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GROWTH AND DEVELOPMENT OF THE SCAPULA IN CHILDREN WITH SPRENGEL DISEASE AFTER DEFORMATION CORRECTION

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The topicality of the problem. Congenital high standing of the scapula or Sprengel's disease is a complex anomaly in the development of the shoulder girdle, spine and chest [1,2,3,4,5]. In Sprengel's disease, a complex of developmental anomalies is observed, the main manifestations of which are: violation of the spatial position, growth and deformation of the scapula, displacement in the cranial direction of the proximal end of the clavicle, hypoplasia of the muscles of the shoulder girdle and trunk, up to their complete aplasia, impaired functional state of the neuromuscular apparatus, pathology of the main vessels and impaired peripheral blood flow [6,7,8]. So far, the development and formation of the scapular bone after its reduction to a normal level in children have not been sufficiently studied.

The purpose of this work is to study the growth and formation of the scapula in children with Sprengel's disease in the postoperative period.

Materials and methods. We carried out clinical and radiological methods of research in 33 children with congenital high standing of the scapula, from 4 to 13 years old, who were treated by the surgical method in the Department of Pediatric Orthopedics of the State Institution RSNPMCTO of the Ministry of Health of the Republic of Uzbekistan for the period from 2012 to 2022. All patients underwent clinical, digital X-ray, MSCT examination of the chest to study the shape and size of the scapula. The studies were carried out in the X-ray department: X-ray studies in a modern digital device WDM, HF51-5 (manufactured in China), MSCT studies on a Neuviz 64 device from Neusoft (manufactured in China).

All patients were divided into 2 groups. The first group (12 children) included patients operated on without reconstruction of the shape of the scapula. The second group included 21 children operated on with reconstruction of the shape of the scapula.

X-ray measurements and determination of the size of the scapula during MSCT studies were carried out. The dimensions of the scapula before and after surgical treatment in the control and main groups of patients were analyzed. The index of the scapula was determined by dividing the length of the scapula by the width (Fig. 1):

