

SOMATIC FIGURE OF CHILDREN AGED 8-18 YEARS COVERED SPORTS TRAINING PERSONNEL WITHIN THE PODKARPACIE PROVINCE

Stanisław CIESZKOWSKI, Lesław LASSOTA, Justyna LENNIK

*Faculty of Physical Education, University of Rzeszow, Rzeszow, Poland
cieszko@onet.eu*

Key words:

- somatic figure,
- Podkarpackie province,
- sport.

Abstract:

The aim of this study was to assess the somatic figure of talented young people in sport. Region. The material for this work is a survey conducted among the sport team of senior and junior youth in Podkarpackie Province. The study involved 417 people aged 8-18 years, including 244 boys and 173 girls. . The study included an assessment of a body composition, ie. measurement of height and weight (calculated on the basis of their BMI), height of the seat, length of the lower limbs and the girth measurement: waist, hips and thighs. The analysis confirms that covered sports training a group of children and adolescents was selected appropriately for training and shows above-average level of individual somatic.

INTRODUCTION

Modern sport puts very high demands on the candidates for the masters who receive results in training which place them among the best [1,8]. Therefore, one of the basic stages of sports training is properly conducted and fairly recruitment and pre-selection of candidates [1, 3, 8]. It should include not only the assessment of physical fitness and motor abilities but also an assessment of body composition including primarily featur genetically determined, because on their basis can determine the final body size of a future champion. Milicerowa identified four somatic features, which are characterized by the relative stability of development while adequately define the figure of the body for the purpose of forecasting. These include height and weight, chest girth and calf girth [3]

Professional sport is characterized by a continuous increase in the level of performance and the efficiency of competition [4, 6] Therefore, a very important link in the process of training in the period of a child or youthful. For this purpose, a theoretical "master models" which are helpful in recruiting and directions of development of relevant features, characteristic for the specialization of sports. In these models, somatic structure is one of the most important criteria to have a decisive influence on the player achieving the highest level of sport. Studies show a significant relationship with the level of body building and sports results [5,7].

The aim of this study was to assess the somatic figure of talented young people in sport and training covered within the staff of Podkarpackie Region

MATERIAL AND METHODS

The material for this work is a survey conducted among the sport team of senior and junior youth in Podkarpackie Province. The study involved 417 people aged 8-18 years, including 244 boys and 173 girls. The study was conducted in May 2013 with significant help students-members of the Student Research Anthropometrics WWF UR. The study included

an assessment of a body composition, ie. measurement of height and weight (calculated on the basis of their BMI), height of the seat, length of the lower limbs and the girth measurement: waist, hips and thighs. For all age groups index of sexual dimorphism was calculated. The whole of the collected material was developed using the basic methods of mathematical statistics. So for boys and girls calculated arithmetic means and measures of variability. The results obtained were normalized to 0 and 1 urban population of Krakow [2]

RESULTS

Body height increases in the coming years assuming the size of the calendar age in a series of athletes from 126,67 cm (8-year-olds) to 167,55 (18-year-olds) and respectively - among the players - 138.13 and 177.06 cm. 12-year-old girls have a higher body height in relation to the boys what can be explained by jump height associated with puberty. Also, the girls at the age of 9 years are higher than their peers which is probably due to the fact this parameter to take into account the initial somatic recruiting for sports. The largest gender differences were recorded in the series features 17-year-olds (Table. 1 and 2). Analogous regularities observed in the case of body weight, where both the 9 and 12 year old girls are heavier than their peers. The biggest sexual differentiation is observed among the 15-and 17-year-olds. Comparative analysis in relation to the urban population of Krakow shows that except for a few cases of youth sports training covered within the staff of the Podkarpackie Region presents a higher level of these somatic parameters (Table 9).

