

Disorders of sexual development of school boys in clinical praxis: the study of Rīga Stradiņš University, 2005–2007

Zeltīte Cēderštrēma,

Jānis Vētra,

Ilva Duļevska

Department of Anatomy and Anthropology, Institute of Anatomy and Anthropology, Rīga Stradiņš University, Latvia

Background. Disorders of sexual differentiation and sexual development is the topic, which was little spoken of in society in recent past, and about which doctors had very superficial knowledge. The aim of our research is to study how sexual development is exposed in Latvia among school-age boys and whether any deviations in sexual development can be encountered.

Material and methods. The chief indicator of secondary sexual signs is the development of testicles, which was chosen to be the basis for our study. 683 boys involved into the study, aged from 7 to 18 years, were divided into 12 age groups. Sagittal size or thickness of the testis was measured by J. Tanner's method. By sagittal size or the testis thickness we understand the measurement, which is carried out from the external surface of the testis towards its internal surface.

Results. In the study process we found out, that the problems of testicle development among Latvia's boys are similar to those in the world described in the literature. The most surprising finding was that part of the boys studied and their parents did not have any idea of the existence of this problem. Therefore, the question arises concerning the quality of medical professionals' duties and the attitude towards man's health as such.

Conclusions. The growth of the testes is gradual, reaching its maximum at puberty, the size of the right and left side testes do not differ. Developmental deviations of the testes in the populations of boys are rather wide-spread. The most common developmental deviation of the testes is bilateral cryptorchism.

Key words: sexual development, boys, anthropometry, cryptorchism

INTRODUCTION

Changes in social and economical factors call for the necessity to follow up the changes of the human body forms and functions (1–4), as well as to test, whether the boys in Riga city are seen to have changes in the physical development in this century, since in the last ten years the physical and puberty parameters of boys in Latvia have not been defined. Therefore, in 2005 the Institute of Anatomy and Anthropology started a study on "Evaluation of Riga school-age boys physical development at the turn of the century". Anthropometrical measurements of 683 boys at the age from 7 to 18 years were carried out in Riga schools. In parallel to the anthropometrical measurements, the assessment of sex signs was done. One of the sex signs is the development of testes. Several developmental deviations were identified during measurements, namely, cryptorchism and pseudocryptorchism.

Cryptorchism or the condition when the testes fail to descend into the scrotum, except for the situations, when the testes

are retracted (retained within the abdomen in the outer opening of the inguinal canal) and by means of very careful palpation, it is possible to bring them into the scrotum (5). In the literature it is mainly defined as a retracted scrotum or pseudocryptorchism (6). Both cryptorchism and pseudocryptorchism tend to be unilateral and bilateral.

The aim of the study was to determine physical and sexual development parameters in boys at the age from 7 to 18 years.

MATERIALS AND METHODS

683 boys involved into the study, at the age from 7 to 18 years, were divided into 12 age groups. Sagittal size or thickness of the testis was measured by J. Tanner's method (1962) (7). By sagittal size or the testis thickness we understand the measurement, which is carried out from the external surface of the testis towards its internal surface.

RESULTS

In the study the sagittal size of the testis (Tables 1, 2), developmental deviations of the testes and their incidence (Tables 3, 4) were analyzed.

At the age from 7 to 9 years, the size of the testes is within 0.7 to 0.85 cm, at the age from 10 to 12 years the mean value of the testes ranges from 0.1 to 1.68 cm, however, from 13 to 17 years the size of the testes is within the borders from 2.17 to 2.86 cm. At the age of 18 they reach the sagittal size of 3.0 cm.

Table 1. Size of the right testis

Age of boys, years	n	Min, cm	Max, cm	Mean, cm	SD
7	55	0.5	1.0	0.72	0.15
8	66	0.5	1.5	0.78	0.15
9	62	0.6	1.5	0.85	0.35
10	57	0.5	1.8	1.01	0.37
11	56	0.7	2.5	1.25	0.39
12	65	0.7	3.5	1.68	0.41
13	50	0.8	2.8	2.18	0.71
14	58	0.8	3.5	2.37	0.46
15	38	2.3	4.0	2.84	0.57
16	83	0.9	4.0	2.88	0.40
17	62	1.9	3.8	2.86	0.57
18	30	2.5	3.3	3.0	0.38

n – number of persons.

