

MINIMUM MUSCULAR FITNESS IN SCHOOL CHILDREN

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Abstract : Two hundred and fifty school boys from Lonavla were randomly selected and tested with Kraus-Weber tests for their minimum muscular fitness. The results revealed that 20.8 per cent boys failed in the tests. Multiple failures were 4.8 percent while flexibility failures alone were 11.6 percent. Boys at the age of 15 years failed more in flexibility test. Boys at the age of 10 years had the maximum percentage of failures to the extent of 38.5. Inclusion of Yogasanas in the programme of physical activities of the school is suggested for the improvement of the status of the failures.

Key words : minimum muscular fitness yoga k-w test

INTRODUCTION

Muscular fitness is one of the most important components of physical fitness. Many of the health hazards and most of the disorders could be checked by maintaining a certain level of fitness. A level of strength and flexibility measure of particular key muscular groups is necessary for the function of the body below which the health of the individual seems to be in danger. A battery of six muscular strength tests was prepared by Kraus and Hirschland (1) after 18 years of clinical experience and is a pass or fail test with one 'fail' on any of its six test items constituting a whole-test failure. It was reported (2) that those who failed in these tests appeared to be sick, emotionally

imbalanced and having constant strain in them.

The early work of Kraus and Hirschland (3) showed that 56.6 per cent of 4,458 American children and 8.0 per cent of 1,987 European children failed in one or more of the six test items. Repeat study by the same workers (1) revealed that 57.7 per cent of 4,264 American children 8.7 per cent of 2,870 European children failed in one or more of the six test-items. Further studies showed that flexibility item causes the greatest percentage of failures (4, 5, 6, 7). Girls were found more muscularly fit and more flexible than boys (4, 5, 6). Flexibility failures increased as age increased (4, 6). Back-strength test-items were not discriminative (4, 6, 8). Most strength

failures were caused by abdominal weakness (5, 6, 9). Failures of three test-items indicated signs of maladjustment (4). In the first survey of minimum muscular fitness in 375 school children of Lonavla, the percentage of failures reported was 40.3, multiple failures to the extent of 63.9 per cent (11). Further study of Moorthy (12) on 1000 school children reported 84.8 per cent failures.

The Kraus-Weber tests used in the above mentioned studies have been proved as a screening device to mark abnormal children.

The purpose of this study was to determine the present status of the school children of Lonavla regarding the minimum muscular fitness and to compare the results with the previous studies reported.

METHODS

The subjects included in this study were 250 boys selected from fifth standard to ninth standard reading at the local Dr. B. N. Purandare High School, Lonavla. Every third boy was selected from the attendance Register of each section of the class. Their agewise physical characteristics means were as shown in Table I.

The Kraus-Weber tests were administered to the boys in their school according to the procedure described below. The boys were shown how to do each test-items correctly and then they were asked to perform the same to confirm

their capacity on that performance. There was no warming-up before the boys underwent the tests.

Description of the Kraus-Weber tests

Test 1. "Abdominals Plus Psoas"

The subject lies supine with hands behind the neck. The feet are held by the examiner. On command the subject rolls up into a sitting position. This is a test of the strength of abdominal and psoas muscles.

Test 2. "Abdominals Minus Psoas"

The subject lies supine, hands behind neck and knees bent. The feet are held. On command the subject tries to roll up into a sitting position. This is further test of abdominal muscles without psoas.

Test 3. "Psoas" or P

The subject lies supine with hands behind the neck and legs extended. On command feet are lifted 25 cms (10 inches) above the ground and maintained for ten seconds. This is a test for the strength of psoas and lower abdominal muscles.

Test 4. "Upper Back" or UB

The subject lies prone with a pillow under the abdomen but far enough down to give a seesaw effect. He holds his hands behind the neck. The examiner holds down the feet and asks the subject to raise

up his chest, head and shoulders and maintain them for ten seconds. This test is for the strength of the upper back muscles.

Test 5. "Lower Back" or LB

The subject lies prone over the pillow and places his hands in front and rests his head on them. The examiner holds the chest down and asks the subject to lift his legs up without bending in the knees and maintain for ten seconds. This is the test for the strength of the lower back muscles.

