Novel approach to multilevel congenital scoliosis in young children

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Method

- 2 male syndromic patients with multilevel congenital scoliosis
- Both failed non operative treatment
- Multilevel spinal osteotomies
- Insertion of biologically inert substance into the osteotomy sites (ex. bone wax, autologous adipose tissue)
- Subfacial insertion of magnetic spinal growing rods (MSGR)
- Frequent, small increment lengthening of MSGRs

Results

- Follow up - 2y 9mo & 2y MAGEC, 5y Phenix and MAGEC combined
- No perioperarive complications
- No complications to date – no infections, neuro deficit, hardware issues or junctional deformities (Phenix replaced by MAGEC at its limit)

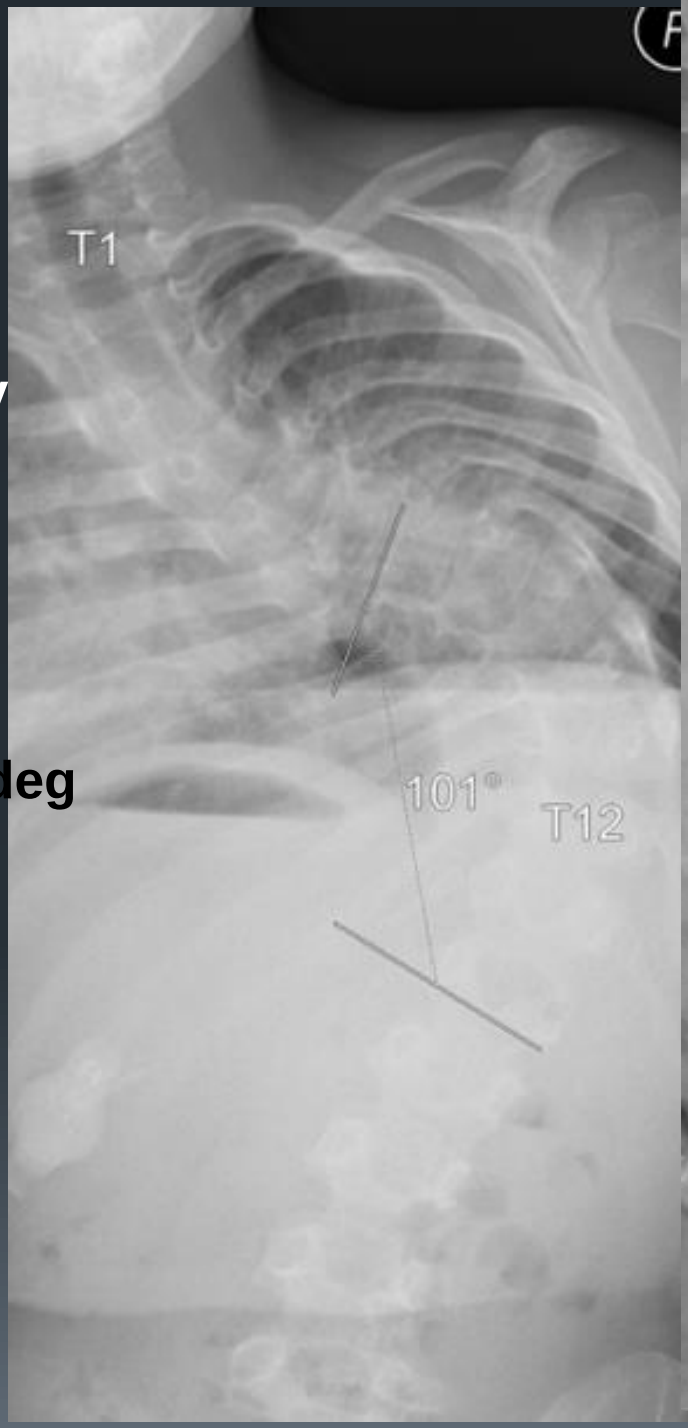
Results

- Lengthenings – Q 6 weeks at 2 mm setting per lengthening
- Average lengthening - 0.9 mm/mo.
- Average pre operative Cobb angle - 98 deg
- Average Cobb angle at last follow up - 55 deg
- Improvement in sagittal profile

