

SEASON PHYSICAL FUNCTIONING DYNAMIC OF MEN WITH DIFFERENT PHYSICAL CONDITION

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Abstract. *Purpose:* study season peculiarities of physical functioning of men with different physical condition. *Material:* in the research 53 men of 41-55 years' age without chronic disease, who practiced healthy life style, participated. It was assessed: daily physical functioning of different intensity with the help of bio-register BASIS B1; body mass index; adaptation potential of Bayevskiy. *Results:* we determined that men with normal adaptation potential have less quantity of highly intensive steps than men with excessively tensed adaptation potential of cardio-vascular system. Men with tensed adaptation potential have less expressed season changes in physical functioning. *Conclusions:* We found the following optimal correlations: total quantity of steps per day; quantity of steps with average intensity (80-86 steps per min.); total run steps of high intensity (140-145 steps per min.); quantity of low intensity steps (8-10 steps per min.).
Key words: physical functioning, season character, life style, men, steps.

Introduction

Longevity, health and physical condition of men depend on many factors of their life style: physical functioning, eating, rest, as well as on other physiological processes in organism, conditioned by environmental factors. Physical functioning (PF), specificities of its scope and intensity play important role in this process. Their studying during long period of time, against the background of season (natural and social;-personal changes) can permit to understand peculiar features of men's PF and their appropriate physical condition.

Dependence of human organism's on season changes of environment was noticed by many researchers [2, 3]. In some works it is noted that eating depends on season [10, 20]. Other scientists studied season changes of body weight [12, 19] depending on genetically formed internal processes in human organism [8, 21]. There are rather few researches of human PF in different seasons of year. Only increase of PF in summer, in comparison with winter, was confidently confirmed [13, 15]. In other researches [17, 18] season changes of adolescents' PF were analyzed.

Purpose, tasks of the work, material and methods

The purpose of the work is to study season peculiarities of physical functioning of men with different physical condition.

Organization and methods of the researches:

In the research 53 men (urban inhabitants) of 41-55 years' age without chronic disease, who practiced healthy life style, participated. The research was conducted in the south of Ukraine in 2014 – 2015 during 7 summer days and 7 winter days. Physical functioning was studied with the help of bio-register BASIS B1 [5, 23]. We registered total quantity of steps per day: quantity of steps with average intensity (80-86 steps per min.); total run steps of high intensity (140-145 steps per min.); quantity of low intensity steps (8-10 steps per min.). Besides, we measured mean day heart beats rate (HBR). For general characteristic of men's physical condition [16] we determined body mass index (BMI) (kg/m^2). Physical condition was assessed with the help of index of cardio vascular system's (CVS) adaptation potential of Bayevskiy (APB) [1]. APB was measured every evening before sleep. The received results were noted in individual diaries. At every season stage of researches man's results were formed by mean week indicator of individual APB (see tables 2 and 3) and by mean year individual indicator APB (see table 1). Statistic processing was carried out with methods of non parametrical statistic as far as results did not correspond to normal distribution. We determined: inter-quartile range (IR), median (Me). Comparison of mean year and season indicators of different groups of men was conducted with the help of criteria of iconic grades by Wilkinson. We used programs **EXEL and Statgraphics16**.

Results of the researches

As a result of grouped data for one year quantity of members of group with APB <1.80 conv. un. was 28 men (see table 1). In group with APB >1.80 conv. un. there were 25 persons. BMI of both groups' members was above normal more than by $2.56 kg/m^2$. We can assume that excessive weight was conditioned by trained muscles but not by fact. BMI in first group was confidently less. Distribution into groups was carried out by APB. In the first group APB was by **0.12** conv. un. lower than normal. It witnessed about normal status of CVS in this group. In the second group APB was confidently higher than in the first group. APB was by 0.11 conv. un. higher than recommended standard. It points at certain tension of CVS in second group. Mean day HBR in both groups characterizes satisfactory physical condition of members. In first group HBR was confidently less than in second group. It was detected that total quantity of steps per day (without confident differences between groups) was much less than recommended 10 000 steps. It puts some questions concerning physical condition. Especially it concerns the members of first group. Separately, we calculated quantity of low intensity steps of first group men. It was confidently less than in the second group. Quantity of average intensity steps in the first group was confidently higher than in the second group. Quantity of high intensity steps had no confident distinctions between groups.

