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A FOUR-YEAR STUDY OF PHYSIQUE IN YOUNG BASKETBALL PLAYERS

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A b s t r a c t. A preliminary comparison was made between the growth rates of 21 boys selected as talented for basketball at the age of 11 and children with normal development and average physical activity. When selected, the basketball group had significantly larger body dimensions than the reference ones, but the form factor metric index was comparable. In the further observations the chest dimensions agreed fully. Dimensional growth ran along the same slopes in both groups. The parallel lines of development were, however, mostly significantly separated. In view of their larger dimensions, the basketball players were close in development to the one year older reference group. This alone, however, was not considered fully sufficient for regarding them as biologically more advanced.

Key words: physique, growth rate trends, basketball players.

Introduction

Higher stature is an essential component or precondition of athletic proficiency in several events of sports. Because of this fact experts responsible for educating young athletes mostly prefer the children who are taller than their age-mates (Szabó 1969). In this early period of development one can hardly tell if the children selected by the coaches are advanced in maturation or else they are endowed with a taller stature. Though coaches usually succeed in choosing children who will eventually become tall adults, assessment of developmental rate may be a kind of objective help to them.

In a long-term observation the goal of this preliminary report was to compare the growth rate of children who when selected for basketball at 11 years of age were taller, to a non-athletic reference group with average stature. Four observations, i.e. a period of 2.5 years between autumn 1976 and spring 1979, are reported on in the present paper.

Material and Methods

The subjects wete 21 boys selected for basketball. In taking weight, stature, chest width and depth, biacromial distance, lower-arm girth and hand circumference the IBP suggestions were observed (Weiner and Lourie 1969). As a reference basis, the cross sectional data of Mészáros and Mohácsi (1978) were used. Body dimensions served also to calculate the index pair of Conrad's growth types (Conrad 1963, Szmodis et al. 1976). The changes in body di-

mensions and the plastic index were also compared by regression analysis, in which the independent variable was age. Reference values were linearly extrapolated to achieve full correspondence with test-group age. None of these corrections exceeded a quarter of a year.

Results and Discussion

Already at the time of selection the body dimensions of the test group were significantly larger than the reference data (Table 1), and corresponded to those of the one year older reference children. This result points again to the fact that in some sports, as e.g. also in basketball tall stature is an essential criterion in deciding on the aptitude of the candidate for that sport or event.

Table 1

Means and standard deviations of basketball players and non-athletic subjects: Observation 1 (Oct. 16. 1976)

Dimension	Non-athletic		Basketball		t_{B-N}
	$\bar{x}$	s	$\bar{x}$	s	
Body height	143.63	6.81	148.35	8.80	5.27
Body weight	35.73	6.30	39.70	8.38	4.75
Chest depth	15.16	1.50	15.38	1.43	3.66
Chest width	21.60	1.49	22.20	1.54	3.24
Shoulder width	31.10	1.78	31.79	1.93	3.09
Lower arm girth	19.64	1.51	20.59	1.79	4.90
Hand circumference	17.08	1.01	17.63	1.21	4.23
Metric index	−1.14	0.30	−1.15	0.35	0.15
Plastic index	67.99	3.69	70.01	4.60	4.20
N	316		21		

Metric index, the form factor of the chest and thus a measure of body linearity, gave initially a non-significant difference. This similarity of body build can be explained with the rules governing spontaneous development.

Table 2

Means and standard deviations of basketball players and non-athletic subjects: Observation 2 (Jan. 16. 1978)

Dimension	Non-athletic		Basketball		t_{B-N}
	$\bar{x}$	s	$\bar{x}$	s	
Body height	150.00	6.43	155.89	10.08	6.34
Body weight	41.15	7.02	46.54	11.06	5.30
Chest depth	15.98	1.36	16.18	1.46	0.65
Chest width	22.59	1.45	22.89	1.67	0.91
Shoulder width	32.11	1.79	33.20	2.13	4.65
Lower arm girth	20.55	1.57	21.56	1.97	4.83
Hand circumference	17.84	1.09	18.38	1.23	3.84
Metric index	−1.13	0.29	−1.32	0.41	4.72
Plastic index	70.69	3.75	73.13	5.02	4.82
N	277		21		

In the course of observations 2 through 4 (Tables 2 to 4) also hereditary trends may have become manifest, since the chest dimensions have later consistently agreed with the reference values, whereas the difference from reference stature, weight and girths has not changed; in some instances it even grew. Consequently, the metric index became significantly more negative,

Table 3

Means and standard deviations of basketball players and non-athletic (subjects: Observation 3 (Oct. 26. 1978)

