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# APSS-MEDTRONIC FELLOWSHIP REPORT 2016

Dr Aiyer Siddharth Narasimhan

Host spine centre:

Department of Orthopaedic surgery,  
National University Hospital, Singapore.



**Duration of fellowship:** 26th October to 29th December 2017

**Mentor:** Prof Gabriel Liu



**Department faculty**

Prof Hee Kit Wong

Prof Naresh Kumar

Prof Joseph Thambiah

Dr Lau Leok Lim

Dr Dennis Hey

Dr John Ruiz

## Introduction

The APSS Medtronic clinical fellowship is an excellent opportunity for spine surgeons in the Asia-Pacific region to train at some of the best centres in the region. Firstly, I would like to thank the APSS for this opportunity and also the spine unit at the NUH, Singapore for making my fellowship a rich and valuable experience.

I started my fellowship on the 26-10- 2017 by attending the weekly spine rounds which are conducted on Thursday. I was introduced to Prof Naresh Kumar, Dr Dennis Hey, Dr Lau Leok Lim, Dr John Ruiz and other members of the spine unit. My fellowship teaching schedule was theatre days Monday to Friday from 26th October to 30<sup>th</sup> November. For the second month, I had theatre days from Monday to Thursday and clinic on Friday. I also attended spine rounds on every Thursday.

Day	AM	PM	Date
<b>Monday</b>	OT3 (Prof H K Wong)	OT3 (A/Prof Gabriel Liu)	
<b>Tuesday</b>	OT3 (Prof H K Wong)	OT3 (Prof H K Wong)	
<b>Wednesday</b>	OT2 (A/Prof Gabriel Liu)	OT2 (A/Prof Gabriel Liu)	
<b>Thursday</b>	Spine round	OT3 (A/Prof Naresh Kumar)  Or MCOR2 (Dr Lau Leok Lim)	
<b>Friday</b>	OT3 (A/Prof Naresh Kumar)	OT3 (A/Prof Naresh Kumar)	Month of October, November 2017
	KRW Rm 24-26 (Prof H K Wong)	KRW Rm 25 & 26 (Prof H K Wong)	1 Dec
	Clinic B Rm 6 & 7 (A/Prof Gabriel Liu)	Clinic B Rm 6 & 7 (A/Prof Gabriel Liu)	8 Dec
	-	'Scoliosis Specialist Clinic (HPB) (Dr Lau Leok Lim)	15 Dec

## Surgical case log book

Sr no	Date	Age /Sex	Diagnosis	Procedure	Surgeon	Role	Remarks
1	26-10-2017	73/ F	L4-5 degenerative spondylolisthesis	MIS TLIF	Prof Naresh Kumar	Assisted	Observed process of percutaneous screw insertion and over the top decompression
2	27-10-2017	69/ M	L3-4, L4-5 large disc extrusion with degenerative facet arthritis	Open L3-4, L4-5 TLIF	Prof Naresh Kumar	Assisted	Observed dural tear suturing technique during procedure
3	30-10-2017	11/ F	Adolescent idiopathic scoliosis Lenke 2C	Posterior T2-11 fusion and deformity correction	Dr. Lau Leok Lim	Assisted	Selection of levels of fusion in double thoracic curves
4	30-10-2017	15/ M	Adolescent idiopathic scoliosis Lenke 2C	Posterior T2-12 fusion and deformity correction	Prof Hee Kit Wong	Observed	Use of pedicle guard pedicle finder in scoliosis deformity
5	31-10-2017	13/ F	Adolescent idiopathic scoliosis Lenke 1A	Video Thoracoscopic anterior spine deformity correction	Prof Hee Kit Wong	Observed	Process of thoracic port insertion,  Screw and rod insertion
6	31-10-2017	73/ M	L4-5 right synovial cyst with grade 1 degenerative spondylolisthesis	Open L4-5 TLIF	Prof Hee Kit Wong	Observed	
7	1-11-2017	67/ F	Grade 2 degenerative spondylolisthesis	Open L4-5 TLIF	Prof Joseph Thambiah	Assistant	
8	1-11-2017	14/ F	Adolescent idiopathic scoliosis Lenke 2 A	Posterior T2-L1 fusion and deformity correction	Prof Gabriel Liu	Observed	Direct vertebral rotation technique for scoliosis correction
9	2-11-2017	57/ F	Polymetastatic spine disease with breast primary	Hybrid fixation MISS Fixation with open decompression	Prof Naresh Kumar	Observed	MISS thoracic pedicle screw insertion
10	2-11-2017		L5-S1 lytic spondylolisthesis L4-5 degenerative disc disease	L4-5, L5-S1 TLIF	Prof Gabriel Liu	Assisted	Planning to cage selection in patients with high Pelvic incidence

