Evolution of Growing Rod Surgery in Treatment of Early Onset Scoliosis: Trends in the Past 30 Years

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Disclosures

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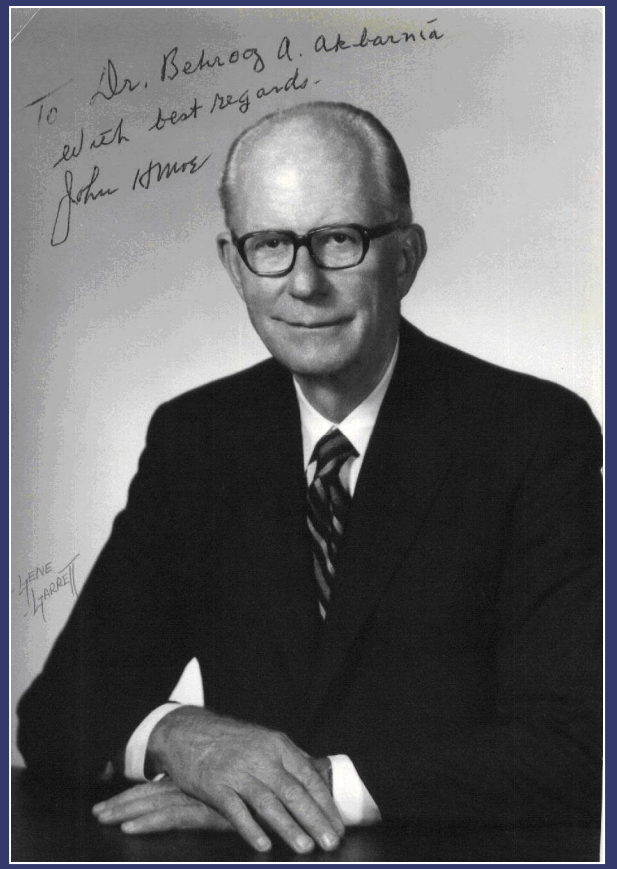
c. Stock/Shareholder
d. Speakers' Bureau
e. Other Financial Support

Introduction

- The growing rod (GR) procedure has become the most common alternative treatment for progressive Early Onset Scoliosis (EOS)

- Based on Harrington's technique, Moe introduced spinal instrumentation with limited fusion for treatment of EOS in early 1980s

- The GR Technique has been modified over the years and has become increasingly popular



Introduction

Purpose of Study:

To report the trends involving the growing rod technique over the past three decades

Methods

Query of articles published in peer review journals on GR techniques:

- Two online medical databases
- Ten English language articles from 1984 to 2009
- Data for both single and dual rods collected
- All clinical, radiographic and surgical data were recorded and analyzed

Results

Number of papers published:

- 1 in 1980s, 3 in 1990s, 6 in 2000s

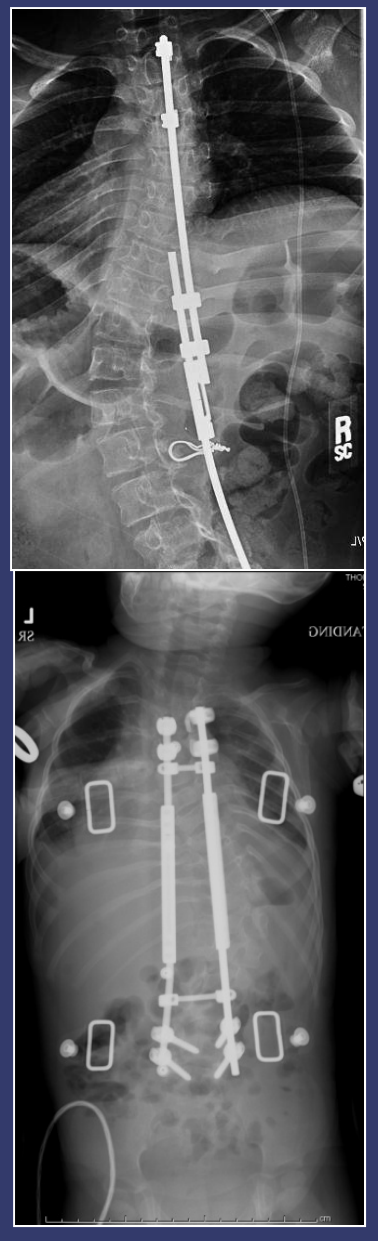
Patient summary:

- 268 total patients
- 73 neuromuscular, 58 idiopathic, 50 syndromic, 38 congenital, 46 “other”
- Mean age at surgery 77.4 mos (49-108 mos)
- Mean scoliosis 72° (56-82°)
- Mean initial curve correction 46% (27-56%)
- Mean final curve correction 32% (5-54%)

Results

Patient summary (continued):

