COMPARATIVE ANALYSIS OF THE ANTHROPO-MOTOR DEVELOPMENT LEVEL BETWEEN BOYS AND GIRLS AT THE SELECTION AGE IN SPEED SKATING

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Abstract

This study has as purpose the study of the anthropo-motor availabilities of the age at which the selection in speed skating is realized and we want to be a reference point for the agents (coaches, teachers, instructors etc.) that are in charge with this complex process. The hypothesis that was at the base of this study was that the more we know the exact actual development level of the children potentially performance athletes, in our case skaters, the more we can adapt more exactly the specific requests necessary to their initial selection, both at boys and girls. Also, I wished to make a comparison between the anthropo-motor development level of the boys and girls, knowing that at the age the selection takes place in skating there are certain variations specific to the growth period in what concerns the anthropo-motor data, these being more or less different at boys in comparison with the girls.

Material and methods

The comparative analysis has been realized by studying 100 children of the Ploiesti city (50 boys and 50 girls), with ages of 7- 8, measurements being axed on the main anthropo-motor aptitudes used by the specialists, aptitudes that can be measured relatively easy, without needing a complex device. During the experiment we evaluated the following anthropo-motor aptitudes: waist (cm), bust (cm), weight (kg.), superior and inferior limbs length (cm.), biacromial and bitrohanterian diameters (cm), thoracic perimeter (P.T.) (cm.), thoracic perimeter in profound inhale and forced exhale (cm.).

The used research methods and techniques were: the bibliographic study method, the measurements and recordings method, the statistic-mathematic method, the graphic method and the experimental method.

Results

From the obtained data it came out that, in what concerns waist, this is higher at boys than at girls, at the weight parameter the difference between girls and boys is insignificant, the bust values differing at the two sexes, boys having smaller bust than the girls, the superior and inferior limbs lengths having inferior values at both parameters at girls than at boys.

From the point of view of the biocromial and bitrohanterian diameters we can observe that the values tendency is an inferior one at both diameters measured at girls than boys, while the medium values of the thoracic perimeter in rest are relatively close, the thoracic perimeter means in profound inhale and forced exhale having superior values at boys in comparison with the girls.

Conclusions

Analyzing the obtained results we can say that at the age of 7-8 there are no considerable differences between boys and girls in what concerns the measured parameters values, these differences being in their large majority insignificant, noticing also relatively minor differences of proportionality between the two sexes.

Key words: anthropo-motor development, comparative analysis, selection, speed skating.

Introduction

In general, the theory and practice of the sport selection process have been psychological and social grounded on the basis of the requests of the aimed sport branches having at the base also the individual particularities through which the difference between individuals is being realized.

The child must not be treated as an adult of smaller dimensions, but differentiated depending on his growth and development processes, also of the age particularities that must be well known by the coach.

The age notion has different senses in the specialty literature; mostly existing difficulty in what

concerns the clear delimitation of the age even at the teaching staff.

The chronological age is defined by R. Manno (1996) as the determined age after the number of years, months and days of life.

The chronological age (calendar) is also defined as the age which appreciates the years number from birth to a certain moment of life so it refers to the calendar date, having a statistic value (E. D. Colibaba, I. Bota, 1998).

The biologic age supposes the appreciation of the individual particularities of each athlete in part or of those that deviate from the general age particularities (E. D. Colibaba, I. Bota, 1998). Also, the biologic age is also defined as the determined age

depending on the significant biologic characteristics. Among others: osseous maturity, primary and secondary sexual characters, figure and body weight (R. Manno, 1996).

This age is a very important indicator for the physical education coaches and teachers that are in charge with training and selecting the athletes through the fact that they can appreciate the maturity level of the athlete.

In order to realize the appreciation of the biologic age we must take into consideration an entire series of indicators (morphological, functional, endocrine, biochemical etc.) that are in general appreciated in laboratory conditions by the specialists of the reminded domains.

From the existent data in the specialty literature we can say that, in this period (7-8 years), growth is approximately uniform, this being made especially according to the inferior limbs elongation (M. Ifrim, 1986).

Towards the end of the early scholar period, age at which also the selection in speed skating is being made, we can notice an acceleration of the growth process.

