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COMPARATIVE INVESTIGATIONS OF CHOSEN PHYSIOLOGICAL PARAMETERS OF COMPETITORS PRACTISING ORIENTEERING IN DIFFERENT AGE GROUPS

ABSTRACT: High sports results depend on various internal and external factors, among which the age is important. The aim of the work is to value chosen physiological parameters of men practising orienteering.
Eighty men divided into 2 age groups, were subject to research. Thirty one competitors below 18 years of age constituted the first group, whereas to the second belong 49 competitors over 18 years of age. Investigations were held during a four year period of time. Narrow clinical examinations were conducted regarding biochemical and laboratory investigations. Effort test was performed on mechanical tract. The obtained results showed less deviations in clinical investigations among competitors below the age of 18, whereas competitors over 21 had better parameters in effort tests.

KEY WORDS: Electrocardiogram – Biochemical – Efficiency examination

INTRODUCTION

High sports results depend on various internal and external factors, among which the age is important. The aim of the work is to value chosen physiological parameters of men practising orienteering.

OBJECTIVE

The aim of the paper was to assess the behaviour of clinical and competence parameters of competitors practising orienteering in various age groups.

MATERIAL AND METHOD

The material consisted of 80 competitors practising orienteering, divided according to their age into two groups.

The first group included 31 competitors below 18 (16–18 years old). The second group consisted of 49 sportsmen above 18 (19–26 years old). Both groups were very thoroughly examined. The electrocardiogram in rest and after effort, biochemical examinations including bioelements and effort test on mechanical tract were performed. The maximum encumberance was used for assessing anaerobic transformation.

The blood tests were performed 4 and 30 minutes after completing the test aimed at measuring lactate and blood PH.

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TABLE 1. Type of change ECG.

Type of change	Examination rest < 18 years old		Examination after effort > 18 years old	
	Number	Percentage	Number	Percentage
Dysrythmia	1	1.5	3	4.5
Disorder conductans	1	1.5	1	1.5
Disorder of blood supply	–	–	–	–
Excess and overload	1	1.5	3	4.5
Change unspecific ST – T	2	3.0	3	4.5

TABLE 2. Results of biochemical examinations.

Examination parameter	< 18 years old		> 18 years old		Statistically significant
	A	SD	A	SD	
CK	95.80	11.20	53.30	7.80	**
ALAT	35.60	7.20	21.40	4.40	**
ASPAT	18.40	3.10	26.20	4.80	*
Zn	15.10	3.80	19.40	4.20	**
Mg	0.85	0.04	1.10	0.10	**
Cu	14.20	1.60	19.80	2.40	**
Fe	185.00	32.00	140.00	30.80	**
K	4.40	0.50	4.30	0.80	*

TABLE 3. Results of investigations competence of both groups.

Examination parameter	< 18 years old		> 18 years old		Statistically significant
	A	SD	A	SD	
BM	66.04	4.45	67.03	5.82	**
Vmax	19.93	1.00	20.33	1.31	NS
V max mid	18.23	0.80	19.50	1.22	**
V O2 max	67.32	4.59	69.06	5.85	*
HR max	195.93	10.16	184.80	10.45	*
HR after 3'	112.50	7.14	108.80	11.76	*
RQ	1.01	0.03	1.06	0.17	*
Lactate after 4'	9.09	1.29	10.44	2.37	*
Lactate after 30'	3.07	0.58	3.63	1.31	*
PH after 4'	7.16	0.02	7.21	0.05	*
PH after 30'	7.40	0.01	7.37	0.02	*
BE after 4'	–11.89	1.51	–13.28	–3.48	**
BE after 30'	–1.13	1.42	–2.18	–1.39	**

Legend: NS – non significant; * – $p<0.05$; ** – $p<0.01$; *** – $p<0.001$

The blood for biochemical examinations was taken from elbow vein in the morning with empty stomach. Statistical analysis of the results was done.

THE RESULTS

The results of our research are presented in *Tables 1–3*.

DISCUSSION

Table 1 includes the list of abnormal records in electrocardiography (ECG).

Among the stated, most frequent abnormalities were: non-specific repolarization ST-T, disrythmia, disorder conductions, disorder of blood supply, excess and overload and signum left ventricular hypertrophy.

Higher percentage of these disorders occurred in the group including the runners exceeding 18 years of age. The number of these abnormalities was increasing significantly after effort.

These observations are compatible with the results obtained by other researches (Fagart 1996, Maron 2001, Stolt *et al.* 2000). They report frequent changes in the heart muscle geometry manifested in echocardiography in competitors practising running for a long time.

Comparing the group including runners below 18 years of age with the group consisting of runners of more than 18 years, we found out (*Table 2*) statistically significant discrepancies in favour of the older group, in biochemical examinations (CK, ALAT, ASPAT, Zn, Mg, Cu, Fe). Better results obtained by the latter group may stem from better preparation for exercise performance and also from better training. The discrepancies in the level of chosen bioelements may also be a result of incorrect supply of elements in the diet. Big physical effort (running) may also cause increase in the level of magnesium in plasma, not influencing its level in red blood cells (Houston 2001, Rama *et al.* 1993).

Our investigations of competence show (*Table 3*) statistically significant discrepancies in most of the examined parameters ($p<0.05$).

As far as comparison of the groups is concerned the statistical significance is increasing with respect to assessment of BE 4 and 30 minutes after the effort in the group of above 18 years of age.

Contrary to the reports of other authors (Billat *et al*. 1996, Brandon 1995, Flyn *et al.* 1994), we found out that maximal oxygen uptake – VO2 and the blood lactate concentration (Billat 1996, Foxdel *et al.* 1996), were significant only at the level of $p<0.05$, thus our results were similar to these obtained by Billat concerning cyclists and runners.

CONCLUSIONS

1. The examinations performed revealed statistically significant discrepancies in the values of parameters between the groups.
2. The discrepancies confirmed concerned mainly the group of older competitors.
3. The discrepancies concerned disorders in electrocardiogram performed in rest and after effort, biochemical parameters and bioelements.
4. The discrepancies were also found out in after effort, restitutive competence.

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