Table 1. Height

Age	Girls					Boys					d	WD
	x	s	v	min	max	x	s	v	min	max		
8	126,67	5,87	4,63	118,5	134,5	138,13	7,64	5,53	127,0	144,0	11,46	1,70
9	136,67	9,70	7,10	125,5	143,0	134,50	4,01	2,98	128,0	140,5	-2,17	-0,32
10	140,05	7,12	5,08	128,5	152,0	143,59	7,00	4,88	136,0	159,0	3,54	0,50
11	149,06	9,31	6,25	131,5	163,0	150,71	7,18	4,76	134,5	160,0	1,65	0,23
12	160,17	6,95	4,34	145,0	171,0	154,57	8,34	5,39	138,5	168,5	-5,60	-0,73
13	162,87	10,36	6,36	142,5	183,0	165,06	9,77	5,92	148,5	190,5	2,19	0,22
14	164,14	6,79	4,14	154,0	180,0	172,50	8,08	4,68	143,0	191,5	8,36	1,12
15	161,75	5,27	3,26	152,0	169,0	174,99	8,72	4,98	158,0	194,0	13,24	1,89
16	162,63	6,41	3,94	153,5	175,0	175,34	6,71	3,82	163,0	192,0	12,71	1,94
17	161,71	4,39	2,71	156,0	167,0	178,44	6,51	3,65	161,0	190,0	16,73	3,07
18	167,55	4,79	2,86	162,0	174,5	177,06	8,84	4,99	161,5	189,0	9,51	1,40

Table 2. Body weight

Age	Girls					Boys					d	WD
	x	s	v	min	max	x	s	v	min	max		
8	24,52	3,75	15,28	18,8	29,0	29,20	5,78	19,78	21,0	33,3	4,68	0,98
9	32,00	7,57	23,64	23,5	38,0	31,63	4,63	14,64	26,4	39,6	-0,37	-0,06
10	31,81	5,98	18,79	22,9	43,1	39,57	8,49	21,45	28,0	51,1	7,76	1,07
11	39,38	10,53	26,75	25,8	64,6	42,94	7,54	17,56	28,8	55,7	3,56	0,39
12	47,54	8,56	18,00	32,6	67,4	46,44	11,89	25,61	31,6	78,5	-1,10	-0,10
13	51,21	11,87	23,18	29,7	75,6	52,62	10,33	19,64	34,0	74,3	1,41	0,13
14	54,96	6,98	12,70	39,6	73,1	62,53	9,95	15,92	38,5	79,2	7,57	0,89
15	51,94	6,78	13,06	41,4	68,3	66,46	12,70	19,12	44,0	120,5	14,52	1,49
16	57,15	8,41	14,71	44,2	73,0	67,59	8,83	13,07	56,4	101,7	10,44	1,21
17	59,49	14,05	23,62	50,9	90,5	72,71	10,58	14,56	60,5	102,8	13,22	1,07
18	60,85	9,18	15,08	45,4	76,6	68,93	14,07	20,42	47,8	96,4	8,08	0,70

Table 3. Length of lower limbs

Age	Girls					Boys					d	WD
	x	s	v	min	max	x	s	v	min	max		
8	59,50	4,30	7,2	55,0	64,5	67,88	4,89	7,20	61,0	72,5	8,38	1,81
9	66,17	6,25	9,45	59,0	70,5	64,92	2,84	4,37	62,0	68,5	-1,25	-0,28
10	68,45	4,84	7,08	61,5	78,0	72,64	5,87	8,08	63,0	84,0	4,19	0,65
11	72,41	4,01	5,53	65,5	78,0	76,04	6,38	8,40	67,0	89,5	3,63	0,70
12	78,48	4,96	6,32	67,0	87,5	77,72	5,38	6,92	66,0	88,5	-0,76	-0,15
13	80,25	5,93	7,39	67,0	91,0	83,17	5,43	6,53	74,0	95,0	2,92	0,51
14	76,50	6,23	8,14	72,5	94,0	81,74	6,08	7,49	72,5	99,0	5,24	0,85
15	78,14	3,50	4,48	70,5	86,0	87,81	5,10	5,81	75,5	97,5	9,67	2,25
16	80,80	8,43	10,43	74,5	107,5	86,86	6,53	7,52	78,0	99,0	6,06	0,81
17	77,71	4,66	6,00	71,5	83,0	88,39	4,40	4,98	76,0	96,0	10,68	2,36
18	80,20	3,57	4,45	75,0	85,0	87,50	5,80	6,63	79,0	95,0	7,30	1,56

