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Statistical data on pediatric congenital musculoskeletal anomalies (malformations) in St. Petersburg

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Introduction A scientifically-based knowledge on the incidence, dynamics of detection and structure of congenital malformations of the musculoskeletal system (CMMS) has both practical and scientific significance. For many years, the Turner Institute has close scientific and practical ties with the state public health institution "Diagnostic Medical and Genetic Center" of St. Petersburg which carries out a regional monitoring of congenital disorders in St. Petersburg. Our **objective** was to present regional statistical data on the CMMS detection and structure in newborns and children of the first and second years of life, morbidity and disability in children aged 0-17 years in connection with congenital malformations of the musculoskeletal system, to study the proportion of CMMS patients in the orthopedic clinic and their need for surgical, including high-tech, treatment, and dispensary follow-ups in outpatient orthopaedic settings. **Material and methods** Regional statistics of St. Petersburg on prevalence, dynamics and structure of congenital malformations of the musculoskeletal system in children born in St. Petersburg in 2001–2015 were analyzed. The statistical data on the prevalence of congenital malformations of the musculoskeletal system in children aged 0–17 years in St. Petersburg were studied. Based on the studies conducted at the Turner Institute in 2014–2016, the proportion of patients treated for congenital malformations of the musculoskeletal system was revealed as well as their need for surgical treatment. Peculiarities of dispensary follow-ups of CMMS patients at orthopedic consultations of children's clinics of St. Petersburg were analyzed. **Results and discussion** The prevalence and structure of congenital malformations of the musculoskeletal system in 783,000 children born in St. Petersburg in the period of 2001–2015 are presented in accordance with blocks Q65–Q79 of ICD-10. Diagnostic results of congenital malformations of the musculoskeletal system in newborns (2.70 ‰) and in children of the same group until they reached three years of age (4.21 ‰) were studied in dynamics. Infacnts and children up to 17 years old with congenital malformations of the musculoskeletal system are under regular supervision of orthopedic surgeons. Disability due to congenital anomalies and malformations takes the third place among all the diseases detected in patients aged 0-17 years, established by pediatric medical and social expert boards of St. Petersburg. At the clinic of the Turner Institute, the proportion of patients with CMMS among all admitted patients was 38.6 %. Among them, 78 % of patients with CMMS received surgical treatment, of which 80 % of operations were performed using high technologies. Conclusions Statistics on congenital malformations of the musculoskeletal system in newborns and children under 3 years old and a high level of their disability shows the need in a specialized care for these children, including high-tech surgical treatment.

Keywords: children, statistics, congenital anomalies, malformations, deformities, musculoskeletal system

INTRODUCTION

Children with congenital malformations (CM), deformities and chromosomal abnormalities need constant care and medical supervision from the first days of their life. Their treatment is long-lasting, sometimes throughout life. Children with persistent disorders of the body functions due to congenital anomalies (malformations) often receive the category of "disabled child" and need social protection in the system of state-guaranteed economic and legal measures, as well as social support. Individual programs of rehabilitation and habilitation of invalids (IPR) include medical rehabilitation, reconstructive surgery, prosthetics and orthotics, sanatorium and spa treatment, and provision of technical means and services to the disabled at the expense of the federal budget according to indicationse [1]. At the age of 18, a patient with a CM who was categorized as a "disabled child" is transferred to the adult system of medical institutions for treatment and is referred to as "an invalid since childhood", which means that he/she still needs social support from the state.

Families that have children with developmental defects suffer a lot. One of the members of the family, more often a mother, has to leave work to take care of the child and follow treatment recommendations. Due to neurologic disorders, functional and anatomical abnormalities, a child with a CM has difficulties or is unable to visit a nursery or other children's institution. The conditions for obtaining education are limited, and there is always uncertainty about the possibility of

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getting a job and integrating into society. The families frequently break up. Moral and physical difficulties are accompanied by financial distress. Siblings also suffer because parents do not have time to pay them enough attention. Thus, the life of children with disabilities due to CMs and people around them is a huge medical and social problem.

