Sagittal plane following final fusion after growing rods: the effect of distal extension of instrumented levels

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Background

• Almost half of growing rod patients that undergo final fusion have an extension of instrumented levels.

• Limited data exists on sagittal plane parameters that may lead to distal extension.
Purpose

• Review growing rod patients converted to definitive instrumented final fusion.

• Compare sagittal plane radiographic parameters of patients with distal extension of final fusion instrumented levels to those whose levels remained the same.
Methods

• Radiographs were assessed at four points
  – Preoperatively (PreGR),
  – After growing rod insertion/first lengthening (PostGR),
  – Following growing rod treatment before final fusions (PreFF)
  – After final fusion (FF).

• Measurements included sagittal balance, lumbar lordosis (L1-S1), thoracic kyphosis (T5-T12), and distal junction angle (DJA).
Results

• 21 patients were included. In the entire cohort, there was no overall change in sagittal balance (p=0.89).

• Significant decrease in lordosis and kyphosis from PreGR to PostGR (p=0.001 for both), which increased from PostGR to PreFF (p=0.009, p=0.001).

• No change in kyphosis or lordosis from PreFF to FF (p=0.54 for both). From Post GR to FF, DJA increased 7.1 degrees on average (CI 2.9 to 13.4; p<0.001).
Results

• Seven patients (33%), had distal extension at FF (Average 2 levels, Range 1-4). Four were revised for sagittal plane decompensation.

• When comparing patients who had distal extension at the time of FF to those whose levels remained the same, there was no difference in the change in sagittal balance (p=0.90), lordosis (p=0.57), kyphosis (p=0.64).
Conclusions

• Most growing rod patients that undergo final fusion demonstrate acceptable correction of sagittal plane radiographic parameters.

• A small cohort of patients requires distal extension at FF due to sagittal plane decompensation.
Representative Case: Pre-operative xrays of a 12 year old female patient with VATER syndrome who failed previous VEPTR treatment
Post-operative x-rays following growing rod insertion from T3-T12 at age 12.
Two years following growing rod insertion, she had progression of both distal coronal and sagittal plane deformity.
She underwent distal extension of her instrumented levels. Final levels were T3-L4, demonstrating correction of the coronal and sagittal plane.
Thank you