Results - pulmonary function

- Dramatic improvement in both patients
- No pneumonias since surgery in both. One or two PICU admissions per year for respiratory issues for both prior to treatment
- PFTs in one cooperative patient improved from 41% predicted to 94% predicted (within normal limits)

4 y/o male
Coffin-Sirus syndrome
Developmental delay
Tracheomalasia
Non verbal
Severe early onset scoli
104 deg.
High early mortality 2* to respiratory failure
Failed non operative treatment
Unsegmented bar noted on concavity



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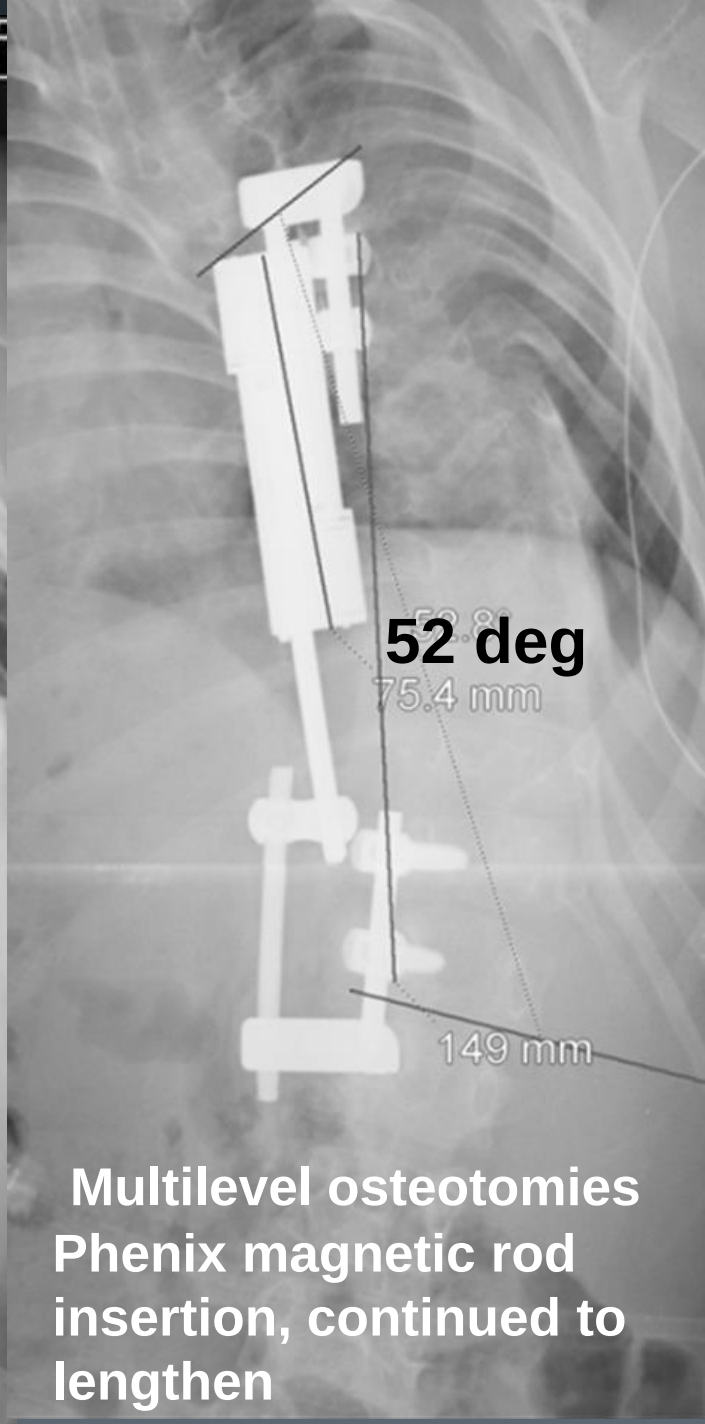
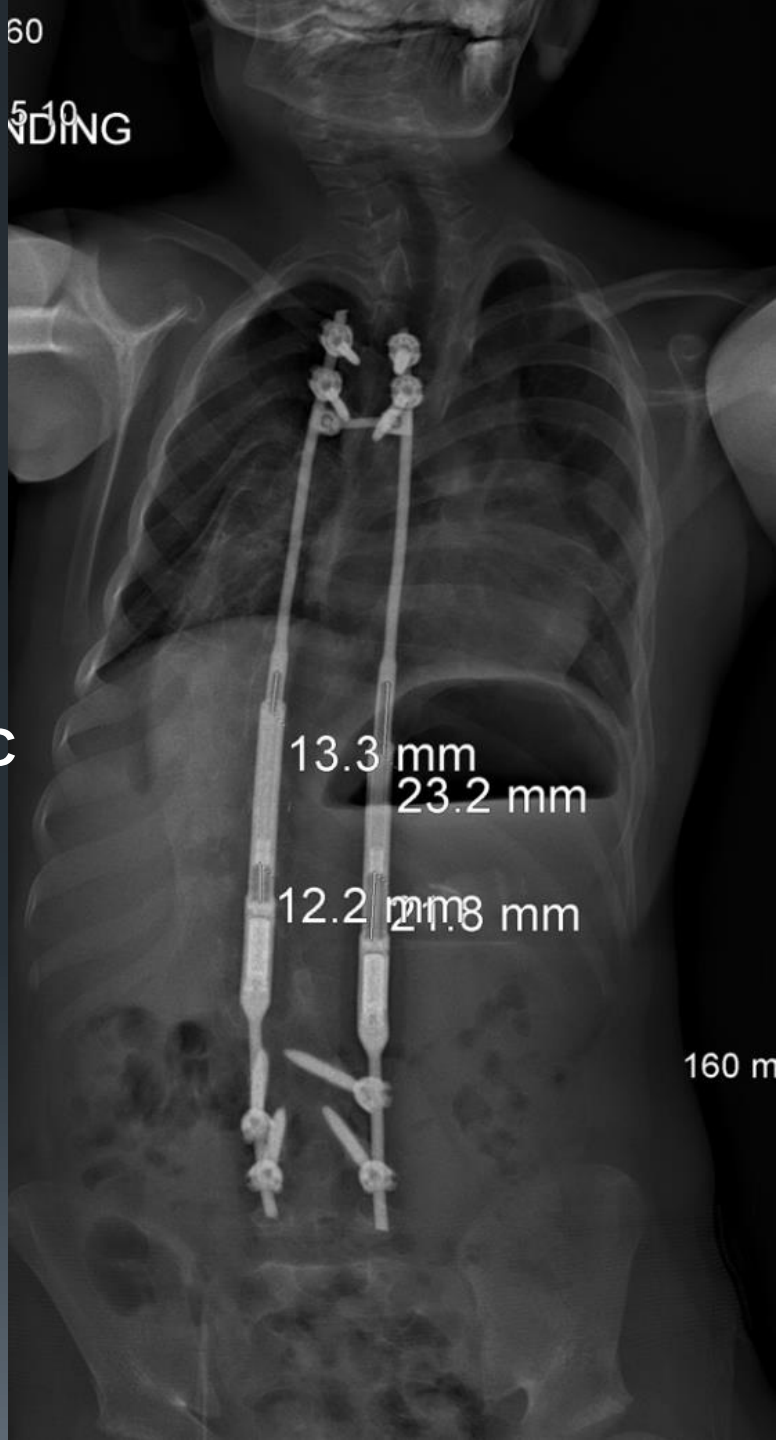
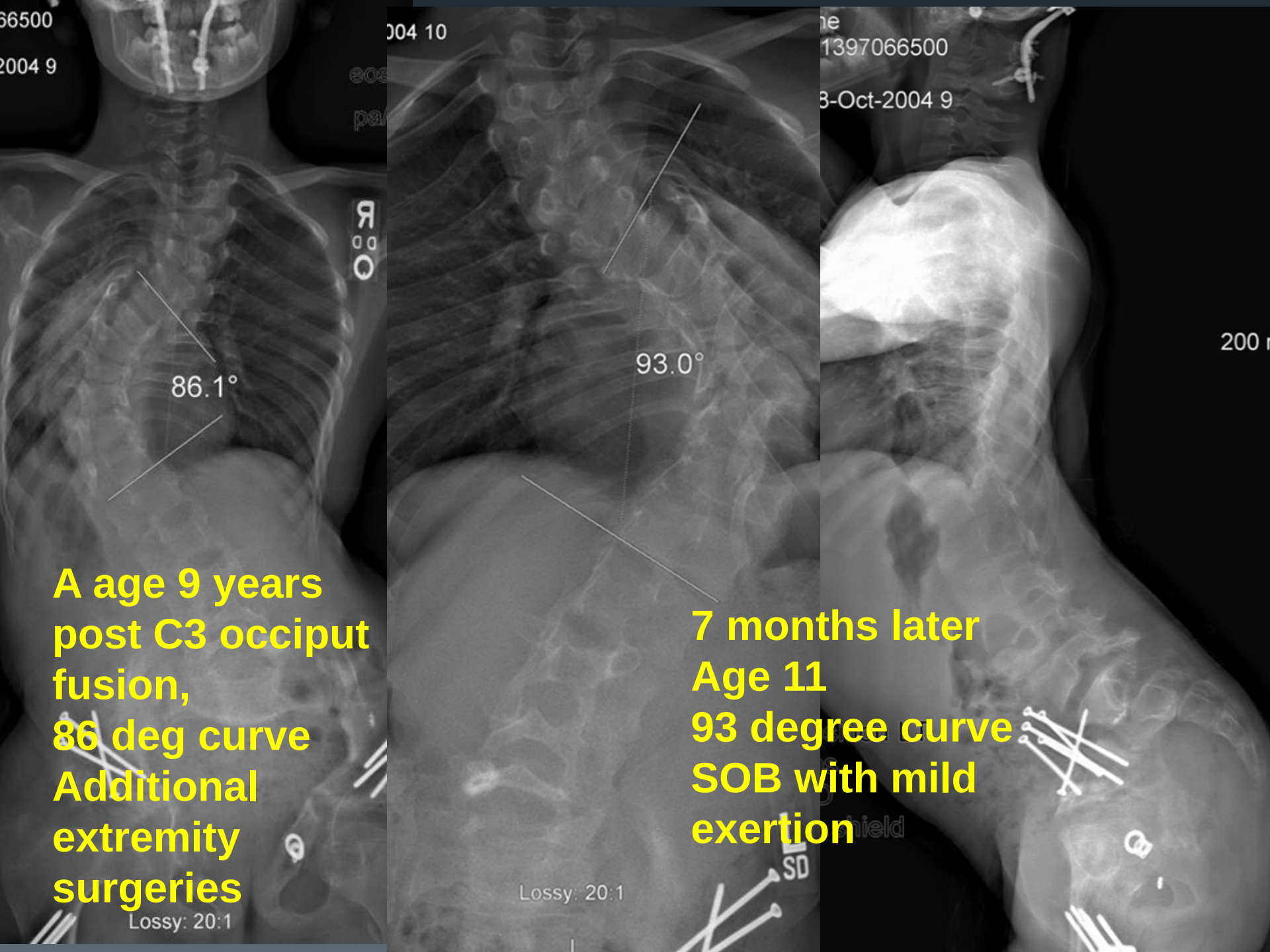