Table 2. Size of the left testis

Age of boys, years	n	Min, cm	Max, cm	Mean, cm	SD
7	55	0.5	1.0	0.70	0.18
8	66	0.5	1.5	0.75	0.37
9	62	0.6	1.5	0.84	0.41
10	57	0.5	1.8	1.03	0.38
11	56	0.6	2.5	1.25	0.41
12	65	0.6	2.8	1.67	0.58
13	50	0.7	2.8	2.17	0.47
14	58	0.8	3.5	2.35	0.58
15	38	2.3	4.0	2.84	0.40
16	83	0.9	3.9	2.88	0.56
17	62	1.9	3.8	2.86	0.38
18	30	2.5	3.3	3.0	0.20

n – number of persons.

In the group of 7-year-olds, 3.63% (2 cases) out of 55 boys were found to have pathology, 50% of which were bilateral cryptorchism and 50% left side cryptorchism.

In the group of 8-year-olds, 13.6% (9 cases) out of 66 boys were found with pathologies, 50% of which were bilateral cryptorchism, 22.22% right side cryptorchism, and 33.33% left side cryptorchism.

In the group of 9-year-olds, 14.28% (9 cases) out of 63 boys were found to have pathologies: 44.4% bilateral cryptorchism, 22.22% left side cryptorchism, 11.11% bilateral pseudocryptorchism, 11.11% right and 11.11% left side pseudocryptorchism.

In the group of 10-year-olds (84 boys), 10.52% (6 cases) were found to have pathologies: 33.3% bilateral cryptorchism, 50% right side cryptorchism, 16.66% bilateral and 16.66% right side pseudocryptorchism, while 16.66% had other changes.

In the group of 11-year-olds (56 boys), pathologies were found in 5.35% (3 cases), of which 33.33% were bilateral cryptorchism, 33.33% bilateral pseudocryptorchism and 33.33% other changes.

In the group of 12-year-olds, 15.38% (10 cases) out of 65 boys were with pathologies, of which 30% were bilateral cryptorchism, 30% right side cryptorchism, 10% bilateral pseudocryptorchism and 50% other testicular changes.

In the group of 13-year-olds (50 boys), 4.0% (2 cases) were found to have pathologies, 50% of which were bilateral cryptorchism and 50% other testicular changes.

In the group of 14-year-olds, 17.24% (1 case) out of 58 boys, in the group of 16-year-olds, 2.4% (2 cases) out of 83 boys, in the group of 17-year-olds, 3.2% (2 cases) out of 62 boys, in the group of 18-year-olds, 3.33% (1 case) out of 30 boys were found to have other pathologies. In the group of 15-year-olds, no developmental deviations of the testes were determined in the group of 38 boys.

DISCUSSION

In 1989, Hjertkvist and co-authors analyzed and described the chief risk factors of cryptorchism. Almost 100% cases of cryptorchism are diagnosed in children, who are born with the body mass <900 g, 17% in cases when the weight at birth is from 2000 g to 2500 g, but in pre-term boys, cryptorchism is seen in 5–7% cases. After the age of 1 year, cryptorchism rate rapidly decreases and it constitutes from 1% to 2.5% (8).

At Rīga Stradiņš University Children's Clinical Hospital, 435 pre-term boys and 354 full-term boys underwent observation for a period of five years. The acquired data show that cryptorchism in pre-term boys is seen in 30.8% cases, while in full-term boys it is observed 10 times rarer (3.8% cases). Besides, in pre-term boys whose body mass is <1500 g, cryptorchism was seen in 56.5% cases (9, 10). Similar data are also described in the literature (11, 12).

In the study of 2005–2007, out of the 683 boys measured, 47 were diagnosed to have deviations in the testicle development, and in 28 cases, or 59.56%, of which cryptorchism was observed.

The literature data can make us conclude, that cryptorchism is more common in boys, whose gestation period is up to 37 weeks, as well as in twins (13). Besides, the lesser is the weight of pre-term boys, the more common is cryptorchism. The common sign in pre-term born children is that in the majority of cases the testicle goes down at the age of 3 months, i.e. reaching the real gestation time, but the common sign in all the newborn boys is that after the age of one year, cryptorchism is seen only in 1–4% cases.

