

Total hemivertebra resection by posterior approach in congenital scoliosis and Kyphoscoliosis : results with 7 years mean follow up

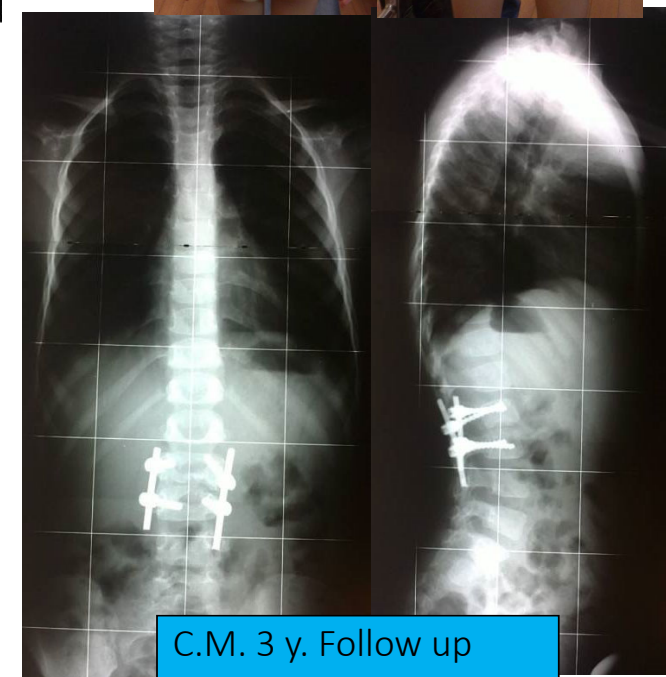
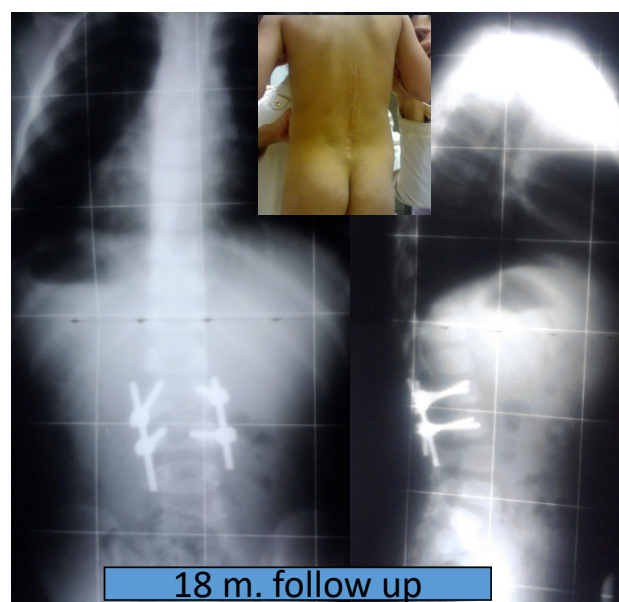
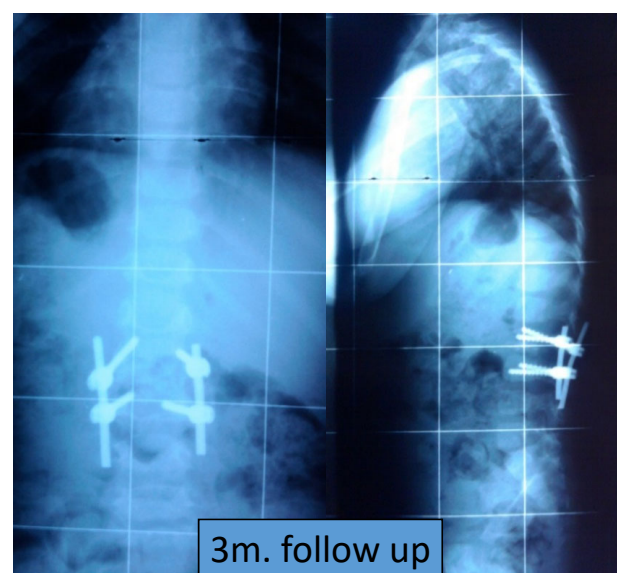
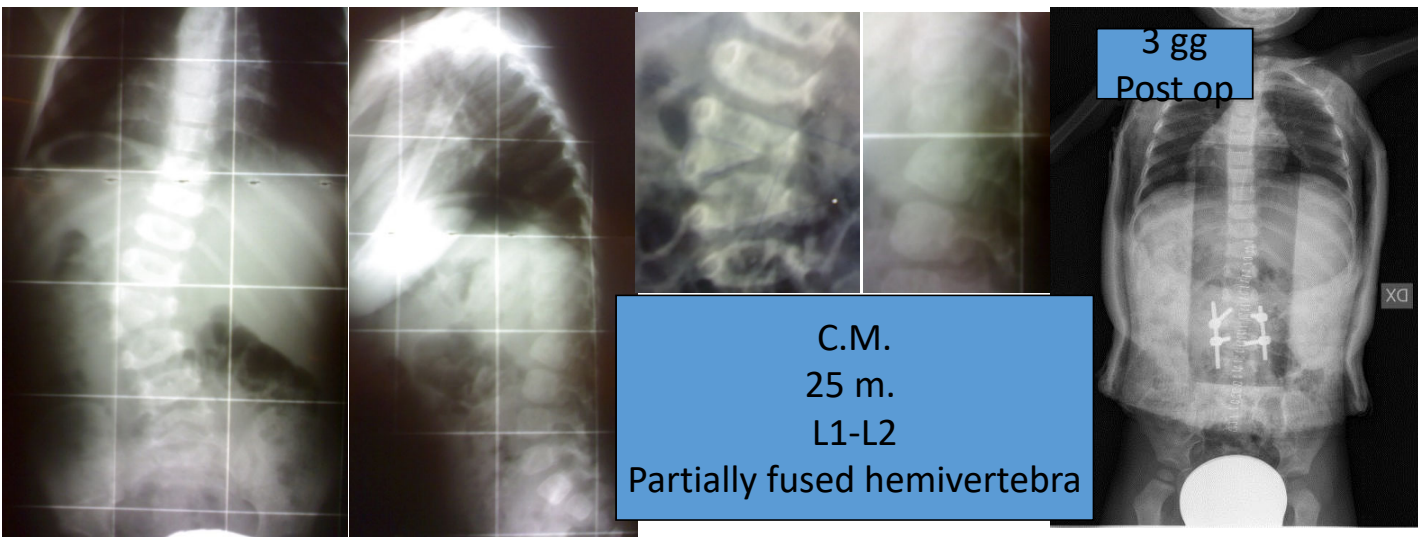
Marco Crostelli, Osvaldo Mazza,
Massimo Mariani, Dario Mascello
Spine Disease Unit
Ospedale Pediatrico Bambino Gesù Roma

