Is Vertical Expandable Prosthetic Titanium Rib (VEPTR) Application a Sufficient Method to Provide Expected Spinal Growth in Congenital Scoliosis?

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Author Disclosure Information

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Classifying *Non-Fusion Techniques* and *Growth friendly Implants*

Distraction
<8 y, all et.

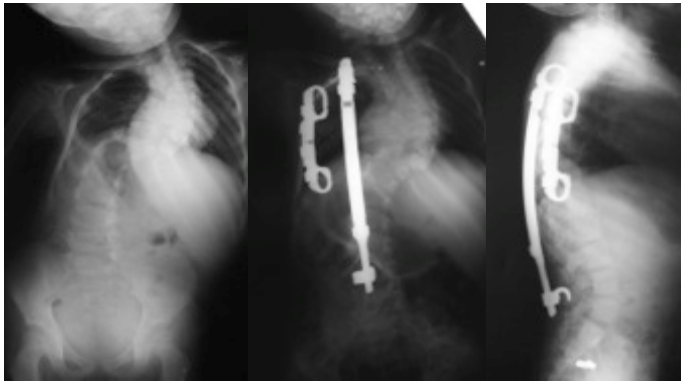
- Growing Rod (Single/Dual)
- ***VEPTR (FDA)***
- Hibrid Growth Rod
- MCGR (Phenix/MAGEC)

Growth guidance <9 y, all et.

- Shilla
- Luque trolley

Convex Compression
Tension ≥8 y
Congenital ø

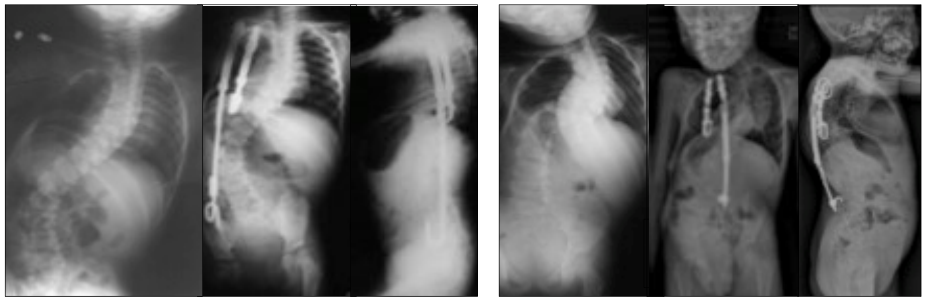
- Stapling (Shape memory staples)
- Tethers



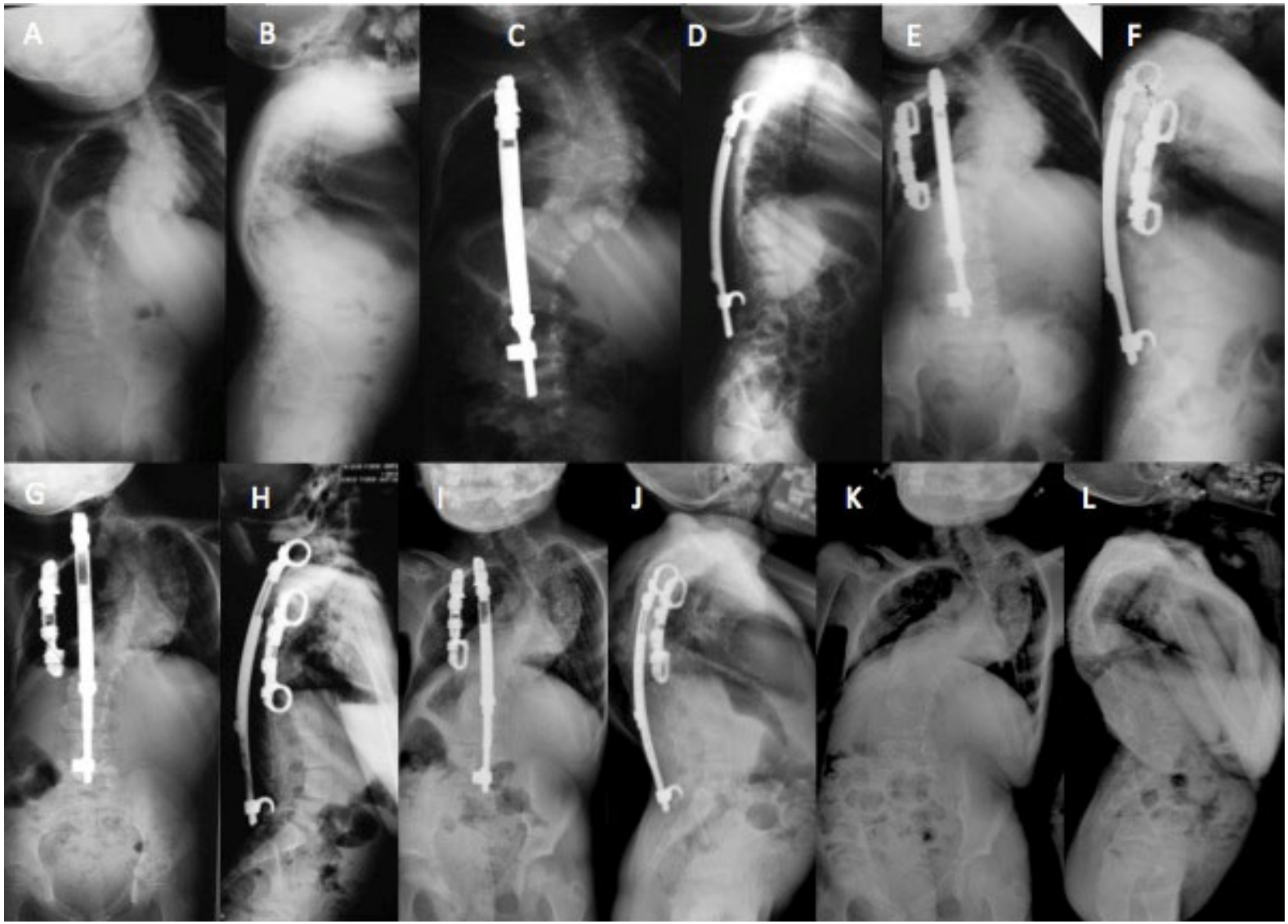
Skaggs, Witale et al
Tis , Karlin, Akbarnia et al

