METROLOGICAL REQUIREMENTS FOR THE MONITORING OF THE PHYSICAL ABILITY OF ATHLETES

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ANNOTATION

The work was discussed scientific approaches to monitoring the physical fitness of athletes. The author examines in detail the fundamental requirements of the mathematical theory of tests, in particular the theory of test standardization. The obtained experimental materials provide a basis for the statement about the need to introduce into the training process a more improved method of differentiated monitoring of athletes' physical fitness.

Key words: monitoring, in formativeness, reliability, objectivity, testing, physical fitness, athletes, control exercises, theory of standardization, mathematical theory of tests.

INTRODUCTION

The success of monitoring the physical fitness of athletes to a greater extent depends on the choice of control exercises. Nevertheless, scientific approaches to monitoring an athlete's motor fitness have been developing for several decades, and during this time a number of principles have been developed that underlie any testing system.

Since the selection of tests for monitoring physical fitness is carried out on the basis of any logical considerations (for example, tests should be accessible to the capabilities of the subjects, simple, acceptable for research), and hypotheses put forward, which, of course, may be more or less reasonable. In order to improve the effectiveness of the test monitoring system, it is necessary to use the fundamental requirements of the mathematical theory of tests.

The theory of standardization of tests presupposes, before the practical use of exercises, the need to analyze them for *information content, reproducibility and objectivity*. In each case, when developing one or another new test, all these properties are carefully considered, and then subjected to independent verification by experts, and only in the case of wide recognition, the tests are included in the arsenal of researchers and practitioners [2]. This is probably why the number of common tests is not so great, while the total number of developed and ever used is many hundreds.

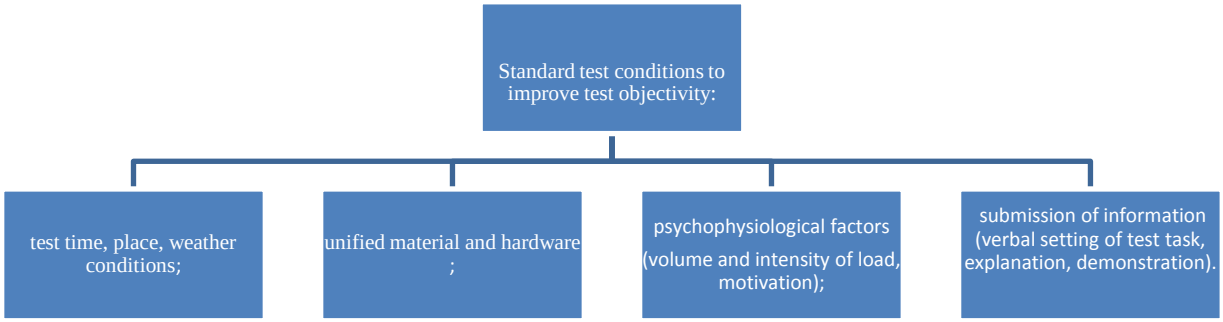
*The Informativeness*of a test is the degree of accuracy with which it measures an estimated motor ability or skill. In the literature, the term *"validity"* is used instead of the word *" Informativeness."* In fact, speaking of informativeness, the researcher answers two questions; which of measures this particular test and what is the degree of accuracy of the measurement. There are several types of informativeness: logical (containing solid), empirical (based on experimental data) and predictor.

Informativeness is the most important criterion for the standardization of tests, which determines the compliance of the control exercise with the assessed physical quality. *Test reliability refers* to the degree of accuracy with which it evaluates a certain motor ability regardless of the requirements of the person who evaluates it. Tests can be considered reliable, with the help of which, when retesting the same test subjects, it is possible to record the same or similar results. Reliability of test is determined by means of correlation-statistical analysis by calculation of coefficient on duty. Various methods are used, on the basis of which the reliability of the test is judged.

Test stability is based on the relationship between the first and second attempts repeated after a certain time in the same catch by the same experimenter. *The stability of the test* depends on the type of test, the age and sex of the subjects tested, the time interval between the test and the retest.

The equivalence of the test lies in the correlation of the test result with the re results of other tests of the same type. For example, when you need to choose which test more adequately reflects speed abilities: running 30, 60 or 100 meters.

Tests should be tested for objectivity, which implies the unambiguity of the results of this exercise, obtained on the same subjects by different experimenters (teachers, judges, experts). However, the coincidence of the results in different experimenters does not yet indicate objectivity, since they can be mistaken, distorting the objective truth. It is more correct to talk about the consistency of re-results of judges, experimenters in assessing sports achievements. To improve test objectivity, the standard test conditions must be met (Table 1).