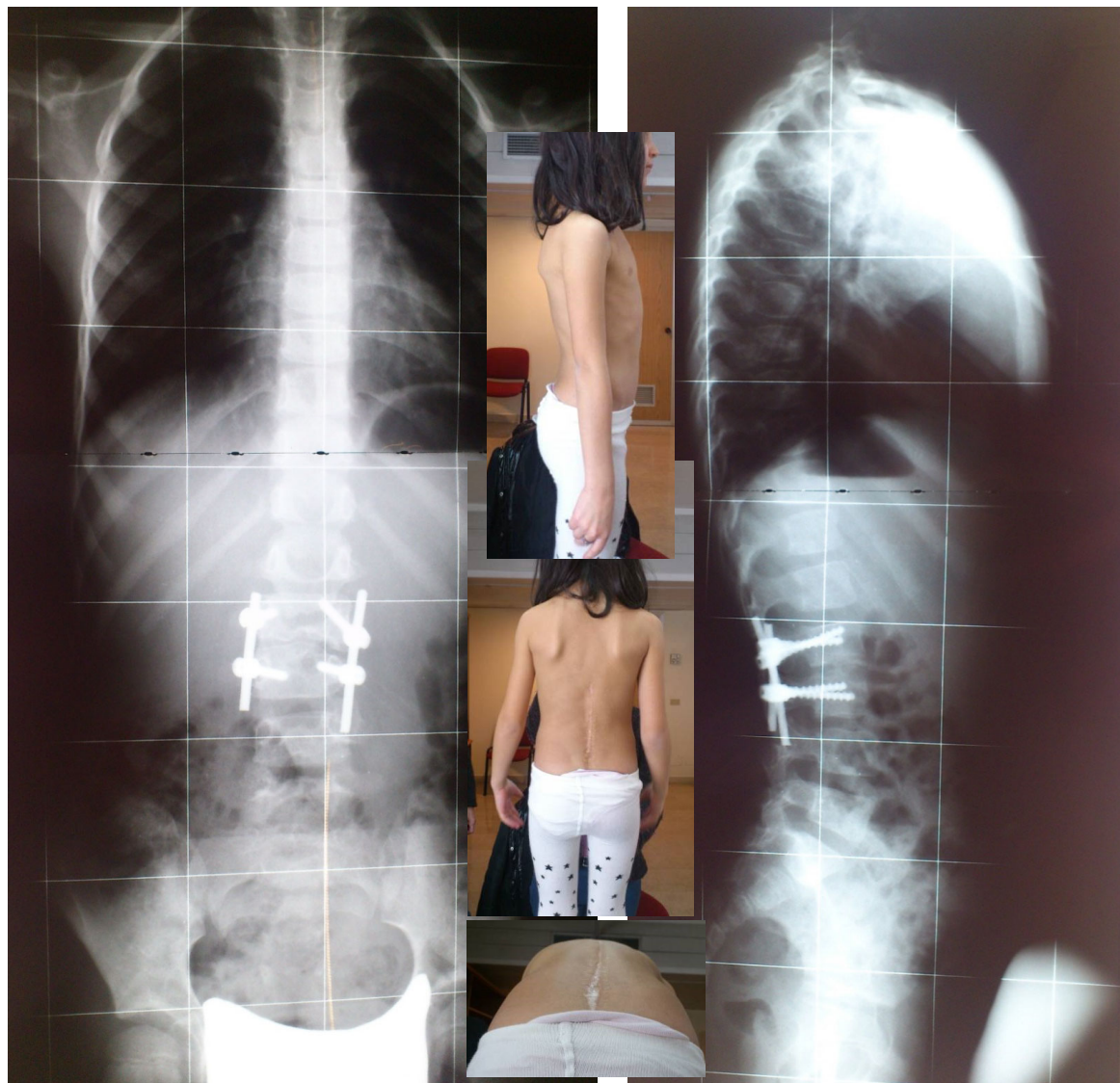
MATERIALS AND METHODS

- from 2006 to 2015 we operated 74 patients with congenital vertebral deformities (56 scoliosis and 18 kyphosis and kyphoscoliosis) by posterior approach with different techniques (subtraction osteotomy, hemivertebra resection) and instrumented arthrodesis with pedicle screws- today we speak only on resection; in all cases curve worsening
- Mean age at surgery was 8 years, and 22 patients was under 10 years of age
- Mean kyphosis curve was 75° Cobb, mean scoliosis curve was 44°
- In interventions until 2011 we did not use intra operative neurophysiologic monitoring, that was used after 2011.

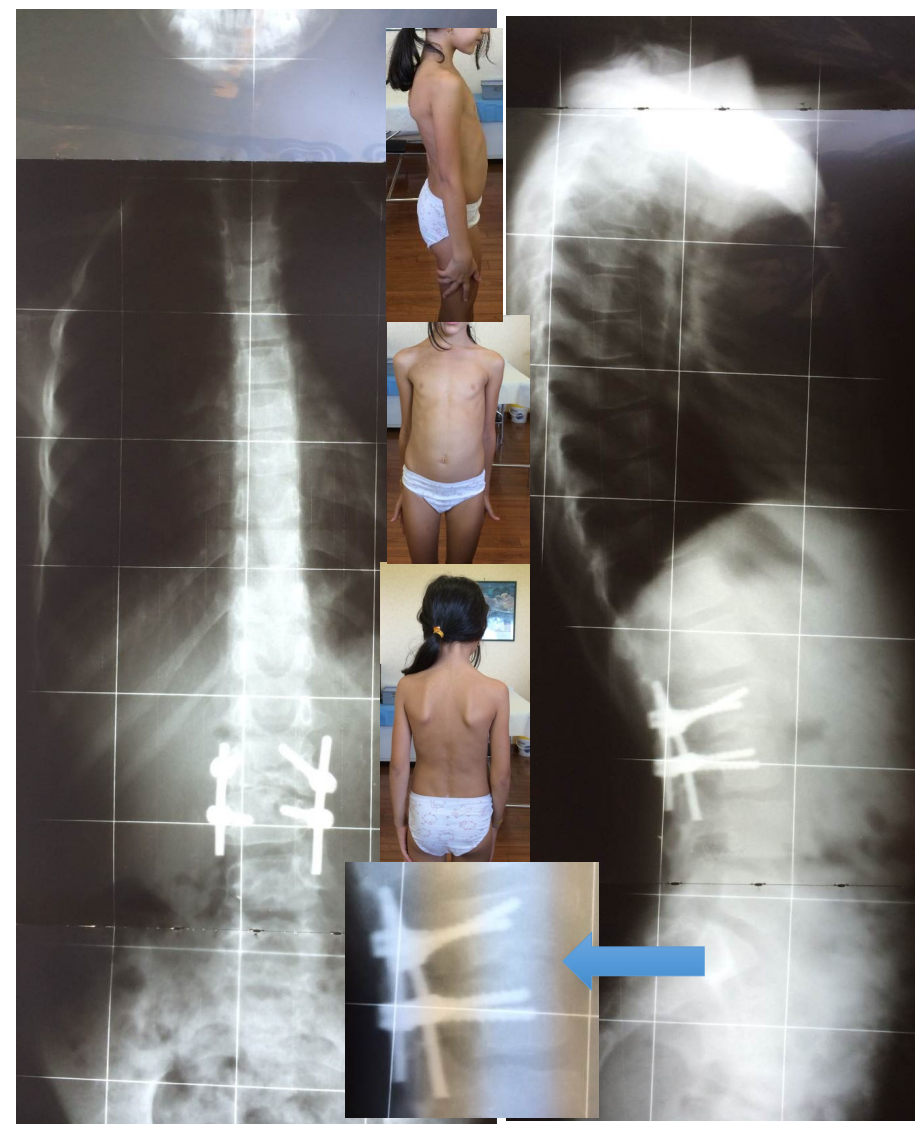
RESULTS

- Mean follow up was 7 years
- Mean Kyphosis curve after surgery was reduced to 20° Cobb and
- Mean scoliosis curve was reduced to 11° Cobb.
- We had no mayor complication after surgery (neurologic, vascular or visceral injuries, instrumentation failure with loss of correction, infections)
- 1 case pedicle fracture during screw insertion, pedicle screw inserted to upper level: no implant failure or loss of correction at 7 years follow up

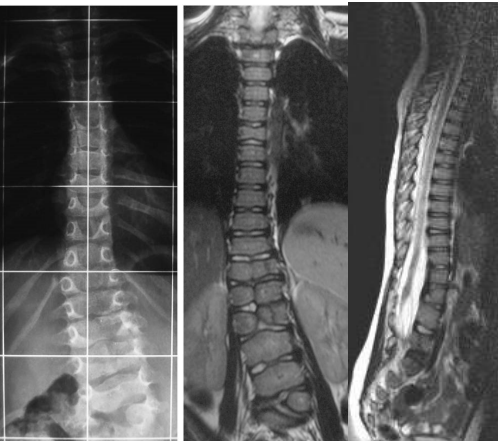




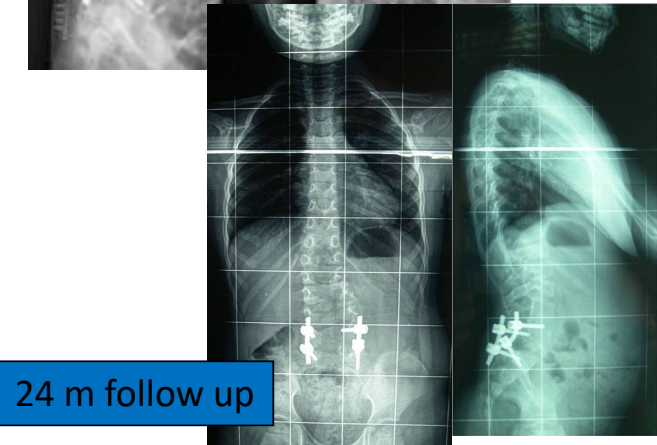
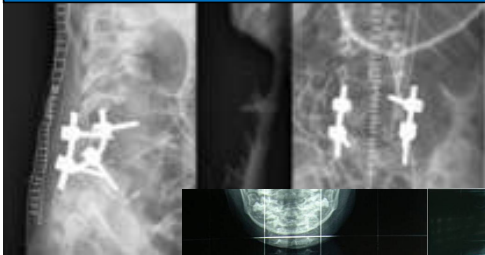
C.M. 5y + 6m follow up



