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A COMBATANT COMMAND DEALS WITH OCCUPATIONAL HEALTH IN WAR

Plotkin, F.R., USA

Occupational health and preventive medicine strategies must be developed and optimized in order to achieve success in military operations. Prior to and during the US campaigns in Afghanistan and Iraq, US Central Command, in conjunction with the military medical community, developed policies and procedures to address these issues.

This paper briefly describes the major strategies for dealing with occupational health issues that were foreseen or encountered during operations post September 2001. Key strategies employed involved a medical preparation of the battlefield with accurate medical intelligence on diseases and environmental factors of military importance for the regions of concern, development of requirements for protective measures, dissemination of these requirements through operational plans, education of the Servicemembers through pre and post-deployment health threat briefs, and ongoing disease-nonbattle injury surveillance. Another area of concern was the potential for exposure and the effects of chemical and biological weapon agents. This was addressed through pre-exposure immunization, use of detection systems, issue of and training with protective gear, and fielding of protective and curative pharmaceuticals. Finally, in order to avoid the complications encountered when unfit personnel are deployed into medically austere theaters of operation, special guidance was published to provide occupational health guidelines that allow reasonable disqualification of civilian government employees and contractors. Despite the known potential health hazards, the military fighting strength was optimized and maintained. Through these combined strategies it is noteworthy that Operation Enduring Freedom witnessed one of the lowest recorded disease non-battle injury rates of any major conflict.

ABOUT TERMINOLOGY IN NORMATIVE DOCUMENTS

Osipov O.A., Vedeneev E.V., Ivanov V.A., Protopopov V.Y., Russia

Formation of methodological basis for safe human vital activity is an important problem of current preventive medicine. Some terms and definitions in normative literature are often contradictory and vague. Thus, it is necessary to revise terminology and develop the theoretical base of the problem.

ANALYSIS OF RISK FACTORS OF PNEUMONIA IN SERVICEMEN IN RUSSIA

Zhogolev K.D., Zhogolev S.D., Ogarkov P.I., Zueva N.V., Polaykov A.S., Russia

The study allowed determining main risk factors in pneumonia development among servicemen. The base of pneumonia pathogenesis is a decrease of the immuno-resistance. In this connection numerous factors of army life affecting the immune system can be regarded as risk factors for pneumonia in military populations. In 75-85% of servicemen the disease was associated with previous effect of cold factor out of doors or in accommodations without adequate heating. Risk factors which reduce the immuno-resistance include: initial acute respiratory disease, adaptation to military service and new climatic and geographical conditions, psychic and emotional tension, physical overstrain, malnutrition, and hypo-vitaminosis. It is established that about 80% of pneumonia cases are recorded in recruits within first three months of the service. In the last years the influence of such factor as immunodeficiency increased. Comparative analysis of the immune status in recruits of 1988-1992 and 2000-2004 years showed a doubling of the number of recruits with the signs of immunodeficiency (risk group) (from 12.0% to 24.4%). Probably a growth of pneumonia in servicemen for the last 12 years was connected with these circumstances. Risk factors include the carriage of Streptococcus pneumoniae and other causative agents as well as such factors as “mixing” of recruits, overcrowding, and living in isolated and inadequately ventilated rooms in winter months, cough, sneezing and rhinitis in acute respiratory diseases.

ANTI-FATIGUE EFFECT OF L-ARGININE AND Puerarin ON MICE

Tian YP, Song SZ, Wang DQ, Wang L., China

Fatigue is a very common syndromes in modern society and the main reason is over produced lactic acid and lower oxygen saturation in blood. To investigate the anti-fatigue method, the L-arginine which could regulates cardiopulmonary vascular smooth muscle by producing nitric oxide combined with antioxidant of Puerarin. Thirty mice were randomly divided into three groups (n = 10). A: control group (0.9% normal saline); B: positive medicine group (0.08mol/L Fructose Sodium Diphosphate Oral Solution); C: experimental group...
(0.17mol/L of L-arginine + 30mg/ml of Puerarin), the volume is 0.5ml/day, were treated for 2 weeks. The swimming experiments have been done. After the mice swimming for 15 minutes, blood was sampled from orbit venous plexus, plasma lactate, LDH, SOD, MDA level and blood gas analyze were measured, respectively. And the swimming time was recorded. The results showed that PO2 and SO2 in group C was significantly increased, while the decrease of BE and cHCO3- was remitted; Simultaneously, extensive lactate production occurred in group A after swimming, lactate values in group C showed a decrease compared with group A. Moreover, less accumulation of lactate and MDA content in experimental group were found. The endurance swimming time experiments showed that the swim time were (88.6±24.7), (103±14.15) and (147.67±31.71) in A,B,C groups respectively. It was concluded that L-arginine combined with Puerarin could prolong the swimming time of mice by regulating smooth muscle of cardiorespiratory vascular, improving V/Q ratio. Therefore resulted in raising aerobic metabolism and decrease plasma lactate accumulation in mice undergoing endurance swimming.

### AVIATION MEDICINE IN ESTONIA

Juri Verrev, Estonia

The primary aim of aviation medicine is to ensure flight safety. All Authorised Medical Examiners (AMEs) are located in the Aeromedical Center (AMC) in Tallinn. In addition Estonian Air Force (AF) employs two flight surgeons and jointly with the civilian system the number of physicians is sufficient for the needs of our small country. The Ministry of Defense (MoD) and AF HQ have no flight surgeons.

Since 1992 Estonia has been a member of ICAO and in 2004 it joined NATO and the European Union. The Association of Aviation Medicine was founded in 2001.

The AMC issues medical certificates to all the members of flight personnel, out of whom the military make up about 5 per cent. The medial standards are divided into 3 classes: I, II, and III. However, the list of qualifications for physicians established by a regulation of the Minister of Social Affairs (responsible also for medicine) does not include flight surgeons. The military legal framework does not provide for the health standards of flight personnel either.

**Conclusion:** The integration of Estonia into the EU and NATO makes it necessary to harmonize legislation in the area of aviation medicine and amend Estonian laws.

### BASIC PRINCIPLES OF THE CONCEPT OF REPRODUCTIVE HEALTH PROTECTION OF MILITARY WOMEN OF PROFESSIONAL GROUPS OF RISK

Bezhenar V.F., Tsvelev J.V., Nikiforov A.M., Antushevich A.E., Russia

In order to study the mechanisms of origin, clinical manifestations and dynamic of reproductive health disorders of women under the complex influence of negative ecological and professional factors 77 military women who took part in breakdown elimination of radiation accident on Chernobyl atomic power station were examined.

It was fixed, that the mechanisms of origin, development as well as peculiarities of reproductive health disorders of military women, who were exposed to the combined factors of radiation accident, in long-term post-damage period depend on the influence both basic (radiation dose at external and internal radioactive irradiation), and concomitant factors (type of works in 30-km zone of the accident, arrival time and duration of operations there, the age and status of specific functions of a female organism under the influence of negative factors, character and degree of their changes during the period of checkup, psychological effect). In the clinical respect reproductive health disorders are expressed by the increase of frequency of a menstrual cycle breaking as a menstrual molimina, frequency of hyperplastic processes of genitals, nonspecific chronic inflammatory diseases of genitals and dis-biotic diseases of vagina, as well as increase of a pathology of pregnancy, delivery and postnatal period. In the long-term period after the influence of the complex of factors of radiation accident the reproductive health disorders of women are manifested by a complex of clinical, hormonal, immuno-genetic and microbiological changes, which are nonspecific in most cases.

The concept of origin and development of reproductive health disorders of military women under the influence of combined negative factors of radiation accident is developed, the basic idea of it is the thesis about high sensitivity of reproductive health of women to the influence of the indicated factors of radiation accident in low doses.

### COLD CHAIN MANAGEMENT OF TEMPERATURE SENSITIVE PRODUCTS

Paula Doulaveris, Mr. Ruben Gueits, USA

The United States Army Medical Materiel Agency (USAMMA) been designated to fulfill the Department of Defense (DoD) distribution of anthrax and smallpox vaccines. To accomplish the day-to-day management, USAMMA established the Distribution Operations Center (DOC). The DOC is a core group of skilled specialists recognized within (DoD) for the distribution management, coordination and execution of these products to include cold chain management consultation and training. The DOC operates under the clinical and technical direction of USAMMA’s Pharmacy Consultant who is also the Deputy Director for Distribution Operations of
the Military Vaccine Office (MILVAX). USAMMA/DOC’s expertise expanded with missions to support the distribution of a variety of temperature sensitive medical products (TSMPs) including Investigational New Drugs (INDs) on a case-by-case basis. These products can be refrigerated, non-refrigerated, and/or frozen. In addition to managing selected TSMPs shipments for both medical and non-medical units, the DOC provides both on-site and on-line training of key principles of Cold Chain Management procedures. This training provides state of the art information on tools, techniques, and procedures for moving pharmaceuticals within narrow temperature ranges. USAMMA became actively engaged in the management, oversight, and distribution of other specialty pharmaceutical products, such as the U.S. Army Influenza vaccine and other time-temperature sensitive medical materiel. These expansion efforts resulted in USAMMA assuming additional missions. Since the inception of Cold Chain Management procedures, the DOC has maintained a 99.8 percent success rate of safely delivering temperature sensitive products.

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### COMPARISON OF BLOOD PRESSURE AND HEART RATE, BEFORE AND AFTER FLIGHT IN DECOMPRESSION CHAMBER OF IRIAF HEALTH ADMINISTRATION

Ghazizadeh Kambiz, Akbari Aliakbar, Mohsenzadeh Hamidreza, Montazeri Bahram, Kangarlu Hamidreza, Panjehband Mehrdad, Abtahi S.Reza, Iran

**Background:** Decompression chamber as an essential equipment in aviation medicine, is used to simulate hypobaric pressure in different altitudes. Ample attention to the first symptoms of hypoxia can prevent aviation accidents. This study was designed to investigate the effect of hypoxia in decompression chamber on blood pressure (BP) and heart rate (HR).

**Materials & methods:** In a cross-sectional study on a simple randomized group, consisting of 180 aviation personnel, BP and HR were recorded before and after the experiment of decompression chamber. Collected data were analysed using SPSS software.

**Results:** Mean age of the studied individuals was 32 years. 23.3% of them were fighter pilots, 26.7% cargo pilots, 20% flight crew, and 30% flight students. Their mean flight hours was 1790 hours. No significant disease history was present and 73% had no history of being grounded. Changes in the first hypoxia symptom comparing to the last flight in decompression chamber was observed in 17.1%. Among hypoxia symptoms, dizziness was the most common one (24.4%).

Differences between mean arterial BP, mean systolic BP, and mean diastolic BP, before and after flight in decompression chamber were investigated by paired t-test. None of these parameters had a meaningful change (p > 0.05). Mean HR before and after this flight were also measured and compared, which were significantly different (p=0.002).

**Conclusion:** Regarding that no meaningful changes in blood pressure occur after flight in decompression chamber and heart rate remains in a range not threatening life, it can be concluded that this level of experimented hypoxia in decompression chamber does not impact on these vital signs and in this view is a safe flight simulating.

### DEFINITION OF BIOLOGICAL AGE AS THE METHOD OF ESTIMATING THE STATE OF HEALTH OF SERVICEMEN

Melnitchenko P.I., Vlasenko A.V., Russia

The biological age (BA) characterizes the correlation of a real physiological and psychological state of an organism with a certain ‘standard state’ peculiar to an organism of the fixed chronological age under living conditions of the given population. Measurement of some physiological parameters is necessary to determine it.