Table 4. Height when sitting

Age	Girls					Boys					d	WD
	x	s	v	min	max	x	s	v	min	max		
8	67,17	3,11	4,63	62,00	71,00	70,25	3,52	5,02	66,00	74,50	3,08	0,93
9	70,50	3,46	4,91	66,50	72,50	69,58	3,20	4,60	65,00	72,00	-0,92	-0,28
10	71,61	3,41	4,76	66,00	77,00	70,96	4,14	5,83	65,50	79,00	-0,65	-0,17
11	76,66	6,38	8,32	65,50	88,00	74,68	3,91	5,24	67,00	78,50	-1,98	-0,38
12	81,69	3,51	4,30	74,50	87,00	76,85	5,24	6,82	68,50	87,00	-4,84	-1,11
13	82,62	5,59	6,77	72,50	93,00	81,89	5,66	6,91	73,00	95,50	-0,73	-0,13
14	84,52	3,25	3,84	77,00	90,50	86,62	4,05	4,67	75,00	92,50	2,10	0,58
15	83,61	3,54	4,24	76,50	89,00	87,18	6,35	7,28	65,00	97,50	3,57	0,72
16	81,83	7,29	8,91	58,50	91,50	88,47	4,27	4,83	73,00	97,00	6,64	1,15
17	84,00	3,06	3,64	78,50	89,00	90,06	3,61	4,00	85,00	96,00	6,06	1,82
18	87,35	2,95	3,38	83,50	92,00	89,56	5,45	6,08	80,50	97,00	2,21	0,53

Table 5. BMI

Age	Girls					Boys					d	WD
	x	s	v	min	max	x	s	v	min	max		
8	15,30	1,51	9,89	13,5	17,0	15,13	1,57	10,39	13,0	16,5	-0,17	-0,11
9	16,90	1,81	10,70	15,0	18,6	17,48	2,38	13,63	15,6	22,1	0,58	0,28
10	16,14	1,95	12,07	13,1	19,3	19,05	3,21	16,83	15,1	24,6	2,91	1,13
11	17,44	2,71	15,54	14,6	24,3	18,82	2,40	12,77	15,5	23,2	1,38	0,54
12	18,39	2,17	11,82	15,5	23,9	19,20	3,42	17,81	15,3	28,5	0,81	0,29
13	18,89	2,69	14,22	14,1	25,3	19,20	2,53	13,19	15,3	26,5	0,31	0,12
14	20,69	2,80	13,55	15,5	32,2	20,95	2,51	11,97	16,2	25,3	0,26	0,10
15	20,37	3,61	17,71	16,6	32,7	21,61	3,20	14,80	17,2	36,8	1,24	0,36
16	21,20	2,47	11,45	18,2	27,7	21,97	2,24	10,20	19,0	30,7	0,77	0,33
17	22,79	5,62	24,67	19,2	35,4	22,78	2,65	11,62	18,9	28,5	-0,01	0,00
18	21,69	3,05	14,07	16,9	26,2	21,80	2,46	11,30	18,4	27,0	0,11	0,04

Numerical characteristics of sitting height and length of the lower extremities included in the table. 3 and 4 The size of these parameters is changing in the following age categories. Among the athletes the longest torso is characterized by 18-year-olds and shortest players in the age of 8 years. Among the players, in turn, the smallest value of this parameter was observed in 9-year-olds and the biggest in the 17-year-olds. In the age group of 9-12 years, this feature dominates among the girls and the magnitude of sexual dimorphism index is at a level of 0.17 to 1.11. In the other age categories, this feature dominates among boys. The longest lower limbs feature a 16-year-old athlete and 17-year-old players, the shortest 8 and 9-year-olds. Age 9 and 12 years is a slight difference in favor of girls. The biggest sexual differentiation was observed among 8-, 15 and 17-year-olds. In the other age categories of

sexual dimorphism index does not exceed 1,0sd. Analyzing the value of the indicators normalized states that the test gifted youth sports has a shorter torso and head in relation to the urban population. The opposite situation is observed in the case of the length of the lower limbs, where - with the exception of 8-year-old studied group of girl sport is characterized by higher values of the parameters (Table. 9).

