



Academic Sports Scholars

ASSESSMENT OF PHYSICAL FITNESS IN CHILDREN AND ADOLESCENTS

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ABSTRACT

Existing proof proposes that physical wellness is a brilliant pointer of the soundness of kids and teenagers and is an indicator of wellbeing in later life. Besides, estimating, surveying and checking of physical wellness ought to be viewed as a general wellbeing need. Presently on the planet there are in excess of fifteen battery (gathering) tests for the appraisal of physical wellness in youngsters and youths. Not at all like most European nations which are as of now applying the EUROFIT battery of tests in schools, or the United States where the FITNESSGRAM battery test is being connected, Serbia does not have an unmistakably indicated and very much characterized system for testing physical wellness in youngsters and youths. The undeniable issue of testing physical wellness in youngsters and youths is the focal point of this audit. The fundamental thought is to, by demonstrating the most widely recognized battery of tests and the conditions in which they are acquired and being supplanted,

illuminate the idea and significance of testing, select the parts that are important to test and propose a substantial, solid and target gathering of tests for wellness in kids and teenagers. The examination of the most well-known gatherings of tests and new logical proof has featured the significance of assessment of the segments of wellbeing related wellness. ALPHA-FIT battery tests are proposed in physical training, which were



brought about as a major aspect of the ALPHA undertaking of the European Union (Assessing Levels of Physical Activity and Fitness).

KEYWORDS :health, testing, EUROFIT, FITNESSGRAM, ALPHA-FIT.

INTRODUCTION :

There are in excess of 15 battery tests for the evaluation of the physical wellness of youngsters and youths and a few key parts of physical wellness right now being used around the world (Castro-Pinero et al., 2010). Dissimilar to most European nations, which are employing the EUROFIT test battery in schools, and the U.S. where the FITNESSGRAM test battery is being utilized, Serbia does not have a plainly determined and very much characterized technique for testing the physical wellness of kids and teenagers. Instructors are coordinated to existing tests distributed in the Official Gazette and the EUROFIT battery of tests (Radojević, 2011). In spite of the fact that testing is given, there is no confirmation that it is executed and there are no brought together databases of the outcomes that can be later prepared and looked at. Then again, the commitment of the Institute of Sports Medicine and Sports of the Republic of Serbia is the intermittent testing or checking anthropometric attributes of kids, youth and grown-ups (Sport Act, 2011). Remembering that anthropological human space comprises of natural (morphological and physiological), mental (psychological and conative), sociological and a complex of engine exercises (Radojević, 2011), the inquiry is the thing that complex, or segments (measurements) of the complex the Institute should test. It is very plausible that this organization does not have adequate staff which can play out the testing of all the school youngsters, particularly not all the anthropological segments. The undeniable issue of testing physical wellness in youngsters and teenagers is the focal point of this survey. The essential thought is that, by demonstrating the most widely recognized battery of tests and the conditions that have emerged, we can clarify the idea and significance of testing, select the segments that are important to test and propose a substantial, dependable and target battery of tests to evaluate the physical type of youngsters and teenagers.

Physical wellness

Physical wellness is characterized as the capacity of a person to capability and proficiently perform regular errands without unnecessary exhaustion, and with enough vitality staying to appreciate investing free energy, and also to determine surprising circumstances of sudden and unfired-seen crisis (Council of Europe, 1983). It can be viewed as a coordinated measure of, if not all, at that point a large portion of the body capacities (muscle-skeletal, cardio-respiratory, hemato-circulatory, psycho-neurological, metabolic and endocrine), engaged with the execution of every day physical exercises as well as physical exercise (Ortega, Ruiz, Castillo and Sjöström, 2008b). In the Serbian dialect we utilize the term physical condition. In spite of the fact that the words are fundamentally equivalent words, it is generally trusted that the term condition applies just to competitors. Consequently, the term wellness stretches out the dialog to the whole populace, i.e. competitors and non-competitors.

