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Paper #10

Analysis of EOS Cases that are Resistant to Correction and Length Gain

George Thompson, Paul Sponseller, John Emans, Charles Johnston, Dong-Phuong Tran, Pediatric Spine Study Group

Summary: Congenital etiology may restrict EOS curve correction more than idiopathic or syndromic, but patients with 20% T1-12 or T1-S1 length gain have other factors restricting elongation.

Hypothesis: Curves resistant to correction are likely to have congenital (**C**) etiology instead of idiopathic(**I**) or syndromic(**S**)

Introduction: Some patients fail to gain sufficient curve correction or lengthening, defined as 20% Cobb improvement and/or 20% gain T1-12 or T1-S1 length at initial growth friendly surgery. We wish to determine how curve etiology might limit correctability.

Methods: We analyzed curve correction and elongation from preop and first postop xrays in 87 patients (25 **C** ,32 **I** ,30 **S**) from a multicenter database and divided them into group 1 (<20% correction/length gain) or group 2(>20%) for each parameter, which were age,etiology,% correction and % length gain.N-Mpatients were excluded.

Results: Preop Cobb angles were similar (75° mean) for the 3 etiologies while mean T1-12 length was less in **C** compared to **I** & **S** (p=.01). For curve correction: group 1 patients(n=14,age4.9 yr)were younger than group 2(n=73,age7.3) at surgery,p=.014. Group 1 patients gained only 4.5° correction(7%) vs 36° (46%) in group 2. 8/14 patients in group 1 were **C** vs 17/73 in group 2(p=.02).

Analyzing -12 length gain: 61 group 1 patients gained 1.7cm (9.8%) at initial surgery,26 group 2 gained 4.4cm(30%); **C** etiology in 19/61 group 1 vs 6/26 group 2(p=.6). In spite of small T1-12 gain group 1 curves were corrected 72° -41°, the same as group 2 correction(81°->48°)

For T1-S1 length, 68 group 1 patients gained 2.9cm(10%) at initial surgery compared to 19 in group 2 gaining 5.9cm(24%), with 21/68 **C** in group 1 vs 4/19 group 2(p=.06). Curve correction was again similar: group 1:72.

Conclusion: Etiology contributes to resistance to curve correction but does not appear to restrict length gain to same degree. Cases with restricted T1-12 or T1-S1 gains < 20% with initial surgery had only modest incidence of **C** patients compared to **I** or **S** andachieved similar: underline curve correction as patients gaining >20% length. Other factors beside etiology may be responsible for restricted length gain

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Paper #11

Does the Law of Diminishing Returns Exist in Early Onset Scoliosis with Connective Tissue Disorders?

Majd Marrache, Klane White, A. Noelle Larson, Tricia St. Hilaire, Regina Woon, Majella Vaughan, Paul Sponseller, Pediatric Spine Study Group

Summary: Contrary to what is seen in patients with early onset scoliosis (EOS) undergoing repeated lengthening of growth friendly rods, the law of