

# LUMBAR DISC HERNIATION ASSOCIATED WITH SCOLIOSIS IN A 15-YEAR-OLD GIRL

## Case report

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**ABSTRACT** - Intervertebral disc herniation is a rare condition in childhood and adolescence, although some cases have already been reported in the literature. We present the case of a 15 year-old-girl with low back pain and scoliosis. She had no previous history of trauma or collagen diseases. MRI showed L4-L5 and L5-S1 disc herniations and no further bone and structural changes. After two level discectomy, pain ceased and scoliosis improved, without further treatment. Based on her evolution and on what has already been reported in literature, we consider that scoliosis associated with disc herniation in young patients is most likely to be only an anthalgic position, not indicative of further structural changes.

**KEY WORDS:** lumbar disc herniation, low back pain, scoliosis, adolescence.

### **Hérnia de disco lombar associada a escoliose em uma jovem de 15 anos: relato de caso**

**RESUMO** - Hérnia de disco intervertebral é condição rara em crianças e adolescentes. Alguns relatos isolados e algumas séries foram publicadas. Descrevemos o caso de uma paciente de 15 anos, sem antecedentes relevantes, que apresentou hérnia de disco intervertebral em dois níveis lombares (L4-L5 e L5-S1) associada a escoliose não estrutural que melhorou após a cirurgia, sem necessidade de órtese. Baseados neste caso e no que encontramos na literatura, acreditamos que escoliose associada a hérnia de disco em jovens é resultante apenas de posição antiálgica, não representando necessariamente alteração estrutural.

**PALAVRAS-CHAVE:** hérnia de disco lombar, escoliose, adolescente.

Intervertebral disc herniation is a rare condition in children and adolescents. Wahren (1946) was the first to report a case of a disc herniation surgery in a 12 years old boy. Since then, some single cases and series have been reported<sup>1-6</sup>. Less than 1% of lumbar disc herniation surgery occur in patients between 10 and 20 years old and only 0.5% of these discectomies are performed in patients under 16 years. Most of these patients (40% to 70%) have a history of traumatic injuries to the lumbar spine, usually related to sport activity, falls (higher than 1m) and motor vehicle accidents. In patients under sixteen, about 2% of the cases occur at the L3-L4 level and 98% are distributed equally between L4-L5 and L5-S1 levels<sup>7</sup>. Pain relieve posture is described in nearly 20% of pediatrics patients with lumbar disc herniation, whereby scoliosis is usually present, with the convexity turned to the affected side<sup>4</sup>.

We report the case of a 15-year-old girl, with no previous history of spinal disease, who presented with a non-traumatic intervertebral disc herniation in two lumbar levels (L4-L5 and L5-S1), associated with a non structural scoliosis, that improved after surgery, without need of further treatment.

### **CASE**

A 15 years old girl, caucasian, otherwise healthy, with no history of previous spinal disease, was admitted with difficulty to walk and low back pain ("stabbing"), with diffuse irradiation to the left leg. The onset of symptoms occurred four months before. The pain worsened when sitting and relieved when laying. Fifteen days before admission, she felt weakness in the left leg. On physical examination, a remarkable thoraco-lumbar scoliosis with left convexity was observed, weakness (grade IV) for plantar flexion, dorsal flexion of the left halux and foot were evident, left achilleus reflex was hypoactive, and tactile and

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Fig 1. (1), (2) On this pre-op spinal plain X-rays we can see a thoraco-lumbar scoliosis with the convexity on the left and absence of lumbar spinal lordosis; (3), (4) The post-op spinal X-rays shows the improvement after surgery (1 month).

pain sensation in left L4, L5 and S1 dermatomes were reduced. Lasègue sign (30°) and a crossed Lasègue sign (45°) were present. Plain X-rays showed a thoraco-lumbar scoliosis with left convexity (Fig 1). On spine CT-scan and MRI films, a central L4-L5 and a paramedian right L5-S1 disc herniation were depicted (Fig 2).

As the patient did not improve with clinical management and physiotherapy, we decided for a two level discectomy. After general anesthesia, we could already notice a significant reduction of the scoliosis. She was submitted to a left posterior approach to the L4-L5 and L5-S1 spaces. Discectomy was performed in both levels, when it became evident that there was an important anterior compression on L5 and S1 left nerve roots. Disc samples showed cartilaginous tissue fragments with mixoid degeneration.