Just BA of the person characterizes the degree of ageing and the extent of changing the level of health, that allows estimate objectively the physiological status of a person which manifested itself by the state of structure, functions and adaptation possibilities of an organism. Application of BA criterion doesn’t reject traditional methods of research, it gives qualitatively new information on a state of health of an organism.
Transforming a scientific substantiation of an opportunity of using BA as criterion of estimating the current state of health and as the forecast of the future state of health into the pragmatic directions, it is possible to summarize one of the basic purposes of our attention to BA – whether there can be it one of the tools, allowing to avoid mistakes in recruitment for the army and fleet on a contract basis.

**CREATION OF A SYSTEM OF RADIATION - HYGIENIC MONITORING IN THE MINISTRY OF DEFENSE OF RUSSIAN FEDERATION**

Shumilov V. Rusakov V., Russia

Now in Armed forces different kinds of the installations, devices, arms etc. are exploited, in which one the radioactive materials will be used in this or that kind.

The purpose of a created system of radiation - hygienic monitoring (RHM) in Armed forces of Russian Federation is the detection, estimation and minimization of negative influencing on health of the servicemen of the radiation factor. Basic elements RHM are radiation - hygienic certification of military units in which one the ionizing radiation sources are exploited and a system of the count and the control of radiation doses the servicemen. At operation of a system RHM usage of methods of a physics health and environmental epidemiology is supposed.

At the maiden stage of creation of a system RHM are designed and the methodical documents on realization RHM in military units and entities of the Ministry of defense act, the analysis of the obtained items of information by results of the conducted radiation - hygienic certification is carried out.

The administrative and registration documentation for the departmental monitoring system and count of personal doses of the servicemen is designed within the framework of the Unified state monitoring system, created in Russian Federation, and count of personal radiation doses of the citizens. The created system of RHM is the constituent of social - hygienic monitoring in the Ministry of defense of Russian Federation.

**DRUG NOMENCLATURE DEFINITION TECHNOLOGY FOR THE TREATMENT PATIENTS WITH NONHOSPITAL PNEUMONIA**

Kononov V.N., Morgunov V.A., Golubenko R.A., Russia

The purpose of research: search of the optimum drug nomenclature necessary for treatment of patients with non-hospital pneumonia, allowing to raise the quality of medical care and to reduce expenses in its rendering in military treatment and prophylactic establishments of patients with non-hospital pneumonia.

Results of research: Research of case records has been carried out in specialized branches of medical establishments of St.-Petersburg. The nomenclature used for treatment of patients has been done on the basis of methods of pharmaco-economical analysis, the most significant for patients with non-hospital pneumonia drugs having optimum parameters on a ratio cost – efficiency has been selected.

Conclusions: The researches have allowed to generate the model of medical supply of specialized pulmonological departments with the necessary nomenclature and the quantity of 10 patients with non-hospital pneumonia necessary for pharmacotherapy.

**EFFECT OF ENVIRONMENT QUALITY ON THE EFFICIENCY OF HUMAN ACTIVITIES**

Zimin A.G., Russia

The distribution of psychophysical reactions according to integration levels made it possible to identify the regularities of CNS hierarchic levels excitement depending on the environment quality. If the quality of the environment is estimated in terms of discomfort, then the density of nerve impulses flow on the general integration level of the body neuron structures, expressed by the non-shifted standard normal law, will reflect the density of discomfort. In this case a unit of discomfort determines the range of structures excitement within the limits of the adaptive sphere. The adaptive sphere means the body structures of the same historical age. In order to identify the extent of discomfort using the analytical method, it is necessary to know any two of the three normal values of the environment parameter: threshold, optimum and limiting. The reaction of neuron structures of the highest integration level is a sense of discomfort. This sense is manifested by a specific reaction, stipulated by the spatial integration of excited receptive fields. The non-specific function of integration in time reflects the probability of generalization of structures on the general level of somatic sphere. The probability of generalization, which amounts to 0.5, determines the null point of discomfort. Discomfort can be changed in the range from -0.5 to +0.5 units. Negative discomfort means the retardation, whereas the positive one – the excitement of neuron structures of the common level. In both cases the discomfort leads to the increase in the period of psychophysical reaction, while the efficiency of human activity decreases,
which is reflected by the parameter of untimeliness of the executed operations. The positive discomfort, stipulated by the decrease of the capacity of informational channels in the somatic adaptive sphere, as well as the speed of this process in terms of density of discomfort, provide for the emotional stress. If the discomfort reaches 0.5, then all structures, which connect the adaptive sphere with the environment, are in the state of excitement, closing the informational channels throughout the whole period of psychophysical reaction, from minimum to maximum values of the period, which makes 24 hours. That is why the general law of the environment’s effect on the organism is manifested by the fact that the decrease in the quality of environment increases the period of psychophysical reaction, the extent of discomfort being expressed by the extent of psychophysical reaction in terms of the period, which is measured in days.

EFFECT OF HYPOXIC PRECONDITIONING ON PULMONARY NITRIC OXIDE CONCENTRATION AND NA+ - K+ ATPASE ACTIVITY IN RAT

Xia QM, Li FX, Quan Y, Li HY, Xiao ZL, Xiao XR., China

Aim: To study the effect of hypoxic preconditioning on pulmonary nitric oxide concentration and Na+ - K+ ATPase activity in rats under different experimental altitudes.

Methods: Thirty-two Wistar rats were randomly divided into four groups: normal control group (CG), acute hypoxia group (AHG), 3000m (3KG) and 5000m hypoxic preconditioning group (5KG). The concentration of pulmonary nitric oxide and the activity of Na+ - K+ ATPase were measured after hypoxic preconditioning finished. Ultrastructural changes of lung tissue were observed by electronic microscope.

Results: The pulmonary interstitial edema was observed in AHG. As compared with AHG, pulmonary edema was relieved in 3KG and 5KG. The nitric oxide concentration in AHG(17.09±3.62umol/L) was significantly lower than that of CG (60.55±4.27umol/L, P<0.01). The nitric oxide concentrations in 3KG and 5KG (34.74±3.09umol/L, 52.24±3.08umol/L, respectively) was markedly higher than that of AHG (P<0.01), being nearly the same as that in CG. The activity of Na+ - K+ ATPase in AHG (0.126±0.020mmol/g.h) was obviously lower than that in CG (0.237±0.035 mmol/g.h, P<0.01), but the Na+ - K+ ATPase activities in 3KG and 5KG rose to 0.348±0.023 mmol/g.h and 0.491±0.034 mmol/g.h, respectively, being significantly higher than that in CG(P<0.01).

Conclusion: These data suggested the increases of pulmonary nitric oxide concentration and Na+ - K+ ATPase activity in hypoxic preconditioning groups may relieve the pulmonary edema of hypoxic rats.

Keywords: Hypoxia; Nitric Oxide; Lung; Na+ - K+ ATPase.

ENSURING OF APPROACHES TO WATER QUALITY STANDARDIZATION IN FIELD CONDITIONS

Lizunov Y. V., Narykov W. U., Bokharev M. A., Russia

Normative and methodic base, that ensure water quality in field conditions, must take into consideration specific features of field water – supply of troops and risk factors existence. This demands curtailment of indicators enumeration and some deviation from accepted hygienic norms. Priority is consider to indicators of epidemiological safety, chemical harmless and organoleptic acceptability.

Determination of enumeration of normative indicators must to be based on principle of guaranteed water – purified treatments. This that the means of water signifies, purification and storage, which are delivered to troops guarantied ensure the needed quality of treated water. In such position water in field conditions may be controlled with use of restricted enumeration of indicators, which define the adherence of technological conditions of water treatment. Established normative indicators must take into consideration the possibility of their operative detection in conditions when may be deficit of time and laboratory equipment.

For achievement the quarantined quality of water treatment at working – out and testing stage means it is necessary to use the extended list of epidemiological and chemical water safety.

The offered system of normalization gives the opportunity to fulfill the routine laboratory control of water quality by aid of laboratory assistants from field water – supply units.

ERGONOMICS IN INTERESTS OF MILITARY-PROFESSIONAL HEALTH CONSERVATION OF THE AVIATION SPECIALISTS

Polyakov M.V., Russia

Variety of dynamic combat action methods leads to the continuous and inevitable intensification of influence of the unfavourable factors and environment on the aviation specialists (AS).

The unfavourable influence of series of professional factors (for example, the flight and impact g-loads) can significantly be superior to the human body compensatory chances and give rise to deterioration of functional state, decrease of performance reliability and fast development of pathologic changes.
Therefore the decision of professional health conservation problems, a support of AS high performance and efficiency, are the most important ways in the ergonomic optimization of the military aviation equipment (AE) specimens.

For these aims within the framework of modern aviation medicine with the position of concepts of professional health, activity approach and prophylactic cascade idea of human stability are ergonomic features of ergatic system elements “AS-AE specimen-environment” with the dynamic of functional state, characteristics of professional health and results of activity; there are developed the medical-and –technical (ergonomic) requirements to the working places and means of activity, there are substantiated the methods and means on the prevention of unfavourable influence on AS the factors and conditions of activity processes; there are determined the methods and means of psycho-physiologic training, support of optimum performance level and rehabilitation procedures, including the complex of medical and psychological methods.

The practical introduction of results of the approach allows prepare in time the normative-and-technical documents, initial ergonomic data for the development, test and usage of AS-specimens, to provide for the achievement of necessary technical specification for an increase of AS-protection and professional health levels. The most effective realization of ergonomic developments of the military aviation physicians is carried on under the ergonomic support of AS-specimens at the early stages of it’s designation.

### ERGONOMICS OF THE MOBILE MEDICAL COMPLEX SPECIMENS

**Ushakov I.B., Polyakov M.V., Najchenko M.V., Russia**

An approach of qualified medical care for the wounded and injured men to the zones of combat actions and extreme situations is supported by the use of the mobile medical complexes (MMC), including the surgical, reanimation, dressing and other special modules at the wheeled and caterpillar landing gears.

The modern approaches to MMC-development are based on a realization of principles and methods of ergonomic support of the complicated man-machine systems. In addition in contrast to the traditional three-component ergatic systems «man-machine-environment», the requirements to the MMC-specimens are developed and substantiated on a basis of methodological notion about the four-component ergatic system «wounded (injured) man-medical specialist- equipment-environment» . The wounded (injured) man, in the state of which there are observed substantial changes, associated with a trauma, the time of medical care helping an environmental conditions and other factors, is not only an object of the medical specialist attention and actions, but the most important system-generated factor for determination of an ergonomic decision of movable specimen of the medical equipment.

Moreover the requirements to the MMC-development must support the optimum of medical personnel performance and their protection from the affected means and unfavorable factors of environment. The problems of forming and conservation of the medical specialist performance in the MMC-specimens are considered separately.

The most effective realization of ergonomic requirements is achieved under the ergonomic supervision of MMC-specimens with the participation of medical specialists and the use of theoretical-and-analytical, experimental methods of the military-medical ergonomics. The special attention is given to the modeling and development of the MMC-specimens mock-ups.

### ESTIMATION OF NONSPECIFIC RESITENCY OF CREWS OF DEEP-SEA TECHNICAL FACILITY

**Moskalev A.V., Makarov P.P., Sbojchakov V.B., Osipova O.N., Potapova L.A., Buyanova A.N., Russia**

**Introduction.** Influences of many adverse immunity factors under the conditions of off-line sailing of submariners on immune system can result in formation of induced secondary immunodeficiency and the conditions accompanying with an infectious pathology. Application of the developed and as much as possible balanced diet has the purpose to lower effect of influence adverse immune system can result in formation of induced secondary immunodeficiency and the conditions accompanying with an infectious pathology.