At this age, the domain specialists consider that the waist increases with approximately 5 cm annually, the body weight with 2,3 kg – 3,5 kg. Also, the musculature structure is similar with the adult's one, being different only the proportion of the muscular fibers (C. Bota, 2000).

At the same time, at the age of realizing the selection in speed skating, specialists have considered an increase of the osseous system at the solicitations of swinging, pressure or traction. The definitization of the cyphose takes place around the age 6-7.

We know that the skeleton of the children of an early scholastic age has in composition a rather high percentage of cartilaginous tissue, the ligaments stretching easily and the articulation being very mobile. Also, the backbone has the highest mobility at children until the age of 9.

Through this study we tried to make a connection between the anthropo-motor development level between boys and girls at an early, very important age for realizing the selection in speed skating.

The specialty federation recommends that during the selection frame we should follow: the general physical development level of the children, of course related to the age and sex particularities, finding the possible physical deficiencies that contraindicate practicing performance sport in general and of the speed skating in particular, also finding the aptitudes with genetic determination favorable for the obtaining of performances at tasks specific to speed skating. As we can notice, the general physical development level at children related to the age and sex particularities holds an important role in the selection process at this age (Romanian Federation of Speed Skating, 1991).

At the same time, we can say that this study wants to re-update the existent data in order to realize an unitary selection system depending on the shown changes at the children's level having at the base the changes provoked by the actual social evolution.

Material and methods

The study I have realized had as starting point certain questions that have their roots in the practical activity concerning the selection process in speed skating, questions that have risen after the discussions held with specialists from the domain and also from the observations of the researched phenomenon.

This study started from the hypothesis that, an agent (coach, teacher etc.), the better he knows the exact actual development level of the children potentially performance athletes, in our case skaters, the more exact he can adapt the specific requests necessary to their initial selection, referring to boys – girls. Also, I wished to make a comparison between the development level at boys and girls, knowing that at the age the selection in speed skating takes place, there are certain variations specific to the growth period, in what concerns the anthropo-motor data, these being different both at boys and girls.

The comparative analysis has been realized by studying 100 children of the Ploiesti city (50 boys and 50 girls), with ages of 7- 8, measurements being axed on the main anthropo-motor aptitudes used by the specialists, aptitudes that can be measured relatively easy, without needing a complex device.

During the experiment we evaluated the following anthropo-motor aptitudes: waist (cm), bust (cm), weight (kg.), superior and inferior limbs length (cm.), biacromial and bitrohanterian diameters (cm), thoracic perimeter (P.T.) (cm.), thoracic perimeter in profound inhale and forced exhale (cm.).

The used research methods and techniques were: the bibliographic study method, the measurements and recordings method, the statistic-mathematic method, the graphic method and the experimental method.

The statistic processing had at its base the following indicators: the ponderate arithmetic mean, the trust interval of the mean - -95% - + 95%, median, the superior limit (x_{max}), the inferior limit (x_{min}), quartiles – are those values of the characteristic that divide the series in four equal parts, amplitude (W), dispersion, the quadratic mean deviation (S), the standart error, the variability coefficient (Cv).

The experiment took place in 2007 having at its base more studies of my own and consisted of a series of measurements, comparisons and interpretations.

Obtained results

The obtained results in this experiment are shown in the following tables and graphics, tables 1, 2, 3 and 4 presenting the obtained values with the help of the statistic calculi of the anthropo-motor aptitudes both at boys and girls, and figures 1 to 6 present graphically the differences between the medium values of all researched aptitudes between boys and girls.

