Distraction-Growth Guided Technique (DGG) for Lumbar Curve Deformity in Immature Progressive Scoliosis

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Introduction

In immature patients with a progressive thoracolumbar/lumbar curve, the control of vertebral rotation and kyphosis is difficult with typical growing rod constructs.

To prevent deterioration of these deformities with saving lumber mobile segments, co-author (NS) developed a new surgical procedure.

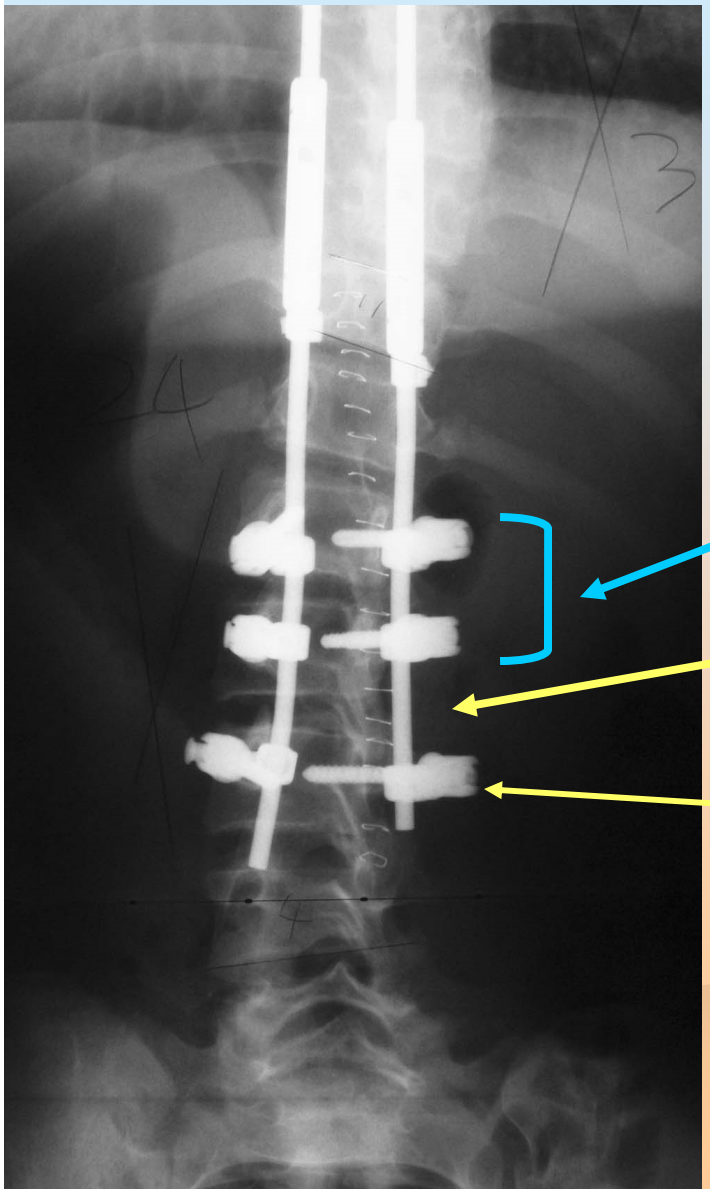
Distraction-Growth Guided Technique (DGG)

Combining concepts
- **Dual Growing Rod technique**
- **Shilla procedure**

- **Controlling Lumbar Curve**
  - **Scoliosis progression**
  - **Rotation**
  - **Vertebral Tilt**
- **Proper Growth of Lumbar Vertebra**
- **Preserving Mobile Segments**

Expectation : LMFV higher than L3

Surgical Procedure of DGG



Additional Pedicle Screws below Distal Foundation without Facet Fusion (Growth guided screw)

Distal Foundation

Preserving mobility of the segment

Growth Guided Screw (GGS)

Rod is not fixed to the rod-screw connector by set screw.

Results

DGG Technique in 7 Cases

of total 69 Growing Rod Cases

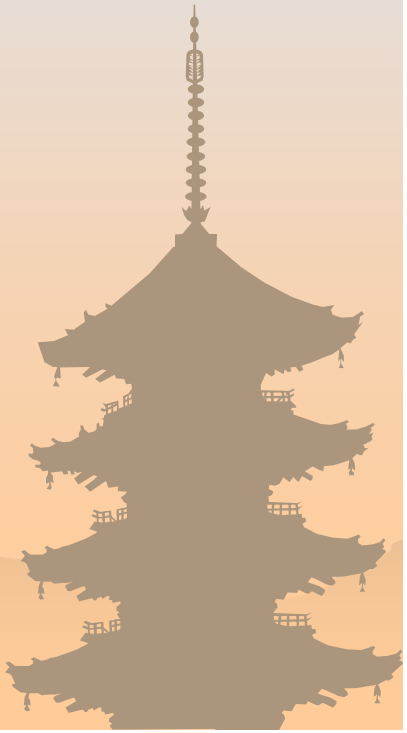
- Female : 4 Male : 3
- Idiopathic : 6 Syringomyelia : 1

