

The Effect of High Oxygen Level (Kaqun) Water and the Ability to Use It to Maintain Military Combat Tone

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In the last decade, the nature and purpose of wars have changed, along with the rules and methods of conducting military activities. The problem of chronic stress has come to be a significant factor in foreign peacekeeping and policing missions. Physical training and psychological methods have been covered so far in the preparation and management of the stock in extreme environments. Our examination of the neurobiological side concerns the process. We assume that the biological state of the 60-year-old healthy population is closest to the situation of younger, distressed people.

We studied the effect of water with high oxygen content (Kaqun water) on cardiovascular and mental functions of elderly people in a randomized, double-blind, control group study. We have examined the plethysmogram, the standard deviation of the pulse in relaxed state and under load with the tools of heart rate variability (HRV) analysis, the speed of vasodilation (flexibility), blood pressure (systolic and diastolic), oxygen saturation, simple reaction time (SRT) and cognitive reaction time (CRT). We experienced significant changes in the reduction of systolic blood pressure, reflex time and cognitive time, stress index.

These are early signs of changes in chronic stress. The use of Kaqun water has normalized the status of test subjects. Based on this—as well as our experience—the use of Kaqun water is also recommended in operational conditions to increase combat ability, regeneration and rehabilitation.

Keywords: *water with high oxygen content, Reactive Oxygen Species (ROS), hypertension, reflex time, cognitive time, vascular stiffness, distress, chronic stress, combat capability*

Introduction

In the last decade, the nature and purpose of wars have changed, along with the rules and methods of conducting military activities. Whereas from the Second World War to the beginning of the Gulf War massive armies fought against each other, in the modern age smaller units fight for specific goals in peacekeeping and policing missions, as well as in the current military activities in Iraq and Syria. In such military activities and battles, the role and the workload of individuals increase, which makes an individual more valuable than before. The usage of modern weapons systems, the required mental and physical performance cause stress, even if it is different in character from that experienced in earlier wars. These factors

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emphasize the importance of the individual soldier, and the importance of enhancing or maintaining his physical and mental capabilities.

In the performance of its international obligations, new environmental pathogenic factors have appeared in the operating environment of our national military, and these factors will become more and more probable in the near future. In our missions conducted in crisis zones, we have already encountered the stress-inducing effects of extreme weather, heavy workload and the need for independent decisions. These factors affect the adaptive and reactive ability of the body (both in a biological and psychological sense). The types of effects on the human body: the performance of the body and the adaptability of the circulatory system also decrease, certain mental processes slow down, and the fluid balance may be upset.

In NATO, it is becoming more and more important to assess human factor by unified principles. Physical eligibility assessment and fatigue management has come up as a new demand. More research shall be done and appropriate measuring instruments and systems should be developed to learn more on the performance of soldiers working in extreme conditions, their physiological reactions, internal processes, the limitations of their mental and physical capacity and the causes of those limitations. These experiments shall focus primarily on the effect of sensory experience on the autonomic nervous system, the circulatory system, its adaptation, and the operation of mental processes. One indicator and consequence of the increased stress is the hypoxic state, so the monitoring and treatment of that should be a top priority. Hypoxia and the changes taking place in the body as a response to that are of primary importance for the functioning of the body.

Presently, the targeted selection of the military staff has already reached a high level.

However, two factors appear to be necessary to improve the process and solve the above problem:

1. Biological stress reaction shall be measured, which can be a starting point in the preparation of the individual.
2. A new methodology shall be introduced, which, applied at the service location, enhances the ability of the individual to adapt to environmental circumstances, and helps to speed up the process of physical as well as mental adaptation.

The ability of a person to work and fight is affected by the vegetative nervous system, in particular, and by the condition of the circulation, stress sensitivity and mental state, especially memory. Measuring these parameters (tremor, HRV analysis, nerve conduction velocity and reflex time, and working memory time-usage time) appropriately traces the individual's work and combat ability. Combat capability can be maintained and improved by enhancing the above parameters:

- The outside world and the individual's biological system are in close relationship.
- The biological system can be taught, trained, and the upset balance of the body can be restored by suitable methods.
- Balance is the result of a process whose precondition is achieving and maintaining homeostasis.

