Classification of Early Onset Scoliosis (C-EOS) and MCGR Lengthening Outcomes

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DISCLOSURES

I have nothing to disclose

My co-authors have nothing to disclose
BACKGROUND

• MCGR are increasingly becoming the standard of care implants for surgical treatment of EOS

• Despite initial enthusiasm for this technology, a better understanding of its mechanical abilities and limitations is being discovered

• Variables such as construct design and lengthening intervals are being investigated to assess their impacts on MCGR efficacy
BACKGROUND — PATIENT IMPACT

• An understanding of the typical asynchrony of MCGR intended compared to actual implant lengthening is now appreciated.

• While implant specific issues may account for this, patient variables may also play a role and are still unknown.
PURPOSE

This study aims to determine the effects of EOS etiology on total MCGR lengthening efficacy.

HYPOTHESIS

Patient classification according to the etiology subgroup of C-EOS predicts MCGR lengthening success.
METHODS

• Retrospective chart and radiology review of all patient who underwent MCGR implantation and treatment for EOS at a single institution.

• All etiology and patient ages were included, a minimum of one year of MCGR lengthening was required for inclusion.

• Medical record review was used to determine the intended lengthening of each rod at each lengthening visit and post-lengthening radiographs were measured to determine the actual lengthening achieved.

• The lengthening ratio over the entire follow-up period (achieved / intended) was compared across scoliosis etiologies using the non-parametric Kruskal-Wallis analysis of variance.
RESULTS – OVERALL POPULATION

• 34 patients were included in the study

• C-EOS etiologies were as follows:

<table>
<thead>
<tr>
<th>C-EOS Etiology</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuromuscular</td>
<td>20</td>
</tr>
<tr>
<td>Idiopathic</td>
<td>7</td>
</tr>
<tr>
<td>Syndromic</td>
<td>5</td>
</tr>
<tr>
<td>Congenital</td>
<td>2</td>
</tr>
</tbody>
</table>

• No difference in mean overall lengthening ratio (achieved/intended) between convex and concave rods
  • Convex: 0.63
  • Concave: 0.64 (p = 0.97)
**RESULTS – C-EOS**

- No significant variation in mean total lengthening ratio across the four etiological categories in either rod

<table>
<thead>
<tr>
<th>Patient Classification</th>
<th>Number of Patients</th>
<th>Mean Lengthening Ratio Concave Rod *</th>
<th>Mean Lengthening Ratio Convex Rod *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congenital</td>
<td>2</td>
<td>0.81 ± 0.08</td>
<td>0.63 ± 0.05</td>
</tr>
<tr>
<td>Idiopathic</td>
<td>7</td>
<td>0.63 ± 0.35</td>
<td>0.61 ± 0.35</td>
</tr>
<tr>
<td>Neuromuscular</td>
<td>20</td>
<td>0.63 ± 0.30</td>
<td>0.64 ± 0.30</td>
</tr>
<tr>
<td>Syndromic</td>
<td>5</td>
<td>0.60 ± 0.28</td>
<td>0.61 ± 0.22</td>
</tr>
</tbody>
</table>

* P value: Concave = 0.88; Convex = 0.99
CONCLUSIONS

1. There appears to be a mean achieved/intended lengthening ratio of 0.64 with MCGR
   - No difference in either concave or convex implant

2. EOS etiology, as classified by the C-EOS does not appear to significantly correlate with the MCGR lengthening efficacy

3. Further analysis may determine other significant factors that may predict lengthening success