Age at Initial Surg. : 8y10m – 13y5m (mean 12y1m)

F-up Period : 9m – 60m (mean 26m)

DGG at initial OP 3 cases

DGG at Rod ext. 4 cases



Growing Rod Graduate : 0 / 7 case

	pre-DGG	pos-DGG	F-up
Lumbar Cobb	45.3°	16.4°	22.6°
	28-69	8-24	12-27
L3 tilt	16.9°	6.6°	7.4°
	5-31	1-10	1-15
L4 tilt	21.5°	8.9°	8.3°
	11-35	4-14	4-14
Coronal Off Balance	2 / 7	0 / 7	0 / 7

Case 1

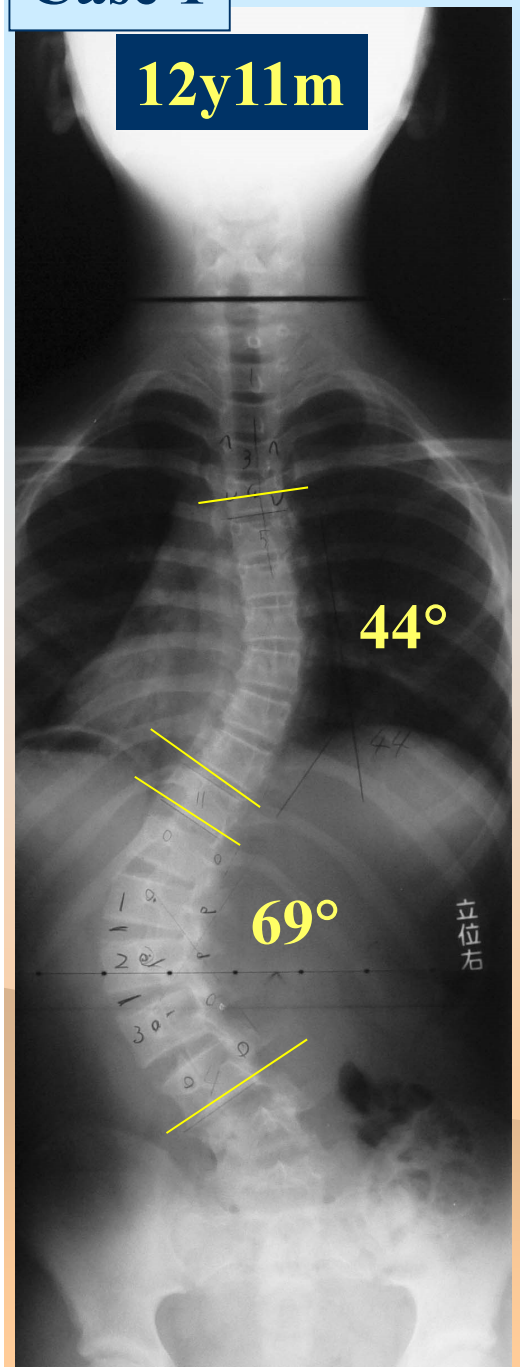
First Case of DGG.

