THE FIRST EXPERIENCE OF ANTERIOR DYNAMIC CORRECTION OF SCOLIOSIS IN ADOLESCENTS WITH COMPLETE GROWTH AND ADULTS: SURGICAL TECHNIQUE AND IMMEDIATE RESULTS

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Objective. To describe the technique of anterior scoliosis correction in patients with completed growth and to analyze immediate results of its application.

Material and Methods. Study design: retrospective clinical series. Level of evidence IV (D). A retrospective analysis of clinical and radiological data of 19 patients aged 13–44 years, who underwent anterior dynamic correction of typical idiopathic scoliosis, was performed. Patients were divided into groups as follows: Group 1 (Lenke type 1 scoliosis) – 8 patients; Group 2 (Lenke 3) – 4 patients; and Group 3 (Lenke 5) – 7 patients. When analyzing clinical and radiological data, the age was taken into account; the deformity magnitude before and after surgery, and correction angle, were studied; and intraoperative blood loss, the number of fixed levels, duration of surgery and hospital stay length were evaluated. The functional status was assessed using the VAS and the SRS-22 questionnaire. Control examinations were carried out before and after surgery as well as at 4–6 weeks and 3, 6, and 12 months after surgery. The search for statistically significant differences was carried out between all groups in pairs: between groups 1 and 2, 2 and 3, and 1 and 3. Statistical analysis was conducted using Mann – Whitney U-test. The SRS-22 and VAS data were processed using the Wilcoxon W-test.

Results. The number of dynamically fixed levels varied from 6 to 12. The most proximal level of fixation was T5, the most distal – L4. The average time of surgery was 181 ± 28 minutes for transthoracic access and 198 ± 34 minutes for thoracophrenolumbotomy. The average length of hospital stay was 7.2 ± 1.5 days. In the intergroup comparison of indicators of age, mean angle of deformity before and after surgery, mean angle of correction and blood loss between groups with Lenke 1 and 3 scoliosis, no statistically significant differences were found. Comparison of the same indicators for groups with Lenke 1 and 5 scoliosis showed significant differences in the angles of deformity after surgery and in the number of fixed levels ($p = 0.024$ and $p = 0.006$, respectively). There were also no statistical differences between types 1 and 5. At 3 months after surgery the average SRS-22 score for all patients was 4.0 ± 0.42 (from 3.00 to 4.95). The VAS score changed from 6.9 ± 1.5 (4.0–9.0) before surgery to 4.4 ± 1.6 (1.0–7.0) which indicates the effectiveness of the treatment in the short term.

Conclusion. Analysis of the immediate results of anterior dynamic correction of Lenke type 1, 3 and 5 scoliotic deformities in physically active young adults showed positive primary effectiveness in terms of VAS and SRS-22, which makes it possible to recommend this technique for use in the presented cohort of patients. The method is effective for all studied types of scoliosis, with a greater efficiency in Lenke types 1 and 5. Further evaluation of long-term results on a larger clinical material will allow developing more precise indications and an algorithm for application of the method.

Key Words: anterior dynamic scoliosis correction, adult scoliosis, Lenke classification.

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The gold standard of surgical treatment of idiopathic scoliosis is the formation of a bone block applying both posterior and anterior approaches to the spine in patients with deformities more than 40° according to Cobb. So far, the non-surgical therapy has proven itself well. For example, with the help of individual active spinal supports in children and adolescents [1–3]. Nevertheless, at the beginning of puberty, accompanied by accelerated growth and development, almost 75 % of patients with deformities up to 30° need surgical correction, even after corset treatment [4–7]. However, hard stabilization has a number of serious shortcomings: an intrusive limitation of the growth potential of the spine, the development risk of the adjacent segment disease in the future, a complete lack of mobility of the spine in the fixed area. The spinal fusion performance also affects the growth of the chest and lungs due to the close anatomical and physiological relationship between the chest and the spine [8].

The dynamic correction of the growing spine (vertebral body tethering – VBT) is a new technique in growing patients. An Anterior Scoliosis Correction - ASC is applied for adults since the remodeling technique is impossible in this situation. ASC is the initial approach to the correction of deformities with the complete growth of the spine, which promotes its flexibility. Before the adoption of this method in practice, studies on animal models for biomechanical justification of growth modulation

were published. The experiments were performed in mini pigs, which had a certain growth potential. According to these experiments, a flexible cord installed between the transpedicular screws through the anterior approach can change the morphology of the spine and result in its deformity [9]. There are also similar studies conducted on other animals like goats and cows [10, 11].

