

APSS MEDTRONIC SPINE FELLOWSHIP

Fellow:

Dr Aditya Raj

MBBS, MS (Orthopaedics)

Fellowship in Spine Surgery

Guide:

Prof. Chong-Suh Lee

MD, Ph.D.

Professor & Director

Spine Centre

Hospital:

Samsung Medical Centre

Seoul

Duration of fellowship:

August 9, 2021 – November 6, 2021

INTRODUCTION

I was selected for the Asia Pacific Spine Society (APSS) – Medtronic Spine fellowship in the year 2020. The fellowship was postponed to 2021 due to ongoing COVID-19 pandemic and it was finally scheduled from 09 August 2021 to 06 November 2021 at Samsung Medical Center, Seoul under the guidance of Prof. Chong-Suh Lee. Overseas fellowship during the time of a pandemic seemed impossible but the APSS secretariat and the host institute played a pivotal role in the entire process to make it convenient. I had previously heard accolades about the fellowship from colleagues at my institution and was eager to utilize this opportunity to the fullest.

I would like to extend my sincere gratitude to the entire team of APSS secretariat for making this fellowship possible during the unprecedented COVID-19 pandemic. Ms. Kaelyn Liew and Ms. Jennifer Matthew from the secretariat played an important role in organizing the fellowship program. They were in constant communication and were an integral part of the entire procedure well before the fellowship started. I would also like to thank Ms. Dominique Cho, the international fellowship coordinator at Samsung Medical Center for her patient support and taking care of the necessary official work and documentation, making the entire experience flawless. The entire process starting from the VISA acquisition to accommodation and travelling would not be possible without the coordinated efforts of the entire team at APSS and the host institute.

It is important to note that the entire world was grappling with the second wave of COVID-19 pandemic just before the commencement of the fellowship and hence the entire travel itinerary and the fellowship schedule was tailored till the very end to accommodate daily changes in rules imposed by the governments. I had received the weekly schedule of my fellowship program in advance,

prepared by the fellowship coordinator at the Spine center.

Monday	Tuesday	Wednesday	Thursday	Friday
	Weekly surgical case review (07:00~08:00, every week, 12 th floor conference room)	Spine center symposium (06:45~07:20, every other week, 1 st floor conference room)		
		Spine tumor board (07:20~08:00, every week, 1 st floor conference room)		
Operation (08:00~17:00, MOR room 6, <i>Pf. Jin-Sung Park</i>)	Operation (08:00~17:00, MOR room 6, <i>Pf. Chong-Suh Lee</i>)	Operation (08:00~17:00, MOR room 6, <i>Pf. Se-Jun Park</i>)	Operation (08:00~17:00, MOR room 6, <i>Pf. Chong-Suh Lee</i>)	Operation (08:00~17:00, MOR room 6, <i>Pf. Se-Jun Park</i>)

Fellowship Experience



I reached Seoul by a long flight 2 weeks before the start of my fellowship for the mandatory quarantine as per government rules. I spent the quarantine period for the first 7 days in a hotel allocated by the government and then a rented Airbnb for the next 7 days. I was in constant communication with Prof. S.J Park, Ms. Dominique and the APSS secretariat during this period and they enquired about my well-being and whereabouts. I finally moved to the accommodation arranged by APSS and the host institute on 08 August 2021 after completing my quarantine. The accommodation was an apartment located in close proximity to the hospital and was well equipped.



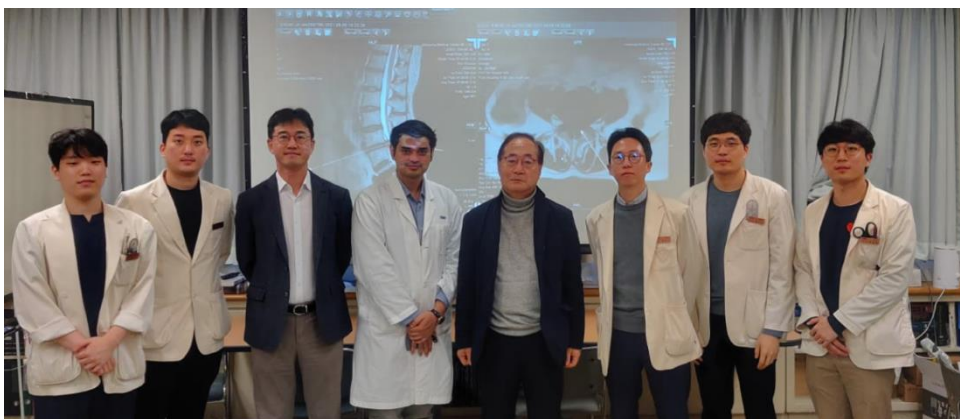
I was received on the day of commencement of my fellowship by Ms. Dominique Cho from the International Training Office (ITO) and she briefly gave me an entire tour of the hospital. She had already prepared my electronic access card and she also provided me access to the EMR at the hospital. My first day started straight in the OR by meeting Prof. Jin-Sung Park. He took me to the OR where he introduced me to the entire staff inside the OR. He then explained to me about the cases for that day and then discussed the various treatment options. He let me scrub for the cases from the first day itself. My usual weekly routine included OR on all working days, and the entire experience was very enjoyable. The department of Orthopedic Spine Surgery composed of three surgeons headed by Prof Chong-Suh Lee. He was ably assisted by Associate Prof. Se-Jun Park and Assistant Prof. Jin-Sung Park. The fellow in the department of Spine Surgery during my tenure was Dr Byeong-Jik Kang and he personally helped me in all my queries and activities.