11	3-11-2017	27/ F	L1 burst fracture with implant in situ short segment fixation done 10-month-old	Implant removal done	Prof Naresh Kumar	Assisted	
12	6-11-2017	46/ F	L5-S1 extruded disc	Micro lumbar discectomy	Dr Lau Lim Leok	Observer	
13	6-11-2017	66/ M	L4-5 degenerative disc disease	Open TLIF	Prof Hee Kit Wong	Observer	
14	6-11-2017	61M	L4-5 lumbar canal stenosis	L4-5 decompression	Prof Hee Kit Wong	Observed	
15	7-11-2017	83/ F	L4-5 stenosis	L4-5 decompression	Dr John Ruiz	Assisted	
16	8-11-2017	14/ F	Adolescent idiopathic scoliosis Lenke 1	Robotic guidance assisted T6-L1 posterior deformity correction	Prof Joseph Thambiah	Assisted	Calibration and registration using the Mazer Robotic system.
17	8-11-2017	59/ F	C4-5, C5-6 cervical disc prolapse	C4-5, C5-6 ACDF	Prof Gabriel Liu	Observed	
18	8-11-2017	30/ M	L3-4, L4-5, L5-S1 disc prolapse	L3-4, L4-5, L5-S1 microlumbar discectomy and decompression	Prof Joseph Thambiah	Observed	
19	9-11-2017	15/ F	Adolescent idiopathic scoliosis	T4-L2 posterior deformity correction and fusion	Dr Lau Leok Lim	Observed	
20	10-11-2017	59/ F	L4-5 Degenerative spondylolisthesis	L4-5 TLIF	Dr Dennis Hey	Observed	Assessment of ok pelvic parameters and look
21	13-11-2017	69/ M	Previous L4-5 TLIF with pseudoarthrosis	Revision L2-S1 fusion	Dr John Ruiz	Observed	
22	14-11-2017	61/ F	L4-5 degenerative spondylolisthesis multiple level disc disease	L3-S1 fusion, L4-5, L5S1 TLIF	Dr Dennis Hey	Observed	Assessment of normal variation of lumbar lordosis. Tips to reconstruct based on the types 1-4
23	15-11-2017	13/ F	Adolescent idiopathic scoliosis Lenke 2	Posterior T2-L1 deformity correction and fusion	Prof Gabriel Liu	Assisted	