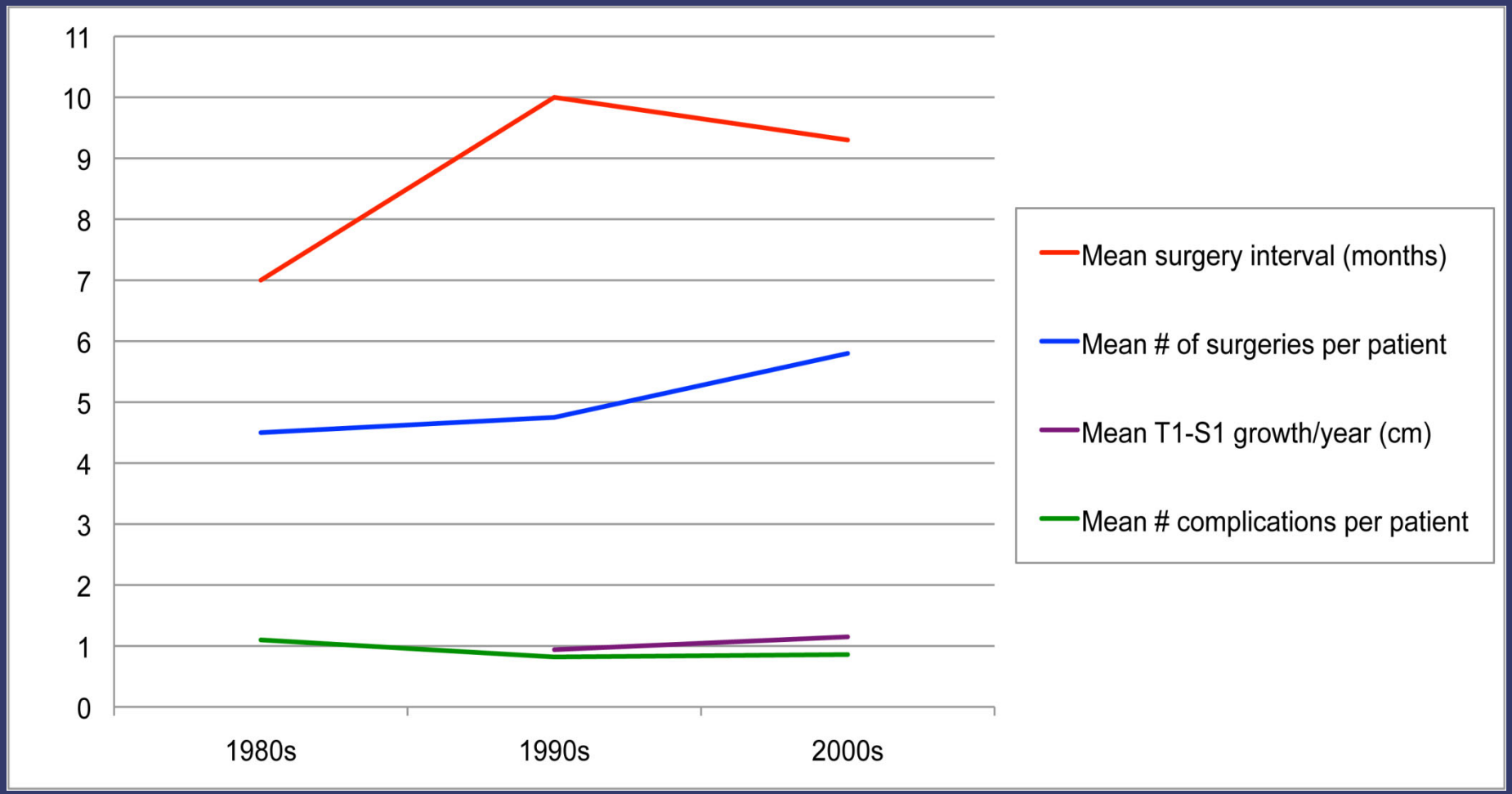
- 218 Single Rod (SR)
- 50 Dual Rods (DR)
- Mean Follow-up 52 mos (31-73 mos)
- All surgeries before 2000 were SR
- In 2000s more than 40% of reported cases were DR