Oxygen as a highly reactive substance is an essential element in the formation of free radicals. ROS and Reactive Nitrogen Species (RNS) play an important role in controlling the functions of the body, such as:

- They stimulate the functioning of the immune system and also form the main antimicrobial substance of the phagocytes.
- The release of the free radical is an aspecific stimulus of the cellular immune system, and antiviral and antitumor immunity is initiated. This process is also verified by our own measurements.
- Reactive nitrogen radicals play a significant role in the formation and disappearance of pulse wave-associated vasodilation. Reactive nitrogen radicals play the role of the primary neurotransmitter in the synaptic transmission of information.

The pathological role of low oxygen levels has been demonstrated in military operations mainly involving diving, airborne and mountain troops. In the latter case, staying 4,500 m for a short time (less than 4 hours) or between 2,500 to 3,500 m for more than 4 hours fall in different categories. [1] [2] High mountain oxygen deficiency can lead to acute high-altitude disease, chronic high-altitude sickness, cerebral edema, and pulmonary edema. [3] Acclimatization takes 5–9 days (controlled by instruments), but according to US military authors, the adaptation process lasts longer. There have been experiments with special respiratory muscle training, but they brought visible results at heights above 4,000 m. [4] Oxygen is a basic element for life, this is well known. We know less about the role of water in the intra and extracellular space. Kaqun water is a specially produced water for consumption and bathing (functional water), whose physical properties, pH, oxygen level are different from the normal drinking water (OTH permit 420-2/2007, OKI expert opinion: 6212/2011). Kaqun water is a fluid, which contains 16 mg oxygen per litre, pH value is between 7.5 and 8.5 (slightly alkaline) and it has a lower osmotic pressure than cytoplasm, whose effect mechanism is:

- The modified absorption and utilization conditions, reducing the size of the water clusters, where the average cluster size is 4–8 water molecules because of the tetrahedron structure. This size can penetrate through the openings of the cell wall along with the dissolved substances in them.
- A high rate of oxygen, which is believed to be the consequence of reduced hydrogenation and so the oxygen molecules are inherently reduced in the electron content.
- A burst-like pro-oxidant (ROS) effect, which acts as a signal for the body, enhances apoptosis, accelerates cell regeneration, enhances the function of natural killer cells, promotes vasodilation and potentiates the body's antioxidant enzyme system.
- The alkaline effect due to the rearrangement of the water molecules, which reduces acid deposition and so tissue edema, as well.

We associate the deceleration of memory, neural and cognitive functions with old age. We assume this is due to the accumulation of pro-oxidant radicals, metabolites accumulating in the body and the decrease of neural and mental activity.

The decline of neural and mental functions is one of the early signs of ageing, which can be objectively determined by measurements.

The aim of the study is:

- To justify or reject the hypothesis that the consumption of Kaqun water influences:
 - basic mental functions;
 - has to have an impact on the operation of the autonomic nervous system;

- influences blood pressure;
- affects vasodilation.
- To examine whether these effects depend on the dosage.
- To examine the rate of development in time and durability of the effects.

Method of Examination

The study was a *placebo-controlled, randomized, double-blind* trial.

The materials: Kaqun water, placebo: tap water in Kaqun bottle.

Basic thesis: reactivity to the outside world of the average population about 61 years old is similar to a young, hardened population, but in a state of chronic stress.

A total of 60 people took part. They formed 4 groups of 15 people each:

1. Consumption of 0.5 l Kaqun water daily;
2. Consumption of 1 l Kaqun water daily;
3. Consumption of 1.5 l Kaqun water daily;
4. Control group; consumption of 1 l water daily.

Table 1. *Group characteristics.* [Edited by the author.]

	Composition			Age
	Male	Female	Total	Average
1.	5	8	13	65.69 years
2.	3	12	15	63.73 years
3.	3	8	11	68.36 years
4.	2	7	9	66.44 years
Total/Average	13	35	48	65.93 years

The dropout during the examination was not due to side effects. One volunteer complained about headache, but the relationship with water consumption could not be proven.

The study included volunteers of both sexes between 50 and 75 years of age, who did not consume Kaqun water nor bathed in Kaqun water for 2 months prior to the study. Health status was appropriate for their age. The sorting of the people was done in order of arrival. The members of the control group were selected in another city so they did not meet with the test group.

