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Platelet Functions In The First Adulthood When Regularly Practiced In Adolescence In The Tennis Section.

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ABSTRACT

Features morphofunctional development of the human body largely depends on the activity of platelet hemostasis, which largely determines the adequate rheological properties of blood. Regular exercise can positively affect individual indicators of platelet functions. The continued lack of knowledge of the state of platelet activity in young men who do not have bad habits, in the past regularly trained actively in the tennis section, but subsequently reduced the intensity and frequency of training caused the assessment of the dynamics of the aggregation activity of their platelets. It was found that those who had previously visited the big tennis section of young men aged 18–22 years old and who subsequently stopped training had a consistently low functional platelet activity. At the age of 26-35, platelet aggregation was at a low level in them, without experiencing significant fluctuations, which is apparently due to the constancy of their sensitivity to exogenous influences. Optimally low platelet activity causes unexpressed aggregation with inductors and their combinations in conditions close to intravascular, which provides the necessary level of tissue microcirculation in the human body, who regularly trained physically in his youth.

Keywords: platelet activity, first mature age, cessation of regular exercise, rheological properties of blood, microcirculatory features of platelets.

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INTRODUCTION

The peculiarities of the morphofunctional development of the organism largely depend on the activity of platelet hemostasis [1-5], which largely determines the adequate rheological properties of blood [6-9]. It is known that physical activity can positively affect individual indicators of platelet functions [10-13]. However, the state of platelet activity in young people who do not have bad habits, who in the past regularly trained in the tennis section, but subsequently reduced the intensity and frequency of training, has not been studied [14]. The dynamics of the aggregation activity of their platelets under the influence of various inductors and their combinations present in the blood flow conditions has not been evaluated. These people also have not evaluated the severity of the morphological activity of platelets in vivo, which determines the liquid properties of blood and its fluidity through the vessels. In this regard, the purpose of the study was formulated: to find out the activity of platelet functions in healthy young people who do not have bad habits, who left regular training in the big tennis section.

MATERIAL AND METHODS

The research was approved by the Ethics Committee of Russian State Social University (record №5 from 12.05.2014).

The study group included 72 healthy young men of 26-35 years old who regularly trained in college years in the big tennis section, and currently have left regular training sessions, reducing them to the level of rare irregular workouts at the amateur level (24 people 26-27 years old, 25 people 30-31 years, 23 people 34-35 years). The control group consisted of 147 young people aged 18–22 who regularly exercise physically in the big tennis section.

The level of intraplatelet lipid peroxidationwas determined in all the examined by the concentration of the basal level of malondialdehyde (MDA) in the thiobarbituric acid reduction reaction and by the level of acyl hydroperoxides (AHP), catalase and superoxide dismutase. The number of platelets in the capillary blood in the Goryaev chamber was counted. The products of platelet-induced phospholipid-coagulation activators (F3-platelets) labilization were traditionally evaluated by calculating the platelet activity index. The duration of platelet aggregation (AP) was determined by a visual micromethod using as inducers ADP (0.5×10^{-4} M), collagen (dilution 1: 2 of the main suspension), thrombin (0.125 units/ml), ristomycin (0.8 mg/ml), adrenaline (5×10^{-6} M), as well as combinations of ADP and adrenaline, ADP and collagen, adrenaline and collagen to simulate real blood flow conditions. Statistical processing of the results obtained was carried out using Student's t-test.

RESEARCH RESULTS AND DISCUSSION

At the stage of inclusion in the group of studies in young people, the main physiological parameters were determined, morphological and biochemical blood tests were performed, which showed that the estimated total functional and biochemical values of all subjects were within the physiological norm.

