

## **New Methods in Promotion of the Health Related Activities in the Czech Army.**

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Regular physical activity has been long regarded as an important component of a healthy lifestyle. Individualization of exercise program plays a major role in planing optimum and the most effective workout. In order to achieve personal exercise goals one has to be thoroughly informed about his/her actual health status. Success in physical activity is therefore highly determined by an actual shape. Miscellaneous diagnostic methods are used in abundance and in a great variety throughout the world. CASRI Praha has created a special approach to diagnostics of actual state, which was designed to be maximum fast and effective in searching for key parameters that are essential for individualized exercise prescription.

Nevertheless the proper diagnostics is only the first step in improving someone's health. Of course, the keystone is scientifically evaluated exercise program. We have created unique multimedia software that can significantly improve the workout. It is based as a personal advisor, that presents an exercise recommendations in a new way and thus motivate a person for continuation in his/her effort.

### **Project WELLNESS**

For many years we are aware of the insufficient communication between people taking care for physical education and fitness and medical staff. That is why we were looking for some solution how to unite those two groups to work together for the heath and fitness of all military professionals and soldiers as well. The project WELLNESS creates a platform for their mutual cooperation. The project is the physical training, medical and diagnostics program designed by the Czech Army Sports Research Institute (CASRI).

The Institute deals with top-level army sportsmen as well as with other army staff for almost twenty years at the field of biochemistry, anthropology, psychology and physiology. The Institute offers assistance in the sphere of the diagnostics of actual physical, psychical and health status. A component part of our activities is guidance for improving basic nutritional and movement habits and the support at the field of motivation and information on how to start and proceed physical activities.

On the basis of processing of the information and measured data files, a computer software called WELLNESS CENTRE processes the evaluation measured parameters, and the evaluation serves for follow-on suggestions and recommendations for an optimization of physical and psychical activities. For this part of recommendation we use another software called WELLNESS STUDIO. The project's concept allows to cover a broad spectrum of activities from a level of recreational exercise up to the performance oriented physical training. In addition to this, in a routine manner the project can cover the age span of average population from school children's age up to sixty years old population.

Long-term monitoring of sports(women) and common population and comparisons with certain partial elements of similar systems abroad have become a basis for designing model characteristics and for designing the algorithms for data processing and evaluation. On the basis of these designs, the procedures were developed for influencing and optimizing fitness, nutrition, regeneration, relaxation and rehabilitation.

The WELLNESS project is about to be launched in the Czech Army from the beginning of the next year, when approximately 20 medical centers will be equipped with necessary equipment. These 20 centers will cover over 70 percent of all officers and will provide full-scale diagnostics. The rest of medical centers will provide same diagnostics, only physical test will be carried out by mean of step test (not by stationary bike).

The examination will be mandatory for every officer who will be obligated to pass through this examination in occasion of annual reexamination. The officers will be treated upon their health status. The person with minimum health problems will be involved in preventive programs supervised by physical education chiefs. People with more serious health problems will be referred to the medical services. Obviously this project requires some legislation changes, mainly in those cases when some officers do not meet the needs of physical fitness and health.

We suppose to extend this project to recruits and conscripts as well. In this case the results will be used in assignment in order to allocate soldier for appropriate missions.

However the program WELLNESS provides possibilities for a broader application - for instance the program can be used for testing especially observed groups of regular soldiers (e.g. pilots, soldiers of reconnaissance units, fast response brigade, personnel of international missions, etc.). Or, the program can be applied as a source of information for the optimization of the program of preventive rehabilitations in cooperation with the bodies of the Czech Army Medical Service. Therefore the project's integration to the Czech Army has being prepared. It is meant to be an interdisciplinary element for improving the care of the Czech Army soldiers, the element, which interconnects the sphere of physical education and the sphere of medical care.

### **Diagnostics**

During last 7 years we, step by step, developed a diagnostic system called WELLNESS. The system is focused on monitoring of the health status including exercise recommendations.