When selecting the sample, the following criteria had to be fulfilled by the volunteers: self-sufficient, or still active worker in the given age group, lives an active social life, has average health status. *The examination consisted of the following tests:* Serial reflex time (SRT)—testing the dominant hand 32 times. We analysed the average P200 time, filtering out the 3 highest values we deem as a learning phase. We also examined the wave of the P200 time. The normal value is 200 msec.

1. Cognitive reflex time (CRT)—recognizing different sounds, signalling with the push of a button, making it more difficult with counting backwards, pushing the button and simultaneously saying the number. The length of the test is 32 times. The normal value is 300 msec. In the examination we did not include the 3 highest values and values un-

- der reflex time. We deemed the highest value a learning value, which falsely stretches the results and the values under 200 msec are not the results of a cognitive process.
2. Heart rate variability (HVR) measurement, standard deviation, standard deviation % in normal condition and after 10 squats (30-watt load). We recorded base data and the differences. The standard deviation data represent the stimuli of the sympathetic and parasympathetic nervous system, so they can be used as a stress index. We determine the minimal and average value of vasodilatation, which shows the flexibility of the capillaries.
 3. Measuring oxygen saturation.
 4. Blood pressure and heart rate were recorded. The heart rate was measured in a relaxed state and after load in every 10 second cycle, the fit index, i.e. the time when the heart rate reached the relaxed heart rate after load.

Instruments for Measuring

Oxygen saturation: Innomed joint-stock company Oxycard device, which records the oxygen saturation of the peripheral blood and the average heart rate.

Other tests: Kellényi's tremometer, which records the time between a signal and the response. A software dynamically records the measures valued after statistical analysis.

Statistical analysis: Fast Fourier Transform (FFT) analysis, linear correlation and regression analysis, standard error analysis, normality test, dependent variables (equality of averages test, stochastic homogeneity test), and to assess the significance level of the changes.

Five measurements were performed on the selected subjects, at the beginning, then on the 7th, 14th, 21st and 28th days.

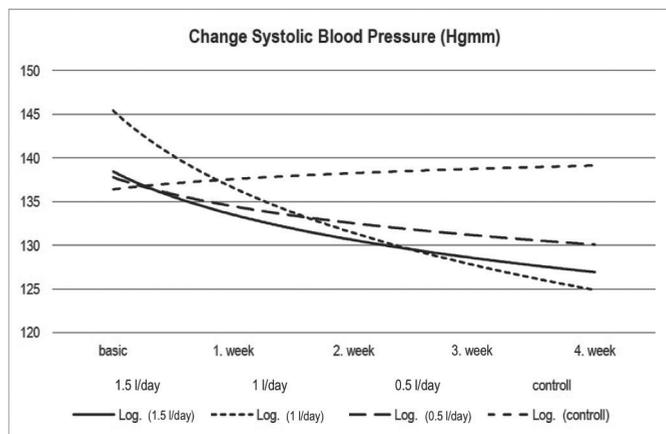


Figure 1. *Evaluation of blood pressure.*
[Edited by the author.]

The blood pressure was measured before everything else, after at least 10 minutes' rest. The results are as follows (comparison of median values). The number in parentheses is the biggest value of reduction.

Kaquun water significantly reduces systolic blood pressure. In the 1.5 l/day $p = 0.0147$, in the 1 l/day group $p = 0.0259$, while in the 0.5 l/day group this is $p = 0.0174$. The data of the control group do not follow the moving of test groups. Rather, it has increased slightly. The result is significant.

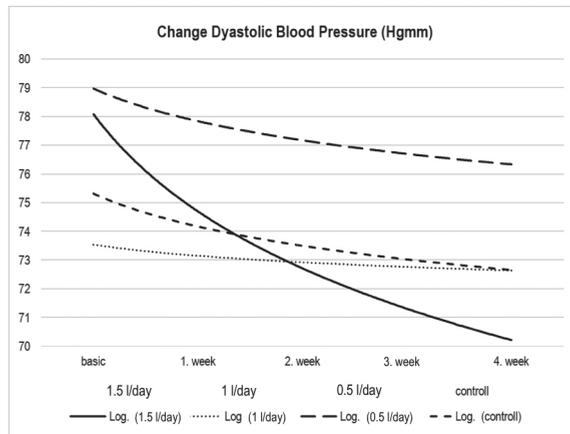


Figure 2. *The change of the diastolic blood pressure. In the control group the pressure increased, in the Kaqun group it depended on the decreased dose.*
[Edited by the author.]

