Original Article

Conditioning of biological and training factors on resting blood pressure values

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Abstract:

Purpose: To study judokas resting blood pressure value dependence on the age and judo training factors.

Methods: The research was conducted in Georgia, on male judokas. The blood pressure was measured by BP 3AX1. The variation single-track analysis test - ANOVA was used to determine the dependence of blood pressure changing/decrease on age (8 and 20.). Quantitative data are presented as Mean, Standard Deviation, Maximum and Minimum values. Level of significance was set up at $p < 0.05$.

Research Results: Results of the study revealed that on the one hand, judokas blood pressure value increase proportionally at each next age, and are subject to biological regularities, but on the other hand, after comparing untrained and judokas data, it was noticed that physical exercise factor somewhat slows down the increase rates.

Conclusions: On example of untrained persons of 20 years of age mean values of systolic and diastolic blood pressure make 119 and 79 millimetres, and based on the biological regulation this value is determined by the age; In judokas of the given age the blood pressure values are other, lower, and systolic blood pressure is by 11.8 mm. lower, and the diastolic – by 11.7 mm. lower. The change by this value is characteristic for this particular kind of sport and is subjected to the training factors in judo;

Keep at rest in the arterial blood pressure changes of the body's adjustment to high loads should proceed when the blood vessels of a trained subject are elastic and increases the degree of dilatation, which in turn leads to decrease arterial blood pressure levels.

Key words: blood pressure dependence, age, training factor.

Introduction

In medico-biological studies measurement of blood pressure has substantial practical value. With it is also possible on the one hand to assess the level of training for sportsmen and on the other hand to detect possible flaws vessels in their body functional systems.

In sportsmen, blood pressure is measured as at rest as in demonstration of different degree statical exertion and physical activity (30%, 80%, 100%). According to Beam et al. (2010), studying of blood pressure measurements are also often used for assessment of potential risks resulting from high loads to the body.

One researcher notices that blood pressure value depends on many factors, for example, on gender, or on level of training status and physical conditions (Michelsen et al., 1990). When it comes to gender differences, it should also be said that at rest the systolic and diastolic blood pressure mean values are relatively higher in men than in women. In trained persons this value makes in average 105/65 mm. (Wielemborek-Musiał et al., 2005; Beam et al., 2010). Study of the Hansen et al. (1985) shows that systolic and diastolic blood pressure at rest in 11-16 year old children increases with age and there is also increasing correlation between examined persons' weight and these blood pressure values. It is well known, that training factor generally slows down the blood pressure values, but as several studies has shown, blood pressure decreasing rate depends on the type of sport as well (Whelton et al., 2002), as it appeared a 'quite large significant difference between the BP values of athletes involved in static muscular activity (power athletes) and dynamic- type strength athletes (combat competitors)' where regular dynamic activity was decreasing resting BP more effectively than power training (Varga-Pintér, et al., 2011).

A large part of the information presented in references serves to general theoretical reflection of blood pressure values. Consequently, dependence of judokas blood pressure value changes on various sports training factors is less studied. Moreover, judo is associated to the combat type of sports, and as it was mentioned above, the factor of exercising in judo might be associated with the deeper decrease of the blood pressure values, compared to untrained individuals. And the question arises here: how deep these differences are? The aforesaid determined the aim of the study.

Aim of the research

The aim of the research was to study the values of judokas blood pressure at rest and to reveal its dependence on the age and judo training factors.

Objectives

1. Study of judokas blood pressure level at rest;
2. In order to determine the judokas' blood pressure increasing rates, study the data from possibly maximally distanced ages (8-20 years);
3. To find information of the resting blood pressure mean values in untrained individuals in a reliable source and to compare quantitative (mean) values of blood pressure between untrained persons and judokas.

Method

Subjects - The study was carried out on 281 male judokas of 8 - to 20 years of age in different regions of Georgia. Each age composed of 21.6 ± 1.4 judokas. Distribution of judokas by age is given on the table #1.

Measurements

Blood pressure was measured by BP 3AX1 (see picture 1).

Fig. 1. Blood pressure monitor (BP 3AX1).

Statistical Analysis

Statistical analysis of data was carried out by the computer program SPSS 19. The ANOVA test was used in order to determine the dependence of the age factor on blood pressure values. Quantitative data are presented in the mean, standard deviation, minimum and maximum values. Reliability level was $p < 0.05$.

