AGGREGATIVE THROMBOCYTE READINESS OF THE FIRST
MATURE AGE PERSONS, DURABLY AND REGULARLY TRAINING
IN HAND-TO-HAND FIGHTING SECTION

ANNOTATION
As one of the main elements of organism’s homeostasis supporting on the whole and blood system we have thrombocytes which are able through their activity modulation in response to different impacts influence the microcirculation and tissue exchange level. In the investigation group there were included 112 healthy people of the first mature age training from childhood in hand-to-hand fighting section. The control group was composed of 97 healthy people of the first mature age meaningly avoiding loads during their lifetime. Physically trained people during the first mature age were registered to have stable not high peroxide lipid oxidation in thrombocytes. Being under examination this group turned out to have steadily not high thrombocyte aggregation. The constancy of thrombocyte aggregation activity with strong and weak inductors which hand-to-hand fighters possessed was provided by steadily not high activity of thrombocyte receptors and intrathrombocyte mechanisms of their aggregation. In connection with the mentioned above it can be considered that started from childhood regular physical training in hand-to-hand fighting section provides during the first mature age steadily not high thrombocyte activity and, with the help of this, - physiological conditions for microcirculation and hemostasis.

Keywords: hand-to-hand fighting, physical loads, the first mature age, thrombocytes, aggregation.
1. INTRODUCTION

Intense muscle activity during the first mature age promotes active development of adaptation processes to it of all the organs and their systems highly increasing organism’s stability on the whole towards factors of the environment [1]. Meaningful role in adaptation to physical loads’ impact belongs to blood system to great extent limiting the evidence of oxygen provision of the working organs [2].

As the important element of organism’s homeostasis support on the whole and blood system in particular we have thrombocytes able through modulation of their aggregation in response to different impacts influence microcirculation and tissue exchange level [3]. It is very interesting while investigating thrombocyte aggregation (AT) to evaluate the influence on it of natural for organism impact – physical load as a natural stimulator of many life processes [4].

In available scientific literature there not so many data about physical training impact on thrombocyte functions. Most of available works are devoted to thrombocyte activity dynamics during treatment of developing and formed heart-vessel pathology considered to be the source of the risk of clinically meaningful and fatal thrombosis attacks [5]. Collected data about the impact of long and regular physical training on thrombocyte functions of healthy people are limited enough [6, 7]. But one thing is not studied enough. This is the impact of regular long physical training as far as different single combats are concerned including rather popular at present training in sections of hand-to-hand fighting on aggregative ability of blood platelets and mechanisms of its realization for people of 22-35 years old. There were made no comparisons between their state and the same of healthy people of the first mature age, having no meaningful regular physical loads, during their lifetime.
The aim of investigation – to define the activity of thrombocyte aggregation of healthy people of the first mature age which have long regular physical training in the section of hand-to-hand fighting.

1. MATERIALS AND METHODS

2.1 Materials

The fulfillment of study was approved by the Ethics Committee of Kursk Institute of Social Education (branch of Russian State Social University) (record №5 from 12.05.2014). The work was conducted on the base of sport complex of the Russian State Social University in town Kursk, Russia. In the investigated group there were included 112 healthy people of the first mature age training from childhood in the section of hand-to-hand fighting (31 persons – 22 years old, 26 persons – 26-27 years old, 28 persons – 30-31 years old, 27 persons – 34-35 years old). In control group there were included 97 healthy people of the first mature age which during their lifetime meaningly avoided loads (30 persons – 22 years old, 23 persons – 26-27 years old, 22 persons – 30-31 years old, 22 persons – 34-35 years old).

2.2 Methods

All the investigated people were defined to have the level of thrombocyte peroxide lipid oxidation (POL) according to the concentration of malondialdehyde (MDA) in the reaction of thiobarbituric acid reduction and to the level of acylhydroperoxides (AHP) [8]. There was made the calculation of thrombocyte quantity in capillary blood in Gorjaev’s cabinet. There was made the evaluation of the plasma level of the products of thrombocyte phospholipids’ labilization (these phospholipids are the activators of coagulation (F₃ - thrombocytes)) by calculating the index of thrombocyte activity (ITA) [9]. The duration of thrombocyte aggregation (AT) was defined
with the help of visual micromethod [10] using as inductors ADP (0, 5 × 10^{-4} M), collagen (dilution 1:2 of the main suspension), ristomycinum (0, 8 mg/ml) and adrenalin (5×10^{-6} M). Statistical processing of the results was made by Student's t-criterion. Statistical processing of received data was carried out with the usage of a program package “Statistics for Windows v. 6.0”, “Microsoft Excel”. Differences in data were considered to be reliable in case of (p<0.05).