Scientific data on the prevalence, dynamics of detection and structure of congenital malformations of the musculoskeletal system (CMMS) have both practical and scientific significance. On the one hand, they identify the number of children with CMMS among the general population, and on the other they help determine the needs of such patients for social support, rehabilitation, conservative and surgical treatment. However, collection of the data presents certain difficulties, since the CMMSs (Q65-Q79) according to the state statistics of the Ministry of Health of Russia belong to class XVII "Congenital malformations, deformations and chromosomal abnormalities," in which the malformations and abnormalities of fourteen organs and systems were united [2].

Turner Research Institute for Children's Orthopaedics of the Ministry of Health of Russia has close scientific and practical ties with the state public health institution Diagnostic Medical Genetic Center of St. Petersburg for many years. The center, organized in 1969, conducts medical genetic counseling of families on the progeny prognosis, diagnosis of congenital and hereditary malformations, mass neonatal screening of newborns aimed at detection of orphan diseases [3]. Since 1999, it has been conducting regional monitoring of congenital pathology in St. Petersburg. The monitoring tasks include creation of a database of epidemiological information by registering CMs in newborns, children of the first and second years of life, monitoring the frequency and dynamics of certain CMs in accordance with ICD-10 codes. For specialists in traumatology and orthopedics, it is especially important that DMGC separately registers congenital malformations and deformations of the musculoskeletal system (Q65-Q79 according to ICD-10) that are part of class XVII "Congenital malformations, deformations and chromosomal abnormalities" [4, 5].

The aim of the study was to present regional statistics on the detection of CMs of the musculoskeletal system in newborns and children of the first and second years of life, the statistics on morbidity and disability in children aged 0-17 years in connection with CMMS, to study the proportion of patients with CMMS in the orthopedic clinic and their need for surgical treatment, including high-tech care, and dispensary examination in outpatient settings.

MATERIAL AND METHODS

The statistical database of St. Petersburg (SPb), characterizing the prevalence, dynamics and structure of congenital malformations (anormalities) of the musculoskeletal system (CMMS) in children born in St. Petersburg in 2001-2015 was analyzed. The statistical data on the prevalence of CMMSs in children aged 0-17 years in St. Petersburg were studied. Based on the activities of the clinic of the Turner Institute of the Ministry of Health of Russia in 2014-2016, we revealed the proportion of patients treated for CMMS as inpatients and their need for surgical treatment. The peculiarities of dispensary follow-ups of patients with CMMS in SPb's orthopedic consultations of children's consultative clinics were analyzed.

RESULTS AND DISCUSSION

From January 2001 to December 2015, 78,2921 children were born in St. Petersburg. Maternity hospitals reported on CMs detected in each of the newborns for all 14 systems and organs belonging to class XVII "Congenital malformations, deformations and chromosomal abnormalities" to the organizational and methodical office of DMGS. If the CM diagnosis was first established during the first and second years of the child's life, this information was additionally transmitted to the DMGC from other medical institutions, consultative clinics, hospitals, and children's homes. The monitoring of congenital pathology of newborns in St. Petersburg is of great importance. It is the database of epidemiological information about the CMs in the city. It allows for CM identification in various systems and organs, determines the gender composition of affected children, uses statistics in scientific research and compares the data with other regions of Russia.

Totally, 16,417 cases of congenital anomalies of class XVII were identified in children born in St. Petersburg in 2001-2015. That is, 21 children out of 1,000 had some developmental defect. The developmental defects were recorded at the DMGC for organs and systems in accordance with ICD-10.

Of this amount, 3,230 cases of congenital malformations (developmental anomalies) of the musculoskeletal system (CMMS) were detected and documented and made 19.7 % of the total in class XVII. The gender ratio of boys /girls with CMMSs was 1.25:1. In quantitative and percentage values, CMMSs are inferior only to congenital malformations of the cardiovascular system, which were detected in

5,244 children or 31.9 %.

According to the data from maternity hospitals, 2,120 cases of CMMS were diagnosed among 78,2921newborns for 15 years, which amounted to 2.708 per 1,000 births. In children of the same group, during the first and second years of life, the total number of CMMSs grew up to 3,230 cases after examination by specialists and imaging studies. There were 4.126 cases of congenital anomalies per 1,000 children under 2 years of age (inclusive), and a CM case could be detected in one of the 242 children examined.