In order to simplify the whole process of acquiring data and further elaboration (including exercise recommendation) the diagnostics was unified throughout the Czech Army and the process was computerized. The idea comes from the needs of acquiring proper and exact information on the actual health status of soldiers in order to create efficient exercise program.

The whole system was developed to be maximum fast and effective. Our approach allows diagnosing up to 12 people an hour according to equipment, with only 5 people of operating staff. When figure of participants doesn't exceed 50 person a day they will receive the results the very same day. It takes less then one hour for patient to get through all the examination procedures.

Following parameters are either measured or calculated during the examination:

Blood pressure, EKG;

Body weight, body height, skin folds, segment perimeters, aspexe;

BMI, percentage of body fat, lean body mass, percentage of muscles and bones, somatotype;

Muscle imbalances;

Total cholesterol, HDL, LDL, triacylglycerol, glucose, hematocryt, hemoglobin;

W170, W150 a W130 or step-test result, hand grip;

Risk of cardiovascular diseases, motion activity index;

psychological tests; and more.

When the diagnostics of the WELLNESS project is executed in its complete form and in its entire range, it presents certain amount of time, material support and expert staff. Naturally all this reflects in higher time and finance requirements. This full-ranged diagnostics can be offered by CASRI and starting next year in another 20 places around the Czech Army with the Medical Centers.

In order to reduce the time and costs a shorter version of the program has been designed and verified. The shorter version covers a scope which is a little bit narrower and presents lower requirements for: instrumentation, time taken by executing diagnostics procedures, staffing. Measurements in this shorter version are performed nearly same as those under the procedures of full program; however, biochemical parameters are not monitored, EKG is not measured, and load test can be modified down to performing step-test variants.

Practical verification confirmed that the shorter version is optimum and sufficient for current practice. On the basis of this version the proficient physical education personnel that underwent professional preparation are capable of creating condition programs and instruction for the fulfillment of sound living style. Advantages are the operativeness, low time requirement and low requirement for material support.

Summary data from examinations will be regularly elaborated and the results will be used for evaluation of actual situation of units, estimating trends and for planing further steps.

Every examinee will receive detail information about his/her health state. If some parameter gets out of limit, the report provides information how to proceed in order to improve the parameter or, if the situation is more serious, the patient is sent to special medical care. Even recruits and conscripts will proceed through this examination.

The goal of this diagnostics differs by object of examination. The results of examination of recruits will be used for assigning to the military services. Thus, we hope to avoid problems concerning failure of soldier because of insufficient abilities. The examinations of conscripts at the end of their one-year service will provide information about effect of various military services on the health and fitness of conscripts. The usage of the WELLNESS program offers to officers a valuable information about their health. The results of diagnostics keeps people motivated and when repeated annually provides complex overview of health trends of every individual.

### **Software WELLNESS**

From the methodological point of view system is based on complex diagnostics which is followed by the recommendations how to improve the physical fitness and reduce the risk of diseases.

The system is aimed to the diagnostics of the health status and subsequent recommendations concerning training loads. The training program is based on results of diagnostics. That way every single person who was examined knows what he/she should take special care of and, furthermore, how to do it. More then 9000 people who proceeded through it during last six years verified the software.

Software WELLNESS was created to fulfill a few needs.

At first, we were looking for simple - but still effective - way of screening the health status, in order to avoid later serious diseases, which may appear due to the omission of the preventive care.

The second need concerns objectivity of data collection and its subsequent elaboration. To meet this need the system was arranged into the software package.

The next reason is helping people to get informed about their actual state, giving them recommendations how to improve their health and, when some serious health risk was discovered, advising them to the special medical care. We suppose that information offered on daily basis may help to keep up the motivation of patients throughout the whole year.

The other reason why we created this software package was to facilitate storage of the data about client's health state and physical condition as well as a saving of the basic personal data. And that way decreases amount of a necessary administration.

The system is not aimed only to diagnostics. Diagnostics essentially must be followed by the evaluation of optimal exercise program for clients, in order to ensure proper and the most effective workout. This software helps to create an exercise program so as to avoid a danger of damaging client's health state because of inappropriate execution of exercise program.

