



Systematic Review

Current Evidence Regarding the Treatment of Pediatric Lumbar Spondylolisthesis: A Report From the Scoliosis Research Society Evidence Based Medicine Committee

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Abstract

Study Design: Structured literature review.

Objectives: The Scoliosis Research Society requested an assessment of the current state of peer-reviewed evidence regarding pediatric lumbar spondylolisthesis to identify what is known and what research remains essential to further understanding.

Summary of Background Data: Pediatric lumbar spondylolisthesis is common, yet no formal synthesis of the published literature regarding treatment has been previously performed.

Methods: A comprehensive literature search was performed. From 6600 initial citations with abstract, 663 articles underwent full-text review. The best available evidence regarding surgical and medical/interventional treatment was provided by 51 studies. None of the studies were graded Level I or II evidence. Eighteen of the studies were Level III, representing the current best available evidence. Thirty-three of the studies were Level IV.

Results: Although studies suggest a benign course for “low grade” (<50% slip) isthmic spondylolisthesis, extensive literature suggests that a substantial number of patients present for treatment with pain and activity limitations. Pain resolution and return to activity is common with both medical/interventional and operative treatment. The role of medical/interventional bracing is not well established. Uninstrumented posterolateral fusion has been reported to produce good clinical results, but concerns regarding nonunion exist. Risk of slip progression is a specific concern in the “high grade” or dysplastic type. Although medical/interventional observation has been reported to be reasonable in a small series of asymptomatic high-grade slip patients, surgical treatment is commonly recommended to prevent progression. There is Level III evidence that instrumentation and reduction lowers the risk of nonunion, and that circumferential fusion is superior to posterior-only or anterior-only fusion. There is Level III evidence that patients with a higher slip angle are more likely to fail medical/interventional treatment of high-grade spondylolisthesis.

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Conclusions: The current “best available” evidence to guide the treatment of pediatric spondylolisthesis is presented.

Level of Evidence: Level III; review of Level III studies.

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Introduction

The progress of published medical knowledge, changes in societal expectations, and developments in health care economics have lead medical organizations to develop evidence-based documents and products such as clinical practice guidelines, appropriate use criteria, and performance improvement modules. The initial step of each is to perform a structured literature review to assess the current state of peer-reviewed evidence. The Evidence Based Medicine Committee of the Scoliosis Research Society recently undertook a structured literature review of Pediatric Lumbar Spondylolisthesis. Clinically relevant questions regarding treatment, both surgical and medical/interventional, were proposed by the committee.

Methods

Committee members

The working group consisted of volunteer members of the Scoliosis Research Society Evidence Based Medicine committee. The working group included physicians and surgeons who are clinically involved with the medical/interventional and operative treatment of pediatric spondylolisthesis and trained in evidence-based medicine methodologies.

A working definition for pediatric lumbar spondylolisthesis was developed by group consensus. Relevant clinical questions were proposed and refined by group consensus.

Data sources

A thorough, comprehensive literature search was performed with the assistance of a professional medical librarian. Databases searched for this project included PubMed (US National Library of Medicine), Ovid Medline (Wolters Kluwer), Cochrane Database of Systematic Reviews (Cochrane Collaboration resources), Web of Science (Thomson Reuters Web of KnowledgeSM), and Scopus (Copyright 2013 Elsevier B.V.). A search strategy was discussed, revised, tested, and finalized first in Ovid Medline, then translated into appropriate search terms and syntax for each database. Both subject headings and free text were searched for spondylolisthesis and variant word endings. Results were

limited to English-language articles and foreign language articles with English abstracts and human studies. Publication types “comment” and “letter” were omitted when possible.

The Ovid Medline strategy was run in PubMed with slight variations to pick up newly added records that were not yet fully indexed. The strategy was also slightly changed for the remaining databases to accommodate differences in search terminology and mechanics. Citations and abstracts were retrieved. Abstracts were reviewed for obvious exclusions (ie, those studies not associated with pediatric lumbar spondylolisthesis).

Study selection criteria

Independent review of the abstracts for inclusion/exclusion was performed, and articles were recommended for full-text review if the study was expected to provide evidence to answer the clinical questions. Disputes regarding inclusion/exclusion were resolved by group consensus, with preference given to inclusion in unresolved cases. From 6,600 initial citations with abstract, 663 articles were included in the full-text review. The same inclusion/exclusion process was repeated during full-text review. Additionally, a hand search of the bibliographies revealed 20 articles that underwent the inclusion/exclusion process (Fig. 1). Fifty-one articles [1-5], which provided the best available evidence for the clinical questions regarding treatment, were included in the data extraction list (Table).

Grades of evidence were determined as follows: Good (High Quality) Evidence from Level I studies with

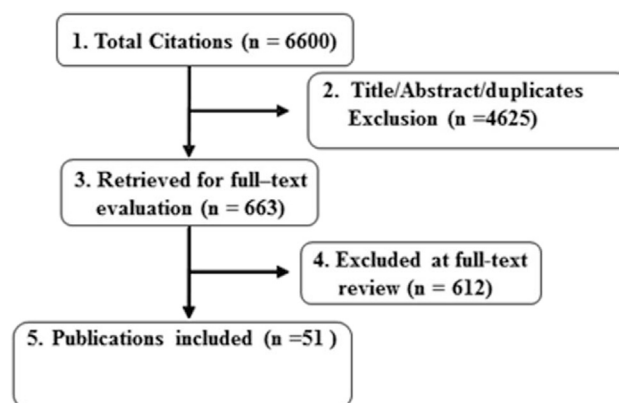


Fig. Flow chart showing results of literature search.

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