There is no widespread agreement on the meaning of key parts (measurements) of physical wellness. Most are characterized by two goals: a) donning accomplishments or b) wellbeing. a) Fitness related with brandishing accomplishments alludes to the segments that are required in singular games rivalries, abilities tests or expert work. b) Fit-ness related with wellbeing (restorative shape) alludes to parts pertinent to a good wellbeing status. By wellbeing wellness we mean the capacity to perform day by day exercises with vitality attributes and limits that are related with a lower hazard for creating ceaseless illness and unexpected passing. It straightforwardly relies upon the level of physical action of the individual (Ruiz et al., 2009)

The cardio respiratory part is a standout amongst the most essential segments of wellbeing related wellness. It is an immediate marker of the physiological status of the individual. It mirrors the aggregate limit of the cardiovascular and respiratory frameworks to supply oxygen amid long haul

physical movement and mirrors the capacity to perform delayed strenuous exercise (Ruiz et al., 2006a).

The musculoskeletal segment incorporates an adjusted, solid working of the musculoskeletal framework. This requires a specific muscle or gathering of muscles can master duce power or torque compel (i.e. muscle quality) to withstand rehashed constrictions after some time or to keep up maximal deliberate compression for a drawn out period (i.e. solid continuance), and perform maximal, dynamic withdrawal of a muscle or gathering of muscles in a brief timeframe (the unstable power or strong power). Adaptability as a factor of the musculoskeletal segments is the capacity of a muscle or gathering of muscles to move unreservedly through a full scope of movement (Ruiz et al., 2009).

The morphological part alludes to the relative position of muscle, fat, bone, and other indispensable segments of the human creature (Ruiz et al., 2009). Body arrangement is fundamental for ideal wellbeing and athletic execution. Abundance greasy tissue over the optimal esteem opens a man to an expanded wellbeing danger of corpulence, cardiovascular malady, diabetes and threatening sicknesses (Ostojić et al., 2009), and keeps competitors from ideal execution in sports overwhelmed by running or bouncing exercises (Ostojić, 2003).

The engine segment (physical wellness related with aptitudes) comprises of variables of physical wellness that are related with enhanced donning accomplishments and engine abilities. People with a decent level of engine wellness will probably participate in customary physical movement, and in this manner may have a superior wellbeing related wellness. Engine wellness factors are estimated by measures of progress. These elements, for example, speed, change over acquired predisposition instead of sound ways of life, particularly among kids (Ruiz et al., 2009).

Diminished physical action or potentially physical wellness is related with the etiology and predominance of a few non-transferable maladies, for example, cardiovascular illness, diabetes, tumor, and their hazard factors (hypertension, hoisted glucose, and obesity), influencing the general soundness of individuals around the (World Health Organization, 2010). Physical action of direct to high power fortifies practical adjustment of the considerable number of tissues and organs of the body (i.e., enhanced shape), hence lessening the negative effect of way of life on degenerative and interminable maladies (Ruiz et al., 2006a). In a precise survey of the writing Ruiz et al. (2009) inferred that:

A) there is solid confirmation to propose that: I) larger amounts of cardio respiratory fitness in youth and pre-adulthood is related with a more beneficial cardiovascular profile further down the road; II) change of muscle quality from adolescence to immaturity is inversely connected with changes in all out fat cells (adipocytes); and III) a more advantageous body structure in youth and pre-adulthood is related with a more advantageous cardiovascular profile and a lower danger of death sometime down the road;

B) There is direct proof that: I) more elevated amounts of cardio respiratory wellness in youth and youthfulness lessen the danger of creating metabolic disorder and blood vessel divider solidness further down the road, II) expanded cardio respiratory wellness is conversely connected with changes in lipids and lipoproteins in the blood; III) enhancing muscle quality from youth to immaturity are contrarily connected with general corpulence, and IV) there is no relationship between's body arrangement (i.e., weight file - BMI) and agony in the lumbar locale of the back;