Comparison of the detection rate of separate CMMSs in newborns and in children who have reached the age of 3 years shows that the diagnosis of anomalies has improved and the number of cases detected increases in % relative to the total number of CMMSs (columns 3 and 6 of Table 1) as the child grows with respect to the revealed pathology per 1,000 children (columns 4 and 7). At the same time, the number of children in whom a single case of congenital pathology could be detected (columns 5 and 8) decreased.

If CMMS was visible without further examination (polydactyly, syndactyly, reduction defects of upper and lower limbs, absent distal parts of extremities) the identification of pathology reached 75 % or more in maternity hospitals. Deformities of the feet and osteochondroplasia with a change in the shape of the chest were detected in newborns in 70 %. Deformations of the sternocleidomastoid muscle and deformity of the spine in newborns were established only in 13-15 % when compared to children under 3 years old. Perhaps this is because the clinical signs of torticollis become noticeable several weeks after birth while the congenital pathology of the spine is identified by specialists using radiographic examination. An important conclusion was that the diagnosis "Congenital deformities of the femur", despite a large number of described symptoms and evidence of the need for early treatment of this pathology, was established in newborns only in 48 %.

More detailed information on separte congenital malformations of the musculoskeletal system and connective tissue is presented in Table 2. These data are of interest in studying the epidemiology of certain CMMS types and for scientific research. It is noteworthy that some CMMSs were diagnosed only in single cases in 15 years. This can be explained not only by the rarity of the pathology, but also by the fact that doctors of different profiles transmit data on CMs to the MGC. A lot of them are not familiar with the symptoms of rare anomalies and orphan diseases, and therefore they cannot conclude accurately on the condition in the first two years of child's life. Moreover, it is possible that, in some cases, CMMS occurs in children with multiple developmental defects, and DMHC registers a more severe underlying pathology.

Table 1

CMMSs identified in 782,921 children, born in St. Petersburg in the period from January 2001 to December 2015, and registered during the newborn period, and then supplemented after the first and second years of life of children up to the age of 3 years

ICD-10 code	CMMS	Data from maternity hospitals, maternity wards in municipal and federal institutions on newborn children			General data on children from 0 to 3 years old (from maternity hospitals, children's homes, diagnostic centers, consultative clinics, and hospitals)		
		CMMS Number and % in newborns and infants of the 1st year of life	Per 1,000 of born children ‰ (pro mille)	One case detected in «x» of children born	CMMS Number and % in children up to 3 years of age	Per 1,00 children, born for 3 years, ‰	One case detected in «x» of children born for 3 years
1	2	3	4	5	6	7	8
Q65	Congenital deformities of hip	279 / 13.2 %	0.356	2810	580 / 18.0 %	0.741	1350
Q66	Congenital deformities of feet	505 / 23.9 %	0.645	1550	723 / 22.4 %	0.923	1083
Q67.5–Q67.7	Congenital musculoskeletal deformities of spine and chest	6 / 0.3 %	0.008	125000	45 / 1.4 %	0.057	17398
Q68	Other congenital musculoskeletal deformities	41 / 1.9 %	0.052	19231	131 / 4.1 %	0.167	5976
Q69	Polydactyly	565 / 26.6 %	0.721	1387	757 / 23.4 %	0.967	1034
Q70	Syndactyly	478 / 22.5 %	0.610	1639	623 / 19.3 %	0.796	1257
Q71–Q73	Reduction defects of upper limb and lower limbs	103 / 4.8 %	0.131	7634	138 / 4.3 %	0.175	5714
Q74	Other congenital malformations of limb(s)	50 / 2.4 %	0.064	15625	80 / 2.5 %	0.102	9804
Q76	Congenital malformations of spine and bony thorax	50 / 2.4 %	0.064	15625	87 / 2.7 %	0.111	8999
Q77	Osteochondrodysplasia with defects of growth of tubular bones and spine	17 / 0.8 %	0.022	45455	21 / 0.6 %	0.027	37282
Q78	Other osteochondrodysplasias	19 / 0.9 %	0.024	41667	21 / 0.6 %	0.027	37282
Q 79	Congenital malformations of musculoskeletal system, not elsewhere classified	7 / 0.3 %	0.009	111110	24 / 0.7 %	0.031	32622
Total	Q65–Q79	2120 / 100 %	2.708	369	3230 / 100 %	4.126	242