Table 1

Physical functioning of men with different APB in average per year

№	Indicator	APB <1.80 (n=28)	APB >1.80 (n=25)	W	p
		Me (95%IR)	Me (95%IR)		
1.	BMI (kg/m^2)	27.54 (25.48;29.59)	27.86 (25.79;29.93)	2898	<0.05
2.	APB (<i>conv. un.</i>)	1.68 (1.57;1.79)	1.91 (1.89;1.92)	2408	<0.05
3.	HBR per day (<i>b.p.m.</i>)	55.65 (53.37;57.93)	58.73 (56.39;61.09)	2056	<0.05
4.	Ordinary steps (<i>quantity</i>)	5955.29 (3573.17;8337.4)	5960.19 (3595.84;8324.54)	891	>0.05
5.	Low intensity steps (<i>quantity</i>)	2295.17 (2144.24;2446.1)	2551.06 (2372.28;2729.84)	2059	<0.05
6.	Average intensity steps (<i>quantity</i>)	3356.76 (3031.1;3682.43)	3004.67 (2744.08;3265.27)	1948	<0.05
7.	High intensity (run) steps (<i>quantity</i>)	398.47 (294.33;502.61)	484.34 (359.66;609.01)	778	>0,05

Analysis of the conducted research in winter months showed change of quantity of experiment participants in groups. For example, in first group only 21 persons remained (see table 2) and in second group – 32 persons. In winter period BMI of first group's men was confidently less than in the second group. In both groups BMI was by 2.7kg/m² above standard. APB of first group men witnessed normal state of CVS. In second group APB was by 0.15 conv. un. above standard. It points at existing tension of CVS in men of the second group. Mean day HBR in winter period in first group was also confidently less. PF in winter was confidently higher in second group by quantity of ordinary steps. Quantity of low intensity steps was less in first group (without confident statistical confirmation). Quantity of average intensity steps was confidently less in first group by 694.57 steps per day. Quantity of high intensity steps in first group's men was by 272.48 steps confidently less then in the second group.

Table 2

Physical functioning of men with different APB in winter months

	Indicator	APB <1.80 (n=21)	APB >1.80 (n=32)	W	p
		Me (95%IP)	Me (95%IP)		
1.	BMI (kg/m^2)	27.66 (25.7;29.74)	28.06 (25.98;30.14)	2023	<0,05
2.	APB (<i>conv. un.</i>)	1.71 (1.62;1.80)	1.95 (1.81;2.09)	2584	<0,05
3.	HBR per day (<i>b.p.m.</i>)	56.23 (53.54;58.90)	59.58 (56.94;62.22)	2496	<0.05
4.	Ordinary steps (<i>quantity</i>)	4766.3	5918.65	2579	<0.05

	Indicator	APB <1.80 (n=21)	APB >1.80 (n=32)	W	p
		Me (95%IP)	Me (95%IP)		
		(3046.35;6486.26)	(4223.16;7614.14)		
5.	Low intensity steps (quantity)	2185.71 (1934.93;2436.5)	2435.79 (2133.59;2738.0)	1011,5	>0.05
6.	Average intensity steps (quantity)	2529.28 (1913.74;3144.83)	3223.85 (2721.0;3726.69)	2321	<0.05
7.	High intensity (run) steps (quantity)	160.94 (31.13;290.75)	433.42 (220.55;646.29)	1506,0	<0.05

In summer months quantity of the tested in groups changed: in first group quantity increased to 35 persons (see table 3); in second group quantity reduced to 18 persons. In summer period in both groups BMI was by 1.13kg/m² above normal. BMI was confidently less in first group. APB of first group's men reduced in comparison with winter period by 0.09 conv. un. In second group it reduced by 0.13 conv. un. APB exceeded the recommended norm by 0.02 conv. un. and was confidently higher than in first group.