C.M. 9y 3m 7y2m follow up



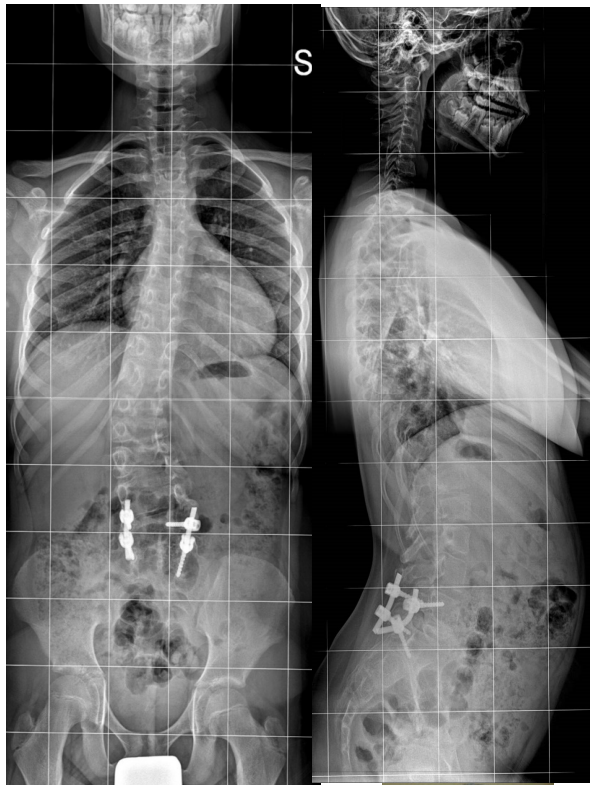
K.J., 32 m L5-S1 fused hemivertebra
Tethered cord diastematomyelia



24 m follow up

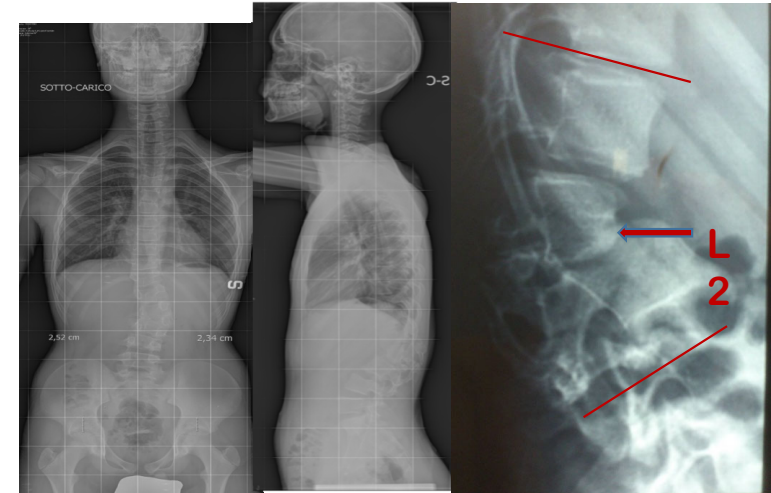


36 m follow up

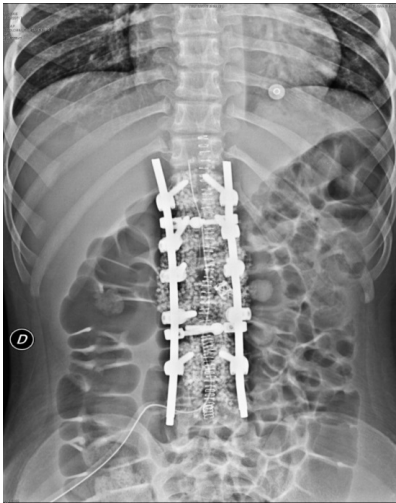
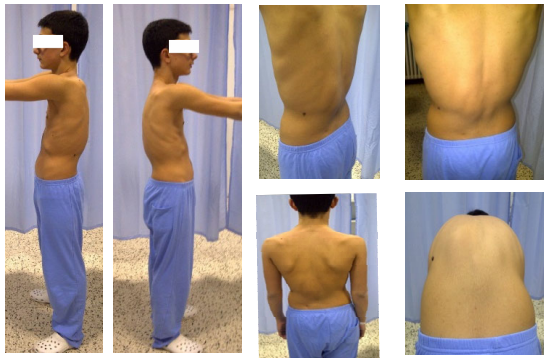


K.J. 10y+2m 8y+7m follow up

ZC, m 13ys 5ms L2-L3 hemivertebra 30° Cobb Scoliosis 80° Cobb Kyphosis



Clinical appearance

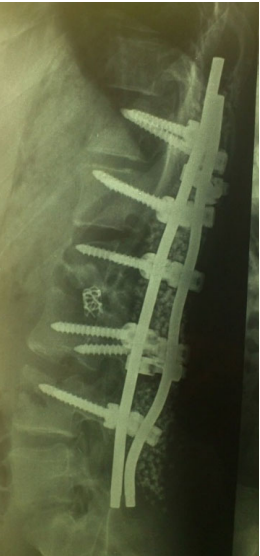


CT scan 3D L2-L3 wedged hemivertebra

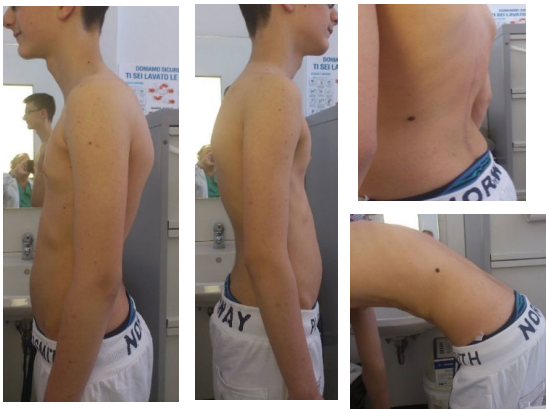
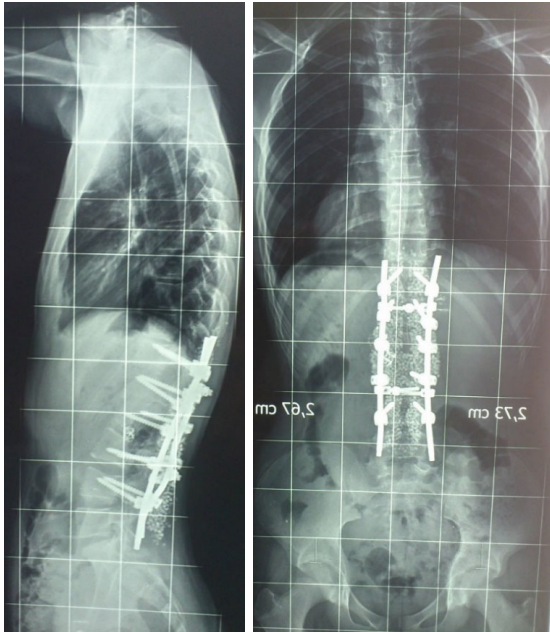
Posterior access hemivertebra resection, L2-L3 articular fusion resection, interbody fusion L2-L3 with titanium cage and autologous bone, T12-L4 instrumented arthrodesis, scoliosis curve reduced to 8° Cobb, kyphosis curve reduced to 5° Cobb 3 months bracing after surgery



