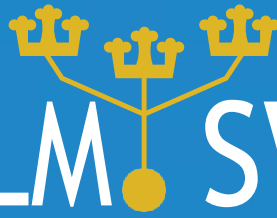# SRS
Scoliosis Research Society

57TH ANNUAL MEETING
STOCKHOLM SWEDEN
SEPTEMBER 14-17, 2022 • Stockholm Waterfront Congress Centre

FINAL PROGRAM

www.srs.org • www.srs.org/am22

SRS-0722-416

PODIUM PRESENTATION ABSTRACTS

97. NATURAL HISTORY OF IDIOPATHIC SCOLIOSIS: VALIDATEDMODELS OF CURVE PROGRESSION FOR THREE GROUP AGES (PRE, AT AND POST GROWTH SPURT)

Stefano Negrini, MD; Maryna Yaskina, PhD; Sabrina Donzelli, MD; Giulia A. Rebagliati, MD; Alberto Negrini;Claudio Cordani, PT; Eric C. Parent, PhD

Hypothesis
The progression of idiopathic scoliosis (IS) can be predictedfrom x-rays obtained at the initial specialist consult.

Design
Secondary analysis of natural history data prospectively collected (n=22387) in a national clinical database since2003.

Introduction
Knowledge of the natural history of IS during growth has limits (models not validated; only one age or treatedpatients included). We validated a model with fair precision (<63%) from age 6 to bone maturity to predict
progression from the first x-ray. Duval-Beaupère described three progression risk periods: before, at, and after the growth spurt. We aimed to verify if three models specific tothese growth periods provided better prediction than one encompassing all growth.

Methods
Inclusion: IS, age <26, no prior treatment, first consult and at least one previous spine x-ray. We identified threegroups: before (GA), at (GB) and after (GC) growth spurt. Since growth spurt age is individual, for validationpurposes, we chose the upper age limit for GA so to minimize Risser 1 patients (growth spurt ongoing) and havea sample size of GA good enough for validation. We developed linear mixed-effects models with random effects and a variance components structure to predict future Cobbangles. We evaluated models by the smallest Akaike (AIC)and Bayesian (BIC) Information Criterion. Due to the low number of males and the growth spurt differences between sexes, we developed a model for females and checked if valid for males in GB. We used two methods to evaluate the accuracy of the models: the standard prediction intervalthat comes with the model (standard) and the interval formed using 95% CI from coefficients' estimates (new).

Results
At ages 9, 10 and 11 we had 77, 246 and 548 patients with 1.3%, 3.2% and 10.2% Risser 1, respectively. Consequently, we included ages 10 in GA and 11 in GB. We included 275 participants (allowing three cross-validations) in GA, 782 (5) females and 190 (3) malesin GB, and 316 (3) in GC. The selected predictors weresimilar in all the models, with sex influencing only modelGC. Of note, curve severity over the clinically significant threshold of 30° improved all models. The prediction accuracy ranged 15-85% (standard), and 62-99% (new).

Conclusion
The accuracy of IS progression models increased when tailored by growth spurt periods.

Predictive models and prediction accuracy