The use of fitness testing in primary schools

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This paper, whilst proposing that fitness tests should be used more extensively in schools at both primary and secondary levels, advocates the need to identify a clear purpose behind the testing. It also emphasises the importance of holding this purpose in mind (along with other more general restrictions, which impose the need to employ relatively simple tests) when deciding what tests to employ. This paper is intended to be of general interest, rather than providing specific information, and it therefore takes the form of a comment on the issue as opposed to an account of original research. A battery of simple fitness tests, which has been used in two primary schools by the author, is also included.

It would seem fair to suggest that there is, generally speaking, some interest in the idea of fitness testing in schools (1, 2, 7, 9). This fact is also evidenced by the increasing amount of fitness testing equipment being advertised. However, although isolated examples may exist, little seems to have been done in concrete terms to introduce it into schools. This situation undoubtedly results from a number of factors, one of which may be the need for a clear idea about the real reasons for employing fitness testing, so that it is not seen to be considered only because of its apparent 'fashionability'.

This paper will concern itself with possible reasons for employing fitness testing in schools as a continuing activity; the broad implications that these reasons have on what sort of tests are employed, and what peripheral activities these may involve.

Fitness testing could be initiated in schools for a variety of reasons including:

1. Assessing 'absolute' fitness levels of British schoolchildren — i.e., as part of a national survey.
2. As an intrinsically worthwhile activity, or because it may act to motivate participants in terms of increasing individual activity levels.
3. As a means of providing a physical activity profile of pupils — a quantitative record for PE.
4. As a means of identifying potential for various sporting roles.
5. As an aid for teaching about health-related aspects of exercise.

1. 'Absolute' fitness levels
It is not my intention to discuss the use of fitness tests as part of a survey of the school population's fitness levels. Although it is not unimportant to assess fitness levels of British schoolchildren, such an exercise will be a 'one-off' event, requiring the development of a validated and relatively extensive battery of fitness tests, followed by its application in a controlled manner by an external group of 'sports scientists' (the latter being necessary if only because of the time such a survey would require).

2. A 'worthwhile activity'
Godin et al (6), studying the Canadian Home Fitness Test, suggest that the original aim of the Test was to motivate, although their study failed to find any significant effect from the use of the Test, with other simple fitness assessments and subsequent counselling, on the motivation of a group of mainly white-collar adult volunteers. They go on to suggest, though, that a more important role of fitness tests will be to demonstrate a response to training, thereby reinforcing the initial intent (ref. 6, page 244).

A similar point is made in an appendix to a study carried out by McIntosh & Charlton on the Sports Council's Sport for All campaign. They suggest that one reason for testing fitness is the motivation of the individual (ref. 8, page 181) and consider that the most valuable feature of simple fitness tests... is that there is almost a guarantee of improvement in performance on repetition of the tests after a short programme of exercise (Ibid). However, no evidence is provided concerning the motivational effect of fitness testing.

The Godin study involved adult volunteers. In schools the element of choice will only be present if fitness tests are used within an option-based system. Fitness testing supported by general conditioning, as opposed to specific sports-oriented training, may provide an alternative to traditional and even non-traditional sports-based curricula, especially if the pupils in question are concerned with their body-image (11); however, it would seem more appropriate for such testing to supplement a sports-oriented programme.

Worsley & Coonan (11) carried out some research investigating changes in physical health status and body knowledge in 10-year-old Australian schoolchildren following certain teaching and activity programmes. They found that in terms of body knowledge, behavioural change, and fitness levels, it was best to employ a mixture of health lessons and daily PE lessons, plus self-monitoring in the areas of physical activity and diet, including a battery of fitness tests.

So, although it is assumed that fitness testing can act to motivate individuals in terms of participation in physical activity, in reality there is little empirical evidence to support this assumption. This may be because the link is regarded as being too obvious to warrant extensive research into it! Certainly the incitement of occasional fitness testing into a PE programme could provide variety, stimulate interest amongst some pupils, and provide an extra form of extrinsic motivation. It is worth noting a finding of Worsley & Coonan's, however, that too frequent monitoring of physical activities can produce boredom and lessening of performance (ref. 11, page 119).

3. A physical activity profile
The third reason suggested for employing fitness testing in schools was to provide a physical activity profile of pupils. This profile could then act as the basis of a more objective means of assessment of pupils' ability than occurs in the majority of schools. Obviously, assessment would not be made purely on the basis of performance over a range of tests: a record could also be kept of pupils' participation in physical activity outside normal lessons in school, and outside school.