C) from a set number of studies, uncertain confirmation recommends that: I) changes in cardio respiratory wellness are related with changes in the thickness of the center piece of the course divider, extending the carotid supply route consistence, weight pick up, diabetes and metabolic disorder, II) changes in muscle quality are related with changes in systolic pulse and convergences of blood lipids

and lipoproteins, III) engine wellness in youth and puberty brings down cardiovascular hazard factors in later life, and IV) engine wellness in youth and youthfulness brings down the danger of lower back agony sometime down the road. Research results ought to be translated with alert due to the diverse tests used to evaluate physical wellness, follow-up time, age, test comes about, and also parasitic factor estimations (Ruiz et al., 2009). Expanding levels of physical movement in kids and youths enhance physical fit-ness. An abnormal state of wellness in adolescence positively affects wellbeing (Mesa et al., 2006, b) and has a drawn out impact further down the road (Ruiz et al., 2006b, c).

Appraisal of physical wellness

The outcomes and experience picked up from a few European investigations propose that physical frame is a key marker of the wellbeing of youngsters and teenagers (Ruiz et al., 2006) and is an indicator of wellbeing in later life (Ruiz et al., 2009). Normal observing of the level of physical movement and physical wellness of the whole populace ought to be viewed as a general wellbeing need (World Health Organization, 2010). Observing includes steady estimating as well as assessing (aggregate test) levels of physical action and physical fit-ness of the person and also the assessment of the information.

The level of physical movement, practically speaking, is for the most part evaluated by methods for question-naris or journals, on the whole called "self-reports of exercises", albeit specialized gadgets are being utilized increasingly as of late - accelerometers and pedometers (Vanhees et al., 2005). Physical wellness can impartially be estimated in the research facility. Be that as it may, the utilization of such tests is restricted by and by because of the need of complex instruments, qualified professionals and time requirements. Field tests give a sensible option be-cause they are additional time-proficient, requiring a lower cost of gear, and they are capable of testing more individuals in the meantime (Castro-Pinero et al., 2010). By testing physical wellness we really check the utilitarian status of the considerable number of frameworks of a man (Or-tea et al., 2008b).

Schools can assume a vital part in distinguishing youngsters with low physical shape by applying the institutionalized field test. They can likewise elevate positive conduct identified with an expansion in wellness (España-Romero et al., 2010), and to advance great wellbeing propensities by empowering kids' exercises with a specific spotlight on the power of the exercises (Ortega et al., 2008b). As the authoritative structures and substance of physical instruction have dependably relied upon the level of improvement of a specific culture and environ-met being considered (Dedaj, 2011), it ought not amaze us that numerous nations have rec-composed the significance of estimating and evaluating physical wellness and have incorporated the required battery of tests in their training procedure (Table 1).

Battery tests connected in Serbian schools were created by the Yugoslav Institute for Sports Medicine and Sports in the late eighties. The framework was utilitarian until the point when 1999 when it quit working. At long last, in 2009, after a couple of sporadic endeavors, the Institute of Sport and Sports Medicine tried 878 students with a changed Euro fit battery test which did exclude estimation of cardio-respiratory perseverance, and skin overlap thickness (Gaelic, 2009). Subsequent to inspecting the new logical confirmation, a portion of the specified battery tests don't meet the fundamental psychometric properties (Castro-Pinero et al., 2010; Ruiz et al., 2011).

Table 1. Existing field-based physical fitness test batteries for children and adolescents (Ruiz et al., 2011; according to: Castro-Pinero et al., 2010).