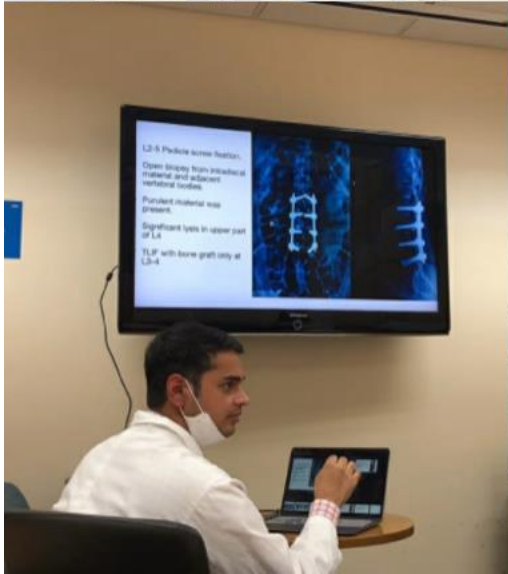
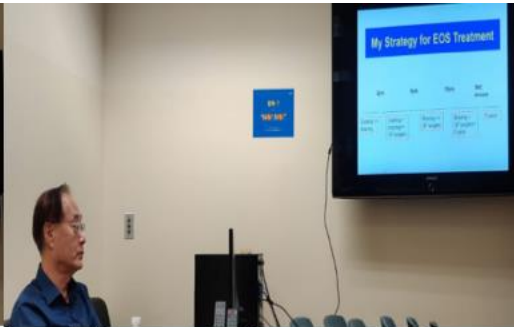
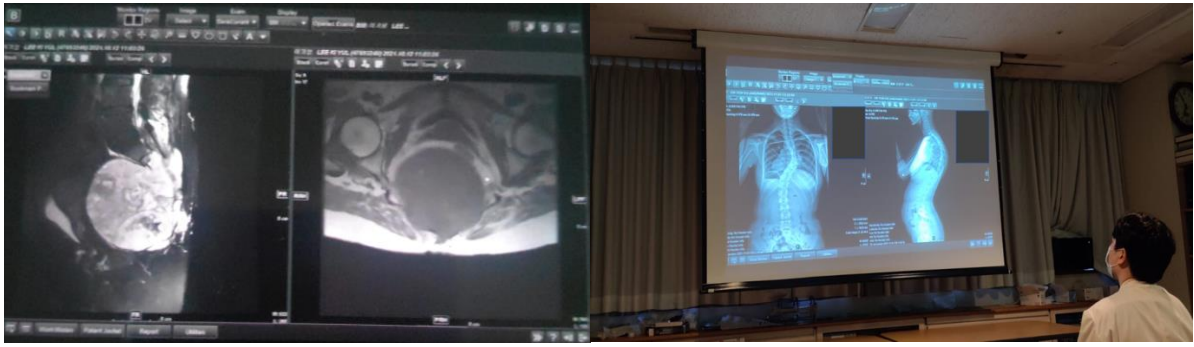
Prof. Lee was able to organize a welcome lunch keeping in mind the restriction on the number of people due to the COVID-19 regulations and it was a benevolent gesture!

Academic meetings

The department conducted a weekly case discussion on every Tuesday morning, discussing the operated cases of the previous week and upcoming cases of the current week. There was a critical analysis of all the operated patients and plans were decided for the upcoming ones. All the Professors discussed the plans for the cases in details and always ask for my method for approaching those cases. This would be followed an in-depth discussion of the pros and cons of different techniques for a particular case. Every Wednesday morning, a tumor board was organized comprising of spine surgeons, musculoskeletal radiologists, radiation

oncologists and neurosurgeons. Due to COVID-19 restrictions on public gathering, this was organized virtually on a weekly basis. Samsung Medical Center (SMC) is the first hospital in South Korea to have an individual Spine Tumor Board and it greatly facilitates patient management and ensures highest quality of individualized treatment to the patients. This hospital is also one of two centers in South Korea with the facility of Proton beam therapy. I was surprised to see its frequent use in the management of Chordomas of the cervical region and the sacrum. It was an enriching experience to understand the multi-departmental approach towards decision making of spine tumors. It helped me broaden my insight towards management of primary spinal tumors and metastatic tumors of the spine. Similarly, every alternate Wednesday, interesting case discussions were organized virtually which was presented by the spine fellows and Professors at SMC. Frequently, I was allowed to show presentations on my topics of interest which included spinal infections and spinal trauma. Prof Chong-Suh Lee would also take lectures on various topics like pediatric spine deformity, early onset scoliosis, thoracoscopic management of scoliosis and anterior approaches to the thoracolumbar spine.





All the faculty members were always eager to teach new techniques and talk about their experience in the management of cases. The use of anterior approach towards management of Adult Spinal deformity was a new concept for me as my previous training included an all-posterior approach in the surgical management. I got to observe and assist many cases of Anterior column realignment (ACR) procedures at this institute which is rarely performed in such numbers elsewhere. The restoration of segmental lordosis and achieving global sagittal balance without any three-column osteotomy was delightful to watch and learn. Prof. Lee is one of the pioneers for spine deformity surgery and spine oncosurgery in Seoul and I was fortunate to be on the receiving end of the abundant wisdom he shared all throughout the fellowship. Prof. S.J Park was always eager in sharing the tips and tricks of anterior retroperitoneal approaches during deformity correction surgeries. He took personal interest in clarifying all my doubts however smallest it might seem. He also shared his considerable expertise in the management of primary spine tumors and paid extra attention in discussing the various treatment options for each case, at lengths.

At a time when in-person academic meetings were rarely organized, I got a wonderful chance to attend The Fall Congress Korean Society of Spine Tumor in Seoul. Prof. Lee arranged for me to attend the conference and it was a wonderful experience listening to all the esteemed members talk about diverse topics on benign and malignant tumors of the spine. There were talks by musculoskeletal radiologists, radiation oncologists and pathologists as well, discussing about the recent advances in management of spine tumors. Carbon ion radiation therapy in the management of tumors is a novel piece of technology and learning about it during the conference was a great upgrade to previous knowledge.