Methods

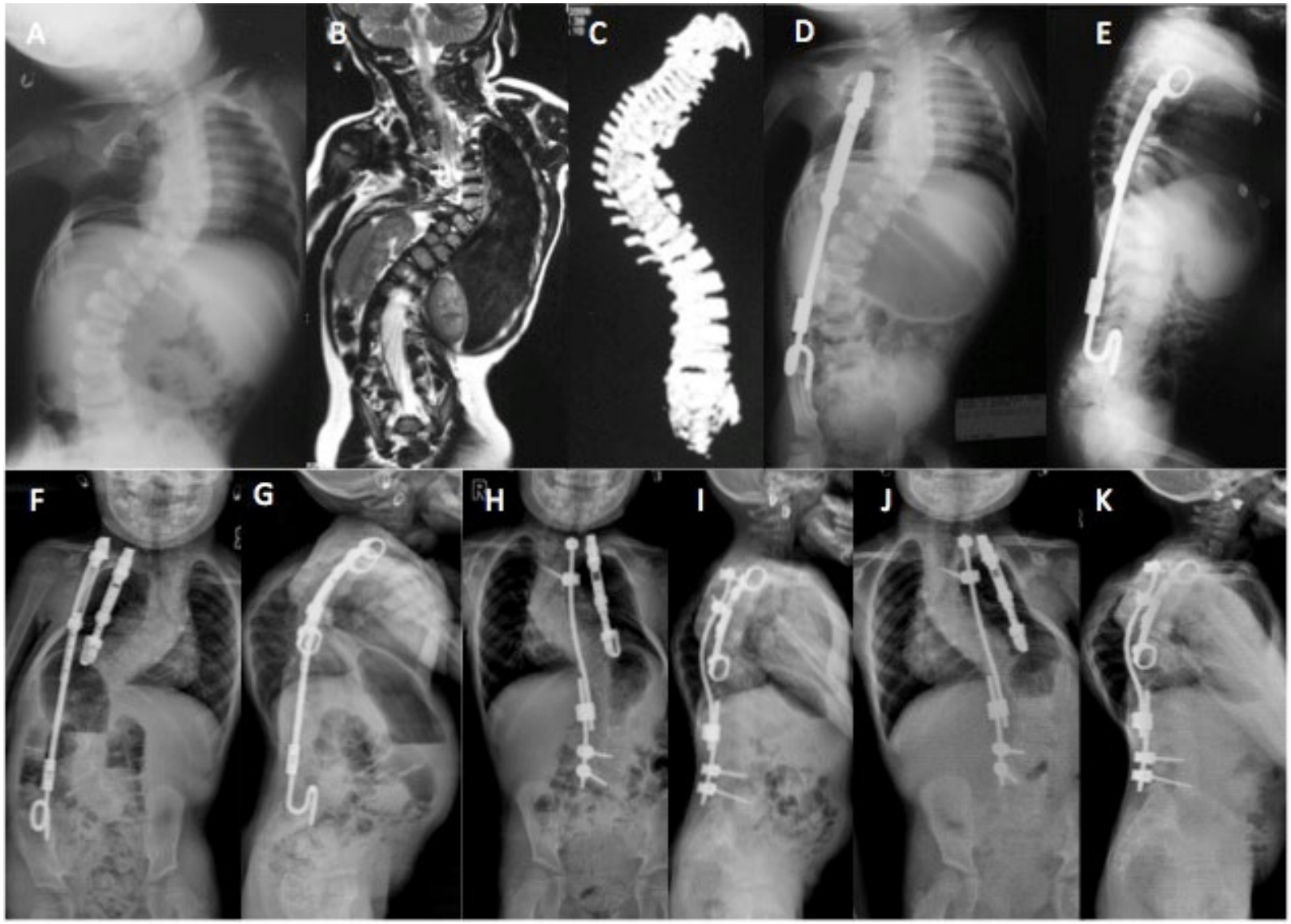
- Expansion Thoracostomy +/-
  - Open Thoracic wedge osteotomy
- Treatment option for TIS
- Aetiologies (Congenital)
- 5 patients (4 F, 1 M)
- Age 48 m (20-79)
- AP Cobb angle
  - Preop 72° (60-97)
  - Last control 52° (40-78)
- FU 52 m (20-62)
- Correction 28%
- Lengthening and surgical intervention
  - 6.8 (6-9)



