Masters Techniques:
Rib Anchored Distraction Based Growing Rods

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Use of Spine Hooks on Ribs NOT FDA Approved
Part 1: Theoretical Advantages
Hooks on Ribs: No intentional fusion
Do not expose or fuse upper spine
No thoracotomy!
Traditional Growing Rods Cause Autofusion
Cahil, et. Al, Spine 2010

• 8/9 patients autofused - Stiff Curves!
• Growing rods in for 7 yrs
• Mean of 7 osteotomies done at final fusion
• 44% Cobb Angle correction
Motion - Slower to autofuse???
“give” of the ribs
“slop” of the hooks
Less likely to break rods?
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“slop” of the hooks
Less likely to break rods?

GSSG Study – 176 pts, 56 month f/u
rib anchored growing rods 77% less likely to break rods than spine anchored
**Are Rib Vs. Spine Anchors Protective Against Breakage of Growing Rods?**

Yamaguchi, Skaggs, Mansour, Myung, Yazici, Johnston, Thompson, Sponseller, Akbarnia, Vitale, Growing Spine Study Group, Spinal Deformity, 2014

<table>
<thead>
<tr>
<th></th>
<th>Patients</th>
<th>Rod Breakage</th>
<th>Anchor complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rib Anchored</td>
<td>34</td>
<td>6%</td>
<td>38%</td>
</tr>
<tr>
<td>Spine Anchored</td>
<td>142</td>
<td>29%</td>
<td>33%</td>
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<tr>
<td></td>
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<td>P=0.04</td>
<td>P=0.12</td>
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</tbody>
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Rods broke 4X more with spine anchors than rib anchors

*Size of Cobb angle most significant (p=0.01)*
Nutritionally Depleted Population

• Soft tissue Coverage Challenging
• 47% pts pre-op failure to thrive (<5 percentile)

Myung, 2009
Rib based anchors better for PJK?

- Hybrids 42% (5/12) vs. Growing rods 62% (10/17)
  - P=0.059

Advantages of rib anchors

- Avoid proximal fusion
- Less rigid system
  - Minimize autofusion?
  - Less rod breakage
- Lower Profile
- Less PJK?
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Possible Disadvantage
- Does it hurt pulmonary function?
Why use “spine hooks” instead of VEPTR

• Already in hospital
  – Staff familiar
  – Minimize inventory
  – I am more familiar with systems I use daily

• No IRB approval needed
• Less expensive
• Easy to adjust sagittal contour and hook placement
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My opinion

Clinical Equipose Between “spine hooks” and VEPTR
Part 2: Technique

• Disclosure - Technique is pretty straightforward
• Few Problems
Midline Incision - Plan for final fusion

Single Rod Case
3 and 5 cm incisions
no thoracotomy
Midline Incision - Plan for final fusion

- No Dissection of Proximal Spine
- Feel bump of transverse process
- Split muscles just lateral to TP
Adjacent to TP

Extra-Periosteal
Want ribs to hypertrophy
NOT in chest
No chest tube
No Advantage to “Claw”
Don’t use first rib
Fails Posterior
Case Example
5yo boy

- Ambulatory
- Neuromuscular
- 91° Scoliosis - progressive
- Extremely thin
Current Preference
– Dual-sided constructs
– ≥3 up-going hooks

REALLY thin kids
NO Thorcotomy
Thank You