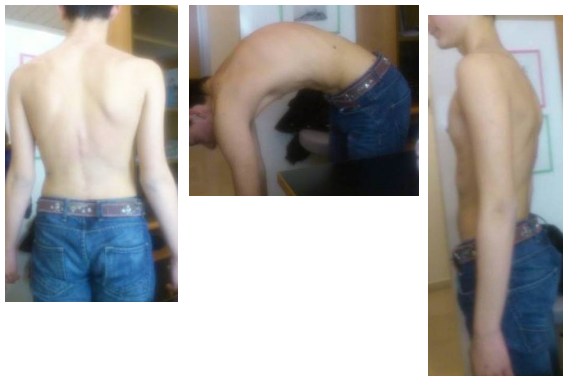
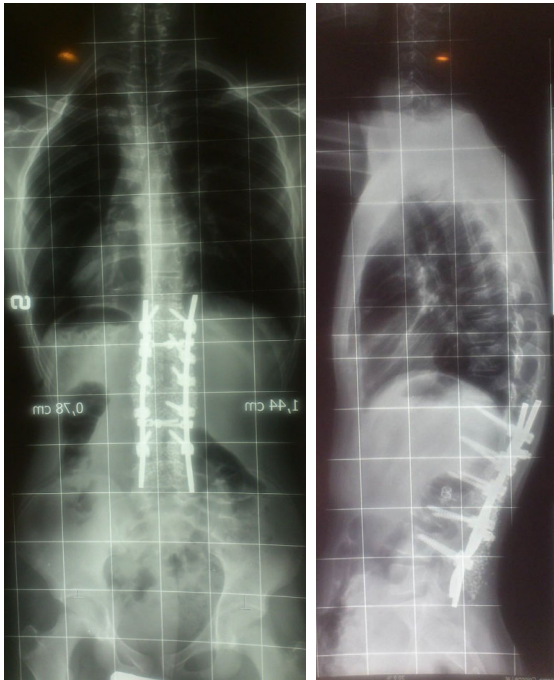
CZ Follow up 6 ms



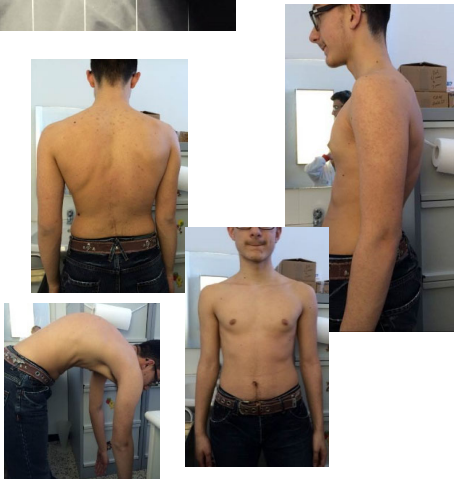
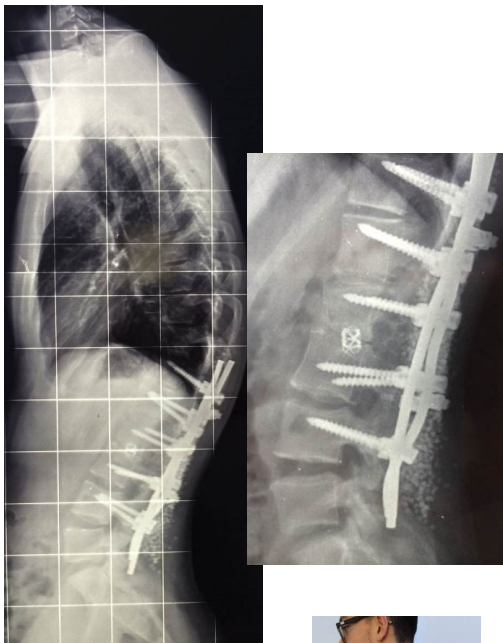
Follow up 1 yr



Follow up 2 yrs

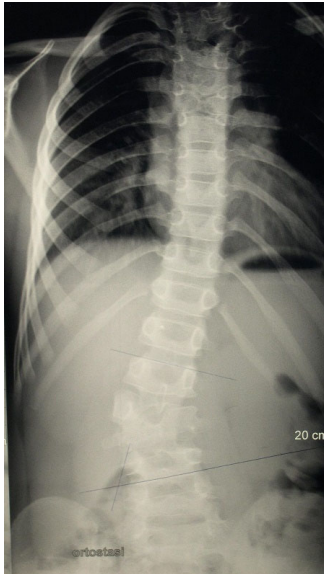


Follow up 3 yrs

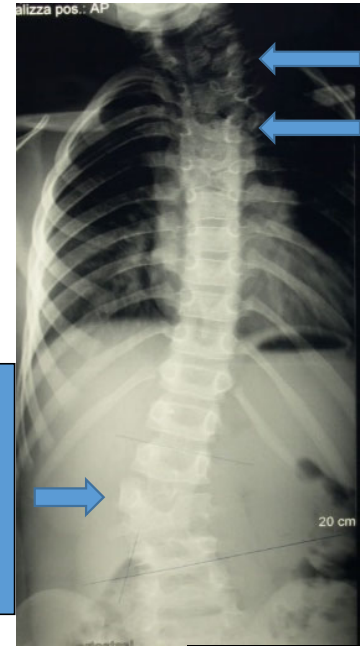
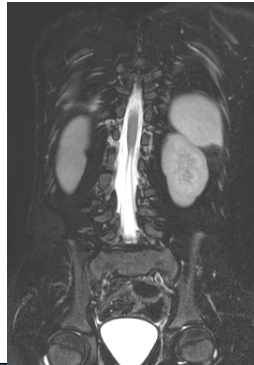
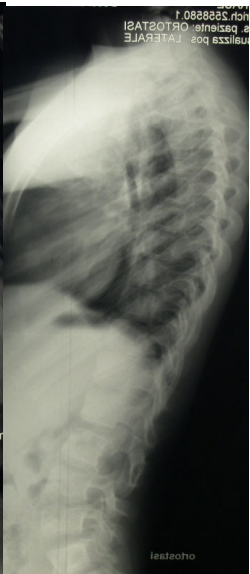




G. M. 5y+10 m. 23° cobb

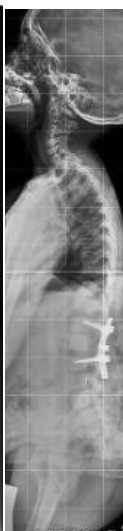
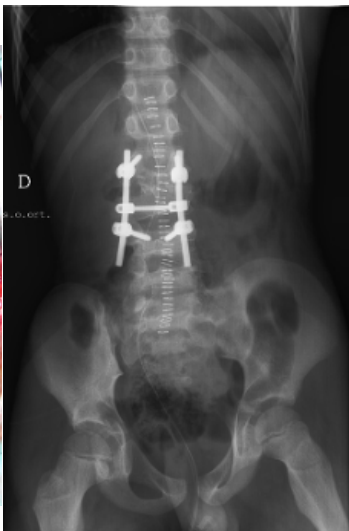
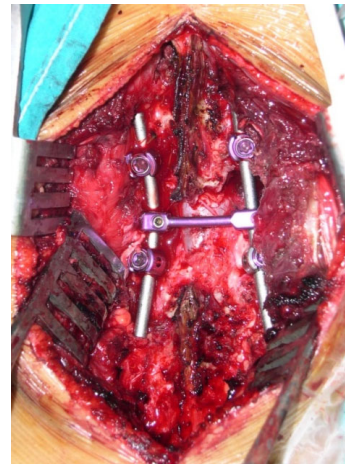


G.M. 5y+ 7 m. 35° cobb



G.M. 6ys+7ms L2-L3 right, partially free hemivertebra
T1-T2 right hemivertebra C6-C7 hemivertebra

