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Case Report

Correction of Congenital Kyphosis

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Abstract

Introduction

The reported case is female, black, operated at 11 years of age, with 90º kyphosis at a right angle of T11 / T12 / L1, due to defect of formation and segmentation.

Material and Method

Surgical correction of anterior and posterior hyperkinesis, with long fixation of T7 to L5, short arthrodesis only in T10 to L2, was performed after 6 months, the terminal ends of the synthesis

was removed, and the fixation was only in the segment with arthrodesis.

Conclusion

The association of the two surgical approaches in this case was an excellent option.

Introduction

Bingold *et al.,* in 1953, defined congenital kyphosis as a deformity consequent to the presence of one or more anomalous vertebrae, with an inclination of the vertebral spine anteriorly, determining an angular deformity with posterior convexity [1].

Lonstein, in 1999, defined congenital deformities of the spine as being an abnormal development of vertebrates present at birth. Thus, affected children tend to have a curvature observed much earlier than do patients with idiopathic scoliosis [2].

Lomberd *et al.,* in 1938, described the first case of paraplegia resulting from spinal cord compression by congenital kyphosis, demonstrated by myelography [3].

Winter *et al.,* in 1973, presented a radiological classification: Type I - partial or total absence of one or more vertebral bodies; Type II - lack of segmentation between vertebral bodies; Type III - the association of Type I and Type II defects [4].

Williams *et al.,* in 2014, in association with fourteen experienced surgeons, performed a system of consensus classification for scoliosis and early onset. It is used to identify three main variables (greater scoliosis angle, etiology, kyphosis and an annual progression variable). In the end, the classification consisted of: congenital, neuromuscular, syndromic and idiopathic, (C, M, S, I), greater angle of scoliosis (1, 2, 3, or 4), kyphosis (-, N, or +, and annual progression modifier (P0, P1, P2). This classification system would serve as a basis for guiding ongoing research efforts and standardizing communication in the clinical setting [5].

Winter *el al.,* in 1985, presented a study of ninety-four patients submitted to surgical treatment of congenital kyphosis, which were reviewed. Those authors state that surgical intervention is best performed early to minimize the number of spinal levels requiring treatment. Early surgery includes excision of the hemivertebra, in which the abnormal vertebra is removed, allowing the spine to become almost completely stretched, and the adjacent portions of the spine to grow normally [6].

Feng *et al.,* In 2016, point out that the main treatment for congenital scoliosis is the resection of the posterior hemivertebra with bilateral transpedicular fixation [7].

The Cobb technique measures the angle of the spine curvatures in the sagittal and coronal planes. The calculation of the angle between the lines, respectively traced, that touch the upper terminal plate of the cranial vertebra and the lower end plate of the caudal vertebra. The two lines perpendicular to these will meet to form the angle to be measured [8].

Objective

The objective of the present study is to evaluate the outcome of the surgical treatment of a patient with congenital kyphosis.

Materials and Methods

The specialists of the Vertebral Spine Institute and the Santa Casa Vertebral Spine Group, both in Belo Horizonte, Brazil, performed a case report, a 12-year-old female patient with severe congenital kyphosis, in a retrospective study. The case is part of a series of 29 patient operated in the Service with 3rd generation instruments.

A radiographic study was carried out by means of panoramic views of the vertebral spine in orthostatic position in the posterior-anterior, profile incidences. The images were measured by the Cobb method in the pre and postoperative periods.

Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) were performed before and after surgery.

Performed thoracofrenectomy was performed on the right, the osteotomy was performed on T11 / T12 and the anterior arthrosis area of the deformity. After three weeks the T11 / T12 level was submitted to osteotomy, T7 to L5 was fixed, the spinal cord was monitored, the deformity was reduced, and arthrodesis was performed only from T10 to L2, and lastly, the area was reviewed and levels were closed.

In the immediate postoperative period, cervico-thoracolumbar orthotic orthosis was indicated for four months.

After six months of performing the procedures, the terminal ends of the instrumentation were removed, with the fixation being only T10 to L2.

In the images below, the severity of the reported case deformity and the procedures that have been performed can be evaluated, see figures 1 to 7.