Complications due to cryptorchism:

1. infertility – in a unilateral cryptorchism group 60–90% men are married and 80% of them have children. In the bilaterally corrected cryptorchism group, 50% of men have children;
2. malignization – seminomata are most commonly seen uncorrected or corrected late (after puberty) in cryptorchism cases;
3. testicular torsion and injury – in cases of cryptorchism the risk for testicular torsion increases. Torsion may happen within

Table 3. Cryptorchism and other developmental deviations

Age of boys, years	n	n*	Developmental deviation						Other
			Cryptorchism			Pseudocryptorchism			
			bilateral	right side	left side	bilateral	right side	left side	
7	55	2	1	–	1	–	–	–	–
8	66	9	4	2	3	–	–	–	–
9	63	9	4	–	2	1	1	1	–
10	57	6	2	1	–	1	1	–	1
11	56	3	1	–	–	1	–	–	1
12	65	10	3	3	–	1	2	–	–
13	50	2	1	–	–	–	–	–	1
14	58	1	–	–	–	–	–	–	1
15	38	–	–	–	–	–	–	–	–
16	83	2	–	–	–	–	–	–	2
17	62	2	–	–	–	–	–	–	2
18	30	1	–	–	–	–	–	–	1
	683	47	16	6	6	4	4	1	9

n – number of persons; n* – number of cases.

Table 4. Developmental deviation (%)

Age of boys, years	n	n*	Developmental deviation						Other
			Cryptorchism			Pseudocryptorchism			
			bilateral	right side	left side	bilateral	right side	left side	
7	5	3.63	50.0	0	50.0	0	0	0	0
8	66	13.6	44.4	22.22	33.33	0	0	0	0
9	63	14.28	44.4	0	22.22	11.11	11.11	11.11	0
10	57	10.52	33.3	50.0	0	16.66	16.66	0	16.66
11	56	5.35	33.3	0	0	33.33	0	0	33.33
12	65	15.38	30.0	30.0	0	10.0	20.0	0	0
13	50	4.00	50.0	0	0	0	0	0	50.0
14	58	17.24	0	0	0	0	0	0	100.0
15	38	0	0	0	0	0	0	0	0
16	83	2.4	0	0	0	0	0	0	100.0
17	62	3.22	0	0	0	0	0	0	100.0
18	30	3.33	0	0	0	0	0	0	100.0
	683	6.88	34.04	12.76	12.76	8.51	8.51	2.12	19.14

n – number of persons, n* – number of cases.

the uterus and at any time after the birth. Testicles, which are outside scrotum, get constantly traumatized and cause a sense of discomfort to a child.

4. cosmetic and psychological aspects – lack of testicles both in children and in adult males causes a serious psychological trauma, therefore in the case of anorchism it is possible to substitute it by prosthesis.

The method of treatment and assessment of results may be difficult because of the variety of cryptorchism classifications described in the literature. The outcome of cryptorchism treatment depends on the form of cryptorchism, the child's age and the treatment method chosen. There are such cryptorchism forms as pseudocryptorchism which does not call for any treatment. According to the data of Rīga Stradiņš University Children's Hospital, pseudocryptorchism accounts for 30% of

the total number of cryptorchism patients. The literature data describe that treatment of cryptorchism has to be started after reaching one year of life, thus decreasing the possibility of testicular degeneration.

Surgical operation plays the leading role in the treatment of cryptorchism today. The treatment of cryptorchism, considering its complicated etiopathogenesis, classification, operating technique and specificities of methods, has to be entrusted to experienced clinical paediatric surgeons or paediatric urologists, and also inviting paediatric endocrinologists.

CONCLUSIONS

Having analyzed the data obtained, the following conclusions were made:

1. the growth of the testes is gradual, reaching its maximum at puberty, i. e. at the age of 13–14 years, the size of the right and left side testes does not, in fact, differ;

2. developmental deviations of the testes in the populations of boys are rather wide-spread: 6.88% or 47 cases out of 683 boys under the study;

3. the most common developmental deviation of the testes is bilateral cryptorchism – 34.04% or 16 cases.

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