Too Small / Too Stiff - Strategy?

You can't shine suede

ICEOS Atlanta 2019
JW 0+9

6 ribs
CT ? 3 unopposed hv's
14 mo T1-12 =~8cm -> time to expand
6/09 age 2+8  T1-12 8cm

6 procedures incl add 2nd rod and revise S rods -> minimal correction + length gain, volume

Options:  
-Correct deformity by HV resection  
-Combine w more distraction  
-Just keep going (kick)
Continuing with distraction...

T12-L1 HV resection A/P
Should have been mid-Th?

Final revision age 7
Age 12/13 OR’s
PFT hi 20’s

Unable to distract x 3 yr

--- SPIROMETRY ---

<table>
<thead>
<tr>
<th>Pre-Bronch</th>
<th>Actual</th>
<th>Pred</th>
<th>%Pred</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVC (L)</td>
<td>2.82</td>
<td>2.82</td>
<td>104</td>
</tr>
<tr>
<td>FEV1 (%)</td>
<td>0.72</td>
<td>0.72</td>
<td>29</td>
</tr>
<tr>
<td>FEV1/FVC (%)</td>
<td>91</td>
<td>87</td>
<td>104</td>
</tr>
<tr>
<td>FEF 25% (L/sec)</td>
<td>1.07</td>
<td>5.01</td>
<td>21</td>
</tr>
<tr>
<td>FEF 75% (L/sec)</td>
<td>0.84</td>
<td>2.80</td>
<td>30</td>
</tr>
<tr>
<td>FEF max (L/sec)</td>
<td>1.13</td>
<td>5.22</td>
<td>21</td>
</tr>
<tr>
<td>FVC (L)</td>
<td>0.66</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>FIF max (L/sec)</td>
<td>1.15</td>
<td></td>
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</tbody>
</table>
Persist with ineffective distraction.....

- Inadequate length
- PJK
- Crankshaft & worsening convex spine penetration (doesn’t control apex) = lousy PFT + TIS
Lesson - don’t allow deformity to persist.... the deformity does the chest wall damage.

- Jarcho-Levin family
- No indication for thoracic lengthening
- Asymptomatic
- Mother age 24
- T1-12 18.1 cm
- Grandmother age 49
- Mother age 24
- T1-12 18.1 cm
What’s the alternative...?

• Lots of traction **early** - multiple sessions
Traction X 5 sessions until age 6

1st GRI

age 10
Rod removal, final HGT -> ASF/PSF
ASF (vats)/PSF with extensive posterior facet ankylosis

T1-12 = 22.0 cm  
T1-S1 = 32.3 cm  
T4-L1 48°  
FVC,FEV1 hi 40’s%

Caveat:  
Non-congenital w/ no rib abnormality
What’s the alternative...?

- Resection/osteotomy combine w/ GRI → partially correct to make distraction more effective

Age 6 neglected cong scoli w rib fusions, VACTERL
Traction - not effective

resection
Upper 9 seg's available to be lengthened (most of seg's = fused) -> not definitive
But...deformity better managed
What about early fusion? L. Karol data

% FVC

<18 but 55-85%

Applies only to cases fused w/ minimal correction

Big curves fused in situ

Fig. 3

The thoracic height at the time of follow-up versus the percentage of predicted forced vital capacity (FVC). Patients with the shortest thoracic spinal height (measured from T1 to T12) had the greatest restriction of pulmonary volume ($r = 0.73$, $p < 0.001$).
Distraction-based Rx and The 18cm hurdle
El-Hawary et GSSG, CSSG

135 pts. / mean lengthen 11
Final Th Ht > 18 cm  65%
> 22 cm  30%

>18cm
Congen  48%
N-m  80%
Syndr  86%
JIS/IIS  68%

Rest doomed?
Summary

• We don’t really know where “sweet spot” combining length and deformity correction lies
• Short stature patients w/o deformity and no other morbidity = healthy
• Emphasis on too short most likely misplaced
• Deformity control = best insurance vs. TIS

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