Soon after surgery we could already observe an important relieve of pain, scoliosis and weakness. One month after, the neurologic examination was normal, with a significant improvement of the scoliosis, also seen in plain X-ray films (Fig 1 and 3).

## DISCUSSION

In childhood and adolescence, the signs and symptoms of root compression suggest the diagnosis of tumors (osteoma and osteoblastoma), infection or spondylolisthesis as the most likely. Due to its low incidence during the first and second decades of life, disc herniation should only be considered when the diseases above were ruled out. CT scan and MRI are also the best imaging methods to both show the disc herniation and exclude other possi-



Fig 2. (5), (6) Axial CT and MRI show a central L4-L5 disc herniation and (7), (8) a paramedian right L5-S1 disc herniation; (9), (10) Sagittal spine MRI, T2 and T1 respectively, showing the disc herniations, mainly L4-L5 due to central disc herniation, and the anterior dura compression.

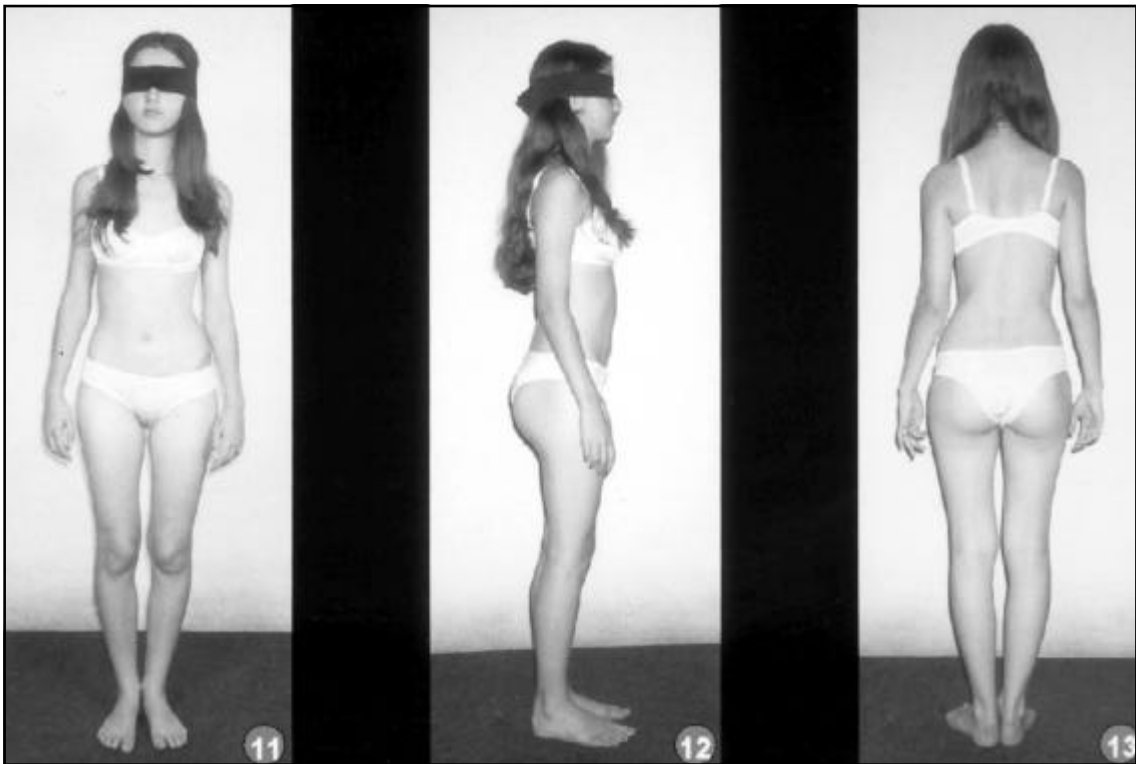


Fig 3. (11), (12), (13) Patient's anterior, lateral and posterior view one month after surgery, showing almost total postural recovery.

bilities. Disc herniation occurs when tears in the annulus fibrosus are frequent and significant enough to allow the nucleus pulposus to herniate. These tears are usually caused by aging and repeated uneven pressure distribution on axial loading.

