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Conservative Management of Scheuermann's Disease in an Adolescent Girl: A Case Report

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Abstract **Case Report**

Scheuermann's disease is the most common cause of structural kyphosis in children and adolescents, characterized by anterior wedging of at least three consecutive vertebrae associated with vertebral endplate abnormalities. We report the case of a 13-year-old girl with no significant past medical history who presented with painful thoracolumbar kyphosis and compensatory lumbar hyperlordosis. Computed tomography (CT) of the thoracolumbar spine confirmed the diagnosis, revealing staged anterior wedging, vertebral endplate irregularities, disc space narrowing, and intraosseous hernias (Schmorl's nodes). A multimodal conservative approach was implemented, combining supervised motor rehabilitation, a home exercise program, and a custom-made anti-kyphosis orthotic brace. After two years of regular follow-up, significant clinical improvement was observed, marked by a notable reduction in pain and partial correction of the spinal deformity. The Cobb angle decreased by approximately 8 degrees, and lumbar hyperlordosis was attenuated. No neurological, cutaneous, or orthopedic complications were noted. This case highlights the effectiveness of a multimodal conservative management strategy in Scheuermann's disease in adolescents, and underlines the importance of early diagnosis and individualized treatment to optimize functional and morphological outcomes.
Keywords: Scheuermann's disease; thoracic kyphosis; adolescent ; orthotic brace; rehabilitation.

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1. INTRODUCTION

Scheuermann's disease is the most common vertebral growth dystrophy in children and adolescents [1]. It represents the leading cause of pathological structural kyphosis in this age group, with a prevalence estimated between 0.4% and 8% in the general population [2].

The disease typically manifests during the rapid growth period, between 10 and 14 years of age, and is radiologically characterized by anterior wedging of at least 5 degrees in three or more consecutive vertebrae, associated with vertebral endplate irregularities and intraosseous hernias (Schmorl's nodes) [3]. Two classical types are distinguished: Type 1 (typical), with the apex located in the thoracic region (T7-T9), and Type 2 (atypical), with a thoracolumbar or lumbar apex [2].

Clinically, the disease may evolve silently or manifest as back pain, spinal stiffness, and an aesthetically disabling deformity that can impact the adolescent's quality of life, pulmonary function, and body image [4]. The objective of this case report is to illustrate the benefit of early multimodal conservative management in a young patient with atypical Scheuermann's disease.

2. CASE REPORT

We report the case of a 13-year-old girl with no notable past medical history, referred to the Department of Physical Medicine and Rehabilitation for a painful spinal deformity that had been evolving for one year. The patient presented with mechanical dorsal and lumbar pain, worsening at the end of the day and with prolonged flexion, rated 6/10 on the Visual Analog Scale (VAS), along with fatigue on standing and aesthetic concern.

Physical examination revealed a marked exaggeration of thoracolumbar kyphosis associated with compensatory lumbar hyperlordosis, producing a 'round back' profile. The kyphosis was non-voluntarily reducible, confirming its structural nature. Adam's forward bend test accentuated the deformity without notable rib hump. Limitation of extension mobility was

noted, with painful points from T10 to L2 and bilateral paraspinal muscle contracture. Neurological examination of the lower limbs was normal.

CT scan of the thoracolumbar spine demonstrated: staged wedge compressions from T11 to L2 with vertebral endplate irregularities, disc space narrowing from T10 to L3, intraosseous hernias (Schmorl's nodes) from T12 to L4, and bilateral foraminal disc protrusion at L4-L5 without radicular conflict. Cobb angle measurement revealed thoracic kyphosis of 58 degrees, confirming the diagnosis of Type 2 thoracolumbar Scheuermann's disease.

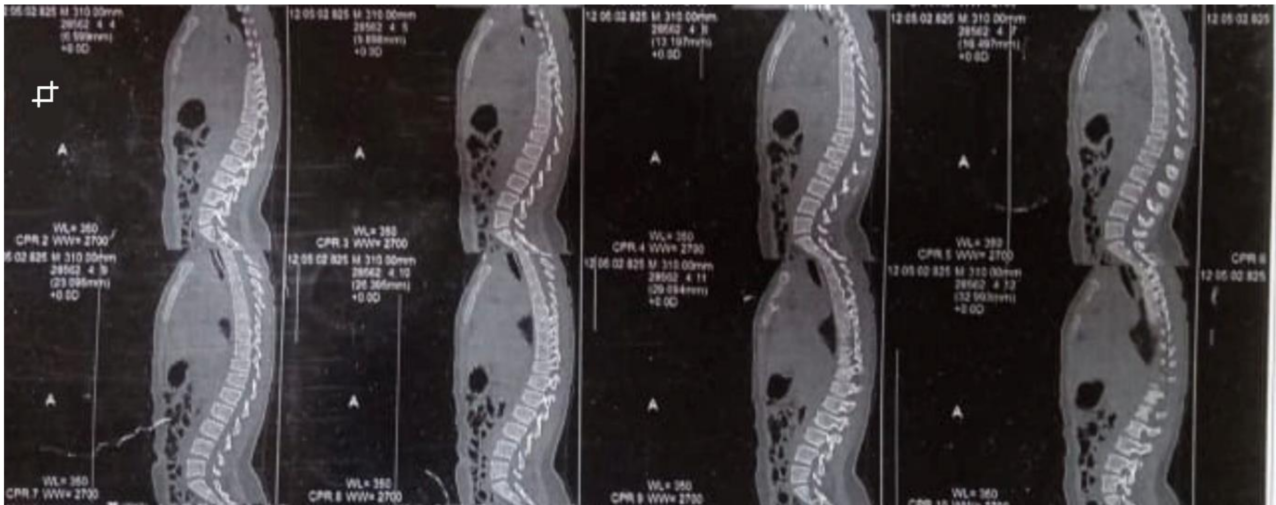

Figure 1 : CT scan of the thoracolumbar spine at diagnosis, showing signs of thoracolumbar Scheuermann's disease

A multimodal conservative treatment was initiated, as the patient was in active growth (Risser stage 1). It comprised three components : rehabilitation, home exercise program, and orthopedic bracing.