24	17/11/2017	69/ F	Tandem stenosis, L2 osteoporotic vertebral fracture	L3-4, L4-5 decompression L2 vertebroplasty	Prof Naresh Kumar	Assisted	
25	17-11-2017	62/ M	Spinal cord injury ASIA C	C6-7 ACDF	Prof Naresh Kumar	Assisted	
26	20-11-2017	77/ F	Adjacent segment degeneration, L2-3, post L3-5 TLIF with sagittal plane imbalance	Extension of fusion L1-5, L2-3 XLIF and L1-2 Posterolateral fusion	Prof Hee Kit	Observed	
27	20-11-2017	77/ F	Degenerative scoliosis L3-5 lumbar canal stenosis	L3-4, L4-5 TLIF	Prof Gabriel Liu	Assisted	
28	21-11-2017	69/ F	Lumbar canal stenosis L4-5 with degenerative disc disease at L3-4 and L5-S1	L3-S1 fusion, L4-5, L5-S1 TLIF	Prof Hee Kit Wong	Observed	
29	21-11-2017	66/ M	Cervical myelopathy with cervical kyphosis	C3-4,4-5,5-6, 6-7 ACDF	Dr Dennis Hey	Observed	
30	22-11-2017	15/ F	Adolescent idiopathic scoliosis Lenke 6	Posterior deformity correction and fusion T4-L4	Prof Gabriel Liu	Assisted	
31	23-11-2017	68/ M	Cervical myelopathy	C3-4 ACDF and C3-C4 laminectomy with instrumentation	Prof Naresh Kumar	Assisted	
32	24-11-2017	22/ F	Adolescent idiopathic scoliosis Lenke 2A	Posterior deformity correction and fusion T2-L1	Prof Naresh Kumar	Assisted	
33	25-11-2017	56/ M	T12 collapse with metastatic gastric adenocarcinoma	T10-L2 MISS with T12 decompression	Prof Naresh Kumar	Assisted	MISS screw insertion
34	27-11-2017	15/ F	Adolescent idiopathic scoliosis Lenke 6	T11-L3 anterior lumbar fusion with scoliosis correction	Prof Hee Kit Wong	Observed	Under correction of lumbar curve to accommodate the un- instrumented thoracic curve.
35	28-11-2017	16/ F	Adolescent idiopathic scoliosis Lenke	T2-L1Posterior deformity correction and	Prof Hee Kit Wong	Observed	

				fusion			
36	29-11-2017	55/ F	Lumbar canal stenosis	L3_4, L4_5 micro- decompression	Dr Lau Leok Lim	Observed	
37	29-11-2017	58/ M	T4 metastatic spine tumor with neurological deficit	T2-6 stabilisation with posterior decompression and epidural tumor separation	Prof Naresh Kumar	Assisted	Epidural component separation in spine metastatic surgery
38	30-11-2017	80/ M	C4 metastasis with neurological deficit primary prostate	C4, C5 corpectomy and anterior mesh cage reconstruction and anterior cervical plating	Prof Naresh Kumar	Assisted	
39	4-12-2017	14/ F	Adolescent idiopathic scoliosis Lenke 2PT2-	Posterior deformity correction T2-L2 and fusion	Dr Lau Leok Lim	Assisted	
40	5-11-2017	66/ M	Cervical myelopathy with previous C3-4 fusion	Cervical laminoplasty	Prof Hee Kit Wong	Observed	Discussion on technique of C3 dome laminotomy and laminoplasty techniques
41	5-12-20	66/ F	Posterior T7-L5 fusion in 1990 for scoliosis  Now L5-S1 DDD with instability type back pain.	L5-S1 ALIF	Prof Hee Kit Wong	Assisted	Observed vascular surgeon perform retroperitoneal access to Lumbosacral spine. Previous LSCS resulted in considerable scarring and difficulty in finding retroperitoneal space
42	6-12-2017	14/ F	Adolescent idiopathic scoliosis Lenke 1 C	Thoracoscopic anterior T5-T11 selective thoracic fusion	Prof Gabriel Liu	Assisted	Selection of levels. Under contour rod to accommodate proximal and distal curves
43	11-12-2017	14/ F	Neuromuscular scoliosis cerebral palsy with sitting imbalance and pelvic obliquity	Posterior T2- iliac fixation and fusion	Dr Lau Leok Lim	Assisted	Iliac fixation in neuromuscular scoliosis (cerebral palsy)
44	12-12-2017	34/ F	Cervical C6-7 with radiculopathy	C6-7 ACDF	Prof Hee Kit Wong	Observed	