These methods remain to be explored. There is skimpy information concerning the long-term results of treatment, even among the pioneers of the use of this technique. The method is based on the technology of transcorporal implantation of titanium screws on the outer side of the primary curve (curves), in the heads of which a flexible (polyethylene terephthalate) cord is passed and fixed. The main difficulty of deformity correction is sequential compression with fixation of the tense cord using special tools. In order to install the system, open and endoscopic approaches are used in the thoracic segment, and for lumbar and thoracolumbar – only opened one within a small incision [12–14] due to the anatomical features of this area.

The VBT principle is applied in patients with a certain growth potential. The potential candidates for surgery using this method have different types of deformities. Most of them suffer from idiopathic scoliosis (adolescent, juvenile or some other forms, for example, syndromic associated with genetic diseases: Marfan syndrome, Prader – Willi syndrome, etc. [15, 16]). Each case is individually evaluated and is thoroughly reviewed. As a rule, the patients are over 10. They have a potential growth and good mobility of the spine. Also, these patients have a thoracic, thoracolumbar or lumbar curve(s) with a magnitude from 30 to 80°.

We observe a group of patients with scoliotic deformity and completed growth potential or close to it. These patients underwent surgical treatment using anterior scoliosis correction with a follow-up period from 3 months to a year. Such selection of patients was performed consciously to avoid possible complications when mastering the techniques associated with hypercorrection and cord break described in children [17]. The study consisted of young physically active adults whose use of this method was justified by their desire to preserve the spine mobility in the fixed area after deformity correction.

The objective is the following: to describe the technique of anterior dynamic scoliosis correction in patients with completed growth and to analyze immediate results of its application.

The study design is a retrospective clinical series. Level of evidence IV (D).

Material and Methods

A retrospective analysis of clinical and radiological data of 19 patients aged 13–44 years (18 women, 1 man), who underwent anterior dynamic correction of typical idiopathic scoliosis in June 2019 – February 2020, was performed. The following indications were used for the application of ASC: the curve magnitude is not more than 70°; spinal mobility is not less than 40% in functional tests; BMI is less than 30; according to the densitometry of the Ward region of the femoral necks, the T-criterion is more than -1.5 (absence of osteoporosis/osteopenia); absence of pronounced degenerative changes of intervertebral cartilages by MRI (Pfirrmann I–II). All the surgeries were carried out by open approach.

The patients with scoliosis of those types for which the number of observations was less than 4 were excluded from the analysis at the study planning stage. These are the 2nd and 6th types (one patient each). Therefore, the number of patients declined from the initial 21 to 19. Patients with the 4th type of scoliosis did not seek for a medical advice during the specified period and, accordingly, were not included in the study. The patient groups were formed as follows: Lenke 1 – 8 patients, Lenke 3 – 4, and Lenke 5 – 7. The total number of patients was 19. They were compared with each other in pairs.

For statistical analysis, the following indicators were selected: age, the deformity magnitude according to Cobb before and after surgery, as well as correction angle, and blood loss. The number of fixed levels, duration of surgery and hospital stay length were evaluated. The functional status was assessed using the VAS and the SRS-22 questionnaire. Control examinations were carried out before and after surgery as well as at 4–6 weeks and 3, 6, and 12 months after surgery. Prior to the surgery, all patients and their families were warned about the use of the new technique, as well as the risk of complications. They have signed a written informed consent for intervention.

Since the patient groups are numerically small (8, 4 and 7 patients), it was agreed to use nonparametric criteria for their comparison. We have applied Mann – Whitney U-test. The SRS-22 and VAS data were processed using the Wilcoxon W-criteria.

Surgical technique. The side-lying position was chosen for the patient and the convex side of the deformity was upwards. The vertebral levels to determine optimal approach were confirmed by intraoperative fluoroscopy in anteroposterior and lateral positions. A standard thoracotomy is done with rib resection, especially during surgeries when bone grafts are required for interbody spinal fusion. While performing this surgery, the thoracotomy at the same level without resection of the rib was done if there was a short fixation of a small curve with one cord.