Surgical Experience

I was glad to attend the operation room on all working days of the week. All types of spinal disorders and the entire spectrum of cases was covered during my fellowship ranging from infections, osteoporosis, ankylosing spondylitis, adult spinal deformity, pediatric spinal deformity, and minimally invasive spine surgery. I was given the chance to actively assist in maximum number of cases. The planning and discussion about the management of cases extended in the OR as well. Prof. S.J Park took out time to answer all my queries on spine deformity and tumor surgeries. He also shared his previous experience in spine tumor surgeries and helped me learned the goal of treatment along with the best technique to achieve long lasting results. The use of modern technology including the O-arm and navigation inside the OR was a unique experience.

To complete the academic bonanza, I was allowed to participate in few of the research activities going on at the Spine center. These were pertaining to adult

spinal deformity and spinal metastases. While working on these topics, I got a chance to expand my knowledge and use them further in my clinical practice.

I was fortunate to be given this amazing opportunity to widen my academic and clinical horizon at Samsung Medical Center and I sincerely look forward to utilize all the knowledge into my upcoming clinical practice to improve patient management and care.





LOG OF CASES

S No.	Age	Sex	Date	Role	Diagnosis	Surgeon	Procedure
1	69	F	09/08/21	A	S/p L4-S1 PLI, L2-4 PLF, L2 Vertebroplasty with iatrogenic flat back and global sagittal imbalance	Dr J.S Park	T10-L4 Screw fixation, L1-2 DLIF, L2-4 ACR, T10-S1 Rod insertion
2	75	F	10/08/21	A	L4-5 central stenosis, Instability L4-5-S1	Dr S.J Park	L4-S1 PLIF
3	59	F	10/08/21	A	S/p L3-4-5 PLIF with ASD at L5-S1	Dr S.J Park	L5-S1 PLIF Extension T1-L1 Screw fixation, facetectomy, deformity correction & fusion
4	13	M	11/08/21	A	Lenke 2C- Idiopathic scoliosis	Dr S.J Park	
5	70	M	11/08/21	A	Retrododontoid pseudotumor with cervical myelopathy (C/o R.A)	Dr J.S Park	C1-C2 Goel Harms fixation and fusion
6	77	F	12/08/21	A	T6-12 Continuous OPLL, OYL at T9-11	Dr J.S Park	T9 & T12 screw fixation, T7-8,10-11 laminectomy, T10 & T11 sliding osteotomy
7	63	F	12/08/21	A	L5-S1 lytic spondylolisthesis	Dr J.S Park	L5-S1 PLIF
8	71	F	13/08/21	A	s/p L4-5 PLIF, ASD at L1-4, collapsed disc height at L1-3, Stenosis at L2-4 & instability L1-4	Dr S.J Park	OLIF L2-4, Screw fixation L1-3, Rod L1-5, Laminotomy at L2,3
9	77	M	13/08/21	A	L4-5 foraminal stenosis, L3-4 central stenosis	Dr S.J Park	L3-5 PLIF
10	47	M	16/08/21	A	S/p C3-6 Laminoplasty, C1-3 OPLL, C7-T2 OPLL with stenosis cervical myelopathy	Dr J.S Park	C2-T3 screw fixation, C7-T2 laminectomy, C2 dome osteotomy
11	67	F	17/08/21	A	S/p L4-5 PLIF with L3-4 and L5-S1 stenosis with degenerative scoliosis	Dr C.S Lee	L3-4, L5-S1 PLIF L3-S1 screw and rod, deformity correction
12	44	M	18/08/21	O	C5-7 PID with radiculopathy	Dr S.J Park	C5-7 ACDF (plate+allograft)
13	39	F	18/08/21	O	L4-5 PID with left lower limb radiculopathy	Dr S.J Park	Left L4 hemilaminotomy
14	44	M	18/08/21	A	L4-5 Degenerative disc disease with axial back pain	Dr S.J Park	L4-5 PLIF
15	65	M	19/08/21	O	L4-5 central and foraminal stenosis Post Ca lung	Dr C.S Lee	L4 midline splitting laminoplasty and decompression
16	68	F	19/08/21	A	S/p L3-5 OLIF, L5-S1 PLIF with L1-2, L2-3 stenosis, T8-12 cord compression with flat back deformity	Dr C.S Lee	T7-S1 screw fixation, L1-2,L2-3 PLIF, L2 PSO & deformity correction
17	71	F	20/08/21	A	L2-3, 3-4, 4-5, L5-S1 stenosis with flat back deformity	Dr S.J Park	OLIF L2-3, ACR L3-5, PLIF L5-S1 L1-S1 screw and rod, deformity correction
18	75	M	20/08/21	A	L3 Kummels disease	Dr S.J Park	L1-4 Pedicle screw fixation with cement augmentation, L4 laminar hook, bone graft + BMP at L3 and PLF
19	62	M	23/08/21	A	S/p L4-5-S1 PLIF, T10 VP with T11 compression, L5-S1 NU, T10-11 cord compression, L2-4 stenosis	Dr J.S Park	T9-11 screws, T10-11 decompression, L2-S1 & iliac screws, L2-3,3-4 PLIF
20	61	M	24/08/21	O	L4-5 PID with right lower limb radiculopathy	Dr C.S Lee	L4-5 microdiscectomy
21	69	M	24/08/21	A	S/p L4 splitting laminoplasty, L4-5 degen. Spondylolisthesis with stenosis	Dr C.S Lee	L4-5 PLIF
22	79	M	24/08/21	A	T10-L1 OYL, L2-5 stenosis with flat back sagittal imbalance	Dr C.S Lee	L2-3 OLIF, L3-4,4-5 ACR, Decompression T10-L1, Ponte's osteotomy at L1-L3, T9-S1 Posterior instrumentation
23	69	F	25/08/21	A	L4-5 dege. Spondylolisthesis with flat back and sagittal imbalance (LDK)	Dr S.J Park	L3-S1 OLIF and Posterior screw fixation
24	71	F	25/08/21	A	L4-S1 stenosis with instability	Dr S.J Park	L4-S1 PLIF
25	70	F	26/08/21	A	S/p L4-5 PLIF Scotts wiring L5, Degen listhesis with stenosis at L3-4, L5-S1	Dr C.S Lee	L3-4, L5-S1 PLIF, L3-S1 screw and rod construct
26	74	F	26/08/21	A	S/P L4-5 PLIF with L2-4 central stenosis, L5-S1 lateral recess stenosis	Dr C.S Lee	Stage 1 - L5-S1 ALIF, Stage 2 - L2-3,3-4 ACR Extension of fixation to L5, screw reinsertion at L4, L3 partial corpectomy and expandable lordotic cage
27	75	M	27/08/21	O	Post-op L3 kummels disease with L4 screw backout	Dr S.J Park	
28	74	F	27/08/21	A	S/P L4-5-S1 PLIF with flat back and sagittal imbalance	Dr S.J Park	L2-4 ACR and T10-S1 fixation
29	38	M	27/08/21	A	L4-5 large PID	Dr S.J Park	Left microdiscectomy
30	63	M	30/08/21	A	C3-5 OPLL with myelopathy	Dr J.S Park	C3-6 Open door laminoplasty (screw plate)
31	65	F	30/08/21	A	s/p L4-S1 PLIF, ASD L3-4,L2-3	Dr C.S Lee	L2-3,L3-4 OLIF L2-5 screws, L2-3 laminectomy
32	58	F	31/08/21	A	L5-S1 stenosis with degen scoliosis	Dr C.S Lee	L5-S1 PLIF
33	74	F	31/08/21	A	S/P L4-5 PLIF with L2-4 central stenosis, L5-S1 lateral recess stenosis	Dr C.S Lee	Stage 3- L2-S1 iliac screws, L3-4, L5-S1 decompression