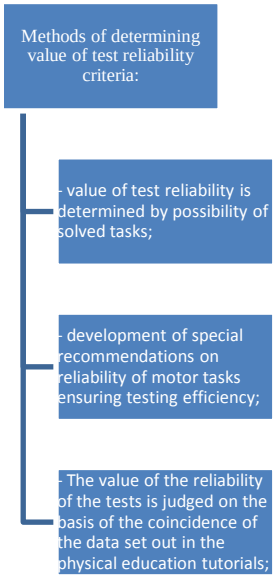
Tab.1. Required standard test conditions to improve the objectivity of physical fitness monitoring

In general, as experts note, the reliability of tests can be improved in various ways: by stricter testing standards, by increasing the number of subjects, by increasing the number of evaluators, (judges, experts), by increasing the consistency of their opinions [1, 4]. There are no fixed test reliability values. In most cases, follow-up recommendations; 0.99 - 0.95 - excellent reliability; 0.94 - 0.90 - good; 0.89-0.80 acceptable; 0.79 - 0.70 - bad; 0.69 to 0.60 for indie species estimates is questionable, the test is only suitable for characterizing a group of subjects.

Normalization, *comparability* and *cost-effectiveness* were important additional test criteria.

The rationing was that standards of particular relevance to practice could be created from the results of testing. With the delivery of the test, it is possible to compare the results obtained by one or more forms of parallel tests. In practical terms, the use of comparable motor tests reduces the likelihood that, as a result of regular application of the same test, not only is the level of ability assessed, but the degree of skill. At the same time, comparable test results increase the accuracy of conclusions. The essence of economy as a criterion of test quality is that conducting a test does not require long time, high material costs and the participation of many assistants.

Analysis of data published in the special literature shows that at present there is no single point of view on the value of Cree reliability criteria [2, 3, 5]. This makes it difficult to create an effective monitoring system that includes common criteria for assessing a person's physical fitness. Different ways of overcoming the situation are applied (tab.2).



Tab. 2. Methods of determining the value of test reliability criteria.

The value of the test consistency coefficient in the range of 0.80 to 0.89 can be estimated as satisfactory. Unfortunately, we have to state that part of the exercises that teachers use in assessing the physical fitness of athletes did not pass the test for compliance with the requirement of the standardization criterion.

The pedagogical approach in monitoring is used when determining the level of development of physical qualities or skills. However, not all exercises met the stringent test requirements, which significantly narrowed the range of exercises that could serve as an objective assessment of motor capabilities. Among the most recently used exercises-tests should be mentioned such as:

- running 30 or 100 meters from a high start;
- number of pulls to failure;
- tilting the torso forward;
- 3x10 shuttle run;
- running for 6-minute .

Most of the other tests raise various objections among individual specialists, either because of their lack of efficiency, or because of difficulties in standardizing the conditions of conduct, or because of the significant influence of the technique of movements on the result, which does not reveal the level of development of a particular motor quality in its pure form [2, 4].

The contradictions of scientists in the standardization of physical fitness tests make obvious the need for further accumulation of exponential material characterizing the standardization of a wide range of motor tasks from the practice of athletes of various ages. This will unify a variety of physical fitness tests and create an effective monitoring system.

The results of the studies show that a number of tests (tilting of the tulo-whisky forward, 6-minute running, pulling on a high crossbar) have an acceptable and good reliability during the analyzed period (r = 0.80 - 0.94).

In certain age periods, the indicators of other tests (running 30 m from the start, running 30 m on the move, throwing the ball at the range) have a moderate or low reproducibility (r = 0.67- 0.73), which is primarily explained by the internal structure of the exercises, the technique of movements, the age of those involved. So, in throwing a

small ball at a range with one hand, the wide variability of movements leads to different results in repeated attempts and, accordingly, a drop in the reliability of the indicators (r = 0.63 - 0.72).

With age, the reliability factors of most exercises increase slightly, indicating greater stability of the technical characteristics analyzed for motor actions in adult athletes. This is especially manifested in running 30 m from the start and running 30 m off (r = 0.73-0.85), in long jump from place (r = 0.81-0.85) in subjects with age, the reproducibility of exercises increases.

Reproducibility of the results of short-distance running (60 and 100 m) increases with age (r = from 0.81 to 0.86). It is possible to note the same trend in shuttle running 3x10 m. In long jumps from a run, the output of the results decreases with age (r = from 0.84 to 0.71), and in a 6-minute run it first rises and then slightly decreases.

The analysis of informativenesscoefficients shows that showing the values of the analyzed tests significantly affect the sports performance of athletics exercises. In the age range from 9-17 years, the performance of running at 30 m, the range of jumping from a place has a significant impact on the results in running at 100 m and in long jumps. The performance of a 6-minute run is closely related to the time of running at 1000 m.

Thus, the introduction of new forms of operational monitoring at training sessions is not bypassed in the sports training system. The obtained experimental materials give the basis for approval of necessity of introduction into training process of new methodology of differentiated monitoring of physical fitness of athletes. The obtained data of the present study can become the basis for applying new approaches in the construction of the training process, and in the development of program and regulatory requirements for physical fitness - one of the promising directions.

The results of our studies show that the applied tests characterizing the level of physical fitness are mainly consistent with the requirements of the theory of standardization and can be used in school sports practice.

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