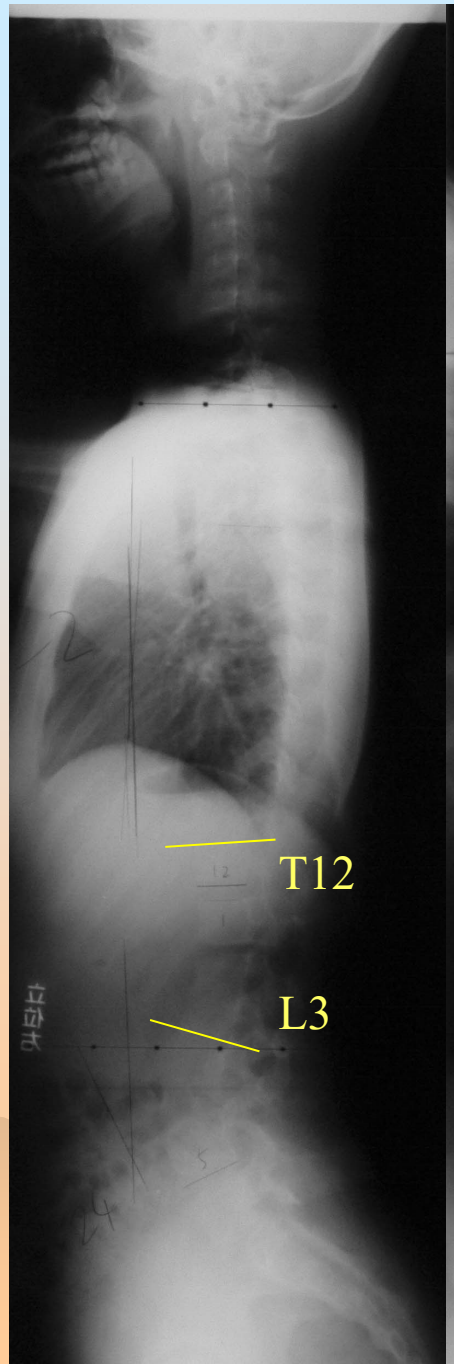
12 y/o girl, Idiopathic Scoliosis.
69° of Lumbar Scoliosis and Thoracolumbar Kyphosis.
Risser 0 and Non Menarche.

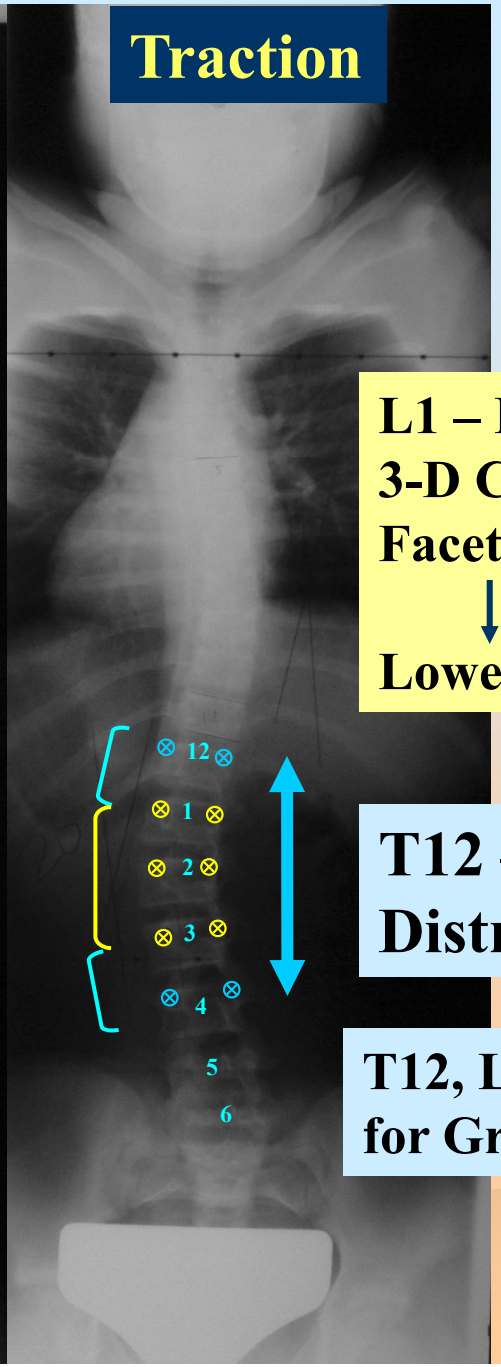
DGG was applied at initial surgery.
During 2y3m periods after initial surgery, lumbar scoliosis and vertebral rotation has been well controlled.

Final Fusion is scheduled in December 2011.
There remains a possibility to make the LMFV at L3 preserving 4 mobile segments.

