Spinal Growth in Patients with Juvenile Idiopathic Scoliosis Treated with Boston Brace

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Disclosure

- None of the authors have relevant disclosures related to this research project

Juvenile idiopathic scoliosis

- **Treatment goal**
  - Control scoliosis + preserving spinal, thoracic and lung growth
- **Possible treatments**
  - Growth-friendly spine surgery
  - Bracing
- **Risks growth-friendly implants**
  - Multiple surgeries, frequent complications, reduced spinal growth
- **Effect of bracing on spinal growth is unknown**

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Aim

To describe the longitudinal spinal growth in patients with juvenile idiopathic scoliosis treated with Boston brace

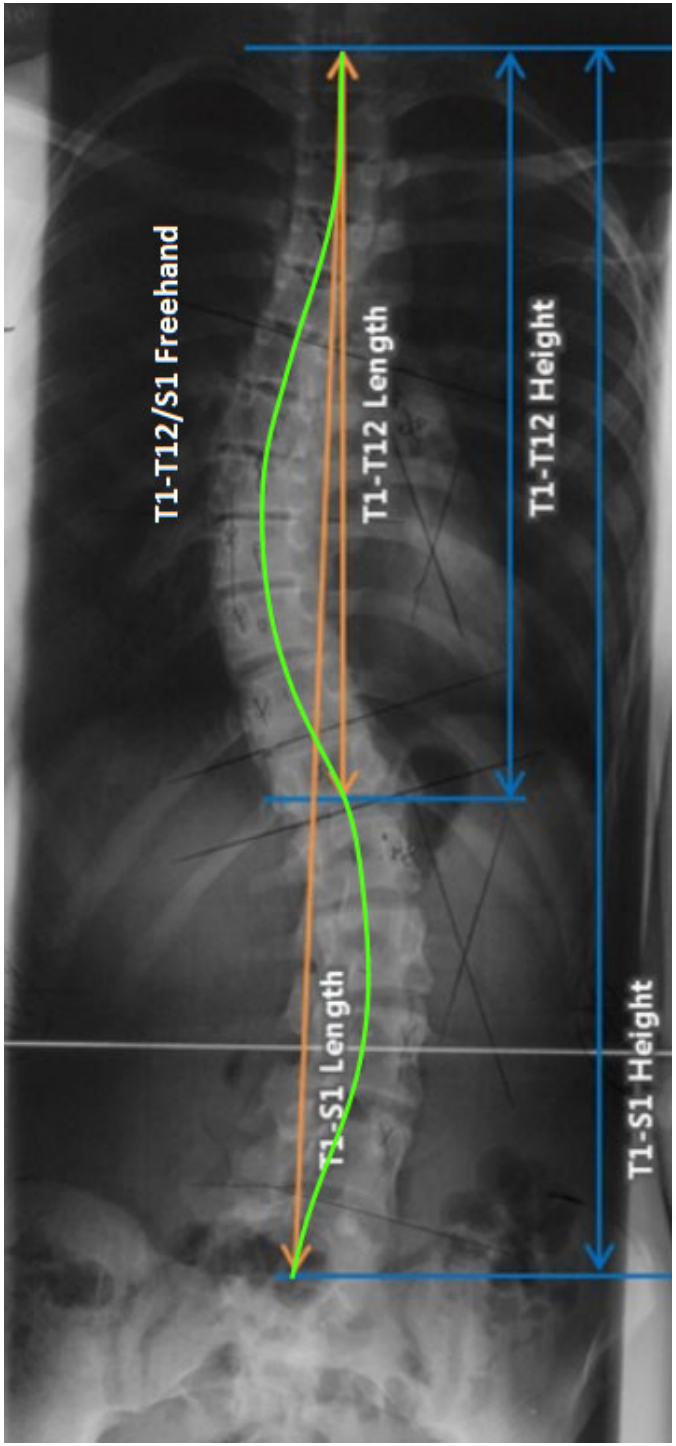
Method selection

- Retrospective radiographic analysis
- 49 JIS patients treated with Boston brace were included
- Three radiographs
  1. Before brace treatment
  2. After brace treatment
  3. At final follow-up

Method analysis

- T1 –T12 **length**
- T1 – T12 **height**
- T1 – T12 **freehand**

- T1 –S1 **length**
- T1 – S1 **height**
- T1 – S1 **freehand**



Patient characteristics

All patients	n= 49
Mean age of diagnosis (yr)	7.4 (±1.4)
Mean total brace wear time (yr)	2.9 (±1.7)
Mean age at start brace treatment (yr)	10.6 (±2.4)
Mean age at weaning (yr)	14.1 (±1.9)
Requiring surgery (n)	14 (28.6%)
• Surgical indication before bracing (n)	4 (7.8%)
• Surgical procedures per patient (n)	1

Results Spinal length

n=49	Before bracing	After bracing		Final follow-up	
Average	n=49	***Brace*** n=35	***Brace & OR*** n=14	***Brace*** n=35	***Brace & OR*** n=14
Age (y)	10.4	14.7	12.8	18.0	
Major Cobb angle (°)	33 (±10.1)	26 (±8.9)	51 (±16.2)	28 (±9.6)	39
T1 – T12 freehand (cm)	24.5	29.0	27.9	29.4	28.8
T1 – S1 freehand (cm)	39.1	46.4	45.4	47.0	47.0
Total body height (cm)	153.0	171.7	164.2	172.3	171.1

Results Spinal growth during brace treatment

During brace treatment	n=49	
	Total growth	growth/year
T1-T12 (Freehand)	4.22 cm (±2.60)	1.08 cm/ year (±0.49)
T1-S1 (Freehand)	7.00 cm (±4.61)	1.75 cm/ year (±0.79)

Spinal growth between 10 years and skeletal maturity based on Dimeglio's data [1]	
T1-T12	1.1 cm/ year
T1-S1	1.8 cm/ year

1) Dimeglio A, Canavese F. The growing spine: how spinal deformities influence normal spine and thoracic cage growth. Eur Spine J. 2012 Jan; 21(1): 64–70.

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Conclusion

- Spinal growth was 1.75 cm/year during brace treatment.
- Boston brace does not seem to affect spinal growth, compared to Dimeglio's data.
- Further analyses and studies are necessary to confirm this preliminary conclusion.

N=49	Start bracing	After bracing		Final follow-up	
Average	n=49	**Brace** n=35	**Brace & OR** n= 14	***Brace***	***Brace & OR***
Age (y)	10,4	14,7	12,8	18,0	
Major Cobb angle (°)	33	26	51	28	39
T1 –T12 length (mm)	241	286	263	290	281
T1 – T12 height (mm)	241	286	262	290	279
T1 – T12 freehand (mm)	245	290	279	294	288
T1 –S1 length (mm)	386	457	432	463	457
T1 – S1 height (mm)	386	457	432	463	456
T1 – S1 freehand (mm)	391	464	454	470	470
Total body height (mm)	1530	1717	1642	1723	1711