The principle of determining the upper and lower end vertebrae for fixation is similar to that for the standard rigid anterior stabilization of scoliotic deformity. The choice of end vertebrae for both thoracic and lumbar deformities relied on the position of the neutral vertebrae of the main structural curve on the basis of functional radiographs performed with slopes in the patient's backlying position. The distal fixation level was defined by the position of the most caudal first opening disc in direct projection on radiographs in the patient's standing position and the disc through which the central sacral vertical line passes, as well as on functional radiographs with slopes in the patient's back-

lying position. The choice of the proximal fixation level was identified by the position of the lower vertebra of the segment that deviated less than 10° during the bending test. Moreover, the number of vertebrae of the distal arm should be at least two from the apex of the deformity (Fig. 1).

In order to select the correct intercostal level, the 12th rib was palpated and EOP control was done. For thoracolumbar approach, the incision can be extended in the direction of the external abdominal oblique by about 3-5 cm anteriorly. The incision length depended on the part of the lumbar spine to be visualized. Following visualization of the deformity apex, X-ray control of the levels was done. The parietal pleura (Fig. 2) dissected throughout the entire length of the planned fixation over the vertebral bodies and discs. After the pleura was dissected, the lungs were retracted (Fig. 2), the anterolateral part of the vertebral bodies was skeletonized. The segmental vessels were identified, coagulated and dissected. It may be argued that segmental vessels should be preserved [18]. Nevertheless, according to our experience, the preservation of segmental vessels considerably complicates approach to the vertebral bodies and implantation, increases the risk of bleeding in the postoperative period. We did not face any complications related to segmental vascular dissection. The special feature is that this should be done in the middle of the vertebral bodies to preserve collateral blood circulation between the segmental arteries in the intervertebral foramen.

For additional retroperitoneal approach, the incision is widened caudally in the direction of the muscle fibers of the external abdominal oblique. Depending on the level of lower thoracotomy, it may be essential to dissect the costal arch followed by retroperitoneal approach through the costochondral juncture. A special attention should be paid to the surgical release of the peritoneum (Fig. 2) from the quadratus lumborum and iliac muscles, as well as the identification of the ureter in the posterior part of the peritoneum, from which it is released anteromedially. When the peritoneum separates from the posterior and lateral abdominal walls and the diaphragm, the latter, then the internal oblique and transverse muscles can be crossed by electrocoagulation. The diaphragm is dissected at a length of no more than 1 cm from its attachment to prevent denervation of the descending phrenic nerve (Fig. 2).

The lumbar muscle is retracted posteriorly, exposing segmental vessels located at the midpoint between the lumbar spaces, which can be bandaged or coagulated and dissected. This enables to perform additional surgical release of the lumbar muscle for visualization of the entire lateral border of both the lumbar vertebrae and discs.

Once performing access and before installing the screws, the upper and lower endplates, the anterior edge of the body and the anterior border of the spinal canal should be clearly identified for each vertebra. The special staples with denticles in combination with bicortical passage of screws show a much more stable fixation compared to only fixing with screws (Fig. 3).

The titanium screws for transpedicular fixation are installed on the convex side of the spinal deformity transcorporally (Fig. 2); then a flexible cord made of polyethylene terephthalate (Fig. 2) is passed from the bottom up through the heads of screws installed in the vertebral bodies. The next step is to place a pusher with a T-shaped handle on the jacks of the screws alternately. The spine correction is arranged due to the tethering of the cord between the vertebrae and the vertebrae translation. The tethering degree is controlled visually and with by means of a marker on the tensioner handle. As a rule, one cord is used in the thoracic spine; two in the thoracic and lumbar departments; up to the level of the T7 vertebra it is possible to use two cords routinely. The proximal approach is more difficult due to the small size of the vertebral bodies. The nuts on each screw are tightened after reaching the appropriate correction. The deformity is eliminated by alternately tightening the cord between the screw heads.

In patients with preserved axial growth, a continued growth results in further correction of the primary curve. After all the nuts are finally fixed, the fluorovisualization of the spine is carried out both in the antero-posterior and in the lateral projection to confirm the deformity correction (Fig. 4).

