DEVELOPMENT OF MOTOR ABILITIES OF TRAINED INDIAN BOYS OF 9-16 YEARS OF AGE

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ABSTRACT

A study was conducted on 294 north Indian boys of 9-16 years of age. The boys were studying in a sports school and were doing systematic sports training twice a day. The following tests were conducted on the subjects: Standing broad jump, standing shot put (4 kg), 40m sprint, zig-zag run, forward bend and reach and endurance run. The results indicated that the spurt in height, weight and motor abilities of Indian boys is less pronounced than in boys of Europe and America.

Key words: Motor development, Training, Growth spurt, Motor abilities.

INTRODUCTION

It is an established fact that high performance in sports cannot be achieved by a short training period of two or three years. Long-term training extending up to 8 or more years is required to reach the international level. This means that systematic sports training must start in early childhood so that the sportsman/woman is able to give his/her life's best performance in the age of high performance. The age of high performance is the age period in which a person has the best biological pre-requisites for performing in a sport (Harre, 1979). The age of high performance varies from sport to sport but is generally between 18 to 25 years.

The training in childhood has to be such that the growth and development is positively affected and fully exploited for achieving high performances in the age of high performance (Winter, 1976; Harre, 1979). The motor development of untrained children has been studied quite extensively (Peters, 1965; Fomin and Filin, 1972; Stemmler, 1976; Hebbelinck, 1982) but the motor development of children undergoing systematic sports training has been scantily explored.

METHODOLOGY

The study was conducted on boys of 9-16 years of age. The subjects were studying in a sports school in north India (Motilal Nehru School of Sports, Rai). In addition to their studies the subjects were undergoing systematic sports training twice a day (approximately 3 hours of training). The subjects were natives of Haryana and Punjab (north Indian states). The following tests were conducted on the subjects in February 1983.

Test	Factor measured
1. Standing broad jump	Leg strength
2. Standing shot put (4 kg)	Arm and shoulder strength
3. 40 metre sprint	Speed
4. Zig-zag run	Agility
5. Forward bend and reach	Trunk flexibility
6. 800 metre run (boys up to 12 years)	Endurance
7. 1500 metre run (boys above 12 years)	Endurance

The date of birth of the subjects was recorded from the school register. The standing height and body weight of the subjects was also taken.

RESULTS AND DISCUSSION

Height and Weight

The boys of north India i.e. of the Punjab and Haryana are 2-3cm shorter and 3-5kg lighter than the boys of Europe as reported by Oehmisch in 1970 (cited by Harre, 1979). The height and weight of Belgian boys of 6-13 years was reported by Hebbelinck (1982). When compared with the Indian boys the Belgian boys of 10 and 11 years are taller by 2-4cm but 12 and 13-year-old Indian boys are taller than their Belgian counterparts by 1-3cm. The Belgian boys (6-13 years) are however heavier than the Indian boys by 0.5 to 1.0kg. According to the results reported by Eiben (1981) the north Indian boys are lighter by about 4kg than the Hungarian boys. They are also shorter till the age of 14. But 16-year-old north Indian boys are taller and heavier than the Hungarian boys.

The spurt in weight increase with the onset of puberty is less pronounced in the case of north Indian boys than in European boys. Marcusson (1961) and Stemmler (1968) have reported yearly increase in weight of Russian and East German boys of about 5-6kg. Tanner (1962) also reported a pronounced spurt in increase of height and weight in puberty. The yearly increase in the case of north Indian boys is less than 5kg except from 11-12 years and 15-16 years (Table I).

TABLE I
The mean height and weight of the subjects.

