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 thorocotomy!
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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</tbody>
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P=0.04
P=0.12

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
Low Profile
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 thorocotomy
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
– $\geq 3$ up-going hooks

REALLY thin kids

NO Thorcotomy
Thank You