Age	Acronym	Society/Organization	State/Region
6-18	EUROFIT	Council of Europe Committee for the Development of Sport	Europe
5-17	FITNESSGRAM	The Cooper Institute	USA
6-17	PCHF	The President's Council on Physical Fitness and Sports/American Association for Health, Physical Education, and Recreation (AAHPER)	USA
6-17	PCPF	The President's Council on Physical Fitness and Sports/American Association for Health, Physical Education, and Recreation	USA
6-17	AAUTB	Amateur Athletic Union Test Battery. Chrysler Foundation/Amateur Athletic Union	USA
6-17	YMCA YFT	YMCA Youth Fitness Test	USA
5-17	NYPFP	National Youth Physical Program. The United States Marines Youth Foundation	USA
5-18	HRFT	Health-Related Fitness Test, American Association for Health, Physical Education, and Recreation (AAHPER)	USA
5-18	Physical Best	American Association for Health, Physical Education, and Recreation (AAHPER)	USA
9-19	IPFT	International Physical Fitness Test (United States Sports Academic/General Organization of Youth and Sport of Bahrain)	USA
7-69	CAHPER-FPT II	Fitness Performance Test II. Canadian Association for Health, Physical Education and Recreation (CAHPER)	Canada
15-69	CPAFLA	The Canadian Physical Activity, Fitness & Lifestyle Approach (Canadian Society for Exercise Physiology)	Canada
9-19+	NFTP-PRC	National Fitness Test Program in the Popular Republic China (China's National Sport and Physical Education Committee)	China
6-12	NZFT	New Zealand Fitness Test. Rusell/Department of Education	New Zealand
9-19	AFEA	Australian Fitness Education Award. The Australian Council for Health, Education and Recreation, ACHER	Australia

EUROFIT battery of test

The Committee of Experts on Sports Research propelled the testing of physical wellness and the foundation of regulating information for European understudies in 1977 out of the blue. The fundamental targets included:

- a) concurrence on joint battery of tests in Europe
- b) help in surveying the viability of physical training in schools
- c) help in estimating the wellness of school kids.

The set objectives originated from the conclusion that because of the changed way of life later on, molded by industrialization and mechanization (decreased physical action and an expanded inactive way of life), youngsters and grown-ups will experience issues fathoming regular difficulties. Therefore, physical wellness will be diminished, which will have a negative effect, especially on wellbeing status. In this manner, physical exercise won't involve individual decision, only for entertainment only and joy, yet a need for consistently, smooth capacity (Council of Europe, 1983). We see that the conclusion remains constant.

After a few gatherings of specialists in 1983, the impermanent manual "Physical wellness testing EUROFIT - trial battery" was created. After four years, the Committee of Ministers of the Council of Europe received a proposal for the utilization of the EUROFIT battery of tests to survey the physical wellness of kids and the youthful. It was recommended to every single European nation to receive this battery of tests, since: a) physical wellness is an essential segment to wear and physical instruction as well as wellbeing and wellbeing training, and that it is vital for the condition of general prosperity; b) that ace-rate and solid measures of physical wellness are of incredible significance for people, educators and strategy producers keeping in mind the end goal to enhance the level of general or individual wellness; c) that instructing and finding out about physical wellness can make a vital commitment to the self-learning and inspiration of the person to stay dynamic, and on the educational process all in all; d) that the testing, under controlled conditions, will give important information which will be utilized as a part of the production of a national arrangement for kids' wellbeing, sustenance, physical training and game; e) that EUROFIT gives a basic and viable arrangement of tests reasonable for across the board use among school kids, and that it is planned, in addition to other things, to accomplish set objectives, giving data on the physical wellness of school kids in each state (Council of Europe, 1987).

As per the embraced proposals, a Handbook for the EUROFIT trial of physical wellness manual was made which was planned for analysts (instructors, teachers). The EUROFIT battery of tests was acknowledged by the greater part of European nations, and it is likewise utilized as a part of nations outside Europe. The tests are basic, intended for mass use in the field, and in the utilization of consistent physical training classes. In light of the information acquired by this battery of tests (Table 2) the physical state of kids and youngsters is evaluated in connection to their wellbeing (Council of Europe, 1988). Testing on this model does not remove all the inactive measurements of engine space, however depends on a gauge of parts firmly identified with wellbeing.

Table 2. Eurofit tests of physical fitness (Council of Europe, 1987).