The diastolic blood pressure was in the normal value for each group. There was a significant decrease ($p = 0.0416$) found only 1.5 l/day group, although it was noticeable in the other Kaqun groups, as well. The data of the control group rather increased.

Relaxed Vegetative Index Analysis

The vegetative index is the quotient of the average R-R distance divided by the standard deviation. The heart frequency is controlled by the autonomic nervous system, an immediate reaction can be seen to the body's physical and psychological effects. [5] [6] The hypothesis of the study is that the consumption of Kaqun water improves the body's cope with stress to physical impacts. Heart frequency is an immediate indicator of the body's physical and psychological effects. The rating is monitored between the R-R peaks, and the standard deviation of this. The standard deviation shows the vividness of the autonomic nervous system (change of sympathetic and parasympathic effects). Among customers who have increased sensitivity to stress and use 1.5 l Kaqun Water pro die, the decrease is significant ($p = 0.0135$). In one litre/day group decreasing of stress index was significant ($p = 0.002726$). Where the group used 0.5 l /day water, the result was not significant.

SRT Analysis

The change in reflex time shows the difference in the speed of the nerve impulses. The measurement was done with the classic method, push-button reply to acoustic stimuli. The time between the sounds was random. We kept the lowest values, the three highest values were excluded. We observed among the elderly people the low degree slowdown of the reflex time.

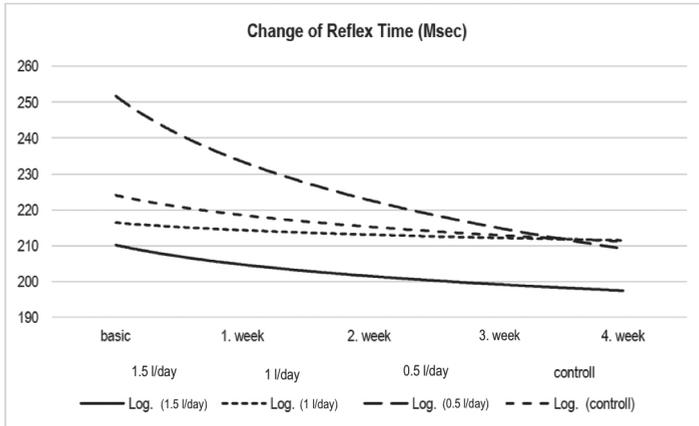


Figure 3. Change of reflex time. The effect depends on the dose, the 1.5 and 1 l/day are similar, the control is not changed.

[Edited by the author.]

It is noteworthy that the reflex time of the studied population differs only slightly from the normal 200 msec value. During the reflex examination we have excluded all disturbing factors, the volunteers only focused on the automatic execution of the task. During the test, the standard deviation shows fatigue, lack of attention and concentration of the test subject. The greatest improvement is seen in the worst-case group. Therefore, the use of water accelerates the reflex time and also improves the concentration.

Cognitive Reaction Time

The study of the time requirement of cognitive processes measures the usage time of the work memory in case of divided attention. It can be seen that compared to the base time, significant acceleration can be seen against the control group. The normal range of cognitive time is 300 msec. Significance levels: 1.5 l/day group starting position is higher than 300 msec – $p = 0.024937$; 1 l/day group $p = 0.00098$; 0.5 l/day group $p = 0.00403$.

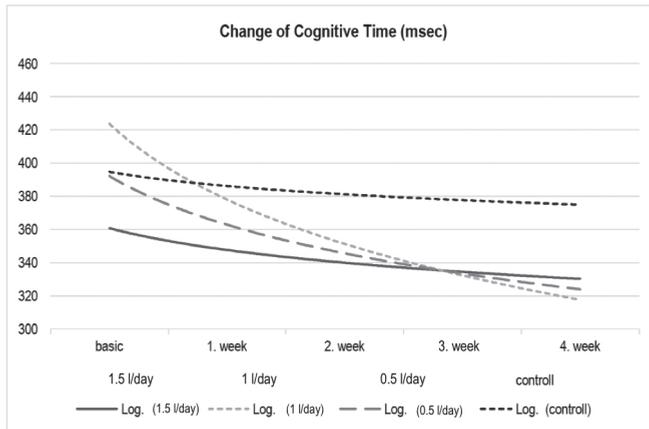


Figure 4. Change of cognitive time. The results of every water group were significant. [Edited by the author.]