34	76	M	01/09/21	A	S/P L4 hemilaminotomy with L3-5 stenosis, degen listhesis, L2-3 epidural lipomatosis	Dr S.J Park	L3-4-5 PLIF, L2 hemilaminotomy
35	56	M	01/09/21	A	C4-7 foraminal stenosis	Dr S.J Park	C4-7 left foraminotomy
36	73	F	01/09/21	A	L4-5,L5-S1 stenosis, L5-S1 degen listhesis	Dr S.J Park	L5-S1 PLIF L4-5 hemilaminotomy
37	76	F	02/09/21	A	L4-S1 foraminal stenosis and degen scoliosis	Dr C.S Lee	L4-S1 OLIF with percutaneous screw fixation
38	63	M	02/09/21	A	L3-4-5 central and foraminal stenosis	Dr C.S Lee	L3-4-5 PLIF
39	59	M	03/09/21	A	L4-5 degenerative listhesis with facet arthritis L5-S1 facet arthrosis and foraminal stenosis	Dr S.J Park	L4-S1 PLIF
40	72	M	03/09/21	A	S/P L4-5 PLIF with Old L2-3 infective discitis with instability and non union	Dr S.J Park	L2-3 disc curettage and autologous bone grafting, T11-L5 Screw fixation and L2 foraminotomy
41	70	F	06/09/21	A	L4-S1 stenosis with degenerative scoliosis	Dr J.S Park	L4-S1 PLIF
42	61	F	07/09/21	A	S/p L4-S1 PLIF, L3-4 endoscopic discectomy, with ASD at L2-3,L3-4	Dr C.S Lee	PLIF extension L2-4, L2-S1 screws
43	77	F	07/09/21	A	S/p T4-S1 iliac fixation and deformity correction with B/L rod fracture	Dr C.S Lee	Rod exchange and Cement insertion at T11-12
44	73	F	08/09/21	A	Lumbar degenerative kyphoscoliosis	Dr S.J Park	L3-5 ACR, L5-S1 ALIF, T9-iliac screws and deformity correction
45	56	F	09/09/21	O	L4-5 right lateral recess stenosis	Dr C.S Lee	L4-5 hemilaminotomy
46	16	M	09/09/21	A	Thoracolumbar scoliosis with CATCH 22 syndrome	Dr C.S Lee	T3-L4 screws insertion, deformity correction
47	77	F	10/09/21	A	L3-5 stenosis with instability	Dr S.J Park	L3-5 PLIF
48	72	F	10/09/21	A	L2-4, L5-S1 stenosis	Dr S.J Park	L2-4 OLIF, L5-S1 PLIF, L2-S1 iliac screws
49	64	F	13/09/21	A	L4-5 lytic listhesis Grade 2, L5-S1 lysis without listhesis	Dr J.S Park	L4-5 PLIF, L4-S1 screws, L5-S1 PLF
50	70	F	13/09/21	A	L4-5 lytic listhesis Grade 2, L5-S1 lysis without listhesis	Dr J.S Park	L4-5 PLIF, L4-S1 screws, L5-S1 PLF
51	70	M	13/09/21	A	C4-6 OPLL with myelopathy	Dr J.S Park	C4-6 laminoplasty
52	10	F	14/09/21	A	Marfans syndrome with lumbar scoliosis (type 5)	Dr C.S Lee	T8-L4 screws and deformity correction
53	66	F	14/09/21	O	s/P L4-5 laminoplasty with post-operative discitis	Dr C.S Lee	Debridement
54	42	M	15/09/21	A	L5-S1 DDD	Dr S.J Park	L5-S1 TLIF
55	69	F	15/09/21	A	L3-S1 stenosis with degenerative scoliosis	Dr S.J Park	L3-4, L4-5, L5-S1 OLIF, L3-S1 screws
56	57	M	15/09/21	O	L4-5 central stenosis	Dr S.J Park	L4 splitting laminoplasty and UBD
57	47	M	16/09/21	A	C4-6 central stenosis, C5-6, C6-7 foraminal stenosis	Dr C.S Lee	C4-6 laminoplasty, C5-6, C6-7 foraminotomy
58	16	M	16/09/21	A	Thoracolumbar scoliosis with Marfans syndrome (Double major)	Dr C.S Lee	T3-T11 screws, deformity correction
59	79	F	23/09/21	A	L4-5 central and foraminal stenosis	Dr C.S Lee	L4-5 PLIF
60	76	F	23/09/21	A	L2-3, L5-S1 stenosis with degenerative scoliosis	Dr C.S Lee	L2-5 ACR (stage 1)
61	66	M	23/09/21	A	s/p T11-L4 fixation and L3-4,4-5 PLIF with ASD at L5-S1	Dr C.S Lee	L5-S1 PLIF extension with iliac screws and revision of L4 screws
62	77	M	24/09/21	A	s/p L3-4-5 fixation L4 corpectomy and spacer with L3 screw backout and stenosis at L3-4	Dr S.J Park	L1-2 fixation extension and decompression at L3-4
63	74	M	24/09/21	A	s/p L4-5 PLIF with ASD at L3-4	Dr S.J Park	Fusion extension to L3-4
64	72	F	27/09/21	A	L2-5 stenosis, T11-12 stenosis	Dr J.S Park	L2-5 OLIF, L2-S1 screws, T11-12 decompression, L4-5 decompression
65	73	F	27/09/21	A	L3-4, L5-S1 stenosis	Dr J.S Park	L3-4, L5-S1 hemilaminotomy
66	69	M	28/09/21	A	T11-12 posterior stenosis	Dr C.S Lee	Laminectomy
67	76	F	28/09/21	A	S/p L2-5 ACR	Dr C.S Lee	T10-S1 iliac screws & L5-S1 PLIF
68	74	M	29/09/21	A	s/p T12-S1 fixation, with PJF at T11-12, loosening of screws at L1 & S1	Dr S.J Park	Extension of fusion to T9, TDIF at T12-L1
69	74	M	29/09/21	A	MESCC T3 with nonambulatory paraparesis ? Ca prostate	Dr S.J Park	Decompression and fixation T1-5
70	54	M	30/09/21	O	L4-5 stenosis	Dr C.S Lee	L4-5 splitting laminoplasty and decompression
71	73	M	30/09/21	O	C4-5 foraminal stenosis with deltoid weakness	Dr C.S Lee	C5 foraminotomy (left)
72	67	F	30/09/21	A	L4-5 lytic listhesis, L5-S1 foraminal stenosis	Dr C.S Lee	L4-S1 PLIF
73	70	F	01/10/21	A	S/p L4-5 PLIF, ASD at L3-4 and foraminal stenosis at L5-S1	Dr S.J Park	L3-S1 PLIF
74	78	F	01/10/21	A	L4-S1 central and foraminal stenosis	Dr S.J Park	L4-S1 PLIF

