Operative Treatment of Spondylolysis and Low Grade Spondylolisthesis in Children and Young Adults: A Meta-Analysis of Observational Studies

Authors: Guy Klein DO PGY 2, Charles T. Mehlman DO MPH2, Dietrich Schlenzka MD PhD3

Affiliations: 1: University Hospitals Richmond Medical Center, 2: Cincinnati Children’s Medical Center, 3: ORTON Orthopaedic Hospital, Helsinki, Finland

Purpose: The purpose of this study was to conduct a systematic review and meta-analysis of operative treatment of spondylolysis and low grade spondylolisthesis in children and young adults.

Methods: A comprehensive literature search identified articles meeting the following inclusion criteria: (1) the target population was children and young adults with spondylolysis with between 0% and 50% spondylolisthesis, (2) the treatment intervention was operative, (3) the minimum follow-up was one year in studies using clinical parameters as their primary outcome, and (4) the studies included at least 10 subjects. Outcome data from eligible studies was pooled into one of two groups: clinical outcome or radiographic evidence of a union of the parts defects.

Results: Five observational studies measuring clinical outcome after fusion had a weighted and pooled success rate of 84.8% in 238 patients. Fifteen observational studies measuring clinical outcome after pars repair had a weighted and pooled success rate of 87.7% in 251 patients. A subgroup analysis comparing the clinical outcome of patients treated with fusion to patients treated with pars repair was not significantly different. Five studies evaluating healing of the defects with computed tomography (CT) after pars repair had a pooled success rate of 66.5% (n=126).

Conclusion: A meta-analysis of observational studies suggests that more than 84% of cases treated operatively will have a successful clinical outcome after one year. The choice of operative technique (pars repair vs. fusion) does not appear to influence the functional outcome. In contrast to the high rate of success with clinical parameters, one third of defects did not heal with operative treatment suggesting that a successful clinical outcome does not depend upon healing of the lesion.

Significance: In summary, operative treatment has shown a high rate of success when measured by clinical outcome. The use of pars repair in contrast to fusion does not appear to influence this outcome.