45	12-12-2017	15/ F	Adolescent idiopathic scoliosis	Posterior deformity correction T2-L4 and fusion	Prof Hee Kit Wong	Observed	
46	13-12-2017	11/ F	Adolescent idiopathic scoliosis Lenke 2Pos	Posterior deformity correction and fusion T2-L1a	Prof Gabriel Liu	Assisted	
47	14-12-2017	64/ F	Lumbar canal stenosis	L3-4, L4-5 and L5-S1 decompression	Prof Naresh Kumar	Assisted	
48	14-12-2017	73/ F	L5-S1 spondylolisthesis  Status L4-5 PLIF	Extension to L5 and iliac fixation with L5S1 PLIF	Dr Dennis Hey	Assisted	
49	15-12-2017	47/ F	C4-5 OPLL with cervical myelopathy	C4-5 ACDF	Prof Naresh Kumar	Assisted	
50	15-12-2017	31/ M	L4-5 disc extrusion L5-S1 disc prolapse	L4-5,L5-S1 microlumbar discectomy	Prof Naresh Kumar	Assisted	
51	16-12-2017	28/ M	L1 burst fracture AO type A3 B2	Posterior vertebral column resection and T11-L3 fusion	Prof Gabriel Liu	Assisted	
52	18-12-2017	15/ F	Adolescent idiopathic scoliosis Lenke 2C	Posterior deformity correction and fusion T2-L1	Prof Hee Kit Wong	Assisted	
53	18-12-2017	15/ F	Adolescent idiopathic scoliosis Lenke 6	Posterior deformity correction and fusion T11-L3	Prof Gabriel Liu	Assisted	
54	19-12-2017	14/ F	Adolescent idiopathic scoliosis Lenke 5	Thoracoscopic anterior deformity correction and fusion T9-L2	Prof Hee Kit Wong	Observed	
55	19-12-2017	43/ F	L4-5 Degenerative spondylolisthesis	L4-5 TLIF	Prof Hee Kit Wong	Observed	



56	20-12-2017	73/ F	L4-5 degenerative spondylolisthesis	L 4-5 Robotic MISS TLIF	Prof Gabriel Liu	Observed	
57	20-12-2017	78/ M	L2-3 adjacent segment degeneration, T12 osteoporotic fracture with vertebral pseudoarthrosis	T10-iliac fixation, L2-3 XLIF and L5-S1 ALIF  Staged procedure	Prof Gabriel Liu	Assisted	
58	22-12-2017	15/ F	Adolescent idiopathic scoliosis Lenke 6	Posterior deformity correction and fusion T4-L3	Prof Gabriel Liu	Assisted	
59	26-12-2017	60/ F	L4-5 degenerative spondylolisthesis	L4-5, L5-S1 TLIF	Dr Dennis Hey	Assisted	

