Spine Based Anchors

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Disclosures as Listed

Royalties from K2M, DePuy Synthes.
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“Let’s take High Road”
Dave’s Got Rib Hooks...
Proximal Fixation Options

• Spine
  Lamina, TP, Pedicle Hooks
  Pedicle, Translaminar Screws
  Sublaminar Wires, Cables, Bands

• Ribs
  1 hook, 2 hooks, 3 hooks, 4…
One potato! Two potato!
Three potato! 4! 5 Potato!
6 Potato! 7 Potato!
More!
And More!
And More!
And More!
1 Potato, 2 Potato...
5 Potato, 6 Potato
7 Potato, More!
Google: Rib Anchors...
Tech: 1st prepare hamburger
Spontaneous Fusion?
Theoretical Advantages of rib fixation thus far...

- Avoid proximal fusion
- Less rigid system
  - Minimize autofusion?
  - Less rod breakage
- Less Prominent
- Above true of VEPTR and laminar hooks...
Extraspinal ossifications after implantation of vertical expandable prosthetic titanium ribs (VEPTRs)

Vanja Zivkovic · Philippe Büchler · Dror Ovadia · Rolf Riise · Ralf Stuecker · Carol Hasler

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Remember why you are there!

- Don’t mess up the chest to fix the spine
The Classification for Early-onset Scoliosis (C-EOS) Correlates With the Speed of Vertical Expandable Prosthetic Titanium Rib (VEPTR) Proximal Anchor Failure

Howard Y. Park, MD*, Hiroko Matsumoto, MA†, N. Wajdi W. Kanj, BS, MD‡, Randal R. Betz, MD§, Paul MD¶, Scott J. Luhmann, MD#, Sumeet Garg, MD††, John M. Flynn, MD§§, and Michael G. Vitali
Are Rib Versus Spine Anchors Protective Against Breakage of Growing Rods?

Yamaguchi KT Jr\(^1\), Skaggs DL\(^2\), Mansour S\(^3\), Myung KS\(^3\), Yazici M\(^4\), Johnston C\(^5\), Thompson G\(^6\), Sponseller P\(^7\), Akbarnia BA\(^8\), Vitale MG\(^9\); Growing Spine Study Group.

RESULTS: Thirty-four patients had rib-anchored growing rods and 142 had spine-anchored growing rods. This analysis found that proximal rib-anchored growing rods have a 23% risk of lifetime rod breakage compared with spine-anchored growing rods (6% vs. 29%) (p = .041).

CONCLUSIONS: Preoperative Cobb angle appears to be the most influential factor in determining whether growing rods break (p = .014). Univariate analysis found that rib anchors were associated with less than one-fourth the risk of rod breakage than spine anchors (p = .04) but multivariate analysis found no significant association between anchors and rod breakage (p = .07). This trend suggests that rib-anchored growing rod systems may be associated with less rod breakage because the system is less rigid as a result of some "slop" at the hook-rod interface, as well as the normal motion of the costovertebral joint.

4 times more case done with Spine Anchors… for good reason

Rib anchors are sloppy… Bad for pushing on the spine
Adjacent to TP

Extra-Periosteal
Want ribs to hypertrophy
NOT in chest
No chest tube
Biomechanical Evaluation of 4 Different Foundation Constructs Commonly Used in Growing Spine Surgery: Are Rib Anchors Comparable to Spine Anchors?

Akbarnia BA\textsuperscript{1}, Yaszay B\textsuperscript{2}, Yazici M\textsuperscript{3}, Kabirian N\textsuperscript{4}, Blakemore LC\textsuperscript{5}, Strauss KR\textsuperscript{6}, Glaser D\textsuperscript{2}; Complex Spine Study Group\textsuperscript{6}.

RESULTS: All specimens eventually failed at the bone-anchor interface. Not better and standard deviations of ultimate loads were measured as RR (429 \pm 13). There was no statistically significant difference between the following constructs calculated for each construct type and no statistically significant difference.

Conclusion: …may be considered as an alternative…
If you want to fix the spine, attach it to the spine
Mix and Match
Not just Hooks & Screws
Spine Anchors

• For spine problems…
• Versatile, Revisable
• Cross-link option
• Secure when incorporated into limited fusion mass
Conclusion: More severe cases with more extensive fusions have lower FVC
PJL Pain…spine or rib based…
Be the one to guide me
but never hold me down
Growth *Guide Me, but Never Hold Me Down*

Fused Apex

Ends free to Slide
NF1

- No Pedicles
- Rib Hooks
- Domino

Conclusion: Rib hooks are the option of last resort
The only truly growth friendly spine implants live in the front!