Differential Lengthening of MCGR Does Not Improve Coronal Decompensation

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Disclosures

- Alexander Nazareth, MS: None
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- Burt Yaszay, MD: Biogen (b); DePuy (a, b, d); Globus Medical (b, d, f); Harms Study Group (a); K2M (a, b, d); Nuvasive (a, b, d); Stryker (d); Spine Deformity (e); Orthopediatrics, K2M (f)
- Peter Sturm, MD: DePuy (b); Nuvasive (b); Green Sun Medical (c); JCO(e)
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Background

- MCGR rods allow for deformity correction and non-invasive spine lengthening
- Differential lengthening proposed as a technique to improve curve correction or coronal balance in dual MCGR constructs
- No reports in literature on effectiveness of differential lengthening
Purpose

To evaluate the effect of intended differential lengthening on coronal balance and radiographic lengthening amounts in EOS patients with MCGR constructs.
Methods

• Retrospective review of EOS patients treated with MCGR prior to final fusion from a multicenter database

• Index instrumentation at < 10 years of age with ≥ 2 year follow up

• Patients with prior spinal instrumentation or lack of documented lengthening amounts were excluded
Methods

• Intended lengthening amounts recorded by each surgeon

• Rod lengthening amounts measured either from plain film imaging or ultrasound

• Differential lengthening defined as ≥ 2mm difference between total intended rod lengthening on each side over the lengthening period
Results

• 33 patients mean age at index: 5.7 years
  - Neuromuscular (N=14)
  - Idiopathic (N=9)
  - Syndromic (N=8)
  - Congenital (N=2)

• Mean radiographic follow-up: 2.4 years
Results

• 10 (30%) patients had differential lengthening
  – Mean intended difference between rods of 3.6mm

• 23 (70%) patients had symmetrical lengthening
## Results - Rod Length

<table>
<thead>
<tr>
<th></th>
<th>Differential (N=10)</th>
<th>Symmetrical (N=23)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total distraction difference between rods sides (mm)</td>
<td>1.6</td>
<td>2.1</td>
<td>0.60</td>
</tr>
</tbody>
</table>
## Results - Coronal Balance

No significant difference between groups for change in coronal balance from post-op to last radiographic follow-up ($p = 0.68$)

<table>
<thead>
<tr>
<th></th>
<th>Pre-Op coronal balance (mm)</th>
<th>Post-Op coronal balance (mm)</th>
<th>Final coronal balance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33.6</td>
<td>26.3</td>
<td>23.2</td>
</tr>
<tr>
<td></td>
<td>25.1</td>
<td>20.3</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>0.31</td>
<td>0.44</td>
<td>0.83</td>
</tr>
</tbody>
</table>
Conclusions

• Differential and symmetrical lengthening had similar:
  - Postoperative change in coronal balance
  - Difference in distraction between rods

• Differential lengthening may not further improve alignment following initial implantation
Do everything you can to get it right from the first time in the OR