

EFFECT OF TRAINING ON IMPROVING SWIMMING BIOLOGICAL AGE AND CAPABILITIES OF PEOPLE AGED 30-35 YEARS

Fedinyak N.V.

Prikarpat'skiy National University;

Annotation. *Purpose:* to verify the anti-aging effect of improving navigation on involution processes of the human body 30-35. *Material:* participation in the experiment took 43 men and women aged 30-35 years. Biological age is measured by the method of V.P. Voytenko. *Results:* obtained reliably between biological age men engaged in wellness swimming and those who engage in other forms of physical activity. We found that swimming as non-drug product may be recommended to address the problem of premature aging. It is confirmed that the rate of aging men set the pace of aging women may be caused as a social (especially labor, bad habits, etc.) and sex specific (men still developing atherosclerosis, blood circulation of the brain). *Conclusions:* navigation as non-drug remedy is recommended to prevent premature aging.

Keywords: biological age, aging, swimming, anti-aging

Introduction

As on to day ageing is understood as process, which goes by two ways: physiological (natural) and pathological (accelerated) [1, 9]. With it, variant of ageing is conditioned by reliability of self-regulation mechanisms. Physiological ageing is the basis of long life span, while accelerated ageing facilitates formation of age-dependent pathology. In most cases (85-90%) people grow old too early [9, 18].

In diagnostics of human individual health it is important to have integral criteria of evaluation. One of such criteria is indicators of biological ageing rate. It is known that by biological age it is possible to determine the rate of human growing old.

Ageing is a fundamental and multi-dimensional process, which has become a subject of many branches of science [2, 3, 4, 5, 12, 13, 16, 19].

Both physiological and accelerated ageing are conditioned by exogenous and endogenous factors. Role of genetic factor is proved by cases of progeria, when changes of appearance, characteristic for old age, appear in young age. Many scientists marked higher indicators of mortality among descendents of parents with short life span [9]. However, share of genetic factors is only up to 40% of "determinants" of ageing, while more important part (70%) is conditioned by environmental factors. Also it is known that excessive weight (75%), obesity (33%), smoking and absence of physical functioning negatively influence on life span [1].

Introduction of conception «biological age» is explained by the fact that calendar (chronological) age is not a sufficient criterion of health and workability of ageing individual. Among peers as per chronological age usually there are significant distinctions by rates of age changes. Differences between chronological and biological age, which permit to evaluate intensity of ageing and functional potentials of an individual, are ambiguous indifferent phases of ageing process. The highest rates of age changes are among people with long life span; in younger groups they are insignificant. That is why it is purposeful to determine biological age in groups of 30 years and more age. Its evaluation it is required for solution of social hygienic tasks, diagnostics of morbidity, health, determination of measures for slowing of ageing rates and prolongation of active old age.

Principle approaches to prevention from morbidity and disablement in any age are widely propagated in the frames of active ageing doctrine, which was developed by WHPO. It is based on principle that neither ageing nor disablement are diseases and their appearance is a result of human individual development. It is necessary that such approach should be used in formation of governmental programs devoted to ageing of population. The concept of healthy ageing has been related to the most important directions in developed by UN program project "Programs of scientific researches on ageing problems in 21st century" [11, 15, 17].

As on to day modern medical science offers the whole arsenal of methods for human life prolongation – the so-called gero-protectors. Possibility of life span prolongation was experimentally demonstrated with the help of anti-oxidants, lathirics, халатних агентів, adaptogens, neurothropic preparation, glucocorticoids, sex hormones, growth hormones, melatonin, immune stimulators and mimetics [7]. However, application of medicals is restricted in connection with weakening of kidneys and liver functions as well as with polymorbid state, frequent allergy reactions and complications caused by using medicines. Also, in opinion of many authors there is no chemical gero-protector with undoubtedly proved positive effect. In this connection non medical geriatric methods, based on using of inner organism's potentials or environmental factors have become of special interest.

Human biological age, its components can be purposefully corrected for changing of ageing rate both with medical methods and with physical culture means [9, 10].

However, the problem of early ageing by means of determination of human biological age and its correction by means of physical culture have not been paying sufficient attention to by scientists up to day and require further studying.

Purpose, tasks of the work, material and methods

The purpose of the research is determination of anti-ageing influence of health related swimming on persons of 30-35 years old age.

The methods of the research: for realization of our aim we applied analysis, synthesis, comparison, functional tests (Shtange’s test, test of Genchi, BP test, static balancing, VCL), methods of mathematical statistics.

Results of the research

In the research 43 women and men of 30-35 years old age, who were selected by random choice, took part. All tested did not have any chronic diseases and twice a week during year trained aerobic physical exercises (swimming, football, volley ball, ping-pong, track and fields and etc.). The tested were divided into first and second groups. First group included people, who trained health related swimming, second group included people, who trained other kinds of sports.