The rate of memory usage (consciousness) is determining the organization’s operation and maintenance of survival. This is a prerequisite for adaptation for the load. Cognitive time plays a major role in the rapidity of position recognition, task solving, decision-making, i.e. in the survival of military personnel in combat situations.

Oxygen Saturation Analysis

The consumption of water with high oxygen content should result in the increase of oxygen saturation, the improvement of the body’s oxygen supply. The increase in saturation was 1% in the control group. The reason for the 1% increase is probably the bodies being filled up with water. By comparison, we have experienced saturation increase in the 1.5 l/day Kaqun group. The linear correlation analysis considered the changes in the 1.5 l group significant. The data raise the possibility of the filling of the bodies with water improves oxygen saturation in itself.

Table 2. Oxygen saturation. [Edited by the author.]

	1.5 l/day	1 l/ day	0.5 l/day	Control
Change in %	2	0.73	0.54	1

Dosage, Efficacy and Maximum Time of Effect Appearance

An important question is in what dosage should the water be consumed and when does the maximum impact appear at the given dosage.

Table 3. *Evaluating efficacy*. [Edited by the author.]

	Sist. RR	Diast. RR	Veg. index	SRT	CRT	Saturation	Total points
1.5 l	2	1	3	1	3	1	11
1 l	1	3	1	2	2	2	13
0.5 l	2	2	2	3	1	3	13

We put in this table depending on the scale of changes first, second or third place. From this we can prepare the dosage suggestions. So:

- Consumption of 0.5 l daily is recommended to increase the CRT.
- Consumption of 1 l daily is recommended to decrease systolic blood pressure and reduce stress sensitivity.
- Consumption of 1.5 l daily is recommended for other cases.

The appearance of maximum impact generally falls on the third week in case of both the 1.5 l and 1 l dosage, and then the values decrease. The exception is in the cognitive time but even here the difference between the third and fourth week is minimal. Therefore, basically the three-week consumption followed by a one-week break is the recommended dosage.

Evaluation

The high oxygen content “ionized” waters basically change the cluster structure of water, modify the H-O rate in favour of the oxygen, thus changing the electrical activity of the water molecules, as well. The osmotic pressure of this water (300 mOsm/l) is higher than the osmotic pressure of the cytoplasm (280 mOsm/l). This pressure difference also helps the lower sized clusters of water molecules flow into the cell. The structure of water clusters determines its effect. [7] This influx is also supported by the transport proteins of the cell membrane. [8]

Cellular metabolism contains such redox processes, where even under physiological conditions oxygen with oxidative properties (Reactive Oxygen Species—ROS) and nitrogen (Reactive Nitrogen Species—RNS) compounds are created. They include free radicals with one or more unpaired electrons on their external electron shell, such as hydroxyl radicals, superoxide radicals, nitric oxide radicals or lipid peroxy radicals and highly reactive molecules without radical properties such as hydrogen peroxide or hypochlorous acid. Due to the effect of Kaqun water, the number of free radicals in the body increases, which starts biological processes representing dangerous signals for the body. Although free radicals and reactive compounds created in a specified concentration and location do play an important role as signals for the physiological functioning of the cells. [9] Due to their great reactive properties, they play a regulatory role in the signal transduction pathways, since getting into interaction with signalling molecules and enzyme proteins, they can influence their functions.

Nowadays more and more studies confirm the signalling role of the redox system. The redox signal triggers specific regulatory processes (e.g. apoptosis at cellular level, vasodilation at tissue level. [10] Redox processes have a role and place in the operation of the body, they cannot be considered as clearly negative participants, although they play a role in

many lesions and diseases. Nowadays the regulatory role of free radicals is considered more primary as their pathological role, which is not about free radicals, but about the pathology, exhaust the body's control system. The oxygen molecule is not dangerous, but during transformation with electron uptake free radicals are developed and these have harmful effects, as well.

The life span of free radicals is in vivo 10^{-7} , 10^{-4} sec which enables them to act as signals and exert their effects not only at the place of creation but further away, as well. The physiological location of the creation and control of free radicals is in the cell mitochondrion. Here the continuously created free radicals are neutralized by the superoxide dismutase enzyme. In the presence of iron or copper ions, it is very aggressive. Hydroxyl (OH) radical is created, which stays for 10^{-9} sec. No enzyme is able to neutralize this (Fenton-reaction). As we have seen it, this reaction also has a role in water polymerization. The control of the body takes place in the earlier, peroxide phase.