Table 6. Girth of a thigh

Age	Girls					Boys					d	WD
	x	s	v	min	max	x	s	v	min	max		
8	38,00	3,79	9,99	33,0	42,0	38,25	3,50	9,15	34,0	42,0	0,25	0,07
9	43,33	6,03	13,91	37,0	49,0	43,00	4,52	10,50	37,0	49,0	-0,33	-0,06
10	41,66	3,67	8,81	35,0	49,0	44,59	8,09	18,14	30,0	55,0	2,93	0,50
11	45,94	5,69	12,40	39,0	58,0	47,07	4,08	8,68	38,0	55,0	1,13	0,23
12	48,14	4,97	10,32	39,0	57,0	47,25	6,10	12,90	38,0	63,0	-0,89	-0,16
13	50,67	7,33	14,46	40,0	73,0	48,83	4,61	9,44	40,0	62,0	-1,84	-0,32
14	52,69	3,66	6,95	45,0	60,0	52,50	4,70	8,96	43,0	62,0	-0,19	-0,05
15	51,53	4,26	8,26	44,0	63,0	54,00	4,76	8,81	43,0	73,0	2,47	0,55
16	54,00	4,32	8,00	47,5	64,5	54,60	3,49	6,40	48,0	65,0	0,60	0,15
17	55,64	5,08	9,13	53,0	67,0	56,58	5,15	9,09	48,0	66,0	0,94	0,19
18	57,55	6,75	11,73	48,0	67,0	54,88	5,41	9,86	46,0	65,0	-2,67	-0,44

Table 7. Girth of a waist

Age	Girls					Boys					d	WD
	x	s	v	min	max	x	s	v	min	max		
8	51,00	4,00	7,84	46,00	57,00	57,25	2,75	4,81	54,00	60,00	6,25	1,85
9	58,00	6,25	10,77	51,00	63,00	58,17	5,91	10,17	53,00	69,00	0,17	0,03
10	56,58	4,01	7,10	49,00	64,00	64,46	9,89	15,35	53,00	78,00	7,88	1,13
11	60,97	9,53	15,63	52,00	88,00	67,07	8,29	12,35	53,00	83,00	6,10	0,68
12	65,36	7,34	11,23	51,50	81,00	67,68	8,48	12,53	55,00	90,00	2,32	0,29
13	61,00	8,71	12,99	53,00	85,00	70,55	8,01	11,36	57,00	89,00	9,55	1,14
14	68,75	6,30	9,16	59,00	83,00	75,24	7,52	9,99	62,00	90,00	6,49	0,94
15	65,08	4,66	7,15	74,50	62,00	75,72	8,18	10,80	62,00	113,00	10,64	1,66
16	71,43	6,73	9,43	62,00	81,50	74,20	5,27	7,10	65,50	89,00	2,77	0,46
17	72,57	10,83	14,92	64,00	96,00	78,47	6,87	8,75	69,00	97,50	5,90	0,97
18	71,50	5,42	7,58	59,00	79,00	74,25	4,83	6,51	69,00	82,00	2,75	0,54

BMI Size varies from 15.30 (8-year old girls) and 15.13 (8-year-old boys) to 22.79 and 22.78 respectively (Table. 5). Definitely more volatile intragroup is characterized by girls, especially 17-year-olds, where the size of the coefficient of variation is at the level of about 25%. Sexual differentiation in almost all age categories does not exceed 0,5sd. The greatest value of the ratio of sexual dimorphism in favor of boys reported among 10-year-olds. In the last two age categories sex differences almost disappear. Comparison of average size with a population of BMI metropolitan of Krakow shows that apart from a few age groups and a group of talented sports is characterized by higher values of this parameter. This applies to both boys and girls. This does not mean that the tested provincial staff have a tendency to be fat, on the contrary weight advantage over the amount due to the training loads (Table. 9).

Thigh growing steadily with age. Among the athletes the greatest value of this parameter was observed in the last age category with players in the circle of 17-year-olds. 9-, 12, 13, 14 and 18 year old girls have a slightly higher values of the features compared to boys (table 6). Comparative analysis of the population of metropolitan of Krakow shows that, as in the case of BMI, studied group of senior players from Podkarpackie voivodship has a greater girth of the lower limb and the size of the standardized indicator oscillates around 0.3-1.0 sd (tab.9).

