# Anterior Vertebral Body Tethering: Technique

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## Outline

 Patient selection Goals of surgery Anesthesia Single lung Positioning Instrumentation Correction



### **Patient Selection**

Ideal patient:
Skeletally immature
Sanders ≤ 4
Risser ≤ 2
Vertebral bodies of adequate size



## **Patient Selection**

Curve
Magnitude 35-60°
Flexible ≤ 30°
Rotation ≤ 20°
Kyphosis ≤ 40°



# Patient Selection: Proximal Curve a Contraindication?



3 month

### 9 month

## **Goals of Surgery**

How much correction? *Typically aim for* ≤ 20° on table *Increase when upright*Adjust for remaining growth
Consent for initial and 'adjustment' surgery

# Correction: Supine Intra-op Versus First Erect



## **Goals of Surgery**

How much correction?
Typically aim for ≤ 20° on table
Increase when upright
Adjust for remaining growth
Consent for initial and 'adjustment' surgery

## **Potential For Overcorrection**





### Anesthesia/Positioning

- Single lung ventilation
  CO<sub>2</sub> insufflation
  Firmly secured
  Tape and gel rolls
  Three 15mm working portals
- Three 5mm portals



## **Exposure/Instrumentation**

- Pleural dissection
  - Segmentals taken
- Screws
  - Staple placed adjacent to rib head
  - Aim for contralateral rib head
    - Bicortical
    - AP fluoro
    - Medial/lateral difficult



# Screws: Optimizing Medial Lateral Angle





## **Correction: Flexible Curve**

#### 11.5 yo male



Pre-op

Intra-op

1<sup>st</sup> Erect

2 year

### **Correction: Instruments**





Tensioner Pusher Set Screw

Thoracoscopic Compressor

### Correction

- Attempt to parallel discs under fluoro
- Beware of disc reversing at bottom of curve





### Correction



Tether passed through inferior portal Sequential tightening

## Complications

- 60 patients with anterior vertebral body tether
- Initial correction averaging 50%
- One patient with persistent atelectasis requiring bronchoscopy
- Two patients with overcorrection requiring lengthening

### Case #1

#### Pre-op

#### 1 year post-op



### Case #1 Feb 2011 now 14 yo

Pre-op

1.5 years post-op



### Intra-op Photos from Case 1 Lengthening









### Case #1 Follow-up after Adjustment

Pre tether adjustment



1<sup>st</sup> erect post tether adjustment



3 mos after adj, 2 yrs post-op



Risser 4-5

# Summary

- Technically easier than anterior thoracoscopic fusion
- Appears to show consistent improvement of tethered segments, as long as adequate growth remains
- Optimal correction specific to patient remains unknown