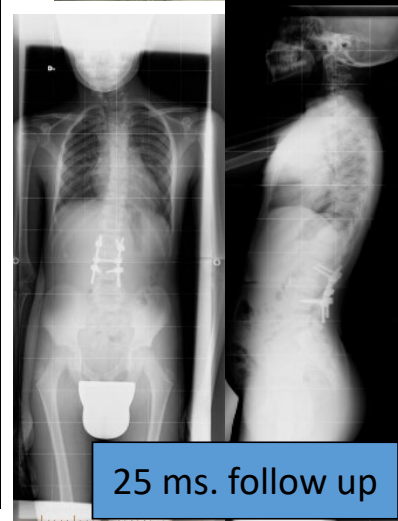
Only pedicle available for screw insertion below L2 is
at hemivertebra level, common hiatus for L2-L3 nerve
roots



G.M. 3ms follow up

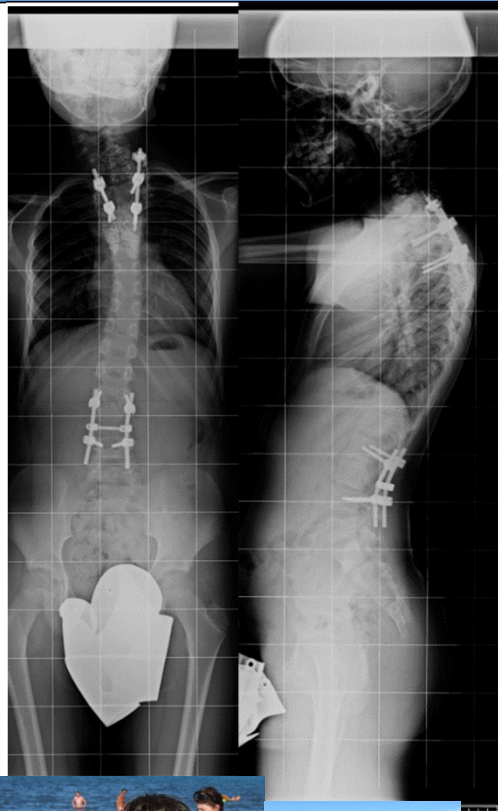


12 ms. follow up

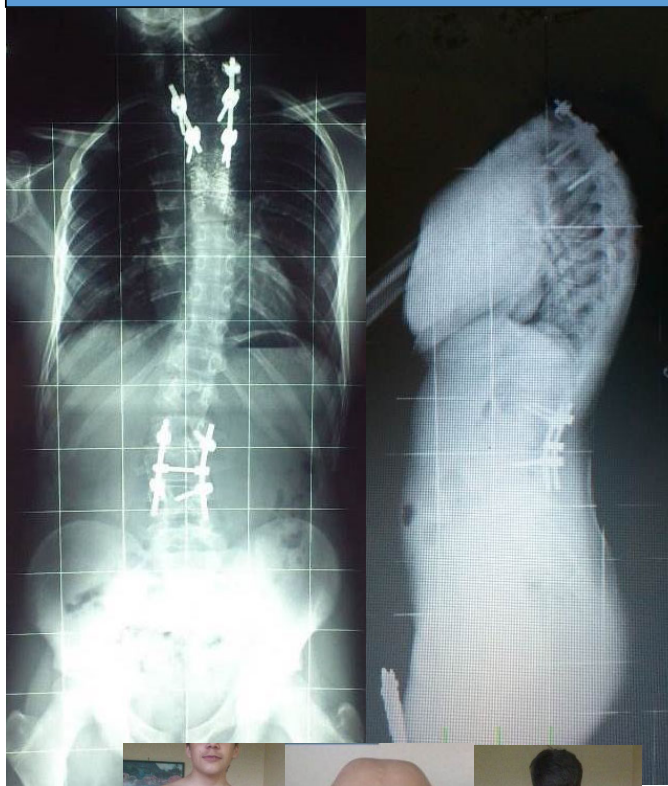


25 ms. follow up

G. M. 3 ys follow up lumbar hemivertebra resection 6 ms follow up thoracic hemivertebra resection

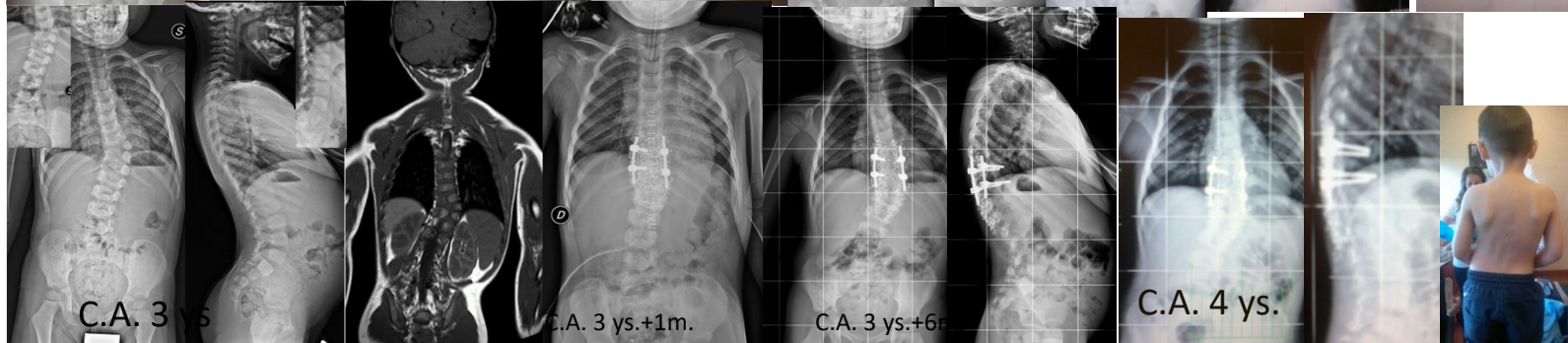
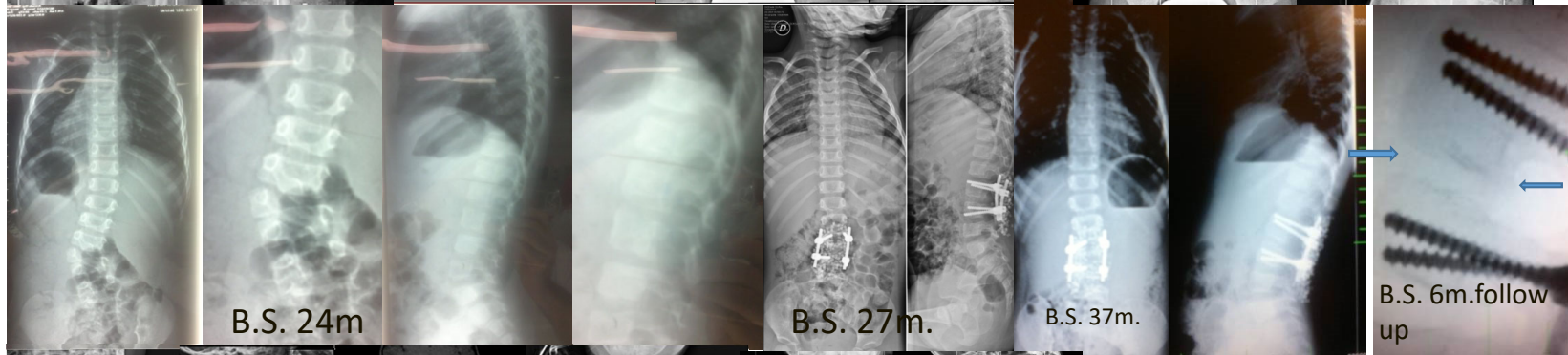
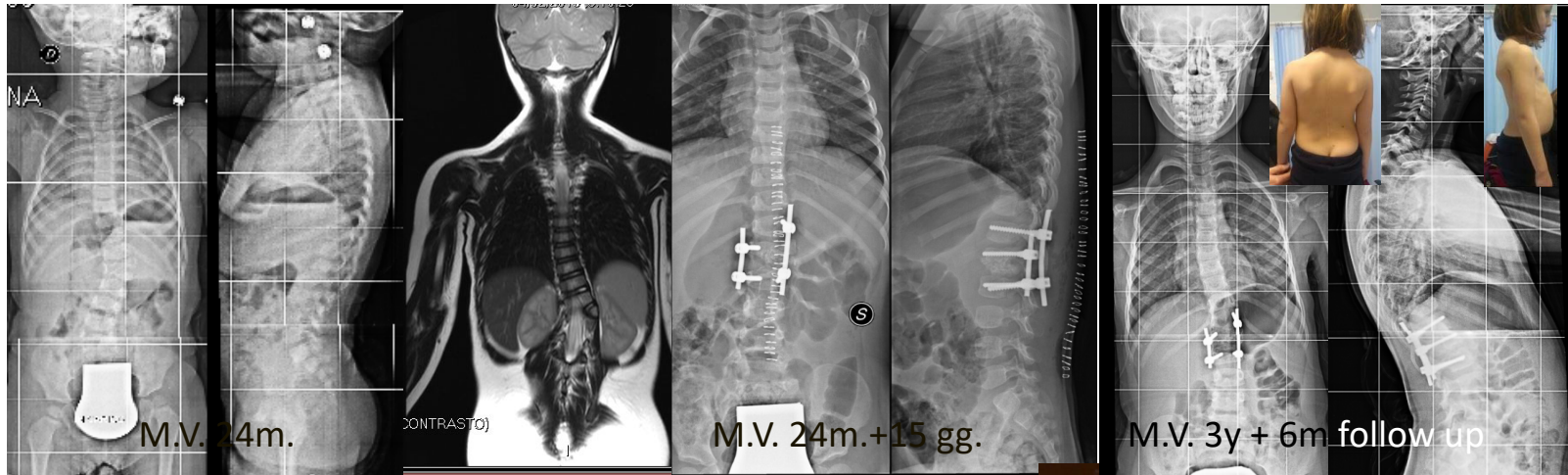