Table 8. Girth of hips

Wiek	Dziewczeta					Chłopcy					d	WD
	x	s	v	min	max	x	s	v	min	max		
8	65,42	4,10	6,27	61,00	71,00	68,13	7,12	10,46	59,00	74,50	2,71	0,48
9	73,33	8,14	11,11	64,00	79,00	70,75	7,90	11,16	57,00	79,00	-2,58	-0,32
10	71,18	5,18	7,28	64,00	84,00	79,96	9,40	11,76	67,00	96,00	8,78	1,20
11	77,66	9,23	11,89	66,00	96,00	79,57	6,97	8,76	67,00	95,00	1,91	0,24
12	84,17	7,65	9,09	69,00	98,00	81,08	8,40	10,37	68,00	100,00	-3,09	-0,38
13	86,10	8,85	10,28	70,00	100,50	84,28	7,52	8,92	65,00	102,00	-1,82	-0,22
14	89,13	7,55	8,48	61,50	100,00	91,15	7,20	7,90	77,00	106,00	2,02	0,27
15	89,19	5,62	6,30	79,00	102,00	93,43	7,32	7,84	78,00	122,00	4,24	0,65
16	92,60	6,63	7,16	81,00	106,50	92,27	5,19	5,62	83,00	108,00	-0,33	-0,06
17	95,86	8,60	8,97	90,00	115,00	97,08	6,61	6,81	85,00	113,00	1,22	0,16
18	94,90	6,80	7,17	84,50	105,00	93,19	7,96	8,54	84,00	109,50	-1,71	-0,23

Table 9. Somatic characteristics of respondents normalized to 0 and 1 population of Krakow

Wiek	Płeć	Wysokość ciała		Masa ciała		Wysokość siedząc		Obwód pasa		Obwód bioder		Obwód uda		Dł. kończ. dolnych		BMI	
		D	WU	D	WU	D	WU	D	WU	D	WU	D	WU	D	WU	D	WU
8	K	-2,83	-0,46	-3,28	-0,52	-2,53	-0,83	-4,1	-0,73	-1,48	-0,24	-1,4	-0,3	-0,3	-0,08	-1,2	-0,51
	M	8,63	1,5	0,9	0,16	0,05	0,01	0,25	0,04	0,73	0,11	-0,35	-0,07	8,58	2,43	-1,67	-0,65
9	K	2,77	0,51	2,1	0,36	-1,1	-0,35	1,9	0,36	4,13	0,69	2,33	0,53	3,87	1,25	0,3	0,12
	M	0,5	0,08	0,63	0,09	-2,42	-0,75	0,37	0,05	1,45	0,21	2,7	0,52	2,92	0,87	0,38	0,13
10	K	0,15	0,02	-2,69	-0,32	-2,59	-0,63	-3,02	-0,4	-3,02	-0,37	-1,44	-0,26	2,85	0,66	-1,26	-0,44
	M	2,69	0,42	4,17	0,52	-3,54	-1,05	2,86	0,36	5,76	0,75	2,09	0,38	6,24	1,66	1,35	0,46
11	K	3,56	0,53	2,18	0,28	0,06	0,02	-0,03	0	0,96	0,14	1,14	0,22	3,51	0,94	-0,06	-0,02
	M	4,81	0,7	4,14	0,48	-1,82	-0,52	3,47	0,44	2,77	0,36	2,77	0,57	6,64	1,64	0,72	0,24
12	K	7,37	1,08	4,54	0,57	1,59	0,43	3,06	0,46	3,67	0,5	1,04	0,19	5,88	1,42	-0,01	0
	M	3,77	0,51	4,64	0,47	-1,65	-0,44	3,18	35	4,18	0,49	2,85	0,54	5,32	1,1	1	0,31
13	K	4,17	0,54	4,21	0,48	-0,68	-0,17	-1,5	-0,24	2,7	0,35	1,67	0,3	4,85	1,25	0,29	0,1
	M	6,76	0,76	5,02	0,47	0,29	0,06	4,85	0,59	4,38	0,51	2,13	0,38	6,47	1,28	0,4	0,13
14	K	2,54	0,42	3,96	0,42	-0,88	-0,24	3,85	0,53	2,13	0,27	2,49	0,47	0,3	0,08	1,19	0,38
	M	6,8	0,82	9,73	0,93	1,32	0,29	7,64	0,98	7,05	0,92	4,3	0,77	1,34	0,27	1,85	0,63
15	K	-2,25	-0,36	-3,06	-0,38	-3,59	-1,14	-1,22	-0,21	-1,81	-0,3	-1,87	-0,4	1,34	0,31	-0,13	-0,05
	M	3,19	0,41	7,06	0,6	-1,72	-0,38	5,92	0,8	5,33	0,73	3,1	0,59	4,91	1,02	1,61	0,52
16	K	-1,97	-0,34	2,35	0,32	-6,27	-2,07	6,83	1,34	2,3	0,37	1,9	0,45	3,8	1,04	1	0,42
	M	0,44	0,06	3,89	0,35	-2,83	-0,78	2,3	0,29	2,17	0,32	2,5	0,5	3,26	0,75	1,17	0,39
17	K	-2,39	-0,4	3,39	0,46	-4	-1,26	7,67	1,38	4,96	0,83	2,94	0,75	1,51	0,39	1,99	0,81
	M	2,14	0,34	6,91	0,71	-2,44	-0,72	6,67	1,02	6,78	1,09	4,38	0,97	4,59	1,14	1,58	0,59
18	K	3,35	0,55	5,05	0,66	-0,35	-0,11	6,8	1,16	4,9	0,78	4,95	1,06	3,7	0,8	0,99	0,4
	M	-0,94	-0,14	0,23	0,02	-4,04	-1,07	0,85	0,11	1,69	0,26	1,48	0,29	3,1	0,72	0,1	0,03

