Suken A. Shah, Alfred I DuPont Hospital for Children, AAOS, POSNA, Setting Scoliosis Straight Foundation, SRS, Depuy Synthes, DePuy Synthes Spine, K2M, Nuvasive, Stryker, Ethicon, Arthrex, Globus, Globus Medical; Richard McCarthy, Arkansas Children's Hospital, Medtronic; Peter F. Sturm, Cincinnati Children's Hospital Medical Center, DePuy Spine, Journal of Children's Orthopaedics, POSNA, SRS, Biomet, Nuvasive, Depuy Synthes, Medtronic, DePuy, A Johnson & Johnson Company, Ellipse Technologies, Medtronic Sofamor Danek; Paul Sponseller, Johns Hopkins University, JBJS, Oakstone Medical, Scoliosis Research Society, Depuy Synthes, DePuy Synthes Spine, DePuy, A Johnson & Johnson Company, Globus Medical; Growing Spine Study Group, Growing Spine Foundation, Nuvasive, POSNA; Scott Luhmann, Washington University School of Medicine, Metronic, Styker, Orthofix, Globus Medical, Lippincot

Paper #2

Expert Consensus for Early Onset Scoliosis Surgery 2018

Jason Anari, Patrick Cahill, Divya Talwar, John Flynn

Summary: A survey of 20 EOS world thought-leaders with a combined 478 years of experience reached consensus on 0/6 cases, confirming a compelling need to develop best-practice standards for EOS surgical indications.

Hypothesis: Despite a validated classification system, highly quality multicenter research databases (CSSG/GSSG), and a recent proliferation in publications, EOS surgeons have no consensus on standards for surgical treatment.

Introduction: The twenty first century revolution in EOS care has only accelerated, with the arrival of a classification system, magnetically controlled growing rod, Nusinersen, and improved non-operative care (Mehta casting and compliance-monitored braces). This dizzying pace of change may have outstripped our ability to develop best-practice standards for EOS surgical indications. To learn where consensus is best (and worst) at this moment, we surveyed 20 EOS world thought-leaders on 6 representative cases.

Methods: The 6-case survey was sent to 20 EOS world thought-leaders. Reponses regarding surgical timing and technique were analyzed for consensus (>80%) or plurality (>50%). The cases were representative of the major treatment categories: idiopathic, neuromuscular, syndromic, congenital, thoracic dysplasia and spinal muscular atrophy (SMA) (specifically to assess impact of Nusinersen and parasol deformity on surgical planning). Results were analyzed by years of experience and geography; the survey concluded by asking for the single EOS thought-leader who had the greatest impact on the respondent.

Results: Response was 100%. Clinical experience ranged from 8 to 40 years (average 23.9). There was no consensus on any case. The greatest variability was on the congenital case; the closest to consensus was on the SMA case. 3 or more approaches were selected for all 6 cases; 4 or more approaches were selected for 5 cases. There is a trend towards screw fixation for proximal anchors. The management of thoracic dysplasia and parasol deformity is far from consensus.

Conclusion: The lack of consensus for surgical treatment of 6 representative EOS cases demands a renewed effort and commitment to develop best-practice guidelines based on multicenter outcome data.

Author Affiliations and Disclosures: Divya Talwar: The Children's Hospital of Philadelphia

Paper #3

Consensus-Based Best Practice Guidelines (BPG) for Use of Preoperative Halo Gravity Traction (HGT) for Pediatric Spinal Deformity

Benjamin Roye, Megan Campbell, Hiroko Matsumoto, Joshua Pahys, Michelle Welborn, Jeffrey Sawyer, Nicholas Fletcher, Amy McIntosh, Peter F. Sturm, Jaime A. Gomez, Laurence Lenke, Michael Vitale, Children's Spine Study Group

Summary: Consensus-based BPG including 42 items were developed for the use of preoperative HGT for pediatric spinal deformity using the Delphi and nominal group technique. It encompassed areas of goals, indications, preop evaluations, protocols and complications.