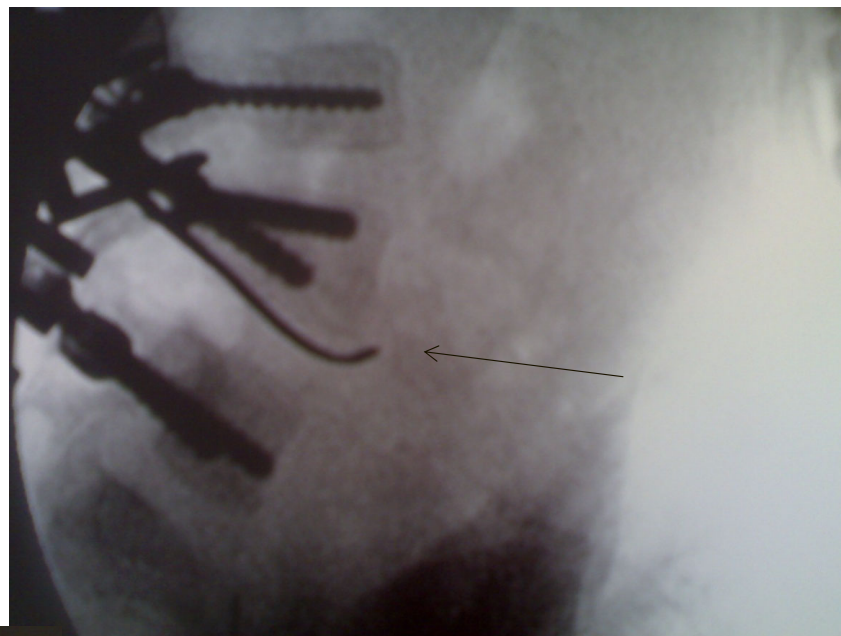
G.M 5y5m fu 1°
2y7m fu 2°



G.M. 8y 8m fu I°
4y fu II°



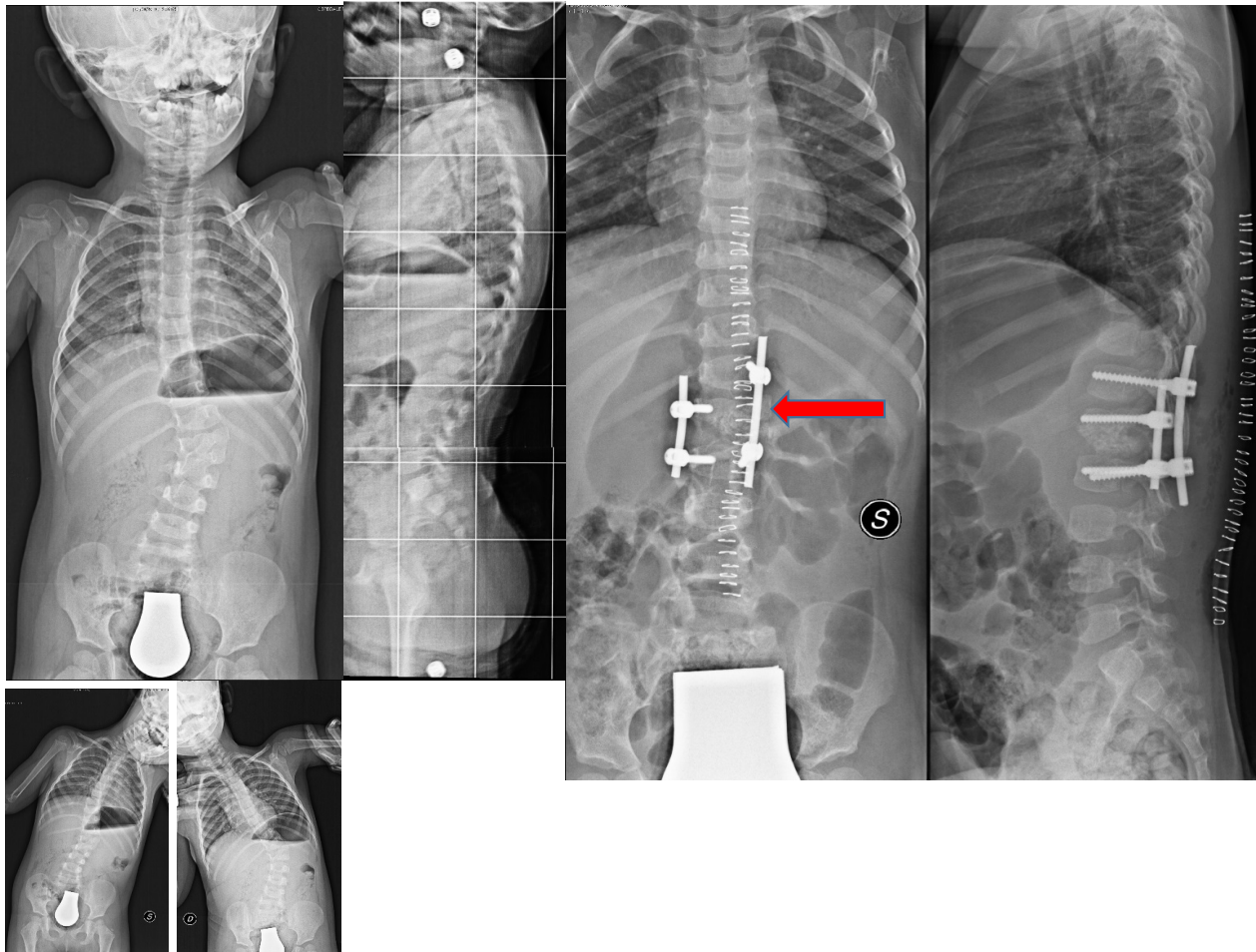




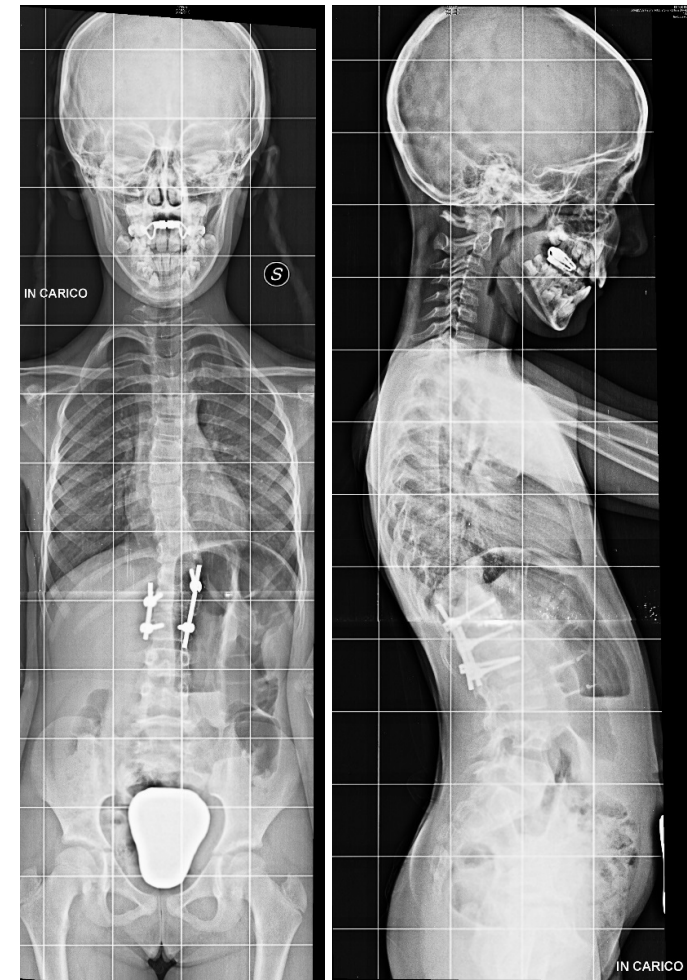
L.D. 3 years L5-S1 Hemivertebra

COMPLETE AND ACCURATE RESECTION

MV 2years +1 month l1-l2 left hemivertebra, posterior approach resection, during surgery left L1 pedicle fracture at screw insertion, screw inserted at T12 level and correction of curve, 4 months bracing after surgery



No loss of correction at 7 years follow up, no implant failure



FOLLOW UP

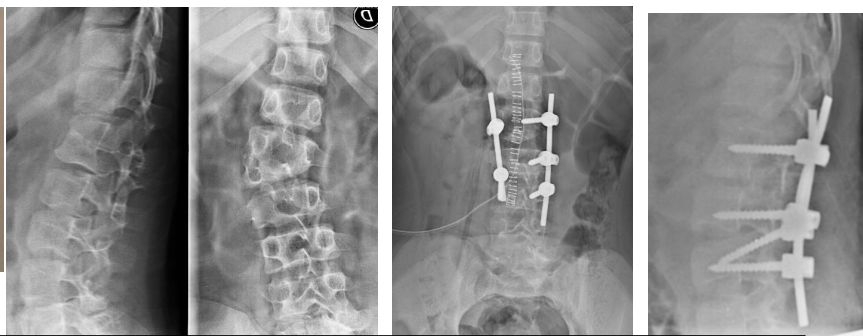
- In contrast with results reported by other authors (Ruf 2003, Zhu 2014, Ansari 2015, Guo 2015*) we had just 1 complications risk construct/implant related in our series of 70 patients, even in patients under 5 years of age and with bisegmental fusions
- 5% pedicle screws implanted in suboptimal positioning , due to small anatomy , but without nervous complications, implant loosening or loss of correction at follow up