75	61	M	05/10/21	A	L3-5 central stenosis, L5-S1 biforaminal stenosis	Dr S.J Park	L5-S1 PLIF, L3-5 ULBD
76	67	F	05/10/21	A	L5-S1 lytic spondylolisthesis	Dr S.J Park	L5-S1 PLIF
77	68	M	06/10/21	A	Ankylosing spondylitis, s/p L4 PSO & L2-S1 fusion with L4-5 Non union, B/L rod fracture and sagittal imbalance	Dr S.J Park	T9-Iliac screws, L2 Corner osteotomy (modified PSO) deformity correction, posterior fusion
78	52	F	07/10/21	A	L5-S1 lytic spondylolisthesis	Dr J.S Park	L5-S1 PLIF
79	75	M	07/10/21	A	C4-5 compressive myelopathy	Dr J.S Park	C4-6 laminoplasty
80	74	F	08/10/21	A	Lumbar degenerative kyphoscoliosis	Dr S.J Park	L5-S1 ALIF, L3-5 ACR, L2-3 OLIF, T10-S1 iliac screw fixation, posterior fusion
81	80	F	12/10/21	A	L4-S1 Stenosis	Dr S.J Park	L4-S1 PLIF
82	18	F	13/10/21	A	Right 5th,6th Rib and T6 Ewings Sarcoma	Dr S.J Park	VATS Separation, T5-6 partial corpectomy,5th,6th 7th rib resection, T3-T8 posterior fusion
83	64	M	14/10/21	O	L3-5 stenosis	Dr J.S Park	L3-5 ULBD, L3-4 microdiscectomy
84	70	F	14/10/21	A	S/p L4-5 PLIF, ASD L3-4	Dr J.S Park	Extension of PLIF to L3-4, L3-5 Instrumentation
85	56	M	18/10/21	A	C4-6 segmental OPLL with myelopathy	Dr J.S Park	C 4-6 open door laminoplasty
86	70	F	18/10/21	A	L1,3 Kummel Disease with sagittal imbalance	Dr J.S Park	T10-Iliac fixation, T10-11 cement augmentation, Deformity correction
87	72	M	19/10/21	O	L3-5 Stenosis	Dr S.J Park	L3-5 ULBD
88	74	F	19/10/21	A	L2-S1 stenosis with degenerative flat back	Dr S.J Park	L2-S1 OLIF, L2-S1 fixation, L2-4 decompression, deformity correction
89	39	M	20/10/21	A	L4-5 Grade I Degenerative spondylolisthesis	Dr S.J Park	L4-5 PLIF
90	67	M	20/10/21	A	L3-5 stenosis, T11 OYL, L4-5 spondylolysis, L5-S1 Grade 3 lytic spondylolisthesis	Dr S.J Park	L3-5 OLIF, L5-S1 PLIF, T11 laminectomy, L3-S1 instrumentation and deformity correction
91	58	M	21/10/21	A	Cervical myeloradiculopathy C4-7 stenosis, C5-7 foraminal stenosis	Dr J.S Park	C4-6 open door laminoplasty, C7 dome osteotomy
92	64	M	21/10/21	A	L4-5 lytic spondylolisthesis	Dr J.S Park	L4-5 OLIF, percutaneous fixation
93	67	F	22/10/21	A	L2-5 Stenosis with flatback	Dr S.J Park	L2-5 OLIF, L2-5 screw fixation
94	74	M	22/10/21	O	L4-5 left lateral recess stenosis	Dr S.J Park	L4-5 hemilaminotomy
95	64	F	25/10/21	A	Lumbar degenerative kyphoscoliosis	Dr J.S Park	L2-4 ACR, L4-5 DLIF, L5-S1 OLIF (Stage I)
96	61	F	25/10/21	A	Extension of PLIF to L3-4, L3-S1 Instrumentation	Dr J.S Park	
97	69	F	26/10/21	A	s/p L4-S1 PLIF, ASD L3-4	Dr S.J Park	L3-5 OLIF, L5-S1 PLIF, L3-S1 screws (Navigation)
98	72	M	26/10/21	O	L3-S1 stenosis with degenerative scoliosis, agenesis of right S1 pedicle and sacral slanting	Dr S.J Park	L4-5 Bilateral laminotomy and microdiscectomy
99	55	M	27/10/21	O	L4-5 stenosis, Left side PID	Dr S.J Park	T6-8 microscope assisted decompression
100	73	F	27/10/21	A	S/P L2-3 hemilaminotomy, T6-8 OYL, thoracic myelopathy	Dr S.J Park	L5-S1 OLIF, L2-3 ACR, T10-S1 iliac fixation, deformity correction
101	65	M	28/10/21	A	S/p L3-5 PLIF, iatrogenic flat back and sagittal imbalance	Dr J.S Park	L5-S1 PLIF
102	64	F	28/10/21	A	L5-S1 instability with foraminal stenosis	Dr J.S Park	T10-S1 iliac screws and deformity correction (Stage 2)
103	61	M	29/10/21	A	Lumbar degenerative kyphoscoliosis	Dr S.J Park	En-bloc excision with pediculotomy at T4-5, T2-7 screws and posterior fusion
104	72	F	01/11/21	A	T4-5, Right posterior element ? chondrosarcoma	Dr J.S Park	L3-4, L5-S1 OLIF, L3-S1 fixation and posterior fusion
105	65	M	01/11/21	A	S/p L4-5 PLIF, L4 screw backout, ASD L3-4	Dr J.S Park	L4-5 instrumented PLF
106	16	F	02/11/21	A	S/p L4-5 TDR, with facet arthritis at L4-5	Dr C.S Lee	T7 hemivertebrectomy, T4-10 instrumentation, deformity correction posterior fusion
107	62	F	03/11/21	A	Congenital scoliosis with T7 hemivertebra	Dr S.J Park	L4-5 PLIF
108	59	M	03/11/21	A	L4-5 stenosis with facet arthritis	Dr S.J Park	OLIF at L3-4, Instrumentation L3-5, Coflex interspinous device at L2-3
109	69	M	04/11/21	A	S/p L4-5 PLIF, ASD at L3-4, Retrolisthesis at L2-3	Dr C.S Lee	L4-5 PLIF