**Results.** The results have shown, that at the end of experiment there was an expressed oppression phagocytosis activity of microphages. Percent cells of phagocytosis (74,2±2,2 % and 66,4±3,1 %; p <0,05), a parameter of completeness phagocytosis (74,4±1,9 % and 67,8±2,4 %; p<0,05) have been authentically reduced, and index of completeness phagocytosis (4,9±0,3 and 3,2±0,6; p <0,05), the microbic number tended to decrease (7,2±0,8 and 5,5±0,6; p> 0,05). Parameters of the basic parameters of phagocytosis proved to be true authentic decrease in quantity of active phagocytes (2,7±0,4 and 2,2±0,2х109/l; p <0,05), and also the tendency of decreasing absolute phagocytosis parameter (14,2±1,8 and 12,9±2,1х109/l; p> 0,05). Oppression of functional activity of microphages corresponded with the decrease in levels of pro-inflammatory cytokines: IL-8 (14,8±1,9 and 12,6±2,1 pg/ml; p> 0,05), TNFα (8,4±1,2 and 4,5±1,6 pg/ml; p<0,05), and also levels of complement C3 complex (0,9±0,18 and 0,5±0,1 pg/ml; p<0,05) and C5 (0,1±0,05 and 0,06±0,04 pg/ml; p> 0,05).

**Discussion.**
Conclusion. Application of the balanced diet under conditions of an independent self-contained underwater sailing does not compensate high-grade functional activity of microphages. Conditions off-line sailing of submariners, probably, is expressed in suppressing the efficiency of phagolyzosome some enzymes and the chemotaxis phenomenon, in reducing adhesion of endothelial cells and activation of complement on a classical and alternative way. Under conditions of long independent sailing can be complexified according to the infectious syndrome.

EXPERIMENTAL STUDY ON THE PHYSIOLOGIC FUNCTION CHANGES OF THE HUMAN BODY IN THE 153MSW SIMULATED AIR-BREATHING BUOYANT FAST ASCENT


Object: To explore the effect of great deep air-breathing buoyant fast ascent on the physiologic function changes of the human body.

Method: Seven subjects wearing submariner air-breathing buoyant fast ascent suits conducted the experiments in the escape tower. The tower was compressed according the formula Pt=2t/n and 3msw, 10msw, 60msw, 80msw, 100msw, 120msw and 153msw simulated air-breathing buoyant fast ascent were carried out with the n value being 30, 20, 15, 12, 8 and 7 seconds. The changes of precordial Doppler bubble sounds, blood pressure, pulses, respiratory rates, EEG, Holter EEG, ECG, pulmonary function and psychological assessments in the divers were observed.

Result: 40 man-time submariner air-breathing buoyant fast ascent were carried out. 3 man underwent 153msw submariner air-breathing buoyant fast ascent. In the 40 man-time submariner air-breathing buoyant fast ascent, no precordial Doppler bubbles were detected. The blood pressure, pulses, respiratory rates of the subjects were increased after submariner air-breathing buoyant fast ascent. The ACTH content in the urine of the subjects were greatly increased after submariner air-breathing buoyant fast ascent. All of the changes were returned to normal in 24h after submariner air-breathing buoyant fast ascent.

Conclusion: The 153msw simulated air-breathing buoyant fast ascent have the effects on the physiologic function of the human body. The changes of the physiologic function of the human body was temporary and functional. These changes may be induced by psychological stress response to the simulated air-breathing buoyant fast ascent. during the experiment.

FUNCTIONAL ASYMMETRY INFLUENCE ON TRAINING COMBAT ACTIVITY

Rhjepetskaya M.K., Russia

Army personnel reduction and change for the worse of selectees’ health resulted in rational use of personnel to keep its optimal efficiency.

The pronouncement of brain interhemispheral asymmetry is one of the characteristics of human mechanisms of regulation and adaptation peculiarities; ie its registration can conserve the efficiency of activity. The purpose of this study is to reveal the interrelations between the training combat efficiency and the indices of interhemispheral asymmetry.

Soldiers executed training combat tasks under natural conditions. We defined functional state of central nervous system of servicemen with variation chronoreflexometry (SVMR); individual profiles of brain interhemispheral asymmetry (IPFA) can be revealed in total sensor (eye, ear) and motor (hand, leg) asymmetries.

During execution the training combat tasks decreasing of indices of SVMR of left hand as distinct from indices of right hand have been registered, so the deviation of functional asymmetry to the right has occurred that evidences about activation of the left hemisphere. The pronouncing of influence leads to the increasing of asymmetry between hemispheres. Some investigators connect revealed activation of left hemisphere with the state of anxiety and tension, on one hand, and, on the other hand, with the character of activity the most part of which needs logic comprehension of the information. The indices of IPFA does not allow to prognosticate with high precision the fulfillment of training combat tasks as distinct to dynamic motor asymmetry of hands (motor asymmetry of legs and sensor asymmetry).

Defining of propensity of servicemen for different kind of training combat activity according to individual profiles of functional asymmetry can be one of the way of army personnel efficiency keeping. So, revealing servicemen with latent period of SVMR from 170 to 230 ml/sec who are mainly right handedness and mainly left handedness can cut down expenses of combat training of servicemen.

GENDER AND PHYSICAL TRAINING EFFECTS ON AUSTRALIAN SOLDIER PHYSICAL COMPETENCIES

Stephan J. Rudzki, Mark J. Patterson, Warren S. Roberts, Wai-man Lau, John F. Marsden, Steven K. Prigg., Australia

Purpose: This study sought to establish whether given sufficient physical training, females could complete an infantry-based task at an equivalent level to their male counterparts.
Methods: The Australian Army has a combat fitness assessment which comprises a 15km march at 5.5km/hr, followed a run-dodge-jump (RDJ) activity. All soldiers in the study (35 males and 28 females) carried a weight of 34.6 kg during the march activity, with this weight being based on the minimum requirement for a 3 day patrol activity. Webbing and rifle (12kg) was carried when performing the RDJ. A baseline assessment was conducted in August. Study participants were then divided into a control group and a special training group (STG) who undertook a specialised 12 week physical training program before performing another assessment in November.

Results: Baseline assessments showed that males exhibited greater aerobic and anaerobic capacities as well as increased muscle strength and endurance compared to the females. All males could complete the RDJ in the rested state, prior to the march, but only 43% of females could complete the activity. 91% of males completed the 15km march within the allotted 168 mins, while only 36% of females completed within time.

The specialised physical training improved strength and aerobic capacity in the women, but only strength in the males. The between gender differences remained. These objective improvements did not translate into significant functional improvements in the infantry-based task. Only one of the women in the specialised training group was able to complete the RDJ following the 15 km march in November. Heat stress was also noted to be higher in November (WGBT 26C vs 19C) and is likely to have had an impact on functional performance.

A significant disparity was also noted between the aerobic standards required in the basic fitness fitness test (2.4 km run) and the aerobic capacity required for weighted pack marching.

Conclusions: Despite specialised physical training it is likely that only a very small number of female soldiers are physically able to complete infantry related tasks at the same performance level as current infantry soldiers. The aerobic standards used in basic fitness assessments need to be more closely aligned to the aerobic demands of infantry activities.

**GENERAL EDUCATION MILITARY SCHOOL CADET COMPLEX HEALTH PRESERVATION PROGRAM**

Avdiyenko G.Yu., Fedotkina I.V., Kravchehko Yu.V., Gulyayevskaya N.G., Russia

Based on comprehensive investigation of development patterns in psychophysiological characteristics of cadets, a program supporting study process has been developed and approved for the first time. The program includes a set of medical and psychological methods preventing disorders in socio-psychological adaptation and health of adolescents. The set of supporting measures includes three stages corresponding to the main critical periods of learning: initial adaptation to specific life conditions, a period of reduction of motivation, and a stage of professional self-determination of graduates. A set of psychodiagnostic methodologies has been chosen intended for express diagnostics of disorders in psychic and somatic health of adolescents. The efficiency of dynamic observation in the form of psychodiagnostic monitorings has been shown for a timely detection of dysadaptation disorders. On account of increased physical, learning, and psychoemotional loads on adolescents in the military system of learning, a program of group trainings obligatory for all cadets has been developed to facilitate development of cognitive, communicative, emotionally volitional, adaptation qualities of personality. As part of psychological help individually sought by cadets, psychological consultation with elements of psychotherapy is used. To correct detected disorders in adaptation, personal development, and the functional state of adolescents’ organisms, a set of approved medico-psychological and pedagogic measures has been offered. The developed supporting system has been implemented in practical activities of professional selection groups in military schools.

**HEALTH MAINTENANCE AND PROLONGATION OF PROFESSIONAL ACTIVITY IN FLYING PERSONNEL AS AN URGENT PROBLEM OF AVIATION MEDICINE**

Bondarev E.V., Russia

The work concerns our long-term experience in scientific investigations on the peculiarities of professional activity of the long-range aviation personnel involved in training-combat non-stop trans-meridional flights West-North-East-West, 15-22 hours in duration (with two air refuelings).

It is known that a decrease in working capacity and professional quality, which govern the crew safety, becomes a factor threatening the personnel health in case of non-observance of work and rest conditions. The protection of flying personnel health is a main component of Russian national conception the health of healthy man (academician A.N.Razumov).

Complex examination of flying crew included the use of physiological, psycho-physiological and electrophysiological methods. It was conducted under stationary conditions one day before flight, then during the flight and after its completion in hospital for recovering the all body functions up to initial level.

The analysis of the data received made it possible to determine the dynamics and phases of fatigue intensification, the level of professional efficiency, functional state of CNS as well as visual, auditory and vibro-tactile analyzers, intensity of neuro-emotional tension during bombing, the winged missile launching and air refueling.

Our practical recommendations on rational planning of the flying load, maintenance of high professional efficiency during the flight, and provision of the flying personnel with adequate post-flying rest depending on the flight duration are included in the...
Medical Service basic documents for medical officers of the Air Forces. The maintenance of the flying personnel’s health is not only accidentological and economic problem but social as well.

HEAT INJURY PREVENTION – ARE OUR HYDRATION STRATEGIES APPROPRIATE

Stephan J Rudzki, Australia

Australian and US Military Forces rely on standard work-rest tables to define activity levels in hot environments. Traditionally these include fixed hydration regimes of up 1-1.5 litres of fluid per hour; based on expected sweat losses in extremes of heat.

Research in Sports Medicine has identified that elite marathon runners only consume between 100-200 mls per hour during an event. Rates of gastric emptying and intestinal absorption during exercise reflect these intakes. Other research suggests that the maximum rate of fluid absorption is likely to be less than 800 mls/hr.

Fluid intake in excess of absorption capacity may be sequestered in the colon and contribute to the hyponatremia seen in some slow paced endurance athletes and military recruits. Coupled with this is the wide range of sweat loss observed in athletes, which render fixed hydration schedules problematic. This paper will review the athletic concepts of pre-hydration, hydration and rehydration as an alternative to current fixed fluid intake strategies.

IN HYPERBARIC AND HYPOBARIC ENVIRONMENTS INTRAOCULAR PRESSURE (IOP) CHANGES

Dilaver Ersanli, Senol Yildiz, Tuğrul Akin, Murat Sönmez, Ahmet Akın, Ahmet Hamdi Bilge, Turkey

Introduction: We aim an analysis of intraocular pressure (IOP) changes in hyperbaric and hypobaric environments.