For determination of biological (functional) age we used methodic of V.P, Voytenko (2001) in connection with easiness of application and relative objectiveness of the received results.

For determination of biological age we used the following formulas:

BA (biological age) men:

$$BA=26,985+0,215 \times SBP-0,149 \times PIP+0,723 \times SEH-0,151 \times SB$$

BA – women

$$BA=-1,463+0,415 \times PP+0,248 \times BM+0,694 \times SEH-0,14 \times SB$$

Where:

SBP – systolic BP, mm. merc.col.

PP – pulse BP, mm. merc.col.

PIP – pause period after inhale, sec.

SB – static balancing, sec.

BM – mass of body, kg. .

SEH – subjective evaluation of health (is determined with the help of questionnaire, consisting of 29 questions).

For determination of human ageing rate we compared individual BA value with SBA (standard biological age), which characterizes population standard of age “wear out”. After calculation of index BA-SBA we knew to what extent BA of the tested is higher or lower than BA of his peers.

For calculation of SBA we used the following formulas:

SBA (standard biological age) – men:

$$SBA=0.629 \times CA+18.56$$

SBA – women:

$$SBA=0.581 \times CA+17.24$$

As a result of the conducted research we received the following data:

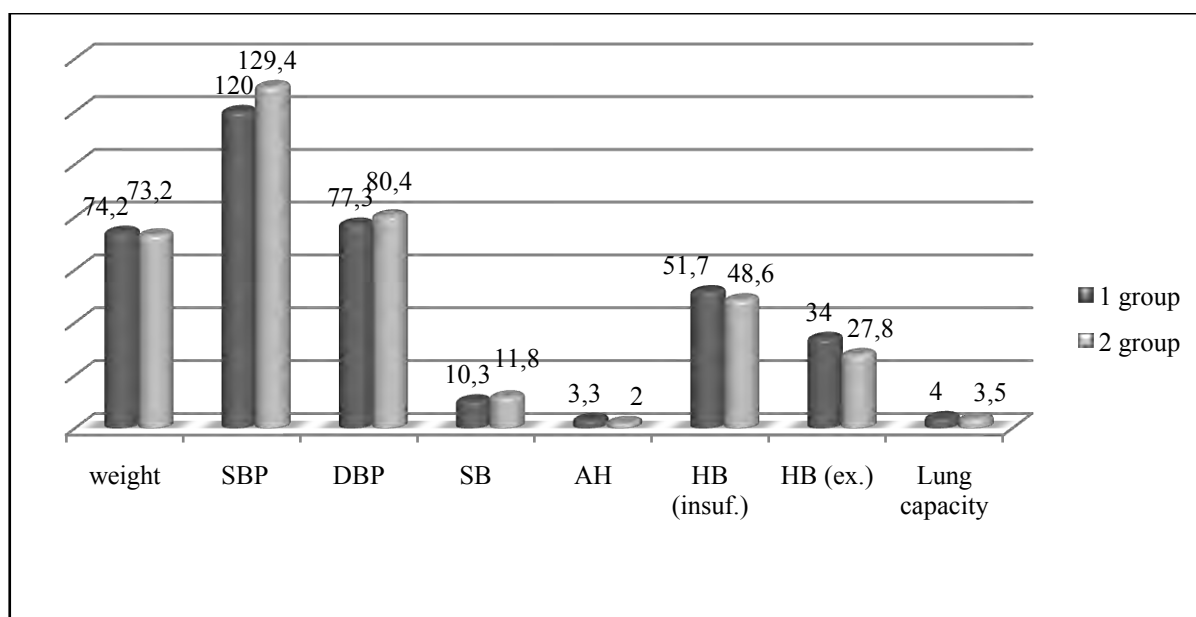
Accelerated rate of ageing is characteristic for men of 1st and 2nd tested groups (see table 1). It was determined that there are confident changes in calculation of biological age between men, who trained health related swimming and those, who practiced other kinds of motion functioning (p<0.05). Biological age of 2nd group men was determined as 47.2 years old with their calendar age in average – 31.4 years old; in 1st group - 45.0 and 33.6 accordingly, that witness about slower ageing rates of 1st group men (see table 1).