Although during the first and second decades of life the nucleus pulposus is more expansible, disc herniation does not usually occur, due to the lack of tears in the annulus fibrosus at this age. However, in traumatic events, with heavy axial loading, or in patients with collagen tissue diseases, the annulus fibrosus may be damaged and disc herniation may follow. This explains why, in pediatric and adolescent patients, disc herniation is mostly related to traumatic events, collagen tissue diseases, congenital weakness of the annulus fibrosus or spine malformations that cause inadequate pressure distribution of axial loading. Our patient had no evidence of any of the conditions mentioned above.

Difficulty in walking, scoliosis and inability to perform anterior flexion of the trunk are frequent complaints of children and adolescents with lumbar disc herniation. Lumbar pain is the most common symptom; limitation of lumbar motility and Lasègue are the most common signs.

In seven patients described by Rugtveit<sup>4</sup>, all of

them presented with difficulty to walk, scoliotic posture, and inability to flex the trunk. It is important to notice that three of the seven patients harbored congenital malformations. Two of them had six lumbar vertebrae and one, an asymmetric sacralization of the fifth lumbar vertebra. The unsatisfactory outcome he observed, was probably due to the long period of a symptoms before surgery.

Shillito<sup>5</sup>, during 37 years, operated on 20 patients under fifteen years with disc herniation. Sixty-five percent of them were between 13 and 15 years old. Thirty-five percent related a growth spurt one year before the surgery and 60% were pubescent, like our patient, who also had a growth spurt recently.

Bradford and Garcia<sup>8</sup> found microscopic evidences of degenerative changes in 8 of 25 patients younger than 18 years submitted to discectomy. This could be the expression of a congenital defect of the annulus fibrosus leading to the nucleus pulposus herniation. Shillito<sup>5</sup> found ossification of the posterior longitudinal ligament or of the annulus fibrosus in 8 of 20 patients under fifteen years. The microscopic study of our patient's disc showed myxoid degeneration.

The association between scoliosis and lumbar disc herniation is observed sometimes, although its clini-

cal significance and pathophysiology are not well known. It is well established that children's spines have better adaptive capacity, which helps to protect the nervous tissue. An example of this could be scoliosis in patients with root compression, when he bends to the side contrary to the compression, causing an enlargement of the affected foramen and root release. Matsui et al.<sup>3</sup> observed that 80% of the patients with disc herniation and scoliosis had the convexity on the side of the root compression. Five of his patients were studied with MR, and it was evident that the scoliosis widened the foramen.

Grass et al.<sup>2</sup> reported the youngest case, a 10-years-old girl with intervertebral disc herniation, related to a fall from a low height, with unusual presentation of a progressive structural scoliosis. She improved after surgery, with no need of orthosis. Our patient was 15 years older, pubescent, had no history of traumatic injury, but had a satisfactory evolution after surgery as well.

In the opinion of Rugtveit<sup>4</sup>, surgical treatment has the same indications in children, adolescents and adults. Scoliosis, if present in patients in growth spurt, may worsen, if the intervertebral disc herniation is not treated. Surgery results were excellent in all related cases, between 88% and 97%<sup>5,7,9-12</sup>.

The patient we describe in this report presented no one of the established predisposing factors but the relation with a growth spurt. A fast growing of the spine, muscles and ligaments, as well as a quick increase in height and weight, may lead to a transient weakness of the disc or even an overload with inadequate load distribution. This could explain the disc herniation in pubescents in whom no other predisposing factor is found.

In conclusion, lumbar disc herniation in adolescents and children is not common and can be the cause of scoliosis and lumbar pain with or without sciatica. The scoliosis is not predictive of the level of disc herniation, but is suggestive of the affected side<sup>3</sup>. A growth spurt may be the only predisposing factor for disc herniation in pubescents. An appropriated diagnostic investigation must be carried out, with spine MRI, in order to rule out other diseases. The presence of a disc herniation and the persistence of signs and symptoms are indications for surgical treatment.

Lumbar disc herniation can be alone the cause of scoliosis in children and adolescents. In this case the treatment of choice is discectomy.

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