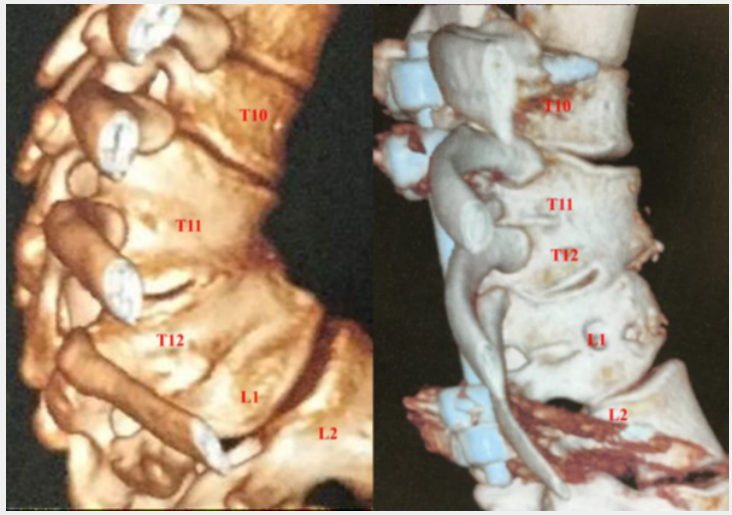

Figure 1: *The left CT image of the spine in profile shows evidence of formation defect and right angle segmentation in T11, T12 and L1. On the right another CT image, after 16 months of procedures, avoiding osteotomy and solid arthrodesis anteriorly from the apex of the deformity and posterior fixation.*

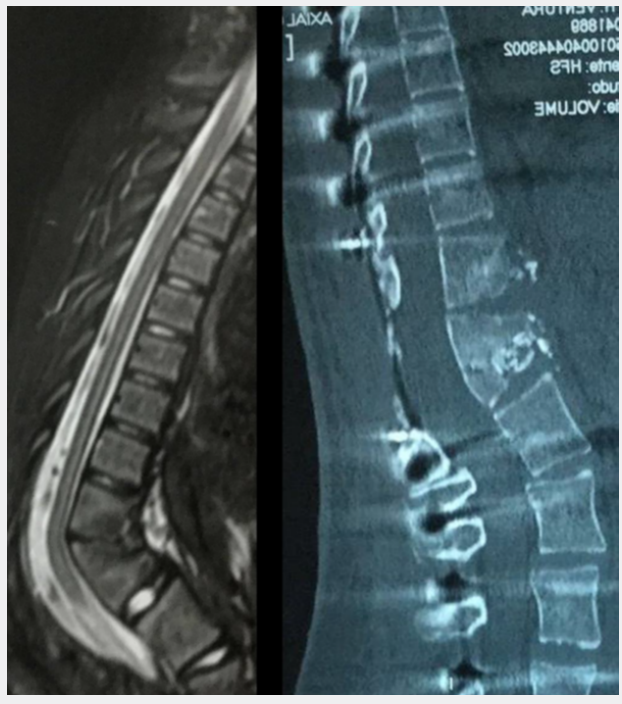

Figure 2: *The left MRI of the patient's spine in profile, shows a defect of right-angle segmentation in T11, T12 and L1, shows hyperkyphosis, and the spinal cord without signal change. The right segment image by CT, in profile, evoking osteoarthrosis and anterior osteotomy at the T11 / T12 level. Fixation and correction done by posterior route can also be seen.*