Then the excess cord sections are cut off and left at least 2 cm at both ends. It is problematic to suture the pleura in the presence of implants, but this is not required, since it has a good regenerative ability. A pleural drainage is installed with a thoracophrenolumbotomy of the lower part, suitable for the suturing site of the diaphragm. The pleural cavity is irrigated, the lung is bellied again under the under direct vision; aero- and hemostasis performed; the wound is sutured in layers.

Results

In total, 21 surgeries were performed in 19 patients. In two cases, two-stage intervention was required with repeated surgery from the contralateral side after 3 months.

Three patients underwent two stages in one surgical session: a combination of traditional and dynamic fixation. Moreover, the first one was a selective posterior correction of the thoracic spine. Then the patient was laid on his side for the anterior stage. This technique was chosen for patients with rigid deformities of the thoracic spine. It is impossible to achieve satisfactory correction with dynamic fixation, as well as due to the presence of hypercorkyphosis, which cannot be eliminated with a flexible cord (Fig. 5).

Out of eight patients with Lenke type 1 deformity, only three underwent anterior fixation via thoracotomy approach. In the remaining five cases, thoracophrenolumbotomy was required due to the elongation of fixation below L1, and in six cases, double thoracotomy was essential.

The number of levels of dynamic fixation for all types ranged from 6 to 12. The complete data distribution for patients is given in Table. The most proximal fixation level is T5, the most distal is L4. As

a rule, in case of Lenke 5 curve, the fixation area was T11–L4. Two cords were used in the lumbar and thoracolumbar departments in order to increase the strength of the structure and prevent its rupture. In the thoracic spine, one cord is enough, since the rib cage creates additional stability and has less mobility in comparison with the lumbar section. The small size of the vertebral bodies in the thoracic spine limits the possibility of installing two screws, especially in young patients. During the correction of double curves, one screw was also installed in the lower end vertebra of the thoracic part of fixation and in the upper end vertebra of the lumbar part of fixation.

The average time of surgery was 181 ± 28 minutes for transthoracic access and 198 ± 34 minutes for thoracophrenolumbotomy. There were no complications during intraoperative neuromonitoring, as well as neurological deficits in the postoperative period. The average length of hospital stay was 7.2 ± 1.5 days.

All but two 13-year-olds in whom the Risser test was 4 had bone growth completed. The Sanders test was not carried out. The predominant part of the patients was over 18.

In the comparison of indicators of age, mean angle of deformity before and after surgery, mean angle of correction and blood loss between groups (Table 1) with Lenke 1 and 3 scoliosis, no statistically significant differences were found.

The comparison of the same indicators for groups with Lenke 3 and 5 scoliosis showed significant differences in the angles of deformity after surgery (Lenke 3: 28.2° ± 7.2°; Lenke 5: 12.6° ± 9.5°) and in the number of fixed levels (Lenke 3: 9.5° ± 1.0°; Lenke 5: 6.4° ± 1.0°; $p = 0.024$ and $p = 0.006$, respectively). Since the differences for the initial angle of deformity are statistically insignificant ($p > 0.05$), we argue that different effectiveness of treatment of types 1 and 3 scoliosis is possible. However, this requires further research on more clinical material. In this regard, there were no statistically significant differences among the considered indicators before the surgery. The differences have appeared after the surgery. It is anticipated that type 5 is more susceptible to ASC treatment than type 3 and may have a significantly better prognosis. There were no statistical differences found between types 1 and 5.

There is no sufficient statistical significance for differences in the angles before the surgery between groups I and II, II and III, as well as the deformity angles after the intervention between groups I and II at this stage. Nevertheless, they can be considered as potentially provable ($0.05 < p < 0.1$) with an improvement in the number of patients, including when adding new observations to those already included in this study.

We have not identified any problems due to cord rupture, correction loss or hypercorrection at the observation stages, which may be connected with a short observation period. Pneumonia at the side of the surgical access was noted among the complications in a case. It was reverted within two months after the surgery. Despite the limited possibilities of derotation when using a flexible cord, it was possible to achieve a satisfactory clinical result in most cases (Fig. 6).