### Presentation on previous work and Short Introduction



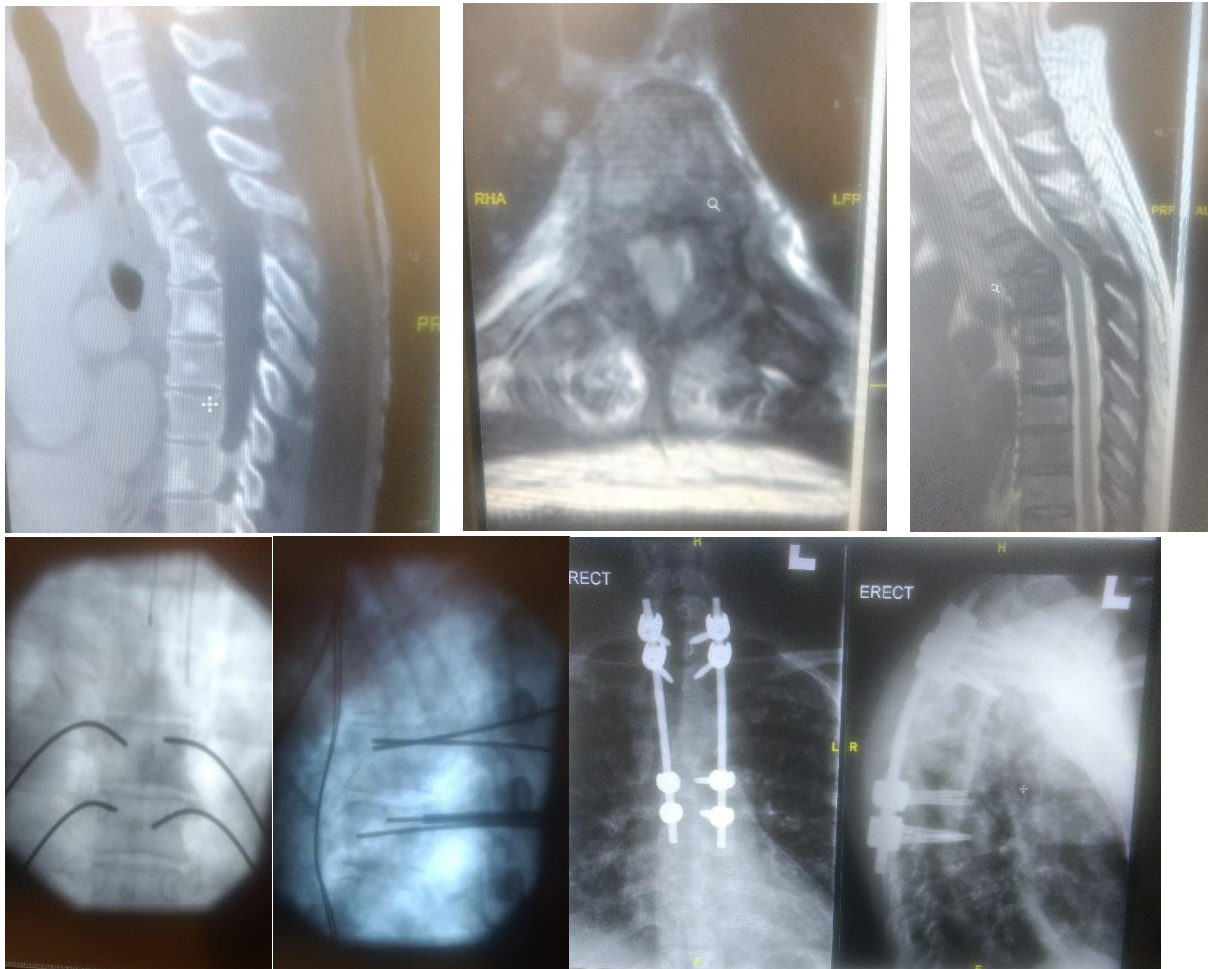
I was honoured to present a short personal introduction to the spine unit on the spine rounds on Thursday. The meeting was attended by Prof Hee Kit Wong, Prof Gabriel Liu, Prof Naresh Kumar and other members in the spine unit. I presented some of my previous work conducted at Ganga Hospital, Coimbatore on spine navigation and lumbar disc degeneration. It was an absolute privilege to discuss some of the finer points of the research work with the expert faculty at the NUH spine unit.

### Acknowledgement

I would like to thank Ms Siew Yian Tan and Ms Chua Li Ping at medical affairs and the department of Orthopedic for their help with my fellowship application and with local procedural formalities.

## Case 1

A 67-year-old female presented with multiple spine and visceral metastasis due to a primary breast carcinoma. The patient was diagnosed with breast carcinoma 12 months ago with no chemotherapy or radiotherapy taken. The patient presented with early myelopathy due to a pathological collapse of the T4 vertebra. The patient was treated with a hybrid fixation of MISS screw fixation and open decompression at the level of pathological fracture



