
TEST BATTERIES ASSESSING PHYSICAL FITNESS IN SCHOOL-AGED CHILDREN IN THE CZECH REPUBLIC: A BRIEF REVIEW

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Abstract:

The optimal level of physical fitness in boys and girls of school age is considered as an important factor in the prevention of non-communicable diseases resulting from the unhealthy lifestyle. The evaluation of physical fitness in children at schools is objectively possible only by using available field methods (standardized test batteries). In recent years, numerous of different test batteries assessing physical fitness have been designed. The aim of the work is to compare the selected test batteries assessing physical fitness in school-aged children in the Czech Republic. EUROFIT, FITNESSGRAM, INDARES, OVOV and UNIFITTEST are currently the most widely used test batteries in this country. Generally, the concepts of test batteries used in the last quarter century in the Czech Republic has mostly registered a significant progress in its overall approach from the performance-related to the health-related fitness. Other advances are made in reduction and simplification of the test items, relational evaluation of physical fitness and physical activity, application of the criterion-referenced standards for positive feedback and possibility of self-assessment. The presented study promotes the practical implementation of physical fitness testing to the complex physical education program and also enables physical education teachers to make the decision for selecting the appropriate test battery based on their individual requirements (e.g., time and equipment).

INTRODUCTION

Many research studies documented negative secular trend in physical activity and physical fitness in adults and youth [3, 18]. In addition, children in school age often have also negative attitude to physical education and physical activity generally [1]. According to [2, 17] active lifestyle significantly affects body composition and overall physical fitness. Optimal or even higher level of physical fitness significantly contributes the quality of human life, allows with appropriate vitality implement daily routine activities, reduces health risks associated with physical inactivity and is a prerequisite for participation in physically vigorous activities that enrich human [12].

AIM

This paper describes the development of physical fitness diagnosis in youth and reviews the most widely used test batteries in the Czech Republic so the physical education teachers will be able to select an appropriate test battery depending on school conditions.

EVALUATION OF PHYSICAL FITNESS

Assessment of physical fitness in the population of school-aged children has passed significant development since early beginnings [14]. In the past, in many countries was mostly associated with obtaining the fitness badges which were aimed on testing maximum motor performance. The turning point came with the concept of health-related fitness. This resulted in a greater impact on the health aspect of the individual. A positive finding is that the diagnosis and analysis of performance in tests of physical fitness is not performed only in young athletes (e.g., searching talents), but more and more space is devoted to the general population of school children and the issue of individuals with low level of physical fitness [20].

Evaluation of physical fitness in school-aged children is usually performed by using somatic measurements and motor tests which determine the level of the basic components of physical fitness. These tests are from practical reasons often grouped in standardized test batteries [5]. According to [20] is the importance of test batteries for testing children especially in determining the level of the basic components of health-related fitness which is very important for proper physiological development and overall health. The following subsection is a brief description of the most common test batteries (Table 1), which are currently used for evaluation of physical fitness in the population of school children in the Czech Republic.

Table 1. Test batteries commonly used in the Czech Republic

NAME	ORGANIZATION/AUTHOR	YEAR
EUROFIT	Council of Europe, Committee for the Development of Sport	1983
FITNESSGRAM	The Cooper Institute	1982
INDARES	Křen F. et al.	2006
OVOV	Změlík R. & Šebrle R.	2008
UNIFITTEST	Kovář R. & Měkota K. et al.	1993

References: [4, 6, 10, 13, 16]

EUROFIT

Committee for the Development of Sport of the Council of Europe initiated the creation of the test system EUROFIT whose purpose is to obtain comparable results from different European countries by using the standardized methodology. This test system is divided into two sections: for adults and youth. The first experimental methodological guide of the test battery EUROFIT for school-aged children was processed in 1983. In 1988 was published the finished test system manual in English and French. Currently the results of extensive empirical studies are known from Belgium, Estonia, Italy, Lithuania, Hungary, Netherlands, Poland, Northern Ireland, Spain, and Turkey. This is the most widely used test battery in European countries at present [6, 11].

The test battery for youth contains nine motor tests and basic somatic measurements (Table 2). In the test battery are represented health-related and performance-related items with low mutual relations. According to [11] it is necessary in the future to continue with motor tests reliability verification and the creation of their health-related standards. They also consider as more important issue an inclusion of the test battery EUROFIT in school physical education, despite the fact that it has relatively high demands on time, personnel and material requirements [6, 15, 20].

Table 2. Components of physical fitness assessed by the test battery EUROFIT

COMPONENT OF PHYSICAL FITNESS	TEST
HEALTH-RELATED	
Body Composition	Body Mass Index Skinfold Measurement
Aerobic Capacity	Bicycle Ergometer W ₁₇₀ * Endurance Shuttle Run
Muscular Strength & Endurance	Bent Arm Hang Sit-Ups
Flexibility	Sit and Reach
PERFORMANCE-RELATED	
Balance	Flamingo Balance
Power	Hand Grip Standing Broad Jump
Speed & Agility	Shuttle Run 10 x 5 m Plate Tapping

Note: * = alternative test. Reference: [6]

FITNESSGRAM

The test system FITNESSGRAM has been developed by the Cooper Institute in Dallas under the guidance of the Advisory Council, composed of leading U. S. experts. The first version of FITNESSGRAM test battery was published in 1982. The result of more than 30 years of research is currently the latest ninth version. The most significant adjustments were reflected in the sixth version in which it was first included survey aim on the level of physical activity under the name ACTIVITYGRAM, and in the eighth version which includes additional separate extension known as ACTIVITY LOG which is used to evaluate the resulting data from pedometers. Currently the whole test system is also available as a paid on-line program [4, 20, 21].