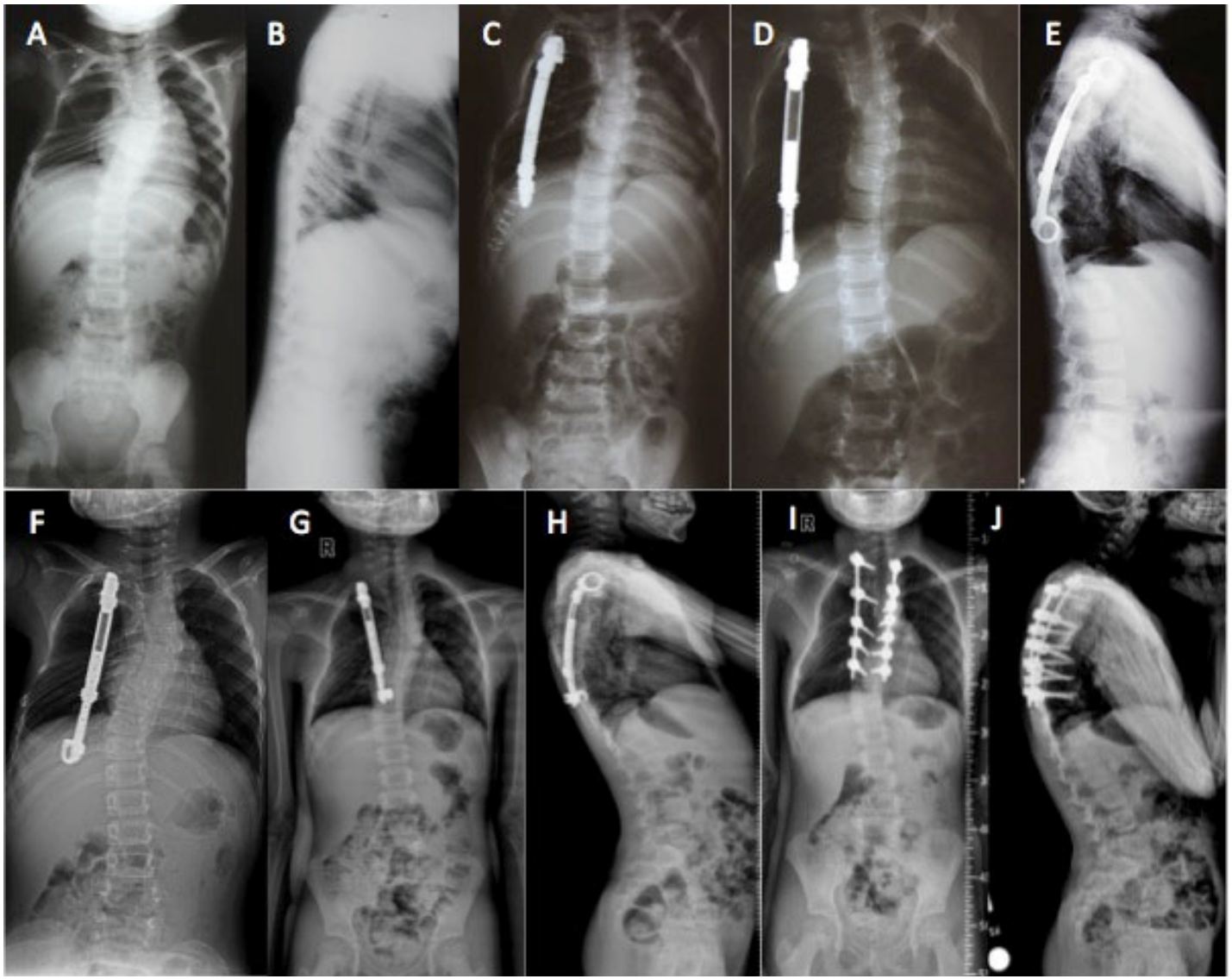
Patient 1. Pre and post-operative radiographies of patient 1. (A,B) Pre-operative AP and LAT radiographies (C,D). Early postoperative AP and LAT radiographies of Rib to lamina VEPTR application (E,F). AP and LAT radiographies of revision with R-R and R-L VEPTR and lengthening (G,H,I,J). AP and LAT radiographies of lengthening procedures (K,L). Finalization of VEPTR and preparation for future treatment in 2014.