## Case 2

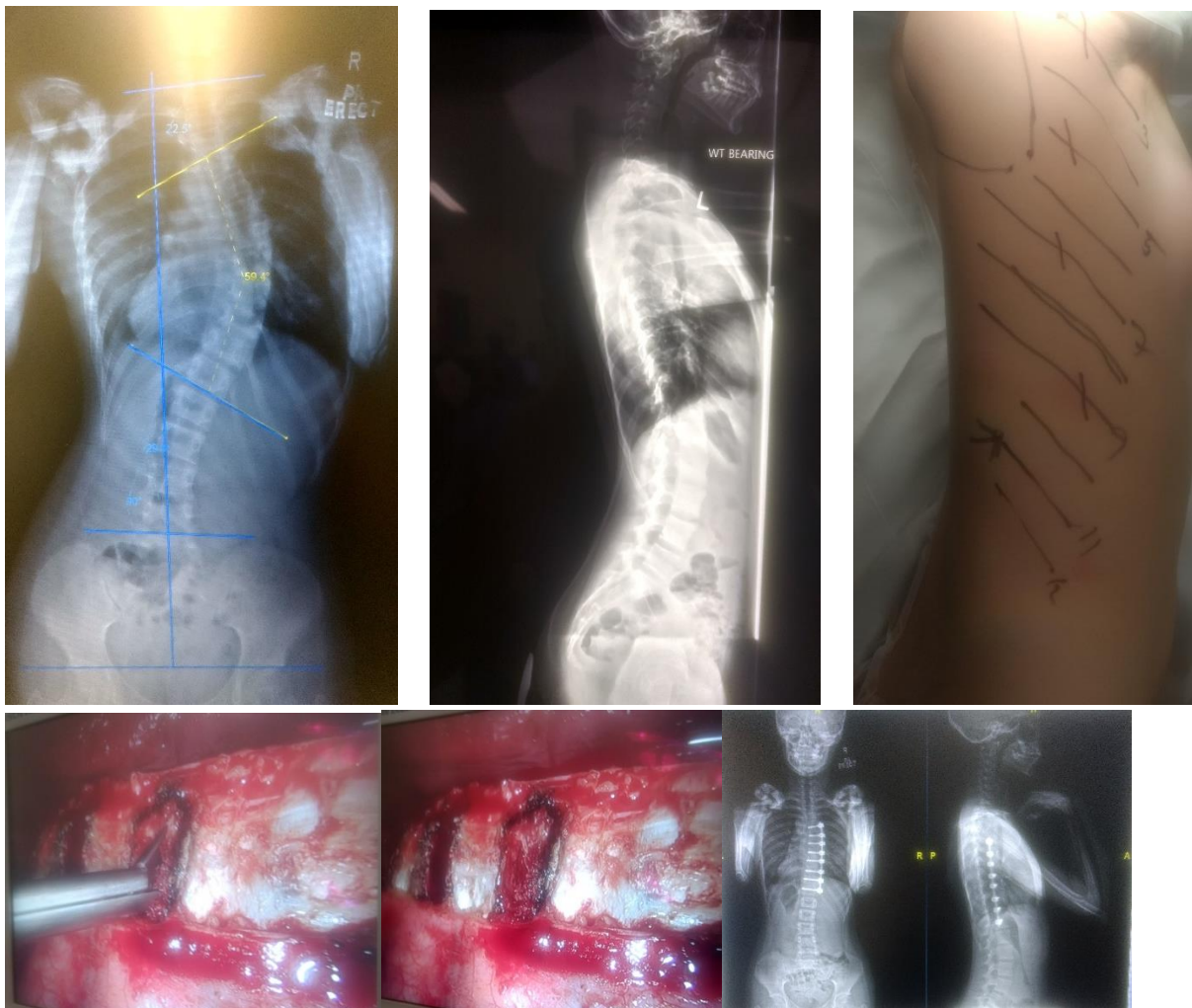
A 14-year-old girl presented with adolescent idiopathic scoliosis Lenke 1A. The patient was planned for a posterior instrumented deformity correction and fusion using a robotic guidance assisted surgery. A preoperative CT scan was performed and the data was fed into the Mazer robotic system. Pedicle screws were placed using the robotic guidance system. This was a novel experience as it was a first hand experience with the robotic surgery.