- All patients cast bracing for 3-4 months, we think initial immobilization reduce instrumentation failure risks

*

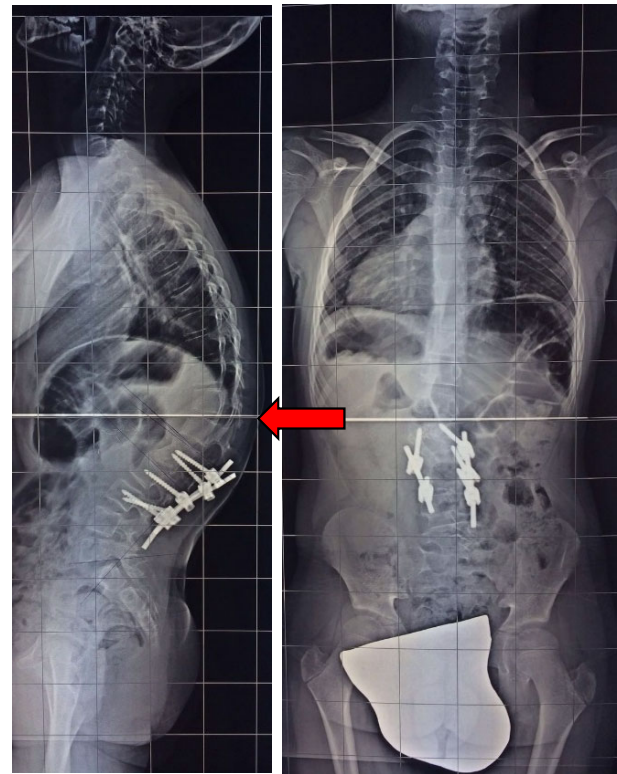
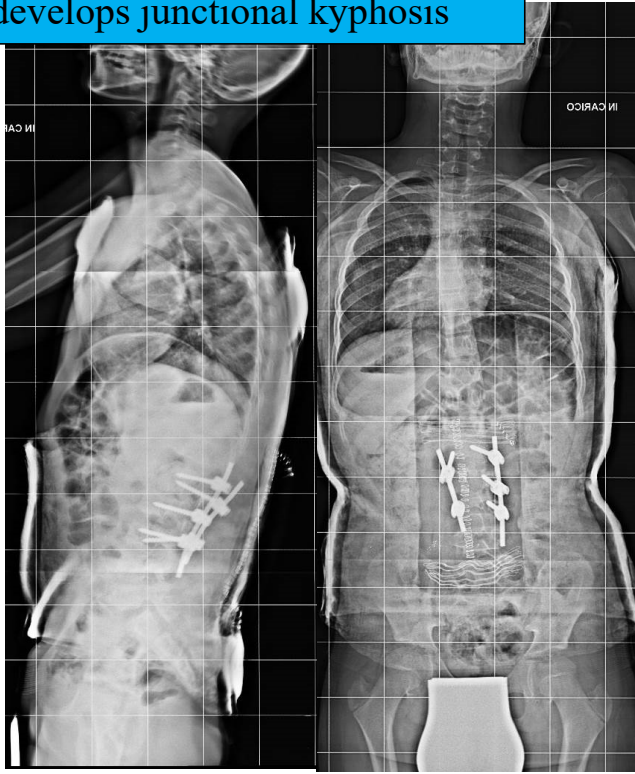
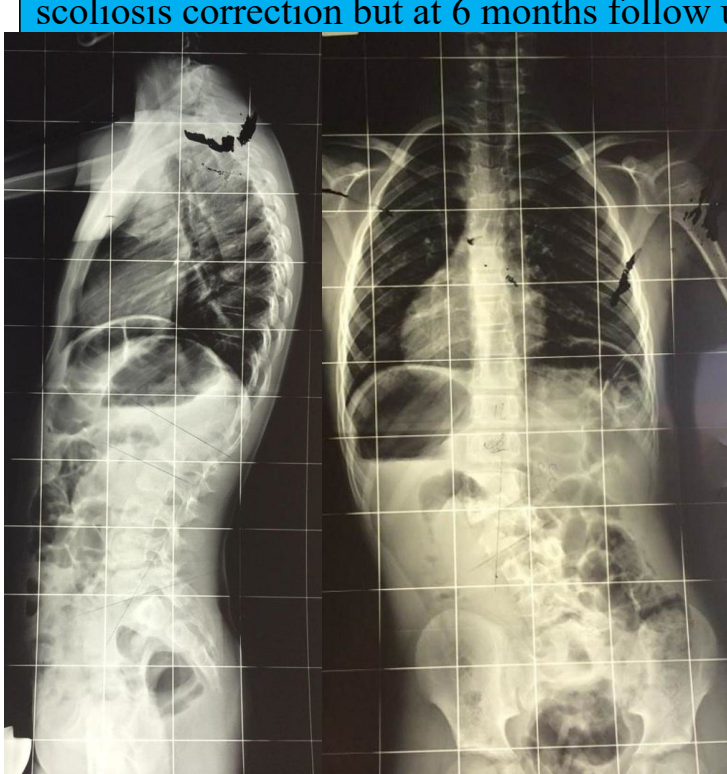
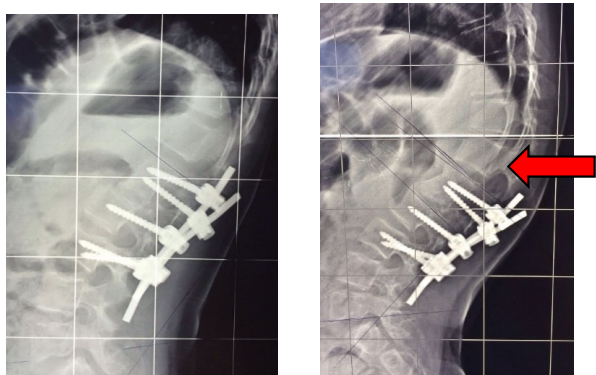
- Guo J, Zhang J, Wang S, Wang H et al Risk factors for construct/implant related complications following primary posterior hemivertebra resection: study on 116 cases with more than 2 years ‘ follow-up in one medical center BMC Musuloskeletal Disorders (2016) 17:380
- Zhu X, Wei X, Chen J et al Posterior hemivertebra resection and monosegmental fusion in the treatment of congenital scoliosis Ann R Coll Surg Engl 2014; 96(1):41-44
- Ruf M, Harms J. Posterior hemivertebra resection with transpedicular instrumentation: early correction in children aged 1 to 6 Years Spine 2003; 28(18):2132-8
- Ansari SF, Rodgers RB, Fulkerson DH. Dorsal midline hemivertebra at the lumbosacral junction: report of 2 cases. J Neurosurg Spine 2015; 22(1):84-89