	scapula length
Blade bone index=	**scapula width**

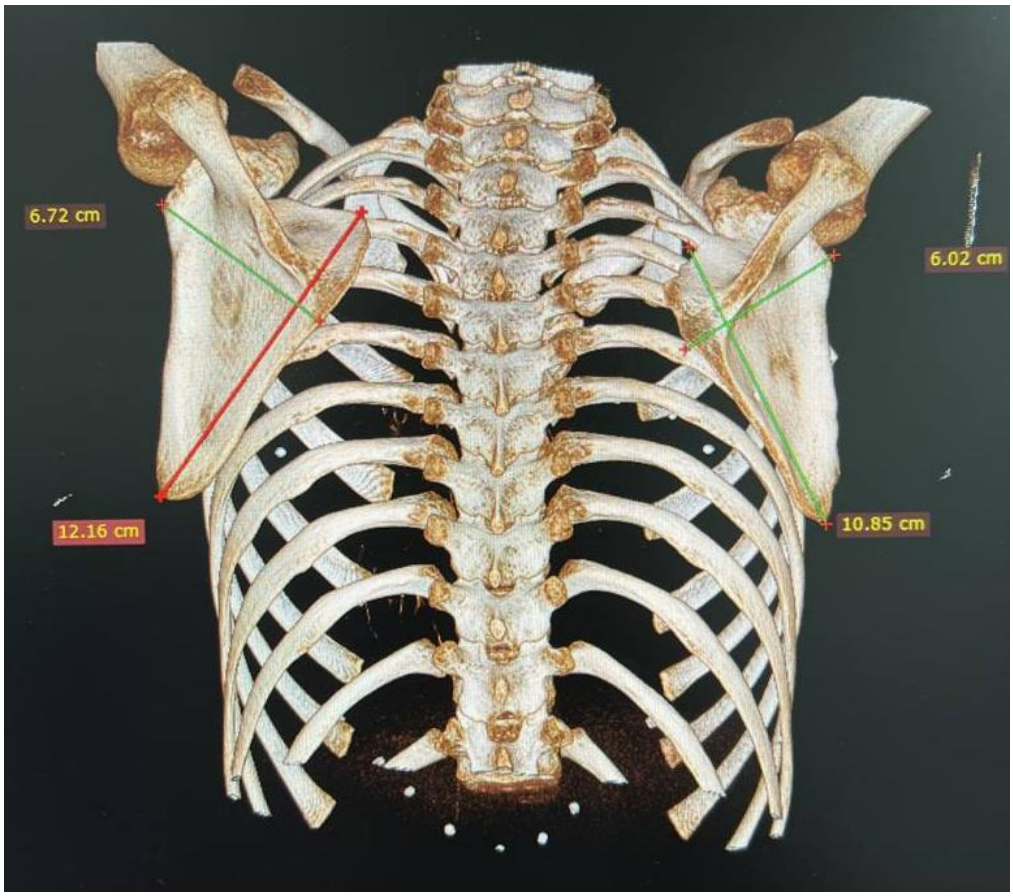


Fig.1. Scheme for determining the index of the scapula by MSCT of the chest

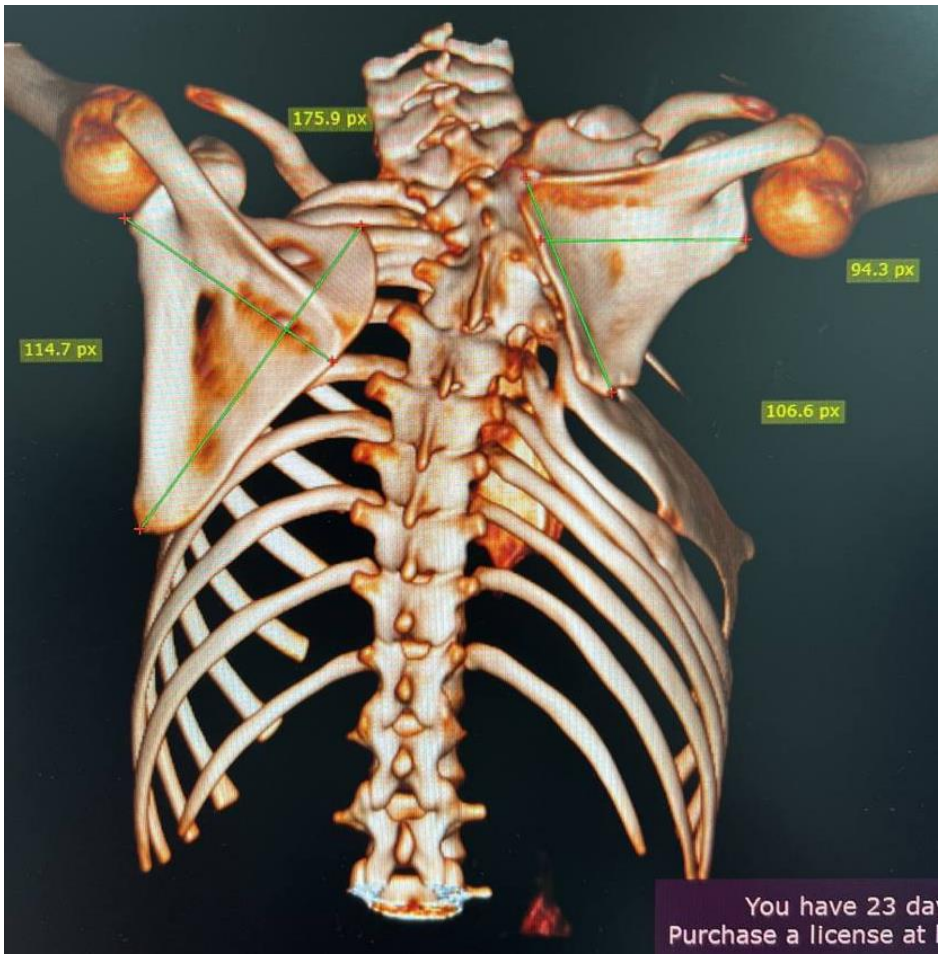


Fig.2. MSCT of the chest of patient A.S., 11 years old, with congenital high standing of the scapula on the right.

All patients measured the dimensions (length and width) of the scapular bone in both the affected and healthy sides. The index of the scapula was calculated as follows: length of the scapula/width of the scapula. In accordance with the purpose and objectives of the study, the digital data obtained during the work were processed by statistical methods. When analyzing statistical data, mean values, relative values, mean errors of relative values and mean values were calculated. The reliability of differences in digital indicators was determined by Student's t-test, on the basis of which the degree of probability of an error-free forecast was determined - "P".

For statistical processing of primary data and the implementation of some special algorithms and statistical analysis, the capabilities of the Excel 2017 program (Microsoft, USA) were used.

Taking into account the peculiarities of the analyzed data, parametric methods were used only to describe the general characteristics inherent in the compared indicators in the groups.