Test 6. "Back and Hamstring" or BH

The subject stands erect with his hands at sides and feet together. On command he leans down slowly to touch the floor with his fingertips. The knees are kept straight and the leaning down position is maintained for ten seconds. No bouncing is allowed to touch the floor. This tests the length of back and hamstrings muscles and is a test of flexibility.

These tests are shown in Fig. 1.

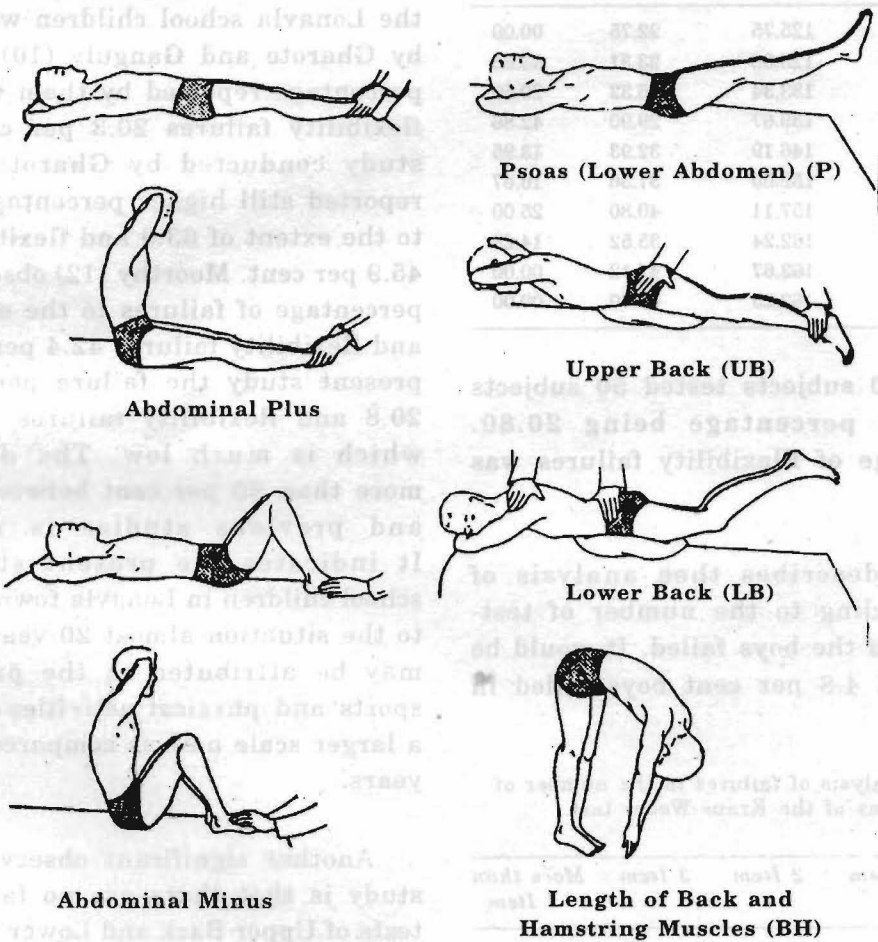


Fig. 1 : KRAUS-WEBER TESTS

RESULTS

Table I shows physical characteristics and the age-wise failures in the school boys. It will be seen that maximum failures to the extent of 53.85 per cent are observed at the age of 10 years. There are no failures in the age groups of 9, 17 and 18 years.

TABLE I : Physical characteristics of the subjects and their failure percentage.

Age in completed years	Number	Mean height (in cms.)	Mean weight (in kgs.)	Test failures percentage
9	04	125.75	22.75	00.00
10	13	126.08	23.31	53.85
11	34	133.34	26.32	20.59
12	21	139.67	29.90	42.86
13	43	146.19	32.93	13.95
14	36	152.60	37.36	16.67
15	44	157.11	40.80	25.00
16	42	162.24	35.52	14.28
17	09	162.67	47.12	00.00
18	04	162.25	46.50	00.00

Out of 250 subjects tested 50 subjects failed, their percentage being 20.80. The percentage of Flexibility failures was 11.60.

