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AND TIPS FROM AROUND THE WORLD

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PROGRAM GUIDE

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Sublaminar Band Posterior Fixation for AIS Results in Greatest Improvement in Alignment and Stable Outcomes ~5 Years

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Introduction:

Scoliosis is a 3d deformity.
Surgical correction entails:

- Correcting coronal deformity.
- Improving sagittal alignment.
- Improving coronal spinal balance.
- Improving sagittal spinal balance.
- Keeping shoulders level.
- Improve axial rotation and paravertebral prominence.

Study Purpose:

To compare the clinical and radiographic results of 3 types of sublaminar techniques.

- Compare implant costs of sublaminar techniques.
- Compare *radiographic* results of sublaminar technique to literature for all screw techniques.
- Compare *clinical* outcomes of sublaminar technique to literature for all screw techniques.
- Compare implant costs of sublaminar techniques to all screw techniques (low and high density, < >1.4 implants per level).

Methods:

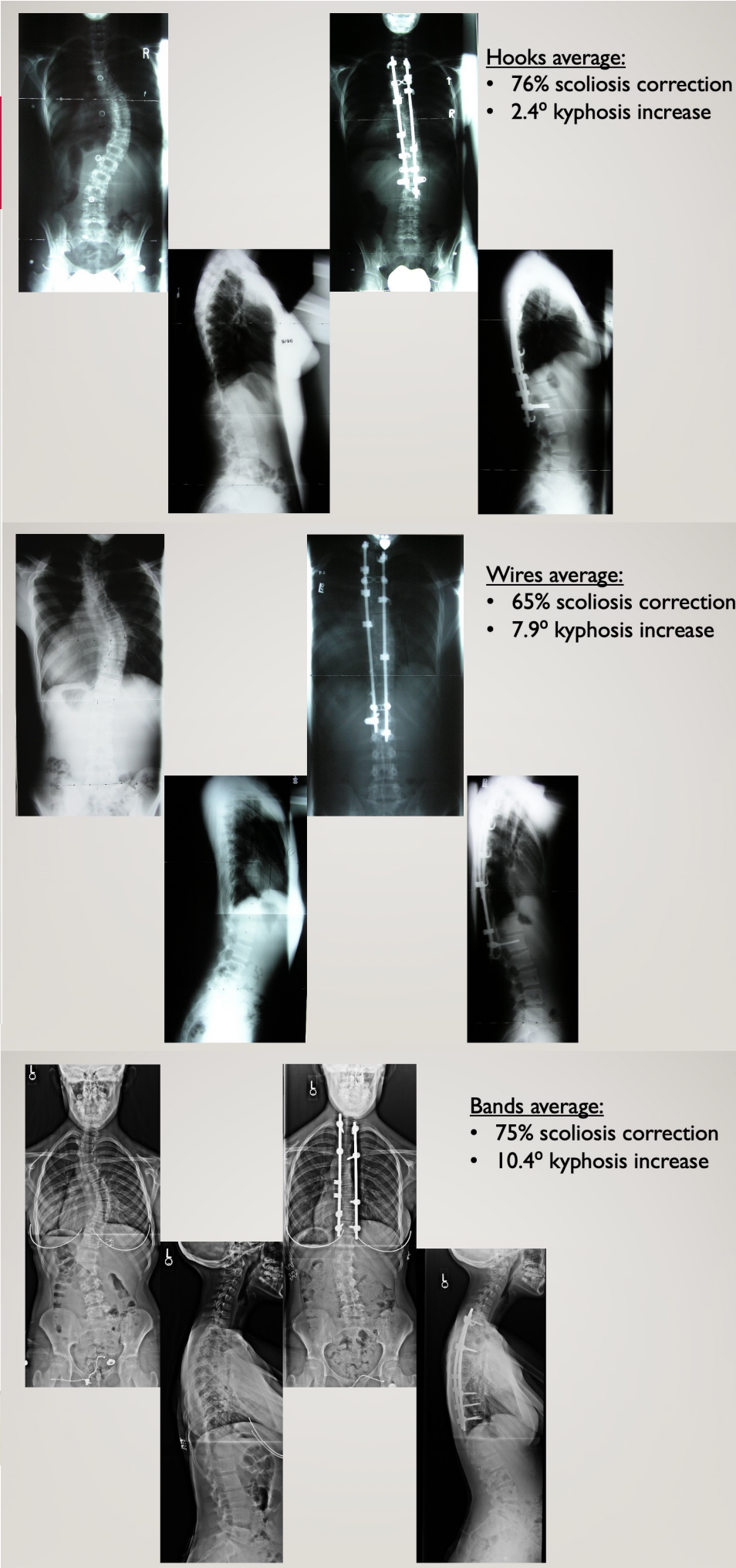
- Retrospective review of *prospectively collected* data; radiograph and PROMs (patient reported outcomes measurements).
- *Inclusion criteria:* Consecutive AIS patients with type 1, 2 and 3 Lenke curves. Age range 12-24 with relatively flexible curves.
- 2-10 year follow up.
- Patient PROMs were compared to age and gender matched controls.
- All patients had pre-surgical thoracic MRI scan which included assessment of adequate canal size.
- Hybrid *low density* implant construct of a primary thoracic curve.
- Distal fixation= screws
- Proximal fixation= screws or hooks
- Apical fixation= *Sublaminar* hooks, wires, bands
- Concavity of the curvature was instrumented first.
- Bone graph: local bone graph + DBM and rib autograph (via thoracoplasty, same incision).
- Minimal radiation technique applied (“free-hand” technique).
- Surgical navigation (O-arm) *not* used.
- Fluoroscopic imaging preformed; total of 5-12 images.