The information which could be gleaned from such records is potentially of greater use than merely as a record of individual achievement. It could be used to evaluate, and open up to question, the role of the school in the provision of extra-curricular opportunities for physical activity; it could also identify clubs within the community with which it might be beneficial to promote links. In addition, once recording has been carried out over a number of years, with different pupils, it might become possible to use the data in a comparative manner: to compare both achievement over the range of tests employed and levels of physical activity.
Care should be taken, however, not to become too analytical in the use of fitness testing in this way, especially with younger children. There is a real danger that the enjoyment may be taken out of playing the game if testing and the results of the tests are taken too seriously.

5. Exercise as a health-related activity

If this is to be the aim of fitness testing, the tests selected should be able to illustrate whatever benefits of exercise are being suggested by the course work it supports. The tests should also be integrated with the course work, not used as an ‘add-on’ piece of practical work — which is perhaps not always the case with all practical work undertaken in schools. As a result of the course work and fitness testing, the pupils should be able to make an approximate evaluation of their own fitness levels, and be able to decide for themselves what action they can take if they want to maintain or improve their level of fitness (3, 5, 10, 11). If this is to be done, a certain core of information will be required — including the benefits to be expected from a variety of activities, and what facilities are offered by the community and school to highlight unsuspected abilities of individuals, or in identifying individuals with low levels of activity or fitness who may need...

4. Potential sporting ability

This use of fitness testing would require teachers in charge of a team to define a number of characteristics that they consider to be desirable for different positions in the team. A battery of fitness and skill tests could then be used to aid identification of appropriate players. These may include tests which are specific to the particular sport involved, but should also include general fitness. The battery of tests would obviously only supplement general observation by the teacher of individuals; but the results of the tests may provide some interesting suggestions about positions, or they could be used to suggest ways in which individuals might improve their game by utilising specific training drills.

Some general points

Whatever the reason for employing fitness testing in schools, a basic core of tests covering tests related to stamina, strength and suppleness should be included. The actual tests employed should be selected with the common situation in mind as to whether the pupils, in the event of employment, are to be expected to be used in, and the equipment at hand (or likely to be available) in mind.

Of course, it may be decided to carry out fitness testing in schools for a combination of the suggested reasons, or for other reasons, which may require other considerations to be taken into account —

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Some simple fitness tests for use in primary schools

The battery of tests outlined here was used by the author in two primary schools to introduce the idea of a connection between regular physical activity and the maintenance of good health. A questionnaire on physical activity levels, and a handout sheet, were also used to supplement a semi-structured discussion.

Test 1: 40 metre sprint

Pupils sprint between two marked points, being timed by a partner. [Performance in pairs or small groups depending upon the availability of stopwatches — pupils may use their own stopwatches.] The test is to be completed in a standing position, with the hands on hips. [Performance in pairs, assuming space permits.]

Test 2: standing long jump

Performed on concrete to facilitate measurement — the pupil jumps from a marked line and a partner places a chalk mark at the back of the trailing foot. After three attempts the best jump is measured with a tape measure or ruler. [Performance in pairs or small groups depending upon the availability of tape measures/rulers.]

Test 3: 300 metre shuttle run

Pupils run around two marked points, 50 metres apart (if space allows) for a total of 300 metres, being timed by a partner. In order to demonstrate how the basic speed is measured, the race is carried out in reverse order to the longer shuttle run, an 'endurance ratio' (time for 50m divided by time for 300m) calculated. This may prove a better measure of endurance than a raw time, as it attempts to take some account of an individual's basic running ability. [Group size as for test 1.]

Test 4: standing high jump

Performed against a wall, the pupil's height is measured by placing the top of the head against the wall, making sure the back is straight and the soles of the feet are flat on the floor. A chalk mark is made, and the height of the pupil is measured from the mark to the floor. [Group size dependent upon the number of benches.]

Test 5: 30 second press-ups

The number of press-ups achieved in 30 seconds is counted by a partner, one press-up being counted every time the chest of the subject touches the fist of the counter, on the floor under the subject's chest. [Performance in pairs, assuming space permits.]

Test 6: 30 second sit-ups

The number of bent knee sit-ups achieved in 30 seconds is counted by a partner. [Group size as for test 5.]

Test 7: flexibility

This test involves the measurement on a four point scale of the ability of pupils to bend forward with straight legs. The following scale has been adopted: (1) if most of the hands including the palms touch the ground; (2) if most of the fingers touch the ground, (3) if the tip of the fingers touch the ground, (4) if no part of the hands touch the ground; pupils should be able to hold the position for at least 30 seconds. [Performance in pairs or individually.]