Methods: Fifty-nine patients (Group I) administered hyperbaric oxygen (HBO) therapy for various reasons at the GATA Haydarpasa Teaching Hospital Marine and Underwater Medicine Clinic, and 38 cases (Group II) exposed to a hypobaric environment during Low Pressure Chamber training at the Air Health Examination and Physiological Training Center were included in the study. Subjects’ IOP levels prior to exposure to these environments were measured using a tono-pen XLTM tonometer; subsequently, IOP measurements were repeated in a hyperbaric environment in Group I and in a hypobaric environment in Group II, and these values were compared with subjects’ IOP levels in a normobaric environment.

Results: When IOP levels were measured at a pressure of 2.5 atmospheres (ATA) (simulated depth of 45 feet) during 90-min HBO therapy in Group I, and at a pressure of 0.3 ATA (in a hypobaric environment at a simulated height of 30,000 feet) in Group II, using a tono-pen XLTM tonometer, the averages were 13.00 ± 2.95 mmHg (range, 9-21) in Group I and 16.75 ± 4.09 mmHg (range, 14-27) in Group II, and the IOP changes in both groups were determined to be statistically significant compared with levels in normobaric environments (p<0.05).

Discussion: It was observed in this study that hyperbaric and hypobaric environments had manifest effects on IOP values. HBO, the use of which for treatment purposes in many diseases is today becoming widespread, requires a long-term treatment period. In addition, members of various professions work in hyperbaric and hypobaric environments (pilots, divers). Considering that patients previously diagnosed with glaucoma may require HBO therapy for various reasons, it is thought that this will not represent a contraindication.

MACHINE LEARNING METHODS IN PSYCHODIAGNOSTICS

Naidenova X. A., Yakovlev A.V., Russia

Psycho diagnostics as a branch of science has been formed as the theory of measuring instruments for objective evaluation of different psychological and psycho-physiological human characteristics. The methods for creating diagnostic tests (questionnaires) are well developed, they are practically indispensable means of resolving problems: from diagnostics of mental diseases to rational professional orientation. However the plenty of possibilities to measure a lot of characteristics does not guarantee receiving valuable practical results without using the methods of automatic analysis and interpretation of experimental data. To measure does not mean to understand. The analysis of data embraces inferring regular links between measured characteristics. The interpretation of data is based on using the discovered regularities for forming knowledge models, rules of decision making and models of reasoning in a context of task to be solved. The machine learning methods supplement psycho diagnostics with the procedure of data – knowledge transformation.

The following tasks are solved with the use of machine learning:
- Construction of concepts, extraction of objects’ classes or patterns from data;
- Description of given objects’ classes;
- Formation of classification structures on a set of objects or concepts;
- Extraction of essential features or examples for pattern recognition problems;
- Extraction of functional, implicative and associative dependencies from data;
- Formation of logical rules and models of reasoning for solving different practical problems;
- Finding the patterns by identifying the underlying rules and features in the data.

Our goal in this paper is to analyze the experience of using machine learning methods in psycho diagnostics in the frame of scientific investigations in the Research centre of the Military Medical Academy.

It is shown that all the tasks of machine learning are reduced to solving only one problem that is formulated as finding the best approximations of a given classification on a given set of training examples. We use the lattice theory as a mathematical instrument for generating of machine learning algorithms.

The examples of problems that have been solved in our centre are given: searching for functional dependencies in data, forming logical rules for diagnostics of immunological status of military men, studying the dynamics of intellectual development of students of the Military Medical Academy and some other tasks.

**MATHEMATICAL MODEL OF HUMAN ADAPTATION**

Zimin A.G., Russia

The model was constructed on the basis of the representation of the organism evolution in terms of ontogenesis and philogenesis in the form of vertical and horizontal links between the interacting structures. Vertical processes of specific adaptation are expressed by functions of spatial integration and differentiation of nervous impulse flows by the CNS structures. Horizontal processes of non-specific adaptation are a dynamics of general hierarchic level structures' efficiency under the influence of time factor. Structures related to general adaptation processes are displayed in the form of adaptive spheres. Adaptive spheres are the body structures of the same age reflecting the philogenesis stage. Vertical and horizontal adaptive connections between the structures stipulated the adaptive morphology, which made the body functional morphology more exact. The status of somatic adaptive sphere of the organism is measured by discomfort, which is expressed by psychophysical reaction period in days. The starting point of horizontal physiological processes integration is shifted into deep adaptive spheres (vegetative, humoral, protective) by discomfort index. The structures of common hierarchic level of adaptive spheres, forming the coordinate axis, make up a straight horizontal way. This allows to associate the functional efficiency of the coordinating axis with the absence of functional reserves, and to go on to the notion of physiological malfunction as an event reflecting the absence of functional reserves in some young structures of the coordinating axis. These events are related to as the organism damages in the initial reference source, and are clearly manifested under stress in the form of adaptation diseases: common excitement and anxiety; ulcer damages of gastrointestinal tract; damaged vessels, joints and tissues against the background of general hypertension; general illness with the activation of the body immune system; death. Thus, the notion of "physiological malfunction" is no longer abstract, and is now expressed in exact terms of adaptation diseases. The mathematical model of human adaptation enables to predict the probability of the body general disorders depending on the discomfort presented by the environment and by the time factor. This enables to resolve the problems of creating the environment with preset properties, providing for the physiological reliability of the human organism. It was revealed, that potential lifespan in days is determined by the ratio of mean periods of vegetative and psychophysical reactions. The task of adaptation is to decrease the psychophysical period of the body reaction.

**MEDICO-SOCIAL AND HYGIENIC ASPECTS OF ISCHEMIC HEART DISEASE INCIDENCE AMONG OFFICERS IN MIDDLE VOLGA REGION**

Gluschenko V.A., Slobodyanyuk I.L., Karchanin N.P., Byelov E.V., Russia

Ischemic heart disease (IHD) is characterized by high index of morbidity, death-rate, stable and temporary disability of people, especially young and middle aged. For this reason medico-social and hygienic estimation of military service influence on IHD incidence of officers staff is especially urgent because of planning adequate prophylactic measures and their further sofistication.

Influence of unfavourable factors of military service, living conditions, life styles of the officer staff in Middle Volga region on IHD incidence was studied. For achieving these aims method of hygienic diagnostics, based on studies of natural and social medium, human health, medico-social and medico-psychological studies of officers, estimation of functional body condition and medico-economical values of studied pathologies.

With the help of specially devised questionnaire we have studied 316 officers in the age of 30-55 years. 86 of them were acknowledged healthy after dispenser examination; 230 were clinically diagnosed having IHD.

Data analysis, obtained in the course of investigation, showed frightening speed of the given pathology growth. IHD incidence among officers of Middle Volga region according to middle and multiple annual data (1988 to 1998) made 3.32 +/-0.24 %, average annual growth made 4.52 +/-0.16%.

On the basis of the studies we worked out discriminant models, allowing to subdivide officers into various groups according to various probability of having IHD.

For CF1 we have:

\[ CF1 = -5.76 + 0.35*MA + 0.28*PFC + 0.1* S + 0.27*H + 0.38*IFC - 0.15*IBW + 0.29*TBC + 0.29*AQ + 0.93*DP + 0.45*AP + 0.08*PS + 0.21*C \]

For CF2 we have:

\[ CF2 = -1.36 - 0.19*MA + 0.13* PFC - 0.27* S - 0.03*H + 1.29*IFC + 0.03*IBW - 0.85*TBC - 0.39*AQ + 0.15*AP + 0.31*PS + 0.31*C \]

As a result of studies we worked out the principal scheme of primary-prophylactic measures among officers. It was proved that following these measures is effective not only in medico-social, but also in economical aspects, because it helps to preserve the high level of health, working and fighting capacity of military services of the Russian Federation.

**METHODOLOGICAL PRINCIPLES OF MILITARY-MEDICAL SYSTEM DEVELOPMENT ON THE CONSERVATION, PROPHYLAXIS AND REPRODUCTION OF PROFESSIONAL HEALTH**

Ponomarenko V.A., Russia

The serviceman’s health at all stages of active service is a system category, that defines the principles of selection, differentiable education, standardization of nutrition, physical, psycho-physiological, professional training and examination. The category of mental health is multiform. In it there are the social-psychological motivation, self-perfection of the combat abilities, readiness to overcome military hardships personality’s orientation to the military doctrine, what determines the system of military-psychologic training.

On the basis of this paradigm the professional health, including congenital and acquired adaptive, compensatory, regulatory mechanisms in the system of psycho-physiologic reserves, is a system-generated ability, that determines the serviceman’s capacity.

The forming of professional health and its recovery have a basic difference from the rehabilitation system and are included in a program of recovery medicine with the use of mainly non-medicamental means, including the ethic, aesthetic, cultural. The recovery medicine is included as a component of the general prophylaxis at the principles of «Health of healthy man» (A.N.Razumov, V.A.Ponomarenko, 2001-2004).

The serviceman’s professional health is an organic component of combat readiness and combat capability and accordingly of the given rating is arranged during the rear, medical provision and combat-training activity.

**MORPHOLOGICAL DEFINITION OF TISSUE RESPIRATION**

Korzunin V.A., Didenko A.V., Russia

The peripheral blood analysis in healthy persons has demonstrated that its echinocyte content depends on person’s age and functional state. It is supposed that this phenomenon is connected with tissue respiration intensity. To test this assumption the authors studied echinocyte and normocyte (erythrocytes of regular thoroidal shape without villi) correlations in the peripheral blood taken from a finger before and after passing the atmospheric and expired air through the blood. Experimental results have showed that echinocyte content correlates to blood carbon dioxide saturation. A normocyte number increase during ambient air passing through the same blood shows that just this shape of erythrocytes is connected with their oxygenation. Appearance of villi on erythrocyte surface points to active oxygen release from erythrocyte and its CO2 saturation. As a result practically all venous blood consists of echinocytes. It takes milliseconds to transform erythrocytes from one form to another and it corresponds to the time of erythrocyte being in arterial tissues and alveolar capillaries.

**NEW POSSIBILITIES TO OPTIMIZE HERMETIC RESCUE HABITATION FACILITIES**

Zhiltsova I.I., Russia

The crew and the passengers rescue in emergency and shipwreck is still an acute problem of nowadays. Hermetic rescue facilities can be considered to be the most reliable in emergency situations in the sea providing good prospects for survival. The facilities like hermetic cameras, capsules and cutters could be used to evacuate a submarine or a ship crew in disasters like uncontrolled fire on the vessel and burning oil spills.

The major feature of rescue facilities is their small interior free volume of about 0,26-0,5 m 3/person. So the problem of life-supporting facilities and vital medical, water and food supplies providing adequate living till being rescued arises. The number of experiments has been carried out to define the minimal physiological requirements in extreme environment in order to reveal body recourses, physical and mental performance under the influence of a number of extreme factors influencing people in rescue facilities. Formation of environmental factors and the weather condition effects have been revealed and studied.