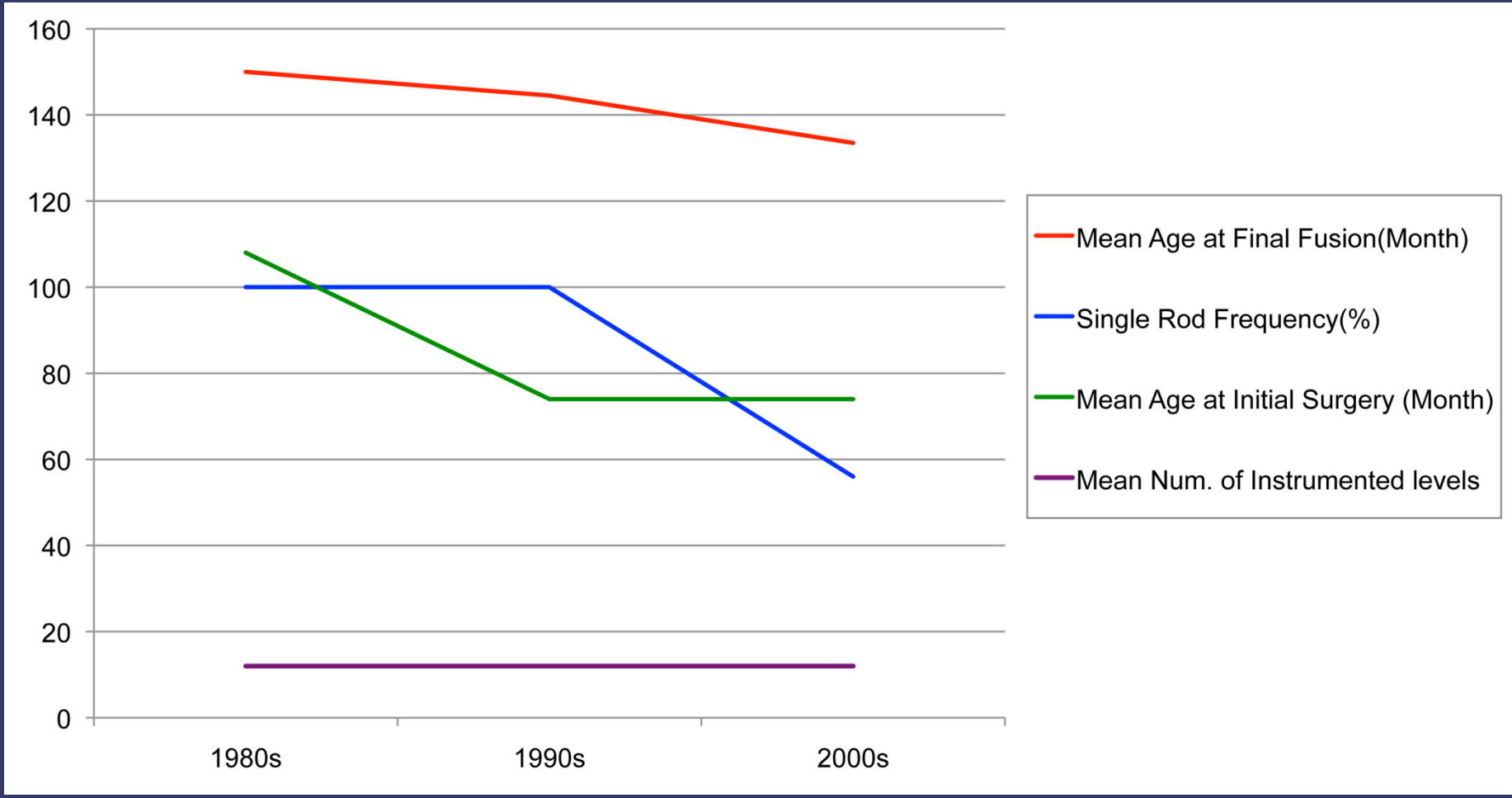
Results

- Complications:
  - Mean # of complication per patient slightly decreased from 1980s to 2000s
  - In 1980s, fewer patients had complications but those who had complications had higher number of complications
  - On average, 54% of patients experienced complications (24-90%)
- Mean Surgery Intervals:
  - Increased from 7 to 10 mos (5-15 mos) in the 1990s
  - Decreased to 9 mos (7.5-12.7 mos) in 2000s
- Mean age at surgery (incl. final fusion) decreased over time
- T1-S1 gain reported only in 3 papers and increased in 2000s

Results


11
10
9
8
7
6
5
4
3
2
1
0
1980s
1990s
2000s
Mean surgery interval (months)
Mean # of surgeries per patient
Mean T1-S1 growth/year (cm)
Mean # complications per patient

Results


160
140
120
100
80
60
40
20
0
1980s
1990s
2000s
Mean Age at Final Fusion(Month)
Single Rod Frequency(%)
Mean Age at Initial Surgery (Month)
Mean Num. of Instrumented levels

Conclusions

- Over the past three decades of GR surgery:
  - Complication rate has decreased
  - T1-S1 gain has increased
  - Mean number of surgeries per patient increased

- There has been an earlier trend to perform GR surgery earlier, and therefore final fusion, at a younger age but this trend may be changing as new information becomes available.

- Outcomes of GR surgery continue to improve; however, a concerted effort is needed to conduct clinical research, implement new technology, reduce complications and improve clinical outcomes