Table 3

Physical functioning of men with different APB in summer months

№	Indicator	APB <1.80 (n=35)	APB >1.80 (n=18)	W	p
		Me (95%IP)	Me (95%IP)		
1.	BMI (kg/m ²)	27.13 (25.02;29.24)	27.36 (25.18;29.54)	1934.5	<0.05
2.	APB (conv. un.)	1.62 (1.60;1.63)	1.82 (1.80;1.84)	2078	<0.05
3.	HBR per day (b.p.m.)	54.58 (53.08;56.07)	56.33 (54.37;58.30)	1914.5	<0.05
4.	Ordinary steps (quantity)	6730.36 (5862.06;7598.66)	5420.19 (4239.57;6600.8)	1675	<0.05
5.	Low intensity steps (quantity)	2075.72 (1722.89;2428.56)	1953.03 (1560.88;2345.18)	901	>0.05
6.	Average intensity steps (quantity)	4253.07 (3533.0;4973.15)	3002.97 (2081.57;3924.38)	1925	<0.05
7.	High intensity (run) steps (quantity)	606.13 (317.75;894.52)	840.75 (346.36;1335.14)	694.5	>0.05

Mean day HBR in summer period in first group was confidently less than in second group. HBR reduced by 1.65 b.p.m. comparing with winter period. Quantity of ordinary steps per day in summer increased in first group of men by 1964.06 steps per day, comparing with winter period; in second group it reduced 498.46 steps. Accordingly, PF of second group's men was confidently less. Quantity of low intensity steps in summer period had not confident distinctions. In comparison with winter period, in first group the quantity of low intensity steps reduced by 109.99 steps per day. In

second group the quantity of such steps reduced by 482.76 steps. Quantity of average intensity steps in first group was confidently higher (by 1250.1 step), comparing with second group. Comparing with winter it increased by 1723.79 steps. In second group the quantity of average intensity steps reduced by 220.88 steps. Quantity of high intensity steps in both groups had no confident distinctions. In comparison with winter their quantity increased in first group by 445.19 steps per day and in the second group – by 407.33 steps.

Discussion

The contingent of the tested consisted of men of mainly second maturity, who have no harmful habits and practice weakly mobile [6, 9], urban way of life. The men observe principles of healthy eating and practice fitness.

Analysis of combined season results of BMI, APB and HBR witnessed that the results of the first group are confidently better. Mean year BMI exceeded standard [22] in both groups. Mean day HBR in rest corresponds to relatively age standard of physically healthy persons in both groups. Confident reduction of HBR in the first group in complex with other physiological indicators witness about more economic functioning of CVS.

Mean year results of men's PF have not confident distinctions by quantity of ordinary steps and highly intensive steps. Confidently higher quantity of low intensity steps is observed in second group. Against the background of weakly mobile way of life such quantity of steps witnesses about absence of positive influence of such kind of PF on men's physical condition. Confident majority of average intensity steps in first group confirms previous researches [4] about positive influence on men's physical condition.

Season dynamic of total quantity of men's steps changes significantly during year. Also there are substantial changes between experimental groups. Changes of men's PF are confirmed by previous researches [7, 11]. In these researches increase of PF in summer, in comparison with winter, is confirmed. Natural factors are considered to be the reason of such PF increase [14]. Confident changes in groups we observe in winter and in summer. Group with normal APB has lower indicators of total quantity of steps in winter and the highest indicators in summer (in comparison with group of men with APB above normal).

Season dynamic of quantity of average intensity steps during all seasons has confident distinctions (comparing groups): reduction of quantity of steps in winter and increase of quantity of steps in summer in group of men with normal APB.

Season dynamic of highly intensive steps has confident distinctions (comparing groups) only in winter. Men with normal APB have lower quantity of highly intensive steps than group of men with tensed adaptation potential of CVS.

Conclusions:

As a result of long-term PF study of mature men we observed confident distinctions, depended on their physical condition. Men with normal adaptation processes of CVS have confidently less quantity of low intensity steps per day. They have confidently higher quantity of average intensity steps per day than men with over-tension of CVS.

Confidently higher activity of men with normal APB in summer can be related to season specificities. It is manifested in total quantity of average intensity steps. These men also have confidently less quantity of total quantity of steps in winter with exclusion of low intensity steps.

Study of season PF dependence of men with different physical condition proves higher influence of natural, season PF changes in group with normal APB. Men with tensed adaptation potential of CVS have less expressed season changes of PF.

The prospects of further researches imply study of season influence on PF of different age categories' men.

Conflict of interest

The author declares that there is no conflict of interest.

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Cite this article as: Prushva O.B. Season physical functioning dynamic of men with different physical condition. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015;10:56-61. <http://dx.doi.org/10.15561/18189172.2015.1009>

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Received: 16.07.2015

Accepted: 19.08.2015; Published: 20.08.2015