The results made it possible to work out recommendations on improving environment of rescue facilities, equipment-updating including updated type of insulation. New advancements in the hygiene and desinfection have been achieved. The experimental data also gave opportunity to recommend special water and nutritional norms for rescue facilities.
ON PREVENTIVE MEDICO-CRIMINALISTIC REGISTRATION EXPERIENCE OF SERVICEMEN OF KFOR COUNTRIES

Momot D.V., Kolkutin V.V., Russia

Within the framework of the program of improvement of professional skill and an exchange of experience of KFOR medical officers, weekly conferences were carried out on the basis of KFOR military hospitals on which representatives of medical services of countries-participants KFOR performed thematic reports and information messages on various specialties. At the specified conferences the senior officer on medico-criminalistic registration of military unit field post 83864 (supernumerary medico-legal examiner of Russian military contingent in the Union Republic of Yugoslavia) has given a report twice. In particular, in 9/14/1999 - the report on a theme « Identification of remains of servicemen in the Russian Army » and in 11/21/1999 - the report on a theme « Experience of military-medical service of Armed Forces of the Russian Federation in a confrontation 1994-1999 on the territory of the Chechen Republic ».

Especially fruitful was a conference in 9/14/1999 as a result of which the information on measures for the prevention of the dead servicemen depersonalization in armies of KFOR countries have been received.

The command of the medical service of the Armed Forces of the Russian Federation keeps informed that the USA Army carries out preventive collection of blood and hair specimens as well as fingerprinting of all servicemen at the conclusion of the contract on military service. In reality a preventive registration of servicemen with a collection of blood, hair and semen specimens is carried out only in separate divisions of Special Forces. Other measures are reduced to registration and issue of metal dog tags with a surname, a name, a military rank and division.

One dog tag is placed on a short chain, another - on long one for carrying on a neck of the servicemen. The dog tag on a short chain in case of a death of the servicemen is removed from a body and transferred to the commander of the unit, the counter on a long chain remains on a corpse. If serviceman gets into an extreme situation (a captivity, etc.) or in a case of serious wounding him, according to instruction, has to swallow a dog tag on a short chain, or to place it into an oral cavity or a rectum.

In armies of the other countries participating in peacemaking operation on the territory of Kosovo, special medical registration for postmortem identification, except fingerprinting, was not carried out. Practically all armies use the system of double dog tags. In some of them dog tags consist of two separated medals (USA, Great Britain), the other use dog tags with the perforated strip on which it can be broken on two halves (France, Germany, Ukraine, etc.).

ON THE PHENOMENON OF MOTION-SICKNESS IN THE ITALIAN AIR FORCE

Lucertini M, Lugli V, Arrabito B, Tomao E, Italy

Motion Sickness (MS), or kinetosis, is a complex clinical syndrome which is characterized by various initial symptoms and signs, such as sweating, pallor, drowsiness, parestaesia, and others, which induce nausea and vomiting over sufficiently prolonged exposures to appropriate stimulation. In some cases prodromic symptoms are missing, and the patient immediately experiences distress accompanied by retching and vomiting. This is a very common disease, that is also related to several psychological factors, and implies a significant impairment of the physical fitness and readiness in affected individuals. The role of MS is stressed when frequent exposures to nauseogenic environments are required, specially in people undergoing highly demanding tasks, as aircrews, parachutists, mariners.

Unfortunately, the possible onset of side effects (mainly sedation) related to the pharmacological treatment/prevention of MS often contraindicate the use of anti-MS drugs in a military environment. As a matter on fact, within the Italian Air Force (ITAF), air sickness (AS) is a major cause of exclusion for student pilots during their training course.

However, also other forms of MS related to the aircrew standard activity and training must be considered, due to their relatively high incidence. Among these, simulator-sickness plays a major role for its negative effects on learning and training, as for the possible need of temporary grounding. The present study indicates the ITAF main epidemiological findings observed in the recent years. Moreover, the results of the ITAF rehabilitation program developed to desensitize aircrews affected with AS are also presented. Finally, possible guidelines adopted to prevent the other forms of MS are discussed.

OPTIMIZATION OF HEAT EXCHANGE IN SERVICEMEN IN USING ARMoured WAistCOAT UNDER CONDITIONS OF HIGH TEMPERATURE OF ENVIRONMENT

Vlasov A.A., Schedrin A.K., Peleshok C.A., Kudrin A.I., Russia

As a result of this investigation we have worked out the effective method of natural ventilation of under-wear space resulting in optimization of heat exchange in servicemen.
Realization of the investigation program has allowed get the following results:

1. We have devised a physiological – hygienic method of optimization of body’s heat exchange of servicemen with environment and have found more constructive and rational version of natural ventilating device of under-wear space as a kind of waistcoat. Air movement in channels of ventilating waistcoat is stipulated by movements of breast and abdomen in the process of breathing and also by gradient of temperatures of human body surface and environment. Besides, we have defined the dependence between air flow rate in channels of ventilating waistcoat and concrete value of given temperature gradient.

2. In environment temperature about 40°C ventilation of under-wear space with system of channels of ventilating waistcoat increases sweat evaporation efficiency by 7.7% and enlarge the duration of fulfillment of physical work in medium loads by 18%.

3. Efficiency of using armoured waistcoats together with ventilating waistcoat in environmental temperature from 20 to 40°C can be defined by optimization of body’s temperature regime and can be compared to the effect of environment temperature decreasing by 5-10°C or decreasing the duration of fulfillment of intensive physical work by 15-40%.

The results of these researches allow us, applying new methods, to solve problems of modern military equipment producing with using devices of natural ventilation of under-wear space and estimate efficiency of its using by servicemen under extreme conditions of hot climate.

**PHYSIOLOGICAL SUPPORT OF MILITARY OCCUPATIONAL ACTIVITIES**

Avdushenko S. A., Russia

Development of ways and means of fighting, sophistication of military equipment and conditions of its use have greatly complicated and intensified the military specialists activities. In addition to its traditional objectives, the military medicine is now challenged with physiological support of military occupational activities.

The basic elements of physiological support are diagnostics of functional states of combatants (evaluation of basic physiological systems and professionally essential functions) and correction of functional disorders.

The objectives of physiological support are following:

- standardization of physiological indices of a combatant depending on severity of physical and intensity of mental evades in various ecological and occupational conditions (including the effect of extreme factors);
- control over fitness as to functional abilities of civil youth for military service;
- occupational selection based on evaluation of professionally essential physiological functions;
- prediction of successful professional activities based on informative physiological indices;
- periodical control over functional states of combatants;
- control over adaptation of servicemen during various periods of service;
- control over reserve capacities of the whole organism and of its separate systems;
- control over physiological cost of occupational activities;
- correction of functional disorders of the servicemen’s organisms caused by various ecological and professional factors.

Physiological support measures are arranged in stages: 1) military career orientation; 2) occupational selection; 3) tracking of military occupational activities.

**POST-CHERNOBYL SYNDROME: MAINTENANCE OF SERVICEMEN AND POPULATION HEALTH UNDER CONDITIONS OF THE DESTABILIZED RADIATION ENVIRONMENT**

Grebenkov S.V., Russia

The complex hygienic estimation of the destabilized radiation environment on the health status of servicemen and members of their families is presented in the report (radioactive contamination areas as a result of Chernobyl accident as the basis).

Current achievements in the study concerning the effect of continuous exposure to small doses of ionizing radiation, radiation risk estimate, residence in the areas suffered from serious radiation accidents are analyzed and generalized.

Radiation and radio-ecological situation is assessed in garrisons and populated localities on territories contaminated due to Chernobyl accident. The structure and ways of formation of dose loads are analyzed.

With the help of original methods of pre-nosological diagnosis the complex investigation concerning the health status of servicemen and population in radiological areas is carried out (pre-morbid and pre-pathological states).

An attempt is made to assess adaptation health reserves of servicemen on these territories under conditions of adverse factors of the environment altered due to radiation.

Conceptual bases of safe residence in the areas of increased radiation, with regard to peculiarities of military service. Hygienic recommendations for providing radiation safety, optimization of vital activity and maintenance of servicemen (as well as members of their families) health on contaminated territories are scientifically grounded.
PREVENTIVE PROGRAMS FOR ENSURING MENTAL HEALTH IN LITHUANIAN ARMED FORCES (LAF)

Vaicaitiene R., Lapenaite D., Jurgaitis A., Levuliene E., Jankauskas D., Petrauskas Z., Vysniauskiene R., Lithuania

Modern military operations require that military personnel will be psychologically fit for duty at all times. Most of deployed personnel experience trauma, which can cause long lasting stress. For conscripts the most stressful period is first weeks of adaptation during basic training course. Psychologists of the LAF teach operational stress management and train all personnel to be deployed to support each other and to recognise early symptoms of unusual psychological reactions.

Questionnaires and randomly selected servicemen drug testing are used for evaluation of effectiveness of applied measures. As multiple 10 questions questionnaire about stress for 70 servicemen showed, only 18.5% of volunteers and 4.7% of servicemen answered all questions correctly before pre-deployment education. After the lesson this number increased to 51.9% and 11.6% respectively.

Specific stress questionnaire involved more than 700 conscripts and servicemen in order to assess the most important psychological problems during basic training showed that nearly 5% of conscripts were feeling anxiety, more than one third had anger attacks against their friends or commanders. Data revealed that 7.6% of soldiers had sleeping disorders, almost 10% mentioned thoughts about suicide, 1% of soldiers accidentally used drugs. After testing for drugs of risk group persons and soldiers suspected in drugs using positive result was found in 4.6% of urine samples. Hence 93% of personnel to be deployed was trained by psychologists.

All preventive measures according latest research results are involved in development of five years preventive programs for ensuring mental health and preventing drug abuse in Lithuanian Armed Forces.

PROBLEMS OF FORECASTING OF PSYCHOLOGICAL CONSEQUENCES OF LOCAL MILITARY CONFLICTS

Shevchuk I.A., Shevchuk L.E., Russia

At the present time the problem of health protection and ability to work of military people, who took part in military operations became really actual. The main “targets” are low productivity of military service activities, violation of social functioning, addicted behavior, increasing of sickness rate.

For many years we observed and made complex testing of 650 maritime infantrymen – participants of armed conflicts in Caucasus in 1995 and 1999-2001.

It was established that the breaking of mechanism of psychological regulation happens at the moment of military operations, though formation of stable negative status, which is known at scientific literature as after-stress syndrome, happens after finishing of active military operations. At the military environment 54% of people have neurotic complaints; 32.5% have problems with behavior. After leaving fights’ regions, an opposite transformation happened. There was predominance of behavior change (about 59%), as well as development of somatic sicknesses.

Analysis of the experimental data gives the opportunity to assert that young military people are more susceptible to influence: the risk level of psychological breaking development and expression depends directly on duration of the participation at the military operations-the 3 month term is a critical one. Adapting ability reserves are the most important for pre-sickness status development. There are another objective conditions of appearance of more distinguished problems with health such as lack of social support, as well as lack of the state and society support, especially at the beginning (December, 1994-February, 1995). 100% of the people whom we observed say, the most traumatic factors are constant life threat, colleagues’ death and injuries, the necessity to kill.

That’s why the formation and level of PTSD symptoms display of the military people depends on the main factors such as intensity of psychological and emotional loading; psychological, physiological and age peculiarity of the person; the period of stay at the “hot point”; attitude of the State and society to the veterans of the military conflicts.

This investigation work was done in purpose to forecast possible social and medico-psychological consequences of psycho-traumatic situations endured by the participants of the military operations at the Northern Caucasus.