Case examples

- 1) 73-year-old female presented with primary complaints of significant back pain and reduced walking distance. She was diagnosed to have lumbar degenerative kyphoscoliosis with a thoracolumbar curve of 29° , PI-LL mismatch of 42° , PT of 32° and SVA of 9.7 cm. She underwent L3-5 ACR with lordotic cages, L5-S1 ALIF, followed by T9-S1-iliac fixation, correction of deformity and posterior fusion. Post-operatively she had good coronal and sagittal balance and pain improved significantly along with improved walking time.



2) A 16-year-old male presented with progressive deformity of the back. He was previously diagnosed to have CATCH-22 syndrome. The current diagnosis was double major type scoliosis with thoracolumbar curve of 55° and thoracic curve of 37° and Risser's grade 4. The patient underwent T3-L4 instrumentation and deformity correction with SmartLink instrumentation system and posterior fusion.



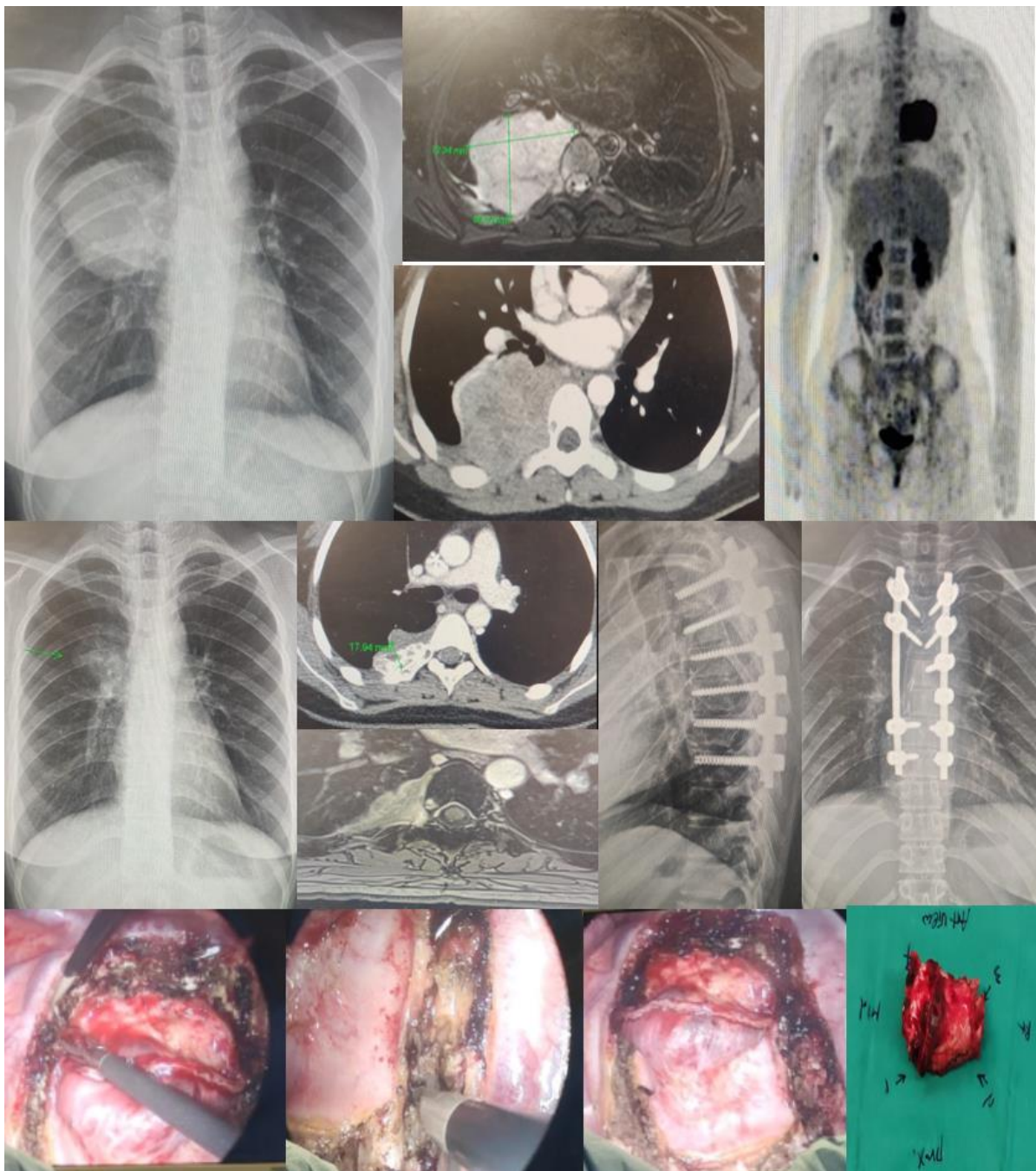