Table 2

CMMS detected in 78,2921 children born in St. Petersburg between January 2001 and December 2015 and identified in the age up to 3 years

ICD- 10 code	CMMS	CMMS number in children up to	% to the total CMMS	‰ per 1,000 children born for 3 years, pro mille	1 case detected in «x» children up to 3 years of age
	Number of children – 78,2921				
Q65	Congenital deformities of hip	63	1.95	0.080	12427
Q65.0	Congenital dislocation of hip, unilateral	101	3.12	0.129	7752
Q65.1	Congenital dislocation of hip, bilateral	73	2.26	0.093	10725
Q65.2	Congenital dislocation of hip, unspecified	7	0.21	0.009	111846
Q65.3	Congenital subluxation of hip, unilateral	45	1.39	0.057	17398
Q65.4	Congenital subluxation of hip, bilateral	24	7.55	0.031	32622
Q65.5	Congenital subluxation of hip, unspecified	6	0.18	0.008	130487
Q65.6	Unstable hip	174	5.38	0.222	4500
Q65.8	Other congenital deformities of hip	81	2.50	0.103	9666
Q65.9	Congenital deformity of hip, hnspecified	6	0.18	0.008	130487
Q66	Congenital deformities of feet	79	2.44	0.101	9910
Q66.0	Talipes equinovarus	107	3.31	0.137	7317
Q66.1	Talipes calcaneovarus	76	2.35	0.097	10302
Q66.2	Metatarsus varus	165	5.10	0.211	4745
Q66.3	Other congenital varus deformities of feet	12	0.37	0.015	65243
Q66.4	Talipes calcaneovalgus	80	2.47	0.102	9787
Q66.5	Congenital pes planus	11	0.34	0.014	71175
Q66.6	Other congenital valgus deformities of feet	29	0.89	0.037	26997
Q66.7	Pes cavus	1	0.03	0.001	782921
Q66.8	Other congenital deformities of feet	153	4.73	0.195	5117
Q66.9	Congenital deformityof feet, unspecified	10	0.30	0.013	78292
Q67.5	Congenital deformity of spine	12	0.37	0.015	65243
Q67.6	Pectus excavatum	28	0.86	0.036	27961
Q67.7	Pectus carinatum	1	0.03	0.001	782921
Q67.8	Other congenital deformities of chest	4	0.12	0.005	195730
Q68	Other congenital musculoskeletal deformities	18	0.55	0.023	43496
Q68.0	Congenital deformity of sternocleidomastoid muscle	67	2.07	0.086	11685
Q68.1	Congenital deformity of hand	11	0.34	0.014	71175
Q68.2	Congenital deformity of knee	11	0.34	0.014	71175
Q68.3	Congenital bowing of femur	4	0.12	0.005	195730
Q68.5	Congenital bowing of long bones of leg, unspecified	3	0.09	0.004	260974
Q68.8	Other specified congenital musculoskeletal deformities	17	0.52	0.022	46054
Q69	Polydactyly	91	2.81	0.116	8604
Q69.0	Accessory finger(s)	344	10.65	0.439	2276
Q69.1	Accessory thumb(s)	166	5.13	0.212	4716
Q69.2	Accessory toe(s)	110	3.40	0.140	7117
Q69.9	Polydactyly, unspecified	46	1.42	0.059	17020
Q70	Syndactyly	39	1.20	0.050	20075
Q70.0	Fused fingers	46	1.42	0.059	17020
Q70.1	Webbed fingers	22	0.68	0.028	35587
Q70.2	Fused toes	328	10.15	0.419	2387
Q70.3	Webbed toes	128	3.96	0.163	6117
Q70.4	Polysyndactyly	41	1.27	0.052	19096
Q70.9	Syndactyly, unspecified	19	0.58	0.024	41206
Q71	Reduction defects of upper limb	8	0.24	0.010	97865
Q71.0	Congenital complete absence of upper limb(s)	2	0.06	0.003	391461
Q71.1	Congenital absence of upper arm and forearm with hand present	1	0.03	0.001	782921
Q71.2	Congenital absence of both forearm and hand	13	0.40	0.017	60225
Q71.3	Congenital absence of hand and finger(s)	45	1.39	0.057	17398
Q71.4	Longitudinal reduction defect of radius	5	0.15	0.006	156584