PROFESSIONAL CONDITIONS OF THE NAVY SPECIALISTS AND TYPE “A” BEHAVIOR PATTERN OF CORONARY HEART DISEASE

Sisoev V.N., Kuvshinnikov A.V., Russia

Type A Behavior Pattern (Type A Behavior) of coronary heart disease (CHD) for diagnosis, treatment and prophylaxis of cardiovascular diseases is necessary as an important factor influencing on the morbidity of military specialists. Presently, in modern practice of the Russian Federation Armed Forces Medical Support this factor is taken into account incompletely due to insignificant scientifically-
based approach to the problem. Thus, new findings on the relations between Type A Behavior and professional conditions of the Navy specialists are considered to be interesting.

The purpose of this research is to study psychological and behavioral peculiarities of the Navy specialists with CHD in accordance with the organization of their professional work.

In naval hospitals 80 male-specialists of the Navy (aged from 37 to 53) with CHD were examined. All of them have stable exertional angina of the first and second functional classes. 39 men were on active duty, and 41 patients have been recently retired to the naval reserve. 54 men belonged to the shore personnel, whereas 26 men - to the ship personnel (including 20 men with watch duty organization and 6 men with non-watch one).

Psychological peculiarities of patients were evaluated by the Cattell’s Sixteen Personality Factor Questionnaire (16-PF) technique. Behavioral peculiarities were appreciated by Type A Behavior Scale (Polozencev S.D., Rudnev D.A., 1990).

As a result we found the reliable (P<0.05) prevalence of mean values on “L” scale (16-PF) in the group of ship personnel comparing with the group of shore personnel, as well as in the stage of group compared to the non-watch group. High level of their self-conceit and egocentrism was revealed. Mean indices of age and intensity of Type A Behavior were practically undistinguished (P>0.05).

The data detected will be useful for further planning CHD preventive measures in Navy specialists.

PROSPECTS OF PRENOSOLOGICAL HEALTH DIAGNOSIS BASED ON ELECTROPUNCTURE PRINCIPLES FOR MILITARY PREVENTIVE MEDICINE

Zakurdaev V.V., Lizunov Y.V., Zakurdaev Vl.V., Kozlov V.G., Opalev A.A., Russia

In connection with an increase in the severity of military ecosystem and number of factors dangerous to human health the urgency of pre-nosological diagnosis, which is now at the stage of methodological and methodical elaboration is growing.

The possibility of using a version of electro puncture diagnosis for this purpose was studied. A feature of the method was the application of liquid electrodes (0.9% sodium chloride solution ) and light measuring current (nano-volt-ampere range). This allowed us to record in known active points a new metrological parameter of liquid media, i.e. concentration-kinetic potential of quantum nature. The parameter accounted for the dynamics of other indices of human body internal medium and electromagnetic homeostasis in accordance with conventional and present-day notions of functional systems adaptation.

The method was approved under extreme conditions of the war in Afghanistan, in the course of servicemen prophylactic medical examination, and in special investigations connected with adaptation problems. Over 10 000 complex investigations were performed, and correlation with conventional and instrumental and laboratory methods was studied.

The results made it possible to substantiate the concept of energopuncture status as a methodological base of this new technique - human systemic adaptometry (HAS). HAS - method has a wide sphere of application, from individual health appraisal (professional selection, dynamic observation, nutritional and bioenergetics correction) up to decision of national problems in the field of socio-hygienic monitoring, large-scale preventive measures, and scientific researches.

PSYCHO-PHYSIOLOGIC PROBLEMS OF THE MILITARY PILOTS SELECTION AND TRAINING

Ponomarenko V.A., Vorona A.A., Gander D.V., Zhdanko I.M., Pokrovsky B.L., Russia

Selection and training are considered in the integral system of psycho-physiologic support of aircrew professional activity.

The aircrew psychologic selection is determined by a number of factors: the evolutionary unpracticalness of man to an activity in the three-dimensional space, the rate of psychic and physical activity, the probability of extreme and potentially dangerous situations for a life, a value and after-effects of erroneous actions, including the danger of pilot’s death and losses of expensive aviation technics. The supermanoeuvrability of aircraft in XXI century gives rise to the complication of spatial orientation and development of specific illusions and disorientation. This requires a more precise definition and improvement of existing methods and norms of the professional medical and psycho-physiologic selection of applicants for a flight school. The special attention must be given the professionally important qualities (PIQ) of a pilot as the spatial abilities, the capabilities of information processing and the stress - stability.

In the pilots education there is noted not only a factor of training effect, but a role of the forming and ripeness of personality, the motivation to a social adaptability, to a long-duration professional functioning and reliability under an influence of the combat flight stress factors and emergency situations. The system of medical-and-pedagogical supervision of forming and development of PIQ pilots directed to an increase of professional reliability, psychological stability and prolongation of the pilots professional longevity in conditions of modern combat stress-factors action, on the basis of development and introduction of new information, psychological and medical technologies, which have been integrated in the up-to-date program-and-apparatus means of monitoring and correction of functional state and performance.

The decision of given problems allows to select the more long-term aircrew on the psychological criteria for professional activity at the new aviation engineering, to increase an efficiency of the pilots training, stress – stability, performance a reliability of professional activity of aircrew, and also to conserve professional health.
PSYCHO-PHYSIOLOGICAL SUPPORT OF FLIGHT PERSONNEL IN THE PROC-ESS OF PROFESSIONEL ACTIVITIES

Peshkov V.V., Russia

The psycho-physiological support (PS) of flight personnel stipulates the continuity of measures, providing with accumulation of information about flight personnel and suggests the constant study of state and degree of expressiveness of professionally important qualities (PIQ) at the stages of professionalization.

The continuity of PS is reflected in such sequence: primary selection, professional training and distribution according to specialties; professional orientation in flight specialty distribution; collection of information concerning successfulness of subsequent activities, expediency and periods of teaching anew.

Realization of principle of dynamic prolonged PS is carried out by means of psychological and psycho-physiological examinations, collection, generalization and analysis of data characterizing the manifestation of personality virtues including PIQ under various conditions military-professional activities of flight personnel.

At present in Ministry Defense (MD) system there are youthful aviation schools (YAS) and Russian defense-sportive-technical organization (DSTO), where training, teaching and perfection of flight personnel are carried out. Those who are training in such organization are considered by the commanders to be potential applicants to the higher aviation schools (HAS) and as military pilots in the future.

PS in YAS and DSTO is carried out in accordance with the guidelines which differ from those applying at entering the HAS. Psychodiagnostic methods in both guidelines are identical but there are some differences concerning personal methods of investigation that do not give the possibility to estimate the dynamics of PIQ in full measure at the stages of pilot formation due to breach of united approach principle.

Maintenance of united approach principle and continuity of PS elements gives the opportunity to observe the dynamics of pilot formation from the beginning of pilot activities till its completion and in proper time make all necessary measures of PS depending on psychological state, professional pilot's qualification of various types and kinds of aviation and peculiarities of battle training.

RADIATION HYGIENIC ESTAMINATION OF RADONIC SOURCES ON MILITARY SANATORIUM MOLOKOVKA

Alexandrov V.N., Amogolonov B.C., Grebenkov S.V., Russia

Radiation hygienic estimation of radon sources on the military sanatorium Molokovka was performed with devices «Alpha-quard» and «SGS-200». The activity of radon in hot water of sanatorium Molokovka amounted to 348,6 ± 105,4 nKi /l (1290 ± 390 Bq /l), whereas in cold water it was 500±151 nKi /l (1850 ± 560 Bq /l).

RESEARCH ON PSYCHOSOMATIC HEALTH OF NAVY DIVERS AND RELATED FACTORS

Tao KZ, Tao HY, China

Objective: To investigate psychosomatic health of navy divers and examine its relationships with personal background (age, education, only-son, length of service) and personality characteristics.

Methods: Tests of Cornell Medical Index (CMI), Symptom Checklist 90 (SCL-90) and Eysenck Personality Questionnaire (EPQ) were administered to 200 Navy divers.

Results: Navy divers were normal in psychosomatic health with 8 items of SCL-90 significantly lower than the Chinese norm. On personality, divers were significantly lower on psychoticism and neuroticism and higher on extroversion than the military norm. Age and length of service correlated significantly with four physical items and one or two psychological items of CMI. Both physical and mental health correlated significantly with neuroticism. Psychosomatic health scores of divers with low neuroticism were significantly lower than that of divers with high neuroticism. Divers with high neuroticism scored significantly higher on hostility, paranoid ideation, psychoticism and positive symptom total of SCL-90 than the Chinese norm.

Conclusion: Although their professional environment is unfavorable to human health, navy divers adapt to it successfully and are normal in psychosomatic health on the whole. Personality, especially the dimension of neuroticism personality constitutes an important factor that exerts an impact on psychosomatic health of navy divers. To a much lesser extent, age and length of service have influences on physical health.
RESPONSES TO GLOBAL MASS FATALITY INCIDENTS AND THE NEED FOR AN INTERNATIONAL CONSENSUS ON FORENSIC PROTOCOLS

Tyrrell, A. J., Benedix, D. C., Dunn, K. N., Emanovsky, P. D., Gleisner, M. R., Kontanis, E. J., USA

The mission of the Joint POW/MIA Accounting Command (JPAC) is to search for, recover, and identify missing U.S. service personnel from past wars. JPAC is also tasked to undertake humanitarian missions. On 27 December 04, JPAC was ordered to assist in the forensic response to the effects of the South Asian Tsunami.

This poster presents some of the fundamental difficulties to overcome when large numbers of international Disaster Victim Identification (DVI) response teams work together. It illustrates these problems with reference to case studies based on observations made by the JPAC team of forensic anthropologists and odontologists.

The current standard for the international DVI community (and that used post-Tsunami in Thailand) is the INTERPOL Protocol. Since DVI is largely a police process, the INTERPOL Protocol reflects this bias. The protocols maintain an implicit assumption that scientific methods are the standards by which identifications are made, yet there is an explicit lack of scientific methodology to explain how the very large and complex problems that arise when attempting to identify unknowns from large scale, open ended populations are resolved.

It concludes by stressing three main points:
• The need to re-think the generalized INTERPOL DVI Protocol.
• The need for international consensus on scientific discipline-specific practicums for the collection of antemortem and postmortem data sets.
• The need for international consensus on fundamental evidence management and basic forensic techniques.

Identification and repatriation is essential for the post-traumatic resolution of communities. Humanitarian assistance does not stop with the living.

ROLE OF STANDARDIZATION FOR PREVENTION AND CONTROL OF ACUTE MOUNTAIN SICKNESS IN THE MILITARY

Niu WZ, Li J., Wu Q., Guo JM, China

The military hygienic standards concerned with high altitude (HA) are an important part of the standardization system of Chinese People’s Liberation Army (PLA). Three standards related to prevention and control of acute mountain sickness (AMS) have been published, including “Indexes and evaluation of high altitude acclimatization”, “Principle of diagnosis and treatment of benign form of acute mountain sickness” and “Principle of diagnosis and treatment of high altitude coma”. In addition, “Principle of diagnosis and treatment of high altitude pulmonary edema” and “Hygienic requirement for army exposed to high altitude” will be published soon. These standards are benefit in ensuring the health of army men at HA. To aim directly at the pathogenesis of AMS, standardization for prevention and control of AMS can eliminate the causative factors leading to AMS, decrease oxygen consumption of army men at HA and help them acclimatize HA environment. Based on the results of following-up several ten thousands recruits sent to HA by airplanes for more than ten years, it was demonstrated that the incidence of AMS in these recruits decreased remarkably from 48.45% (1987) to about 10% (2003), and the hospitalization rate dropped from 2.18% (1993) to 0.18% (2004). No death occurred in recent years. Therefore, it is concluded that standardization play a very important role in prevention and control of AMS in the army.