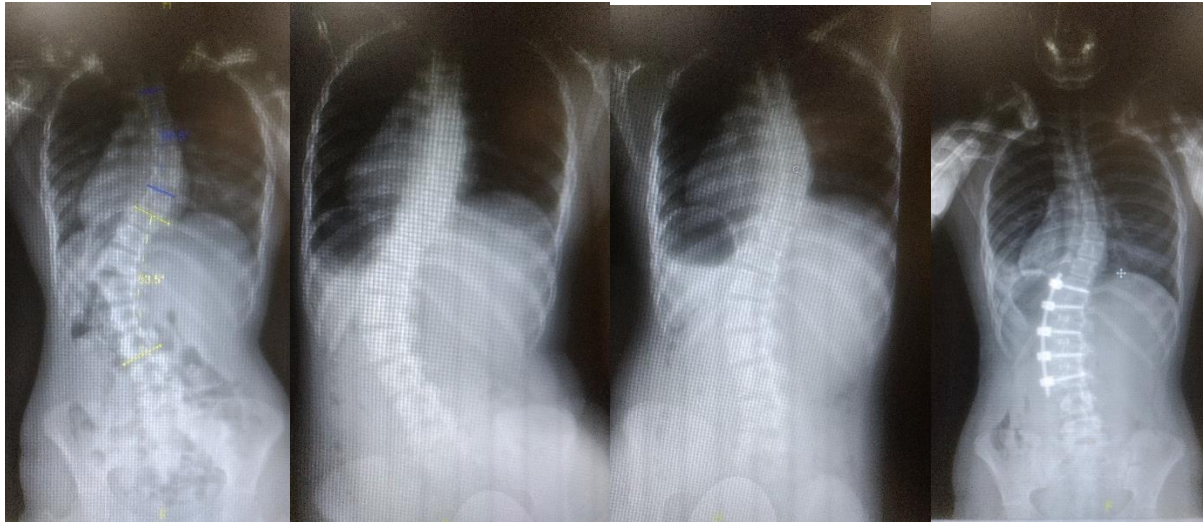
### Case 3

A 13-old-year girl presented with adolescent idiopathic scoliosis Lenke 1A. The patient was treated with a video thoracoscopic anterior approach deformity correction and fusion. The technique of port placement was discussed with pearls and pitfalls. A right sided approach was taken and end vertebra to end vertebra fixation was planned. Four ports are needed for screw placement and an additional anterior port to retract the underlying lung tissue. Anterior discectomy and fusion with rib graft was performed. Screws were inserted and rod connected to correct the deformity.



