



1 Original article

2 **Anatomical and radiological characteristics in**
 3 **adolescent idiopathic scoliosis with surgical**
 4 **indication**☆

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11 A B S T R A C T

12 Objective: This study aims to analyze the anatomical and radiological characteristics of adolescent idiopathic scoliosis patients with surgical indication.

13 Methods: Retrospective, descriptive study of 100 medical records pertaining to patients included in the group of scoliosis with surgical indication from the years 2008 to 2015. Descriptive statistics were used for statistical analysis.

14 Results: 28 patients met the inclusion and exclusion criteria, and were selected for the study. The average age was 15.4 (SD ± 1.2 years); in the selected sample, the female/male ratio was 6:1; the kyphosis measured in degrees by Cobb angle between T5–T12 had an average 32.10 (SD ± 13.37); according to the Lenke classification, the most prevalent type was type 2, representing 28.6% of cases.

15 Conclusion: The mean patient age in the present study was 15.4 (SD ± 1.2 years); the most prevalent type was type 2 in the Lenke classification. There is a need for new anatomical and radiological studies to elucidate the morphological characteristics common in adolescent idiopathic scoliosis patients.

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Características anatomorradiológicas na escoliose idiopática do adolescente com indicação cirúrgica

R E S U M O

Palavras-chave:

Escoliose/anatomia & histologia

Escoliose/radiografia

Adolescente

Resultado do tratamento

Objetivo: Avaliar as características anatomorradiológicas em pacientes com escoliose idiopática do adolescente com indicação cirúrgica.

Métodos: Estudo descritivo retrospectivo de 100 prontuários de pacientes do grupo de escoliose com indicação cirúrgica de 2008 a 2015. A análise usada foi a estatística descritiva.

Resultados: Preencheram os critérios de inclusão e exclusão 28 pacientes e foram selecionados para o estudo. A média foi de $15,4 \pm 1,2$ anos DP; na amostra selecionada, a proporção menina:menino foi de 6:1; a cifose foi medida em graus pelo ângulo de Cobb entre T5-T12 e teve como média $32,10^\circ \pm 13,37^\circ$ DP; segundo a classificação de Lenke, o mais prevalente foi o tipo 2, observado em 28,6% dos casos.

Conclusão: A idade média dos pacientes no presente estudo foi de 15,4 anos; o mais prevalente foi o tipo 2 da classificação de Lenke. Novos trabalhos anatomorradiológicos são necessários para elucidar características morfológicas comuns nos pacientes com escoliose idiopática do adolescente.

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Introduction

Scoliosis is a three-dimensional deformity of the spinal column. The main diagnostic criterion is a spinal curvature exceeding 10 degrees on an anteroposterior view radiograph of the spine.¹⁻⁴ Adolescent idiopathic scoliosis (AIS) is a common condition that affects 0.5–5% of children.⁵ The female:male ratio ranges from 1.5:1 to 3:1, substantially increasing with age.⁵ The co-occurrence between monozygotic twins is higher than 70%.¹

The diagnosis of AIS is made by exclusion, when other causes of scoliosis, such as vertebral malformations or neuromuscular disorders, are excluded.^{1,2} The etiology of AIS is unknown and multifactorial.^{1,5-7} It is very difficult to adequately characterize the morphology of the most important spinal curvatures in patients with AIS, as there is a great variability among individuals.

Some prognostic factors for the progression of the spinal deformity are: thoracic curve or multiple curves, Cobb angle greater than 25 degrees at diagnosis, and delayed skeletal maturation.⁸ The Lenke classification is often used to define treatment in AIS. However, even within the six standard defined curves, there are structural variations within the same kind of curve,⁹ what may interfere with the surgical treatment.

New studies are important to elucidate the prevalent clinical features in patients with AIS in order to assist in the correct anatomical and radiological understanding of the disease. Therefore, this study aimed to assess the anatomical and radiological characteristics of patients with AIS with surgical indication.

Material and methods

This was a retrospective descriptive study of 100 medical charts of patients from the IOT HC-FM-USP scoliosis group,

assessed from 2008 to 2015. The inclusion criteria were: patients with AIS with surgical indication and presence of a panoramic radiograph of the spine in anteroposterior and lateral view. The exclusion criteria were: patients with incomplete registers regarding demographic data, non-walking patients, and those with defined causes for the scoliosis.

The classifications used were Cobb angle and the Lenke classification. Descriptive statistics were used for analysis.

The present study was approved by the Research Ethics Committee of the institution.

The following parameters were assessed: patient age (in years); Cobb angle (measured in degrees), and the first (most cephalad) and the last vertebra (most caudal) of the Cobb angle of the main curve of each patient; Lenke classification of each patient's curve; neutral cephalad, neutral caudal, and neutral apical vertebrae of the main curve; and stable vertebra. The results are shown in charts, tables, sheets, or figures.

Results

After 100 medical registers from scoliosis group patients treated from 2008 to 2015 were retrospectively analyzed, 28 met the established inclusion criteria and were selected. The mean age of patients was 15.4 ± 1.2 years (Fig. 1).

Of the 28 patients analyzed, 24 were girls and four were boys, a ratio of 6:1. Overall, the most prevalent apical vertebra was the T8, in 35.7% of the cases, followed by T9, in 25% of cases. In turn, the most prevalent stable vertebrae were L4 and L3, representing 25% and 21.4% of the cases, respectively (Tables 1 and 2). The most prevalent neutral cephalad vertebra was T5, in 32.1% of the cases, followed by T6, in 25%. The most prevalent neutral caudal vertebrae were L1 and L2, in 35.7% and 21.4% of the cases, respectively (Tables 3 and 4).

Mean kyphosis, measured in degrees by the Cobb angle between T5 and T12, was $32.10^\circ \pm 13.37$ (Fig. 2).

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