Dimension	Factor	Factor Eurofit Test
Cardio-respiratory endurance	Cardio-respiratory endurance	Endurance shuttle run (ESR) Bicycle ergometer test (PWC 170)
Strength	Static strength	Hand grip (HGR)
Muscular endurance	Explosive power	Standing broad jump (SBJ)
	Functional strength	Bent arm hang (BAH)
	Trunk strength	Sit-ups (SUP)
Speed	Running speed - agility	Shuttle run: 10 x 5 meters (SHR)
	Speed of lumb movement	Plate tapping (PLT)
Flexibility	Flexibility	Sit and reach (SAR)
Balance	Total body balance	Flamingo balance (FLB)
Anthropometric measures	Height (cm):	
	Weight (kg):	
	Body fat (5 skinfolds: biceps; triceps; subscapular, suprailiac, calf):	
Identification data	Age (years, months):	
	Sex:	

FITNESSGRAM battery of tests

The FITNESSGRAM battery of tests contains a program for the appraisal of physical wellness of youngsters concerning wellbeing. It incorporates an assortment of tests intended to assess: a) cardiovascular perseverance, b) body structure, c) muscle quality, d) muscle solidness and e) adaptability (Table 3). The FITNESSGRAM battery test utilizes the model that demonstrates wellbeing gauges and the norms related with great wellbeing. In particular, the principles depend on what sort of wellness is important to keep a youngster healthy.

The consequences of past logical research were utilized to characterize the wellness required to meet the essential wellbeing prerequisites and to characterize "physical wellness in a sound zone". With it, it shows the scope of results identified with great wellbeing. Results beneath this zone are delegated "require change", and advise that it is important to work out so as to set the outcomes in the solid zone (Pangrazi and Corbin, 2008).

Table 3. Additions and Deletions to the FITNESSGRAM Health-Related Fitness Test Battery 1987–2005 (Plowman et al., 2008).

Fitness component	Test item	Year included	Year deleted
Aerobic Capacity	One Mile Run/Walk	1987	
	PACER	1992	
	One Mile Walk Test	1999	
Body Composition	Skinfold Measure of % Body Fat	1987	
	Body Mass Index (height & weight)	1987	
	Portable Bioelectric Impedance Analyzers	2004	
Muscular Strength & Endurance	Modified Sit-up Test	1987	1992
	Curl-up Test	1992	
	Pull-up	1987	2005
	Flexed Arm Hang	1987	
	90° Push-up	1992	
	Modified Pull-up	1992	
	Trunk Lift	1992	
Flexibility	Sit-and-Reach Test	1987	1992
	Back-Saver Sit-and-Reach Test	1992	
	Shoulder Stretch	1992	
Other Items	Shuttle Run (K-3)	1987	1992

The FITNESSGRAM idea started in 1977 in America. Its creation is identified with the executive of the Health and Physical Education from Texas, Charles M. Sterling, who, in-retested in the physical type of his understudies started to make a "report card". As a team with his instructors he performed tests for the evaluation of engine capacities of understudies and kept a record in the principle school utilizing PC programming which was produced for the incorporation of the individual report cards. From the snapshot of its creation, the FITNESSGRAM program developed from a report card about the engine capacities of understudies into customized reports about physical wellness and physical action of understudies identified with their wellbeing. Today the FITNESSGRAM alongside self-writes about exercises – the ACTIVITYGRAM is a product framework for instructive evaluation and revealing utilized by a great many instructors for many youngsters in schools the world over. By observing structures identified with wellbeing and physical action after some time we pick up the data important to make customized reports for kids, guardians, and school overseers (Plowman et al., 2008).

The principle reason for these batteries of tests is to advance long lasting physical wellness, extract and conduct that strengthens wellbeing. Results got from the tests are a beginning stage from which: a) youngsters obtain information about their wellbeing, and additionally techniques and manners by which to reinforce and safeguard it, b) guardians of kids become acquainted with the wellness of their kids and show the means to be taken in arranging exercises with kids, c) the educators and others get comfortable with the wellness of understudies and subsequently plan the physical instruction educational programs (Pangrazi and Corbin, 2008).