Continuation of table 2

CMMS detected in 78,2921 children born in St. Petersburg between January 2001 and December 2015 and identified in the age up to 3 years

ICD- 10 code	CMMS	CMMS number in children up to	% to the total CMMS	‰ per 1,000 children born for 3 years, pro mille	1 case detected in «x» children up to 3 years of age
Q71.6	Lobster-claw hand	4	0.12	0.005	195730
Q71.8	Other reduction defects of upper limb(s)	8	0.24	0.010	97865
Q71.9	Reduction defect of upper limb, unspecified	5	0.15	0.006	156584
Q72	Reduction defects of lower limb	7	0.21	0.009	111846
Q72.0	Congenital complete absence of lower limb(s)	1	0.03	0.001	782921
Q72.2	Congenital absence of both lower leg and foot	4	0.12	0.005	195730
Q72.3	Congenital absence of foot and toe(s)	13	0.40	0.017	60225
Q72.4	Longitudinal reduction defect of femur	3	0.09	0.004	260974
Q72.8	Other reduction defects of lower limb(s)	4	0.12	0.005	195730
Q72.9	Reduction defect of lower limb, unspecified	3	0.09	0.004	260974
Q73	Reduction defects of unspecified limb	2	0.06	0.003	391461
Q73.0	Congenital absence of unspecified limb(s)	1	0.03	0.001	782921
Q73.1	Phocomelia, unspecified limb(s)	4	0.12	0.005	195730
Q73.8	Other reduction defects of unspecified limb(s)	5	0.15	0.006	156584
Q74	Other congenital malformations of limb (s)	16	0.49	0.020	48933
Q74.0	Other congenital malformations of upper limb(s), including shoulder girdle	7	0.21	0.009	111846
Q74.1	Congenital malformation of knee	6	0.18	0.008	130487
Q74.2	Other congenital malformations of lower limb(s), including pelvic girdle	8	0.24	0.010	97865
Q74.3	Arthrogryposis multiplex congenita	9	0.27	0.011	86991
Q74.8	Other specified congenital malformations of limb(s)	29	0.89	0.037	26997
Q74.9	Unspecified congenital malformation of limb(s)	5	0.15	0.006	156584
Q76	Congenital malformation of spine and bony thorax	5	0.15	0.006	156584
Q76.0	Spina bifida occulta	7	0.21	0.009	111846
Q76.1	Klippel-Feil syndrome	2	0.06	0.003	391461
Q76.3	Congenital scoliosis due to congenital bony malformation	9	0.27	0.011	86991
Q76.4	Other congenital malformations of spine, not associated with scoliosis	17	0.52	0.022	46054
Q76.5	Cervical rib	26	0.80	0.033	30112
Q76.6	Other congenital malformations of ribs	13	0.40	0.017	60225
Q76.7	Congenital malformation of sternum	4	0.12	0.005	195730
Q76.8	Other congenital malformations of bony thorax	2	0.06	0.003	391461
Q76.9	Congenital malformation of bony thorax, unspecified	2	0.06	0.003	391461
Q77	Osteochondrodysplasia with defects of growth of tubular bones and spine	1	0.03	0.001	782921
Q77.0	Achondrogenesis	1	0.03	0.001	782921
Q77.1	Thanatophoric short stature	1	0.03	0.001	782921
Q77.4	Achondroplasia	16	0.49	0.020	48933
Q77.5	Dystrophic dysplasia	1	0.03	0.001	782921
Q77.9	Osteochondrodysplasia with defects of growth of tubular bones and spine, unspecified	1	0.03	0.001	782921
Q78	Other osteochondrodysplasias	2	0.06	0.003	391461
Q78.0	Osteogenesis imperfecta	9	0.27	0.011	86991
Q78.1	Polyostotic fibrous dysplasia	1	0.03	0.001	782921
Q78.5	Metaphyseal dysplasia	2	0.06	0.003	391461
Q78.6	Multiple congenital exostoses	4	0.12	0.005	195730
Q78.8	Other specified osteochondrodysplasias	3	0.09	0.004	260974
Q79	Congenital malformations of the musculoskeletal system, not elsewhere classified	10	0.30	0.013	78292
Q79.6	Ehlers-Danlos syndrome	1	0.03	0.001	782921
Q79.8	Poland syndrome	13	0.40	0.017	60225
Total in the group: Q65 - Q79		**3230**	**100 %**	**4.126 ‰**	**242**