Dimension	Non-athletic		Basketball		t_{B-N}
	$\bar{x}$	s	$\bar{x}$	s	
Body height	155.51	6.78	160.32	10.64	4.91
Body weight	44.02	7.92	50.32	10.89	5.80
Chest depth	16.43	1.42	16.59	1.32	0.50
Chest width	23.30	1.58	23.43	1.80	0.36
Shoulder width	33.51	2.11	34.25	2.21	2.77
Lower arm girth	21.24	1.71	22.21	2.05	4.27
Hand circumference	18.26	1.16	18.82	1.24	3.80
Metric index	−1.21	0.35	−1.37	0.44	3.43
Plastic index	73.17	3.21	75.29	5.24	4.49
N	278		21		

Table 4

Means and standard deviations of basketball players and non-athletic subjects: Observation 4 (March 10. 1979)

Dimension	Non-athletic		Basketball		t_{B-N}
	$\bar{x}$	s	$\bar{x}$	s	
Body height	158.63	6.78	164.17	10.86	5.61
Body weight	46.55	7.92	54.06	10.52	6.99
Chest depth	16.75	1.42	17.08	1.56	1.02
Chest width	23.81	1.58	24.07	1.81	0.72
Shoulder width	34.25	2.11	35.05	2.28	2.97
Lower arm girth	21.74	1.71	23.02	1.81	5.90
Hand circumference	18.60	1.16	19.41	1.27	5.46
Metric index	−1.22	0.35	−1.39	0.45	3.62
Plastic index	74.71	3.21	77.47	5.12	5.91
N	278		20		

i.e. the complex trait called leptomorphy became more marked. In view of the general rules of development along growth channels it seems justifiable to assume that these children will retain this more linear build later as well, and also their final stature will be taller than the average and so selecting them was correct.

A similar result was obtained in the regression analysis of body dimensions (Table 5). Except for chest diameters, the respective lines of developmental course are well separated. The identity of growth-rate slopes is, after all,

surprising only to the superficial look. It is hardly conceivable, namely, that 10 to 11 years old children with an average stature should become tall adults 7 to 8 years later. Nevertheless, concerning tall final stature only a continuation of this study can substantiate or disprove the aspirations of the coach and the assumptions of the researcher.

Table 5

Coefficients of the regression equations of growth

Dimension	Group	Individual equations			Adjusted equations		
		Intercept	Slope	r	Intercept	Slope	ta
Height	B	148.33	6.43	.52	148.68	6.17	6.72
	N	143.63	6.16	.65	143.35	6.17	
Weight	B	39.66	6.81	.47	41.52	4.45	5.84
	N	35.78	4.36	.49	35.66	4.45	
Chest d.	B	16.10	0.23	.14	15.56	0.62	2.24
	N	15.17	0.65	.41	15.21	0.62	
Chest w.	B	22.13	0.74	.37	21.92	0.87	1.77
	N	21.58	0.90	.50	21.59	0.87	
Biacromial	B	31.73	1.33	.50	31.78	1.29	3.71
	N	30.95	1.29	.53	30.93	1.29	
Lower arm	B	20.52	0.96	.42	20.20	1.19	2.76
	N	19.60	1.21	.32	19.15	1.19	
Hand cirf.	B	17.59	0.79	.47	17.70	0.62	3.88
	N	17.09	0.62	.47	17.08	0.62	
Plastic i.	B	69.88	2.99	.49	70.13	2.76	5.77
	N	67.82	2.74	.60	67.80	2.76	

r: linear correlation coefficient; ta: *t* test value of intercepts; B: basketball players; N: normal non-athletic group.

The increase af linearity (leptomorphy) in the basketball players is not too favourable, despite their larger dimensions. Experience has shown that though the game demands higher stature, the players whose tall stature is associated with a proportionate or robust body build are clearly at advantage (Szabó 1969, Mészáros and Ezer 1978). Coaches who reduce the selection criteria of physical aptitude simply to a taller stature ought to revise their view.

REFERENCES

CONRAD, K. (1963): *Der Konstitutionstypus.* — Springer, Berlin.

MÉSZÁROS, J.—EZER, L. (1978): Testalkati vizsgálatok tapasztalatai kosárlabdázóknál. — Testnevelés- és Sportegészségügyi Szemle *19;* 195—199.

MÉSZÁROS, J.—MOHÁCSI, J. (1978): A gyermekek és serdülőkorúak fejlődésének összefüggései az iskolai testneveléssel. — (Rektori pályázat, Magyar Testnevelési Főiskola.) Budapest.

SZABÓ, J. (1969): Ki lehet kosárlabda játékos? — Kosárlabda *5;* 13.

— (1975): Nincsenek véletlenek. — Kosárlabda *6;* 22.

SZMODIS, I.—MÉSZÁROS, J.—SZABÓ, T. (1976): Alkati és működési mutatók kapcsolata gyermek-, serdülő és ifjúkorban. — Testnevelés- és Sportegészségügyi Szemle *17;* 255—272.

WEINER, J. S.—LOURIE, J. A. (Eds) (1969): *Human Biology — A Guide to Field Methods.* IBP Handbook 9. — Blackwell, Oxford.

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