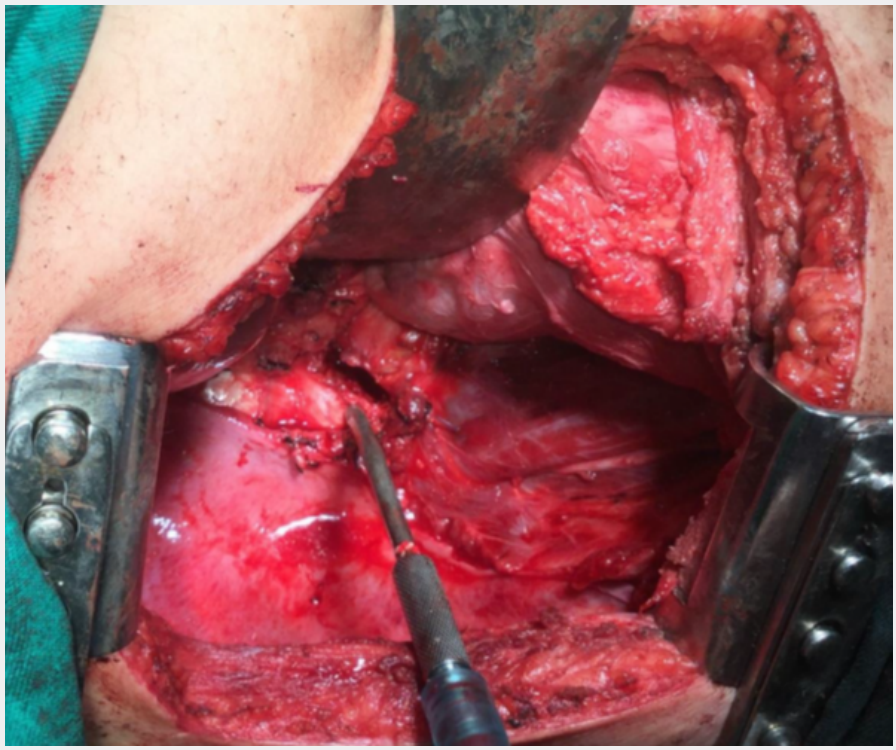

Figure 3: *Photograph of the surgical procedure performed through thoracophrenectomy on the right, the osteotomy of the spine in T11 / T12 is visualized, associated with the arthrodesis of the apex of the diffusion.*

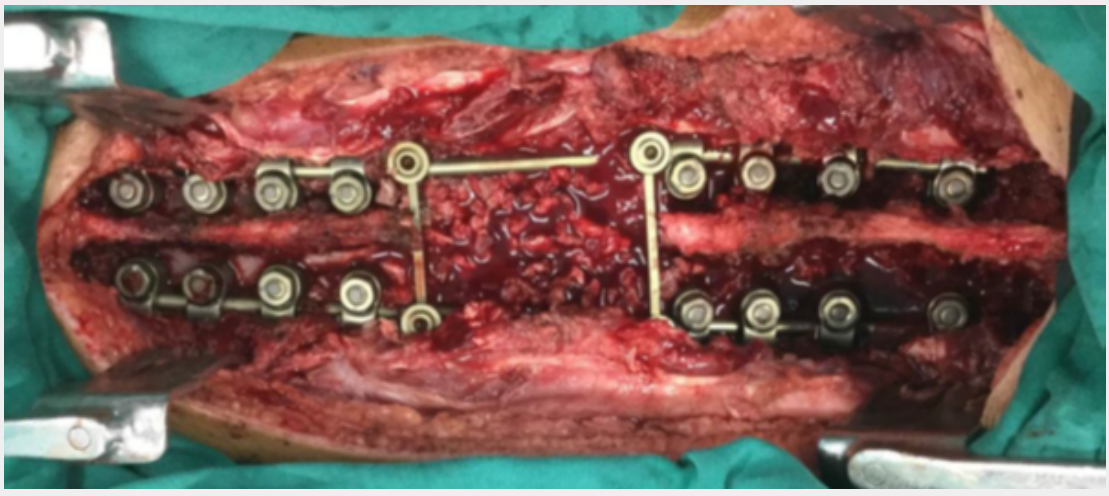

Figure 4: *Photo of the posterior access, osteotomy was performed in T11 / T12, transpedicular fixation of T7 to L5, short arthrosis of T10 to L2 was done. After 6 months of performing the two surgical procedures, the screws and rods were removed from the instrumentation ends, leaving the fixation only in the arthrodesed area.*