Rehabilitation consisted of three sessions per week for the first six months, then two per week, including strengthening of the spinal extensors (trapezius, rhomboids, erector spinae), stretching of the pectorals, hamstrings, and hip flexors, postural reprogramming, proprioceptive and trunk stabilization exercises, and manual mobilization and muscle relaxation techniques.

The home exercise program included prone extension exercises, trapezius strengthening, thoracic stretching, and ergonomic advice (double-strap backpack, regular breaks, adaptation of the school workstation).

A custom-made rigid orthotic brace was prescribed, providing three-dimensional correction through posterior thoracic pads and a sternal counter-pad. The brace was recommended for 21 hours per day, removed only for personal hygiene and rehabilitation sessions. Analgesic treatment with paracetamol was prescribed during painful flare-ups.

Figure 2 : The patient wearing a rigid thoracolumbar orthotic brace.

Evolution was favorable, with a notable reduction in pain (VAS 1/10), improved postural tolerance, and gain of extension mobility. Follow-up radiograph showed a reduction of the Cobb angle by approximately 8 degrees and attenuation of lumbar hyperlordosis. No neurological, cutaneous, or orthopedic complications were observed.

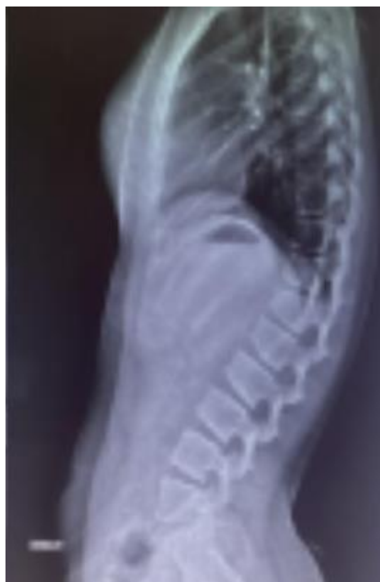

Figure 3: Follow-up radiograph after two years of conservative treatment, showing improvement in spinal alignment

3. DISCUSSION

Scheuermann's disease is the leading cause of structural kyphosis in adolescents and represents a well-defined clinical entity characterized by vertebral growth dystrophy [3]. Although the classic thoracic form is the most frequent, atypical thoracolumbar forms, as observed in our patient, are less common but often more painful [8].

In our case, the thoracolumbar location combined with staged wedge compressions, vertebral endplate irregularities, and multiple Schmorl's nodes corresponds to the classical radiological criteria described in the literature [5]. Type 2 form is characterized by lower spine involvement and a more pronounced painful symptomatology than typical thoracic forms [2]. The clinical presentation dominated by mechanical dorsolumbar pain with limited extension concurs with several published series [11].

Diagnosis relies on precise radiological criteria, including at least three adjacent vertebrae with wedging greater than 5 degrees, associated with endplate irregularities and intraosseous hernias [3]. The Cobb angle of 58 degrees in our patient confirms a significant structural kyphosis justifying active orthopedic management, particularly given the substantial residual growth potential (Risser stage 1) [14]. The non-reducible nature of kyphosis is also a distinctive clinical element differentiating structural from postural kyphosis [11].

Treatment depends essentially on the severity of the deformity and residual growth potential. For patients presenting with kyphosis between 50 and 70 degrees with active growth, conservative treatment is the first-line approach [7], combining orthotic bracing and functional rehabilitation to limit deformity progression and improve pain [12].

In our case, the combination of structured rehabilitation, home exercise program, and rigid bracing achieved notable clinical improvement, with significant pain reduction and improved postural tolerance. The Cobb angle reduction of approximately 8 degrees is consistent with results reported in series managed by conservative bracing [13].

Functional rehabilitation is an essential component of conservative treatment, targeting strengthening of spinal extensor muscles, stretching of anterior muscular chains, and improvement of postural control, thereby reducing pain and improving spinal function [10]. The efficacy of bracing in growing patients has been widely demonstrated, particularly when therapeutic compliance is satisfactory [14].

The favorable evolution observed in our patient underlines the importance of early diagnosis and adapted multidisciplinary management. Regular surveillance until the end of growth remains essential to prevent potential kyphosis progression and optimize long-term functional and cosmetic outcomes [8].

4. CONCLUSION

Thoracolumbar Scheuermann's disease represents an atypical but clinically significant form of

structural kyphosis in adolescents, potentially responsible for spinal pain and quality of life impairment if not managed early. Our case illustrates the benefit of a conservative and multimodal therapeutic approach—combining motor rehabilitation, home exercise program, and custom-made orthotic bracing—in the management of a young patient presenting with painful structural thoracolumbar kyphosis and compensatory lumbar hyperlordosis.

Results obtained after two years of follow-up, marked by significant pain reduction, functional improvement, and partial deformity correction, are encouraging and support early and coordinated management. This case also underlines the need for controlled studies specifically dedicated to Scheuermann's disease in adolescents, to refine therapeutic protocols and improve long-term prognosis.

Conflict of interest: The authors declare no conflict of interest.

Informed consent: Written informed consent was obtained from the patient's parents prior to the writing and publication of this case report.

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