Age	n	Height (m)	Weight (kg)
9	11	1.33 ± 0.038	27.55 ± 2.592
10	40	1.35 ± 0.049	29.55 ± 3.911
11	52	1.38 ± 0.058**	30.57 ± 3.979
12	39	1.47 ± 0.077**	36.51 ± 6.432**
13	53	1.53 ± 0.080**	40.95 ± 5.590**
14	59	1.60 ± 0.086**	45.40 ± 7.625*
15	25	1.65 ± 0.075**	50.22 ± 8.428**
16	15	1.70 ± 0.064*	57.74 ± 5.681

Significantly different from boys one year younger, * $p < 0.05$, ** $p < 0.01$

Strength

The performance of north Indian boys in broad jump and shot put is on the whole better than the boys of Europe (Adam et al, 1982; Hebbelinck, 1982). Various authors have reported a very rapid increase in strength performances in puberty (Pavek, 1971; Pilicz, 1971; Komadel, 1975; Winter, 1976). Such a pronounced increase in strength is not visible in north Indian boys of comparable age.

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TABLE II
The mean values of performance of the subjects in different tests.

Age	Trunk Flex. (cm)	40m (s)	S.B. Jump (m)	Zig-zag run (s)	Shot put (m)	Endurance† (s)
9	9.73 ± 3.027	7.16 ± 0.353	1.59 ± 0.086	8.45 ± 0.367	3.40 ± 0.782	195.60 ± 42.00
10	9.55 ± 3.392	7.01 ± 0.409	1.66 ± 0.160	8.20 ± 0.341**	3.84 ± 0.636	194.80 ± 32.434
11	9.40 ± 3.296	6.91 ± 0.385	1.71 ± 0.143	8.11 ± 0.271	4.05 ± 0.614	190.56 ± 37.237
12	8.81 ± 2.981	6.60 ± 0.982	1.86 ± 0.157**	7.98 ± 0.293**	5.05 ± 0.974**	183.64 ± 39.207
13	9.74 ± 4.298	6.58 ± 0.387	1.88 ± 0.176	7.99 ± 0.296	5.84 ± 1.024**	377.99 ± 45.456
14	9.42 ± 3.862	6.33 ± 0.404**	2.00 ± 0.193**	7.99 ± 0.351	6.90 ± 1.546**	373.79 ± 48.786
15	9.80 ± 3.730	6.14 ± 0.456	2.12 ± 0.173*	7.94 ± 0.281	7.77 ± 1.503*	364.20 ± 42.985
16	11.00 ± 3.741	5.67 ± 0.328	2.21 ± 0.103	7.74 ± 0.381	9.03 ± 1.134**	353.40 ± 40.096

Significantly different from boys one year younger, * $p < 0.05$, ** $p < 0.01$

† 800m for boys under 12 years, 1500m for boys over 12 years

Speed

The speed of north Indian boys improves continuously and at moderate rate. There appeared to be no phases of accelerated improvement as reported by Crasselt (1972) and Koinzer (1978).

Endurance

The endurance of north Indian boys improved continuously till the age of 16 years. This is in agreement with the findings of Rutenfranz (1965) and Pilicz (1971). Stemmler (1968) has given the average time for German boys in an 800m run. North Indian boys of 9 and 11 years were better by 0.5 and 1.2s respectively. However, boys of 13 and 15 were slower by 1.2 and 3.5s respectively over 1500m.

Agility

Several scholars have reported that agility and co-ordinative abilities improve rapidly before puberty after which the improvement slows down considerably (Winter, 1976; Hirtz, 1976; Ludwig and Hirtz, 1981). In north Indian boys also there is no significant yearly increase in agility performance after the age of 13 years.

Flexibility

The trunk flexibility of north Indian boys does not show any significant improvement from 9-16 years. Winter (1976) reported that flexibility improves steadily till adulthood. However, Kos (1964) and Morscher (1970) reported that the growth spurt has a negative effect on flexibility but by training it can be maintained during this period. The studies reported in the literature were conducted on boys not doing any systematic sports training. The boys who were the subjects in the present study were doing systematic sports training of about 3 hours every day except on Sundays. When one compares the boys of Europe and America with those of north Indian boys it becomes clear that the spurt in north Indian boys' height, weight and motor abilities, from 9 to 16 years, is less pronounced than in boys from Europe and America. This could be related to the training regimen undertaken by the Indian boys.

CONCLUSIONS

1. The spurt in height, weight and motor abilities of Indian boys of 9-16 years is less pronounced than in boys of Europe and America.
2. The north Indian boys are shorter and lighter than the boys of Europe and America.

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