

**THE NATURAL HISTORY OF IDIOPATHIC SCOLIOSIS DURING GROWTH: A META-ANALYSIS.**

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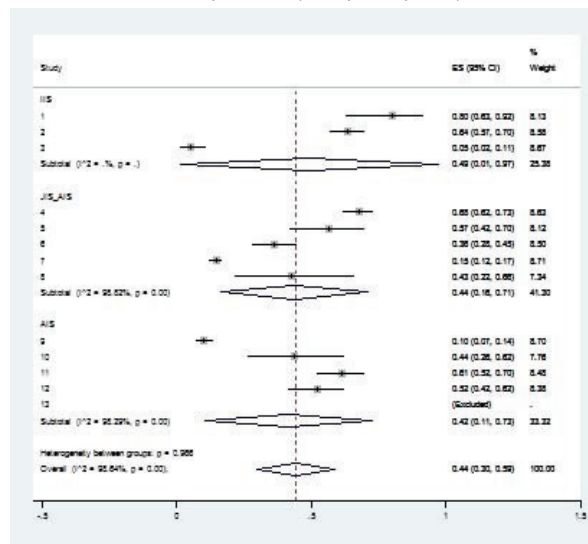
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**Introduction:** The real risk of progression of idiopathic scoliosis is considered to vary during different growing phases, but so far data concerning this issue refer only to few studies and narrative reviews. Today no systematic reviews or meta-analysis are available to group the results of different studies. The aim of this study is to provide a systematic review and a meta-analysis of the current literature concerning the natural history of idiopathic scoliosis during growth.

**Methods:** We searched the MEDLINE, EMBASE and SCOPUS databases up to November 2016 to retrieve articles reporting about natural history of scoliosis during growth. Eligible studies were prospective or retrospective studies that enrolled patients with infantile, juvenile or adolescent idiopathic scoliosis followed up without any treatment from the time of detection. The studies were included only if they reported the progression rates during growth of untreated patients. Two authors independently reviewed each article for data extraction and quality assessment. The main outcome measure was the rate of progression. For the meta-analysis, the studies were grouped according to diagnosis: Infantile Idiopathic Scoliosis (IIS), Juvenile Idiopathic scoliosis, (JIS) and Adolescent Idiopathic Scoliosis (AIS). Due to expected heterogeneity, we applied a random effect model to pool data together.

**Results:** Of the 1797 citations screened, we assessed 61 full-text articles and included 13 of these (2301 participants). Three studies included IIS patients (347 participants), 5 studies included a mixed population of JIS and AIS (1330 participants), 5 studies included AIS patients only (624 participants) The random pooled estimated progression rate was 49% (95CI: 1-97%) for IIS; 44% in a mixed group of patients affected by juvenile or adolescent IS (95CI: 16-71%) and 42% in AIS (95CI: 11-73%). The criteria to define progression were slightly different among studies, being this a change of 5, 6 or 10° Cobb, or a progression over the threshold of 50° Cobb. Risser, age and clinical features varied among studies.



**Discussion:** During growth, idiopathic scoliosis tends to progress in a high percentage of cases. The progression rate varies according to the age at diagnosis, with infantile scoliosis being the most unpredictable. There are many confounders like age, Risser sign and baseline Cobb angles that were not consistent among studies, and this makes the data quite heterogeneous as reported in our analysis. These features , together with the different definitions of progression can explain the variability of results among different studies. We suggest that future research about natural history looks in a more detailed way at the clinical parameters that can predict progression, and give more homogeneous definition of progression.