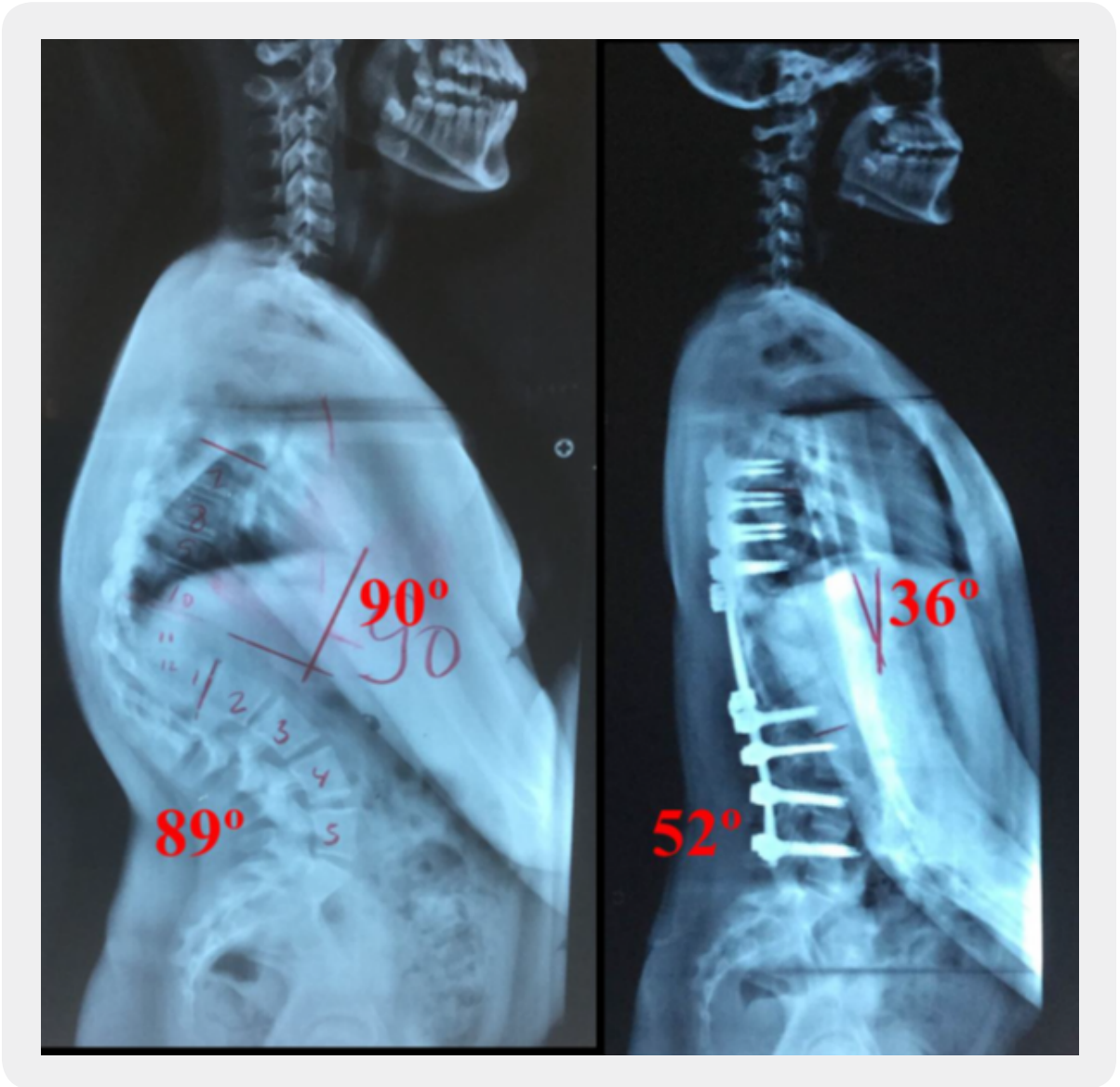

Figure 5: *The left side shows na Rx of the spine in the incidence in panoramic, orthostatic position, in profile, of the preoperative. Evidence of hyperkyphosis of 90º and hyperlordosis of 89º. In the image to the right, we see a correction of hyperkinesis, reduced to 36º and hyperlordosis 52º in the postoperative period.*

