Ideal Growing Rod System

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Premise:

As we develop new systems we should agree upon what constitutes an ideal system

- Today no perfect system exists

System should be applicable to all forms of early onset deformity

- All ages
- Kyphosis and Scoliosis
- All types of diagnoses

Should grow with the child

- Should grow at same natural rate as a child following growth charts
- Should avoid O.R. visits to lengthen

Minimize trips to O.R.

- Avoid infections
- Avoid implant loosening or breakage
- Avoid developmental and CNS effects of repeated anesthesias

Easy to apply

- Minimize time to implant
- Top loading
- Easy to explant at end of treatment

Maximize pulmonary function

- Lung space
- Maximize activity of child to increase PFT function

Avoid PJK

- Product of distraction

Minimize prominence on child's back

- Low profile for implants

Minimize negative effect upon natural growth of spine

- Minimal number of growth segments arrested in order to lock in implant
- Avoid heterotopic bone

The device should be compatible and non-toxic to the child

- Need to minimize metal fretting and metallosis
- Should be MRI compatible
- Metal molecule size effects spread

The device should be strong enough to control the deformity and resistant to breakage

It should restore alignment in all planes 3 dimensionally

- Maintain the correction over entire period of growth

Should be easily removable or dissolve prior to adulthood

Ultimate goal is to send the child into adulthood with a spine:

- Well balanced
- Aligned close to neutral in all planes
- Free of metal
- Maximally mobile