Results:

- Bands had greatest scoliosis correction which was significantly better than wires.
- Paravertebral prominence improvement (Scoliometer): Bands 12 degrees, Wires 9 degrees, Hooks 9 degrees.

Results Continued:

	Sublaminar bands	Wires	Hooks
Number of patients	22	31	8
Average age (yrs)	15	16	16
Scoliometer pre-op (degrees)	15.4	13.7	13.1
Scoliometer post-op (degrees)	3.9	4.5	5.3
#levels ± SD	10.3 ± 1.5	8.8 ± 1.7	9.3 ± 2.0
Implant Density	1.1 ± 0.2	1.3 ± 0.3	1.2 ± 0.1
Implant Costs	\$11246 ± 1755	\$5861 ± 1733	\$6129 ± 2779
Scoliosis Flexibility (%)	61	55	76
Scoliosis improvement (degrees,%)	55 → 14 75	53 → 19 65	47 → 11 76
Kyphosis increase (degrees)	10	8	2
Sagittal balance change (cm)	0.2	-1	-2



- **Complications**
 - None related to the sublaminar devices
 - No neurological deficits
 - No pseudarthrosis
- **Secondary surgeries**
 - Hooks: 3 late instrumentation removals, 1 hook revision
 - Wires: 3 for instrumentation removal, 2 fusion extensions
 - Bands: 2 for instrumentation removal, 1 fusion extension

Limitations:

- Retrospective non-randomized study
- Underpowered
- Loss to follow-up in control patients

Discussion and Conclusion:

- Bands gave greatest correction of scoliosis, axial rotation, and kyphosis (10 degrees but not significant relative to wires, similar to prior reports) (Presenti 2020)
- No significance difference in outcomes between sublaminar groups.
- Pain improved after surgery, but mild increase in back pain after 5 years.
 - Also mild increase in control groups
- Pre-op, early, and long-term pain scores are similar to prior studies. (Louer 2019, Newton 2020)
- Implant cost of bands is greater than wires and hooks, but similar to intermediate density screw construct \$12,500. (Baky 2020, Cheng 2005)
- Safe procedure; no implant related failures/injuries
- Less radiation: No CT was used in this technique. In comparison all screw techniques use intraoperative CT scan. (averaged 4+ spins/case, Guenther 2020)

