Evolving Treatment Options for EOS: Is Growth Modulation of the Spine the Answer?

Eric Wall, MD
Growth Strategies

1. Grow Rods
2. Shilla
3. Staples and Tethers
Does Growth Modulation Work in the Spine of Animals?

- Animals:
  - Tethering (Newton, Braun)
  - Staples (Betz, Wall)
  - Other Devices/Techniques

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Other Investigators

- Zhou/Zhang/Sucato/Johnston 2014
- Burke JG 2014
- Liu J, 2014
- Zhang W 2014
- Sanchez-Marquez JM 2013
- Roth AK 2013
- Driscoll/Parent/Aubin/Moreau/Sarwark 2013
- Schwab/Lafage 2013
- Caballero A 2011
- Aronsson/Stokes 2011
- Accadbled F 2010
- Dodge/Bowen 2010
- Fok/Carey J 2010
- Zheng GQ 2009
Does it work in animals?

- Yes
- No
- Maybe

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Does it work in animals?

☑ Yes
☐ No
☐ Maybe
Is Growth Modulation the Answer in any Scoliosis?

- Adolescent Idiopathic Scoliosis
Betz et al

- Thoracic Curves
  - < 35°  80% Success
  - > 35°  75% Failure
Samdani 2014, *Spine* 2 yr mean results

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Samdani 2 yr Results

- 11 patients
- Age = 12.3 yrs
- Risser mean = 0.6
- Mean tether span = 7.8 levels
- T5-L2
- Surgical time = 6hrs ⇒ 5½ hrs
- Mean T Cobb: 44º ⇒ 20º ⇒ 13.5º (70%)
Wall/Bylski Clip

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Answer

- Yes
- No
- Maybe

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Answer for EOS?

- Yes
- No
- Maybe
JIS (Crawford/Lenke 2010)

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POST TETHER REMOVAL

6yrs po

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Spine compresses bronchus

RESTRICTIVE

↓ FVC

OBSTRUCTIVE

↓ FEV1/FVC

Spine compresses bronchus

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Pulmonary Function EOS?

• Karlin/Campbell; Jarcho-Levin Syndrome, *JBJS* 2014
  – Asst Vent Rate improved

• Yoon, W; Magnetic Rods in EOS, *Spine* 2014
  – ↑FVC, ↑FEV1

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Neuromuscular?

☐ No

O’Leary/Sturm, 2011, JPO
Congenital scoliosis

Winter, JPO, 1981

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Congenital

☑️ Maybe

A
B
C

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Demirician
Answer for EOS?

☐ Yes
☑ No (If pulmonary issues)
☑ Maybe
Curves ≥30° = 100% fusion

Dimeglio’s work

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Best Potential Indications

- 3 years of growth remaining
- Curves 30°-60°
- 50% Flexible
- Kyphosis < 40°
- Lenke 1a, 1b
- 9+ years
Volunteerism

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<thead>
<tr>
<th>George Thompson</th>
<th>Bob Campbell</th>
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<tbody>
<tr>
<td>Alain Dimeglio</td>
<td>Courntey Brown</td>
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<tr>
<td>Greg Redding</td>
<td>Rick McCarthy</td>
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<td>Jose Herra-Soto</td>
<td>Muharrem Yazici</td>
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<td>Viral Jain</td>
<td>Jo-Chen Son Hing</td>
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<td>Behrooz Akbarnia</td>
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<td>Peter Sturm</td>
<td>Laural Blakemore</td>
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<td>Alvin Crawford</td>
<td>Ralf Stüecker</td>
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<td>Mark Ericson</td>
<td>Randall Betz</td>
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Thank you from Cincinnati