



www.symona.ru

UNIVERSAL

DIAGNOSTIC TECHNOLOGY

FUNCTIONAL STATE OF
THE ORGANISM OF MILITARY MEN

The combat capability of military units to a large extent depends on the functional state of the organism (FSO) of soldiers and officers, so the diagnostics the FSO and the objective control of efficiency of actions for preservation and increase of the FSO in military spjcialists are extremely important.

Military medicine is not engaged in the FSO diagnostics of healthy military specialists, as it doesn't possess relevant technologies. Now the health of soldiers is eva luated only at rest according to generally accepted examinations by various medical specialists, and blood and urine tests. FSO diagnostics for soldiers are wrongfully substituted for the physical testing on overall endurance and muscle performance, that include running (sprint and cross), pull-UPS, push-UPS and other strength exercises. Such FSO diagnostics has some significant drawbacks: hard work, time consuming, does not apply before a combat mission associated with spending large amount of physical and mental energy, and contraindicated in the presence of injuries or diseases.

We, a group of Russian developers, have created a new universal medical diagnostic technology of the functional state of the organism (FSO):

DIAGNOSTICS FUNCTIONAL STATE OF THE ORGANISM OF MILITARY MEN AT REST



Diagnostics of one person takes less than 10 minutes and is performed in the horizontal supine position in a quiet relaxed state.

Diagnostics FSO is carried out using a multifunctional hardware-software complex

INTEGRAL MONITORING SYSTEM

SYMONA 111

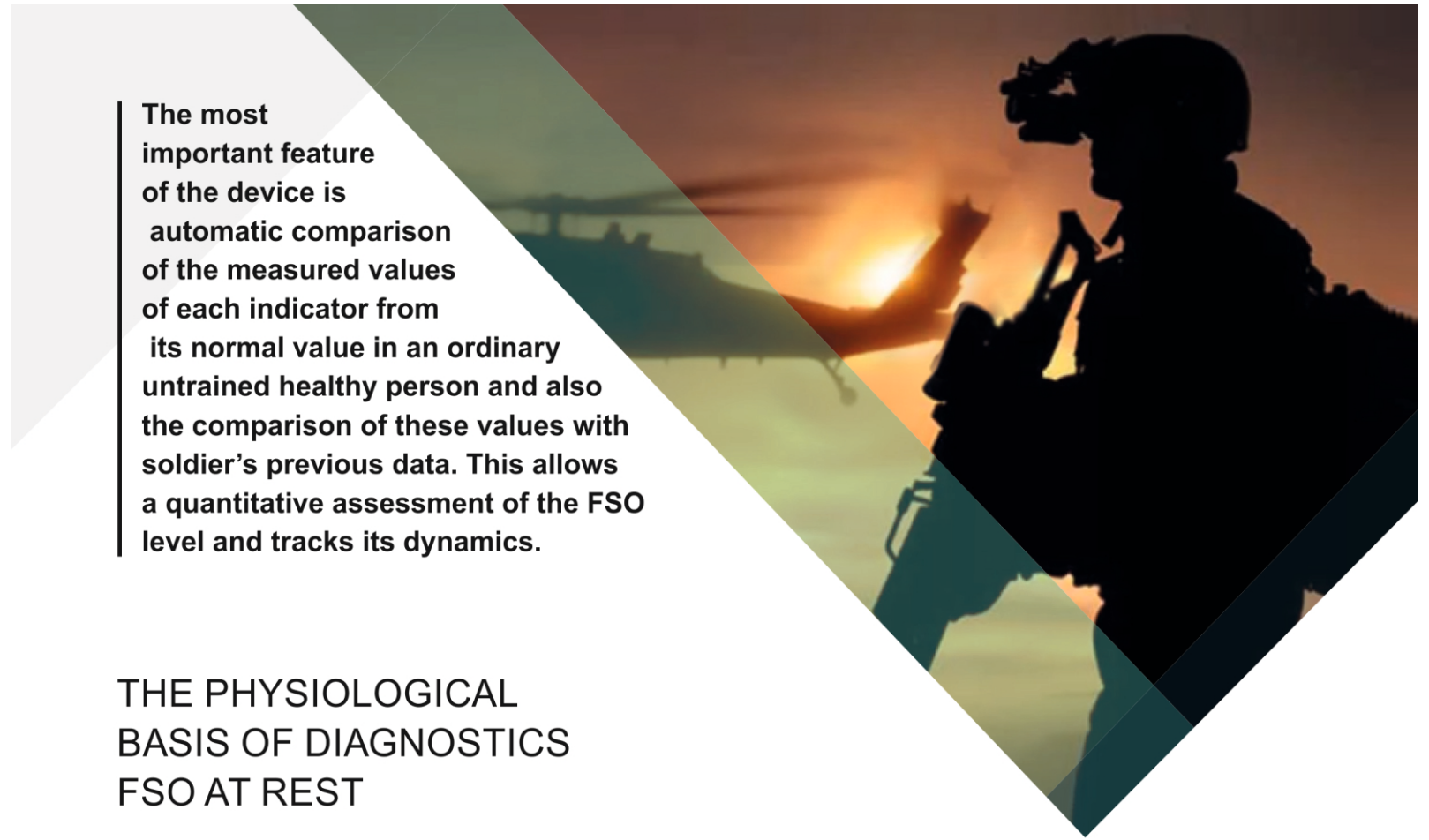


Complex consists of 8 measuring modules, combined by a computer program:

1. Cardioplethysmograph,
2. Electrocardiograph,
3. Pulsoximeter,
4. Non-invasive blood pressure,
5. Body temperature (2 channels),
6. Electroencephalograph,
7. Gas breathing ($\text{CO}_2 + \text{O}_2$),
8. Breathing mechanics.

The complex is designed for non-invasive measurements of various physiological parameters of central and peripheral hemodynamics, respiratory function, delivery and consumption of oxygen, metabolism, body temperature, activity of the central and vegetative nervous system. Simultaneously it displays information about the value of more than 100 simple and integral indicators.

«SYMONA 111» is used in clinical practice (cardiology, pulmonology, functional diagnostics and intensive care), as well as in sports and military medicine.



The most important feature of the device is automatic comparison of the measured values of each indicator from its normal value in an ordinary untrained healthy person and also the comparison of these values with soldier's previous data. This allows a quantitative assessment of the FSO level and tracks its dynamics.

THE PHYSIOLOGICAL BASIS OF DIAGNOSTICS FSO AT REST

In the body of any person under the influence of many years physical training occurs a functional restructuring. First of all, it is visible in the restructuring of the muscular-articular apparatus, and psychological status (the nervous system). But the primary factor limiting the work of muscles and nervous system is a functional condition of the cardio-pulmonary system (CPS).

Under the influence of physical activity occur both immediate and long-term changes in CPS. All these changes are ultimately aimed at optimal providing of the entire body's energy at rest and in operation.

Long-term changes of CPS in servicemen are well measured at rest using complex «SYMONA 111» and expressed in increasing Heart Chambers, Myocardial Contractility, Blood Volume, improved Pulmonary Oxygenation of the blood and Oxygen Delivery function of the blood, reducing Heart Rate, Vascular Resistance, and in changing many other parameters.

The higher these numbers differ from the normal values of the ordinary untrained person, the FSO is better.

These functional parameters are very unstable in any person. After the big physical and nervous loadings, as well as the loss of physical state for any reason (illness, injury, overwork, poor nutrition, poor sleep, etc.) these indicators are falling, approaching the normal value of untrained person, or can even fall below it.

When FSO is restored the functional indicators of CPS returns to usual high values of the soldier. The sooner there is a complete recovery of the functional indicators and the greater are their magnitudes, the higher is the level of fitness and the higher is the readiness to perform a large amount of work.

FSO DIAGNOSTICS IS PERFORMED VIA 4 INTEGRAL INDICATORS



DO₂I – Oxygen Delivery Index (ml/min/m²)

It characterizes the intensity of the aerobic metabolic processes. In a healthy person normal rate is 600\ 06100. In trained soldiers D₂I is always above 700.



IB – Integral Balance Deviation (±Δ%)

It characterizes the level of functioning of the cardio-pulmonary system at rest compared to an untrained person of the same sex, age, weight and height. In an ordinary healthy person normal rate is 0±100. In trained soldiers IB is always above 100. In a very healthy soldier IB reaches 300–700. When the value of IB is less than minus 100, it is a sign of the strong fatigue or illness.



CR – Cardiac Reserve (c.u.)

It characterizes the existing reserves of the heart to do the work. In an untrained healthy person normal rate is 5±1. In servicemen with high levels of health and endurance, CR reaches 11. At the weary soldier, and after a hard work or disease, CR reduces to 4. The higher the CR is, the greater physical endurance is. The lower the CR is, the worse the FSO is as well as the level of physical fitness.



AR – Adaptive Reserve (c.u.)

It characterizes the level of body reserves to perform physical and mental work. In an untrained healthy person normal rate is 500±100. At servicemen with high levels of health and ready to make a huge amount of physical and mental work, AR reaches 1200–1500. At the weary soldier, and after a hard work or disease, AR reduces to 400. The more the AR is the better the FSO is as well as the fitness level.

THE APPLICATION OF TECHNOLOGY IN MILITARY MEDICINE:

- The selection of candidates for military educational institutions and for work under the contract.
- Formation of groups with a high level of health, stamina and physical performance for extreme conditions of service.
- Diagnostics fatiguej\ 27nd evaluation of the transferred loads
- Evaluation of thej\ 35ffectiveness of therapeutic and rehabilitation measures
- VIP medical examinvtion of senior officers.

«OCULUS 2000» LLC
23/5, Usievicha str., Moscow, 125315,
Russian Federation

+7 (499)155-3488
+7 (499)155-3951

E-mail: sym111@mail.ru
www.symona.ru