3. RESULTS AND DISCUSSION

The concentration of primary products POL-AHP in thrombocytes of 22 years old persons having no physical training was at the level of 2.24±0.07 D_{233/10}^{9} tr., gradually increasing to 34-35 years to the level of 2.65±0.16 D_{233/10}^{9} tr. At the same time the level of MDA in thrombocytes – final product POL at 22 years old of the given category of investigated persons – was 0.69±0.019 nmol/10^{9} tr., increasing to 34-35 years to the level of 0.84±0.017 nmol/10^{9} tr. AHP concentration in thrombocytes of 22 years old persons training in the section of hand-to-hand fighting turned out to be lower than in control group (p<0.05) and composed 1.95±0.14 D_{233/10}^{9} tr. It didn’t change for certain to 34-35 years (2.02±0.25 D_{233/10}^{9} tr. At the same time MDA content in thrombocytes of those training in hand-to-hand section also stayed stable between 22 years (0.48±0.18 nmol/10^{9} tr.) and 34-35 years (0.51±0.24 nmol/10^{9} tr.), reliably yielding to the rates of persons avoiding physical loads (p<0.01).

Index ITA of people avoiding physical loads at 22 years was equal to 23.7±0.11% increasing together with their lifetime till 29.8±0.10% at 34-35 years. This fact points at gradual labilization aggravation of thrombocyte phospholipids – activators of blood coagulation of examined persons. ITA level of those training in hand-to-hand section at 22 years reached 20.4±0.16% and
stayed at the given level in case of elder examined persons. So, people of 34-35 years regularly training physically had the level of the given index 21.0±0.20% for sure yielding to the same rate (p<0.01) of the same age people having no physical training.

Untrained people at 22 years have got AT development time under collagen influence as the least one gradually curtailing alongside with the age growth of examined persons (table). Analogical AT regularity in case of untrained people was also noted under the influence of the rest trusty inductors: ADP (to 39.0±0.05s), ristomycinum (to 40.2±0.08s) and adrenalin (to 86.1±0.07s). AT of 22 years hand-to-hand fighters came in response to collagen in 35.8±0.12s for sure having no difference with AT rate of elder investigated persons and exceeding its time (p<0.01) of untrained persons. Low AT activity of trained persons during the first mature age was also noted under the influence of the rest trusty inductors: ADP, ristomycinum and adrenalin, for sure (p<0.01) differing from control rates.

Morphophysiological status of human organism is mainly provided by adequate hemostasis state and blood reology which are influenced by different environmental factors including regular physical loads. In its turn blood platelets activity being mostly the basis of functional hemostasis readiness on the whole seriously influences microcirculation state and metabolism in organism’s tissues [11].

In this investigation it was defined that people having long regular physical training in section of hand-to-hand fighting during the first mature age are registered to have steadily not high POL. Given biochemical peculiarities of hand-to-hand fighters can be evaluated as one of the factors promoting long preservation of not high blood platelet activity. So, persons having regular
physical training during the first mature age were noted to have steadily not high \( \text{AT} \) in response to all the used inductors. It may be mainly connected with the preservation on the physical loads background of the constant level of their receptors’ sensitivity to exogenous influence (aggregation inductors’ concentration in blood and Willybrand’s factor – cofactor of thrombocyte adherence. Constancy of \( \text{AT} \) activity under the influence of strong aggregation inductors is mainly provided in case of hand-to-hand fighters by long activity invariability of thrombocyte phospholipase C. It led to functioning stability of phosphoinosital way, protein phospholirirovation of contractile system, output level of \( \text{Ca}^{2+} \) from internal thrombocyte repository and contractive ability of actomyosin. Stable not high reaction of their thrombocytes on weak aggregation inductors pointed at physiological level of fibrinogenic receptors’ (GPIIb-IIIa) expression on thrombocyte surface and low activity in them of phospholipase \( A_2 \) regulating output from membrane phospholipids of arachidonic acid which is used on the creation of huge thromboxane aggregant \( A_2 \).

4. CONCLUSION

Persons having long regular training in section of hand-to-hand fighting during the first mature age are noted to have steadily not high thrombocyte activity which gives them physiological conditions for microcirculation and hemostasis.

REFERENCES


11. Zavalishina SYu, Kutafina NV, Vatnikov YuA, Makurina ON, Kulikov EV. et al. Platelet-Activity Dependence on the Age of Rats with

Table. Platelet aggregation of the surveyed persons of the first mature age

<table>
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<td>Collagen, s</td>
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<td>Adrenalin, s</td>
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Regularly train in unarmed combat section, n=97, M±m

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Note: p – the significance of differences in platelet aggregation time examined its value at 22 year olds.