Lung Function Before and After Spine Fusion in Children With EOS Who Have Been Treated With Growing Rods

G. Redding, K. White, H. Matsumoto, V. Bompadre, W. Krengel, N. Kawakami
University of Washington, Columbia University, USA & Meijo University, Japan
Disclosures

- Matsumoto, Bompadre, Krengel: None
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Introduction/Rationale

• Children with AIS who undergo spine fusion have similar lung functions before and after the procedure if the posterior approach is used. (1,2)

• Children with EOS who have lower lung functions prior to fusion have similar lung functions to their pre-op values after fusion. (3)

• Children with EOS have the lowest lung functions if they have received growing rods prior to fusion. However the changes after a fusion procedure have not been reported.
Methods

• We reviewed Forced Vital Capacity (FVC%) values as a % of predicted based on arm span ≤6 months before spine fusion with values obtained <2 years after surgery among children with EOS of different etiologies from 2 spine centers.

• Data was compared as mean values for the groups before and after fusion.

• Data was also compared as % of each group based on etiology that experienced FVC>8% change, a value that is 2 standard deviations greater than day to day and week to week variability among normal children.

• Changes on Cobb angle before and after fusion were correlated with changes in FVC% for the entire group.
Patient Characteristics and Results

N=47  Nagoya=33; Seattle=14 patients

Age at Fusion: 12.4+/-1.5 years (range 8-16 years)

- Etiology of EOS:
  - Congenital 25 (53%)
  - Neuromuscular 12 (26%)
  - Syndromic 6 (13%)
  - Idiopathic 3 (6%)
  - Other 1 (2%)

- Pre-op Cobb angle 65.8+/-23°
- Post-op Cobb angle 47.6+/-23°

- Pre-op FVC% 56+/-18% (range 20-88%)
- Post-op FVC% 51+/-20% (range 13-99%)  
  Paired t-test, P>.10
Proportions of Children with >8% Improvement or Worsening after Spine Fusion by Etiology of EOS

<table>
<thead>
<tr>
<th>Etiology Change</th>
<th>Improvement</th>
<th>Worse</th>
<th>No change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congenital (25)*</td>
<td>8%</td>
<td>60%</td>
<td>32%</td>
</tr>
<tr>
<td>Neuromuscular (12)</td>
<td>50%</td>
<td>42%</td>
<td>8%</td>
</tr>
<tr>
<td>Syndromic (6)</td>
<td>17%</td>
<td>17%</td>
<td>66%</td>
</tr>
<tr>
<td>Idiopathic (3)</td>
<td>66%</td>
<td>0%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Correlation of Change in Cobb vs Change in FVC%; \( R=0.77; p>.40 \)

*P<.05 Multi-Chi Square between groups
Conclusions

• Although mean values for FVC% from each center did not change significantly after spine fusion, 48% patients with EOS worsened; 30% remained unchanged, and 22% improved by 8% FVC compared to pre-operative values.

• Children with EOS due to congenital scoliosis who received growing rods before fusion worsened more frequently by ≥8% FVC than other diagnoses.