The software primary consists of five modules:

- Diagnostics,
- Psychodiagnostics,
- Nutrition,
- Aerobic training and
- Strength training.

Maximum information about client's health state has to be obtained in order to provide the optimal exercise for every single client. This is the only way how to preserve client against injuries, non-reversible damages of motion apparatus or other fatalities. To ensure this **DIAGNOSTICS MODULE** was created. This module constitutes a keystone of the whole software.

The diagnostics module has a few planes of processing. The first one serves to collection of basic personal data (for example age, sex, inheritable presumptions, smoking, type of occupation, injuries, etc.). These questions may be answered by questionnaire. Next level represents measurement of anthropometrical parameters (body weight and height, skin folds, segment perimeters), muscle imbalances, motion test and some more. The last level acquire more time and means to carry out the testing, but offers more detail information about health state (biochemical parameters and physiological parameters).

Since mental fitness plays key role in army duties, this module called **PSYCHOLOGICAL MODULE** was developed. This module is able of monitoring actual state, sending warning signals in case that abnormalities appears and furthermore offers solutions where possible or recommendation of more detail cure whenever the findings are too serious to be solved without skilled psychologist.

All data acquired by previously mentioned modules serves as basis for creation of exercise program. Two more modules were created: Aerobic training and Strength training

The **AEROBIC TRAINING** serves for creation of endurance workout. This module is based on a permanent control of burnt-out energy with comparison to amount of energy gained by food. This module contains package of the most widely provided aerobic exercises. This

module may be used for body weight reduction exercise programs as well as for a prevention of cardiovascular diseases.

The STRENGTH TRAINING module is used for creation of exercise programs aimed to developing muscle strength, providing body forming and body building and mainly removing muscle imbalances. A package of strength exercises stretching exercises was added into this module.

Wrong nutrition habits are cause of many health problems, because of our software contains NUTRITION MODULE. This module is able to give the nutrition recommendations based on both energetic balance and balance of resources. Energetic balance means amount of energy taken from a food contrary to amount of energy burnt out during a day. Balance of resources represents balance of carbohydrates, fat, proteins, vitamins, minerals and trace elements. This module is closely linked to the aerobic workout module.

#### **Exercise recommendations (Software WELLNESS STUDIO)**

The completely new generation of multimedia software at the field of health care has been recently developed. It is called WELLNESS STUDIO. The WELLNESS STUDIO represents a completely new generation of multimedia software at the field of health care. Video and audio sequences that allow better understanding to principles of exercise enhance workout efficiency. The software can be used for creation of exercise programs aimed to developing muscle strength, providing body forming and body building and mainly removing muscle imbalances. Therefore the WELLNESS STUDIO is aimed to wide variety of customers - households, offices, fitness centers, physical education teachers, physical therapists and more.

CD-ROM disk enables to store a large amount of data and thus present exercise program in revolutionary new way. CD-ROM platform enables to offer the exercise programs in form, that include video and audio sequences of proper motion performance and much more additional information, all in graphical form (including atlas of anatomy). This multimedia presentation connects more senses (vision and hearing) and as a result a user can better empathy into the motion. The entertaining form of WELLNESS STUDIO helps user to keep the motivation and stick with the exercise routine.

The highly sophisticated part of software is a possibility to evaluate an exercise program base on actual health state with respect to individual differences (muscle imbalances, motion activity index, etc.). In order to ensure individual approach to every person a diagnostics of muscular apparatus was included. All tests are easy to perform and accompanied by video and audio sequences. WELLNESS STUDIO can automatically select the most convenient exercise program. Selection of exercises and methodology respects the goal of exercise, previous activity, muscle imbalances, hyperflexibility and contraindications. Advanced user can create his/her own program. All risky exercises can be on request automatically excluded from selected or created exercise program. Prepared exercise program can be printed out when needed.

Over 70 exercise programs concerning the most frequent health problems are included into database. Number of stretching, strengthen and aerobic exercises exceeds figure of 250.