To determine the differences in the distribution of indicators between groups, universal methods of non-parametric statistics and the corresponding criteria were used. To assess the statistical significance of the calculated criteria, indicators and tables of critical values for acceptable significance levels (P) were used. For statistical differences, four main levels of significance were taken: high - $P < 0.001$ (***), medium - $P < 0.01$ (**), low (limiting) - $P < 0.05$ (*), insignificant (insignificant) - $P > 0.05$. Factor analysis was performed using the method of principal components (Quartimax Normalized variant).

Research results and discussion.

Our observations have shown that in children with Sprengel's disease, not only an abnormal high location of the scapula is observed, but also underdevelopment and deformation of the shape of the scapula. In 9 children, we noted hook-shaped, in 11 - concave and 13 - mixed deformation of the shape of the scapula. In the control group of patients, we performed operations to lower the scapular bone without changing the shape of the scapula. In the main group of patients (22 children), operations were performed with the reduction and reconstruction of the pathological form of the scapula. Reconstruction of the shape of the scapula was performed by subperiosteal fracture along the line of deformation and then fixed by suturing with Mylar thread or Ilizarov wires.

The size of the scapula was measured in all children before surgery and in the long-term period after treatment - from one year to 11 years. Table No. 1 presents the results of measuring the size of the scapula in children of the control group of patients.

Table 1

Dimensions of the scapula in children with Sprengel's disease control group before and after surgery

Treatment period	Healthy side		Affected side		Blade index	
	Scapula length	Scapula width	Scapula length	Scapula width	Healthy side	Affected side
Before treatment	10,36± 1,03	5,92±0,66	7,81±0,70	5,51±0,66	1,73±0,12	1,42±0,21
After treatment	12,13± 1,05	6,38±0,68	9,78±1,01	6,1±0,67	1,83±0,12	1,51±0,17

p<0,05

As can be seen from the data presented in table No. 1, the average value of the size of the scapula in patients with Sprengel's disease in the control group before treatment was: the length of the scapula in the healthy side 10.36+1.03, the width - 5.92+0.66, length of the scapula in the affected side - 7.81+0.70, width - 5.51+0.66.

The average value of the size of the scapula in patients with Sprengel's disease after surgical treatment was as follows: the length of the scapula in the healthy side was 12.13+1.05, the width was 6.38+0.68, the length of the scapula in the affected side was 9.78 +1.01, width - 6.1+0.67.

Table 2.

Dimensions of the scapula in patients with Sprengel's disease in the main group of patients before and after surgical treatment

Treatment period	Healthy side		Affected side		Blade index	
	Scapula length	Scapula width	Scapula length	Scapula width	Healthy side	Affected side
Before treatment	11,41± 1,06	6,12±0,89	8,54±0,78	5,92±0,86	1,93±0,34	1,52±0,67
After treatment	13,21± 1,01	7,26±0,76	11,02±1,02	6,01±0,68	1,95±0,22	1,71±0,18

As can be seen from the data presented in table No. 2, the average value of the size of the scapula in patients with Sprengel's disease in the main group of patients before treatment was: the length of the scapula on the healthy side - 11.41 + 1.06, the width - 6.12 + 0 .89, length of the scapula in the affected side - 8.54+0.78, width - 5.92+0.86.

The average value of the size of the scapula in patients with Sprengel's disease after surgical treatment was: the length of the scapula on the healthy side - 13.21 + 1.01, the width - 7.26 + 0.76, the length of the scapula on the affected side - 11.02 +1.02, width - 6.01+0.68.

The index of the scapula in children with Sprengel's disease in the healthy side before treatment in the control group of patients was 1.83+0.12, in the main group of patients it was 1.93+0.34, in the affected side in the control group of patients it was 1.42 +0.21, in the main group of patients it was 1.52+0.67. After surgical treatment in children with Sprengel's disease: in the healthy side of the control group of patients was 1.84+0.21, in the main group of patients - 1.95+0.22, in the affected side of the control group of patients was 1.42+0 ,21, in the main group of patients was 1.71±0.18.