Case 1





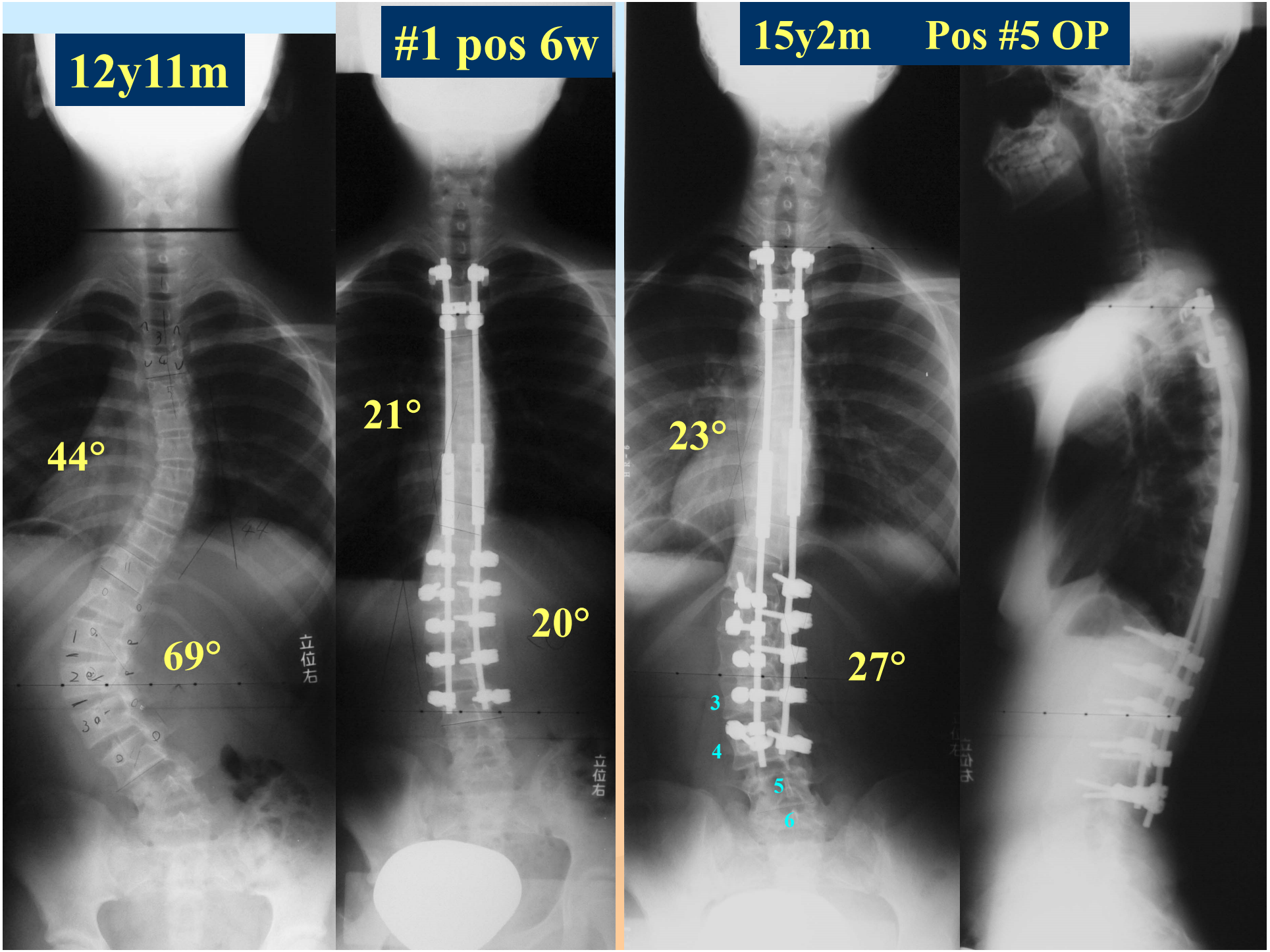


Idiopathic
Risser 0
Menarche (-)

L1 – L3
3-D Correction
Facet fusion (+)
↓
Lower Foundation

T12 – L4
Distraction

T12, L4 : GGS
for Growth Guidance


12y11m
44°
69°
立位右
#1 pos 6w
21°
20°
立位右
15y2m
Pos #5 OP
23°
27°
3
4
5
6
立位右

Case 2

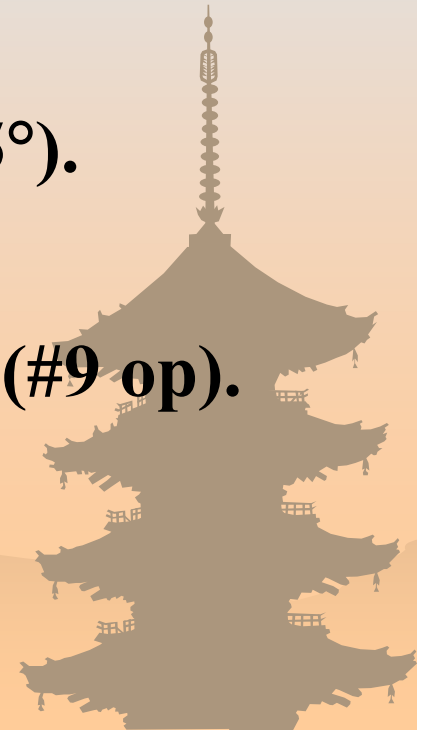
8 y/o boy, 72° of Idiopathic Scoliosis.
Open triradiate cartilage.