SCREENING SYSTEMS PSYCHIATRIC EXAMINATION OF ENLISTEES

Kulikov V.V., Rabotkin O.S., Russia

Screening is aimed at differing of persons ill with psycho disadaptation and persons without such defects. It is done by determination of primary, supposed information concerning persons under examination. Basic on practice of mass psycho-diagnostic researches the two-level scheme of examination was used. At the first level the preference was given to the methods, allowing to determine “the high risk group” of appearance of mental diseases with maximum efficiency. Methods must be compact and with minimum time consumption. At the same time such methods must be rather sensible to any expressions of any neuro-mental disfunctions (NMD). At the second level, to achieve more profound, clear information about persons from outlined groups, personal polls and other special methods were used.

The standard tests became basic for screening psychological - psychiatrist research works. They are the following: SMIL (modified variant of MMPI test; 16-FLO, forecast (or MLD adaptivity), vegetative - resonance IMEDIS test. Additional tests: immune - chromatographic express test for drugs and metabolites in urine, anamnestic blank, DAP-3 method, Lusher test etc... Validity of psycho - diagnostic system in use is determined by the validity of the containing tests and estimated approximately in 75 - 80%. Moreover the reliability of screening raised because of possibility to add the results of tests of the person who is examined.
Their integration allows you to get the key data about anamnesis (risk factors), estimate complex data about persons and estimate their psychological health and also basic expression of possible pathology.

Our computer technology integration allowed us to find out all information about the anamnesis (risk factor) to learn all aspect complex information about patients personalities and their psychological sense, and in case of psychological pathology to find out their reasons.

Our developments admitted that the main reason of risk factor development is NMD. According to the first time commissioning from 7 till 8% of men are NMD affected is less than 1%. That means most of men are unrecruited (according to their health and other reasons). It was found out that 37% of men with NMD are unrecruited. The same time high level of recruit retirement is being noticed. The reasons are: bad state of health, development of negative social cases (suicides, illegal military relationships and others).

The development of screening methods allowed us to increase the level of psychological pathology revealing among recounts and to decrease the number of bad health retired men twice.

**Resume.** There are a number of screening methods of research in the practice of mass psychodiagnostic examinations aimed at the proper establishment of the military medical examination of the enlistees.

Standard tests together with the computer equipment let in short period of time to get basic knowledge about risk factors, determine complex variable information of the examined characters and to estimate the state of their moral, and in case of any disease - its main features.

The examination affirmed that the main risk factor for of the mental disease’s development is nerve distraction.

It was shown that the usage of screening methods allowed greatly increase efficiency of mental diseases determination among the people to be enlisted and decreased twice the number of those retired for the reason of their mental health.

### STUDIES ON THE ANTI-FATIGUE FUNCTION OF LI-GUYUAN CAPSULE

Gu F., Wang DQ, Tian YP, Song SZ, China

**Aim:** To study the resisting fatigue effect of Li-GuYuan capsule in mice.

**Methods:** 160 Kunming mice, male, weighing 20-22g, were randomly divided into 4 groups, each group for 40, were randomly divided into four subgroup, including control group and 0.36 g/kg, 0.72 g/kg, 1.08 g/kg dosage groups, 10 mice each subgroup for 10. Each day, all animals have been weighed and than take water or different dose of Li-GuYuan capsule by gavage for 30 days. To end the experiment, the Load swimming time was recorded and the changes of liver glycogen, lactic acid of blood, urea of serum have been measured, respectively.

**Results:** In the loading swimming group, the swimming time which treated by 0.72g/kg, 1.08g/kg dosage of Li-GuYuan capsule subgroups was significantly longer than control group( t =3.436 , p<0.01; t =5.625, p<0.01 ). The parameter of plasma lactic acid of 0.72g/kg, 1.08g/kg dosage were significantly lower than control group( t =3.981 , p<0.01; t =4.725 , p<0.01 ) and liver glycogen in these two groups were significantly higher than those of control group ( t =3.357 , p<0.01; t =4.095 , p<0.01 ). However, the serum urea of experimental subgroups was no significantly changes compared with control group.

**Conclusion:** Li-GuYuan capsule possesses the potential effects of against fatigue.

### THE ACTUAL ASPECTS OF INTENSIVE GRAVITATIONAL STRESS IN AVIATION MEDICINE

Khomenko M.N., Bukhtiyarov I.V., Russia

There have been carried out the studies at a centrifuge under the influence of high g-loads with a participation of subjects-volunteers. The mechanisms of activity of cardiovascular, respiratory, locomotor and sensory systems in the human body were estimated under an influence of the gravitational stress with an ultimate intensity, including the pulsed character and the changing relatively a body axis the resulting gravital and inertial vector.

The findings show, that the h-load tolerance is significantly decreased at +hz exposures with a value to 9 units, duration – 60s under the use of an anti-g suit and h-load onset rate – more 1 unit/s. The dependence of h-load tolerance decrease from the its onset rate is a nonlinear function and in the greatest degree this decrease is observed at the increase of onset rate from 1.0 to 5.0 units/s in conditions of compound profile of h-load with values from 5 to 9 units, very likely, in a result of the rising fatigue and unfavourable effects cumulation, there is observed a decrease of limiting tolerable time of gravitational stress on the average by 37%.

It has been shown, that the exposures of a high-h-loads levels with the ultimate values induce the most serious and threatening extreme states, associated with hemodynamic disorders, such as a gravitational syncope, the maximum exhaustion of body functional reserves, the impairments of cardiac rhythm and conduction respiratory function. As a result of unfavourable biomechanic and biodynamic responses it is possible the development of acute painful syndromes in spine. The sensory responses are accompanied by the physiologic-influenced illusions of spatial position and the partial or full loss of pilot’s spatial orientation.

As a result of investigations the specified requirements to the system of means and methods of improvement of pilots in-flight performance in the modern and forward-looking aircraft were substantiated.
THE APPLICATION STUDY OF MODERN FULL-DIMENSIONAL HEALTH PROTECTION PRINCIPLE TO THE HEALTH CARE SERVICE OF NAVY LONG VOYAGE FLEET

Li AF, Xu QL, Shen WM, Xin SN, China

**Objective:** To study the effect of modern full-dimensional health protection principle to the health care service of China Navy global task group.

**Methods:** To observe the promotion of medical support effect by changing the focus of navy fleet health care program from post-casualty treatment to integrated preventive, surveillance, and clinical programs.

**Results:** The mission of China navy global navigation was successfully accomplished. The 24 hours morbidity decreased and no cases of infectious disease was observed. The ergonomic investigation showed that no physical readiness decrease was observed in the crew.

**Conclusion:** The health care program characterized by integrated physiological and psychological support, casualty prevention and casualty treatment based on modern full-dimensional health protection principle has significant promoting effect to navy long voyage fleet.

**Key words:** long voyage, health care, full-dimensional health protection, military medicine.

THE EFFECTS OF THE NURSING PROFESSION ON THE NURSE’S NUTRITIONAL HABITS

Manolidou Z., Kostopoulou E., Salourou M., Mouratoglou G., Greece

**Aim – Purpose:** The aim of this research study was to examine the effects of the nursing job on the nursing personnel’s nutritional habits.

**Material – Method:** The sample of our study consisted of a population of two hundred nursing personnel’s, aged from 21 to 45 years old, working at the 401 GMHA. The data collection was performed by the filling of questionnaire consisted of open and closed type questions.

**Results:** According to the results 46% of the nursing personnel do not take breakfast at home either because they do not have enough time or because this is their habit (34%). However, those of the nursing personnel who take breakfast, they prefer to drink only coffee (64%). The majority of the participants prefer to consume proteins and mainly meat at their main course of the day, which is lunch (69%). A proportion of 67% of our sample would prefer to change their profession either due to burnout syndrome they are experiencing (38%), or became low wages (35%) and of the unhealthy working conditions.

**Conclusions:** Nurses tend to stop following the traditional Mediterranean nutrition and follow Western type eating habits. The sense of being unsatisfied is so strong among nursing personnel and it makes them to strongly desire to change their job.

THE INFLUENCE OF DIFFERENT STRESS FACTORS ON THE REACTIVITY OF THE CARDIOVASCULAR SYSTEM FOR ORTHOSTATIC LOAD

Filatov V.N., Russia

The objective of the research was the influence of different stressful factors on reactivity of the cardiovascular system (CVS) to orthostatic load. The first group of the examined was participating in paratrooper’s training of cosmonauts, they were exposed to nervous emotional tension; the second group was undergoing training with combined thermal load; the third one was participating in training exposed to hyperthermia in combination with the continuous activity mode. The reaction of CVS for orthostatic probe was studied with mathematical method of heart variability analysis. 48 patients were examined.

The ortho-probe was undertaken before and after stressful circumstances. Except standard indices of heart rate variability (HRV) we calculated sphygmic index of orthostatic instability (SIOI) to analyze stability of CVS to ortho-probe.

After analysis of observations it was cleared that in three particular cases of the research work the reaction of heart rate for orthostatic load after stress was characterized by the growth of normalized capacity of the LF wave (p1<0,01; p2<0,01; p3=0,05) and sympathetic index LF/HF (p1<0,01; p2=0,03; p3=p0,01), and by the decrease of normalized capacity of HF wave (p1<0,01; p2=0,05; p3<0,01). The biggest range of deviation was noticed in the third group. Most probably the reason of this fact was that continuous activity mode led to the centralisation of heart rythm control. In the second and the third groups SIOI has increased (p2<0,01; p3<0,01), and in first group it has decreased (p=0,02). Most likely this reaction of CVS for the tilt-test was caused by high intensity of the stress factor of the parachute jump, that led to emaciation of adrenal glands and to decrease of sympatho-adrenal system activity.

Consequently, stress factor leads to hyper-sympathetic respond of CVS for the orthostatic probe and to growth of orthostatic instability. But high intensity stress stimulus can lead to emaciation of sympatho-adrenalin system that is reflected in paradoxical decrease of sphygmic index of orthostatic instability.
THE INFLUENCE OF ENVIRONMENTAL EXTREME LOW TEMPERATURE MULTIPLE IMPACTS ON THE COLD RESISTANCE OF A HUMAN BEING

Rybin E.V., Russia

One of the actual problems of the military medicine is the search of means and methods aimed at increasing the organism stability under the conditions of long lasting action of non-favourable military service and environment factors.

To estimate the influence of multiple cold impacts of environmental low temperature on the cold resistance of military men, a research has been carried out in which 25 volunteers (healthy males aged 21.2±0.6 in average) participated in order to be examined.

An extreme cold impact was carried out in a specially equipped cryocabin. A person without a uniform had been located in the cabin and influenced during 3 minutes by the vapour based on nitrogen supplied under pressure by the heat-transfer medium.

The temperature which was maintained in the cabin filled by vapour coming out of the heat-transfer medium was 120-140 degrees Celcium. The cryotherapy course consisted of 10 daily procedures.

The cold resistance of the examined volunteers was estimated using the factor of thermoresistance (TF) to the low temperature impact suggested by Novikov V.S. together with the co-author (1997) under the cold impact maximally endurable by the volunteers - a temperature of minus 15 degrees Celcium in the climatic complex “TABAI”.

The time during which the healthy volunteers had been examined under the cold impact made up from 80 upto 128 min.

The research results showed that during the cryotherapy course the psychic emotional tension becomes reduced, as well as the reactivity of cardiovascular and respiratory systems to hypothermy, while the immunity nonspecific component gets activated and the physical performance results - increased. A change of the thermal condition is characterized by negative dynamics of the rectal temperature tempo reduction and an increase of hypothermy endurance time, which results in an increase of the thermoresistance factor up to 51% in average compared to the original values.