Multilevel osteotomies
Phenix magnetic rod insertion, continued to lengthen

Revised to MAGEC as Phenix rod failed
Continues to lengthen with curve correction
24 mo after implant



7 y/o male with syndromic skeletal dysplasia with congenital scoliosis, C2 – occiput instability, and multiple extremity deformities and length discrepancies



A age 9 years post C3 occiput fusion,
86 deg curve
Additional extremity surgeries

7 months later
Age 11
93 degree curve
SOB with mild exertion

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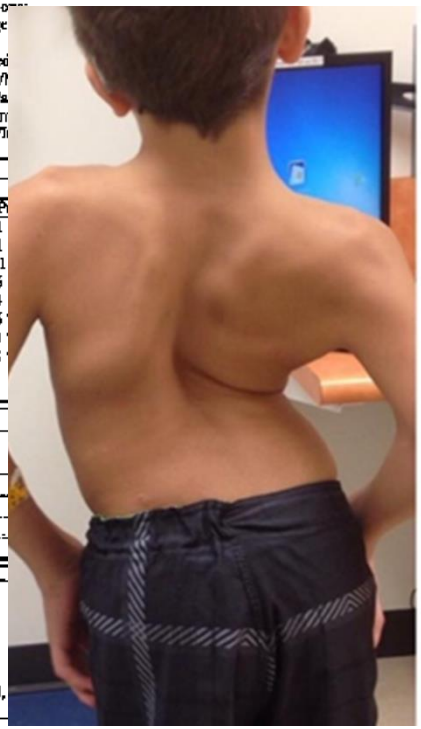
Spirometry Report

The Children's Clinic
9555 SW Barnes Rd
Portland, OR 97225

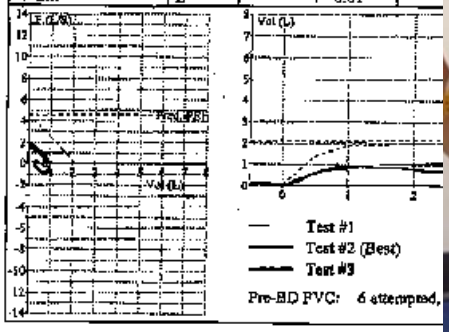
Name:	Jake K Dering	Age:	12 years	Race:	Caucasian
ID:	3062012	Height:	57 inches	Weight:	99 lbs.
Sex:	Male	Indication:			
Smoker:	No	Medications:			
COPD Risk:	Low	Lung Age:	N/A		

Requested By:	Nichols MD, William D [wnichols]	Performed By:	Dilan RN , Cheryl
Test Date:	05/15/14 11:28:02	Sensor S/N:	554754
Test Date Post:		Sensor Calibrated:	03/13/17 14:39:14
Press./Temp.	760 mmHg / 71 degrees F	Spiro Control Ver:	8.6.1
Bronchodilator:		Normals/Interp.:	NHANES III (Pediatric)/ATS (1991)



Pre-Bronchodilator Trial

Measurement	Units	Predicted	1 Actual	1 % Pred.	4 Actual	4 % Pred.	Best Actual	Best % Pred.
FVC	L	2.08	0.85	41	2.25	86 %	2.38	91 %
FEV1	L	1.87	0.77	41	2.02	86 %	2.09*	90 %
FEV1/FVC	%	90 %	91 %	101	90 %	105%	88 %	103%
FEF25%	L/S	3.60	1.66	46	2.88	80 %	2.77	58 %
FEF50%	L/S	2.50	1.11	44	2.41	86 %	2.42	86 %
FEF75%	L/S	1.27	0.59	46	1.35	88 %	1.50	106%
FEF25-75%	L/S	2.37	0.94	40	2.41	88 %	2.55	93 %
PEF	L/S	4.56	1.72	38	3.21	64 %	3.03	61 %
Exp. Time	Sec.		1.58		2.25		3.60	
V ext.	L		0.01		0.11		0.09	



Pre-BD FVC: 6 attempted, 6 accepted, 2 matches.

Interpretation: Severe restriction.

Observations:

Unconfirmed Report

Interpretation: Normal spirometry.