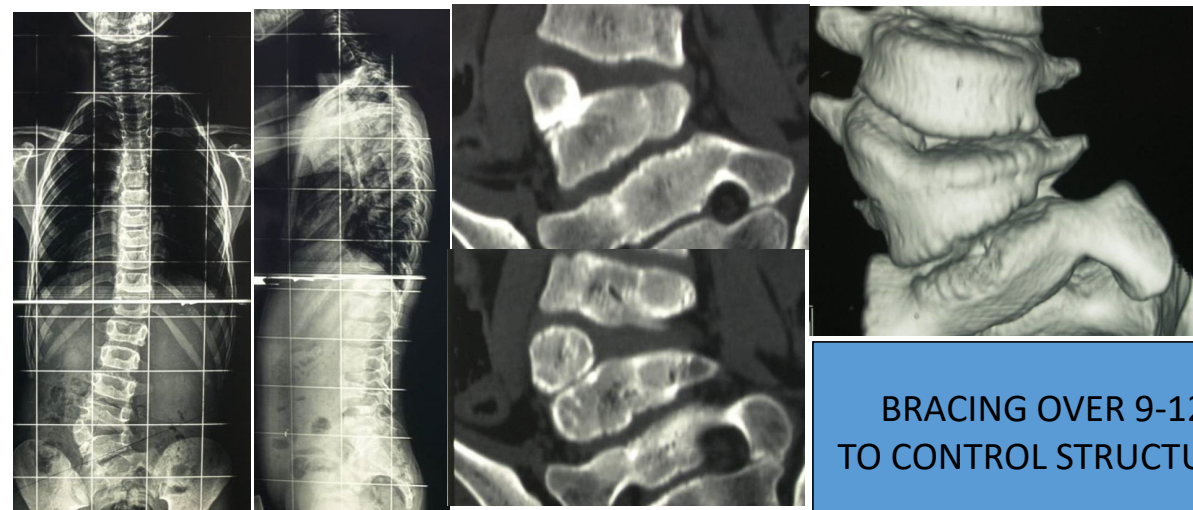
CURVE PROGRESSION AFTER SURGERY

- We experienced 5 cases (8% of our patients) of curve progression on frontal or sagittal plane after surgery
- Progression could be caused by mistakes in deformity curve cover by implant
- “Memory” of the curve? Not only primary curve, but secondary curves too mantain «deformity memory» after correction

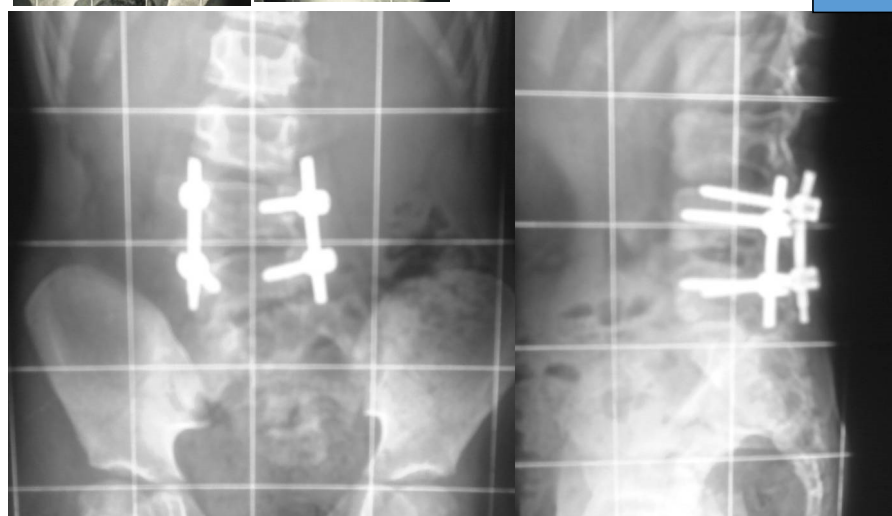


PM 8y lumbar congenital scoliosis, L2-L3 hemivertebra resection with good scoliosis correction but at 6 months follow up develops junctional kyphosis





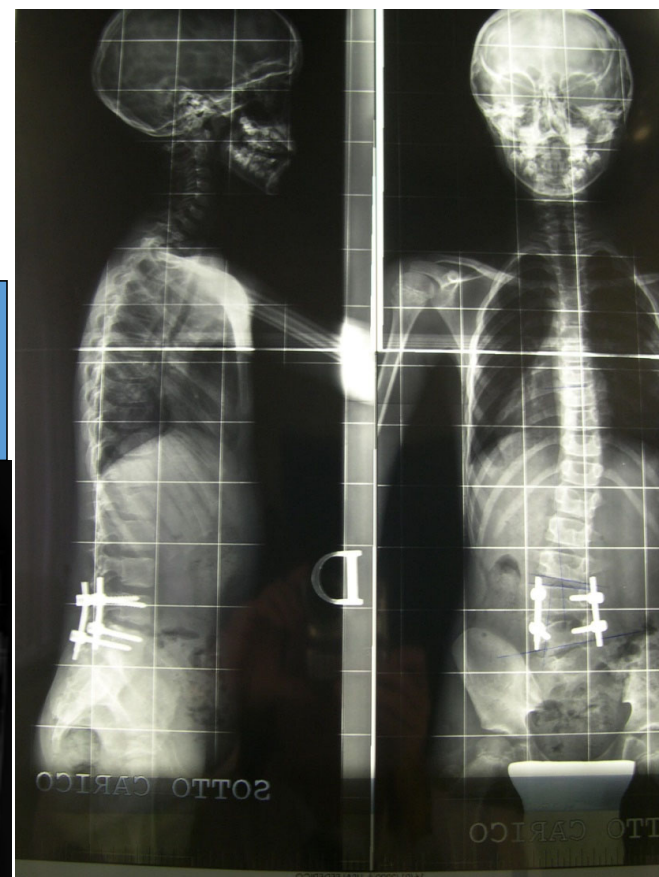
BRACING OVER 9-12 MONTHS
TO CONTROL STRUCTURED CURVES



F.U., 4 y 5m; L4-L5 partially fused hemivertebra



12months follow up



U.F. 25 m. follow up