3) A 70-year-old male with history of Rheumatoid arthritis, presenting with signs and symptoms of compressive cervical myelopathy, was diagnosed to have retrododontoid pseudotumor. Since the main etiology for the symptoms was atlantoaxial microinstability, only instrumented fusion was planned. The patient underwent C1-C2 Goel-Harm's fixation under O-arm and navigation and posterior fusion.



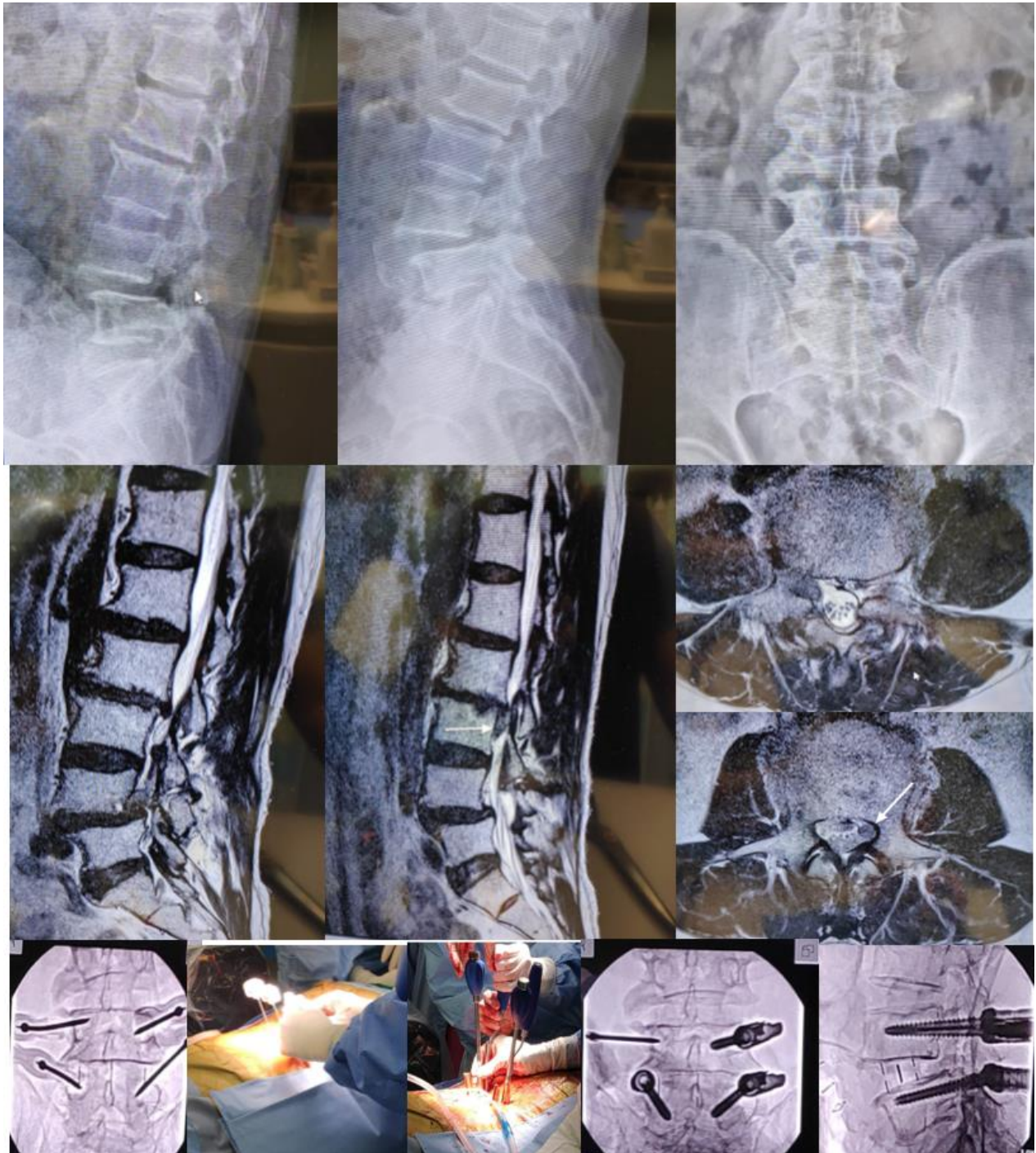
4) A 75-year-old osteoporotic male presented with L3 Kummel's lesion and previous healed osteoporotic fracture at L1. The patient only complained of mechanical back pain and there were no signs and symptoms of neurological compression. The patient underwent instrumentation from L1-L5 with cement augmentation at the ends. This was followed by retroperitoneal partial corpectomy of L3 and reconstruction with expandable lordotic cage and bone graft. The patient experienced dramatic improvement of symptoms and Injection teriparatide which was started before the surgery, was continued in the post-operative period as well.