Based on the statistical data of the State Medical and Information Analytical Center (MIAC) of the St. Petersburg Committee for Public Health, the statistics of congenital anomalies (malformations) in children from 0 to 17 years old were studied. Congenital anomalies of class XVII in children from 0 to 14 years old were 36,000 cases (50 ‰) and 5,000 cases (48 ‰) were registered in children aged from 15 to 17 years in outpatient and inpatient treatment and prevention institutions of St. Petersburg in 2016. The comparison shows that congenital pathology accumulates in the population and does not tend to decrease as the children grow up. Congenital anomalies of MSS were not separated from the whole class XVII in the statistical lists of MIAC.

The tasks of orthopedists at children's consultative clinics of St. Petersburg included preventive examinations of pediatric population for early CMMS diagnosis, correctional and medical prevention work with patients, referring to them for comprehensive complex rehabilitation treatment in clinics, hospitals, sanatoriums. Among the patients with congenital and acquired diseases of the MSS and with the consequences of injuries that were under the supervision of district orthopedists, diagnosis of CMMS was established in 30 to 40 % of children. Children were observed and received out-patient treatment in orthopedic consultative facilities of St. Petersburg. Among the nosological forms detected in children undergoing orthopedic dispensary observation, there were (in decreasing order) deformities of the feet, reduction defects of the upper limbs, congenital deformities of the hip, osteochondroplasia with defects in bone and spine growth, congenital anomalies of the spine and bones of the chest, including children who underwent surgical restorative treatment for CMMS in hospitals. Continuity in the work of inpatient and outpatient units is extremely important. Following up the child in the process of growth and his/her rehabilitation reduces the degree of anatomical and functional disorders, helps prevent recurrences and complications, and decreases the number of children with disabilities.

In cases of severe congenital MSS pathology, orthopedists of consultative clinics refer patients for examination to a medical and social expert commission. The experts of pediatric MSEC confer the category "disabled child" on the basis of persistent anatomical changes and functional disturbances in the movement of the head, trunk, extremities, with disfiguring disorders due to congenital scarring, contractures and deformities, incomplete differentiation of limb parts, when limitations of life activities and social insufficiency are present.

The statistics of St. Petersburg's MIAC registers children's disability as a whole in class XVII "Congenital malformations, deformities and chromosomal abnormalities." In 2016, disabled children of class XVII accounted for 13.5 % from the total number of children with disabilities in the city. Of this group, primary disability was detected in 42.5 %, and disability was re-recognized in 57.5 %. Boys with disabilities prevailed (60.6 %). Children by age groups were as follows: 0-4 years old – 33.5 %, 5-9 years old – 29.3 %, 10-14 years old – 23.2 %, 15-17 years old – 14.0 %. According to the calculations given above, CMMSs account for about 19 % of class XVII, so it is possible to imagine an approximate number and sex/age ratios of disabled children with CMMS.

After the child has been graded as disabled, an individual rehabilitation program is offered to him/her. Children with disabilities should execute it under the supervision of an orthopedic surgeon of the children's consultative clinic of St. Petersburg. Orthopedists refered children with disabilities to conservative complex treatment (gymnastics, massage, physiotherapy) that they undergo at children's consultative clinics (39 %), to children and adolescent departments of hospitals (46.7 %), to the city rehabilitation center for pediatric orthopedics and traumatology named “Ogoniok”. Children with disabilities were referred for obtaining technical means of rehabilitation: fixation devices (15.2 %), fixation corsets (4.6 %), crutches (8.4 %), orthopedic footwear, braces and insoles (23.5 %). Reconstructive and restorative surgical treatment of disabled children was conducted at the Turner Institute for Children’s Orthopaedics.