According to the evaluation scales, in 3 months after the surgery the average SRS-22 score for all patients was 4.0 ± 0.42 (from 3.00 to 4.95). The VAS score changed from 6.9 ± 1.5 (4.0–9.0) before the surgery to 4.4 ± 1.6 (1.0–7.0) after the surgery. There is a significant improvement in the parameters, which indicates an absolute effectiveness of the surgical treatment nothing less than in a short term.

Fig. 1
A postural front view radiograph of the spine of the 17-year-old patient with idiopathic right-sided Lenke 1A thoracic scoliosis before surgery **(a)**; bending test in the backlying position of the patient with a bending to the right **(b)** and a postural radiograph of the spine in a front view after surgery **(c)**: end vertebrae T6, T12 (**a** – blue arrows) are included in the fixation area **(c)**. The deformity apex (apical vertebra) is at the level of T9 on standing front view radiographs (**a** – yellow arrow), which means that 3 proximal vertebrae (T6, T7, T8) were included in the fixation area. During the bending test, T12–L1 is the first intervertebral disc to open (**b** – red arrow) thus, T12 was chosen as the distal fixed vertebra **(c)**; the central sacral line (CSL) on standing radiographs **(a)** crosses the middle of T12, which approves the need for vertebra fixation

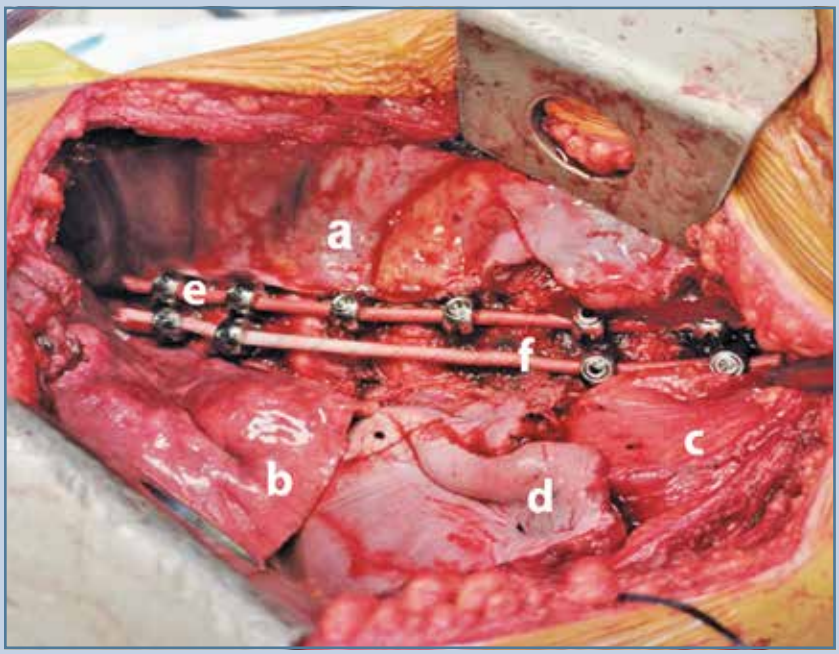

Fig. 2
Intraoperative image: there is a parietal pleura in the wound **(a)**, lower lobe of the lung **(b)**, Peritoneum **(c)**, Diaphragm **(d)**, the screw heads with a polyethylene terephthalate cord fixed in them by nuts **(e)**, a polyethylene terephthalate cord strained between the screw heads **(f)**