Table 1: Obtained values with the help of statistic calculi of the anthropo-motor aptitudes at boys

Boys		Waist	Weight	Bust	Superior limbs length	Inferior limbs length
Number		50	50	50	50	50
Arithmetic mean		127.8	26.3	68.1	56.9	59.7
Trust interval of the mean	95.0%	122.4	23.5	66.0	53.9	56.3
	95.0%	133.2	29.2	70.2	59.8	63.1
Median Inferior limit		126.3	25.5	67.5	55.5	59.1
		120.0	23.0	65.0	53.0	55.0
Superior limit		137.5	32.0	72.0	63.0	66.5
Lawer Quartile		123.0	23.3	66.2	54.5	56.5
Upper Quartile		133.3	29.3	70.3	59.5	62.5
Amplitude		17.5	9.0	7.0	10.0	11.5
Dispersion		41.6	11.8	6.3	12.4	16.7
Quadratic mean deviation		6.5	3.4	2.5	3.5	4.1
Standard error		2.3	1.2	0.9	1.2	1.4
Variability coefficient		5.0	13.0	3.7	6.2	6.8

From table 1 we can notice that the arithmetic means at boys are of 127,8 cm at waist, 26,3 kg at weight, 68,1 cm at bust, and of 56,9 cm and 59,7 cm at the superior and inferior limbs length.

Table 2: Obtained values with the help of statistic calculi of the diameters and perimeters at boys

Boys		Biacromial diameter	Bitrohanterian diameter	P.T.	P.T. in inhale	P.T. in exhale
Number		50	50	50	50	50
Arithmetic mean		27.6	21.8	61.6	66.0	59.6
Trust interval of the mean	95.0%	26.1	20.7	58.9	63.8	57.3
	95.0%	29.0	22.8	64.2	68.2	61.8
Median		27.3	22.0	62.0	66.0	58.8
Inferior limit		24.5	20.0	57.0	63.0	56.0
Superior limit		30.5	23.0	67.0	70.0	64.0
Lawer Quartile		27.0	20.5	59.0	63.5	57.8
Upper Quartile		28.5	23.0	63.3	68.0	61.8
Amplitude		6.0	3.0	10.0	7.0	8.0
Dispersion		3.0	1.6	10.2	7.2	7.3
Quadratic mean deviation		1.7	1.3	3.2	2.7	2.7
Standard error		0.6	0.5	1.1	0.9	1.0
Variability coefficient		6.3	5.9	5.2	4.1	4.5

The mean values obtained with the help of statistic calculi of the diameters and perimeters at boys are of 27,6 cm respective 21,8 cm at the biacromial and bitrohanterian diameters, 61,6 cm at the thoracic perimeter in rest, 66,0 cm and 59,6 cm at the thoracic perimeter in profound inhale and in forced exhale.

Table 3: Obtained values with the help of statistic calculi of the anthropo-motor aptitudes at girls

Girls		Waist	Weight	Bust	Superior limbs length	Inferior limbs length
Number		50	50	50	50	50
Arithmetic mean		126.9	26.4	69.2	54.3	57.7
Trust interval of the mean	-95.0%	121.3	20.3	66.6	50.6	54.1
	95.0%	133.9	32.5	72.7	57.9	61.9
Median		125.7	24.0	67.8	54.0	55.5
Inferior limit		120.0	20.0	66.0	49.5	54.0
Superior limit		142.5	41.0	75.5	63.0	67.0
Lawer Quartile		122.3	21.5	66.7	50.8	53.9
Upper Quartile		131.0	29.5	72.9	56.0	60.8
Amplitude		22.5	21.0	9.5	13.5	13.0
Dispersion		57.2	53.5	13.3	18.9	21.9
Quadratic mean deviation		7.6	7.3	3.6	4.4	4.7
Standard error		2.7	2.6	1.3	1.5	1.7
Variability coefficient		5.9	27.7	5.2	8.0	8.1

Also, we can notice in table 3 the arithmetic means of the anthropo-motor parameters measured at girls, these being of 126,9 cm at waist, 26,4 cm at weight, 69,2 cm at bust, also 54,3 cm and 57,7 cm at the superior and inferior limbs length.