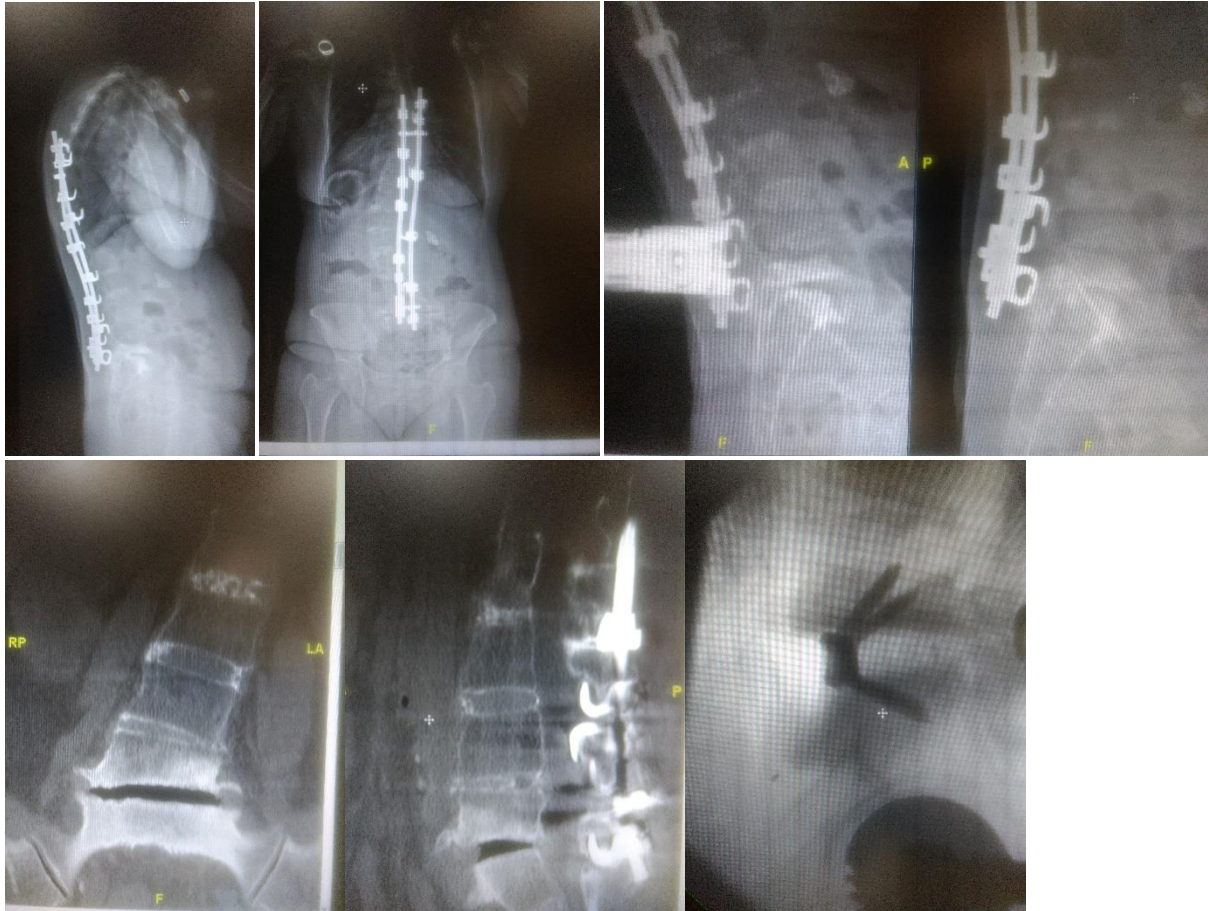
#### Case 4

A 16-year-old girl presenting with an adolescent idiopathic scoliosis. She was noted to have progressive scoliosis. The Lenke VI C curve was treated with a selective anterior fusion for the lumbar curve. This was an interesting case as anterior selective fusion for Lenke VI C curves was something I had not seen previously. The curve was under corrected to accommodate the structural thoracic curve.



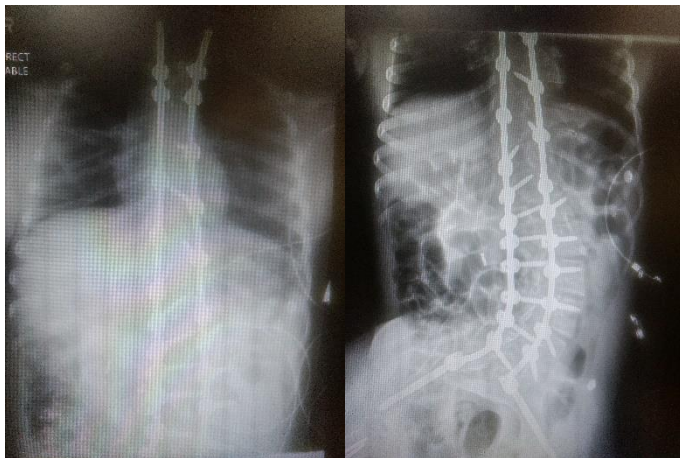
## Case 5

A 68-year-old female presented with progressive instability type low back pain. The pain had restricted her standing and walking ability to 10 minutes. She had undergone a previous posterior fusion for scoliosis in the year 1990 from T7 to L5. The posterior fusion was performed with a rod and hook construct. The radiographs showed a significant L5-S1 DDD with vacuum sign and instability. She was planned for a first stage ALIF at L5-S1 and followed by revision of the posterior instrumentation to pedicle screws with extension to iliac fixation



## Case 6

A 14-year-old female child with cerebral palsy and neurogenic scoliosis was treated with posterior fusion and correction of scoliosis. The patient had a progressive loss of sitting balance with difficulty feeding. The radiograph showed a pelvic obliquity with a severe lumbar scoliosis measure about 90 degrees. She had a previous surgery for hip subluxation which was treated with a pelvic osteotomy. The case has challenging due to rigid nature of deformity, poor bone stock and dysplastic pelvic bone. The fixation was extended from t2 to iliac bone. A satisfactory improvement in the curve was noted with improvement in the sitting balance.





## Time in Singapore

I had nice time exploring the local sights and tourist spots. Prof Wong and Prof Liu were kind enough to host a farewell dinner with the very popular Sea food restaurant Jumbo Seafood. I enjoyed a lot of the local cuisine sampling Japanese, Korean and Chinese delicacies.

