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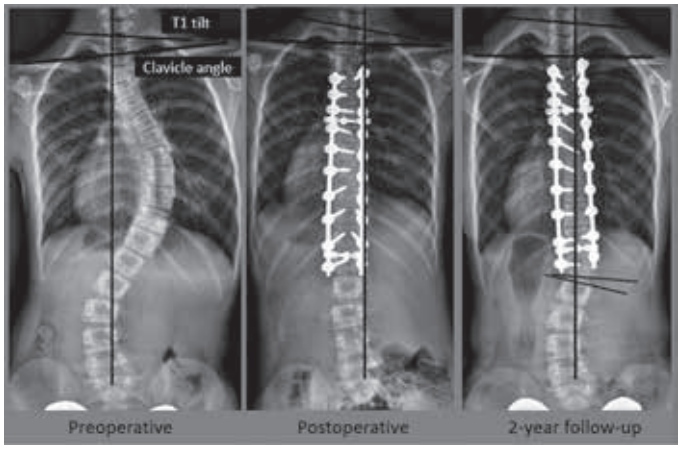

286. The "Risser +" Grade. The "Risser +" Grade: A New Grading System to Classify Skeletal Maturity

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Summary
This study aims to propose and validate a new unified "Risser+" grade that combines the North American (NA) and European (EU) variants of the classic Risser score. The "Risser+" is a reliable scale to classify patients based on skeletal maturity when clinical data is known for participants in scoliosis research studies.

Hypothesis
The "Risser+" grade (RP) can effectively combine the North American and European Risser Classifications for skeletal maturity with adequate intra-rater/inter-rater reliability and agreement.

Design
Comparative study

Introduction
The Risser Plus (RP) scale is an 8 point system which combines the versions and assesses the triradiate cartilage (TRC) maturity; RP 0-(open TRC), 0+ (Closed TRC), 1, 2, 3, 3/4, 4 and 5.

Methods
Agreement and reliability were evaluated for 6 raters (3-NA, 3-EU) who assessed 120 pelvic radiographs from the BrAIST trial, all female, average age 13.4 (range 10.1-16.5 years). Blinded raters reviewed x-rays at two time-points. Intra- and inter-rater agreement (RA) were established with Krippendorff's alpha (k-alpha), while intra- and inter-rater reliability (RR) were established with intraclass correlation coefficients (ICC). Acceptable agreement and reliability were set a priori at 0.80.

Results
Inter-RA of RP sign for the 1st and 2nd readings was k-alpha of 0.72 (0.63-0.79) and 0.86 (0.81-0.90) respectively, and overall RA was alpha of 0.79 (0.74-0.84). EU raters exhibited slightly better agreement then NA Raters for both the first (EU: 0.78 vs NA: 0.66) and second readings (EU: 0.88 vs NA: 0.87) Intra-rater agreement was sufficient for 4 out of the 6 raters in the study (all k-alpha > 0.80). One rater from each of EU and NA presented subpar intra-rater agreement (k-alpha = 0.64 and 0.74, respectively). Graded response modeling determined reducing the number of categories in the RP scale increased intra-RA substantially with coefficients ranging from 0.87 to 0.96. 16 readings were identified in which 1 rater recorded a rating that was more than 4 units from the other 5 raters. After removing these values, agreement improved substantially with interRA at alpha 0.85. Most variability occurred at Risser 2-4. The EU raters had a slightly higher reliability, EU: ICC = 0.93 (0.91 – 0.95), NA: ICC = 0.91 (0.88 – 0.93).

Conclusion
The Risser+ system showed excellent reliability across multiple reads and raters and demonstrated 79% agreement over all reads and ratings. Agreement increased to over 85% when raters could distinguish Risser 0+ from Risser 5.

Table 1: Visual representation of the Risser+ system.

"Risser+" staging	Definition	Example					
0-	Tri-radiate cartilage NOT ossified		2	25-50% coverage		4	Start of Fusion
0+	Tri-Radiate cartilage closed		3	50-75% coverage		5	Complete Fusion
1	0-25% coverage		3/4	75-100% coverage			

287. The Contribution of the Rib Deformity to the Pulmonary Dysfunction in Congenital Scoliosis

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Summary
The effect of rib deformity on the pulmonary has not been well described previously in the setting of congenital scoliosis(CS).

Hypothesis
The rib deformity could have various influences on the pulmonary function in CS patients on the basis of different complexity.

Design
Retrospective Cohort.

Introduction
Congenital scoliosis is usually accompanied with the rib deformity. Cobb angle and the rib deformity are both important factors to the pulmonary dysfunction. The effect of the cobb angle was well researched. However, no prospective studies have been