Hypothesis: Consensus-building using formal techniques will develop BPG for use of HGT.

Introduction: No guidelines for the use of preoperative HGT exist to assist surgeons in their practice.

Methods: This was a consensus-building study. Delphi process of three iterative surveys asking ideal practices were administered to nationwide experts in pediatric spinal deformity. Final determination of consensus and equipoise were established using the Nominal group technique in a facilitated meeting. 80% or higher agreement/disagreement was considered consensus.

Results: Responses were received from 31-40 surgeons for each of the three surveys. The final in person meeting included 14 experts with an average 10.5 years in practice and average 88 annual spinal deformity cases. Experts reached consensus on 42 items including goals (4 items), indications (10, examples in Table), pre-op evaluations (4), protocols (18, examples in Table), complications (6). Nine items remained items of equipoise.

Conclusion: Consensus-based BPG including 42 items were developed for the use of preoperative HGT for pediatric spinal deformity. This BPG can give new surgeons a place to begin their practice of HGT and drive future research.

Author Affiliations and Disclosures: Hiroko Matsumoto, Columbia University Medical Center, Children's Spine Foundation, SRS, POSNA; Benjamin Roye, POSNA, OSRF, OMeGA, CPF; Michelle Welborn, Shriner's Hospital, KRM, Depuy Synthes, POSNA; Joshua Pahys, Shriner's Hospital, DePuy, A Johnson & Johnson Company, Globus Medical, DePuy Synthes, NuVasive, Zimmer Biomet; Amy McIntosh, Texas Scottish Rite Hospital; Jeffery Sawyer, Campbell Clinic, AAOS, Campbell Foundation, POSNA, Medicrea, Medicrea Spine, Mosby, Wolters Kluwer Health - Lippincott Williams & Wilkins, DePuy, A Johnson & Johnson Company, Nuvasive; Peter F. Sturm, Cincinnati Children's Hospital Medical Center, DePuy Spine, Journal of Children's Orthopaedics, POSNA, SRS, Biomet, Nuvasive, Depuy Synthes, Medtronic, DePuy, A Johnson & Johnson Company, Ellipse Technologies, Medtronic Sofamor Danek; Laurence Lenke, Columbia University Medical Center, Medtronic, Broadwater, Seattle Science Foundation, SRS, Stryker Spine, The Spinal Research Foundation, EOS, Setting Scoliosis Straight Foundation, Fox Rothschild, LLC, Quality Medical Publishing, Evans Family Donation, Fox Family Foundation, AOSpine; Megan Campbell, Rutgers New Jersey Medical School; Michael Vitale, Columbia University Medical Center, Children's Spine Foundation, IPOS, POSNA, SSG, Biomet, Medtronic Sofamor Danek, Stryker, Wellinks, CSSG, SRS, OREF, OSRF, DePuy, DePuy, A Johnson & Johnson Company, FOX, Children's Spine Foundation, Medtronic, OMEGA, Synthes, Morgan Stanley Children's Hospital of New York, SSG; Jaime A. Gomez, Children's Hospital at Montefiore, K2M, Inc; Nicholas Fletcher, Emory University School of Medicine; Harrison Foundation, Children's Healthcare of Atlanta, Scoliosis Research Society via Setting Scoliosis Straight, Orthopaediatrics, Zimmer/Biomet; Children's Spine Study Group, DePuy Synthes Spine, Depuy Synthes, DePuy, A Johnson & Johnson Company

EXAMPLES OF INDICATION ITEMS

Radiographic Criteria

- Fusion procedures
  - Generally, consider HGT when major coronal or sagittal curves are over 90°
  - When major coronal or sagittal curves are between 60°- 90°, HGT is rarely indicated unless patient has medical co-morbidities

EXAMPLES OF PROTOCOL ITEMS

Pins

- At least 6 pins should be used in skeletally immature children and consider using 8 or more pins for children 6 and under

Torque

- For most children, insertion torque should be 4 - 8 in-lbs