Table 4: Obtained values with the help of statistic calculi of the diameters and perimeters at girls

Girls		Biacromial diameter	Bitrohanterian diameter	P.T.	P.T. in inhale	P.T. in exhale
		50	50	50	50	50
Arithmetic mean		27.0	21.4	61.9	65.4	59.4
Trust interval of the mean	-95.0%	25.5	19.5	55.3	59.4	53.5
	95.0%	28.5	23.4	68.5	71.5	65.3
Median		26.3	21.0	60.0	62.8	56.5
Inferior limit		25.5	19.0	54.0	59.0	52.5
Superior limit		30.5	25.0	74.0	77.0	71.0
Lawer Quartile		26.0	19.5	56.0	60.0	55.3
Upper Quartile		27.8	23.3	67.8	71.0	64.0
Amplitude		5.0	6.0	20.0	18.0	18.5
Dispersion		3.1	5.2	62.5	52.4	49.9
Quadratic mean deviation		1.8	2.3	7.9	7.2	7.1
Standard error		0.6	0.8	2.8	2.6	2.5
Variability coefficient		6.6	10.7	12.8	11.1	11.9

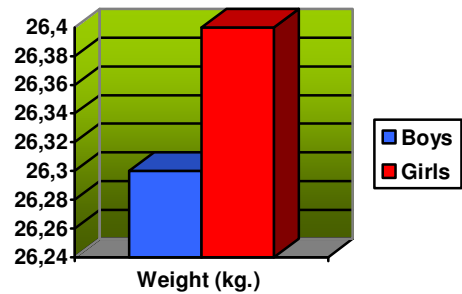The statistic calculi of the diameters and perimeters at girls give us certain medium values of 27,0 cm respectively 21,4 cm at the biacromial and bitrohanterian diameters, 61,9 cm at the thoracic

perimeter in rest and of 65,4 cm and 59,4 cm at the thoracic perimeter in profound inhale and forced exhale.
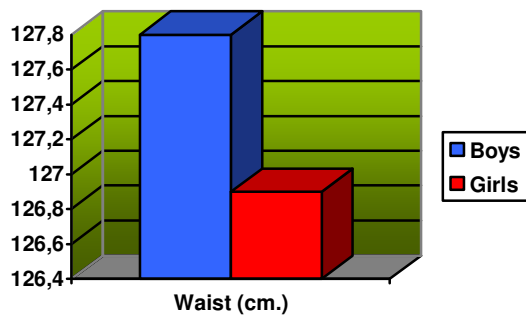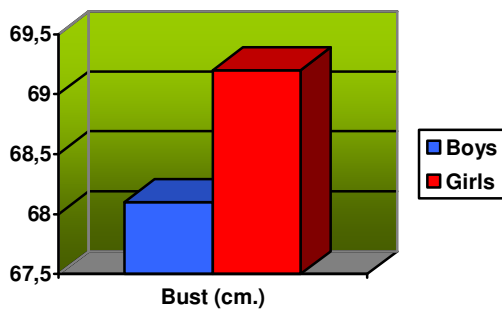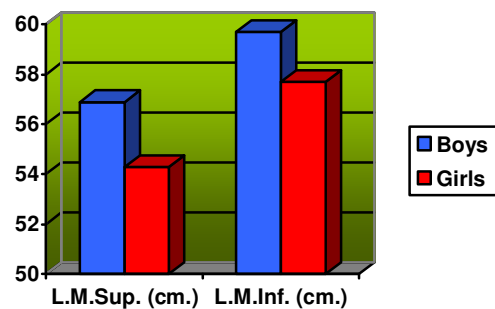

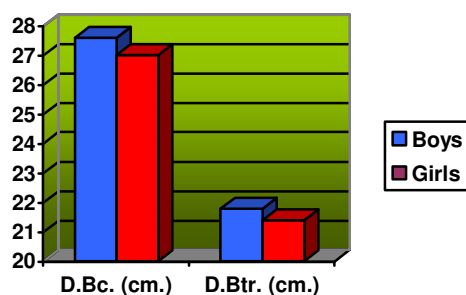**Figure 1:** Medium values of the waist at boys and girls

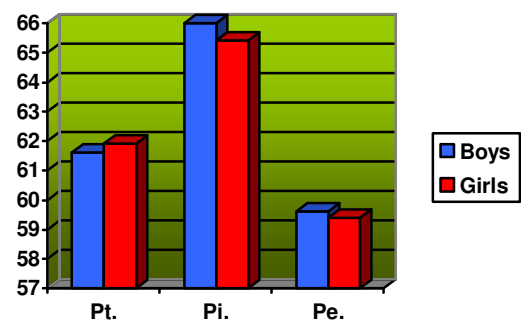**Figure 2:** Medium values of weight at boys and girls