5) An 18-year-old female complaining of right sided chest pain was diagnosed to have a posterior mediastinal mass arising from 5th and 6th ribs and infiltrating into the T5,6 vertebral body. It was proven to be Ewing's sarcoma on needle biopsy. She underwent neoadjuvant chemotherapy with an excellent response and shrinking of tumor size. First, anterior tumor separation, wedge resection of lung and ligation of segmental vessels was done under Video assisted thoracoscopy (VATS). Next T5-6 partial corpectomy and rib resection was done to achieve en-bloc resection and T3-8 instrumented fusion was done.

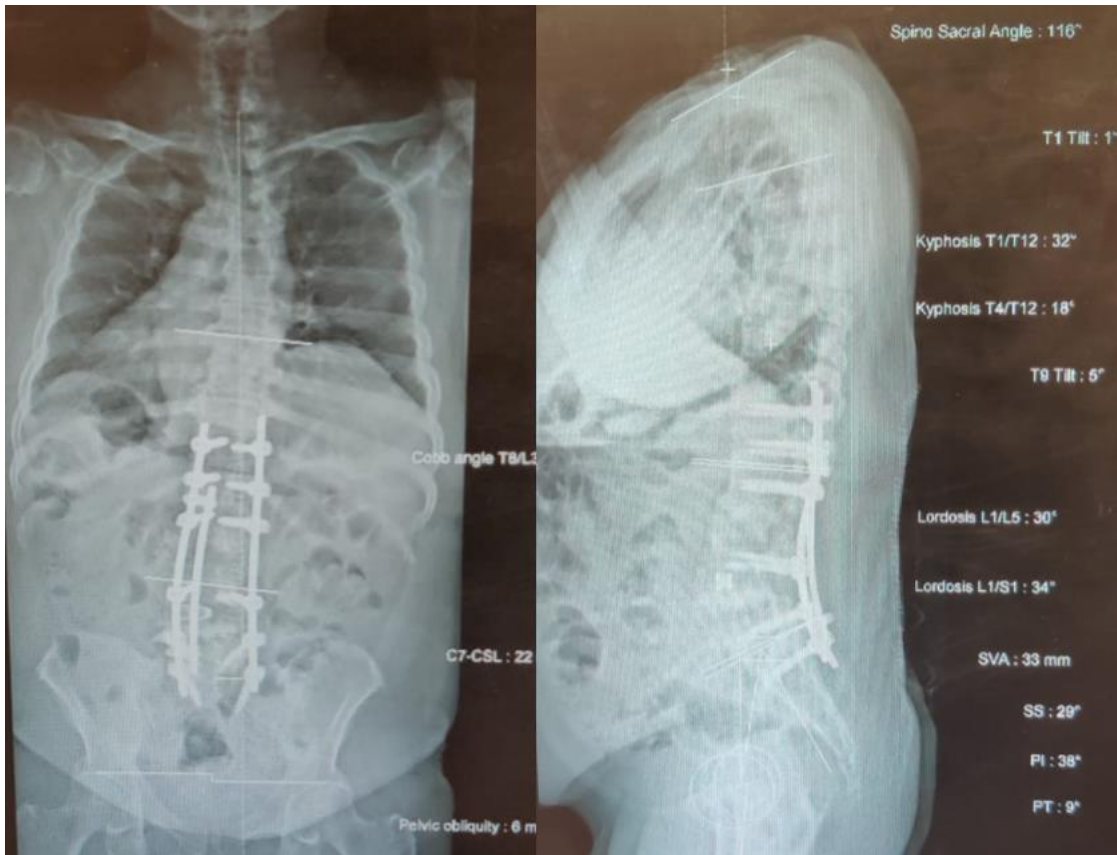


6) A 64-year-old male presented with unilateral right sided radiculopathy in the anterior part of leg. He was diagnosed to have L4-5 spondylolytic spondylolisthesis with foraminal stenosis and instability. There was also an incidental sequestered disc at L2-3 but it was on left side. The patient underwent minimally invasive OLIF at L4-5 followed by percutaneous screws and rod without any posterior decompression. There was marked improvement in the pain, postoperatively.



- 7) A 68-year-old male with history of ankylosing spondylitis presented had been previously operated for L4 PSO and L2-S1 fusion in 2015. He then presented with gradually progressive stooping and mechanical back pain with walking time of 2 minutes. There was bilateral rod failure, pseudoarthrosis at L4-5 and screw breakage at L4,5 and pullout at L3. The C7-SVA at the time of presentation was 25.3 cm, PT 30° and PI-LL mismatch of 35°. In the first step, L4-5 cage was removed and a large lordotic cage with bone graft was inserted. Next, instrumentation was done from T11 – S1 and a corner osteotomy was performed at L2. Postoperatively, pelvic parameters improved greatly, and a good plane sagittal correction was achieved.





8) 63 year old male presented with symptoms of cervical myelopathy and main complaint of gait instability. Radiographs demonstrated C3-7 focal cervical stenosis and signal change in the spinal cord. Since the patient was relatively younger and there was no segmental instability, he underwent C3-6 open door laminoplasty with C7 dome osteotomy.

