Superior Extension of Upper Instrumented Level in Distraction Based Surgery: A Surrogate for Clinically Significant PJK

Ron El-Hawary, John Heflin, Ozren Kubat, Mohamad Yasin Nadim Joukhadar, David Skaggs
Disclosures

- **Grants / Research Support**
  - Depuy–Synthes Spine
  - Medtronic Canada
  - EOS Imaging

- **Consultant**
  - Depuy–Synthes Spine
  - Medtronic Canada
  - Halifax Biomedical Inc.
Proximal Junctional Kyphosis
Revision surgery with superior extension of the upper instrument level (UIL).
Purpose

- To determine the **rate of clinically significant proximal junctional kyphosis (PJK)** during distraction based growth friendly surgery.
Study Design

- Retrospective, clinical and radiographic review of the Children’s Spine Study Group database.
Inclusion Criteria

- Early Onset Scoliosis (<10 yrs)
- Treated with rib-based
- \( \geq 2 \) yr f/u
- \( \geq 3 \) lengthening procedures
Inclusion Criteria

- Superior extension of upper instrumented level during distraction phase or at graduation from distraction-based surgery.

- Radiographs available between each lengthening procedure.
Exclusion

- Superior extension of upper instrumented level secondary to progression or adding on of scoliosis.
Primary Outcome

- Rate of patients treated with distraction based surgery who required superior extension of their upper instrumented level (UIL).
Results

- CSSG Registry
  - 397 patients (rib-based)

- 40 of 397 required a revision surgery that involved superior extension of the UIL

- 10% rate of clinically significant PJK
Results – At Implantation

- Revision Group was Younger
  - 4.9 vs. 5.5 yrs ($p<0.05$)

- Otherwise, the revision group was characteristic of the entire study population
  - Scoliosis 70°
  - Kyphosis 50°
Results – At Revision

- Time to revision was 2.3 yrs
- Scoliosis 67°
- Kyphosis 55°
Future Work

- Review patients treated with spine-based distraction from Growing Spine Study Group Database.

- Evaluate radiographic measures (proximal junctional angle) on all patients.
  - Is PJA predictive of clinically significant PJK?
Conclusions

- A 10% rate of clinically significant PJK was found within this group of children who were treated with rib-based distraction surgery.

- These patients were younger than the non-revision patients at time of implantation.

- Mean time to revision was 2.3 years.
Thank You