FITNESSGRAM test battery is time- and material-saving, motor tests contained are according to [19] reliable enough for individual diagnosis. Moreover, [7] inform that self-testing is possible. Test battery consists of five motor tests divided into groups according to the components of health-related fitness and also includes basic somatic measurements (Table 3) [4, 21].

Table 3. Components of physical fitness assessed by the test battery FITNESSGRAM

COMPONENT OF PHYSICAL FITNESS	TEST
HEALTH-RELATED	
Body Composition	Bioelectrical Impedance Body Mass Index Skinfold Measurement*
Aerobic Capacity	One-Mile Run One-Mile Walk PACER*
Muscular Strength & Endurance	90° Push-Ups* Curl-Ups* Flexed Arm Hang Modified Pull-Ups Trunk Lift*
Flexibility	Back Saver Sit and Reach* Shoulder Stretch

Note: * = preferred test. Reference: [4]

INDARES

Project INDARES (International Database for Research and Educational Support) is a complex on-line system focused on recording, analyzing, and comparing physical activity of its users. System has been developed in cooperation with the Center for Kinanthropology Research at Faculty of Physical Culture of Palacký University in Olomouc. According to [8] the INDARES is an appropriate tool for on-line collection of data focused on physical activity which are then used for research purposes and eventually for future compilation of intervention programs. The system is free of charge [10].

INDARES Internet system is composed of several modules. One of them is a test battery designed to self-evaluate physical fitness of individual. It contains together eleven motor tests and somatic measurements, divided into four groups by areas of health-related fitness (Table 4). Other modules that this system provides are questionnaires related to physical activity, analysis of physical activity and proper analysis of the realized daily steps [10].

Table 4. Components of physical fitness assessed by the test battery INDARES

COMPONENT OF PHYSICAL FITNESS	TEST
HEALTH-RELATED	
Body Composition	Body Mass Index Hips and Waist Circumference
Aerobic Capacity	Resting Heart Rate 2-Kilometre Walk 12-Minute Run
Muscular Strength & Endurance	Chair Squats Modified Sit-Ups Push-Ups
Flexibility	Wall Squats Shoulder Stretch Sit and Reach

Reference: [10]

OVOV

Project OVOV („Versatility Badge of Olympic Champions“) is prepared by Czech Olympic champions in decathlon Šebrle and Změlík. The aim is to increase physical activity among today's generation of school children and potentially to start their sport career. Patrons of this program are many of Czech medalists and participants in the Olympic Games, World Championships and European Championships. The great popularity of this project is supported also by number of partners and state institutions [16].

The OVOV program is divided into individual competition (individuals up to 7 years) and team competition (groups of four girls or boys from the same school) with identical motor tests for both categories (Table 5). The results are evaluated by the scoring tables. Everyone can annually get a type of OVOV badge (bronze, silver, gold or diamond) when a certain number of points in each category is achieved. For participants is prepared the recording brochure which also includes training diary, complete the scoring tables and recommendations how to train the different disciplines [16].

Table 5. Components of physical fitness assessed by the test battery OVOV

COMPONENT OF PHYSICAL FITNESS	TEST
HEALTH-RELATED	
Aerobic Capacity	1-Kilometre Run 2-Minute Dribble 2-Minute Swim* 2-Minute Jumping*
Muscular Strength & Endurance	Push-Ups Sit-Ups Modified Pull-Ups
PERFORMANCE-RELATED	
Power	150-Grame Ball Throw 2-Kilogramme Medicine Ball Throw Standing Triple Jump
Power & Speed	Long Jump
Speed	60-Metre Run

Note: * = alternative test. Reference: [16]

UNIFITTEST

The origin of the test system UNIFITTEST is dated to 1988 when experts (mostly from the former Czechoslovakia), after more than two decades of studies and researches, approved the basic outline of the project. In 1993 was published the first manual of test battery UNIFITTEST (6-60). The reason for the creation a new test set in the former Czechoslovakia was to fill the gap after the abolition of fitness PPOV badge, which was a mandatory part of physical education at elementary schools [13].

The UNIFITTEST test battery is characterized as a set of four motor tests with alternative tests according to specific needs. Test battery is enriched with basic indicators of body composition (Table 6). Its application is practicable for a wide range of individuals aged from 6 to 60 years and reflects contemporary approaches to the physical fitness testing. Construction of normatively referenced standards was based on the results of several national representative surveys [9].

Table 6. Components of physical fitness assessed by the test battery UNIFITTEST

COMPONENT OF PHYSICAL FITNESS	TEST
HEALTH-RELATED	
Body Composition	Body Mass Index Skinfold Measurement
Aerobic Capacity	2-Kilometre Walk* 12-Minute Run* Endurance Shuttle Run*
Muscular Strength & Endurance	Flexed Arm Hang* Pull-Ups* Sit-Ups
Flexibility	Sit and Reach*
PERFORMANCE-RELATED	
Power	Standing Broad Jump
Speed & Agility	Shuttle Run 4 x 10 m*

Note: * = selective test. Reference: [9]

CONCLUSION

Concepts of test batteries used in the last quarter century in the Czech Republic has mostly registered a significant progress in its overall approach from the performance-related to the health-related fitness. Other advances are made in reduction and simplification of the

test items, relational evaluation of physical fitness and physical activity, application of the criterion-referenced standards for positive feedback and possibility of self-assessment. The purpose of the physical fitness evaluation should be to encourage children to achieve a higher level of physical fitness and to add or maintain physical activity in their lifestyle, from this reasons it should be a part of physical education classes.

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