Should the balance of the pro-oxidant and anti-oxidant system be upset, degenerative diseases begin; this is called oxidative stress.

The living cells continuously create and maintain an extreme, complex, 3-dimensional electric, i.e. redox pattern as electrical systems. The most efficient and quick physiological (and pathological) control is done by reactive oxygen and nitrogen derivatives. In the aerobic cells, the coordinated mitochondrial network consumes 90% of the oxygen used, securing the energy provided by adenosine triphosphate (ATP) for cellular processes. This dynamic mitochondrial energy and the redox system change from moment-to-moment depending on the intra- and extracellular signs. When the oxygen is reduced compared to the current energy demand of the cell (reduced oxygen supply or increased energy demand) the coordinated intracellular mitochondrial network issues a hypoxic redox signal with the increased ROS emission. The increased ROS emission, as a secondary messenger system induces a coordinated complex response with redox-sensitive factors and molecules.

The oxidative processes in the body are bound to two compounds, the ROS and RNS group. The RNS enzyme has three different isoforms. The neuronal nRNS (in central and peripheral neurons) and endothelial eRNS (mainly in endothelial cells) continuously express calcium and calmodulin dependent enzymes. The inducible iRNS are created in immune cells and several other cell types. The transcriptional activation of iRNS can be caused by endogenous mediators (chemokines, cytokines) or exogenous factors (bacterial toxins, viral infections, allergens, ozone, hypoxia, tumours, etc.).

The effects induced by ROS in the signal transduction pathways can be divided into four main groups: [11]

- By increasing the IC concentration of certain ions (e.g.: Ca^{2+}), contraction and cell migration are triggered.
- By activating certain transcription factors (AP-1, NF- κ B, HIF-1), inflammation is induced.
- The matrix can modify the proteins of the extracellular matrix by affecting the metalloproteinases.
- Reversibly inactivates such protein tyrosine phosphatases like mitogen-activated protein kinases (MAPK), which by representing an important IC signal transduction pathway ultimately activate transcription factors (e.g.: c-myc, p38), which control apoptosis, cell growth and differentiation.

ROS and RNS also operate as neurological signals; they play a role in the neural signalling processes, in the formation of neuroplasticity and memory. Nitric oxide (NO) is a free radical molecule capable of freely diffusing through the cell membrane and can act as a neurotransmitter, neuromodulator and signalling molecule. It controls the neurotransmitter emission, and through this way the synaptic activity and can control the excitability of midbrain dopamine neurons. However, neurotransmitters also have antioxidant and free radical catching properties, thus they regulate neurotransmission and the protective effects towards neurons.

The consumption of Kaqun water creates a reactive radical peak (-OH, O₂⁻ and H₂O₂) from the moment of consumption for about 20 seconds, which with the above-mentioned mechanism, on one hand enhances the effect of free radicals and promotes apoptosis, the stimulation of immune system, on the other hand it provokes the body's own antioxidant system. [12].

Several mechanisms may be responsible for the effect of Kaqun water:

1. Creation of free radicals, which has a direct vasodilational activity and plays a signalling role; quickens the neurotransmission speed as a neurotransmitter (decrease of reflex time) and information processing on the nerve cells (improvement of memory time).
2. Improved energy processes due to the higher oxygen consumption of mitochondria.
3. Improved oxygenation due to the indirect effect of the fluid compartments filling up.

Lucas found [13] that training enhances the Hgb level in the brain of elderly people with a parallel improvement of the cognitive functions. This coincides with our own observations. Shpirer et al. have published [14] about the decrease of attention in people with apnea due to hypoxia.

Such pathologies are rooted in the warming climate and the shifting weather zones that influence the general reactivity of the human body. The appearance thereof is expected mostly in the form of cardiovascular diseases, the increased dehydration of the body, such as nephrolithiasis, increasing amount of harmful metabolic products, old-aged dehydration symptoms.

The performance, persistence, and reactivity of the human body are influenced by various factors. These have already been analysed in detail in the Euro-Atlantic literature, but the analyses have not considered the results of Oriental life sciences and their theoretical-logical-empirical world. Oriental medicine describes the world organically, in the context of environment and man. These are the descriptions of currently known scientific results from another logical-empirical approach. This experience is valid even now and gives the opportunity to interpret and utilize the scientific based results of the two areas.