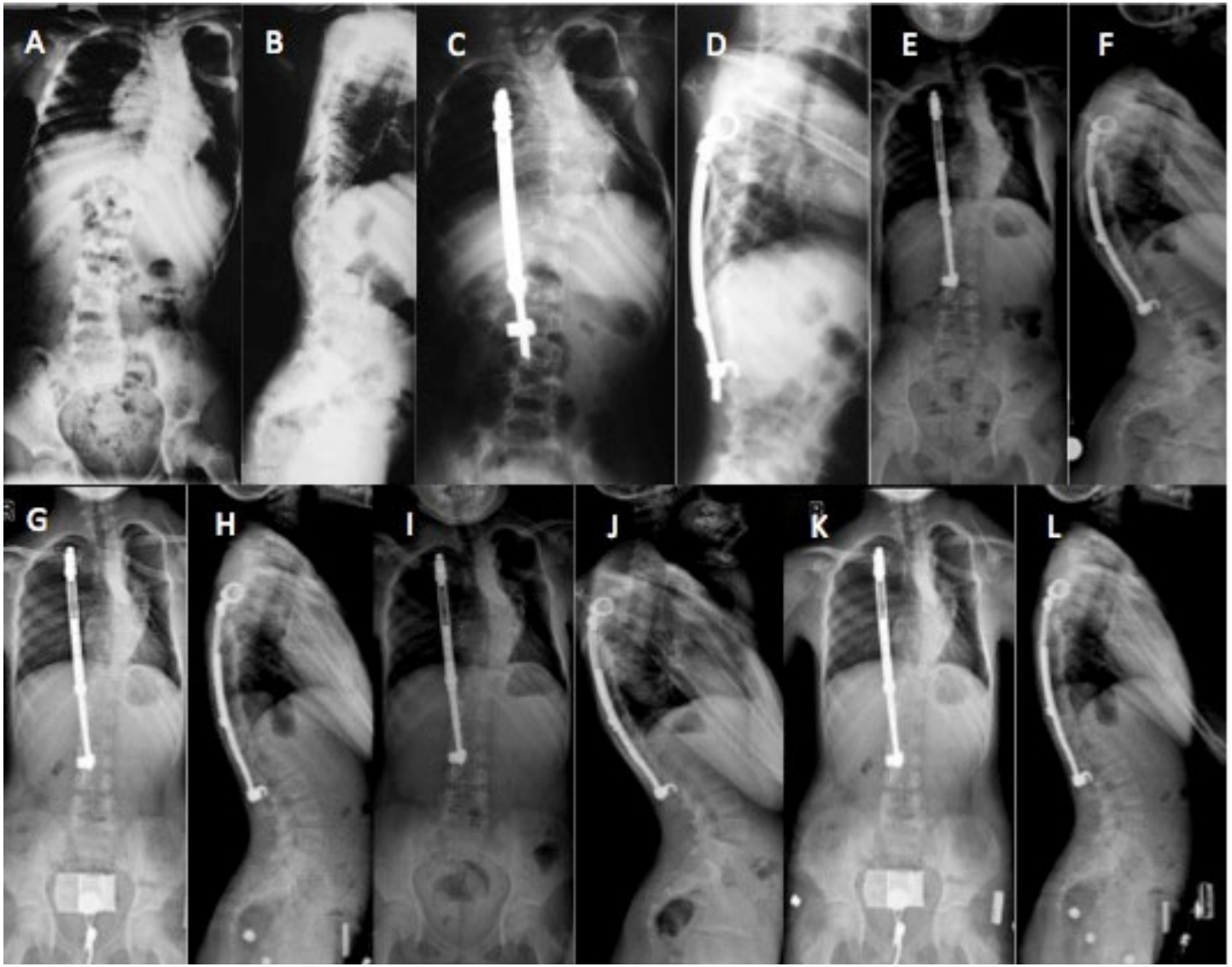
Patient 2. Pre and postoperative radiographies (A). Pre-operative AP radiography (B,C). Pre-operative MRI and CT (D,E). Early postoperative AP and LAT radiographies of Rib to Pelvis VEPTR application (F,G). AP and LAT radiographies of lengthening (H,I,J,K). AP and LAT radiographies after replacement of R-P with Growing Rod and lengthening with VEPTR.



