Ideal Growing Rod System

Richard E. McCarthy, M.D.
Professor, Departments of Orthopaedics and Neurosurgery
Arkansas Children’s Hospital
University of Arkansas for Medical Sciences
Little Rock, Arkansas
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