Figure 3: Medium values of the bust at boys and girls

Figure 4: Medium values of the superior and inferior limbs at boys and girls

Figure 5: Medium values of the biacromial and bitrohanterian diameter (boys and girls)

Figure 6: Medium values of the thoracic perimeter in rest, profound inhale and forced exhale

Discussions

From the previously presented data we can say that, in what concerns the waist, the difference between boys and girls is of 0,9 cm in favor of the boys, the homogeneity degree being high both at the girls and boys. Also, the difference between girls and boys at the weight parameter is insignificant, this being of just 0,1 cm., the homogeneity level being medium at boys and weak at girls.

Studying the figure 3, also the tables 1 and 3, we can say that, the bust values differ at the two sexes, the boys having a smaller bust with 1,1 cm. than the girls, the values homogeneity being higher at both groups.

From the point of view of the superior and inferior limbs length we notice inferior values at both parameters at girls towards the boys, the difference being of 2,6 cm. at the superior limbs and of 2 cm for the inferior ones, the homogeneity degree level being higher at both sexes both at the superior and inferior limbs.

In what concerns the biacromial and bitrohanterian diameters we can notice that the values tendency is an inferior one at the both diameters at girls in comparison with boys, the difference being of 0,6 cm. for the biacromial and of 0,4 cm. for the bitrohanterian diameter. From the obtained data results that the homogeneity is higher, at boys, at both measure diameters, while at girls this is higher only at the biacromial diameter, at the bitrohanterian one the values homogeneity being medium, but at closed level from the higher homogeneity.

The medium values of the thoracic perimeter in rest are relatively close, the difference being of 0,3 cm. in favor of the girls, while at the thoracic perimeters means in profound inhale and forced exhale these values are superior at boys, the differences being of 0,6 cm. for the thoracic perimeter in profound inhale and of 0,2 cm. for the thoracic perimeter in forced exhale. The resulted values have a high level of homogeneity at all the three thoracic perimeters measured for boys and medium for girls.

From the calculus of the indexes Amar and Adrian Ionescu we noticed relatively low differences of proportionality between the two sexes, the values of the index Amar being of 53,28 at boys and 54,53 at girls, and the one of the index Adrian Ionescu being of 4,2 at boys and 5,75 at girls. The values of the thoracic elasticity are of 6,4 cm at boys and 6 cm at girls.

Conclusions

- Analyzing the obtained results we can say that at the age of 7-8 there are no considerable differences between boys and girls in what concerns the measured parameters values, these differences being in their large majority insignificant, noticing also relatively minor differences of proportionality between the two sexes.

- At this age, the selection itself must be treated as a process with a progressive character, avoiding the wrong conception to be understood as a moment operation, knowing that the somatic, anthropo-motor parameters have a different evolution at this age, evolution influenced by a series of internal and external factors.

- At the same time, we must make the difference, by the specialists that work with children of this age, between the chronologic and the biological age, between the two being able to appear significant differences.

- The selection process must allow the participation in the performance sport of only those children that have a very good well-being, the health factor being very important at the level of the initial selection process.

- From the presented data we noticed small differences of proportionality between the two sexes.

REFERENCES

BOTA, C., 2000, *Ergofiziologie*, Edit. Globus, Bucureşti, 280-281.

COLIBABA, E. D., BOTA I., 1998, *Jocuri sportive – Teorie şi metodică* , Edit. Aldin, Bucureşti, 213-216.

IFRIM, M., 1986, *Antropologie Motrică*, Editura Ştiinţifică şi Enciclopedică, Bucureşti, 40-42.

MANNO, R., 1996, *Bazele teoretice ale antrenamentului sportiv*, C.C.P.S., Bucureşti, 29-30.

FEDERAŢIA ROMÂNĂ DE PATINAJ, 1987, *Criterii, probe şi norme pentru selecţia în patinaj*, C.N.E.F.S, C.C.E.F.S. and F.R.P, Bucureşti.

FEDERAŢIA ROMÂNĂ DE PATINAJ, 1991, *Patinaj*, U.I.P., 29, Bucureşti, 111-112.