The preservation and maintenance of the capacity to work nowadays means more than the self-fulfilling and serving interest of the self, or the manifestation of the ego. For society, it is now an important economic and future determining interest that the working capacity of the population and the fighting efficiency of the army is guaranteed. The two areas are inseparable; the working ability of the population is a support (sustenance) toolkit and frame of reference, it also defines the "labour task", the fighting efficiency of the army.

The morbidity data of Hungary, and the very fact that they are lagging behind the majority of European and post-socialist countries prove that our solutions applied by us so far are not efficient, thus both the theoretical and practical approaches need to be restructured.

One of the compensation methods for ambient effects is adaptation. The method of adaptation can be social, technical, system organizational, but one should not disregard individual biological adaptation that can be the result of a personalized method. With the help of the test, we would like to define how the techniques established as a result of the screenings tracking biological functions built on personal characteristics can support a given person's adaptation against the changes of ambient circumstances.

The results of the test provide a solution for the following problems:

Increasing the stress-bearing capacity of military forces used in modern warfare is possible by regulating the vegetative nervous system, accelerating brain function, reflex time and cognitive time, and improving physical performance. This effect can be achieved and maintained without any other side-effect by applying Kaqun water. Although it is not discussed in the present study, the cellular immune system intensifying the effect of Kaqun water is widely known, similarly to its wound cleansing and healing effects—primarily if applied as a bath treatment. All these make it ideal to apply it as a mobile (containerised) service in camps.

The results of the research—over and above the narrower focus military application—are also highly beneficial on a social level. The increasing number of the elderly is characteristic of modern societies; this process has already started in Hungary, but practically it is present in every modern state, including India and China. Taking care of the elderly alongside with the present policy principles brings about a significant increase in costs and expenses, not only due to the payment of the pension, but also because of the increasing demand for certain services (social and healthcare).

In connection to the climate change, social adaptation was put into the forefront, regarding elderly care; social reactions have been studied which currently means a restriction on care services due to the economic situation. The improvement of individual stress processing ability and adaptability enhance the working and self-sustaining ability of the individual, thus betters the quality of life, lifetime, and the keeping of self-evaluation. The social effects thereof would save billions of HUF in the sector of the active healthcare only.

Military Use

In asymmetric war operations and peacekeeping procedures, our soldiers are situated and acting not in a moving front line, but rather in camp circumstances. As a result, they use half-stationary water treatment systems placed in containers. These systems can be connected to a mobile Kaqun water system also installed in a container, and as a result, either the 4-tube bathing system or the 10,500 l/day Kaqun drinking water manufacturing system can also be established. Soldiers are supplied with special drinking water from this system. The Kaqun water manufacturing unit can be fed from either tap water or from the water arriving from the water treatment facility. If using water treatment container, the connecting tap should be installed behind the first demineralizing round, and the Kaqun water production system can operate by using this water. In the case of drinking water production, there is no by-product,

whereas in connection with bathing, a thermal load of the used bathing water of 34–36 centigrade needs to be considered.

The application of Kaqun water in military circumstances:

1. Maintaining and intensifying physical performance; for this, the consumption of 1 litre of Kaqun water per day is enough.
2. Improving mental performance.
3. Compensating environmental pathologic effects with the help of Kaqun water consumption and bathing.
4. Stress reduction after deployment by applying one 50-minute bath per day. With the already existing 4-tub system the bathing of 60 persons can be performed per day.
5. Healing superficial wounds, injuries. [15] [16]

The Use of Kaqun Water for Rehabilitation Purposes

In order to use the previously described effects, the Las Vegas Kaqun Bath has concluded a contract with the Veterans Charity Ride to Sturgis program of the White Hearth Foundation. In this program, the rehabilitation of injured soldiers wounded in recent wars is performed.

Injuries, problems of the soldiers:

- fractured or amputated limbs due to explosion and the replacement thereof with prosthetic devices;
- post-traumatic syndrome (sleep disturbance, panic disorder, social inclusion disorder);
- gunshot wounds;
- skull—brain injury;
- locomotion disorders and resulting;
- overweight.

In preliminary studies primarily with veterans with posttraumatic stress disorders (PTSDs), there was a significant improvement in pain, insomnia, tense nervous system, and drug use.