Table II describes the analysis of failures according to the number of test-items in which the boys failed. It would be apparent that 4.8 per cent boys failed in three items.

TABLE II : Analysis of failures in the number of items of the Kraus-Weber test.

No. of item	1 Item	2 Item	3 Item	More than 1 Item
%Failures	18	3.6	1.2	4.8

Considering item-wise test-failures it was found that maximum failures to the extent of 11.6 per cent occurred in the test of Back and Hamstrings which is a test of flexibility. There were no failures in the tests of upper-back-and lower-back-muscle strength.

DISCUSSION

Results of this study are significant in many respects. The failure percentage observed in this study has been lowest reported so far in India. The first study on the Lonavla school children was conducted by Gharote and Ganguly (10). The failure percentage reported by them was 40.3 and flexibility failures 20.3 per cent. Another study conducted by Gharote et al. (13) reported still higher percentage of failures to the extent of 63.9 and flexibility failures 45.9 per cent. Moorthy (12) observed highest percentage of failures to the extent of 84.8 and flexibility failures 42.4 per cent. In the present study the failure percentage was 20.8 and flexibility failures 11.6 percent which is much low. The difference of more than 20 per cent between this study and previous studies is remarkable. It indicates the present status of the school children in Lonavla town as compared to the situation almost 20 years back. This may be attributed to the programme of sports and physical activities promoted on a larger scale now as compared to previous years.

Another significant observation of this study is that there are no failures in the tests of Upper Back and Lower Back. Earlier study of Gharote and Ganguly (10) reported

very low percentage of failures as 0.5 and 2.9 respectively in the above two tests. These two strength tests are not considered as discriminative, since practically no failures are observed in these tests by other workers (6). Our study also confirms this.

This study has again confirmed that the school children mostly fail in the Abdominals and Back and Hamstrings tests denoting these as weak areas.

Agarwal et al. (14) have reported that the failures in the Abdominal tests showed significant impairment related to nutritional status as judged by Anthropometry. They have also pointed out that the performance in the two abdomen tests of those who were short (stunted) was significantly poorer than that of children who had normal heights indicating that shortness, irrespective of weight, compromised performance. This is, perhaps, the single observation showing relationship of the failures of K-W tests in the Abdominal sub-tests with the nutritional status. We have not taken into consideration the factor of nutrition or stunted growth of the children, simply because our purpose was different. The purpose was to determine the present status of the school children of Lonavla regarding the minimum muscular fitness as measured by the K-W tests and to compare the results with the previous studies reported.

In the earlier studies of Gharote (13), and Gharote and Ganguly (10) a positive effect of Yoga training on the failures of the K-W tests has been reported. This obviously did not affect the nutritional status or sexual growth level within the

training period. It may be possible to study further relationship of the failures in K-W tests and their nutritional status to confirm the observations of Agarwal et al. (14).

Gharote and Ganguly (10) have suggested inclusion of Yogasanas in the programme of physical activities of the schools for the improvement of the status of failures. Gharote (13) has reported improvement in the failures of the Kraus-Weber tests after training of Yogasanas. Moorthy (12) undertook extensive study to investigate the effect of selected Yogasanas and physical training on the failures of Kraus-Weber tests in the school children and found significant improvement in the failures after the training of Yogasanas.

These references indicate the need of greater emphasis on teaching Yogasanas to the school children for the improvement of the weak areas which affect their physical fitness.

To summarize, the study of minimum muscular fitness tested through Kraus-Weber battery of six tests on 250 Lonavla school children revealed the following facts :

- In the Kraus-Weber tests, 20.8 per cent boys failed. Multiple failures were found to the extent of 4.8 per cent. This is the lowest percentage of failures reported so far.
- There were 11.6 per cent flexibility failures.
- Maximum failures of 38.5 per cent were found at the age of 10 years.

- Greatest flexibility failures of 34.5 per cent were noted in the age group of 15 years.
- No flexibility failures were observed in the age group of 9, 17 and 18 years.
- Upper Back and Lower Back tests had no failures.

- Multiple failures were found to be 4.8 per cent.

Inclusion of Yogasanas in the physical activities programme in the schools is suggested for the improvement of the status of the failures. Further work along this line is in progress.

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