Research results and discussion

The results obtained are presented in the Table 1.

Table. 1. Descriptive data of judokas resting blood pressure values (mmHg) by age. As the panels, placed in the

Age	#	Systolic Blood Pressure	St. deviation	Diastolic Blood Pressure	St. deviation
		Minimum, Mean and Maximum			
8	20	77 100.2 123	12.1	49 60.1 71	6.7
9	22	78 100.8 124	12.3	49 60.9 72	6.8
10	21	78 101.4 124	12.2	50 61.7 73	6.9
11	21	79 102 125	12.4	49 62.2 75	6.7
12	24	79 102.6 125	12.5	50 62.8 74	6.5
13	20	80 103.2 126	12.6	52 63.6 76	6.8
14	22	81 103.7 127	12.8	51 64.1 77	6.9
15	21	81 104.3 127	12.9	53 64.6 77	6.6
16	24	82 104.9 128	13	54 65.2 78	6.4
17	22	82 105.5 128	13.2	56 65.7 79	6.5
18	21	83 106.1 129	13.2	55 66.3 80	6.8
19	20	84 106.7 130	13.1	57 66.8 79	6.7
20	23	84 107.2 130	13.3	58 67.3 80	6.5

table show, systolic and diastolic blood pressure levels at rest in judokas are growing at each next age by a certain proportion. The minimum systolic blood pressure values from 8 - 20 years of age increases from 77 to 84 mm, and the maximum ones - from 123 - to 130 mm. The data dispersion percentage values at two aforesaid

ages in contrast, is characterised by the decreasing trend, and at the age of 8 makes 59.7% (77 and 123 mm.), and at the age of 20 it makes 54.8% (84 and 130 mm.). In case of diastolic pressure from 8 - to 20-years of age minimum values increase from 49 - to 58 mm, and the maximum values - from 71 - to 80 mm. In assessment of the minimum and maximum value dispersion percentage, the obtained data is the same as for systolic pressure; in particular, at the age of 8 the fixed percentage value (44.9% (49 and 71 mm.) is higher than at the age of 20 (37.9% (58 and 80 mm.)). The mean values in the table shows that systolic blood pressure compared with 8 years of age (100.2 mm.) is higher at the age of 20 (107.2 mm.) by 7%.

The same index for the diastolic blood pressure (60.1 and 67.3 mm.) makes 12%.

As percentage assessment of mean values show, from 8 - to 20-years of age systolic blood pressure increases by fewer units (7%) than diastolic blood pressure (12%). From quantitative viewpoint, they increase equally, by 7-7 mm. (100.2-107.2 mm. and 60.1-67.3 mm.). In order to determine how the training factor affected the blood pressure changes - obtained by us mean values of judokas blood pressure values were compared with the same types of indices in untrained persons of 20 years of age (The mean/average values of resting blood pressure in untrained persons (119/79 mm.) which we used for comparison, was found by us in the data of Beam et al. (2010), pp. 177 and 179)). As the table shows, the aforesaid differ from the same values, obtained in the judokas. This allows us to determine the training level affect on the process of blood pressure change. Systolic blood pressure at age of 20 in the untrained persons makes in average 119 mm, and in judokas - by 11.8 mm. less, 107.2 mm. In case of the diastolic blood pressure this difference makes 11.7 mm. respectively (79 - 67.3).

Conclusions

At rest the blood systolic and also diastolic pressures in judokas from 8 - to 20 years of age increases in average by 7-7 units (mm.). The former increases by 7%, while the latter- by 12%. On example of untrained persons of 20 years of age mean values of systolic and diastolic blood pressure make 119 and 79 millimetres, and based on the biological regulation this value is determined by the age. In judokas of the given age (20) the blood pressure values are other, lower, and systolic blood pressure is by 11.8 mm. lower, and the diastolic – by 11.7 mm. lower. The change by this value is characteristic for this particular kind of sport and is subjected to the training factors in judo. Keep at rest in the arterial blood pressure changes of the body's adjustment to high loads should proceed when the blood vessels of a trained subject are elastic and increases the degree of dilatation, which in turn leads to decrease arterial blood pressure levels.

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