Fig. 3
Titanium support platforms with denticles – staples

Discussion

The data concerning the use of anterior dynamic correction was published only in five papers. It should be noted that these publications concerning the use of VBT/ASC are reduced to the description of clinical cases or small cohorts of patients with a follow-up period of no more than 5 years [17, 19–21]. A relative scarcity of these studies is due to the lack of comparison groups. Moreover, they are retrospective in nature, which is due to the technique's novelty. Our current findings are also difficult to systematize due to the heterogeneity of types of deformities and treatment options, including a combination of rigid instrumentation and a short follow-up period. It should be noted that the first mentions of VBT use belong to Crawford and Lenke [17], when this approach was applied in a five-year-old patient suffered from juvenile scoliosis. The use of videothoracoscopy for anterior dynamic correction is a relatively safe and effective treatment method with a low risk of complications of typical forms of idiopathic scoliosis [19–21]. Nevertheless, the video system needs the use of special tools, which are currently unavailable in Russia. This challenge can be solved by registering original designs or domestic analogues of this system. The limitations of the indication for the application of the technique are also not clearly defined. So far, the upper bound of the magnitude of the main curve/curves according to Cobb is under discussion. In the described cohort, authors performed a surgery for spine deformity with a magnitude of 83°. Additionally, the deformity should be sufficiently mobile within functional tests. Samdani et al. [19] use the lower age limit of 10 years, because the existing systems are not applicable to young children with small vertebral bodies. Meanwhile, it is problematic to predict the growth rates and potential, which may result in an excessive correction. In this regard, at first we began to apply this technique in adolescents and adults with completed growth (the lower age limit in the described cohort was 13 years, Risser 4, mobility index of at least 40 %, deformity magnitude of less than 70). It is possible to use releasing techniques, such as nucleotomy, resection of the rib heads, excision of the posterior longitudinal ligament. They will enable doctors to achieve a better correction. Nevertheless, in the conditions of dynamic fixation, in our opinion, this requires further investigations. An essential condition for the use of this technique is the desire of patients to maintain the spine mobility. It means that it is possible to make a comparative analysis of this technique with standard posterior instrumentation systems. According to the primary findings of a comparative analysis of VBT with rigid posterior fixation, adolescents with idiopathic scoliosis in the group with dynamic correction method managed to achieve less correction and required more surgical explorations. Nevertheless, the authors emphasize that the application of VBT provided for delaying or preventing the use of hard stabilization in the majority of

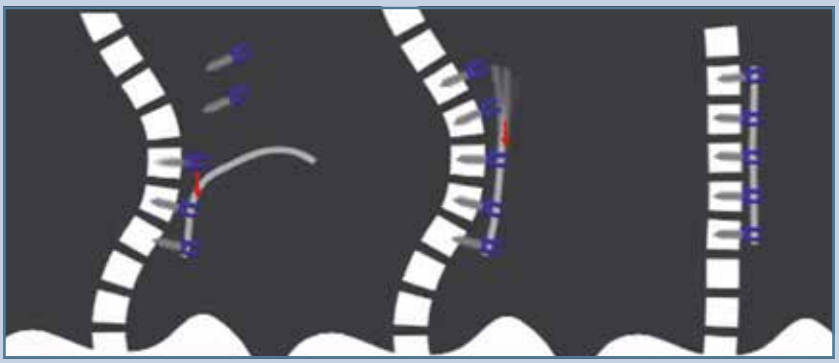

Fig. 4
The stages of cord tension between the screw heads are segmented: the red arrow shows the point of the tensioner application; during the correction, a fluoroscopic control is carried out at each level

Fig. 5
Plain spine X-rays of a 23-year-old patient with idiopathic thoracolumbar Lenke 3BN scoliosis in frontal view before and after two-stage intervention using a combination of a rigid instrumentation in the thoracic spine and dynamic fixation in the lumbar spine

patients [22]. As for adults, it is possible to achieve greater effectiveness in terms of better correction and a structure of complications in comparison with the application of stable systems. It is connected with higher density of bone tissue, anatomical dimensions of vertebral bodies, which provides the opportunity to install two screws in a transcorporal manner and perform a greater segmental correction on two cords. For increasing the stability of the screws, especially end ones, special support platforms – staples were installed during the corrective movement. Our observations did not reveal resorption around the screws, which may be the result of a short observation period.

On the other hand, there is a certain incorrectness of comparing rigid and dynamic instrumentation. There is an absence of uniform evaluation criteria for them. Currently, the mobility in the fixation area is under study. We are of opinion that this can be done using bending tests and spondylograms in the flexion and extension positions.

According to our data, the ASC technique is more preferable in the treatment of patients with lumbar and thoracolumbar deformities, which, of course, should be further investigated.

The most frequent implant-associated complications are excessive correction and cord rupture. Their development does not need removal of the system. We recommend posterior stabilization as a choice treatment for revision technology [15]. The data of a recently published literature review indicate that atelectasis and pneumothorax may be found after the surgery. These complications are primarily associated with the surgical approach [23]. The pulmonary function during anterior correction in the early postoperative period (after 6–12 months) is known to be reduced compared to dorsal correction. This data indicates a possible influence of anterior approach. However by the long-term period (more than two years), as a rule, spirography indicators are normalized [24]. The patients return in a short time to their usual physical activity and sports, including running, cycling, etc. [25]. Thus, while using this technique, it may be essential to change the rehabilitation principles.