a 

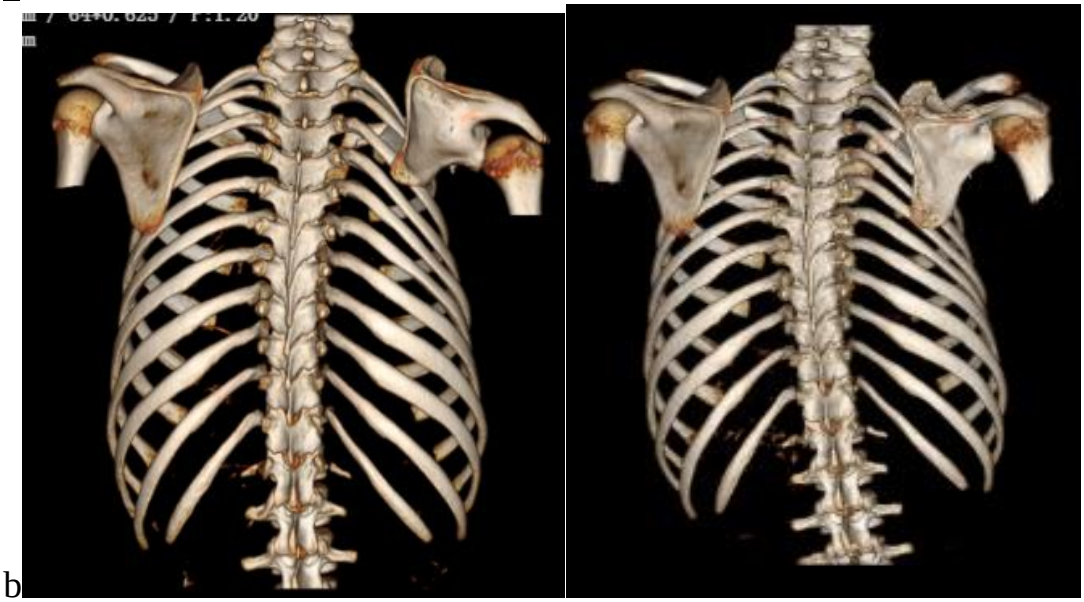
b 

Fig. 3. Patient N, 8 years old, Sprengel's disease on the right, soft tissue form, moderate severity, scoliosis of the first degree, photo and MSCT of the patient before and after surgical treatment.

Figure 3 shows a clinical example: patient N., 8 years old, with Sprengel's disease on the right, of moderate severity. The patient was brought down the right scapular bone. On MSCT tomograms, one can see the growth of the right scapula before and after surgical treatment. The index of the scapula before surgery is 1.4, after surgery - 1.7.

Conclusions: Thus, MSCT research is an indispensable method for diagnosing the form and development of Sprengel's disease in children. The undoubted advantage of the MSCT study was the analysis of the shape and size of the scapula, which made it possible to objectively assess the shape, size, spatial relative position of the bones, plan a surgical treatment plan, and determine the growth and development of the scapula before and after surgical treatment.

Our studies have shown that surgical treatment with reconstruction of the pathological shape of the scapula favorably affects the growth and restoration of the size of the scapula closer to normal values.

References:

1. Cho T.J. The Sprengel deformity morphometric analysis using 3D-CT and its clinical relevance / T.J. Cho, I.H. Choi, C.Y. Chung, J.K. Hwang // J. Bone Jt Surg [Br]. - 2000. - Vol. 82-B, #5. - P.711-718.

2. Samartzis D, Herman J, Lubicky JP, Shen FH. Sprengel's deformity in Klippel-Feil syndrome. Spine. Aug 15 2007;32(18):E512-6.

3. Sadofeva V.I. Normal X-ray anatomy of the shoulder girdle and upper limb. Normal X-ray anatomy of the osteoarticular system in children. - L .: Medicine, 1990. - S. 80-104.

4. O'Brien SJ, Voos JE, Nevasier AS, Drakos MC, . Developmental anatomy of the shoulder and anatomy of the glenohumeral joint.. In: Rockwood CA, Matsen FA, eds. The shoulder. (4th ed.). Philadelphia, PA: Saunders/Elsevier; 2009. p. 1-12

5. Kadavkolan AS, Bhatia DN, DasGupta B, Bhosale PB, . Sprengelen deformity of the shoulder: Current perspectives in management. Int J Shoulder Surg. 2011;5:1-8.

6. Boon JM, Potgieter D, Van Jaarsveld Z, Frantzen DJ. Congenital undescended scapula (Sprengel deformity): a case study. Clinic Anat. Mar 2002;15(2):139-42.

7. Algazali M.I. Sprengel deformity associated with the omovertebral bridge between the inferior angle of the scapula and the cervical spine: a case report. Qad Med J. 2014; 10:234-8.

8. Azuz E.M. CT demonstration of an omovertebral bone. Ped Radiol. 2007; 37:404.