Summary

The raised oxygen (Kaqun) water has special characteristics. Oxygen and free radicals in the tissues stimulate the body's energy system and are thus suitable for the prevention and treatment of chronic stress (battle stress, fatigue, PTSD).

References

- [1] MUZA, S. R.: Military Applications of Hypoxic Training for High Altitude Operations. *Medicine & Science in Sports & Exercise*, 39 9 (2007), 1625–31.
- [2] BHAUMIK, G., DASS, D., BHATTACHARYYA, D.: Heart Rate Variability Changes during First Week of Acclimatisation to 3500 m Altitude in Indian Military Personnel. *Indian J, Pszol Pharmacol*, 57 1 (2013),16–22.

- [3] LUO, Y., WANG, Y., LU, H., GAO, Y.: 'Ome' on the Range: Update on High-altitude Acclimatisation/Adaptation and Disease. *Molecular BioSystems*, 10 11 (2014), 2748–55. DOI: 10.1039/C4MB00119B
- [4] LOMAX, M.: Inspiratory Muscle Training, Altitude and Arterial Oxygen Desaturation: A Preliminary Investigation. *Aviat Space Environ Med*, 81 5 (2010), 498–501.
- [5] VIGGIANO, A., VICIDOMINI, C., MONDA, M., CARLEO, D., CARLEO, R., MESSINA, G., VIGGIANO, A., VIGGIANO, E., De LUCA, B.: Fast and Low-cost Analysis of Heart Rate Variability Reveals Vegetative Alterations in Noncomplicated Diabetic Patients. *Journal of Diabetes and Its Complications*, 23 2 (2009), 119–23.
- [6] MATVEEV, M., PROKOPOVA, R.: Circadian Profiles of Heart Autonomic Balance Evaluated by Time-related Common Indicator of Heart Rate Variability. *Anatolian Journal of Cardiology*, 7 1 (2007), 125–9.
- [7] CLARK, G. N. I., CAPP, C. D., SMITH, J. D., SAYKALLY, R. J., HEAD-GORDON, T.: The Structure of Ambient Water. *J. Molecular Physics*, 108 2 (2010), 1415–1433.
- [8] SZALKAI I.: *Kaun the Element of Life*. Budapest: Radnai Publisher, 2012.
- [9] DRÖGE, W.: Free Radicals in the Physiological Control of Cell Function. *Physiological Reviews*, 82 (2002), 47–95. DOI: 10.1152/physrev.00018.2001
- [10] TOUYZ, R. M.: Mitochondrial Redox Control of Matrix Metalloproteinase Signalling in Resistance Arteries. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 26 4 (2006), 685–8. DOI: 10.1161/01.ATV.0000216428.90962.60
- [11] WALDECK, W., MUELLER, G., WIESSLER, M., BROM, M., TOTH K., BRAUN, K.: Autofluorescent Proteins as Photosensitizer in Eukaryotes. *International Journal of Medical Sciences*, 6 6 (2009), 365–373.
- [12] TÓTH J.: The Effect of Oxygenation on the Biological Behaviour of Tumours. *Orvosi Hetilap*, 148 30 (2007), 1415–1420. DOI: 10.1556/OH.2007.28024
- [13] LUCAS, S. J., AINSLIE, P. N., MURRELL, C. J., THOMAS, K. N., FRANZ, E. A., COTTER, J. D.: Effect of Age on Exercise-induced Alterations in Cognitive Executive Function: Relationship to Cerebral Perfusion. *Experimental Gerontology*, 47 8 (2012), 541–51. DOI: 10.1016/j.exger.2011.12.002.
- [14] SHPIRER, I., ELIZUR, A., SHORER, R., PERETZ, R. B., RABEY, J. M., KHAIGREKHT, M.: Hypoxemia Correlates with Attentional Dysfunction in Patients with Obstructive Sleep Apnea. *Sleep & Breathing*, 16 3 (2012), 821–7. DOI: 10.1007/s11325-011-0582-1
- [15] SEN, C. K.: The General Case for Redox Control of Wound Repair. *Wound*, 11 6 (2003), 431–8.
- [16] HENRIQUES, A. J., COOPER, S. R., BURTON, N.: Free Radical Production and Quenching in Honeys with Wound Healing Potential. *The Journal of Antimicrobial Chemotherapy*, 58 4 (2006), 773–7.