The short-term results demonstrate that the surgery duration and blood loss are quite low or comparable with similar data for anterior interventions using rigid systems [26]. The research also shows that the ASC technique provides a period of fairly rapid recovery with a low average duration of inpatient hospitalization.

For sure, our study has a number of limitations, as it contains data from patients with a small follow-up period. Nevertheless, we believe that it is essential to submit a paper to familiarize spine surgeons who are involved in the correction of spinal deformities, as there is an up-to-date need to master this advanced technique. The functional findings are promising. There is a high level of patient satisfaction. The technique guarantees further development, which will enable us to determine the optimal indications and timing of ASC application.

Table

Average indicators of patient examination data

Group	Lenke scoliosis type	Number of patients	Average age at the time of the surgery, y.o.	Mean deformity angle before the surgery, deg.	Mean deformity angle after the surgery, deg.	Mean correction angle, deg.	Number of fixed levels, n	Average blood loss, ml
I	1	8	21.0 ± 6.3	45.1 ± 9.0	17.9 ± 9.3	29.7 ± 8.3	8.0 ± 2.0	407.1 ± 153.9
II	3	4	24.0 ± 11.0	64.7 ± 14.6*	28.2 ± 7.2	38.0 ± 12.1	9.5 ± 1.0*	533.3 ± 104.1
III	5	7	25.3 ± 10.9	45.4 ± 9.6*	12.6 ± 9.5	32.9 ± 9.1	6.4 ± 1.0*	357.1 ± 249.0

The data is given in the form M ± , where M is the average value, is the standard deviation. The symbol (*) shows the parameters of groups II and III, between which statistically significant differences were observed: the deformity angle after the surgery ($p = 0.024$); the number of fixeded levels ($p = 0.006$). For other pairs of signs, statistical significance is not given ($p > 0.05$). For comparison, the Mann-Whitney U–test was applied.

Conclusion

Analysis of the immediate results of anterior dynamic correction of Lenke type 1, 3 and 5 scoliotic deformities in physically active young adults showed positive primary effectiveness in terms of VAS and SRS-22, which makes it possible to recommend this technique for use in the presented cohort of patients.

The method is effective for all studied types of scoliosis, with a greater efficiency in Lenke types 1 and 5.

Further evaluation of long-term results on a larger clinical material will allow developing more precise indications and an algorithm for application of the method.

Study limitations. The paper is based on the analysis of the short-term (up to 1 year) findings of the application of anterior dynamic scoliosis correction in a cohort of young patients with completed axial growth. The lack of late findings, as well as data for a comparative study of the application of rigid systems stipulates the study limitations.

The study had no sponsors. The authors declare that they have no conflict of interest.