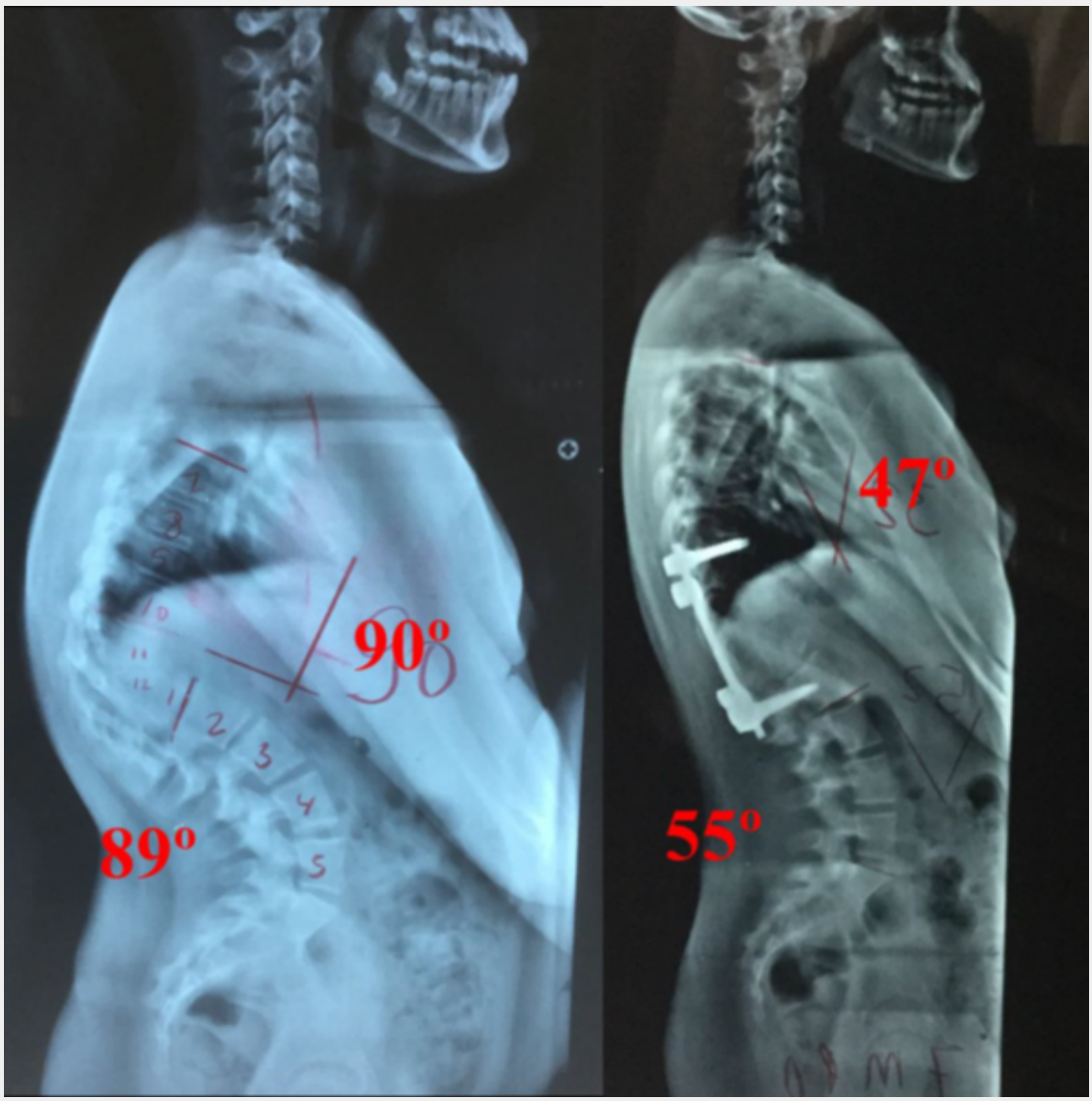

Figure 6: *On the left is observed the initial image before the correction. The right spine Rx, in the orthostatic position, standing after 1 year of procedures. It is emphasized that six months after the correction, part of the instrumentation ends was removed, remaining only from T10 to L2, as shown in this image.*

