Anterior Spine Tethering

A new fusionless treatment option for scoliosis in the growing spine

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Shriners Hospitals for Children® - Philadelphia
Spinal Tethering

**Old use:** FDA approved as a “dynamic stabilizer“ in the *posterior* lumbar spine

**New use:** Physician directed scoliosis treatment as a dynamic stabilizer in the growing *anterior* thoracic spine (growth modulation)
Here is a bone model of the tether (white cord) attached to bone screws in the vertebral bodies of the spine.
Components

- Titanium pedicle screws placed on the convexity (outside) of the scoliotic vertebral bodies

- **Polyethylene-terephthalate (PET)** flexible cable connects and compresses the adjacent screws to help straighten the spine
  - Cable safety extensively studied
  - Animal and computer simulation models show scoliotic correction

*Dynesys system by Zimmer spine*
Published Case Report

- 8.5 yr old boy with JIS
- thoracic curve 40°, tethered T6-T12 (Jan 2005)
- immediate post op 25°
- @ 4 yrs post op
  - thoracic curve 6°
  - total height increased 36 cm
  - tethered spine increased 2 cm

Tethering advantages

- FUSIONLESS
- Allows the spine to grow and remain flexible
- One time surgery
- No “lengthening” required
- Can be used with lumbar staples (VBS)
- “burns no bridges”, can do a later fusion if needed
“Ideal” candidate

- Idiopathic scoliosis (adolescent or juvenile) or Idiopathic “like” (i.e. post syrinx decompression)
- >8 yrs old with remaining spine growth (* > 10 yrs old may be preferred to decrease risk of overcorrecting the curve)
- Thoracic curve 35° to 55°
- OR <35° but does not bend below 20°
- Alternative to VBS + hybrid rod
Case #1  Feb 2011  12 yo female

Before surgery

During surgery

5 days after surgery

Tethering

Staples
Same patient

Before surgery

1 year later
Case #3  Aug 2011  14 yo male

Before surgery

4 months after surgery (tethering only)
Case #8  Nov 2011  13 yo female

Before surgery

3 months after surgery

Providence TLSO at night for lumbar curve
Unknowns

- Not currently using for thoracolumbar or lumbar curves (but hope to in the future)
- New technology
- No longterm follow-up
- Small number of cases so far
- Potential for overcorrection of curve
- Refined criteria for “ideal” candidate
- Refined Post op activity restrictions (temporary protective brace for 3 months)