The level of the primary products of lipid peroxidation of acyl hydroperoxides in the platelets of healthy 26-27 year old young people who had previously regularly trained physically was 2.06±0.15 $D_{233}/10^9$ platelets, without significant change by the age of 34-35, reaching at that age 2.08±0.25 $D_{233}/10^9$ platelets (in the control 1.98±0.17 $D_{233}/10^9$ platelets). At the same time, the level of basal MDA in platelets - the end product of lipid peroxidation in the age of 26-27 years among the examined was 0.52±0.27 nmol/10^9 platelets, also remaining at this level up to 34-35 years of life (0.52±0.14 nmol/10^9 platelets) at a control level of 0.49±0.16 nmol/10^9 platelets. The activity of catalase and superoxide dismutase in the blood plates, which were monitored by healthy young people, did not have reliable dynamics from 26-27 years old (9690.0±216.7 IU/10^9 platelets and 1690.0±16.5 IU/10^9 platelets, respectively), up to 34-35 years (95900.0±192.8 IU/10^9 platelets, 1690.0±22.3 IU/10^9 platelets, respectively) with an activity value of these enzymes in the control of 9646.0±158.6 IU/10^9 platelets, 1690.0±19.7 IU/10^9 platelets, respectively).

The level of the platelet activity index at 26-27 years in the examined corresponded to 22.4±0.20%, remaining at this level in the older surveyed and not differing from the level of control (20.5±0.13%). This indicated stability at the age of 26–35 years in healthy young people, who had previously been physically

trained regularly, in the blood platelets of the level of the products of labilization of platelet phospholipids - blood clotting activators. In the examined young people at 26-27 years of age, the time of development of antibodies under the influence of collagen was 35.8±0.24 s (in control 34.6±0.17 s), being at a similar level in the older subjects. Similar activity of AP at this age in young people who left regular training was noted under the influence of ADP (46.8±0.22 s, in the control 46.2±0.12 s) and ristomycin (50.7±0.13 s, in control 49.0±0.15 s). At a later date, thrombin and adrenaline AP developed, being in 26-27 years old 57.2±0.14 s and 105.2±0.34 s, respectively (in control 57.1±0.16 s and 103.4±0.19s, respectively), with no significant change in the older patients. At 26-27 years old, when combined inductors were used in physically young people, AP was 37.2±0.10s for ADP + epinephrine, 27.2±0.09 s for ADP+collagen, and for epinephrine + collagen 28.9±0.18s (in control 37.1±0.18s, 27.7±0.15s and 29.9±0.16s, respectively), remaining stable for all tested inductors and their combinations up to 34-35 years of age.

The level of fluid properties of blood and its fluidity through the vessels depends on a large number of factors, which, of course, include regular moderate exercise [15,16].

In healthy young people 26–35 years old, in the past regularly trained physically in the big tennis section, stable normal indicators of antioxidant activity of platelets and a low level of lipid peroxidation in them were noted, which largely determines their blood platelet activity [17,18]. It is possible that this is largely due to the preservation of a low level of sensitivity of platelet receptors to the exogenous effects of various chemicals [19,20] in various environmental conditions [21,22]. The low density of receptors on the platelet membranes is caused by complex adaptive reactions of the body in the examined [23,24], ensuring that the necessary level of adaptation of platelet hemostasis to the functioning conditions is maintained [25,26].

AP activity with a number of inductors tested and their combinations in young people 26–35 years old who were physically trained in adolescence allowed us to establish the constancy of the aggregative function of the blood platelets [27]. The state of antibiotics when platelet aggregation agonists, collagen and thrombin [28], can be caused in many respects by the constancy of the mechanism of platelet activation through phospholipase C [29], which stimulates the phosphoinositol pathway [30] through diacylglycerol and protein kinase C [31] and phosphorylation of phosphorylation and phosphorylation in 30 [32-34]. Low AP in the surveyed contingent of young people, also noted with weak aggregation inducers - ADP and adrenaline [35], is caused by the unexpressed expression of fibrinogen receptors (GPIIv-IIIa) [36] with stimulation of phospholipase A_2 [37], regulating the release of arachidonic phospholipids and the next metabolism [38].

Evaluation of antibodies with several inductors simultaneously showed their mutually potentiating action, confirming the patterns found in the study of antibodies with isolated agonists [39]. There is no doubt that not only the stability of the activity of the enzyme systems of platelets, including thromboxane formation, but also the low activity of secretion of ADP and ATP and the functional readiness of the actino-myosin complex [40] plays an important role in maintaining low AT.

CONCLUSION

Previously held general physical training of young people aged 18-22 years old and subsequently discontinued training, stable low functional platelet activity was revealed. For 26-35 years, platelet aggregation in these young people is at a low level, without experiencing significant fluctuations, which is apparently due to the constancy of their sensitivity to exogenous influences.

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