We performed growing rod at initial surgery.

In the course of 8 rod extension surgeries, lumber curve progression and L3 rotation became significant at age 13y7m (L3 Perdriolle : 25°).

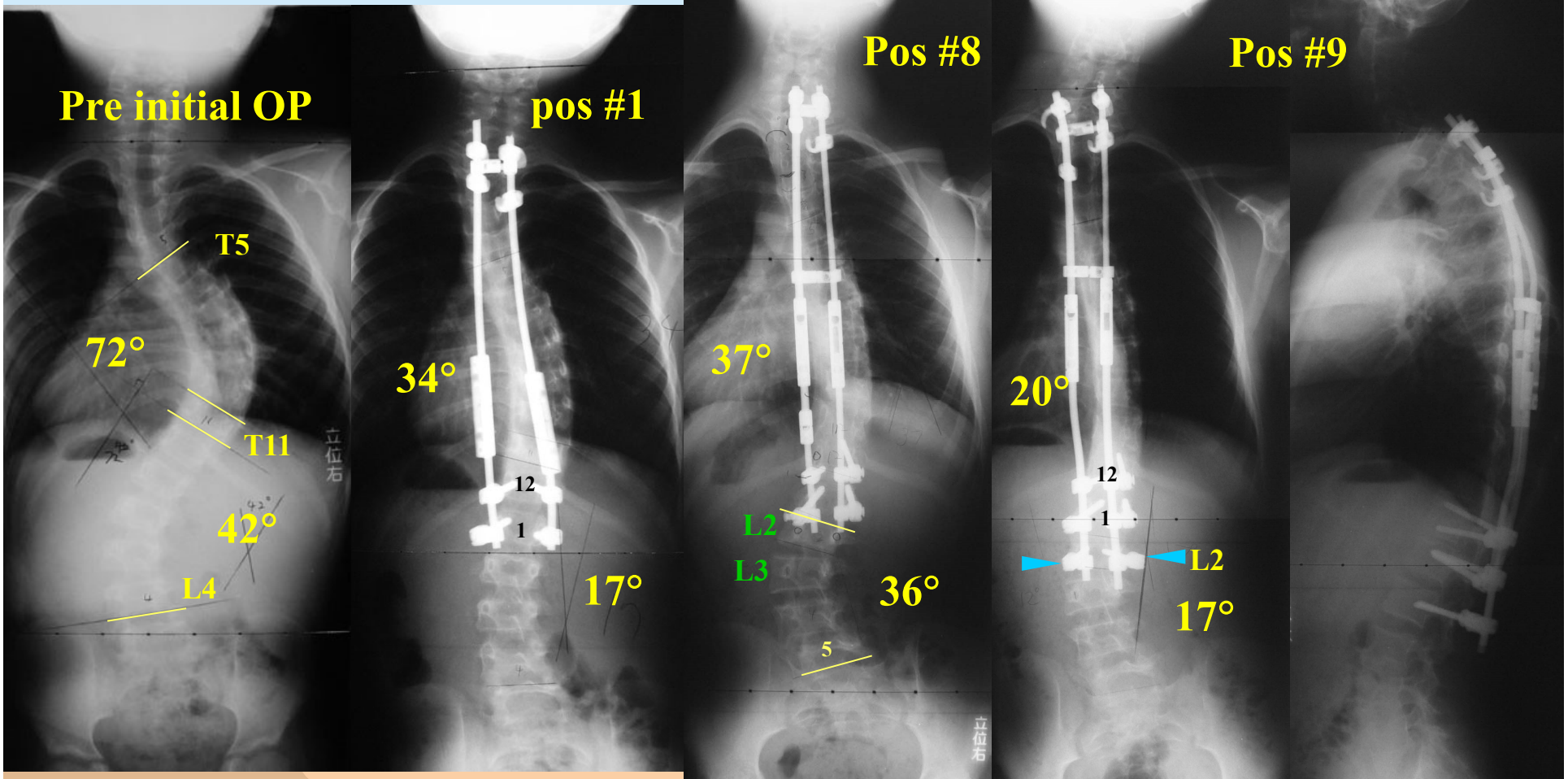
GGS were added to L2 to intercept the Vicious Cycle of deformity progression (#9 op).

Lumbar deformity is well corrected by this additional procedure.



Case 2

Male : Idiopathic



L2 : GGS

L3 Perdriolle 25° ⟶ 12°

Summary

- **Distraction-Growth Guided technique (DGG) provided lumbar curve correction with less fused segments.**

- **The results of DGG technique shows the possibility of making the LMFV higher than/at L3 at the final fusion surgery.**