimizes oxygen consumption in cells and "adopts" them to ischemia [1].

This property permits to explain positive effect in situations patho-physiologically similar to ischemia, i.e. under increased physical load [2].

The goal of this article is to access the influence of Mildronate on physical working capacity among judokas during second preparation period.

Material and Methods

In total 14 members of the Georgian National Team of Judo were examined. The Experimental group included 7 athletes aged 25 ± 2.27 years, weighed $96,6 \pm 2,4$ kg. All of them received 0.25 mg. Mildronate in capsules per os four times a day during 20 days. The control group included 7 athletes aged $18,4 \pm 1,76$ year, weighed $73,0 \pm 6,4$ kg. Both of the groups were trained with the same regimes at the same time during the second preparation period. All of the sportsmen included into experimental and control ones were subject before and after course to a complex medical examination comprising general medical check-up, ECG, ECHO and functional tests (submaximal two-step voloergometric testing and JMG tests). No divergences in physical condition were observed for any athletes receiving Mildronate.

ECHO examination was performed on Medison SA-600 with determination of cardiac output (CO); stroke volume (SV), ejection fraction (EF), shortening fraction (SF) and left ventricular mass. The physical working capacity of judoka was assessed by method of PWC 170 on SECA Cardio test-100.

The aerobic-anaerobic capacity for work of judokas was determined by means of the JMG test. This test is specifically designed for the judo players and based on

the capacity to produce mixture energy. The test lasts three minutes (one minute for each exercise). First exercise - the tunnel, second - sit-ups (abdominal) and third exercise is jumping from one side to the other of a bench [3].

The following data are necessary to establish the ratio JMG:

P1 - heart rate at the moment of finishing the test,

P2 - heart rate a minute after finishing the test,

N Rpt - number of complete repetitions executed,

Kg - weight in kilograms,

Age - age of test subject

The following equations are used while obtaining the ratio JMG:

$$A = [(P1 + P2)/2] - [N \text{ Rpt} + \text{Kg}/2]$$

$$B = [K - (P1 - P2)] - [N \text{ Rpt} + \text{Kg}/2]$$

$$K = 220 - \text{age}$$

$$\text{Ratio JMG} = (A+B)/2 \quad [3]$$

The results of the ratio JMG give a clear idea of the functional state of competitor from the point of view of the above-mentioned facts. Negative results of the ratio JMG indicate a good aptitude (for example - 50 - excellent; 0 - fair; +50 - very bad). The results coincide favorable with various laboratory controls and remain true with the performance of judokas.

Results and Discussion

According to the data of assays positive shifts were noted under mildronate application on left ventricular functional parameters: Table I shows that the average increase in the EF and SF at the background of Mildronate administration are 6,3% and 9,1% respectively, as compared to the control group where

EF and SF increased only by 3,1% and 4,5% respectively (*Tab.1*).

Concerning to the cardiac rate during the rest period there were very little changes in both groups. Thus the result of the studies of Mildronate effect once again confirm that improvement of left ventricular systolic function resulted from optimization of oxygen consumption on the cell level. [4]

The results of the trials prove the positive effect of Mildronate on the physical working capacity. The physical working capacity for judokas was determined by means of general PWC 170 and relative PWC 170.

It was obtained that Mildronate enhances general PWC170 and relative PWC170 by 12% and 14% respectively as compared to the control group where PWC170 and PWC170/kg increased just by 7% and 6% respectively (*Tab.2*).

For the athletes of the experimental group after Mildronate administration a definite decrease in the JMG ratio was observed. It decreased by 14% as compared to the control group where JMG ration decreased only by 16 %.

The preparation administration caused no side effects. Subjectively the sportsmen noted improvement in tolerance of training exercises and recovery of fatigue.

The following conclusions can be drawn up:

1. Mildronate administration does not contradict the anti doping control criteria.
2. Mildronate can be used as an agent for increasing the physical capacity in the practice of sports pharmacology for combat sports.
3. No side reactions were detected at Mildronate application.
4. Mildronate use is recommended at the early stages of preparation period when the main emphasis is made on the aerobic training.

Parameters	Before course of Mildronate	After course of Mildronate
HR rest	68,0±3,7	67,2 ± 2,3
EF (%)	60,7 ± 0,85	64,8 ± 0,8
SF (%)	32,8 ± 0,6	35,8 ± 0,59
PWC ₁₇₀ (kg.m/min)	1555,0 ± 88,2	1741,6 ± 66,1
PWC ₁₇₀ (kg.m/min/kg)	15,8 ± 0,97	18,02 ± 0,67
JMG	15,57 ± 1,8	13,08 ± 1,4

Tab.1 *The dynamics of parameters in the experimental group (M±m).*

Parameters	Before course of Mildronate	After course of Mildronate
HR rest	70,0 ± 3,5	68,4 ± 2,7
EF (%)	63,8 ± 2,6	65,77 ± 2,1
SF (%)	35,0 ± 2,16	36,57 ± 1,7
PWC ₁₇₀ (kg.m/min)	1148,0 ± 62,8	1228,36 ± 73,9
PWC ₁₇₀ (kg.m/min/kg)	15,8 ± 1,06	16,8 ± 0,5
JMG	18,14 ± 2,5	17,05 ± 1,7

Tab.2 *The dynamics of parameters in the control group (M±m).*

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Эффект действия милдроната на трудоспособность у дзюдоистов

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РЕЗЮМЕ

Представлены итоги исследования по влиянию препарата милдроната на трудоспособность у дзюдоистов. Выявлено что действие милдроната особенно эффективно при физической нагрузке аэробного типа и его можно применять как дополнительное фармакологическое средство у спортсменов. Милдронат не входит в список допинговых препаратов.

Ключевые слова: *объем физической нагрузки, функциональные параметры левого желудочка, милдронат*