Hip girth and waist girth in a series of competitors increases with age and in the case of hip the highest value is characteristic for the oldest age group, while in the case of waist girth for the 17-year-old. (Tab.7 and 8) In a series of players both parameters are characterized by a 17-year-olds. Indicator of sexual dimorphism of a discussed somatic features takes essentially the same trend as in the case of thigh girth. Referring average values of these characteristics to the urban population, it is noted that in addition to age classes 3-4 girls in a series of levels of both parameters is much higher among trainees and the size of the standardized ratio exceeds 1.3 times the level of sd (Table. 9).

SUMMARY

Achieving optimal training effect is conditioned by a proper recruitment and selection of children and young people to competitive sports [1,5,8]. In turn, the implementation of the training process must take into account the specific aspects of biological development. The analysis confirms that covered sports training a group of children and adolescents was selected appropriately for training and shows above-average level of individual somatic.

REFERENCES

1. Drozdowski Z., Antropologia sportowa. Morfologiczne podstawy wychowania fizycznego i sportu. PWN Warszawa-Poznań 1982
2. Gołąb S., Chrzanowska M., Dziecko krakowskie 2000. Poziom rozwoju biologicznego dzieci i młodzieży miasta Krakowa. Studia i Monografie Nr 19.AWF Kraków 2002
3. Milicer H., Budowa somatyczna jako kryterium selekcji sportowej. Biblioteka Trenera Warszawa 1971
4. Raczek J., Rozwój- podstawowy cel i wyznacznik szkolenia sportowego dzieci i młodzieży. Sport Wyczynowy 2001,9-10
5. Socha T., Charakterystyka morfologiczna czołowych lekkoatletek i lekkoatletów polskich. Zeszyty–Zmienność biologiczna człowieka.Uniwersytet Jagielloński 1996, 6
6. Ważny Z., Współczesny system szkolenia w sporcie wyczynowym. Sport i Turystyka Warszawa 1976
7. Ziemilska A., Budowa somatyczna zawodników różnych dyscyplin sportowych. Wychowanie Fizyczne i Sport 1968, 3
8. Ziemilska A., Specyfika sportu dzieci i młodzieży. Trening 1999, 1-2