The ALPHA-FIT battery of tests

Most battery field tests for the appraisal of wellness that are accessible (see Table 1) were produced for kids and teenagers in the United States. In Europe, the EUROFIT has exclusively been connected for a long time. The European Union, over the most recent couple of years, financed various

container European activities with a specific end goal to reinforce and save the strength of youngsters and teenagers (Ruiz et al., 2006). One of the last ones, ALPHA, was propelled with a plan to give an arrangement of instruments to evaluating levels of physical movement and physical wellness equivalently inside the European Union nations. Following quite a while of studious and orderly examinations that included in excess of 10,000 patients - youngsters and teenagers in Europe, an ALPHA-FIT battery of tests for the assessment of physical wellness identified with wellbeing was characterized.

The battery of tests comprises of legitimate, solid, reasonable and secure field tests that can be utilized to screen general wellbeing. Construct exclusively in light of new logical proof from mongrel recently accessible transversal and longitudinal investigates on the planet, the ALPHA-FIT battery test incorporates the accompanying tests: (1) the 20 m stretched out keep running between cones to assess cardio respiratory wellness, (2) the hand hold, and (3) the standing bounce to assess solid skeletal wellness, and (4) the weight list BMI, (5) midriff size and (6) skin overlay thickness (triceps and subscapular skin crease) for body piece appraisal. Plausibility ponders in the school condition show that the time required for the implementation of these tests in a gathering of 20 understudies with one educator is around 2 hours and 30 minutes, or three classes of physical instruction of roughly 55 min. At the point when there are time imperatives, as the case might be in schools, tests incorporated into high need ALPHA-FIT are suggested. It incorporates all types of tests in view of proof other than skin overlap thickness estimations. The time required for the execution of the battery of tests for 20 understudies with one instructor is under 2 hours (i.e., two classes of around 55 min). At the point when there are no due dates, as may be the situation in sports clubs or amid re-look, it is prescribed to utilize the expanded ALPHA-FIT, which incorporates an extra test: stick running 4 × 10 m, to evaluate engine shape (Ruiz et al., 2011). This test is a marker of speed and dexterity, and is related with bone mass in youngsters (Ortega et al., 2008a). Be that as it may, there is no proof of its instinctive and basis legitimacy (Ruiz et al., 2011).

CONCLUSION

Physical wellness is a critical marker of the strength of youngsters and teenagers and furthermore a decent indicator of wellbeing in later life. Lately enthusiasm for the assessment of shape has expanded in the general population space. As opposed to the conventional practice tests which evaluated the inactive measurements of engine space (physical wellness so as to be fruitful), new logical proof propose and point to the approval of the segment estimate wellness that are specifically identified with wellbeing (physical wellness with the end goal of wellbeing). Numerous developed nations have incorporated this gathering of tests in their instructive techniques. This certainly does not decrease the need to survey engine abilities in kids and teenagers. Remembering that the level of engine aptitudes relies upon achievement in sports exhibitions or rivalries, they ought to be and must be evaluated, however inside games clubs, school sports segments, the Department of Sport and Sports Medicine or logical research. Notwithstanding, given the significance of the different segments based on which one can decide the wellbeing status of youngsters and youths, the appraisal of physical wellness ought to be actualized in schools as a major aspect of physical training classes. The information got by testing would be utilized by: 1) the members - understudies would know about their physical wellness; subsequently, their educators would need to instruct the techniques and approaches to fortify and protect their wellness, and furthermore wellbeing, 2) instructors by establishing out their understudies' wellness levels could outline singular projects, and 3) guardians, who might think more about the exercises of their youngsters (affected when spent at the PC or TV, and

energize association in sports clubs and different types of physical action), 4) "society", in the arranging or plan of more compelling methodologies for the avoidance of wellbeing.

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