Test 8: increase in pulse

This involves teaching pupils how to take their own, or a partner’s pulse. Having taken their resting pulse rate, the pupils perform a step test on benches. Using a metronome or a song with a regular fast beat ('Feed me' by Blancmange, which has a beat of two beats per second was used by the author) the pupils sit up and down on the benches in time with the beat for three minutes. After three minutes the pupils sit down and, when instructed by the teacher (as a group, as all the pupils have found their pulses), take their pulse for ten seconds. The change in pulse can be expressed as a raw difference or as a percentage increase. Alternatively the measure used could be just the pulse rate after three minutes. [Group size dependent upon the number of benches.]
there may even be problems in secondary schools of overlap between subject areas. What I have attempted to imply is that the reason for employing fitness testing should be clearly thought out, as it may dictate a number of specific considerations that will have to be taken into account.

Some general problems arise from attempting to perform fitness testing in schools. These stem from the fact that a relatively large group of subjects will have to be dealt with in the same limited time. Testing pupils one at a time, or even in small groups, is not a realistic option in schools, especially it testing is going to be a continual activity — even if it is only carried out once or twice a year. The questions, therefore, which have to be asked about any proposed tests, include the following:

- Can the test be done with a large group, or with the pupils in the group performing the tests as individuals, in pairs or in small groups?
- Is enough equipment available for the group or can the test be adapted for use with whatever equipment is available?
- Is the test acceptably accurate? 'Absolute' accuracy is not essential, but the test has to be worth doing (cf Armstrong, ref. 1, who also details the problems with respect to the accuracy of performance tests in this issue of Education and Health).

These questions, it is suggested, favour relatively simple tests as opposed to more elaborate ones which may require greater resources in terms of both time and equipment.

A further and perhaps slightly less general question is the frequency with which the testing should be repeated. As was stated above, Worsley & Coonan (11) found that boredom and even lessening of performance could result from too frequent monitoring. Although the reason for employing the tests may have some influence on their frequency and timing, it would seem sufficient to carry them out either near the beginning and end of the school year or perhaps once a term.

Many of the points made in this paper could be regarded as being fairly obvious, but sometimes it is easy to overlook the obvious. If fitness testing — for whatever reason it is being employed — is going to be effective, it is important to get as many aspects as possible clarified in the planning stage, to avoid loss of enthusiasm by both pupils and teachers.

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References

What does 'fitness testing' really test?

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The author suggests that differences in performance in fitness tests between pupils in a single year group are closely linked to physical maturity. If this fact is ignored, unjustified assumptions about levels of fitness will be made. While being of great potential value in raising levels of knowledge and awareness, 'performance tests simply determine the obvious, and do no more than distinguish the mature child from the immature child'.

The use of performance tests of physical fitness such as those described by Christopher Yule elsewhere in the previous article may be justified from a pedagogical or psychological viewpoint. They may be valuable teaching aids in stimulating interests, introducing new concepts in health related fitness, or in helping children to understand their bodies. They are not, however, generally based on sound physiological foundations, and are of little value in the complex analysis and assessment of children's fitness. Much of the data is meaningless, not capable of rigorous interpretation and more likely to cause confusion than solve problems.

Performance tests are primarily dependent upon motivation and maturation. Several writers emphasise the use of means, standard deviations or norm tables to compare subjects — but how can tables constructed on the basis of chronological age provide worthwhile information about children at different levels of skeletal and biological maturation? For example, in any 3rd-year class of boys, 20% of the group may be pre-pubertal, 20% at puberty stage 5, and the rest somewhere in between. We have documented the effects of growth and maturation on performance elsewhere (1), but in order to clarify the role of testing I will outline some of the major factors in relation to Wibberley's tests.

Muscular strength, endurance, and power output (tests 2, 4, 5 and 6) are specific to each muscle group, and there is no single test which is able accurately to define an individual's muscular fitness. Tests such as sit-ups and press-ups are notorious for their relative upon motivation! Sexually immature children have low levels of male hormones (androgens), and maximal strength-gaining potential is not possible until adult levels of androgens are achieved. The extent of the development and performance of muscle is also dependent on the relative maturation of the nervous system, which is not complete until sexual maturity is reached. The immature child cannot be expected to respond to strength training, or achieve the same performances, as the mature child. When this information is combined with the fact that immature children also have a lower concentration of the glycolytic rate-limiting enzyme phosphofructokinase (PFK), the value of comparing the muscular fitness of children of the same chronological age but different biological age is put into perspective.