



Original Article

Assessment of spontaneous correction of lumbar curve after fusion of the main thoracic in Lenke 1 adolescent idiopathic scoliosis[☆]



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ABSTRACT

Objective: To evaluate the clinical and radiographic response of the lumbar curve after fusion of the main thoracic, in patients with adolescent idiopathic scoliosis of Lenke type 1. **Methods:** Forty-two patients with Lenke 1 adolescent idiopathic scoliosis who underwent operations via the posterior route with pedicle screws were prospectively evaluated. Clinical measurements (size of the hump and translation of the trunk in the coronal plane, by means of a plumb line) and radiographic measurements (Cobb angle, distal level of arthrodesis, translation of the lumbar apical vertebral and Risser) were made. The evaluations were performed preoperatively, immediately postoperatively and two years after surgery.

Results: The mean Cobb angle of the main thoracic curve was found to have been corrected by 68.9% and the lumbar curve by 57.1%. Eighty percent of the patients presented improved coronal trunk balance two years after surgery. In four patients, worsening of the plumb line measurements was observed, but there was no need for surgical intervention. Less satisfactory results were observed in patients with lumbar modifier B.

Conclusions: In Lenke 1 patients, fusion of the thoracic curve alone provided spontaneous correction of the lumbar curve and led to trunk balance. Less satisfactory results were observed in curves with lumbar modifier B, and this may be related to overcorrection of the main thoracic curve.

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Avaliação da correção espontânea da curva lombar após a fusão da torácica principal na escoliose idiopática do adolescente Lenke 1

RESUMO

Objetivo: Avaliar a resposta clínica e radiográfica da curva lombar após a fusão da torácica principal, em pacientes com escoliose idiopática do adolescente (EIA) Lenke 1.

Palavras-chave:

Escoliose

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Parafusos ósseos
Resultado de tratamento

Métodos: Foram avaliados prospectivamente 42 pacientes portadores de EIA tipo Lenke 1 operados por via posterior com parafusos pediculares. Fizeram-se mensurações clínicas (tamanho da giba e translação do tronco no plano coronal pelo fio de prumo) e radiográficas (ângulo de Cobb, nível distal da artrodese, translação da vértebra apical lombar e Risser). As avaliações foram feitas no pré-operatório, pós-operatório imediato (POI) e dois anos após a cirurgia.

Resultados: Foi observada correção de 68,9%, em média, do ângulo de Cobb da curva torácica principal (TPR) e 57,1% da lombar. Oitenta por cento dos pacientes apresentaram melhora do equilíbrio coronal do tronco, dois anos após a cirurgia. Em quatro pacientes foi observada piora dos valores da medida do fio de prumo, sem, entretanto, haver necessidade de nova intervenção cirúrgica. Os resultados menos satisfatórios foram observados em pacientes com modificador lombar B.

Conclusões: Em pacientes Lenke 1, a fusão exclusiva da curva torácica proporcionou correção espontânea da curva lombar e compensação do tronco. Os resultados menos satisfatórios foram observados em curvas com modificador lombar B e podem estar relacionados à hipercorreção da curva torácica principal.

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Introduction

In cases of adolescent idiopathic scoliosis, the aim of surgical treatment is to provide compensation for the trunk and vertebral fusion for curvature that is considered to be structured. For this, the curvature is determined in accordance with the preoperative radiographic flexibility, and this guides the planning of the levels that are to undergo arthrodesis. King et al.¹ introduced the concept of selective thoracic arthrodesis in cases that were named “false double curves”. This concept has been refined over recent decades, especially consequent to the paper published by Richards in 1992.²

In 2001, Lenke et al.³ published a two-dimensional classification of adolescent idiopathic scoliosis. In this, the curvature is grouped into six main types and is also described in terms of lumbar and sagittal modifiers. Lenke type I is the most frequent classification, and this only presents structuring of the main thoracic curve (TPR). There is a consensus in the literature that type 1A curvature should only receive fusion of the main thoracic curve. However, in types B and C, inclusion of the lumbar curvature (TL/L) is a matter of controversy. Moreover, with the evolution of operative techniques and instruments that have greater corrective power, it has been observed that greater interest has been taken in identifying factors that predict equilibrium or iatrogenic decompensation of the trunk after selective fusion of the spine.

The objective of the present study was to evaluate the clinical and radiographic correction of lumbar curvature and its predictive factors, after only performing fusion of the thoracic curve in patients with Lenke 1 adolescent idiopathic scoliosis.

Materials and methods

This study was approved by the institutional research ethics committee of the Catholic University of Santos (UNISANTOS) under the number CAAE 31602014.4.0000.5536. Forty-two patients with adolescent idiopathic scoliosis presenting curvature greater than 40° who underwent spinal arthrodesis

participated in this study. They were evaluated clinically and radiographically in a prospective manner: before the operation, immediately after the operation (10 days afterwards) and after two years of follow up. All the patients were operated by the same senior surgeon. The clinical and radiographic evaluations were performed by members of the medical team who did not have direct participation in the research.

The following individuals were considered to be within the inclusion criteria: both genders; those with Lenke type 1 adolescent idiopathic scoliosis; those operated between the ages of 11 and 18 years; those with Cobb angles between 40° and 90°⁴; and those who underwent arthrodesis of the main thoracic spine by means of a posterior access route, using pedicle screws. Patients who required preoperative traction or distal fusion at L1 and those whose data were incompletely filled out were excluded.

The classification of the curves followed the criteria proposed by Lenke et al.³ In this, the curves were classified into six main types, according to their structuring, and were also described in terms of a lumbar modifier (relationship between a central-sacral vertical line and the lumbar apical vertebra) and a sagittal modifier (kyphosis between T5 and T12).

Correction of the TPR followed the principles of derotation of the concavity with a rod by means of the technique of Cotrel and Dubousset.⁵ This method was used in cases with lumbar A and B modifiers, as explained in the following: after placement of the pedicle screws, a previously molded concavity rod was positioned within the format of the scoliosis, followed by placement of fixation systems without completely locking them. At this time, the curve was corrected by means of derotation of the rod until it coincided with the kyphosis plane, or until the maximum correction in the coronal plane had been obtained. The correction finished with distraction between the screws and complete locking of the system. This was followed by placement of the second rod, which was molded in a rectified position with the aim of diminishing the thoracic hump and enabling fixation of this. In patients with the lumbar C modifier, a compression and distraction technique was used. In addition, deliberate undercorrection of the main thoracic

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