Located in St. Petersburg, the Research Institute for Children's Orthopedics named after G.I. Turner has a huge experience in diagnosing, treating and rehabilitating patients with CMMS. More than 33 thousand patients from different regions of Russia and CIS countries apply to the consultative and diagnostic center of the Institute every year. Out of 21,069 patients treated at the Institute's clinic in 2014-2016, children with CMMS amounted to 8,131 or 38.6 % of

all the hospitalized. Of these, 12.7 % were residents of St. Petersburg, 3.1 % from the Leningrad region, 81.4 % represented the regions of Russia and 2.8 % came from the CIS countries.

Among CMMS patients who received specialized treatment in the Institute's clinic, children with congenital deformities of the hip were 20.8 %, congenital musculoskeletal deformities (25 %) and congenital limb anomalies (24 %), osteochondrodysplasia (8.8 %), congenital anomalies of the spine and chest bones (7.5 %), with congenital anomalies of the face and neck (7.1 %).

Out of 8,131 children with CMMS, 6,340 patients (78.0 %) received surgical treatment, including 5,035 patients who underwent high-tech operations using federal quotas and clinical approbations (79.5 % of all interventions). The most frequent high-tech operations were for congenital deformities of the hand and reduction defects of the upper limb (1,598), congenital deformities of the hip (924), congenital multiple arthrogryposis (624), congenital deformities of the foot and reduction defects of the lower extremity (622), anomalies of the spine (451).

Such novel technologies as microsurgical techniques for transplantation of tissues and organs, computer technologies in correction and stabilization of congenital spine pathology, hip replacement in adolescents, distraction osteosynthesis using a new-generation of transosseous apparatus based on computer navigation "Ortho-Suv", cell technologies in the treatment of congenital maxillofacial malformation were used. Since the introduction of conservative treatment for congenital clubfoot by the Ponseti method, the number of interventions for congenital clubfoot decreased. The majority of CMMS patients were admitted to the clinic repeatedly at the stages of surgical treatment. Thus, the statistical data of the Turner Institute also demonstrate the great need of CMMS children in surgical treatment, including high technologies.

CONCLUSIONS

1. Data on the regional statistics of St. Petersburg characterize the prevalence of congenital anomalies (malformations) of class XVII "Congenital anomalies (malformations), deformities and chromosomal abnormalities" (16,417 cases – 22.5 ‰) in children born in St. Petersburg in 2001-2015. Congenital malformations (malformations) of the musculoskeletal system were detected in 19.7 % of class XVII and were registered.

2. Comparison of separate CMMS cases detected and registered in newborns, and then the addition of CM cases diagnosed in the same group of children until they reach the age of three years shows that as a child grows, the diagnosis of anomalies improves, and the number of registered CMMSs increases both in the number of cases detected and in the revealed pathology per 1,000 children of the corresponding age (in newborns 2.7 ‰, in children under 3 years – 4.13 ‰).

3. Comparison of the structure of detected CMMS in newborns and children under 3 years shows that more than 70 % of congenital anomalies of MS visible without additional examination (polydactyly, syndactyly, reduction defects of the upper and lower extremities, foot deformities and changes in the shape of the chest are detected and recorded in maternity hospitals. The diagnosis "Congenital deformities of the femur", despite the large number of described symptoms and proofs of the need for early treatment of this pathology, is established in newborns in no more than 48 %.

4. Up to 45 % of children are diagnosed with CMMS among the patients undergoing dispensary supervision of district orthopedists. Children with disabilities due to CMMS undergo reconstructive and restorative surgical treatment in accordance with an individual rehabilitation programs, conservative complex rehabilitation treatment, are referred to facilities for the manufacture of technical means of rehabilitation, and to sanatorium treatment. Clinical follow-ups of CMMS patients after in-patient surgical treatment prevent recurrences and complications during the child's growth.

5. Among the patients treated for 3 years at the clinic of the Turner Institute of the Ministry of Health of Russia, 38.6 % were diagnosed with" Congenital anomalies (malformations) of the MSS. Among them, only 15.8 % were residents of St. Petersburg and the Leningrad region. Surgical treatment was received by 78 % of patients with CMMS, of which 79.5 % underwent surgical interventions using high technologies.

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