Patient 3. Pre and post-operative radiographies (A,B). Preop AP-LAT radiographies (C). Early Post-operative AP radiography (D,E,F). Radiographies during the lengthening procedures (G-H) of VEPTR revised to Rib to Lamina configuration (H-I) AP and LAT radiographies during the last control after final posterior fusion.



Patient 4. Pre and post-operative radiographies (A,B). Preoperative AP and LAT radiographies (C,D). Early postoperative AP and LAT radiographies (E,F). Postoperative Rib to Lamina VEPTR application (G,H,I,J). Radiographies during the lengthening procedures (K,L). AP and LAT radiographies during the last control in 2014.



Results

Patient	Age (m)	Gender	Etiology	Follow-up (m)	AP Cobb (°)			LAT Cobb (°)			SAL [L/R (mm)]			T1-S1/T1-T12			Lengthenining Revision	
					Pre-op	Post-op	%	Pre-op	Post-op	%	Pre-op	Post-op	%	Pre-op	Post-op	%	N	Proces
1	45	F	CS, TIS	63	97/62	78/52	19.6/16	37	59	37.3	53/ 69	88/ 98	39.8/29.6	154/88	183/106	15.9/17	9	Rib-Lamina+ Rib-Rib VEPTR Finalised
2	20	F	CS, TIS	56	94/67	54/64	42.6/4.5	35	25	28.6	48/84.4	63.9/113.6	42.9/25.7	230/112	248/142.5	7.2/21.4	7	Rib-Lamina VEPTR Rib-Pelvic Rib-Pelvic + Rib-Rib VEPTR Gowing rod + Rib-Rib VEPTR
3	68	F	CS, Thorx Deformty	63	64	41	36	16	31	48.4	98.5/120	115/134	14.4/10.5	228/120	290/174	21.4/31	6	Rib-Rib VEPTR Rib-Lamina VEPTR Fiinalised (Posterior Füzyon)
4	79	F	CS, Thorx Deformty	61	64	32	50	36	34	5.6	98/89	131/114,6	25.3/22.4	232/140	306/178	24.1/21.4	6	Rib-Lamina VEPTR

Results

Age		53 m (20-79)
FU		5.1 y (4.5-5.4)
Correction of the Curve		28.4 % (4.5-50)
SAL (L)		30.6 %
SAL (R)		22 %
Annual length T1-T12		0.7 mm
Annual length T1-S1		0.9 mm
Complications	Migration of the device	3
	Wound problems	2
	Rod fracture	1

Complications

- These are the complications that we experienced:
  - Early / late deep and superficial wound infections
  - The migration of the cranial anchors to the proximal
  - Rip and lamina fracture or failure
  - Insufficient skin cover
  - Rod breakage

Conclusions

- VEPTR may provide a good correction in the treatment of congenital spinal and thoracic deformities.
- However obtained spinal height and the increase in the respiratory functions may not be sufficient.
- Long term, multicenter, prospective studies that compare the spinal height, respiratory functions, the severity of the deformity and the spinal balance are required in order to evaluate the efficacy of VEPTR.