Observations:

Unconfirmed Report

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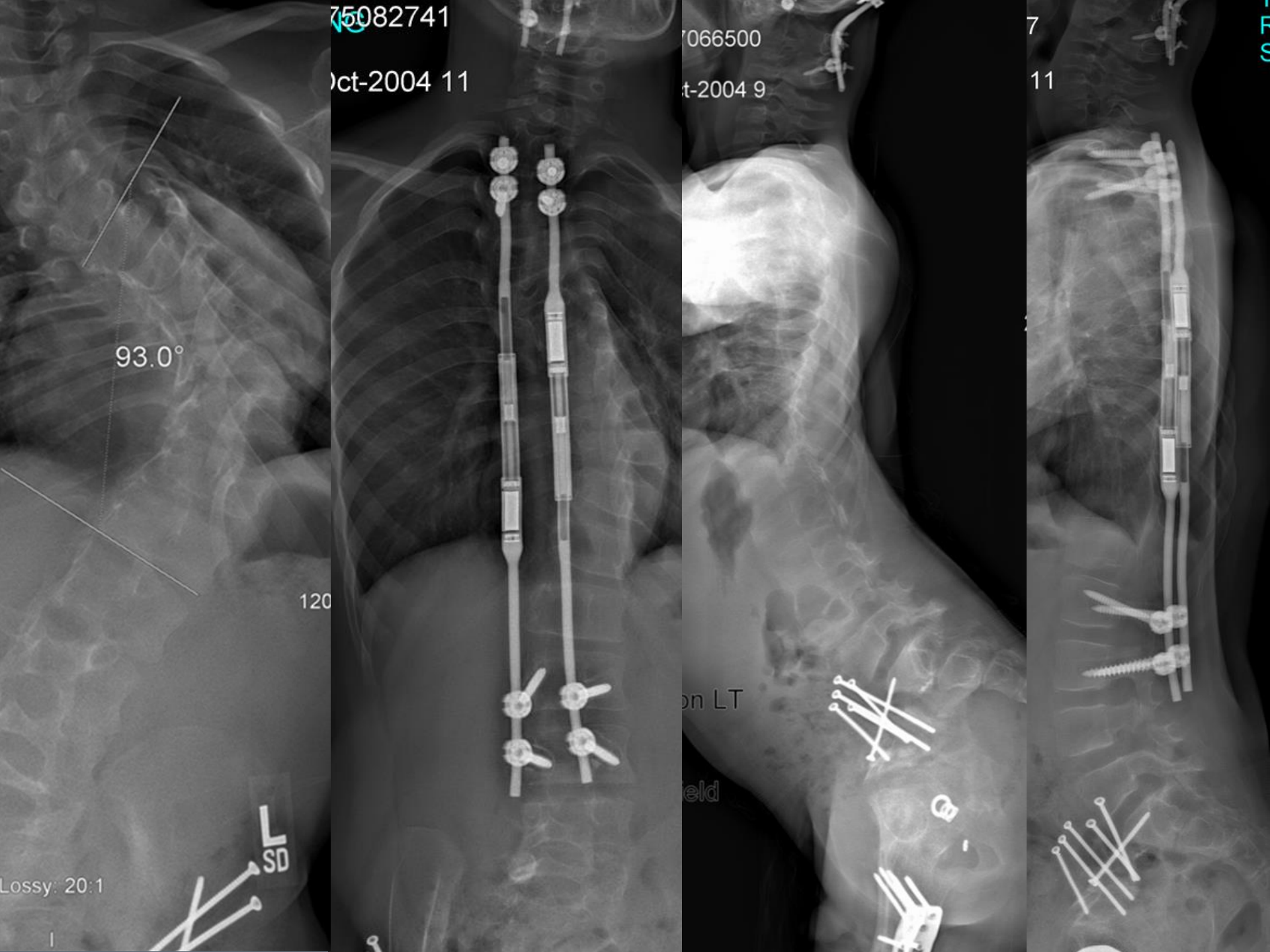
Pre-BD FVC: 6 at

Severe restriction.

Normal spirometry.


93.0°
Lossy: 20:1
Oct-2004 11
on LT

Conclusion

- Our technique of multiple osteotomies, preservation of mobility using interposition inert material, insertion of MSGRs with frequent, small increment lengthening would appear to hold a promise in treatment of severe congenital scoliosis