Thus, the environmental extreme low temperature impacts course carried out in respect to the military men causes an increase of cold and nonspecific resistance. The given method can be used for accelerated cold training among the military men.

THE MECHANISM OF SEASICKNESS ADAPTATION

Guo JS, Zhou LM, Cai JM, Ji YH, Liu MH, Li M, Li HQ, China

[ABSTRACT] Objective: To study the duration required of adaptive training for anti-seasickness and the mechanism of seasickness adaptation, thereby providing scientific basis for making training plan for anti-seasickness and theoretical basis for effective adaptive training against seasickness.

Methods: Questionnaires were taken among the soldiers of an army. To the animal research, the seasickness and adaptability formation were determined and evaluated by the kaolin consumption and the concentration of some neuroendocrine factors. Using suppression subtract hybridization technique to construct subtracted cDNA library of the brain stem and hypothalamus of seasickness adaptive rats. Dot blot was used for differential screening the subtracted library. HO-3 mRNA expression level in brain stem, hypothalamus and adrenal gland before and after adaptability formation were analyzed with RT-PCR.

Results: Under 3~4 grade of sea waves, the incidences of seasickness decreased for training. To animals, the Kaolin consumption decreased for seasickness adaptation. After screening the subtracted library, 48 differential fragments were finally obtained, 29 fragments contain part of sequences of known genes, 19 fragments of unknown genes. HO-3 expression in brain stem and hypothalamus rose continuously during the whole process of seasickness adaptability formation.

Conclusion: It may take 8-21 days of training to get seasickness adaptation. The heme oxygenase, mitochondrial genome and et al may play role in adaptability formation to seasickness.

Key words: seasickness; adaptation; mechanism

THE METHOD OF EXPRESS DIAGNOSTICS OF THE FUNCTIONAL STATE OF ORGANISM FOR THE MILITARY-OPERATOR SPECIALISTS

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The professional activity of the military-operator specialists usually takes place under the condition of neurosis and can be followed by pathological functional states of the organism (FSO), which can lead to their professional military health lowering without adequate psychological measures.

So, in this way, the research of the express diagnostics of the FSO for the military-operator specialists’ method, which can opportunely find unfavorable changes developing and hold some optimizing FSO measures, acquires a special topicality.

Thus, 45 military specialists under 21-48 years old took part in the research. The research had three steps: before going to the session, after coming back and before the next going to the session.
Such methods were used for the complex characteristics of the tested military specialists’ FSO: a) physiological: finding frequency of heart beat, blood pressure, FGG, OV1, effective heart-working index, indexes of Rüd and Bogomazov, anthropometry, indexes of Kerdo, Robinson, defining Index of physiological changes (IPC), tests of Rufie, Shitange and Gench; b) psycho-physiological: reaction to the moving object, finding information processing speed according to the results of latent time measurement for the complex sense motor reaction, finding the time of simple sense motor reaction finding the muscle endurance; c) psychological: color test by M.Lusher. The analysis of the researching results allows define that the most informative methods of the FSO assessment are: defining Index of physiological changes (IPC), the assessment of cardio respiratory system and defining the heart-working index. Indexes of dynamic and balance for the main nervous processes (excitement and braking) and speeding of the sense motor reaction are the most adequate characteristics for the psycho-physiological state of FSO.

The assessment of FSO according to this method allows finding “the risk group”, people who have a high probability of unfavorable functional states developing, which leads to the professional military health lowering.

THE REASONS OF MENTAL DISEASE HIGH DEGREE OF MILITARY SEAMEN IN THE FIRST MONTHS OF SERVICE: DISEASE OR HIGH DETECTABILITY IN A COMBINATION TO HYPERDIAGNOSTICS

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For analysis of the reasons of high mental disease in the Navy the distribution of 1316 cases of initial disease and hospitalization in the psychiatric section of the Baltic navy main hospital of military seamen serving as recruits in the period from 2000 to 2004 was investigated. Research has shown, that to the first month of service falls to 29,8 % of all disease cases which have entailed hospitalization in a psychiatric section, that makes 58,2 % from cases of disease in the first quarter and 43,4 % - in the first 6 months.

At the analysis of the reasons it is necessary to take into account, that 80 % of all cases of a direction on stationary inspection and treatment in the first month of service occur experts of acceptable-technical commission (ATC) of the Navy where all recruits acting on Navy pass medical inspection. According to instructions the main task of psychiatrists is to make impossible of service in the Navy of persons with mental disorders. In the cause that opportunities for psychiatric inspection in conditions of the big stream of recruits are limited, doctors - psychiatrists try to attain sending on stationary inspection all of recruits with the slightest doubts concerning the use of substances, personal deviations, disorders of adaptation. 392 recruits directed on stationary inspection showed in 188 cases (48 %) neurotic disorders, in 165 cases (42 %) - personal deviations and in 39 cases (10 %) - other mental and behavioral disorders. Military-medical examination made the conclusion, that in connection with long current neurotic disorder 8 % (31) of recruits were dismissed; because of manifestation of personal disorders - 114 (29 %), in connection with other frustration - 39 (10 %). The staying 208 (53 %) recruits were recognized suitable for military service.

To our opinion such approach makes artificial overestimates parameters of disease and hospitalization of military seamen. This conclusion proves to be true by the results of military-medical examination of recruits from which - 53 % are recognized suitable for military service.

The received data specify necessity of development of more strict criteria of a sending on stationary inspection and treatment in a psychiatric section of hospital.

THE ROLE OF CELL ADHESION MOLECULES IN GASTRIC CANCER METASTASES

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Introduction: Gastric Cancer represents 4% of all the diagnosed cancers in the UK. Surgery is the main method of treatment, but many patients develop localised peritoneal metastases following the operation. Chemo-radiotherapy has a limited role. Tumour-Mesothelium adhesion considered to be under the control of many molecular mechanisms like: Mesothelial HA-Tumour CD44, Extracellular matrix-Tumour integrins, Mesothelial ICAM-1-CD43.

Aim: To investigate the role of CAM in tumour-peritoneal adhesion and invasion.

Materials and methods: We used 2 Gastric Cancer Cell lines and we performed Gell-Zymography and Facs Analysis in normoxia and hypoxia.

Results: Primary human mesothelial cells express CAMs. Gastric Cancer Cells (AGS) express CAMs. Cytokines (TNF & IL8) up-regulate AGS’s CAMs expression. We found a significant increase of the expression of c-Met on AGS in response to hypoxia. CAMs blocking reduces Tumour-Mesothelium adhesion.

MMP’s is a family of functionally related Zinc-containing proteins capable of degrading all ECM components that include Gelatinase (Gelatinase A, MMP2, 72kDa & Gelatinase B, MMP9, 92 kDa), Collagenase and Stromelysin. Both MMP 2 & 9 are closely related to adhesion and subsequent enhancement of invasion. Targeting this interaction offers a significant advancement in cancer therapy.
TOXIC PROPERTIES OF SOME OZONE-FRIENDLY MEANS OF VOLUME EXTINGUISHING

Kuznetsov S.M., Russia

Our investigations were aimed to study toxic properties of several aerosol and gaseous volume extinguishing means proposed instead of those in use. There were investigated 5 aerosol com-poundings and 3 gaseous extinguishants in total. The biological effect was estimated on rats and mice.

Single inhalation exposure of combustion products of the aerosol compoundings in a range of concentrations and exposure studied was characterized by a potentiation of toxic effects of nitric and carbon oxides and caused in animals a failure of the heart functioning, respiratory depression and progressing of a hypoxia of a mixed type. Therefore, applying of the studied aerosol extinguishants for protection of closed objects is impossible because of a high toxicity of their combustion products and temporary loss of ability for a person to be visually oriented in a room.

Experimental study of toxicity of gaseous fire-extinguishing means allows to conclude that sulfur hexafluoride, pentafluoroethane and heptafluoropropane are low-toxic substances (fourth class of hazard). The pattern of biological effect and parameters of toxicometry of these compounds correspond to general regularities known for non-electrolytes. The possibility of their applying for fire protection of habitable premises has been substantiated and the maximum allowable concentra-tions for short-term exposures have been worked out.

WATER DISCIPLINE IN DIVERS AND THE BODY STABILITY TO DECOMPRESSION SICKNESS

Myasnikov A.A., Kuleshov V.I., Chernov V.I., Shitov A.Y., Russia

Among specific pathological states typical for hyperbaric conditions decompression sickness (DS) occupies a leading place both in the incidence and severity of the disease. The successes of last decades in the development of various directions in DS prevention have led to the situation, when more than 90 % of all acute DS cases are of a mild forms. In our opinion, the opportunity of chronic forms development practically is not taken into account. A basic preventive measure of DS prevention remains to be a choice of a rational decompression regime, though it not always allows to provide due safety during the diving works. This is due to the fact that while selecting a decompression regime the insufficient attention is given to an estimate of individual stability of divers to DS and changes of their functional state after submersion.

One of the factors influencing on divers’ stability to DS and to their functional condition during descent under water is the qualitative and quantitative composition of food and, especially, liquids taken by divers. The literature data concerning this problem are contradictory. Now as a means preventive DS in persons working under conditions of the changing pressure in gas and water environment the product named “Divers tea” is suggested. He composition includes various vegetable components.

To check the efficiency of using “Divers tea” the first investigation phase has been conducted, on experimental animals. The quantity of a consumed liquid has been determined, depending on its qualitative composition.

Healthy inbred male rats (n=60) with body weight 290-420 g were used in test and control groups. In the first group “Divers tea”, whereas in control group – water were used within 20 day.

The data received showed that consumption of liquid depends on the body weight and on its qualitative composition of the liquid, and this fact should be taken into account in carrying out the further research.

ON SETTING UP TELEMEDICINE NETWORKS AT THE ESTABLISHMENTS OF THE STATE SANITARY AND EPIDEMIOLOGICAL SURVEILLANCE OF THE RUSSIAN FEDERATION ARMED FORCES AND THEIR EMPLOYMENT IN EMERGENCY SITUATIONS

Shumilov V.I., Russia

The creation of telemedicine systems and networks is a component of health service support informatics including the establishments and facilities that carry out sanitary and epidemiological surveillance in the troops and establishments of the Russian Federation Ministry of Defense. The technologies of telemedicine should be adapted for solving problems of prophylactic medicine.

Telemedicine networks may be most urgently needed in the areas of technological and ecological catastrophes, local armed conflicts, as well as under the conditions of emergency situations including acts of terrorism at nuclear, chemical and biological works.

Rapidly changing chemical and biological situation at the emergency area requires making prompt decisions by territorial organs of sanitary and epidemiological surveillance and by operational groups, and submitting them to the approval of higher organs and
agencies. That is why the employment of telemedicine networks will enable us to reduce the periods of collection and primary analysis of information directly in the emergency zone. Creation of portable terminals and mobile complexes for data analysis and transmission will ensure the transmission of primary materials to the central organs and agencies.

Thus, the creation of telemedicine systems and networks will ensure a permanent access to all services of sanitary and epidemiological surveillance organs and facilities of the Russian Federation Armed Forces, the possibility of graphical and functional enhancement of the set of functions for diagnosis, prophylaxis of diseases among the personnel, for training specialists and, most important, it will ensure the unification of sanitary and epidemiological surveillance territorial centers and operational mobile groups to form a unique space of information and telemedicine.