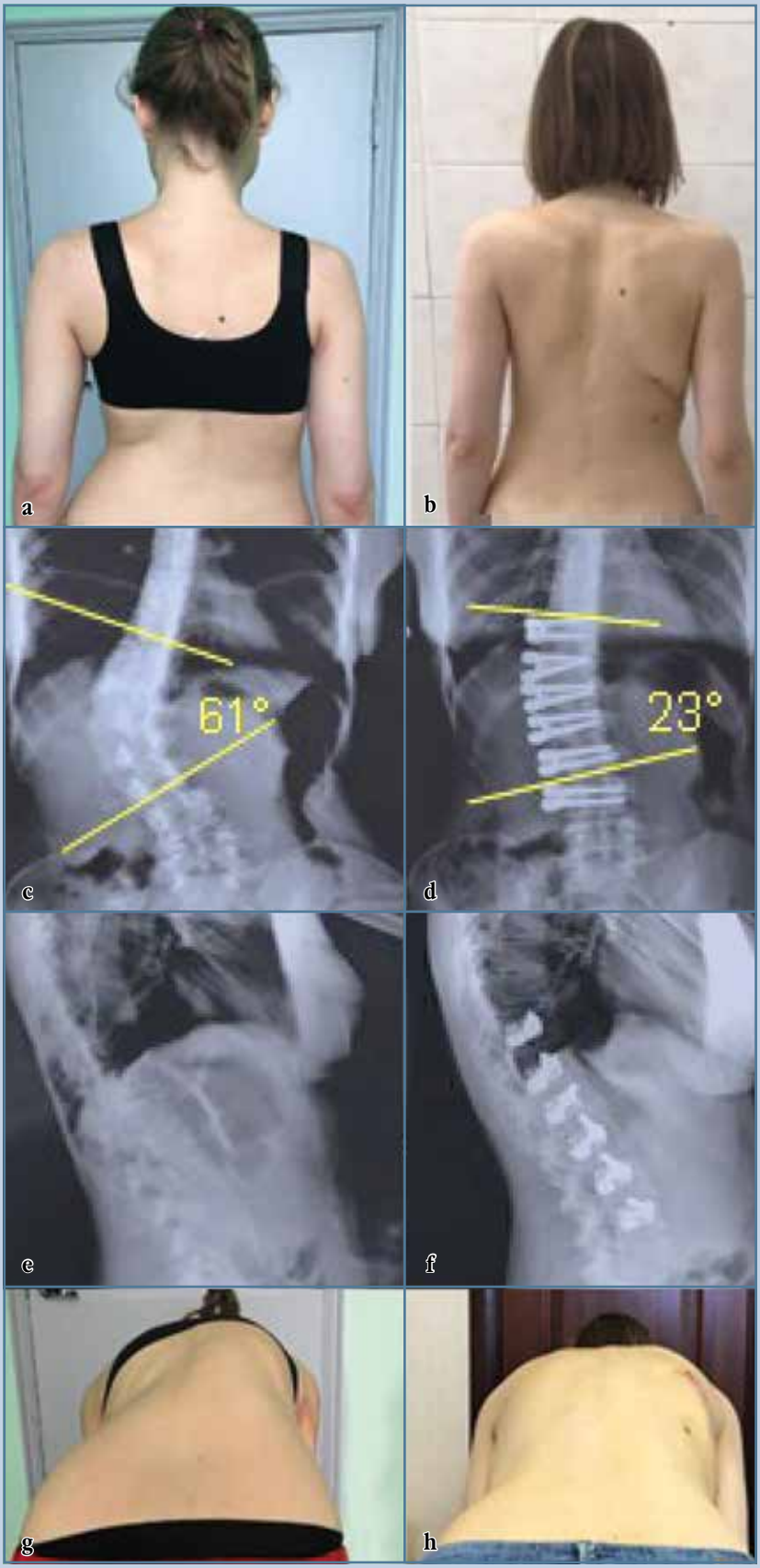

Fig. 6
A 32-year-old patient with grade 4 Lenke 5C- idiopathic scoliosis: procedures: thoracophrenolumbotomy on the right, anterior dynamic correction (ASC) at the T11–L4 level: appearance before **(a)** and after **(b)**, there is an improvement in the back profile; postural radiographs of the spine before **(c, d)** and after **(e, f)** the surgery; photo of the back before **(g)** and after **(h)** surgery show the derotation possibilities with ASC

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An editorial comment

The article by S.V. Kolesov et al. "The first experience of anterior dynamic correction of scoliosis in adolescents with complete growth and adults: surgical technique and immediate results" focuses on the use of anterior dynamic correction (tethering). This technique is used to correct scoliotic deformity of the spine while preserving mobility in the spinal motion segments throughout the fixation area. In recent years, the technique has advanced in popularity in leading foreign clinics. That is why the experience of its use in our country is more attractive. In deciding on the publishing of the article, the editorial board could not help but mark certain issues, the answers to which are not available in the publication. Firstly, only 19 patients were divided into three subgroups. A comparative analysis between these subgroups demands the use of special statistical techniques to verify the validity of the identified differences. Secondly, the first experience of application of this technique in the world has shown that, on the one hand, it is related to a certain risk of complications (especially often – cord rupture); on the other hand, it assumes a very careful selection of patients (according to the size and mobility of the deformity). Thirdly, the technique is followed by a fairly extensive advertising company, which is not fully based on the scientific evidence. Nonetheless, the editorial board found it possible to publish the article. It represents exactly the first outcomes of the trending technique. In the light of experience, the authors will be able to share data based not only on a larger number of observations, but also on a better analysis.