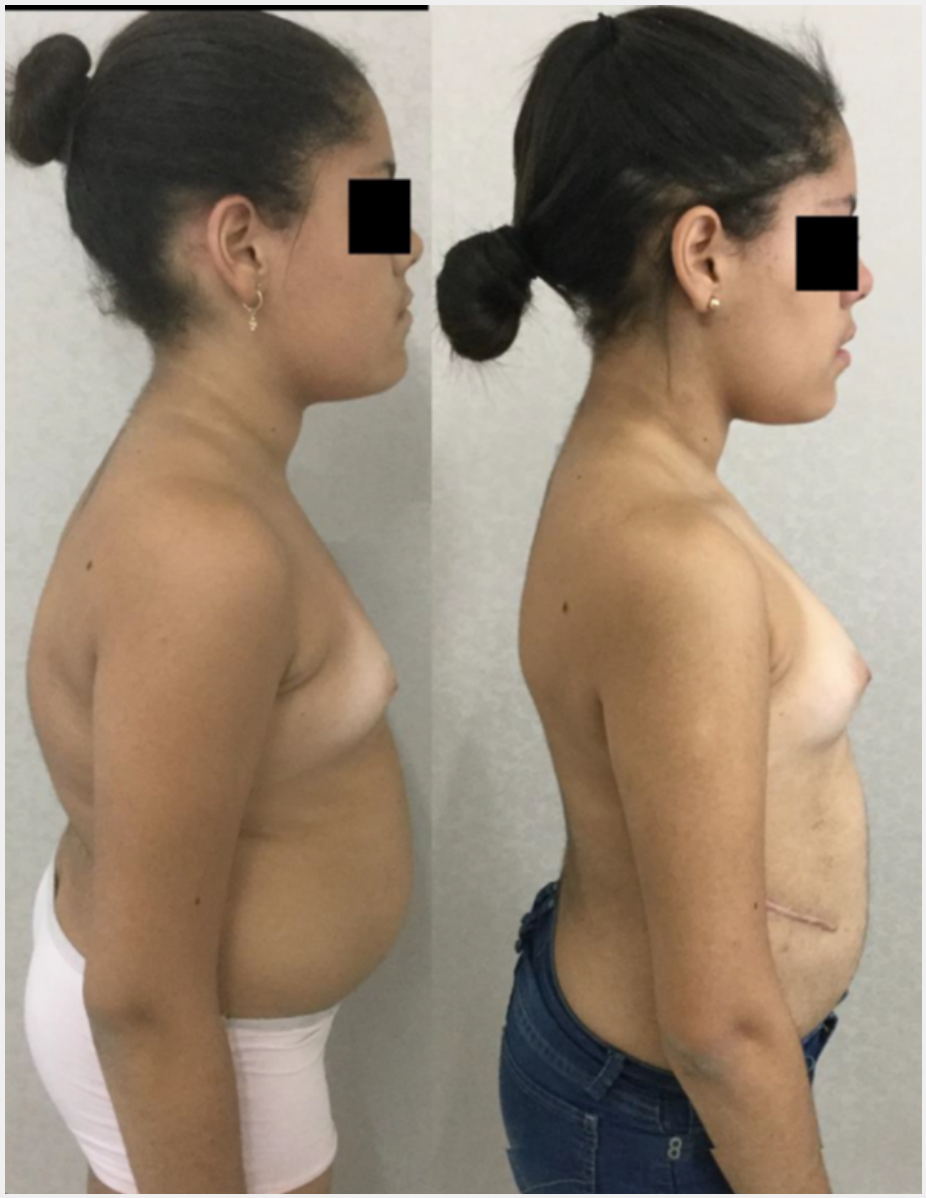

Figure 7: *On the left the photograph of the preoperative patient. The right picture after 1 year of correction of the deformity.*

Discussion

The authors state that there is a tendency in young children with congenital deformities of the spine not to receive the optimal treatment. These curves should not be permitted to get worse. In many cases, early fusion is necessary to avoid severe worsening of the deformity [2,10].

These authors recommend the treatment of congenital kyphosis only with the use of the posterior pathway, performing osteotomies, neurological decompression, shortening of the vertebral canal, arthrodesis and transpedicular fixations [9-17].

Other authors defend the association of the posterior access approach for vertebral release, discectomy, osteotomies, vertebral mobilization, 360° arthrodesis, and lengthening of the vertebral canal at the site of the anterior osteotomy, without disregarding the possibility of anterior access [19,20,21].

Congenital Kyphosis is difficult to solve, and the procedures come with high risk of neurological deficits, each case with its own peculiarities.

In the presence of severe congenital kyphoscoliosis with formation and follow-up defects, anterior access is performed or not. The posterior access is performed, applying osteotomy, instrumentation, and monitoring the spinal cord judiciously. At this proper time to reduce, fortunately, the present authors have always had positive results. Considering joint correction, for kyphosis and scoliosis, using rigid instrumentation, this is considered the really challenging moment of correction.

In more severe, rigid, deforming cases, the previous anterior approach to the spine, for soft tissue release, osteotomy, neurological decompression and arthrodesis. Followed by the posterior pathway with osteotomies, transpedicular fixation, neurological decompression and arthrodesis. This association of procedures facilitates spinal stretching, avoids greater exposure and manipulation of neurological structures, makes possible the alignment of the spine, and can offer a quality result, which the present authors obtain frequently in the service.

After six months of performing the procedures in the patient reported, the terminal ends of the instrumentation was removed, fixation was only maintained in the arthrodesed area of T11 to L2. Thus, it was possible to preserve greater vertebral mobility.

In the case reported, the combination of anterior and posterior access was performed, showing excellent evolution.

The patient was reassessed after 15 months of the correction, she was asymptomatic, with preserved spinal function and excellent vertebral mobility.

Conclusion

The association of the two surgical approaches in this case was an excellent option.

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