Table 1

Results of studying of 30-35 years old people biological age

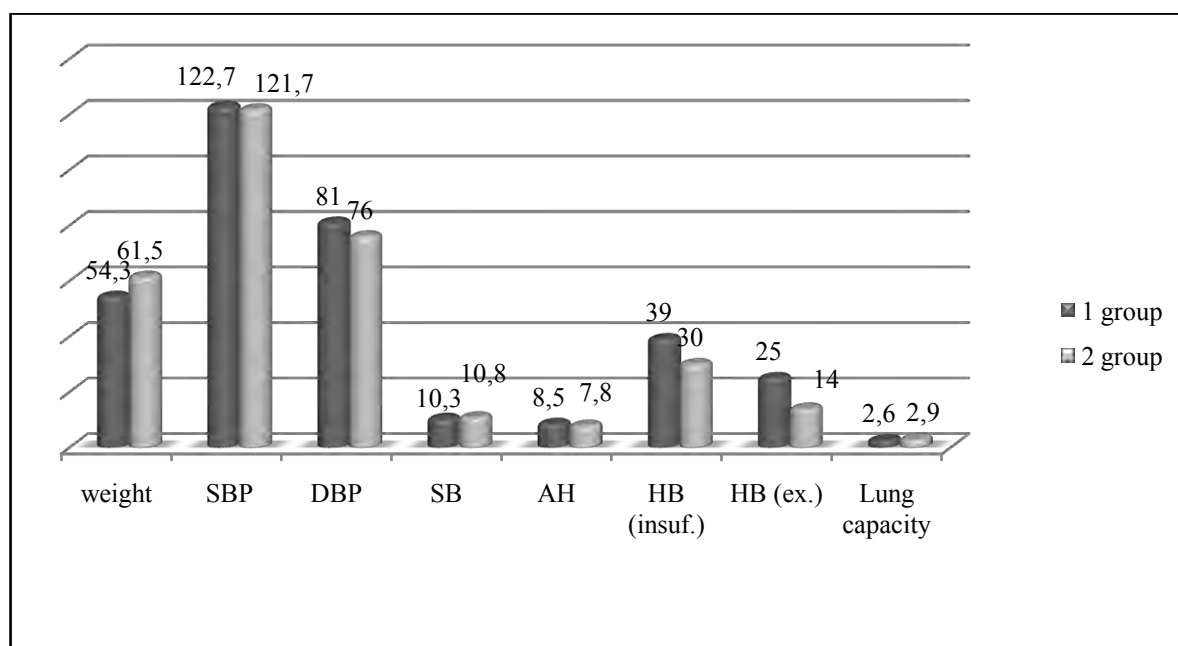
Sex	Sample (n=86)	CA	BA	SBA	BA-SBA
1 group					
Men	22	33.6±0.9	45.9±2.4*	39.7±0.6	BA-SBA >0
Women	20	32±3.5	33.8±7.3	35.8±2	BA-SBA <0
2 group					
Men	21	31.4±1	47.2±0.7	38.3±0.6	BA-SBA >0
Women	23	32±1.8	36.7±5.9	35.8±1.1	BA-SBA <0

* – indicator is confident in respect to its analogue of 2nd group, p<0.05.



Functional tests

Fig.1 Results of measurements of functional potentials of 30-36 years old men



Functional tests

Fig. 2. Results of measuring of 30-35 years old women's functional potentials

SBP – systolic BP, DBP – diastolic BP, SB – static balancing, AH –subjective evaluation of health, HB (isuf.) – breathing pause on inhale, HB (ex.) – breathing pause on exhale,.

Women of both tested groups have lower rates of ageing in comparison with men (see table 1). 1st group's women have biological age 2 years lagging behind their standard biological age, while 2nd group's women is 0.8 years ahead of their standard biological age, i.e. for women of both tested groups physiological rate of ageing is characteristic, with its being slower at 1st group.

Test Genchi showed statistically confident positive difference ($p < 0.1$), in subjective evaluation of health and vital capacity of lungs ($p < 0.05$) of men, who train health related swimming (see fig.1).

Concerning women such confidence was registered in Shtange's test and Genchi's test ($p < 0.05$) (see fig. 2).

Conclusions:

As a result of research we determined less difference between biological age and standard biological age of persons, who train health related swimming in respect to those, who practice other kinds of motion functioning.

It was stated that health related swimming, in contrast to other kinds of motion functioning better improves functional state of human organism's systems, integral indicator of which is biological age and it was noticeable in 1st tested group.

We also found lower rates of women's ageing in comparison with men and it can be conditioned by social factors (specificities of labor, traumatism, alcohol, smoking etc.) as well as sex characteristics, which influence on frequency and peculiarities of different diseases' progressing (men have more frequent cases of atherosclerosis, more acute disorders of blood circulation of heart and brain).

We have shown possibility of application of health related swimming as a kind of gero-protector for slowing of degradation age changes against the background of improvement of organism's functional potentials.

The prospects of further researches imply development of author's program of health related swimming, oriented on prevention from early ageing.

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Information about the author:

Fedynyak N.V.: ORCID: 0000-0002-0785-7651; Nazarchito@i.ua;
Prikarpatskiy National University; T.Shevchenko str., 44-a, Ivano-
Francovsk, 76018, Ukraine

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